

Airport Rail Links - A Post Audit

by David Ashley, Sinclair Knight Merz

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Introduction

Interest in airport access improvement arises from such issues as road congestion on airport approaches and along the route to the city, traffic and environmental impacts on local residents, government transport policies and the economic effects of poor airport accessibility.

Rail access offers a potential contribution to these issues and my aim in the paper is to discuss some of the complexities of airport rail access planning: the conflicting interests of diverse stakeholders, the high costs of rail access provision and the market for rail services. I draw on a range of airport examples in USA, Europe and Asia, illustrating the Australian issues by reference to Melbourne.

My background in surface access is as a consultant since the late 1980s to UK Department of Transport and BAA on surface access at Heathrow airport. I prepared the forecasts for the Heathrow Express rail link (HEX), was an expert witness on surface access mode shares at the Heathrow Terminal 5 public inquiry and am currently working on rail access proposals to the two main Scottish airports: Edinburgh and Glasgow.

Conflicting Interests

Stakeholders in airport access schemes include federal, state and local governments, the airport owner/operator, operators of current transport services - taxi companies, bus companies etc - and the public.

Airports have large impacts on the surrounding communities, as do the access links. Road traffic particularly may create congestion and pollution on routes to the airport. Access routes within the airport boundary and the siting of airport station(s) require the agreement of the airport operator, whose concerns will include avoiding disruption of airport services and potential conflicts with other revenue-raising activities (such as car parks).

Governments may have multiple objectives for public transport access improvement, as in Melbourne where the State Government wished to increase existing commuter rail capacity. Local government will be concerned about the impacts on residents and may find it unsatisfactory that airport rail links often do not serve communities along the route from the city.

The history of the Melbourne Airport Rail Link (MARL) illustrates these issues. In 1999, the government sought a reservation for its preferred route via Broadmeadows. Following the deferment of a decision by the independent Panel, and subsequent studies and public consultation, a second panel process was conducted. The second Panel rejected the Broadmeadows option in 2001 because of its perceived environmental, social and traffic impacts, preferring the more expensive route through Albion East supported by the six local governments. Subsequent patronage and revenue studies led in 2002 to deferment of the rail link project on the evidence that it would not be viable for at least 10 years. Concurrently, the government announced plans to improve the Skybus airport bus service. Consequently, a project which was strongly supported by both state and local governments as well as the independent Panel in the end did not proceed.

Costs and Finance

For an airport rail link designed to satisfy the requirements of air passengers, there are high costs involved in:

- ❑ commissioning new rail stock (applied to both MARL and Heathrow Express);
- ❑ accessing the airport: both MARL and Heathrow Express required new track in tunnel and underground airport stations;
- ❑ linking the airport via existing rail lines to the city: additional track capacity was required for MARL;
- ❑ providing appropriate facilities at the city centre station for air passenger needs: check-ins, luggage storage and taxi access were all issues for Heathrow Express.

Heathrow Express was privately financed more or less fully by BAA and in order to recover the high costs a premium fare is charged (Figure 1). This is broadly equivalent to a day's car parking charge, making the high class service more expensive than the existing public transport services (metro and coach) but only one third of the price of a taxi.

Figure 1 Comparative Costs of Travel to Heathrow and Melbourne Airports

	Heathrow	Melbourne
Distance	~25kms	
Taxi	\$130	\$35
Parking	\$40/day	\$8/day
Airbus	\$24	\$13
Metro	\$11	-
Rail	\$36	?

Evidence and research confirms that air passengers are prepared to pay a higher price for high quality, more direct services (Coogan 1995 and Ashley, 1996). One contributory factor is the average income of air passengers - at Heathrow, air passengers' average income is more than double the national average. The fare that can be charged is of course constrained by the price of the competition. It is for example difficult to imagine that a much higher fare than that presently applying to the Melbourne Skybus coach service could have been charged for MARL, which would presumably undermine its attractiveness to the private sector.

European and other airports may seek to restraint competition from other modes to improve the variability of public transport services. For example, those European countries which pursue strong integrated transport policies commonly do not permit bus/coach services to compete with rail (eg The Netherlands and Switzerland).

There are a number of obvious risks about which a private sector funder would be concerned. As we shall discuss, there may be high patronage risks associated with future air passenger market growth and the response of the competition (eg taxis, car parking, buses). Control of the operating environment is a concern with other agencies responsible for the airport, the main line tracks, other rail services, the central city station and access to it. An example is the operation of taxis serving Heathrow Express at Paddington Station; approximately 50% of air passengers are expected to prefer to use taxi to travel from the station to their final destination, but constraints on taxi operations at the station lead to long queues and delays in peak periods.

The Market for Airport Rail Links

In principle there are many markets - airport employees, air passengers, air passenger escorts, other airport visitors and trips unconnected with the airport. I will limit my discussion to the first two of these, the remainder in my view being far less important.

Airport Employees

As a general rule, public transport, and particularly rail, is unlikely to cater for a significant share of airport employees (Figure 2). The reasons are:

- ❑ airports are typically located on the periphery of a city or outside it; like other workplaces in such locations, car parking is unrestricted and local public transport offers few advantages over the car: in London, for example, 80% of employees use public transport to commute to the city centre, but less than 20% commute by public transport to workplaces in outer London; airport employees make similar choices of mode, but may have higher car preferences due to the prevalence of shift working and the need to travel at anti-social times of day when public transport may be scarce;
- ❑ within an airport site, rail services will normally be focused on the passenger terminals, but many airport employees do not work at the terminals; for example, about three quarters of employees at Heathrow work at other sites on the airport;
- ❑ it is common to find that airport workers live close to the airport site; most Heathrow employees live in the boroughs surrounding the airport; similarly 45% of Glasgow airport employees live within 5-6 kilometres of the airport; while local buses can provide an effective commuting service, these distances are generally too short for rail¹ to serve.

Figure 2 Employee Access to Airports

Airport	% Car	% Public Transport
<i>Europe</i>		
Edinburgh	94%	6%
Koln/Bonn	88%	5%
Manchester	84%	4%
Frankfurt	84%	15%
Heathrow	82%	13%
Glasgow	82%	15%
Hamburg	76%	15%
Amsterdam	73%	14%
Dusseldorf	46%	51%
<i>USA</i>		
Boston Logan	88%	10%
New York Kennedy	86%	13%
Newark	81%	17%
La Guardia	78%	18%
Chicago O'Hare	75%	21%

Sources: Niblett (1995), Airport Access Planning Guide and Sinclair Knight Merz.

Air Passengers

Air passengers are the primary market for airport rail services. But is rail a 'natural' choice for air passengers in the same way that it can be, say, for commuting to a city centre? How do we interpret the difference in the share of air passenger trips for the direct rail service to Manchester airport (5%) and that for Oslo (43%)? Either there is no natural market, for if

¹ The London underground (Piccadilly Line) does cater for employees, principally because it provides an effective local service between some of the local boroughs, the airport terminal areas and other parts of the airport (via the peripheral station at Hatton Cross). Despite this, the majority of employee public transport access to Heathrow is by bus.

there was why is it not evident at Manchester or, if there is a natural market, then its size must vary widely between airports.

Market research (Bates et al, 1987) suggests that air passengers seek the following characteristics of modes for accessing airports:

- ❑ quality of access journey: an overwhelming preference for door-to-door travel which eliminates the difficulty of accessing the transport system, especially for those unfamiliar with it;
- ❑ luggage carrying capability;
- ❑ a dedicated service: which requires less user knowledge of the transport system and offers greater security;
- ❑ service dependability/reliability (in public transport, particularly associated with rail services).

These characteristics all point to car and taxi being the 'natural' modes of airport access, but also explain the provision at some airports of custom-designed, dedicated rail services with city luggage check-ins. Commentators are sometimes misled by these characteristics into believing that journey time is a less important attribute: this is a mistake, air passengers place a high value on journey time also, and a rail service is unlikely to be successful if its journey time is uncompetitive (Schank & Wilson, 2000).

There are however sub-markets which public transport/rail services may best target: visitors who have reduced access to cars, people travelling independently in smaller groups or with little luggage (such as business trips), air passengers destined for locations most easily served by rail (such as the city centre) or destinations too far from the airport to be feasible by taxi or convenient to be picked up by meeters and greeters.

Thus, while it seems that rail does not have a natural market share, it will be successful if it can compete in these sub-markets with the transport modes which are most preferred by air passengers. Simply providing a rail service will not of itself ensure patronage. Unlike, say, the city centre commuter market, congestion and parking restrictions may not be major factors in mode choice. In practice, more modes are available to air passengers, as exemplified by the wide use of taxi and the preponderance of lifts to the airport provided by meeters and greeters (commonly referred to as 'kiss-&-fly'). Charter/hotel coaches, shared taxis and hire cars may also win significant market shares at some airports, serving the door-to-door requirement of air passengers.

Evidence on public transport shares at existing airports is given in Figures 3-5, from which it can be seen that:

- ❑ the public transport and rail shares vary widely;
- ❑ US airports are markedly less successful at achieving high public transport shares;
- ❑ US data suggests that high quality coach services (such as at Boston Logan airport) can in appropriate circumstances be as effective as rail;
- ❑ European and Asian airports with high public transport shares have direct rail services;
- ❑ at many airports the public transport share derives from a combination of modes, suggesting that bus/coach may be a better alternative for some journeys than rail.

Perhaps the most important point is that the very wide spread of public transport and rail market shares implies that considerable effort is likely to be needed to pin down the expected patronage of a new public transport facility at an airport.

Figure 3 Public Transport Access Shares at US Airports

Public Transport Share	US Airports	The Main Public Transport Modes		
		Rail	Bus	Shared Taxi
20-30%	<i>San Francisco (sh,st)</i>		X	X
10-20%	<i>Boston Logan (sh)</i>	X	X	
	Washington Reagan	X		
	<i>New Orleans</i>		X	
	<i>Denver</i>		X	
	<i>Los Angeles(st)</i>		X	X
	<i>Las Vegas McCarran (st)</i>			X
	<i>Seattle Tacoma (st)</i>		X	X
	<i>Orlando (st)</i>			X
< 10%	Chicago Midway	X		
	Atlanta Hartsfield	X		
	Chicago O'Hare	X	X	
	Baltimore-Washington		X	
	Cleveland Hopkins	X	X	
	Philadelphia (st)	X		X
	Lambert-St Louis	X	X	

Italicised text identifies airports without direct rail links. sh: shuttle bus to rail. st: shared taxi accounts for major part of public transport share. Source: Mandle et al (2000).

Figure 4 Public Transport Share at European and Asian Airports

Public Transport Share	European and Asian Airports	The Main Public Transport Modes	
		Rail	Bus
> 40%	Oslo (62%)	X	X
	Hong Kong (60%)	X	X
	Tokyo (60%)	X	X
	Geneva (45%)	X	
	London Heathrow	X	X
30-40%	Munich	X	
	Zurich	X	
	London Gatwick	X	X
	London Stansted	X	
	Frankfurt	X	
	Amsterdam	X	
20-30%	Brussels	X	X
	Paris De Gaulle	X	X
	<i>Paris Orly</i>		X
10-20%	Dusseldorf	X	
	<i>Edinburgh</i>		X
	<i>Luton</i>		X
	<i>Birmingham</i>	X	X
< 10%	Manchester	X	X
	<i>Glasgow</i>		X
	<i>Melbourne</i>		X

Italicised text identifies airports without direct rail links. Source: Mandle et al (2000) and Sinclair Knight Merz.

Figure 5 Rail Shares at Overseas Airports

Rail Share	USA	Europe and Asia
> 30%		Oslo, Tokyo, Geneva, Munich, Zurich
20-30%		Hong Kong, London Heathrow, London Gatwick, London Stansted, Frankfurt, Amsterdam
15-20%		Brussels, Paris De Gaulle
10-15%	Washington Reagan	Dusseldorf
5-10%	Atlanta Hartsfield, Chicago Midway	Manchester (5%)
< 5%	Baltimore-Washington, Chicago O'Hare, Cleveland Hopkins, Philadelphia, Lambert-St Louis	

Source: Mandle et al (2000).

What characterises the contexts in which public transport and/or rail win a high market share? Figure 6 structures some of the simple but critical issues and Figure 7 provides evidence for this in terms of the specific characteristics of some airports. There appear to be two major markets in which rail can win a high market share - travel to the city centre and travel to the wider state/national market, while the suburban market is generally recognised as being particularly difficult to serve.

The city centre market is strongest where there is a high demand to the city centre, a high proportion of visitors, and the airport is at some distance from a congested city centre such that rail can offer substantially cheaper fares and faster journey times. In this respect, comparing Heathrow with Melbourne (Figure 1), taxi access to London is slow (ca. 1 hr, longer in the peaks, and expensive at \$130) while for Melbourne it remains quick and relatively cheap. Some 70% of people travelling to central London from Heathrow are foreign visitors. While I do not have access to the statistics for Melbourne, it is not the premier Australian tourist or business destination and has a relatively low proportion of employment in the city centre and its environs (about half that of London, for example). Consequently, it seems likely that the visitor proportion is very much lower than London (which is the major UK business and tourist destination), with much of the air travel being by residents.

The other major market is the rest of the State/country. Airports like Zurich and Amsterdam are leading examples. Amsterdam airport serves all of the Netherlands including the ring of cities around Amsterdam (The Hague, Rotterdam and Utrecht). Consequently well over 90% of the airport's population catchment lies outside the city, for which direct rail services to the airport are provided along the extensive Dutch rail network. Zurich is in a similar position. In both countries rail also plays the role of airport feeder. In marked contrast, the Melbourne metropolitan area by itself accounts for two thirds of the population catchment of the airport, and major population centres in regional Victoria have local airline feeders to the airport.

Finally, there may be Australian parallels with Mandle et al's explanation of the low public transport shares of US airports:

It appears that these [European and Asian] data [on public transport shares] are not transferable to the United States because of the extensive public transport networks, limited highway access, regional population densities, and the use of rail as a feeder in Europe and Asia.

The paper goes on to suggest that bus services may be more appropriate than rail at many US airports.

Figure 6 Air Passenger Market Analysis

Destination	City Centre	Suburbs	Rest of State/Country
Key factors	<ul style="list-style-type: none"> · competing modes: car less important taxi very important · visitor proportion · business trip proportion 	<ul style="list-style-type: none"> · mainly residents' trips · diversity of destinations 	<ul style="list-style-type: none"> · national rail networks · taxi uncompetitive · kiss-&-fly less competitive
Discussion	Taxi competition reduced by: <ul style="list-style-type: none"> · longer distance · higher congestion · higher tariffs 	Generally difficult market for public transport to compete with car and taxi.	A potential market.
Success Factors	<ul style="list-style-type: none"> · market size · % visitors · % business trips · expensive and/or slow taxi option 	An extensive, fast, frequent public transport service providing mainly direct airport connections.	<ul style="list-style-type: none"> · Market size and concentration (in towns and cities) · an extensive, fast, frequent public transport service providing mainly direct airport connections

Figure 7 Key Factors in the Rail Shares at Specific Airports

Rail Share	Airport	Key Factors
> 20%	Oslo, Tokyo, Hong Kong, London Heathrow, London Gatwick, London Stansted	<ul style="list-style-type: none"> · typically long distance to city · taxi much slower and more expensive · dedicated service
> 20%	Amsterdam, Zurich, Geneva	<ul style="list-style-type: none"> · focus on larger national market · other cities in longer distance catchment areas with direct airport services · no bus competition · Swiss airports: high taxi fares and integrated baggage handling
10-15%	Washington Reagan	<ul style="list-style-type: none"> · high proportion of air passengers with a city centre destination (more than double that of other US airports with a direct rail service) · high proportion of airport visitors
5%	Manchester	<ul style="list-style-type: none"> · close to city (15 kms) · affordable taxi fares · low foreign visitor proportion (13%) · low proportion of city centre destinations

In Figure 8, I offer an assessment of the key factors affecting airport rail shares in the context of the deferred Melbourne rail link. Like the US airports, Melbourne would not expect to achieve substantial patronage from the relative small market outside the metropolitan area. The focus of a rail link would therefore be on the city centre market, but there is strong

competition from taxis and cars. Although we have no details on the size of this market, we suspect that both the proportion of visitors and the proportion of city centre destinating air passengers would not be high.

While the proposed rail service would have good characteristics, it would be almost identical in running time, headways and destination (Spencer Street Station) to the present Skybus service. We may therefore take this service as an indication of the market. Skybus carries 500,000 people annually, 75% visitors, about 3% of the 17m airport throughput. Arguably, Skybus provides a better service than the proposed rail link as it includes an onward minibus service to hotels, amounting to a door-to-door service. Without some such connection, it is quite unclear how air passengers alighting from the proposed rail link at Spencer Street station would most conveniently reach their destinations.

The Melbourne Skybus achieves fast journey times by being able taking advantage of the new high quality road infrastructure connecting the airport to the city. Investment in the bus service and in providing priority through the peak bottleneck between the Calder and Tullamarine freeways will further improve the service to air passengers.

Figure 8 Assessment of a Melbourne Rail Link

Airport Rail Link Key Factors	Melbourne Rail Link
<u>Statewide market</u> Integration with national rail network Market size Competing air feeders	poor, interchange required minor market yes
<u>City Centre Market</u> Taxi competition Road times are unreliable Airport parking Market size % Visitors	quick and not expensive some unreliability in peaks only low cost, no constraints <i>not known, probably not dominant</i> <i>not known, probably not dominant</i>
<u>Rail Service</u> Airport rail station Baggage Competitive line haul times Acceptable headways City centre rail station	centrally located special rail stock @ 20mins line haul times are no better than Skybus or taxi, except in peaks @ 15 mins they are acceptable but no better than Skybus location on western edge of city; very unclear how passengers reach their final destination; in comparison Skybus provides an onward hotel shuttle

Summary

While recognising the reasons why rail-based public transport improvements are popular at airports, the paper has sought to illustrate some of the difficulties. These include the need to reach agreement with many stakeholders and the high costs of these rail links.

The major demands for airport access arise from airport workers and air passengers, but it is argued that rail services are in general unlikely to attract many airport workers and the focus will usually be on air passengers. It is evident from international experience that rail systems cannot be counted on to attract large volumes of air passengers. There are however some key sub-markets which rail systems can target. If these are relatively large for the airport in question, and the rail service is competitive with other modes (the car and taxi in particular)

then the service may achieve significant market shares if it is designed to meet passenger requirements. In the case of Melbourne, analysis of the context suggests that this is unlikely.

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