

Rail Links and Sydney's Airports

Key Success Factors

by

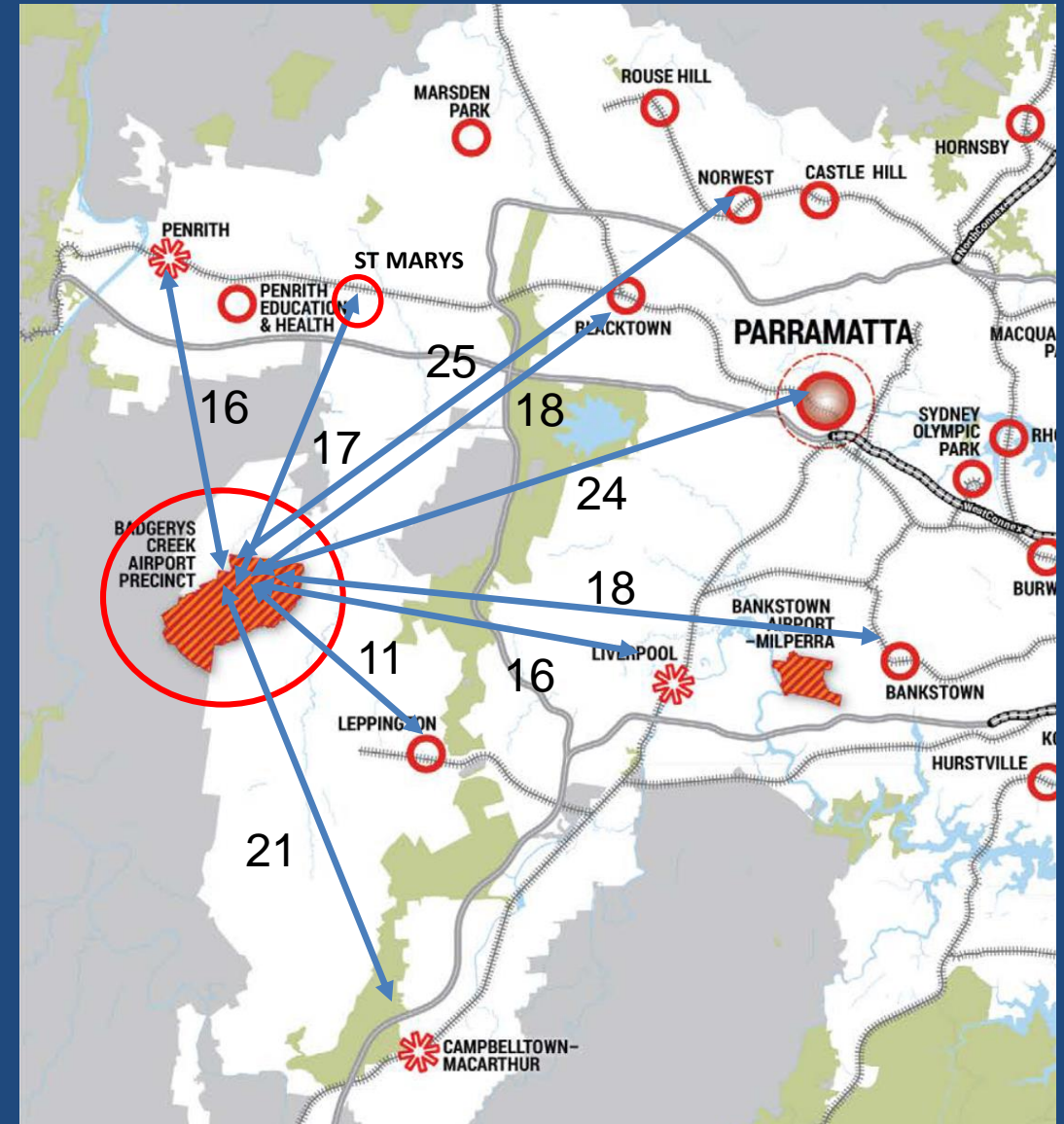
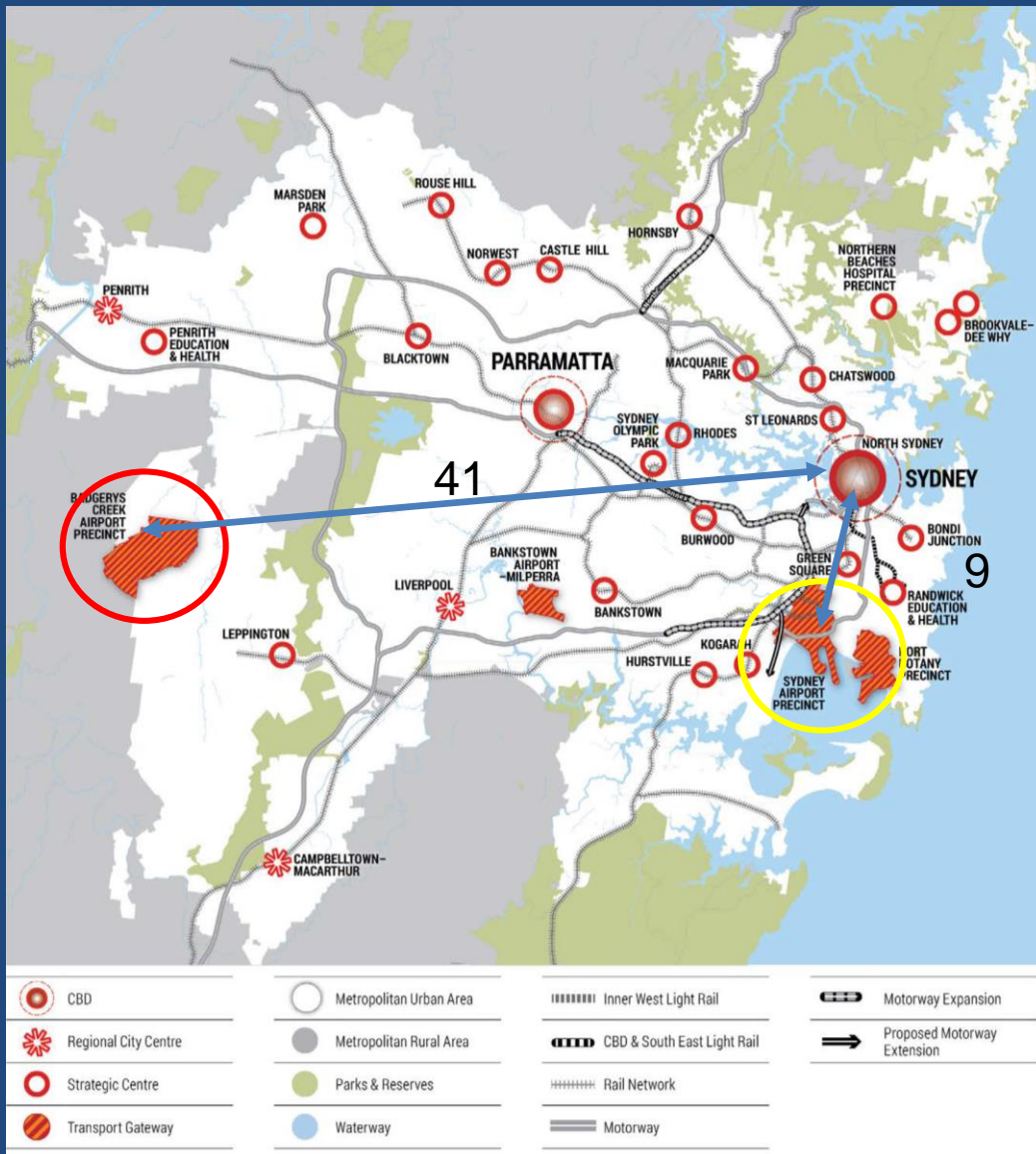
Peter Thornton

www.transportationassociates.com.au/downloads

Transportation Associates Pty Ltd

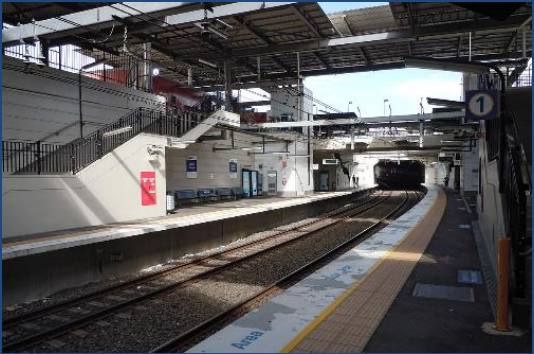
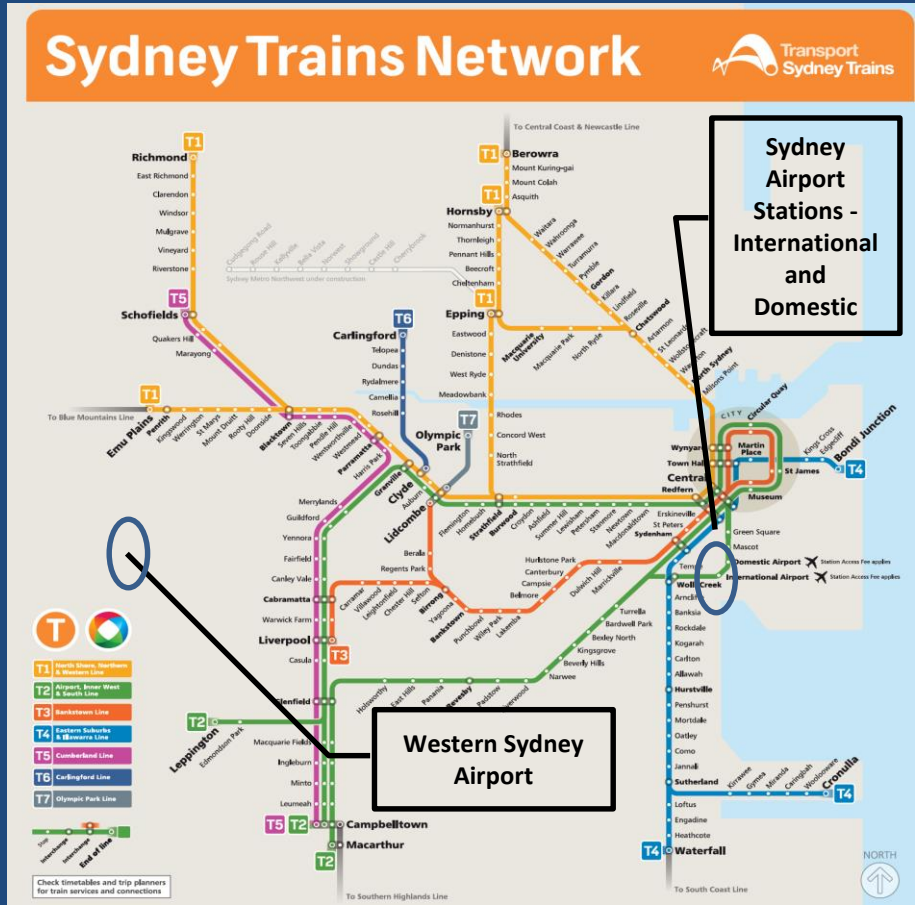
Updated 18 March 2020

- What type of rail link(s) does WSA need to be successful – as an airport?
- Is the existing rail link at Sydney airport a good model for WSA?
- What proportion of passengers can be or should be expected to use rail?
- To what markets – or centres of population or economic activity should a WSA airport rail link?
- What service parameters are needed to create a successful airport rail ?
- Are current proposals the answer?



- Source: WSA-EIS-Volume-1-Chapter-5-Stage-1-Western-Sydney-Airport.pdf

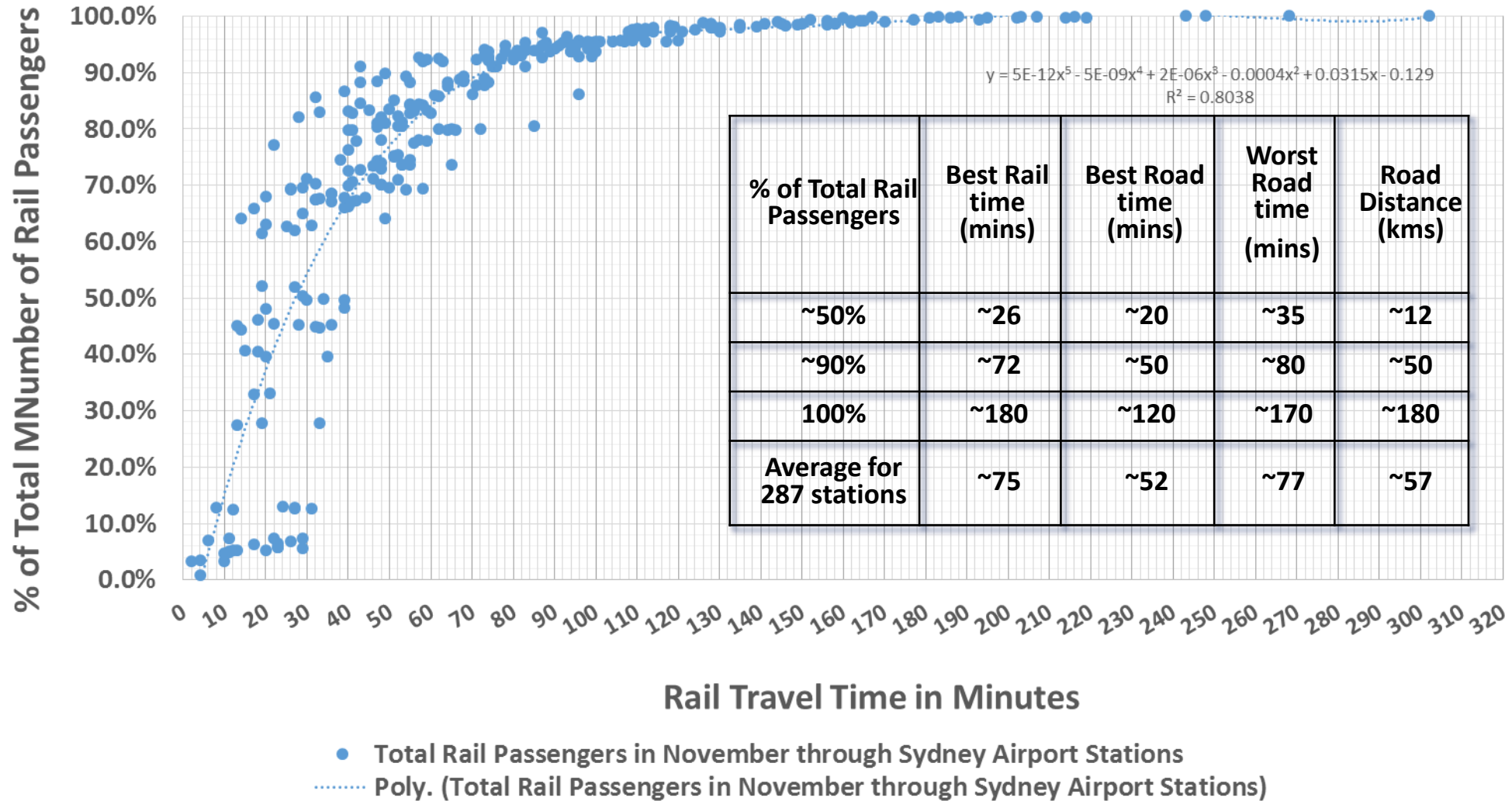




<https://www.airportlink.com.au/trip-information/locations/>

<http://www.bouygues-construction.com.au/project/sydney-airport-link/>

Total Rail Passengers in November 2016 through Sydney Airport Stations

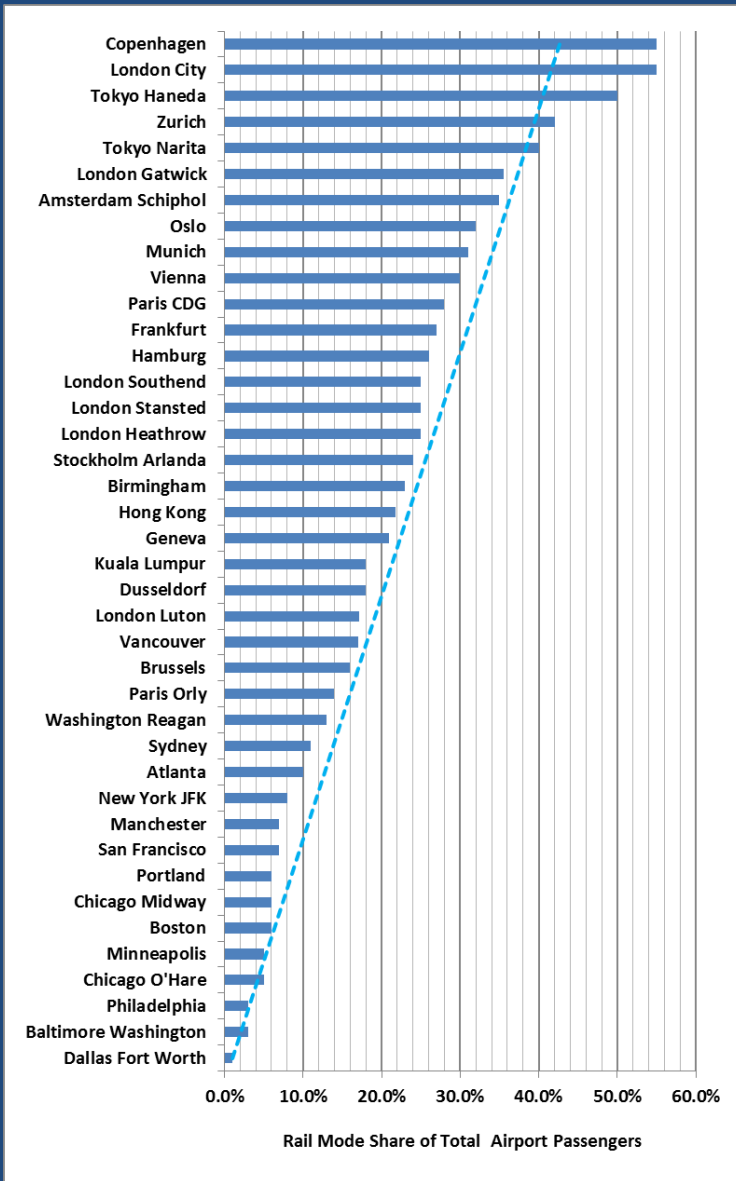


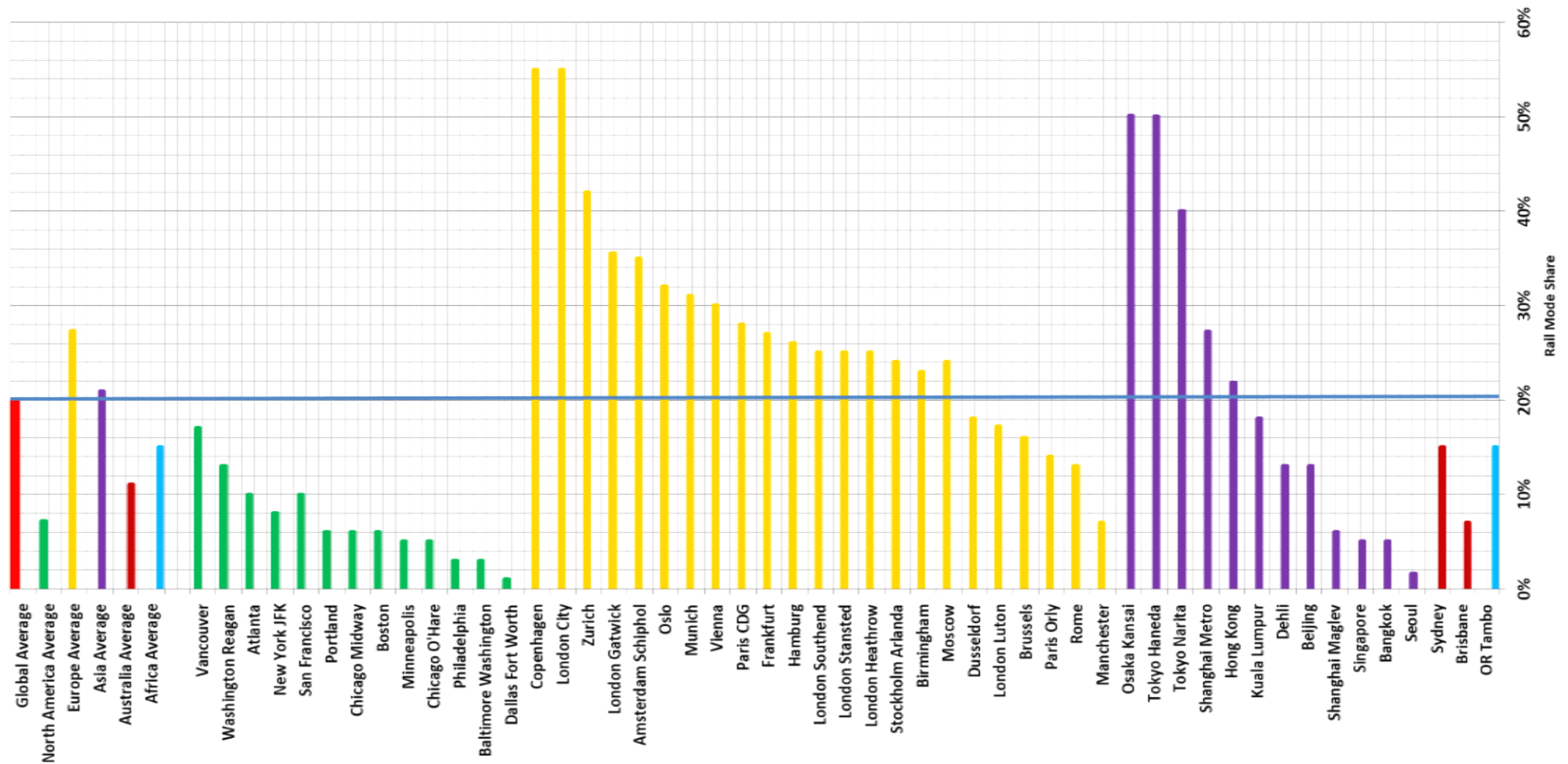
Graph shows % of total rail passengers passing through Airport Stations by rail travel time

- Africa - OR Tambo;
- Australia - Brisbane; Sydney
- Asia - Seoul; Bangkok; Singapore; Shanghai Maglev; Beijing; Delhi; Kuala Lumpur; Hong Kong; Shanghai Metro; Tokyo Narita; Tokyo Haneda; Osaka Kansai;
- Europe - Manchester; Rome; Paris Orly; Brussels; London Luton; Dusseldorf; Moscow; Birmingham; Stockholm Arlanda; London Heathrow; London Stansted; London Southend; Hamburg; Frankfurt; Paris CDG; Vienna; Munich; Oslo; Amsterdam Schiphol; London Gatwick; Zurich; London City; Copenhagen;
- North America - Dallas Fort Worth; Baltimore -Washington; Philadelphia; Chicago O'Hare; Minneapolis; Boston; Chicago Midway; Portland; San Francisco; New York JFK; Atlanta; Washington Reagan; Vancouver

Key Points

- Source: IARO (IARO Report 18.13) and others;
- Why is the airport rail mode share of ground access so different around the world?
- What makes Copenhagen so different from Dallas Worth?
- What factors bear on mode choice?
- Can it be reliably predicted from those factors?
- What models work? And how well?
- Issues – getting up to date mode share data; excluding transit passengers from those requiring ground access; comparing like with like (parity pricing); getting consistent data on travel times and costs; multi-airport cities; multiple rail links to one airport (e.g. Heathrow);





Sources Transportation Associates analysis based on data originally assembled by IARO (IARO Report 18.13: Forecasting Air-Rail Author: Paul Le Blond), GARA and internet research

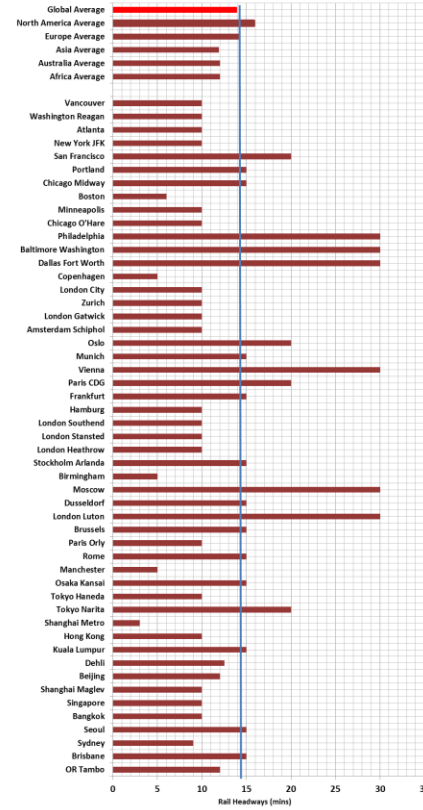
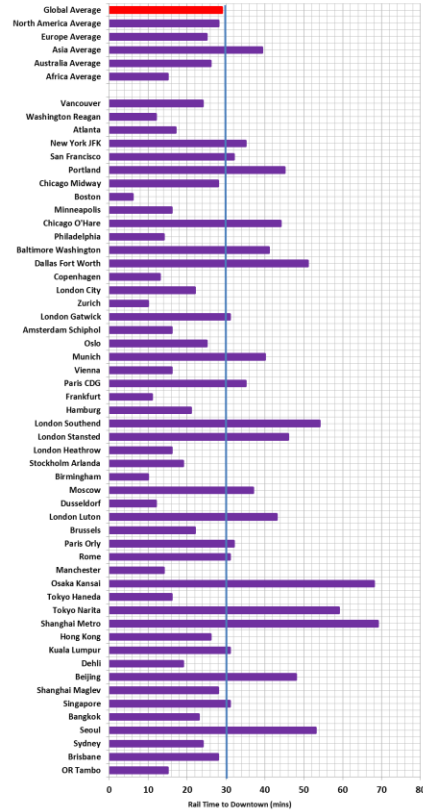
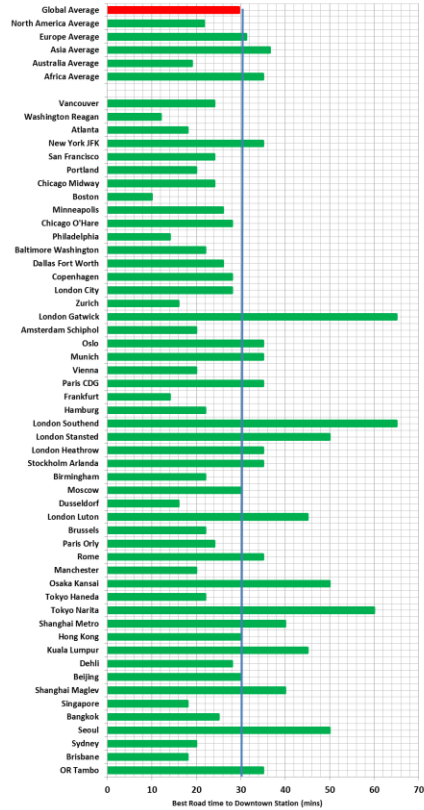
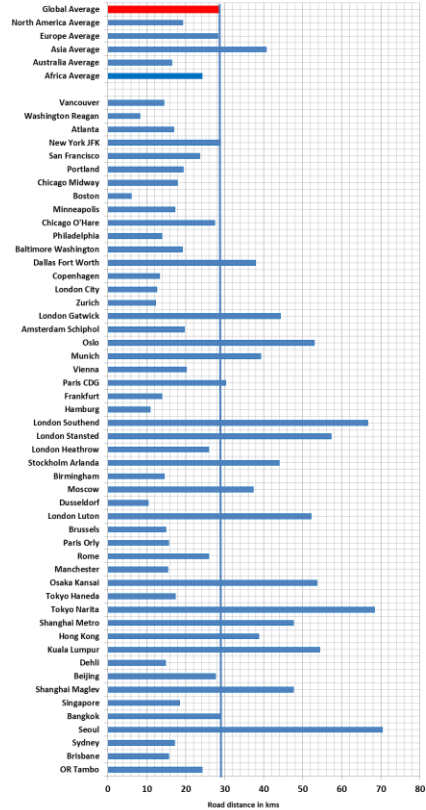
Multi-Factor Linear Regression Factors

Selected as likely to be influential and data available:

- Road distance to Common Downtown location (kms);
- Best Road Time to Common Downtown Location (mins);
- Worst Road Time to Common Downtown Location (mins);
- Rail Time to a Common Downtown location (mins);
- Rail Headway (mins);
- Taxi Fare - Parity Price in 2014 USD;
- Airport Parking (best available price for parking for 24 hours short stay at airport) in USD 2014 parity currency;
- Rail Fare - Parity Cost in 2014 USD.

Key Points

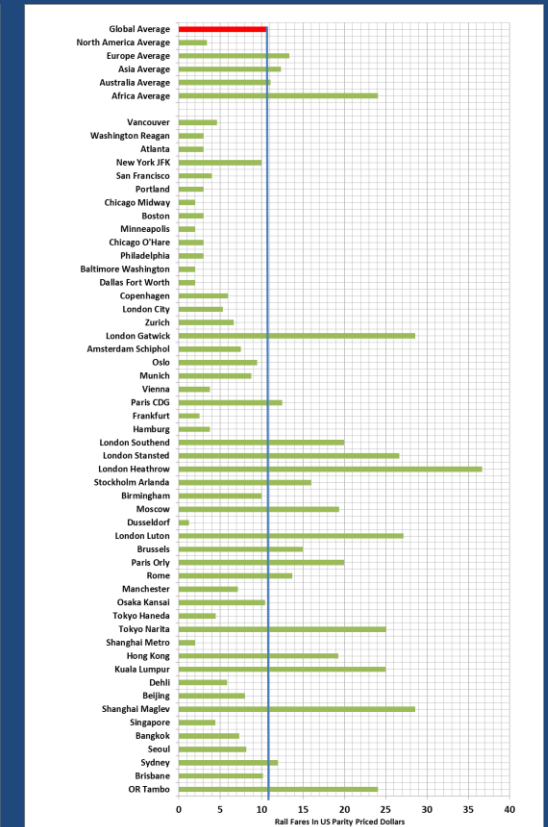
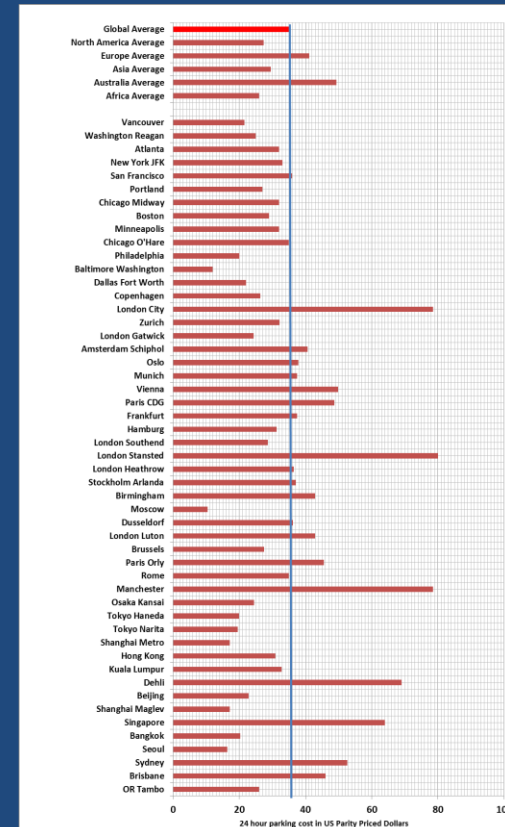
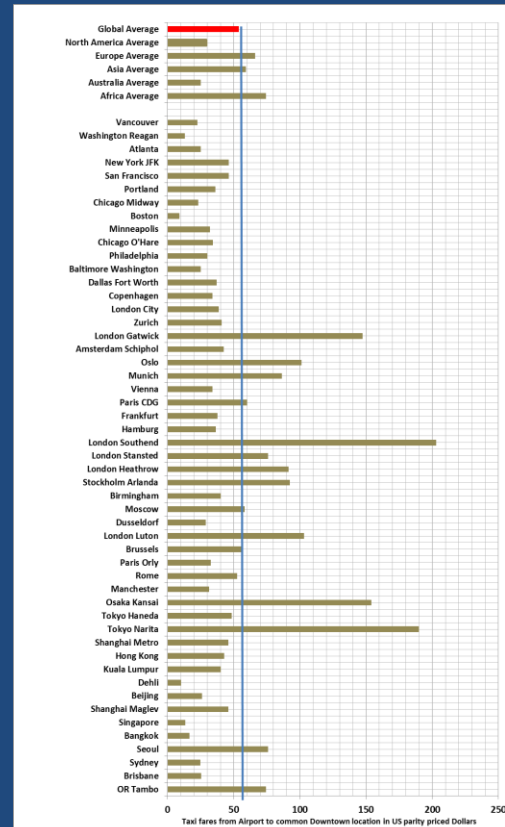
- All factors highly variable in all continents;
- US airports closer to downtown on average than European or Asian;
- US Airport Rail links competitive on average with Global Averages for Rail Time and Service Headway.



Factor	Road Distance (kms)	Best road time to Downtown Station (mins)	Rail Time (Mins)	Rail Service Headway (mins)
Africa	24.3	35.0	15.0	12.0
Australia Average	16.5	19.0	26.0	12.0
Asia Average	40.7	36.5	39.3	11.9
Europe Average	28.3	31.2	25.0	14.1
Nth America Average	19.4	21.8	28.1	15.8
Global average	28.4	29.6	29.0	13.9

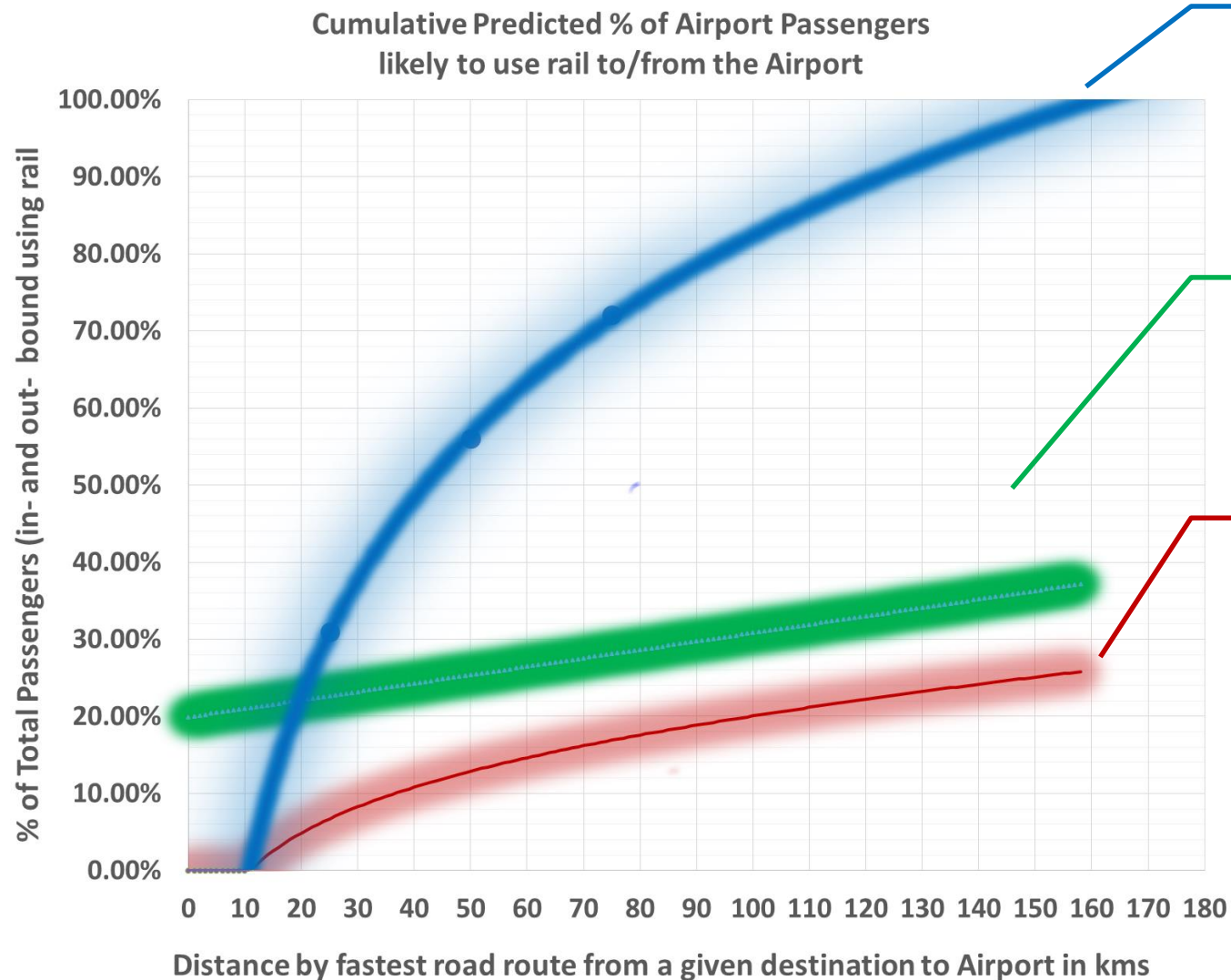
Key Points

- All costs US\$2014 Parity Priced)
- Highly variable on all dimensions on all continents;



Factor	One way Taxi to Downtown Location	24 hr parking	One way Rail fare to Downtown Location
Africa	USD 74.4	USD 25.9	USD 24.1
Australia Average	USD 25.0	USD 49.3	USD 11.1
Asia Average	USD 59.0	USD 29.5	USD 12.4
Europe Average	USD 66.2	USD 41.1	USD 13.4
Nth America Average	USD 29.1	USD 27.4	USD 3.4
Global average	USD 53.6	USD 34.9	USD 10.7

	Global Average	Copenhagen	Dallas Fort Worth (2014)
Rail Mode Share	19.8%	55%	1%
Road Distance (kms)	28.4	13.4	37.9
Best Road Time (Mins)	29.7	28	24.0
Worst Road Time (mins)	51.3	40	45.0
Rail Travel Time (mins)	29.0	13	51.0
Headway Mins	13.9	5	30.0
Taxi Fare (USD Parity)	\$53.70	\$33.9	\$43.0
Parking 24 hrs (USD Parity)	\$34.93	\$26.3	\$22.0
One Way Rail Fare (USD Parity)	\$10.81	\$5.9	\$4.0



Cumulative % of passengers passing through airport by distance from airport (difficult to estimate in two airport city and for a new airport)

% of total passengers likely to use rail by distance from airport(estimated by multifactor linear regression analysis from 51 airports data)

% of passengers likely to use rail by distance from airport (product of two above curves)

Model Predicts ~18% for Sydney airport – actual about 17 % and growing;



% of total rail passengers inside this distance from WSA

Model predicts: rail ridership of ~26% of total inbound and outbound passengers at WSA

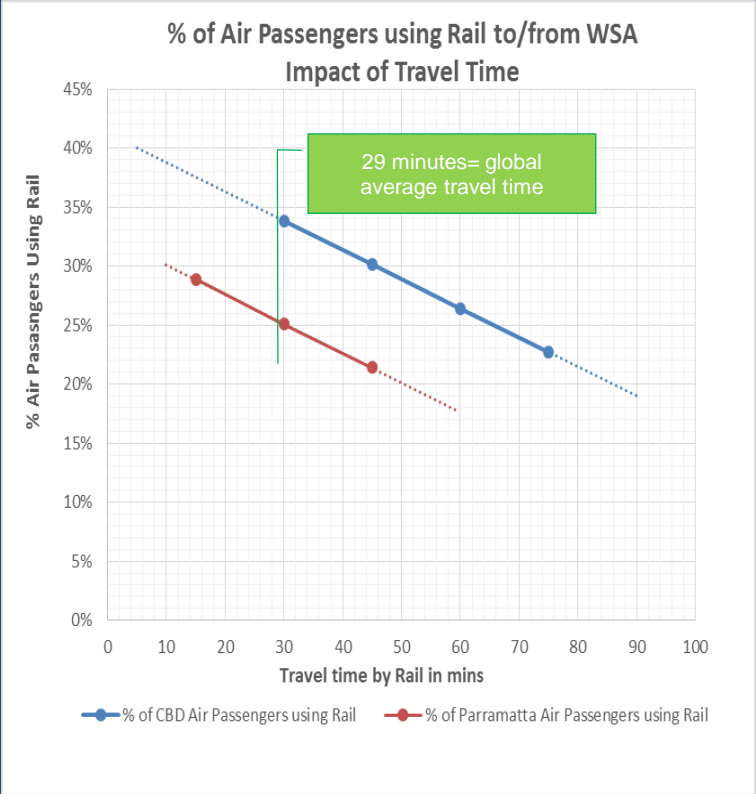
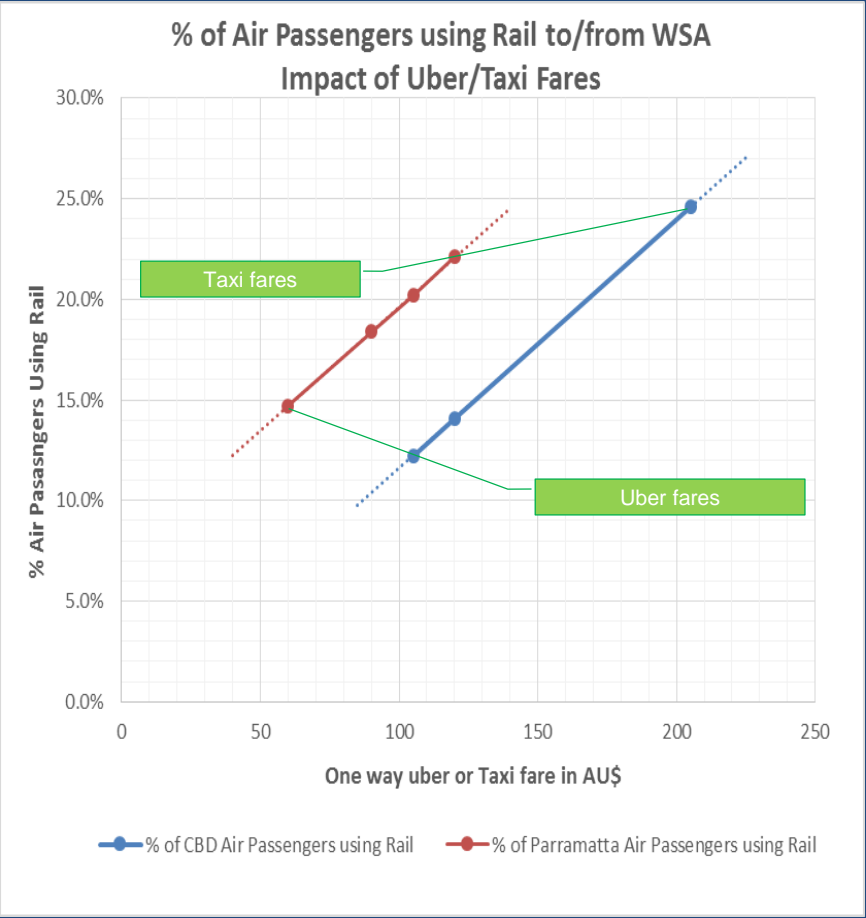
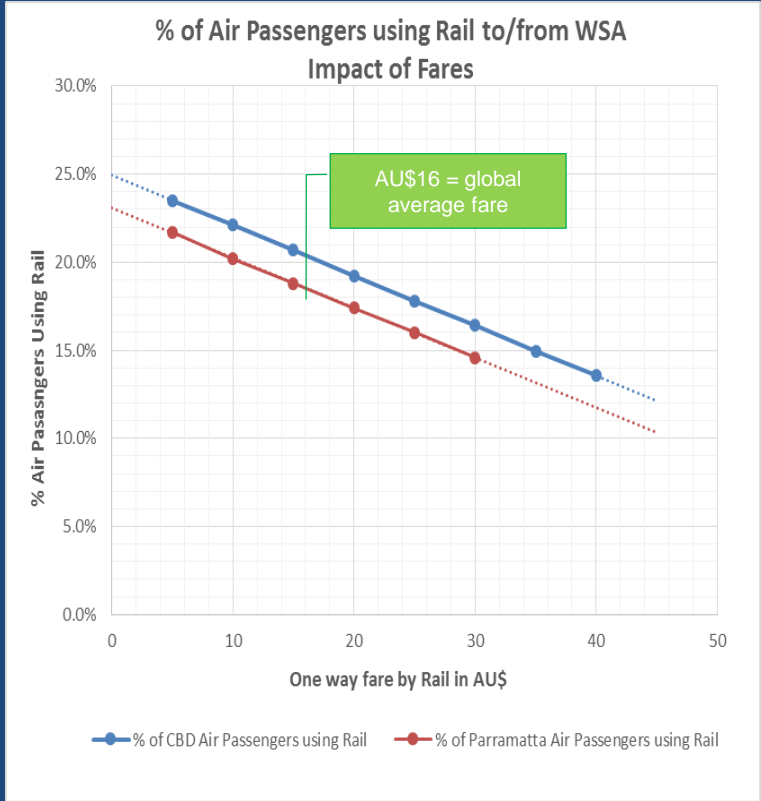
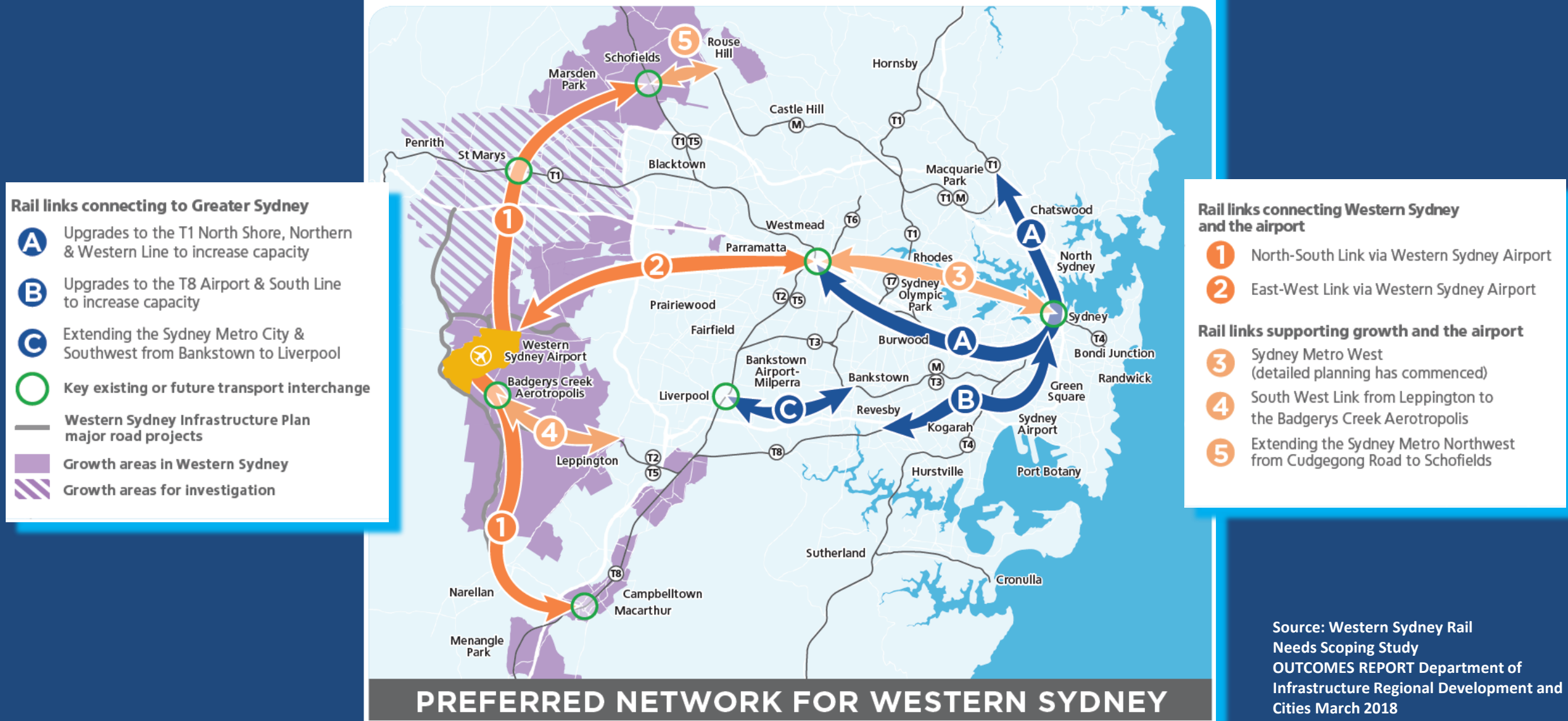


Figure 25 The Preferred Network for Western Sydney



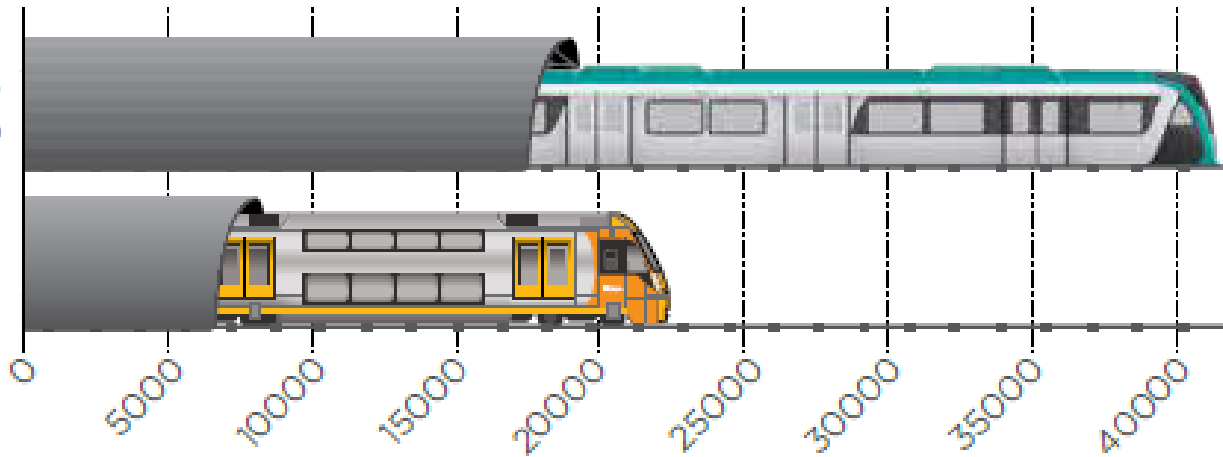
Source: Western Sydney Rail Needs Scoping Study OUTCOMES REPORT Department of Infrastructure Regional Development and Cities March 2018



“The NSW Government will also safeguard the ability to extend Sydney Metro , as well as towards the west beyond Westmead – where one option could be to the new Western Sydney Aerotropolis”



Current
suburban



Maximum Sydney train customers per hour per line

“Metro rail moves more than 40,000 people an hour in each direction – significantly more than a current suburban line”

<https://www.sydneymetro.info/west/project-overview>

But 70% standees, so is this the right configuration for people to travel 50kms and up to 1 hour to from CBD?

Equally are DD’s suitable as airport trains?

	Headway (mins)	seats per train	standees per train	total pax	Seats per hour	Standees per hour	Total Pax per hour	% standees
Sydney Metro at Start-up	4.0	346	806	1,152	5,184	12,096	17,280	70%
Sydney Metro NW Capacity	2.4	346	806	1,152	8,640	20,160	28,800	70%
Safeguarded Capacity (12 car trains)	2.0	461	979	1,440	13,824	29,376	43,200	68%
Waratah DDs	4.0	894	418	1,312	13,410	6,270	19,680	32%
Waratah DDs – ERTMS	2.4	894	418	1,312	22,350	10,450	32,800	32%
Waratah DDs (12 car trains) & ERTMS	2.0	894	418	1,312	26,820	12,540	39,360	32%



Sydney Metro if extended

- SD Longitudinal seating
- All stops - 45 mins
- Mixed travellers
- No dedicated CBD terminus?
- Average speed 60km/h



Stockholm Arlanda Express

- SD 2+2 seating
- No stops – 20 mins, 10 mins headway
- Airport travellers only
- Dedicated CBD Terminus
- Suburban Service as well



Oslo Gardemoen Express

- SD 2+2 seating
- One stop 19 mins, 10 mins headway
- Airport travellers
- Dedicated CBD Platform
- NSB link as well



Helsinki Airport Railway

- SD 2+2 seating
- 5-7 stops 27 mins, 10 mins headway
- Airport and suburban travellers
- Dedicated CBD Platform

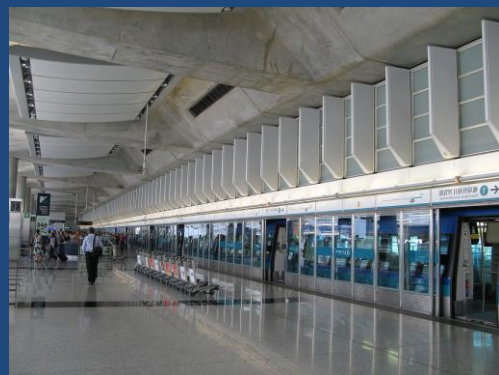
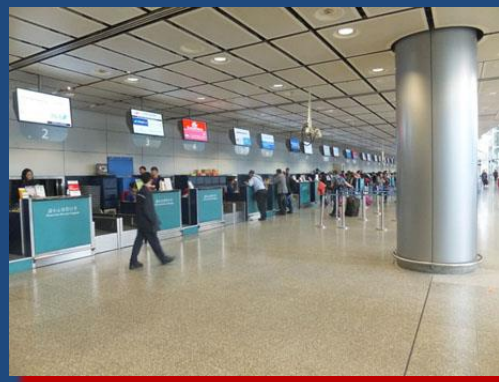


Copenhagen Airport Railways

- SD 2+2 seating
- Mainline 13 mins, 10 mins h'way
- Metro 13 mins, 4 mins h'way
- International, Airport and suburban travellers
- Dedicated Mainline Platform; Metro Station in CBD



Average Speed ~85 km/h



Source: Wikipedia; Veloasia; MTR;

- High passenger generation capability and growth potential locations
 - e.g. Parramatta and Sydney CBDs;
- A CBD to WSA time of 30-35 minutes; Competitive fares;
- Clearly identifiable CBD point of “*low friction*” access;
- Similarly, an airport station that is more findable than a taxi rank;
- Focus on a few key interchanging locations;
- Fully seated, not commuter standing and crowded, airport style rolling stock;
- Less than 15 minute headways;
- Future North-of-harbour link to tap into Sydney’s “*Golden Arc of Employment*”?

- Focus the service parameters – travel time, fares, comfort;
- North – South Link more about urban development than making airport successful per se;
- As currently presented, Sydney West Metro not suitable;
- BUT – there are some positives so it could become so!
- Hong Kong's Tung Chung Line is good model – fast airport overlaid on slower stopping suburban services;
- Unique opportunity to link the three GSC designated cities;
- Keep on encouraging the Governments to plan and deliver a rail link which can help make the Airport successful.

If you are interested in the original data or analyses
then go to

www.transportationassociates.com.au/downloads
or

<http://www.transportationassociates.com.au/files/IARO%20Presentation%20WashingtonV5.pdf>

Transportation Associates Pty Ltd
Sydney, Australia