Air-Rail Link Ridership Due Diligence Report
Draft Version 2.0

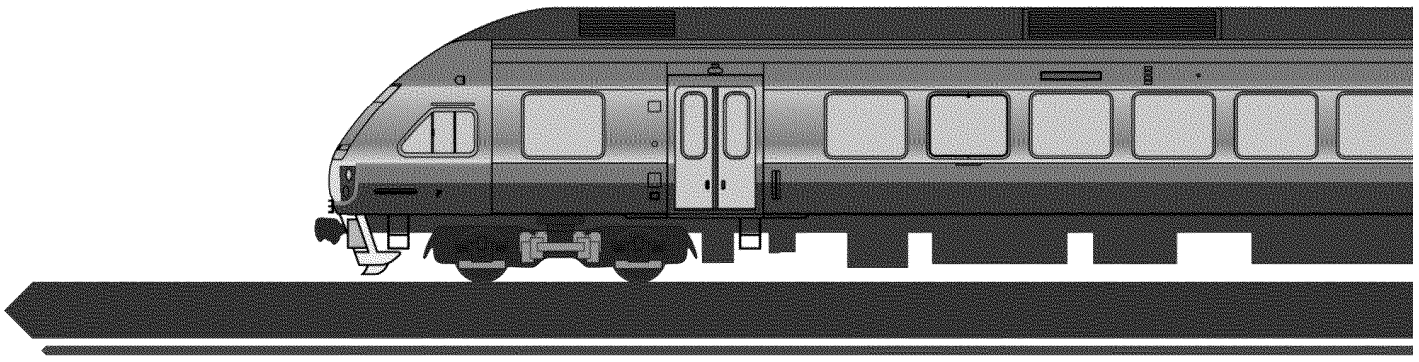
Modified: Oct. 3rd, 2012

Authors: Matthew Lattavo

Denny Yip

Mark Park

Notes: This document is an internal ARL/ Metrolinx document. It is not intended for outside distribution unless permitted and confirmed by the Director, Business Planning at ARL Division, Metrolinx. Reproduction externally without prior authorization requires approval. Any reproduction in part of this report cannot be interpreted separately without reference to this entire document.



Union-Pearson Air Rail Link

Ridership Due Diligence

This page is intentionally blank

2012 10 03 Ridership Due Diligence D ML, DY, MP

Table of Contents

Works Cited

Cadillac Fairview and Armadale Properties. "Buttonville Presentation to Development Services Committee." 22 November 2011. *City of Markham.* http:/ / www2.markham.ca/ markham/ ccbs/ indexfile/ Agendas/ 2011/ Devel opment%20 Services/ pl111122/ Buttonville%20Presentation.pdf. 3 July 2012.

City of Toronto. *Union Station Revitalization*. 2012. http:/ / www.toronto.ca/ union_station/ index.htm. 3 July 2012.

Cowan, James. "Can Air Canada be Saved?" *Canadian Business* (2012): 1. Website. Online: http:/ / www.canadianbusiness.com/ article/ 79337 --can-air-canada-be-saved.

Greater Toronto Airport Authority. *A World of Possibilities - GTAA Annual Report 2011*. Annual Report. Toronto, 2012. Online: http:/ / www.torontopearson.com/ uploadedFiles/ GTAA/ Content/ Publica tions/ GTAA _2011_AR.pdf.

—. *Taking Flight - The A*
http:/ / www.tor

Halcrow Group Ltd, C
Station Revenue

Jacobs Consultancy. *To*
Toronto, 2010.

Leslie Woo, Metrolinx
2012.

Marshall,
essways of
July 200

Metrolinx. *C*
D

Mordant, Nicol
http:/ / ca

Porter Airlines. *News*
https:/ / www.
July 2012.

Regional Municipality of York. *York Region Official Plan*. 7 September 2010. Website. 16 July 2012.

Steer Davies Gleave. *Blue 22 Ridership and Revenue Forecasts Final Report*. London, 2004. Report.

—. *Georgetown Corridor Airport Rail Link Forecasting Update 2011/ 12*. Report. Toronto, 2012. SlideShow.

—. *Toronto Airport Rail Link 2009 Traffic and Revenue Update*. Final. London, 2009. Document. The contents of this report are proprietary and confidential.

Transport Canada. *Needs Assessment Study - Pickering Lands*. 10 February 2012. Online: http:/ / www.tc.gc.ca/ eng/ ontario/ pickeringstudy.htm. 7 July 2012.

—. *Transport Minister Announces Winning Proposal For Toronto Air-Rail Link*. News Release. Ottawa, 2003. Online: http:/ / www.westoncommunitycoalition.ca/ Nov%202003%20Selection%20 of%20SNC %20and%20Backgrounder.pdf.

TTC. *Rapid Transit Expansion Study*. Information. Toronto: Toronto Transit Commission, 2002. Document.

Wallace, Scott Deveau and Kenyon. *Buttonville Airport set to close within five years*. Newspaper Article. Toronto: The National Post, 2010. http:/ / news.nationalpost.com/ 2010/ 10/ 27/ buttonville -airport-set-to-close-within-five-years/ .

Waterfront Toronto. http:/ / www.

1 Introduction

1.1 Background

This report presents a comparison and due diligence audit of the ridership Exclusion per Committee Direction forecasts prepared over the past 15 years for the previous and current owners of the Union-Pearson Air Rail Link project (ARL).

The ARL has been in various stages of planning and implementation over the past 15 years by various bidders. As a result of winning the bid for the 2015 Pan American Games, the City of Toronto, the Province of Ontario, and the Government of Canada have given the project greater priority. The most recent iteration of the project—owned as part of the Metrolinx family of companies—has relied on Steer Davies Gleave (SDG) for ridership Exclusion per Committee Direction forecasting. Following the initial review of the draft Final Report produced by SDG, analysis into archived ridership reports produced by SDG and others was conducted.

1.2 Content

This report summari to Link ridership and as

It attempts to conne e w reasoning behind the

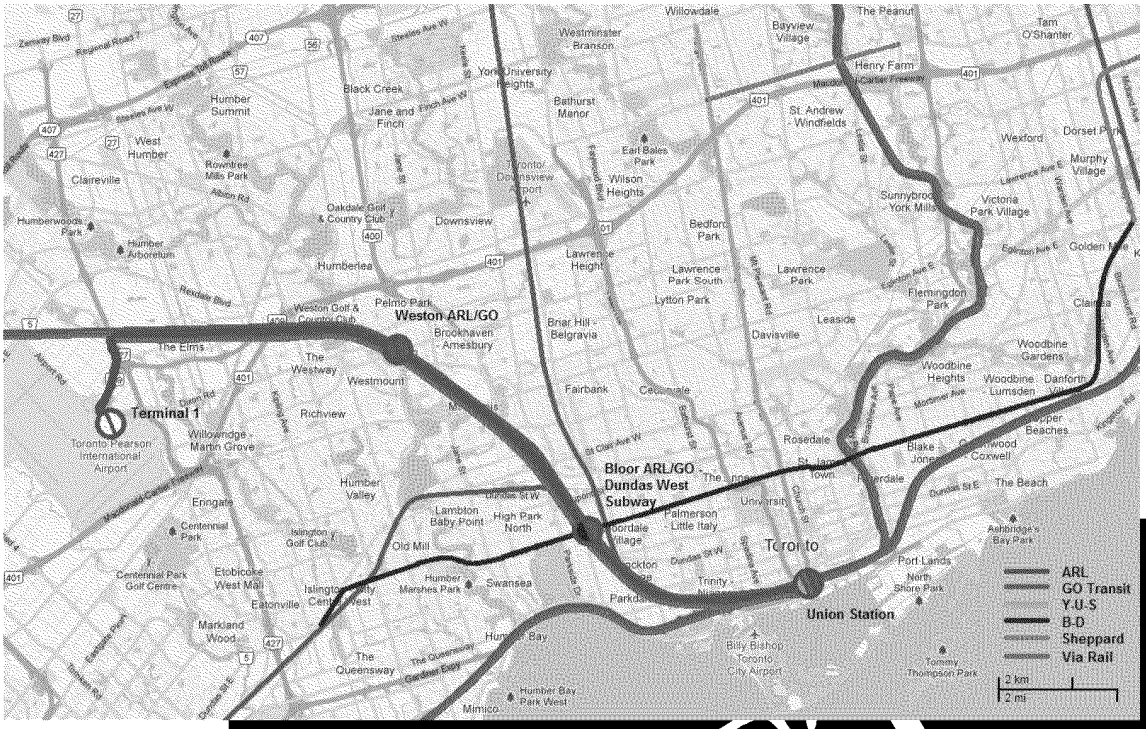
The review discusses nd s of the ARL project a

- chang se, ni
- t in the for of
- an tio f th
- ri ip/ ro ns:

1.3 T Air Li

The Union-Pear
Toronto's Union
The ARL routing i
Bathurst, the Canadian National Railway (CN) Weston Subdivision from the USRC to Highway 27 at Milepost 13.4 sharing tracks with GO Transit, Via Rail, and CN freight trains. A new elevated right-of-way between the Weston Subdivision and Terminal 1 Parking Garage in the LBPIA lands will take trains directly into the airport.

With direct station connections to the Greater Toronto Airport Authority (GTAA) LINK Automated People Mover (APM) station and the rest of Terminal 1, the route will include stops at Weston GO/ ARL Station, and Bloor GO/ ARL Station with connections to the Toronto Transit Commission (TTC) at Dundas West Station. Figure 1 illustrates the alignment of the ARL as described above.



The ARL service wil
The brand will draw
of Toronto. By prov
ARL will contribute
International stand
current ARL

1.4 Previous Ridership Studies

Previous r
1990s. Stud

Six studies are

- 1999 study
- 2002 study by Halcrow Group Ltd.
- 2004 study by Steer Davies Gleave
- 2009 study by Steer Davies Gleave
- 2010 Due Diligence audit by Jacobs Consultancy
- 2012 study by Steer Davies Gleave

The important details of each of these reports and their contribution to the development of the ARL project are discussed in the report.

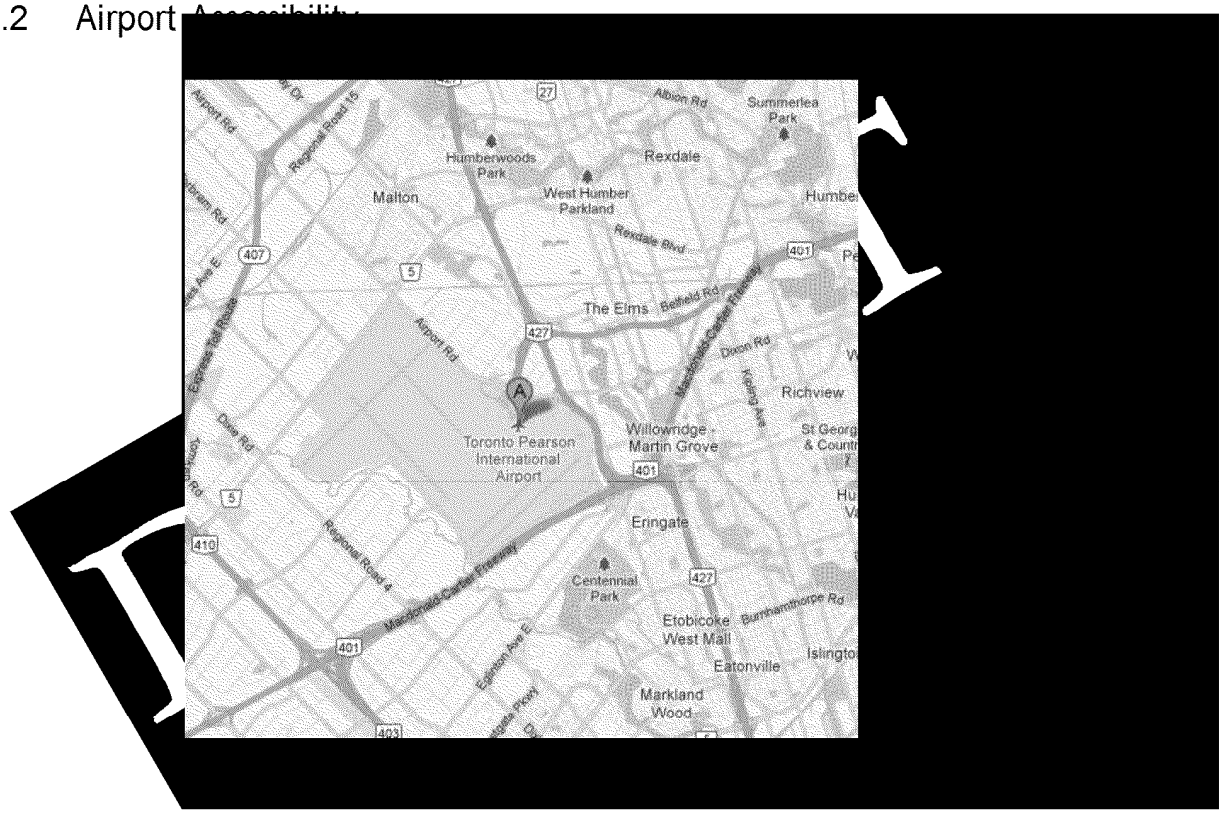
2 Air-Rail Link Corridor and Market (Market Analysis Comparison)

2.1 Toronto Pearson International Airport

Toronto Pearson International Airport (LBPIA) is Canada's largest and busiest airport.

LBPIA is located at the northeast corner of Mississauga, bordering Toronto to the east. It features two airline terminals, five runways, airline storage facilities, and an automated people mover connecting the two airline terminals. As of 2012, 66 airlines, as of 2012, have flights originating or terminating at LBPIA. It is a major airport for both passenger and goods movement.

2.2 Airport Accessibility



Access to LBPIA using public roadways includes Highway 409, which terminates at the airport and provides connections to Highways 27, 401 and 427. Airport Road/ Dixon Road can also be used to access the airport.

From downtown, private vehicles usually utilise the Gardiner Expressway west, heading north onto Highway 427.

Modes of transport to the airport include private cars, car rental, public transportation, taxis and limousines. LBPIA offers parking for both the short-term and the long-term. Five agencies at LBPIA provide passengers with car rental.

Taxis make up a large percentage of trips to and from the airport. 360 taxis and 276 limousines are licensed to provide service to/ from LBPIA. The average cost per trip is $50 from the downtown core.

Current public transit connections to LBPIA are by Toronto Transit Commission (TTC) bus routes from the Bloor-Danforth subway and the Spadina subway. The 192 Airport Rocket from the Bloor subway boasted a daily ridership of 4200 in 2011, while the 58 Malton had ridership of 17000 (though this number includes riders that locally travel along Dixon Road and Lawrence Ave). All other transit connections to LBPIA from Mississauga and Brampton are also provided by buses. 24-hour transit access is available through TTC buses.

GO Transit currently provides service to LBPIA using coach buses along Dixon Road, Highways 401, 407 and 409. These services do not connect to downtown Toronto but connect to municipal transit providers (e.g. route 34 connects to Yorkdale).

Direct bus service to
Express bus. It oper
minutes to one hour
bus offers pickup an

Can-Ar Coach parall
frequency and contir

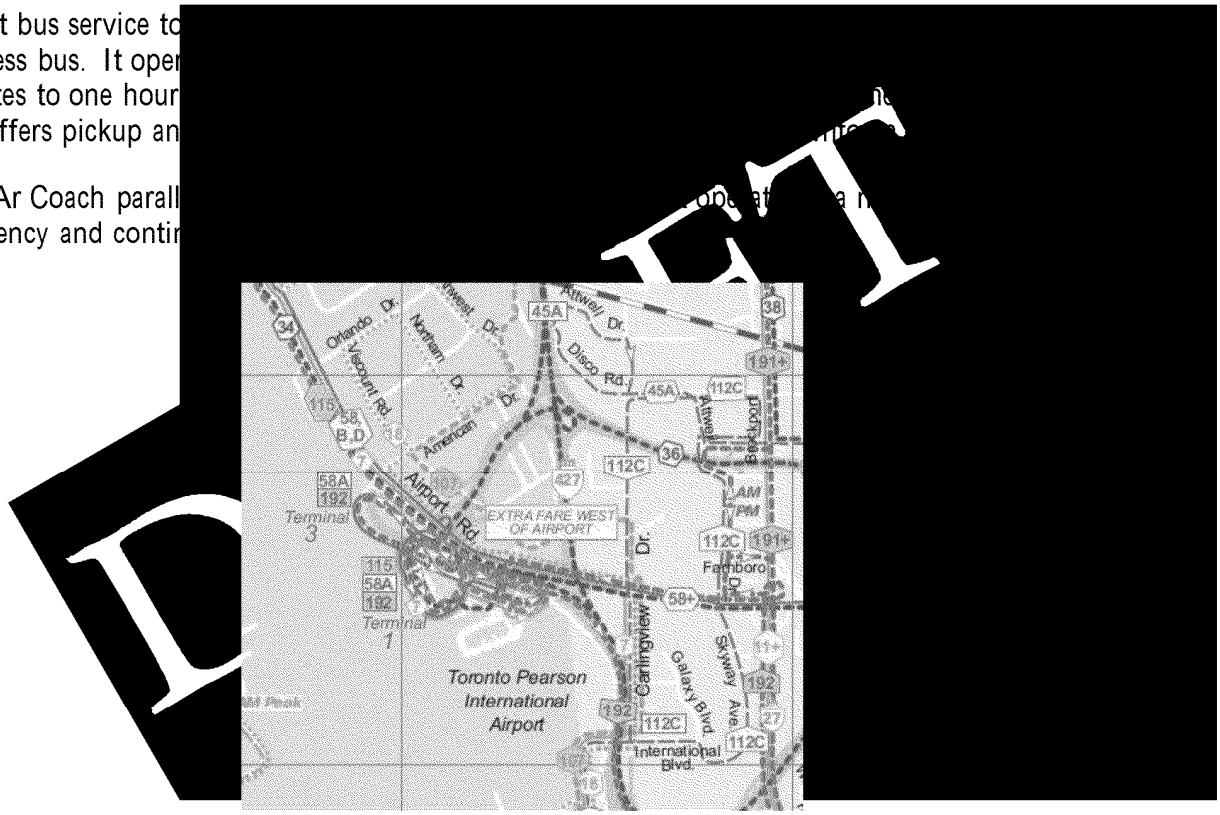


Figure 3: Transit Connections to LBPIA. Red denotes TTC, orange Mississauga, green GO Transit, and blue Brampton

Appendix A illustrates various modes of airport travel around the world.

2.3 The Air-Rail Link Project

The Air Rail Link project will provide a consistent service with 15-minute headways and a one-way trip time of 25 minutes in a high quality environment, using dedicated diesel rolling stock. It is a premium express rail service and is clearly differentiated from commuter services such as GO.

As the Air Rail Link
report has a slightly

2.3.1 1999

This report discusses
Union Station Co
along a new
identifi
entertai

2.3.2 Ha 02

The 2000 ride study
Air Rail Project

Transport Canada
bidders for a "bankable" feasibility study. The results of this ridership study informed the bidders of the anticipated ridership demand for this service based on a set of parameters created by Transport Canada with input from the bidders. These parameters included the baseline requirement for an express rail service connecting Union Station to Pearson Airport's new T1 facility.

The assumptions also included the possibility of a stop at Bloor/ Dundas West (to connect with the TTC Bloor-Danforth subway) and another stop to serve/ connect with the Woodbine Entertainment Group lands.

The recommended service discussed in the Halcrow report is a twenty minute (one-way) express service from Union to a new terminal at LBPIA, with a single stop at Bloor Street, operating on

fifteen minute intervals. It also discusses the line as if there were another stop at the Woodbine entertainment complex. The line would use diesel multiple units (DMUs); however, no mention is given as to a specific vehicle model. Service would begin in 2005 and would run daily from 6am to midnight.

2.3.3 SDG 2004 Report

The ARL service proposed in the 2004 SDG report is Blue 22, a high-quality premium rail service with a single stop at Bloor. One-way travel times are pegged at twenty-two minutes, with headways of fifteen minutes on the line. Transport Canada suggests that the line could be operational by 2008, and would use refurbished Budd Rail Diesel Cars (RDCs). (Transport Canada).

Figure 5: Budd RDC rolling

2.3.4

ARL ser e In 2005 rt
one-way t tin ty-
that a seat is ran e
diesel multiple ts
the Jacobs Con ane

Figure 6: Proposed benchmark rolling stock

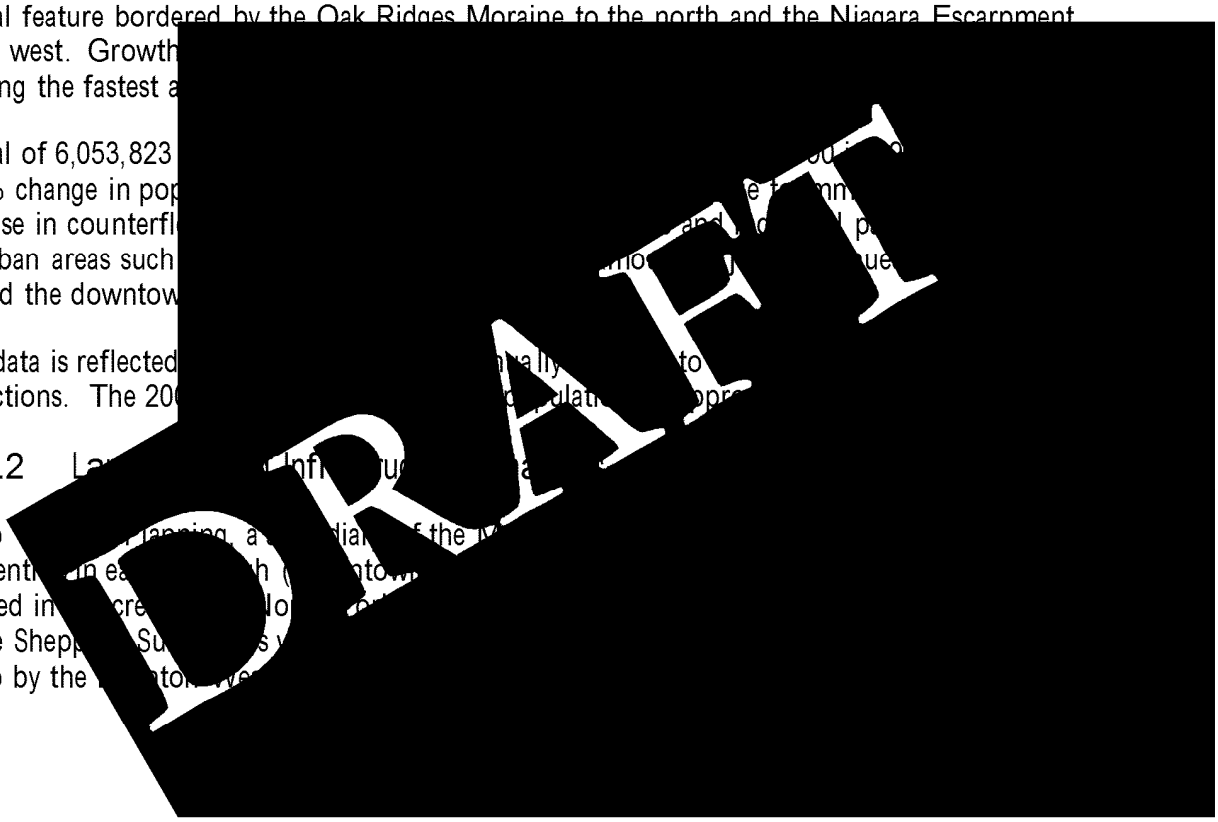
2.3.5 SDG 2011 Report

Steer Davies Gleave's current report assumes a system similar to their previous report, with service beginning in April 2015, intermediate stops at Bloor and Weston, and fifteen minute frequency with a twenty five minute travel time between Union and Pearson. The service would make use of Nippon-Sharyo DMUs in two-unit train sets (with three-unit trains arriving in July 2015) providing initial capacity of 120 seated passengers per train (180 in a three-unit trainset).

3 GTA Growth, Land Use, and Traffic Patterns

3.1 Population Growth Projections

Most growth in the Greater Toronto Area is taking place in suburban regions, such as York Region and Peel Region. However, this development is physically limited by the Greenbelt, a natural feature bordered by the Oak Ridges Moraine to the north and the Niagara Escarpment to the west. Growth



growing the fastest a

A total of 6,053,823

42.9% change in pop

increase in counterfl

suburban areas such

around the downtow

This data is reflected

projections. The 20

3.2 La

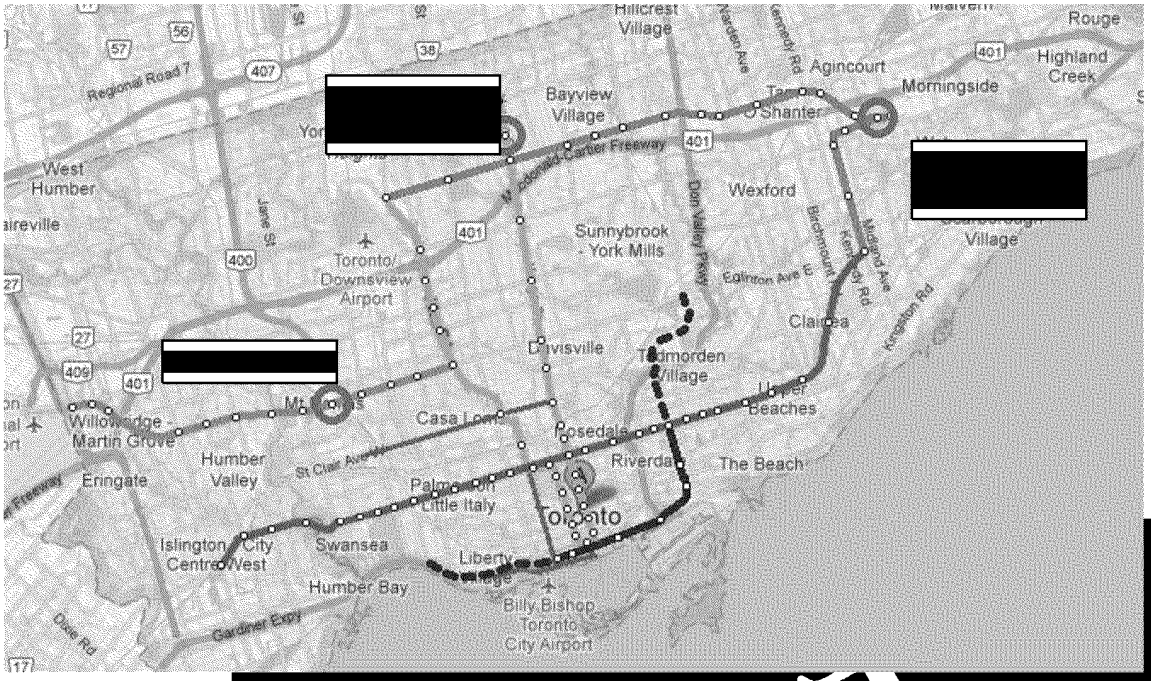
Metro

city cent

resulted in

by the Shepp

Metro by the



Figure

Metro had projected
in centres was consi
planning policy has

Most of the land in
areas, most of thi
friendly road
with m

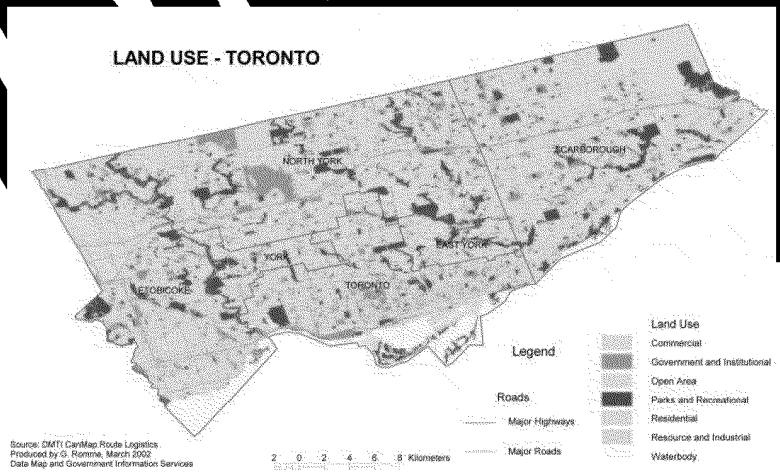


Figure 8: Toronto Land Use in 2002

Development in surrounding regions has increased in the past few years. Mississauga is currently developing around the City Centre area (Square One), and York Region is constructing

centres in its towns/ cities. Markham, Richmond Hill, and Vaughan all expect to have new 'downtowns' within the next twenty years (Regional Municipality of York).

3.3 Traffic and Transportation Patterns

3.3.1 Private Vehicle

Metro Toronto planning originally had priorities set on establishing a network of expressways. This was brought to a stop by urban activists and resulted in a truncated network of expressways which consists of the Gardiner Expressway, Don Valley Parkway, and Allen Road (Marshall).

Fig Cap

Coupled wit ack si traffic conditi worsen

The increased gr in the City of Toro congested roadways in the City are in suburban areas.

A constriction in the existing Highway 404-Don Valley Parkway-Highway 401 interchange causes southbound traffic flow problems in AM peak, as people continue to flow downtown for work and leisure. Daily traffic problems are evident along the full extent of the Gardiner Expressway and Highway 401 (in Toronto) at almost any time of day.

Toronto's gridlock has slowly worsened over time, being named the worst commute in all of North America ahead of Los Angeles. An estimation of the effects of this lost time adds up to approximately $3.3 billion to commuters ($2.7 billion in GDP) in 2006, projected to meet upwards of $7.8 billion to commuters in 2031 ($7.2 million in GDP) (Metrolinx).

3.3.2 Local Transit

Municipal regions around the City of Toronto operate their own transit (bus) systems. All systems (Brampton Transit, Burlington Transit, Durham Region Transit, MiWay (Mississauga), Oakville Transit, and York Region Transit) feature some form of integration with GO Transit through fares and scheduling. The main provider for local transit in Toronto is the Toronto Transit Commission (TTC), which runs a network of subways, streetcars, and buses.

The subway system expanded with a 5.5 km subway line along Sheppard Avenue in 2002 and a 2 km extension of the Spadina subway from Wilson Avenue to Sheppard Avenue in 1996. An 8.6 km, 6-station subway extension of the Spadina subway is currently under construction, making six total station stops, including York University and Highway 7 West.

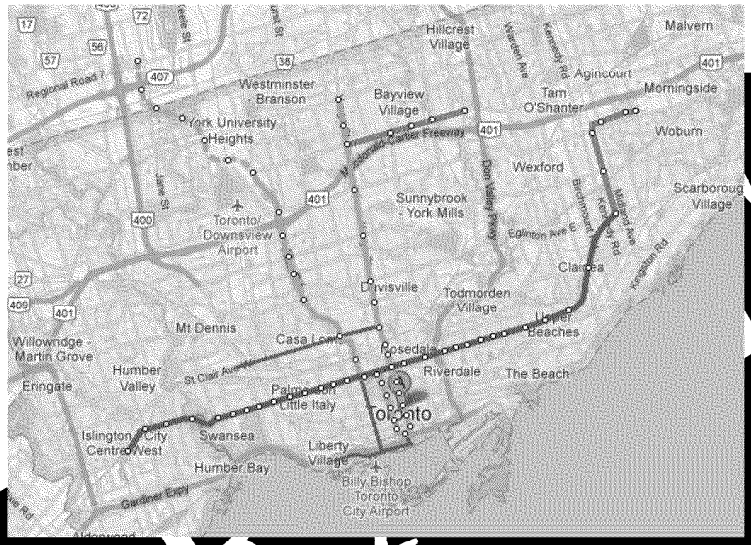


Figure ing id Transit S

The TTC ren ree way m
stock, and st out
routes in mix raf er
provide paratr ser vic

Ridership has ste
approximately 2.5 m

In earlier reports, mention was given to the Eglinton West subway which was cancelled a year after groundbreaking. This subway, when completed as planned, would have connected with LBPIA. One report briefly mentioned the SmartRide LRT proposal by a consortium of engineering consultants but it was quickly dismissed due to poor public opinion of LRT.

LRT made a comeback in 2007 when Transit City was announced, which included seven LRT lines and improved feeder bus service. This plan was cancelled in 2010 by the new municipal government.

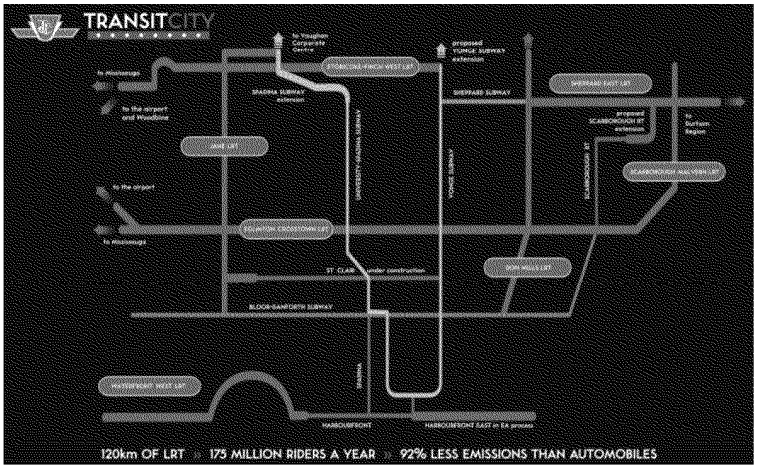


Figure 11: Transit City proposal

The newer reports fa
which included some
Sheppard Ave East,
conventional light ra
connect to LBPIA; h
LBPIA has been give
Bus Rapid Transit (B

3.3.3 Regi

GO Transit is the op
Ontario. Train on
service. The

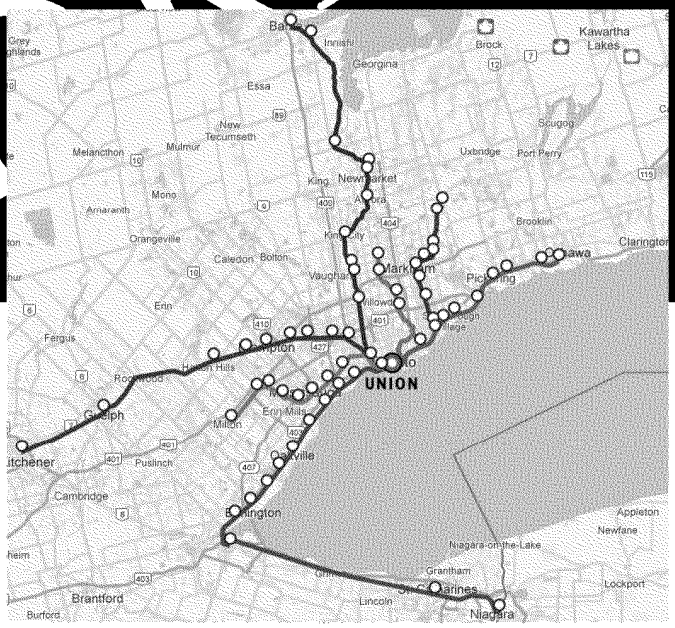


Figure 12: Existing GO Commuter Rail network

GO Transit ridership has steadily increased, with slight overcrowding on most trains between 0745 and 0845. GO plans to orient service towards customers such that frequency will be high enough to provide every passenger with a seat.

Via Rail provides interregional commuter rail services in and out of Toronto to other popular Canadian destinations. It is centred at Union Station and frequently provides trains along the Windsor-Quebec City corridor (known as 'the Corridor'). No service is provided to LBPIA; however, Union Station is connected to Billy Bishop Airport by a shuttle bus and ferry service. It provides occasional stops along the Corridor.

Ontario Northland also provides inter-county commuter rail and bus services into Toronto from areas to the north. One train route connects downtown Toronto to towns such as Huntsville and North Bay.

3.3.4 Developing Projects

Municipal Transit

The current local tra
full BRT in York Re
transit route is also b
built by Metrolinx in

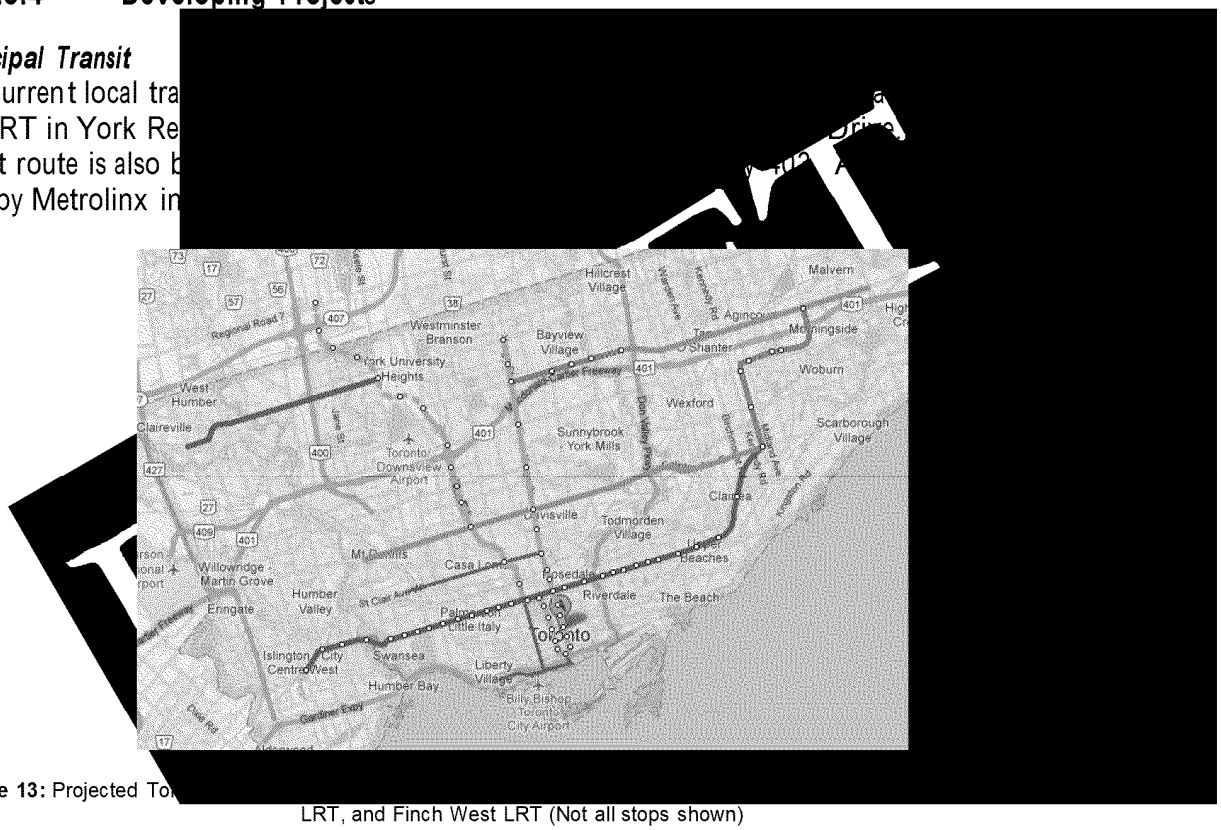
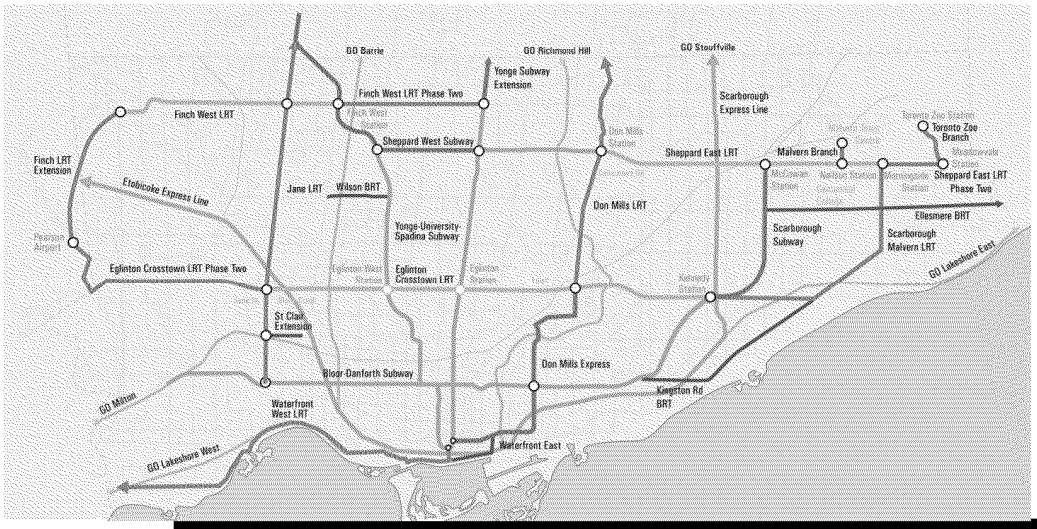


Figure 13: Projected To
LRT, and Finch West LRT (Not all stops shown)

Future plans for local rapid transit include an LRT line along Hurontario Street in Mississauga, bus rapid transit along Highway 7 West and Yonge Street. Durham Region is planning to start a BRT-lite service into Toronto in July 2013, with full BRT running by 2016.

A new Toronto transit plan was politically announced in June 2012 called the 'OneCity Transit Plan' which would provide extensive rapid transit coverage around Toronto. This plan is conceptual and is subject to Council study. It included ten LRT lines (most from the Transit City proposal, with the Scarborough RT removed) and six subway lines/ extensions. Much of the plan is focused on Union station and a downtown subway line that would provide easier access to the ARL.



Two lines proposed as rapid transit. It also Province has not sup as a priority by City

Metrolinx, the region which looks at transi version of The Big M Woo). A key directi throughout the city are t activity and mi pedestria

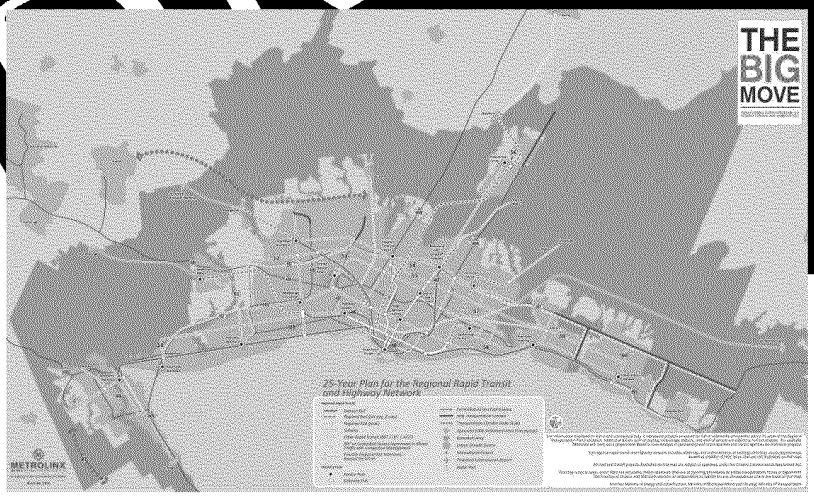


Figure 15: Big Move plan in 2008, looking ahead to 25 years later

GO Transit Improvements

For GO Transit, there are plans to introduce capacity improvements along all railway corridors, including signalling, double tracking, and increasing train lengths from 10 cars to 12 cars.

However, these improvements are hindered by capacity issues during peak hours at Union Station. A temporary solution to increase train density at Union is to extend platforms to allow double berthing.

Pearson Airport has the potential of becoming one of the largest, most significant mobility hubs in the network. According to the 2009 SDG report, this would be satisfied by the following initiatives to revitalize public transit, commuter service, and private travel to and from the airport:

- Eglinton LRT, Finch West LRT, 403 Transit Way LRT, and the 427 Transit Way LRT
- Union-Airport Rail Link
- Upgrading existing highway and arterial road connections to include HOV lanes on 400, 427 and QEW, and a widened 401 from the 410 to Hurontario

The ARL would contribute to this development, linking the two largest transit hubs in the country by an expres

Union Station Revital
The Union Station R
TTC, the City of To
transportation hub.
American Games in
next 25 years (City o

The revitalization in

- Restoration
- A new
- Re
- a new
- R
- A n
- A new
- Glass
- A new N
- Numerous
  Union Statio

Waterfront Toronto Mixed-Use Development
Created in 2001, Waterfront Toronto is responsible to turn the 800 hectares of brownfield lands on Toronto's west waterfront into sustainable, mixed use communities with dynamic public spaces. The area is expected to house about 6000 new residents and 8000 new jobs.

The area would be public-transit focused, and would preferably be served by an LRT extending from Union Station, along Queens Quay to the east.

The Waterfront Toronto development is expected to be completed in phases with some already completed or in advanced development. The West Don Lands site has been accelerated for

completion prior to June 2015 as it is the location for the Pan American Games Athletes Village (Waterfront Toronto).

Report Findings
Each report considered future developments to varying degrees, partially due to the stage in development each was in during the development of the report. The SDG 2009 and 2012 reports consider all of the developments outlined above in Section 3.3.4.

4 Airport Passenger Growth

4.1 Introduction

Airport travel continues to increase all over the world. LBPIA is indifferent to this and has expanded to accommodate record numbers of passengers. There are many projections for what the ridership will increase to, and these projections have a direct impact on the mode share and ridership of the Air

Table 1: Summary of Air

	Open Yea		Th tu
Halcrow	200		9
SDG 2004	200	3	
SDG 2009	201		
SDG 2011	201		

4.2 C ton

Over th ye rs, a ffi be
general, t of co sio
These even e c p
However, co eri pa
differences in th a

Some historical e

- North American recession of 1982
- Persian Gulf War of 1990/ 1991
- September 11 terror attacks in 2001
- SARS outbreak in 2003
- Global recession of 2008/ 2009

4.2.1 SDG 2009

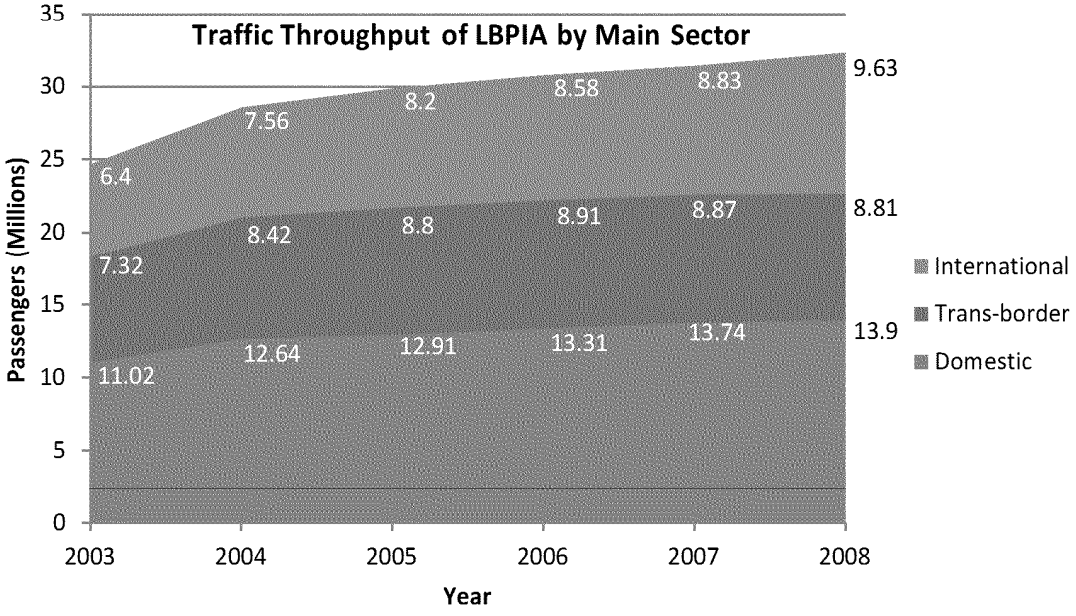
The Steer Davies Gleave 2009 Report developed their growth forecasts for LBPIA while the world suffered from the global recession. SDG used historical trends to estimate the effect and the degree to which the recovery would take place, noting that downturns in traffic growth due

to conflict, economic downturns, and events such as the SARS epidemic affect air traffic in the near-term, but recovery is quick to rebound before returning to slower, more natural growth.

SDG noted that the main influences on traffic patterns between 2003 (the previous SDG report) and 2009 were:

- Strong post 9/11 and SARS recovery in 2003-2004
- Consolidation of the Canadian Low-Cost Carrier Market
- Expansion of WestJet
- Establishment of Porter at TCCA
- The Global Financial Crisis of 2008-2009

Figure 15 indicates the most the historical growth at LBPIA from 2003 to 2008.



[redacted]

4.3 Limits

GTAA estimates that Terminal 1 and Terminal 3 have enough capacity for 50 million passengers per year, so this is not foreseen as a major limit to growth. Runway capacity is capable of 120 movements per hour in visual conditions or 105 movements per hour under instrumental conditions. However, a capacity limit of 84 movements per hour has been imposed which is more than sufficient capacity to sustain higher traffic levels.

The largest barrier to growth at LBPIA is competition from other local airports. In particular, Toronto City Centre Airport (TCCA) has considerable potential, but currently operates with many financial, physical, and political constraints.

4.3.1 Competing Airports

Toronto City Centre Airport

Toronto City Centre Airport has the potential to compete with local domestic and trans-border flights from LBPIA. Over the past decade, TCCA has grown from offering 1,340 flights in 2006 to 9,505 flights in 2007 following the introduction of Porter Airlines. Capacity increased a further 84% in 2008 and an expected 21% in 2009. Porter offers short-haul flights between Toronto and cities such as Halifax, Chicago, Ottawa, Montreal, Newark, Thunder Bay, and Washington DC.

Porter Airlines focuses on a niche market of business-class travelers, advertising itself as a more convenient option than traveling through LBPIA. However, Porter Airlines operates within a number of physical and political constraints that limit its operations to providing service using only turboprop aircraft.

Currently, Porter Ai
turboprop aircraft.
limits jet and turbofa

Expansion of the ru
which operates TCC
extensions to existin
mainland. However,
allowed.

Changes to the Tripa
and the Federal Gov

Porter Airli
Porter
nearly 3
traveler m
Centre inste

Other GTHA A ts

Hamilton Airpo
Lands have all bee
immediate concern

Hamilton Airport is not an ideal alternative to LBPIA since transit options are limited and private vehicle commute times can be very high due to highway congestion. Traffic at the airport has been shrinking since WestJet and Air Canada's Jazz services pulled out of the airport. WestJet currently continues to operate services to multiple locations in North America as an alternative to LBPIA, albeit with reduced frequency.

Buttonville Airport does not operate any commercial flights, and its location along the congested 404/ DVP corridor into the city makes it a difficult commute. However the airport does provide service for private jet service that TCCA and LBPIA are unable to handle (Wallace). Plans to develop the land were confirmed in 2010 (Wallace) and a conceptual design for the mixed use development was proposed in November 2011 (Cadillac Fairview and Armadale Properties)

Windsor Airport is a considerable distance from the city core, and most scheduled services operate through the LBPIA hub network, so Windsor Airport is not considered competition.

Since the development of the Pickering Lands as future relief for LBPIA has been put on hold, Steer Davies Gleave does not believe that it will be operational prior to 2018 and therefore is not perceived as immediate competition.

The Region of Waterloo International Airport is very briefly discussed in the 2004 SDG report; however, it is not considered to be a competitor due to its distance from LBPIA. It also operates relatively few commercial flights, with only three operators and direct flights to only five cities.

4.3.2 Dominant Carrier Failure

Dominant Carrier Failure is a potential, major effect on air traffic through LBPIA. Air Canada offered 46% of all fl
circumstances over t
failure, other relevan

Air Canada has com
resulting in a loss of
interest and debt pay
negotiating with the

In 2008, Air Canada
system.

Some comparabl
Airport resu
collaps
Sabena's
did not re
cost operat

Steer Davies G
impossible) that
Should Air Canad
capacity, transfer tra

4.4 Airport Growth Projections

Airport passenger traffic forecasts vary for each of the five studies. The cause of the variance is largely attributed to unforeseen circumstances of the past twelve years, including the September 11th Terror Attacks, the SARS outbreak, the Iraq War, and the Recession of 2008/ 2009. Figure 17 includes each projection, and offers a comparison to historical GTAA forecasts as well.

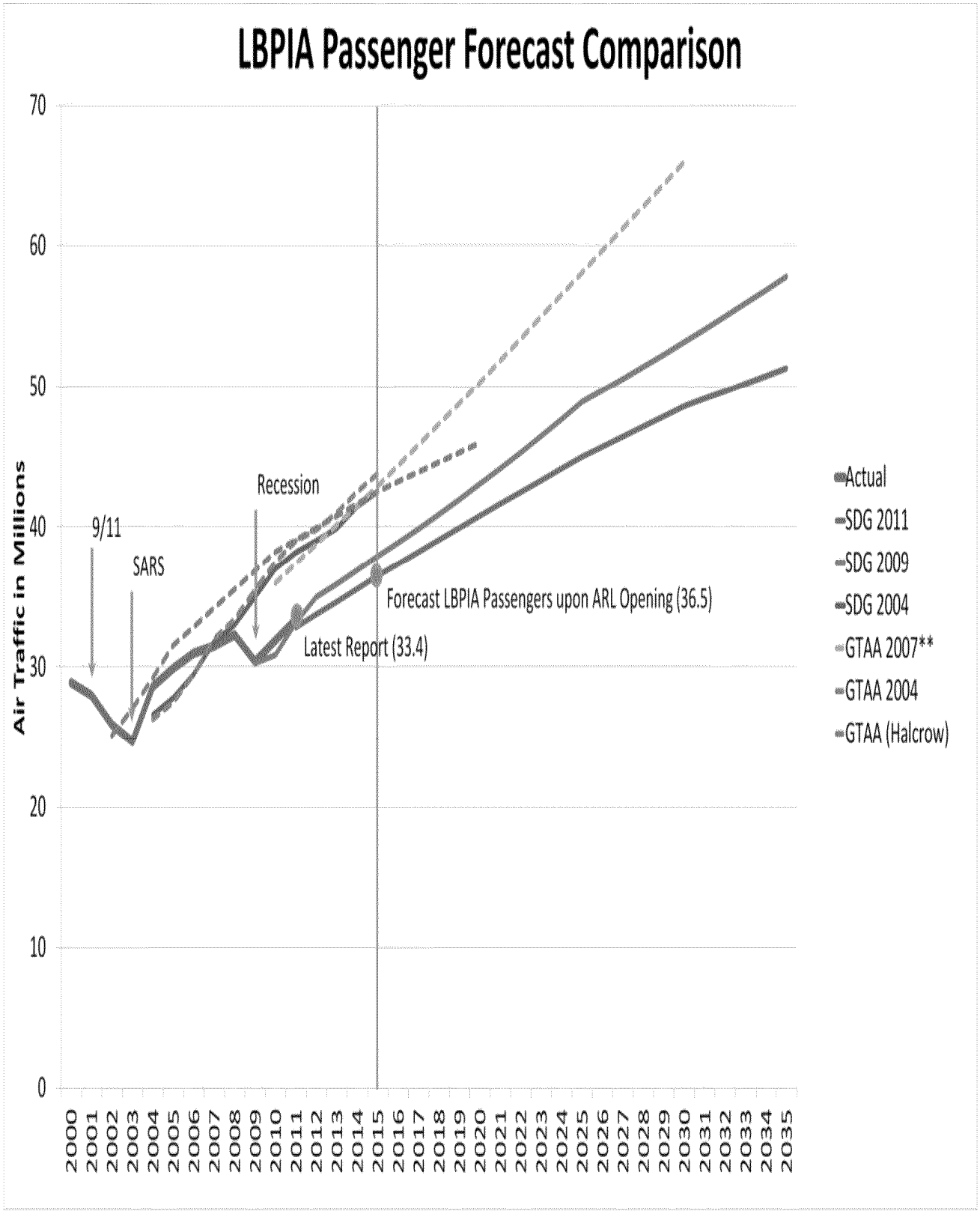


Figure 17: LBPIA Passenger Forecast Comparison – Data collected and extrapolated from various sources

The following subsections discuss the assumptions and considerations made in each report.

4.4.1 Halcrow 2002 Report

In the Halcrow 2002 report, projections were created by Transport Canada for the GTAA using a revised model that built upon the World Trade Center September 2001 attacks. The estimates include connecting passengers, which makes up about 25% of total passengers. These passengers are not considered to be leaving the airport.

The distribution of traffic in 2000 is estimated at 44% for domestic travel, 32% for trans-border travel, and 24% for international travel.

4.4.2 SDG 2004 Report

In their 2004 report, Steer Davies Gleave predicted that the total air traffic would be lower than that predicted by the

- Transpor
  estimatio
- Immedia
  border, a
- Connecti

4.4.3 SDG

In Steer Davies Glea
particular, the GDP
combination with
to be consid

-

The SDG repor
that once traffic r
year. As Porter ind
surpass 2.1 million in 2011 after an increase of nearly 35% from 2010 ridership levels (which had already exceed 1.5 million).

The SDG report also considers the trend indicated in Table 2 for transferring passengers at LBPIA.

Table 2: Percentage Connecting Passengers of Total at LBPIA

	Domestic	Trans-border	International
2009	22%	22%	22%
2015	21%	21%	21%
2020	20%	20%	20%
2026-2059	19%	19%	19%

The SDG report also made the following growth assumptions:

- Decrease of 6.3% as a result of recession
- Slow rec
- Approxi
- Growth

Comparison GTAA S
Growth has been co
being periods of rela

This indicates that th
but rather an indicati
result of the maturin

In the GTAA fo
2025, wher
leading
more in

4.4.4 SD Re

Steer Davies G e upd
trends and proje
(in particular, with

The adjusted figures consider a slower average growth rate (2%) indicative of a more mature air-travel market over the period from 2011 through 2031. Historical and projected trends in the three flight-sectors are illustrated in Figure 18.

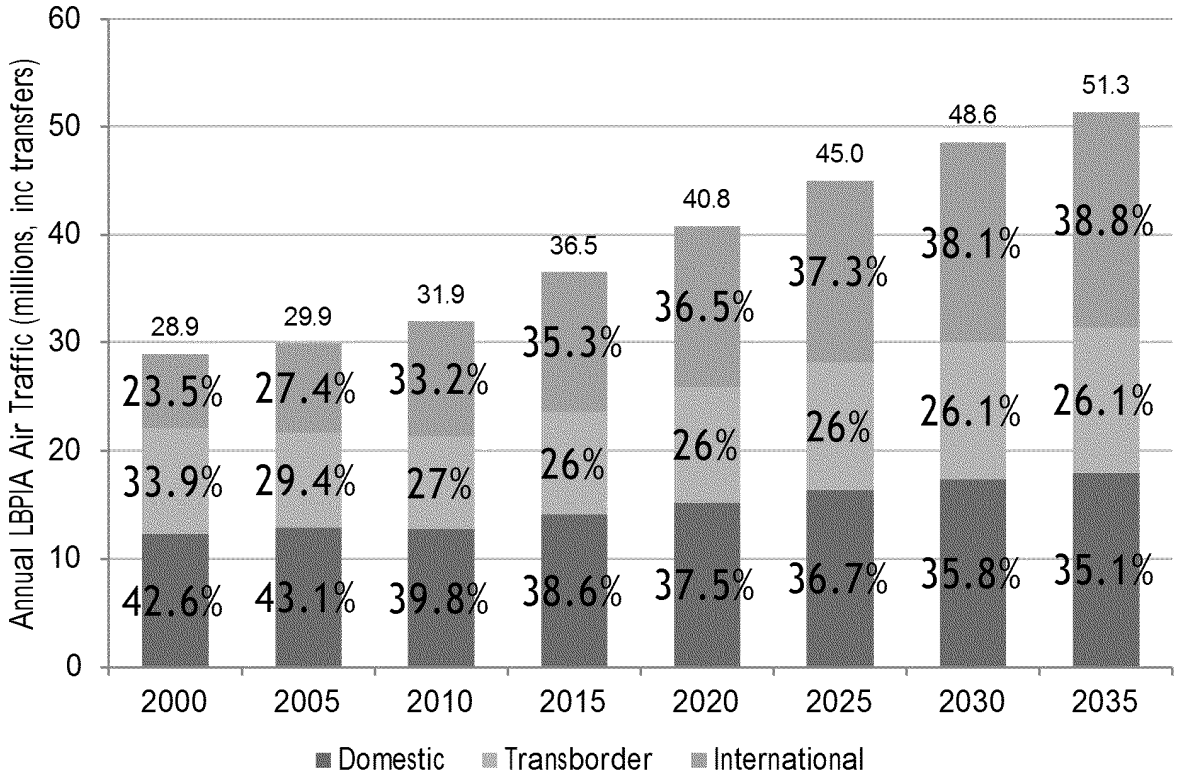


Figure 18: Pearson Interna

4.4.5

- [illegible]
- [illegible]
- Assume [illegible] until 201

4.4.6 GTA

The GTAA projects the following passenger numbers after recovery from earlier global events. However, the recent recession is ignored, and the most recent actual counts are from 2006. It must be noted that despite actual passenger counts being available for 2011, the GTAA continues to use these projections for the future.

Year	Domestic Passengers	Transborder Passengers	International Passengers	Total Passengers
2005 (actual)	12906000 (43.1%)	8803000 (29.4%)	8205000 (27.4%)	29914000

2006 (actual)	13466000 (43.5%)	8923000 (28.8%)	8583000 (27.7%)	30972000
2010 (projected)	15121000 (42.0%)	10375000 (28.8%)	10520000 (29.2%)	36016000
2015 (projected)	17139000 (40.0%)	12703000 (29.6%)	13049000 (30.4%)	42891000
2020 (projected)	19184000 (38.1%)	15206000 (30.2%)	15896000 (31.6%)	50286000
2025 (projected)	21233000 (36.5%)	17883000 (30.8%)	18992000 (32.7%)	58108000
2030 (projected)	[illegible]			

Projections of up to [illegible] to have the Pickering [illegible]

4.5 Comme[illegible]

4.5.1 Halc[illegible]

The Halcrow report [illegible] airliners. It only stat[illegible]

4.5.2 [illegible]

In the [illegible] airline tra[illegible]

The Toronto [illegible] projected that [illegible] predicts that the [illegible] not considered in[illegible]

In 2001, Air Canada took over Canadian Airlines and expanded its monopoly over the domestic market. However, due to increased activity by competitors and increased world events/ disasters, the company filed for bankruptcy protection in 2003 for corporate restructuring. It planned to build hubs out at Vancouver and Toronto as layover facilities to reduce needs at other North American airports.

WestJet was a fairly new low-cost airline that first started Ontario operations at Hamilton airport. The company grew rapidly and moved some operations to LBPIA in May 2002, directly competing with Air Canada. It provides services from both LBPIA and Hamilton that parallel Air Canada's services.

CanJet and JetsGo were two low-cost airlines that also operate out of LBPIA. Similar to WestJet, they operate standardized fleets and low frequency services to international destinations.

4.5.3 SDG 2009 Report

In 2003, Air Canada underwent corporate restructuring, and added a new low-cost service to compete with WestJet. However, it is still reporting losses of up to $1.0 billion in 2008. It is believed it will re-enter bankruptcy.

WestJet has continued to grow and has become Canada's second largest airline. Touting low-cost transportation with praised customer service has continued to allow it to expand its customer base. In 2008, 16.5% of WestJet's departing flights were stationed from LBPIA. Code-sharing agreements with other airlines have allowed it to boost travel options.

Porter Airlines is a r
has increased flight
flight options.

American carrier act
services between Ca
connections are mad
controlled by Ameri
were American airlin

4.5.4 Jaco

The Jacobs Cons
Canadian ca
service

4.5.5

Today, Air C
fire due to dis
union ized perso
undisturbed flight
relations, and pens
Toronto City Centre airport.

WestJet has continued with sustained passenger growth as low-cost flight activity becomes increasingly popular as well as excellent labour relations allowing service to continue, being non-unionized. The airline has added multiple popular destinations (through their own fleet and code-sharing) and is now directly competing with Porter by adding new service between LBPIA and New York LaGuardia airport. It has plans to introduce a new local carrier service, similar to Porter, with access to smaller communities using a fleet of turboprop aircraft (Mordant).

Porter has added multiple new destinations to their routes, increasing service where necessary. However, it has been toted to be a money-losing operation overall. It is not expected to enter

bankruptcy or cease operations in the near future. However, it continues to operate under tight restrictions imposed by the Toronto Port Authority.

5 Ridership Forecasting Model Comparison

5.1 Forecasting Approach

5.1.1 Halcrow 2002 Report

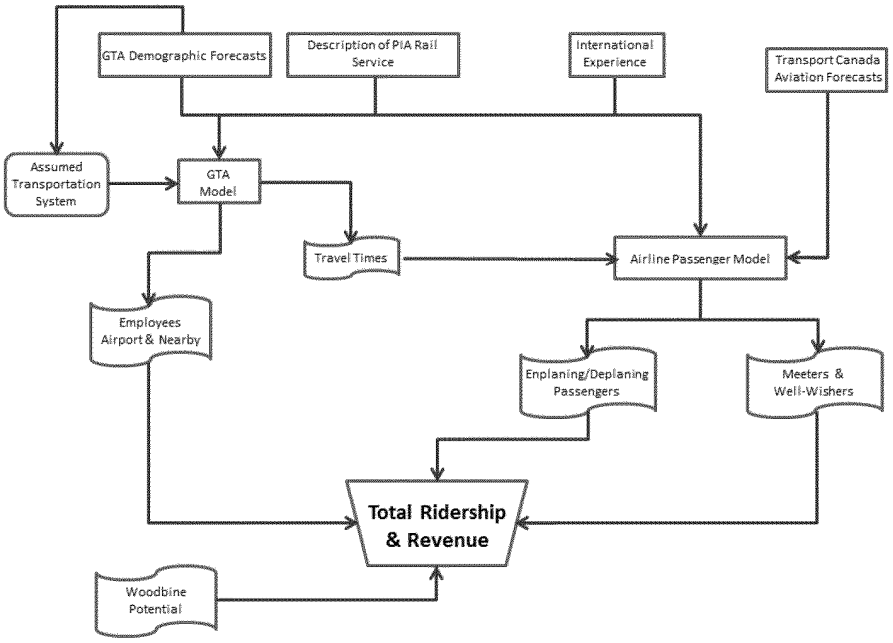
The Halcrow report uses a model based off of Transport Canada's projections for the GTAA. It makes many overall assumptions that allow the model to be built.

The assumed one-way fare for air passengers at the start of service is $20 from Union to Pearson, while fare from Bloor to Pearson is $15. Meeters and well-wishers pay a fare of $10 and $7.50 for Union and Bloor respectively, of which the fare also includes a return time limitation (i.e. simila
information is given
airport employees, it
to that of the existin

The ridership base is

- Airline passe
includes con
- Passenger m
them off or
- Airport e
- No
- L
ou
- Em

The various ele
chart.



To better estimate th ... of existing systems, ... development of a sp ...

The benchmarking s ... United States, fou ... rail links wer ... transit ... and sup ...

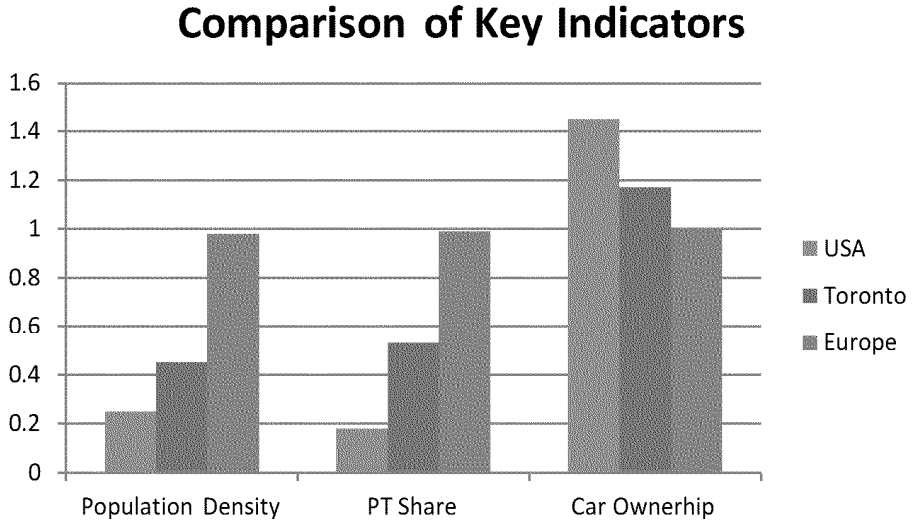


Figure 20: Comparison of Key Indicators

The Key Indicators denote that European cities have much higher population density and public transit share, with car ownership significantly lower than North America. For Toronto, population density and public transit use is incrementally higher than that of the United States.

To put a value on the geographic distance from the airport to the metropolitan urban area, Halcrow put together an 'isolation index', I, which is calculated as:

The isolation index is a fraction of the distance from downtown to the airport over the distance from downtown to the edge of the urban area. For an area where the airport is further from the city, but the city is considerably denser, the isolation index would be higher. This result is generally displayed in Halcrow's data where higher rail mode share (%) is met with a higher isolation index.

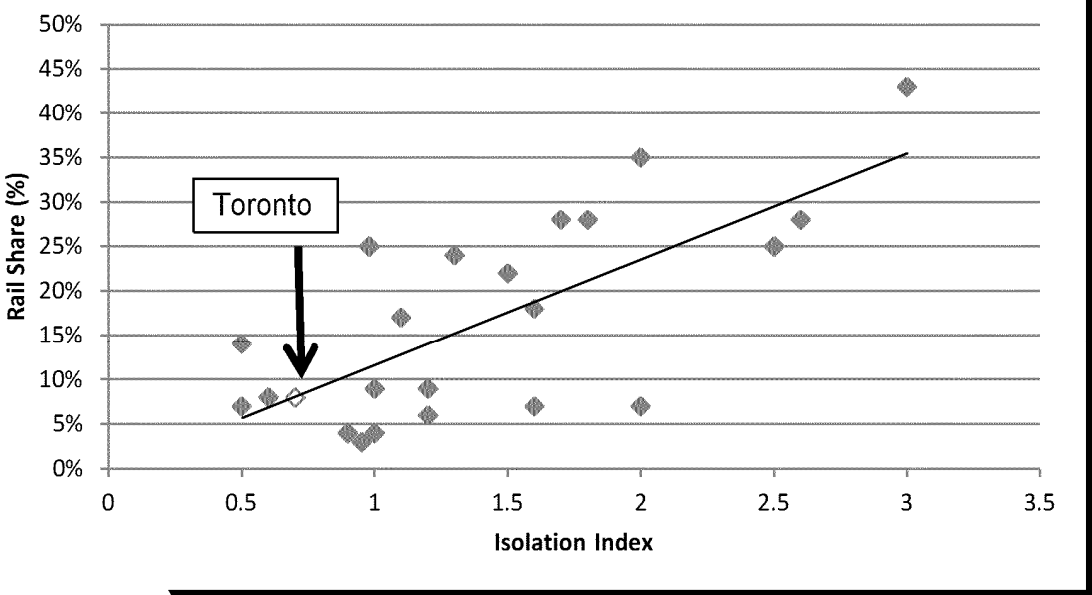
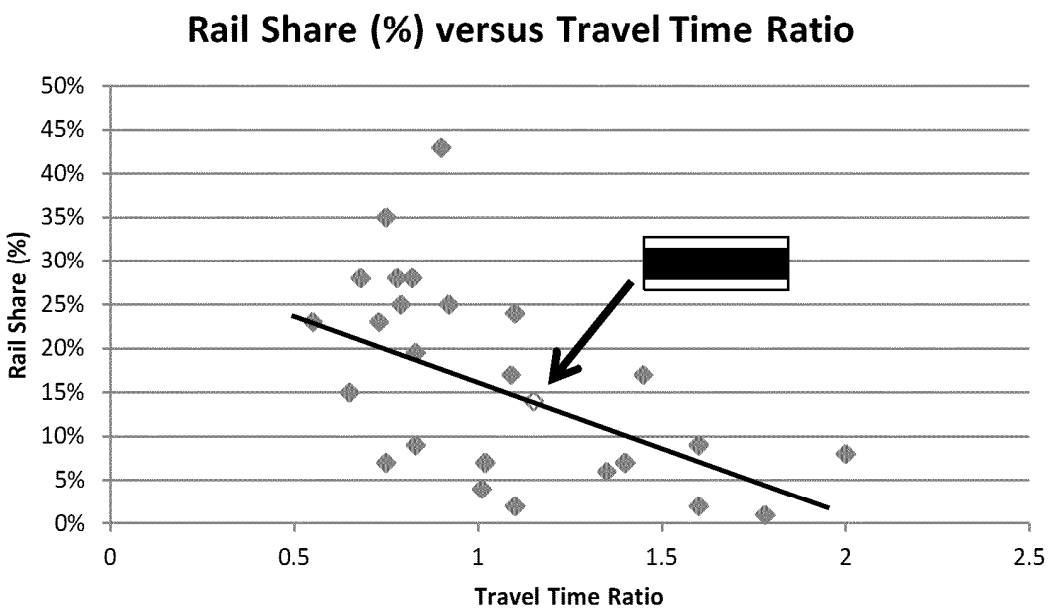


Figure 21: Rail Market S

Toronto's isolation index is approximately 0.7; estimating with linear regression, the Air Rail Link will have a rail mode share of 8%.

Halcrow next looked at supply-side characteristics of the Air Rail Link, including various factors such as ease of access, frequency, comfort, pricing, and journey times. However, as most of these values are immeasurable, Halcrow provides an example based on the travel time ratio of rail to taxi against rail mode share. A higher ratio number implies that rail travel is slower.



[redacted]

Toronto's results are [redacted] approximately 14% [redacted]

Lastly, Halcrow look[redacted] needs to get from do[redacted] points in this regr[redacted]

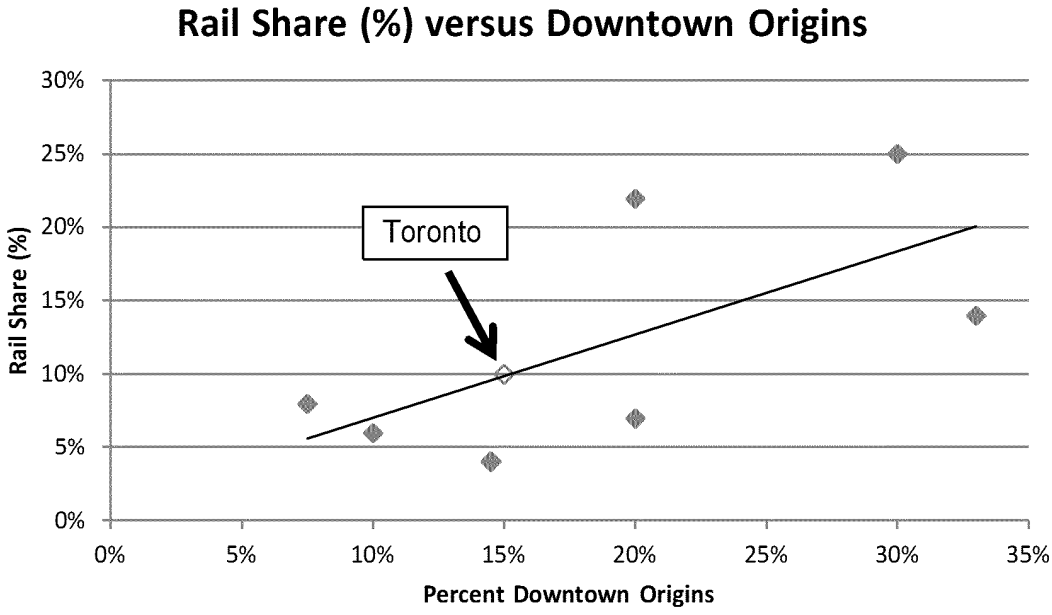


Figure 23: Rail Market Share when Traveling To/From Airport

Halcrow lists Toronto's rail share from this test as approximately 12%, but its associated graph indicates it is closer to 10%.

The Stated Preference Survey creates a series of logistic, probabilistic, and diversion models through various parameters depending on the results from passengers, along with network data such as diversion rates of air passengers, current mode, trip purposes, and residential status. This survey was taken in terminal departure lounges with n = 2566 passengers. The results of the Stated Preference Survey can be found in Appendix B.

5.1.2 SDG 2004/2009 Reports

The forecasting approach is similar in both the 2004 and 2009 SDG reports. It is based on a three-step approach:

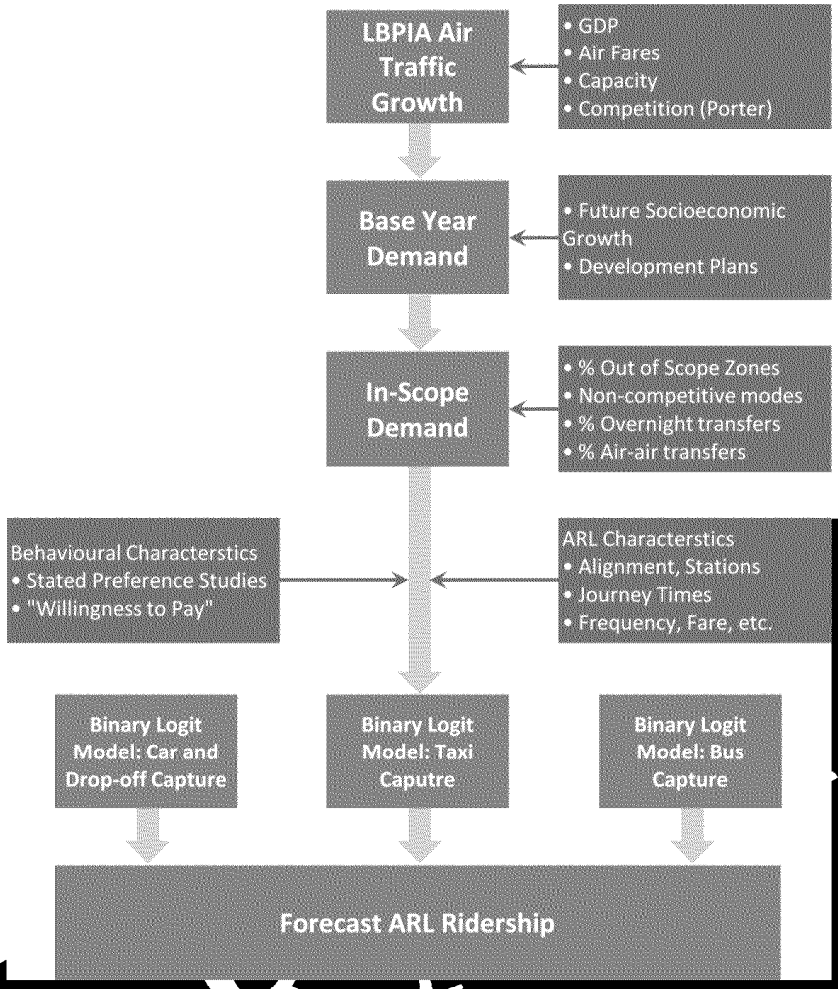
- Quantification of the in-scope market
- Forecasting
- Application

This approach is sim

5.1.3 SDG

Steer Davies Gleave
and then determinin

For Metrolinx, SDG
level of traffic captu
experiential ass
outlined in



5.2

5.2.1

The Halcrow repo
are given in constan

Base case forecasts include airline passengers, greeters/ well-wishers, airport employees and non-passenger business travellers. Users from employment around the airport and at Woodbine station are excluded.

Two base case models are considered – a Union-Pearson non-stop express service and a service with an intermediate stop at Bloor station.

5.2.2 SDG 2004 Report

The base case is the Blue 22 scheme. Four points were assumed:

- The Airport station is connected to Terminal 1, with access to Terminal 3 via the automated people mover.
- Bloor/ Dundas station will connect to the subway station via an elevator.
- Union Station will operate from Platform 1, where there will be a passenger lounge.
- Service frequency is fifteen minutes and the expected one-way runtime is twenty-two minutes.

5.2.3 SDG 2009 Report

In Steer Davies Gleave's 2009 report, the operating assumptions included the following:

- The ARL will open for service in 2015
- Trains operating daily throughout the year (365 days)
- Service operation from 1am to 5am the following morning
- Trains will operate on 15min frequencies, servicing all stops four times per hour
- Every train v
  Station
- The duration
  minutes
- A one-way fa
  including tax

SDG used a commo
the first year of servi
the third at 95%, to

5.2.4 SDG

Steer Davie
assump

- T RL fo ice
- Tra ill th
- Servi er wi
- Trains oper
- Every tra
  Station
- The duratio
  minutes
- A one-way fare from Union Station to Terminal 1 Station would be $20 on opening day including taxes

SDG once again considered "ramp-up" when developing forecasts. However, the percentage increase was adjusted from 65%, 80%, 95% to 65%, 80%, 90%.

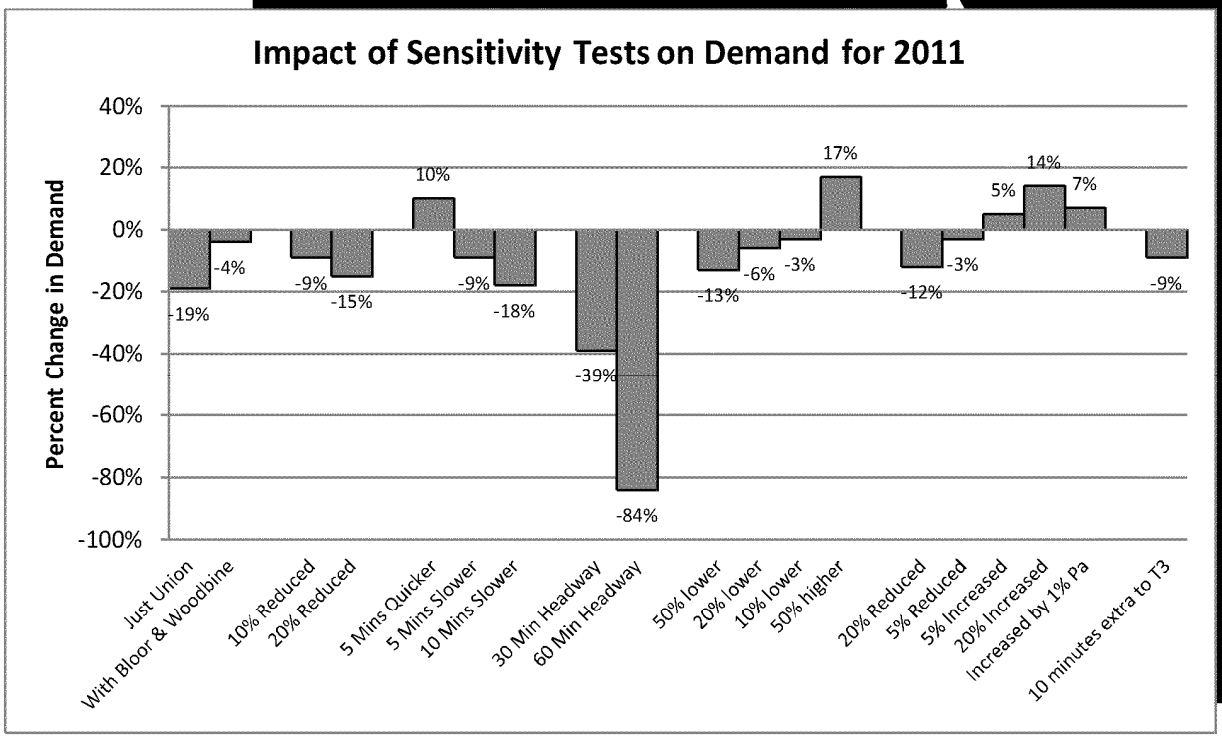
5.3 Sensitivity Analysis

5.3.1 Halcrow 2002 Report

Halcrow has carried a series of sensitivity tests to measure change in potential demand through one variable at a time. These variables are:

- additional stations
- changes in rail service travel times
- rail headways
- changes in time take by passengers to access the ARL
- changes in travel times by highway modes
- changes in estimated values of time for air passengers
- accessibility to T3 (access/ egress)

Results are below in [redacted]



Exclusion per Committee Direction

Results:

- One way run
- 2 minute diff
- Inverse char
- Frequ
- I
- A

5.3.2 DG R

SDG's sensitivi
assessment is bro
costs and times.

In-Scope Demand

Four key issues were considered by SDG. These issues are, with their respective tests:

- Background passenger growth – testing GTAA background passenger growth rates ± 1%;
- Scale and rate of recovery from anomalies on air travel – proposing that there is no recovery from SARS and 9/ 11, or full recovery by 2006;
- Proportion of business trips – setting the proportion of business travellers to 45.2% and 28.4%, and;

- Competition from other airports – assuming that the City Centre airport is constrained at 200,000 passengers, or increasing its capture rate at twice the planned rate up to one million passengers per year.

Behavioural Parameters and Travel Costs and Times
Four main variables were believed to best reflect public opinion of Blue22:

- Value of Time – how users juggle between time and money;
- Access Weight – the inconvenience factor of using other modes of transport after riding Blue22; in this model, it has a value of 1.95, but for testing it has changed to 1.5 and 2.5;
- Headway Weight – what uses think of train frequency; values go from 1.0 to 3.0 for business users, while leisure users have values of 1.0 to 1.5, and;
- Rail Constant – a factor that reflects how users compare different modes of transport. Values vary for the mode being compared to Blue22.

Miscellaneous factor
taxi fares (±20%), ar

The results of the se
important issues are
parameters (e.g. acce

Several other sensitiv

- A change in
point at whic
- A change
ride
- [illegible]
in

5.3.3

The methodolog
develops new Air
GTAA's report as a
sensitivity tests. Three subheadings were outlined: in-scope demand, behavioural assumptions, and travel times and costs.

In-Scope Demand
Similar to the previous report, this category is subdivided into a further six key factors.

- Growth in economic activity – two tests where economic growth is ±20% than the assumption in the central case
- Relation between economic activity and air traffic growth – two tests where GDP elasticity is ±25%

- Scale and rate of recovery from the current slowdown in air travel – one test where recovery is reduced to 66% of the trend and a test where recovery is achieved over three years rather than two
- Sector sensitivities – three tests were undertaken; a restructuring of Air Canada as a result of a second bankruptcy, higher growth at the City Centre airport, as well as a test if Porter was to fail.
- High oil prices – a test by fare increase due to a substantial increase in oil prices
- Distribution of demand between downtown and other areas. – this last test assumes a higher percentage of total trips to the airport are from areas other than downtown (i.e. a 10% loss in downtown demand).

Results of the in-scope demand tests are tabled below.

Behavioural Assumptions

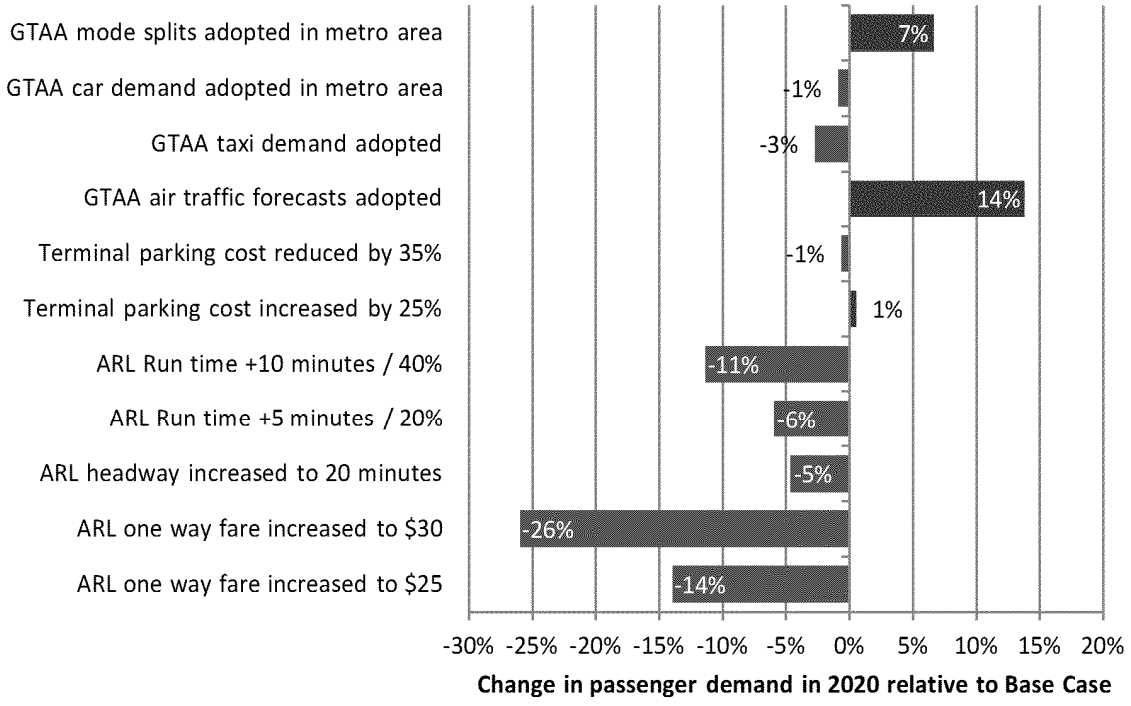
Another four factors, based on the human factor, were analyzed for sensitivity testing.

- Value of Time – adjusted the values by ±15%
- Access and Wait Time Weight –
- ARL Constant – perception of the mode against others, varied by ±10 minutes
- Acceptance of Transit – an LRT mode penalty of 10 minutes based on significant transit improvements

5.3.4 SDG 2011 Report

The SDG methodology changed little from the 2009 to the 2011 report, but various parameters affecting land use patterns and growth in the GTA have resulted in adjusted ridership values. The sensitivity tests test for many similar changes both to infrastructure, operating plan, and use of other indicators and forecasts.

The results of the 2011 Senstivity Analysis are included below in Figure 25.



6 Ridership Forecasts

6.1 Introduction

Halcrow and Steer Davies Gleave have each provided forecasts for future ridership and revenues, based on historical data of passenger activity at LBPIA. The Jacobs Consultancy report uses the 2009 SDG study and discusses potential error and questions with regards to the forecasts.

The following tables summarize the ridership and revenue forecasts for each of the reports.

Table 3: Summary of Air Rail Link Ridership Forecasts (in millions)

	Opening Year	Ridership (Opening Year)	Opening Year + 5 (Maturity)	Ridership (Maturity)	Ridership (2015)
Halcrow	2005	1.57	2010	3.15	33.58
SDG 2004	2008	2.21	2013	2.73	2.9
SDG 2009	2015	1.49	2020	2.63	1.49
SDG 2011	2015	1.35	2020	3.08	1.35

Table 4: Summary of Air Rail Link Revenue Forecasts (in millions of dollars, currency value not standard)

	Opening Year	Revenue (Opening Year)	Opening Year + 5 (Maturity)	Revenue (Maturity)	Revenue (2015)
Halcrow	2005	$ 21.07	2010	$ 50.84	$ 57.70
SDG 2004	2008	$ 43.00	2013	$ 53.04	$ 56.37
SDG 2009	201				
SDG 2011	201				

6.2 LBPIA C

Origin-Destination c
However, the Jacobs
report) discusses pot
projected land use ar

- Regional
- ut and do

6.3 S

The current AR
of 15 minutes pe
the same hours as

6.3.1 Halcrow 2002 Report

The services discussed in the Halcrow report is 1) a twenty-two minute (one-way) running time express service from Union to a new terminal at LBPIA, with a single stop at Bloor Street, operating at fifteen minute intervals; and 2) a twenty-minute non-stop express service at fifteen minute frequencies. Trains would operate between 6am to midnight at a one-way fare cost of $20.

6.3.2 SDG 2004 Report

The ARL service proposed in the 2004 SDG report is Blue 22, a high-quality premium rail service with a single stop at Bloor. One-way travel time is twenty-two minutes, with headways of fifteen minutes.

6.3.3 SDG 2009 Report

The SDG 2009 service base case is a twenty-four minute (one-way) service with intermediate stops at Bloor Street and the Weston community (approximately Lawrence Avenue West and Weston Road). Service would operate between 0500 and 0100 every day.

6.3.4 Jacobs Consultancy

The ARL service discussed in this report is the same as the SDG 2009 report.

6.4 Future A

Factors considered i

- Driving – an
- Pearson park
- Transit servi
- Airport expr
- Taxis, with f
- Eglinton-Sca
  operation i

None of
Gardine
viable op

The Eglinto
reach LBPIA;
Eglinton LRT a

6.5 Future

The SDG 2009 report considered a format of the Eglinton LRT that included service, beginning in 2021, that would call at LBPIA every 8 minutes and cost $5 per trip (integrated with the TTC Subway Fare). It is expected that the Eglinton LRT will not have a significant effect on the ARL ridership.

6.5.1 Bus Services

Bus service to LBPIA is expected to increase as passenger traffic to LBPIA increases. However, this is not expected to be a competitive mode to the ARL in the future as it does not provide the same service from the same origin. Bus services are expected to connect to suburban areas outside of the City of Toronto.

The TTC may begin service of an airport express bus service from the Jane terminus of the Crosstown LRT. The TTC is undergoing procurement for high-capacity articulated buses which may be used for this service.

The Mississauga bus rapid transit plan includes provisions for GO buses to access LBPIA from the west.

6.5.2 Rapid Transit

The Eglinton-Scarborough Crosstown LRT line is planned to connect to LBPIA. A transfer is still required from downtown commuters to reach LBPIA via the LRT, and the expected time of travel is 45 minutes.

As a rapid transit line, it will be tailored towards everyday commuters rather than the same market as the ARL. It will feature 2.65 m wide Light Rail Vehicles with only two areas with high mobility, which may

Access to the Crosst
lines, which are curr
believe taking the T

It is possible that a c
Passengers that do n
on the TTC would li

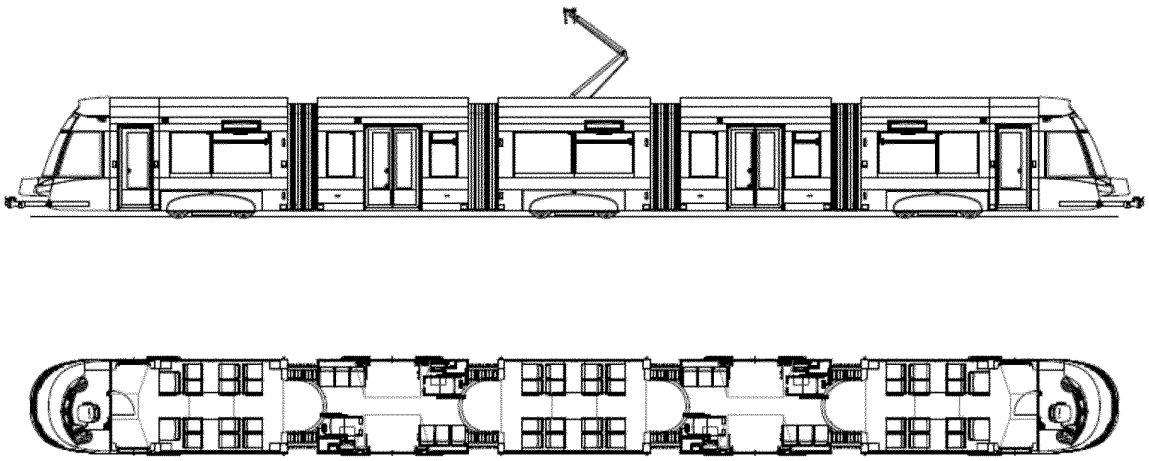


Figure 26: Elevation and plan of proposed Light Rail Vehicle. Areas for mobility are in 2nd and 4th sections

The Finch West LRT is also planned to eventually connect with LBPIA, providing access from the north. It will run the same vehicles as the Crosstown LRT and therefore have the same mobility issues. This line is not expected to reduce ridership because it serves a completely different area and market from the ARL.

A subway extension to LBPIA is not being considered at any time. Mode changes for routes 192 Airport Rocket and 58 Malton are not expected.

6.6 Behavioural Values

The 2009 SDG report created behavioural values based on Stated Preference research by surveying n = 1260 people. This data is summarized in (Actual report: section 3.3.4, table 3, 4). Behavioural values considered important were:

- In-vehicle time
- Access and egress time
- Wait time
- Interchanges
- Mode constants
- Scale parameters

6.7 Induced Demand

All reports do not se
ridership. The Jacob
reasonable assumptio

This is a reasonable
regular commuter lin
goal of revenue neut

6.8 Traffic

6.8.1 Halc

The Halcro
(page 4
3 respec

6.8.2 SD

In the SDG 20
provides recom
ramp-up is difficu
they also believe tha
example, SDG based another set of ramp-up profiles on the Arlanda Express and ended up with ramp-up numbers of 75%, 95%, and 100% in years 1, 2 and 3 respectively.

6.8.3 SDG 2009 Report

In the 2009 SDG report, ramp-up profiles of 65%, 80%, 95%, and 100% are used for years 1, 2, 3, and 4 respectively. Jacobs Consultancy agrees with these values.

6.8.4 SDG 2011 Report (Current)

Ramp up values in the SDG 2011 report are reported as 65%, 80%, 90%, and 100% for years 1, 2, 3 and 4 respectively.

6.9 Fraud and Evasion

Fraud and fare evasion poses a significant risk to operations revenue. This section discusses possible revenue loss due to fare evasion.

6.9.1 Halcrow 2002 Report

The Halcrow report accounts for fraud and fare evasion by reducing revenue by 4%. No mention is given as to how a potential guest would fare evade.

6.9.2 SDG 2004 Report

The SDG 2004 report briefly discusses revenue loss. The recommended strategy to mediate revenue loss is through access control and ticket enforcement. The easiest situation to evade fare is to under-purchase/ over-travel on a fare. This is when someone purchases a $15 ticket to Bloor from Pearson,

6.9.3 SDG

The SDG 2009 fore
Consultancy believes
allowance in the fina

6.9.4 Toda

The currently propos
electronically issued.
alighting at the co
to fare evasi

Figure 27: Example of fare card and device

6.10 ARL Ridership Exclusion per Committee Direction

The Toronto Air Rail Link will be a premium, Exclusion per Committee Direction express service. In order to achieve revenue neutrality, revenues must equal operating costs. Numbers in this section only concerns fare revenue – non-fare revenue, such as from advertising, are not discussed.

6.10.1 Halcrow 2002 Report

Two base cases were established to build forecasting models – a non-stop express service between Union and LBPIA, and an express service that stops once at Bloor Street. It assumes an air-traveller fare of $20 for Union-LBPIA travel and a fare of $15 for Bloor-LBPIA travel. Meeters and well-wishers pay half of the standard fare. Forecasts are split up by category of passenger.

For the Union-Bloor-LBPIA case, Appendix D illustrates forecasted ridership and revenue in both tabular and graphical formats. This does not include employee trips from a loyalty fare. The following Appendix E forecasts ridership and revenue for the non-stop Union-LBPIA case.

6.10.2 SDG 2004 Report

SDG has produced multiple forecasts based on uncertainty. The base case is modelled and values are changed t
available graphically

- uncertainty i
  17% in 2015

6.10.3 SDG

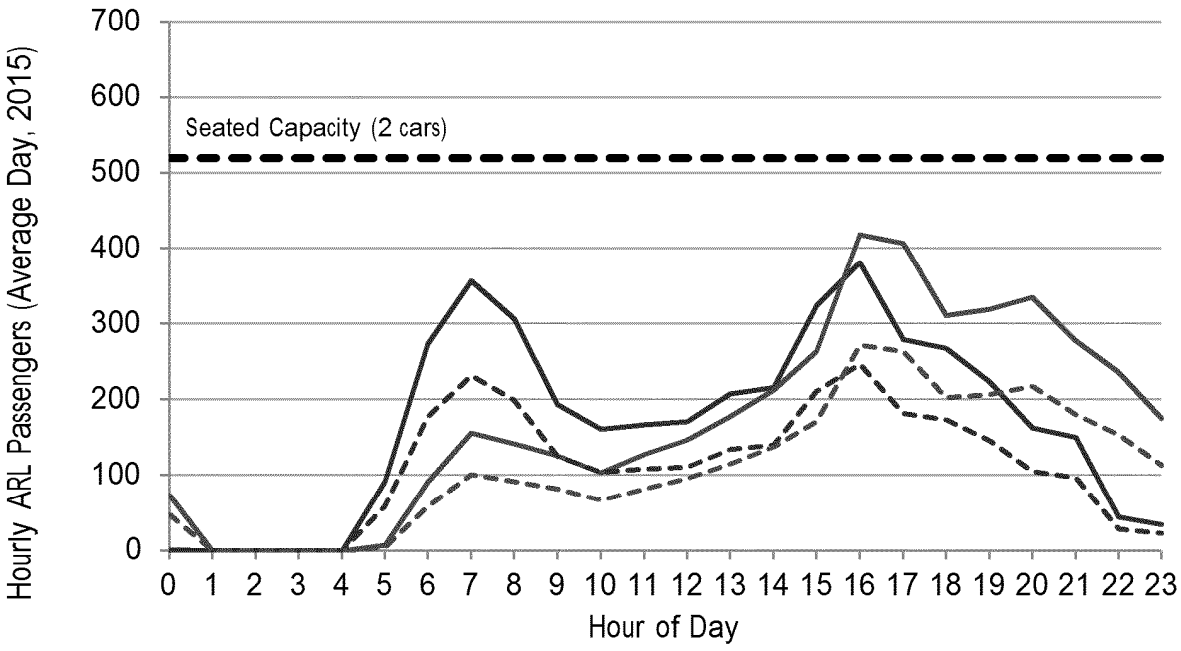
- In opening y
- By service m
  modal share)
- 89% of passe
  to/ from

6.1 2011 rt (

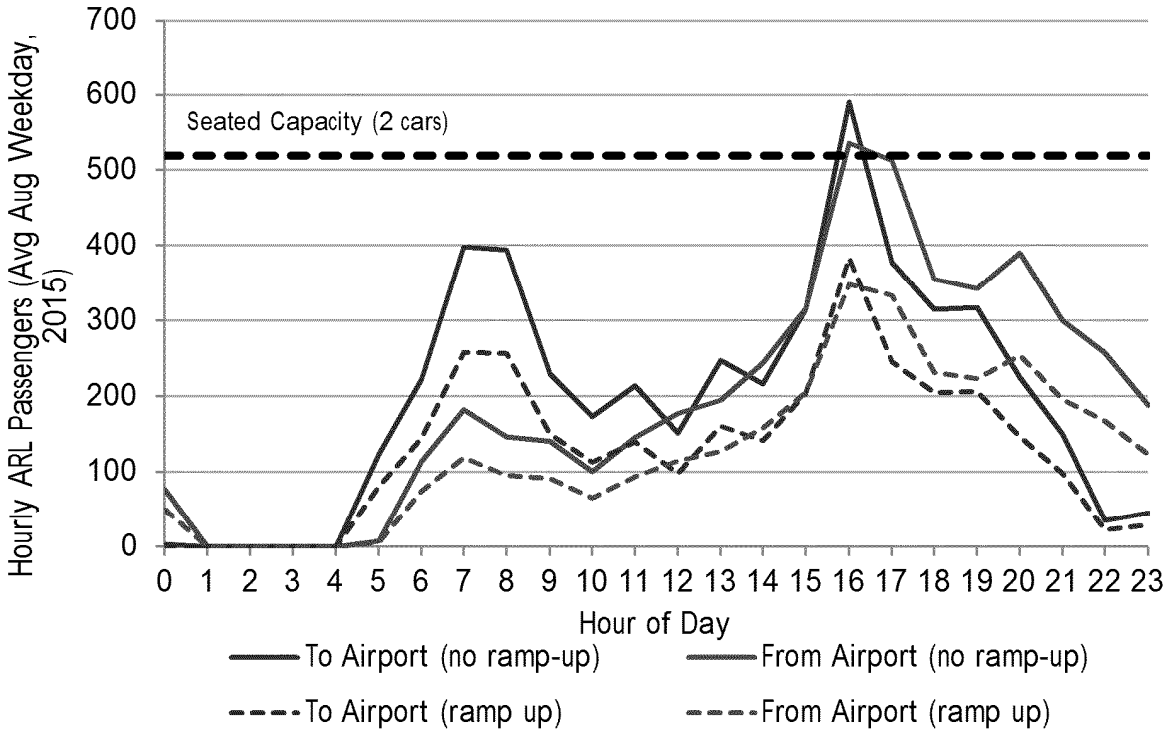
SDG pro d g s for

- In op g
- By ser matur
  of 10.3%
- 76% of pa
  to/ from W

The following charts illustrate hourly demand on an average day in both directions



Fi ag 5 (S



Figur [redacted]

6.11 Benchm [redacted]

All reports comp [redacted] world. It w [redacted]

- [redacted]
- he [redacted]
- ligh [redacted]

These modes v [redacted] time due to stop [redacted] built to cater to th [redacted] than connect downt [redacted]

Figure 30: Example of commuter rapid transit access to an airport

Overseas, the majority of air rail links are dedicated, premium services which run at moderate frequencies (i.e. fifte
experience. These r

6.11.1 Ha

The forecasting approach includes a significant amount of study of other air rail links. It looked at existing air rail links all over the world – seven in the United States, four in the United Kingdom, one in Australia, and twelve in Europe. Factors that the study looked at include global metropolitan characteristics (i.e. urban density, public transit passenger-kms, etc.), geographic position of airport from the core city (i.e. downtown), and supply and demand characteristics of the rail link.

6.11.2 SDG 2004

The SDG 2004 report looks at multiple airport rail link experiences globally. It looks at a total of 38 airport links, some of which are regular commuter lines and some of which are dedicated

air rail links. It tables the nature of service as well as the fare in 2004. It also briefly tables five planned airport links.

6.11.3 SDG 2009

The SDG 2009 report originally listed fifty global air rail links, but reduces benchmarking to six air rail links. This reduction is based on whether the lines are dedicated airport expresses, the distance between the airport and the downtown core, and the passenger throughput of the airport.

The six rail links are London's Gatwick Express, London's Heathrow Express, Oslo's Flytoget, Stockholm's Arlanda Express, Hong Kong's Airport Express, and Kuala Lumpur's KLIA Ekspres. These lines are described with detail regarding pricing, travel time, and passenger amenities. Furthermore, it briefly discusses lessons from these ARLs that the Toronto ARL should consider.

6.11.4 Jaco

A basic average of ai
rail links (all commu
services). These resu

6.11.5 SDG

The latest SDG repo

- London Gat
- Hong K
- Os
- A
- Fra rt
- Stoc m
- Vienna
- New Yo
- Chicago M
- Vancouver
- Various European high speed rail services

7 Conclusions

This page is intentionally blank

Union-Pearson Air Rail Link

Appendices

This page is intentionally blank

Appendix A

Modes of Airport transportation to elsewhere in the city. Omitted: hotel shuttle buses

Mode	Photo	Example cities
Car		
Taxi		
Local transit bus service		Toronto, New York
Premium express bu service (run by local transit)		
Coach bus		
Premium rail link		
Commut rail l		
Rapid transit (su		
Light Rail (light metro/ ROW streetcars)		Baltimore, Portland
Rail shuttle		New York

Appendix B

Halcrow Stated Preference Survey Results

	SP Survey %	Other Surveys %
Samples by Terminal		
T1	10.3	9-32
T2	59.2	37-47
T3	30.5	32-51
By Age		
Under 24	9.9	12-13
25-34	22.5	24-25
35-44	27.0	25-26
45-54	22.0	22
55-64	13.1	11
65+	5.5	4-5
By Gender		
Male	59.4	54-56
Female	40.6	44-46
Airport Access		
Taxi/ Limo		
Hotel/ Airport Bus		
Other Bus		
Rented Car		
Car Parked		
Car Lift		
Other		
Residency		
Resident		
Non-resident		
Party Size to LBPIA		
1		
2		
3+		
Bags Checked-In		
0		
1 or more	82.1	
Meeters/ Greeters		
Mean per passenger		
Income		
Up to $20000	5.7	
$20000 - $40000	8.9	
$40000 - $60000	16.4	
$60000 - $80000	13.7	
Over $80000	55.3	
Don't know		
Trip Purpose		
Business		
Non-business		
Choice of Rail Link Station		
Union Station		
Bloor & Dundas		
Access to Rail Link		
Walk	17.8	5.2
Taxi/ Limousine	23.9	18.7
TTC Bus/ Streetcar	1.7	8.3
Car	10.2	23.0
TTC Subway	32.8	43.9
GO Train	12.0	0.4
Other	1.6	0.4

* Data not available

(Halcrow Group Ltd, Cansult Ltd)

Appendix C

TABLE 7.1 BLUE22 SENSITIVITY TESTS

Test	2012 Patronage	Difference from Central Case	2022 Patronage	Difference from Central Case
Airport passenger growth minus 1% per year growth	2.42m	-8%	2.89m	-17%
Airport passenger growth plus 1% per year growth	2.89m	+9%	4.17m	+20%
Full SARS and 9/11 recovery by 2006	2.65m	0%	3.47m	0%
No SARS and 9/11 recovery	2.20m	-17%	2.89m	-17%
Business travellers 28.4% of total	2.56m	-3%	3.36m	-3%
Business travellers 45.2% of total	2.69m	+2%	3.53m	+2%
City Airport constrained to 200,000 pax	2.67m	+1%	3.51m	+1%
City Airport maximum 1,000,000 pax	2.62m	-1%	3.45m	-1%
Value of Time plus 15%	2.59m	-2%	3.41m	-2%
Value of Time minus 15%	2.72m	+3%	3.57m	+3%
Access time parameter increased to *2.5	2.25m	-15%	2.96m	-15%
Access time parameter reduced to *1.5	3.02m	+14%	3.96m	+14%
Headway parameter increased to *3.0 Business and *1.5 Leisure	2.09m	-21%	2.76m	-21%
Headway parameter reduced to *1.0 Business and *1.0 Leisure	3.17m	+20%	4.14m	+19%
Constants 10 minutes more	2.14m	-19%	2.82m	-19%
Constants 10 minutes less	3.19m	+21%	4.18m	+20%
Airport parking costs reduced by 20%	2.62m	-1%	3.44m	-1%
Airport parking costs increased by 20%	2.68m	+1%	3.52m	+1%
Taxi charges reduced by 20%	2.38m	-10%	3.12m	-10%
Taxi charges increased by 20%	2.87m	+8%	3.76m	+8%
Congestion does not worsen over time	2.53m	-4%	3.32m	-4%
Congestion worsens twice as fast as assumed	2.77m	+4%	3.63m	+4%

Appendix D

Halcrow Base Case Annual Forecasts (Table) (Excludes Employee Trips) (Union-Bloor-Pearson)

Base Case Annual Forecasts: Union Station - Bloor - T1 with a 15-Minute Headway

Year	Annual Demand in Millions			Annual Revenue in $2002 Millions			Fare for Air Passengers	Fare for Meeters&Greeters
	Air Passengers	Meeters&Greeters	Total	Air Passengers	Meeters& Greeters	Total		
2005	1.40	0.17	1.57	$ 19.86	$ 1.20	$ 21.06	$ 14.19	$ 7.06
2006	2.18	0.26	2.44	$ 35.16	$ 2.13	$ 37.29	$ 16.13	$ 8.19
2007	2.52	0.31	2.83	$ 43.01	$ 2.61	$ 45.62	$ 17.07	$ 8.42
2008	2.62	0.32	2.94	$ 44.65	$ 2.71	$ 47.36	$ 17.04	$ 8.47
2009	2.71	0.33	3.04	$ 46.29	$ 2.81	$ 49.10	$ 17.08	$ 8.52
2010	2.81	0.34	3.15	$ 47.93	$ 2.91	$ 50.84	$ 17.06	$ 8.56
2011	2.91	0.35	3.26	$ 49.57	$ 3.01	$ 52.58	$ 17.03	$ 8.60
2012	2.98	0.36	3.34	$ 50.77	$ 3.09	$ 53.86	$ 17.04	$ 8.58
2013	3.05	0.37	3.42	$ 51.98	$ 3.16	$ 55.14	$ 17.04	$ 8.54
2014	3.12	0.38	3.50	$ 53.18	$ 3.24	$ 56.42	$ 17.04	$ 8.53
2015	3.19	0.39	3.58	$ 54.39	$ 3.31	$ 57.70	$ 17.05	$ 8.49
2016	3.26						17.05	$ 8.48
2017	3.33						17.05	$ 8.46
2018	3.40						17.06	$ 8.43
2019	3.47						17.06	$ 8.62
2020	3.54						17.06	$ 8.58
2021	3.61						17.07	$ 8.57
2022	3.68						17.07	$ 8.56
2023	3.75						17.07	$ 8.52
2024	3.83						17.03	$ 8.51
2025	3.90						17.03	$ 8.48
2026	3.97			67.6			17.04	$ 8.47
2027	4.04			8.83	$	4.23	17.04	$ 8.46
2028	4.11			04			17.04	$ 8.60
2029	4.18						17.04	$ 8.59
2030	4.25			$			17.05	$ 8.58
2031	4.32				$		17.05	$ 8.55
2032	4.39						17.05	$ 8.54
2033	4.46	5.		76.86			17.05	$ 8.51
2034	4.53	5.0		$ 77			17.06	$ 8.50
2035	4.60	5.		$			17.06	$ 8.49

(Halcro p [illegible] Consu [illegible]) [illegible] XV. P[illegible]

Appendix D

Halcrow Base Case Annual Forecasts (Graph) (Excludes Employee Trips) (Union-Bloor-Pearson)

Exclusion per Committee Direction

(Halcrow G[illegible] L[illegible] L[illegible]ge[illegible]

Appendix E

Halcrow Base Case Annual Forecasts (Table) (Excludes Employee Trips) (Union – Pearson non-stop Express)

Base Case Annual Forecasts: Union Station - T1 with a 15-Minute Headway

Year	Annual Demand in Millions		
	Air Passengers	Meeters&Greeters	Total
2005	1.19	0.13	1.32
2006	1.86	0.20	2.06
2007	2.14	0.23	2.37
2008	2.21	0.24	2.45
2009	2.28	0.25	2.53
2010	2.36	0.26	2.62
2011	2.43	0.26	2.69
2012	2.49	0.27	2.76
2013	2.55	0.28	2.83
2014	2.60	0.28	2.88
2015	2.66	0.29	2.95
2016	2.72	0.30	3.02
2017	2.78	0	
2018	2.83	0	
2019	2.89	0	
2020	2.95	0	
2021	3.01	0	
2022	3.06	0	
2023	3.12	0	
2024	3.18	0	
2025	3.24	0	
2026	3.29	0	
2027	3.35	0	
2028	3.41	0	
2029	3.47	0	
2030	3.52	0	
2031	3.58	0	
2032	3.64	0	
2033	3.70	0	
2034	3.75		
2035	3.81		

(Halcrow [illegible] Cansult [illegible] Pa[illegible]51, Table[illegible])

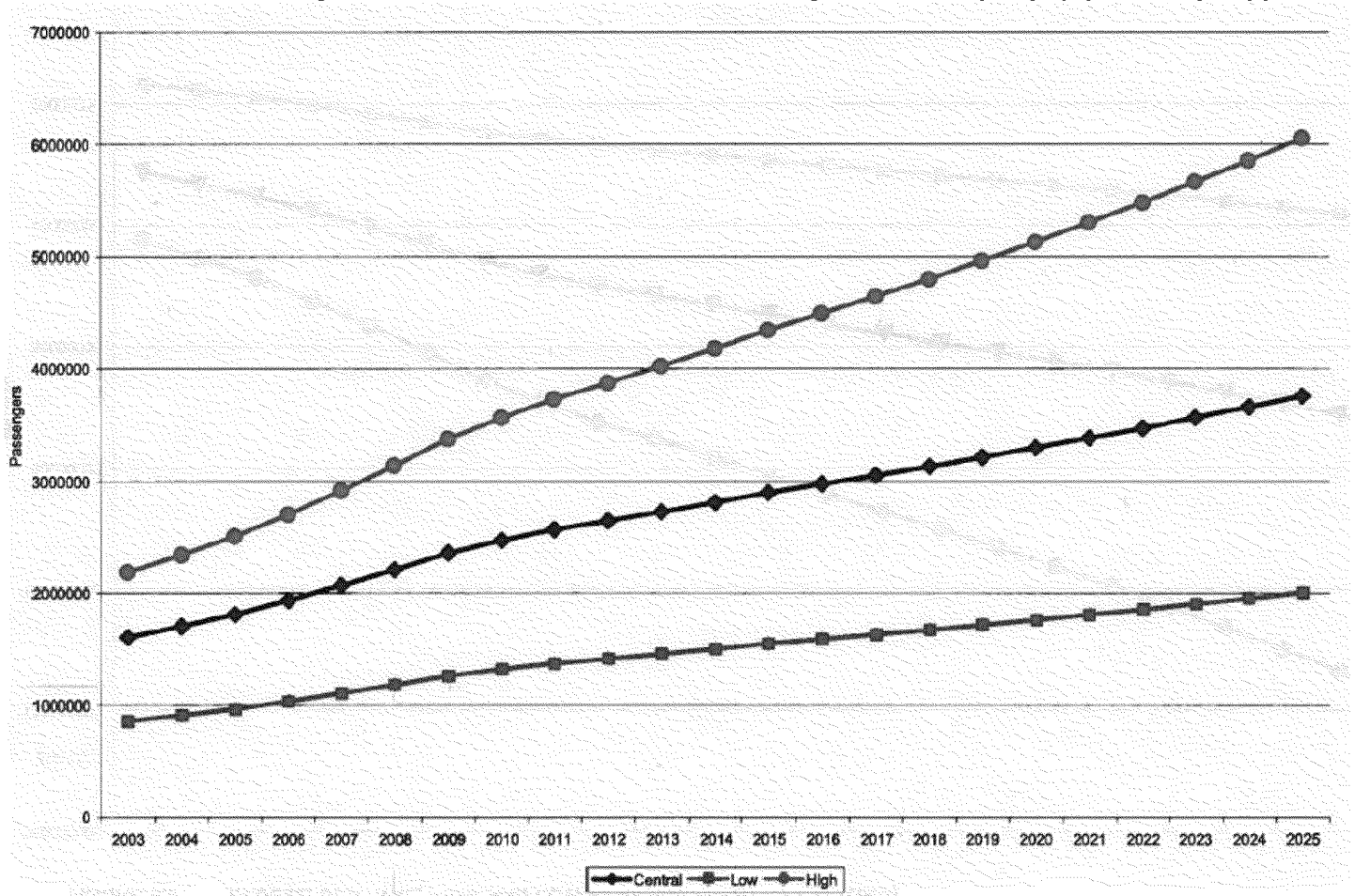
Exclusion per Committee Direction

DR

Exclusion per Committee Direction

Appendix F

SDG 2004 Annual Passenger Forecasts with Low, Central and High Forecasts (Graph) (No Ramp-Up)



(Steer Davie[illegible]eav[illegible]

[redacted]

Exclusion per Committee Direction

Appendix G

Jacobs Consultancy Rail Link Mode Shares

Air Rail Links – Mode Shares (%)

Airport	Heavy Rail - Dedicated	Heavy Rail - Other	Light Rail	Subway/ Rapid Transit
				
North American airport rail links				
Atlanta	-	-	-	10
Baltimore/ Washington	-	-	3	-
Boston	-	-	-	6
Chicago Midway	-	-	-	6
Chicago O'Hare				
Cleveland				
Minneapolis-Saint Paul				
New York JFK				
New York LaGuardia				
New York Newark				
Oakland				
Philadelphia			-	
Portland			6	
San Francisco				
Seattle				
St. Louis				
Vancouver				
Washington Dulles			-	
Washington Reagan				
Simple Average				
Other airport rail links				
Amsterdam			5	
Barcelona				
Birmingham				
Frankfurt				
Hong Kong	-			
Kuala Lumpur	17			
London Gatwick	0			
London Heathrow	0			
London Stansted	5			
Milan Malpensa	13			
Moscow (3 airports)				

Munich	-	-	-	33
Oslo	36	7	-	-
Paris Orly	-	-	-	13
Stockholm Arlanda	19	-	-	-
Sydney	4	-	-	-
Tokyo Narita	41	-	-	-
Vienna	20	-	-	-
Simple Average	**20**	**20**	**-**	**21**

(Jacobs Consultancy)

Ridership And Revenue Forecasts

TABLE 7.1 BLUE22 SENSITIVITY TESTS

Test	2012 Patronage	Difference from Central Case	2022 Patronage	Difference from Central Case
Airport passenger growth minus 1% per year growth	2.42m	-8%	2.89m	-17%
Airport passenger growth plus 1% per year growth	2.89m	+9%	4.17m	+20%
Full SARS and 9/11 recovery by 2006	2.65m	0%	3.47m	0%
No SARS and 9/11 recovery	2.20m	-17%	2.89m	-17%
Business travellers 28.4% of total	2.56m	-3%	3.36m	-3%
Business travellers 45.2% of total	2.69m	+2%	3.53m	+2%
City Airport constrained to 200,000 pax	2.67m	+1%	3.51m	+1%
City Airport maximum 1,000,000 pax	2.62m	-1%	3.45m	-1%
Value of Time plus 15%	2.59m	-2%	3.41m	-2%
Value of Time minus 15%	2.72m	+3%	3.57m	+3%
Access time parameter increased to *2.5	2.25m	-15%	2.96m	-15%
Access time parameter reduced to *1.5	3.02m	+14%	3.96m	+14%
Headway parameter increased to *3.0 Business and *1.5 Leisure	2.09m	-21%	2.76m	-21%
Headway parameter reduced to *1.0 Business and *1.0 Leisure	3.17m	+20%	4.14m	+19%
Constants 10 minutes more	2.14m	-19%	2.82m	-19%
Constants 10 minutes less	3.19m	+21%	4.18m	+20%
Airport parking costs reduced by 20%	2.62m	-1%	3.44m	-1%
Airport parking costs increased by 20%	2.68m	+1%	3.52m	+1%
Taxi charges reduced by 20%	2.38m	-10%	3.12m	-10%
Taxi charges increased by 20%	2.87m	+8%	3.76m	+8%
Congestion does not worsen over time	2.53m	-4%	3.32m	-4%
Congestion worsens twice as fast as assumed	2.77m	+4%	3.63m	+4%