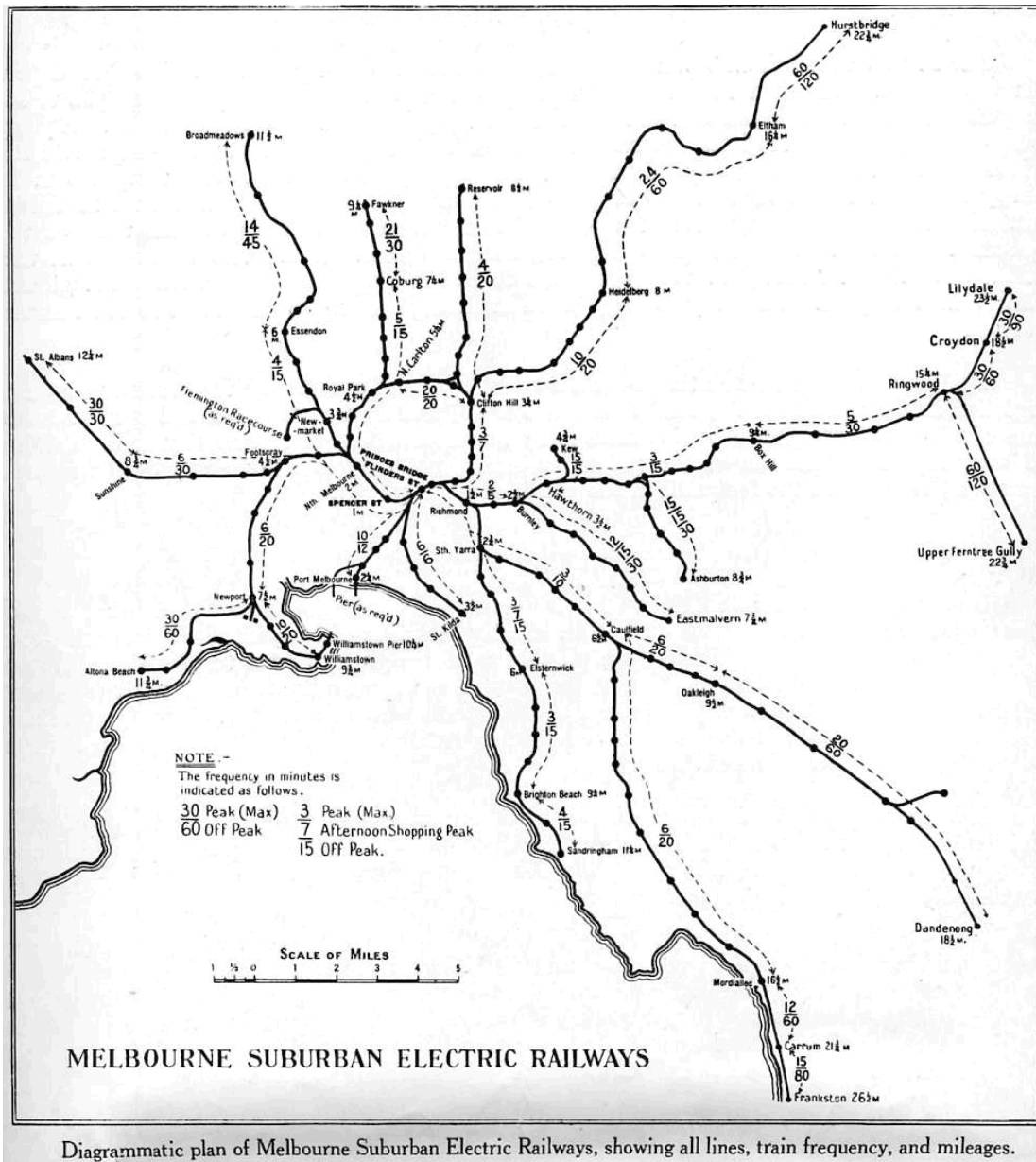


Does Melbourne need another central city rail tunnel?



A report by

Dr. Paul Mees
 Environment & Planning Program
 School of Global Studies, Social Science & Planning
 RMIT University
 Melbourne

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Cover: from the 1929 Melbourne Town Plan

Summary

- While other cities are extending their rail systems to cope with rising oil prices and climate change, Melbourne has not built a new suburban railway since the Glen Waverley line opened in 1930. The Department of Transport and Connex say the system cannot be expanded because there is a ‘capacity crisis’ on the City Loop.
- The Eddington report has backed these claims, and proposes spending \$8.5 billion on a new central city rail tunnel that will not be completed until at least 2019. This will mean no new rail extensions until then, and possibly longer because there may be no money left.
- Melbourne appears poised to repeat the mistakes of the 1970s, when some \$5 billion was spend building the City Loop in anticipation of patronage increases that never came. Because the loop used up all the available funds, Melbourne did not build any new suburban rail lines.
- The tunnel proposed in the Eddington report is unnecessary. Melbourne’s rail system is currently carrying substantially lower volumes of passengers and trains than the City Loop and associated inner city works were designed to handle.
- Rail patronage in peak hour has increased by 20-25% over the last 5 years, but peak services have hardly increased at all. The failure to increase services in line with this modest increase in patronage has produced severe overcrowding.
- The current ‘capacity crisis’ is the result of inefficient operating practices that developed during and after the 1980s, when rail patronage had fallen to only a third the level the City Loop was expected to handle. Because all the staff with the skills and ‘corporate memory’ needed to operate the system according to its original designs left at or before privatization, neither Connex nor the Department has the ability to efficiently utilize the capacity that has already been provided at such huge cost.
- The City Loop and inner city rail system has 8 in-bound tracks available for suburban trains in peak hour (this is a third more than Sydney’s system offers). Each of these tracks can handle 24 trains an hour, giving a total capacity of 192 trains, more than double the 94 trains currently operated in the busiest hour.
- The technical documents produced for the Eddington report detail the ‘reasons’ Connex and the Department offer for not utilizing the full available capacity. On closer scrutiny, these all turn out to be examples of inefficient work practices that would not be tolerated in a competently-run rail system.
- The Department of Transport has agreed to fix some of the work practices, enabling hourly train throughput to increase from 94 trains currently to 136. This will provide enough capacity for train lines that operate through Clifton Hill and Burnley, and the Sandringham line, but not for the ‘Northern’ or ‘Caulfield’ groups. Strangely, the Department has not considered fixing the remaining inefficiencies, even though in some cases this would be easier than the changes they have agreed to implement.

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- The proposed \$8.5 billion tunnel would allow another 40 trains per hour to operate, but fixing the remaining inefficient management practices would allow another 56 trains to run, providing more extra services at virtually no capital cost. The changes required are terminating LaTrobe Valley peak period services at Flinders Street instead of Southern Cross, reopening closed platforms at Flinders Street station, reducing turnaround times at Flinders Street from 7.5 to 5 minutes (still longer than in the 1920s), and improving 'dwell times' at stations to allow an extra 4 trains per track per hour.
- The real problem with the Melbourne rail system is what the international expert Professor Vukan Vuchic calls 'self-defence of incompetence', as the Department of Transport and Connex collaborate to shield each other from suggestions that efficiency can be improved. Rather than fixing this problem, Eddington proposes to reward the incompetence with \$8.5 billion in capital funding.
- Melbourne needs a dynamic, 'European-style' system of rail governance and management. This will only come about through reform led by advice from internationally recognised experts. Although adequate funding is also important, in the absence of these changes the money will be wasted, and Melbourne will repeat the sagas of Myki, the City Loop and Regional Fast Rail.

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Introduction

With world oil prices at record levels and widespread agreement on the dangers of global warming, the need for a viable public transport alternative to the car has never been clearer. Many Canadian and European cities made the necessary transport policy shift years ago and are already well-placed to meet these challenges.

Perth is also enjoying the benefits of wise transport policy decisions made earlier this decade. The \$1.6 billion New Metro Rail project, which doubled the size of the city's rail system, was completed late last year with the opening of the new Southern Railway to Mandurah. This new 72-kilometre line, incorporating an underground section through the city centre, was built in less than four years, for around \$1 billion. It is already attracting 80% of its projected daily patronage of 50,000.

Rail patronage across Perth has increased six-fold in the last 20 years, but the Western Australian government is not resting on its laurels. It has ordered new trains to cope with rising demand, and is now planning a second round of rail extensions, with six new or extended lines proposed, including a new link to Perth Airport.¹

Meanwhile, in Melbourne, nothing seems to be happening. Rail patronage is increasing after decades of decline, but service levels remain stagnant, resulting in increasing overcrowding. There has not been a new suburban railway built since the Glen Waverley line opened in 1930. The Department of Transport (formerly the Department of Infrastructure) and Connex, the private rail operator, argue that nothing can be done because growth in patronage means the system is at capacity and cannot cope with additional trains. Interestingly, only four years ago the Department convinced the government to bail Connex out with additional \$1 billion in subsidies because patronage was *lower* than had been expected.

The East-West Transport Needs Study by Sir Rod Eddington has endorsed the claims that nothing can be done, and advocated spending \$8.5 billion on a new rail tunnel from Caulfield to Footscray, plus a new line between Footscray and Werribee (via Deer Park and Tarneit), for V/Line (country) trains.² The project would take until at least 2019 to complete.

This report examines the central claim of the Department of Transport and the Eddington Report, namely that the central city rail system is at capacity and cannot accommodate significantly more services unless the Caulfield-Footscray tunnel is built. It concludes that this claim is baseless, and can be shown to be so by scrutinising the consultant reports available on Eddington's own website. The central city rail system has the capacity to accommodate twice the current level of service,

¹ 'Public transport plays centre stage in Labor's future vision', Media Release, WA Premier, 29 June 2008 (www.mediastatements.wa.gov.au).

² *Investing in Transport: East West Link Needs Assessment – A Study by Sir Rod Eddington*, available at: www.doi.vic.gov.au/eastwest ('main report'), p. 214.

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and the real capacity problems lie in the Department of Transport and Connex, not in the city loop.³

Why these questions are important

The Eddington report proposes the largest single investment in infrastructure in Australian history, with a total cost (road and rail) 10 times that of Perth's New Metro Rail project, 18 times that of the Mandurah line, and 15 times the Alice Springs to Darwin Railway. Yet, after more than a decade of construction and the expenditure of all this money, Melbourne's rail system would be much the same as it is now: no links to the Airport, Doncaster, Monash or other places that should have been served by rail years ago.

The Eddington Report expressly rejects a rail line to Doncaster, and since its release Eddington has publicly ruled out a rail link to the airport. Eddington claims Melbourne's airport is not busy enough to justify a rail link — unlike Perth's, apparently! Although he has not explicitly rejected other rail extensions, if his recommendations are accepted these projects will not go ahead until at least 2020 — and by then, there may well be no money left.

The \$8.5 billion rail tunnel budget alone could pay for:

- elimination of all rail level crossings in greater Melbourne (\$3 billion), plus
- new lines to East Doncaster, Rowville (via Monash), Morningson, Aurora, Mernda (via South Morang) and Melbourne Airport (\$2 billion), plus
- electrification of lines to Melton (via Caroline Springs, and including track duplication), Sunbury and Cranbourne East, and duplication of single-track sections on the Cranbourne, Hurstbridge, Epping, Lilydale, Belgrave and Altona lines (\$1 billion), plus
- doubling the size of the train fleet (\$2 billion).

This is not the first time Melbourne has faced the choice between massive investment in expanding inner-city rail capacity, and extending the rail system to new regions of Melbourne that have grown up since 1930. Almost 40 years ago, another transport study released plans for the underground City Loop, plus suburban rail extensions. The loop was built, but the extensions were not, because by the time the underground opened, there was no money left for anything else, as the loop had cost the equivalent of \$5 billion in today's money.

Perceptive critics of the City Loop pointed this out at the time, noting that the existing rail infrastructure could handle much higher passenger volumes if operated efficiently. Spending all the available funds on capacity enhancements, rather than

³ This report focuses on the central city rail system, and does not examine capacity issues on the suburban rail system, other than those that relate to the proposed Tarneit line. An earlier paper by the author explains how the Dandenong line can accommodate more trains without a third track; see 'Infrastructure constraints or poor service planning? Increasing service to Melbourne's City Loop and Dandenong Rail Corridor', Australasian Transport Research Forum, Melbourne, 2007.

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improving efficiency, was a bad investment, they said. Despite the criticisms, the City Loop was indeed built, and vastly expanded the capacity of the central city rail system. But patronage actually declined for many years, and even now is much lower than the loop was intended to handle. So why are we poised to repeat the mistake?

Efficient rail operators don't spend money on capacity enhancements when the same result can be achieved more cheaply by other means. The Swiss Federal Railways (SBB), possibly the world's most efficient operator, faces much greater increases in patronage than Melbourne has had to deal with, and has responded with a program called PULS-90:

The SBB's PULS 90 program has the goal of planning and operating Switzerland's rail network as efficiently as possible, which is defined as satisfying customer demand with a minimum level of infrastructure investment.⁴

So why isn't Melbourne adopting this approach? We should be following the lead of the best rail planners and managers in the world, instead of rewarding poor performance, and saving scarce capital funds to extend the rail system to serve new regions of Melbourne.

Size and patronage of the Melbourne rail system

Melbourne's electrified suburban rail system is very extensive by world standards: it's similar in size to the London Underground and larger than the Paris Metro. Importantly, the inner city segment of the Melbourne rail system is very extensive, having (as discussed below) eight in-bound tracks (and 8 corresponding out-bound tracks). Sydney's rail system has only 6 in-bound tracks, a figure that will rise to 7 upon completion of the proposed Sydney Metro.

In contrast with its physical extent, the Melbourne rail system carries low passenger volumes by international standards, with 179 million trips made in 2006/07⁵: see figure 1. Tokyo's rail network carries more passengers in a week than Melbourne's does in a year. Tokyo's system is bigger than Melbourne's, but the Paris Metro has less track and smaller trains, but carries around 6 times as many passengers as Melbourne's. Even Toronto's subway and Montreal's Metro – which between them are barely half the size of the Melbourne system – carry 317 and 274 million passengers per annum. Importantly, neither the Toronto nor the Montreal system are regarded as being at capacity, and are both currently being extended.

One instructive comparison is between the Melbourne rail system and the Northern Line of London's underground, shown in figure 2. The Northern Line carried 207 million passengers last year, compared with 179 million for the whole Melbourne network, but is a fraction of the size, utilises smaller trains with lower passenger-carrying capacity and has a much older signalling system (the signalling system in Melbourne's inner city was modernised in the late 1970s as part of the city loop

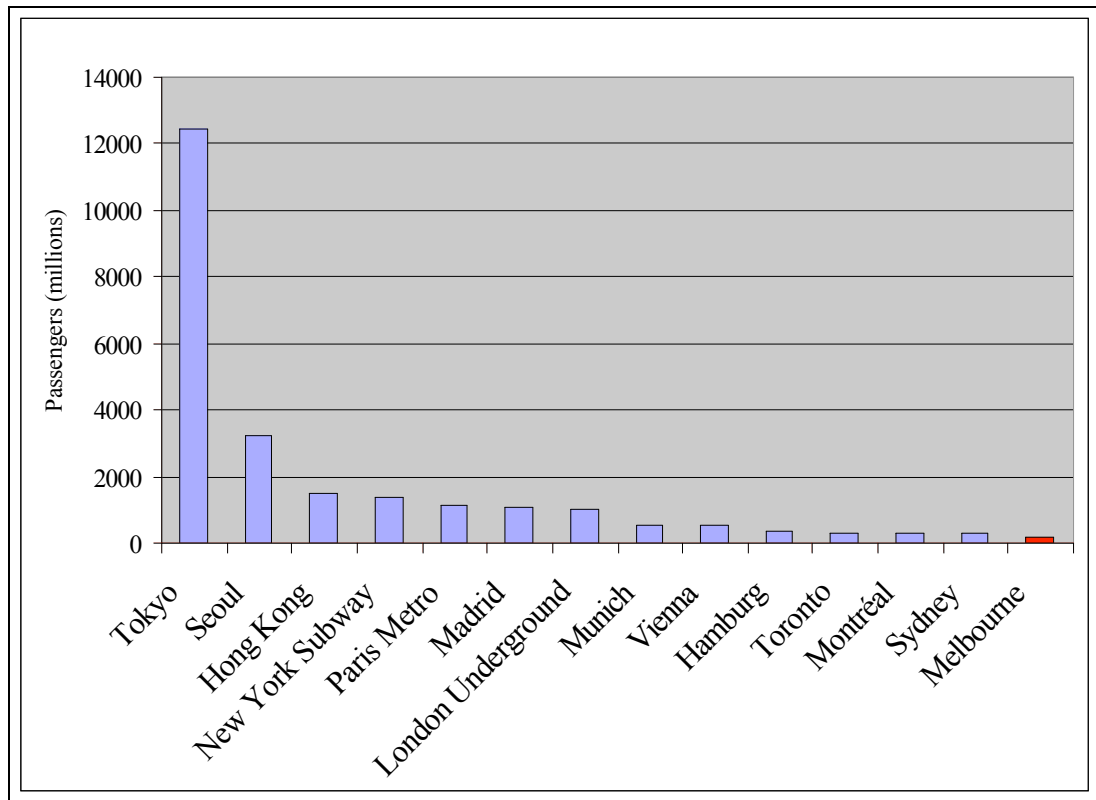
⁴ 'Rescheduling and Train Control: A New Framework for Traffic Control in Heavily Used Networks', by M. Luethi, F. Laube & G. Medossi, Paper for 86th Transportation Research Board Annual Meeting 2007, Washington DC.

⁵ 2008/9 Victorian Budget Paper 3, p. 130.

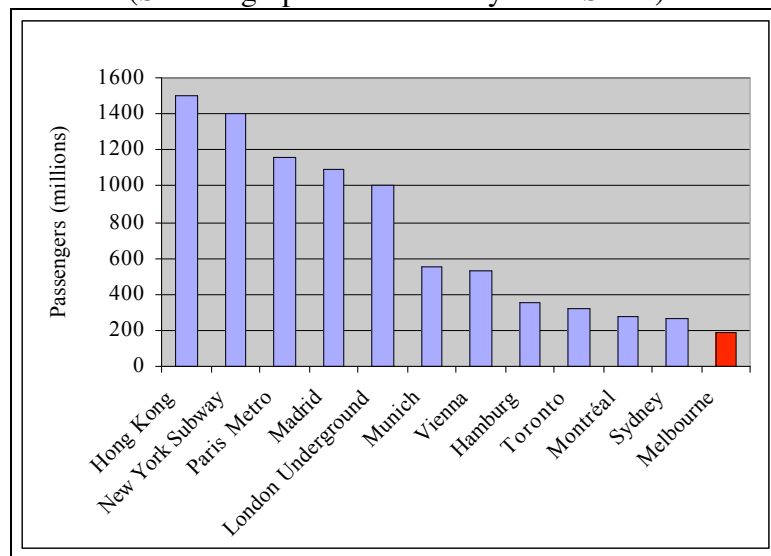
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project). Yet Transport for London believes the capacity of the Northern Line can be substantially expanded with modern signalling and simplified operating patterns.⁶

Fig. 1 Annual Rail Boardings in Selected Cities



(Second graph: without Tokyo and Seoul)



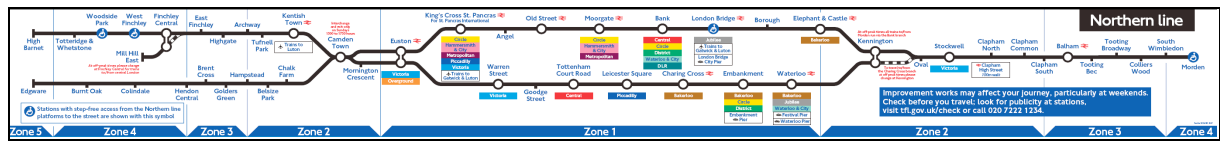
Sydney and Melbourne: 2006/07

Other cities: Figures from *Jane's Urban Transport Systems 2008–2009* (Webb, 2008); *An International Sourcebook of Automobile Dependence in Cities 1960–1990* (Kenworthy and Laube, 1999)

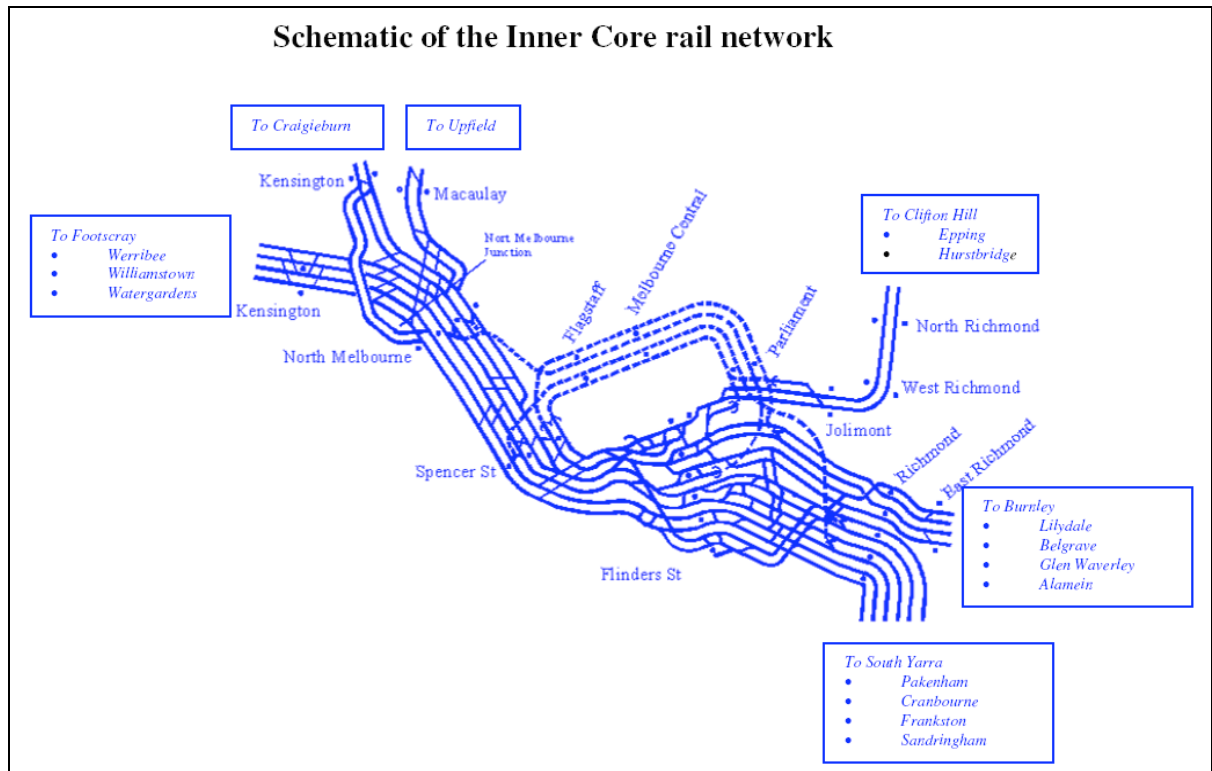
⁶ Northern Line information from www.tfl.gov.uk.

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Fig.2 Comparison of Northern Line and Melbourne rail network



Transport for London, www.tfl.gov.uk

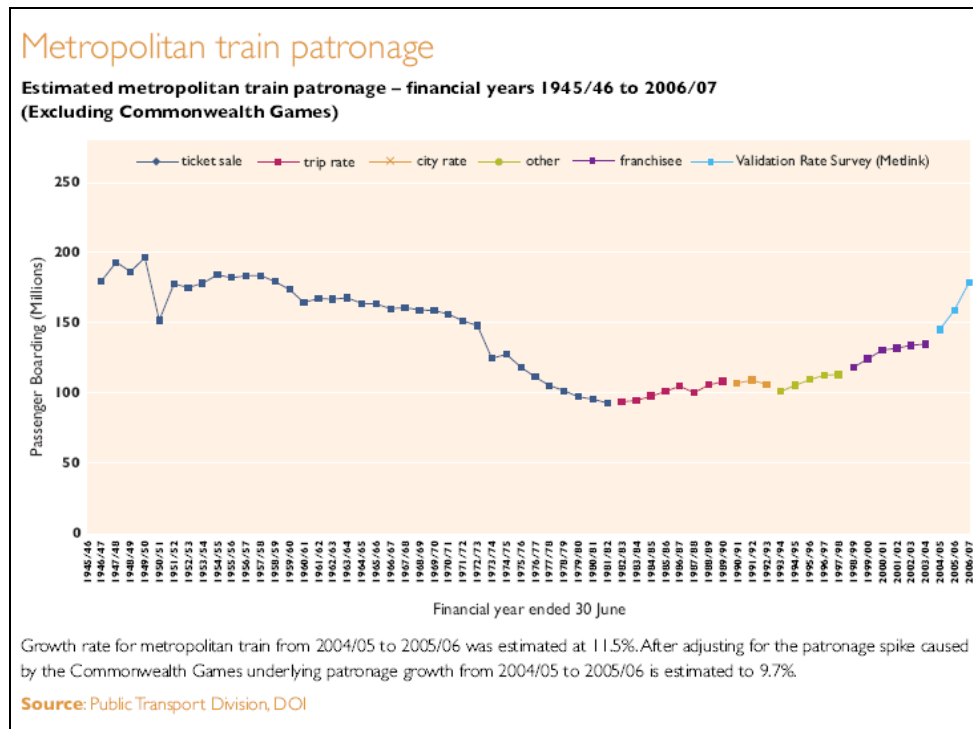


'Analysis on Rail Capacity', Public Transport Division, Department of Infrastructure, technical paper to Eddington Report, March 2008, p.19.

How current patronage compares with what the city loop's planners expected

Figure 3 comes from a Department of Transport report, and shows the changes in rail patronage in Melbourne since World War II. It highlights the fact that the recent rises in patronage followed a change in the methodology used to count passengers which inflated the figures by comparison with the methods employed in previous years. In particular, the current methodology counts a person who changes trains during the course of a journey as having made two trips: in the past, this would have been counted as a single trip. This means that current patronage is still lower than the peak recorded in the early 1950s, when the figures are compared on a consistent basis. More importantly, however, current patronage is dramatically lower than past rail planners expected, and planned for (even without adjusting for the changed counting methodology): see figure 4.

Fig.3. Rail patronage in Melbourne since 1945



Transport Demand Information Atlas for Victoria 2008, Volume 1: Melbourne, Department of Transport, p.25.

In the 1920s, rail patronage was growing rapidly, following the electrification of the suburban system and expansion of the viaduct between Flinders Street and Spencer Street from two to four tracks. In 1929, the Metropolitan Town Planning Commission predicted that patronage would grow from 158 million in 1924 to 370 million in 1964⁷, but stated:

So far as the Flinders-street station is concerned, its capacity to handle traffic has by no means been exhausted. Automatic signalling, electric traction, longer trains, the provision of two double tracks right through from Flinders-street to North Melbourne, all greatly add to the passenger capacity of the station... The present Flinders-street station is capable of handling a very large increase in the present traffic.⁸

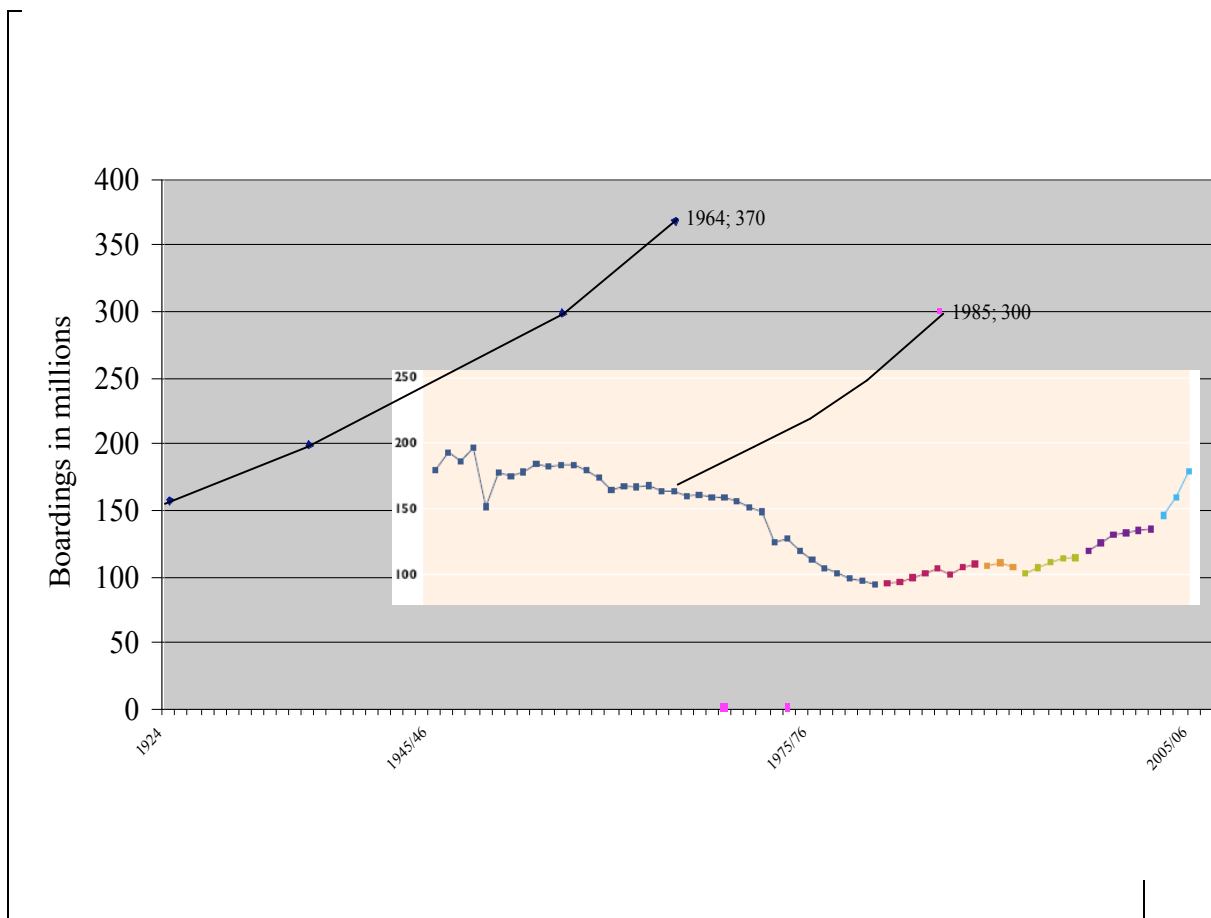
By 1929, Flinders Street Station was handling 113 suburban trains in the busiest hour of the day, compared with only 94 in 2008 (see table 1 on page 17).⁹ Figure 5 shows suburban train frequencies across the whole system in 1929. The Commission made it clear that the rail system had the capacity to handle many more trains than this.

⁷ *Metropolitan Town Planning Commission: First Report, 1925*, pp, 12, 13.

⁸ p. 13.

⁹ 5:00 to 5:59 pm. The 1929 Town Plan cites a figure of 116, at p. 130, but this includes three trains departing at 6:00 pm. Figures calculated from 1929 and 2008 timetables; 2008 busiest hour is trains arriving between 8:00 and 8:59 am.

Fig.4. Past projections of patronage increase compared with actual figures



Transport Demand Information Atlas for Victoria (2008); Plan of General Development, Melbourne (1929); Melbourne Transportation Study (1969)

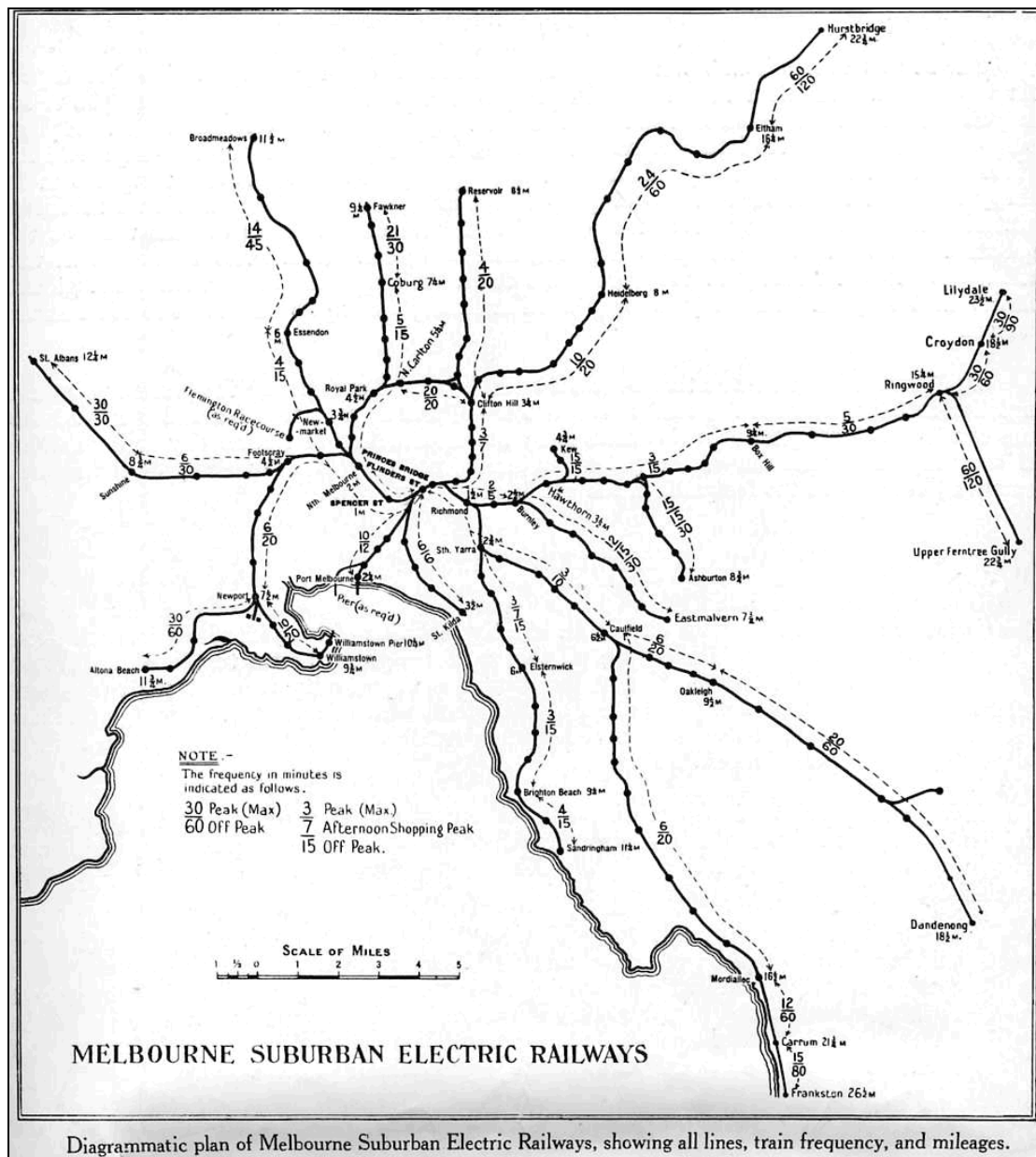
In its 1929 Plan of General Development, the Commission endorsed the Victorian Railways Commissioners' plan for a two-track underground 'northern city railway' (shown in figure 6), but this was intended to deal with congestion of *passengers* at Flinders Street, not congestion of trains. However, this proposal (which did not proceed, owing to the Depression) was predicated on the assumption that annual patronage would increase to 370 million (figure 4).

The rail patronage growth predicted in the 1920s did not eventuate, because of the rise of the car: by 1964, annual patronage was only 170 million trips, less than half the level predicted. And the number of trains serving Flinders Street Station in the busiest hour of the day had actually fallen, from 113 to 108.

The 1969 transport plan predicted that rail patronage would nearly double, to around 300 million, by 1985 (figure 4). Again, the predictions turned out to be incorrect: patronage actually declined until the early 1980s, and did not begin a significant recovery until the early 1990s. Although patronage is now higher than two decades ago, it remains much lower than the planners of the 1960s expected, and the number of suburban trains in the busiest hour has fallen to only 94 (table 1).

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Fig.5. Suburban train frequencies, 1929



Plan of General Development, Melbourne, p.129.

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Fig.6. Proposed Underground 'Northern City Railway', 1929

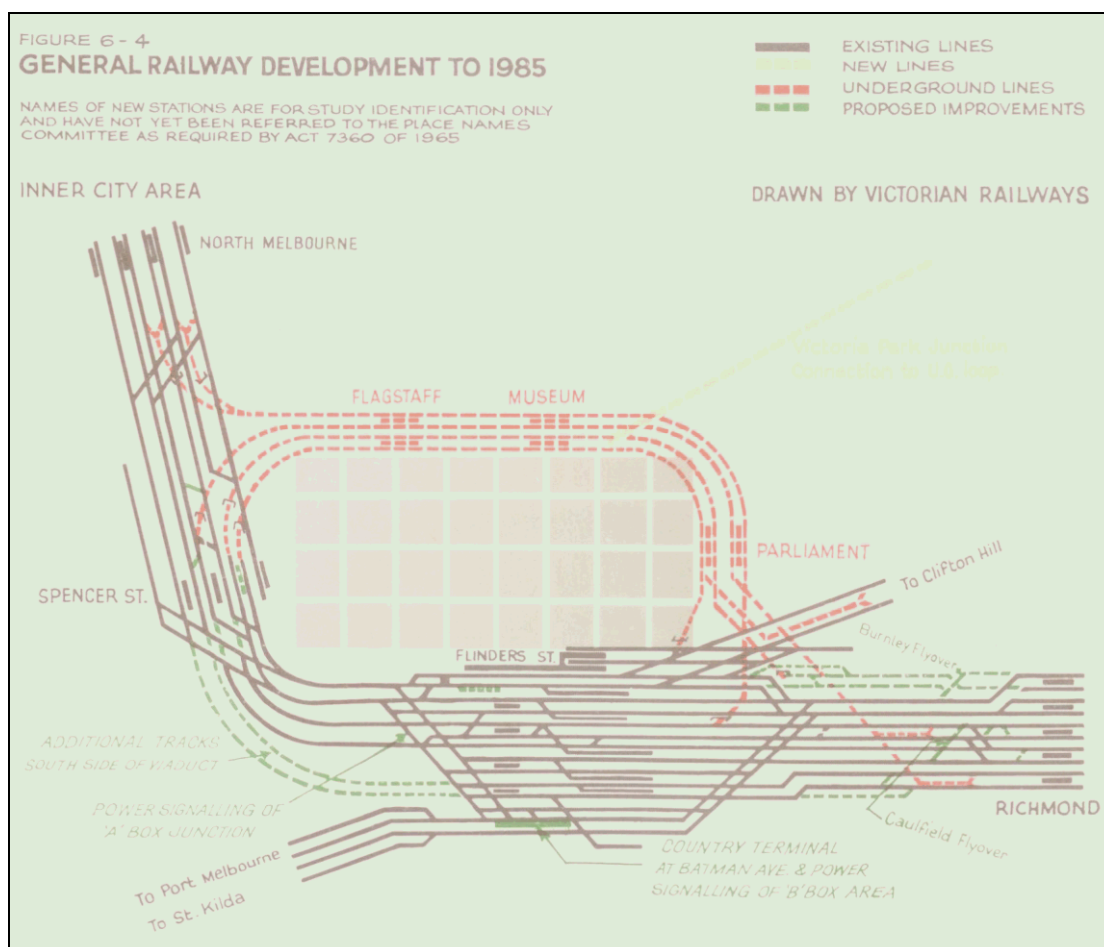


Plan of General Development, Melbourne, 1929, p.130.

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The 1969 Transport Plan proposed a series of new suburban lines, and greatly increased service frequencies and express running. To accommodate these additional services, the plan proposed a four-track underground rail loop (figure 7). The loop was intended to serve the anticipated 300 million passengers in 1985, plus 'the capacity for expansion beyond the design year'.¹⁰ Supplementary inner city works complemented the loop, including a new signalling and control system, expansion of Richmond station from 6 to 10 platforms (during the 1950s), two additional tracks to Burnley and Footscray, and on the viaduct between Flinders Street and Southern Cross/ Spencer Street stations.

Fig.7. Plan for City Loop, 1969



Melbourne Transportation Study, 1969, vol.3, p.38

The city loop was indeed built, largely following the 1969 plan shown above, but the anticipated additional lines, train services and patronage never eventuated.¹¹

¹⁰ p. 34.

¹¹ Some third 'express tracks' proposed in the 1969 plan have not been built, but this is not a problem. The 1969 plan underestimated the number of CBD workers who would come from inner suburban areas, which at the time were regarded as 'slums', and overestimated outer suburban patronage. For example, it proposed an express train from Mordialloc every 2 minutes in peak hour.

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The city loop was a controversial project. Critics, notably the Shadow Transport Minister Barry Jones, argued that it was wasteful and unnecessary. In particular, the critics warned that the loop would use up all available capital, leaving nothing remaining to fund the urgently needed new and extended suburban lines. The critics were proven right: the loop was indeed built, but none of the proposed suburban extensions were. And by the time it opened in 1981, rail patronage and service levels were lower than they had been before work started on the loop. Patronage was so low that the government-commissioned ‘Lonie Report’ proposed closing half a dozen lightly-patronised suburban lines, proposals that were revived upon the election of the Kennett government in 1992.

Although the line closure proposals of the 1980s and 1990s were eventually withdrawn, the central problem remained. Melbourne had over-built its inner city rail network, at enormous expense, to boost capacity in anticipation of patronage increases that never eventuated. In doing so it had passed up the opportunity to extend rail to new growth areas. How odd, then, that in 2008, with patronage still at much lower levels than anticipated in the 1920s or the 1960s, it should be proposed to build yet another, even more expensive, underground rail line through the city centre instead of using the available inner-city capacity and extending the suburban rail system to new growth areas.

How was the city loop planned to operate?

To understand how the loop was intended to operate, it is first necessary to understand how the pre-existing system operated. From the 1920s, with the rail system electrified and a four-track viaduct between Flinders and Spencer Street Stations, Flinders Street operated mainly as a ‘through’ station. This means that the busiest lines between the east and west were linked, with trains only pausing briefly at Flinders Street before continuing to the other side of the city.

An example of this approach is shown in figure 8, taken from the 1929 timetable. The Dandenong and Williamstown lines were ‘paired’ and services ran through Flinders Street. Interestingly, it was possible then to travel from Footscray to Caulfield without changing trains! Trains from the Upfield line (then the Fawkner line) ran through to Kew (now closed), and the Sandringham and Broadmeadows lines were also linked.

Figure 9 shows the Broadmeadows (Essendon) to Sandringham service in the morning peak period. It should be noted that this service utilised a single platform (no. 8) at Flinders Street only, which means that trains were timed to arrive at this platform at short intervals after the departure of the previous train (e.g. 8.01 arrived only one minute after the departure of the 8.00; whilst there were only two-minute gaps between the arrivals of the 8.21, 8.46 and 8.55 services, the preceding trains departing at 8.19, 8.44 and 8.53). The Department of Transport claims now that at least 3 minutes has to be allowed for this.¹²

¹² SKM report, p. 27.

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Not all trains could be operated as ‘through’ services, because there were (and still are) more trains serving the east of Melbourne than the west. The city loop was intended to address this problem and provide additional train ‘paths’ to allow more services to operate. But the majority of trains were still intended to follow the traditional model, operating as ‘through’ services between the east and west of Melbourne:

Services would be arranged so that some of the trains on each line would run to or from one of the loop lines and the remainder directly to or from... Flinders Street...¹³

What happened after the loop opened?

By the time the city loop opened, patronage had declined to barely a third of the 300 million trips projected for 1985. Train services had also been cut back, as shown in Table 1, which compares current service levels with past performance and the predictions made for 1985 at the time the City Loop was planned (for explanations of the various ‘groups’, see discussion below).

Table 1: Peak hour suburban train services to Flinders Street Station

Group/line	1929 (actual)	1964 (actual)	1985 (predicted)	2008 (actual)
Northern	26	23	35	25
Clifton Hill	18	14	21	11
Burnley	22	23	43	29
Caulfield	17	23	58	22
Sandringham line	14	9	10	7
Total	113	108	181	94

Sources: Victorian Railways Suburban Timetable book 1929 (trains departing between 5:00 and 5:59 pm); Melbourne Transportation Plan 1969, Vol. 3, pp. 34 & 37 (1964 & 1985); Connex timetables 2008 (arrivals from 8:00 to 8:59 am).

Note: 1929 and 1964 totals include Port Melbourne and St Kilda lines; 1985 total also includes proposed Doncaster line.

Without consciously planning to, rail managers used the surplus capacity as an opportunity to relax the culture of efficiency and reliability established in the 1920s. Work practices deteriorated, inefficient timetables were introduced, through-running was abandoned and operating efficiency levels that had been achieved as long back as

¹³ 1969 Transport Plan, vol 3, p. 34.

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the 1920s gradually became unthinkably difficult. V/Line services from the LaTrobe Valley, which had always terminated at Flinders Street to avoid clogging up the viaduct and suburban platforms at Spencer Street, were extended into Spencer Street/Southern Cross Station.¹⁴

In the early 1990s, financial problems led to further service cutbacks. On most lines, this meant the partial or complete elimination of ‘direct to Flinders Street’ services, with all or most trains operating through the loop. By this time, only a fraction of the available capacity of the central city rail system was being utilised, but few people were perturbed, since patronage and service levels were so low. Some platforms at Flinders Street station were even decommissioned because they were not being used.

In the late 1990s the train system was privatised and most of the few remaining rail planners who remembered how the system had been designed to operate left. A Public Transport Division of the Department of Infrastructure was established to monitor the private contracts, staffed by lawyers, accountants and others with expertise in contract administration. Until about 2005, the main focus of this organization was dealing with the unravelling of the 1999 privatisation, as the British firm National Express pulled out of Victoria, and the remaining operators demanded (and won) large increases in subsidy payments.

In this environment, nobody was working on operational or infrastructure planning for the rail system. And by 2005, there was nobody available with the necessary skills to do so had it been desired. The Public Transport Division focussed on expanding bus services instead, as these were ‘easy’, and left rail planning to Connex. Unfortunately nobody at Connex had the relevant skills either, as the firm simply inherited the former Public Transport Corporation’s staff, minus the ‘best and brightest’, who had left.

When the Public Transport Division finally noticed that patronage had begun to increase, it had no idea how to respond. Lacking expertise in rail planning, it called on ex-Vicroads road engineers in the Department of Infrastructure for advice. Unfortunately, the skills involved in rail planning and road engineering are not transferable, so the advice offered — widen lines with third tracks at various points on the suburban system, and resist all calls for new lines — was useless. Around 18 months ago, the Public Transport Division re-hired a former PTC staffer (who had moved interstate when the system was privatised) as a consultant to advise it on rail issues.

This one person, working part-time, has been the department’s — and Eddington’s — sole source of advice. He has simply not had the time or the assistance (i.e. from other staff with the necessary skills) to examine the issues thoroughly. Neither Sir Rod Eddington nor any of his study team have any expertise in rail planning¹⁵; nor was any advice sought from outside experts.

¹⁴ The V/Line (country) platforms at Southern Cross can only be accessed from the North/West, so trains coming from the East have to stop at the suburban platforms. For this reason, trains from Gippsland terminated at Flinders Street for over a century until the late 1980s.

¹⁵ Staff are listed on p. 1 of the Eddington report.

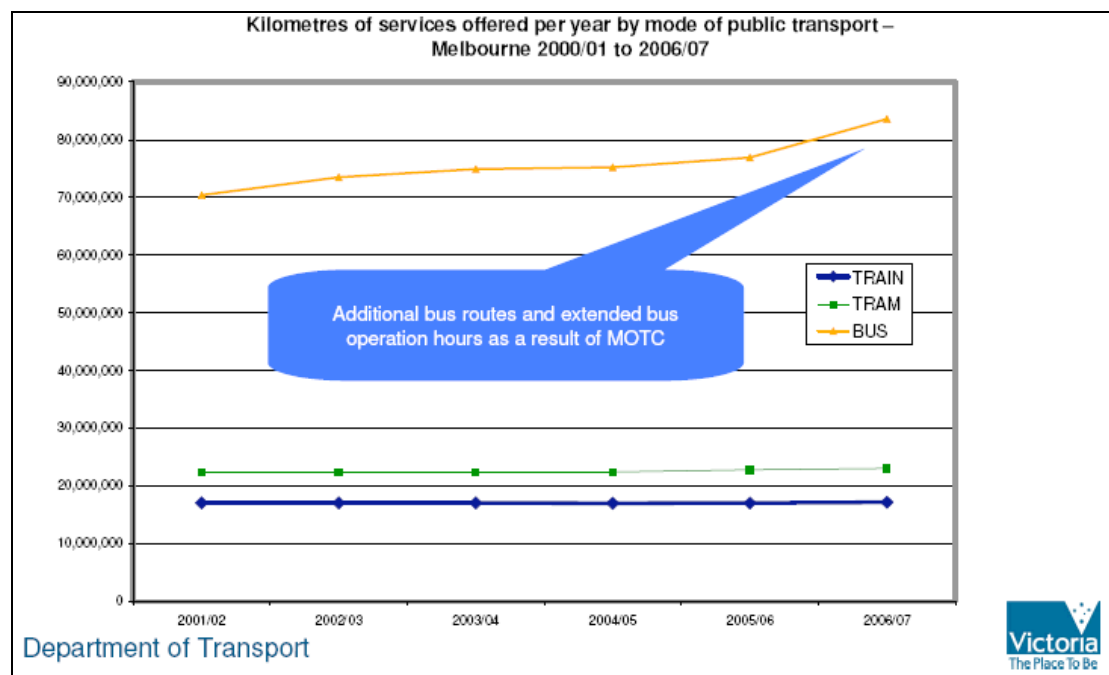
So what is causing the overcrowding?

Reported rail patronage has increased by around a third over the last five years. However, as indicated above, some of the apparent increase is a result of the change in estimation methodology in 2005. In addition, off-peak patronage has risen faster than peak patronage, due to measures such as discounted weekend fares. So the increase in peak demand over the last five years is around 20-25%.

A modest increase in peak demand like this should not present problems for a rail network that was designed to carry much higher volumes. So why has overcrowding become so severe?

The simple answer is that there has been virtually no increase in peak period suburban services over the last 10 years, let alone the last five. This can be seen from figure 10, taken from a recent document produced by the Department, which shows that overall train service levels have barely changed over the last five years.

Fig.10. Level of service provision, 2001/02–2006/07



‘Understanding and Forecasting Metropolitan Public Transport Patronage’, Department of Transport, Public Transport Division, 2008, p.34.

The lack of change in peak hour can be illustrated by considering the Williamstown, Werribee and Sydenham lines, three routes where patronage is growing rapidly due to population growth plus an increased propensity for workers to be employed in the city centre. The 1998 ‘Bayside Trains’ timetable for these lines shows that in the busiest hour, between 8:00 and 8:59 am, 3 Williamstown, 4 Werribee and 4 Sydenham (then St Albans) line trains arrived at Flinders Street Station. Ten years later, there are now

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3 Williamstown, 5 Werribee and 5 Sydenham trains arriving in this hour: there have been no new services on the Williamstown line and only one each on the other two.

Other lines, such as Alamein, Glen Waverley and Belgrave/Lilydale, have seen no additional peak hour services at all over the last decade. No wonder crowding has increased!

It may seem surprising that there has been so little increase in service, because there have been regular announcements of additional services over the last decade. Unfortunately, these announcements have been public relations exercises designed to obscure the absence of real change.

For example, in April this year, ‘the biggest shake up of train services since the city loop’ was announced, featuring an ostensible 105 new services per week.¹⁶ On closer examination, it turns out that only five of these additional weekly services represented a train running to the city in the busiest hour of the morning peak (the 8.22 Oakleigh to Flinders Street), and none at all left Flinders Street in the evening peak hour (5:00 to 5:59 pm). Thirty of these 105 ‘new services’ were extra shuttle trains between Frankston and Stony Point; ten services were already-existing trains that simply started their runs earlier (e.g. at Frankston instead of Mordialloc); fifteen were empty ‘counter-peak’ (e.g. to the city in the afternoon) services that had been altered to pick up passengers; the remaining 45 were ‘shoulder’ (i.e. near, but not during, the peak) trains. In any event, more than 12,000 suburban trains run across the system every week, so even if there had been 105 genuine new services, this would represent an increase of less than one per cent.

So the simple explanation for overcrowding on the rail system is that peak-period patronage has increased 20-25%, but service levels have barely changed at all, especially in peak period. Given that the Department of Infrastructure/ Transport released the *Melbourne 2030* strategy back in 2002, which projected that patronage would more than double by 2020, the Department’s inability to accommodate even such a modest rise in numbers reflects poorly on its competence.

How many trains can the existing infrastructure accommodate?

It is surprising that, with the exception of works by the present author, none of the documents produced on the capacity of the Melbourne rail system have relied on, or even referred to, the accepted manuals that set out international best practice in urban rail operations. The two leading urban rail capacity and operations manuals, at least in the English-speaking world, are:

- *Urban Transit: Systems and Technology* (2007, John Wiley & Sons, New Jersey), by Professor Vukan R. Vuchic of the University of Pennsylvania; and
- *Transit Capacity and Quality of Service Manual* (2nd edition, 2003, TRB, Washington DC), by the US Transportation Research Board.

Both manuals give consistent advice, and this report relies on them, except where otherwise indicated. This report also discusses a technical appendix to the Eddington

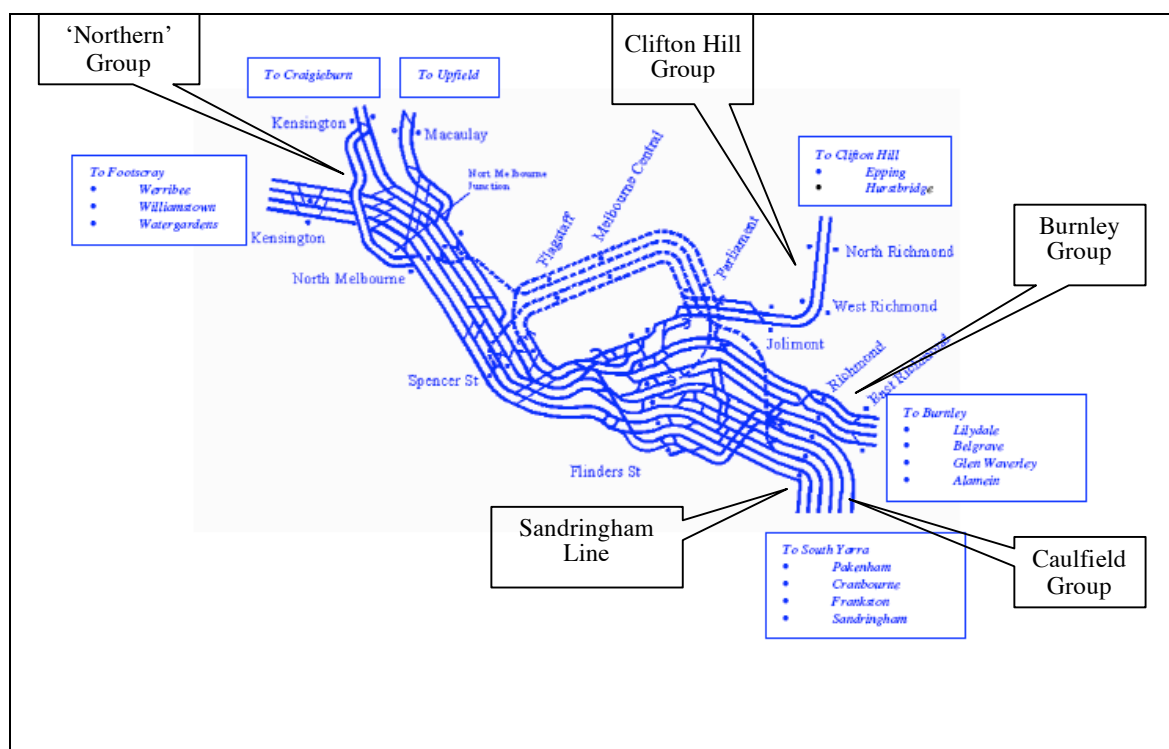
¹⁶ Connex, ‘Our Plan’: New April Services, www.connexmelbourne.com.au/ourplan

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report, *East West Needs Study: Transport Supply and Demand (Existing and Future)*, produced by engineering consultants Sinclair Knight Merz and Maunsell and available from the Eddington website ('the SKM report').¹⁷ The SKM report sets out some useful information about current operational practices on the Melbourne rail system, but more importantly provides the only public statement of the reasons the Department of Transport offer in support of their claims of limited capacity in the existing inner city system.

Capacity is generally calculated per line or track, so the first thing to establish is the number of tracks available for suburban trains entering the city centre. The SKM report correctly identifies 8 such tracks for in-bound trains heading for Flinders Street Station (corresponding with another 8 for out-bound trains): see figure 11.

Fig.11. Inner city rail system, showing line groups and 8 in-bound tracks



The 8 tracks are:

- Two tracks for the 'Northern group', lines through North Melbourne station from Williamstown, Werribee, Sydenham (Watergardens), Craigieburn (Broadmeadows) and Upfield. One track runs through the city loop, the other via Southern Cross Station. (Figure 11 actually shows three in-bound tracks through North Melbourne, but the third track serves the V/Line country platforms at Southern Cross.)
- A single track for the Clifton Hill group through Jolimont station, connecting to a city loop tunnel. This serves the Epping and Hurstbridge lines.

¹⁷ available from www.doi.vic.gov.au/eastwest ('supporting/ technical documents and reports').

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- Two tracks for the Burnley group, through Richmond station, one via the loop and one direct to Flinders Street. These serve the Belgrave, Lilydale, Alamein and Glen Waverley lines.
- Two tracks for the Caulfield group, through South Yarra and Richmond Stations, one loop, one direct. These serve the Dandenong (Pakenham, Cranbourne) and Frankston lines.
- One track serving Sandringham trains. This runs through South Yarra and Richmond, and runs direct to Flinders Street. It does not have access to the loop.

The next step is to estimate the number of trains each of the 8 tracks can carry. Both Vuchic and the TRB manual explain that there is a theoretical capacity determined by the signalling system, which must then be reduced to make room for an ‘operating margin’ to accommodate minor delays and ensure that these do not hold up following trains. The TRB manual says that ‘conventional train control systems can support a throughput of up to 30 trains an hour with typical train length, performance, station dwells and operating margins’, while noting that the Moscow Metro manages 40 trains an hour with extremely tight adherence to timetables.¹⁸ The Melbourne inner city rail system has a control system of this conventional type (called ‘fixed block’). Interestingly, the SKM report states: ‘The signalling capability in the city and inner suburbs... generally allows for 2 minute headways...’¹⁹ — i.e. 30 trains per hour.

In Melbourne, 30 trains per track per hour would allow a total of 240 suburban trains an hour, well over double the 94 currently operated in the busiest hour. Vuchic recommends operating at around 80 per cent of theoretical capacity to maintain reliable operations: this would give 24 trains per track per hour, or 192 per hour across the whole system. This would still enable twice the current service level, and is considerably higher than the 145 suburban trains per hour the Department of Transport estimates would be possible *after* the proposed Caulfield-Footscray tunnel is built.²⁰ So Eddington and the Department of Transport are proposing to spend \$8.5 billion to provide less train-carrying capacity than already exists!

Why is the available capacity not being utilised?

Sir Rod Eddington does not discuss this question at all in his report, but the SKM report, available on the Eddington website, sets out a series of ‘reasons’ the rail system supposedly cannot accommodate 24 trains per track per hour. Virtually all of the reasons offered are simply examples of poor management and operational practices that could be remedied, and which would have been in any competently managed rail system.

SKM report that the Department of Transport have agreed to fix some of the operational problems, but not others. This increases the potential throughput of trains, but only modestly (see table 2 below). In particular, the Department’s revised

¹⁸ TRB, p. 5-11.

¹⁹ SKM, p. 22.

²⁰ DoT: *Analysis on Rail Capacity* (Technical Report to Eddington review, available from website), p. 33.

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operating procedure provides no increase in capacity at all for the Northern Group, but these are the services with the fastest-growing patronage. The measures with the greatest potential to increase throughput, especially on the Northern Group, are ignored, even though some of them are actually easier to implement than the measures the Department has agreed to put in place.

The following discussion will consider first the operational restrictions the Department agrees can be fixed, then those it wants to leave in place. However, first we consider the potential impacts of the various changes. These are set out in Table 2.

Table 2 shows that, under current operational practices, the inner city rail system can handle 17 more suburban trains than are being run in the busiest hour at present, mostly by running more ‘direct’ services, an increase of less than 20%. The lines that are actually closest to theoretical capacity are the Burnley Group, which are already running one train ahead of supposed capacity (what this really shows is how slack the ‘current’ practices actually are). The key pressure points, however, are the Northern and Caulfield groups, which serve urban growth corridors and have the most rapidly growing patronage. The Northern group can accommodate another 7 trains an hour under current practices; Caulfield another 6 trains.

Table 2: Number of suburban trains per hour

Line	Existing 2008 timetable	Potential Current practice	<i>DoT proposals</i>	<i>Best practice</i>
Northern group				
via loop	19	20	20	24
direct	6	12	12	24
total	25	32	32	48
Clifton Hill group (all via loop)	11	15	20	24
Burnley group				
via loop	21	20	20	24
direct	8	8	16	24
total	29	28	36	48
Caulfield group				
via loop	20	20	20	24
direct	2	8	13	24
total	22	28	33	48
Sandringham line (all direct)	7	8	15	24
Grand total	94	111	136	192

Sources: Connex timetables (2008); SKM report (current practice and DoT proposals); analysis below (best practice).

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Under the Department's revised operating regime, another 25 trains an hour can be provided. However, there is no increase on the Northern Group, where maximum throughput remains at 32 trains per hour. Since the Northern group has the fastest-growing patronage, it appears that more infrastructure is required in this corridor. But under 'best practice' operating conditions, Northern Group throughput increases to 48 trains an hour, an increase of nearly 100% on current levels, removing the need for new infrastructure.

The following sections explain how this is achieved.

Operational changes proposed by the Department of Transport

The SKM report details some operational changes proposed by the Department of Transport. It describes these as 'base case assumptions' and 'operating strategies', noting that they were developed as part of 'work... in relation to the proposed north-south rail tunnel through the CBD.'²¹ In other words, these changes do *not* represent an assessment by SKM and their team of what could be achieved under 'best practice': they simply report what the Department of Transport had already decided to do of its own accord. Apparently, neither Eddington nor the Department asked the consultants for advice about the capacity of the rail system under 'best practice' operating conditions.

Removing train conflicts arising from 'limited sectorisation'

- *5 additional trains/ hour*

The first reason offered by the Department for not utilising the available capacity is conflicts between suburban trains on different lines and between suburban trains and V/Line trains around the entrance to the V/Line terminal at Southern Cross Station.²² The main reason for this problem is the complicated pattern of services currently operated, which increases the number of such conflicts.

The Department proposes to ameliorate this problem by simplifying train operations, especially between North Melbourne and the City. In particular, running Werribee and Williamstown line trains on the 'direct' route via Southern Cross rather than through the loop eliminates the current practice, in which these trains must cross a number of other lines to reach the loop entrance (because no direct entrance to the loop was provided from the platform at North Melbourne used by these trains). These trains would then be 'through-routed' to the Caulfield Group to eliminate layover time at Flinders Street (see below). Interestingly, this change does not actually free up any train paths, as can be seen by comparing the Northern group figures in the second and third columns of Table 1.

The Department proposes dealing with a similar problem for Clifton Hill group trains²³ by reversing the direction in which the City Loop operates, and this allows the

²¹ SKM, p. 110.

²² SKM, pp. 24-5.

²³ This problem exists because the underpass enabling these trains to enter the City Loop without crossing out-bound trains, shown in Figure 7 to the left of the words 'to Clifton Hill', was not built, as an economy measure. It would cost about \$50-60 million to add this underpass now, as provision was made for it when the Clifton Hill loop was built.)

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number of trains per hour to increase from 15 to 20. (This approach will inconvenience many Clifton Hill Group passengers, so it is surprising that alternative options were not considered – such as running some services ‘direct to Flinders Street’.)

Removing crew changes and ‘layovers’ at Flinders Street

- 20 additional trains/ hour

Currently, train crews change over at Flinders Street station, and trains operating on ‘direct’ routes reverse at Flinders Street as well (trains that run through the loop don’t need to reverse, because running through the loop turns them around en route). The time allowed for these manoeuvres, plus additional time included to permit late-running trains to catch up to schedule, is called ‘layover time’. Layovers block platforms at Flinders Street Station, thereby limiting train throughput.²⁴

Scheduling crew changes and other layovers at the busiest point in the rail system is very inefficient. In well-run rail systems, layovers occur at suburban terminals where more space is available.

The Department proposes ‘through running’ for ‘direct’ services between east and west, and to move most layovers to suburban terminals. Interestingly, the Department seems unaware that this amounts to a reinstatement of the operating regime in place from the 1920s to the 1970s, a clear illustration of the loss of ‘corporate memory’.

Removing layovers enables additional trains to run on the ‘direct to Flinders Street’ tracks serving Burnley group, Caulfield group and Sandringham line services, allowing a total of 20 extra services across these routes (compare second and third columns in Table 1). However, the changes do not provide any additional space on the critical Northern group, because of conflicts with V/Line services from the LaTrobe Valley (discussed below).²⁵

Operational changes *not* considered by the Department

The Eddington report and the Department claim the proposed East-West rail tunnel will allow the operation of an additional 40 trains per hour, over and above the total of 136 per hour achievable under the Department’s proposed operational changes. But efficiency improvements that could be achieved right now with the existing infrastructure would permit an even greater increase, of 56 trains per hour. The majority of these additional trains, 31 in all, would be on the critical Northern and Caulfield groups.

Terminate LaTrobe Valley V/Line trains at Flinders Street

- 15 additional trains/ hour – all on Northern & Caulfield groups

As Table 1 indicates, the Department of Transport’s revised operating procedures would allow 20 trains per hour on the city loop lines serving the Northern and Caulfield groups, but only 12 and 13 on each of the ‘direct’ lines. The SKM report

²⁴ SKM, pp. 25-6.

²⁵ SKM, p. 110.

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explains that the difference of 15 trains an hour is due to two morning peak V/Line services from the LaTrobe Valley. These trains take up suburban platform space at Flinders Street and Southern Cross, and train paths on the viaduct between the two stations. It is not possible to run these trains into the V/Line terminal at Southern Cross, as this can only be accessed from the North/West.²⁶

The obvious question is: why are these two V/Line trains operated in a way that prevents the operation of 15 suburban services per hour, which can carry 12,000 passengers, on the very lines that have the fastest-growing patronage? Why are these trains not terminated at Flinders Street station instead?

The answer provided by the Department, and quoted in the SKM report, is revealing, because it again demonstrates the loss of corporate memory:

*Southern Cross station has always been considered the start and finish point for all V/line services.*²⁷

This statement is simply false. From the opening of the LaTrobe Valley line in the 1880s until about 20 years ago, all services operated to and from Flinders Street, not Spencer Street/ Southern Cross. Figure 12, for example, shows the 1967 timetable, with all trains departing from Flinders Street.

LaTrobe Valley trains used to arrive and depart from Platform 1 at Flinders Street Station, which had waiting rooms, a cafeteria and country booking office. To reach this platform, the trains had to cross up to 8 tracks between Flinders Street and Richmond, as Platform 1 is on the north side, while the Dandenong/ LaTrobe Valley tracks are on the south side. To eliminate this problem, a new terminal for country services was built on the south side of the station, as part of the works accompanying construction of the City Loop. This terminal, which is now Platforms 12 and 13, is shown in green at the bottom of the 1969 loop plan reproduced above as Figure 7.

The extension of V/Line services to Southern Cross in the late 1980s was partly a response to the unattractive facilities on Platforms 12 and 13 (the environment is even worse now, as these platforms sit underneath Federation Square), and partly a response to the surplus track capacity available after the City Loop opened. Despite the unattractive environment, the vast majority of LaTrobe Valley V/Line passengers board and alight trains at Flinders Street: most of the rest do so at Richmond (transferring to or from City Loop services).

The two morning peak LaTrobe Valley V/Line trains between them carry a few dozen passengers to and from Southern Cross. There is no justification for continuing this practice when it prevents another 15 trains per hour, capable of carrying 12,000 passengers, operating on the busiest suburban lines. LaTrobe Valley services should terminate at Flinders Street, at least in peak hour.

LaTrobe Valley passengers do, however, deserve a better terminus than the subterranean environment of Platforms 12 and 13. The terminus should be at Platform

²⁶ SKM Report, pp. 26, 111 (fig. 3.9) and 112 (fig. 3.11).

²⁷ SKM report, p. 26.

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10 on the south side of the station by the Yarra River (this was not available at the time the loop was built, as it served the St Kilda and Port Melbourne lines, but these lines were converted to light rail 20 years ago). Since Platform 10 is now used by Sandringham trains, it will be necessary to reopen Platform 11, the last platform before the Yarra River, which was decommissioned during the 1990s. This is discussed in the next section.

Fig.12. Services to the LaTrobe Valley, 1967 timetable

WARRAGUL, TRARALGON, SALE, BAIRNSDALE						
(continued on next page)						
	Suburban train to D'nong	● Pass. Mon. to Sat.	● "The Gippslander" Mon. to Sat.	● Pass. Sat.	Pass. Mon. to Fri.	Pass. Mon. to Fri.
	Mon. to Fri.	Mon. to Sat.	Mon. to Sat.	Sat.	Mon. to Fri.	Mon. to Fri.
MELBOURNE (Flinders St.)	dep. 6 39	a.m. 7 25R	a.m. 8 35R	p.m. 12 40R	p.m. 1 15R	p.m. 3 38R
Caulfield ...	6 57	7 42	8 52	12 57	1 32	3 54
Oakleigh ...	7 6	*	*	*	*	4 2
Huntingdale ...	7 8	*	*	*	*	*
Clayton ...	7 12	*	*	*	*	*
Westall ...	7 15	*	*	*	*	*
Spring Vale ...	7 18	*	*	*	*	4 11
Sandown Park ...	7 20	*	*	*	*	4 13
Noble Park ...	7 22	*	*	*	*	4 15
Dandenong ...	arr. 7 26C	...	...	...	...	...
Hallam ...	dep. 7 38	8 1	9 11	1 17	1 51	4 21
Narre Warren ...	*	8 9	*	1 22	1 56	4 27
Berwick ...	7 49	8 14	*	1 28	2 1	4 31
Beaconsfield ...	*	8 18	*	1 34	2 6	4 36
Officer ...	*	8 23	*	1 38	2 10	4 40
Pakenham ...	7 59	8 30	*	1 43	2 15	4 45
Nar-Nar-Goon ...	8 5	8 37	*	1 51	2 22	4 52
Tynong ...	8 10	8 43	*	1 59	2 29	4 59
Garfield ...	8 15	8 48	*	2 6	2 35	5 5
Bunyip ...	8 19	8 52	*	2 11	2 40	5 10
Longwarry ...	8 24	8 57	*	2 16	2 44	5 14
Drouin ...	8 34	9 7	*	2 21	2 49	5 19
	arr. 8 45	9 17R	10 2	2 33	2 59	5 29
				2 43R	3 10	5 40R
WARRAGUL	dep. ...	9 27	10 4	2 53	...	...
Darnum ...	...	9 34	*	3 0	...	...
Yarragon ...	...	9 40	*	3 6	...	...
Trafalgar ...	...	9 47	*	3 14	...	...
MOE ...	...	9 57	10 27	3 25	...	...
MORWELL ...	...	10 12	10 42	3 42	...	...
	arr. ...	10 30	10 54	4 0	...	...
TRARALGON	dep. ...	...	11 2	...	...	...
Rosedale ...	...	...	11 23	...	...	...
Kilmany ...	...	...	11 36	...	...	...
	arr. ...	...	11 49	...	...	...
SALE	dep. ...	...	11 57	...	...	...
Stratford ...	...	...	p.m. 12 15	...	...	...
Munro ...	...	...	F	...	...	...
Fernbank ...	...	...	12 38	...	...	...
Lindenow ...	...	...	12 49	...	...	...
Hillside ...	...	...	12 56	...	...	...
BAIRNSDALE	arr. ...	...	1 15	...	...	...

For explanation of symbols see opposite page.

Reopen closed platforms at Flinders Street Station

- Additional trains counted under other changes

Prior to the 1990s, Flinders Street Station had 17 Platforms: numbers 1 through 16 and 'Platform 1 West' at the Southern Cross Station end of Platform 1. Following the service cutbacks of the early 1990s, five of these platforms were decommissioned (1 West, 11, 14, 15 and 16). Platform 14 (directly East of Platform 1) has recently been reopened as a back-up for Clifton Hill Group services, and should remain open for

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this purpose. Platforms 15 and 16 cannot be reopened, as they have been incorporated into Federation Square.

Platform 11 by the Yarra River is basically intact, except that the tracks have been removed and the overhead and signalling decommissioned. It should be reinstated, at a cost of \$3-4 million, for Sandringham train services. This will allow the adjacent Platform 10 to be used by V/Line services from the LaTrobe Valley (and by Sandringham services when unoccupied by V/Line trains). Platforms 12 and 13 should remain open as a back-up for peak-period Sandringham services.

Reduce turnaround times for Burnley group and Sandringham 'direct' trains

- *9 additional trains/ hour*

Under the Department's proposed revised operating procedures, most trains from the South and East of Melbourne would not need to reverse at Flinders Street, as they would either run through the loop, or continue to/from the North/ West. However, 'direct' trains on the Burnley group, and all trains on the Sandringham line, would still need to do so.

The Department claims that only 16 Burnley group 'direct' services per hour can be reversed at Flinders Street (see 3rd column of Table 1), even though two platforms (3 and 4) would be available.²⁸ This amounts to one train every 7.5 minutes on each platform. As Figure 9 shows, in 1929 this process could be accommodated in 3-4 minutes (note the 7:49 and 8:00 am departures to Sandringham from Flinders Street), and the Victorian Railways Commissioners believed that operational changes would 'enable the trains to be run at closer intervals during the absolute peak of traffic'.²⁹

So why does it now take twice as long to reverse a train as it did 80 years ago? The US TRB Capacity Manual says:

*Correctly designed and operated turnbacks should not be a constraint on capacity.*³⁰

The Manual estimates that turnback times for trains can be reduced to as little as 175 seconds (just under 3 minutes) with efficient operations – including 'set back crewing, where a crew from a previous train is pre-positioned at the far end of the train.'³¹

Table 1 allows for a turnback time of 5 minutes per train per platform, giving a combined frequency across the two platforms serving Burnley group direct trains of 2.5 minutes, or 24 trains per hour (Table 1). This is considerably more generous than the margin recommended in the operating manuals, or even than Melbourne practice of the 1920s.

With up to three platforms available for reversing Sandringham trains (see discussion above), it should be even easier to achieve a throughput of 24 trains per hour.

²⁸ SKM report, p. 112 (figure 3.12).

²⁹ MTPC, First Report, 1925, p. 13.

³⁰ p. 5-15.

³¹ pp. 5-16, 5-17.

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As the SKM report notes, projected demand in 2021 for the Burnley group and Sandringham line is for fewer trains than the available capacity would allow, even under the lower Department of Transport capacity estimates.³² On the Burnley group, this means that there would be some spare capacity, while on the Sandringham line, the spare capacity would be used to accommodate V/Line services from the La Trobe Valley. The most efficient way of doing so, in the critical morning peak where the number of train services operated is higher than in the evening peak, would be to add a crossover between South Yarra and Richmond stations allowing V/Line services to switch across to the Sandringham line before reaching Richmond station. The cost of such a crossover, including changes to signalling, would be approximately \$2 million.

Increase train throughput from 20 to 24 trains per line per hour

- *Additional 32 trains/ hour*

Two-minute headways, or 30 trains per hour, are regarded as easily achievable by conventional urban rail systems. As indicated above, the signalling in and around the City Loop was designed to accommodate this figure. But the Department of Transport insists that 3 minutes, or 20 trains, is the limit. The difference may not sound much, but even the difference between 3.0 and 2.5 minutes, the rather relaxed standard proposed in this report, amounts to an additional 32 trains per hour across the 8-track system.

Why should Melbourne be unable to achieve operating frequencies considerably more relaxed than already managed in overseas systems, including those with cramped stations, older signalling and more severe crowding? The SKM report sets out a series of excuses offered by the Department of Transport: these relate mainly to 'long dwell times' at stations, which are caused by poor operating practices that simply would not be tolerated on any competently run rail system.

We will discuss these issues in turn, but first note that even the SKM report admits that:

A comparison with other international railway operators showed that dwell time performance could be significantly improved in the City loop...³³

However, strangely, this suggestion was not followed up: neither the SKM report nor the Eddington report considers how many additional trains could be operated if dwell times were significantly improved.

Passengers in wheelchairs

The first excuse is passengers in wheelchairs: 'The presence of wheelchair passengers affects 2-3% of trains and increased the dwell time [by] up to 55 seconds.'³⁴ One would think from reading this that Melbourne is the only city in the world where people in wheelchairs use trains! The US Department of Transport's Manual says that wheelchair passengers need not cause delays in systems with 'high platform boarding' (like Melbourne's trains), because 'the movement of wheelchairs on level services is generally faster than walking passengers..³⁵

³² SKM report, p. 113, table 3-9.

³³ SKM report, p. 27.

³⁴ SKM, p. 27.

³⁵ Manual, p. 5-37.

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The delays in Melbourne are not caused by wheelchair passengers at all, but by current inefficient operating procedures, which require the train driver to leave the front compartment, walk down the platform, unlock the wheelchair ramp from inside the train, fix it in position, then repeat the manoeuvre in reverse. These tasks should be performed by station staff, not drivers, as is the case in competently managed rail systems. If they were, there would be no additional time required for passengers in wheelchairs.

Late boarders

‘In the PM peak late boarders frequently add up to 20 seconds.’³⁶ This refers to drivers holding doors open for late arriving passengers running for the train. If this happened on busy rail systems Like London or Paris, trains would never leave the station because passengers arrive continuously. This is simply an issue of driver training and passenger information. Drivers should be instructed not to wait for late-running passengers, and passengers should be informed why this is so (as they used to be, by prominent signs at all stations, until about 20 years ago). As the SKM report notes, provision of on-platform staff might help also (these staff could also assist wheelchair passengers).

Train layout and number of doors

‘One of the main reasons for long dwell times is the internal layout of trains [which] limits passenger capacity and internal movement, thus extending dwell times at stations. Also, Siemens trains have 2 doors per carriage per side compared with 3 doors for other train types, further restricting the movement of boarding and alighting passengers.’³⁷ And who approved the purchase of those poorly-designed Siemens trains? The same Department of Transport that now says the rail system is at capacity.

It is true that the internal layouts of the newer trains (Siemens and X-trapolis) slow boarding and alighting, mainly because they leave insufficient space around doors. Here we have yet another instance of lost corporate memory and competence. The old Hitachi trains provide more doorway space than the newer models, but also provide more seats (536 per Hitachi train, compared with 528 for Siemens and X-trapolis³⁸). The newer trains should be internally refurbished to provide more doorway space: this can be done without reducing the number of seats.

The Siemens trains present a more serious problem, as it would be difficult to now add extra doors. The solution is to use these trains on lines that have spare capacity, and can accommodate the slower boarding and alighting, such as the Sandringham line and Burnley group direct services. At present, the exact opposite is done: the slow-boarding Siemens trains are used on the busiest lines, the Caulfield and Northern groups.

Irregular arrival of trains from the suburbs

In addition to the long dwell times, the SKM report also notes ‘irregular arrival of trains from different lines at the loop portals.’³⁹ Unlike the excuses discussed above,

³⁶ SKM, p. 27.

³⁷ SKM, p. 27.

³⁸ SKM report, p. 22.

³⁹ SKM report, p. 22.

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this is a genuine issue in all rail systems with branching lines that converge in the central city — such as the Northern Line of the London Underground discussed earlier (and most other Underground routes). It is why the Underground cannot match the very high train throughput of systems like the Moscow or Paris Metros, and normally only manages 30 trains per line per hour.

However, in Melbourne's case, 24 trains an hour provides ample capacity to adjust to any problems of this kind. The problems can be greatly reduced by replacing the current, unnecessarily complicated, service pattern with a simpler arrangement in which trains have more predictable stopping patterns, something the Department has now agreed to do after the present author and others raised the issue.⁴⁰

Conclusion on train throughput

The SKM report confirms that the current Melbourne system was designed to handle up to 30 trains an hour. It also confirms that dwell time performance can be greatly improved. Close scrutiny of the Department of Transport's excuses for long dwell times reveals them to be simply examples of poor operating procedures that could, and should, be fixed. Once this is done, 24 trains per track per hour can be seen to be a very modest throughput.

Isn't it a good idea to separate suburban trains from country and freight trains?

The clearest illustration of the loss of corporate memory found in the Eddington report is the proposal to separate V/Line trains from suburban trains through Sunshine and Footscray. This is to be achieved by extending the East-West tunnel under Footscray station to link up with two additional tracks between Footscray and Sunshine.⁴¹ This project, together with the associate 'Tarneit link', accounts for \$1.5 billion of the \$8.5 billion budget for Eddington's rail projects.

The fact is that the infrastructure required for this separation of services already exists, and has been in place for 80 years. In the 1920s, the Victorian Railways built a bypass line comprising an additional bridge over the Maribyrnong River, connecting to a tunnel under Footscray (the Bunbury Street tunnel), two extra tracks to Sunshine and a new line from Albion (north of Sunshine) to Jacana (near Broadmeadows). These extensive works were constructed for the very purpose identified in the Eddington report — separating steam-hauled country and freight trains from electric suburban trains.⁴²

When the standard gauge rail link to Sydney was constructed in 1962, the bypass route was used for access to Melbourne, and the bridge and tunnel were converted to dual-gauge (i.e. each track can handle both standard gauge trains and the broad gauge used by suburban and most V/Line trains). In addition, a new flyover was built north of Spencer Street/ Southern Cross to carry long-distance passenger trains over the suburban lines and into the V/Line terminal at Southern Cross.

⁴⁰ See Mees, 2007.

⁴¹ Eddington Report, p. 214.

⁴² The main concern at the time was the Broadmeadows line, which has steep grades (this was a problem for steam trains), and had a very frequent suburban service (every 4 minutes as far as Essendon in peak period: see Figures 5 and 9).

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This infrastructure still exists: it is shown on the Melways street directory, and is illustrated in Figures 13 and 14.⁴³ So why not use it? The issue is not discussed in the Eddington report, but the reason appears to be that nobody thought to ask – although jurisdictional issues (the trackwork is leased from the Victorian government by the Australian Rail Track Corporation) may also have inhibited creative thinking.

Fig.13. Bunbury Street tunnel and adjacent bridge, Footscray



locopage.railpage.org.au/photovic.html

Although the bypass route is used by freight trains, plus passenger services to Sydney (twice daily) and Adelaide (three times weekly), these operate infrequently, and generally outside the morning and evening peaks. There is ample spare capacity on this route to allow some peak-period V/Line services to bypass the suburban network.⁴⁴

The main limitation at present concerns access to North Melbourne station, at which V/Line passengers transfer to City Loop services. The bypass route branches after it crosses the Maribyrnong heading for Southern Cross.⁴⁵ A northern branch crosses Dynon Road and joins the route used by Werribee, Williamstown and Geelong trains just before North Melbourne station. V/Line services following this route can stop at North Melbourne. The southern route stays south of Dynon Road and enters Southern

⁴³ See also Melways maps 2S (ref. F9-J10 for the tunnel; K10 for the bridge). The Albion-Jacana line is also shown on maps 26, 27, 15 and 16.

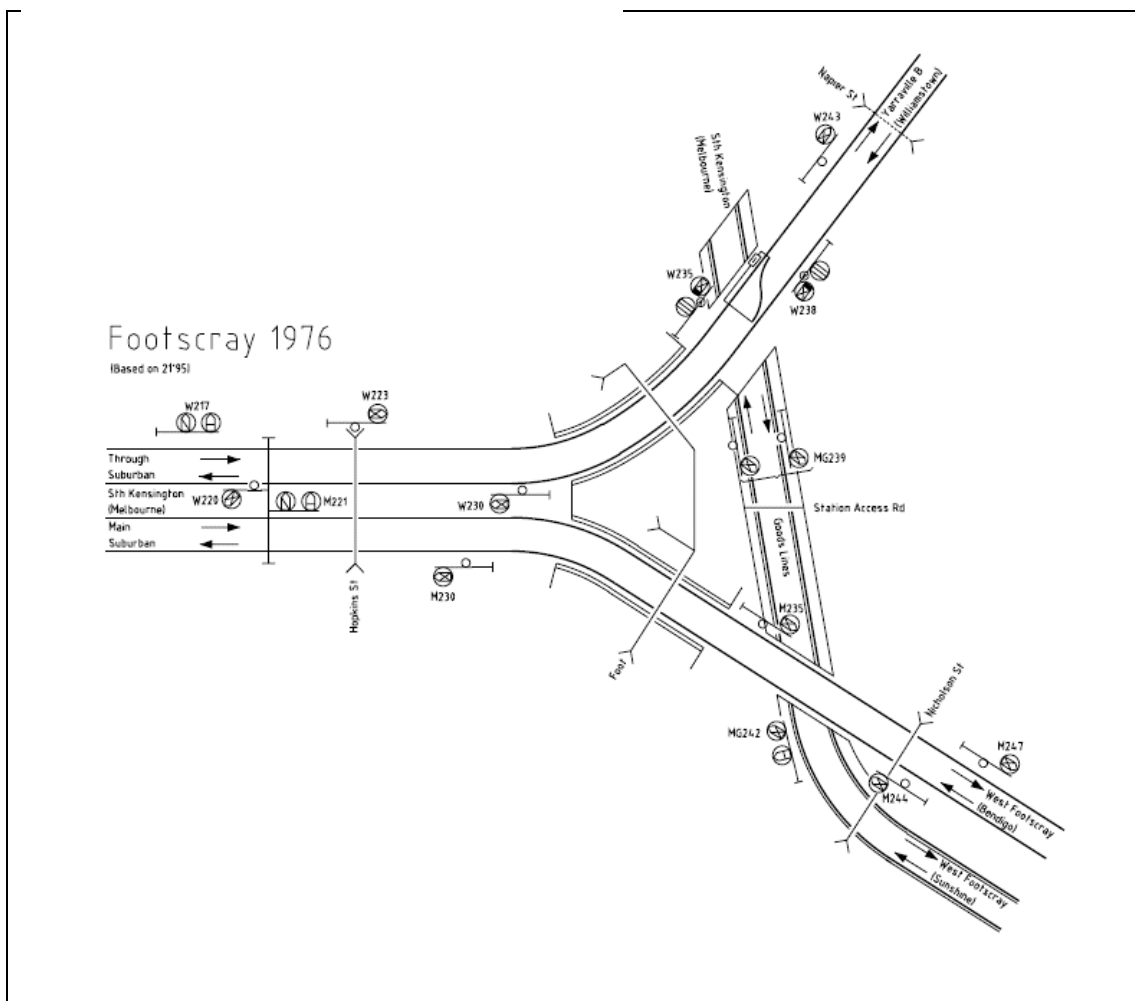
⁴⁴ One transport commentator told *The Age* that the Bunbury Street tunnel should be duplicated (see 'Melbourne's Next Stop: Underground', 9/5/08, p. 13), but the tunnel has been double-track since it opened in 1928, as can be seen from Figures 13 and 14.

⁴⁵ See Melways map 2T, ref. B10.

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Cross by the flyover built for the standard gauge line. Trains following this route cannot stop at North Melbourne, but it offers a number of advantages, particularly minimising interference with suburban services. In the long term, it would probably be a good idea to link the two routes by providing two additional platforms to the west of North Melbourne, and tracks linking to the flyover and the northern branch discussed above. These measures would cost around \$20-30 million.

Fig.14. Plan of Footscray Station, showing separate tracks for suburban and V/Line trains ('goods lines')



What about the Tarneit line?

There has been a good deal of confused commentary about the Tarneit route recommended in the Eddington report. Some observers have praised the link as a way of serving new housing estates, but they have missed two critical points: firstly, the route passes through a 'green wedge' which is supposed to be protected from development; secondly, the line is intended for V/Line express services to and from Geelong, and would therefore have no stops en route.

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The rationale for the Tarneit proposal is to enable Geelong line trains to overtake Werribee and Williamstown suburban services,⁴⁶ but the Tarneit route serves this purpose very poorly, even before its substantial cost is considered. It increases the trip from Geelong to Southern Cross station by approximately 10 kilometres, which will add to journey times, and it prevents Geelong services stopping at Werribee station, inconveniencing the considerable number of passengers who travel between Werribee and Geelong.

Geelong trains can already overtake Werribee line trains by using the ‘express route’ while the latter are on the ‘Altona loop’ (both the loop and the direct route are shown on Melways map 54). The Department of Transport are proposing to prevent this being possible by running all Werribee trains along the direct route and none through Altona. While this would provide Werribee passengers with a faster trip, it would also ensure a very infrequent service for Altona passengers (who even now only get a train every 20 minutes in peak period), and make it harder to operate Geelong trains. If some Werribee services continued to run via Altona, there would be no problem.⁴⁷

Why haven’t the simple, inexpensive improvements been implemented?

The deteriorating efficiency in Melbourne rail operations described in this report is an example of a familiar phenomenon in public transport organizations, which Vuchic describes as follows:

With time organisations have a tendency to develop a pattern of operation that is convenient for personnel, rather than for passengers and long-term operating efficiency ... This pattern of operations is not easy to change, because in an organization a resistance to change develops that may be designated as “self-defense of incompetence” ... The less competent employees are, the more they resist any changes ... Management must undertake energetic steps to break the pattern of service deterioration, decreasing economic efficiency, and resistance to innovations. In some cases, to introduce changes, management may need support of political leaders, external advisors, citizen advisory groups, and other bodies to get a better perspective on the conditions of service, needed improvements, and obstacles that should be overcome.⁴⁸

The problem in the case of Melbourne’s rail system is that there have been few serious attempts to break the pattern of inefficiency in recent decades, with the result that resistance to change is now strongly entrenched. Levels of operating efficiency that Melbourne’s rail administrators of the 1920s believed could be

⁴⁶ Eddington report, p. 214.

⁴⁷ An opportunity for an express route connecting Geelong services to the Bunbury Street tunnel will occur in conjunction with the mooted North Altona freight terminal. This will require a re-routing of the standard gauge line to Adelaide (via Geelong), which was built in the 1990s on an indirect route with tight curves, running through Tottenham, West Yarraville and Newport. A direct standard-gauge connection from Tottenham to North Altona will be needed, and tracks for Geelong express services could be included in this project at modest expense. This would enable all V/Line services to use the bypass route into Southern Cross discussed above.

⁴⁸ *Urban Transit: Operations, Planning & Economics*, Wiley & Sons, 2005, p. 317 (this is the companion volume to Vuchic’s *Systems and Technology*).

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bettered are now regarded as impossibly difficult to achieve. Lacking the necessary skills, the Department of Transport has focused for many years mainly on rationalizing and excusing poor performance, instead of trying to fix it.

Privatisation has actually made the problem worse, by establishing a cosy ‘partnership’ between Connex and the Department.⁴⁹ Because the officials responsible for implementing privatization, and for negotiating the 2004 bailout, remain in charge of the Department of Transport, the Department tends to regard any suggestion that current practices are inefficient as an attack to be defended, rather than an opportunity for improving performance. Connex and the Department each have a vested interest in defending one another’s performance. So while in Melbourne, a train is still ‘on time’ if 5 minutes 59 seconds late, the Swiss Federal Railways’ PULS-90 project is working towards ‘an accuracy of +/- 15 *seconds* [plus] further improvements for an even more accurate driving behaviour’.⁵⁰

The Eddington inquiry missed the opportunity to challenge this culture of excusing inefficiency, because it unquestioningly accepted those responsible for the status quo as its source of expertise.

Giving the Department \$8.5 billion to fix non-problems arising from inefficient management and planning would be to offer a gigantic reward for the ‘self-defence of incompetence.’ This is not the way to create a best-practice rail system.

What needs to be done?

It is commonly claimed that Melbourne’s public transport problems are mainly the result of insufficient funding, but sagas like Myki, the City Loop and Regional Fast Rail suggest that investment is not the only thing needed. Five Canadian academics published an influential analysis in 2005 that identified four ‘pillars’ of good urban transport.⁵¹ Adequate finance was important, but came second after ‘governance’, meaning effective organisational structures staffed by competent staff operating in a dynamic, accountable culture of innovation and improvement. This is precisely what Melbourne is missing, as is dramatically demonstrated by the decline in efficiency in rail operations since the 1920s.

The first thing that is needed to provide Melburnians with ‘European-quality’ public transport is European-quality governance and management. The *Zurcher Verkehrsverbund* (ZVV), the public agency responsible for all public transport across the Canton (State) of Zurich, employs 34 staff (all named on its website)⁵² to serve a system covering a similar geographical area to Melbourne, and carrying similar

⁴⁹ See ‘The Pitfalls in Competitive Tendering’, by P. Kain, in *Competitive Tendering of Rail Services*, European Conference of Ministers of Transport, Paris, 2007, pp. 43-125.

⁵⁰ Luethi et al, 2007, p. 8: emphasis added.

⁵¹ ‘The Four Pillars of Sustainable Urban Transportation’, by C. Kennedy et al, *Transport Reviews* 25(4), 393-414.

⁵² www.zvv.ch

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patronage. Melbourne employs at least 20 times as many officials to perform the same task much less effectively.

The current cosy arrangements, in which an unaccountable Department and private operator cooperate to repel innovation, must be replaced.⁵³ This means putting the current re-tendering process on hold, because it is likely to continue the present system of ‘self-defence of incompetence’ – and indeed to entrench it in contracts lasting up to 15 years. The place to begin is with a genuinely independent review of current infrastructure, capacity, governance and performance, led by experts of international standing. Interestingly, 20 years ago just such a review, by a team that included Vukan Vuchic, enabled the Western Australian government to overcome bureaucratic resistance to the expansion of Perth’s rail system.⁵⁴

Melbourne’s public transport requires urgent and dramatic change, so it can serve the needs of citizens, rather than those of its operators and administrators. Spending billions of dollars on another, unnecessary, inner city tunnel is not the answer. Although ultimately we should be aiming for international best practice in rail management, even a return to the levels of competence shown in the 1920s would solve the current overcrowding problems, and enable the rail system to be extended to serve the travel needs of the 21st century.

⁵³ For more details, see *Putting the Public Interest Back into Public Transport*, by P. Mees, M. Buxton, J. Stone & P. Moriarty, 2006.

⁵⁴ *A review of northern suburbs rapid transit options: Report of expert panel to the Minister of Transport*, by P. Newman, D. Howard & V. Vuchic, Perth, 1988.