# High speed rail

*It is claimed in Canberra that the ‘stars are aligning’ for high speed rail.[[1]](#endnote-1) Perhaps, but before proponents get too carried away, is the best view of alignment from Canberra or elsewhere?*

## Background

In its latter days, the former Commonwealth Labor Government commissioned a study into high speed rail in Australia. Its Department of Infrastructure and Transport was to supervise the effort. The Department established an internal high speed rail unit. It published two reports on the matter; in 2011 and 2013. These were reviewed by an advisory group chaired by the Department and including rail supporters.[[2]](#endnote-2)

The first report presented some basic parameters for high speed rail. It provided a short history of Australian consideration of the issues as well as some information on overseas systems, both of which are most welcome inclusions. It shows indicative routes Brisbane to Melbourne via Sydney, and made various assumptions about operations, fares and demand. Cost was estimated to be in the order of $82 billion for the full route. Demand varied along the route.

The second report presented more defined routes, train operations and costs. Costs were over $110 billion. It recommended reservation of a corridor and staging of construction starting with Melbourne-Sydney with a first step Canberra-Sydney. It also presented station locations.

The report from the advisory group agreed with the basics of the two Departmental reports, was optimistic about high speed rail, and argued for corridor reservation and a public authority.

## Discussion

The second Department report contained a number of peculiarities such as Canberra being on a spur line and stations at each of the relatively close towns of Coffs Harbour, Grafton and Casino. It is unclear why the study opted for Casino rather than the much larger, more popular and more accessible centres of Lismore or Ballina. Also peculiar are the proposed station sites well outside of Newcastle and Coffs Harbour.

While both Departmental reports provided views on transport demand, neither referred to a basic transport property; traffic density. Density is usually initially assessed by population, or goods, divided by distance to be travelled. The greater the population, and the shorter the distance, the greater the justification for a transport system. This should be used as a common sense test to assess the likelihood of various ‘sophisticated’ demand projections.

An initial density assessment would not rank Melbourne-Sydney top of the list; while their combined populations are the highest the long distance between them tells. Rather shorter distances; Wollongong or Newcastle-Sydney and Brisbane-Gold Coast have vastly greater densities. Table 1.

**Table1: Distance density, static 2012-14 end point populations (a)**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pairing** | **Combined 2012-14 population 000** | **Distance by road km** | **Density (b)** | **Fastest current transit time hrs (c)** |
| Melbourne-Sydney | 9280 | 875 | 10.6 | 3.5 |
| Canberra-Sydney | 5265 | 285 | 18.5 | 2.5 |
| Sydney-Newcastle | 5460 | 160 | 34.1 | 2.5 |
| Sydney-Brisbane | 7115 | 920 | 7.7 | 3.5 |
| Wollongong-Sydney | 5130 | 85 | 60.3 | 1.5 |
| Gold Coast-Brisbane | 2890 | 80 | 36.1 | 1 |

1. Inclusion of en route populations would increase densities for Melbourne-Sydney (eg. Including Canberra), Sydney-Newcastle (eg. Including Central Coast), and Sydney-Brisbane (eg. Including Coffs Harbour, Port Macquarie and Newcastle). Populations used are Sydney 4840, Melbourne 4440, Brisbane 2270, Gold Coast 614, Newcastle etc 620, Wollongong 289, Canberra 423. For comparison Central Coast is 318.
2. Density is population divided by distance.
3. Melbourne, Canberra, Brisbane to Sydney by air plus on ground transit to/from CBD.

Previous articles had Sydney’s size at around 1 hour.[[3]](#endnote-3) An implication is that high speed rail might be unable to greatly assist a city pair currently within an hour of each other; Gold Coast-Brisbane and perhaps Wollongong-Sydney. Sydney-Newcastle is the best prima facie prospect; orders of magnitude better than any other pairing, for example nearly double Canberra-Sydney.

The next level of sophistication in density is to account for costs; Table 2.

**Table 2: Cost density, static 2012-14 end point populations based on cost**

|  |  |  |
| --- | --- | --- |
| **Pairing** | **Cost $million** | **Cost density** |
| Melbourne-Sydney (a) | 49900 | 0.2 |
| Canberra-Sydney (a) | 26900 | 0.2 |
| Sydney-Newcastle | 18900 | 0.3 |
| Sydney-Brisbane | 64200 | 0.1 |

1. Inclusion of en-route populations would increase simple densities for Melbourne-Sydney (eg. Including Canberra by 3%), Sydney-Newcastle (eg. Including Central Coast by 6%), and Sydney-Brisbane (eg. Including Coffs Harbour, Port Macquarie and Newcastle by 17%). It would not change orders of magnitude or relativities

Again Sydney-Newcastle is by far the best even taking into account relatively high costs per km. Inclusion of the Central Coast, near as populous as Canberra, puts Sydney-Newcastle further ahead.

A higher level of sophistication, but more tenuous, is to consider future demand - likely travellers, rather than population. Future demand divided by cost is analogous to density, albeit at a different scale. This is shown in Table 3.

**Table 3: Second study future demand, adjusted for intermediate Canberra demand**

|  |  |  |
| --- | --- | --- |
| **Pairing** | **Demand 2065** | **Demand/cost** |
| Melbourne-Sydney | 39930 | 1.3 |
| *Canberra-Sydney (a)* | *8440* | *5.1* |
| Canberra-Sydney (b) | 5270 | 3.2 |
| Sydney-Newcastle | 4920 | 3.8 |
| Sydney-Brisbane | 33130 | 1.9 |

1. These report figures include surprisingly large demand from intermediate stations; 3250 units. Surprising because the route is via the southern highlands where total population including Goulburn is in the order of 70,000; around one fifth of the Central Coast and one tenth of the Newcastle region the two of which generate only around 4900 units i.e.; similar localities with fifteen times the population generate just 50% more than purported Canberra-intermediate demand. The Campbelltown and Liverpool district might be able to generate such demand (population around 350,000), however they are within Sydney; both less than one hour by road or frequent rail services to the CBD, and substantially closer than central coast locations such as Gosford. An example of the figures in question is appended.
2. Adjusted to deal with note a.

The reason for demand being more tenuous is that it is forecast rather than observed. The method and data used in forecasting determines the result. The second study presented some economic consideration which drew on its forecast demand to recommend the first phase of Australian high speed rail should be Melbourne-Sydney of which the initial stage should be Canberra-Sydney.

The conclusion regarding Canberra is suspect for a number of reasons, largely relating to questions about forecast demand.

First, given the population density figures (Tables 1 and 2) the forecast demand and thus conclusion is counter-intuitive. The forecast warrants detailed explanation. However, such explanation and relevant detail are lacking in the published material; for example traffic counts on the Sydney-Newcastle corridor are not provided.

Second, while Table 3 shows Canberra-Sydney to be the best prima facie candidate based on the studies’ forecasts, some of these numbers are inexplicable; particularly demand for intermediate stops between Canberra and Sydney. Discounting for this, Sydney-Newcastle becomes the lead candidate (see Table 3 note a).

Third, the reports do not properly account for changes in population likely to result from introduction of high speed rail. It is assumed that demand will be highest for those areas which are assumed to be have highest 2065 populations without high speed rail. While a reasonable assumption for Sydney and Melbourne, it is not reasonable for places which high speed rail reduces transit to less than one hour; notably Newcastle and the intermediate Central Coast. A central idea of high speed rail is to change population growth in regional centres, a factor not accounted for in the criteria imposed on the studies by the Department.[[4]](#endnote-4)

Fourth, the reports and forecasts do not apparently deal with the introduction of road pricing. Road pricing involves replacement of taxes with distance and location charges, and is likely to occur within the relevant time frame. The author (and the former Office of the National Infrastructure Coordinator in Infrastructure Australia) mooted road pricing as a fundamental test for infrastructure projects; would a project be needed if there was road pricing?[[5]](#endnote-5)

The introduction of such pricing will have greatest positive impact on case for high speed rail on the Newcastle-Sydney corridor; Newcastle-Sydney has at least three times the volume of road traffic as Goulburn-Sydney (and even more than Canberra-Sydney), and car is not a preferred means of travel for very long distances such as Melbourne-Sydney-Brisbane.[[6]](#endnote-6)

There may be other motivations behind proposing Canberra-Sydney as the first stage. The advisory group opined that high speed rail should compete with air travel, significant for the Department and Canberra but not for Sydney-Newcastle. Other motivations might include: Commonwealth ability to exercise jurisdiction over interstate matters; national pride in connections between Australia’s capital and largest city; the presence of Government, advisers and lobbyists in Canberra; a view it may practically ‘lock in’ Melbourne-Sydney high speed rail; a more cynical view that closer examination will reveal it to be flawed undermining any proposals for high speed rail elsewhere in Australia. The view that Canberra may ‘lock in’ Sydney-Melbourne is further undermined by the study putting Canberra on a spur; prima facie a nonsensical proposition for a national capital.

None of these other motivations relate to transport, and perhaps stronger non-transport points could be made in favour of Newcastle.

## Conclusion

There is a need to re-examine the reports’ recommendations on phasing of introduction of high speed rail in Australia.

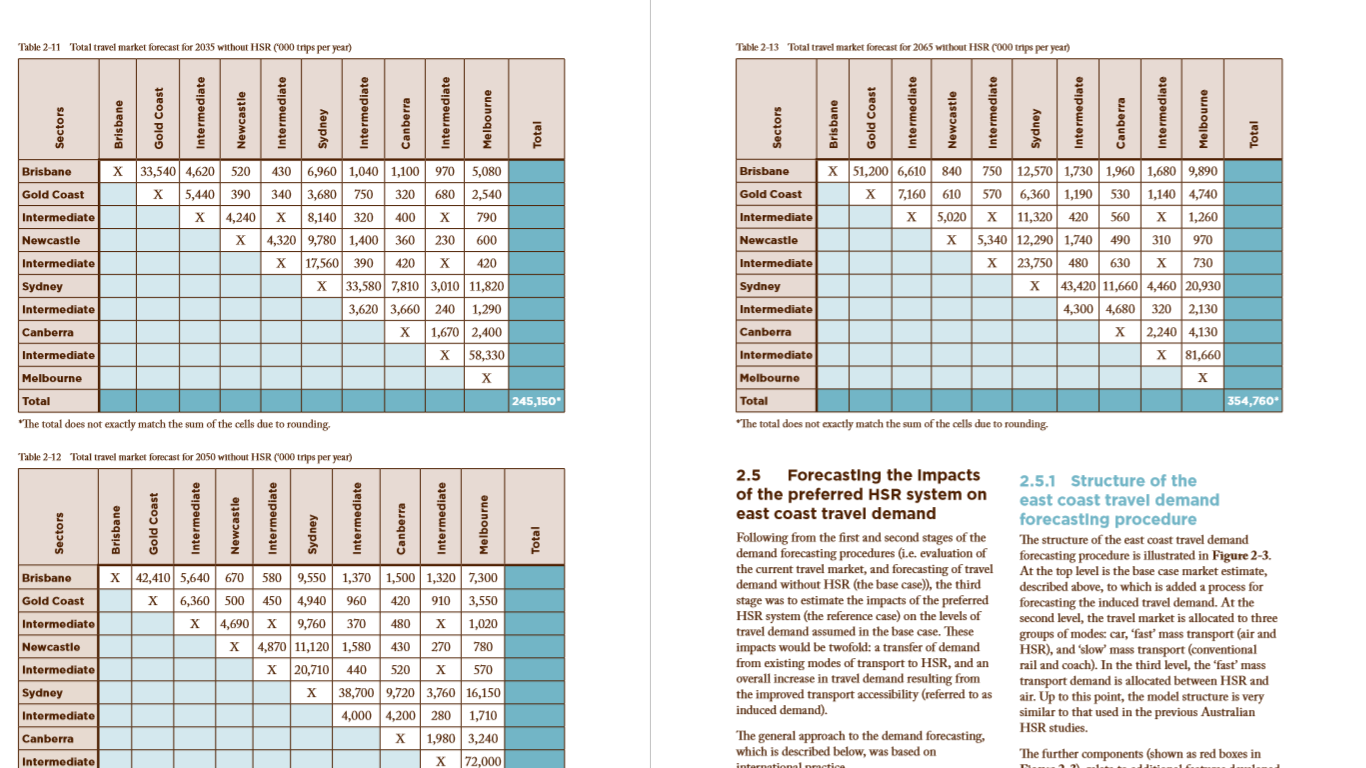
In particular there should be consideration and explanation as to whether Sydney-Newcastle should be the initial stage.

It should also be noted that Sydney-Newcastle is the least costly section; the one most affordable to the economy and within a constrained budget. And all investment on this segment would be usable for the intercapitals route, unlike the segment Goulburn-Canberra.

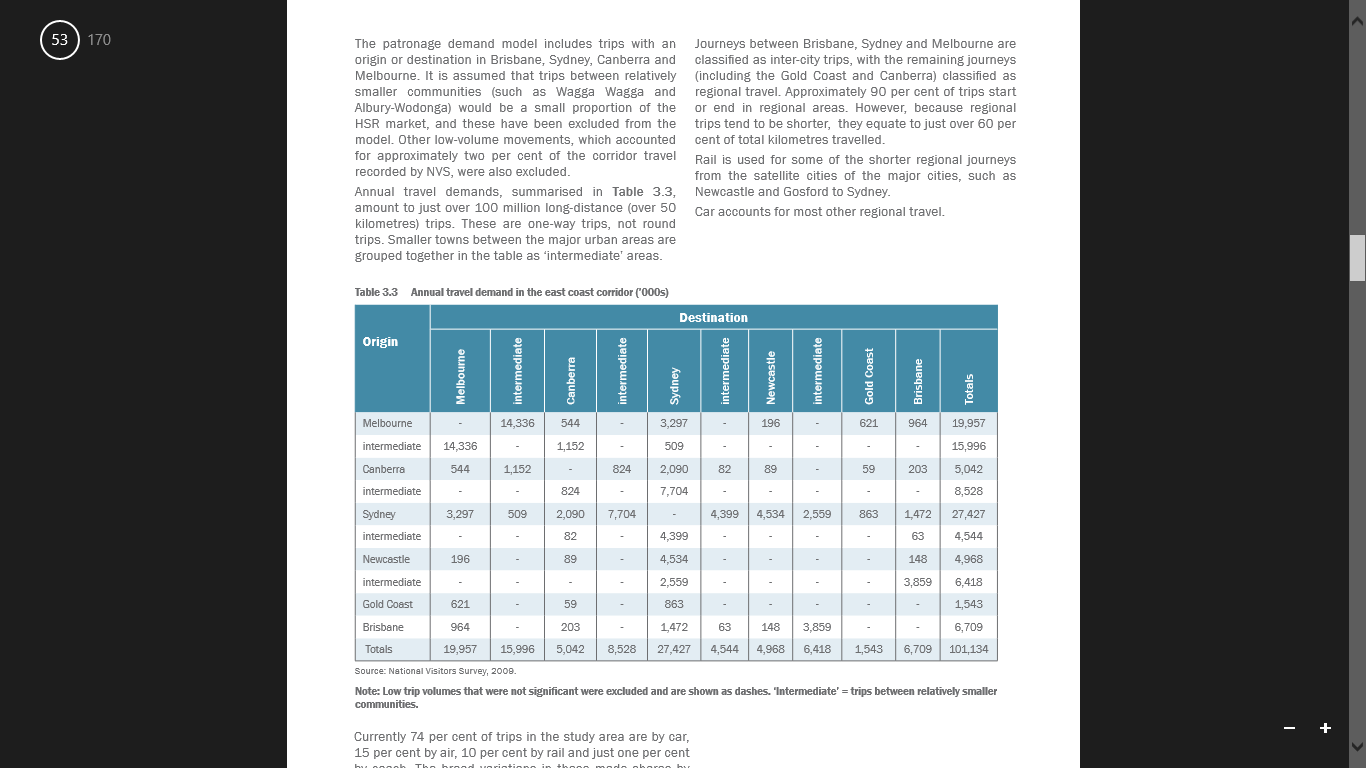
## Appendix:

The following table 2.11 is drawn from study report.

Note cells Newcastle-Sydney 9780 and Intermediate-Sydney 17560 (which would be Central Coast). Compare with cell Sydney-Intermediate 33580 (which would be southern highlands and Goulburn).



The origins of this high level of demand appear in study 1 table 3.3 below (note this table reverses origins and destinations compared with table 2.11 above). By far the highest transport demand on the east coast to/from Sydney (fifth line) is ‘intermediate’ (between Canberra and Sydney)



1. http://www.canberratimes.com.au/national/stars-are-aligning-for-australia-to-build-high-speed-rail-says-international-expert-20160301-gn75i6.html [↑](#endnote-ref-1)
2. Reports available at: https://infrastructure.gov.au/rail/trains/high\_speed/ [↑](#endnote-ref-2)
3. See: http://www.thejadebeagle.com/sydney.html [↑](#endnote-ref-3)
4. See: Strategex submission at http://www.aph.gov.au/Parliamentary\_Business/Committees/House/ITC/Transport\_connectivity/Submissions. [↑](#endnote-ref-4)
5. See: http://www.thejadebeagle.com/submission-to-infrastructure-australiarsquos-national-infrastructure-audit.html [↑](#endnote-ref-5)
6. See: http://www.rms.nsw.gov.au/about/corporate-publications/statistics/traffic-volumes/map/index.html (interactive map). [↑](#endnote-ref-6)