



**Veitch Lister Consulting** Pty Ltd

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*Zenith Victoria* Technical Note

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## Airport Travel Model

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**Travel Demand Forecasting & Transport Infrastructure Planning**

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## **Zenith Victoria Technical Note**

### **Airport Travel Model**

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24-10-2012	A	AMA	JP	GH	Draft Report
25-10-2012	B	AMA	AMA	AMA	Updated to include more recent traffic counts for EWL study
14-02-2013	C	TV	AMA	AMA	Updated to include PT validation



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## 1 Introduction

This Technical Note is one of a series of papers that collectively describe the Zenith Travel Model of *Victoria*.

The subject of this note is the Zenith Airport Travel Model, which is designed to reflect all land-side travel made by air passengers and weepers / greeters.

The remainder of this document is structured as follows:

- Section 2 describes the airport demand modelling methodology;
- Section 3 discusses model validation; and
- Section 4 discusses some key results.



## 2 Approach to Modelling Airport Demand

### 2.1 Travel Market Segmentation

The 3 travel markets ultimately adopted in Melbourne, although South East Queensland currently uses 4, are sub-divisions of the 2 primary travel markets ('leisure' and 'business'). As summarised in Table 1, the further split in the travel markets allows them to be distributed to differing land use types.

**Table 1 - Zenith Air Travel Markets**

Primary Market	Zenith Market	Zenith Segment	Description
Leisure	Inbound Leisure	Air VHBR	Distributed to visitor accommodation & homes
	Outbound Leisure	Air HBR	Distributed to residents (dwellings)
Business	Inbound Business	Air WBW	Distributed to employment (predominantly finance & business and other white collar jobs)
	Outbound Business	Air HBW	Distributed to residents (white collar, workers)

Note: 'Outbound' passengers reside in Melbourne & 'Inbound' reside outside of Melbourne

### 2.2 The Passenger Demographic Fields

The Zenith model uses 3 demographic fields to quantify the passenger movements through any specific airport (as tabled below):

- AirPax\_Business = Business passenger movements (inbound and outbound, combined)
- AirPax\_Local = Outbound (local residents) leisure passenger movements
- AirPax\_Visitors = Inbound (visitors) leisure passenger movements

In Melbourne, the total numbers of both 'business' and 'leisure' passenger movements at Melbourne Airport were sourced from the BITRE Aircraft movements through capital city airports to 2029–30. The assumptions for Melbourne and Laverton Airport can be seen in Table 2.

The division of 'leisure' passengers into locals and visitors was produced by taking into account the ABS total 'local population' and 'total visitors' in the modelled area. In Melbourne, the 'outbound leisure' numbers grow much faster than the locally generated 'inbound leisure', but in some other Australian cities, it is the opposite.



**Table 2 – Airport Demographic Fields**

Airport	Year	All Air Passengers Travelling for Business (Air Pax Business)	Passengers Travelling for private reasons who are residents within the region (Air Pax Local)	Passengers Travelling for private reasons who are not residents within the region (Air Pax Visitors)
Melbourne	2011	37,500	13,500	24,100
	2021	60,000	22,400	39,600
	2031	79,100	31,100	54,600
Laverton	2011	340	2,690	2,690
	2021	1,300	6,850	6,850
	2031	1,940	10,460	10,460

## 2.3 Person-trip Rates

### 2.3.1 Trip Productions / Attractions

The Zenith model sets an airport as the 'production' end of the trip, and the homes / offices / hotels, etc, as the 'attraction' end of the trip. This allows the actual passenger movements forecast (by BITRE) to be exactly replicated at all horizons (i.e. independent of modelled population, employment, etc.).

### 2.3.2 Greeters and Weepers

The trip rates add on extra 'weepers and greeters' for the 2 types of leisure passenger. The following numbers were sourced from Maunsell's 'Brisbane Airtrain Passenger Forecasts' report and were derived from 'intercept' surveys at the same airport:

- Inbound Leisure = 0.25 greeter per passenger (on average)
- Outbound Leisure = 0.85 weeper per passenger (on average)

### 2.3.3 Business Market

In the absence of detailed information relating to the 'business' market, it was nominally split 50% inbound and 50% outbound. The outbound was further split 50% from home and 50% from place of work. The net result is that 75% of business passengers are to/from places of work and 25% are to/from residential homes.

## 2.4 Trip Distribution

The 'alpha' and 'beta' trip distribution parameters were generated in order to achieve a relatively 'flat' trip length frequency, where close trips were equally likely to use the airport as longer distance trips.



## 2.5 Mode Split

The mode share parameters adopted for each air travel market were as follows:

- Outbound and Inbound Leisure both use the mode parameters for the Home Based Recreation for 2 and 3 car households (HBR23) segment group
- Business trips use the mode parameters for the Work based Work segment group

## 2.6 Vehicle Occupancies

Vehicle occupancy rates were established by considering both the rate used for the equivalent non-air travel market segment (e.g. HBR23, VHBR, WBW, etc) and also the numbers of greeters/weepers.



## 3 Model Validation

### 3.1 Traffic

Table 3 presents a comparison of modelled and observed total traffic volumes on the Tullamarine Freeway between Melbourne Airport and the Western Ring Road for the AM peak, PM peak and across the day. Note that the latest available observed data is from 2010, while the model represents 2011 traffic flows. The model represents total traffic volumes on the Tullamarine Freeway very well in the peak periods and across the day.

**Table 3 – Tullamarine Freeway Traffic Validation**

Location	Direction	AM		PM		Daily	
		Observed ('10)	Model ('11)	Observed ('10)	Model ('11)	Observed ('10)	Model ('11)
b/w Centre Dr & Mickleham Rd	Eastbound	5,500	6,000	4,800 to 4,900	5,000	40,500 to 42,000	42,000
	Westbound	5,300 to 5,700	5,600	5,800 to 6,300	6,900	41,500 to 45,000	41,000
b/w Mickleham Rd & WRR	Eastbound	7,600	7,200	6,600	6,000	56,500	54,000
	Westbound	6,300	6,200	7,600	7,500	54,000	52,500

Source of Observed data: VicRoads – Road Information Services

The Melbourne Airport Ground Transport Plan 2009 states that for all purposes (e.g. passengers, staff):

- Total on-site cars (park & fly, kiss & fly, rental, taxi, VHA) entering or leaving the Airport equates to 27,500 vpd (one-way), or 55,000 vpd two-way
- 2,800 vpd (one-way) entering or leaving off-site car parks, or 5,600 vpd two-way
- Historical growth (2000/01 to 2006/07) in passenger was 4.4% (CAGR)

Therefore in 2009, there were approximately 30,000 cars per day accessing Melbourne Airport.

At the time of writing this report, we do not have access to 2011 estimates of cars (on-site and off-site) entering and leaving Melbourne Airport. However, if historical passenger growth rates are applied to the 2009 estimate, by 2011 there could be approximately 33,000 cars per day accessing Melbourne Airport. This value compares favourably with the 2011 Zenith model which has 35,000 vpd cars per day accessing Melbourne Airport travel zones (which have been separated from surrounding zones).

### 3.2 Public Transport

...coming soon...



## 4 Summary of Key Results

### 4.1 Select Link

Figure 1 shows the base year select link traffic volumes to and from the Melbourne Airport (in orange) and the origin of car trips (in Blue) to the airport (across the whole day). While the origins of the car trips to Melbourne Airport are relatively well spread across Melbourne (reflecting the distribution of leisure trips from the home), there is a cluster within the CBD, relating to exiting leisure trips (by non-residents) and outbound business trips (by residents and non-residents).

*Figure 1 – Select Link Traffic Volumes to and from the Melbourne Airport (with origins)*

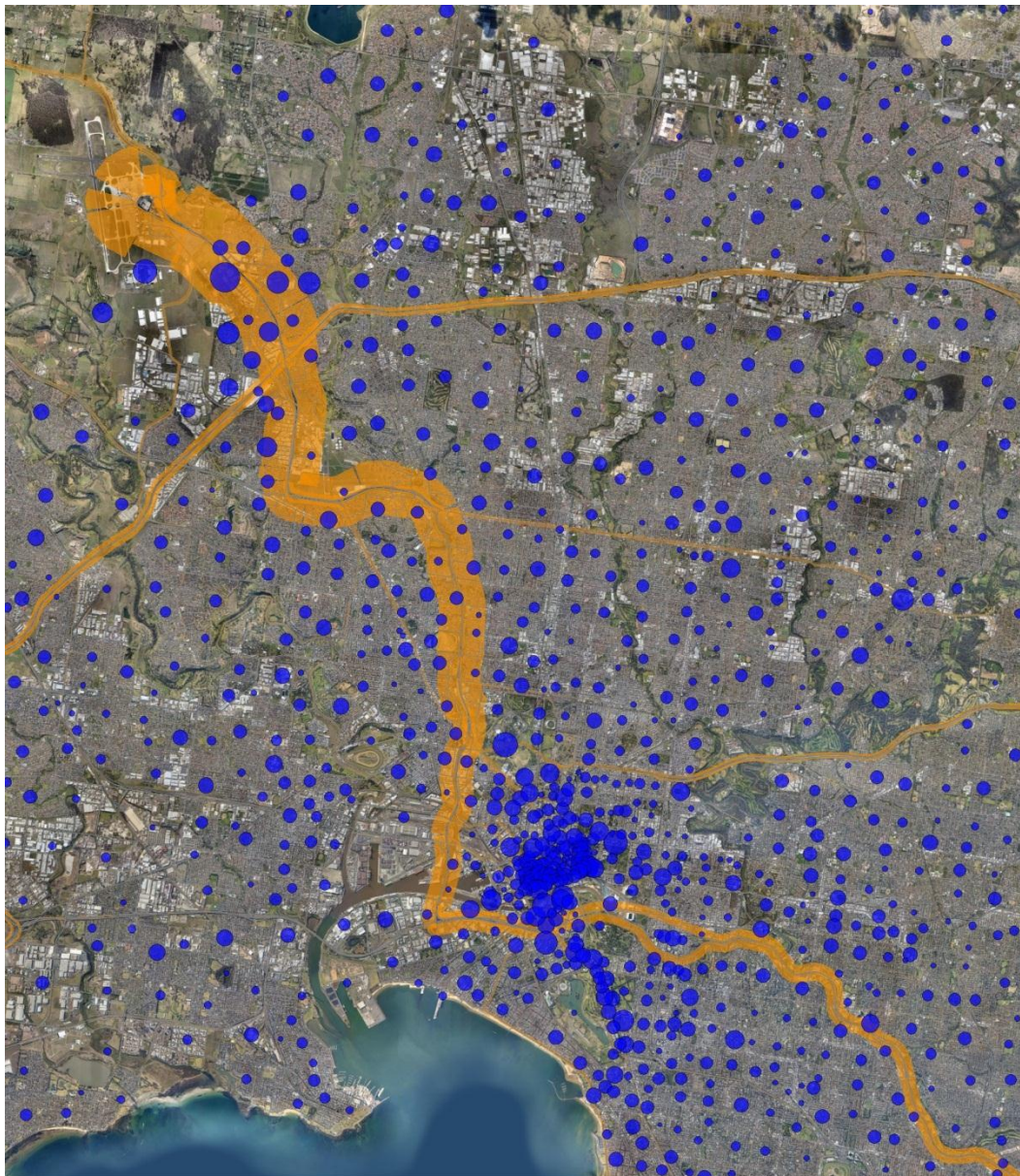




Figure 2 presents a select link of public transport volumes to and from Melbourne airport (in orange), with the origins of trips to the Airport shown in blue. Relative to car trips, public transport demand is highly concentrated in the CBD, with hotels and businesses generating a large proportion of trips. Some demand also makes use of the 901 Frankston SmartBus, though this demand is small compared with the SkyBus.

**Figure 2 –Select Link Traffic Volumes to and from the Melbourne Airport (with origins)**

