Economic Impact of Winnipeg International Airport
Prepared for Winnipeg Airports Authority Inc. (WAA)

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Dr. Barry E. Prentice, Director
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Transport Institute, University of Manitoba
September, 1998
WINNIPEG

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by

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September 1998

TRADE
TOURISM
LOGISTICS
TELECOMMUNICATIONS

EXECUTIVE SUMMARY

Winnipeg International Airport (YWG) is a major generator of economic activity for the City of Winnipeg and the Province of Manitoba. YWG has a significant and positive influence on the local economy; providing jobs, taxes and ongoing business revenues. This effect of this economic activity at YWG leads to further indirect and induced effects that generate millions of dollars in additional revenues. YWG attracts major passenger airlines and offers a strategic air cargo link with the rest of the world.\(^1\) It is currently working to establish itself as an international gateway for air freight business.

A measurement of economic activity was last undertaken in 1989 by the University of Manitoba Transport Institute (UMTI).\(^2\) The total contribution of airport-related activity was estimated to be $384.2 million in direct, indirect and induced economic impact, measured in GDP expenditures. The total employment impact of airport operations created 7,553 direct, indirect and induced jobs and $233.9 million in total labour income.

Since that last study, considerable changes have taken place in the environment in which the Winnipeg International Airport operates. 1996 marked the year Winnipeg Airports Authority Inc. (WAA) "set the stage" for the official transfer of YWG from Transport Canada to WAA. The airport was officially transferred on January 1, 1997.

WAA determined the need to update the 1989 study in order to capture the economic impacts for the final year preceding the commercialization of the airport. Employment and income benefits have been calculated, based on information obtained from businesses and government departments operating at or in support of the airport. The primary method of collecting information was a survey

\(^1\) Passenger airlines operating out of YWG include Air Canada, CAL, Canada 3000, Northwest Airlines, Air Ontario, Perimeter Airlines, Northwest Territorial Air, Air B.C., Air Manitoba, Athabaska Airlines, Canadian Regional, Calm Air International and Bearskin Airlines. Greyhound Airlines provided service at YWG from July, 1996 to September 21, 1997.

\(^2\) D. Futz, B. E. Prentice and S. Yeow, "The Economic Impact of the Winnipeg International Airport", University of Manitoba Transport Institute (UMTI), August 31, 1989. This project was supported by a financial contribution from the Transportation Industry Development Advisory Committee (TIDAC) and the Winnipeg International Airport. The two sponsoring agencies of TIDAC consisted of Transport Canada and the Government of Manitoba.
questionnaire that was sent to each firm or organization. The survey produced virtually a complete
census of the direct impact of YWG on the local economy. The economic spinoff benefits derived
by the community at large, called induced benefits, were calculated using economic multipliers. The
total economic impact derived from the airport was estimated by adding the direct, indirect and
induced impacts.

This study has achieved its overall objectives of describing and estimating the economic
impact of the Winnipeg International Airport (YWG). The response rate comprising the survey of
primary and secondary linkage organizations was 65.8 percent, while a second survey involving
“airport-dependent” hotels and motels achieved a response rate of 79.2 percent. Although a
complete census could not be obtained, the surveys captured the economic activity of the largest
organizations which are deemed most critical to the study. The 1989 economic impacts depicting
GDP, employment and labour income have been calibrated to exclude capital expenditures (airport
construction), CFB Winnipeg and travel agencies. The 1989 study cannot be directly compared to
the results emanating from the current study because of advances in economic impact methodology.\(^3\)

In 1996, airport operations produced the following results:

(i) Total enplaned/deplaned passengers at Winnipeg International Airport was 2.830 million.

(ii) The Winnipeg International Airport contributes $287.5 million in total airport-related
expenditures in terms of direct, indirect and induced economic activity. These expenditures
represent the actual purchases of goods and services that are spent locally.

---

\(^3\) For example, the methodology used in the 1989 studies across Canada included air ticket sales at the airport as part
of the local impact. This was incorrect because a large part of these revenues were used to compensate for aircraft
purchases and fuel, that were not produced locally. Moreover, airports with more international travel (higher ticket
prices) were inflated relative to airports with mainly domestic services. In the current study, no airline ticket sales are
included.
(iii) The total employment impact of Winnipeg International Airport is 7,219.5 person-years. Included in this total impact are 4,862 jobs that are directly airport-related. Indirect and induced employment impacts account for 2,357.5 person-years through the multiplier effect.

(iv) Total labour income of approximately $149.5 million is directly attributable to economic activity at Winnipeg International Airport. With the inclusion of $71.9 million in indirect and induced labour income, YWG generates $221.4 million in total labour income annually. Included in this total are locally earned commissions derived from provincial travel agents that generate $27.8 million in labour income.

(v) YWG’s total direct labour income contribution of $149.5 million represents 1 percent of the total annual labour income in Manitoba. One dollar out of every $103 in wages and salaries in Manitoba is therefore the result of airport-related activity. Basing the total direct labour income of $112.9 million from surveyed primary and secondary linkages (excluding hotels) on the reported employee numbers represents an average weekly income of $785.52. The average provincial earnings were $601.24. These wage levels, skewed by high earnings in the airline and aerospace industry, exceed most of the major industrial sectors in Manitoba. If the statistic for airport-related earnings includes accommodation income which evidently is a relatively low paying service industry, the calculated average weekly earnings falls to $591.41 — below the provincial average.

(vi) The airport has a substantial impact on a well defined segment of the Accommodation Industry. While airport-dependent hotels and motels comprise 34 percent of the total number operating in Winnipeg, they account for approximately 73 percent of the total available rooms. The average accommodation rate of air travellers staying in airport-dependent hotels and motels was found to be 31.8 percent. The direct impacts related to airport operations provide 2,097.5 full-time equivalent positions, approximately $36.6 million in labour income.
and $47.5 in airport-related expenditures. Furthermore, surveyed hotels and motels reported paying $96.5 million in total operating expenses.

(vii) The surveyed primary and secondary organizations reported paying $16.5 million in total airport-related taxes, of which approximately $6.4 million is municipal, $5.5 million provincial and $4.6 million federal. The surveyed accommodation industry comprising hotels and motels reported paying $2.6 million in provincial and $4.5 million in municipal taxes.

(viii) The total economic impact of a night restriction between the hours of 24:00-06:00 is approximately $57.1 million in airport-related expenditures, 564.5 full-time equivalent jobs, and over $13.8 million in labour income.

(ix) A map of the airport’s area of economic influence was created based on the direct and indirect economic activities. This is a first in the economic impact studies of Canadian airports but is preliminary in the sense that only obvious relationships are shown. The pattern that emerges suggests a cone-shaped area that funnels commercial traffic from the airport to downtown Winnipeg.

(x) Total air cargo volume at YWG was estimated to be 101,460 metric tonnes. A breakdown of this total indicates that approximately 53 percent was enplaned and 47 percent deplaned. Furthermore, the largest volume of air cargo had a domestic origin/destination representing 89.2 percent of total air cargo. This was followed by 6.2 trans-border and 4.6 percent international.
Currently, no legislation exists that requires cargo operators to disclose information pertaining to cargo volumes. Statistics Canada is unable to provide air cargo data other than from the main line scheduled carriers and charters that are obliged to report. The absence of courier data pertaining to cargo volumes represents a large segment of the cargo market that is subsequently not captured. The cargo data estimated in this study attempts to disclose air cargo information in order to foster further research and to make the push for changes in the statistical reporting of cargo at Canadian airports.
ACKNOWLEDGEMENTS

In late June 1997, Winnipeg Airports Authority Inc. (WAA) requested the University of Manitoba Transport Institute ("UMTI") to quantify the economic impact of the Winnipeg International Airport for the 1996 fiscal year. The economic impacts were to be captured for the final year preceding the commercialization of the federal airport to an "airport authority".

WAA and UMTI would like to thank the 77 air carriers, air charters, couriers, air support services, cargo handlers, freight forwarders, ground transportation services, airport management, retailers and government offices who took the time to complete the surveys and interviews in August and October 1997. We are appreciative of the assistance received from other persons and organizations consulted, in particular, Winnipeg Airports Authority Inc. (Warren Thompson, Alex Guruprasad, Brenda Belfry and Wil Dewit), the 19 hotel/motel managers who provided additional data on the accommodation survey and Errol Tan from the University of Manitoba Transport Information Group (UMTIG) who produced the geographic location maps presented in the report. Without their generous input of time and knowledge, it would not have been possible to share the insights contained in this report.

We would also like to recognize individuals of the "airport project team" who have made significant contributions to this work. This includes Scott J. Shurvell, research associate of UMTI and Todd F. Harrison, a former research affiliate of UMTI. We would also like to thank Michael Crockatt, M.A. student from the Faculty of Geography.

Every effort has been made to insure that the views expressed have been represented fully and accurately in this report; UMTI takes full responsibility for any errors or omissions.

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TABLE OF CONTENTS

Executive Summary ................................................................. i
Acknowledgments ................................................................. vi
List of Tables ......................................................................... ix
List of Figures .......................................................................... x
List of Location Maps .............................................................. x
List of Appendices ................................................................... xi

1. Introduction ........................................................................... 1
   1.1 Profile of the Winnipeg International Airport ...................... 1
   1.2 Economic Outlook: Passengers ........................................... 3
   1.3 Economic Outlook: Air Cargo ............................................ 6
   1.4 Department of National Defense (DND) ............................... 6
   1.5 Rationale for the Study ..................................................... 7
   1.6 Study, Scope & Objectives ............................................... 8
   1.7 Organization of the Study .................................................. 9

2. Airport Economic Impact Methodology .................................. 10
   2.1 Airport EL vs. Feasibility Studies ....................................... 10
   2.2 Improvements to the Accepted Methodology ..................... 11
   2.3 Review of Recent Economic Impact Studies ...................... 12
      2.3.1 Vancouver International Airport (YVR) ...................... 12
      2.3.2 Calgary International Airport (YYC) .......................... 13
      2.3.3 Lester B. Pearson International Airport (YTO/YYZ) .... 13
   2.4 Direct Economic Impact .................................................. 14
   2.5 Direct Economic Activities .............................................. 14
      2.5.1 Primary Linkages ..................................................... 15
      2.5.2 Secondary Linkages .................................................. 16
   2.6 Indirect Economic Activities .......................................... 16
   2.7 Induced Economic Activities ......................................... 16
   2.8 Types of Economic Impact to be Measured and Methods of Measurement ...................................................... 17
   2.9 Indirect Economic Impact .............................................. 18
   2.10 Induced Economic Impact ............................................. 18
   2.11 Economic Multipliers .................................................... 18
   2.12 Data Collection .......................................................... 19
2.12.1 Survey Development .................................................. 20
  2.12.1.1 Data Limitations ................................................ 20
  2.12.1.2 Economic Impact Survey for
             Primary and Secondary Organizations .................. 21
  2.12.1.3 Survey for “Airport-Dependent” Hotels and Motels .... 21
2.12.2 Results of Survey Pre-Test ........................................ 22
2.12.3 Secondary Sources .................................................. 23
  2.12.3.1 Airline Ticket Sales Commissions ......................... 23

3. Economic Impact of Winnipeg International Airport .................. 25
  3.1 Direct Impacts ....................................................... 26
  3.1.1 Surveyed Primary and Secondary Organizations .............. 26
  3.1.2 “Airport-Dependent” Hotels and Motels ...................... 27
3.2 Results of the Study .................................................. 29
  3.2.1 Airport-related Expenditures ................................... 29
  3.2.2 Employment ...................................................... 31
  3.2.3 Labour Income .................................................. 33
    3.2.3.1 Travel Agent Commission Income ....................... 36
  3.2.4 Airport-related Taxes ........................................... 36

4. The Airport Area of Economic Influence ............................. 36
  4.1 The AEI of Winnipeg International Airport ...................... 37

5. Airport Night Restriction .............................................. 45
  5.1 Nighttime Air Traffic at YWG ...................................... 45
  5.2 Total, Local and Itinerant Movements by Month, 1993-95 to 1997 45
  5.3 Monthly Night Movements between 24:00 and 06:00 ............. 49
  5.4 Hourly Movements between 24:00 and 06:00 ..................... 50
  5.5 Runway Utilization Patterns ...................................... 52
  5.6 Noise Reports ..................................................... 54
  5.7 Airport Night Restriction Impacts ............................... 56
    5.7.1 Data Collection ............................................... 57
  5.8 Direct and Total Economic Impact ............................... 57
    5.8.1 Sectoral Distribution of Impacts ......................... 57
  5.9 Air Carrier Operations .......................................... 61
  5.10 Courier Operations .............................................. 62
  5.11 Air Support Services ............................................ 64
  5.12 Time Trend Analysis ............................................. 65
6. Air Cargo Movement .......................................................... 67
   6.1 Air Cargo Data ............................................................ 67
   6.2 Air Cargo Impacts ....................................................... 68
   6.3 Winnipeg ................................................................. 69
7. Conclusions ........................................................................... 71

References .................................................................................. 89

LIST OF TABLES

Table 1 Total Passenger Movement .................................................. 3
Table 2 Top 10 Airports Ranked by Enplaned/Deplaned Passengers .......... 5
Table 3 Target Population and Response Rate of YWG - Economic Impact Survey .......... 26
Table 4 Winnipeg Accommodation Survey, Selected Statistics .................. 29
Table 5 Winnipeg International Airport (YWG): Airport-related Expenditures ................. 30
Table 6 Winnipeg International Airport (YWG): Employment (Person-Years) ................. 32
Table 7 Winnipeg International Airport (YWG): Labour Income ...................... 34
Table 8 Manitoba Average Weekly Earnings, by Industry, 1996 ....................... 35
Table 9 Night Restriction Impacts: Airport-related Expenditures ....................... 58
Table 10 Night Restriction Impacts: Employment (Person-Years) ....................... 58
Table 11 Night Restriction Impacts: Labour Income ........................................ 58
Table 12 Manitoba Economic Impact Multipliers, Transportation Industry, 1994 ............ 60
Table 13 Winnipeg International Airport (YWG):
   - Direct and Total Effects of a Night Restriction ..................................... 60
Table 14 Direct and Total Impacts at YWG Expressed in Terms of Landings .............. 61
Table 15 Winnipeg International Airport (YWG): Air Cargo Volume, 1996, tonnes ........ 69
LIST OF FIGURES

Figure 1 Total Passengers Enplaned/Deplaned, Actual and Forecasts, 1986-2001 ............... 4
Figure 2 Total Aircraft Movements by Month, 1993-95 to 1997 ................................. 46
Figure 3 Local Aircraft Movements by Month, 1993-95 to 1997 ................................. 47
Figure 4 Itinerant Aircraft Movements by Month, 1993-95 to 1997 ............................... 48
Figure 5 Total Nighttime Movements by Month, 24:00-06:00, 1993-95 to 1997 ............... 50
Figure 6 Total Nighttime Movements by Hour, 24:00-06:00, 1993-1997 .......................... 51
Figure 7 YWG Runway Designation Map ................................................................. 52
Figure 8 Runway Usage: Average Number of Arrival per Month, 24:00-06:00, 1993-1997 ........ 53
Figure 9 Runway Usage: Average Number of Departures per Month, 24:00-06:00, 1993-1997 ..... 54
Figure 10 Number of Noise Reports per Month, 1993-95 to 1997 ................................. 55
Figure 11 Time Trend of Direct Impacts, 1989-96 ...................................................... 66

LIST OF LOCATION MAPS

Map 1 Primary and Secondary Airport-related Organizations (excluding hotel/motels) ........ 41
Map 2 Primary and Secondary Airport-related Organizations in the Southeast Vicinity of YWG (excluding hotel/motels) .............................................. 42
Map 3 Airport-Dependent Hotel/Motels ................................................................. 43
Map 4 YWG Airport-related Organizations Outside Winnipeg .................................. 44
LIST OF APPENDICES

Appendix A  List of Survey Participants
             - Primary and Secondary Organizations  .......... 74

Appendix B  Survey for Primary and Secondary Organizations  .......... 76

Appendix C  List of Survey Participants
             - “Airport-Dependent” Hotels and Motels  .......... 80

Appendix D  Survey for “Airport-Dependent” Hotels and Motels  .......... 81

Appendix E  Survey Data  .......... 83

Appendix F  Manitoba Economic Impact Multipliers  .......... 83

Appendix G  Direct Economic Impacts of the Winnipeg International Airport  .......... 84

Appendix H  Sectoral Distribution of the Direct Impacts of a Night Restriction at YWG  .......... 84

Appendix I  Winnipeg International Airport (YWG) Cargo Movement,
             - Major Scheduled and Charter Services (loaded/unloaded cargo)  .......... 85

Appendix J  Theory of Airport Areas of Economic Influence  .......... 86
1. Introduction

Airports generate substantial economic activity in their communities. The economic activity of the Winnipeg International Airport (YWG) is the result of customer services provided by airport management, airport tenants and supporting and complementary businesses.

The full economic impact of YWG extends far beyond the terminal doors and aircraft gates. Airplanes and passengers require services that contribute to the local and provincial economy by employing local residents, paying wages and buying locally produced goods. These direct expenditures have a "trickle-down" effect as re-spending occurs in the economy. Economic Impact Studies (EIS) measure the total contribution of an airport's existence.

1.1 Profile of the Winnipeg International Airport

The Winnipeg International Airport (YWG) has been an important part of Manitoba's transportation network since 1928. Winnipeg International is Canada's sixth busiest airport in terms of enplaned and deplaned passengers, and fifth largest in cargo operations. The airport is located only 4.5 miles (7 km) from downtown Winnipeg which provides more convenient access for business and visitor traffic than any airport of comparable size in Canada. YWG provides national, trans-border and international air transportation services, access to the fast delivery of goods and significant economic spinoff benefits.

The City of Winnipeg lies at the geographic centre of North America. For many decades, Winnipeg's strategic central location has made it a logical distribution and re-distribution gateway for road and rail transport in North America. Geographically, YWG is located within two hours flying time of 64 million people. In terms of surface transport, 80 million people can be reached within 24 hours of driving.

Part of the economic benefits that accrue to Manitoba are a function of YWG's 24-hour operating status. It is the only international airport between Calgary and Toronto, a distance of approximately 3,500 kilometers, that offers a broad range of air passenger and cargo services.

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4 YWG is Canada's longest serving international airport: opened in 1928, it was named Stevenson Field, after Captain F.J. Stevenson D.F.C., a noted Manitoba aviator.

5 The census population for the City of Winnipeg is 667,209. Source: Statistics Canada, May 1996.
including international carriers, commuter airlines, jet freight carriers, fixed base operators and various charter operations. In 1996, it served approximately 2.8 million total enplaned/deplaned passengers, handled over 155,000 total aircraft movements and over 101,000 tonnes of air cargo. Currently, aircraft movements at YWG utilize only 64 percent of airfield capacity which highlights the non-congested nature of the air traffic system and the potential for tremendous efficiencies for Winnipeg cargo/courier and passenger clientele. Table 1 presents the breakdown of domestic, transborder and international passenger movements at YWG. From 1991-96, passenger growth increased 36.5 percent from approximately 2.1 to 2.8 million total enplaned/deplaned passengers. For 1996, domestic passengers accounted for approximately 86.2 percent of total enplaned/deplaned passengers while transborder and international passengers accounted for 12.5 and 1.3 percent respectively.
Table 1 Winnipeg International Airport (YWG): Passenger Movement (‘000)

<table>
<thead>
<tr>
<th>Year</th>
<th>Domestic</th>
<th>Transborder</th>
<th>International</th>
<th>Enplaned/Deplaned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>1,755.4</td>
<td>287.9</td>
<td>29.3</td>
<td>2,072.6</td>
</tr>
<tr>
<td>1992</td>
<td>1,804.7</td>
<td>303.6</td>
<td>34.0</td>
<td>2,142.3</td>
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<tr>
<td>1993</td>
<td>1,706.1</td>
<td>335.8</td>
<td>39.6</td>
<td>2,081.5</td>
</tr>
<tr>
<td>1994</td>
<td>1,757.3</td>
<td>342.9</td>
<td>45.3</td>
<td>2,145.5</td>
</tr>
<tr>
<td>1995</td>
<td>1,962.3</td>
<td>339.8</td>
<td>46.8</td>
<td>2,348.9</td>
</tr>
<tr>
<td>1996</td>
<td>2,440.9</td>
<td>352.8</td>
<td>36.3</td>
<td>2,830.0</td>
</tr>
<tr>
<td>1997</td>
<td>2,685.3</td>
<td>368.4</td>
<td>46.3</td>
<td>3,100.0</td>
</tr>
<tr>
<td>1998*</td>
<td>2,473.1</td>
<td>371.5</td>
<td>55.4</td>
<td>2,900.0</td>
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<tr>
<td>1999*</td>
<td>2,515.7</td>
<td>377.8</td>
<td>56.5</td>
<td>2,950.0</td>
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<tr>
<td>2000*</td>
<td>2,558.4</td>
<td>384.2</td>
<td>57.4</td>
<td>3,000.0</td>
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<tr>
<td>2001*</td>
<td>2,614.1</td>
<td>392.3</td>
<td>58.6</td>
<td>3,065.0</td>
</tr>
</tbody>
</table>

*Unofficial YWG Enplaned/Deplaned Passenger Forecast

1.2 Economic Outlook: Passengers

Figure 1 illustrates actual and forecasted total passenger movement at YWG. During the 1990s, YWG experienced significant growth. Over the 1993-96 period, total enplaned and deplaned passengers have increased 36 percent. While this looks impressive it only returned passenger traffic to its peak of the previous decade. The passenger trend indicates continued growth with unofficial 1997 passenger statistics showing a further 9.5 percent increase. This increase reflects Winnipeg’s expanding role as a major transportation gateway for air service. Since the Free Trade Agreement (FTA), Manitoba’s economy has been led by export trade with the United States. The value of trade with the U.S. has doubled during the 1990s. Unlike the prior decade when air traffic was stimulated by inflation, growth in the 1990s is based on solid productivity gains.
Passenger forecasts to the year 2001 indicate stable growth estimated at 2.9 million passengers for 1998, 2.95 million for 1999, 3.0 million for 2000 and 3.065 million for 2001. This forecast anticipates a recessionary adjustment triggered by a slowdown in the U.S. economy and/or a significant appreciation in the value of the Canadian dollar.

Table 2 presents the top 10 airports ranked according to enplaned and deplaned passengers. For 1996, passenger growth at YWG increased 23.1 percent over the previous year. This was the third highest passenger growth among the top ten ranked airports across Canada. Only Edmonton (63 percent) and Calgary (25.9 percent) Airport’s experienced a greater percentage change over 1995.\(^6\) Calgary increased its airport ranking from fourth to third, Edmonton from ninth to fifth and Winnipeg from eighth to sixth.

\(^6\) The dramatic passenger growth at Edmonton International Airport is partially explained by the merger with the Edmonton Municipal Airport called “Edmonton City Centre Airport” (Blatchford Field).
Table 2  Top 10 Airports Ranked by Enplaned and Deplaned Passengers (’000), 1996

<table>
<thead>
<tr>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td>Toronto/LB Pearson</td>
<td>11,284.2</td>
<td>11,385.0</td>
<td>20,909.2</td>
<td>22,669.2</td>
<td>8.4</td>
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<tr>
<td>2</td>
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<td></td>
<td>Vancouver</td>
<td>6,537.8</td>
<td>6,552.2</td>
<td>11,107.3</td>
<td>13,090.1</td>
<td>17.9</td>
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<tr>
<td>3</td>
<td>3</td>
<td></td>
<td>Calgary</td>
<td>3,322.8</td>
<td>3,339.4</td>
<td>5,291.1</td>
<td>6,662.2</td>
<td>25.9</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td></td>
<td>Montreal/Dorval</td>
<td>3,074.3</td>
<td>3,067.9</td>
<td>5,728.5</td>
<td>6,142.2</td>
<td>7.2</td>
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<td>5</td>
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<td>Edmonton</td>
<td>1,440.5</td>
<td>1,456.0</td>
<td>1,776.6</td>
<td>2,896.6</td>
<td>63.0</td>
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<td>6</td>
<td>6</td>
<td></td>
<td>Winnipeg</td>
<td>1,421.4</td>
<td>1,408.7</td>
<td>2,299.0</td>
<td>2,830.0</td>
<td>23.1</td>
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<tr>
<td>7</td>
<td>7</td>
<td></td>
<td>Ottawa/MacDonald-Cartier</td>
<td>1,382.2</td>
<td>1,381.3</td>
<td>2,458.2</td>
<td>2,763.4</td>
<td>12.4</td>
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<td>Montreal/Mirabel</td>
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<td>2,391.6</td>
<td>0.7</td>
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<td>10</td>
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<td>Victoria</td>
<td>433.3</td>
<td>446.1</td>
<td>726.9</td>
<td>879.4</td>
<td>21.0</td>
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</table>

Data Source: Air Carrier Traffic at Canadian Airports, Statistics Canada Cat. no. 51-203-XPB, 1996.

* note: Edmonton International Airport E/D passenger growth reflects the merger with the municipal airport.

The support for YWG’s economic growth is a function of the macroeconomy. The outlook for the Canadian economy has improved but both unemployment and taxes are high. The improvement of the domestic market exists in a low inflationary economy. Further reductions in taxes and growth of employment are likely to occur because of the momentum generated. The virtuous cycle, thus created, should modify the slowing of the trade sector. Calgary and Toronto have emerged as the growth poles of Canada. All ships rise with the tide, but those in the swells rise the most. Located halfway between these cities, Winnipeg’s air links to Calgary and Toronto have grown significantly.

Despite the growth of trade between Manitoba and the U.S., transborder passenger traffic has not led to new connections. In part this can be explained by routing via connecting airports. It is only a question of time before the opportunity to expand direct flights between YWG and U.S. air
hubs encourages new routes to be established.

1.3 Economic Outlook: Air Cargo

Winnipeg’s 24-hour airport policy makes the city attractive to cargo handling operations. Airlines and cargo operators have been encouraged to expand their activities at Winnipeg because of the flexibility it offers for scheduling their time-sensitive operations. Inbound and outbound flights can be scheduled to maximize economic efficiency without regard to the timing of the activity. Cargo operations are expected to increase over the next several years as YWG becomes an effective air freighter hub for air transport between North America and countries in Europe and the Asia-Pacific Rim. Winnport, a Winnipeg based transportation consortium, is looking to establish international air cargo services utilizing Winnipeg as its primary hub. Winnipeg’s role as a leader in air cargo operations will strengthen the economy by creating jobs in the transportation sector which will ultimately generate many spin-off benefits to other areas.

Growth of air cargo service is anticipated to stimulate the location of an industrial park in the contiguous area to the west and north of YWG. At current rates of absorption (about 25 hectares per year), the 3,000 hectares of land would be adequate for 120 years. Hence, the opportunity for improvement with the attraction of industry is exciting. Provincial estimates of economic impact predict the creation of 6,000 jobs. Air cargo service between Winnipeg and China begin in the fall of 1998.

1.4 Department of National Defense (DND)

A distinctive feature of YWG is its joint military/civilian operations that have existed since the 1920s. In addition to its commercial traffic, the airport handles a significant amount of military activity. The activities of the Department of National Defense (DND) is an integral part of the operations at the southern side of the Winnipeg International Airport. However, the economic activity of DND is not included in this economic impact study.7

7 Unlike the 1989 EIS, this study does not attempt to estimate the economic impact of military activity (i.e. CFB Winnipeg) at YWG since the majority of activity occurs off-site and is transient in nature. In addition, they are not included because they do not pay landing fees or other compensation for use of the YWG infrastructure.
1.5 Rationale for the Study

In 1994, the Government of Canada adopted the National Airport Policy (NAP) that paved the way for the commercialization of airports. Its rationale was to “impose market discipline on the development and operation of airports and make them more responsive to the needs of their customers and communities” and at the same time “shift the cost of running Canada’s airports from taxpayers to those who actually use the facilities”. The NAP defined the 26 airports that handle almost 95 percent of all air passengers and cargo as the National Airports System (NAS). The goal of NAP is to transfer financial and operational management of these airports to Canadian airport authorities, with the federal government remaining as “landlord and regulator”. The commercialization of YWG began in 1991 under the previous local airport authority process. The intent to transfer had been signed prior to the change in government, but it was canceled with the introduction of NAP. The Winnipeg International Airport was officially transferred to Winnipeg Airport Authorities Inc. (WAA) from Transport Canada on January 1, 1997.

Transition to an airport authority provides flexibility in the control of local airport management, operations and investment. It brings with it the potential for a significant transformation of the airport’s effectiveness in serving the City of Winnipeg and adjacent areas, contributing as a competitive enterprise to regional economic development and marketing.  

The National Airports Policy recognizes that locally owned and operated airports are more responsive to local needs — and better able to match levels of service to local demands. The larger airports across Canada are operating successfully without federal support. Their experience is no guarantee of success for the new policy of smaller airports, but YWG appears to have the size necessary to join those that are financially viable.

Winnipeg International Airport is an important contributor to the well-being of the City of Winnipeg and the Province of Manitoba. An economic impact study is necessary to identify and measure the economic significance of the airport — and portray its role as an economic generator. The study’s current execution fulfills another purpose: to capture the economic impacts for the final

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5 WAA is a profit motivated company but is classified as a non-for-profit company under the Canada Business Act. Profits remain with WAA for investment in airport infrastructure, development and for enhancing the long term viability of the business since it does not have shareholders and does not have to pay shareholder dividends, Winnipeg Airports Authority Inc. 1996 Annual Report.
year proceeding commercialization. This will greatly aid in creating “before and after” pictures of the National Airport Policy’s impacts. This study will serve as a benchmark to evaluate the effects of commercialization when future post-commercialization economic impact studies are done.

1.6 Study, Scope & Objectives

This report presents the economic impact of the Winnipeg International Airport in terms of income, employment and airport-related expenditures. Economic impacts of airports extend across frontiers but the force diminishes rapidly with distance. For the purposes of this study, most impacts are assumed to occur within the boundaries of the Province of Manitoba. Impacts that are clearly outside provincial borders (i.e. expenditures) are not counted. By quantifying the impacts, the significant impact effect of the airport can heighten the awareness of the community and local businesses of the role played by the airport in the economic fabric of its region.

The specific objectives of the EI study are:

(i) to quantify the direct impacts of the airport in terms of “primary” and “secondary” economic activities;

(ii) to calculate the “multiplier effects” that result from the initial direct economic impact;

(iii) to develop a preliminary map of YWG’s economic hinterland in Winnipeg and the provincial economy;

(iv) to reveal the importance of its 24-hour operating status and the economic impact if a potential night restriction were imposed on airport operations between the hours of 24:00 and 06:00; and

(v) to describe air cargo volume in terms of tonnage moving through the airport.\(^8\)

Airport activities include not only the operation and management of the terminal facility, but also the business of airport tenants and airport-related organizations located off-site. Unless this

\(^8\) Information on air cargo volume includes total air cargo enplaned/deplaned in metric tonnes (mt) and the percentage breakdown of total cargo at YWG into domestic, trans-border and international volumes.
airport-related activity is viewed as a whole, the real economic significance of the airport may be obscured. The scope of this report includes all airport-related business carried out during 1996.

1.7 Organization of the Study

The main body of the study is contained in chapters 2 through 5. Chapter 2 outlines the economic impact studies methodology. The general approach is described and explanations of economic activity, economic multipliers and economic impact are provided. The chapter includes an assessment of current airport economic impact methodology and recent improvements. In addition, contemporary airport impact studies from other jurisdictions are reviewed. Subsequently, the goals of data collection, survey development, data limitations and survey pre-test are described. The requirements for secondary data sources are also identified.

Chapter 3 deals with the economic impact that is presently being generated by Winnipeg International Airport. The results of the study include aggregate levels of direct, indirect and induced activities of the airport as a purchaser of goods and services. The economic impact is calculated in terms of airport-related expenditures, employment and labour income. The research is extended to quantify the economic impact of “airport-dependent” hotels and motels.

Chapter 4 describes the boundaries of the airport’s “area of economic influence” (AEI) based on the direct and indirect economic activities. Location maps of YWG’s AEI visually illustrate the spatial relationship between the airport and airport-related organizations.

Chapter 5 examines the impact of a potential night restriction at YWG between the hours of 24:00 and 06:00. Information on businesses related to nighttime operations reveal the importance of the airport’s 24-hour capability and the economic effect if a night restriction were imposed. This section presents the economic impact of a potential curfew and provides a trend analysis of aircraft movements by month, by nighttime hours and by runway utilization. A data trend of day-time and night-time noise reports is also described.

Chapter 6 outlines air cargo movement. This section discusses the gap between published and unpublished air cargo statistics and attempts to describe total air cargo impacts (both enplaned and deplaned) at the airport. The percentage breakdown of domestic, trans-border and other international cargo movements is presented. Furthermore, with a growing global market for air
cargo services, a brief look at Winnipeg’s goal of establishing a global multi-modal transportation hub at YWG will be discussed.

There are also a number of appendices contained at the end of the report. These appendices include a list of survey participants, surveys for primary and secondary organizations, and “airport-dependent” hotels/motels, survey data, Manitoba economic impact multipliers, the direct economic impacts of YWG, a sectoral distribution of the direct impacts of a night restriction and air cargo movement of major scheduled carriers and charter services.

2.0 Airport Economic Impact Methodology

The methodology used to evaluate economic impact studies is empirically based. An input-output approach is used to assess the overall economic impact. In recent years, more attention has been focused on the micro elements of the economic impact as opposed to broad aggregate or macro impacts. Due to the lack of detail at the aggregate levels, applied economics requires one to adopt a micro approach in order to obtain the necessary detail for local planning and development purposes. As airports become more customer service oriented, the role of individual industries within the airport economy can change. Only with detailed information on airport activities can customer service and accountability to the surrounding community be improved.

The most common methodological approach for estimating the economic impact at airports is a type of “hybrid” approach. This usually employs the detail of activity/site-specific information which is highly suited to measuring direct impacts at the municipal level for a number of different airport-related industries. Based on these direct estimates of economic activity, input-output techniques are then used to estimate the resulting indirect and induced impacts using multipliers from Statistics Canada’s Provincial Input-Output Model. What distinguishes this approach is that the initial round of data collection is extended beyond the requirements of conventional models in order to cover the other site-specific statistics. This approach proved to be a success in assessing

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10 Input-output models are based on production theory. Economic impact metrics require a census of the factors of production measured in terms of employment, labour income, business expenditure and taxes. Subsequently, general input-output coefficients of a macro model are used to measure the indirect and induced impacts.

11 For example, a possible hybrid would use the activity/site specific approach at the municipal level, thereby ignoring indirect impacts, but employ input-output techniques to measure indirect impacts at the regional or provincial level.
the economic impact of Lester B. Pearson International Airport in 1996.\textsuperscript{12}

2.1 Airport EIS vs. Feasibility Study

Although conceptually similar, "economic impact studies" and "feasibility studies" of airports are quite distinct. To clear up any misinterpretation, EI studies use a "descriptive research approach" to examine specified economic, social, environmental or institutional impacts. An airport EI study provides a snap shot of the aggregate airport-related economic activity. A feasibility study would be used to determine the cost-benefit ratio of specific airport projects. While EI studies are considered appropriate for depicting the economic linkages such as an airport, they do not evaluate the net effects. To assess such effects, cost-benefit analysis (which employs a discount rate) is used to appraise the viability of projects. Cost-benefit studies assess the net effect of future streams of revenues and expenditures.

In general, EI studies are static rather than dynamic analyses. They can incorporate projected levels of economic activity, but are not a predicting tool. These studies measure short-term effects of airport operations and the marketing of services. EI studies establish economic benchmarks of the structure of complex activities. In a sense, an EI study is like an annual report of a very large industrial corporation. The differences are the decentralization of decision making and the service nature of the airport’s output. To use a biological analogy, an airport is more like an organism comprised of many cells, than a large single cell.

2.2 Improvements to the Accepted Methodology

"Double-counting" is a criticism that is often alleged in economic impact studies. A summation of gross revenues (i.e. economic output) is an accepted measure of economic impact, its major drawback, however, is that it may "double-count" economic activity. For example, the receipts from the sale of aviation fuel and catering services to air carriers are included in the measure of total economic output. While these revenues constitute a revenue for intermediary firms, they are ultimately an expense to the final users (air carriers). If these expenses are not deducted from airline

\textsuperscript{12} Marketing And Economic Development Study For L.B. Pearson International Airport, Toronto, Final Report Volume I Economic Impact, June 1996.
gross revenues they inflate the true magnitude of economic activity. In other words, incorporating revenues derived from the sale of final goods and services with the economic output of all intermediary firms would grossly exaggerate the actual level of economic activity. Furthermore, revenues include profit margins that also inflate the interpretation of revenue impacts that are attributable to the airport. Direct revenues become overestimated and make the economic impact appear larger than it would be otherwise. The inclusion of revenues also makes it difficult to account for where the economic impact is being "absorbed".¹³

Unlike past economic impact studies, this study measures airport-related expenditure information. This is regarded as a better and more appropriate indicator of direct impacts because it represents the actual purchases of goods that are spent locally. It does not suffer from the double-counting problem and provides an unbiased estimation in terms of the direct economic impact. In addition, firms are more inclined to disclose expenditure information (rather than revenues) due to the confidentiality of their commercial operations.

2.3 Review of Recent Economic Impact Studies

Before presenting the results of the impact analysis, it is imperative to review the most recent airport impact studies from other jurisdictions. Methodological approaches to impact calculation varies in terms of survey design and data analysis. It is important for researchers to follow up and understand current impact methodologies used to assess the overall economic impact at airports. Recent EI studies at Vancouver, Calgary and Toronto International Airports are reviewed.

2.3.1 Vancouver International Airport (YVR)

The University of British Columbia prepared an economic impact study of the Vancouver International Airport in 1995.¹⁴ This study addresses the macro impact of the airport on the British Columbia and Vancouver economies. It begins with a review of the B.C. economy, including a discussion of transition underway from the traditional employment base to the new types of jobs in

¹³ That is, are the revenues injected into the "local economy" or removed as "leakages"?
¹⁴ M.W. Tretheway, "The Economic Impact of the Vancouver International Airport", The Faculty of Commerce and Business Administration, UBC, May 11, 1995. This study was prepared for the Vancouver International Airport Authority.
the information era. The study then proceeds to take a more micro approach. First, it measures
direct employment at YVR, both in total as well as for specific air services. Following this, it
measures the monetary impacts of the airport in terms of output and GDP. The tax contribution of
the airport community is also measured and described.

2.3.2 Calgary International Airport (YYC)

The methodology used at Calgary International was designed to produce data on revenues,
expenses and employment.\footnote{Calgary International Airport Economic Impact Study Update, 1996, prepared by ACL Airport Consulting Ltd. utilizing the services of South River Management Consulting Inc.} In this 1996 update, operations at YYC were categorized into four
distinct groups: airlines and aircraft operators, aviation and aviation support, commercial and retail
concessions and airport administrative functions which includes government operations. The study
follows the methodology described by Mazarolle and Bisson\footnote{T.M. Mazarolle and B.G. Bisson, "A Methodology for Airport Economic Impact Studies", Canadian Transportation Research Forum (CTR), 1989, pp 1-13.} which provides for a more widely-
recognized sub-classification.

2.2.3 Lester B. Pearson International Airport (YYZ)

The results at LBPIA\footnote{Lester B. Pearson International Airport Economic Impact Study was carried out on an integrated basis by IBI Group in association with Hickling Lewis Brod Inc. (HLB) and Gerald Grant Associates (GGA), with advisory input from SH&E, 1995.} are presented initially for the 1995 base year and then for estimated
future conditions, including a base line traffic projection and four alternative traffic scenarios. The
report outlines four principle approaches to measuring the economic impact of an airport: macroeconomic and regional models; input-output models; activity and site-specific models; and
hybrid approaches. These alternatives contain similarities and noticeable differences in their
respective approaches. The Toronto study used the hybrid approach in measuring the economic
impact. This methodology went through an academic review process and was found to be
theoretically and practically sound.
2.4 Direct Economic Impact

The direct economic impact is defined as the employment, income and other economic benefits generated by those directly working at the airport or in direct support of the airport's activities. This impact is measured in terms of the number of jobs and labour income (salaries and benefits) directly created by those who work at the airport. The direct impact is generated by airlines, general aviation (fixed-base operators), air support services, air cargo/freight handlers, airport operations and administration, and commercial and retail tenants. Activities that produce these impacts typically entail employment of airport personnel and the purchase of locally-produced goods and services. The distinguishing feature is that it is an immediate consequence of airport activity.

For the purposes of this study, the airport economy has been disaggregated into a number of sectoral operations or categories. This breakdown allows the economic impact analysis to account for the different types of activities that take place across various sectors.

2.5 Direct Economic Activities

Direct economic activity is attributable to the operations of organizations for which aviation, or aviation-related, activity comprises a portion of its total business. This study adopts the conventional terminology developed in previous economic impact studies of this type and divides airport-related firms and organizations into "primary" and "secondary" linkages. The division of direct impacts into linkages has no computational effect on the total impact; rather, it is a practice used to facilitate the discussion and analysis.

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2.5.1 Primary Linkages

Primary linkages are defined as aviation-related and are usually located either on-site or in the immediate vicinity of the airport. Primary linkages include:

(i) **Air Carriers**: All companies offering scheduled air service within Manitoba, or to other points in Canada from the Winnipeg International Airport.

(ii) **General Aviation**: This classification includes:
- charter air operators (rotary and fixed wing);
- corporate aviation organizations;
- aviation-related organizations or educational institutions; and
- government aviation.

(iii) **Air Support Services**: This category includes companies whose business is primarily or wholly aviation-related, or who provide “direct” support to air carriers or general aviation businesses.

This includes:
- couriers and freight forwarders;
- aircraft maintenance services;
- aircraft repairs;
- fueling services;
- aircraft parking and storage operations;
- aircraft rental or leasing businesses; and
- other general services.

(iv) **Airport Operations and Administration**: These activities consist of all organizations involved in the direct operation of the airport (e.g. Airports Authority Group, Area Control Centre), providing for its overall administration, or that provide support services at the airport (e.g. atmospheric information, customs, immigration), and any contract services (e.g. security, janitorial).
2.5.2 Secondary Linkages

Secondary linkages encompass organizations that are either airport-related (but not aviation-related), or for which their business is derived from air passengers, both off and on the airport site. Secondary linkages include:

(i) **Commercial Services**: All retail and personal service businesses operating on the airport site (e.g. duty free shops, newsstands, gift stores, coffee shops, and other concessions).

(ii) **Ground Transportation Services**: Operations that transport passengers to the airport are classed as ground transport services.
* car rental;
* taxi and limousine service;
* bus transportation.

(iii) **Accommodation Industry**: This sector includes all airport-dependent hotels/motels.

2.6 Indirect Economic Activities

Indirect economic activity of the airport is attributable to firms that supply services (i.e. fuel, food), materials and other inputs to the organizations involved in the direct economic activity. Airport-related expenditures from direct airport activity becomes the revenue of indirect activity. For example, expenditures by an airport snack shop become the revenue of a food wholesaler (which represents the indirect activity).

2.7 Induced Economic Activities

Induced economic activity is the effect of successive rounds of spending which begin with the consumption spending of individuals involved in the direct and indirect economic activities. These “trickle-down” impacts represent the multiplier effects of the direct and indirect impacts. The result is increased employment and income over and above the levels for which the direct and indirect activities are responsible.
2.8 Types of Economic Impact to be Measured and Methods of Measurement

Three measures of the economic impact of the Winnipeg International Airport can be assessed. Included are estimates of airport-related expenditures on goods and services, employment and labour income. Furthermore, estimates of airport-related taxes represent the contribution to the local tax base. These units of measurement are defined as follows:

(i) Airport-related Expenditures:

Airport-related expenditures represent the actual purchases of goods and services that are spent locally.

(ii) Employment:

Employment totals are reported in terms of total person-years of airport-related employment. One person, employed full-time for a period of one year, represents one-person year of employment. Alternatively, two part-time employees who work twenty hours per week are considered to be equivalent to one-full time employee.

(iii) Labour Income:

Labour income measures the total annual wages, salaries and benefits received as a result of airport-related employment. This also includes any overtime paid to local employees.

(iv) Airport-related Taxes:

Airport-related taxes includes the contribution to the local tax base: this measure assesses the total federal, provincial and municipal taxes and levies paid by airport-related firms and organizations.

The indirect and induced economic impacts associated with the above measures of economic activity were measured as follows:
2.9 Indirect Economic Impact

The indirect impact are those produced from activities that occur entirely off-site, but as a result of the airport’s existence. Indirect impacts are the jobs and income generated by the purchases of goods and services of firms dependent upon airport activity. The spending by these firms on goods and services represents output for other firms further down the production chain, bringing about indirect employment, income, and tax activity.\(^{19}\)

2.10 Induced Economic Impact

A second multiplier effect is initiated when firms involved in airport activities hire residents from the surrounding community. A portion of the labour income received by these employees is, in turn, spent on household goods and services. This re-spending creates successive rounds of economic activity which is known as the “induced impact”. For example, catering services provide meals to the airlines; the income generated by the catering services is considered indirect. These catering services hire chefs and other workers, and these workers also spend money in the community, on such goods and services as cars, homes, etc. Those who benefit from these expenditures also enjoy economic benefits, which are called induced benefits. For example, the car salesman who sells a car to a chef enjoys induced economic impacts as a result of the airport.

2.11 Economic Multipliers

Indirect and induced effects of airport-related activity is difficult to measure. Indirect effects would require surveying a large number of firms whom airport activity account for only a small portion of their overall business. Similarly, measuring the induced effects would require surveying the entire economy. Instead, economists resort to using economic multipliers to calculate indirect and induced impacts. A multiplier is defined as the ratio of the change in national income to the initial change in expenditure that brings it about.

\(^{19}\) For example, taxi companies, airport-dependent hotels, restaurants and other retail activities owe some of their customer and expenditure base to the fact that the Winnipeg International Airport provides a supply of air travellers. These businesses employ staff, pay wages, buy local goods and services and invest just as their on-site airport counterparts.
The economic multipliers used in this study were obtained from the Manitoba Bureau of Statistics (MBS). They are derived from a statistical model of input-output data that trace Manitoba inter-industry flows of goods and services. The MBS multipliers are widely accepted and recognized as being comprehensive and accurate. As a result, the indirect and induced impacts can be measured by applying the appropriate multiplier to the direct impacts. The "total economic impact" incorporates the direct, indirect and induced impacts of the initial impact. The summation of these impacts ensures the absence of double-counting and that "leakages" (that part of the activity occurring outside of the provincial economy) have been identified.

2.12 Data Collection

The goal of data collection for an economic impact study is to obtain the most accurate and relevant information possible on the defined activity. Although the activity the Winnipeg International Airport generates includes numerous and diverse firms and organizations, it is important to capture the required information from as many of these airport and airport-related "participants" as possible. To accomplish this, there are three main requirements:

(i) the participants must be well-defined; a comprehensive and up-to-date contact list must be generated;

(ii) a data survey must be created that captures the necessary information while at the same time avoids being difficult or overly consuming; and

(iii) the cooperation of the survey participants must be secured. This last requirement is critical for the success of the data collection.

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21 The multipliers representing the 1994 revision are the most current available at the time this study was conducted. Although they may seem dated, there is unlikely to be any significant loss in their precision because the structure of the Manitoba economy has not experienced any dramatic changes during this period.
22 While the mechanics of multiplier use is rather straightforward, the inappropriate use of multipliers often invalidates the end results. To avoid common pitfalls of using the wrong multiplier or applying it incorrectly (i.e. applying the multiplier to total expenditures rather than to direct Manitoba based expenditures thereby ignoring the direct expenditure leakage) required being familiar with the data and multipliers being used; what they represent and what their limitations are.
From the analysis of the airport and the resultant activities, the required list of participants were generated. The survey and the method of data collection were determined by the chosen economic impact study methodology. The economic impacts were measured by performing a complete enumeration, rather than inferring the impacts from a sample. Securing the cooperation of the survey participants was accomplished through the liaison activities between WAA, the "airport project team" at UMTI and surveyed participants.

2.12.1 Survey Development

The first step in calculating the total economic impact of the airport is to calculate the direct effects. This is done through a survey questionnaire of on-site firms as well as firms directly linked to the airport but located off-site. To collect site-specific information, WAA targeted the majority of airport-related firms and organizations. Surveys were also targeted to companies located off-site but who rely on the airport as their prime source of activity. Other off-site airport-related activity were subsequently captured by UMTI through interviews with participants and the use of the Winnipeg Telephone Directory.

An introductory letter from WAA was sent to each survey participant indicating the nature of the study and a promise of anonymity (Appendix E summarizes the confidentiality of the survey data). Accompanying the letter were surveys which targeted either the economic impact for primary and secondary organizations or the accommodation industry. Surveys were to be returned postage paid to the University of Manitoba Transport Institute for subsequent analysis.

2.12.1.1 Data Limitations

A total of 141 surveys were distributed to participants. Where it was reasonable to do so, the economic activity of non-respondents has been estimated either by substituting the data of a comparable respondent or, if more than one such response was received, by using an average. In cases where the economic activity of non-respondents could not be estimated with some confidence, rather than risk overstating the impact, no estimates were made. The data estimates are only intended to "round out" the analysis. Where complete responses were not supplied by the participants, attempts to obtain partial responses were made by contacting firms directly by
telephone interview or by fax. Where firms were unwilling to provide specific information, standard statistical techniques are used to smooth the data.

In many cases, firms located on-site and off-site are subsidiaries of other firms or have merged with other companies. Precautions were taken to avoid double-counting (i.e., sampling more than once) these firms. This primarily involved identifying those firms that were subsidiaries of larger companies or affiliated with other organizations. Such information was generally provided by WAA or the participants themselves.

2.12.1.2 Economic Impact Survey for Primary and Secondary Organizations

The Winnipeg Airport Economic Impact Study was carried out using a methodology similar to that described by T.M. Mazerolle and B.G. Bisson (1989). To collect all site-specific information, a direct survey of firms and organizations located at and around the airport was designed. The primary data obtained describes information on expenditures, employment, labour income and taxation. Unlike previous economic impact studies, the survey also attempts to capture information pertaining to the movements of air cargo volume and the value of nighttime operations to constituents and users of the airport. This information is used to supplement the economic impact analysis as well as provide input to other components of the study.

Survey information provides the basis for calculating the direct economic impacts while Statistics Canada's Interprovincial Input-Output Model is used to estimate the indirect and induced impacts. The list of survey participants and a copy of the survey for primary and secondary organizations are presented in Appendices A and B.

2.12.1.3 Survey for “Airport-Dependent” Hotels and Motels

Air travellers generate a substantial impact on the Manitoba accommodation industry. In order to capture the spin-off effects of airport activity on the accommodation industry, a separate survey was developed to quantify the economic impact of airport-dependent hotels and motels. The survey is similar to the preceding survey, except that it is simplified and designed for the

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23 See Footnote (16).
hotel/motel-manager respondent. The list of survey participants for airport-dependent hotels and motels is included in Appendix C.

Although the study considers those hotels and motels that depend on the airport for a significant portion of their patrons, no attempt is made to infer the economic impact on the entire accommodation industry in Manitoba. The survey illustrates that airport activities have a substantial effect over a particular segment of the hotel and motel industry. The development of a regression equation in 1990 to estimate the economic impacts of airports revealed that a significant relationship exists between hotel numbers and passenger traffic. The quantitative results suggested that accommodation-related activity should be included in the methodology used to quantify airport economic impacts. The data obtained from the survey consists of information on employment, accommodation rates, operating expenses, labour income and taxation. The survey for airport-dependent hotels and motels is included in Appendix D.

### 2.12.2 Results of Survey Pre-Test

To ensure the surveys generate a high response rate by organizational type and that information obtained would be quite complete, involved the development of a survey pre-test. Feedback from the pre-test was used to make further adjustments or modifications to survey design. When necessary, telephone conversations and interviews were conducted with organizations where questionnaire response was either absent or only partially provided. The pre-test involved a total of six survey mail-outs covering the range of organizational categories and accommodation mentioned above. Both the response rate and the quality of the information obtained from the initial pre-test showed considerable promise for subsequent mail-outs. Five out of six surveys returned were filled out completely with only one survey (representing a small air carrier company) returned partially complete.

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25 The pre-test consisted of surveying one business or firm from each organizational category (i.e. air carrier, general aviation, air support services, freight handling, ground transportation) and one airport-dependent hotel/motel from the "accommodation industry".
2.12.3 Secondary Sources

2.12.3.1 Airline Ticket Sales Commissions

Airlines derive their revenue from ticket sales, but it is difficult to determine what portion of this revenue would end up as local economic impacts. Whalen and Roach (1989) consider the revenue impact problem associated with airline tickets sales and suggest that the incorporation of ticket sales as an economic impact at airports is without logical foundation: "Airline revenues which are available for a particular airport represent the revenue from the sale of tickets originating at the site, to their destination or point of transfer. It is not reasonable to assume that all this revenue is attributable to the point of origin". 26

Travel agents derive a substantial portion of their income from air ticket sales27, and capturing this income would aid in determining the economic impacts of travel agents attributable to the airport. Because this study is focused on expenditures and not revenues, the commissions that travel agents earn on ticket sales (which are an airline expense) can be included. The impact of locally earned commission income is presented in Chapter 3, Section 3.2.3.1. How they are determined is discussed below.

Ticket Sales and Bank Settlement Plan

The ticket sale commission is dependent on the ticket and airline combination, and may be either a percentage of the ticket price or a fixed fee. It becomes income for the travel agency and/or agent that sold it. If the airline sells a ticket, a fixed commission is absorbed into the airline's operating revenues; the income benefit is not as readily identifiable as in the former sales transaction.

To book airline seats, travel agents in Canada use a computer reservation system (CRS) terminal to access flight and fare information; the ticket generated confirms the contractual agreement between passenger and airline. But the financial side of the transaction is processed by another system. The Bank Settlement Plan (BSP) is the electronic system that transfers funds from

27 Even though airlines have the ability to sell tickets directly to consumers, 70 percent of airline tickets in Canada are sold by travel agents. See M.W. Treibawy, T.H. Oum, Airline Economics: Foundations for Strategy and Policy, Centre for Transportation Studies, UBC, 1992.
travel agents to airlines. The two systems are independent of each other. The BSP in Canada is under the management of Automated Data Processing Systems (ADP). ADP is employed by the International Air Transport Association (IATA) to collect travel agent ticket sales information, determine the balances between agent and airline, and then calculate and transfer the funds to the airlines.

Detailed information on travel agent airline ticket sales is available from IATA. The BSP Canada system produces the Agent Air Product Sales Report. The Report can be purchased from the BSP Canada Accounting and Operations department in Montreal. The geographical coverage of the information is dependent on the purchaser. For example, provincial ticket sales summaries can be obtained, as well as by postal code areas (as long as there is a minimum number of travel agents in the postal code area to protect confidentiality). Each travel agent automatically receives a copy of the report, but detailing only their own sales.

The Agent Air Product Sales Report is produced monthly and includes the following ticket sales information:

**Air Products:** The air products descriptions are by destination and purpose of travel. The destinations are grouped by international and domestic destinations. International is disaggregated into the following areas: Mexico, Central America, Caribbean, South America, Europe, Africa, Middle East, Asia, and South Pacific. Domestic is disaggregated into Canada and the United States. For each of these destinations, ticket sales are divided into purpose of travel: Business or Pleasure.

**Tickets:** The actual number of tickets sold for each air product category during the month.

**Fares:** Total dollar value of ticket fare sales by air product less any refunds or exchanges.

**Sales Growth:** The percentage growth in ticket sales and fare values for the current month as compared to last year’s same month is calculated, as is the percentage growth for the current year to date as compared to the same year to date period of last year. Again, these are listed by air product category.

**Commission Revenue:** This provides the net amount of commission earned for each air product category.
Commission Growth:  The percentage growth in commission (for each air product category) for the current month as compared to last year's same month is calculated, as is the percentage growth for the current year to date as compared to the same year to date period of last year.

Avg. Fare/Avg. Commission: The average fare/commission and percentage comparison's to last year's same month.

Average Percentage Commission: For each air product category, the average commission percentage of fares (rounded to nearest whole percent). This is also compared to the same month last year.

There are numerous other categories that the monthly report highlights. This includes the number of tickets bought by credit card, a breakdown of international and domestic air products into categories of business/pleasure, and the airline distribution of ticket sales by air carrier.

In summary, the ticket sales information available is very comprehensive and up-to-date, and its presentation is conducive to the analysis of air ticket sales impacts — for example, the economic impacts of locally-earned commissions.

3. Economic Impact of Winnipeg International Airport

This section deals with the economic activity that is presently being generated by the Winnipeg International Airport. The results of the study include aggregate levels of direct, indirect and induced activities at the airport as an employer and purchaser of goods and services. The activity figures for YWG are compared to local and regional values. The total impacts are derived by applying economic impact multipliers (see Appendix F) to the direct impacts. The total impacts are calculated in terms of airport-related expenditures, employment and labour income. Moreover, selected measures of economic impact that are deemed to be noteworthy are identified and described. This includes the taxation impact (i.e. contribution to the local tax base) of airport activities.
3.1 Direct Impacts

3.1.1 Surveyed Primary and Secondary Organizations

172 firms and organizations were originally sent questionnaires. The list was subsequently narrowed to 117 firms. Firms that had no airport-related activity were removed from the list.\(^{23}\) Of the 117 organizations, 77 replied by mail implying an overall response rate of 65.8 percent. The total overall response which includes the Accommodation Industry is 68.1 percent. Table 3 breaks down the response rate received from each linkage category.

<table>
<thead>
<tr>
<th>Linkage</th>
<th>Number in Target Population</th>
<th>Response Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Linkage Organizations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Carriers</td>
<td>9</td>
<td>78%</td>
</tr>
<tr>
<td>General Aviation</td>
<td>12</td>
<td>58%</td>
</tr>
<tr>
<td>Air Support Services</td>
<td>62</td>
<td>50%</td>
</tr>
<tr>
<td>Airport Operations &amp; Administration</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Secondary Linkage Organizations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td>12</td>
<td>92%</td>
</tr>
<tr>
<td>Ground Transportation</td>
<td>12</td>
<td>92%</td>
</tr>
<tr>
<td>Accommodation Industry</td>
<td>24</td>
<td>79%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>141</td>
<td>68.1%</td>
</tr>
</tbody>
</table>

\(^{23}\) In addition, firms that merged, consolidated, went into receivership, or did not operate for the 1996 fiscal year were removed from the list of survey participants.
While a complete enumeration was not achieved the response rate is high when compared to most other similar studies. But, the response rate alone, cannot be used to assess the overall success of the survey. Clearly, what is more important is the relative impacts of those that responded and those that did not. An impact study will be more credible and possess more weight if it captures the “major players” involved in airport activity (i.e. major air carriers), despite a low overall response rate.

Table 3 categorizes the survey response rate by organizational type. Although most primary and secondary linkage organizations were cooperative and did respond to the survey, those classified as “Air Support Services” provided a rather weak response. However, because organizations in this category have rather small operations compared to those in other categories, this undisclosed information should not affect the reliability of the overall findings. In this study, freight forwarders and customs brokers, which typically have small operations, account for nearly one-quarter (23 percent) of non-respondents. Furthermore, Ground Transportation represents a relatively small portion of the total economic activity generated at YWG. Since a high response rate was received by organizations having the greatest impacts, the variation between the estimated and actual impact is probably insignificant.

3.1.2 “Airport-Dependent” Hotels and Motels

Air travellers have a substantial impact on the Manitoba accommodation industry. In particular, business travellers and convention delegates are a high impact segment of the tourism market and have a greater propensity to stay in a hotel/motel than travellers having any other trip characteristic. Since people travel so frequently by air, the air traveller can also be viewed as having a substantial impact over a particular segment of the hotel and motel industry. The economic impact on “airport-dependent” hotels and motels has been determined primarily from the returned accommodation surveys. Of 24 surveyed businesses 19, or 79 percent, responded. However, in terms of the total number of guest rooms, hotel/motel respondents accounted for 81 percent of the total, representing most of the economic activity of the target population.29 The economic activity

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29 In Winnipeg, the target population for “airport-dependent” hotels/motels comprises 4,107 total room units. Of this total, respondents accounted for 3,337 room units and non-respondents for 770 room units.
of non-respondents was estimated by combining the survey data with secondary statistics.\footnote{Manitoba Accommodation and Campground Guide, Travel Manitoba, 1998.}

Although the total number of hotels and motels that are "airport-dependent" represent a relatively small portion of the provincial total, they account for a major share of the accommodation business. Presently, there are 70 hotel/motels operating in Winnipeg.\footnote{A total of 356 accommodation hotels/motels comprising 10,914 room units exist in Manitoba. Of this total, 70 are located in Winnipeg (5,631 room units) while 286 are located in rural Manitoba (5,283 room units). In Winnipeg, 13 hotel/motels provide airport shuttle service and 47 provide convention/banquet facilities for their patrons. \textit{Source: Manitoba Accommodation and Campground Guide, Travel Manitoba, 1998.}} While airport-dependent hotels and motels comprise only 34 percent of this total, they account for approximately 73 percent of the total available rooms. In terms of Winnipeg tourism sector performance indicators, the average occupancy rate for the Winnipeg accommodation industry was 71 percent in 1996. This is greater than the Canadian average of 62 percent. Furthermore, the average regular room rate was $64.10 versus a Canadian average of $74.30.\footnote{1997 data spanning Jan-Nov indicate an occupancy rate of 71 percent and average regular room rate of $67.10 compared to a Canadian average of 65 percent and $80.50. \textit{Source: Economic Planning Group of Canada "Canadian Lodging Outlook", Tourism Winnipeg, 1998.}}

Table 4 presents statistics from the accommodation survey. Approximately 58 percent of hotel/motel respondents have an average accommodation rate between 61-80 percent. Taking into account accommodation size, there are two categories of airport-dependent hotel/motels. Most respondents and non-respondents either fall in the smaller 75-150 room range or the much larger 226-301 room range. Furthermore, the majority of respondents (15 total) indicate that the number of hotel rooms rented to air travellers as a percentage of all guests is evenly dispersed between less than 20 percent to a range of 41-60 percent. Only 4 hotels replied that air travellers accounted for over 60 percent of all guests. Utilizing statistical averaging techniques, the average accommodation rate of air travellers staying in airport-dependent hotels and motels is 31.8 percent.\footnote{The occupancy rate for air travellers staying in airport-dependent hotels was estimated by multiplying the midpoints of the average accommodation rate and number of guest rooms rented to air travellers (as a percentage of all guests) for each hotel/motel, and multiplying these figures by the total number of guest rooms for each hotel/motel.} This implies that approximately one in every three Winnipeg hotel/motel patrons is an air traveller.
Table 4  Winnipeg Accommodation Survey, Selected Statistics

<table>
<thead>
<tr>
<th>Average Accommodation Rate (%)</th>
<th>&lt; 20</th>
<th>20-40</th>
<th>41-60</th>
<th>61-80</th>
<th>&gt; 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Hotels/Motels</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>11</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Guest Rooms (room units)</th>
<th>&lt; 75</th>
<th>75-150</th>
<th>151-225</th>
<th>226-301</th>
<th>&gt; 301</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Hotels/Motels</td>
<td>3</td>
<td>9</td>
<td>4</td>
<td>6</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hotel rooms rented to air travellers as a % of all guests</th>
<th>&lt; 20</th>
<th>20-40</th>
<th>41-60</th>
<th>61-80</th>
<th>&gt; 80</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Hotels/Motels</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: UMTI airport-dependent hotel/motel survey, 1996

3.2 Results of the Study

3.2.1 Airport-related Expenditures

The figure for airport-related expenditures related to Winnipeg International Airport are presented in Table 5. These are the total expenditures from actual purchases of goods and services that are spent locally, and directly attributable to the airport.
The largest contribution of direct economic expenditures is represented by Air Carrier Operations, with just over $51 million in airport-related expenditures. Air Support Services is the next largest contributor, with expenditures of approximately $35.3 million. Airport Operations and Administration and General Aviation account for approximately $22.4 million and $18.9 million respectively. The total expenditure impact represented by primary linkages is $128,019,771.

<table>
<thead>
<tr>
<th>Linkage</th>
<th>Direct</th>
<th>Multiplier</th>
<th>Indirect &amp; Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Carriers</td>
<td>$51,347,333</td>
<td>1.5528</td>
<td>$28,384,806</td>
<td>$79,732,139</td>
</tr>
<tr>
<td>General Aviation</td>
<td>$18,944,085</td>
<td>1.5528</td>
<td>$10,472,290</td>
<td>$29,416,375</td>
</tr>
<tr>
<td>Air Support Services</td>
<td>$35,312,939</td>
<td>1.5005</td>
<td>$17,674,125</td>
<td>$52,987,064</td>
</tr>
<tr>
<td>Airport Operations &amp; Administration</td>
<td>$22,415,414</td>
<td>1.6204</td>
<td>$13,906,522</td>
<td>$36,321,936</td>
</tr>
<tr>
<td>Subtotal</td>
<td>$128,019,771</td>
<td></td>
<td>$70,437,743</td>
<td>$198,457,514</td>
</tr>
<tr>
<td><strong>Secondary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td>$3,937,635</td>
<td>1.5537</td>
<td>$2,180,268</td>
<td>$6,117,903</td>
</tr>
<tr>
<td>Ground Transportation</td>
<td>$6,477,913</td>
<td>1.4246</td>
<td>$2,750,522</td>
<td>$9,228,435</td>
</tr>
<tr>
<td>Accommodation Industry*</td>
<td>$47,458,599</td>
<td>1.5532</td>
<td>$26,254,097</td>
<td>$73,712,696</td>
</tr>
<tr>
<td>Subtotal</td>
<td>$57,874,147</td>
<td></td>
<td>$31,184,887</td>
<td>$89,059,034</td>
</tr>
<tr>
<td>Total</td>
<td>$185,893,918</td>
<td></td>
<td>$101,622,630</td>
<td>$287,516,548</td>
</tr>
</tbody>
</table>

*note: This figure is a proxy measure of airport-related expenditures. It is calculated by multiplying the total hotel operating expenses by the number of rooms rented to air travellers as a % of all guests for each hotel/motel.
The Accommodation Industry which represents airport-dependent hotels and motels had 1996 expenditures of $47.5 million, considerably more than those of Commercial Services and Ground Transportation. Total annual expenditures from secondary linkages is approximately $57.9 million.

In addition to direct airport-related expenditures, indirect and induced expenditures are determined by the application of the appropriate multiplier to the direct expenditures. They are the effects of successive rounds of airport-related spending within Manitoba. Table 5 shows that primary linkage organizations represent a direct airport-related expenditure contribution of just over $128 million, and generate $70.4 million in indirect and induced economic activities. The total contribution of the primary linkages to Manitoba’s airport-related expenditure is approximately $198.5 million.

From direct airport-related expenditures of $57.9 million, the secondary linkages generate approximately $31.2 million of indirect and induced economic activities. They thus contribute a total of $89.1 to Manitoba’s economy.

Winnipeg International Airport is responsible for a direct contribution to airport-related expenditures of approximately $185.9 million. From this, $101.6 million is generated within the province by indirect and induced economic activities. The total contribution to Manitoba’s economy that is attributable to YWG is approximately $287.5 million.

### 3.2.2 Employment

In order to facilitate discussion, employment totals are reported in terms of person-years of employment. One person-year of employment is the equivalent of one person, employed full-time for a period of one year. Alternatively, two part-time employees who work twenty hours per week are considered to be equivalent to one-full time employee. Employment figures for Winnipeg International Airport are presented in Table 6.
Table 6  Winnipeg International Airport (YWG) Economic Activity: Employment (Person-Years)

<table>
<thead>
<tr>
<th>Linkage</th>
<th>Direct</th>
<th>Multiplier</th>
<th>Indirect &amp; Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Carriers</td>
<td>667</td>
<td>1.6704</td>
<td>447</td>
<td>1,114</td>
</tr>
<tr>
<td>General Aviation</td>
<td>248</td>
<td>1.6704</td>
<td>166</td>
<td>414</td>
</tr>
<tr>
<td>Air Support Services</td>
<td>1,337.5</td>
<td>1.5634</td>
<td>753.5</td>
<td>2,091</td>
</tr>
<tr>
<td>Airport Operations &amp; Administration</td>
<td>334.5</td>
<td>1.4877</td>
<td>163</td>
<td>497.5</td>
</tr>
<tr>
<td>Subtotal</td>
<td>2,587</td>
<td>1,529.5</td>
<td></td>
<td>4,116.5</td>
</tr>
<tr>
<td><strong>Secondary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td>68.5</td>
<td>1.2658</td>
<td>18</td>
<td>86.5</td>
</tr>
<tr>
<td>Ground Transportation</td>
<td>109</td>
<td>1.2889</td>
<td>31.5</td>
<td>140.5</td>
</tr>
<tr>
<td>Accommodation Industry</td>
<td>2,097.5</td>
<td>1.3712</td>
<td>778.5</td>
<td>2,876</td>
</tr>
<tr>
<td>Subtotal</td>
<td>2,275</td>
<td></td>
<td>828</td>
<td>3,103</td>
</tr>
<tr>
<td>Total</td>
<td>4,862</td>
<td>2,357.5</td>
<td></td>
<td>7,219.5</td>
</tr>
</tbody>
</table>

Winnipeg International is directly responsible for 4,862 person-years of employment, as reported by surveyed primary and secondary linkages. Of this total, 1,337.5 person years of employment are provided by Air Support Services, 667 by Air Carriers, 334.5 by Airport Operations and Administration, and 248 by General Aviation Services. The primary linkage organizations therefore provide positions for the equivalent of 2,587 full-time employees.
Of the 2,275 person-years of employment represented by the secondary linkage organizations, the full-time equivalents of 2,097.5 positions are provided by the Accommodation Industry, 109 positions by Ground Transportation Services\textsuperscript{44} and 68.5 by Commercial Services.

In addition to direct employment, the airport is responsible for 2,357.5 person-years of indirect and induced employment. The total impact effect of economic activities at YWG is 7,219.5 person-years of employment in Manitoba.

In comparison to this impact, Statistics Canada reports that, in Manitoba, 3,470 persons were employed in the air transport industry, and another 655 were employed in service industries that are incidental to air transport.\textsuperscript{35} Since Statistics Canada measures employment in the "air transport industry", rather than for the airport, their statistics are not directly comparable with the present study's findings. Nevertheless, the air transport industry provides significant employment in the province where it is highly concentrated in Winnipeg and around the airport.

The actual employed labour force of Winnipeg, as identified by the 1991 Census, is 314,000 people.\textsuperscript{36} The direct employment effect of YWG is equal to the provision of full-time positions for 1.5 percent of Winnipeg's labour force.

3.2.3 Labour Income

Labour income of just over $149.5 million per year is directly attributable to economic activity at YWG. Table 7 shows that Air Support Services are responsible for the largest labour income portion of the categories listed, with payrolls of approximately $40.1 million. The primary linkage organizations pay out a total of $82.8 million in direct annual wages and salaries.

\textsuperscript{44} The results obtained underestimate the number of jobs associated with the Ground Transportation Linkage. No allowance is made for the number of jobs attributable to taxi traffic at YWG as it is practically impossible to determine how many taxicabs and thus drivers depend on YWG for their livelihood. As of 1997, the number of taxicab licenses authorized to operate in Winnipeg remains at 400, held by approximately 361 owner-operator/shareholders (Unicity Taxi - 224 individual shareholder-owners; Duffy's Taxi - 134 individual owner operators; while Spring, Blueline and Rapid Taxi Services each account for one owner/shareholder. The total number of drivers is 1,700. \textit{Source: Manitoba Taxicab Board}, 1997.

\textsuperscript{35} The above figures are based upon 1991 Census of Canada, Labour Force - Industry data. The Standard Industrial Classification (SIC) groupings listed does not include 4,330 persons employed in the Aircraft and Aircraft Parts Industry. \textit{See Industry and Class of Worker, Statistics Canada, Cat. No. 93-326}.

<table>
<thead>
<tr>
<th>Linkage</th>
<th>Direct</th>
<th>Multiplier</th>
<th>Indirect &amp; Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Carriers</td>
<td>$22,501,345</td>
<td>1.5117</td>
<td>$11,513,938</td>
<td>$34,015,283</td>
</tr>
<tr>
<td>General Aviation</td>
<td>$6,464,065</td>
<td>1.5117</td>
<td>$3,307,662</td>
<td>$9,771,727</td>
</tr>
<tr>
<td>Air Support Services</td>
<td>$40,125,000</td>
<td>1.4908</td>
<td>$19,693,350</td>
<td>$59,818,350</td>
</tr>
<tr>
<td>Airport Operations &amp; Administration</td>
<td>$13,741,183</td>
<td>1.4616</td>
<td>$6,342,930</td>
<td>$20,084,113</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$82,831,593</td>
<td></td>
<td>$40,857,880</td>
<td>$123,689,473</td>
</tr>
<tr>
<td><strong>Secondary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td>$1,218,109</td>
<td>1.3982</td>
<td>$485,051</td>
<td>$1,703,160</td>
</tr>
<tr>
<td>Ground Transportation</td>
<td>$1,049,095</td>
<td>1.3919</td>
<td>$411,140</td>
<td>$1,460,235</td>
</tr>
<tr>
<td>Accommodation Industry</td>
<td>$36,601,541</td>
<td>1.5209</td>
<td>$19,065,743</td>
<td>$55,667,284</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$38,868,745</td>
<td></td>
<td>$19,961,934</td>
<td>$58,830,679</td>
</tr>
<tr>
<td>Travel Agent Commissions*</td>
<td>$27,822,873</td>
<td>1.3982</td>
<td>$11,079,068</td>
<td>$38,901,941</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>$66,691,618</td>
<td></td>
<td>$31,041,002</td>
<td>$97,732,620</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$149,523,211</strong></td>
<td></td>
<td><strong>$71,898,882</strong></td>
<td><strong>$221,422,093</strong></td>
</tr>
</tbody>
</table>

*note: locally-earned commission income derived from travel agents is presented in Section 3.2.3.1.

The Accommodation Industry represent airport-related income of $36.6 million. The secondary linkage organizations are responsible for $66.7 million in annual wages and salaries. With the inclusion of approximately $71.9 million in indirect and induced labour income, YWG generates approximately $221.4 million in total labour income annually.
YWG's total direct labour income contribution of $149.5 million represents 1 percent of the total annual labour income in Manitoba. One dollar out of every $103 in wages and salaries in Manitoba is therefore the result of airport-related activity. Basing the total direct labour income of $112.9 million from surveyed primary and secondary linkages (excluding hotels) on the reported employee numbers represents an average weekly income of $785.52. The average provincial earnings were $601.24. These wage levels, skewed by high earnings in the airline and aerospace industry, exceed most of the major industrial sectors in Manitoba. If the statistic for airport-related earnings includes accommodation income which evidently is a relatively low paying service industry, the calculated average weekly earnings falls to $591.41, below the provincial average.

Table 8 presents Manitoba average weekly earnings, by industry. By excluding accommodation income and employment, the average airport-related employee income exceeds, with the exception of mining, those of every industrial sector in Manitoba.

<table>
<thead>
<tr>
<th>Sector</th>
<th>Weekly Earnings ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mining, including Milling</td>
<td>989.05</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>587.72</td>
</tr>
<tr>
<td>Construction</td>
<td>614.48</td>
</tr>
<tr>
<td>Transportation, Comm., Utilities</td>
<td>698.31</td>
</tr>
<tr>
<td>Trade</td>
<td>400.00</td>
</tr>
<tr>
<td>Finance, Insurance &amp; Real Estate</td>
<td>568.87</td>
</tr>
<tr>
<td>Service</td>
<td>435.16</td>
</tr>
<tr>
<td>Industrial Aggregate</td>
<td>515.85</td>
</tr>
</tbody>
</table>


37 For 1996, the total labour income for Manitoba was 14,155.3 million. See *Statistics Canada, Cat. No. 72-002, 1996.*
3.2.3.1 Travel Agent Commission Income

As discussed in Section 2.11.3.1, travel agents derive a substantial portion of their income from airline ticket sales. For 1996, the economic impact of locally-earned commission income in Manitoba were $27,822,873. 38 With the inclusion of approximately $11 million in indirect and induced labour income, locally-earned commissions generated $38.9 million in labour income. The total labour income (including locally-earned commissions) directly attributable to economic activity at YWG were approximately $215.7 million.

3.2.4 Airport-Related Taxes

Governments of all levels derive substantial tax revenue from the airport and airport-related businesses. Information on airport-related taxes indicate the importance of business contributions to this source of government revenue. In this study, surveyed primary and secondary organizations reported paying $16.5 million in total airport-related taxes, of which approximately $6.4 million is municipal, $5.5 million provincial and $4.6 million federal. The surveyed accommodation industry comprising hotels and motels reported paying $2.6 million in provincial and $4.5 million in municipal taxes.

4. The Airport Area of Economic Influence

Van Cleef (1941) defined a hinterland as "the area adjacent to a trade centre within which economic and some cultural activities are focused largely on the primary centre". This definition need only be slightly altered when referring to the hinterland of airports. 39 An airport's area of economic influence (AEI) can be considered in two distinct ways. First, it could be the large geographical area from which an airport draws its passengers and cargo. In the case of Winnipeg International Airport, this AEI would include all of Manitoba and parts of Saskatchewan and Northern Ontario. Attempting to study and define this type of AEI is problematic. Within Winnipeg

38 Bank Settlement Plan (BSP), Monthly Agent Air Product Sales Report, International Air Transport Association (IATA), Provincial Summary, Year Ending, December 1996.
39 In this study, we have redefined Van Cleef's hinterland concept as being the "area of economic influence (AEI)".
International Airport's AEI lie several other airports, each with its own AEI. Therefore, one place may be a part of two separate economic areas.

The second AEI type concerns the companies that have some degree of dependence on a particular airport. This hinterland is considerably smaller and rarely extends beyond the boundaries of the city. The firms located in this AEI parallel those surveyed in the economic impact study.

4.1 The AEI of Winnipeg International Airport

The location of surveyed primary and secondary organizations help define the boundaries of the airport's area of economic influence (AEI). Location maps of YWG's AEI visually illustrate the spatial relationship between the airport and airport-related organizations, and the economic impact of YWG.40

The vast majority of the firms surveyed had locations in the southeast vicinity of the airport. The tendency to locate to the southeast is due to the location of the main ground access roads to the airport. This fact could have been predicted by following Von Thünen's theory of concentric circles. Von Thünen stated that the zones of agricultural production — or, in this case, zones of airport dependence would expand themselves along a preferred transport axis. For YWG, the zone of economic impact is not just at and in a circle around the airport, rather, it expands along Sargent and Wellington Avenues which are the preferred transport routes entering and exiting the airport. Map 1 illustrates the cone-shaped hinterland of primary and secondary organizations that funnel commercial traffic from the airport to downtown Winnipeg.

Mapping of airport-related firms (excluding airport-dependent hotels/motels) revealed that of 102 surveyed firms, 69 or 67.6 percent were located within a two kilometre radius of the Winnipeg's Air Terminal Building. Furthermore, 81 firms, or 79.4 percent were located within three kilometres. This left 20.6 percent of the surveyed firms having locations further than three kilometres from the terminal of the airport.

Map 2 provides a blow-up view of primary and secondary organizations located in the southeast vicinity of the airport. The symbols on the map may be misleading because they do not

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40 Location maps have been generated from Transportation GIS Software called TransCad.
relate to firm size or in such cases as the multi-tenant cargo building, the number of firms. A methodology to examine these relationships is presented in Appendix J.

While primary and secondary organizations tend to locate within close proximity to the airport site, this does hold for airport-dependent hotels and motels. Map 3 presents the spatial location of airport-dependent hotels and motels. In this study, targeted accommodation firms included firms that advertise on the airport site or in the “Manitoba Accommodation and Campground Guide”. Hotels that do not advertise, but lie within close proximity of the airport were also included.

Apart from a small number of hotel/motels that are located on lands adjacent to the airport (8 hotel/motels, or 33.3 percent are located within a 3 kilometre radius of the airport and only 6, or 25 percent are located within a 2 kilometre radius. This left 16 of 24 hotel/motels, or 66.7 percent are located outside the three kilometre radius of the passenger terminal. In this study, the majority of the hotels are located in the downtown business district and are not a part of the airport AEI. Although the benefits they receive from the airport are directly related to passenger volumes, these firms are more closely related to the growth role of Winnipeg’s commercial environment in the city centre.

The information presented shows a number of firms that depend on the airport in some way. The majority of airport-dependent firms are located very close to the airport boundaries. However, it is impossible to display how strong the airport's economic impact is at a particular geographic point since information regarding the degree to which each firm depends on the airport is unknown. It may be true that hotels in other parts of the city depend on the airport for a percentage of clients, but these hotels would surely survive without the presence of the airport. Some firms are just the opposite. Without a major airport in the immediate vicinity, the company would cease operations.

The AEI and the airport are certainly co-dependent. This study has shown a strong link between the airport and the firms near it. If a defined cut-off point (a point beyond which the economic impact of the airport is not vital to the firm) were declared, a better analysis of the airport's AEI could be determined.

Map 4 presents the location of YWG airport-related organizations outside Winnipeg. The provincial map highlights firms located in Thompson, Swan River and St. Andrews.
<table>
<thead>
<tr>
<th>ID #</th>
<th>Type</th>
<th>Company</th>
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<td>Air Canada, Athabaska Airways Ltd., Canada 3000 Airlines, Northwest Airlines Inc.</td>
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<tr>
<td>2</td>
<td>•</td>
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</tr>
<tr>
<td>3</td>
<td>•</td>
<td>Calm Air International Ltd. (Thompson)</td>
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<tr>
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<td>Perimeter Airlines Ltd.</td>
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<tr>
<td>6</td>
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<td>Bearskin Airlines</td>
</tr>
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<td>7</td>
<td>▲</td>
<td>MB Air Services Branch</td>
</tr>
<tr>
<td>8</td>
<td>▲</td>
<td>Midwest Helicopters Inc.</td>
</tr>
<tr>
<td>9</td>
<td>▲</td>
<td>Westwind Aviation, Northway Aviation Ltd., Ministic Air Ltd.</td>
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<td>10</td>
<td>▲</td>
<td>Aerospace Training Can.</td>
</tr>
<tr>
<td>2</td>
<td>■</td>
<td>Emery Worldwide (CNF)</td>
</tr>
<tr>
<td>3</td>
<td>■</td>
<td>A.D. Rutherford &amp; Co. Ltd.</td>
</tr>
<tr>
<td>4</td>
<td>■</td>
<td>ACE Courier Services, Overseas Courier Service</td>
</tr>
<tr>
<td>5</td>
<td>■</td>
<td>Advance Avionics Aircraft</td>
</tr>
<tr>
<td>6</td>
<td>■</td>
<td>Aero Recip (Canada) Ltd.</td>
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<td>8</td>
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<td>Aerotech Herman Nelson</td>
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<td>9</td>
<td>■</td>
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<td>10</td>
<td>■</td>
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<td>■</td>
<td>W. Can. Aviation Museum</td>
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<tr>
<td>12</td>
<td>■</td>
<td>Assiniboine Cust. Brokers, DHL Worldwide Express</td>
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<tr>
<td>13</td>
<td>■</td>
<td>PLH Aviation Services</td>
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<tr>
<td>16</td>
<td>■</td>
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</tr>
<tr>
<td>17</td>
<td>■</td>
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<td>22</td>
<td>■</td>
<td>Esso Avitat Winnipeg</td>
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<td>23</td>
<td>■</td>
<td>Expert Customs Brokers</td>
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<tr>
<td>24</td>
<td>■</td>
<td>Goulet Aircraft Supply</td>
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<td>25</td>
<td>■</td>
<td>Aviall Canada Ltd.</td>
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<td>26</td>
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<td>Shell Canada Products, Kelly Western Services</td>
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<td>27</td>
<td>■</td>
<td>Kuehne &amp; Nagel International</td>
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<td>28</td>
<td>■</td>
<td>Loomis Courier Service</td>
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<td>29</td>
<td>■</td>
<td>Lynden Air Freight</td>
</tr>
<tr>
<td>30</td>
<td>■</td>
<td>Morningstar Air Express</td>
</tr>
<tr>
<td>31</td>
<td>■</td>
<td>PHL Holding Ltd.</td>
</tr>
</tbody>
</table>
32  Panalpina, Canpar
33  Purolator Courier Ltd.
34  Schenker of Canada Ltd.
35  Sierra Courier Services
36  Standard Aero Ltd.
37  UPS Canada Ltd.
38  Unger's Aircraft Interiors
39  Unicity Custom Brokers
40  Orbit Aircraft Instruments, Amodeo Enterprises Ltd.
41  West-Can Inspection
42  Western Propeller Co.
43  Cara Operations
44  Aeroweld
45  Cadorath Aerospace Inc.

2  ✦ Winnipeg Airports Auth., Air Traffic Control Tower
3  ✦ Can. Customs-Comm.
4  ✦ J & R Building Mtc.
5  ✦ NavCanada Wpg. ACC

1  ★ A Store is Born Aviation Interfaith Ministry, Coles Book Stores Ltd. Four Winds Trading Co., Mutual of Omaha, The UCS Group Transit Gifts & Duty Free, Versa Services Ltd.
2  ★ Credit union Central
3  ★ National Vending Ltd.
4  ★ Tourism Winnipeg
5  ★ Welcome Flowers

1  ★ Amik Transportation
2  ★ Avis Rent-A-Car
3  ★ Beaver Bus Lines Ltd.
4  ★ Budget Rent-A-Car
5  ★ Executive Airpark Inc.
6  ★ Greyhound Canada Trans.
7  ★ Hertz Rent-A-Car
Map 2: Primary and Secondary Airport-related Organizations in the Southeast Vicinity of YWG (excluding hotel/motels)
Map 4: YWG Airport-related Organizations Outside Winnipeg
5. **Airport Night Restriction**

This section of the study describes and estimates the economic impact if a potential night restriction were imposed on airport operations. Based upon past studies\(^1\), a restriction on nighttime activities between 24:00-06:00 would cause a significant contraction of the local economy because many of these operations cannot be shifted or rescheduled to another time of day. The lost utilization costs the airport significant revenues from landing fees and concession rental, the governments lose part of their tax base directly and feel the second round effects as spending by employees and suppliers creates an indirect and induced impact. The direct impacts of a night restriction are the losses in employment, income and airport-related expenditures that would be experienced by firms directly involved in 24:00-06:00 operations at YWG.

5.1 **Nighttime Air Traffic at YWG**

Before calculating potential night-restriction impacts, it is important to identify the air movements that occur between the hours of 24:00 and 06:00. The analysis begins with a comparison of total aircraft movements to movements during nighttime hours.\(^2\) The trend of aircraft movements is examined on a monthly and hourly basis to reflect seasonality and peak-noise periods. The data analysis spans the period 1993 to late 1997 to identify any recent time trends.

5.2 **Total, Local and Itinerant Movements by Month**

All movements at YWG are classified as either local or itinerant movements. A local movement is referred to as an aircraft landing or departing YWG, yet remaining within the same air space. An itinerant movement encompasses all other domestic, trans-border and international aircraft arrivals and departures occurring at YWG. Figures 2-4 provide data for total, local and itinerant monthly movements for 1996 and 1997. These years are plotted against the previous three year average for 1993-95.


\(^{2}\)Runway utilization movements comprise arrivals and departures of prop, turbo-prop and jet aircraft. This does not include helicopter movements, over-flights and missed approaches.
A "by month" analysis demonstrates the seasonality of movements at YWG. Figure 2 provides an overall summary of the total movements by month. For 1996, the majority of total movements per month lie above the previous three year average. This is a reflection of increased air travel in Canada. Aircraft movements during the winter months are considerably lower than the rest of the year, with December and January the least active months. The most active period commences in May and peaks at approximately 15,000 total movements in June. From June onwards, YWG experiences a gradual decline in the total number of local and itinerant movements.

**Figure 2** Total Aircraft Movements by Month, 1993-95 to 1997

For 1997, the data presents a different picture. Interestingly, total aircraft movements are most active in April rather than June, and peak at approximately 16,500 in May (representing a 20 percent increase over the same time in 1996). Furthermore, while the 1997 trend lies consistently above the 1993-95 three year average from January to mid July, it is below the 1996 trend from June to December.

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43 In 1996, there were approximately 155,000 total aircraft movements. Total movements increased by approximately 600 in 1997. *Source: Tower Sheet Statistics, Monthly Aircraft Movements, Winnipeg International Airport.*
Figure 3 provides a description of the total number of local movements during this period. The period encompassing 1993-95 experienced an overall higher proportion of local movements than those witnessed in 1996 and 1997. The peak period for local movements occurs in May, shortly before the overall total YWG peak period in June. A comparison of local movement data for 1996 and 1997 indicates a 1996 peak in June versus a 1997 peak in May. Furthermore, while second peak periods for local movements are evident in the month of September, the number of local movements appears to stagnate in the month of August. For example, in 1996 the numbers declined to 2,198 local movements and account for approximately 16 percent of total movements.\footnote{In 1996, there were approximately 28,000 local aircraft movements. These movements decreased by approximately 12 percent in 1997. Source: Tower Sheet Statistics, Monthly Aircraft Movements, Winnipeg International Airport.}

**Figure 3** Local Aircraft Movements by Month, 1993-95 to 1997
Itinerant movements in 1996 range between approximately 9,000-10,000/month during the winter months, and steadily increase to approximately 12,000/month during the summer months. In 1996, total itinerant movements constitute approximately 126,200, or 81.4 percent of total movements at YWG. In Figure 4, itinerant movements tend to follow a very stable seasonal pattern over the five year period. That is, the peak period occurs in mid summer (June/July) and slowly tapers off in August and September. While itinerant movements for 1996 and 1997 are consistently higher than the 1993-95 three year average, 1997 movement data significantly exceed 1996 over the mid February to July period. The peak occurs in the month of May (13,500/month) and tapers off thereafter. The decline in itinerant movements in the fall of 1997 over the same time during the previous year reflects the withdrawal of Greyhound Air from the passenger service market.

Figure 4 Itinerant Aircraft Movements by Month, 1993-95 to 1997

41 Itinerant movements have increased substantially over the past several years with a 3.4 percent increase from 1995 to 1996 and a 5 percent increase from 1996 to 1997. This is due to an improved economy and carriers responding to increased competition from low cost carriers.

5.3 Monthly Night Movements between 24:00-06:00

Figure 5 provides the monthly analysis of movements during nighttime hours. On average, night movements represent approximately 13 to 16 percent of the total air traffic at YWG. The largest number of flights occur during the summer with approximately 1,192 flights each month. June represents the peak period while the winter months constitute a slower period. The seasonal pattern of nighttime operations appears to have changed in the past two years. In almost each month during 1996 and 1997, the number of movements is consistently greater than the average three-year period preceding 1996. The bulk of this increase is due to the increase in itinerant movements. This is explained by the concentration of courier firms utilizing Winnipeg as a feeder hub and the discontinuance of Air Canada Express providing main deck cargo operations in April of 1994. The void in the air cargo market was immediately filled by carriers that fly smaller aircraft. For 1996, the increase in courier activity has resulted in a greater number of itinerant movements during Feb-Mar, and the period ensuing the summer peak period, during Sept-Oct. The increase in activity during nighttime hours has established a smoother trend and has almost eliminated the difference between the peak summer months and the slower winter months.

47 Technically, the airport movements reported for 06:00 would include all activity up to 06:59.
48 This included Purolator Courier, Federal Express, CanAir Cargo and JetAll. Dedicated cargo aircraft currently operating at YWG include Purolator Courier, Federal Express, UPS, Knighthawk, Morning Star and Royal Air Cargo. Winnipeg Logistics Inc., which if successful in its aggressive plans to position Winnipeg as an air cargo gateway, will dramatically increase the amount of air cargo moving through YWG.
**5.4 Hourly Movements between 24:00 and 06:00**

Figure 6 displays total nighttime activity on an hourly basis from 1993 to 1997. The horizontal axis is broken up into hourly increments from midnight (00:00) to 06:00 a.m. Each bar represents a particular year, while the period average is plotted as a linear line. The peak hours of night activity occur prior to 02:00 and again after 06:00. The peak at 06:00 reflects early morning passenger flights captured between 06:00-06:59. During these peak nighttime periods, between 2,250 and 2,500 movements occur on average each year. During the hours of 02:00 and 05:00 the total annual movements have ranged between 1,250 and 2,000.
Figure 6  Total Nighttime Movements by Hour, 24:00-06:00, 1993-1997

[Bar chart showing total nighttime movements by hour for 1993 to 1997]
5.5 Runway Utilization Patterns

The pattern of runway utilization is used to minimize noise impacts during nighttime operations. Although take-offs generally create more noise reports than landings, the particular runway used is critical to the noise problem. At night, Air Traffic Control gives preferential runway use that has aircraft arriving from the north and departing to the north. Figure 7 depicts runway designation at YWG. The runways are defined by a pair of numbers which describe the two compass directions that one can face when proceeding down the runway. The three runways at YWG are 13/31, 18/36 and 07/25.

Steering aircraft to the northeast of the airport displaces departure noise to southern Winnipeg residents. The runways commanding the most attention regarding noise reduction are runways 31 and 36. Runways 13 and 18 are utilized more for arrivals while runways 31 and 36 are utilized more for departures.49

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49 Departures from a runway typically begin with the acceleration from the extreme end, or threshold, so that the greatest length of the runway is available for takeoff. But, it is possible for aircraft to begin departure on 36 at the intersection of runways 18/36 and 13/31. See Winnipeg International Airport, Noise Management Program, May 30, 1997.
Figure 8 Runway Usage: Average Number of Arrivals per Month, 24:00-06:00, 1993-1997

Figures 8 and 9 outline the average number of arrivals/departures per month using the aforementioned runways. The time intervals are plotted along the horizontal axis, while the average number of arrivals/departures are plotted on the vertical axis. The runway utilization pattern for arrivals decrease for runways 13 and 18 until after 04:00, and increase for departures surging on runways 31 and 36 after 05:00. For example, air freight operations tend to produce more landings during the early morning hours with a surge of take-offs just before dawn. Although the airport does have some discretion regarding runway use, safety factors and wind direction override runway choice.
5.6 Noise Reports

The data trend for noise reports is not unlike the trend depicting aircraft movements during the year. That is, they exhibit a strong seasonal pattern. Noise reports tend to be negligible during the fall, winter and early spring, but peak in the summer months as residents living close to the airport have their windows open at night. Since nighttime activities at YWG tend to peak in the summer months, this accentuates the noise problem. The seasonal peak of nighttime flights occur at the most sensitive time of year and this focuses public awareness to airport activity.

Figure 10 indicates noise report data for 1996 and 1997. These years are plotted against the previous three year average for 1993-95. The data presents day-time and nighttime noise reports per month. Day-time reports generally exceed nighttime reports, and very few of either type exist outside late spring and summer.
Figure 10 Number of Noise Reports per Month, 1993-95 to 1997

In 1996, day-time reports increased significantly from 16 in June to a peak of 45 in July. Furthermore, both report data were lower than the previous three year average. Day-time and nighttime reports decreased 16 and 33 percent, respectively. This represents a total decrease of 22 percent. In 1997, total noise reports declined 8 percent from 1996, and were less than the previous three year average. The decline is attributable to enforced noise abatement procedures for aircraft and an extensive noise management program that is in place to ensure the airport is responsive to

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50 YWG has a very sophisticated and proactive noise management policy. Noise reduction is achieved by strict controls on engine run-ups, including daytime use of remote locations on the airfield and prohibitions on night-time activities. Aircraft take-offs require higher climbing profiles in order to attain higher altitudes more quickly. Also, where winds permit, runways are balanced or rotated to split air traffic over residential areas. All of these procedures help to mitigate noise impacts.

51 Federal regulations as to the requirement of Chapter 3 aircraft will impact air cargo operations. Much of the aircraft at YWG comprises Chapter 2 aircraft such as B727, B737 and DC9 jets. Chapter 2 jets generate significant noise impacts when taxiing, taking off and landing. In 1990, the International Civil Aviation Organization (ICAO) passed a resolution recommending aircraft be replaced or retrofitted with ‘hush kits’ to meet Chapter 3 standards by 2002. Federal Express has commenced the reconfiguring of its fleet by decommissioning its B727’s in favour of the larger but
community concerns. While the Airport Vicinity Development Plan (AVDP) provides protection against incompatible land use and ensures appropriate land use zoning, the airport maintains a regular program of community consultation and involvement. An Airport Advisory Committee on airport noise/environmental exposure deals with noise issues raised by residents in various districts of the City of Winnipeg.

While day-time noise reports decreased 21 percent in 1997, nighttime reports increased 16 percent. Unlike previous years, day-time reports did not peak to the same extent over the June-July period.

5.7 Airport Night Restriction Impacts

The Winnipeg International Airport offers WAA and the community a number of unique and significant advantages over its major competitors. These include unrestricted 24-hour operations, excess airfield capacity (no congestion) and reliable weather conditions. The 24-hour operating window offers both airlines and air cargo operators flexibility in scheduling their time sensitive operations and has encouraged air cargo/courier operations to expand their operations at YWG.

Information on businesses related to night time air operations will reveal the importance of the airports 24-hour capability and the economic effect if a night restriction were imposed. The method employed in this part of the overall study consists of identifying groups that would be affected by a night restriction by incorporating survey questions to determine what impact (if any) those groups would feel were the airport to close at night. The administered survey asked firms if their businesses depended on air operations that occur between the hours of 24:00 and 06:00 and if they could reschedule night time operations if the airport were closed during this time period. Furthermore, participants were asked how much of their airport-related expenditures would decline if airport operations were restricted and whether a night restriction would affect future plans for expansion and investment. The most important impact of a night restriction would ultimately be its effect on the level of employment. The curtailment of nighttime activities would reduce the overall level of employment and economic activity at the airport. The survey attempts to capture total

more noise sensitive Airbus A300. Purolator Courier is also investigating the modification or replacement of their own aging B727 fleet to meet Chapter 3 standards.
employment (full and part-time) that is attributable to nighttime operations.

For simplicity, the airport operational impacts of a night restriction have been conceptually disaggregated into effects on air carrier operations, courier operations and air support services. By categorizing impacts, it is easier to attach a reliable quantitative value to each group.

5.7.1 Data Collection

A list of 77 airport-related businesses were examined to determine which firms were affected by airport operations between the hours of 24:00 and 06:00. The firms on the list included all airport tenants and relevant non-tenants. The list was subsequently narrowed to 41 firms and organizations to represent the affects of a night restriction at the airport. Firms that are obviously not open at night, such as on-site retail establishments, were removed from the list.

Of the 77 organizations initially contacted, 41 firms (53 percent) replied that their businesses depend on air operations between 24:00 and 06:00. Furthermore, 28 firms (68 percent) replied that they could not reschedule their nighttime operations if the airport were closed. Only one firm refused to respond. Also, 25 firms (61 percent) that depend on nighttime activity at YWG replied that any restriction would curtail their plans for business expansion and investment while one firm did not respond.

5.8 Direct and Total Economic Impact

5.8.1 Sectoral Distribution of Impacts

The sectoral distribution of the direct, indirect and induced, and total impacts of a night restriction are presented in tables 9-11. The direct effect of a potential nighttime closure is again, quantified in terms of airport-related expenditures, employment and labour income. At the present time, nighttime activities at YWG generate approximately $37.2 million dollars worth of direct economic activity in Manitoba. Airport-related expenditures provide for 346.5 full-time equivalent jobs and payroll earnings of just under $9.2 million.
## Table 9  Winnipeg International Airport (YWG) Night Restriction Impacts: Airport-related Expenditures

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<tr>
<th>Linkage</th>
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<th>Multiplier</th>
<th>Indirect &amp; Induced</th>
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<td>Air Carrier Operations</td>
<td>$9,415,698</td>
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<td>Couriers</td>
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<td>Air Support Services</td>
<td>$13,623,619</td>
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<td><strong>Total</strong></td>
<td><strong>$37,222,294</strong></td>
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<td><strong>$19,863,968</strong></td>
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## Table 10  Winnipeg International Airport (YWG) Night Restriction Impacts: Employment (Person-Years)

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<th>Linkage</th>
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<td>Air Carrier Operations</td>
<td>113</td>
<td>1.6704</td>
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<td>105.5</td>
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<td>Air Support Services</td>
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<td><strong>Total</strong></td>
<td><strong>346.5</strong></td>
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<td><strong>218</strong></td>
<td><strong>564.5</strong></td>
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## Table 11  Winnipeg International Airport (YWG) Night Restriction Impacts: Labour Income

<table>
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<td>Air Carrier Operations</td>
<td>$2,448,654</td>
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<td>Couriers</td>
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<td>$1,687,550</td>
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<td>Air Support Services</td>
<td>$3,452,318</td>
<td>1.4908</td>
<td>$1,694,398</td>
<td>$5,146,716</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$9,198,900</strong></td>
<td></td>
<td><strong>$4,634,924</strong></td>
<td><strong>$13,833,824</strong></td>
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Upon close examination of the above linkages, the courier industry would suffer the brunt of the direct impact of a nighttime closure. The impact on the courier industry is not unlike the conclusions emanating from the 1994 night restriction study at YWG.\textsuperscript{52} In 1996, courier firms account for approximately 38 percent of airport-related expenditures, 30 percent of employment and 36 percent of the labour income generated between the hours of 24:00-06:00. While employment is much more evenly divided than the expenditures of these groups, it would appear that the highest average earnings are obtained in the courier segment. The 24-hour operating status at YWG is one of the main reasons that several leading courier firms now use Winnipeg as a hub for their Canadian operations. Clearly, the 24-hour operating status must be maintained if courier firms are to maintain their base operations in Winnipeg; otherwise they would be compelled to move.

Air carrier operations and air support services round out the direct impacts. The air support service sector accounts for 37 percent ($13.6 million) of airport-related expenditures, 37 percent (128 full-time jobs) of employment, and 38 percent ($3.5 million) of the payrolls, while the air carriers account for 25 percent ($9.4 million) of airport-related expenditures, 33 percent (113 full-time jobs) of employment, and 27 percent ($2.4 million) of the payroll generated during nighttime hours. A more condensed table of sectoral direct impacts is summarized in Appendix H.

The total economic impact (sum of direct, indirect and induced impacts) is derived through the application of economic multipliers. The multiplier effect are the induced impacts or "second-round" impacts that accompany a change in economic activity. The effect occurs with any change in aggregate expenditure. For example, the economic impact multipliers for Manitoba’s transportation industry are presented in Table 12.

\textsuperscript{52} Courier firms accounted for approximately 57 percent of the employment, 57 percent of the GDP, and 54.6 percent of the payroll during the 24:00-06:00 period. See B.E. Prentice, C. Loly, R. Morrissey, "Economic Impact of a Night Restriction at the Winnipeg International Airport", University of Manitoba Transport Institute, p. 9, July, 1994.
The airport-related expenditure multiplier of 1.5528 indicates that 1 dollar of direct expenditure leads to a total impact of $1.5528. Furthermore, each incremental dollar spent induces $0.5528 of second-round spending in the economy. Similarly, each new direct job leads to 0.6704 other jobs in the economy while $0.5117 of additional labour income results from each incremental dollar earned in the transport sector.

The total economic impact of a night restriction at YWG is approximately $57.1 million in airport-related expenditures, 564.5 full-time equivalent jobs, and $13.8 million in labour income. The direct and total effects are summarized in Table 13.

Following the statistical calibration used in the 1994 study, the economic impacts of a potential night restriction are easier to comprehend if they are expressed on a more distinctive basis (i.e., expenditure per landing, aircraft landings per job, and labour income per landing). Table 14 relates the changes in airport-related expenditures, employment and labour income to the average number of landings that occur each year at YWG during the 24:00-06:00 period.
<table>
<thead>
<tr>
<th></th>
<th>Airport-related Expenditures</th>
<th>Employment (Person-Years)</th>
<th>Labour Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct</td>
<td>$6,264/landing</td>
<td>17.1 landings/job</td>
<td>$1,548/landing</td>
</tr>
<tr>
<td>Total</td>
<td>$9,607/landing</td>
<td>10.5 landings/job</td>
<td>$2,328/landing</td>
</tr>
</tbody>
</table>

Each aircraft that lands during this period contributes $6,264 directly to the economy ($9,607 total), and $1,548 in wages and salaries ($2,328 total). In terms of jobs, for every 17.1 landings another Winnipegger is employed at the airport, while 10.5 landings create the equivalent of 1 full-time job in the Manitoba economy.

5.9 Air Carrier Operations

Air carriers are firms that own and operate their own aircraft. They provide freight carriage service to shippers and also make their aircraft available for chartering during the night. Airlines primarily carry cargo for courier operations and freight forwarders by utilizing air cargo space in the belly of their aircraft. This provides an additional source of revenue for a relatively low incremental cost. Although air carriers provide cargo service, they are not involved in the surface delivery of cargo.

Flight departures often occur during the early morning hours between 04:00-06:00 and require airport operations to be open. Of the air carriers responding to the survey, 75 percent indicated that they could not reschedule their operations outside the 24:00-06:00 window. One scheduled passenger carrier replied that a restriction would cause the loss of one flight per day. Since its departures occur at 05:20, a delay out of Winnipeg would make it impossible to meet connecting flights to a major U.S. hub and subsequent connections from that hub to other eastern U.S. cities. In terms of Canadian air carriers, one firm replied that it would lose its third party contract flights for handling cargo between midnight hours while another replied that it would be

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53 In Canada, approximately 80 percent of all air cargo moves as relatively smaller packages in the cargo holds of passenger aircraft. See Transportation, Distribution Logistics, CITT, p. 5-26, 1997.
unable to achieve the required aircraft utilization for scheduled arrivals coming from sun destinations to make Winnipeg feasible during the winter season. Another firm replied that nighttime activity at YWG enables it to provide unscheduled air ambulance or medevac service — while a third reported it allows for early morning charter departures to remote fishing lodges in northern Manitoba.

At night, airlines also utilize Winnipeg as a location to perform required heavy or light maintenance. The 24:00-06:00 operating window at the airport allows for adequate “down-time” (time when the aircraft is not available for flight). In Winnipeg, Air Canada has a large maintenance facility. Although most of the operations at the facility take place during the daytime hours, some maintenance is scheduled to take advantage of the lower utilization of aircraft at night.

5.10 Courier Operations

YWG’s central location and reliability in terms of airport operations (i.e. no congestion or restrictions) have attracted a large courier presence over the last few years. Although courier companies have found it beneficial to make Winnipeg its distribution hub, the key attraction is the airports 24-hour operating status. The courier industry, which uses the airport facility for overnight delivery would bear the brunt of the direct impact of a nighttime closure.

Like air carriers, some courier operations own their own aircraft. This joint carrier/courier classification places these firms as couriers in this study. Couriers are firms that are engaged in the pick-up and delivery of small packages. While the costs of dedicated freighters is very high, the small size of air express packages results in attractive economics. The key to the air express market is the high willingness-to-pay for the service, relative to the weight. These inter-city couriers require a 24:00-06:00 operating window due to the time-sensitivity of their shipments. The majority of these couriers offer overnight guaranteed delivery to major centres. Consequently, any rescheduling of

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In order to achieve a feasible operation, the responding air carrier attempts to get approximately 17 hours/day of aircraft utilization. This would be difficult to obtain if restrictions were placed on airport operations.
flights outside of this window is impossible since the goods cannot wait until the next day’s passenger flights. Thus, dedicated cargo aircraft flying overnight are required.

A curfew at YWG would severely impact couriers to offer a schedule that would meet the needs of their customers. Cargo movement depends on the flexibility of airline and courier firms to schedule their flights. If airport operations were closed between 24:00-06:00, courier operators would suffer since most cargo operations commence prior to 06:00. The larger courier firms use Winnipeg as the overnight hub for their nighttime freight operations. In particular, a major courier replied that much of the unloaded air freight coming into Winnipeg is rather minimal. When the plane lands at 10:00 a.m., much of the freight stays on the plane. The stop in Winnipeg is essentially to collect additional feeder material for air transport to other Canadian destinations in the east and west. All couriers indicated that airport activity after 05:00 would seriously delay the sortation, consolidation and delivery of air cargo (creating customer service delays).

A closure would adversely affect the investment and expansion plans of courier operations. The 24-hour operations are one of the main reasons that leading courier firms decided to locate in Winnipeg. Several courier firms have built new overnight sorting facilities and bases over the last several years. Any uncertainty surrounding the future of the 24-hour operating status would certainly curtail future investment. Another courier firm reported that any restriction would force it to relocate its air operations out of Winnipeg to either another location within Manitoba or a major centre out of province.

While Intra-city (local) couriers use the airport for pick-ups and deliveries, they do not require the use of the airport between the hours of 24:00 and 06:00. As long as their cargo is at the airport when they arrive to pick it up, say at 8:00 a.m., they are satisfied. These courier operations handle their own transportation arrangements by maintaining their own company fleet or contract out delivery service through the use of owner-operators. However, one intra-city courier replied that it currently retrieves inbound domestic air shipments between 02:00-06:00 and any retrieval after 06:00 would deter its guaranteed overnight delivery service. Therefore, even local courier firms not

55 Cargo shippers prefer to have nighttime services, as this allows them to spend an entire day preparing a shipment. They want to offer the shipment to the carrier for transportation at the end of the day for overnight delivery. Because of this, dedicated air cargo aircraft such as Federal Express, have emerged. These cargo carriers operate flights in the late afternoon and early evening to meet the needs of the shippers. See M.W. Tretheway and T.H. Olson (1992).
present at the airport are also affected by a closure because many of these smaller operations sub-contract inter-city carriages to the larger affected couriers.

In the long run, if a night restriction were imposed and air cargo operations eliminated, consumer demands for air cargo transport services would shift to alternative modes of transport (i.e. truck), creating some employment there, or consumers would be willing to accept some loss in the quality of service (i.e. speed). In any event, such restrictions would cause a distortion in the transport system, resulting in higher costs and slower service being passed onto some segment of the overnight market and disrupting a business that is expected to grow.

5.11 Air Support Services

The Air Support Services category consists of aircraft maintenance and repair facilities, aircraft fueling, ground handling, freight forwarders, flight catering services, ground transport and the providers of any other service that would be affected by a nighttime closure. Included in this category are all government operations.

Canada customs currently staff officers at the airport around the clock. Chartered flight arrivals during the winter season and chartered commercial trans-border departures to U.S. destinations require customs clearance services. Both freight forwarders and consolidators also require clearances after hours. Although a closure would not impact Canada Immigration Services, since it only operates between 08:00-24:00, it would affect U.S. Customs and Immigration Services. U.S. customs start their operations at 04:00 while U.S Immigration begins operations at 04:30 to clear flight departures at 05:30. While Canada Customs and Canada/U.S. Immigration Services could reschedule nighttime operations at YWG, U.S. customs could not because some airlines require early morning departures. With respect to airport operations and administration, WAA replied that its primary airport revenue is received from air cargo activity. A night restriction would lead to significant financial implications for WAA that would make it very difficult to recover from in any other airport-related activity.

56 Freight forwarders and consolidators are those firms which act on the behalf of shippers as forwarding agents, or consolidate shipments from various shippers to take advantage of reduced freight rates.
5.12 Time Trend Analysis

Although economic impact studies are static analyses, they can provide a wealth of information when examined in a dynamic context. A time trend measuring potential impacts of an airport curfew is able to accomplish two things:

(i) measure the associated impact for the year under study; and
(ii) measure the cumulative effect associated with impacts over past periods.

If a curfew were to be implemented at YWG during nighttime hours, there would be a cumulative impact that YWG would be giving up. While the direct impacts of a closure are the losses in employment and labour income, the real losses are the cumulative losses that would be given up in the expectation of future jobs and income that are not realized. In this way, one is not looking only at the impacts for a specific year, but the expectation of future losses.

Figure 11 presents the time trend of direct impacts associated with a night restriction. The trend shows the potential cumulative labour income and employment losses associated with a closure between 24:00 and 06:00.
Figure 11  Time Trend of Direct Impacts, 1989-96

While no economic impact studies were conducted for 1995 and the preceding 1990-93 period, the dynamic analyses reveal an increasing trend of direct employment and payroll income associated with YWG during nighttime hours. The economic multiplier would add an additional two-thirds to labour and one-half to income figures from the indirect and induced impacts.

With nighttime activities expected to grow at YWG, a time line of economic impacts can heighten the awareness of the community and local businesses of the role played by the airport between the hours of 24:00 and 06:00.

The economic impact of nighttime operations are significant for the City of Winnipeg and the Province of Manitoba as YWG is positioning itself to become an effective air freighter gateway. For this opportunity to become a reality, the 24-hour operating status must be maintained.

A drawback of economic impact studies arise from their static nature. Static analyses measure “short-term” effects that become dated very quickly. Yet, such studies provide a great deal of information when examined in a dynamic context. That is, they can be used to measure the long-term “cumulative effect”. By consistently updating airport economic impact studies every few years, the importance of nighttime operations can be revealed through a comparative analysis of past and
present impacts. A time trend measuring potential impacts reveals the growth of airport operations during nighttime hours.

6. Air Cargo Movement

Quantifying the air cargo volume of an airport is important when determining how best to manage and market its movement. Cargo volume provides information necessary when examining airport capacity and related issues of infrastructure investment and noise management. The movement of air cargo impacts an airport’s facilities and operations. Physical planning projection and development must be based on cargo volumes and market development potential is based on air cargo origin/destination information as well. Therefore, it was believed that determining air cargo volumes would help WAA identify and manage these air cargo movement issues.

6.1 Air Cargo Data

Section F of the airport survey (see Appendix B) asked questions on air cargo handling. This section was targeted at those airport-related businesses that directly handled air cargo; i.e. air carriers and air couriers. Survey participants were asked to reveal their air cargo activity in terms of total volume (metric tonnes) and the percentage breakdown of domestic, transborder, and other international cargo movements.

Although Statistics Canada’s Aviation Statistics Centre publications do provide air cargo movement statistics for Winnipeg International Airport including total cargo and similar disaggregation categories, only major scheduled and major charter services are captured (see Appendix 1); courier operations, smaller scheduled services and data for mail carried by the major scheduled services are not collected.37 More importantly, trans-border courier air cargo data is not included; this cargo movement volume is considered substantial (In 1997, Statistics Canada began collecting trans-border courier air cargo movements for inclusion in the trans-border category).

37 Considerable cargo data are not collected for the following reasons: (i) the regional and local scheduled carriers do not file cargo data on their airport activity survey; (ii) the major scheduled services survey (which does capture cargo data) does not (generally) cover carriers which utilize aircraft under 30,000 kg; and (iii) the major charter survey does not collect data on courier cargo or domestic entity cargo flights, See Statistics Canada, Cat no. 51-203-XPB, p.30, 1996.
It is well known that the air cargo industry has undergone significant growth and change in the last 10-15 years; this is reflective of the increasing emphasis on time-based logistics management as well as the overall trend of increasing global trade (and air transport deregulation). In terms of YWG, the air cargo data that is currently available (Statistics Canada) reveals increased volume throughout the 1990s. Even with the exclusion of trans-border courier air cargo data, trans-border movement has almost doubled over the 1991-95 period. Other international movement has also increased dramatically over the same period. Needless to say, the goal of Winnport Logistics Ltd. is to take advantage of this air cargo growth potential.

6.2 Air Cargo Impacts

To calculate the total air cargo volume at YWG, it was important to eliminate the “double-counting” of cargo activity. There are small operations in Winnipeg (i.e. local couriers) that offer pick-up and delivery services on a national or international scale but do not handle the cargo directly. Much of this cargo is shipped indirectly (i.e contracted out) through large carrier/courier operations (i.e. Fedex, Purolator, UPS, etc.) which own dedicated cargo aircraft or shipped as belly freight in passenger aircraft. Including the cargo activity of these smaller operations with larger dedicated cargo operations would amplify total cargo volume moving through YWG. To eliminate the double-counting of cargo activity it was imperative to target this section of the overall survey to cargo handlers only. In this way, the large cargo operations would have captured the majority of the volume at YWG.

Table 15 presents the survey totals related to air cargo volume. Total air cargo volume at YWG was estimated to be 101,460 metric tonnes. A breakdown of this total indicates that approximately 53,773.8 metric tonnes (53 percent) was enplaned and 47,686.2 metric tonnes (47 percent) deplaned. Furthermore, the largest volume of air cargo had a domestic origin/destination representing 89.2 percent of total air cargo. This was followed by 6.2 trans-border and 4.6 percent international.
6.3 Winnport

Winnport Logistics Ltd. ("Winnport") is a private sector consortium dedicated to creating an international air cargo operation based out of Winnipeg International Airport. There is a growing market for global air cargo services, and Winnport has identified Winnipeg as having the potential to provide these services between North America and the two main areas of Europe and Asia. The current air and surface (ship, rail, and truck) cargo transportation, distribution and logistics services in these global markets indicate that there are problems in terms of congestion, delays, and restrictions. The result is higher cargo costs, both financially and temporally. Winnport's goal is to offer the alternative of lower costs for the less time sensitive cargo that is moving through the traditional cargo routes. This would be accomplished by developing a global

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| Table 15 Winnipeg International Airport (YWG): Air Cargo Volume, 1996, tonnes |
|-----------------------------------------------|---------|
| Total Air Cargo                               | 101,460 |
| Air Cargo Enplaned                            | 53,773.8|
| Air Cargo Deplaned                            | 47,686.2|
| Breakdown of Air Cargo                        | Percentage (%) |
| Domestic                                       | 89.2    |
| Transborder                                    | 6.2     |
| Other International*                           | 4.6     |

* excludes U.S.

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multi-modal transportation hub at Winnipeg International Airport. Winnport dedicated cargo aircraft would provide international freight forwarders with a direct connection between the "geographical centre" of North America and airports in Europe and Asia. In addition, a multi-modal transportation complex adjacent to the airport would facilitate the ground requirements of the cargo. The ground activity would be the distribution to, and consolidation from, the rail and truck transportation hubs and the associated logistics services. The complex could also house value-added activities such as assembly, packaging, manufacturing and storage within a "free-trade zone" for subsequent re-export.

The proposal of a multi-modal complex is presented in the Airport Area Plan study. It examines the designated area adjacent to the north and west sides of the Airport, and discusses what is necessary to develop the complex in terms of land use, transportation infrastructure requirements, zoning and environmental considerations, and management and financing arrangements.

The multi-modal complex envisioned has immediate connections to major truck and rail routes throughout North America. The complex is made up of the various components necessary for and related to the operation of a global air hub. These are: direct runway (air-side) access operations, airport related operations, multi-modal operations, intermodal operations, manufacturing and distribution operations, and related office, commercial, aviation and general operations. In the Airport Area Plan, road and rail infrastructure networks are analyzed for their handling capabilities expected from the increased cargo movement. Furthermore, subsequent re-routing, upgrading and expansions are suggested. The plan also maintains the Winnipeg International Airport's 24-hour operation long with the airport vicinity protection areas designated to minimize noise and traffic problems associated with aircraft movements.

Airport Area Plan: North and West of the Winnipeg International Airport, IDG Stanley, 1996.
7. Conclusions

Significant levels of economic activity can be attributed to the Winnipeg International Airport. The cooperation that was received from the targeted firms and organizations indicates the importance of airport operations to their businesses. This study has shown that YWG extends far beyond the terminal doors and aircraft gates. Airplanes and passengers require services and airport businesses that respond to these needs and contribute to the local and provincial economy by providing jobs, paying wages, buying locally produced goods and services and contracting for airport construction and capital improvements.

The direct impact of economic activity combines with the indirect and induced impacts to generate millions of dollars in airport-related expenditures and tax revenues as labour income generated at the airport is re-spent elsewhere in the local economy. Furthermore, thousands of jobs are created as a direct result of this economic activity.

The economic activity related to YWG has a substantial impact on Manitoba’s economy. In this economic impact study, the aggregation of airport-related organizations were evaluated as if they represented a single linkage (i.e. air carriers, air support services, ground transport, accommodation, etc.). This perspective fits with the local airport authority’s concern with the interests and operations of a diverse group of organizations. Issues such as airport development and marketing will affect the operations of an airport and have implications for all those firms, employees, proprietors, and suppliers who have a commercial interest in the efficient operation of the airport. By developing a greater understanding of the primary and secondary airport-linkages, the impact of YWG on the local economy and economic growth of the province can be more fully appreciated.

The community as a whole, both as taxpayers and residents, have a vested interest in the operations of the airport, but no practical way to appreciate its economic contribution. By understanding the economic impact of YWG, the public is better able to form an opinion regarding airport operations. Likewise, the local airport authority requires current and complete information to effectively communicate with the community. Because the interests of a number of businesses and organizations are being represented, the appropriate medium is an Economic Impact Study. Such
a study provides the wide perspective needed to assess the major significance of the airport within the community's economy.

The study's current findings also help to fulfill another purpose, that is, to capture the economic impacts for the final year preceding commercialization. This will greatly aid in creating "before and after" pictures of the National Airport Policy's impacts and serve as a benchmark to evaluate the effects of commercialization when future post-commercialization economic impact studies are undertaken. By consistently updating airport economic studies every few years, the importance of airport operations can be revealed through a comparative analysis of past and present impacts. For example, the time trend analysis measuring the direct impacts associated with a potential night restriction highlighted the long-term cumulative effect of labour income and employment losses associated with an airport closure at YWG.

Improvements were also made to the accepted impact methodology. Airport-related expenditures were regarded as a more appropriate measure of the direct impacts. By including expenditure information, the study does not suffer from the overestimation ("double-counting") of economic activity. Furthermore, it makes it easier to account for where the expenditures are being absorbed, that is, whether they are injected into the local economy or are removed as leakages. This is not the case if one uses revenues as the accepted measure. Another methodological concern is the incorporation of airline ticket sales as an economic impact at airports. Based upon past airport studies, this approach is logically flawed. Past studies assumed that airline revenues based on ticket sales were attributed to the point of origin as a local impact. In reality, these revenues originate at the site, to their destination or point of transfer. Since travel agents derive a substantial portion of their income from air ticket sales, and this study focused on expenditures (not revenues), locally-earned travel agent commissions were used.

One topic that deserves further research is the role of air cargo movement. Air cargo volumes continues to grow at YWG as it positions itself to become an air cargo gateway. However, there is a little information as to the structure or scope of the industry. Currently, no legislation exists that requires cargo operators to disclose information pertaining to cargo volumes. Statistics Canada is unable to provide air cargo data other than from the main line scheduled carriers and charters that are obliged to report. The absence of courier data pertaining to cargo volumes
represents a large segment of the cargo market that is subsequently not captured. An in depth study of the air cargo market would be useful for airport planners, and airport-related businesses. The cargo data estimated in this study attempts to disclose this information in order to foster further research.
Appendix A Surveyed Primary and Secondary Organizations

List of Survey Participants:

**Primary Linkages**

(i) **Air Carriers**
- Air Canada
- Athabaska Airways Ltd.
- Calm Air Airlines Ltd.
- Canada 3000 Airlines Ltd.
- Canadian Airlines International Ltd.
- Greyhound Airlines Ltd.
- Northwest Airlines Inc.
- Northwest Territorial Airlines Ltd.
- Perimeter Airlines Ltd.

- BAX Global (Canada) Ltd.
- Blaiklock Inc.
- Boom-Ad Advertising Systems Ltd.
- Boeing Canada Technology Ltd. (Wpg Div.)
- Bristol Aerospace Ltd.
- Cadorath Aerospace Inc.
- CanPar
- CARA Operations
- Cole Freight Group Inc.
- CPC, Transportation Operations
- David Kirsch Forwarders
- Danzas Canada Ltd.
- DHL Worldwide Express
- Dynamex
- Emery Worldwide, A CNF Company
- Esso Avitat Winnipeg
- Expert Customs Brokers Ltd.
- FastAir Cargo Systems Ltd.
- Federal Express
- Fritz Starbe Inc.
- GHY International Co. Ltd.
- Goulet Aircraft Supply Ltd.
- Inland Technologies Inc.
- Kelly Western Services Ltd.
- Kuehne & Nagel International Ltd.
- Livingston International Inc.
- Loomis Courier Service
- Lynden Air Freight
- Morningstar Air Express
- Orbit Aircraft Instruments
- Overseas Courier Service (Canada) Ltd.
- Panalpina Inc.
- Peace Bridge Brokerage Ltd.
- PLH Aviation Services Inc.
- PHL Holding Ltd.
- Purolator Courier
- Royal Bank of Canada
- Sameday Right-O-way Air Express
- Sierra Courier Services Ltd.
- Secure Freight Systems Ltd.
- Schenker International

(ii) **General Aviation**
- Aerospace Training Canada International
- Bearskin Airlines Ltd.
- Keystone Air Service
- Manitoba Air Services Branch
- Midwest Helicopters Ltd.
- Ministic Air Ltd.
- Mission Air
- Northway Aviation Ltd.
- Skyward Aviation Ltd.
- Sowind Air Ltd.
- TransCanada Pipelines
- Westwind Aviation

(iii) **Air Support Services**
- ACE Courier Services
- A.D. Rutherford & Co. Ltd.
- Advance Avionics Aircraft Ltd.
- Aero Recip (Canada) Ltd.
- Aerotech Herman Nelson Inc.
- Aeroweld
- Air Fab
- Airports Network Ltd.
- Amodeo Enterprises Ltd.
- Assiniboine Customs Brokers
- Aviall Canada Ltd.
Shell Canada Products Ltd.
Springer Aerospace Ltd.
Standard Aero Ltd.
Ungers Aircraft Interiors Ltd.
Unicity Customs Brokers Ltd.
UPS Canada Ltd.
West-Can Inspection Ltd.
Western Canada Aviation Museum
Western Propeller Co. Ltd.
Winnport Logistics Ltd.

(iii) Airport Operations & Administration
Aeroguard Security Services Inc.
Air Traffic Control Tower
Canada Customs
Canada Customs, Air Operations
Canada Immigration Centre
I & R Building Maintenance Ltd.
U.S. Customs
U.S. Immigration
Winnipeg Area Control Centre - NAV Canada
Winnipeg Airports Authority Inc. (WAA)

(ii) Ground Transportation
AMIK Transportation
Avis Rent-A-Car
Beaver Bus Lines Ltd.
Budget Rent-A-Car
Executive Airpark Inc.
Greyhound Canada Transportation
Hertz Rent-A-Car
Kidd's Limousine Service
Leisure Limousine Services
London Limousine Service
National Tilden Rent-A-Car
Thifty Canada Car Rental

Secondary Linkages
Appendix B

ALL INFORMATION WILL BE KEPT STRICTLY CONFIDENTIAL. If you have any questions or concerns when filling out this survey, please contact Todd Harrison or Scott Shurvell of the University of Manitoba Transport Institute at (204) 474-9842.

SECTION A. COMPANY INFORMATION

1.) Please verify the following information:

NAME OF FIRM:
ADDRESS:

2.) Please make any corrections here:

NAME OF FIRM:
ADDRESS:

3.) Please provide us with the following contact information:

YOUR NAME:
TITLE/POSITION:
PHONE NUMBER:
FAX NUMBER:

4.) Please indicate type of business:

a.) Air carrier ........................................... ☐
b.) General aviation ........................................... ☐
c.) Aircraft services (eg. maintenance, fuel, leasing) .............. ☐
d.) Freight handling (eg. couriers, freight forwarders) ........... ☐
e.) Ground transportation ........................................... ☐
f.) Accommodation ........................................... ☐
g.) Retail ........................................... ☐
h.) Other (please specify) ........................................... ☐
SECTION B. EXPENDITURE INFORMATION

Expenditures are important information about your business. When combined with the airport and other airport-related businesses, they help to reveal the economic impacts to the local economy.

For the year 1996, or your most recent full fiscal year (12 month period), please provide the following financial information attributable to your airport-related business ONLY:

1.) Total dollar amount of airport-related expenditures: $____________________

2.) What percentage of these expenditures were Manitoba supplied? _____%

3.) What percentage of these expenditures were salaries, wages and benefits? _____%

SECTION C. TAXATION INFORMATION

Governments of all levels derive substantial revenue from the airport and airport-related businesses through taxation. Tax information obtained will demonstrate the importance of your contribution to this source of government revenue.

For the year 1996, or your most recent full fiscal year (12 month period), please provide the financial information attributable to your airport-related business ONLY:

1.) Total dollar amount of airport-related taxes: $____________________

2.) Please break down your airport-related taxes into the following categories by percentage (%):
   a.) Taxes
   - Municipal (property, water and sewer, business, etc.) .................... _____%  
   - Provincial (fuel, payroll, etc.) .................................................. _____%  
   - Federal (GST, corporate, etc.) .................................................... _____%  
   b.) Subsidies
   - Provincial ................................................................. _____%  
   - Federal ................................................................. _____%  
   TOTAL (should equal 100%) ........................................... _____%
SECTION D. EMPLOYMENT INFORMATION

Providing people with jobs contributes to the overall well-being of the economy and the community. Information on the employment that your business creates is very important in revealing the economic impacts of the airport and airport-related businesses.

For the year 1996, or your most recent full fiscal year (12 month period), please indicate the employment attributable to your airport business ONLY:

1.) full-time airport-related employees residing in Manitoba: _______ employees
2.) part-time airport-related employees residing in Manitoba: _______ employees

SECTION E. AIRPORT NIGHT RESTRICTION

Information on your business related to the night time operations of the airport will reveal the importance of its 24 hour capability and the economic effect if a night restriction were imposed.

For the year 1996, or your most recent full fiscal year (12 month period), please answer the following questions as they relate to airport night time operations.

1.) Does any of your business depend on air operations that occur between 24:00 hrs and 06:00 hrs?

   YES. . . . . . . ☐   NO. . . . . . . ☐

If YES, please explain:

   ___________________________________________________________

2.) Could you reschedule your night time operations if the airport were closed between 24:00 hrs and 06:00 hrs?

   YES. . . . . . . ☐   NO. . . . . . . ☐

If NO, please explain:

   ___________________________________________________________

3.) How much would your expenditures drop if airport operations at the airport were restricted between 24:00 hrs and 06:00 hrs?

   $____________________ or as a percentage of total expenditures _____%
4.) full-time employees resulting from the 24:00 hrs to 06:00 hrs operations of the airport: 

5.) part-time employees resulting from the 24:00 hrs to 06:00 hrs operations of the airport:

6.) Would a night restriction of airport operations between 24:00 hrs and 06:00 hrs affect your plans for expansion and investment?

YES. □ NO. □

If YES, please explain:

SECTION F. AIR CARGO VOLUME

NOTE: This section is to be completed by air cargo handlers only, IN ADDITION to the above sections.

Cargo volume information will help Winnipeg International Airport in determining the appropriate physical and services planning for the amount of tonnage moving through the airport.

For the year 1996, or your most recent full fiscal year (12 month period), please answer the following questions about your air cargo volume.

1.) Total air cargo enplaned .............................. metric tonnes
2.) Total air cargo deplaned .............................. metric tonnes
3.) TOTAL air cargo ........................................ metric tonnes
4.) Please break down your total cargo into the following categories by percentage (%):
   a.) Domestic .............................................. %
   b.) Transborder ......................................... %
   c.) Other International (excluding the U.S.) ............... %

Thank You For Your Time And Effort

Please Forward Your Completed Survey Using The Enclosed
Stamped and Addressed Envelope.

ALL INFORMATION WILL BE KEPT STRICTLY CONFIDENTIAL
### Appendix C  “Airport-Dependent” Hotels and Motels

List of Survey Participants:

<table>
<thead>
<tr>
<th>Airliner Inn*</th>
<th>International Inn*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airport Motor Inn*</td>
<td>The Lombard</td>
</tr>
<tr>
<td>Best Western Carlton Inn</td>
<td>Place Louis Riel All Suite Hotel</td>
</tr>
<tr>
<td>Charter House Hotel</td>
<td>Polo Park Inn</td>
</tr>
<tr>
<td>Comfort Inn (Airport)</td>
<td>Quality Inn</td>
</tr>
<tr>
<td>Country Inn &amp; Suites By Carlton</td>
<td>Quest Inn Downtown</td>
</tr>
<tr>
<td>The Delta Winnipeg</td>
<td>Radisson Suite Hotel Winnipeg Downtown</td>
</tr>
<tr>
<td>Fort Garry Hotel</td>
<td>Ramada Marlborough Inn Winnipeg</td>
</tr>
<tr>
<td>Holiday Inn Airport West*</td>
<td>Sheraton Winnipeg Hotel</td>
</tr>
<tr>
<td>Holiday Inn Crowne Plaza</td>
<td>St. Regis Hotel</td>
</tr>
<tr>
<td>Holiday Inn Fort Richmond*</td>
<td>Travelodge Hotel Winnipeg Downtown</td>
</tr>
<tr>
<td>Holiday Inn Winnipeg South</td>
<td>Viscount Gort Hotel</td>
</tr>
</tbody>
</table>

*did not participate in study.
Appendix D

ALL INFORMATION WILL BE KEPT STRICTLY CONFIDENTIAL. If you have any questions or concerns when filling out this survey, please contact Todd Harrison or Scott Shurvell of the University of Manitoba Transport Institute at (204) 474-9842.

AIRPORT-DEPENDENT HOTELS AND MOTELS

1.) Please verify the following information:

NAME OF HOTEL/MOTEL:____________________________________

ADDRESS:_______________________________________________

2.) Please make any corrections here:

NAME OF HOTEL/MOTEL:____________________________________

ADDRESS:_______________________________________________

3.) Please provide us with the following contact information:

YOUR NAME:_____________________________________________

TITLE/POSITION:_________________________________________

PHONE NUMBER:_________________________________________

FAX NUMBER:____________________________________________

Providing people with jobs contributes to the overall well-being of the economy and the community. Information on the employment that your business creates is very important in revealing the economic impacts of the airport and airport-related businesses.

For the year 1996, or your most recent full fiscal year (12 month period), please indicate the employment at your hotel:

1.) full-time employees: __________ employees

2.) part-time employees: __________ employees
3.) What is the total number of guest rooms in your establishment? _____ rooms

4.) What was your average accommodation rate last year? (please check the appropriate box)
   □ less than 20 percent
   □ 20 to 40 percent
   □ 41 to 60 percent
   □ 61 to 80 percent
   □ over 80 percent

5.) Please estimate the number of hotel rooms that are rented to air travellers as a percentage of all guests. (please check the appropriate box)
   □ less than 20 percent
   □ 20 to 40 percent
   □ 41 to 60 percent
   □ 61 to 80 percent
   □ over 80 percent

Accommodation, payroll expenses and taxes are important information about your business. When combined with other hotels and motels, they help to reveal the economic impacts to the local economy.

For the year 1996, or your most recent full fiscal year (12 month period), please answer the following:

6.) TOTAL dollar amount of hotel operating expenses: $__________

7.) Please estimate the percentage of total expenses that were payroll expenses (salaries, wages and benefits): _____%

8.) Please estimate your taxes:  
   • Municipal (property, water and sewer, business, etc.) $__________
   • Provincial (fuel, payroll, etc.) $__________

Thank You For Your Time And Effort

Please Forward Your Completed Survey Using The Enclosed Stamped and Addressed Envelope.

ALL INFORMATION WILL BE KEPT STRICTLY CONFIDENTIAL
Appendix E  Survey Data

A number of firms and organizations that participated in the Winnipeg Airport Economic Impact Study expressed concerns over the confidentiality of the information being provided. In conferring with Winnipeg Airports Authority (WAA), it was decided that there was no need to present the data that would disclose information at the individual firm level. To alleviate the concerns of the survey population and gain their support for the study, assurance was given that no disaggregated information would be released. Since only several firms may be within each category, only information in an aggregated form has been released and is contained within the text of the report.

Appendix F

<table>
<thead>
<tr>
<th>Manitoba Economic Impact Multipliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linkage</td>
</tr>
<tr>
<td>-------------------------------------</td>
</tr>
<tr>
<td><strong>Primary Linkage Organizations</strong></td>
</tr>
<tr>
<td>Air Carriers</td>
</tr>
<tr>
<td>General Aviation</td>
</tr>
<tr>
<td>Air Support Services</td>
</tr>
<tr>
<td>Airport Operations &amp; Administration</td>
</tr>
<tr>
<td><strong>Secondary Linkage Organizations</strong></td>
</tr>
<tr>
<td>Commercial Services</td>
</tr>
<tr>
<td>Ground Transportation</td>
</tr>
<tr>
<td>Accommodation Industry</td>
</tr>
</tbody>
</table>

Data Source: Manitoba Bureau of Statistics, 1994
### Appendix G

**Winnipeg International Airport (YWG): Direct Economic Impacts**

<table>
<thead>
<tr>
<th>Linkage Income</th>
<th>Airport-related Expenditures ($000)</th>
<th>Employment (Person-Years)</th>
<th>Labour Income ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air Carriers</td>
<td>$51,347</td>
<td>667</td>
<td>$22,501</td>
</tr>
<tr>
<td>General Aviation</td>
<td>$18,944</td>
<td>248</td>
<td>$6,464</td>
</tr>
<tr>
<td>Air Support Services</td>
<td>$35,313</td>
<td>1337.5</td>
<td>$40,125</td>
</tr>
<tr>
<td>Airport Operations &amp; Administration</td>
<td>$22,415</td>
<td>334.5</td>
<td>$13,741</td>
</tr>
<tr>
<td><strong>Sub-totals</strong></td>
<td>$128,020</td>
<td>2587</td>
<td>$82,832</td>
</tr>
<tr>
<td><strong>Secondary Linkage Organizations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commercial Services</td>
<td>$3,938</td>
<td>68.5</td>
<td>$1,218</td>
</tr>
<tr>
<td>Ground Transportation</td>
<td>$6,478</td>
<td>109</td>
<td>$1,049</td>
</tr>
<tr>
<td>Accommodation Industry</td>
<td>$47,459</td>
<td>2097.5</td>
<td>$36,602</td>
</tr>
<tr>
<td><strong>Sub-totals</strong></td>
<td>$57,874</td>
<td>2275</td>
<td>$38,869</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>$185,894</td>
<td>4,862</td>
<td>$149,523 *</td>
</tr>
</tbody>
</table>

*+ note: The total for direct labour income includes $27.8m from locally earned-commission income.*

### Appendix H

**Sectoral Distribution of the Direct Impacts of a Night Restriction at YWG**

<table>
<thead>
<tr>
<th>Linkage</th>
<th>Airport-related Expenditures ($000)</th>
<th>Employment (Person-Years)</th>
<th>Labour Income ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air Carrier Operations</td>
<td>$9,416</td>
<td>113</td>
<td>$2,449</td>
</tr>
<tr>
<td>Couriers</td>
<td>$14,183</td>
<td>105.5</td>
<td>$3,298</td>
</tr>
<tr>
<td>Air Support Services</td>
<td>$13,624</td>
<td>128</td>
<td>$3,452</td>
</tr>
</tbody>
</table>
### Appendix I

**Winnipeg International Airport (YWG) Cargo Movement, Major Scheduled and Charter Services, tonnes**

<table>
<thead>
<tr>
<th>Year</th>
<th>Loaded Cargo</th>
<th></th>
<th></th>
<th>Unloaded Cargo</th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domestic</td>
<td>Trans-border</td>
<td>Other Int'l</td>
<td>Domestic</td>
<td>Trans-border</td>
<td>Other Int'l</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>15,701.2</td>
</tr>
<tr>
<td>1987</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>11,959.2</td>
</tr>
<tr>
<td>1988</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>14,886.7</td>
</tr>
<tr>
<td>1989</td>
<td>11,433.2</td>
<td>970.8</td>
<td>430.2</td>
<td>15,175.1</td>
<td>1,667.4</td>
<td>0</td>
<td>29,676.7</td>
</tr>
<tr>
<td>1990</td>
<td>10,989.9</td>
<td>802.4</td>
<td>0</td>
<td>15,161.8</td>
<td>1,515.1</td>
<td>8.2</td>
<td>28,477.5</td>
</tr>
<tr>
<td>1991</td>
<td>9,959.5</td>
<td>592.7</td>
<td>21.5</td>
<td>43,704.5</td>
<td>1,245.2</td>
<td>19.8</td>
<td>25,543.2</td>
</tr>
<tr>
<td>1992</td>
<td>10,678.7</td>
<td>785.1</td>
<td>169.5</td>
<td>15,019.9</td>
<td>1,595.2</td>
<td>103.2</td>
<td>28,351.6</td>
</tr>
<tr>
<td>1993</td>
<td>11,150.9</td>
<td>750.4</td>
<td>83.5</td>
<td>15,827.4</td>
<td>1,841.1</td>
<td>26.9</td>
<td>29,680.2</td>
</tr>
<tr>
<td>1994</td>
<td>6,685.0</td>
<td>983.9</td>
<td>117.5</td>
<td>9,297.3</td>
<td>1,964.9</td>
<td>23</td>
<td>19,071.6</td>
</tr>
<tr>
<td>1995</td>
<td>4,801.0</td>
<td>1164.0</td>
<td>162.4</td>
<td>6,532.9</td>
<td>2,138.7</td>
<td>42.2</td>
<td>14,840.8</td>
</tr>
<tr>
<td>1996</td>
<td>3,721.9</td>
<td>1187.9</td>
<td>81.9</td>
<td>4,983.8</td>
<td>2,117.8</td>
<td>19.9</td>
<td>12,112.6</td>
</tr>
</tbody>
</table>

Data Source: Statistics Canada, Air Carrier Traffic at Canadian Airports (31-005, 51-203-XPB)

"n.a." denotes not available.
Appendix J  Theory of Airport Areas of Economic Influence

Location theory proposes that distance is the key factor governing all economic activities. Two basic theories about economic geography and location theory are the Gravity Model and the Distance Decay Effect. The Gravity Model states that two separate groups, in this case the airport and a related firm, generate interaction in proportion to the product of their sizes while being impeded by the frictional effect of distance between the two points. Prentice, Urbina and Wang (1998) demonstrate that the Gravity Model measures the derived demand for transportation. The model has the following algebraic form:

\[
I_q = \frac{f(M_i M_j)}{f(D_q)}
\]

where

- \( I_q \) = the volume of interaction between group \( i \) and group \( j \);
- \( M_i, M_j \) = the economic size, or population mass, of \( i \) and \( j \); and
- \( D_q \) = the transportation cost to span the distance between \( i \) and \( j \).

(source: Rich, 1980, p.5)

Rather than rely on the size of the two locations, the Distance Decay Effect formula relies on a particular variable in \( i \) and \( j \). If the airport is at location \( i \) and a related firm is at location \( j \), then the variable, \( P \), may be the degree of dependence on the airport by the firm.

\[
I_q = \frac{f(P_i; P_j)}{f(D_q)}
\]

where

- \( I_q \) = interaction between \( i \) and \( j \);
- \( P = \) the variable in \( i \) or \( j \);
- \( D_q = \) distance between \( i \) and \( j \); and
- \( \alpha = \) deterrent value

(source: Todd, 1995)

The deterrent value in the case of airports may be something like a toll on a major road between the firm's location and the airport. Though these models are applicable to airport studies, it is impossible to go further without more specific numerical data that would breach confidentiality. With more information, it may be possible to use these models to determine the geographical size of the airport area of economic influence. For now, it is sufficient to assume that overcoming distance is one, if not the largest effect on industrial location.
Alfred Weber's model (1909) follows the assumption that overcoming distance has the largest
effect on industrial location. Therefore, according to Weber, the key factor in industrial location is
the transport costs associated with moving the materials and the finished product. The total transport
cost (TTC) is equal to the assembly cost (AC) plus the distribution cost (DC).

\[
\text{(3) } \text{TTC = AC + DC}
\]

(source: Weber, 1909)

The goal of an industrial firm should be to find the point of minimum total transport cost by
trading off the assembly cost and the distribution cost.

While transport costs were the dominant location factor in Weber’s model, they were not the
only determinant of industrial location. Labour and agglomeration were also considered. For the
point of minimum transport costs to be viable for industry, it had to coincide with one of the fixed
locations for labour (Weber assumed that labour was in fixed locations and immobile.)
Agglomeration, according to Weber’s model, may make the point of lowest total cost differ from the
point of lowest transport cost. Advantages of agglomeration, or the savings that a firm reaps from
the nearby operation of other firms, include factors such as labour poaching, shortened supply-chains
and established infrastructure. Agglomeration is definitely evident in YWG’s area of economic
influence.

Hoover (1948) expanded upon Weber’s work by finding intermediate points with lower total
transport costs when dealing with more than one market. Hoover found that if transshipment
between transport modes is necessary, it is at this point that transport costs are likely to be
minimized. It is likely that for many industries, locating near an airport lowers their total transport
costs although original applications of the theory considered seaports as the main trans-shipment
locations.

Hoover also found that goods of high value per unit weight can bear transport costs higher
than goods of lower value per unit weight. Because the cost of air transport is significantly higher
than marine, rail, or truck transport, industries producing goods with high value per unit weight are
more likely to locate near airports.

An airport’s “area of economic influence” (AEI) can be measured. Winnipeg International
Airport’s AEI has been measured unscientifically. The location of airport-related firms were mapped
but, since the degree of dependence for each firm is unknown, it is impossible to firmly define the
AEI's boundaries. For example, some firms, like hotels that are located far from the airport, may have negligible dependence on the airport but are still included in this study. Therefore, while the entire AEI may extend on the map well into downtown Winnipeg and deep into the southern part of the city, this, especially the latter, may be misleading. When the hotels are removed from the study, the concentration of airport-dependent firms is even more strongly concentrated around the airport, suggesting that the AEI of the airport is quite small in terms of the location of firms that depend on it.

The geographical space in which the majority of airport-dependent firms are found is no more than a few square kilometres. Such firms are clustered around the main thoroughfares leading to and from the airport terminal building. Many are also located on the actual airport site. The main reason behind this clustering is that virtually all activity at the airport takes place in that limited area. With the possibility of great change for the type and amount of use for Winnipeg's airport, the AEI may undergo great change as well. Rather than being centred immediately south and east of the passenger terminal, industry may eventually locate north and west of the airport. As this occurs, the geographical size of the airport's AEI will increase several times over.
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