Independent Public Inquiry into a
Long-Term Public Transport Plan for Sydney

Final Report

26 May 2010

for Sarah

Independent Public Inquiry, Long-Term Public Transport Plan for Sydney

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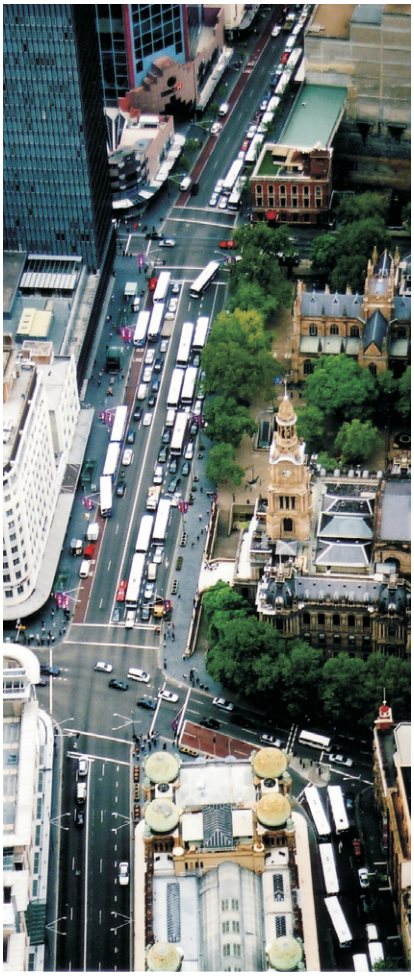

Final Report

26 May 2010

This Independent Public Inquiry was established by *The Sydney Morning Herald* on 22 August 2009 to create a *Long Term Public Transport Plan for Sydney* that would inform decisions by future governments on priorities over the next 30 years. The inquiry has been chaired by Mr Ron Christie, AM, and assisted by a team of independent experts.

Terms of reference

The Independent Public Inquiry will create a *Long Term Public Transport Plan for Sydney* after receiving public submissions.

The plan is to be designed to assist both the public and future governments to make informed decisions about priorities for transport investment.

The plan will cover the following topics:

- The optimisation and integration of existing public transport operations (including ferry, bus, light rail and heavy rail)
- The expansion of public transport services and infrastructure, as well as cycle commuting infrastructure, over a 30-year planning horizon, taking into account existing transport accessibility problems and integration with future land use changes
- The most appropriate governance arrangements to guarantee the plan's longevity, to remove the negative impact of single-term party politics and to optimise investments
- Key environmental sustainability issues
- Key social and economic issues
- Proposals for short term and long term funding, and
- The cost-effectiveness of solutions, taking into account short-term financial costs and benefits and longer term environmental, congestion and other external costs and land-use and accessibility benefits.

Office of the Independent Public Inquiry, Long-Term Public Transport Plan for Sydney

26 May 2010

Mr Peter Fray
Editor
The Sydney Morning Herald

Dear Mr Fray

I am pleased to advise that the Independent Inquiry has now completed its work.

The accompanying report, which contains the Inquiry's findings and recommendations, consists of two volumes.

The first, *Final Report—Themes and Recommendations*, is a summary document which is intended to convey the essential "flavour" and recommendations of the Inquiry.

The second, the full *Final Report*, provides a much greater depth of analysis of the issues, problems and recommended solutions to many of the deficiencies in Sydney's public transport.

A 30-year outline of a long-term public transport plan has been developed in the course of addressing the Terms of Reference.

Sydney is a world class city but has a public transport system which, over several decades, has not kept pace with its increasing population and therefore does not provide a realistic alternative to private vehicle ownership and use for most of the population.

The last decade, in particular, has been characterised by a lack of integrated transport planning based on medium and longer term objectives. As a result, individual projects which are not part of any coherent plan have been announced and cancelled at regular intervals.

This surely raises significant issues, which must be of concern to every citizen, as to why this has occurred and, more importantly, why it is allowed to continue.

In addressing the Terms of Reference the Inquiry reached the conclusion, very early in its deliberations, that **the way public transport in Sydney is planned, managed and funded needs to be overhauled and reformed.**

Unless this is acknowledged and addressed, the malaise of the last decade will continue, punctuated by a few disconnected project announcements from time to time, and Sydney will continue to slip behind comparable cities in providing decent transport for its citizens.

The financial resources available for transport improvements are always going to be limited, so the Inquiry has paid particular attention to funding issues and options.

In particular, the Inquiry has seriously investigated the community's willingness to pay for real public transport improvements.

The Inquiry commissioned statistically sound market research, conducted and analysed by the Centre for Study of Choices at the University of Technology, Sydney, with a wide variety of propositions being put to a representative sample of 2,400 Sydney residents. Examples of these questions have been included in the *Final Report*.

This research revealed that people are prepared to pay additional, limited amounts for the certainty of realistic solutions delivered within a defined period.

A further important finding of the research was a very strong preference for any increased payments to be directed to public transport improvements, rather than further road building.

The Inquiry's strongly held view is that any system of increased payments that are merely fed into the existing arrangements of endless individual project announcements—without reference to a long-term plan derived from a genuine process of public consultation and involvement—will quickly erode public support.

In agreeing to propositions about increased payments, the public would *not* be expecting just more of the same sort of outcomes as those presented to them over the last decade.

There needs to be an acknowledgement that **the existing governance arrangements do not deliver a managed, fully integrated public transport system in Sydney**. The current pretence of integrating fares, while in most cases simply re-badging non-integrated fares, provides just one example.

Furthermore, unless there is **the certainty of dedicated funding sources**, in addition to farebox revenue and current levels of government funding, the public transport expansion, frequency and service quality improvements which are needed to match population growth will never eventuate, and Sydney will increasingly fail to take its place among the more liveable cities around the world.

The result will be a continuation and worsening of the congestion, general frustration and inefficiency which currently plague mobility and accessibility in the greater Sydney area.

Unless the reach and quality of public transport can be markedly improved, under a long-term plan with a strong focus on the next three decades but also, just as importantly, through continuous smaller improvements, starting immediately, private vehicle users will not be presented with a viable alternative.

The Inquiry believes that there is nothing more important or urgent than:

- **Genuine reform of the way the planning and management of public transport takes place** ("governance")
- **A long-term plan which is developed with real community input and has real certainty, backed by legislation,** *and*
- **Guaranteed, dedicated funding** for implementing the plan.

Without all three of these legs of what the Inquiry calls the "**Iron Triangle**", confidence in the way public transport is handled in Sydney will continue to erode.

The Inquiry has developed proposals for solutions embracing all three components of the "iron triangle". These solutions are not "ground breaking". Rather, they draw together approaches which have proved highly successful in comparable cities around the world.

Following the release of the Inquiry's *Preliminary Report* in February 2010, a new round of written submissions has been invited and received, many of them addressing specific aspects of that report, and a workshop has been held, involving a number of interested groups and individuals.

I wish to take this opportunity to thank all who have contributed to the Inquiry's deliberations. This includes the organisations and individuals who took the time to attend public meetings, provide written submissions, attend interview sessions and participate in the workshop.

I also wish to thank members of the Inquiry team for their various contributions.

In initiating the concept of an independent public inquiry *The Sydney Morning Herald* has provided a forum for the public and various stakeholders to participate in a public consultation process of a type and scale not normally available in this city.

What is needed now is exactly what these people have been telling the Inquiry.

They want a public transport plan which will meet their needs both now and in the future, a plan whose components can and will be implemented and a plan which they will be willing to pay for *because* it will happen and *because* it will meet their needs.

And they want our political leaders to listen, act and lead—and above all else, show some real foresight which transcends the electoral cycles.

Yours faithfully,

Ron Christie AM

Acknowledgements

The Inquiry has been fortunate to have the assistance of a number of persons with special expertise.

I wish to acknowledge the contribution of the Inquiry team. The team consisted of:

- Dick Day
- Innes Ferguson, formerly of Transport for London
- Garry Glazebrook, Senior Lecturer, University of Technology Sydney (UTS)
- Alex Gooding, Director, Gooding Davies Consultancy
- Roderick Simpson, Architect & Urban Designer, Simpson & Wilson
- Sandy Thomas, Managing Director, Catalyst Communications
- Jarrett Walker, Principal Consultant, McCormick Rankin Cagney
- Jim Wells, and
- Another person who has chosen to remain anonymous but has convinced himself he is "The Stig".

Most members of this Inquiry team generously donated their time and all contributed their particular expertise to the outcomes of this Inquiry.

The Inquiry has also had the benefit of reports commissioned by the Inquiry from:

- The Allen Consulting Group (funding advice):
    - Kerry Barwise, Director
    - Mayela Garcia, Manager
    - Ben Lodewijks, and
    - Angela Phang.
- The UTS Centre of the Study of Choice (CenSoC) team (market research):
    - Jordan Louviere, Executive Director
    - Terry Flynn, Senior Research Fellow
    - Stephen Bush, Lecturer, UTS, and
    - Karen Cong.

Assistance has also been provided by:

- Jana Milosovicova
- Mark Cole, and
- Benjamin Driver, Urban Designer, Hill Thalis Architecture + Urban Projects.

Secretariat assistance to the Inquiry has been provided by Jon Burton.

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Foreword

Why an 'independent' inquiry?

In Australia public inquiries without any government sponsorship or control are conducted only in very unusual circumstances.

More specifically, it is rare, indeed, for an inquiry into public transport in Sydney to be able to carry out its investigations and reach its conclusions with complete freedom and independence.

So it is important, at the outset, to stress this independence.

This Inquiry into Sydney's public transport system has been unshackled by the short-term political expediencies that bind all governments and oppositions.

Equally importantly, the Inquiry has also been able to operate free of any restrictions or agendas, either imposed or suggested, by the agency which established and has partly funded the Inquiry, in this case *The Sydney Morning Herald*.

The Inquiry and its expert advisers have insisted on having this complete independence, and it has readily been granted for all our studies and deliberations.

The government may not like what the Inquiry is recommending, because significant changes *are* being recommended.

But it is also likely that anyone (including journalists!) searching for "easy" negativity or criticism for its own sake will also be dissatisfied—because the Inquiry recognises that **the challenges Sydney faces in restoring and improving its public transport services are *not* "easy".** They are complex and difficult, the devil is often in the detail, and the community will need to make some very difficult decisions, inevitably involving trade-offs between competing community objectives and interests. In political parlance, there *will* be individual winners and losers, even when the community as a whole makes very large gains and even when the community as a whole strongly supports better public transport (as it does).

So two of the principal purposes of this *Final Report* are to present overviews of the Inquiry's analyses of these complexities and possible responses, trade-offs and solutions, and to encourage inputs to decision-makers from the whole of the community on how these issues ought best be tackled.

Community frustration, productive responses

The catalysts for this independent inquiry into Sydney's public transport system have included increasing community frustration about:

- The inadequacies of our transport networks
- A lack of consultation, leadership and direction
- Long-term underinvestment in our transport systems
- A string of broken promises and *ad hoc*, mutually inconsistent and increasingly unbelievable announcements
- An increasing resort to spin and hype rather than substance in these announcements and associated justifications for successive government decisions, and
- Perhaps most significantly of all, a pronounced absence of transparency in decisions which already affect people's everyday lives and will do so, more and more, for decades to come.

The 571 written submissions by individuals and organisations to the Inquiry overwhelmingly reflect these frustrations and exhibit a high level of community concern about Sydney's future.

But at the same time they have been overwhelmingly positive and community-minded in their suggestions for tackling the city's public transport problems.

Most of these submissions have focussed not on self-interest—for example, complaints about a specific local bus service or train service—but rather on much broader issues. Many have presented thoughtful and well-articulated concepts for transport solutions for the Sydney region as a whole.

For example, as might have been expected, many submissions have argued that the number one priority for expanding public transport in Sydney should be the extension of the rail network, in particular into northwestern Sydney. But it is noteworthy that this view was expressed in submissions from all over Sydney and beyond, with numerous individuals and organisations rating this specific project more highly than public transport or road projects benefitting their own particular area.

Community inputs

Immediately after the call for public submissions, the Inquiry held a series of public meetings around the metropolitan area, in Castle Hill, Liverpool, Parramatta, Kogarah, Kensington, North Ryde, Dee Why and central Sydney.

The Inquiry also met with a number of individuals and organisations who expressed a wish to elaborate on their submissions, and conducted a half-day workshop with representatives of key "stakeholder" organisations.

The large number of submissions meant that unfortunately it was not possible to meet with everyone who had suggested a hearing or meeting. The Inquiry therefore wishes to take this opportunity to thank all those who took the time to set out their ideas and to note that a number of submissions have been referenced in this report.

Back to the future?

There has never been a lack of plans and/or ideas to solve Sydney's public transport problems. Two of these plans were made available as supporting documents when the Inquiry was announced, and there have been many more, both before and since.

As the Inquiry's terms of reference make clear, the crisis in transport in Sydney needs to be addressed by much more than just a plan or a series of good ideas if we are to achieve an efficient transport system worthy of a world-class city and capable of meeting the massive population and employment growth, social, environmental, energy and global warming challenges of the future.

However, it is instructive to note that the Inquiry's commissioning last year coincided with the 100th anniversary of the presentation of the findings of another inquiry: the 1909 Royal Commission into the Improvement of the City of Sydney and its Suburbs.

In introducing their report, the members of that Royal Commission made the following comments:

> *"Such inquiry [was] to be made primarily in view of the present circumstances of the State and the present requirements of the city and suburban population; and, secondly, and independently, in view of the progress of the country, the extension of the metropolis and its suburbs, and the increase of population and traffic within the next 25 years; and to consider also the expediency of constructing such lines of railway and tramway as may be necessary to meet the increasing demands of traffic, of widening existing streets and of opening up fresh avenues of communication, and generally to make such suggestions as to ornamentation and improvements as will tend to add to the attraction and beauty of the city and adjoining suburbs."*

Their first recommendation was:

> *"The immediate introduction of a system of underground electric railways for city and suburban passenger traffic, serving the North Shore, the Eastern Suburbs, and Balmain and adjoining suburbs."*

The Report of the Royal Commission went on to add:

> *"The most urgent need of Sydney at the present time is an effective system of city and suburban railways. On this point the evidence is unanimous. The question to decide is as to what particular system would best meet the requirements of traffic and the convenience of the general public."*

After a series of false starts—again, what else is new?—Sydney introduced a sweeping array of major public transport works and initiatives. As a result, until about halfway through the 20th century Sydney's public transport system not only met the needs of its population but was the envy of many other cities around the world.

This system had several key elements, the most important being an extensive heavy rail system, serving most of the metropolitan area and designed specifically to provide direct access for rail travellers into the heart of the CBD of Sydney without requiring an interchange to a separate "metro" railway. Sydney also had

an extensive tramway system serving the inner suburbs and a comprehensive network of bus and ferry services.

> *"I believe that Sydney has the basics of a good system of public transport. This is mainly due to the work of past generations, including the building of an extensive railway system in the 19th and early 20th centuries, and the construction under Bradfield's direction of the City Circle underground railway, serving most parts of the City of Sydney."* (submission by Graham Hoskin)

Despite this good start, since the 1950s low-density urban sprawl and a rapid growth in motor vehicle ownership have led governments, over many decades, to pursue road-based rather than public transport solutions to Sydney's growing mobility problems.

In particular, there has been a heavy investment in radial freeways and tollroads as governments sought to meet the increasing demand for cars to access the CBD and other centres. More recently circumferential projects such as the Eastern Distributor and the M7 tollway have complemented this radial road network.

These road-based "solutions" have been at the expense of opportunities to significantly expand the rail network to serve the new urban areas and change the bus system to meet the needs of new areas. The tram network, once one of the largest in the world, was closed down and dismantled.

The pursuit of these road-based solutions, coupled with the lack of investment in public transport systems and urban expansion under a "North American model" favouring low-density environments with dispersed residences and jobs, has in turn supported—and in many areas actively necessitated—further growth in private vehicle use. In many parts of Sydney car dependence has been "locked in" by these approaches.

Notwithstanding these pressures, and in marked contrast with all other major Australian cities, Sydney still has a strong centre-based structure, with nearly 40% of the city's jobs and most of its major retail, educational and entertainment facilities being located within some 26 key centres.

For many years successive State governments have adopted planning policies emphasising the development of these and other centres within Sydney, including the CBD, Parramatta and major regional centres. This is best exemplified in the *Metropolitan Strategy,* released in 2005 and now under review by the government, although recent government employment forecasts have placed a greater emphasis on more dispersed employment growth and downgraded employment growth in centres other than the CBD.

What successive State governments have failed to appreciate is that the low-density roads-based model they have pursued is simply not tailored to, and often conflicts with, Sydney's centres-based structure.

As a result, a crisis has now overtaken the transport system. Increasing congestion, combined with a growing dispersal of jobs away from the centres, is adversely affecting both the efficiency of Sydney as a potential world-class city and the lives of many of its residents as they attempt to go about their everyday activities.

What people want—and are willing to pay for

Most of the submissions to the Inquiry have concluded that **the only solution is a long-term commitment, beyond electoral cycles and short-term political expediency, to an improved and expanded public transport system**.

People *want* public transport to be an attractive and competitive alternative to the private vehicle, especially for movements to and from the centres.

The submissions to the Inquiry have been reinforced by the findings of several market research studies commissioned by the Inquiry to gauge public opinion. As discussed later in this report, **these studies have not only confirmed the community's strong interest in and support for public transport improvements but have indicated a remarkably high willingness to pay for these improvements.**

The surveys suggest the community's highest priorities are improvements in peak period public transport capacity and the provision of more frequent services throughout the day, including weekends, followed closely by the long-deferred introduction of integrated fares and ticketing across all modes of public transport.

Many submissions have also highlighted this lack of integrated fares, and particularly the additional fare penalties for transferring between different public transport services, as being deterrents to the use of public transport and stumbling blocks to integration.

Another common theme in the submissions has been the desirability of extending light rail services in Sydney.

Core principles for the future

These and other community responses have informed the development by the Inquiry of a number of principles which have been incorporated into our consideration of priorities for improving Sydney's public transport system.

Sustainability

The most important of these principles is that **the public transport system should play a key role in the community's commitment to achieving sustainability**.

This underpins all the other principles adopted by the Inquiry. "Sustainability" can be expressed in terms of a "triple bottom line" of transport benefits and costs, encompassing:

- Economic factors, including all the ways in which transport contributes to economic activity and resulting prosperity and/or results in economic costs, such as through congestion, traffic accidents and resource and energy costs.
- Environmental factors, including all the ways in which transport can damage the environment and/or consume scarce resources, with particular attention to the benefits of more sustainable modes such as public transport, walking and cycling in providing less damaging, less resource-intensive and more energy-efficient alternatives. Among other things, these issues encompass greenhouse gas emissions, oil dependency, general air pollution and the localised impacts of emissions.

- Social factors, including all the ways in which transport provides accessibility and enables social contact and participation in Sydney's communities and economy, especially for persons disadvantaged by their income, age, disability, language ability or location.

Fairness and equity

Critical to social sustainability is **the need to develop a fairer and more equitable approach to allocating resources to the public transport system**.

While it is impossible for everyone to be provided with the same high level of service no matter where they live, it is clear that parts of Sydney—and in particular many outer suburban areas—are grossly underserviced.

This is exacerbated by a history of under-investment in public transport, and in particular rail infrastructure, in these areas, despite their continuing strong population growth.

As a consequence, this *Final Report* identifies three critical projects in outer suburban areas which should proceed as a matter of urgency, as described later in this foreword.

The principle of equity also needs to be considered in planning for access to the public transport system by the aged, people with disabilities, people on low incomes and other disadvantaged groups.

Associated with equity is the principle of **achieving the greatest good for the greatest number of people**.

This is a particularly important consideration in determining priorities for investments and ensuring the benefits of better public transport flow to those with the greatest need. It must over-ride issues of political convenience, which in the past have frequently distorted investment and service level decisions.

Transparency

A number of submissions to the Inquiry have stressed **the need for greater transparency in decision-making**.

"Transparency" means citizens can see how and why decisions are made, how and why they follow from other decisions that have already been made and how and why they are likely to affect future decisions.

In a well-functioning government, ministers and other politicians should concentrate on setting "strategic" directions and visions and establishing priorities for funding. It should always be clear precisely how these strategic decisions are based on the underlying values, goals and policies that influenced voters to elect the government in the first place.

More "tactical" decisions may be made at lower levels, but again it should always be possible for citizens to see how and why the tactical decisions follow from the strategic ones.

Certainty

Another common theme in the submissions has been **the need for greater certainty in the transport planning and implementation process**.

Individuals and families make important decisions about housing, child care, education and many other factors on the basis of the government's transport plans

All promised ... but "indefinitely deferred", cancelled or quietly dropped

Epping-Parramatta rail link • Hurstville-Strathfield rail link • Fast rail links to Central Coast/Newcastle and Wollongong • CBD light rail extension • North West Rail Link • South West Rail Link (now promised all over again) • New Redfern-St Leonards CBD heavy rail link (now promised all over again), including a new rail Harbour crossing (now deferred, yet again, for at least 25 years) • Several of the most important *Clearways* projects, including extra tracks on the Richmond and Illawarra lines • St Leonards-Chatswood rail quadruplication (now promised all over again) • Major upgrading and modernisation of Town Hall station, including major fire and life safety works • North West Metro • Epping-Top Ryde-CBD Metro • CBD Metro • West Metro • Integrated ticketing (now promised all over again) • ...

and promises, just as businesses, both large and small, determine where they are going to invest on the basis of these plans and promises.

Although governments can specify the scale and form of development in a particular location, this development will actually occur only if the private sector considers it a worthy investment. This in turn requires confidence in the government's plans for public transport infrastructure and services.

Obviously, the repeated practice of announcing and then cancelling, curtailing or "deferring" projects needs to end.

Cities with more disciplined planning systems typically announce projects less frequently than Sydney, but they deliver the projects they announce.

Greater certainty in infrastructure provision is also needed to ensure an orderly improvement in service delivery and to avoid fragmentation resulting from incomplete transport projects.

Increased and guaranteed funding

In turn, certainty in infrastructure provision depends on **the development of a long-term strategy to ensure stable and secure long-term funding is available for public transport**.

This strategy should deliver funding for improvements in a timely manner over a long timeframe, rather than the current *ad hoc* project-by-project approach.

Substantial improvements in infrastructure provision will also require **an increase in the average annual levels of funding**. This *Final Report* presents realistic, equitable, efficient and affordable strategies to achieve this increase, under which the transport plan would be supported by dedicated ("hypothecated") funding to match the projected improvements.

The Inquiry has concluded that **any transport plan which does not incorporate guaranteed funding mechanisms is bound to fail**. The locking of funding into the transport plan is particularly important for infrastructure projects which aim to provide benefits well beyond the period of the plan—in many cases, for three or more decades—but which will be designed and built over a period of some years.

Continuous improvement

Certainty of funding is also essential to achieve **continuous improvement in public transport service delivery and integration**.

This includes, but is not confined to, service frequency improvements, journey time improvements, the introduction of new services and improvements to interchange facilities.

A strong emphasis on continuous improvement recognises the obvious fact—frequently disregarded in past announcements of metros etc—that **a public transport system which meets today's needs and future needs *has* to build on the very considerable public transport assets which already exist.**

Priority for public transport

Market research conducted on behalf of the Inquiry indicates most people in Sydney understand this and express **a clear preference for any additional funds which become available to be used to improve public transport services rather than roads**. Importantly, and perhaps surprisingly for some, this has been found to be the majority view among infrequent public transport users as well as among regular public transport users.

The funding proposals set out in this *Final Report* indicate it is possible to fund a 30-year plan incorporating the priorities recommended in the report. However, the order in which this expansion of the public transport system takes place is critical if benefits are to flow to the areas of greatest demand and greatest need. This also affects the cashflow assumptions in the funding model.

"Locking in" public transport plans and dedicated public transport funding

All of these factors reinforce **the need to "lock in" the public transport plan in legislation**. This *Final Report* sets out proposals for mechanisms to do this, with regular community reviews of the plan to ensure its continued relevance and effectiveness in meeting Sydney's needs.

This *Final Report* describes a range of possible funding sources, but the Inquiry does not recommend any one particular option. Decisions on this issue are properly matters for the government.

Importantly, however, and **whatever the funding sources, they will need to be dedicated to the approved public transport plan** to ensure certainty for the public, transport authorities and service providers and the future of investment in NSW.

The Inquiry also recommends that the public should not be asked to pay more, if this is a necessary part of gaining an improved public transport system, simply on the basis "trust us" promises to spend the additional funds on public transport projects in the future. **The amounts and timing of these increases should be linked to actual expenditures on specific public transport improvements**, through mechanisms such as those described later in this *Final Report*.

Connectivity and integration

Improving connectivity is another key principle in improving the public transport system.

Nobody likes to get off one vehicle and onto another, but connections are an unavoidable part of every great public transport system in the world.

Connections are inevitable for three reasons:

- Passengers coming from low-density outer areas, where buses are the only viable service, will often need to shift to trains in order to efficiently reach major employment centres such as the CBD.
- Sydney's multiplicity of employment, education and commercial centres means that the city needs a multi-destinational network and not one focussed just on the CBD.

  It is simply not possible to run direct services from everywhere to everywhere else, so the only effective approach is to provide an integrated network of services that work together via efficient connections.
- Increasingly people undertake a number of tasks on the same trip, such as dropping children at school on the way to work or picking up shopping on the way home.

  This means that public transport must have strong connections with other modes such as walking, cycling and taxis. The system must also provide adequate "park and ride" and "kiss and ride" facilities at interchanges, to offer a range of mobility options reflecting the diversity of the population and the complexity of the trips they make.

The importance of connectivity also underpins another principle: **public transport should enable passengers to plan and undertake integrated, seamless journeys to their destination, instead of having to negotiate a series of poorly connected separate trips**.

In addition to good connectivity and transfers, this requires **accurate and timely provision of good information, integrated timetables and above all an integrated fare and ticketing system**.

These issues are all addressed in detail in this *Final Report*.

Interchanging and other service improvements

In order to improve connectivity and achieve better journey integration there must also be **improvements in the design and location of interchanges**, both large and small, to ensure that changes between services, operators and modes can always be achieved quickly and easily.

In some cases this may be as conceptually simple as ensuring bus stops and shelters are located close to the intersections of roads on which bus services are used by transferring passengers, instead of at mid-block locations dictated by the priority currently given to private vehicle movements at these intersections.

In other cases there will be opportunities to provide additional community and commercial facilities at interchanges, so passengers can, for example, buy a newspaper, drop off dry cleaning, visit a gym or pick up children from child care. The major interchanges could become iconic attractions in their own right, as important community meeting places; Melbourne's remodelled Southern Cross station and London's St Pancras station, the UK starting point for high-speed services to Europe, are good examples.

These types of improvements to interchanges are but one example of how, with better planning, public transport journeys can be better utilised. Other opportunities can be provided for longer distance commuters, particularly those travelling by train. Operators of similar services overseas often provide wi-fi and

laptop and phone charging facilities for their customers, either at low cost or as part of a premium package. Longer distance trains in Switzerland provide special facilities for children, and many longer distance commuter services provide on-board refreshments.

In short, properly designed public transport can often provide greater convenience and comfort than the private car.

Commuters living outside the Sydney suburban system often face daily journey times of up to three hours. If they could access a "mobile office" carriage fitted with appropriate facilities this time could form part of their working day, allowing them to travel later in the morning and return earlier. Overseas experience suggests employers might well be encouraged to contribute to a premium fare for these facilities as a means of reducing employee fatigue and improving their productivity.

As already indicated, a fundamental principle of any public transport improvement strategy should be **investigating how to make the existing system work better**. Sydney has serious infrastructure needs, but it also already has infrastructure that could be put to better use. Higher frequencies on bus, rail, ferry and light rail services, for example, would attract more riders and help to get better value out of the existing infrastructure. Although many routes are now near capacity in peak periods, there are still significant opportunities to **increase capacity and service frequencies at off-peak times** and thereby encourage customers who can travel off-peak to do so.

A plan to **decrease journey times on selected rail corridors** represents another opportunity for better use of existing the existing network, as faster services increase the system's capacity and attractiveness.

This *Final Report* suggests a suite of improvements of these types which can be implemented now and should not be neglected while pursuing the longer term projects.

Responding to a forecast massive increase in Sydney's population

Whatever the improvements able to be extracted out of the current system, **any public transport improvement strategy also has to respond to population changes. The most pressing of these changes will be population growth.**

While experts disagree about the size of Australia's future population and the desirability of high rates of growth, Sydney's population is likely to reach six million people within 30 years—almost 40% more than now— and could reach seven million by the middle of the 21st century, making Sydney larger than any European city other than London, Paris and Moscow.

It is important to note that a significant portion of this growth will come from natural increase and that neither the birth rate nor the level of migration can easily be controlled by state governments. Further, no new major cities have been established in Australia since Canberra 80 years ago, and the proportion of Australia's population living in its capital cities has increased rather than decreased in recent decades—so there is no realistic alternative to significant further increases in Sydney's population.

Some of the policies and strategies required to accommodate this growth, including continued suburban expansion and significantly increased densities in

established areas, may be unpopular. Whatever the policies adopted, however, they will need to be supported by the public transport system.

This means Sydney's public transport improvement strategies have to be able to:

- Deal not only with "catch-up" measures addressing the under-investment in transport infrastructure for current population levels but also with very high levels of future population growth, and
- Cater both for extensions of the public transport system into outer areas and for significant enhancements of the system in inner areas.

This *Final Report* presents options for public transport developments of both types under two different population and employment growth and distribution scenarios, as described later in this foreword.

Responding to the ageing of Sydney's population

One important contributor to growth is the population's **increasing life expectancies**. Australians are living longer, and cities such as Sydney will need to adapt to meet the needs of older residents, especially those in heavily car-dependent areas with limited public transport and/or limited local shopping facilities and other services.

Responses to ageing will need to encompass a spectrum of strategies as detailed in different parts of this review. Obviously, public transport infrastructure needs to be made more accessible for the aged and people with mobility impairments or disabilities. Community transport services will need to be expanded for people who cannot drive or access regular public transport, and the facilities and institutions that serve ageing clients need better tools for deciding where to locate, so they can choose places where efficient and accessible public transport is provided or planned.

Choosing the 'right' transport modes and technologies

Another important principle adopted by the Inquiry is **identifying and implementing the transport mode or technology best suited to each particular transport task**.

It is very clear that unless this principle is applied to Sydney's transport planning, congestion problems will continue to increase.

For example, even if it were assumed that private vehicle travel will continue to be as viable and affordable as today—notwithstanding the likely unsustainability of this approach in the face of the need for much greater energy efficiencies, linked to curbs on greenhouse gas emissions and/or potential oil price rises and/or oil shortages—adding to or extending Sydney's radial freeway and tollroad system would be an expensive way of providing *at best* very short-term and geographically limited improvements.

As has been demonstrated repeatedly, both in Sydney and in other major cities around the world, the additional private vehicle traffic inevitably induced by this approach would further increase congestion in and around existing centres as these vehicles competed for scarce road and parking space.

This pattern of road-based "solutions" rather than public transport investments has also caused, and would continue to cause, a movement *away* from public

transport, reinforced by deteriorating service frequencies, service qualities and travel times and even the cancellation of off-peak services. It would also make it more difficult to find essential space for cyclists and pedestrians.

This type of downward spiral can be arrested only by an unequivocal commitment to improving public transport rather than continuing road construction, especially for movements to and from Sydney's centres.

It is foolish in the extreme to hold out hope that continued road development will somehow fix the problems of the past, let alone cater for the population increases expected over the next 30 to 40 years.

The authors of many submissions to the Inquiry have reached the same conclusion. While some submissions have advocated arterial road improvements in low-density areas away from the centres, only one, out of 571, has advocated reorganisation of the radial tollroad and freeway system as a sustainable solution to Sydney's transport challenges.

Road improvements will continue to be important for particular types of low-density, cross-regional and freight distribution tasks, but *not* for movements of people more generally and, in particular, not for movements of people to and from Sydney's centres.

Commitment and expertise

The fact that public transport in Sydney provides as good a service as it does—notwithstanding all its faults—is a tribute to the efforts of the people who have worked, and continue to work, to provide what is, for the most part, a necessary and important public service.

The Inquiry received submissions from many public transport employees and from the Rail, Tram and Bus Union. Their analyses and suggestions demonstrated a real depth of collective knowledge built up over many years, and there is no doubt that many employees quite rightly see themselves as providing a valuable public service.

They, like many others in the community, are now looking for a commitment to a plan for a truly integrated public transport system for the future, developed to the level at which it becomes a viable travel option for the community.

Cities which have put their trust in road-based solutions to transport challenges have tended to lose the "know how" to run public transport, not only on a day-to-day basis but also for large events involving complex transport movements and the planning and implementation of both continuous and longer-term improvements.

Commitment and certainty of public transport development are essential if public transport is to attract and keep dedicated employees. In addition, given the needs for innovation, new technologies and continuous improvement, public transport organisations have to be able to attract the "brightest and best". So recognition of the importance of building up and retaining corporate knowledge is a vital component of any transport plan.

Sydney's transport demands will not be met by promoting one form of public transport over another. Instead, there will need to be close collaboration between future land-use planning and planning for the most appropriate form of public transport for each given corridor and destination.

To achieve this, assumptions will need to be made about **the future forms of Sydney's development**.

To assist in understanding the challenges that Sydney faces, **the Inquiry has examined three possible scenarios with different assumptions about where the projected 50% increase in population by 2040 might be housed and where the city's new jobs might be situated**.

Each of these scenarios should be regarded simply as a hypothetical illustration and not as a definitive or recommended outcome.

One of these scenarios, a so-called **"US" scenario**, assumed 60% of the population increase would be housed in existing urban areas and 40% in new areas. Overseas examples of this style of development include Los Angeles and Houston.

Although the Inquiry has tested the "US" scenario for comparative purposes in its analyses of possible transport infrastructure funding approaches (Chapter 5), it has decided to discard this model as unsustainable and impractical for two reasons: it would rely on a large component of new land release development in areas which are yet to be identified, and it would fundamentally assume a road-based "solution" suitable only for low density areas where centres are less developed.

In effect this option has already been tried and found wanting. Given the scale of the projected population increases, its time has already passed.

Two other hypothetical models have been examined in much more detail:

- A so-called **"East Asian" scenario**, with about 78% of the forecast population increase being housed in existing urban areas, both in existing centres located on the heavy rail network, especially in inner Sydney areas, and also around new centres in existing urban areas which would be primarily served by an extensive "metro" system. (The differences and similarities of "metro" and other rail systems are described later in this report.)

  Under this scenario only 22% of the forecast population increase would be housed in new urban areas, and a high proportion of new jobs would be located in Sydney's CBD and surrounding inner urban areas.

  This scenario would see the development of strings of high rise clusters along the new metro lines. It mirrors many features of the latest population and employment growth and distribution assumptions of the State government, with a strong focus on the CBD and much less of a focus than previously—for example, in the 2005 *Metropolitan Strategy*—on growth in other centres such as Parramatta.

  Overseas examples of the "East Asian" style of development include Hong Kong and Singapore.

- A **"European" scenario**, more closely following the land-use patterns of cities like London and Paris.

  This scenario assumes a continuation of the government's previous *Metropolitan Strategy* "centres" policy, with about 72% of the forecast population increase being housed in existing urban areas and 28% in new areas.

  While employment in the CBD would continue to grow, this scenario also assumes strong employment growth in other centres, particularly Parramatta and Macquarie Park and the southwestern centres.

  The significance of this scenario is the fact that Sydney's heavy rail network already serves most of Sydney's centres, although there is a need for improved capacities, greater service frequencies, reduced travel times and improved interchanging as described above.

  The role of any proposed "metro"s under this scenario would be to provide services in areas not already served by heavy rail.

  Several extensions to the heavy rail network itself would also be required to service existing and future centres of activity, which would need to be supported by greatly enhanced cross-regional and fast bus services in outer suburbs.

  This scenario would see the development of a few high rise centres around existing rail hubs and a larger area of moderate density, ranging from terrace-style housing to five-storey apartments, supported by an expanded light rail and high-frequency bus network.

As discussed in Chapter 3 of this *Final Report*, the metro-dominated "East Asian" model would necessitate a concentration of expenditure on public transport projects serving old established areas in the eastern half of the metropolitan area, especially around the CBD, which have already benefited from considerable investments in public transport.

Because only finite funding would be available under any realistic scenario, this inevitably means areas in western and north-western Sydney with little or no public transport would continue to be denied adequate public transport for at least ten years.

For example, even attempting to construct a North West Rail Link by 2020 while the "East Asian" model's initial "metro" system was being built would almost double the requirement for additional public transport funding between 2013 to 2017, compared with the funding increases required for the "European" model's alternative of extending and expanding the capacity of Sydney's heavy rail system as a first priority and then commencing the construction of a metro system only after this heavy rail "backlog" has been overcome.

The "European" model is the model most compatible with the government's current *Metropolitan Strategy*, released in 2005.

But in the light of the government's recent priorities, pronouncements and forecasts it is certainly reasonable to ask whether, despite all its rhetoric about Sydney's being a "city of cities", the government has quietly walked away from the 2005 *Metropolitan Strategy* in favour of an "East Asian" model for the future development of Sydney.

If the government has done so it may well not have realised what it was doing. But regardless of whether the change has been deliberate or inadvertent, it has

been made without any prior consultation with the community and without any hint of transparency about the government's decision-making processes.

Perhaps the government is pursuing a policy of "a little of both"—a policy that all too often can lead to the worst features of each.

Heavy rail and 'metro' priorities

The preferred 30-year public transport plan recommended in this *Final Report* is a plan developed by the Inquiry for the "European" model of the development of Sydney over this timeframe.

This plan focuses on improving connectivity to the existing system. As a result—and in contrast with some of the government's major announcements over the last couple of years, such as a "CBD metro" which, had it been implemented in its then-proposed form, would forever have stymied future major improvements both to the existing heavy rail system and to any future wider metro network—the Inquiry's plan **places a high value on the significant investments already made by taxpayers in this system**.

At the same time, the Inquiry has also identified short-term measures which would immediately improve the services offered by the heavy rail system, with improvements to capacities, travel times and frequencies in the peak periods and, in particular, much improved frequencies during off-peak periods.

Because the heavy rail system already serves the so-called "global arc", from Macquarie Park to the Airport via Chatswood, St Leonards, North Sydney and the CBD, as well as Parramatta and most of the other major "centres" within Sydney, it makes sense that for the highest priority to be placed on improving this system. This was an overwhelming sentiment in submissions to the Inquiry.

This should commence with the construction, from 2011, of the **North West Rail Link** from Epping to Rouse Hill, eventually linking with the Richmond line, to provide an east-west connection across northern Sydney through major employment centres at Norwest, Macquarie Park, Chatswood, Syt Leonards and North Sydney and eliminate the need for many of the bus movements which currently clog the Harbour Bridge and the CBD.

Another high-priority project, which should also be built from next year is the first leg of the **South West Rail Link** from Glenfield to Leppington. The Inquiry supports the State government's recent decision to recommence this project, although faster construction should be feasible.

The next priority—and an absolutely vital one if Sydney's heavy rail network is to be able to cope with forecast future increases in patronage demand—is an immediate start on the design and construction of **a new heavy rail line through the CBD, including a second rail harbour crossing**, not only to serve the new North West Rail Link, South West Rail Link and Parramatta-Epping rail link but also—much more fundamentally—to provide essential additional capacity on all heavy rail lines, especially those serving Sydney's west and south west.

Without this additional link into and through the CBD, providing essential congestion relief in inner Sydney, the capacity of most parts of the existing heavy rail system would be able to be increased only by relatively small margins, rendering it quite incapable of adequately serving the patronage demands forecast over the next 30 years.

Depending on how this crossing is built, it could also enable a new rail link from Central to the south east, serving the Moore Park facilities, the University of New South Wales and Maroubra Junction, as well as a new north east connection, from the lower North Shore to Dee Why.

The Inquiry has examined the need for and benefits of a new cross-CBD, cross-Harbour rail link in some detail, especially because the NSW government's latest *Metropolitan Transport Plan, Connecting the City of Cities*, released on 21 February 2010, proposes no such link and instead proposes a very expensive (but on the Inquiry's analyses largely ineffectual and massively disruptive) extension of an existing stub line into Sydney Terminal station north to Wynyard station. The relative merits of these concepts are discussed in this *Final Report*.

The Inquiry has also identified an engineering option for this new harbour crossing utilising a new route under the CBD and the spare structural capacity of Sydney Harbour Bridge. If proved viable, this option would cost much less than the options previously identified by the government, while providing superior connectivity benefits.

Another "missing link", also regarded as a priority, is a revised form of the previously proposed **Parramatta–Epping rail link**, with a direct connection for services to and from Liverpool, better connections at Parramatta and a much faster alignment. This would complete the linkages on the "global arc" and provide direct access for people from the south and south west to access Parramatta and jobs on the global arc.

All of these heavy rail priorities (other than the south east and north east connection options) should **precede the construction of any new and separate "metro" railway system**, which should only be contemplated once these extensions to the heavy rail system, and their associated operational, infrastructure and rolling stock changes, have been designed, developed and fully funded and their construction is both guaranteed and underway.

Any earlier start on a separate metro system would inevitably divert scarce funds from the urgent priorities highlighted in this report.

In addition, as already indicated, the construction of a "CBD metro" in the form previously proposed by the government, with small stations suitable only for short trains along corridors previously reserved for future heavy rail lines and without any clear overall metro network plan, would have seriously limited essential major improvements to the existing heavy rail system and, in the longer term, handicapped the development of a soundly based, effective metro network that will need to provide adequate capacity for a city with a much higher population and employment density than today.

Bus, light rail and ferry priorities

In line with its emphasis on improving the connectivity of Sydney's public transport system the Inquiry is recommending, in this *Final Report*, a series of **substantive changes to the way bus services are provided and routed throughout Sydney**, including:

- Much more frequent services on a "grid" rather than just a CBD-focussed radial basis, thereby reducing journey times while also reducing bus congestion within the CBD

- The introduction of prioritised circumferential bus services on several defined routes around the Sydney region
- Improved interchanges, and
- As an essential prerequisite, the introduction of an integrated and greatly simplified fare system, eliminating the fare penalties associated with interchanging and significantly improving the viability and attractiveness of any new (and long-promised) integrated ticketing system in Sydney.

The Inquiry is also recommending, in the short term,

- Two options for **extensions of the light rail system into the CBD**, serving both the central CBD "spine" and the western/Barangaroo corridor, followed by a gradual replacement of bus services by light rail on several CBD radial routes with the heaviest demand and the introduction of light rail services to Dulwich Hill and in western Sydney, and
- Improved bus-ferry connections and an examination of improved ferry service frequencies and new frequent ferry services, potentially using smaller vessels.

Efficiency improvements

Sydney's public transport system needs to be more efficient, both in terms of its financial returns on expenditure and in its achievement of outcomes such as performance improvements and increases in patronage.

The funding proposals in this *Final Report* assume there will be efficiency improvements to existing systems. *All* stakeholders need to recognise that reductions in the operating costs of existing public transport across all modes, but in particular the rail system, are essential if any improvements are to be able to be funded.

This raises an issue discussed below, the importance of robust governance, with an independent authority being able to pursue efficiencies (such as, for example, one-person train operations) free of political influence.

Such an authority should match efficiencies with service improvements and be able to demonstrate to the public, and convince the public, that the trade-offs are in their best interests. As part of this process, if it had the freedom to contract with operators for the provision of services, as recommended in this *Final Report*, it could seek competitive tenders for the operation of heavy rail and metro services, along with bus, light rail and/or ferry services, if it is considered this would improve the quality of these services.

Governance

Implementation of these changes will require vastly improved management of the public transport system.

The Inquiry has been asked to recommend the most appropriate governance arrangements, and without doubt this issue is the most important issue addressed this *Final Report*.

As discussed in Chapter 2 of this report, no matter how visionary a public transport plan might be it will succeed only if it is supported by a strong management structure committed to its long-term implementation.

This management or "governance" structure must be able to:

- Secure the resources required to deliver the infrastructure underpinning the plan
- Be strong enough to maintain a commitment to the plan in the face of all the inevitable short-term political considerations
- Manage the whole public transport system cohesively and with authority, and
- Obtain enough funding to deliver both the necessary infrastructure and a high level of services.

The governance structure must also be prepared to champion public transport and other sustainable modes in the face of competing priorities and interests, including the demands of private vehicles.

If the governance system were inadequate even the best possible and most widely supported public transport plan would be unlikely to be delivered, critical infrastructure would not be built, services would continue to be poorly integrated and service provision would remain patchy and unreliable.

These views have been echoed in a number of the submissions to the Inquiry.

The submissions discussing alternative structures all favoured the creation of a single authority to plan and manage all forms of public transport in Sydney.

There were differing views on the form this body should take, with some favouring a body with land-use as well as transport planning responsibilities, but most favoured an entity focussed primarily on public transport.

In addition to responsibilities for funding and project prioritisation, most of the submissions saw the integration of public transport services as a key role for this body.

In this context, the Inquiry has briefly examined recent changes to transport governance in NSW, including the new Department of Transport and Infrastructure, which is intended to "deliver integrated transport planning and service delivery, and consolidation of like-functions [sic] to reduce costs and provide additional funds for front-line staff and services."

The Inquiry has concluded that it is unclear whether this new structure, for which draft formalising legislation has only just been introduced, will really be able to challenge the existing road and public transport authority "silos" by integrating public transport services effectively and by prioritising public transport infrastructure against competing demands for new roads.

Further, even if they were to improve integration, the new arrangements could well increase rather than reduce the risk of excessive political micro-involvement in transport management, because they continue to permit and facilitate this micro-involvement—without any real public transparency about the directions and decisions that are being imposed—and because RailCorp has been brought back under direct government control.

After considering the views expressed in the submissions and examining examples of "best practice" integrated systems in other countries, **the Inquiry recommends the creation of an independent transport co-ordination authority, *Transport for Sydney*, to plan and produce an integrated public transport system that meets both Sydney's immediate needs and its projected needs in the future.**

Transport for Sydney would not be a transport operator, but would instead purchase competitively tendered transport services from various operators in all modes of public transport, both public and private, with the objective of producing a seamlessly integrated system.

It should be emphasised that in recommending this approach—which reflects the principles of contestability already adopted by the government in its 2005 reforms of bus service contracting in Sydney—the Inquiry is *not* supporting either simple-minded privatisation or the equally mindless long-term handing over of control of vital public transport assets, service delivery standards, other operational standards and fares etc to the private sector under so-called "public private partnership" arrangements, such as those adopted by the government for the Airport Line's stations and the previously proposed CBD and western metro lines.

The Inquiry has gone to some lengths in this *Final Report* to specify not only the proposed responsibilities of Transport for Sydney and the preferred representation on its board, but also **the distinct and separate roles of Transport for Sydney and the State government**.

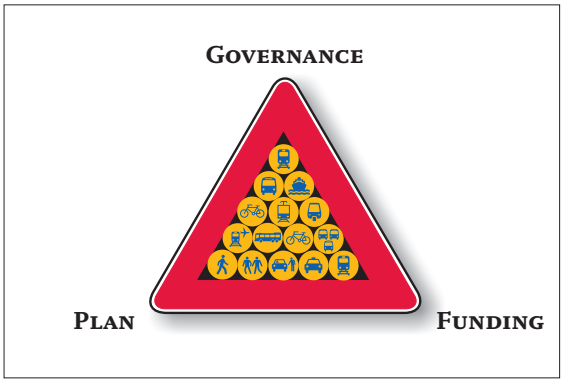
It will be important for the new structure to dispel the fiction that the Minister for Transport can effectively manage the transport system on a day-by-day basis and act as an instant expert on all public transport operational, planning and infrastructure matters. Public accountability for daily management must rest with Transport for Sydney, which will need to display a high degree of visibility, transparency and responsiveness, particularly at the CEO and chairperson levels.

Putting it all together: **an 'iron triangle'**

On the basis of its investigations described above, the Inquiry has concluded that significant progress in providing Sydney with a world-class public transport system will occur only if:

(1) There is a complete overhaul of **public transport governance**, fundamentally changing the ways Sydney's public transport is planned and provided.

(2) The development and delivery of public transport services are **planned with a high degree of certainty of implementation**, through:



- **A long-term *Public Transport Network Plan for Sydney***, developed and periodically updated through transparent statutory processes with significant and real community inputs to achieve high levels of consensus and then entrenched through legislation to protect it from short-term politically motivated interference, and
- Within the context of this plan, and in addition to the longer-term and major projects, **continuous shorter term improvements**, including major reforms to public transport fare structures.

(3) These plans and their implementation are backed by **certainty of funding,** with identified, reliable and committed sources of funds *dedicated* to public transport service quality and infrastructure improvements and expansions.

All three of these "Iron Triangle" elements are essential. Past experience in Sydney, and the Inquiry's examinations of practices in other countries, show that a concentration on only one or two of the elements, while neglecting or downplaying the other(s), *cannot* yield the required improvements.

And in conclusion...

Producing a thirty 30-year plan for Sydney's public transport has been made more complex by the need to take into account the ongoing effects of past decisions and investments.

In many cases these investments in existing systems have occurred over many years and involved large amounts of taxpayer dollars.

The public expect that a plan for public transport spanning three decades will take advantage of whatever technological advancements become available over that time scale.

Equally, they rightly expect that the systems they have already invested in will be operated to meet their expectations and expanded to meet the needs of increasing proportions of the population.

With these expectations in mind, the Inquiry believes this *Final Report* provides a basis for achieving a quality public transport system for Sydney.

The aim is to provide, for very rapidly increasing numbers of people, the ability to choose a quality public transport system for many of their repetitive journeys—as well as their less frequent journeys—in preference to the private vehicle.

This is not to say that there won't be cases where the private vehicle will be the only practical means of transport. It will always be necessary to provide for the needs of commercial vehicles and the movement of much short-distance freight by road. However, unless a significant and continuing mode shift from the private vehicle occurs in large areas of Sydney, the effects of road congestion on the quality of life, together with the cost of transport inefficiency, will be a burden on every citizen.

In summary, this report addresses the changes the Inquiry believes are necessary in the way we plan, decide and execute public transport improvements.

It has been said many times there is no gain without pain. Some of this pain is occurring because our existing public transport systems have not been expanded as people have moved into newer areas and capacity has not increased quickly enough. Therefore, by necessity, much of any 30-year plan has to deal with a *backlog* as a first priority.

The pain also results from the fact that the achievement of a quality public transport system over the next three decades must come at a cost. Nobody likes paying extra for things, but this report makes the point that **provided the community can see tangible improvements *the community is willing to pay* and there *are* ways to fund a world-class, integrated system within most people's lifetime.**

The decision on whether the benefits are sufficient to justify the additional cost to the community is one which can only be made by the present population. And it is clear that decision will be made, in a very real sense, on behalf of future generations.

Nine themes in an Inquiry

Nine themes have consistently emerged in the 571 public submissions to the Inquiry, in the market research commissioned by the Inquiry and in the Inquiry's own deliberations:

- *We have tried the "do nothing" option for public transport. It has failed.*
- *We need a complete public transport network plan and an agency that can deliver it.*
- *A three-legged stool: urban form, pricing and transport.*
- *Public transport, not just roads.*
- *the need for a single, seamless public transport network.*
- *Cost-effectiveness.*
- *Short-term urgency and continuous improvement.*
- *The need for long-term commitment, now.*
- *Leadership, transparency and consultation for the hard choices that will have to be made.*

Theme 1:
We have tried the 'do nothing' option for public transport. It has failed.

Over the last two decades, NSW governments from both major parties have published plenty of glossy documents about their public transport "plans"—but behind this façade they have essentially attempted to defer, ignore or deny the need for the government to lead the development of public transport services and infrastructure in Sydney.

For example, since the opening of the Eastern Suburbs Railway in 1979 only five segments have been added to the suburban rail network, and one of these, the Airport line, relied on private sector construction and operation of its stations, leading to excessive fares and thus preventing the city from making the best use of this important infrastructure.

This recent history has now produced a spectacular public transport infrastructure deficit, placing Sydney well behind comparable cities in Europe, Asia and in some cases even North America.

Within Australia even Brisbane and Perth have moved ahead: recent major infrastructure projects such as the Brisbane busway network and Perth's new Mandurah rail line are on a scale that Sydney no longer even attempts.

Sydney needs to return to the path that "best practice" cities have all followed: one where government has a leading role in planning and building public transport infrastructure and in funding its operations.

No comparable city has ever found a cheap solution to the complex problems of public transport. Instead, they have recognised the fundamental role of public transport in the success of a city, and have invested in it accordingly.

A new approach to funding public transport is needed, one which fully values the unique ability of public transport to support growth in Sydney without the additional sprawl and congestion that growth would otherwise imply.

An effective long-term public transport network services and infrastructure plan will have a substantial long-term funding requirement, especially in the light of the current infrastructure deficit.

Surveys commissioned by the Inquiry have revealed a readiness to consider new ways of funding public transport so as to accelerate its development. The necessary funding sources should be included in legislation implementing the plan.

The funding sources for implementing Sydney's long-term public transport network plan will need to reflect the wide range of beneficiaries of public transport, including but not limited to those who travel on public transport.

Successful cities of Sydney's size see public transport not just as a product or service to be sold to customers, but as an essential support for the city's social, economic and environmental vitality and an expression of its character and values.

Theme 2:
We need a complete public transport network plan— and an agency that can deliver it.

Over the last decade or so systematic public transport planning in Sydney has gradually been replaced by a project-by-project "grand announcement" approach that

is both failing to deliver these projects and failing to develop a coherent network.

In recent years, following its failure to deliver almost all of the public transport projects announced in plans released before the Olympics—in marked contrast to a steady rollout of their tollroads—the government has seemed so desperate to show progress in public transport that it has taken to repeatedly announcing individual projects before they have been clearly thought through, only to withdraw them when a new idea arises.

A better approach is to take the time to plan the entire public transport network and fully engage the public in the decision-making process, so that the conclusions are widely understood and thus have some political resilience.

Sydney's transport network has major implications for its urban form, and *vice versa*. So both must be discussed and widely grasped as the transport network is being planned.

A successful *Public Transport Network Plan* is not just a prioritised list of projects or lines on the map. It is an achievable, fundable vision for the city in its transport dimension, one that attracts broad support, excitement and resolve.

Developing and delivering such a plan requires a bit of distance from the daily pressures of the news cycle. The Inquiry has reviewed many options for governance in this *Final Report*, and has observed that **the most successful structures have included a semi-autonomous authority responsible for public transport**. Elected governments create this authority, define its mission, secure its funding and measure its outcomes, **but they do not micro-manage it**.

Theme 3: *Integrating urban form, pricing and transport*

In imagining the transport future we want to see for Sydney and the goals we want it to serve, it can help to visualise this future as resting on a stool with three legs: the city's urban form, transport pricing and transport infrastructure and operations.

The transport environment of any major city depends very heavily on the relative convenience of private vehicles and more sustainable transport modes, with the latter category including public transport.

Increasing the "convenience" of public transport is not solely a matter of public transport planning and operations. Rather, it emerges from three major groups of policies:

- **Urban form.** The physical form of the city determines how far people have to go to do the things they need to do. These distances, in turn, determine whether each trip can be made by walking or requires some kind of vehicle.

  "Urban form" also encompasses urban density, a dominant variable in determining whether public transport can be more viable than the private car.

  Responsibilities for Sydney's urban form lie largely with the Department of Planning and local governments, although of course private decisions about where to locate drive the markets that determine how the city is built.

- **Pricing.** Decisions about how to travel depend heavily on pricing.

  The elements of pricing under some form of government control include fares, parking charges, road tolls and taxes.

  The relationship between the cost of making a trip by public transport and the cost of driving can do much to determine the outcome. If public transport fares are complex this can also discourage patronage.

- **Transport infrastructure and operations.** The policy area of "transport", as usually understood, encompasses investments in transport infrastructure and the operation of transport services. In Australia, this function is usually divided between "Transport" and "Roads" departments in some form.

These three areas of activity are all absolutely fundamental to determining the success of a city's transport system in meeting the demands of liveability, sustainability and economic vitality.

Policy failures in any of the three areas can largely negate any accomplishments in the others.

In accordance with its terms of reference this Inquiry has focussed most on the "transport" leg. However, this *Final Report* also attempts to point out situations where Sydney's urban form and/or pricing may take the lead in determining public transport outcomes.

The fact that urban form, pricing and transport are so connected does not mean they have to be managed by the same government department or ministry. However, any functional transport agency must have real opportunities to provide inputs into decisions about the city's urban form and pricing.

Equally, assessments of the likely outcomes of a transport project must acknowledge that urban form and pricing may well determine the outcomes every bit as much as the transport project itself might do.

A successful public transport plan must therefore fully reflect the interdependence of urban form, pricing and transport. While the plan should focus on transport, it must envision how urban form and pricing options can both cause transport needs and result from transport projects.

The goal must be an integrated system in which urban form, pricing and transport develop together toward a common goal, with a real commitment to muster the various relevant areas of government to this common end.

As examples,

- All relevant legislation, including planning legislation, should be reviewed and amended to support this process and require full account to be taken of the potential for any decision by government agencies to affect the planning and provision of an integrated public transport network
- The transport, energy and emissions efficiencies of different development patterns—including their compatibility with efficient public transport—must be important considerations in the current review and updating of Sydney's 2005 *Metropolitan Strategy*, and
- All existing public transport corridors and reservations for future corridors in Sydney should immediately be preserved through legislation, and additional public transport corridors should be identified in Sydney's long-term public transport plan and then acquired and preserved, just as the corridors for future major roadways have been preserved for decades.

Theme 4: *Public transport, not just roads*

The balance between public transport investment and road investment is always politically difficult.

Some motorists, in particular, tend to become attached to their cars and insist on road-based solutions for all of their transport needs.

In fact, however, **cars are intrinsically unsuited to transport in very dense cities and urban areas.** The streets of the denser centres of Sydney simply do not have room for everyone to claim 12 to 15 square metres of road space so that they can travel in a separate vehicle or the same amount of space so they can park their vehicle while they are at their destination.

The sheer limits of urban space—quite apart from other cost and sustainability issues—mean that urban centres *must* rely on a suite of transport options in which the private car will play a diminishing role as densities rise.

Public transport, walking and cycling all use limited urban space much more efficiently than the car. Taxis and carsharing also have a role, because although they occupy urban streetspace while they are operating they do not require long-term parking space, the other scarce resource that private cars use very inefficiently.

Of course, not all of Sydney is dense, nor should it be. In lower-density suburbs, for trips not going into urban centres, the private car is likely to remain a dominant mode of travel, although there are good sustainability reasons to encourage alternatives such as cycling even here, and also to support, develop and progressively improve a more basic level of public transport.

At a time when the RTA and the NSW government appear set to embark once more on a spate of motorway upgradings on radial routes to and from the CBD and other major Sydney centres, it is essential—before we are all locked into a future in which most Sydneysiders have to drive to their destinations—to learn from cities in the developed world that have gone furthest along this path, such as Los Angeles, Houston and Phoenix.

It was indeed possible for these cities to grow for many decades in an almost purely car-oriented form, investing almost exclusively in road infrastructure. Today, however, all of these cities are trying to change course, making major public transport investments that aim to shift away from car dependence and nourish more sustainable, denser urban forms.

Compared to such cities, Sydney has been fortunate in its history. In particular, during the mid-20th century, when American cities were abandoning their rail systems to spread out along freeways, Sydney retained the suburban rail system it had developed, with tremendous foresight, over the previous decades, even though the inner city's tram network was dismantled and the rail system would have to wait a long time before any major new investments were made.

Moreover, Sydney features much of Australia's "best practice" when it comes to the use of public transport to guide urban form. It is the only Australian city where major regional activity centres, organised mostly around railway stations, can be found throughout the urban area, from Parramatta to Chatswood to Penrith. Melbourne and Brisbane both aspire, in their long range planning documents, to create such centres, but only Sydney has actually done so.

Sydney's suburban rail network remains the backbone of its urban structure, which means it is also critical to the operations of the city's economy.

Unfortunately, Sydney has faltered in its investments in this rail network, yielding not just a fragmented network with missing links but also the crises of increasingly inadequate capacity and poor service quality that all passengers witness today.

In the face of these difficulties and opportunities, we need to recognise that:

- **For access into Sydney's CBD and other dense centres, road-building solutions—whether road widenings or new roads—are destined to fail**, because these dense centres, by their very nature, simply do not have room for everyone's car.
- In the face of projected major increases in Sydney's population and the desire to accommodate most of this growth within Sydney's existing urban areas, **high quality public transport *must* now be the priority for scarce financial resources.**
- Only an intense expansion of public transport can halt the steady increase in congestion and its resulting inefficiencies and ensure adequate road space remains to support commercial activity.
- **Any major new road investments in Sydney, beyond maintenance, should only be in the form of *circum-***

***ferential* rather than radial connections, enabling travel between lower density areas.**

- All such road developments should be designed and constructed to permit and facilitate the future provision of priority public transport services along these corridors or in complementary corridors if these are better suited to public transport needs.
- Because outer low density areas will still rely heavily on cars while denser areas must rely more on public transport, **the two types of networks must be connected through real opportunities to "park and ride".**

Theme 5: *A single, seamless public transport network*

The notion of an "integrated" public transport network is widely accepted in many comparable cities around the world, but is poorly understood in Sydney.

"Integration" means that publicly funded public transport services must work together in every possible way, rather than competing or seeming to compete with each other.

Integrated services seek to fit together into a single network by encouraging connections between one service and another.

Integration does not mean that operating companies need to be combined. Nor does it imply any view about which operations should be publicly or privately owned.

The principle of integration simply states that all public funding for public transport is for the purpose of purchasing a single complete system for the whole city. The operators which form parts of this system, and the public agency which manages them, are all responsible for ensuring that the pieces are connected to form a whole.

This principle conflicts with deeply embedded notions in Sydney that view public transport operations as "territories" that are in some sense "owned" by certain government agencies or companies.

It also requires bus, rail, light rail and ferry planners to start thinking about all the modes of public transport, not just their own, and about how to provide the best possible interchanges between different services and modes.

Indeed, it demands a system in which there are fewer bus, rail, light rail and ferry planners and more *public transport* planners who understand all the modes and how they can work together.

Public transport services become a "network" only when they work together. In a large city like Sydney with many travel destinations, it is impossible to run direct service from every origin to every destination. Instead, services must connect with each other in convenient ways so that people can use any combination of services to complete their trip. So **interchanging**, an aspect of public transport planning which has largely fallen between the cracks created by the city's reliance on separate public transport providers in the past, will be an increasingly important component of the creation of a seamless, integrated network in the future.

Another vitally important factor is the **integration of fares across all modes of public transport, throughout the integrated public transport network.** Sydney lags well behind most so-called "world class" cities—and other Australian capital cities—in not having a simple system of integrated fares. Indeed, notwithstanding some grossly misleading claims about the recently introduced *MyZone* fare structures, **the current fare system significantly *penalises* customers for most interchanges**, even though these interchanges can often be an inconvenience and even though interchanging is the foundation of efficient public transport network design.

In the light of these considerations, planning for public transport in Sydney must:

- **Be based on establishing and developing an integrated public transport network, with all the various forms of public transport being used to complement and support each other.**
- Address not only the various conventional public transport modes (heavy rail, metros, light rail, buses and ferries) but also the roles of pedestrian access, cycling, community transport, transport services for people with special needs and "transport on demand" services, including taxis.
- In choosing modes and developing services, recognise that, on average, commuters in greater Sydney travel further and longer to and from their places of work than in many comparable cities, so passenger comfort is very important, as is the ability of passengers to do things while travelling that one cannot do while driving a car.
- Focus on the **quality of interchange facilities** and the attractiveness of interchange experiences.
- **Rapidly introduce simple, fair and truly integrated fares, without interchange penalties.**

  This will permit the unlocking of significant efficiencies in the public transport network and greatly improve the attractiveness of public transport for many current and potential users. Without such a change, it would be very difficult, whatever the changes made to the public transport services themselves, to achieve an adequately integrated and sufficiently attractive network.
- **Create less complicated bus routes which can be run much more frequently,** with a particular emphasis on developing orbital and cross-regional services, including a complete grid of frequent service in the inner city that would significantly reduce the need to funnel non-CBD trips through the CBD.

  Services which come so frequently that "no timetable is required" should be highlighted as "frequent services" in all network mapping and other public information.

Theme 6:
Cost-effectiveness

Any public transport agency should obviously be required to use its resources cost-effectively to maximise public benefits.

But two pre-conditions for this are certainty of funding, with known amounts being committed to and dedicated for public transport for much longer periods than the normal annual State Budget cycle, and the agency's full control over its budgets.

This would not only motivate the agency to save money where this could readily be done, but would also ensure it would be able to make logical investments in situations where a small expenditure now would prevent a much larger problem later, such as by not deferring important maintenance.

Theme 7:
Short-term urgency and continuous improvement

The development of Sydney's public transport network certainly needs to be expedited, but this will involve a series of major and often very expensive projects and will inevitably have to occur over the span of two to three decades.

We Sydneysiders often get the impression that "nothing else is happening" while we wait for these types of huge investments. We see the same infrastructure and services year after year, with no real signs of improvement and quite often a gradual (or even sharp) deterioration.

Successful public transport authorities actively counter this impression by constantly looking for sensible, smaller investments that can be done quickly and yield quick results.

This Inquiry has identified many opportunities for existing infrastructure to be used more efficiently to achieve better results. Sydney needs an intense focus on seizing these types of immediate opportunities.

But there is also a need to establish and maintain an *ongoing* spirit of continuous improvement in all its activities. Customers should *notice* things getting better every year, in small but useful ways, even as they look forward to the bigger and more transforming investments that will take years to deliver.

There should be a focus on optimising the reach, usefulness and attractiveness of existing infrastructure. As an example, immediate improvements in service frequencies and journey times should be sought, wherever possible, within the constraints of current infrastructure.

Future time-saving improvements, such as contactless smartcard ticketing, should also yield measurable travel time savings that are visible to customers.

Improvements in minimum service levels are also very important. There should be clear requirements, set by the government, for acceptable minimum levels of service to all developed parts of Sydney, even though some of these will generate low patronage, and the extent and frequency of service to be provided for reasons of equity and/or social inclusion, despite low patronage, should be spelt out in Sydney's long-term public transport plans.

Theme 8:
Long-term commitment, now

Few things destroy public confidence more than the cancellation of projects after they are announced, especially when this becomes the pattern, as it has in Sydney in recent years.

Developers, councils, businesses and individuals all need to make decisions each day that affect the future shape of the city. Major public transport infrastructure, in particular, must have the opportunity to positively influence the urban form around stations etc, but this will not occur unless all the actors believe that once something is announced it really is going to happen.

The need for certainty about future infrastructure is one of the main reasons that it is important to carry out a *serious* planning process (Theme 2) that seeks to build a strong consensus around a particular vision of the city's future. Only such a consensus can ensure there will be a stable investment program that stays on course.

Fortunately, the need for a much better planning process does not mean Sydney has to halt public transport development in the meantime. The North West Rail Link, for example, has long been defined and should now proceed *quickly*, using funding previously "guaranteed" by the NSW government for the now-abandoned "CBD Metro", and not in seven years, with an unspecified completion date, as recently announced by the government in its latest *Metropolitan Transport Plan*.

The Inquiry has identified a series of such investments that will be needed under almost any scenario, including a new cross-CBD, cross-Harbour heavy rail link, a revised form of a Parramatta–Epping rail link and an expansion of light rail routes in inner and western Sydney.

Theme 9:
Leadership, transparency and consultation for hard choices

One of the major themes of the Inquiry's reviews has been a recognition of the fact that the development of coherent and useful public transport in Sydney will require more than money alone.

It will require real leadership.

Sydney is held back by archaic habits that have grown from a widespread attitude of "avoid complaints at all costs".

Many of the steps that urgently need to be taken *will* arouse some opposition from people who are used to things the way they are. In common political parlance, there *will* be "winners and losers".

The cities that are ahead of Sydney in this race are those that have had the courage to confront these issues, explain why change is needed—even though some will dislike it—and build a consensus for moving ahead.

This Inquiry has identified a range of issues that present this basic political problem, including:

- **Fare simplification.** Sydney's arcane and archaic fare structure is a major impediment to easy use of the public transport system. Most other cities have moved well beyond such a complex and often incomprehensible approach.

  And despite all the government's advertising to the contrary, the recently introduced *MyZone* fare changes have done very little to simplify Sydney's fares *from the public transport user's perspective*.

  Unfortunately, any genuine simplification of the fare system *is* going to change some people's fares, and if the simplification is revenue-neutral some people's fares *will* go up.

- **Bus network modernisation.** Inner Sydney's antiquated bus network structure—much of it along old tram routes—is built on a fear of asking anyone to make connections, exacerbated by a fare structure that penalises customers for doing so.

  This fear has a range of consequences, including (a) inadequate frequencies, (b) overwhelming complexity, especially in the STA bus network, and (c) too many buses in the CBD.

  Any modernisation of this network will, however, inevitably require some passengers who currently have a direct trip to make a connection. Similar tradeoffs will play out in other parts of the network.

- **Alignments of major infrastructure.** The locations of railway stations and busway stops can have large effects on local land values and development possibilities, arousing both support and opposition. Above-ground infrastructure can also have a range of visual impacts.

  It can be difficult to ensure the overall need for the project remains in focus as all of these conflicts are negotiated, segment by segment, station by station.

One of the few advantages of Sydney's loss of initiative in public transport in recent years has been the fact that the city has now fallen so far behind that Sydneysiders can more easily see the direction most other cities are going.

This doesn't mean we should follow them blindly, but it does mean that many cities have shown how to do it—not just technically, but politically as well.

This begins with leadership: key figures in government who *care* about public transport enough to really understand it, and who are willing to take some heat to build a system that really works.

Leadership must come not just from the party in government, but also from the opposition, other political parties, the media—which have an important role to play in presenting and explaining difficult issues, and not just running "quick and easy" stories about problems and stuff-ups—and other civic leaders.

All have a role in helping the public *understand* the choices that serious public transport planning must address.

Any good long-term public transport plan must be based on **real consultation** and be "**transparent**", clearly showing how and why its recommendations were reached, how they relate to the larger stated goals of the government and under what conditions (if any) a recommendation might change.

Another of the most crucial results of a good transport plan is long-term stability, so that private investment can take place in confidence that the network will be built as planned. **Transparency and broad consultation are both crucial in achieving this outcome.**

Final Report

Recommendations

Recommendations

From plans to reality (Chapter 2)

Establishment of Transport for Sydney

Recommendation Gov 1:

The NSW government should legislate to establish a new public transport authority, **Transport for Sydney** (TfS), with the mandate, responsibility and powers to plan, create, improve, expand, manage and provide all public transport services, as a fully integrated public transport network, in the Sydney metropolitan area and on the rest of what is currently the CityRail network.

The *Public Transport Network Plan for Sydney*

Recommendation Gov 2:

The legislation establishing Transport for Sydney should encompass the establishment and regular updating of a well-considered, integrated long-term ***Public Transport Network Plan for Sydney***, with the timing of updates generally being tied to New South Wales' four-yearly fixed term electoral cycles.

Under this legislation,

- The *Public Transport Network Plan for Sydney* should set out, in a series of stages, TfS's plans for the development, funding and operation of public transport infrastructure and integrated public transport services over at least the next 30 years.

- The *Plan* should have to satisfy criteria specified in the legislation, including, in particular, consistency with and support for the *Metropolitan Strategy* or its future equivalent(s) and the dedication by the NSW government of adequate funding for implementation of TfS's plans.

  (Other, more specific recommendations by the Inquiry concerning the content of the *Public Transport Network Plan* are set out in **Recommendations LT 1 to LT 12** (Chapter 3), **Recommendations Fares 1 to Fares 7** (Chapter 4), **Recommendations ST 1 to ST 30** (Chapter 5) and **Recommendations Funding 1 to Funding 7** (Chapter 6).)

- TfS should be required to prepare an initial draft *Plan* and release it for public comments, under the supervision of a new independent Customer Advocate (see **Recommendation Gov 6**), as soon as practicable, and then finalise and obtain the NSW government's approval of this initial *Plan* as soon as practicable and in any event by no later than one year after the formation of TfS.
- Subsequently, a draft updated *Plan*, highlighting key choices that will need to be made in finalising the next version of the *Plan*, should have to be prepared by TfS and released for public comments, under the supervision of the Customer Advocate (see **Recommendation Gov 6**), nine months before each State election.
- After the election the new or returned NSW government's policies and funding commitments, as announced prior to the election in response to the draft updated *Plan*, should be applied by TfS, along with comments from the public, in resolving the key choices and finalising the next version of the *Plan*, which should be finalised, approved by the government and adopted as soon as practicable and in any event by no later than one year after the election.
- TfS and the government should be required to satisfy specified minimum procedures and standards for these and other TfS consultations on public transport matters, including consultations on overall policies as well as specific projects, and these consultations should be supervised by the Customer Advocate (see **Recommendation Gov 6**)
- Once it is approved by the new or re-elected NSW government, each new version of the *Plan* and its associated funding commitments by the NSW government—locked in for at least the next four years plus, in the case of all infrastructure projects commencing during the next four years, the full duration of these projects—should be entrenched in legislation, either automatically under the legislation originally establishing TfS and the *Plan* or under specific legislation, in order to protect both the *Plan* and its funding from short-term politically or bureaucratically motivated interference.
- TfS and the government should be entitled to review and amend the *Plan* outside this four-yearly cycle only in the event of a major unanticipated change of any of a limited range of types defined in the legislation, *not* including mere political or bureaucratic convenience, and then only after releasing a draft of the proposed revisions for public comments, under the supervision of the Customer Advocate (see **Recommendation Gov 6**), and transparently taking these comments into account.
- TfS should be obliged, by the legislation, to implement the *Plan*.
- All future major land-use developments in Sydney—include all growth centres and other "greenfield" developments, the redevelopment of existing residential areas to higher densities and the creation and expansion of commercial centres, business parks, employment lands, education and health precincts and other major activity centres—should proceed only if:
    - Transport for Sydney certifies that the proposed developments are supported by, and support, the planned and actual provision

of high-quality, effective public transport as set out in the *Public Transport Network Plan*, and

- Both the Minister for Transport and the Minister for Planning approve the developments on this basis.

Transport for Sydney's responsibilities

Recommendation Gov 3:

Transport for Sydney should have the responsibility and powers to:

- Undertake both short-term and long-term public transport planning, in conjunction with Sydney's metropolitan planning processes, and prepare and update the *Public Transport Network Plan for Sydney* as described in **Recommendation Gov 2**.
- Liaise closely with the Department of Planning, local government and other relevant agencies to ensure full integration of land-use planning and the planning of public transport and facilities for cyclists and pedestrians, in particular in the case of policies, proposals and decisions that might affect public transport, especially near stations and other major public transport nodes and along routes with frequent public transport services.
- Provide, improve and expand public transport services in accordance with the *Public Transport Network Plan for Sydney*.
- Deliver public transport infrastructure—including interchange facilities and cycling and pedestrian facilities that will encourage the use of public transport—in accordance with the *Public Transport Network Plan*, generally through contracts with the private sector and with TfS owning existing and new infrastructure where appropriate.
- Manage Sydney's public transport systems and budget within frameworks established by the *Plan*, based on TfS's control of all public transport farebox revenue and legislated commitments by the government to the long-term provision of funding.
- Determine public transport fare structures, set fares and implement integrated fares and integrated ticketing within the overall public transport budget framework specified in the *Public Transport Network Plan*, subject to any policy ceilings on total fare revenue established by the Independent Pricing and Regulatory Tribunal (IPART) prior to finalisation of the *Plan*.
- Specify routes, timetables and performance standards for all public transport services, to create and maintain an integrated and attractive public transport network.
- Contract for the provision of these services with individual public transport operators, from both the public and private sectors, on the basis of competitive tenders if TfS decides this would maximise both the quality and the value-for-money of the services.

- Assist efforts to organise community transport and "at call" feeder public transport services.
- Manage its contracts with public transport operators, including timely and systematic monitoring of and public reporting on the quality of their services.
- Where necessary, coordinate public transport for major events.
- Approve or veto proposals for road improvements or expansions on "radial" routes to Sydney's "centres" and provide significant inputs on whether major "circumferential" road improvements should proceed (for details on the relevant criteria, see **Recommendation Gov 5**)
- Determine requirements for road-based public transport corridors and public transport priority measures on types of roads specified in the *Public Transport Network Plan for Sydney* (and see **Recommendation Gov 5**).
- Contract with the Roads and Traffic Authority (RTA) for specified types of improvements to nominated types of roads to assist public transport.
- Identify, acquire and preserve future corridors for public transport.
- Advise governments and the community on all aspects of transport policies, including parking policies.
- Develop constructive relationships with the Commonwealth and local governments, to coordinate planning and maximise the potential for funding and other support.
- Provide public information for the entire public transport network, including:
    - A network-wide "branding" system that emphasises the way all services work together and facilitates easy identification of the best services and routes for all public transport journeys
    - Integrated "real time" and other information across all modes and operators
    - Fast, accurate and comprehensive reporting of the quality of all public transport services and of incidents and responses to incidents, and
    - Regular reporting to parliament and the community on TfS's progress in delivering the *Public Transport Network Plan* (see **Recommendations Gov 4 and Gov 6**)
- Market and promote public transport services, again always presenting public transport as a single interconnected system.
- More specifically, promote public transport alternatives to proposals to expand or augment major roads.
- Compile and publish comprehensive data on public transport and other modes, prepare forecasts of future transport demand and, in conjunction with local government, conduct surveys to gauge local opinion on specific transport improvements which might involve a local levy.

RECOMMENDATION GOV 4:

The legislation establishing TRANSPORT FOR SYDNEY and the *Public Transport Network Plan for Sydney* should define TfS's relationships with the NSW government and other government agencies, based on the following principles:

- State parliament should remain the ultimate budgetary and accountability authority for public transport in Sydney, with these roles being built into the legislation for TfS's formation, objectives, responsibilities, powers and reporting requirements (**RECOMMENDATIONS GOV 1 AND GOV 3 TO GOV 6**) and the legislated processes for and entrenchment of the *Public Transport Network Plan* and its associated funding commitments (**RECOMMENDATION GOV 2**).

  Among other things, TfS should be required to submit an annual report on its performance directly to State parliament, without Ministerial intervention, together with any comments and/or verification by the new independent CUSTOMER ADVOCATE (see **RECOMMENDATION GOV 6**).

- The legislation should specify the powers and responsibilities of the NSW government and Minister for Transport for:

  - Selecting the members of the TRANSPORT FOR SYDNEY Board in accordance with the criteria in **RECOMMENDATION GOV 7**, other than the members nominated by the Commonwealth government and local governments.

  - Setting overall goals, targets and performance standards for TfS and the *Public Transport Network Plan,* consistent with relevant wider objectives, criteria and processes set out in the TfS legislation and other laws and including, for example,

    — More specific requirements concerning consistency with and support for the government's *Metropolitan Strategy* or its future equivalent(s)

    — Minimum acceptable public transport service standards

    — Minimum public transport service frequencies

    — Public transport patronage and mode share targets, progressing towards at least a doubling of patronage over the next 25–30 years (see **RECOMMENDATION LT 3**)

    — Minimum requirements for extending and maintaining the geographic accessibility (reach) of the public transport network

    — Minimum environmental standards and targets (including air quality and greenhouse gas emission targets)

— Minimum access requirements and targets, including employment access requirements and disabled access requirements

— Minimum standards for the integration of fares and the introduction of integrated ticketing

— Minimum interchanging standards

— Minimum public and passenger information standards

— Minimum efficiency, continuous improvement, time, cost and budget management requirements and targets, and

— Limits on overall fare revenues, reflecting any policy ceilings on total fare revenue established by the Independent Pricing and Regulatory Tribunal (IPART) prior to finalisation of the *Public Transport Network Plan*.

- Establishing essential additional funding sources for improved public transport, such as the sources discussed by the Inquiry in Part D (Chapter 6) of this *Final Report*.

- Providing (and publicly announcing) detailed policy and funding commitment responses to each draft updated *Public Transport Network Plan* released by TfS nine months before each State election under the processes specified in **Recommendation Gov 2**.

- Approving TfS's final post-election update of the *Public Transport Network Plan*, which under the processes specified in **Recommendation Gov 2** would have to be based on the new or returned government's policies and funding commitments, as announced prior to the election in response to the draft updated *Plan.*

- Monitoring TfS's progress in performing its statutory functions and meeting its statutory objectives and the overall goals, targets and performance standards set by the government.

- Transport for Sydney should have considerable autonomy in:

  - Preparing each draft of the *Public Transport Network Plan*

  - Implementing the *Public Transport Network Plan*, as approved by the government under the processes specified in **Recommendation Gov 2**, and

  - Otherwise performing its statutory functions and meeting its statutory objectives and the overall goals, targets and performance standards set by the government, including control of the public transport budget and management of day-to-day operations (see **Recommendation Gov 3**)

- As already specified in **Recommendation Gov 2**, all future major land-use developments in Sydney should proceed only if:

  - Transport for Sydney certifies that the proposed developments are supported by, and support, the planned and actual provision

of high-quality, effective public transport as set out in the *Public Transport Network Plan*, and

- Both the Minister for Transport and the Minister for Planning approve the developments on this basis.

Major road developments

Recommendation Gov 5:

The legislation establishing Transport for Sydney and the *Public Transport Network Plan for Sydney* should require the Roads and Traffic Authority (RTA) to:

- Obtain TfS's concurrence before approving any expansions of or major improvements to "radial" roads to and from Sydney's "centres"
- Obtain TfS's inputs before approving any road expansions or major improvements on major "circumferential" routes nominated by TfS
- In both cases, where relevant and judged desirable by TfS, incorporate public transport priority measures and cycling and pedestrian access facilities as specified by TfS, so that:
  - Fast, efficient cross-regional public transport is actively assisted and definitely not disadvantaged, and
  - The expansions do not—as has frequently occurred in the past—simply encourage greater use of private vehicles for travel to and from the major centres and/or induce more private vehicle trips, exacerbating the problem of congestion by concentrating more and more vehicles in and around the centres.
- Make submissions to TfS for all proposed expansions of and major improvements to "radial" roads, plus major "circumferential" routes nominated by TfS, at the time each draft initial or updated *Public Transport Network Plan* is being formulated.

These major road proposals should be subject to the same public consultation rigour as the *Public Transport Network Plan*, with TfS, the government and the public being advised of their effect, or otherwise, on the efficiency and attractiveness of public transport and future levels of congestion. They should also be assessed in terms of their relevance to the government's current strategic planning policies.

Assessments of the effects of these major road projects should be made jointly by the Department of Planning and TfS, be made public and be available to the government and the RTA as an input into their decisions on major road projects.

An independent **Customer Advocate**

Recommendation Gov 6:

The legislation establishing Transport for Sydney and the *Public Transport Network Plan for Sydney* should also establish a new statutory **Customer Advocate**, which should be empowered to:

- Independently report, directly to parliament, on the extents to which TfS is meeting its objectives, delivering the projects and service improvements promised in the *Public Transport Network Plan for Sydney* and, more generally, meeting the expectations of customers for an integrated, efficient and attractive public transport network and continuously improving the system, and
- Provide independent verification of TfS's consultation processes, particularly during the formulation of the *Public Transport Network Plan*, including the formation of questions in TfS customer surveys and the interpretation of data, but also during the formulation of concepts for individual projects and service changes, including timetable alterations.

Transport for Sydney's Board and structure

Recommendation Gov 7:

The legislation establishing Transport for Sydney should:

- Establish an independent Board to oversee all of TfS's activities, comprising:
  - Two members nominated by the NSW government, one of them the Board's Chairperson
  - One member nominated by the Commonwealth government, reflecting its role as a major source of public transport funding
  - One member nominated by local government, because local government also makes funding contributions and TfS would be directly involved in local planning, and
  - Four other persons chosen on the basis of their expertise by the NSW government, two with practical management expertise in the transport sector, one with expertise in business and marketing and one with experience in transport advocacy.
- Authorise the establishment and funding of a small TfS secretariat with sufficient resources to undertake TfS's tasks.

Long-term development and expansion of the public transport network (Chapter 3)

The need for a long-term plan

Recommendation LT 1:

The development of public transport in Sydney should be governed by a well-considered, integrated long-term *Public Transport Network Plan for Sydney*, developed and updated as described in **Recommendation Gov 2**.

Land-use planning, pricing and a renewed focus on Sydney's 'centres'

Recommendation LT 2:

Public transport planning should be integrated with the other two essential components of successful urban transport management, land-use planning and pricing (see **Recommendations Gov 2 to Gov 4, Fares 1 to Fares 7** and **Funding 1 to Funding 7**), and both of these other two components should always actively support the attractiveness, viability and development of integrated public transport.

In particular, Sydney's updated *Metropolitan Strategy* and other land-use plans should restore strong emphases on:

- Public transport friendly "centres"-based development, and
- Transit-oriented development near stations and other major public transport nodes and along routes with frequent public transport services,

to at least the levels adopted in the 2005 *Metropolitan Strategy* and assumed in the "European" scenario examined by the Inquiry.

The NSW government's recent unannounced drift away from these strategies to a greater dispersion of future employment locations should be halted and reversed.

Planning targets for public transport, walking, cycling and demand management

Recommendation LT 3:

The *Public Transport Network Plan for Sydney* should adopt:

- Objectives and timeframes for increased mode shares for public transport, walking and cycling, and
- Travel demand management measures linked to specific timeframes

as part of its contribution to the development of a more liveable, efficient, sustainable and economically competitive city.

Public transport ahead of roads

Recommendation LT 4:

In view of the backlogs in the provision of public transport in Sydney, the projected growth of Sydney's population to 6 million by 2036–2040, the increase in the density of development in Sydney which this inevitably implies, the needs to enhance sustainability and manage transport congestion and the strong support of Sydneysiders for greater investments in public transport in preference to roads, **public transport should have priority over road spending for at least the next three decades.**

Recommendation LT 5:

Transport planning in Sydney should recognise that investments in road widenings and new roads for the provision of access to the CBD and other dense centres in Sydney are destined to fail, and that high-quality public transport solutions are essential for this transport task.

Any major new road investments in Sydney, beyond maintenance, should only be in the form of circumferential rather than radial connections, enabling travel between lower density areas, and the principles and procedures recommended in **Recommendations Gov 2 and Gov 5** should apply.

Application of the Inquiry's recommendations to the first *Public Transport Network plan for Sydney*

Recommendation LT 6:

The initial draft long-term *Public Transport Network Plan for Sydney* prepared by Transport for Sydney under the processes described in **Recommendation Gov 2** should adopt, develop and refine the Inquiry's proposals and priorities for major public transport projects over the next 30 years under the "European" scenario examined and preferred by the Inquiry (Chapter 3), recognising that these proposals and priorities reflect:

- An updated application of the land-use planning principles of the 2005 *Metropolitan Strategy* (see **Recommendations Gov 2 and LT 2**)
- A comprehensive but realistic approach to essential longer-term public transport improvements, integrated with and supported by the Inquiry's recommendations on fares and short-term and continuous improvements (**Recommendations Fares 1 to Fares 7** and **Recommendations ST 1 to ST 30**), and
- The public's willingness to pay for real public transport improvements (Chapters 1 and 6 of this *Final Report*) and the funding principles, opportunities and constraints described in Chapter 6 and **Recommendations Funding 1 to Funding 7**.

The highest priority large-scale heavy rail projects

Recommendation LT 7:

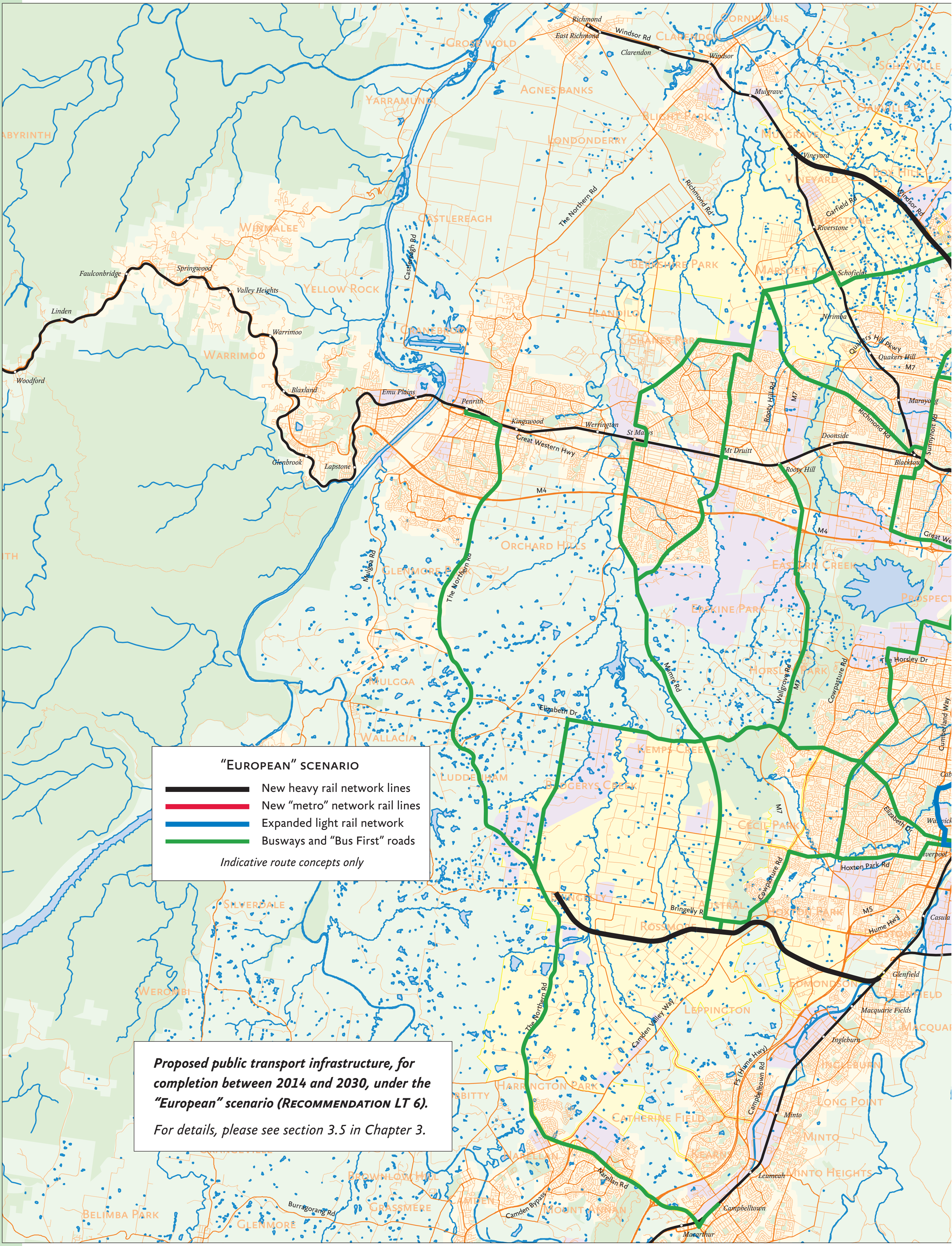
Four major heavy rail projects are essential and should receive the highest priority in the immediate future:

- The North West Rail Link (see **Recommendation LT 8**)
- The South West Rail Link (see **Recommendation LT 9**)
- A new cross-CBD, cross-Harbour Rail Link (see **Recommendations LT 10 and LT 11**), and
- A new Merrylands-Parramatta-Epping rail link (see **Recommendation LT 12**).

North West Rail Link

Recommendation LT 8:

Construction of the North West Rail Link from Epping to Rouse Hill should be commenced and fully completed as soon as practicable. Alignment, operational and environmental studies should be finalised and all necessary approvals obtained to permit construction to start by no later than 2011-12.



Proposed public transport infrastructure, for completion between 2014 and 2030, under the "European" scenario (Recommendation LT 6).

For details, please see section 3.5 in Chapter 3.


Many bus priority improvements throughout inner Sydney

South West Rail Link

Recommendation LT 9:

The design and construction of and operational planning for the South West Rail Link, initially from Glenfield to Leppington, should continue as a high priority, in conjunction with planning for the Leppington and Edmondson Park town centres.

Essential and urgent: A new cross-CBD, cross-Harbour rail link

Recommendation LT 10:

Transport planning in Sydney should once again recognise:

- The critical importance of a new cross-CBD, cross-Harbour heavy rail link as a pre-requisite for increasing train frequencies and patronage capacity throughout Sydney's heavy rail network, and
- The inabilities of the "alternatives" adopted (and in the case of "metros" discarded) by the government in recent years to provide this essential additional patronage capacity

and should therefore take urgent action to ensure this link will be available by the time it is needed (on the Inquiry's analyses, by around 2022).

Recommendation LT 11:

All the route, station and operational options for a new cross-CBD, cross-CBD heavy rail link should now be seriously, independently, fairly and transparently investigated as a matter of urgency, before the options are forever closed off or compromised by further *ad hoc* decision-making.

The route options to be investigated should include the two options originally developed and adopted by the NSW government—a "central CBD" (Pitt Street) alignment and a "western CBD" (Sussex and Kent Streets) alignment—and the alternative route utilising the Harbour Bridge proposed to this Inquiry (see *Thought Provoker #4*), plus all other viable heavy rail route alternatives.

The investigations should also take account of, and seek to protect, all viable potential routes for and interchanges with surface public transport, especially within the CBD (including light rail services), and future "metro" lines and/or lines for medium and long-distance high-speed rail services into and through the CBD in the longer term.

Opportunities for the new link to be shared with high-speed services should also be explored, along with all the other relevant considerations discussed by the Inquiry in this *Final Report.*

The investigations should be conducted in conjunction with the Commonwealth government (including Infrastructure Australia, as a potential contributor to the funding of this project), Sydney City Council and other stakeholders, and should incorporate genuine public consultations and real opportunities for significant and well informed public inputs.

The "City Relief Line" stub rail link proposed by the NSW government in its February 2010 *Metropolitan Transport Plan, Connecting the City of Cities* should not proceed until these investigations have been completed, and should then proceed, as an interim measure only, *only* if:

- The ultimately preferred option for the new cross-CBD, cross-Harbour heavy rail link is a "western CBD" (Sussex and Kent Street) route with connections to the "Main" tracks to and from Sydney's west, rather than the Airport Line and southwest connections previously considered superior by the government and currently considered superior by the Inquiry, and
- The investigations conclude it is cost-effective and desirable to construct and operate the necessary major (but interim) underground turnback and passenger interchange facilities at Wynyard.

A new Merrylands–Parramatta–Epping rail link

Recommendation LT 12:

All the route, station and operational options for a new Merrylands–Parramatta–Epping heavy rail link should immediately be seriously, independently, fairly and transparently investigated, with particular emphasis on:

- Maximising employment access for residents of Sydney's southwest
- Identifying the best alignment and station options within and near the Parramatta CBD, and
- Providing the best synergies and connections with existing and possible future surface public transport services (including light rail) and possible future underground "metros", including the east-west "West Metro" identified as a longer-term priority by the Inquiry.

INTEGRATION OF ALL FARE LEVELS AND STRUCTURES

RECOMMENDATION FARES 1:

Integrated fare levels and structures for all public transport services in Sydney should be developed, reviewed and amended by TRANSPORT FOR SYDNEY (**RECOMMENDATION GOV 1**) in a public and transparent way through the initial development processes and subsequent four-yearly updating processes established for the *Public Transport Network Plan for Sydney* under **RECOMMENDATION GOV 2**, with inputs from and approvals by the NSW government and agencies such as IPART as recommended in **RECOMMENDATION GOV 4**.

IMMEDIATE PRIORITIES

RECOMMENDATION FARES 2:

The first priority in fixing Sydney's public transport fares and ticketing should be to develop and implement immediate improvements to Sydney's fare systems, using currently installed ticketing technologies, which will, as much as possible,

- Overcome the critical problem of interchange fare penalties
- Cover both multi-modal and multi-vehicle trips
- Apply the same fares structure and levels to all modes of public transport, including light rail and ferries, without surcharges for private sector stations or operations
- Remove the current *MyMulti* system's discrimination against western Sydney journeys by introducing additional rail zone combinations
- Introduce shorter term *MyMulti* tickets (e.g. two-hour and four-hour)
- Introduce cheaper daily and shorter term *MyMulti* tickets that do not force passengers to unnecessarily buy expensive tickets covering the entire rail network
- Genuinely simplify fare structures and practical day-to-day fare-paying experiences *from the passenger's perspective*, and
- Significantly reduce the data processing loads imposed on existing ticketing systems and any future smartcard ticketing systems.

RECOMMENDATION FARES 3:

The option of a single and potentially free public transport fare zone in the Sydney CBD should be examined as a way of immediately simplifying fare structures, eliminating CBD interchange fare penalties, eliminating other CBD fare anomalies and maximising the efficiency, convenience and attractiveness of CBD public transport systems for both users and operators.

All modes, no interchange penalties, simplicity

Recommendation Fares 4:

Any long-term, permanent integrated fare structure for Sydney should:

- As an essential prerequisite for efficient public transport network design, cover all modes of public transport in Sydney and imposes fares that do *not* depend on the mode(s) or number of connections required, and
- While acknowledging that a tradeoff between simplicity and fairness is unavoidable, emphasise simplicity, so that customers can readily calculate their fares in advance and the fare system is easy to implement and enforce and transparent, both before and after smartcard ticketing.

Rapid implementation

Recommendation Fares 5:

Once a long-term fare policy has been established (**Recommendations Fares 1 and Fares 4**), every effort should be made to identify aspects of this policy that can be implemented sooner rather than later. (For example, even measures that did nothing more than eliminate fare connection penalties within the STA bus system would unlock significant possibilities for network efficiencies, improved services, improved mobility and reduced CBD bus congestion.)

Smartcard ticketing

Recommendation Fares 6:

Any smartcard ticketing system should be based on the immediate-term fare principles described in **Recommendation Fares 2** (as relevant) and the permanent fare principles described in **Recommendation Fares 4**.

Recommendation Fares 7:

If it is not possible to have a high degree of confidence that a smartcard ticketing system will be *fully and successfully* operational within three to five years, consideration should be given to the option of delaying smartcards for a decade or more and instead proceeding, in the interim, with the next generation of magnetic stripe ticketing technologies.

Short-term and continuous improvement (Chapter 5)

Planning for short-term and continuous gains

Recommendation ST 1:

In addition to addressing longer term issues, the *Public Transport Network Plan for Sydney* (**Recommendation Gov 2**) should set out plans and processes for short-term and continuous improvements to Sydney's public transport services, including improvements to the utilisation, usefulness, reach and attractiveness of existing public transport infrastructure and resources.

More and better rail services

Recommendation ST 2:

Peak period rail service frequencies should be improved as soon as possible, with minimum service frequencies of 20 trains per track per hour, where feasible, in the core of the rail system (from Parramatta, Chatswood, Hurstville, the Airport and Bondi Junction into and through the CBD), utilising measures to reduce station "dwell" times and other measures discussed in this *Final Report*.

Recommendation ST 3:

In order to better exploit the latent capacity of the existing rail network and realise the potential improvements in peak period train frequencies, **20 additional eight-car trains**, over and above the number the government currently has on order, should be purchased immediately.

Recommendation ST 4:

The following **improvements in off-peak rail frequencies** should be introduced as soon as possible :

- Weekend daytime frequencies should match weekday mid-day frequencies
- There should be:
    - At least eight trains per hour each way on the Eastern Suburbs and Airport segments and at least ten trains per hour each way on the Chatswood-CBD and Parramatta-CBD segments, all with reasonably even headways
    - At least four trains per hour (i.e. a train roughly every 15 minutes) each way for most other suburban stations within 25 km of Central (including almost all of the area built before World War 2, which generally has a much higher average density than areas built later)

- Eight trains per hour each way stopping at Newtown, a significant all-day, every-day activity centre and by far the busiest station currently served only by Inner West line trains, and
- All-day services on the Cumberland line direct from Glenfield/Liverpool to Parramatta, Blacktown and Riverstone, with at least two trains each way per hour.

- There should be no daytime track closures for track inspections. Modern technologies should be used to carry out all track inspections safely at night.

Recommendation ST 5:

Rail journey times should be restored to those prevailing before 2005 within one to two years at most, and further continuous improvements should be identified in the *Public Transport Network Plan for Sydney* and implemented in the following years.

Recommendation ST 6:

Cost increases should be ameliorated by restoring the practice of **using four-car trains instead of eight-car trains on weekends and maybe at night.**

Better bus services

Recommendation ST 7:

Sydney's current **inner city bus network**, focussed overwhelmingly on radial services to and from the CBD, should be reviewed and developed into a *connective* network with much more frequent (and orbital as well as radial) services.

Recommendation ST 8:

Significant improvements should be made to bus service frequencies in **outer Sydney suburbs**, especially on key corridors able to support high-frequency services, and the times of the day during which bus services are provided in outer suburban areas.

To assist this, there should be an immediate end to any NSW Treasury or other government policies prohibiting increases in bus service kilometres in existing urban areas.

Recommendation ST 9:

Sydney's "strategic bus corridor" concept should be replaced by a network which presents customers with **a clear hierarchy of the service types actually provided**, each of which is clearly useful for particular kinds of trips and appropriate for particular settings and all of which work together via connections.

For each of these service types there should be:

- A definition in terms of its minimum levels of service frequency and "span" (times of the day during which it operates).
- A definition in terms of its stopping pattern (close, wide) and thus its speed.
- A guideline on the types of land-use situations, distances and road types that typically warrant this particular type of service.
- Clarification of whether the type of service is intended for high patronage or to serve a "social inclusion" need. (Services should be judged on the purpose they are designed to meet. The key performance indicators for a service that is not trying to maximise patronage should not emphasise patronage.)
- Guidelines on the level of amenity that can be expected for the type of service.

Recommendation ST 10:

Priority should be given to developing a "***Frequent Network***" of bus services which run frequently all day, in the evenings and on weekends. This *Frequent Network* should comprise two types of service, deployed as discussed in this *Final Report*:

- "*Frequent Rapid*" services, running every 10 minutes or better all day and serving relatively widely spaced stops (every 500-1,000 m) in order to achieve high average speeds, and
- "*Frequent Local*" services, running every 12 minutes or better all day but stopping more frequently, generally every 200-400 m, to provide continuous local coverage.

Particular attention should be paid to maximising the extent to which the *Frequent Network* routes connect with each other to serve useful trips in many directions, instead of all converging on single destinations such as the CBD.

Bus and light rail initiatives in the Sydney CBD

Recommendation ST 11:

In addition to the Sussex Street/Hickson Road light rail extension from Hay Street to Barangaroo and Circular Quay announced in the NSW government's February 2010 *Metropolitan Transport Plan*, there should be a **light rail extension from Hay Street to Circular Quay via George Street**, connecting with the Barangaroo-Circular Quay extension at Circular Quay.

The George Street extension should be accompanied by a rationalisation of bus services and private vehicle access in the CBD, to enhance the efficiency, amenity and liveability of the city centre and provide capacity for further, longer term light rail extensions to the inner suburbs.

This project should proceed as an immediate priority.

Other short-term light rail initiatives

Recommendation ST 12:

The existing light rail system from Central to Lilyfield should immediately be **extended to Dulwich Hill** utilising the unused freight rail line, in conjunction with the provision of a regional cycleway and "greenway" habitat regeneration.

Ferries

Recommendation ST 13:

Ferry services should be **fully integrated with the rest of the public transport network.** In particular, the market for ferry services should be extended through reliable, well marketed bus connections.

Recommendation ST 14:

An aggressive **"frequent ferry" strategy** should be developed and implemented, focussing on short, competitive routes that can be run very frequently and can thus encourage spontaneous use. Most of these opportunities will be close around the CBD.

Recommendation ST 15:

Inner Harbour ferries should operate like "buses on the water". They should be designed for a low unit operating cost and fast turnarounds, so that they can be run frequently and intensively.

Recommendation ST 16:

Longer ferry services should have more of a peak and/or commuter focus, should retain or increase their current service frequencies and should again be closely integrated with bus services. New longer distance services should also be investigated and developed where feasible.

Demand-responsive transport services

Recommendation ST 17:

Transport for Sydney should work with potential customers for demand-responsive transport (DRT) services, and with existing and potential new operators, to undertake pilot DRT services.

Interchanges

Recommendation ST 18:

One of the key goals of Transport for Sydney should be to achieve better integration between all modes of public transport and between public transport modes and other modes, especially walking, cycling, taxis, demand-responsive transport and private vehicle used for "park and ride" and "kiss and ride" access to public transport facilities.

There should be a strong emphasis on removing barriers to interchanging and ensuring that passengers are provided with consistent levels of service as they interchange.

Recommendation ST 19:

For ease of comparison by customers, every interchange location should be categorised in a way that reflects the type of role it plays in the transport network. (Possible categories are suggested in this report.)

Recommendation ST 20:

Transport for Sydney should:

- Develop minimum design and operational standards and 'best practice' guidelines for each interchange category, to guarantee passengers a consistent experience
- Develop packages for improving particular aspects of interchanging, such as "real time" information across the network, and
- Audit and review interchanges against its standards and co-ordinate work programs to develop the interchanges so full compliance is achieved.

Recommendation ST 21:

Transport for Sydney should monitor and plan for future interchange needs, liaise with the developers of projects potentially affecting interchanges and ensure conflicts between interchanges and other uses are minimised.

Recommendation ST 22:

Additional "park and ride" facilities should be concentrated:

- Where high-quality roads (including motorways) pass close to stations which have low-cost land suitable for the development of these facilities, and
- High-quality bus and light rail stops, again where there is good access and suitable low-value land is available.

All stations and other major public transport stops should be designed to facilitate "kiss and ride", so people can be dropped off or picked up safely and easily.

Information services

Recommendation ST 23:

Public transport information services should always be customer-orientated and always be multi-modal, covering whole journeys and not just individual trip components or individual modes.

They should provide people with simple, easy-to-access information which is based on their whole journey and delivered in "real time" as much as possible.

Recommendation ST 24:

Transport for Sydney should maintain a centralised database of routes, schedules, fares, ticketing options and interchange facilities for all public transport services in Sydney, accessible by all public transport operators.

This information should be made available in standardised formats to *Google Transit* and other third-party information providers.

Recommendation ST 25:

Transport for Sydney should produce maps of:

- The entire Sydney public transport network, including "regional structure" maps catering especially for longer-distance travellers and showing not just the rail system but all the services useful for long-distance travel between major centres
- The "*frequent network*" (see **Recommendation ST 10**), and
- All public transport services in smaller areas, with the highlighting of *frequent network* services (**Recommendation ST 10**) and "major" and "strategic" interchanges (**Recommendation ST 19**).

These maps should be widely displayed at public transport stops and interchanges and on vehicles, and should be made available free of charge, both in print form and on-line (in both interactive and downloadable formats).

Recommendation ST 26:

Transport for Sydney should make a major investment in outreaching to employers, to ensure they have the means to encourage good transport decisions by their staff.

Recommendation ST 27:

Transport for Sydney should:

- Develop a consistent "look" for all public transport signage in Sydney, to convey and reinforce the message that all public transport services are part of one integrated network.
- Work with appropriate disability and stakeholder groups to produce guidelines on how information is displayed and presented (e.g. the minimum size of text and the use of colours and symbols).

Cycling

Recommendation ST 28:

Transport for Sydney should have primary responsibility for co-ordinating cycling programs across all of Sydney, with councils continuing to have a lead role in developing their own infrastructure. Transport for Sydney should:

- Coordinate the production and enforcement of cycling-related design codes, standards and guidelines
- Develop a "strategic" bicycle network
- Implement a city-wide bicycle hire scheme, and
- Coordinate and integrate cycle parking at stations and interchanges, in conjunction with all Sydney councils and public transport operators.

Pedestrians

Recommendation ST 29:

Additional and longer "green times" should be provided for pedestrians at signalised intersections and other signalised pedestrian crossings, not just within the CBD but throughout Sydney.

Recommendation ST 30:

Pedestrian countdown timers should be installed at signalised intersections and other signalised crossings to increase pedestrians' tolerance of waiting and thereby reduce jay-walking.

Funding certainty (Chapter 6)

The need for full and dedicated funding

Recommendation Funding 1:

Any long-term public transport plan for Sydney, such as the *Public Transport Network Plan for Sydney* recommended by the Inquiry (**Recommendation Gov 2**), should be fully funded to ensure projects are delivered on time and in accordance with the plan.

Additional funds therefore need to be raised to cover all additional costs of the *Plan*.

To ensure these funds are directed to the purposes for which they are raised and not reallocated to other government activities, a clear governance and accountability mechanism is required (see **Recommendations Gov 1 to Gov 4**).

General principles

Recommendation Funding 2:

The funding plan should be based on the principles of "good taxation" and sound infrastructure funding.

A broad range of revenue sources

Recommendation Funding 3:

Because both public and private transport users are likely to enjoy the benefits of improved public transport services, through reduced congestion, reduced energy costs, reduced emissions and improved air quality, a *broad* range of funding sources should be used, to obtain contributions from this wide range of beneficiaries.

Matching funding with willingness to pay

Recommendation Funding 4:

The funding mechanisms for the *Public Transport Network Plan for Sydney* (**Recommendation Gov 2**) should ensure that:

- Any charges and levies are **in line with the community's willingness to pay** for the planned public transport improvements, and
- The funds are **dedicated** to implementation of the *Plan*.

PPPs and other funding instruments

Recommendation Funding 5:

The choice of funding instruments should ultimately be a decision for the NSW government.

It should clearly understood that Public Private Partnerships (PPPs) do not provide a "magic bullet". Nonetheless, PPPs could be incorporated, where suitable, *within* an "iron triangle" approach based on an effective long-term public transport plan, an effective public transport governance framework and an effective public transport funding plan.

Impact on the State's credit rating

Recommendation Funding 6:

The government should not be timid about increasing public sector debt as part of the public transport funding plan. The additional funding requirements and sources should not lead to an increase in debt levels sufficient to trigger a review of the State's AAA credit rating.

Managing the construction and transport industries' capacities to deliver

Recommendation Funding 7:

The long-term *Public Transport Network Plan for Sydney* (**Recommendation Gov 2**) should contain a clear timeline of projects designed both to minimise capacity constraints in the construction industry and to manage debt-servicing costs, so that projects can be delivered on time and within their budgets.

Final Report

What's where in this report?

What's where in this report?

The rest of this *Final Report* is arranged in four **parts**, each containing one or more **chapters**—which are often quite long—on various groupings of major public transport issues, and numerous **sections** within each chapter, generally tagged with a three-level hierarchical numbering system to assist easy cross-referencing.

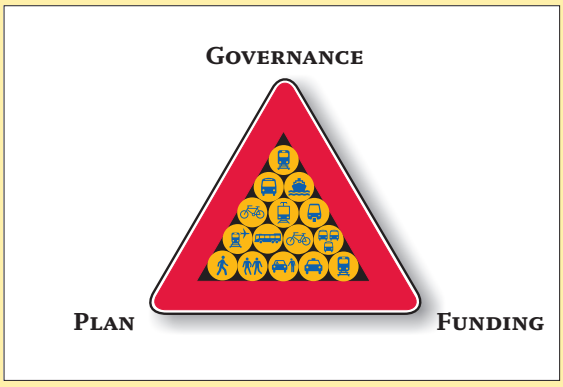
Part A of this report, comprising **Chapter 1: What Sydneysiders say**, summarises the principal themes and visions of the 571 submissions received by the Inquiry and presents an overview of the very encouraging findings of market research surveys commissioned by the Inquiry.

Parts B, C and D then address the Inquiry's responses to these inputs and its terms of reference, structured around what the Inquiry has termed...

The 'iron triangle'

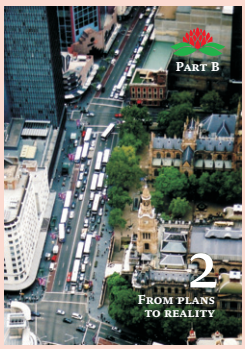
As already indicated in the *Foreword* to this report, the Inquiry has concluded that significant progress in providing Sydney with a world-class public transport system will occur only if:

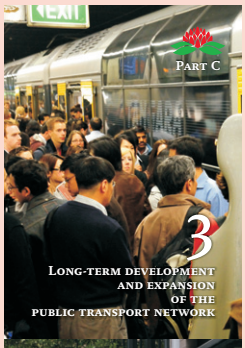
- **There is a complete overhaul of public transport governance**, fundamentally changing the ways Sydney's public transport is planned and provided.
- The development and delivery of public transport services are **planned with a high degree of certainty of implementation**, through:

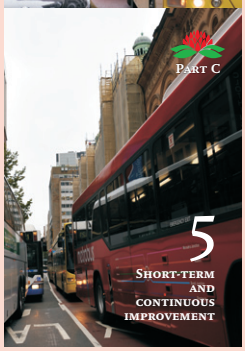


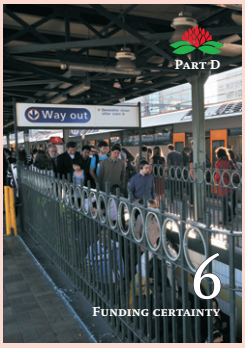
  - **A long-term *Public Transport Network Plan for Sydney***, developed and periodically updated through transparent statutory processes with significant and real community inputs to achieve high levels of consensus and then entrenched through legislation to protect it from short-term politically motivated interference, and
  - Within the context of this plan, and in addition to the longer-term and major projects, **continuous shorter term improvements**, including major reforms to public transport fare structures.
- **These plans and their implementation are backed by certainty of funding,** with identified, reliable and committed sources of funds *dedicated* to public transport service quality and infrastructure improvements and expansions.

All three of these "Iron Triangle" elements are essential. Past experience in Sydney, and the Inquiry's examinations of practices in other countries, show that a concentration on only one or two of the elements, while neglecting or downplaying the other(s), *cannot* yield the required improvements.









PART B of this report, comprising **Chapter 2: From plans to reality**, addresses the first element of the "Iron Triangle", governance, and the *process* aspects of the second, planning.

It proposes a fundamental change in the way Sydney's public transport is managed and governed, to reduce its vulnerability to *ad hoc* decisions driven by short-term political considerations. The proposals in Part B aim to establish a proven and reliable system, with *real* community input and *certainty*, for planning and delivering substantial improvements and delivering a truly integrated, multi-modal public transport network.

PART C of this report then addresses three *content* aspects of the second element of the "Iron Triangle", planning. It comprises:

- **Chapter 3: Long-term development and expansion of the public transport network.** The analyses in this chapter recognise that successful public transport planning for a city such as Sydney always *starts* with a long-term perspective on the type of city people want and the purposes they need and want its transport systems to serve, leading to the development of concepts and options for long-term public transport infrastructure and operational responses.

  Several scenarios for Sydney's future development are investigated, and the Inquiry's recommendations for new and improved public transport services and infrastructure under the preferred scenario are presented.

- **Chapter 4: Fixing the fares**, which discusses the need, both immediately and in the longer term, to simplify and fundamentally reform Sydney's complex, archaic and often counter-productive public transport fare structures. The recent "*MyZone*" fare changes have fundamentally failed to address the critical problems with these fare structures.

- **Chapter 5: Short-term and continuous improvement**, which discusses a wide range of other more immediate measures, some major and many small, identified as important—and in some cases essential—for improving Sydney's public transport services while the longer-term measures get underway.

PART D of this report, comprising **Chapter 6: Funding certainty**, addresses the third element of the "Iron Triangle", how we ought best to pay for major improvements in public transport, anchored to an analysis of what and how the community would be *willing* to pay.

Interspersed between some of the chapters, in *yellow-shaded* "sidebar" boxes, are several **"Thought Provokers"**. These are short articles which provide background information and opinions on important issues considered by the Inquiry and addressed in this report.

Comments on recently released NSW government plans and changes to public transport fares and ticketing are also provided, in *blue-shaded* "sidebar" boxes.

The report concludes with four **Appendices**, providing greater detail on particular matters examined by the Inquiry. The first of these appendices lists the 571 submissions made to the Inquiry. Two of the appendices reproduce reports, by independent experts commissioned by the Inquiry, on the methodologies and findings of the Inquiry's market research surveys and options for funding the proposed public transport improvements, and the remaining appendix presents an analysis of the relative merits of single and double deck trains in Sydney.

Final Report

Part A

Chapter 1: What Sydneysiders say

Part A

1

What Sydneysiders say

1 What Sydneysiders say

An integral part of this Inquiry has been finding out what the people of Sydney really think about the city's public transport.

The Inquiry has sought to learn not only what Sydneysiders identify as the main problems with the current public transport system but, just as importantly, their ideas and proposals on how it can be improved.

The Inquiry has used five main approaches to obtain community inputs:

- A call for **public submissions** in response to the Inquiry's terms of reference, supported by background information and reports on an Inquiry website
- An initial series of **public meetings** throughout the Sydney metropolitan area, to help identify some of the principal local, regional and Sydney-wide concerns and ideas for solutions and, more generally, help stimulate debate
- Follow-up **meetings with individuals and groups** making submissions to the Inquiry, particularly to discuss proposals of special interest
- Extensive **public opinion research**, conducted by independent consultants commissioned by the Inquiry, specifically aimed at guiding the Inquiry's identification of the most important options for improvements and judging the community's willingness to pay for these improvements, both in the short term and in the longer term, and
- The release of a ***Preliminary Report*** by the Inquiry on 5 February 2010, accompanied by extensive reporting of its findings and recommendations in *The Sydney Morning Herald* and other media and briefings of individuals and stakeholder groups, and the inviting of **final submissions**, commenting on the *Preliminary Report*, from individuals, community and business groups, public agencies and all tiers of government.

A large majority of the inputs provided to the Inquiry, of all types, have indicated both a high level of concern about the current state of public transport in Sydney and a high degree of willingness to help find ways to fix and improve the system.

1.1 Initial submissions to the Inquiry

The Inquiry's initial call for submissions attracted considerable community interest.

The Inquiry received 490 formal submissions prior to the release of its *Preliminary Report*, most of them from individual members of the public (***Appendix 1***).

Several submissions were also made by local government organisations, unions and advocacy groups.

The State government, the Opposition and the Greens provided initial submissions, but there were no submissions from any State government departments, authorities or public transport operators.

Several themes recurred, most of them, not surprisingly, directly relating to the Inquiry's terms of reference.

What was striking, however, was the extent to which submissions addressing specific problems broadly agreed on the range of solutions which should be adopted to deal with these problems.

This is not to say that all the submissions agreed on every point or that there was not a diversity of opinion, but rather that there was a remarkable degree of consensus about the key issues affecting Sydney's current public transport system and about how best to address these issues.

Local governments were particularly strongly represented in the initial submissions. The councils and other local government organisations providing submissions included Camden, Gosford, Hawkesbury, Hills, Hornsby, Lane Cove, Leichhardt, Liverpool, North Sydney, Penrith, Ryde, Sydney City, Sutherland, Warringah, Waverley and Willoughby Councils, the Local Government and Shires Association and the Western Sydney and Northern Sydney Regional Organisations of Councils (WSROC and NSROC).

Other organisations making initial submissions to the Inquiry included Access Australia, Action for Public Transport, BicycleNSW, the Bicycle Users Group, the Combined Pensioners and Superannuants Association, Metro Transport Sydney, the NSW Aged Care Alliance, the Planning Institute of Australia, Pyrmont Community Group, Qantas, the Rail, Tram and Bus Union, the Railway Technical Society of Australasia, Sydney Airport, the Urban Taskforce and the Western Sydney Community Forum.

The Inquiry has taken all the views expressed in the submissions into consideration in preparing its *Preliminary Report* and this *Final Report*. Many of the proposals and suggestions made in the submissions have been incorporated in the Inquiry's findings and recommendations.

1.1.1 Key issues raised in the initial submissions

The issues most frequently raised in the initial submissions are listed in ***Figure 1.1***.

Light rail issues were discussed in 41% of the 490 initial submissions and funding for public transport and the north west rail link were each mentioned in around a quarter of the initial submissions. The next most frequently-mentioned topics, each raised in 15% to 20% of the initial submissions, were transport interchanges, fares, the South West Rail Link, train service frequencies, cycling and rail travel times.

It should be noted that *Figure 1.1* is based solely on the number of submissions in which each issue was mentioned and not the extent to which that issue was discussed or whether or not the majority of the initial submissions supported or opposed a specific approach.

Obviously most of the submissions raised more than one issue.

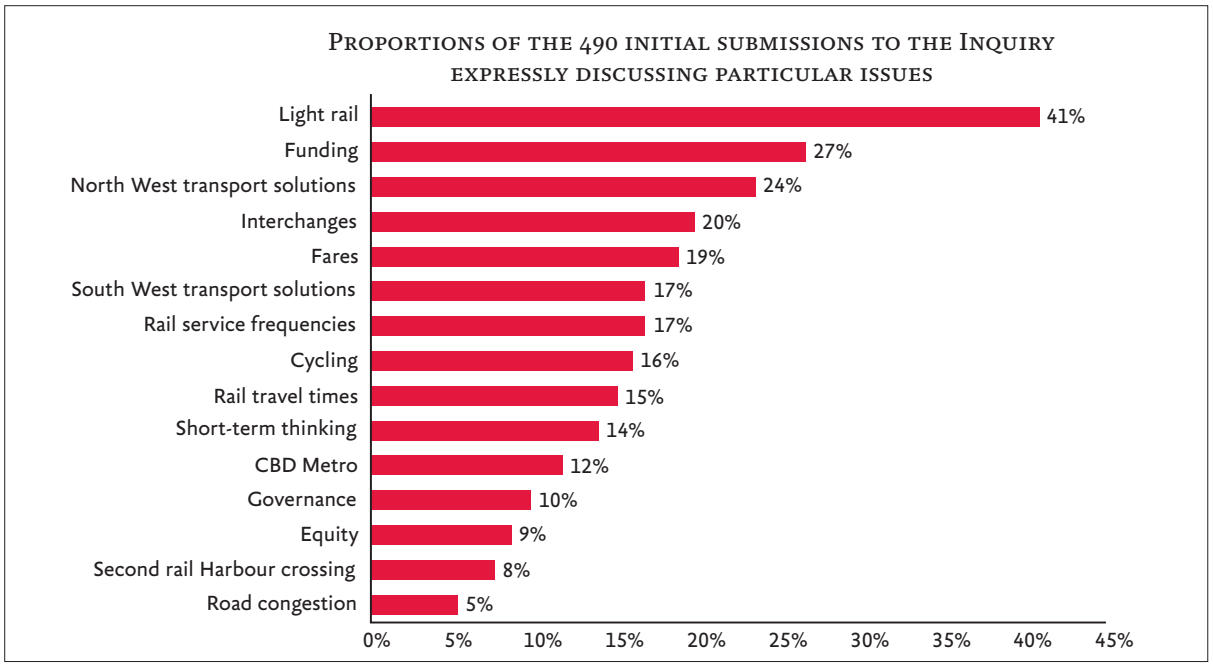


Figure 1.1. *Proportions of the 490 initial submissions to the Inquiry which discussed particular issues (most discussed many).*

Light rail

Of the 203 initial submissions that mentioned light rail, 82% were in favour of its greater use. Many argued that light rail should developed to form part of an integrated network, either through extensions to the current system or through its expansion to other parts of Sydney. On the other hand, 18% of the initial submissions mentioning light rail did not see it as a practical technology in the Sydney environment, and/or did not see it as the main priority in Sydney's public transport system.

> *"NSROC believes that the core objective for the Sydney transport system should be to shift from private to public transport dominance. With the projected population growth across the region, NSROC views mass transport systems such as rail, metro and light rail as the most cost effective way to reduce congestion, lower carbon emissions and improve commuting times."* (Northern Sydney Regional Organisation of Councils)

> *"Light rail needs to be given greater support and opportunity to integrate into the broader transport network. It should be considered as an opportunity to enhance and complement existing public transport links rather than compete directly with it."* (Sutherland Shire Council)

Funding

Funding received the second highest number of mentions in the initial submissions, with many calling for greater levels of funding to sustain and improve the public transport system. A number of submissions suggested possible sources of additional or increased funding.

> *"Sydney is the economic driver which through innovation and global engagement leads the Australian economy. Investment in infrastructure in this area has significant positive multiplier impacts across the entire Australian economy."* (City of Sydney)

North West and South West solutions

The North West Rail Link was the third most frequently mentioned issue, being raised by just under a quarter of all the initial submissions. A large number of these submissions advanced the view that construction of a North West Rail Link should be the first priority for major investment in the public transport system. The most remarkable aspect of this support is that it was not confined to submissions from people and organisations from in the north west, but was common in submissions from all parts of the Sydney area and beyond.

> *"While it is not our intention to advocate particular transport options, councils within Sydney have indicated that a program of Public Transport priorities should include consideration of specific transport projects including ... construction of the heavy rail South West and North West Rail Links."* (LGSA)

> *"In the case of the North West Metro or Heavy Rail Link not being built, not only will the current rail system fail to manage anticipated population growth, but the trend away from public transport will be exacerbated over time."* (NSROC)

Whilst the South West Rail Link was not raised quite as often as its north west counterpart, it was still the sixth most frequently mentioned issue. As with the north west, support for a South West Rail Link came from all parts of Sydney.

> *"The need for public transport infrastructure in Camden is for intra-regional travel. This means direct services to the main centres in the region, being Campbelltown and Liverpool. The South West Rail Link is a critical element of this, as is the delivery of improved frequency and priority for bus services on the identified strategic bus corridors. Beyond these direct links to centres, local bus route improvements, in terms of frequency, reliability and integration are essential."* (Camden Council)

Not surprisingly, a number of the initial submissions raised the need for rail infrastructure in *both* the north west and south west as key priorities:

> *"Construction of rail infrastructure, particularly the North-West and South West rail links, would have greatly improved access to key employment destinations for Western Sydney workers including the Norwest Business Park and Macquarie Park. It would also have assisted in the growth of other new centres at Rouse Hill and Leppington. Without this investment, the current pattern of dispersed employment will continue."* (WSROC)

Interchanges

Nearly 20% of the initial submissions discussed interchanges and interchange-related issues. Some proposed the construction or improvement of specific interchanges, while others discussed interchanges more generally, raising the importance of their design and location.

All of the initial submissions that discussed interchange design emphasised that interchanges should allow for seamless transfers between modes.

> *"Regardless of which rail is adopted where, ticketing and interchange between different modes should be convenient and quick."* (Michael Frommer)

Some submissions went into more detail, discussing the integration of interchanges with walking and cycling networks, car parking and the provision of facilities and services within the interchange itself. Several noted that every public transport stop is in effect an interchange.

> *"Irrespective of the technology chosen the design must ensure that each stop is easily accessible by walking and cycling from the surrounding region and that park and ride facilities are provided at suitable stops. Each stop should make mode interchange between the transit system and feeder bus services and as convenient as possible. Bicycle storage, a GoGet style car hire service, easy access to taxis, access to convenience and food shopping and good information signage will all be highly desirable."* (Warren Yates)

Several of the initial submissions emphasising the importance of location argued that public transport routes should provide good connectivity at interchanges. Some cited overseas examples of systems which rely on multiple interchanges between different types of services.

> *"Rather than a radial design, Sydney needs a 'Chessboard' design similar to Paris. Yes, high capacity RER suburban trains deliver passengers to a number of main interchanges, but overlaying this is a number of independent lines that* commuters can jump on and off to reach their destination." (Andrew McDermott)

Integrated fares and ticketing

Fare and ticketing integration were collectively the fifth most frequently mentioned issues in the initial submissions. Many respondents described the current lack of integrated fares as a major deterrent to intermodal travel. A significant number wondered how a public transport system could ever be properly integrated if users continue to have to pay a second "flagfall" when changing from one public transport service to another, suffering a financial disadvantage compared to users able to utilise just one service for their entire journey.

> *"To ensure an equitable system, a consistent bus fare scale should be progressively implemented across all metropolitan bus services and operators should be required by contract to offer the same core fares, concessions and ticketing arrangements."* (Western Sydney Community Forum)

> *"The multiple flag-falls can be considered as merely another means of revenue raising which can be more easily achieved by simpler ticketing."* (Ian Brady)

Along with concerns about the lack of integrated fares, many submissions raised the continued absence of integrated ticketing as a major deficiency.

> *"Integrated ticketing must be introduced to help streamline the transfer and general movement of passengers across the public transport network."* (Sutherland Shire Council)

> *"There is a need to introduce integrated ticketing across all public transport. This would help speed up effective journey times as users would spend less time buying multiple tickets. Buses particularly would benefit with less standing time issuing tickets."* (Liverpool City Council)

Cycling

Cycling was mentioned in about 15% of the initial submissions, with a wide range of issues related to cycling being canvassed. These included the need to improve the cycling network and bicycle parking facilities at railway stations and transport interchanges.

> *"Develop better ways to better align local, state and federal government resources and projects to becoming bicycle friendly, ensure accountability*

mechanisms for application of appropriate guidelines by decision makers." (BicycleNSW)

"This needs to be a facility where anyone, on the spur of the moment, can leave their bike safely and supervised... In the Netherlands, these are known as 'Fietsstalling' (pronounced feetstolling). They have already been operating for decades all over the world, very successfully." (Lucy Bal)

Rail service frequencies and travel times

Rail service frequencies and travel times were the eighth and tenth most frequently mentioned issues, respectively. Several submissions commented on the deterioration in rail travel times. Particular concern was expressed about a seeming lack of initiative by the government to address these issues, and a sense of frustration was evident in these submissions.

"The loadings per train are also of concern, given that these stations are located in the inner and middle ring suburbs of Sydney, where trains will already be quite full and the high level of loadings per trains will increase dwell time, which will reduce the frequency, reliability and safety of the network." (James Semple)

"On average, Sydneysiders are spending 81 minutes travelling per weekday, compared with 79 minutes a decade ago. This is not surprising, given the congestion, increased car use and public transport capacity issues outlined above." (NSROC)

CBD Metro

While fewer than 12% of the initial submissions mentioned the then-proposed CBD Metro, almost all of those that did so were critical of this project and a number said it should be stopped entirely.

Most of the submissions discussing this metro could not see it as part of any plan for improved public transport, and a number saw it as diverting scarce resources away from improving public transport in areas of greater need.

"[The] CBD Metro will not support its own cost. Investors are required for probably two-thirds of the construction phase." (Robert Gibbons)

"Any new station / metro development such as the proposed CBD Metro [should] not be supported where it would compromise future links and rail infrastructure opportunities to develop the 'beaches' line and other key metro links in the future." (Sutherland Shire Council)

"I am concerned that the CBD Metro proposal is not an integral part of a comprehensive and authoritative long-term plan for public transport expansion. A determination allowing it to proceed to construction would be illegitimate in the absence of such a plan being developed, publicly exhibited and widely discussed." (Geoffrey Barnes)

Governance

Just under 10% of the initial submissions looked at the way Sydney's public transport is governed and managed, and in particular perceptions of a lack of integration between operators and modes.

Almost all of these submissions raised concerns about a perceived lack of coherent planning and/or questioned the manner in which major project decisions are made. Many also cited issues such as a lack of "transparency".

A common theme throughout these submissions was the view that governance issues *must* be adequately addressed in order to achieve any significant improvement in public transport.

> *"By far the most critical thing to get right in the development of a Long Term Public Transport Plan for Sydney is the governance arrangements. Sydney has had transport plans and metropolitan strategies before. None have been fully implemented. Most are abandoned at a change of Government or change of Premier. A single Sydney Transport Authority should be created to co-ordinate and integrate all modes of transport, so as to avoid each mode being planned and operated in competition with each other and to the detriment of the total system."* (NSROC)

> *"Many governance issues raised may be resolved through the development of an Integrated Transport Authority which has funding responsibility and the ability to strategically prioritise transport projects for the long term sustainability of Sydney's transport system."* (Ryde Council)

1.1.2 Meetings with submission authors

A number of organisations and individuals proposed face-to-face meetings with Inquiry members to further discuss aspects of their submissions.

The Inquiry tried to accommodate these requests as much as possible. Prior to the release of the Inquiry's *Preliminary Report* meetings were held with 20 organisations and individuals.

Unfortunately, however, the sheer volume of the submissions received and the amount of work that had to be completed by the Inquiry made it virtually impossible to meet with all the submission authors who generously offered their time for such meetings.

Many issues were discussed during these meetings, mostly to confirm the concerns and suggestions advanced in the initial submissions. These issues included:

- **Governance.** Major flaws in Sydney's current public transport management were identified and the Inquiry was urged to investigate successful examples of alternative models overseas. There was general agreement in the meetings at which governance issues were raised that Sydney's public transport should be managed by some sort of independent authority and the implementation of this would be likely to involve legislative change. A recurring theme at these meetings was that the governance model "needs to be right, or nothing will happen".
- **Funding.** There was also support for greater long-term financial certainty in public transport funding. It was argued that this should be based on a long-term financial plan for transport, one that was sufficiently flexible to accommodate the unpredictable global economic climate.
- **Priority areas for public transport expansion.** A number of high-priority areas were nominated for network expansion. The areas most frequently mentioned were the northwest, the southeast and the Northern Beaches.
- **Accessibility and community transport**. It was noted that some retirement villages and homes are far from public transport, causing obvious problems for elderly residents. One specific issue raised was that some bus routes have been cancelled around areas in which retirement facilities

are located, making even the simplest everyday task such as grocery shopping difficult for the occupants of the retirement homes. One suggestion to the Inquiry for dealing with this issue was the introduction of "Dial-A-Ride" or Telebus services (CPSA).

- **Integrated fares and ticketing**. There was strong support for integrated fares and ticketing, with examples being provided to the Inquiry of a number of cities where integrated systems have been successfully introduced.
- **Bus congestion in the CBD.** Several of the submission authors with whom the Inquiry met noted the problem of bus congestion in the CBD, particularly in York Street at the Queen Victoria Building and on George Street but also on routes from the CBD through Darlinghurst and Kings Cross to the east.
- **Alternative train designs**. Suggestions for new train designs were raised in a number of meetings. In particular, a concept for an articulated double deck train was presented to the Inquiry as possible means of increasing train capacity without increasing train "dwell" times at stations.
- **Alternative energy sources.** Proposals to reduce public transport's dependence on fossil fuels were raised, with the suggestions including the introduction of renewable energy powered electric vehicles.

1.2 Public meetings

The Inquiry conducted eight community meetings across Sydney to discuss the Inquiry process, present overviews of aspects of Sydney's public transport challenges, encourage submissions and gain the views of residents, businesses and organisations from different areas on locally and regionally important public transport issues.

These meetings were held in Sydney's northwest (Castle Hill), southwest (Liverpool), west (Parramatta), south (Kogarah), southwest (Kensington), north (North Ryde) and northeast (Dee Why), and also in central Sydney. In total they were attended by over 1,200 people.

Most of the issues discussed at the meetings were similar to those addressed in submissions to the Inquiry, but there were also several valuable contributions providing fresh perspectives on local and regional transport challenges.

1.3 Responses to the Inquiry's *Preliminary Report*

The Inquiry received 81 further submissions, most of them comparatively brief, specifically responding to the Inquiry's 5 February 2010 *Preliminary Report*, which was publicly released by *The Sydney Morning Herald* on 13 February 2010.

The issues most frequently raised in these final submissions are listed in ***Figure 1.2***. Again, this analysis is based solely on the number of submissions in which each issue was mentioned, and not the extent to which the issue was discussed or whether or not the majority of the submissions supported or opposed a specific approach.

It may be seen that the Inquiry's draft recommendations, proposals and discussions of concepts for a second Harbour rail crossing attracted considerable

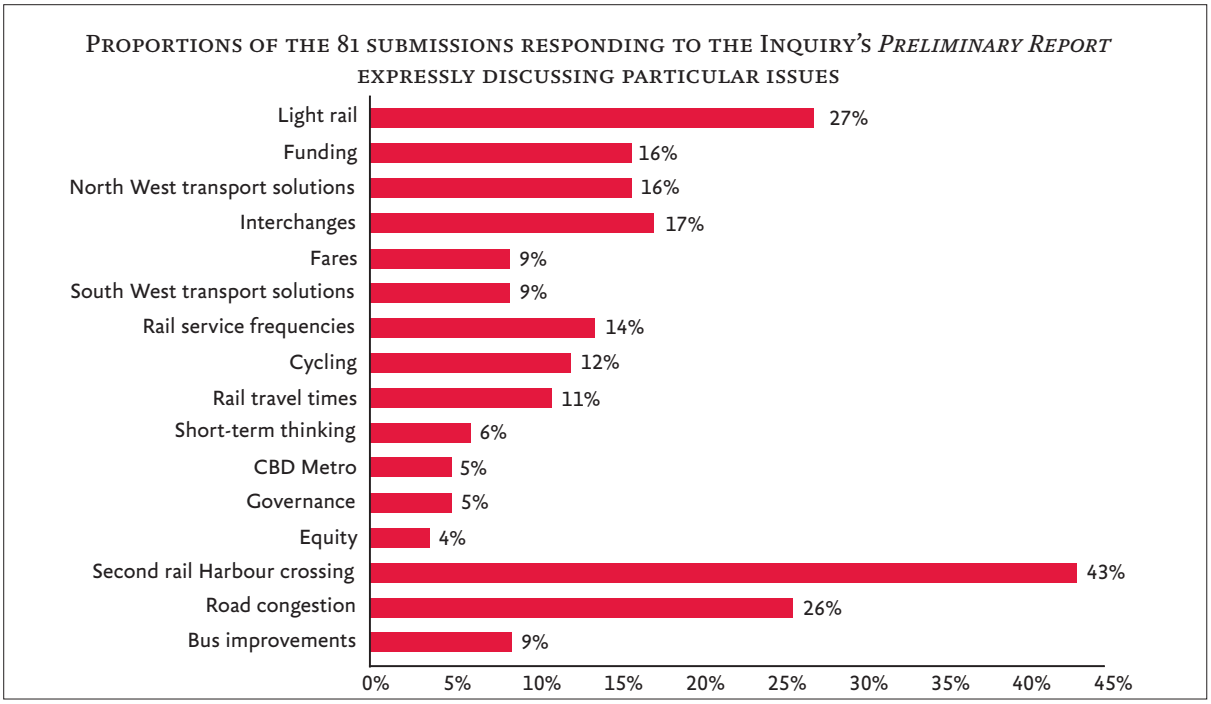


Figure 1.2. *Proportions of the 81 final submissions to the Inquiry which discussed particular issues (most discussed many).*

attention in the final submissions, and these matters have been expanded upon in this *Final Report*.

None of the formal responses to the Inquiry's *Preliminary Report* was from the State government or any State government department, authority or public transport operator, but the State government released its own short-term *Metropolitan Transport Plan* for the period to 2020, *Connecting the City of Cities*, on 21 February 2010. The Inquiry has, in turn, commented on a number of aspects of the new *Metropolitan Transport Plan* in this *Final Report*.

The Inquiry has gathered further responses to its *Preliminary Report* and other inputs to this *Final Report* from informal consultations, including a half-day workshop, with a variety of stakeholders, individuals and interest groups.

1.4 Public opinion research

The Inquiry's *Terms of Reference* address the expansion of Sydney's public transport services and infrastructure over a 30-year planning horizon.

While the submissions received and the interviews, public meetings and workshop conducted by the Inquiry have proved most helpful in identifying concerns and gathering suggestions for such a plan, the Inquiry felt that these and other issues and options ought also to be subject to systematic market research.

The motive for undertaking this market research was the Inquiry's desire to gather inputs from representative cross-sections of the community as a whole and not just those who went to the trouble of preparing submissions or attending meetings.

Because of funding limitations, **the Inquiry decided this research should focus on understanding the public's preferences between different aspects of possible investments in public transport services and infrastructure and possible alternative investments in road infrastructure.**

UTS:CenSoC
Centre for the Study of Choice

In addition, and most importantly, the Inquiry wished to investigate public attitudes and responses to different possible mixes of funding sources for these investments, a critical issue that will affect everybody in Sydney in the future. In other words, the Inquiry has sought to understand **whether, and to what extent, the public are likely to be willing—or at least prepared—to pay to secure short-term and long-term transport improvements.**

The market research commissioned by the Inquiry was designed, conducted and analysed by the Centre for the Study of Choice (CenSoC) at the University of Technology Sydney (UTS). It involved a series of "discrete choice experiments", explained in the box below, using responses to questions in a survey of a random sample of 2,400 Sydney residents.

How the market research commissioned by the Inquiry was conducted

The most important element of the market research methodology was the use of **"discrete choice experiments"**.

Discrete choice experiments are used by several disciplines, including marketing, transportation, mathematical psychology, health economics and environmental economics.

In their current forms they rely on models pioneered by Daniel McFadden, who won the Nobel Prize for Economics in 2000 for his work in this area. (Mr McFadden successfully predicted the demand for the San Francisco Bay Area Rapid Transit (BART) rail system before it was built, using discrete choice data on relevant transport choices of Bay Area residents.)

In transport fields various types of discrete choice experiments are often used to predict patronage demand for proposed new transportation systems with various alternative routes, service frequencies and fares.

Most readers will, at some time, have answered a survey or surveys in which they were asked, in abstract terms, how much they liked something. A survey such as this might, for example, tell you about a particular improvement or feature of transport, for example, and ask you to give it a score from 1 (not important) to 10 (very important).

This type of survey produces some insights but also a great deal of meaningless data, because people come to answer these sorts of questions with different habits and temperaments.

Someone with strong and confident opinions might assign more extreme scores, while someone whose opinions are less firm, or who cares less about the topic, will usually tend to score everything in the middle of the range. People may also score everything higher or lower depending on their mood at the time, or their general feelings of optimism or pessimism.

It is also very common for the results obtained to be influenced by the sequence in which the questions are asked.

These variations can dominate the results of such surveys, and yet they tell us nothing about the choices each person would make *in practice* or (say) the way they would vote in a referendum. Statisticians call such variations "noise," because trying to discern meaningful data from the results is like trying to appreciate a quiet piece of music while your neighbours are using a chainsaw.

The problem with these conventional survey methods is that real life doesn't present us with questions of the form "How much do I like this?" **Real-life decisions are always about how much we like one thing in comparison with another thing.**

For example, when we decide whether to go to a movie our decision isn't just about how much we like movies; it's also about what else we might do instead.

All transport planners are familiar with another obvious example. It would be nice to believe that people decide to use public transport purely on the basis of how much they like it, but in fact they decide on the basis of how good it is *compared with their other options*. A person who cannot drive a car will use lower quality public transport than a person who can, which is why people who don't have the option of driving tend to constitute most of the riders on lower-quality services.

"Discrete choice experiments" reflect this reality by asking only whether the person would choose one thing over another.

In the discrete choice experiments conducted for the Inquiry each respondent was presented with a series of questions, each asking them to compare three alternatives and rank them by their preference.

For example, in the short-term public transport improvements study described in section 1.4.2 below, which investigated nine different kinds of possible short-term improvements, the survey asked several questions about how to rank just three of these options, not all nine, but each respondent was presented with *different* combinations of options, so that all nine were covered by the survey as a whole.

Looking at the results of all these questions together, it has been possible to discern not just how the respondents would rank all nine, but also the relative strengths of their feeling about different improvements and the extents to which people who like any particular improvement might also tend to like another.

In the study of longer term improvements and "willingness to pay" described in section 1.4.1, each of options presented to respondents involved a more complex combination of relevant variables such as travel times, various aspects of service quality, fare levels, road tolls and other costs and taxes, but the principle was the same.

The "discrete choice experiment" methodology is especially useful when estimating people's "willingness to pay," a critical factor in deciding future public transport strategies.

There were generally close matches between the gender, age, marital status, employment, home ownership, personal income and household income characteristics of the sampled population and Sydney's population as a whole, as reported by the Australian Bureau of Statistics (ABS).

The sampled population had a somewhat higher proportion of employed people and higher income people than the general population, but the survey findings, discussed below, disclosed remarkably few differences in the attitudes of respondents with different incomes etc, so the Inquiry does not regard this as a significant deficiency.

Suppose, for example, that researchers want to estimate how much a particular survey respondent would be willing to pay, in the form of additional property taxes, to fund a particular improvement the respondent desires.

They could just ask that question, of course, but most citizens would have no frame of reference for coming up with a number, so the results would contain a lot of meaningless guessing.

Likewise, there's no point in the survey's just offering them (say) three prices to choose from, because of course they will tend to choose the cheapest one.

In the case of the long-term transport improvements component of the Inquiry's survey, discussed in section 1.3.2 below, **what the Inquiry really wanted to know was *the highest price that each respondent would tolerate***—and this could be estimated only by presenting them with several scenarios and observing how they reacted.

As indicated above, it turns out that the best way to tease out "willingness to pay" is to ask people, in each question, to rank, by their preference, three different improvement options, each with multiple benefits and costs. The same person is asked many such questions, collectively covering many options. Each time, the benefits and costs in each option may be slightly different. The study can then assess their true "willingness to pay" by observing the conditions under which they generally pick one option over another.

To help readers understand this better, ***Figure 1.3*** shows an example of a single question from the long-term improvements study's component of the Inquiry's survey (section 1.4.1).

This question (and all the other questions) provided quite a bit of detail about three possible courses of action, each with specific benefits and different types and levels of cost.

The details of the costs and benefits were different in each question. But by asking many of these questions, it was possible to observe, for each respondent, the threshold at which they would no longer finds the benefits to be worth the costs. This cost threshold—the cost above which they stopped preferring an option— should be a good estimate of their *actual* willingness to pay, because it has been obtained by observing the person's actual choices amongst different options: choices that are much like the choices we face in real life.

The Inquiry's survey experts at the University of Technology Sydney's Centre for the Study of Choice have expressed a high level of confidence in the survey's methodology and results.

Set 1 of 8:

Types of benefits and costs that you would experience if implemented	High Investment in Roads	High Investment in Public Transport	Low Investment in Both
Travel times on roads/motorways	Time taken in mins (now) / Time taken in mins (expected): 10 / 9; 20 / 18; 30 / 27; 60 / 54; 90 / 81	Time taken in mins (now) / Time taken in mins (expected): 10 / 13; 20 / 26; 30 / 39; 60 / 78; 90 / 117	Time taken in mins (now) / Time taken in mins (expected): 10 / 14; 20 / 28; 30 / 42; 60 / 84; 90 / 126
Travel times on public transport	Same as now	Time taken in mins (now) / Time taken in mins (expected): 10 / 9; 20 / 17; 30 / 26; 60 / 51; 90 / 77	Time taken in mins (now) / Time taken in mins (expected): 10 / 11; 20 / 21; 30 / 32; 60 / 63; 90 / 95
Coverage by public transport	Same as now	Much better coverage in off-peak periods and also in Western Sydney and outer suburbs	Same as now
Crowding on public transport	Somewhat more crowded than now	No more than now	Much more crowded than now
* Fares on public transport	Same as now	increase by $0.50 per single ticket; relevant increase applies to other tickets/passes	Same as now
* Tolls on bridge/toll roads	increase by $1.00	Same as now	Same as now
* Congestion charges to drive vehicles into the City	$4	$10	$8
* Parking costs in major centres	Same as now	increase by $10 per day	Same as now
* Taxes per household (property, rego)	increase by $170 a household per year	increase by $135 per household a year	None
* Carbon taxes per litre of petrol	10¢	10¢	10¢

* Prices are in today's dollars and are subject to CPI Increase. If you want to review some terms, please click here
Petrol prices are expected to be *the same as now*.

Please evaluate the above three transport scenarios and select the one you would vote for.

- ○ High Investment in **Roads**
- ○ High Investment in **Public Transport**
- ○ Low Investment in **Both**

Figure 1.3. *An example of a single question from the long-term improvements study's component of the survey.*

It needs to be emphasised that the wide ranges of dollar values used in the survey's questions about respondents' willingness to pay (section 1.4.1 below) have been used *only* to ascertain thresholds of support for particular concepts. They do *not* represent recommendations by the Inquiry.

The rest of section 1.4 outlines the market research methodologies and summarises the main findings. More details are presented in ***Appendix 2***.

1.4.1 The long-term improvements study

The aim of the Inquiry's long-term improvements "discrete choice experiment" was to determine both the **level of support** for a range of possible long-term transport improvements and the community's **willingness to pay** for these various improvements.

This particular study involved the questioning of 1,200 of the 2,400 survey respondents on these issues.

Because there are so many possible improvements affecting different parts of the city, the study did not seek to compare specific projects, but instead compared their various *benefits*, such as changes in travel times, and various ways in which these benefits might be funded.

All the options presented to respondents were grouped within three philosophies:

- **"High investment in roads".** Here, the main benefits presented in the various scenarios were related to travel times by car, public transport crowding often got worse but other features of public transport did not change.
- **"High investment in public transport".** Here, three kinds of public transport benefits were varied: travel times, crowding and coverage (the last of these referred specifically to off-peak services, focussed on areas that have little service now, such as Western Sydney and other outer suburbs). The options also sometimes included road travel times worse than now.
- **"Low investment in both".** Options in this group generally involved travel times getting worse for both cars and public transport, while crowding on public transport also got worse. This option came, of course, with the lowest costs.

Several kinds of **costs** were varied in the options presented to respondents:

- **Increased fares** on public transport, expressed as a single ticket cost increase but with the understanding that other fare types would rise proportionally. The single ticket fare increases presented in the options ranged from zero to 50 cents.
- **Increased tolls** on bridges and existing tollroads. The increases presented ranged from zero to $2.05 for a single car trip.
- **A new congestion charge** for driving into the Sydney CBD, ranging from zero to $10. (It was made clear that this charge would not apply to cars passing through the CBD on the Cross City Tunnel, the Cahill Expressway or the Western Distributor.)
- **Increased parking costs in major centres.** The all-day parking cost increases presented in the options ranged from zero to $10.

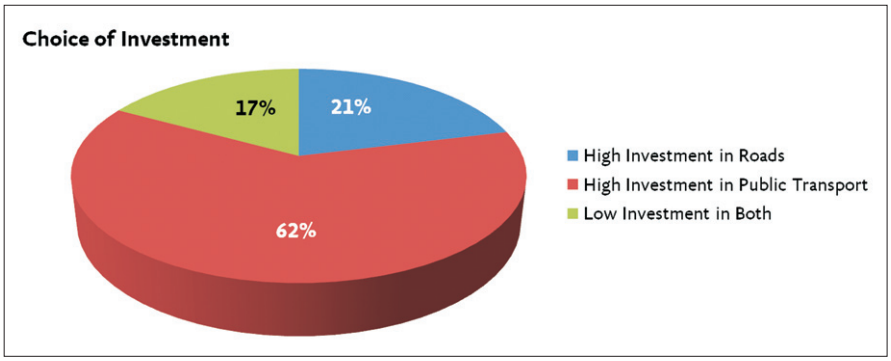


Figure 1.4. *Overall preferences for long-term improvements.*

- **Increased taxes on households**, either in the form of property taxes or registration charges. The increases presented in the options ranged from zero to $205 per household per year.
- **Carbon taxes on petrol**, with the resultant increases in the cost of petrol presented in the options ranging from 5 cents to 10 cents per litre.

Overall preference for public transport investment *v* road investment

As indicated above, every question in this study compared a scenario from each of the three overall philosophies, so considerable data were collected on respondents' overall preferences for each of these philosophies.

"High investment in public transport" was the preferred scenario for 62% of respondents, who selected this option despite clear descriptions of the tax and user charge increases required (***Figure 1.4***).

Support for "high investment in public transport" was nearly constant across both genders, all ages and all income levels. It did not even vary much between people who had used a car in the last seven days and those who had not (***Figures 1.5 to 1.8***).

This last result is especially striking. **People who drive and people who don't *both* support high public transport investment.**

In other words, the survey shows **public transport investment is not an "interest" of a particular demographic group. It is not even a particular interest of people who do not drive. Rather, it has high and surprisingly constant support across the entire population, scoring solidly above 60% in virtually all demographic, income and age groups.**

Support for long-term investment funding options: (a) the "high investment in public transport" scenario

The survey's questions about various funding sources have made it possible to assess not just the levels of support for various potential funding sources, but also for combinations of these sources.

Table 1.1 presents some of the combinations of possible funding sources which the survey suggests would have high levels of support within the "high investment in public transport" scenario.

The first row, for example, shows that the survey suggests that 75% of Sydneysiders would be willing to support a funding "package" achieving a 20% decrease in public transit travel times, albeit with a 25% increase in travel times on roads, if

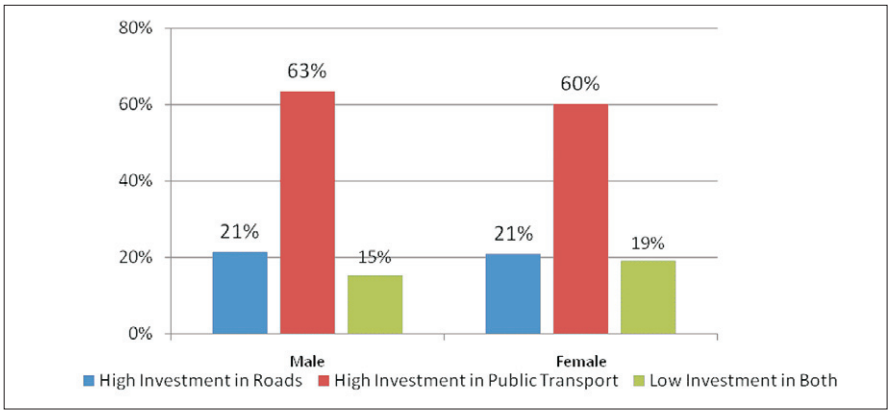


Figure 1.5. *Long-term preferences by gender.*

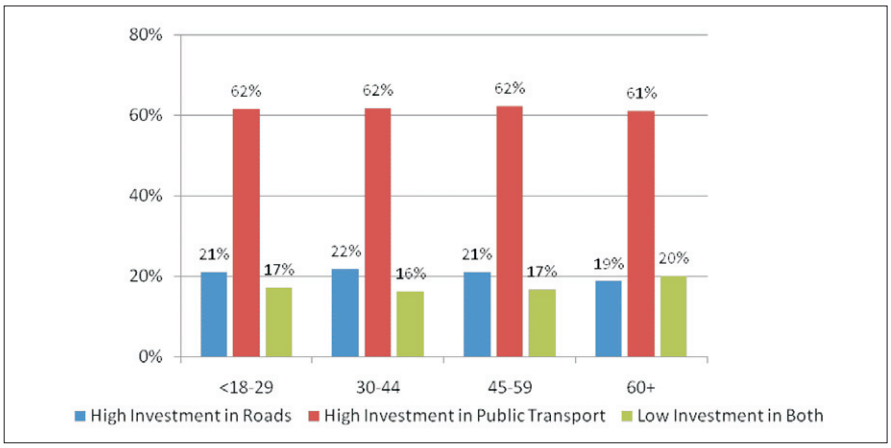


Figure 1.6. *Long-term preferences by age.*

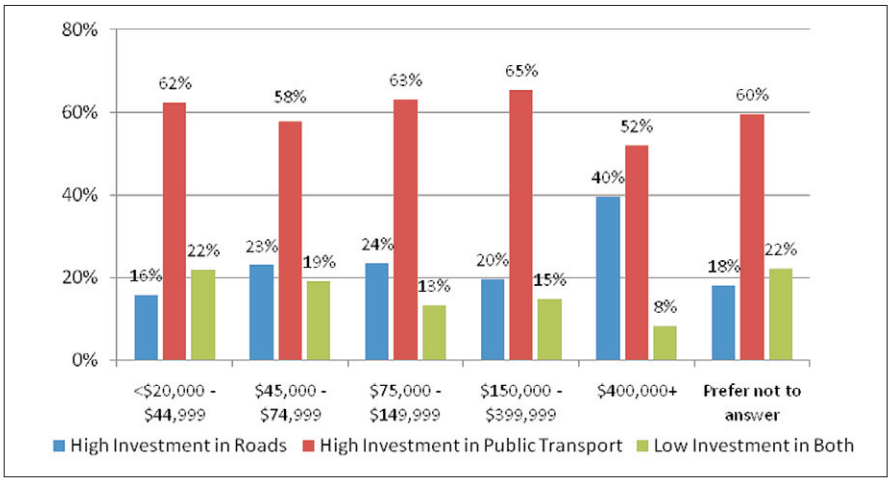


Figure 1.7. *Long-term preferences by household income.*

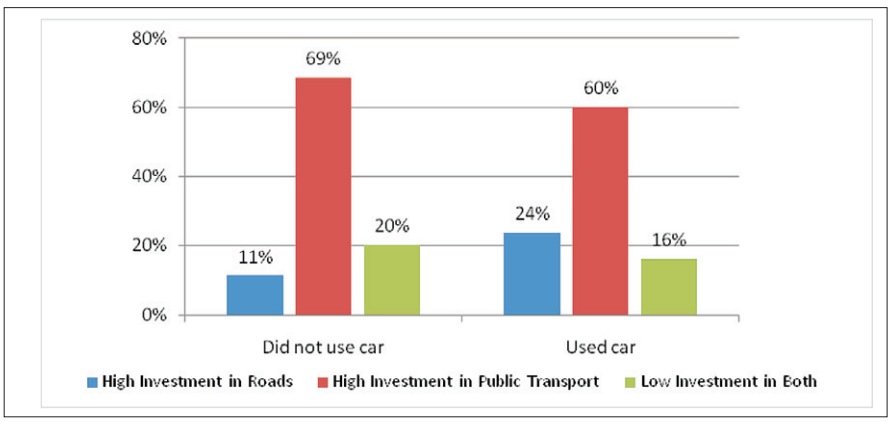


Figure 1.8. *Long-term preferences by use of car in last five days.*

Table 1.1.

Examples of levels of support for "high investment in public transport" improvements funded by "packages" of multiple revenue sources

(Please refer to the text for an explanation of how to read this table.)

Level of support	Context or outcomes		Funding sources				
	% change in travel time via roads	% change in travel time via public transport	Public transport fare increase (single ticket)*	Congestion charge to drive into the CBD	Increased daily parking cost in major centres	Increased annual tax per household	New carbon tax, per litre of petrol
73%	24%	-20%	$0.31	$6.50	$7.06	$141	$0.07
65%	26%	-20%	$0.35	$6.85	$6.92	$148	$0.08
58%	25%	-20%	$0.36	$7.17	$6.93	$161	$0.07
52%	25%	-20%	$0.38	$7.46	$7.19	$158	$0.08

* Respondents were asked to assume that all fare types would rise by the same proportion.

this involved paying a combination of a fare increase (on all fare types) corresponding to a 30 cent increase on a single ticket, a congestion charge of $6, a parking cost increase of $8 per day in major centres, a public transport levy of $132 per household per year *and* a carbon tax on petrol of 7 cents per litre. All the other rows in this table can be read in the same manner.

It is important to note that *many* "packages" with different funding combinations have been found to be likely to attract majority support. *Appendix 2* presents more information on the various combinations that would be likely to be accepted by most people in Sydney.

It can be concluded from these findings that **there is widespread support for funding significant public transport improvements through a package of funding sources involving a mixture of household taxes and user fees, including both fares and road user fees.**

The data in *Table 1.1* and its extended equivalent in *Appendix 2* allow assessments to be made of the sensitivity, or otherwise, of the overall level of the community's support to changes in each of the variables, at least within certain ranges, depending on whether the values shown for a variable are substantially different from one support level to the next or relatively flat across the levels of support.

For example, the survey found that the **higher levels of support were consistently associated with lower values for the fare increase**, indicating that many respondents were weighing this factor in determining their attitude to the combinations of funding sources presented to them.

Conversely, some variables did not matter very much to respondents in determining their overall level of support. This suggests that it might be possible to set the values of these variables even higher than those tested, without much affecting the level of support.

In particular, **there is relatively little sensitivity to the level of a carbon tax per litre of petrol or the level of a congestion charge.**

The survey suggests the "tolerable" value of a congestion charge would be at least $6 and the "tolerable" value of an increase in parking costs in Sydney's major centres would be at least $7—and because respondents did not discriminate much on the basis of the values of these factors, these "tolerable" values could actually be higher.

Table 1.1 and its extended equivalents in *Appendix 2* also show two measurable outcomes of a public transport investment plan: the change in travel time via public transport, which declines, and the change in travel time via roads, which rises (as it would do in a low investment scenario). These variables have allowed the study to observe whether people are sensitive to these two outcomes.

It has been found that respondents' public transport investment approval levels were relatively insensitive to improvements in their public transport travel times, indicating that this was not an improvement which they strongly cared about.

In other words, the survey suggests that Sydneysiders do not necessarily regard improvements in their public transport travel times as a *primary* measure of improvements in public transport. Instead, they appear to understand their investment to be buying an entire mobility system, not a specific travel time benefit for themselves, and that other aspects of the performance of public transport systems are also very important.

This is not to say that improved travel times would not win wide public support, or to argue that they should not be pursued wherever feasible (see Chapter 5).

Support for long-term investment funding options: (b) the "high investment in roads" scenario

The survey results strongly suggest that ***no* "high investment in roads" scenario, even at the lowest end of the range of possible taxes and user fees to fund the road improvements, can win majority support.**

As shown in *Figure 1.4*, only 21% of the preferred individual choices made by respondents in the survey were for options falling within the "high investment in roads" scenario, compared to 62% for options falling within the "high investment in public transport" scenario.

Indeed, 51% of the survey respondents *never*, at any funding level, selected *any* option falling within the "high investment in roads" scenario.

And the highest percentage of respondents agreeing to *any* particular package of funding sources for the "high investment in roads" improvements was only 40%.

1.3.2 The short-term improvements study

This section of the survey sought the views of all 2,400 survey respondents on relatively small public transport improvement projects which might be completed within the next decade or less.

This short-term study did not consider financing, but did explore which types of improvements would be especially valued and whether the respondents who valued certain improvements tended also to value certain others.

Nine possible types of improvement were investigated, as listed in ***Table 1.2***. Most of these improvements are discussed in Chapters 4 and 5 of this *Final Report*.

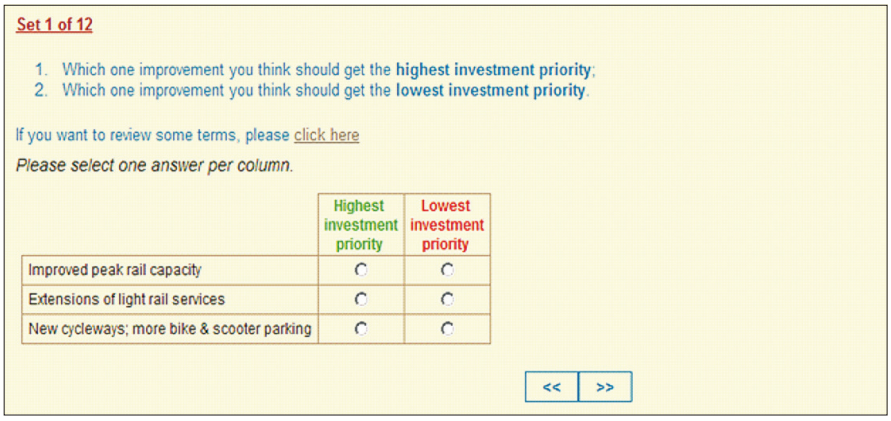


Figure 1.9. *An example of a single question from the short-term improvements study's component of the survey.*

The rankings of the nine possible improvements were determined by asking each respondent twelve questions, each of which, as already indicated, asked them to rank just three of the options.

A sample question is shown in ***Figure 1.9***.

All nine of the improvements appeared several times in these three-way comparisons, yielding solid data on the preferences assigned to each.

Table 1.2.
Potential short-term public transport improvements tested in the public opinion survey.

Improvement	Detailed information about the improvements (based on descriptions in the survey)
More frequent off-peak trains between major centres	Between 7 am and 7 pm, trains every 10 minutes to/from the City and (1) Chatswood, (2) Bondi Junction, (3) Parramatta and (4) the Airport.
Improved peak rail capacity	20% more peak hour trains, with improved capacity on all major routes.
More frequent bus services on major routes	Between 7 am and 7 pm, buses every 6 minutes to/from the City and (1) Bondi Beach, (2) Dee Why, (3) Top Ryde, (4) University of New South Wales and (5) Leichhardt *and* Between 7 am and 7 pm, buses every 10 minutes to/from Parramatta Interchange and (1) Castle Hill, (2) Rouse Hill (T-Way) and (3) Liverpool (T-Way).
Extensions of light rail services	Light Rail extended from Lilyfield to Dulwich Hill on the goods line and from Central Station to Barangaroo along Sussex Street.
Integrated fares	A simplified fare structure, removing penalties for transferring between modes (e.g. bus to rail, ferry to bus, rail to light rail, etc).
Integrated ticketing	A smartcard system to let people pay automatically on entering a station or boarding a bus, ferry or light rail service, eliminating the need to buy tickets.
Real-time arrival information	Real-time information about arrivals posted in all stations, light rail stops and the busiest 200 bus stops, displaying the actual arrival time of the next service (also available on smartphones).
New cycleways and more bike and scooter parking	500 km of new, safe cycleways across the Sydney metropolitan area, and at least 5 km in addition in each local government area. 5,000 secure bike and scooter spaces provided across Sydney, especially at train stations, major bus stops and town centres.
Trains use green power	All trains and light rail lines converted to use clean, green electricity.

The top short-term improvement priorities

Figure 1.10 shows the percentages of all *responses* (as distinct from *respondents*) rating each improvement as the highest investment priority.

These percentages do *not* represent the total levels of support for these items, which were much higher. They are simply based on the number of times that each item was selected as the *top* priority from among three choices.

It is noteworthy that 57% (26% + 19% + 12%) of the responses considered that train and bus services themselves should receive the top priority in investment.

The same data can also be presented in terms of "priority scores", a measure of the relative importance of the various improvements (***Figure 1.11***).*

It may be seen from this figure that, for example, improved bus services (2.01) were seen by respondents as approximately twice as important as integrated fares

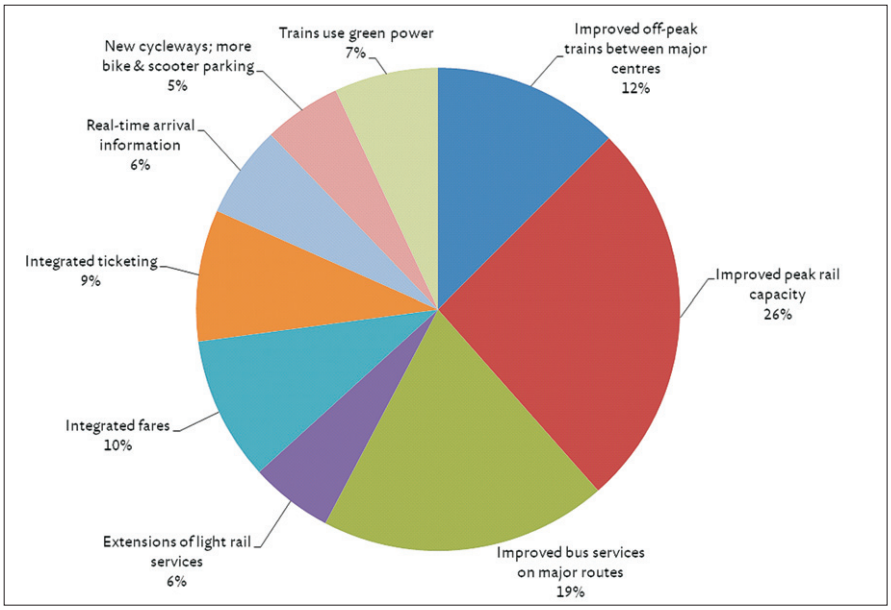


Figure 1.10. *Top priorities for short-term public transport improvements (all respondents).*

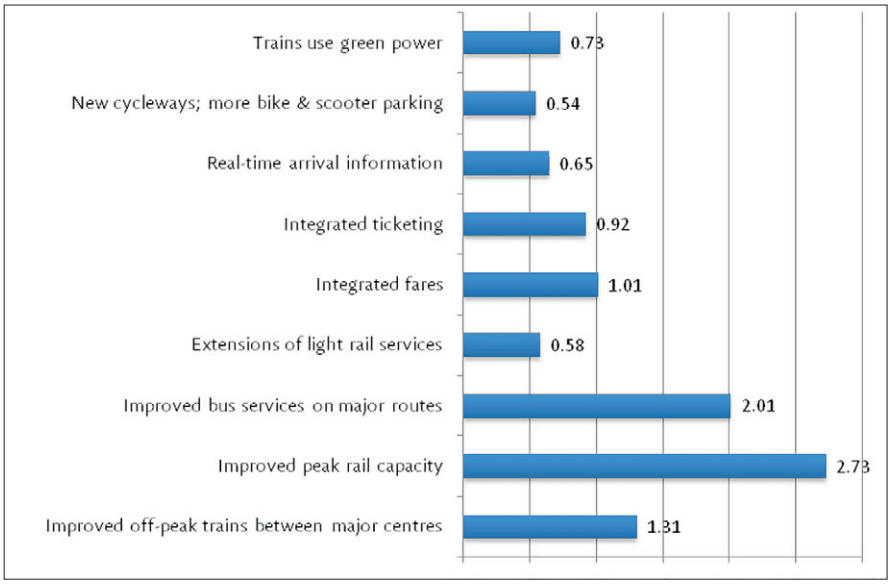


Figure 1.11. *"Priority scores" of short-term public transport improvements (all respondents).**

* The horizontal axis on this chart represents the *relative* popularity of the different improvements. If an improvement gained a score of zero this would mean that *every* respondent gave the improvement the lowest priority ranking *every* time it was presented to them. A score of 0.3 (for example) would mean the improvement in question was seen as only one ninth as much of a priority as an improvement that scored 2.7.

(1.01), so the average resident of Sydney would probably pick "improved bus services" about twice as often as "integrated fares" if asked to choose the most important priority from the full set of nine.

It would often be counterproductive to take these sorts of public opinion survey "scores" as the primary basis for setting priorities for action. In particular, two of the improvements discussed here, integrated fares and integrated ticketing, are in fact very important to the success of several other improvements, notably off-peak frequencies on both rail and bus. It would therefore not be sensible to decide that integrated fares are "unimportant" on the basis of the survey data, even though they are certainly a more abstract kind of improvement and thus less likely to be seen by the community as a top priority.

It should also be noted that because the survey sample covered all of Sydney, improvements with a *geographically narrow* scope were inevitably going to be less widely popular. This at least partly explains the relatively low number of respondents who saw light rail extensions as a high priority.

Top priorities among different demographic groups

The survey respondents' selections of their top preferences for short-term public improvements were remarkably consistent, with only very small variations among different age, gender, marital status and income groups.

So it can be concluded that there is a high level agreement that the highest priority short -term public transport improvements are in the area of rail and bus service frequencies, both peak and off-peak, and these priorities seem to be similar across all categories of age, gender, marital status and income.*

Similarly, there were only very small differences in the priorities of respondents who were users of public transport and respondents who were not (***Figure 1.12***).

While it is understandable that, for example, people who use public transport are more likely to understand the problems of fares and ticketing, the much more striking conclusion is how little current public transport use matters in shaping peoples' views on priorities.

It can therefore be concluded from the survey that **users and non-users of public transport have very similar views about which public transport improvements should be priorities. Once again, there is no particular "public transport user" constituency distinct from the general population.**

Patterns of agreement and disagreement

Another useful way to analyse the survey data from the short-term public transport improvements study is to look at the *tendency for different **groups** of people to agree* on certain priorities.

Using an analysis technique explained in detail in *Appendix 2*, it has been found that the survey responses to the short-term priorities tended to fall into three groups:

- **Subgroup 1: the "frequency and capacity advocates"** (48% of all respondents). The top priorities of this group were peak rail services, off-peak rail services and bus services.

* Peak rail frequency was described in the survey questions as "capacity", but since capacity is delivered mainly by greater frequency (provided the types of trains or buses remain much the same), the effect is the same.

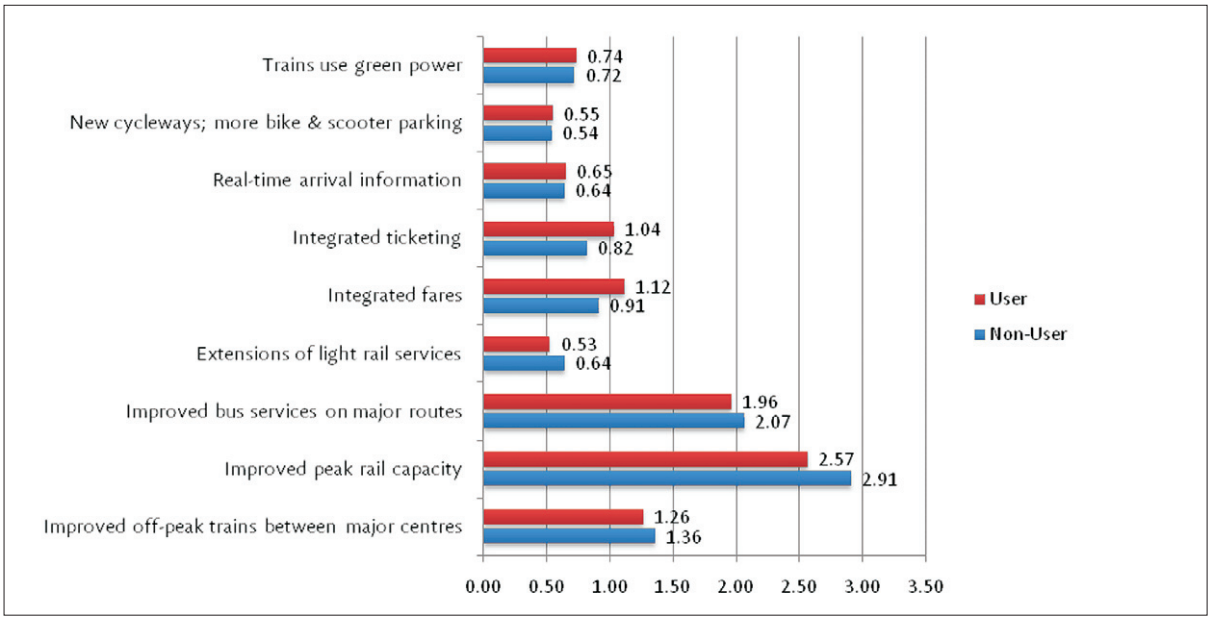


Figure 1.12. *"Priority scores" of short-term public transport improvements (users and non-users of public transport).*

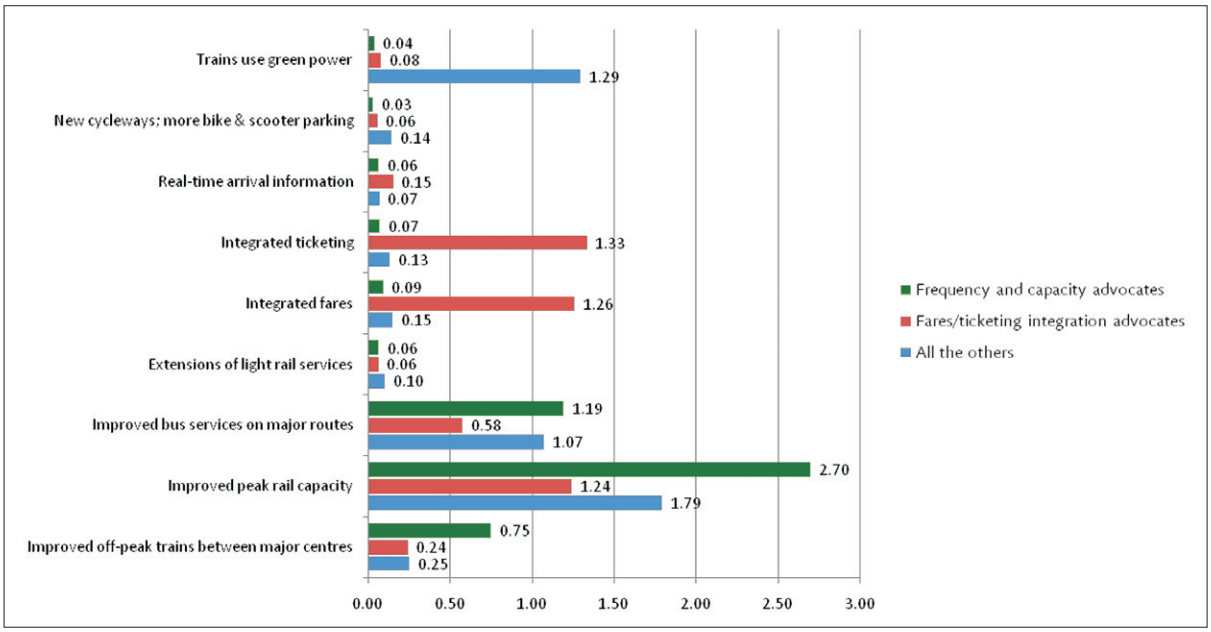


Figure 1.13. *"Priority scores" of short-term public transport improvements (three subgroups of Sydney respondents).*

- **Subgroup 2: the "fare/ticketing integration advocates"** (27% of all respondents). This group tended to focus first on fare or ticketing integration as a top priority. However, improvements in peak rail and bus services still came a very close third and fourth.

- **Subgroup 3: "all the others"** (25% of respondents). This group tended to give a high priority to green power, though they were generally the most diverse group. They tended to have less consensus about the other measures they would support, although peak rail capacity—the most popular single choice overall—still tended to come up correspondingly frequently for this group. The "green power" advocates did not tend to agree on any of the other priorities (***Figure 1.13***).

(These percentages are not the same as those in *Figure 1.10* because, as already indicated, *Figure 1.10* is based on every "choice event" *response* in the survey, not the overall choice patterns of individual *respondents*.)

The respondents in each of these three sub-groups cannot easily be categorised further in terms of their the demographic characteristics or use of transport.

For instance, the first subgroup (prioritising improvements in peak rail services, off-peak rail services and bus services) was not "more male" or "more female'": half of the male respondents and half of the female respondents fell into this group. The only difference by gender was that male respondents were slightly more likely to value integrated ticketing and fares (subgroup 2) and female respondents were slightly more likely to value "green power" (subgroup 3); 31% of the women were in subgroup 3, but only 18% of the men.

It might be that the three subgroups are quite distinct in terms of where they live and/or work, but the sample size of the survey was too small to produce statistically reliable results on a postcode or suburb-by-suburb basis.

Conclusions

The short-term public transport improvements study's survey findings demonstrate there is a widespread belief, among both users and non-users of public transport, that improvements in peak rail and bus services and off-peak rail services should receive the highest priority.

As expected, people who favour improvements in off-peak services also tend to favour improvements in peak services.

Although there appear to be three distinct subgroups of respondents with different priorities, these groups are fairly evenly distributed across age groups, income levels, type of employment, marital status etc.

In terms of public policy responses, these results suggest that:

- As a first priority, **improvements in peak rail capacity would be an overwhelmingly popular short-term priority.**
- As a secondary priority:
    - Improvements in off-peak rail and bus services would be attractive to around half of the population
    - The introduction of integrated fares and ticketing would directly appeal to around one-quarter of the population, and
    - Using "green power" for all trains would directly appeal to the remaining one-quarter of the population.

However, because fare integration is a barrier to the use of off-peak rail and bus services—because these services are more likely to involve connections, which the current fare system penalises (see Chapter 4)—the Inquiry infers that:

- **There is majority support for giving a high priority to both rail and bus off-peak service improvements, a change whose success depends to a significant extent on fare integration**, and
- **About one-quarter of Sydneysiders think that the use of "green power" by trains is a higher priority than the other improvements listed.**

Finally, there is remarkably little variance in attitudes across age, gender, income and other demographic groups, suggesting that a short-term improvement plan that prioritised some of these improvements over others would not be viewed with particular disfavour within any particular demographic category.

Thought provoker #1:

Contexts for change

Around the world there is now a major resurgence in public transport within and between cities.

This resurgence is being driven by, above all else, bare-faced **pragmatism**.

It responds to a now widespread recognition that:

- The increasing levels of congestion caused by motor vehicles cannot be overcome by relying on further decentralisation and endless road building, and
- Public transport offers tremendous advantages in providing essential accessibility in a world faced with global warming, local and regional environmental pollution, potentially serious future oil shortages and other environmental, energy and economic constraints.

The economic costs of congestion are high. So, too, are the political costs, as evidenced by the frustrations of residents caught in endless streams of slow-moving traffic, whether in inner suburbs or on the major roads and motorways of outer suburbia.

While these problems have led, and still lead, to thoughtless policies of further motorway widenings and extensions in Sydney, public support for such a short-sighted and counterproductive approach is diminishing rapidly.

Road pricing responses on a scale able to make a real dint on these problems have been consigned to the "too hard" basket in almost all jurisdictions.

The only really viable alternative is significant public transport enhancement, coupled with infrastructure, pricing and traffic management measures aimed at giving public transport, cycling and pedestrians a much better deal.

Initiatives along these lines strike a chord with the environmental lobby through emission reductions and increased energy efficiency.

But they also make economic sense, by creating conditions that permit increased residential densities, reduced travel times, lowered energy costs and a corresponding reduction in expenditures for all modes of transport.

Some immediate problems

Three of the most significant immediate problems that need to be tackled for the future of public transport in Sydney are:

- Service level deficiencies
- Institutional weaknesses, and
- A systematic failure to elucidate long-term directions and trade-offs as a means of guiding short-term initiatives.

Service level deficiencies

The nature of public transport service level deficiencies in Sydney varies between inner city and outer areas.

In the inner areas the public transport networks are relatively dense and public transport's modal share—especially for journeys to work in the CBD—is high by world standards.

The challenges in these areas relate mainly to the continued growth of central area employment and educational functions and the struggle to meet escalating demand.

This is exacerbated by the very high concentration of activities in the central core and the lack of effective inner *non-radial* public transport routes. This has the effect of pulling many passengers right into the core of the CBD simply so they can make journeys to destinations located on another radial route.

In response to this challenge the government has invested in measures to help maximise the number of trains able to enter the CBD in peak periods. Initiatives have included the Epping-Chatswood line (2009), which, through service diversions, has increased capacity from the west, and the ongoing rail *Clearways* program, designed to remove some of the capacity and reliability bottlenecks preventing increasing services to the CBD.

At the same time, a considerable number of new trains have entered service, although significantly more would be needed if Sydney were to utilise the spare capacity still available on some lines on the existing rail system during peak periods.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NOT IN SERVICE
CITY 610X
VIA BAULK/HILLS
hillsbus
9515


Hornsby
Doors closing
Please stand clear
2

There has also been a simultaneous ramping up of bus operations, both on routes serving the inner areas and on longer distance services, mainly to and from Sydney's burgeoning northwest suburbs, which, despite many broken promises, remain outside the rail network.

The sheer volume of bus operation is now causing congestion in its own right, exacerbated by the routing of many services through the full length of the CBD.

Most bus services also face significant delays coping with other traffic, despite the increased dedication of Sydney's scarce road space to peak-period bus lanes.

In Sydney's outer areas, roughly beyond a line from Hurstville through Strathfield and Epping to Chatswood and Dee Why, the main public transport difficulties—apart from the obvious absence of rail lines to serve large sweeps of northwestern, western and southwestern Sydney—are low service frequencies and low patronage.

These areas are generally the preserve of private cars and private bus companies which, for various reasons, have offered, and continue to offer, lower service levels than those found in the inner city.

A fare system that is even less attractive than that in the inner city, low bus service frequencies, circuitous bus routes (where you pay more and take longer for the privilege of travelling further than necessary), the absence of free transfers between services and the government's pre-occupation with cost minimisation and the "commerciality" of bus operations have all combined to produce service levels and visibilities that act as a powerful deterrent to public transport use in these areas.

Large numbers of people in these areas effectively have no option but to rely on increasingly congested and expensive private vehicle travel.

Institutional deficiencies

The main institutional problems relate to the lack of integrated management and development of the public transport system in Sydney, its extreme politicisation and the low cost recovery of passenger rail services.

Sydney now has the unenviable distinction of being the only Australian capital city that has failed to manage its public transport in a unified manner.

The recently introduced draft legislation to formalise the roles and powers of the new Department of Transport and Infrastructure only partly addresses this lack of integration, and probably worsens the problem of politicisation through its overt centralisation of political control over both the planning and operation of all aspects of public transport.

The full potential value of a metropolitan public transport system can be realised only through a unitary approach to its management.

This should not to be confused with government ownership or an involvement in day-to-day operations, which is invariably best left to the public transport operators.

What is needed is clear direction on:

- The roles and service level specifications to be allocated to each transport mode, including the various public transport modes and private motor vehicles, and
- Overall coordination and integration of fares and ticketing, information, interchanges, network planning and network and service development.

The last of these tasks includes the task of working closely with land-use planning agencies on Sydney's future urban structure. This applies particularly to decisions about the location of major travel demand generators and the provision of future public transport corridors, both in developing urban areas and through existing areas where amplification is required.

The creation of an effective and efficient new public transport coordination authority in Sydney will be difficult, not least because of the extraordinary political involvement that has habitually been associated with all aspects of public transport operations in this city.

Even something as simple as the separation of the reporting of day-to-day incidents from the Transport Minister's office would be a radical break with tradition.

Much more fundamental would be changes that would put an end to the seemingly endless succession of:

- Poorly advised promises to (for example) end breakdowns and improve on-time running, which in the past have often produced entirely counter-productive *degradations* of service quality, and
- Announcements and reannouncements of major public transport and road "initiatives"—often replacing equally grand announcements of inconsistent or quite different initiatives only months before—which have never been subjected to an unbiased, comprehensive and professional (let alone transparent) evaluation process with clear statutory land-use and transport rationales and objectives.

These deficiencies will *not* be rectified by the traditional means of renaming and amalgamating (or disaggregating) existing government agencies, replacing the chief executive officers, creating yet more single-purpose agencies, each keen to pursue its own agendas, or creating toothless high-level advisory bodies without their own core of independent expertise and experience and often without effective secretariats.

Indeed, it has been a combination of all these stratagems, over a period spanning more than 30 years, which has been instrumental in getting Sydney into its current mess. They have resulted in highly fragmented and divisive public transport planning which has repeatedly failed even to identify, let alone adequately address, many critical issues.

Financing public transport development

Transport funding not only has to compete with many other priorities, but ambiguously encompasses several quite diverse funding streams and philosophies.

Roads are generally funded by a combination of user registration charges, government grants and local rates and developer charges. While much attention has been paid to overall road cost recovery, little has been said about the costs of providing for peak hour arterial road users, the use of council rates to maintain local roads or the differential pavement damage caused by heavy vehicles.

In contrast, public transport almost always attracts a direct user fee in the form of a fare. There is frequently Treasury-led consternation if this does not fully cover all costs, even though it is widely understood that road usage—the principle alternative—does not have its operational costs calculated in this way.

As a corollary, public transport is perceived within the government as "loss making" and therefore, almost by definition, subject to limitation, notwithstanding the fact that greater investments in public transport could well be in the overall best interests of the city's economic prosperity and sustainability.

In practice, it is often extremely difficult to evaluate whether more investment is needed for transport and, if so, in what modes and where.

The problem is that in Sydney—even after changes in bureaucratic structures in 2009—there is still no coordinated effort to look at these issues at levels below the Budget Committee of Cabinet, which is itself not aided in this task by any analysis of how the project proposals coming to it fit into an overall framework.

Instead, **the decision-making process is typically a bun fight between competing interest groups within the government making whatever claims they believe may be of value in pushing their own vested interests.**

Such a situation is always undesirable, but it can become critical, given the enormity of the sums involved in providing additional major rail or motorway links.

The problem is exacerbated by the low cost recovery of the existing heavy rail system, which has rarely met its direct operating costs and rolling stock depreciation costs, let alone been able to make a contribution to paying off the cost of the public infrastructure.

This exposes the government to the prospect of increased operational support for extensions to the existing rail system, and helps explain its somewhat superficial attraction to automated operating systems such as those proposed for Sydney's future "metro" railways.

All of this leads naturally to the question of what the most appropriate **fare levels** might be.

The Independent Pricing and Regulatory Tribunal has recently determined, with the government's support, that 30% of future heavy rail infrastructure costs in Sydney ought to be recovered through fares. This provides a recipe for substantial real increases in fares and/or the rejection by the government of almost all future heavy rail improvement projects; some have argued that the latter was Treasury's real motive in supporting the measure, and it is noteworthy that the same principle was *never* applied to the "metro" projects championed by the government until 21 February 2010.

That said, it is an inescapable fact that although Australian rail fares are high by US standards they are very low compared with those in Europe, including the UK, and peak fare levels in Sydney represent a very large subsidy by the State government in favour of generally quite wealthy CBD employees.

The highly politicised regime within which NSW transport operates ensures that this issue receives little attention. The same applies to the broader issues of exactly who benefits from alternative private and public transport initiatives and who should therefore shoulder the costs.

Perceived inefficiencies in the provision of existing public transport services in Sydney are another commonly cited issue, especially in the case of the city's rail services.

The high costs of these rail services are, in part, associated with the presence of at least two operating staff on every train, plus large numbers of station staff and security personnel. It can be argued that much of this reflects the exploitation of public fears regarding security. The poor handling of the tensions within the government of attempting to reduce costs while denying any observable diminution in staffing provides yet one more case study of the deficiencies of the current governance arrangements.

Principles for managing public transport

In deriving a set of principles to assist in the management of Sydney's transport—such as those developed by the Inquiry and set out in Chapter 2 of this *Final Report* —the obvious starting point, which to date has been systematically ignored by the government, is **a clear understanding of what the government, on behalf of the community, is trying to achieve**.

It is only from this that it is possible to develop a set of operational precepts for the various transport modes and the interfaces between them.

Defining the end game

It is axiomatic that Sydney "requires" a transport system that can move goods and people within the urban area in the most efficient and sustainable manner possible under a given level of capital and operating expenditure.

What needs to be clarified is **how this world would look**.

In the future it will certainly be a world requiring a large modal shift to public transport, simply in order to permit the movement of a much larger population and avoid gridlock congestion on what is becoming an increasingly limited road resource.

This shift will have to encompass increasing public transport into the city core, which under all of the possible urban development scenarios examined by the Inquiry faces a significant increase in activity levels.

On its own, however, this will be inadequate. It must be supplemented by major changes in the modal split to public transport in the outer suburbs and for trips to and from secondary centres.

This will require much greater levels of commitment than have been achieved to date.

Means must be found to better regulate the use of motor vehicles on the limited arterial road network, which cannot hope to keep pace with the projected expansions in both population and traffic flows.

In particular, trunk road priority will need to favour public transport and commercial vehicles rather than private passenger vehicles, in the latter case in order to avoid considerable reductions in productivity in wholesale distribution and local deliveries and trade activity.

Even assuming that meaningful progress can be made in transferring up to the target of 40% of inbound Port Botany container traffic to rail—despite the fact that rail's share of this port traffic has *declined* since this target was announced several years ago—the expanded road task from the port will place heavy pressure on even an expanded road system.

The problem would be compounded if there were a continuation of the current implicit encouragement of car usage through continued radial motorway construction and favourable or non-existent pricing regimes designed to curry political favour rather than achieve economic efficiency.

A sound transport management regime would clearly articulate the roles of the different modes in Sydney and the means by which these roles will be supported and integrated.

Service principles

Within this context the attractiveness and functions of public transport can be augmented by a number of means, aimed overall at **increasing convenience**.

As discussed in detail in the rest of this *Final Report*, the key to this will generally be **improved frequency**, which will remove the impossible task of trying to make a large number of relatively infrequent services connect with all the others.

For example, if all trunk routes were to have at least quarter hourly service frequencies, and preferably better, throughout the off-peak period, passengers joining from feeder services would not have long to wait and passengers connecting to feeder services could rely on a good trunk service to get them to the interchange on time.

Translating this into reality would require careful identification of which major bus routes should be upgraded and an acknowledgment that probably all rail services in the Sydney basin should operate at least quarter hourly—and obviously more frequently during the peak periods—in order to create a climate for reduced car dependency.

While the adoption of such a principle would increase operating costs, it would create conditions which could begin to significantly improve public transport's modal share, thereby reducing the overall economic, environmental and energy costs of transport.

As also discussed in the rest of this *Final Report*, many other ingredients essential to the creation of an effective integrated public transport network are also missing in Sydney.

These include integrated and simpler fare structures, common "branding", better information and improved interchanges.

The most critical issue is the absence of generally available integrated fares and the continuation of fare penalties for interchanges, a situation which the recent *MyZone* fare changes have failed to address and have actually worsened in several respects.

This means many passengers have to pay considerably more for trips involving more than one bus or a bus and a train or a tram and a train, while others undertake longer journeys simply in order to remain on the rail system, where interchanging does not incur a fare penalty, instead of changing to a bus, which would often be more direct and quicker for many cross-city trips.

Current fare structures also encourage driving to railway stations, even when good bus services are available, and all too often undertaking entire journeys by car.

These behaviours may be contrasted with the travel patterns of recipients of the multi-modal pensioner excursion ticket, which permits users to seek the most convenient means of travel without incurring numerous penalties in so doing.

The challenge is to remove the barriers to using more than one bus or train or tram for a journey—for example, by overcoming the severe limitations and distortions of existing multi-modal tickets such as *MyMulti*—while not reducing cost recoveries from the fares.

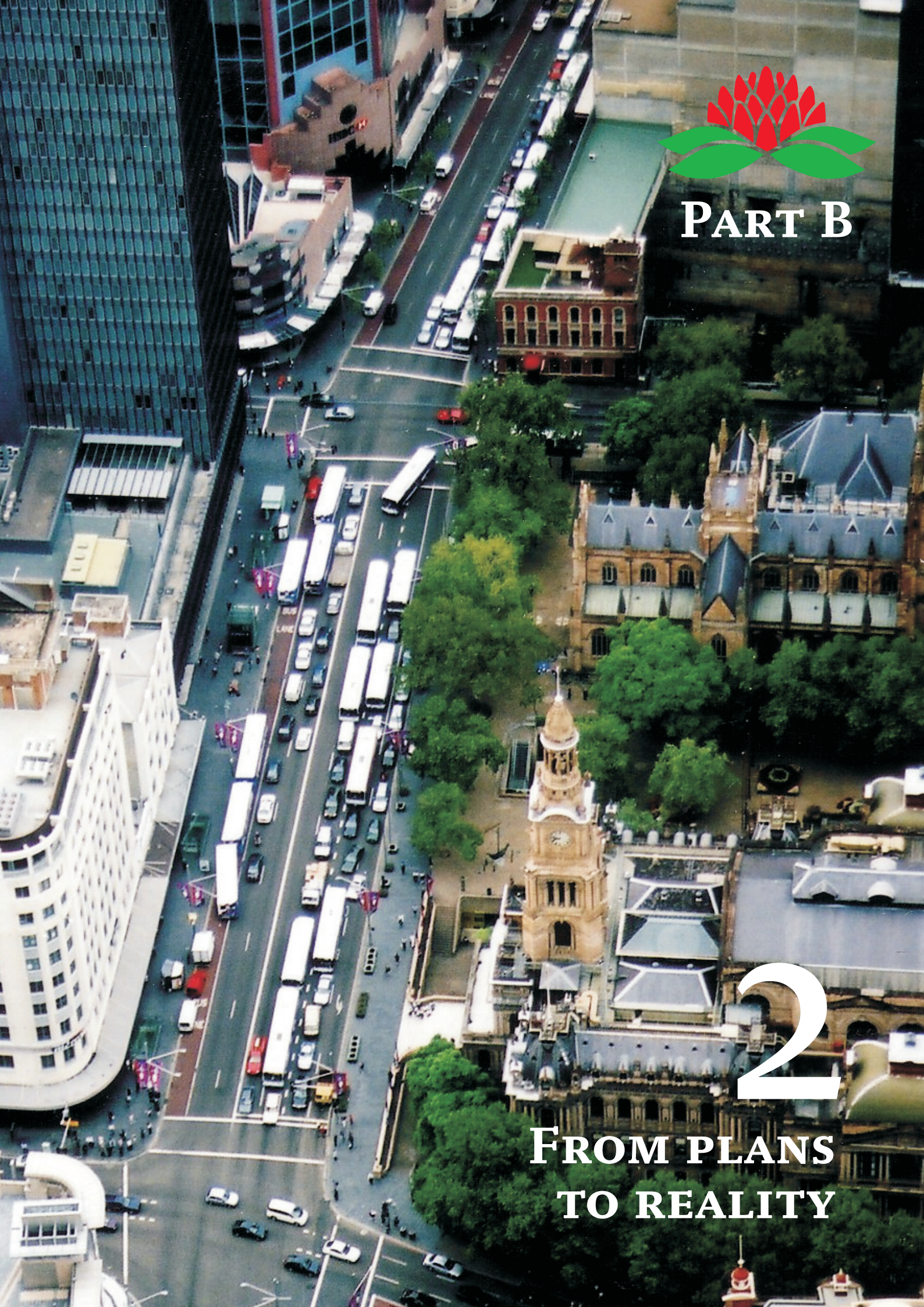
Final Report

Part B

Governance

Processes for **Plan** Funding

Chapter 2: From plans to reality



Part B

2 From plans to reality

2 From plans to reality

2.1 Introduction

2.1.1 The importance of transport governance

No matter how visionary a transport plan may be, it will succeed only if it is supported by a strong management structure and adequate and dedicated funding, both committed to the plan's long-term implementation.

The management structure, or "governance" system, must be:

- Able to secure the resources required to deliver the infrastructure underpinning the plan
- Strong enough to maintain a commitment to the plan in the face of short-term political considerations
- Able to manage the whole public transport system cohesively and with authority
- Able to obtain enough funding to deliver a high level of services (see Part D, Chapter 6), and
- Be prepared to champion public transport and other sustainable modes in the face of competing priorities and interests, such as the demands of private vehicles.

If the governance system is inadequate the public transport plan is most unlikely to be delivered. Critical infrastructure will not be built, services will be poorly integrated and the level of service provision will remain patchy and unreliable.

2.1.2 Sydney's transport management: a history of fragmentation prior to 2009

Sydney has a long history of failures to implement public transport plans and infrastructure promises.

Since the 1940s at least seven separate major public transport plans have been announced for Sydney, promising dozens of projects with hundreds of kilometres of new railway lines and other improvements, yet only a fraction of the promises have ever been honoured.

This failure to deliver has been particularly noticeable in western Sydney, where only 15 km of railway line and three railway stations have been added over the last 70 years, despite very substantial population growth.

In addition, despite decades of technological improvements travel times throughout Sydney's rail network have actually increased, and attempts to introduce

measures such as integrated ticketing, commonplace throughout the world, have failed.

A number of factors have contributed to these failures, but one of the most significant has been **the inconsistent, fragmented and politicised nature of Sydney's public transport governance**.

Except for a brief period during the life of a "Public Transport Authority" in the late 1970s, no single organisation has ever had specific and sole responsibility for planning and running the whole Sydney public transport system.

The most important decisions affecting public transport have been, and are, made by politicians, frequently on the basis of short-term political considerations, and a wide variety of government departments.

These agencies often have competent and dedicated staff, but they are motivated by goals *other than* delivering the best integrated public transport service for the customer. **No single agency currently has the authority and resources to ensure that the entire system works coherently to produce the best possible accessibility for public transport customers and the best possible economic, social, environmental and energy-efficiency outcomes for Sydney, and the proposed roles and structure of the new Department of Transport and Infrastructure will only partly address this deficiency.**

Instead, Sydney's transport management has mostly been divided into separate "silos" representing different transport modes and operators, each working under separate legislation and different corporate models.

These separate "silos" will largely continue under the draft legislation for the new Department of Transport and Infrastructure, but will be under more direct political control.

The silos sometimes feature high degrees of "vertical" integration—for example, from time to time virtually all aspects of the rail network, from planning to operations, have been managed within the one agency—but there has been little "horizontal" integration between the silos.

Different arrangements have been tried in attempts to overcome these problems, from transport commissions to railway corporations to direct departmental control (as now proposed, once again), but at best integration has been limited, temporary and largely confined to the ministerial level.

In addition to failing to deliver vital public transport infrastructure, the "silo" arrangements have failed to ensure that the transport services provided by the different modes and providers operate together seamlessly and effectively.

Instead, the fragmented structure has promoted a focus by each agency on its own particular mode or a particular route, rather than the delivery of an integrated transport service.

While the Transport Ministry, Department of Transport, Department of Transport and Infrastructure or its equivalent has theoretically provided overall oversight, in practice its activities have mainly been confined to management—and in many cases quite counterproductive micro-management—of the bus system in particular, and its authority over operating companies has always been weak.

The Sydney rail network has been managed almost entirely by RailCorp and its predecessors, all of them State government agencies with direct links to the Minister for Transport.

In practice, public transport infrastructure planning has been fragmented between RailCorp, the Department of Transport, the Department of Planning, the NSW Treasury and other elements of the State government.

The Department of Planning has remained almost entirely separate, even during brief periods when there have been attempts for it to assume responsibilities for transport as well as land-use planning, such as those made about five years ago, and there has been little *real and ongoing* linkage—notwithstanding occasional rhetorical flourishes and assertions—between land use planning and the provision of public transport infrastructure in Sydney.

For example, many major residential areas and employment centres have been developed without the provision of new public transport infrastructure, and major roads have been extended or enhanced without any consideration of the effects on existing or future public transport services or on subsequent land-use changes.

Although a degree of integration was provided by the 2005 *Metropolitan Strategy* and the *State Infrastructure Strategy*, no long-term funding or management framework has been established to underpin these infrastructure plans.

In this management vacuum the plans have been changed, added to and then frequently cancelled on an *ad hoc* basis, primarily because of short-term financial and political considerations. Over the years they have borne less and less resemblance to the priorities identified in the original strategies.

In particular, in the space of little over 12 months major rail infrastructure projects in Sydney have been dumped and replaced three times, without any real consultation with the community or key stakeholders, and it seems likely that this will continue to be the pattern in the future.

2.1.3 Are the 2009 and 2010 governance changes enough?

Creation of a Department of Transport and Infrastructure

In July 2009 the NSW government created a Department of Transport and Infrastructure, as one of 13 new "super-departments", to oversee transport "coordination", "policy and planning", "services" and "infrastructure".

The government has stated that this new structure is intended to "deliver integrated transport planning and service delivery, and consolidation of like-functions [*sic*] to reduce costs and provide additional funds for front-line staff and services."

In addition, RailCorp, a State-owned corporation, has reverted to being a statutory authority under direct government control.

It is now many months on, but draft legislation to implement these changes has only just been introduced and nobody can say how substantial these changes will prove to be in reality. The draft legislation itself, as distinct from the government's "spin" about it, reveals few changes of substance.

Will the new structure really be able to challenge the existing "silos" by integrating public transport services effectively and prioritising public transport infrastructure against competing demands for new roads?

How will the new structure relate to the Department of Planning and other elements of government?

And how effectively will it be able to challenge the dominance of the NSW Treasury, which has a long history of antagonism to public transport improvements?

So far the signs are definitely not good, as the evaporation of previously "committed" funding for public transport under the government's new February 2010 *Metropolitan Transport Plan* has demonstrated, but nobody knows.

Importantly, however, **even if the new arrangements do improve integration, their centralisation of power will also serve to increase rather than reduce political micro-involvement in transport management.** Indeed, in introducing the draft legislation for the new arrangements in May 2010 the NSW Minister for Transport and Roads extolled what he saw as the virtues of such centralised political control in enabling him to make "the tough decisions".

The creation of super-departments has a poor track record in NSW. Integrating the "silo" structure at the *political* level may seem logical, but is often doomed to fail without a much more comprehensive integration at the *planning and operational* level.

For example, the last attempt to create a super-department in these areas, the Department of Infrastructure, Planning and Natural Resources, was completely unravelled within a few years, following the departure of the minister responsible for these changes.

Another 'integration' of land-use and transport planning

In March 2010 the NSW government announced a process to "refresh" Sydney's overall 25-year land-use planning strategy, the *Metropolitan Strategy, City of Cities: A Plan for Sydney's Future* (Department of Infrastructure, Planning and Natural Resources, 2005).

This process is described in a "discussion paper" prepared by the NSW Department of Planning, *Metropolitan Strategy Review: Sydney Towards 2036*, which variously states that the government's new *Metropolitan Transport Plan, Connecting the City of Cities*, released on 21 February 2010, will be "fully integrated with the *Metropolitan Strategy*" and, seemingly inconsistently, that "the *Metropolitan Transport Plan* and the *Metropolitan Strategy* will work together as key planning documents".

The Inquiry fully supports real integration of land-use and transport planning. However,

- The precise nature of the proposed "integration" and/or "working together" of two separate documents developed by different government agencies, one expressly considering only the short term and the other the next 25 years, has not been explained.

  Indeed, despite all the "integration" rhetoric, it appears the government's major transport investment decisions have already all been made for at least the next ten years, even before any revised land-use plans have been investigated or developed. The *Metropolitan Transport Plan* repeatedly claims every one of the individual transport projects it describes "will" be implemented and is already backed by "a ten-year funding guarantee".

- **Effective delivery of public transport depends not only on the integration of land-use and transport planning but, every bit as fundamentally, strong**

integration between the *planning* of public transport and the *provision and operation* of public transport.

As already indicated, the consolidation of all transport and land-use planning in a single department has already been tried. While there were some benefits, the resultant structural separation of transport planning from transport operations proved to be counterproductive, both for the efficient and expert management of the public transport system and for the efficient and expert development of new public transport infrastructure.

2.2 Submissions on governance issues

Many submissions to the Inquiry have identified a need for substantial and urgent changes in the transport governance system, a view highlighted in Camden Council's submission:

> *"By far the most critical thing to get right in the development of a Long Term Public Transport Plan for Sydney is the governance arrangements. Sydney has had transport plans and metropolitan strategies before. None have been fully implemented. Most are abandoned at a change of Government or change of Premier."*

The reasons for change consistently identified in the submissions have included:

- A lack of integration between transport operators in the provision of services
- A lack of integration between agencies in land use and transport infrastructure planning
- Failures to implement transport plans or deliver promised transport infrastructure, and
- Political interference in the details of transport management.

Several submissions have noted the better performance of cities with different transport governance structures, such as London, Singapore, Toronto and Zurich, in delivering integrated services and infrastructure, a theme we return to below.

Most of the submissions discussing alternative structures have favoured the creation of a single authority to plan and manage all forms of public transport.

Although there have been differing views on the form this body should take, most of the submissions have favoured an entity focussed primarily on public transport, as summarised in Ryde Council's submission:

> *"Many governance issues raised may be resolved through the development of an Integrated Transport Authority which has funding responsibility and the ability to strategically prioritise transport projects for the long term sustainability of Sydney's transport system."*

In addition to responsibilities for funding and project prioritisation, most of the submissions saw the integration of public transport services as a key role for this body:

> *"A single Sydney Transport Authority should be created to co-ordinate and integrate all modes of transport, so as to avoid each mode being planned and operated in competition with each other and to the detriment of the total system."* (Northern Sydney Regional Organisation of Councils)

There have been more varied views on the new body's relationship with the State government.

Some submissions have called for an "arms length" entity operating largely independently of the government as a statutory authority.

Others, such as the Western Sydney Regional Organisation of Councils, have supported a body representing "local, State and Federal interests".

A smaller number of submissions have proposed closer integration with the government through a transport mega-department similar to that announced by the State government in 2009 (e.g. David Kilsby's submission), stressing the importance of a "whole of government" approach (e.g. Camden Council's submission).

While most of the submissions have supported the creation of a single authority concentrating on public transport planning and services, some have proposed that the new body should also have responsibilities for all forms of road transport.

Others have recommended that the new entity should also integrate transport and land-use planning. For example, the Planning Institute of Australia's submission called for the creation of:

> *"...a 'Sydney Metropolitan Authority' charged with the responsibility of directing, across all Government agencies, the planning and implementation of integrated land use and transport services and infrastructure for Metropolitan Sydney."*

Most of the submissions favouring the establishment of a new body have recommended that it should be a statutory authority or a government-owned corporation. However, a small number of submissions have supported the creation of a *political* authority specifically to take charge of urban planning, infrastructure planning and transport management, based either on council amalgamations (Michael Grosvenor's submission) or directly elected, similar to the Mayor of London model (Glenda Sandars' submission).

In addition, several submissions have emphasised the need for the proposed authority to undertake consultations, especially during the development of its transport plan(s).

Pascal Süess' submission, for example, has argued that:

> *"[The] transport plan should be developed by an independent panel of experts. After public consultation, a referendum should be held, allowing all people of metropolitan Sydney to vote about the plan. If the plan is accepted, it becomes part of the law and it is the government's duty to get it realised."*

Some submissions have described in detail how a transport authority might operate. Joseph Vnuk's submission has suggested an authority with overall responsibility for providing "high-quality, affordable environmentally friendly public transport to NSW in an equitable way" and has argued that public transport should be seen as a natural monopoly protected by the State—but with this monopoly being separated into two distinct markets:

- The purchase of transport services by the transport authority from different operators to provide a specified number of services over specified routes to specified standards, and

- The provision by the authority of integrated journeys to the public. This would require increased frequencies and genuine integration, but would be managed entirely by the transport authority and not the operators.

Some of these ideas and ideas from other submissions are explored below.

2.3 How is public transport managed elsewhere?

The importance of having a single authority for managing public transport is underscored by experience throughout the world.

Many cities have dealt with the sorts of challenges that Sydney is now facing, and the creation of a single authority has been instrumental in their successful development of new, integrated public transport systems and/or the successful expansion and augmentation of existing systems.

All the examples discussed below are cities which are widely regarded as being relatively accomplished in their abilities to deliver major projects and maintain a spirit of continuous improvement.

However, there is no "one size fits all" model of integrated transport management, as the examples show. The governance systems outlined below may not be directly applicable to Sydney, but they all highlight several key attributes which are definitely relevant for Sydney.

2.3.1 Perth

Transperth

Perth's Public Transport Authority (PTA) is separate from the WA Departments of Transport and Planning. It does not have a separate board, but reports to the same minister as the Departments of Transport and Main Roads. The PTA is an independent body staffed by state government employees. Its mandate is statewide, but most of its efforts are devoted to the metropolitan region, where it is known by the brand *Transperth*.

The PTA manages all contracts for public transport operations.

A key feature of the system is a very precise delineation of responsibility between the government and the private operating company, which prevents much of the confused overlapping of authority that is common in Sydney. In Perth, an operating company's job is strictly operations and maintenance. This creates a clearer government authority that is not easily undermined.

For example,

- The transport agency, not the operator, owns the buses, trains and ferries and their depots. Depot locations and fleet availability are therefore removed from the competition over operating contracts, allowing a competition that is narrowly focussed on the operator's cost-effectiveness and service quality.
- The transport agency, not the operator, decides what routes and schedules will be operated. The operators have input into this process as stakeholders but do not make the final decisions.
- The transport agency is the "face" of the service to the public. All public transport vehicles bear the agency's livery, not the operators', and the agency handles the public information and marketing systems, so that the entire network is a clearly a single integrated system. Obviously, bus

drivers work for the operator and do interact with the public, but all other communications are handled through the transport agency.

The result is a strict and clear chain of customer-vendor relationships, in which the rider is the customer of the public transport agency and the public transport agency is the customer of the operators.

In many respects the relationship between the PTA and the operators is analogous to the relationship that the 2004 Unsworth *Review of Bus Services in New South Wales* sought to see evolve over time, but in Sydney these relationships remain confused, primarily because of a lack of resourcing and authority on the government side.

2.3.2 South East Queensland

South East Queensland represents significant transport planning and governance challenges. Its current population is over 2.9 million people and is expected to grow to 4.4 million by 2031. This population is spread across a region which stretches 240 km from Noosa in the north to the NSW border in the south.

Brisbane City Council has responsibility for over one-third of the region's population, and recent amalgamations and growth mean that Brisbane and three other councils, Gold Coast, Moreton Bay and Sunshine Coast, are responsible for nearly 80% of the region's population.

In addition to its size, Brisbane City Council is unique among Australian local government authorities in that it is a major bus and ferry operator. The Queensland Government manages the rail network.

To help overcome some of the practical issues created by this division of ownership, *TransLink* was created in 2004 to introduce integrated ticketing across all modes of public transport. In 2008 its role was considerably expanded through legislation creating the *TransLink* Transit Authority to manage the planning and delivery of all public transport services.

TransLink now has responsibilities for:

- Coordinating, integrating and promoting the public transport services provided by the 18 different operators in South-East Queensland
- Delivering and managing public transport infrastructure
- Providing customer information and feedback facilities, and
- Managing the ticketing system and making recommendations about fare levels.

TransLink is managed by an independent board, appointed by the State government, whose members are the Director-General of the Department of Transport and Main Roads, the CEO of Brisbane City Council and five members (including the chairperson) selected on the basis of their experience and skills.

In other words, the Queensland government has had the courage, unlike any of its NSW counterparts, to legislate the creation of an independent authority, answerable to an independent board, to independently manage public transport not just in Australia's third-largest city but also in one of the most rapidly developing regions in Australia.

TransLink is required under its legislation to prepare a *TransLink Network Plan* setting out a four-year program of service and infrastructure improvements and a

ten-year blueprint to guide the development of the *TransLink* network. In addition, it must produce a written fares strategy at least every five years.

TransLink has identified 12 priorities, known as "the TransLink 12", to guide its actions for the next three to five years, covering public transport organisational structures, customer service strategies, rail and bus/ferry "delivery partnerships", network planning, strategies to increase farebox revenue, commercial opportunities, external relations, the Gold Coast Rapid Transit project, "people strategies", investment and project control, financial control and performance reporting.

2.3.3 London

Transport for London (TfL) is responsible for the London Underground and London buses, as well as heavy and light rail services, taxis, the road network and other land and water transport services in London.

Like many of the other transport agencies discussed, TfL is controlled by a board and managed by a transport commissioner. However, TfL is unique in that the board is appointed by the Mayor of London, a directly-elected position which was created especially to provide strategic governance for the city in specific policy areas such as transport, spatial development, economic development and the environment.

The Mayor sets the TfL budget and the structure and level of public transport fares. In addition, the Mayor is responsible for developing the city's integrated transport and spatial development strategies and has a major say in the approval of large development projects.

Within this framework the previous Mayor, Ken Livingstone, oversaw the introduction of congestion charging and an extensive modernisation and extension of the city's transport networks. The *Oystercard* ticketing system was also introduced, providing travellers with an electronic stored value integrated ticket (see Chapter 3).

2.3.4 Singapore

In Singapore a statutory board, the Land Transport Authority (LTA), reports to the Minister for Transport. The LTA is divided into ten operational groups covering areas such as policy and planning, rail operation and projects, road operations and projects and vehicle licensing. In other words, the LTA controls all land transport in Singapore.

Singapore's *Land Transport Masterplan* of 2008 spells out a series of reforms designed to clarify the LTA's role as the planner and purchaser of public transport services. These include:

> *"LTA will take on the role of central bus network planner in 2009.It will adopt a more commuter-centric approach to planning the bus routes to create a more integrated and service-oriented public transport network."*
>
> *"A ... fare structure will be adopted ... to remove the fare penalty associated with transfers."*
>
> *"Greater contestability will be introduced in the public transport industry to encourage greater efficiency and service improvements ... The basic bus service market will be opened up gradually to allow greater competition."*

In short, Singapore's LTA is part of a process of moving from a historical structure, more like Sydney's, to one that is more like London's or Perth's.

A single agency will ensure that all services are planned and presented as a single integrated network. Operating companies that have viewed themselves as "entitled" to perpetual control over territories will have to become vendors competing for the government's business, thus ensuring the most efficient possible service for the end user.

2.3.5 Vancouver

Like Sydney, Vancouver occupies a narrow space between mountains and the Pacific Ocean, leaving little room for sprawl. It also features numerous water barriers and topographical challenges that will be familiar to Sydneysiders.

Vancouver is routinely at or near the top of international "liveable cities" rankings, partly because of its high level of commitment to public transport. Its public transport features driverless metros (similar to those previously proposed for Sydney) and extensive networks of trolley buses, conventional buses, commuter rail services and ferries. New light rail lines are also under construction.

The city has just completed its third driverless metro line, the Canada Line, through a controversial "public private partnership".

Few cities in North America, or Australasia, have embraced high-rise development, especially residential towers, on anything like Vancouver's scale. The role of the first driverless metro line, *SkyTrain*, in promoting this was especially pronounced. The route of the starter line, opened in 1986, is now easy to pick out on the skyline because it has generated a string of clusters of towers marching all the way across the region, following the line. It has many of the development features, and problems, that would be likely to affect metro-driven redevelopment in Sydney.

Vancouver's specific relevance to governance is that:

- It has a regional transport authority very similar to the one this Inquiry is proposing for Sydney (see sections 2.5.1 and 2.6 below)
- Canada's Westminster system of government is familiar to Australians, and provides a legal context that is more likely to be relevant to New South Wales than many cities in Asia, the United States or even continental Europe, and
- The governance structure was substantially revised by the British Columbia government early in 2009, so debates on governance are still active in the city.

Vancouver's metro-area transport agency, *TransLink*, is responsible for planning, managing and presenting the entire network as a single system. It has a dedicated funding stream derived from tax revenues and the authority to increase some taxes with the consent of the mayors.

It has a three-part governance structure:

- A Mayors' Council, consisting of the mayors of 22 council areas, which appoints *TransLink*'s board and commissioner, described below. Proposals to increase taxation must go through the mayors.
- A Board of Directors that oversees routine actions of the agency, including planning, operations, finance and public information.

  Board members cannot be elected officials. Instead, they are intended to be professionals with relevant expertise in management or transport. They are nominated by the British Columbia government but approved by the mayors.

Board members serve staggered three-year terms and cannot be removed without cause. This provision aims to resolve a problem that we also see in Sydney: the need to maintain some separation between the daily work of the transport agency and short-term political pressures of the moment.

- A Commissioner, who serves as an auditor and customer advocate.

  Most customer surveying is conducted through the Commissioner's office, and he or she publishes reports on system performance. The Commissioner's approval is required before fares may be increased.

  The Commissioner serves a very long term, nine years, and cannot easily be removed.

A recent report by the Controller General has recommended adding British Columbia government representatives to the Mayors' Council, but has also reaffirmed the importance of the integrated planning and operations functions that TransLink performs.

2.3.6 Zurich

Several submissions to the Inquiry have noted the success of Zurich's public transport system.

Zurich has a comprehensive suburban rail, tram and bus network with frequent and reliable services, supported by extensive public transport priority measures such as roadway improvements, traffic signal priority for public transport, transit rights of way and other major facilities.

Zurich's transport network and governance systems are both products of Switzerland's unique system of direct democracy. This gives the residents of Swiss towns and cantons (states) effective vetoes over major government proposals, as well as the right to put a citizen-initiated proposal to a referendum.

Proposals by the Zurich Canton in the 1960s and 70s to develop expensive underground metro systems were defeated, reflecting a community desire to improve the city's existing surface public transport network instead, particularly light rail. After the success of a subsequent ballot to promote and develop the existing system, the city administration began the implementation of this policy, adopting an integrated, whole-of-government approach.

In 1981 a referendum to expand the city's suburban rail network was passed. A line in the successful ballot measure to implement a coordinated ticket system for the entire canton was used as a basis for achieving much greater service integration, and the Zürcher Verkehrsverbund (ZVV) was formed to coordinate, manage and improve the service quality of the region's transit operators.

The ZVV now coordinates eight transport companies with marketing responsibilities and 42 companies which provide services. It acts as a broker, purchasing services to a certain level from each operator for an agreed amount.

The ZVV answers to a cantonal transport board which is responsible for overall coordination and budget management. The board has representatives from the three levels of government but answers directly to the canton. The 171 Zurich municipalities also have inputs into the process, through 12 Regional Transport Conferences which consider all public transport issues relevant to local government.

2.4 Key principles for successful public transport planning and management

The examples of successful public transport governance outlined above all demonstrate at least some of the following characteristics:

- **"Horizontal" integration across all public transport modes and operators.** Successful governance systems aim to present a single network to the customer in which multiple modes all work together.
- **Autonomy from short-term issues.** Successful governance systems are based on the realisation that good network development cannot proceed efficiently if it is buffeted by every crisis of the moment. They have all thought through how to put some boundaries around the authority of the Minister of Transport and other elected officials, such that the government is fully in control of setting policies that reflect its values but is not micro-managing the work of the agency.
- **A commitment to consultation.** Many successful governance systems involve regular conversations with the public, in which questions are phrased to elicit the community's values in a form that can readily be acted upon.
- **Engagement with *all* levels of government**, including both national and local governments.
- **Appropriate and secure resourcing**. Many of these systems use a combination of funding sources and many are supported by long-term funding commitments.
- **Strong accountability and transparency mechanisms**. Several systems have various forms of external auditing or customer advocacy that report on the outcomes of the transport program.

Each of these factors is examined in more detail below.

2.4.1 Integration

Virtually all the successful examples of transport governance systems incorporate high levels of integration at the planning level, meaning:

- The operating companies operate the public transport services but do not design them.

  Instead, integrated public transport network design is carried out by a single authority which has professional expertise in all of the transport modes involved and is charged with making these modes work together, not just making them work separately.

- The public transport authority is the customer of the operating companies and the primary face of public transport to the citizens.

  Unified systems of public information go far beyond the model of Sydney's "131 500 Transport Info" system and embrace the whole spectrum of communications and consultation.

  Citizens feel they have one public transport system, not many, and know who to contact to address any problems that arise. The transport authority then chooses whether to forward these matters to the operators or directly address them itself.

In most cases a single authority is responsible for coordinating *every* aspect of the public transport network. This coordination usually covers all modes and all operators. Public *versus* private ownership of specific transport services does not appear to be an issue, so long as the transport authority has overall control and can set parameters for performance and service delivery.

The visible expressions of successful integration include:

- Integrated fare structures, with fares depending on the nature of the trip and not the number of vehicles or modes it requires
- Successful implementation of electronic stored-value card ticketing systems
- Successful planning of timetables to ensure seamless intermodal transfers
- Interchanges designed to a high standard, with consistent signage and facilities, and
- Planning processes which consistently seek to optimise the entire network rather than the interest of a particular operating company or mode and can be audited and documented in those terms.

In addition, there is usually strong integration of the planning and provision of transport service with land-use planning and the development of infrastructure priorities.

Land-use planning and transport planning authorities are usually still separate, but the integration of the transport function gives weight to the transport authority's role as an advocate of transport-efficient land-use decisions.

In many cities public transport planning is also integrated with—but *not* subordinate to—road transport planning. In some, public transport is given explicit priority.

2.4.2 Autonomy and authority

Many of the successful governance systems give the transport authority a crucial degree of autonomy from central and state governments, coupled with the authority to exert control over operators and make and budget for long-term infrastructure decisions.

This is generally achieved either by:

- The creation of a directly elected position or governance body specifically to undertake strategic activities such as metropolitan-wide land-use and transport planning and provision or
- The creation of a body which is appointed by the relevant level of government but which is granted sufficient powers to have a degree of real autonomy and authority. This body's board or equivalent may include representatives of the government, but this is usually balanced by representation from other levels of government and/or appointments made on the basis of business and technical expertise.

In both cases the central or state government provides the body with funding and sometimes the ability to raise its own funds from farebox and other sources.

It is important to note, however, that the autonomy of these bodies is underwritten and protected by the political support of the governments to which they answer. The relevant government has to have the courage and vision to establish the authority in the first place, and then to continue to provide both financial

support and integration at the "strategic" level with government agencies responsible for land-use planning and other matters that affect the provision of public transport.

2.4.3 Engagement with other levels of government

Under successful governance systems the importance of autonomy for the transport authority is balanced by the need to constructively engage with *all* levels of government.

If this principle were adopted in New South Wales, both the Commonwealth government and local governments would have important roles as partners of a Sydney-level public transport authority.

Commonwealth government

In the last two years, the Commonwealth government has begun to directly fund urban infrastructure, a common practice in many other federal systems, for the first time in nearly 20 years.

This funding obviously entitles the Commonwealth government to "a seat at the table" as project decisions are made. The Commonwealth's funding body, Infrastructure Australia, has been established to ensure the Commonwealth's contributions are constructive, properly represent the nation's economic interests and advance the viability and vibrancy of Australia's major cities.

This influence should encourage better planning and better transport service and infrastructure outcomes, especially as the Commonwealth has announced it will be insisting on the development and adoption of adequate strategic plans before funding individual projects.

In December 2009, in response to these Commonwealth initiatives, the Council of Australian Governments (COAG), comprising the Commonwealth and all, State and Territory governments, formally adopted new national criteria for capital city strategic planning systems throughout Australia.

In doing so it claimed these criteria, set out in the box on page 97, will *"ensure our cities have strong, transparent and long-term plans in place to manage population and economic growth, ... address climate change, improve housing affordability and tackle urban congestion"*, and that they will also:

- *"Provide for future-oriented and publicly available long-term strategic plans*
- *"Be integrated across functions (for example, land-use, infrastructure and transport) and coordinated between all three levels of government*
- *"Clearly identify priorities for future investment and policy effort by governments*
- *"Provide for effective implementation arrangements and supporting mechanisms, and*
- *"Support and facilitate economic growth, population growth and demographic change."*

COAG set a deadline of 1 January 2012 for all of the States to introduce plans that meet the new criteria, and "noted" that the Commonwealth will *"link future infrastructure funding decisions to meeting these criteria"*.

In essence, this means **the New South Wales government will continue to fail to attract significant Commonwealth funding for major public transport projects in Sydney unless and until it starts complying with the new national planning criteria.**

COAG has commissioned an independent review of the consistency of current capital city strategic planning systems with the new national criteria during 2010 and 2011.

Overseas, transport authorities have frequently taken the initiative in meeting similar federal government criteria, thereby establishing a constructive relationship and maximising the potential for receiving federal funding and other support.

Local government

The role of local government is unusually small in Australia, compared to similar countries such as Canada and the US, and it is especially small in NSW, compared to Queensland or Victoria, at least partly because the councils themselves cover such small geographic areas.

National objective and criteria for future strategic planning of capital cities

Objective

"To ensure Australian cities are globally competitive, productive, sustainable, liveable and socially inclusive and are well placed to meet future challenges and growth."

Criteria

"Capital city strategic planning systems should:

- *"Be integrated—*
  - *Across functions, including land-use and transport planning, economic and infrastructure development, environmental assessment and urban development, and*
  - *Across government agencies.*
- *"Provide for a consistent hierarchy of future oriented and publicly available plans, including—*
  - *Long term (for example, 15-30 year) integrated strategic plans*
  - *Medium term (for example, 5-15 year) prioritised infrastructure and land-use plans, and*
  - *Near term prioritised infrastructure project pipeline, backed by appropriately detailed project plans.*
- *"Provide for nationally significant economic infrastructure (both new and upgrade of existing), including—*
  - *Transport corridors*
  - *International gateways*
  - *Intermodal connections*
  - *Major communications and utilities infrastructure, and*
  - *Reservation of appropriate lands to support future expansion.*
- *"Address nationally-significant policy issues, including—*
  - *Population growth and demographic change*
  - *Productivity and global competitiveness*
  - *Climate change mitigation and adaptation*
  - *Efficient development and use of existing and new infrastructure and other public assets*
  - *Connectivity of people to jobs and businesses to markets*
  - *Development of major urban corridors*
  - *Social inclusion*
  - *Health, liveability and community wellbeing*
  - *Housing affordability, and*
  - *Matters of national environmental significance.*
- *"Consider and strengthen the networks between capital cities and major regional centres, and other important domestic and international connections.*
- *"Provide for planned, sequenced and evidence-based land release and an appropriate balance of infill and greenfields development.*
- *"Clearly identify priorities for investment and policy effort by governments, and provide an effective framework for private sector investment and innovation.*
- *"Encourage world-class urban design and architecture.*
- *"Provide effective implementation arrangements and supporting mechanisms, including—*
  - *Clear accountabilities, timelines and appropriate performance measures*
  - *Coordination between all three levels of government, with opportunities for Commonwealth and local government input, and linked, streamlined and efficient approval processes, including under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999*
  - *Evaluation and review cycles that support the need for balance between flexibility and certainty, including trigger points that identify the need for change in policy settings, and*
  - *Appropriate consultation and engagement with external stakeholders, experts and the wider community."*

While the reform of local government extends far beyond public transport and is thus outside the scope of the Inquiry's review, it should be noted that other states in Australia have found it beneficial to have a strong local partner in transport, and that often this is achieved—most recently in Queensland—by consolidating councils into fewer, larger ones representing natural geographic units or "strategic" planning areas.

Several local government roles directly affect public transport. For example,

- The planning of local streets can have substantial impacts, both positive and negative, on bus or light rail services and cyclists and pedestrians using these streets
- The planning of local land uses and community facilities can substantially affect the shape of public transport markets and the relative ease and attractiveness of public transport, cycling, pedestrian and private vehicle access, and thus significantly affects the service levels and efficiency that public transport can achieve, the adoption and safety of cycling and pedestrian modes and the need, or otherwise, for citizens to have to rely on private vehicles, and
- Councils' proximity to community-level organisations and voters allows them to have more robust and ongoing consultation processes, so they can present public transport questions to the public in a way that is integrated with their other concerns, including a shared vision for their communities.

A council that feels "helpless" about public transport is likely to focus its energies on areas of activity over which it has more control. This can often lead to decisions about other things—especially roads and land uses—that undermine public transport.

Only a governance structure that expressly includes councils—engaging their inputs and, in the process, educating their staff—can produce the kind of effective conversations required for politically resilient outcomes.

Most of the overseas examples provide frameworks for local government engagement with transport authorities.

One recent trend in Sydney has been for councils to sponsor specific local public transport services, ideally supplementing rather than duplicating services provided by the State.

Parramatta Council, for example, has been the lead agency in developing a downtown loop shuttle service for the Parramatta CBD, and Willoughby Council has initiated a similar service for the Artarmon industrial area.

These types of approaches can be very successful when the routes of such "feeder" services lie entirely within a single council area or an area governed by a group of councils cooperating in the development of the services. In the past, however, the State government's bus contracting arrangements have effectively tended to discourage such services.

2.4.4 Commitments to consultation

Many of the successful governance systems examined by the Inquiry incorporate the development of long-term strategic plans which underpin the provision of public transport.

The development of these plans usually involves extensive and real consultations with transport users, transport providers, other government agencies, other key stakeholders and the wider community.

In some countries these processes may even involve community referenda on specific transport plans or fund-raising initiatives.

Other methods of seeking community input include sample surveys, "focus groups" and other forms of market research.

A semi-autonomous transport authority should have the scope to ask certain basic questions—in Sydney, for the first time—and formulate a consistent policy on these issues. These basic questions include:

- How do we balance our investment between providing minimum service levels to low-density, low-patronage areas and aggressively competing with the car in higher density areas where the patronage potential is much higher?
- How do we balance our investment between competing for long trips, such as the markets that drive much of CityRail, and shorter trips, for which other modes may be better suited?
- What new funding sources might be used to accelerate the development of public transport?
- What levels of priority for public transport vehicles over private vehicles is appropriate on our roadways?

Effective consultation policies work to engage the public on these sorts of large-scale policy questions *before* a specific issue flares up in a specific place.

For example, a discussion of public transport priority might be illustrated by examples from several different kinds of streets and suburbs, but the goal would be to steer toward a consistent policy, one that can be adopted by governments and cited to justify specific decisions.

This approach to consultation should aim, in the long run, to form guidelines about big questions that staff in all relevant organisations can use to inform their daily work.

The adoption of these guidelines, and the monitoring of them by an independent auditor as recommended by the Inquiry in section 2.7.6 below, should also be designed to allow elected officials to stand back from day-to-day operations as long as the guidelines' general direction is being followed.

2.4.5 Responsibilities for developing long-term public transport plans based on objective assessments

In most of the successful governance systems examined by the Inquiry the transport agency is wholly or largely responsible for developing, implementing and reviewing an overall, long-term public transport plan.

This plan usually lays the foundation for the planning and development of transport infrastructure projects and improvements to public transport systems and services. In some cases they also become the basis for funding bids to central or state governments.

The plans are either developed as stand-alone documents or in conjunction with long-term strategic land-use and infrastructure plans.

They frequently contain a series of scenarios addressing different "funding futures", to facilitate debate about what levels of funding should be provided.

2.4.6 Appropriate and secure funding and resourcing

Very few effective governance systems encourage treasuries or their equivalents to make decisions about the individual details of the transport budget, as NSW still does.

Instead, treasuries are involved at a higher level in government decisions about how to fund the *entire* transport operation.

The successful governance models also provide some real stability to the funding stream from year to year. Although public transport budgets may be buffeted by externalities that affect their revenue streams, such as the financial crisis that began in 2008, they do not vary wildly from one year to the next depending on the politics of the moment.

Most of the successful governance examples are able to retain and utilise farebox revenues from their public transport system.

In addition, they are able to access funding from other sources such as betterment, property, registration or parking levies, congestion charges and road tolls (these types of funding sources are discussed in detail in Chapter 6).

Many also receive operational subsidies from state and/or national governments and negotiate additional grants for specific infrastructure projects that form part of the long-term transport plan.

2.4.7 Strong accountability and transparency mechanisms

Successful examples of public transport management also feature a number of accountability and transparency mechanisms.

In London and several other centres there is direct political accountability through the electoral process. In cases where the transport authority is appointed by the government the authority has to report either directly or through a supervisory board, and if other levels of government such as councils are involved there are lines of reporting that involve them as well.

In terms of *public* accountability, most of these agencies publish their public transport plans, performance reports and other reports on their websites, which they also use to engage the community in public consultation processes.

Several have one or more "commissioners" or "auditors" who independently report on public transport outcomes.

2.5 The need for a long-term public transport plan

The Inquiry has concluded that the development of an integrated, long-term *Public Transport Network Plan* is essential for the creation of an integrated public transport system in Sydney.

As already discussed in section 2.1.3, the Inquiry fully supports the integration of land-use and transport planning, provided this integration is real and not simply "spin" hiding the preservation of separate bureaucratic "silos".

But this alone is not enough. **For the effective delivery of public transport there must also be strong integration between the *planning* of public transport (including the commitment of adequate, dedicated funding) and the *provision and operation* of public transport.**

The separation of these elements, as repeatedly attempted in Sydney and as re-introduced in 2009–2010, is a proven recipe for failure.

The Inquiry has therefore concluded that **a separate long-term *Public Transport Network Plan for Sydney* is required**, in addition to (but closely linked with) the new Metropolitan Plan that will emerge from the current review of Sydney's 2005 *Metropolitan Strategy*.

This plan should underpin all decisions regarding infrastructure and service development *and* the implementation and operation of improved and expanded public transport services. It should:

- Be based on Sydney's land-use patterns, both at present and under preferred patterns of growth, and help to ensure Sydney's long-term environmental, social and economic sustainability
- Produce, sustain and improve an attractive and efficient public transport network for the entire city, fully integrated across all public transport modes
- Expressly and clearly justify the pursuit of each specific planned infrastructure and service improvement or expansion project
- Address public transport needs over at least a 30-year timeframe, but also plan for and specify substantial short-term and continuous improvements, and
- Specify how all of the planned operational service improvements and infrastructure projects are to be funded.

The Inquiry's recommendations on governance issues, set out in section 2.7 below, include recommendations that:

- The development and updating of this *Public Transport Network Plan for Sydney* should be among the core legislated responsibilities of the new public transport governance arrangements recommended by the Inquiry
- The *Public Transport Network Plan for Sydney* should be developed and updated through legislated processes, tied to the State's four-year fixed electoral cycle, that guarantee significant opportunities for public inputs and the transparency of government policies and decision-making, and
- The initial and updated *Public Transport Network Plans* should themselves have legislative force, to help provide ongoing certainty and protection against short-term politically or bureaucratically motivated interference in the implementation of the plans.

2.6 Options for a new public transport authority

2.6.1 The need for a new single public transport authority

Clearly, the failure of Sydney's previous and current fragmented transport governance arrangements to deliver a public transport system of a quality comparable to those delivered successfully through integrated governance arrangements in a wide variety of circumstances overseas points to the need for some form of a new, single public transport authority.

This view has been reinforced by virtually all of the submissions to the Inquiry which discussed governance issues.

In summary, a single new authority is needed to plan, develop and manage all public transport in Sydney.

2.6.2 The need for a public transport focus

Some submissions to the Inquiry have suggested it would be best to go beyond the establishment of a public transport authority and instead create a "super body" with powers over all forms of transport, including all aspects of roads and road-based transport.

While the Inquiry understands the attraction of this approach, it has decided to recommend an authority that **concentrates on the planning and provision of public transport**, because:

- Unlike metropolitan public transport, the management of roads is a State-wide responsibility which also includes the management of long-distance road-based freight, and
- There is very real a danger that such a broadly based authority could lose its primary focus on public transport.

However, the Inquiry endorses the propositions that the new public transport authority should:

- Play a key role in the planning of major road projects in Sydney, especially on Sydney's radial road network and nominated major circumferential routes, to ensure that public transport has priority over private car transport investments, and
- Have specific responsibilities for establishing public transport corridors on existing and new roads.

2.6.3 Geographic area

While there is room for debate about the geographic area to be covered by any new public transport authority, **the authority must be able to focus fully on urban areas where public transport integration is paramount.**

At a minimum, it must cover all of the Sydney metropolitan area.

The new authority would also inevitably have an impact on the larger region currently served by CityRail, as many of these rail services outside Sydney itself are directly tied to services within Sydney.

On the other hand, making the new authority a Statewide organisation would definitely dilute its effectiveness.

It is therefore proposed that **the new transport authority should assume responsibility for all public transport planning, management and services in the Sydney metropolitan area, plus the planning, management and provision of rail services on the rest of what is currently the CityRail network, including passenger rail services in the Illawarra and Hunter regions.**

The provision of bus, light rail and other public transport services in (say) the Hunter region and on the Central Coast could either be administered by separate governance arrangements, reflecting the same principles as those adopted for Sydney, or they could be incorporated into the authority proposed for Sydney.

Similar flexibility exists for the Illawarra, Blue Mountains and Southern Highlands regions.

In general, however, the incorporation of large rural areas is not recommended. Regional centres and rural areas face different transport challenges, so separate administrative arrangements should be adopted. These might involve a single State-wide body, which could also oversee cross-regional services, or separate agencies or boards based on the major regional centres.

In Queensland, for example, *TransLink* covers the whole urbanised area of South East Queensland, including the Sunshine and Gold Coasts, while the Department of Transport and Main Roads—analogous to a combination of NSW's Department of Transport and Infrastructure and the RTA—continues to administer public transport in regional centres.

2.6.4 Possible governance models for the new public transport authority

The following options apply specifically to the authority proposed for the Sydney metropolitan area.

Option 1: Reforming the current structure of direct government responsibility

Under this option the recent transport management reforms implemented by the NSW government (section 2.1.3) would be retained and strengthened.

The Department of Transport and Infrastructure would continue to have the core responsibilities outlined earlier, but with a much more explicit commitment to develop and implement the *Public Transport Network Plan for Sydney*.

The plan itself would be likely to be a considerably more complex and analytical document than the *Transport Blueprint* originally to have been released by the former Premier, Mr Nathan Rees, in December 2009, and would definitely need to present more analysis than the short-term (and short) *Metropolitan Transport Plan, Connecting the City of Cities*, that was ultimately released by the NSW government in February 2010. It would also definitely require much higher levels of community consultation, input and participation.

The Department of Transport and Infrastructure would have to commit additional expert resources to achieving a high level of integration between the different existing transport government agencies and service providers. It would be responsible for contracting with individual operators, and would have to set performance targets and standards for these operators in a much more transparent manner. It would also need to coordinate closely with other relevant

government departments and agencies such as Treasury and the Department of Planning.

While this approach might result in some transport improvements, the continued reliance on a conventional government department subject to day-to-day Ministerial direction would leave implementation of the *Public Transport Network Plan* and the authority's other tasks vulnerable to short-term political considerations, as at present, and to Treasury's traditional hostilities to public transport and pressures to cut costs.

As recent experience has demonstrated, this vulnerability not only leads to *ad hoc* and often inconsistent decision-making but tends to degrade the quality and independence of the advice the government receives from transport agencies, as public servants and others in these agencies are instructed, or seek, "not to rock the boat" and therefore frequently just "tell the government what it wants to hear". The Inquiry understands, for example, that in the development of the State government's long-term *Transport Blueprint*, which was subsequently "reviewed" to become the short-term *Metropolitan Transport Plan*, all transport agencies were instructed by the Department of Transport and Infrastructure that they were to *assume* that several specified new "metro" rail lines—including the two publicly announced but subsequently abandoned metros, the Rozelle–Central "CBD Metro" and Westmead–Central "West Metro"—and several specified new major roads would be constructed in Sydney; in other words, no alternatives were to be considered.

In addition,

- Day-to-day operations would also remain open to political interference, causing wasted work, inefficient results and a loss of focus on long-term goals
- There would be no separate agency acting as an independent advocate for public transport, either to the government or to the wider community, and
- Even if an integrated approach to road and public transport planning were attempted, it is likely that—as with similar attempts in the past—the dominance of the former over the latter would continue.

Option 2: Creating a new tier of governance

This is the most radical option. It would involve the creation of a "mayor" and a "council" for the entire Sydney metropolitan area, as in London.

The new "council" body would be given powers over most aspects of public transport planning and provision, as well as other specific policy areas. It would be responsible for the development and delivery of the *Public Transport Network Plan*. It would have control of farebox revenue, but would also be allocated an appropriate level of funding by the State government.

The "Mayor of Sydney" would likely become a directly elected position of considerable influence. A key benefit of this arrangement would be that elections for this crucial position could be decided exclusively on metropolitan Sydney issues.

Two models could be considered in establishing such a body: the direct election of both the mayor and the members of the council, or the direct election only

of an executive mayor, with an assembly formed from the mayors of existing councils.

Both models assume the retention of the current local government structure in some form, although, as already discussed, larger and fewer councils could result in more "strategic" approaches to public transport by local government.

It should not be assumed, however, that creating a powerful single metropolitan-wide council with powers similar to those in some overseas cities would necessarily produce better public transport. Such a body would not be able to focus solely on key planning and transport issues, and there is a risk that some of the institutional problems which currently occur at the State level would simply be reproduced at the metropolitan level, given the wide powers of such a council.

In contrast, most of the *successful* "political" models overseas are based on an elected body with a narrower range of responsibilities, usually centred on developing and implementing the city's transport plan and *linked* to a similar process for strategic land use planning.

Under these arrangements the mayor and/or council might also be responsible for other specific matters which have a natural "fit" with metropolitan-wide governance, such as roads and environmental management, but the administration of other more local services is usually retained by the existing local councils.

There are positive aspects to this approach, especially if the new layer of government is relatively specialised. For example, in Portland the direct election of the Portland Metro Council—which covers the entire urban area but whose scope is limited to integrated land use and transport planning—means there is a biennial election in which the public debate is specifically about these issues.

One downside of this approach, if existing councils are retained, is that the new metropolitan-wide mayor and council create an additional tier of governance. The community would be electing three or even four levels of government. In London, for example, there are local councils, the Mayor and Assembly of London, the national parliament and the European parliament, and in Portland there are councils, the Portland Metro Council, the state government and the federal government.

In addition, there is often an uneasy relationship between the new body and the existing tiers of government, with potential jurisdictional conflicts.

Finally, this option would require considerable legislative changes and the devolution of considerable power from the State government.

There would probably be considerable public transport benefits if the "London model" were introduced here, but its scope extends so far beyond public transport that it is likely to occur only in the context of a large-scale re-invention of how Australian government is organised.

Option 3: Establishing an independent public transport coordination authority

Under this option a new independent transport coordination authority would become responsible for all of Sydney's public transport planning, development and management.

While this body would ultimately be answerable to the State government, it would operate at "arms length", providing a much greater level of independence and autonomy than the first option, reform of the current structure.

And while it would require considerable legislative change, it would not involve the creation of an additional elected tier of government, and would therefore avoid the political problems associated with the second option.

As already indicated, the establishment of an appointed coordination authority along these lines has been favoured by most of the submissions to the Inquiry which discussed governance issues in detail.

In addition, while various versions of all three options are used in a range of cities, the establishment of an appointed but independent transport coordination authority is probably the most widely used approach, and appears to be very successful in achieving real public transport integration and other substantive public transport improvements.

The preferred governance model

On balance, **the Inquiry recommends the creation of an independent transport coordination authority** (Option 3).

This proposal draws on the successful structures used in South East Queensland, Zurich, Singapore and Vancouver.

Option 1, continued direct control by the NSW government, would retain too many of the dysfunctional features of the existing system.

Option 2, a new metropolitan level of government, is not opposed by the Inquiry, but would involve a change of such a large scope that it should not be undertaken exclusively on transport grounds. For this reason the Inquiry has concluded that a more thorough evaluation of this option falls outside the Inquiry's terms of reference.

2.7 Recommendations

2.7.1 Establishment of **Transport for Sydney**

Recommendation Gov 1:

The NSW government should legislate to establish a new public transport authority, **Transport for Sydney** (TfS), with the mandate, responsibility and powers to plan, create, improve, expand, manage and provide all public transport services, as a fully integrated public transport network, in the Sydney metropolitan area and on the rest of what is currently the CityRail network.

Recommendations Gov 2 to Gov 7 below set out more details, but in general terms Transport for Sydney (TfS) would:

- **Consult:** Facilitate an ongoing interaction with citizens about how Sydney's public transport should develop, the principles that should govern its planning and the community's expectations.
- **Plan long-term:** Establish a long-term (at least 30-year) *Public Transport Network Plan for Sydney* and update it on a four-yearly cycle, using legis-

lated consultation and finalisation processes linked to the four-year NSW electoral cycle.

- **Implement** the long-term *Public Transport Network Plan for Sydney* as approved by the State government every four years under these processes.
- **Manage** all public transport operations, working with operating companies selected by TfS to provide these services, so as to ensure reliable and efficient operations and customer service.
- **Continuously improve** public transport facilities and services, through network planning, fare policies, operational improvements and other measures, large and small, so as to provide a network that is visibly improving from one year to the next, always in the overall directions set by the long-term *Public Transport Network Plan*.
- **Unify:** Present a single integrated system with integrated operations and fares to the customer, as Perth does, so customers won't need to keep track of different operators and their policies and it will be easy to travel throughout Sydney using any combination of modes, without fare penalties when interchanging is required.
- **Advocate:** Be the voice for public transport—and its social, economic and sustainability benefits and outcomes.

The roles and functions of TfS, including the scope of and limits on its autonomy, will need to be defined and guaranteed through legislation, hopefully with bipartisan support.

Among other things, this legislation should specify:

- The establishment of TfS as an independent authority and its objectives, functions and responsibilities (see **Recommendation Gov 3**), commencing with the development of the first long-term *Public Transport Network Plan for Sydney* (see **Recommendations Gov 2 and Gov 3**)
- Development, consultation, review, finalisation and implementation processes for the *Public Transport Network Plan for Sydney*, including statutory guarantees of the protection of each finalised plan and its implementation from political interference and limits on the circumstances under which each finalised plan may be amended prior to the normal four-yearly cycle (see **Recommendation Gov 2**)
- The relationships between TfS and the NSW government and other government agencies, including statutory criteria for the broad objectives and performance targets the NSW government may expect TfS to deliver, TfS's control over farebox revenue, statutory guarantees of the provision of an adequate funding stream from the NSW government for implementation of each finalised *Public Transport Network Plan for Sydney*, statutory limits on day-to-day political control, and requirements and processes for TfS to report to the NSW government, parliament and the wider community (see **Recommendations Gov 4 and Gov 5**)
- The establishment of an independent statutory Customer Advocate, reporting directly to parliament on (among other things) TfS's performance (see **Recommendation Gov 6**), and
- TfS's Board and structure (see **Recommendation Gov 7**).

2.7.2 The *Public Transport Network Plan for Sydney*

Recommendation Gov 2:

The legislation establishing Transport for Sydney should encompass the establishment and regular updating of a well-considered, integrated long-term ***Public Transport Network Plan for Sydney***, with the timing of updates generally being tied to New South Wales' four-yearly fixed term electoral cycles.

Under this legislation,

- The *Public Transport Network Plan for Sydney* should set out, in a series of stages, TfS's plans for the development, funding and operation of public transport infrastructure and integrated public transport services over at least the next 30 years.
- The *Plan* should have to satisfy criteria specified in the legislation, including, in particular, consistency with and support for the *Metropolitan Strategy* or its future equivalent(s) and the dedication by the NSW government of adequate funding for implementation of TfS's plans.

  (Other, more specific recommendations by the Inquiry concerning the content of the *Public Transport Network Plan* are set out in **Recommendations LT 1 to LT 12** (Chapter 3), **Recommendations Fares 1 to Fares 7** (Chapter 4), **Recommendations ST 1 to ST 30** (Chapter 5) and **Recommendations Funding 1 to Funding 7** (Chapter 6).)
- TfS should be required to prepare an initial draft *Plan* and release it for public comments, under the supervision of a new independent Customer Advocate (see **Recommendation Gov 6**), as soon as practicable, and then finalise and obtain the NSW government's approval of this initial *Plan* as soon as practicable and in any event by no later than one year after the formation of TfS.
- Subsequently, a draft updated *Plan*, highlighting key choices that will need to be made in finalising the next version of the *Plan*, should have to be prepared by TfS and released for public comments, under the supervision of the Customer Advocate (see **Recommendation Gov 6**), nine months before each State election.
- After the election the new or returned NSW government's policies and funding commitments, as announced prior to the election in response to the draft updated *Plan*, should be applied by TfS, along with comments from the public, in resolving the key choices and finalising the next version of the *Plan*, which should be finalised, approved by the government and adopted as soon as practicable and in any event by no later than one year after the election.
- TfS and the government should be required to satisfy specified minimum procedures and standards for these and other TfS consultations on public transport matters, including consultations on overall policies as well as specific projects, and these consultations should be supervised by the Customer Advocate (see **Recommendation Gov 6**)
- Once it is approved by the new or re-elected NSW government, each new version of the *Plan* and its associated funding commitments by the

NSW government—locked in for at least the next four years plus, in the case of all infrastructure projects commencing during the next four years, the full duration of these projects—should be entrenched in legislation, either automatically under the legislation originally establishing TfS and the *Plan* or under specific legislation, in order to protect both the *Plan* and its funding from short-term politically or bureaucratically motivated interference.

- TfS and the government should be entitled to review and amend the *Plan* outside this four-yearly cycle only in the event of a major unanticipated change of any of a limited range of types defined in the legislation, *not* including mere political or bureaucratic convenience, and then only after releasing a draft of the proposed revisions for public comments, under the supervision of the Customer Advocate (see **Recommendation Gov 6**), and transparently taking these comments into account.
- TfS should be obliged, by the legislation, to implement the *Plan*.
- All future major land-use developments in Sydney—include all growth centres and other "greenfield" developments, the redevelopment of existing residential areas to higher densities and the creation and expansion of commercial centres, business parks, employment lands, education and health precincts and other major activity centres—should proceed only if:
    - Transport for Sydney certifies that the proposed developments are supported by, and support, the planned and actual provision of high-quality, effective public transport as set out in the *Public Transport Network Plan*, and
    - Both the Minister for Transport and the Minister for Planning approve the developments on this basis.

Initially the *Public Transport Network Plan for Sydney* (which has already been discussed in section 2.5) will need to focus on addressing Sydney's existing public transport infrastructure and service backlogs, but in all cases it will also need to plan for future needs, anticipating factors such as population and employment growth, climate change, energy efficiency, resource availabilities and costs, other environmental impacts, accessibility and equity.

Among other things, each draft of the plan should reflect other relevant government long-term strategies such as the *Metropolitan Strategy* and social, economic, energy and environmental goals, propose investment sequences and priorities for major public transport capital projects and service improvements and help guide the development of a more sustainable city.

As recommended, it should be subject to public exhibition and real (and not just cursory) community consultation and inputs, before it is finalised and submitted for NSW government approval.

It is clear, from the Inquiry's examination of systems in other cities, that **genuine consultation is an essential feature of good governance and an important feature of the principle of transparency in action.**

In some cities this involves specific plebiscites on public transport proposals. In others it simply involves the exhibition of proposals and the inviting of submissions.

In many cases, consultation involves presenting the public with difficult policy choices, inviting citizens to understand and express a view on them. Good consultation listens and educates at the same time.

In the case of TfS, and in the light of the many comments and submissions criticising the manner in which recent public transport decisions have been made, the Inquiry believes it is important for minimum procedures for consultation on public transport matters to be specified in the legislation establishing TfS and the *Public Transport Network Plan for Sydney.*

In formulating the *Public Transport Network Plan for Sydney*, options and reasons, and not just preferred "solutions", should have to be provided to the public to allow comment, and statistically valid surveys should also have to be conducted, under the supervision of the Customer Advocate (see **Recommendation Gov 6**), to ascertain and publish public reactions to specific proposals.

The recommended four-yearly revision process, tied to the four-yearly electoral cycle, would present a major opportunity for the public, the government, the opposition, other political parties and individual electoral candidates to shape TfS's policies and priorities, without going so far as to adopt a requirement for specific plebiscites on specific public transport proposals.

An "adequate" draft *Public Transport Network Plan* should have to be transparent, clearly showing how its recommendations have been reached, how they relate to the larger stated goals of the government and under what conditions (if any) a recommendation might change.

One of the most crucial results of a good transport plan is long-term stability, so that private investment can take place in confidence that the network will be built as planned. Transparency and broad consultation are both essential in achieving this outcome.

2.7.3 Transport for Sydney's responsibilities

Recommendation Gov 3:

Transport for Sydney should have the responsibility and powers to:

- Undertake both short-term and long-term public transport planning, in conjunction with Sydney's metropolitan planning processes, and prepare and update the *Public Transport Network Plan for Sydney* as described in **Recommendation Gov 2**.
- Liaise closely with the Department of Planning, local government and other relevant agencies to ensure full integration of land-use planning and the planning of public transport and facilities for cyclists and pedestrians, in particular in the case of policies, proposals and decisions that might affect public transport, especially near stations and other major public transport nodes and along routes with frequent public transport services.
- Provide, improve and expand public transport services in accordance with the *Public Transport Network Plan for Sydney*.
- Deliver public transport infrastructure—including interchange facilities and cycling and pedestrian facilities that will encourage the use of public transport—in accordance with the *Public Transport Network Plan*,

generally through contracts with the private sector and with TfS owning existing and new infrastructure where appropriate.

- Manage Sydney's public transport systems and budget within frameworks established by the *Plan*, based on TfS's control of all public transport farebox revenue and legislated commitments by the government to the long-term provision of funding.

- Determine public transport fare structures, set fares and implement integrated fares and integrated ticketing within the overall public transport budget framework specified in the *Public Transport Network Plan*, subject to any policy ceilings on total fare revenue established by the Independent Pricing and Regulatory Tribunal (IPART) prior to finalisation of the *Plan*.

- Specify routes, timetables and performance standards for all public transport services, to create and maintain an integrated and attractive public transport network.

- Contract for the provision of these services with individual public transport operators, from both the public and private sectors, on the basis of competitive tenders if TfS decides this would maximise both the quality and the value-for-money of the services.

- Assist efforts to organise community transport and "at call" feeder public transport services.

- Manage its contracts with public transport operators, including timely and systematic monitoring of and public reporting on the quality of their services.

- Where necessary, coordinate public transport for major events.

- Approve or veto proposals for road improvements or expansions on "radial" routes to Sydney's "centres" and provide significant inputs on whether major "circumferential" road improvements should proceed (for details on the relevant criteria, see **Recommendation Gov 5**)

- Determine requirements for road-based public transport corridors and public transport priority measures on types of roads specified in the *Public Transport Network Plan for Sydney* (and see **Recommendation Gov 5**).

- Contract with the Roads and Traffic Authority (RTA) for specified types of improvements to nominated types of roads to assist public transport.

- Identify, acquire and preserve future corridors for public transport.

- Advise governments and the community on all aspects of transport policies, including parking policies.

- Develop constructive relationships with the Commonwealth and local governments, to coordinate planning and maximise the potential for funding and other support.

- Provide public information for the entire public transport network, including:
    - A network-wide "branding" system that emphasises the way all services work together and facilitates easy identification of the best services and routes for all public transport journeys
    - Integrated "real time" and other information across all modes and operators
    - Fast, accurate and comprehensive reporting of the quality of all public transport services and of incidents and responses to incidents, and
    - Regular reporting to parliament and the community on TfS's progress in delivering the *Public Transport Network Plan* (see **Recommendations Gov 4 and Gov 6**)
- Market and promote public transport services, again always presenting public transport as a single interconnected system.
- More specifically, promote public transport alternatives to proposals to expand or augment major roads.
- Compile and publish comprehensive data on public transport and other modes, prepare forecasts of future transport demand and, in conjunction with local government, conduct surveys to gauge local opinion on specific transport improvements which might involve a local levy.

2.7.4 Transport for Sydney's relationships with the NSW government and other NSW agencies

The Inquiry strongly believes that a reasonably high degree of autonomy for Transport for Sydney, especially in its day-to-day operations, is essential for its successful operation, and that this ought to be specified in legislation.

Recommendation Gov 4:

The legislation establishing Transport for Sydney and the *Public Transport Network Plan for Sydney* should define TfS's relationships with the NSW government and other government agencies, based on the following principles:

- State parliament should remain the ultimate budgetary and accountability authority for public transport in Sydney, with these roles being built into the legislation for TfS's formation, objectives, responsibilities, powers and reporting requirements (**Recommendations Gov 1 and Gov 3 to Gov 6**) and the legislated processes for and entrenchment of the *Public Transport Network Plan* and its associated funding commitments (**Recommendation Gov 2**).

  Among other things, TfS should be required to submit an annual report on its performance directly to State parliament, without Ministerial intervention, together with any comments and/or verification by the new independent Customer Advocate (see **Recommendation Gov 6**).

- The legislation should specify the powers and responsibilities of the NSW government and Minister for Transport for:
  - Selecting the members of the Transport for Sydney Board in accordance with the criteria in **Recommendation Gov 7**, other than the members nominated by the Commonwealth government and local governments.
  - Setting overall goals, targets and performance standards for TfS and the *Public Transport Network Plan,* consistent with relevant wider objectives, criteria and processes set out in the TfS legislation and other laws and including, for example,
    - More specific requirements concerning consistency with and support for the government's *Metropolitan Strategy* or its future equivalent(s)
    - Minimum acceptable public transport service standards
    - Minimum public transport service frequencies
    - Public transport patronage and mode share targets, progressing towards at least a doubling of patronage over the next 25–30 years (see **Recommendation LT 3**)
    - Minimum requirements for extending and maintaining the geographic accessibility (reach) of the public transport network
    - Minimum environmental standards and targets (including air quality and greenhouse gas emission targets)
    - Minimum access requirements and targets, including employment access requirements and disabled access requirements
    - Minimum standards for the integration of fares and the introduction of integrated ticketing
    - Minimum interchanging standards
    - Minimum public and passenger information standards
    - Minimum efficiency, continuous improvement, time, cost and budget management requirements and targets, and
    - Limits on overall fare revenues, reflecting any policy ceilings on total fare revenue established by the Independent Pricing and Regulatory Tribunal (IPART) prior to finalisation of the *Public Transport Network Plan*.
  - Establishing essential additional funding sources for improved public transport, such as the sources discussed by the Inquiry in Part D (Chapter 6) of this *Final Report*.
  - Providing (and publicly announcing) detailed policy and funding commitment responses to each draft updated *Public Transport Network Plan* released by TfS nine months before each State election under the processes specified in **Recommendation Gov 2**.

- Approving TfS's final post-election update of the *Public Transport Network Plan*, which under the processes specified in **Recommendation Gov 2** would have to be based on the new or returned government's policies and funding commitments, as announced prior to the election in response to the draft updated *Plan.*
- Monitoring TfS's progress in performing its statutory functions and meeting its statutory objectives and the overall goals, targets and performance standards set by the government.

- Transport for Sydney should have considerable autonomy in:
  - Preparing each draft of the *Public Transport Network Plan*
  - Implementing the *Public Transport Network Plan*, as approved by the government under the processes specified in **Recommendation Gov 2**, and
  - Otherwise performing its statutory functions and meeting its statutory objectives and the overall goals, targets and performance standards set by the government, including control of the public transport budget and management of day-to-day operations (see **Recommendation Gov 3**)
- As already specified in **Recommendation Gov 2**, all future major land-use developments in Sydney should proceed only if:
  - Transport for Sydney certifies that the proposed developments are supported by, and support, the planned and actual provision of high-quality, effective public transport as set out in the *Public Transport Network Plan*, and
  - Both the Minister for Transport and the Minister for Planning approve the developments on this basis.

TfS's legislated guarantees of autonomy would provide a sound basis for it to develop constructive working relationships, through the Chairperson of its Board and its CEO and senior officers (see **Recommendation Gov 6**), with all three tiers of government.

TfS's relationship with the NSW government would be critical to its success.

In the first instance this would involve TfS's dealings with the relevant Minister, within the statutory framework recommended above. However, the relationships between TfS and certain State government agencies would also need specific attention. These include:

- **State Treasury:** Even if there were an initial period of guaranteed funding, a secure long-term relationship would need to be established to ensure that TfS would continue to be regarded as an essential community service and not a target for cost-cutting.
- **Department of Planning:** The relationship between transport planning and metropolitan land-use planning is also critical, because most development decisions have transport consequences and most transport decisions have development consequences.

This applies especially in the case of land-use and parking controls and decisions in Sydney's key centres. A protocol for the development of a consultative relationship should be established, to ensure both these areas are efficiently integrated.

As set out in **Recommendations Gov 2 and Gov 4**, the Inquiry is recommending that all future approvals of major developments in Sydney should proceed only if:

- Transport for Sydney advises that the proposed developments are supported by, and support, the planned and actual provision of high-quality, effective public transport as set out in the *Public Transport Network Plan,* and
- Both the Minister for Transport and the Minister for Planning approve the developments on this basis.

It would be important for the legislation establishing TfS to require the recognition of TfS's autonomy and permit it to act independently if it regarded the Department of Planning's priorities as inappropriate.

- **Roads and Traffic Authority:** For public transport to succeed, especially in corridors served by buses and on-road light rail, it is vital that TfS be given legislated authority to ensure it can provide *priority* on-road public transport services (as suggested in **Recommendation Gov 3**).

  In practice TfS should determine what road-based public transport priority measures are required and what the priorities should be, based on travel time and reliability targets, and then contract the RTA to implement these measures.

  The legislation should also ensure the RTA cannot act capriciously to undermine public transport priority (e.g. by turning off bus or light rail priority traffic signalling systems).

  In addition, as set out in **Recommendation Gov 5** below, the RTA should be required to:

  - Obtain TfS's concurrence before approving any expansions of or major improvements to "radial" roads to and from Sydney's "centres"
  - Obtain TfS's inputs before approving any "circumferential" corridor road expansions or major improvements
  - In both cases, where relevant and judged desirable by TfS, incorporate public transport priority measures and cycling and pedestrian access facilities as specified by TfS and discussed above, and
  - Make submissions to TfS for all proposed expansions of and major improvements to "radial" roads, plus major "circumferential" routes nominated by TfS, at the time each draft initial or updated *Public Transport Network Plan* is being formulated.

- **Independent Transport Safety and Reliability Regulator:** It is proposed that ITSRR would continue its role of monitoring safety issues across all transport modes, but its monitoring and reporting of transport reliability and sustainability issues would be taken over by a newly created independent **Customer Advocate**, as set out in **Recommendation Gov 6** below.

- **Independent Pricing and Regulatory Tribunal:** IPART's role in setting public transport fares in Sydney would be limited to the publication of its advice on fares during the public consultation phase of each four-yearly updating of the *Public Transport Network Plan* and establishing policy ceilings for total fare revenue. (Because the funding of public transport will rely to an extent on prospective fare revenues, each draft plan would need to indicate likely fare levels for at least the next four years.)

  IPART would no longer have a role in actually setting the structure or levels of public transport fares. As discussed in Chapter 4 of this *Final Report* and recommended in **Recommendation Gov 3**, the overall fare structure, across all modes of public transport, would be defined instead by TfS, and would incorporate substantial reforms as an integral element of the design and development of an integrated public transport network.

  It is suggested that overall fare levels and structures would best be developed, reviewed and amended by TfS through the four-yearly processes established for the *Public Transport Network Plan for Sydney* under **Recommendation Gov 2**.

  This would effectively make the overall levels and structures subject to the State government's approval in parallel with its approval of the plan's infrastructure and service improvement components, thereby increasing the transparency of these government decisions.

  (The extents to which fare revenues are likely to contribute to the funding of long-term public transport infrastructure improvements are discussed in Part D (Chapter 6) of this *Final Report*.)

Relationships with the Commonwealth government

TfS and other NSW agencies would need to address the strategic planning requirements and criteria recently agreed by the Council of Australian Governments (COAG) and quoted in section 2.4.3 above, as well as any other funding preconditions and requirements by the Commonwealth government and its agencies such as Infrastructure Australia.

As suggested in **Recommendation Gov 7**, the Commonwealth government should be invited to nominate a member of TfS's Board.

TfS should take direct responsibility for preparing all submissions for Sydney public transport funding to Infrastructure Australia or its successors.

Relationships with local governments

Local government should also be invited to nominate a member of the TfS Board, in recognition of its roles in local planning and as a potential funding provider.

To ensure there is a soundly based recognition of the diversity of relevant local issues across the metropolitan area, TfS should also work through existing local government structures such as its Associations and the Regional Organisations of Councils, and be prepared to set up additional advisory committees if required.

2.7.5 Major road developments

Decisions on major road projects to and from Sydney's employment and activity "centres", and especially "radial" road projects and major "circumferential" road projects, must no longer be taken in isolation from decisions about other transport modes.

Recommendation Gov 5:

The legislation establishing Transport for Sydney and the *Public Transport Network Plan for Sydney* should require the Roads and Traffic Authority (RTA) to:

- Obtain TfS's concurrence before approving any expansions of or major improvements to "radial" roads to and from Sydney's "centres"
- Obtain TfS's inputs before approving any road expansions or major improvements on major "circumferential" routes nominated by TfS
- In both cases, where relevant and judged desirable by TfS, incorporate public transport priority measures and cycling and pedestrian access facilities as specified by TfS, so that:
    - Fast, efficient cross-regional public transport is actively assisted and definitely not disadvantaged, and
    - The expansions do not—as has frequently occurred in the past—simply encourage greater use of private vehicles for travel to and from the major centres and/or induce more private vehicle trips, exacerbating the problem of congestion by concentrating more and more vehicles in and around the centres.
- Make submissions to TfS for all proposed expansions of and major improvements to "radial" roads, plus major "circumferential" routes nominated by TfS, at the time each draft initial or updated *Public Transport Network Plan* is being formulated.

  These major road proposals should be subject to the same public consultation rigour as the *Public Transport Network Plan*, with TfS, the government and the public being advised of their effect, or otherwise, on the efficiency and attractiveness of public transport and future levels of congestion. They should also be assessed in terms of their relevance to the government's current strategic planning policies.

  Assessments of the effects of these major road projects should be made jointly by the Department of Planning and TfS, be made public and be available to the government and the RTA as an input into their decisions on major road projects.

2.7.6 An independent Customer Advocate

As indicated above, at present a section within the Independent Transport Safety and Reliability Regulator advises the Minister for Transport on the quality of services provided by public transport authorities.

The Inquiry believes that this section should be split from the ITSRR to become **a new statutory Customer Advocate, independently reporting directly to parliament.**

Recommendation Gov 6:

The legislation establishing Transport for Sydney and the *Public Transport Network Plan for Sydney* should also establish a new statutory **Customer Advocate**, which should be empowered to:

- Independently report, directly to parliament, on the extents to which TfS is meeting its objectives, delivering the projects and service improvements promised in the *Public Transport Network Plan for Sydney* and, more generally, meeting the expectations of customers for an integrated, efficient and attractive public transport network and continuously improving the system, and
- Provide independent verification of TfS's consultation processes, particularly during the formulation of the *Public Transport Network Plan*, including the formation of questions in TfS customer surveys and the interpretation of data, but also during the formulation of concepts for individual projects and service changes, including timetable alterations.

2.7.7 Transport for Sydney's Board and structure

Recommendation Gov 7:

The legislation establishing Transport for Sydney should:

- Establish an independent Board to oversee all of TfS's activities, comprising:
  - Two members nominated by the NSW government, one of them the Board's Chairperson
  - One member nominated by the Commonwealth government, reflecting its role as a major source of public transport funding
  - One member nominated by local government, because local government also makes funding contributions and TfS would be directly involved in local planning, and
  - Four other persons chosen on the basis of their expertise by the NSW government, two with practical management expertise in the transport sector, one with expertise in business and marketing and one with experience in transport advocacy.
- Authorise the establishment and funding of a small TfS secretariat with sufficient resources to undertake TfS's tasks.

TfS would have quite a different structure to existing bodies such as RailCorp. In effect, it would be contracted by the State government to deliver what is promised in *Public Transport Network Plan for Sydney*.

The Inquiry has been careful to specify the non-government members of the proposed Board in terms of their skills rather than their positions. These members must *not* be seen as representatives of any particular constituencies, and they must be selected mostly for the value of the diverse skills they can bring to the efficient and professional operation of the authority.

The Board should also be able to draw on the expertise of existing bodies (for example, Regional Organisations of Councils) and establish advisory boards or working parties to advise on specific issues.

The Chairperson would be the primary point of contact between the authority and the NSW government.

The Board would select and appoint TfS's CEO, who, along with the Chairperson, would also be expected to be the "public face" of the organisation.

Four distinct functions would need to be accommodated within TfS's structure, as illustrated indicatively in ***Figure 2.1***.

There would need to be:

- A **Plan Process** section, responsible for developing and reviewing the *Public Transport Network Plan for Sydney* and conducting public consultations. Its functions would also encompass:
    - The identification of objectives, targets and priorities
    - Market research
    - Transport data collection, analysis and publication
    - Transport forecasting analysis and publication
    - Governance reforms
    - Funding arrangements
    - Operational reforms
    - Land-use and parking control policies for Sydney's key centres
    - The coordination of cycling and pedestrian improvements
    - Short, medium and long-term infrastructure plans, and
    - General public transport advocacy.
- An **Infrastructure Development** section, responsible for the purchase (on a contestable basis) and project management of the design, construction and delivery of public transport infrastructure, plus the specification and setting of standards for all new public transport vehicles, including rolling stock.

  The Inquiry considers it essential for the task of employing the private sector to design and deliver public transport infrastructure to be performed from within the new TfS.

  Over the last 15 years or so separate government agencies have been responsible for planning public transport operations (e.g. RailCorp) and

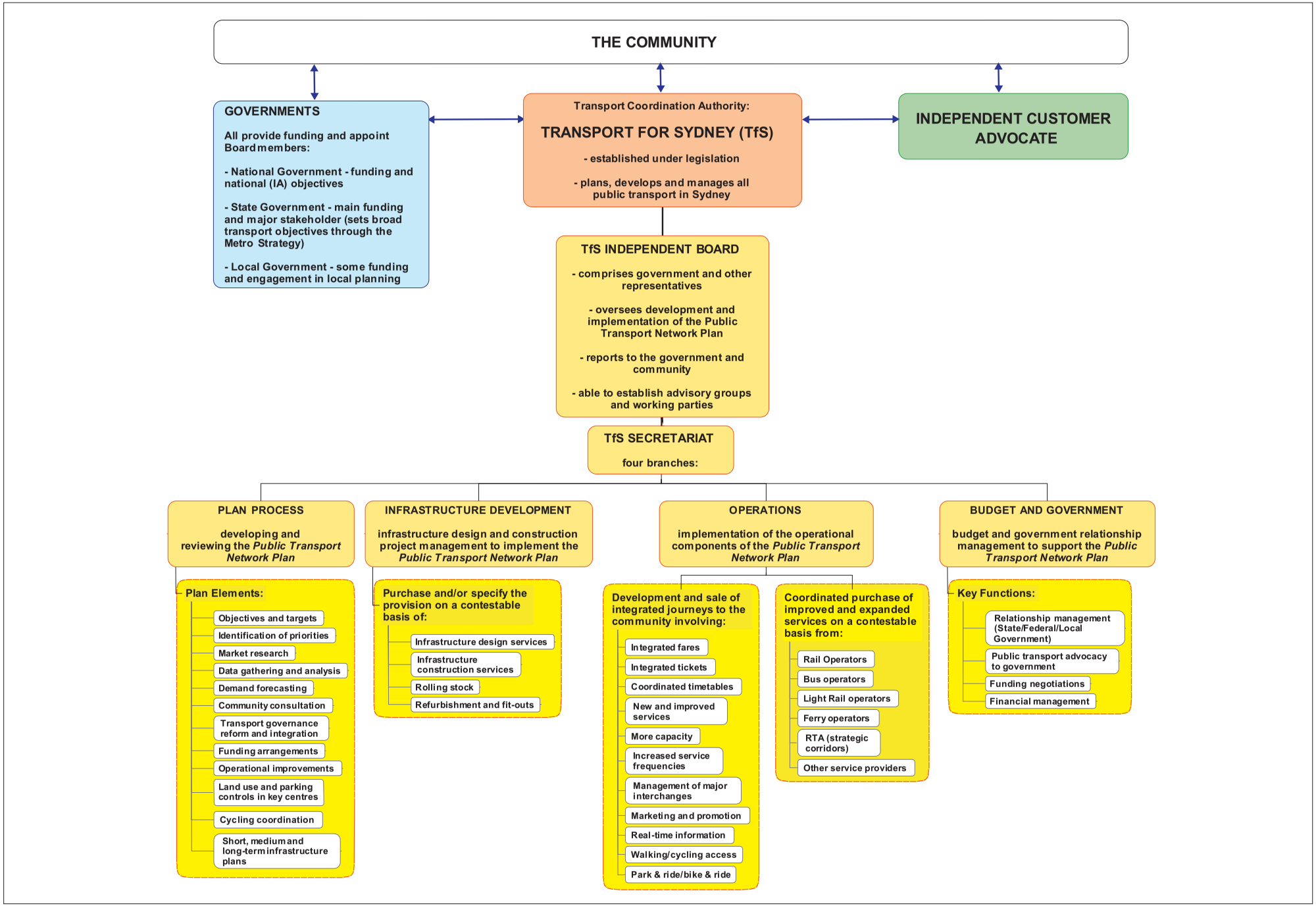


Figure 2.1. *Suggested structure for Transport for Sydney.*

designing and delivering major new public transport infrastructure (currently the Transport Infrastructure Development Corporation). This has repeatedly led to mismatches between operational and maintainability requirements and preferences, on the one hand, and the types, designs and costs of the infrastructure proposed and delivered on the other. If the delivery function is within the same organisation the chances are it will deliver something that actually works and does the job.

- An **Operations** section, which would be responsible for:
    - The development and sale of integrated journeys to the community, involving
        - Integrated fares
        - Multi-model ticketing
        - The specification of routes and interchange locations and facilities
        - The specification of coordinated timetables (detailed timetable production would remain the province of individual operators)
        - The specification of increased service frequencies and other service quality standards
        - Marketing and information services
        - "Park and ride" and "bike and ride" facilities, and
        - In some cases, interchange management, and
    - The coordinated purchase of these improved and expanded public transport services, on a contestable basis, from rail, bus, light rail and ferry operators and, in the case of strategic bus corridors and light rail corridors along major roads, the RTA.
- A **Budget and Government** section, responsible for financial management, funding negotiations and TfS's relationships with State, Commonwealth and local governments in support of the *Public Transport Network Plan*.

2.8 Summary

Table 2.1 summarises the main benefits of the Inquiry's recommended governance model, compared with Sydney's current transport management arrangements.

Table 2.1.
Comparison of current and recommended public transport governance arrangements in Sydney.

Criterion	Current governance arrangements	Proposed independent authority: Transport for Sydney
Number of public transport bodies answering directly to the Minister for Transport	Seven, all subject to political micro-management.	One, without day-to-day micro-management by the Minister.
Autonomy	Limited autonomy. Transport planning is under direct government control and the day-to-day provision of services suffers political interference.	The government sets transport policies that reflect its values but does not micro-manage the agency.
Accountability and transparency	Accountability structures are fragmented and lacking real transparency.	Accountability is explicitly spelt out in legislation requiring a high degree of transparency.
Goals, objectives and targets	Very broad and often vague goals and virtually no set targets or performance measures. When a goal becomes politically inconvenient it is usually quietly dropped.	Specific goals and targets, some set in legislation and others established through the statutory *Public Transport Network Plan for Sydney*.
Long-term certainty	Plans are subject to change at any time. Projects can be selected, changed and dumped with little reference to these plans.	Legislation and the four-year planning cycle both provide greater certainty and a consistent, open framework for project selection.
Integration between agencies and operators	Some improved agency integration, but still mainly at the Ministerial rather than the operational level. Piecemeal integration of operators.	One public transport agency, which contracts services from public transport operators on a consistent basis.
Inter-governmental engagement	Limited capacity at the agency level to develop relationships with Federal and local governments.	A clear brief to establish relationships with Federal, NSW and local government agencies within a clear overall policy framework.
Resourcing	Different arrangements for different agencies, but mainly based on annual budget processes, producing greater uncertainty. Piecemeal approach to additional funding sources.	Overall budget established on a quadrennial basis with guaranteed longer-term certainty. Additional funding sources established and secured through legislation.
Consultation	Submissions sought on the February 2010 *Metropolitan Transport Plan* but no clear ongoing process. Projects announced without consultation or accountability processes.	Systematic and extensive consultation is built into the four-year cycle for developing each update of the *Public Transport Network Plan*.

Final Report

Part C

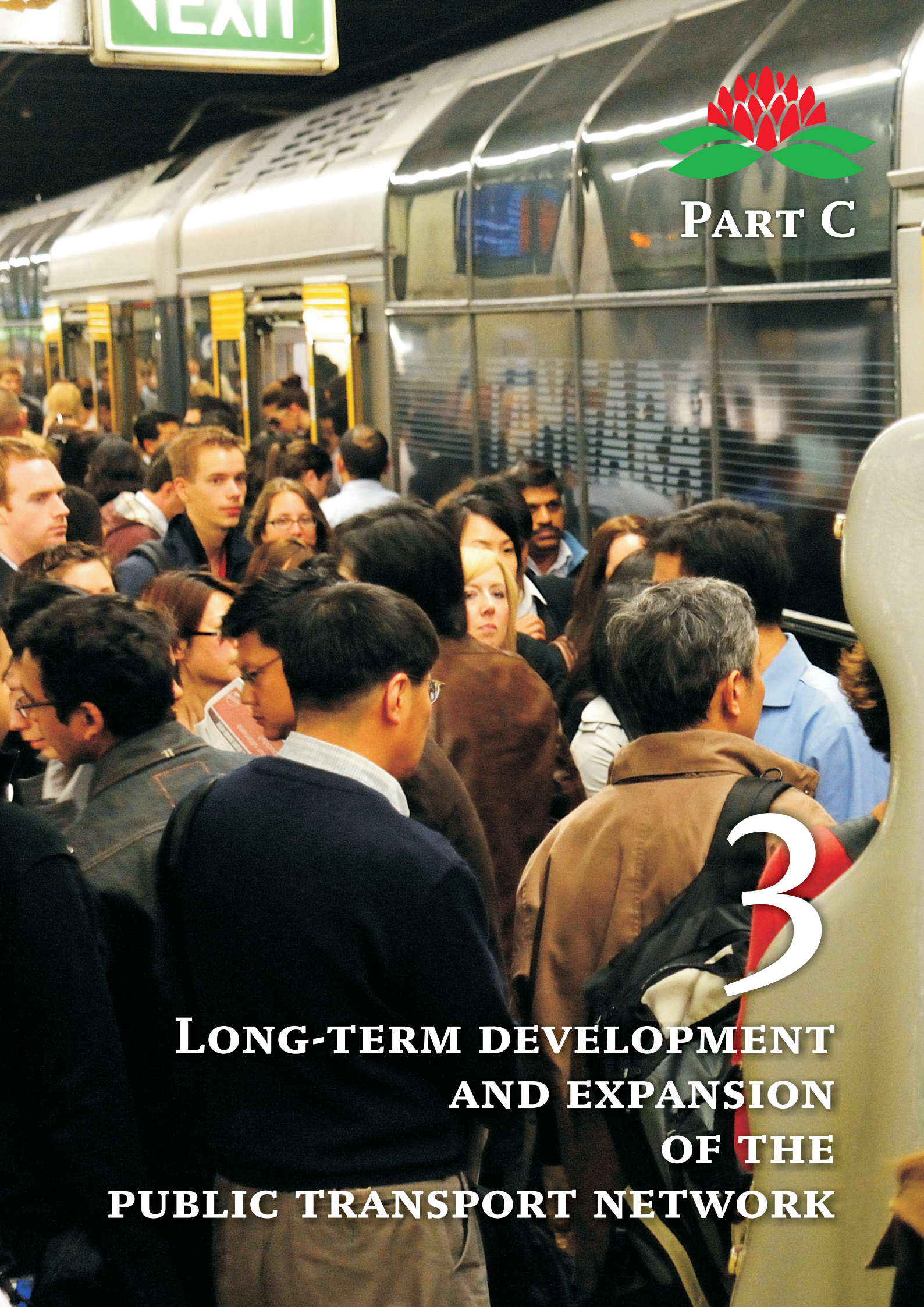
Governance

Content of **Plan** Funding

Chapter 3: Long-term development and expansion of the public transport network

Chapter 4: Fixing the fares

Chapter 5: Short-term and continuous improvement



PART C

3 LONG-TERM DEVELOPMENT AND EXPANSION OF THE PUBLIC TRANSPORT NETWORK

3 Long-term development and expansion of the public transport network

Why are we *starting* by looking at what should be in plans for the next 30 years or so, instead of looking first at planning what can be done tomorrow?

The answer is simple, but fundamental.

Sydney has suffered for too long from short-term, *ad hoc* and often politically motivated decision-making on public transport. Individual projects have succeeded individual projects, and have sometimes been nominally grouped together for "marketing" purposes, but **the long-term vision of what should be driving it all has been lacking.**

Successful public transport planning for a city such as Sydney always *starts* with a long-term perspective on the type of city people want and the purposes they need and want its transport systems to serve.

This then leads both to:

- The development of concepts and options for long-term public transport infrastructure and operational responses, throughout at least the next 30 years or so, *coupled with* the other critical elements of the "iron triangle", systems to reliably deliver these concepts (Part B, chapter 2) and adequate and dedicated funding (Part D, chapter 6), and
- A coherent framework for planning, assessing and implementing immediate, short-term and continuous improvements, ensuring they will really make a difference and will not ultimately be wasted (Part C, chapters 4 and 5).

Sydney is a growing city, with its population now expected to reach up to 7 million by 2050 (Australian Bureau of Statistics 2009). Its transport systems, both road and rail, are close to capacity. Sydney is already Australia's congestion capital, and these costs are set to continue to increase.

Sydney therefore faces major challenges to develop a sustainable transport system which will meet the needs of a growing population, in the context of declining oil resources and the need to reduce greenhouse gas emissions, both of which will, among other things, make improved transport energy efficiency vital.

Section 3.1 of this chapter highlights recent transport trends in Sydney and in other cities.

Section 3.2 considers how fast Sydney might grow in the future.

Section 3.3 examines broad transport "futures" for the city, including the scope for travel demand management, future travel tasks and options for public transport investment.

Section 3.4 looks at freight and inter-regional issues.

Section 3.5 identifies two alternative scenarios for Sydney in accommodating its population and employment growth, and the types of alternative public transport networks which would best support each of these scenarios.

Section 3.6 examines the performance of these alternative approaches in satisfying forecasts of critical public transport capacity requirements and provides some illustrations of possible ways in which Sydney's new heavy rail and metro rail network might function under each scenario.

Section 3.7 compares the two alternative scenarios more widely, in terms of their abilities to address key objectives for social, economic and environmental sustainability.

Section 3.8 briefly summarises the Inquiry's conclusions on these matters and **section 3.9** presents the Inquiry's recommendations.

3.1 Recent transport trends

3.1.1 Sydney

Over the past two decades, Sydney has built up an extensive network of over 110 km of "motorways" (tollroads) and freeways (***Figure 3.1***). These have encouraged a significant increase in car travel, and now cost motorists over $1 billion per year in tolls.

While it can be argued that Sydney needed a modern road system, our public transport systems have been relatively neglected over the same period, with only about 65 km of major rail, busway and light rail projects completed, while many more projects have been cancelled or deferred (***Table 3.1***).

At the same time, the total number of CityRail trains has increased only slightly over the last two decades, while train services were deliberately slowed down and many off-peak rail services cut in the new timetable brought in in 2005. Budget constraints from Treasury have meant that existing bus services have had to be cut back when new routes are introduced.

While some of the rail service cuts have been recently reversed, and some rail *Clearways* projects completed, the overall public transport system has failed to keep pace with the road network or with Sydney's population.

3.1.2 Other Australian cities

In the meantime, other Australian cities have been investing heavily in new and expanded public transport.

Brisbane has built a major new busway network, including the South East busway, the Northern busway and the Inner Northern Busway, introduced fast ferries, extended its rail system (e.g. to the Gold Coast) and built three bridges across the Brisbane River which cater for buses, cyclists and/or pedestrians but not for cars.

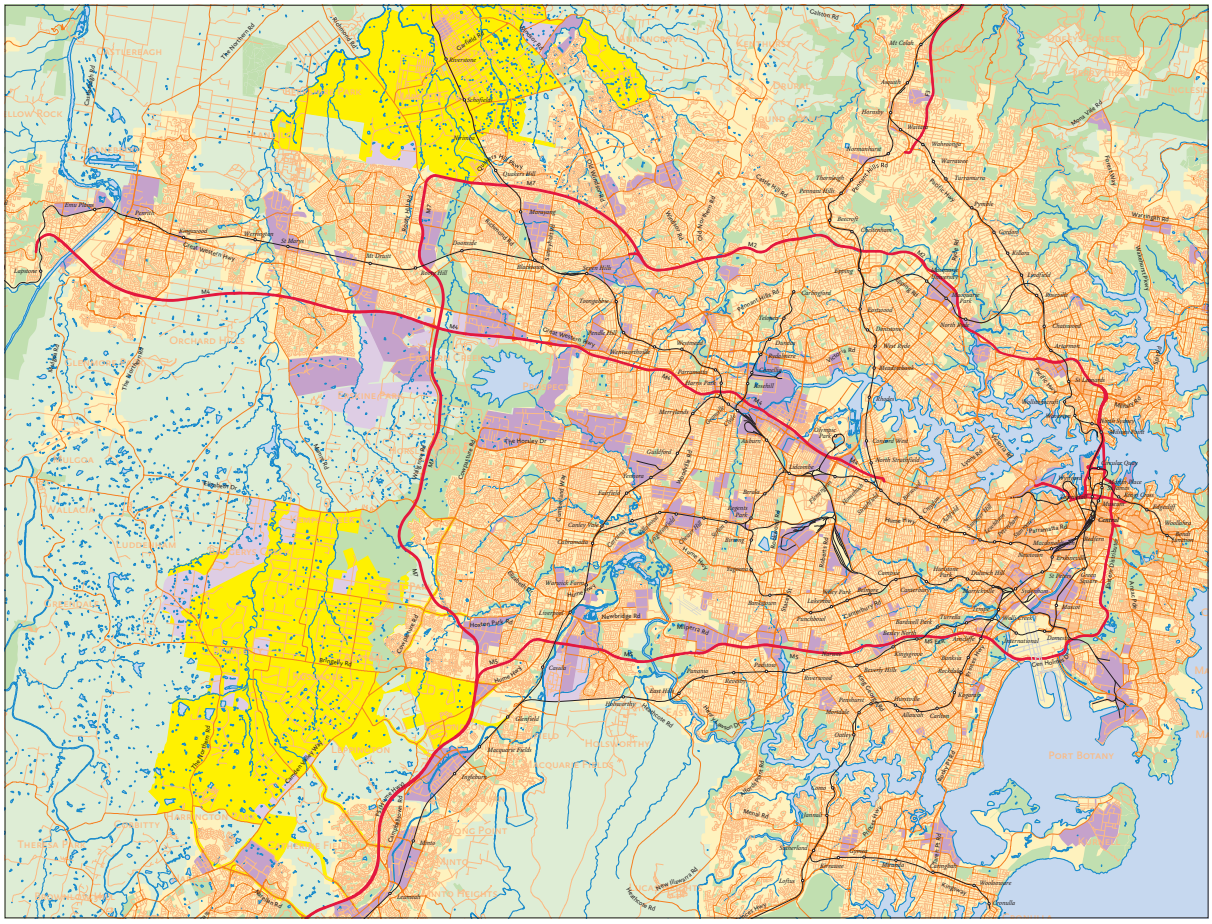


Figure 3.1. *Sydney's major freeway and motorway network.*

Table 3.1.
Major road and public transport projects in Sydney, 1990–2010.

Major projects	Motorways and other major roads	Public transport
Completed	Harbour Tunnel M4 motorway M5 motorway M2 motorway M5 East Anzac Bridge Eastern Distributor motorway Cross City Tunnel motorway Lane Cove Tunnel motorway M7 motorway Numerous major widening and upgrading projects on existing freeways and arterial roads	Light rail, Central–Lilyfield (a partly privately financed "public private partnership" ("PPP") project) Airport rail line (PPP stations) Olympic Park rail loop Liverpool–Parramatta T-way North–West T-Way Epping–Chatswood Rail Link Rail *Clearways* projects (some completed, but several deferred or cancelled)
Cancelled or "deferred"		Epping–Parramatta rail link Hurstville–Strathfield rail link Fast rail links to Central Coast/Newcastle and Wollongong CBD light rail extension North West Rail Link (now re-announced!) South West Rail Link (now partly underway and partly re-announced!) New Redfern–St Leonards CBD heavy rail link (now re-announced!), including new rail Harbour crossing (now "deferred", yet again, for at least 25 years) Several *Clearways* projects, including important extra tracks on the Richmond and Illawarra lines St Leonards–Chatswood rail quadruplication (now re-announced!) Major upgrading of Town Hall station, including fire and life safety works North West Metro Epping–CBD Metro CBD Metro West Metro Integrated ticketing (now re-announced)

Brisbane's South East Transitway.

Perth's new Mandurah line.

Brisbane is now developing a 50-year rail plan which will involve a new line under the river and through the CBD, along with new underground metro/light rail systems, while the **Gold Coast** is building a major mass transit system built on light rail, with the assistance of Commonwealth government funding.

In 1990 **Perth** had a run-down rail system which was slated to be closed. Instead, the city decided to electrify its railways and use them as the basis for its transport system.

Since then there have been major additions to the system: the northern suburbs transit system (an integrated rail and bus network), extensions to the Armadale line and the recently completed 72 km Mandurah line.

Perth has also added orbital bus routes and is considering a new light rail network serving inner suburbs.

Melbourne has steadily extended its light rail and heavy rail lines, rebuilt its main regional station (Southern Cross station) and installed a number of new "Smart bus" ring routes.

The city recently received $3.2 billion from the Commonwealth government for a new rail line to the west and other rail projects, and is planning a new underground line through the city and to the southeastern suburbs.

Adelaide has embarked on a major upgrading of its public transport system, again with Commonwealth assistance. This will include extensions to the light rail and O-bahn guided busway systems and the electrification of the city's diesel-powered rail network.

The greater emphasis placed on public transport in these cities has been reflected in trends in public transport patronage.

While Sydney still has Australia's largest public transport system, patronage in Sydney has only grown by around 5% over the last decade, slower than the growth in population.

By contrast, over the same period public transport patronage has grown by 70% in Perth and South East Queensland, 50% in Melbourne and 20% in Adelaide (***Figure 3.2***).

3.1.3 International trends

The growing emphasis on public transport in other Australian capitals is part of a world-wide trend back to public transport over the last decade or two.

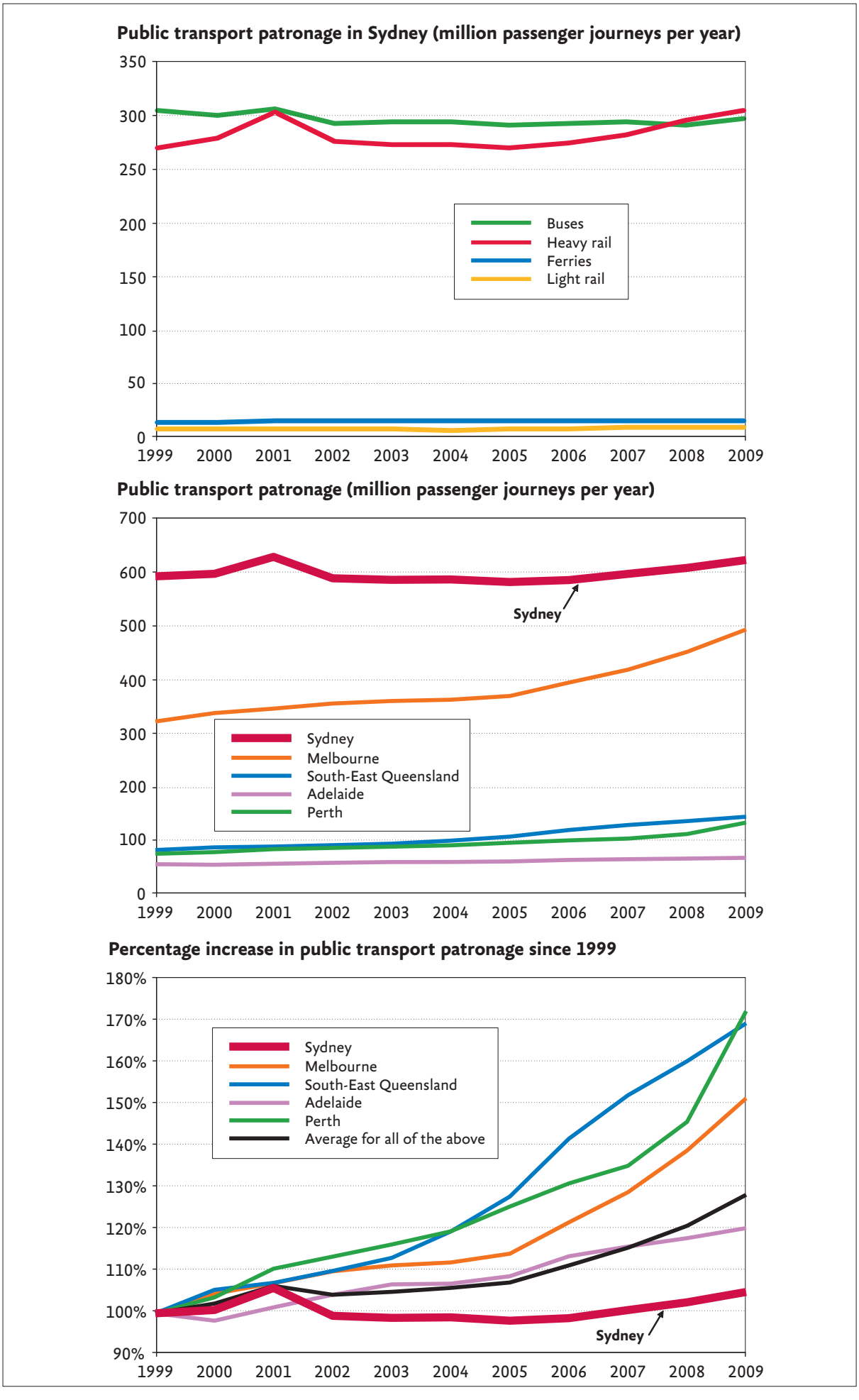


Figure 3.2. *Public transport patronage in Australian capital cities, 1999–2009. Source: UITP (2009).*

Modern light rail in Vienna ...

... and Zurich.

This trend reflects:

- Concern about over-dependence on cars and their impacts on fuel use, health, liveability and climate change
- A shift away from suburban car-based development towards "transit-oriented" development patterns
- Rising oil and energy prices
- Rising congestion in cities and the growing realisation that building more roads is *not* the answer.

In **Europe** the main trends in urban public transport has been to reintroduce light rail as the primary mode for medium sized cities like Strasbourg or Karlsruhe and develop and expand a *combination* of surface rail, underground rail, light rail and bus services in large cities like Paris, London and Vienna.

Some cities, particularly in Germany and Denmark, have now seen *falls* in the share of travel undertaken by car, reversing the trend seen since World War 2.

There is also a growing movement to build "car free" developments in which only very limited parking is provided (see, for example, the list of projects in London at www.carfreehousing.org).

Cities like London, Stockholm and Milan have introduced congestion charging to reduce traffic, and many cities are introducing public access bicycles and other measures to encourage cycling.

The newly emerging cities of **Asia, Latin America, Africa and the Middle East** are also investing heavily in new public transport systems.

Cities such as Curitiba and Bogota in Latin America have built major new busway systems. There are substantial new LRT systems in many cities in countries such as Turkey, Egypt, the UAE and China, while large cities in India, China and many other countries have recently built or are currently building extensive metro systems.

In the **United States and Canada** there has been strong growth in both light rail and commuter rail systems for well over a decade.

For example, in addition to the opening of 25 new light rail systems since 1984, there are now over 20 US cities building or planning to build streetcar (tram) systems as part of downtown urban revitalisation programs.

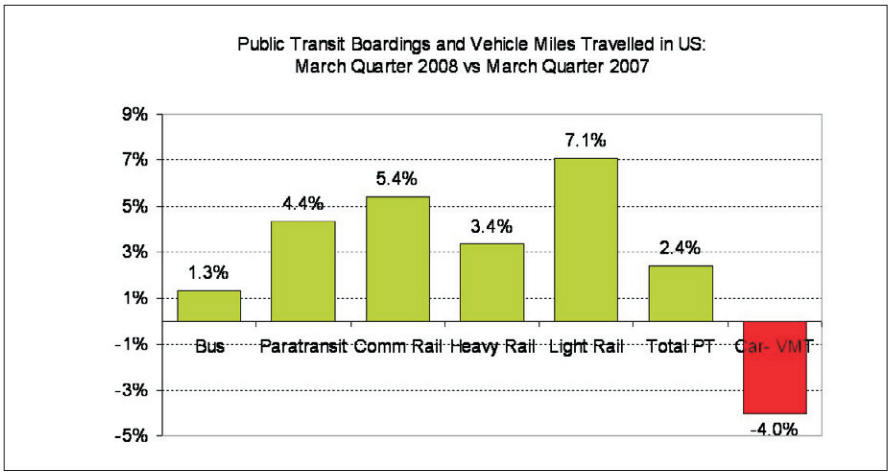


Figure 3.3. *Trends in public transport and car use in the United States. Source: Glazebrook (2009).*

In the last couple of years there has been a downturn in car miles travelled in the US (***Figure 3.3***), and in 2009 car ownership in the US actually fell for the first time since World War 2, with more old vehicles taken off the road than new vehicles sold. In another sign that the US love affair with the car has abated, the number of teenagers in the US with licences has fallen from 12 million in 1978 to 10 million at present.

3.1.4 Sydney in context

In global terms, Sydney is a highly car-dependent city, with 80% of weekday trips and 79% of weekday passenger kilometres being made by car.

It is also a low density city on a world scale, as shown in ***Figure 3.4***, which compares the overall "activity densities" (population plus jobs per hectare) of a range of cities in Europe, North America, Asia and Australia.

On the other hand, Sydney is not only the largest city in Australia but also has the highest densities and the most heavily used public transport system in the country.

The CityRail system handles 11% of weekday passenger kilometres and 50% of peak period trips into the CBD, and is by far the largest rail system in Australia.

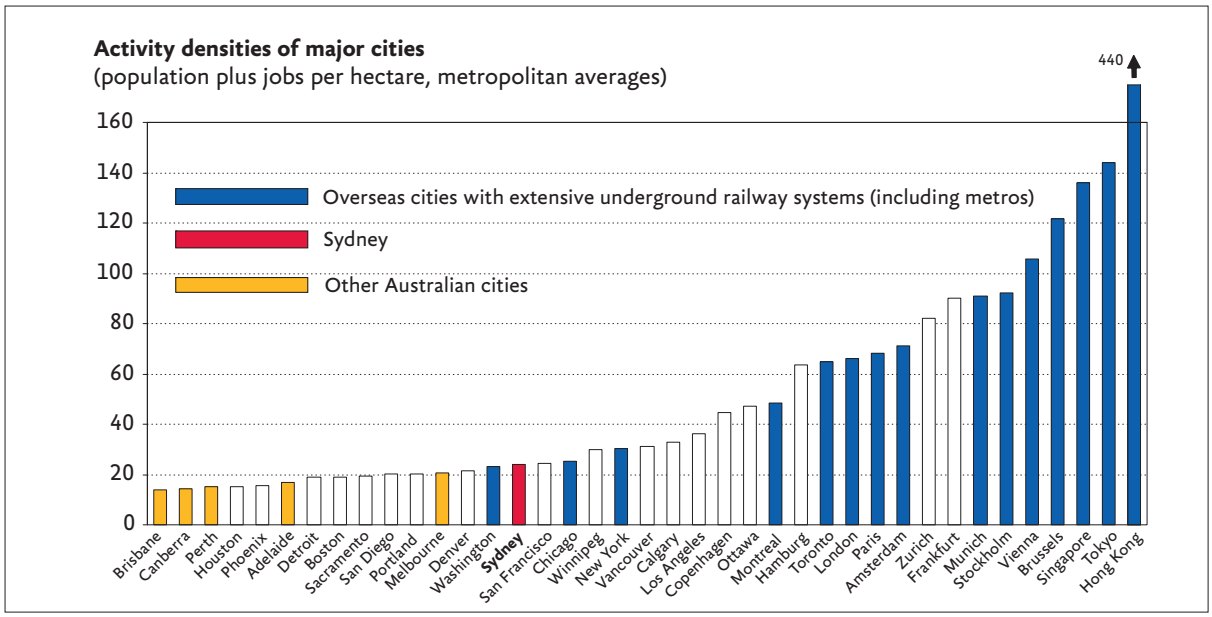


Figure 3.4. *Activity densities of major cities (population plus jobs per hectare, metropolitan averages).*

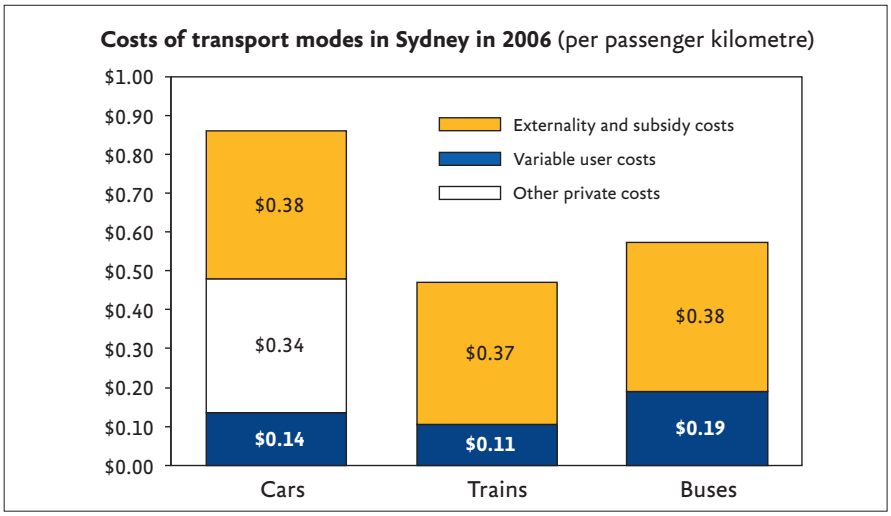


Figure 3.5. *Cost of transport modes in Sydney, 2006. Source: Glazebrook (2009).*

Indeed, it is larger than any urban rail system in the United States, with the sole exception of New York.

Public transport in Sydney uses about 62% less energy per passenger kilometre than cars—and trains use no imported oil. These benefits will become increasingly important in the future as concerns over "peak oil" and climate change increase.

Both trains and buses also have significantly lower overall costs per passenger kilometre than cars. The total "social cost" of cars in Sydney is estimated at 84 cents per passenger kilometre, compared to 48 cents for trains and 57 cents for buses (***Figure 3.5***).

So Sydney's long-term obsession with the development of roads rather than public transport means we have been catering for the most expensive mode—the private automobile—to the detriment of Sydney's overall economic performance.

To summarise ...

There is now a world-wide movement to invest in modern public transport systems and encourage walking and cycling. This is driven by environmental, health and economic factors and the recognition that adding more roads on its own is *not* the answer to congestion.

Sydney has been falling behind other Australian and world cities in this respect, and for the last 20 years has focussed largely on motorways.

However, Sydney still has Australia's largest and best-patronised public transport system. Its rail system, in particular, is a key asset, carrying over one million passengers per weekday.

On a passenger-kilometre basis public transport in Sydney uses much less energy (particularly oil), emits much less carbon dioxide and has lower "external" costs such as accidents, parking costs and pollution than cars.

Sydney's public transport therefore has the potential to contribute significantly to improving the sustainability and liveability of the city.

Achieving this will require a significant enhancement of the system, both to overcome current deficiencies and to cater for future growth.

The system needs to be extended in outer areas *and* enhanced in its capacity and service quality in inner areas.

3.2 How quickly, and where, will Sydney grow in the future?

3.2.1 The 2005 *Metropolitan Strategy's* assumptions

The 2005 *Metropolitan Strategy* for Sydney and subsequent sub-regional strategies provided estimates of how Sydney might grow in the 25 years to from 2006 to 2031.

The key assumptions in the *Strategy* were that:

- Sydney's population would grow by 1.1 million to 5.3 million by 2031, necessitating 640,000 new dwellings and 500,000 new jobs
- 70% of the population growth would occur in existing urban areas and 30% in new release areas on Sydney's fringe (primarily the North West and South West "growth centres")
- 50% of employment growth would occur in Western Sydney, including major centres such as Parramatta, Liverpool and Penrith and business parks such as Norwest, and
- There would also be continuing strong employment growth in the so-called "global arc" stretching from the airport through the city to Macquarie Park.

The overall aim of the *Metropolitan Strategy* was to achieve some "re-balancing" of Sydney's jobs and workforce, with employment in Western Sydney growing faster than the labourforce so as to allow a greater level of "self containment" than in the past.

3.2.2 More recent developments

Since the *Metropolitan Strategy* was completed, there have been several developments which are likely to affect these forecasts.

The Global Financial Crisis ...

The "global financial crisis" of 2008-09 led to a reduction in employment growth and an increase in unemployment world-wide, with particular downturns in the financial and property and business services sectors which underpin Sydney's "global arc". Australia fared better than most countries, but Sydney has still been affected by the global financial crisis. There is evidence, however, that these impacts are now beginning to recede.

... but a booming, if older, population ...

Australia is in the middle of a population boom, driven both by historically high rates of overseas migration and by a rise in the birth rate:

> *"Australia recorded 301,000 births for the year ending 30 June 2009 according to preliminary figures released today by the Australian Bureau of Statistics (ABS).*
>
> *"Australia's total fertility rate reached a 30 year high with just under 2 babies per woman, the highest since 1977.*
>
> *"A population growth rate of 2.1% was recorded for the year ending 30 June 2009, up from 1.7% recorded last year. This is the highest growth rate in 40 years (2.1% in 1969).*

> *"As at 30 June 2009, Australia's population had grown to 21,875,000, an increase of 443,000 people over the previous year.*
>
> *"Australia's net overseas migration contributed to more than half of this growth at 64% or 285,000 people. Natural increase (the excess of births over deaths) contributed 158,000 (36%)."* (ABS 2009)

In response, the Commonwealth government has upgraded its population forecasts for Australia by 2050 from 28 million to 35 million.

Populations of over 7 million are now being openly talked about for both Sydney and Melbourne by the middle of the century.

Australia's population continues to age, with large numbers of "baby boomers" about to enter retirement age. However, partly as a result of the global financial crisis and partly because of longer life expectancies, the average age of retirement is expected to increase, thereby maintaining the labourforce participation rate.

... AND INCREASINGLY UNAFFORDABLE HOUSING

Housing supply in Sydney has been running at historically low levels, notwithstanding the high migration levels.

As a consequence the city's long-term decline in household occupancy rates has been arrested, while housing prices have not crashed as they have in other countries such as the US, the UK and Spain.

Housing remains expensive, and affordability has only improved modestly, mainly because of declining interest rates (until recently).

Australia in general, and Sydney in particular, now have some of the most expensive and unaffordable housing in the world, relative to our incomes.

INTERNAL MIGRATION AND THE SCOPE FOR DECENTRALISATION

Sydney's housing prices remain the highest in Australia, but prices in the other capitals have caught up to some extent, so the impact of housing prices on internal out-migration has eased and Sydney's population growth is now likely to be greater than in the recent past.

Some people have argued that our major cities, and in particular Sydney, are too large and that we should encourage decentralisation to smaller inland cities.

Unfortunately this is not as easy as it might seem. For many decades the population in inland Australia has been static or falling, with all the growth focussed in the coastal strip. South East Queensland has grown particularly strongly over many decades, Sydney grew strongly during the 1990s and Melbourne and Perth have experienced accelerated growth since 2000. Australia's only large inland city, Canberra, has, by contrast, experienced a slowing of growth since the 1980s.

The "sea change" and more recent "tree change" movements of retired people and some younger age groups out of the big cities has had little impact on overall population growth in the capital cities.

Unlike Europe and the United States, Australia lacks a network of medium sized cities (of, say, 500,000 people or more) which are large enough to sustain higher education and highly specialised employment opportunities and are thus able to compete with the major capitals. Furthermore, there have been no new cities established since Canberra almost a century ago, inland water supplies are

increasingly problematic and recent concerns about sea level rises may curtail growth prospects in coastal areas.

Finally, it is worth noting that, contrary to popular opinion, Sydney has lower transport energy consumption per capita than the smaller capitals and cities like Newcastle and Wollongong, because of its higher densities and greater use of public transport and walking. So Sydney is in fact likely to be more resilient than other cities, overall, in the face of rising oil prices, although many outer suburbs could be significantly affected by rising petrol prices.

While ideas of decentralisation or placing limits on Sydney's future population growth may be popular, there is no "silver bullet" and serious planning for the city needs to accept the likelihood of continuing growth. The challenge is to make this growth as sustainable as possible.

3.2.3 New NSW government population projections for Sydney, to 2036

Figures 3.6 to 3.8 and ***Table 3.2*** summarise the NSW government's latest forecasts of population growth and increases in the numbers of dwellings in metropolitan Sydney (including the Central Coast)* and the Illawarra between 2006 and 2036, as set out in:

- Its February 2010 *Metropolitan Transport Plan*, *Connecting the City of Cities*
- A "discussion paper" on the parameters for a review and updating of the 2005 *Metropolitan Strategy* released by the NSW Department of Planning in March 2010, *Metropolitan Strategy Review: Sydney Towards 2036*, and
- A more detailed compilation of forecasts released by the Department of Planning in April 2010, *New South Wales Statistical Local Area Population Projections, 2006–2036*.

It may be seen that the population of Sydney is now forecast by the NSW Department of Planning to increase by 1.70 million people, to 5.98 million people, by 2036, with 63% of this increase being in western Sydney (the North West, West Central and South West "subregions" shown in *Figure 3.6*), 30% in the rest of metropolitan Sydney and 7% on the Central Coast.

3.2.4 The Inquiry's assumptions about Sydney's total population growth to 2041

Figure 3.9 compares the population growth for Sydney assumed in the 2005 *Metropolitan Strategy* with forecasts in the latest ABS projections (ABS 2008) and the NSW government's March–April 2010 projections.

The ABS projections assume a continuation of high levels of overseas immigration, adding 65,000 people annually to Sydney's population, although this is partly balanced by an assumed emigration of 48,000 people per year.

For the purposes of developing its concepts for Sydney's future public transport network, described later in this chapter, the Inquiry has assumed a "mid-range" Sydney population of 6 million by 2041.

This represents an annual average compound growth rate of 1% per year, and would see Sydney gradually lose its share of the State and national population.

* The geographic region referred to as "Sydney" is the Sydney Statistical Division, which includes the Sydney basin, Blue Mountains, Gosford and Wyong. The Hunter and Illawarra regions are separate.

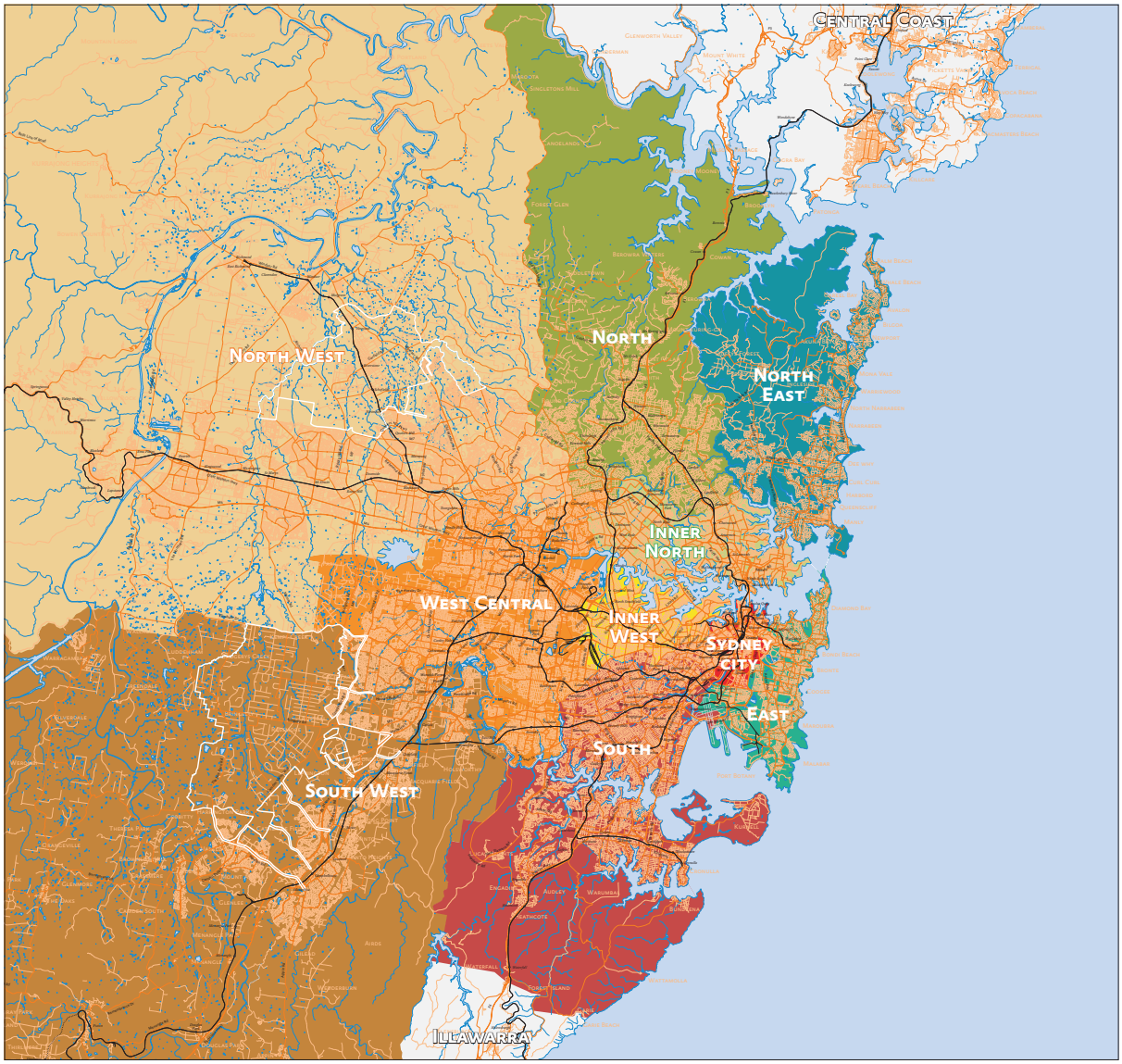


Figure 3.6. *The NSW Department of Planning's Sydney Metropolitan Strategy "subregions" and Illawarra region for which the NSW government's latest population and dwelling growth forecasts are summarised in Figures 3.7 and 3.8 and Table 3.2.*

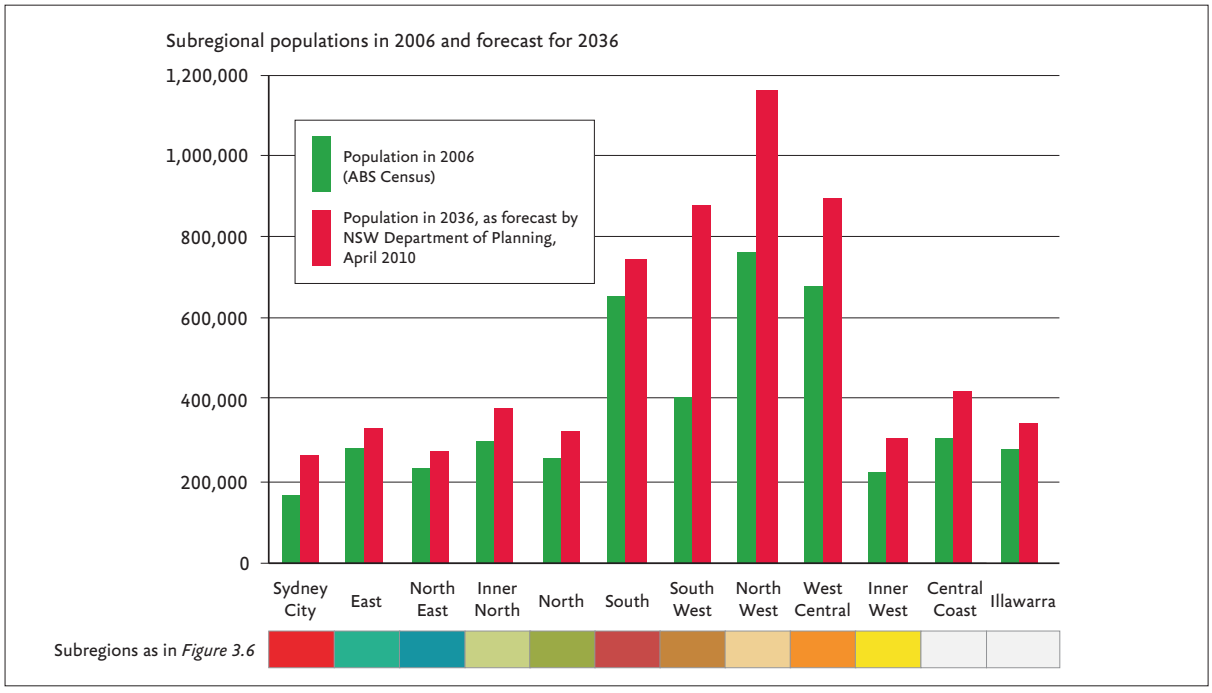


Figure 3.7. *The NSW Department of Planning's latest (2010) forecasts of population growth in different "subregions" of Sydney and in the Illawarra (Figure 3.6) between 2006 and 2036 (sources as described in Table 3.2).*

TABLE 3.2.
THE NSW DEPARTMENT OF PLANNING'S LATEST (2010) FORECASTS OF POPULATION GROWTH IN DIFFERENT "SUBREGIONS" OF SYDNEY AND IN THE ILLAWARRA BETWEEN 2006 AND 2036.

NSW Department of Planning subregion (*Figure 3.6*)	Population in 2006	Forecast population in 2036	% increase in subregion's population	Subregion's share of Sydney's total 2006-36 population growth
Sydney City	165,596	264,800	60%	6%
Inner North	302,948	378,900	25%	4%
Inner West	227,425	307,000	35%	5%
South	651,395	747,600	15%	6%
East	281,789	334,000	19%	3%
North East	235,021	277,000	18%	2%
North	261,911	321,200	23%	3%
North West	761,078	1,155,600	52%	23%
West Central	679,565	896,600	32%	13%
South West	410,516	874,800	113%	27%
Eastern Sydney	**2,126,085**	**2,630,400**	**24%**	**30%**
Western Sydney	**1,851,159**	**2,927,000**	**58%**	**63%**
All of Sydney other than Central Coast	**3,977,244**	**5,557,400**	**40%**	**93%**
Central Coast	304,744	424,700	39%	7%
All of Sydney region	**4,281,988**	**5,982,100**	**40%**	**100%**
Illawarra region	**278,000**	**339,000**	**22%**	-

Sources: *Metropolitan Strategy Review: Sydney Towards 2036*, Discussion Paper, NSW Department of Planning, March 2010, and *New South Wales Statistical Local Area Population Projections, 2006-2036*, NSW Department of Planning, April 2010.

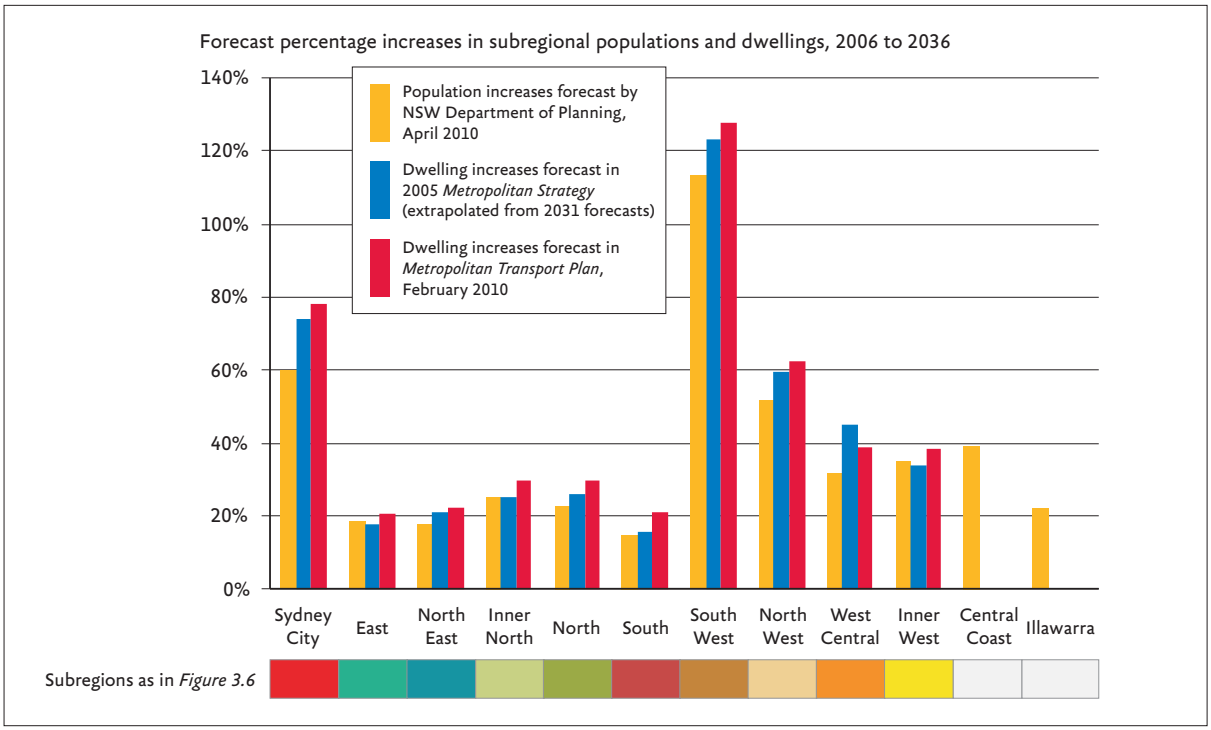


Figure 3.8. *The NSW Department of Planning's latest (2010) forecasts of 2006-2036 population growth rates in different "subregions" of Sydney and in the Illawarra (yellow bars, sources as described in Table 3.2), and a comparison of forecast rates of increase in the numbers of dwellings in the Sydney "subregions" under the 2005 Metropolitan Strategy (blue bars, extrapolated to 2036) and the NSW government's February 2010 Metropolitan Transport Plan, Connecting the City of Cities (red bars).*

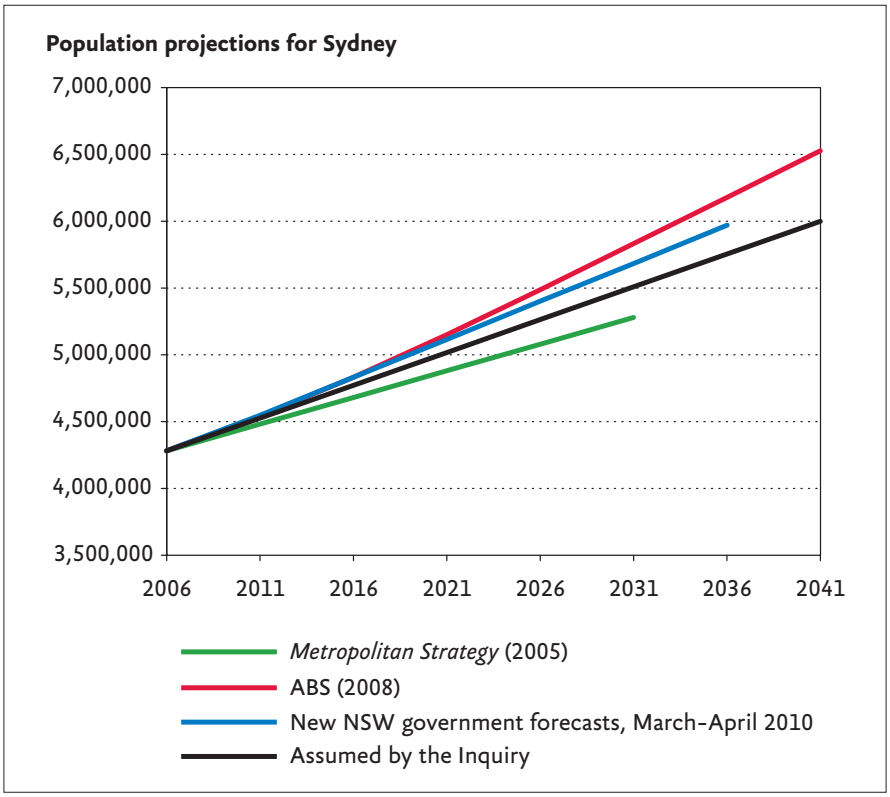


Figure 3.9. *Population projections for Sydney (including the Central Coast).*

3.2.5 Sydney's housing location challenges

Since around 2003–04 there has been a decline in the supply of new apartments and houses in Sydney.

The NSW Division of the Property Council of Australia has estimated that the total new housing supply in Sydney's existing urban areas declined to fewer than 10,000 new dwellings in 2008–09, compared with a requirement of close to 20,000 (this requirement is discussed below).

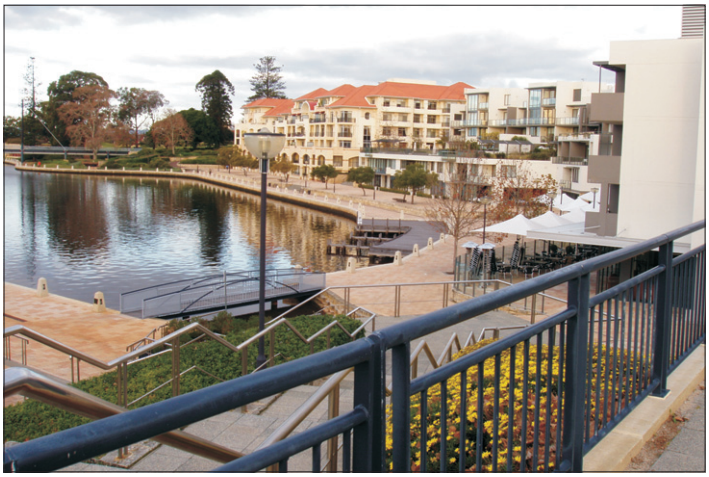
And the scope for major new urban redevelopment projects in existing urban areas is limited, with only a few sites remaining, including Barangaroo, the CUB site in Ultimo, Green Square and Olympic Park.

Most **urban consolidation** will therefore need to occur in:

- Town centres and near key railway stations, as has occurred around Kogarah, Hurstville, Auburn, Hornsby and Strathfield
- Smaller centres, and
- Established low density residential areas, particularly in middle-ring suburbs.

There can, however, be political limits to the rate of consolidation, as evidenced by the debate in places like Kuring-gai. Careful attention to urban design will be essential if the renewal of centres and the intensification of suburban areas is to prove politically acceptable.

There are also financial limits, because at least three-fold increases in housing densities will be needed to make projects financially feasible (for example, by redeveloping typical 600–750 m^2 detached housing lots into three or four town-houses).



Examples of urban consolidation and transit-oriented development: St Leonards and East Perth.

Site amalgamation is also difficult in many cases, particularly in the light of current constraints such as strata title legislation.

There are, however, many examples of highly successful urban consolidation and "transit-oriented" development, such as East Perth and Subiaco in Perth and Kogarah Town Centre and St Leonards in Sydney, providing accessible mixed-use housing and community facilities close to public transport while *enhancing* the local environment and amenity for existing residents.

The challenge for planners, developers and the community is to build on these successes.

The supply of new housing in **new release areas** has also been slow, as developers have struggled to produce housing at prices which are attractive to potential buyers in these areas.

The percentage of all new housing developments in Sydney now taking place in "greenfield" areas is only around 10%. This is well below its long-term average and *very* different from the situation in the 1960s, when the bulk of all new housing was being produced on the urban fringes.

During 2009 there was a modest recovery in new home sales in release areas as a result of reductions in developer charges, low interest rates, subsidies for new home buyers and a shift to smaller lot and housing sizes. However, this is already subsiding with the winding back of the first home buyers subsidy and rising interest rates.

While the *Metropolitan Strategy's* greenfield dwelling target for 2031 required nearly 200,000 lots, only 30,000 of these lots were zoned and serviced in 2006, indicating major challenges in meeting even this target (***Figure 3.10***), let alone the increased numbers required under the NSW government's latest projections (*Figure 3.8*).

It will not be easy to accommodate the forecast growth in Sydney's population to 6 million people by 2040.

Clearly a combination of infill and consolidation in established areas and further growth in greenfield areas is needed.

However, **there *are* some choices here.**

The distribution of growth will depend not only on market supply and demand but also on government policies, including the amount of land released for new

development, the provision of infrastructure and the level of financial contributions by developers, which can influence the cost of new housing.

Some alternative scenarios for accommodating Sydney's future population growth are considered later in this chapter (see sections 3.4 and 3.6).

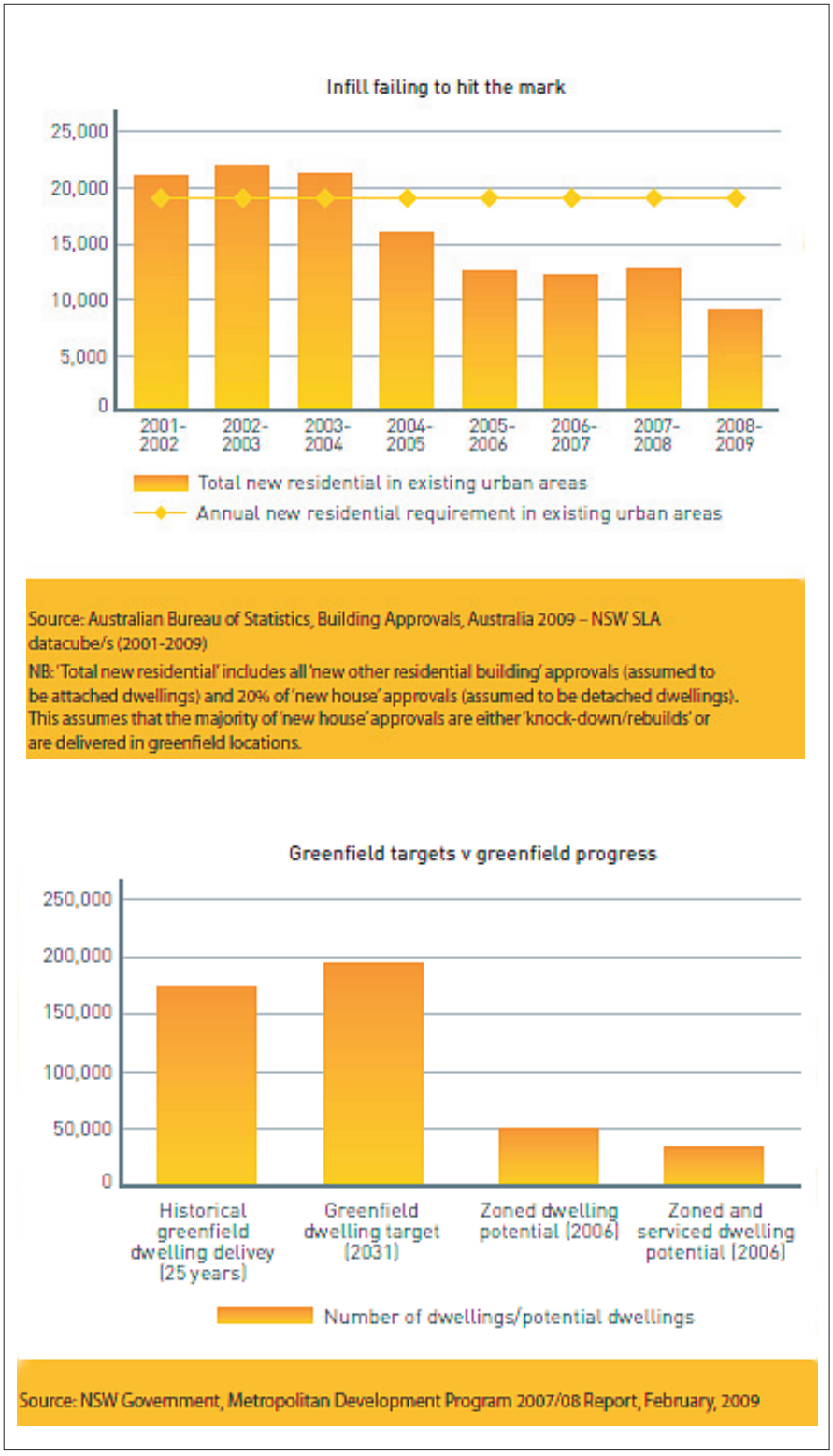


Figure 3.10. *Challenges for urban consolidation and "greenfield" housing. Source: Property Council of Australia, NSW Division (2009).*

Table 3.3. Weekday travel in Sydney in 2004, by purpose.				
Purpose	**Trips (000s)**		**Kilometres travelled (000s)**	
Commuting	2,386	15.1%	36,461	24.8%
Work-related business	1,420	9.0%	21,115	14.3%
Education/childcare	1,319	8.3%	11,532	7.8%
Social/recreation	3,706	23.4%	31,428	21.4%
Serve passenger	2,783	17.6%	19,856	13.5%
Shopping	2,506	15.8%	14,996	10.2%
Personal business	1,252	7.9%	9,678	6.6%
Other	456	2.9%	2,103	1.4%
Total	15,828	100%	147,169	100%

Source: NSW Department of Planning (2006), *2004 Household Travel Survey Summary Report*, Table 2.2.

3.2.6 Current employment and education trip patterns

Journeys to and from work and education, coupled with business travel, currently account for 32% of all trips and 47% of the passenger kilometres travelled on a typical weekday in Sydney (***Table 3.3***).

Work and education trips are typically made during the peak periods. This means journeys to work and education have a major bearing on overall travel and congestion levels and the capacities required of the city's transport systems, even though trips for other purposes are important when considering factors such as overall car kilometres, energy use and greenhouse gas emissions.

Sydney is now a *multi-centred* city, with significant concentrations of employment outside the traditional "Central Business District".

Table 3.4 provides basic data on the distribution of Sydney's employment in 2006. It may be seen that some 37% of the jobs in Sydney to which people travelled on the day of the Census in 2006—or 41% if the people with an unknown or no fixed work address on that day are not counted—were located in Sydney's top 33 key "centres" or other job concentration locations.

These job centres vary significantly, however, in their types, locations and job densities. For example, the CBD has over 500 jobs per hectare, but typical industrial job centres have around only 10-40 jobs per hectare.

Notwithstanding Sydney's multi-centred nature, Sydney's CBD remains crucial to the region, accounting for 230,000 jobs, and there are an additional 70,000 jobs in immediately adjacent areas such as Surry Hills, Pyrmont and Kings Cross (***Figure 3.11***).

"Central Sydney", including the "city education/health" precinct) accounted for some 300,000 jobs, or 17% of the Sydney region's workforce, in 2006.

A further 180,000 jobs (10%) were located in the rest of the "global arc" from Macquarie Park to Sydney Airport, including North Sydney, St Leonards, Chatswood and Macquarie Park north of the Harbour and the Airport and the "South Sydney industrial area" between the airport and the city. Many of the jobs in the

TABLE 3.4.
EMPLOYMENT CONCENTRATIONS IN SYDNEY IN 2006.

"Centre" type	General location	"Centre" name	Journeys to work on date of 2006 Census	Area (ha)	Jobs/ha	Share of total	
						All jobs	Excluding jobs with unknown or no fixed address
Central Sydney	"Global arc"	City: Sydney CBD	230,049	421	546	12.0%	13.3%
		City: Redfern	5,408	128	42	0.3%	0.3%
		City: Surry Hills/Kings Cross	29,981	219	137	1.6%	1.7%
		City: Ultimo/Pyrmont	14,236	119	120	0.7%	0.8%
Commercial	"Global arc"	Chatswood	17,901	66	271	0.9%	1.0%
		Macquarie Park	31,982	462	69	1.7%	1.8%
		North Sydney	35,761	97	369	1.9%	2.1%
		St Leonards/Crows Nest	34,447	322	107	1.8%	2.0%
	Western Sydney	Norwest business park	10,305	234	44	0.5%	0.6%
		Rhodes	6,238	101	62	0.3%	0.4%
		Sydney Olympic Park	5,458	512	11	0.3%	0.3%
Education/ health	"Global arc"	City education/health	20,393	198	103	1.1%	1.2%
		Randwick education/health	13,216	189	70	0.7%	0.8%
	Western Sydney	Westmead	13,008	265	49	0.7%	0.7%
	Elsewhere in Sydney	Gosford	9,734	456	21	0.5%	0.6%
		Kogarah	7,828	110	71	0.4%	0.5%
Industrial	Western Sydney	Eastern Creek (WSEH)	1,858	1,824	1	0.1%	0.1%
		Huntingwood/Arndell Park	9,155	492	19	0.5%	0.5%
		Wetherill Park	16,226	929	17	0.8%	0.9%
	"Global arc"	Port Botany	12,907	981	13	0.7%	0.7%
		South Sydney industrial	48,959	1,136	43	2.5%	2.8%
		Sydney Airport	12,099	883	14	0.6%	0.7%
Regional	Western Sydney	Campbelltown	13,270	972	14	0.7%	0.8%
		Liverpool	13,597	246	55	0.7%	0.8%
		Parramatta	34,234	261	131	1.8%	2.0%
		Penrith	11,704	281	42	0.6%	0.7%
Retail	Western Sydney	Bankstown	6,937	84	83	0.4%	0.4%
		Blacktown	9,513	200	48	0.5%	0.5%
		Castle Hill	5,644	106	53	0.3%	0.3%
	Elsewhere in Sydney	Bondi Junction	8,796	32	275	0.5%	0.5%
		Burwood	7,660	86	89	0.4%	0.4%
		Hornsby	8,112	174	47	0.4%	0.5%
		Hurstville	7,880	153	52	0.4%	0.5%
Key centres			**714,496**	**12,739**	**68**	**37.1%**	**41.2%**
All other known and fixed job locations in Sydney			**1,020,985**	**1,201,437**	**1**	**53.1%**	**58.8%**
		No fixed address	78,077			4.1%	
		Unknown location	110,342			5.7%	
Totals for Sydney Statistical Division			**1,923,900**	**1,242,840**	**1.6**	**100%**	**100%**

Source: NSW Ministry of Transport, Transport Data Centre (2009), Table 1, with additions.

"global arc" are related to Sydney's role as Australia's so-called "global city", and include a large proportion of high-income, specialised jobs in the finance, legal, property, consulting, tertiary education and creative industries.

About 70,000 jobs (4%) were in Sydney's "regional" cities, Parramatta, Liverpool, Penrith and Gosford, and a further 4% were in its nine largest "major centres", including Bondi Junction, Hurstville and Hornsby. 5% were in major business parks such as Norwest, Rhodes and Olympic Park or in major industrial areas such as Wetherill Park, Huntingwood and Eastern Creek.

The remaining 60% of jobs in 2006 were either dispersed throughout the urban area or located in smaller centres or industrial areas.

Tertiary education has been growing faster than population in Australia for some time. Student travel is a not insignificant part of the overall travel task, and is

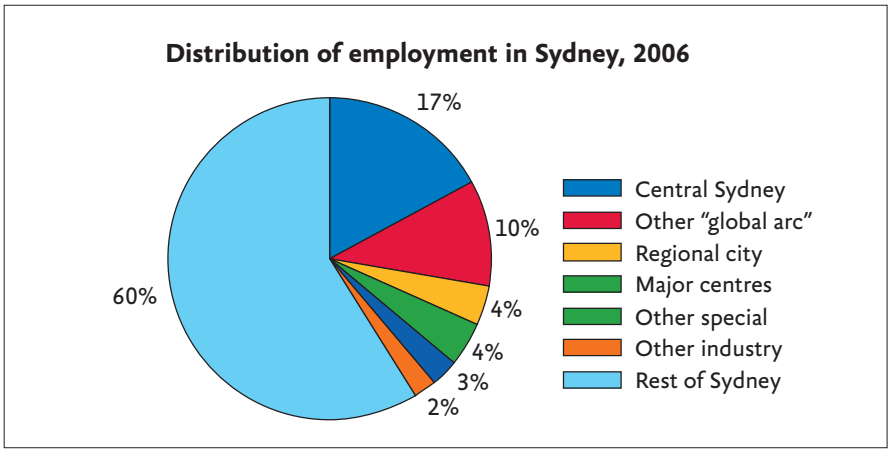


Figure 3.11. *Sydney's employment locations. Source: ABS Journey to Work data, 2006.*

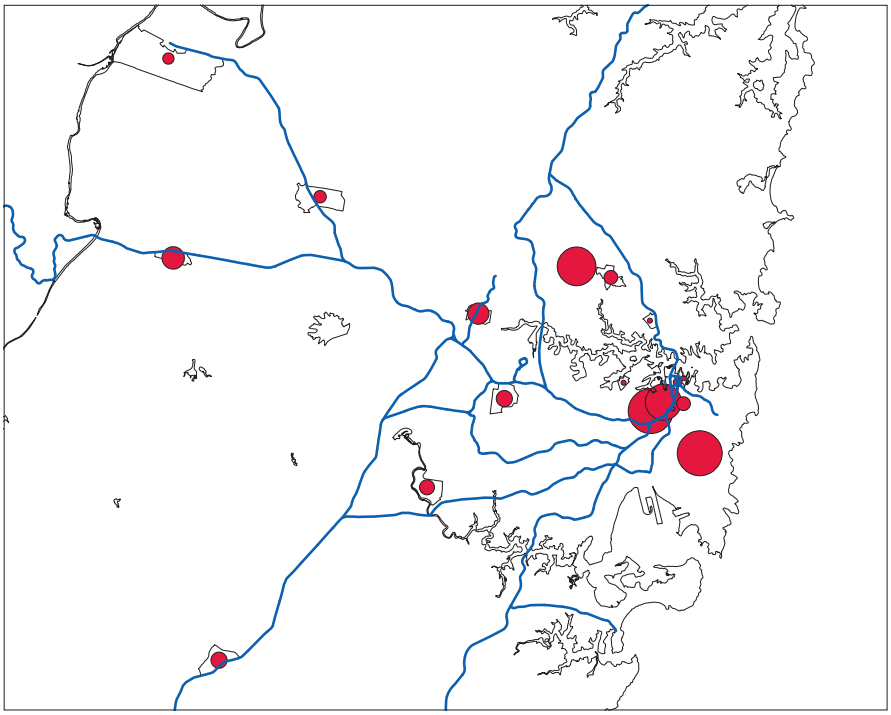


Figure 3.12. *Sydney's tertiary education locations in 2001. Source: Glazebrook (2004).*

even more important for public transport. ***Figure 3.12*** shows the distribution of university places in Sydney in 2001, and in particular the high concentrations in and near the CBD and in the east.

3.2.7 Travel modes for journeys to work at different employment locations

As illustrated in ***Figure 3.13***, the location of a job in Sydney makes a big difference to the mode of travel likely to be used to access that job.

For example, public transport accounts for 75% of journeys to work in the CBD, with a further 5% of these journeys being made by walking or cycling and 20% by car.

By contrast, 96% of people working in the Norwest business park travel by car.

So **the distribution of employment—and, to a lesser extent, tertiary education—is a key driver of demand on different modes within the transport system.**

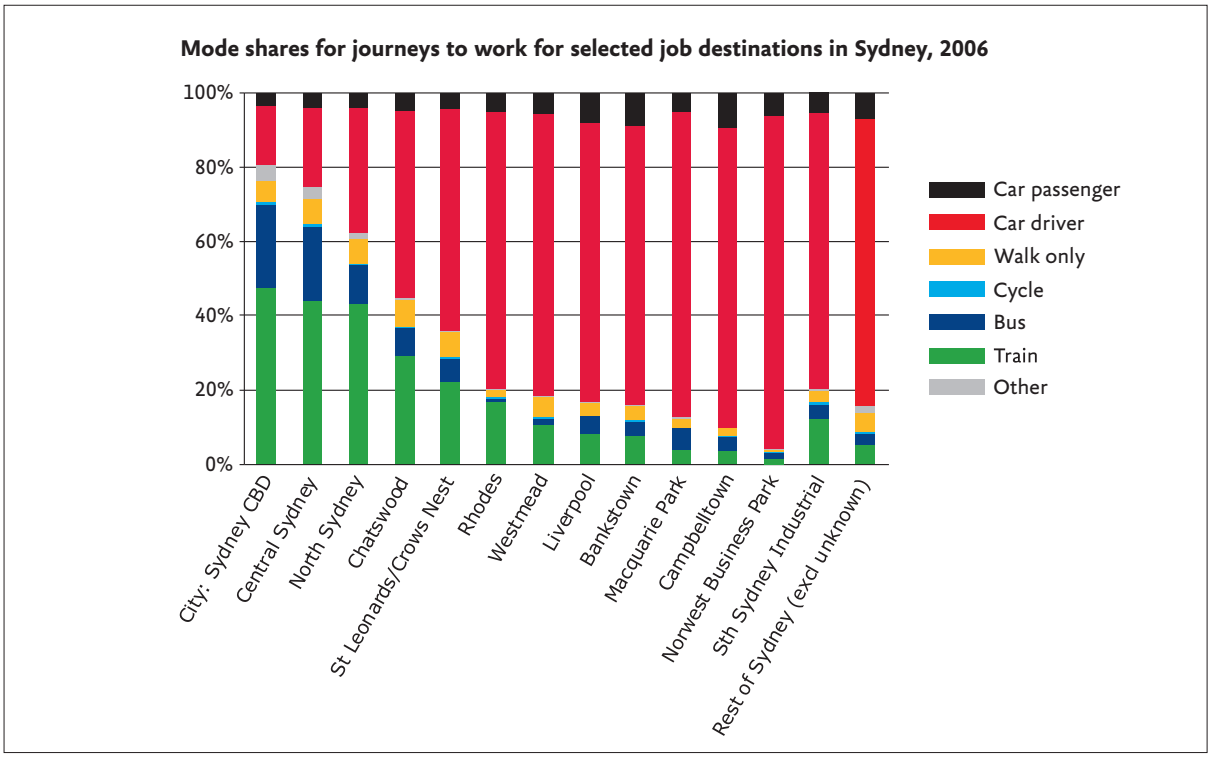


Figure 3.13. *Mode shares for journeys to work at selected job destinations in Sydney in 2006. Source: ABS Journey to Work (2006).*

3.2.8 NSW Government forecasts of locations of jobs growth in Sydney in the future

Over the last 50 years there has been a significant decentralisation of retail and other employment away from the traditional CBD. This has generally involved a switch to jobs in other centres within Sydney, rather than dispersed locations.

As Sydney's population has expanded to the west, the CBD has become increasingly "off-centre", encouraging the growth of secondary business centres such as North Sydney, Chatswood and Parramatta.

In addition, there has been strong employment growth in some business parks such as Macquarie Park in Ryde and Norwest in Baulkham Hills and in other specialised centres.

However some of the traditional "town centres", such as Bankstown and Blacktown, have been less successful, so far, in attracting new firms, and have generally declined in relative terms.

In the 2005 *Metropolitan Strategy* and subsequent *Regional City Strategies*, the preferred "future" for Sydney's employment growth was based on a "City of Cities" model, with strong growth in employment in Parramatta and other centres in Western Sydney to help balance the long-term job shortage in this part of Sydney. Employment was also expected to be reasonably strong in the CBD and the rest of the "global arc" from Macquarie Park to the airport.

However,

- The most recent NSW government forecasts of employment in Sydney's "***centres***" to 2036, released by the government's Transport Data Centre in December 2009, indicate a major shift, with **a much greater emphasis on job growth in the CBD at the expense of Parramatta and other centres, especially in Western Sydney but also on the rest of the "global arc"** (***Table 3.5***).

TABLE 3.5. LATEST NSW GOVERNMENT EMPLOYMENT FORECASTS FOR KEY CENTRES IN SYDNEY, 2006-2036.

"Centre" type	General location	"Centre" name	Jobs in 2006	Forecast jobs in 2036	Forecast employment growth	
Central Sydney	"Global arc"	City: Sydney CBD	274,473	357,847	83,374	30%
		City: Redfern	6,592	20,087	13,495	205%
		City: Surry Hills/Kings Cross	36,208	45,804	9,595	27%
		City: Ultimo/Pyrmont	17,319	20,950	3,631	21%
Commercial	"Global arc"	Chatswood	21,643	25,037	3,395	16%
		Macquarie Park	38,955	58,099	19,144	49%
		North Sydney	43,727	46,864	3,137	7%
		St Leonards/Crows Nest	41,904	53,317	11,414	27%
	Western Sydney	Norwest business park	12,569	18,862	6,293	50%
		Rhodes	7,557	10,435	2,878	38%
		Sydney Olympic Park	6,606	19,209	12,603	191%
Education/ health	"Global arc"	City education/health	24,299	38,039	13,740	57%
		Randwick education/health	15,700	23,389	7,689	49%
	Western Sydney	Westmead	15,515	24,370	8,856	57%
	Elsewhere in Sydney	Gosford	11,625	15,885	4,260	37%
		Kogarah	9,253	13,565	4,312	47%
Industrial	Western Sydney	Eastern Creek (WSEH)	2,297	19,530	17,234	750%
		Huntingwood/Arndell Park	11,105	15,637	4,532	41%
		Wetherill Park	20,004	25,850	5,846	29%
	"Global arc"	Port Botany	15,718	22,455	6,737	43%
		South Sydney industrial	59,812	76,490	16,678	28%
		Sydney Airport	14,732	20,414	5,682	39%
Regional	Western Sydney	Campbelltown	15,990	28,747	12,757	80%
		Liverpool	16,290	31,855	15,566	96%
		Parramatta	40,931	51,984	11,053	27%
		Penrith	14,024	21,120	7,096	51%
Retail	Western Sydney	Bankstown	8,335	11,382	3,047	37%
		Blacktown	11,356	16,844	5,488	48%
		Castle Hill	6,738	10,818	4,080	61%
	Elsewhere in Sydney	Bondi Junction	10,616	12,309	1,693	16%
		Burwood	9,173	12,125	2,952	32%
		Hornsby	9,790	11,572	1,782	18%
		Hurstville	9,448	12,367	2,920	31%
Totals for all key centres			**860,302**	**1,193,261**	**332,958**	**39%**

Source: Transport Data Centre website, latest employment projections by travel zone. It should be noted that the employment numbers shown in *Table 3.3* for 2006 are some 20% lower than those shown in this table, because they excluded people who did not travel to work on the particular day of the 2006 census and people whose job location on that day was unknown or of no fixed address.

For example, the "City Centre" area, which includes the Sydney CBD and immediately surrounding areas, is now expected to gain 123,000 more jobs by 2036, while Parramatta City Centre is now expected to gain only 11,000 jobs and employment forecasts for the airport, at the southern end of the "global arc", have been more than halved.

Indeed, notwithstanding the much greater increase in total employment now being forecast for Sydney, many centres, including Parramatta, Bankstown, Penrith, Norwest, Sydney Olympic Park, Rhodes, Sydney Airport and Chatswood, are now forecast to have significantly fewer jobs in 2036 than the 2005 *Metropolitan Strategy* forecast them to have in 2031.

- The most recent NSW government forecasts of employment in Sydney's "***subregions***" to 2036, released in its February 2010 *Metropolitan Transport Plan*, *Connecting the City of Cities* and quietly amended by its Transport Data Centre in May 2010, indicate two related major shifts, the first of which again makes a mockery of the new *Metropolitan Transport Plan's* "city of cities" subtitle:

  - Except in case of the City of Sydney, **a much greater emphasis on job growth at *dispersed* locations, outside Sydney's "centres",** as demon-

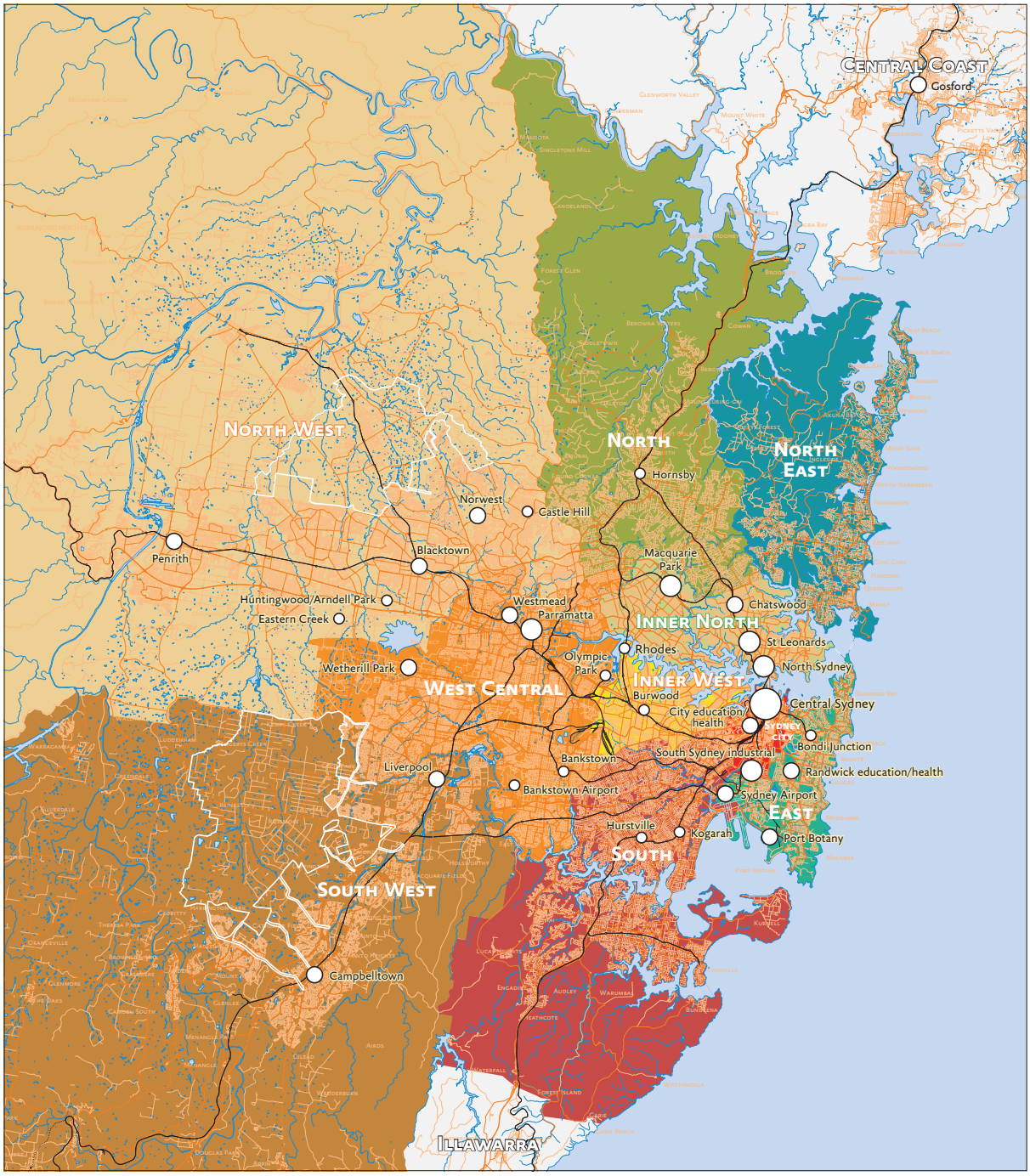


Figure 3.14. *The NSW Department of Planning's Sydney Metropolitan Strategy "subregions" and "centres" within these subregions for which the NSW government's latest employment growth forecasts are summarised in Figures 3.15 and 3.16 and Tables 3.5 and 3.6.*

strated by the forecast significant increases in employment in many subregions, compared with the forecasts made in the 2005 *Metropolitan Strategy*, notwithstanding the large *decreases* in the forecast rates of growth in jobs at "centres" within these subregions (***Table 3.6*** and ***Figures 3.14 to 3.16***).

If it were realised, this increased preference for dispersed employment growth would make it *much* more difficult to provide attractive public transport services for journeys to and from work.

- Notwithstanding substantial increases in forecast employment growth rates (compared with those in the 2005 *Metropolitan Strategy*) in all other subregions, **a *reduction* in the employment growth rate forecast by the government for the Inner North subregion, which encom-**

TABLE 3.6.
THE NSW GOVERNMENT'S LATEST (MAY 2010) FORECASTS OF EMPLOYMENT GROWTH IN DIFFERENT "SUBREGIONS" OF SYDNEY BETWEEN 2006 AND 2036.

NSW Department of Planning subregion (*Figure 3.14*)	Employment in 2006	Forecast employment in 2036	% increase in subregion's employment	Subregion's share of Sydney's total 2006-36 employment growth
Sydney City	429,115	569,696	33%	18%
Inner North	238,039	289,384	22%	7%
Inner West	99,252	125,347	26%	3%
South	192,795	245,327	27%	7%
East	135,519	171,371	26%	5%
North East	88,471	111,959	27%	3%
North	83,314	102,854	24%	3%
North West	266,201	426,357	60%	21%
West Central	322,248	421,415	31%	13%
South West	133,321	238,467	79%	14%
Eastern Sydney	**1,266,504**	**1,615,938**	**28%**	**46%**
Western Sydney	**721,770**	**1,086,239**	**50%**	**48%**
Central Coast	103,952	151,418	46%	6%
All of Sydney region	**2,092,226**	**2,853,596**	**36%**	**100%**
Illawarra region	155,155	202,772	31%	-

Source: Transport Data Centre website, May 2010. It should be noted that these forecasts differ from those presented in the NSW government's *Metropolitan Transport Plan, Connecting the City of Cities*, in February 2010.

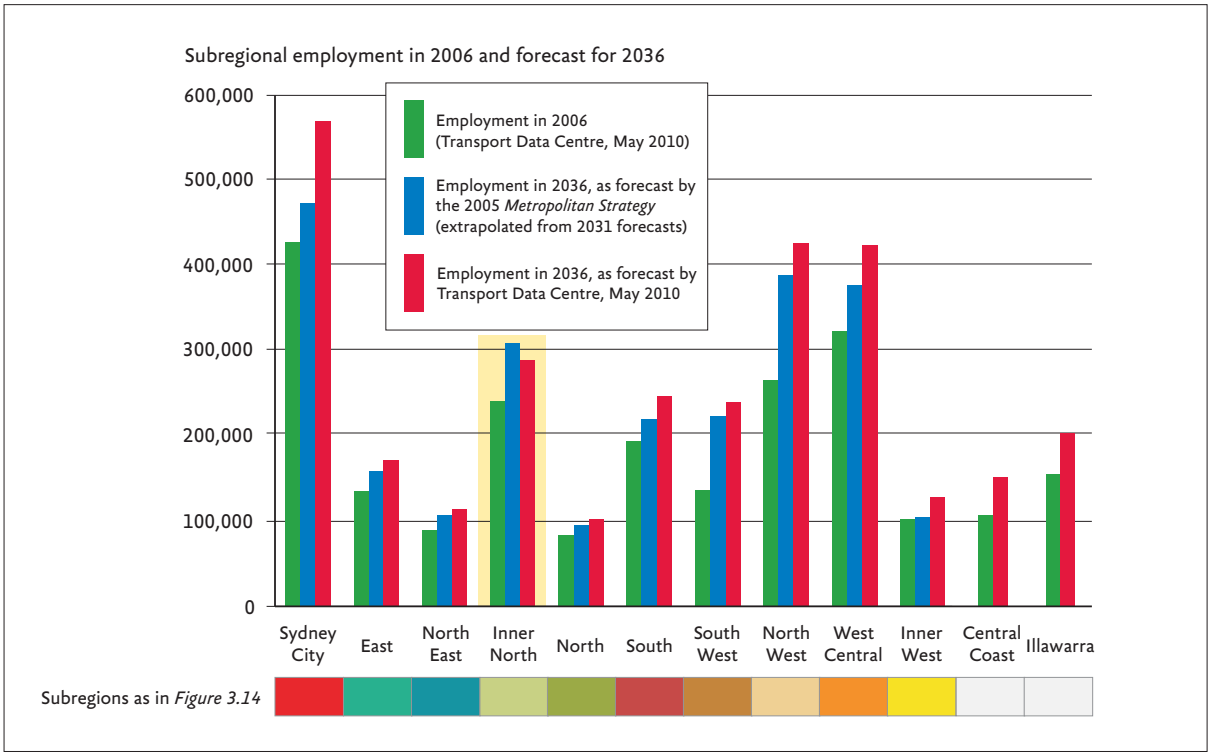


Figure 3.15. *The NSW government's latest forecasts of employment growth in different "subregions" of Sydney (Figure 3.14) between 2006 and 2036 (source: Transport Data Centre, May 2010), compared with equivalent forecasts based on the 2005 Metropolitan Strategy's 2031 employment forecasts for the same subregions.*

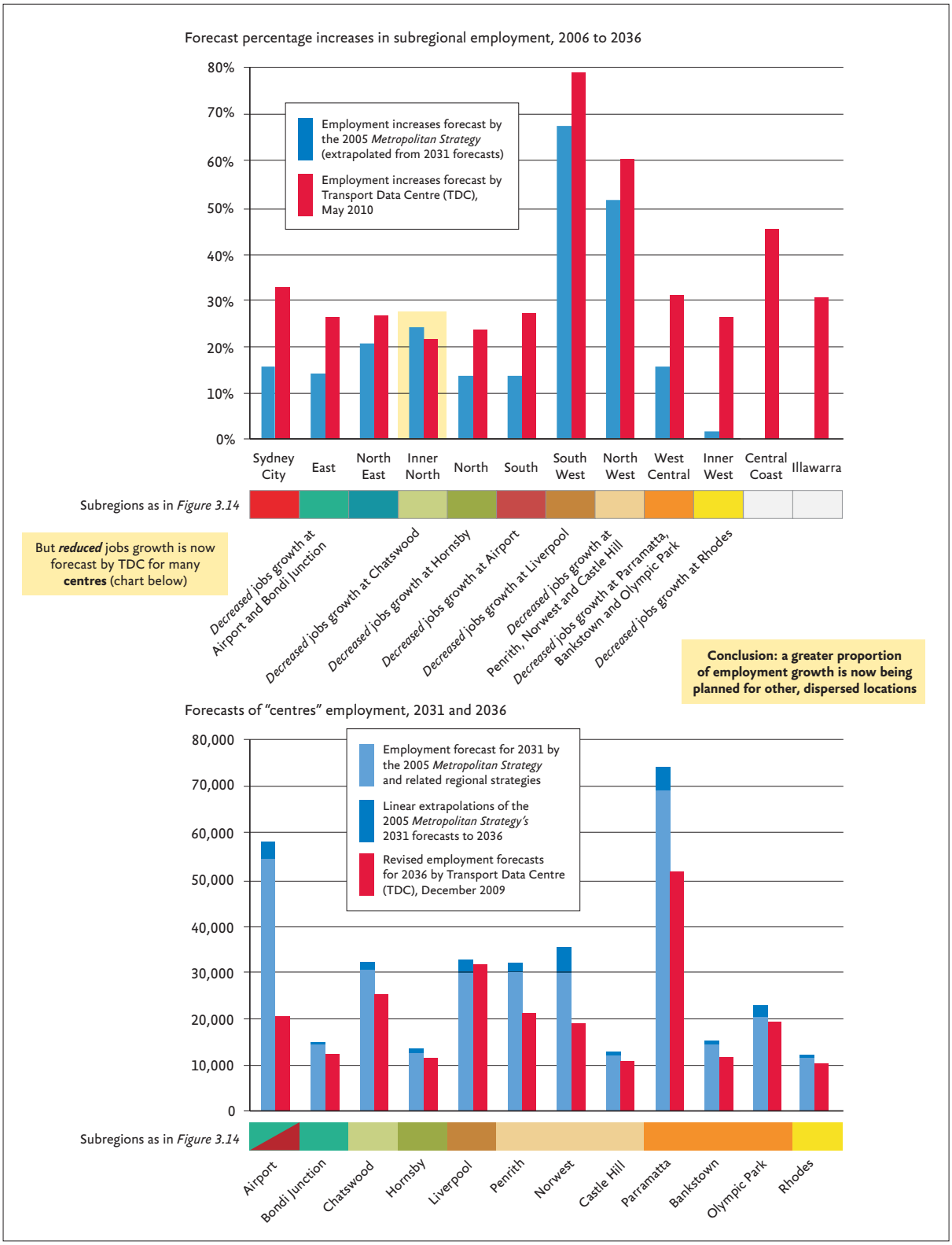


Figure 3.16. *The top chart compares the NSW government's latest forecasts of 2006–2036 employment growth rates in different "subregions" of Sydney (red bars) (source: Transport Data Centre, May 2010) with equivalent forecasts based on the 2005 Metropolitan Strategy's 2031 employment growth forecasts for the same subregions (blue bars, extrapolated to 2036). Significantly faster employment growth is now being forecast by the government for all subregions except the Inner North subregion, which encompasses all of the northern half of the "global arc", including North Sydney, Crows Nest/St Leonards, Chatswood and Macquarie Park (Figure 3.14).*

However, as shown in the lower chart, the NSW government's latest forecasts for employment in Sydney's "centres" within the various subregions (Table 3.5) are for significantly less employment growth in almost all of these centres—with the CBD being a notable exception—than was forecast in the 2005 Metropolitan Strategy and its related subregional strategies. Indeed, the employment now forecast for many centres in 2036 is actually less than was previously forecast for these centres in 2031.

The inescapable conclusion is that the government has quietly switched to planning for a greater proportion of Sydney's jobs growth to occur outside these "centres", at dispersed locations that will be much more difficult to serve with public transport.

passes all of the northern half of the "global arc", including North Sydney, Crows Nest/St Leonards, Chatswood and Macquarie Park (*Figures 3.15 and 3.16*).

No reasons have been advanced by the government for this seemingly anomalous lower forecast, although suspicions have been voiced that it is an "after the event" attempt to rationalise the government's apparent determination, especially during its now-aborted embrace of "metros", not to countenance the possibility of a new CBD and Harbour crossing heavy rail link, providing better access to and within the "global arc", within the next 30 or so years.

3.2.9 Overviews of opportunities for increased employment at key 'centres'

Several of the most important factors affecting future employment growth levels and distributions in Sydney are discussed below.

The capacity of the CBD

There are a several major opportunities for additional commercial/retail space in the CBD, including Barangaroo (approximately 600,000 m^2), the CUB Site (150,000 m^2), Darling Harbour (perhaps up to 600,000 m^2. if the convention and exhibition centre were redeveloped) and Central Station (which, if build over, could generate approximately 300,000 m^2).

The City of Sydney has identified a potential for an additional 2 million square metres of floor space if all available floor space ratios were taken up, although this process would be slow as it depends on redevelopment.

In addition, there are some commercial developments in satellite areas of the CBD, such as the Advanced Technology Park and North Eveleigh (100,000 m^2 potential), while Green Square, Glebe Island , White Bay and the Rozelle railway yards—if not reserved for future metro train stabling—could potentially provide up to 900,000 m^2.

Proposed development at Barangaroo.

The Sydney CBD, illustrating its compactness and density.

Parramatta high rise.

Olympic Park

Taking all these opportunities into account, the CBD and its satellite areas appear to have an ultimate scope for up to 250,000 additional jobs over the next 50 years.

An important question, however, is whether we need to or should accommodate all this growth in the CBD and its immediate surrounds—or whether we should, instead, be encouraging a better balance between employment and residents within central Sydney and encouraging some of the jobs growth elsewhere.

This question has major ramifications, both for the availability of employment in the rest of the Sydney region and for the amount, types and locations of transport investments required to service the development, as discussed later in this chapter.

Parramatta/Westmead

The Parramatta CBD has experienced steady but not spectacular growth over the last few decades, and recent developments in its legal precinct and around its transport interchange indicate it may be about to experience accelerated growth.

Parramatta has the most central location of any of Sydney's major CBDs, so with better public transport access, particularly from the North Shore, it should logically be able to claim the title of Sydney's "second CBD", particularly when its satellites of Westmead, North Parramatta, Granville and Rosehill are taken into account.

Recognising this opportunity, the State government released a new *Local Environment Plan* for Parramatta in December 2007, promising 30,000 additional jobs over the next 25 years, along with 20,000 additional residents, in the city centre.

However, as noted above, the Government's *latest* employment forecasts, quietly released in December 2009, now envisage only 11,000 additional jobs in the Parramatta centre in the ***30*** years between 2006 and 2036, with Westmead employment being expected to grow by around 9,000 jobs over this period.

Macquarie Park

Macquarie Park has been one of Sydney's most active areas for commercial development in the last few years.

Macquarie Park.

The opening of the Epping-Chatswood railway line has provided a major boost and has attracted firms such as Optus, which has moved from North Sydney and added over 6,000 jobs.

The State government recently announced plans for 600,000 m^2 of additional space at Macquarie University, and the *Local Environmental Plan* for the area provides for a growth of up to 100,000 extra jobs over the long term.

Macquarie Park's location, enhanced public transport accessibility and university and environmental attributes appear likely to ensure its continued success in attracting employment.

In this context, the government's latest forecasts of only 19,000 additional jobs in the area between 2006 and 2036 appear *highly* conservative.

Sydney Airport

Sydney Airport is an important employment centre which has grown significantly in recent years, although air traffic has been affected by the Global Financial Crisis.

The airport's curfews on night flights and the shortage of land around the airport have recently led the Commonwealth government to re-activate the search for a second airport, with a recent announcement that the Air Force base in Richmond has been identified as a possible "temporary" site for a secondary airport. Any development of a "temporary" or permanent second airport for Sydney would obviously have significant land transport (and especially public transport) implications.

To date there has been no integrated consideration of the city's overall aviation needs in conjunction with its land-use and land transport needs, including the longer-term potential for alternative uses of the Bankstown airport and Badgerys Creek sites.

Norwest and other business parks

Norwest has been Sydney's most successful business park. In 2006 it had over 10,000 jobs, and there have been significant increases since then.

However, as already indicated, the lack of good public transport has meant that 95% of employees in the area need a car to get to work.

The continued growth of Sydney's northwest, and western Sydney more generally, will provide a growing labour force to support Norwest. However, development of the long-promised North West Rail link—which for years has been "indefinitely deferred" but has now been re-promised, albeit with another seven years' wait until construction commences—would enhance access from both the east and the west and greatly facilitate longer term growth.

A number of other business parks have sprung up across Sydney, including Rhodes and Sydney Olympic Park. The designs of these business parks, to date, have been based on a highly car-dependent US model, with poor "permeability" and accessibility.

Other specialised centres

"Specialised" centres were identified in the 2005 *Metropolitan Strategy* as areas which have groupings of activities with high employment densities and specialised functions, such as health facilities and tertiary education campuses, as well as more normal town centres.

The main examples are the Randwick education and health precinct, comprising the University of NSW, the Children's Hospital and the Prince of Wales Hospital, St Leonards, with the Royal North Shore Hospital, and the "city" education and health precinct, with the University of Sydney, the Royal Prince Alfred Hospital and the King George V Hospital.

These centres will continue to grow and encourage other associated uses to cluster around them in the future. They already have high demands for public transport, and these demands are likely to increase faster than their employment growth as part of their responses to major traffic problems.

Other key centres

Liverpool and Penrith have been designated as "Regional Cities" within the Sydney region, and planning has now been completed to enable them to expand considerably as multi-use employment and cultural centres.

Some developments such as the hospital and education upgrades at Liverpool are now underway, but the growth in office employment, as distinct from retail employment, has been slow in both centres.

Both Liverpool and Penrith are the natural centres for substantial population catchments, but their evolution into full regional centres will take time, especially with the agglomeration economies' favouring of existing CBDs and business parks.

To summarise ...

For the purposes of its initial long-term transport planning, the Inquiry has adopted the following planning assumptions in this *Final Report*:

- Sydney's population will grow by approximately 1.7 million people, from 4.3 million in 2006 to 6 million by 2040.
- Labour force participation rates will fall slightly as a result of the ageing of society, offset to some extent by an increase in the age of retirement.
- Employment in Sydney will grow to 2.64 million jobs by 2040, an increase of about 700,000 jobs (35%) compared to 2006.
- Sydney is likely to remain a "global city", with an economy increasingly tied to Asia. Manufacturing is likely to continue to decline as a proportion of total employment and the services sector is likely to continue to increase.
- Consequently the share of total employment in Sydney's "centres" is likely to increase.
- This will further boost the demand for public transport, given its much higher share of trips to centres than to non-centre locations.
- However, **there are choices to be made** about how these jobs will be distributed between the CBD and other centres such as Parramatta—and this will, in turn, play a large role in determining the best public transport investment strategy for Sydney.

3.3 Broad transport 'futures' for Sydney

3.3.1 Travel demand management

Travel is largely a means to an end, rather than an end in itself.

Mobility simply gives people access to services, employment or activities. Clearly this access can be achieved either by travel or by locating the service or activity within easy reach.

"Strategic" land use and transport planning is therefore just as much about the location of activities as it is about transport services. The two must always be considered together.

A land-use plan without a transport plan is as useless as a transport plan without an accompanying land-use plan.

In view of the likely massive growth in Sydney's population (section 3.2.3), it is desirable to **consider how to manage travel demand rather than simply to accommodate increasing numbers of trips**.

Travel patterns, and hence their impact on transport infrastructure, vary greatly over time and space in major cities like Sydney.

Typically the most congested places in any city are in the city centre and on the approaches to it, given the concentration of activities there.

The busiest and most congested times are usually the morning peak period, when journeys to work and education are most concentrated, and this can occur on roads well outside the city centres.

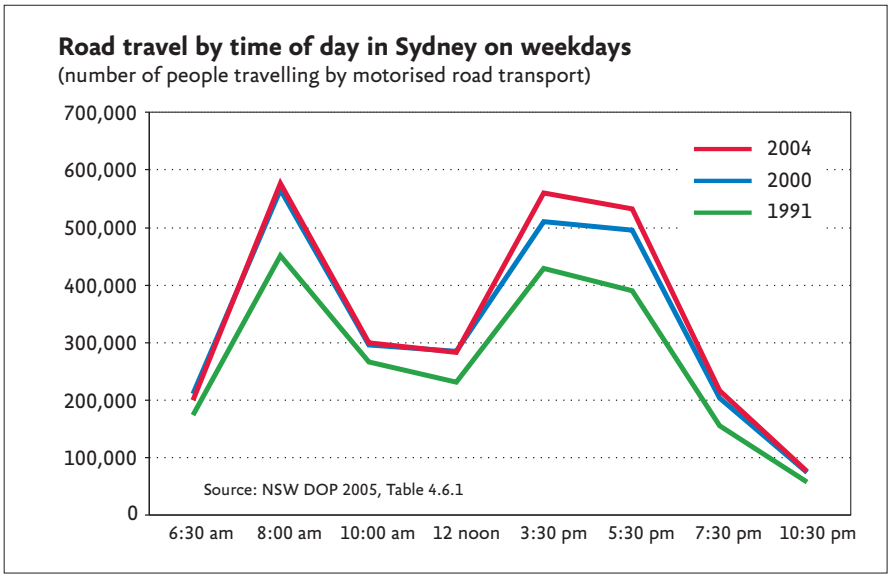


Figure 3.17. *Travel by time of day in Sydney (weekdays).*

As shown in ***Figure 3.17***, the morning peak is "higher" than but not as "wide" as the afternoon peak.

High levels of congestion can also occur at other times and places—for example, on the major roads out of Sydney on long weekends, and on Saturday mornings, when people tend to need to use their cars more and more for shopping trips, dropping children to sporting events, etc, etc.

These types of trips cannot be served by public transport as easily as a simple commuting trip to work, with its single origin and single destination.

Road congestion and crowding on public transport during peak periods in Sydney have encouraged some people to schedule their work hours so as to avoid travelling at these times, and this has been facilitated by more flexible working hours to some extent.

On the other hand, the gradual decline of manufacturing employment and rise of service-based employment has tended to heighten rather than spread the peaks, because manufacturing and other "blue collar" workers typically start and finish work earlier than office workers.

Indeed, the evidence suggests that very little "peak spreading" has been achieved in practice in Sydney, probably because there are economic imperatives and time constraints on when most people can travel. The share of trips undertaken in the morning peak has varied only between 20.3% and 20.8% since 1991, and there is no evident trend.

Similarly, the ability of communications technologies to reduce demand on the transport system appears to be more limited than was once thought. In 2006, for example, only 4.4% of people in Sydney worked from home on any given day.

There are some signs, however, that travel demand management *can* work:

- The total kilometres travelled per capita in Sydney, which had been growing for many years, began levelling off around 2000 and now appears to have plateaued.
- Densities are increasing in Sydney and will continue to increase. This will tend to reduce the amount of travel undertaken, especially by car, because

of traffic and parking difficulties and because other options, like walking, cycling and public transport, become more viable with increasing density.

- Petrol prices rose significantly in 2008, when oil reached US$147 a barrel, and this tended to reduce car-based travel and encourage alternative modes, both in Australia and overseas.

  Although oil prices have since fallen back to around US$75 a barrel, this is still well above price levels in the past, and many analysts expect prices to rise steeply again with the onset of a peaking and then decline of global oil supplies.

- There are increasing efforts by a range of organisations to reduce car dependence in our cities.

  These approaches range from the growth of car-share firms such as "Go Get", which have steadily expanded their operations, to the introduction of travel management plans by companies such as Optus. Only 55% of the 6,300 Optus employees now employed in Macquarie Park now drive to work, compared with an average for the Macquarie Park area of nearly 90% a few years ago.

- The Commonwealth government has recently raised the possibility of road pricing measures such as the introduction of peak period surcharges on tollroads, while other proposals have been made for area-based congestion charging zones, similar to those introduced in Singapore, London and Stockholm.

In the light of these types of considerations, **the Inquiry has assumed, for the purposes of developing its longer-term public transport planning proposals, that there will be a 10% reduction in total per-capita travel in Sydney (kilometres per year per person) over the next 30 years**, as a result of the combined impacts of changes in land uses, including an increase in the proximity of services, the aging of the population, new pricing policies and incentives such as travel demand management and behavioural change programs.

3.3.2 Sydney's future 'travel tasks'

The future "travel tasks" for different transport modes in Sydney will depend on:

- Population and employment growth
- The amount of travelling each of us does, and
- The mode shares for cars, public transport, walking and cycling.

The last of these factors will depend both on detailed land- use patterns and on the prices of the different modes, including fares, petrol prices, parking charges and congestion charges etc.

Evidence within Sydney and from around the world suggests that there is a significant relationship between land-use densities and mode shares. For any given population, the higher the average density the higher the proportion ("mode share") of trips that will be undertaken by public transport, assuming it is available, and the lower the mode share of cars.

Other factors are also important, including travellers' residential locations within the urban area (e.g. their distance from the city centre), the details of urban designs and, as already mentioned, the pattern of employment locations.

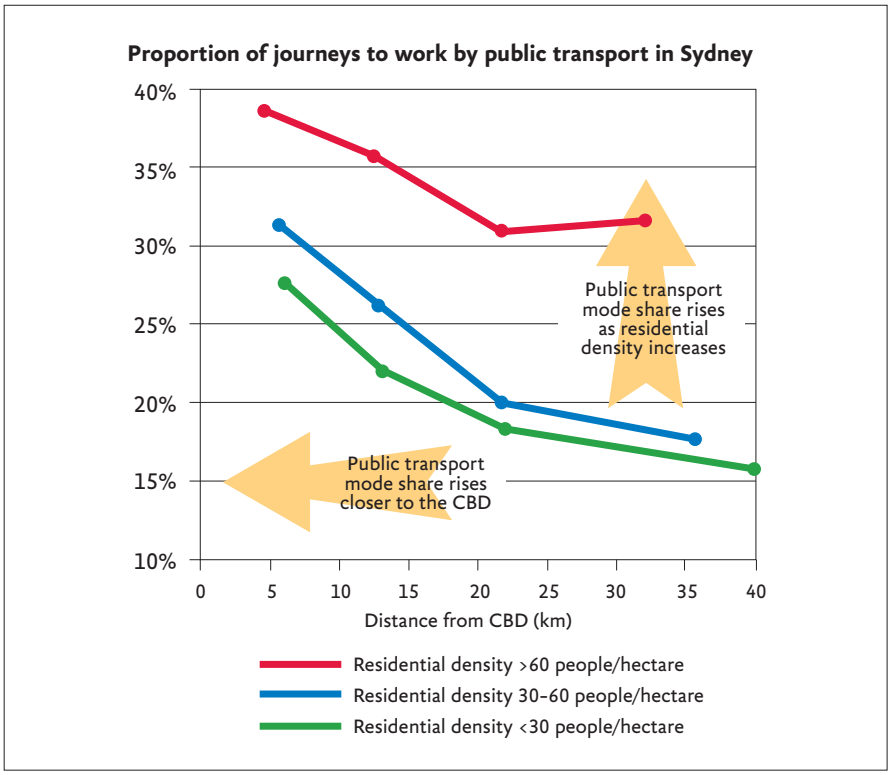


Figure 3.18. *Density, location and mode shares for journeys to work in Sydney. Source: Rickwood (2009).*

For example, ***Figure 3.18***, based on data from a detailed analysis of travel patterns in Sydney (Rickwood 2009), shows that the percentage of people travelling to work by public transport rises both with proximity to the CBD and (independently) with the density of residential development.

And to take another example, more compact development and higher densities help small-scale retail and business service outlets to exist within the urban fabric, rather than isolated from residents as is typically the pattern in traditional low-density outer suburban developments. This allows a higher proportion of local trips to be made by walking or cycling rather than by car.

As discussed in section 3.2, Sydney is likely to grow to around 6 million people by 2040, and much (probably 70% or more) of this growth will occur in established urban areas rather than "greenfield" areas.

This means Sydney's average population density is likely to increase by approximately 20–25%, depending on the exact location and mix of development. This factor alone can be expected to lead to an increase in public transport's mode share of the order of 5% for journeys to work.

In addition, it is likely that the cost of using cars will rise in real terms in the future, both from external factors, such as escalating fuel prices and the application of carbon trading, and from deliberate policies such as the introduction of higher parking charges or road congestion pricing.

Finally, there is already evidence of a trend to greater use of walking and cycling for health as well as environmental reasons, and many local councils are expanding cycling facilities.

Accordingly, for the purposes of developing its proposals for the content of Sydney's *Long-Term Public Transport Plan* the Inquiry has adopted the following mode shift assumptions for Sydney over the next 30 years:

- 10% of car-based journeys to work, mostly the shorter trips, will shift to walking/cycling or small electric vehicles like electric scooters.
- 10% of current car-based journeys to work will shift to public transport, except for journeys to jobs located in selected major centres for which a combination of major enhancements to public transport and further restrictions on cars are assumed to result in a 25% shift.

These assumptions lead to the estimates presented in ***Table 3.7*** for the key dimensions of the "travel tasks" facing Sydney over the next 30 years.

It may be seen that over the next 30 years:

- **While the total number of journeys to work in Sydney is expected to rise by around 36%, the number taken by car is expected to rise by only around 5%**

Table 3.7.
The Inquiry's estimates of changes to "travel tasks" and mode shares in Sydney, 2006 to 2040.

Journeys to work			
	2006	**2040**	**% change**
Total employment (million)	1.94	2.64	+36%
Total journeys to work (million)			
Car	1.4	1.5	+5%
Public transport	0.4	0.8	+93%
Walk/cycle	0.1	0.3	+233%
Mode shares (approx)			
Car	73%	56%	
Public transport	23%	32%	
Walk/cycle	5%	12%	

Note: The NSW government's February 2010 *Metropolitan Transport Plan* and March 2010 *NSW State Plan 2010* "target" an increase in public transport's share of journeys to work in "metropolitan" Sydney from a reported 22% in 2006 to 28% by 2016. This represents a significantly faster rate of growth than those assumed by the Inquiry (32% by 2040) and previous versions of the *State Plan* (25% by 2016). The bases on which the NSW government's new target have been set have not been explained in either the *Metropolitan Transport Plan* or the *NSW State Plan 2010*.

Overall weekday travel (passenger kilometres)			
	2006	**2040**	**% change**
Population (million)	4.3	6.0	+40%
Average weekday kilometres travelled *per capita*	35.5	32.0	-10%
Total weekday travel (million passenger kilometres travelled)	152	192	+26%
Total travel by mode (million passenger kilometres travelled)			
Car	123	125	+1%
Public transport	24	48	+98%
Walk/cycle	5	19	+282%
Mode shares (approx)			
Car	81%	65%	
Public transport	16%	25%	
Walk/cycle	3%	10%	

- **Public transport journeys to work in Sydney are expected to almost double**
- **Walking and cycling journeys to work in Sydney are expected to more than triple**
- Overall travel, expressed in terms of passenger kilometres travelled, is expected to rise by around 26% (i.e. significantly below the rate of population increase, reflecting the effects of demand-management measures on both the number of trips per capita and average trip lengths)
- Total vehicle kilometres travelled by car are expected to remain broadly static
- **The total public transport task, expressed in terms of passenger kilometres travelled, is expected to roughly double**, and
- The total distance travelled by walking and cycling is expected to almost quadruple.

It should be noted that these assumptions are more conservative than the forecasts made by the NSW government in its February 2010 *Metropolitan Transport Plan, Connecting the City of Cities* and March 2010 *NSW State Plan 2010,* which:

- "Target" an increase in public transport's share of journeys to work in "metropolitan" Sydney from a reported 22% in 2006 to 28% by 2016, a significantly faster rate of growth than those assumed by the Inquiry (32% by 2040) and previous versions of the *State Plan* (25% by 2016), and
- Predict that CityRail patronage on an average weekday will increase by 135% between 2006 and 2036 (i.e. it will much more than double, to over 2 million trips per day), with bus patronage increase by around 70% over the same period.

3.3.3 Three possible broad transport investment philosophies for Sydney

In the light of the land-use and mode shift assumptions described above, there appear to be three very broad philosophies which might guide how Sydney's transport systems are developed.

The first is a **"low investment" philosophy**, under which there would be only limited investments in either roads or public transport.

If this philosophy were implemented congestion would be likely to rise significantly, along with crowding on the public transport system, as the increases in total capacity would not be able to match the increased travel demands identified.

Adoption of this philosophy would have one advantage: it would not require any new funding sources to be developed.

The second broad approach is a **"high investment in roads" philosophy**, which would see a continuation of a car-based city, with major new investments in roads but limited investments in public transport.

This philosophy is discussed further in Chapter 6 as part of an examination by the Inquiry of possible funding mechanisms under what the Inquiry has termed a "US scenario" for Sydney's future development.

Because many future major roads would need to be in long and expensive tunnels and are thus unlikely to be financially feasible without government subsidies, implementation of this philosophy would necessitate new taxes as well as toll and fare increases.

It would undermine the mode shifts assumed in section 3.3.2. Instead, it would encourage a shift away from walking, cycling and public transport to increased use of private automobiles.

Such an investment strategy would logically be matched with land-use patterns involving significant low-density housing development on the urban fringes and the dispersal of employment away from Sydney's centres.

Despite all the new roads, road congestion might well still *increase*, because of the induced travel effects of new roads, discussed in section 3.3.6 below.

The third very broad approach is a **"high investment in public transport" philosophy**, which would involve major new expenditure on public transport but strictly limited investments in new roads.

Two alternative ways of achieving this—under a "European scenario" and an "East Asian scenario"—are discussed in detail in sections 3.4 and 3.6 below and in Chapter 6.

Because public transport does not recover its full operating and capital costs, implementation of the "high investment in public transport" philosophy would also necessitate major new taxes and charges, as well as fare increases.

In land-use terms this philosophy would fit with a land-use strategy involving a higher degree of concentration of jobs in centres and a higher share of population growth in established areas rather than new "greenfield" developments.

The 'high investment in public transport" philosophy is compatible with the land-use, mode shift and travel demand assumptions identified in sections 3.3.1 and 3.3.2. Road congestion would stay roughly constant, and would be limited by the shift in travel to public transport, walking and cycling.

3.3.4 Market research on the three broad investment philosophies

As discussed in Part A (Chapter 1), the Inquiry commissioned a survey of 1,200 Sydney residents to explore Sydneysiders' preferences for the ways Sydney might develop in the longer term, and in particular to explore their responses to the three broad transport investment philosophies described above.

As described in section 1.3.1, **a very clear preference emerged for the "high investment in public transport" approach, which won 62% support, while only 21% of respondents were attracted to the "high investment in roads" approach and only 17% to the "low investment" approach** (***Figure 3.19***).

This preference was almost uniformly strong across all major socio-demographic groups and was only marginally affected by people's current travel choices. Car users were almost as supportive of the public transport option as public transport users.

For details, please refer to section 1.3.1.

The survey methodology and questions are described in some detail in section 1.3.1 and ***Appendix 2***, but it is important here to understand that in the questions'

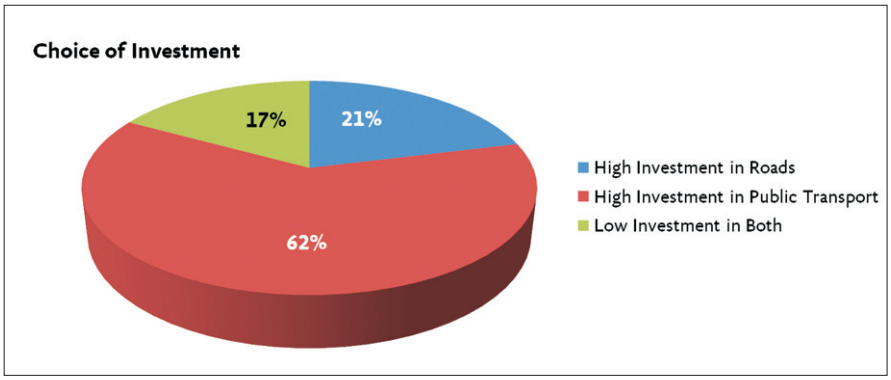


Figure 3.19. *Market research survey findings on Sydney residents' support for the three broad long-term transport investment philosophies.*

options falling within either of the "high investment" approaches were always matched with corresponding funding options involving different mixes of taxes, fares, tolls and charges. In other words, the survey respondents were not offered the choice of any "high investment" transport alternative which was cost-free or low-cost.

The robustness of the 62% majority in favour of the "high investment in public transport" approach, even in the face of questions involving some very high theoretical additional costs, highlights **a willingness by Sydneysiders to pay additional taxes and charges in order to get a city which functions**.

Furthermore, **the survey respondents' willingness to pay additional taxes was much higher for options falling within the broad "high investment in public transport" approach than for options falling within the broad "high investment in roads" approach** (*Table 3.8*).

3.3.5 Submissions to the Inquiry

Numerous submissions to the inquiry examined whether Sydney needs a long-term, integrated transport and land-use plan and what such a plan should contain.

For example, the Planning Institute of Australia noted in its submission:

> *"PIA supports integrated land use and transport planning which acknowledges that transport and development are not two separate things but two facets of the same challenge (i.e. transport is land use planning).*
>
> *"Fundamentally, PIA supports an integrated planning and decision making framework where land use planning processes fully account for the transport implications and requirements of our towns, cities and regions.*

Table 3.8.
Average willingness to pay more in taxes for alternative Sydney "futures", assuming certainty that the relevant "high" investment would in fact be made.

	"High investment in public transport" philosophy's options	"High investment in roads" philosophy's options
Compared to the worst of the "low investment in both" philosophy's options	$877	$224
Compared to the best of the "low investment in both" philosophy's options	$705	$126

> *"PIA supports transport planning and decision making that has due regard to the land use and development implications of these activities.*
>
> *"PIA supports an integrated planning and decision making framework that considers cost effective and efficient and sustainable movement of people and freight, and a focus to reduce car dependency and subsequent emissions."*

While there was support for a number of specific road enhancements—for example, Penrith City Council proposed enhancements to both road and rail links linking growth centres to major activity nodes such as Penrith CBD, while Willoughby City supported the F3-M2 link—most submissions focussed instead on the need for major enhancements to public transport.

An integrated, multi-modal, long-term plan

A common theme was that there needs to be an integrated approach covering all modes of public transport and the whole Sydney region.

> *"A Long Term Public Transport Plan should acknowledge that there are different modes of transport for different purposes (for example, commuting, shopping, leisure and recreation) and that use of multi modes for some journeys may be needed."* (Planning Institute of Australia)

However, there were also many suggestions concerning specific modes and specific enhancements in particular parts of Sydney. A few examples are illustrated below.

North West Rail Link

There was strong and widespread support for building the North West Rail Link as an immediate priority.

This was mentioned by people from all over Sydney, not just people living in the area affected.

There appears to be a widespread recognition that this part of Sydney is particularly poorly serviced by public transport and has a major need for a rail link.

> *"It is important that areas of high urban growth such as the north-west and south-west sectors of Sydney be provided with either a heavy rail system or initially a metro line as suggested by Glazebrook (2009).*
>
> *"This should be of high priority in the integrated land use transport plan for Sydney, as the opportunity to attract a high mode share will be at risk from additional private motor vehicle ownership and use for commuting in response to in action. Inaction will further commit a large portion of the Sydney population to a congested road network."* (Sutherland Shire Council)
>
> *"The case for a dedicated rail link to the Hills is well made out in the Government's own Environmental Assessment and Concept Plan for the North-West Rail Link. It says 18 per cent of Sydney's anticipated residential growth is expected to occur in the area, with the population expanding to 475,000 by 2031 (240,000 in The Hills Shire, up 40,000 from today).*
>
> *"Only seven per cent of total household trips a day are by public transport, the lowest proportion in Sydney. Not only is the level of car ownership the highest in the State, the distance travelled by motor vehicle per household is 27 km a day, compared with 11 km in Eastern Sydney. Clearly, there is a high potential to get people out of their cars and onto public transport.*

"The exponential growth of Hillsbus' City Express Bus clearly illustrates the pent-up demand for public transport in the Hills district. But buses are not the long-term solution to the North-West's transport needs." (Michael Richardson, Member for Castle Hill)

Other heavy rail links

There was also strong support for other extensions of the CityRail system, including the South West Rail Link (e.g. the submissions by Camden Council and the NSW Liberal/National Coalition), a link from Parramatta to Epping (e.g. Willoughby City Council and the Northern Sydney Regional Organisation of Councils) and a second Harbour rail crossing (e.g. Willoughby City Council and Sutherland City Council).

The CBD Metro and metros more generally

There was support in general for metros as a part of a wider upgrade of public transport for Sydney.

For example, Penrith City Council supported a fast west metro line, while Sutherland Council supported a "beaches" metro from Cronulla to the CBD and then on to Dee Why. Willoughby City Council also supported a metro link to the Northern Beaches in the longer term:

"While the introduction of a Bus Lane or T3 Transit lane along Warringah Road to link with Chatswood has been noted above as an essential improvement from Willoughby Council's viewpoint, in the longer term, a rail route to the Northern Beaches should also be provided. It is noted that Garry Glazebrook's document 'A 30 year Public Transport Plan for Sydney' has proposed a metro link between Dee Why and North Sydney and this is supported. Such a link has been proposed by a number of previous public transport plans for Sydney but no move towards implementation has occurred."

Concern was expressed in a number of submissions, however, about the value of the CBD Metro then proposed by the government. Several submissions were concerned, in particular, that this proposal should not prejudice other options such as heavy rail.

Leichhardt Council forwarded the Inquiry a copy of its submission to the Sydney Metro Authority in response to the *CBD Metro Environmental Assessment*, which commented:

"Council contends that the CBD Metro will not generate significant benefits for the municipality. The associated costs and risks are high ...

"The CBD Metro Environmental Assessment fails the fundamental test of major new infrastructure i.e. it does not credibly demonstrate improvements in accessibility."

Willoughby Council's submission stated:

"Council strongly urges the government to place on hold any further development of the CBD Metro until such as time as this inquiry has finished and until the benefits of that scheme have been measured against the benefits of the NW and SW rail proposals as part of a comprehensive transport plan for Sydney."

Sutherland Shire Council's submission argued that:

> *"... any new station/metro development such as the proposed CBD Metro not be supported where it would compromise future links and rail infrastructure opportunities to develop the 'beaches' line and other key metro links in the future."*

Light rail

There was strong support generally from the public for expanding light rail, and light rail was the most commonly referred to issue in the submissions (see section 1.1.1 in Chapter 1).

Organisations whose submissions supported light rail development in Sydney included the Planning Institute of Australia, Sydney City Council, Leichhardt Council, Ecotransit and Sutherland Council, to name a few.

Most saw light rail as part of an integrated system rather than competing with other modes.

The Rail Tram and Bus Union was in a minority in arguing against light rail in the CBD and inner suburbs, but saw a role for it in outer and middle suburbs, as did the submission from Matt Mushalik, who argued that light rail would be much more cost effective than metros.

Buses

Many submissions called for improved bus services and some provided comprehensive proposals, including a report on a Sydney "Overground" originally prepared for the Warren Centre's *Sustainable Transport for a Sustainable Sydney* project.

This submission argued for the creation of a network of inter-connected, high-frequency bus routes rather than radial routes, with passengers able to make cross-regional or cross-suburb trips more readily through such a network. The proposed network would require integrated fares with no transfer penalties, together with upgraded radial links (e.g. light rail) to provide the required capacity and to release buses for the cross-regional routes.

Ferries, taxis and other modes

Suggestions for enhancing other modes included proposals for demand-responsive transport in areas or at times with low traffic densities and also for people with mobility difficulties.

Some submissions proposed the use of innovative technologies, and a few went so far as to propose elaborate networks for Sydney, addressing its needs for the next century.

3.3.6 Are more motorways the answer?

With every new motorway opening in Sydney there has been an increase in *total* traffic volumes—not just traffic volumes on the motorway—in response to the faster travel times.

This effect is known as **"induced" traffic growth**. It occurs because the additional road space initially increases travel speeds and this attracts more people to their cars. The growth typically continues until road speeds begin to decline and congestion returns.

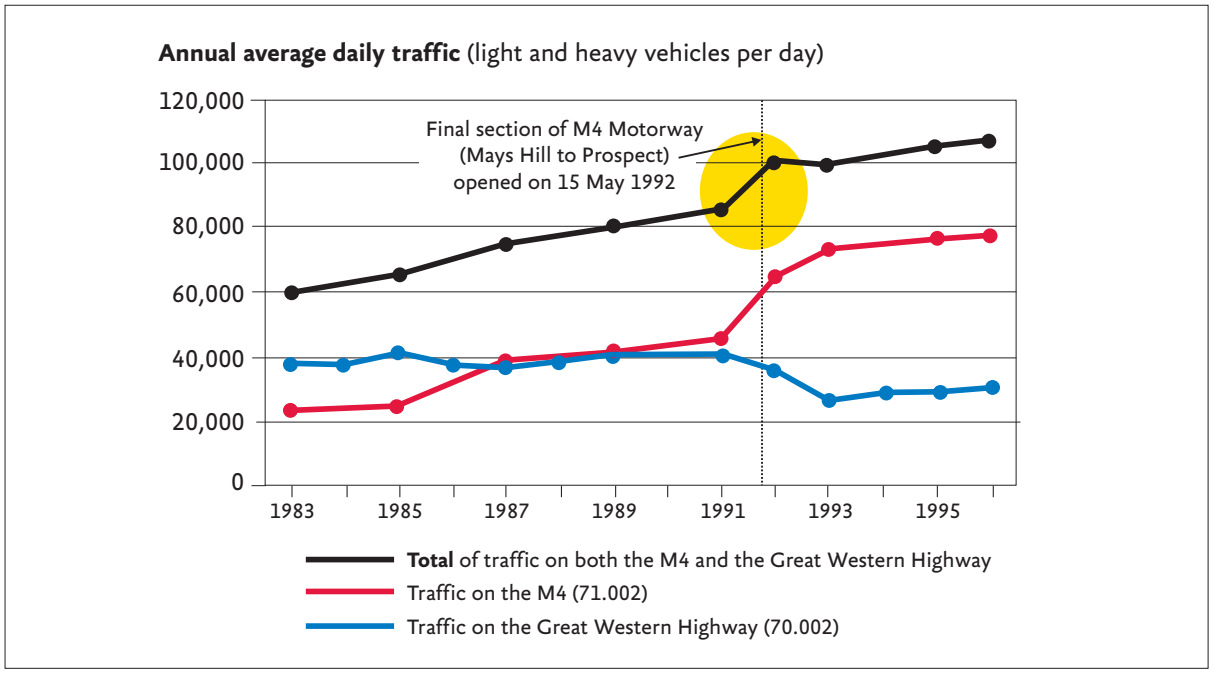


Figure 3.20. *An example of induced traffic. Source: RTA Traffic Volume Data for Sydney Region 1993, cited in Zeibots (2007).*

Figure 3.20 presents an example of induced traffic growth following the opening of the last section of the M4 motorway in 1992. As can be seen, traffic volumes on the M4 (red line) increased in the period immediately after the motorway's opening, as one would expect, and traffic volumes on the Great Western Highway which runs parallel to the M4, saw a decline (blue line). There was a sudden increase *overall*, however, when the volumes for both roads are added together (black line). In other words, it wasn't just a case of Great Western Highway motorists' switching to the new (and temporarily faster) new motorway; the sudden increase in total road capacity had also *induced* a considerable amount of *extra* traffic.

The increase in overall traffic induced by a new motorway—on top of the "traffic reassignment" which occurs when some motorists find the new or improved road is more attractive than an old route and so switch from one to the other—arise from several different travel behaviour responses:

- "Mode-shifting", where people find travelling by car on a new or improved road is now faster than using parallel rail or other public transport services and so shift modes

- "Trip rescheduling", where the initial congestion relief during peak periods encourages some people who previously scheduled their trips outside the peaks to change their departure times back to the peak periods, thereby increasing peak period traffic volumes

- "Change in vehicle occupancy rates", where commuters who were travelling as a passenger in another's motor vehicle choose to drive their own car

- "Trip redistribution", where the initial changes in prevailing travel speeds make destinations that would previously have necessitated too long a trip now fall within a reasonable travel time, inducing people to travel to more distant destinations

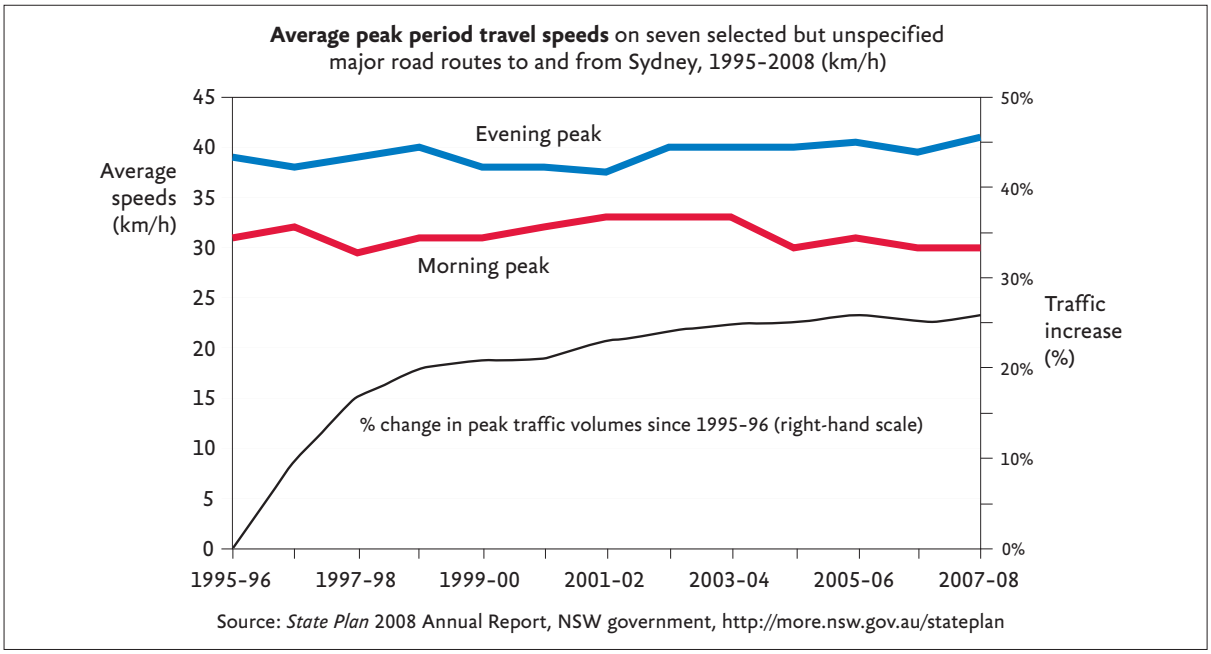


Figure 3.21. *Peak period travel speeds on seven selected but unidentified major roads to and from Sydney, 1995-2008.*

- "Induced or generated trips", where people make more trips as part of their travel routine or undertake trips where previously they did not travel at all, and
- "Development traffic", where potential residential districts that were once inconvenient to access because journeys times were too long initially become more attractive as places to settle.

In the M4 example shown in *Figure 3.14*, some of the increase in traffic was caused by traffic reassignments from other roads, some of them tens of kilometres away from the M4 and Great Western Highway, but there is also evidence to show that some of the increase occurred as a result of mode shifting from the Western Sydney rail line and about 50% of the additional traffic arose from new or longer trips (i.e. "trip redistribution" and "generated trips").

All of the travel behaviour responses described here occur because people are highly responsive to changes in travel speeds and are attracted by greater accessibility.

The important lesson that comes from this is that **just building more roads does not reduce traffic congestion.**

This can be appreciated by examining average traffic speeds on a sample of major arterial roads in Sydney over the last decade and a half (***Figure 3.21***).

As can be seen, average morning peak travel speeds on these roads (red line) have stayed pretty much the same despite all the huge road investments and the large increase in road space during the surveyed period.

In addition, however, it may be seen that the average road speeds *dropped* between 2003-04 and 2004-05, during a period when the CityRail rail network began to experience difficulties with service reliability, with "on-time" running dropping from over 80% to just over 50% (ITSRR 2005), and the lower average road speeds continued after the introduction in 2005 of a new CityRail timetable which made CityRail's services noticeably slower than in the past.

This experience is typical of the working relationships commonly observed between public transport and road network service levels.

When rail-based or other segregated public transport services are running "on time" they generally operate to a fixed travel time set by the timetable. Roads, in comparison, operate on a variable speed basis, because motorists choose when they will travel and this is influenced by road travel speeds and congestions levels, which in turn are influenced by the number of vehicles on the road. In the same way that people are *attracted* to using roads more when they are faster—as shown by induced traffic growth—people are *discouraged* from travel when public transport services are made slower. In these situations the *reverse* of many of the travel behaviour responses listed above usually occur, including, in particular, mode-shifting, with people moving from the rail network to the road network.

This can have a further effect by undermining public transport service frequencies, which in turn shifts further public transport customers onto the road.

One of the most fundamental rules of urban transport planning is that **service levels on the road network are only as good as the service levels on the public transport network.** Indeed, the speed at which public transport services are operated acts as a default speed for the road network.

Accordingly, in the rest of this chapter the discussion will focus on **the options for directing high levels of investment into public transport rather than roads**.

These options will be discussed in terms of two specific scenarios, to illustrate the broad spectrum of land-use and transport choices Sydney faces within the overall "high investment in public transport" philosophy endorsed by the Inquiry.

To summarise ...

It is realistic to assume that a combination of higher prices for fuel, changes in land uses and specific measures to manage travel demand will produce a reduction in total travel per person in Sydney of the order of 10% by 2040, with people, on average, making fewer and shorter trips.

Similarly, the combination of rising densities, an increase in the proportion of jobs in Sydney's centres, improved public transport and other measures such as parking restrictions, road congestion pricing and improved cycling facilities can be expected to lead to significant mode shifts away from the car in the future.

Under realistic assumptions it is likely that the "travel task" to be undertaken by cars can be held roughly constant over the next 30 years, but the travel task for public transport will need to approximately double and that for walking/cycling will treble or quadruple over the same period.

The Inquiry's approaches, assumptions and analyses on these matters have been strongly supported by the findings of the market research commissioned by the Inquiry, most of the submissions to the Inquiry and analyses of the impacts of road-based solutions, all of which suggest that:

- Investing in more roads will *not* reduce road congestion
- Slowing down the CityRail network has probably contributed to slower road speeds
- Investment in improved public transport services will benefit both public transport users and motorists, and so should have a much higher priority than more road investment
- Sydney needs a major upgrade to its public transport over the next 30 years, and this should be the main focus of the city's transport investment
- This enhancement needs to be developed and implemented under an integrated plan, taking account of current and future land uses and covering all modes and regions of Sydney, and
- The public strongly support this approach.

3.4 Freight and inter-regional issues

In a strict sense the Inquiry's *Terms of Reference* are confined to public transport issues and cycling within Sydney.

Indirectly, however, freight transport issues do need to be considered, at least inasmuch as they interact with public transport options.

So do inter-regional transport issues such as future medium and long-distance high-speed trains between Sydney and other cities, at least in terms of their interactions with other public transport services within the Sydney metropolitan area and the provision of access by high-speed trains into Sydney's major centres, especially but not solely the CBD.

Both of these matters are briefly examined below.

3.4.1 Freight

The efficient movement of freight is essential for Sydney's economic viability.

While public transport enhancements cannot handle freight or commercial traffic, they *can* reduce pressure on Sydney's limited roadspace, as discussed above, so the major public transport improvements recommended in this *Final Report* would bring large economic benefits through reductions in road congestion for freight and commercial vehicles (compared with the situation without these improvements).

The vast majority of short-distance freight movement in Sydney occur on the road network, which has much greater flexibility and penetration than the rail network.

However, in addition to its monopoly on coal movements through Sydney, rail has the potential to capture a much increased share of two key freight markets, which can also help to reduce the pressure on roads:

- Container movements to and from Port Botany, and
- Long-distance freight, particularly interstate bulk freight and container movements.

Figure 3.22 summarises the key elements of Sydney's existing and possible future freight transport infrastructure, including the port, motorways, dedicated rail freight lines, shared passenger and rail freight lines, intermodal (road-rail) terminals and industrial areas.

The dedicated freight rail lines link Port Botany, Enfield and a number of freight and intermodal terminals, including Chullora and Cooks River. They allow freight trains to reach these destinations without interference from passenger trains (or road traffic).

However, freight trains currently have to share tracks with passenger trains on the main rail lines into and out of Sydney, including the Northern line (as far south as North Strathfield), the Western line, the Main South line (apart from a few sections with a dedicated freight track) and the Illawarra line.

This competition for track space has led to the use of "curfews", during which freight trains are barred or limited in operation while passenger trains are given priority.

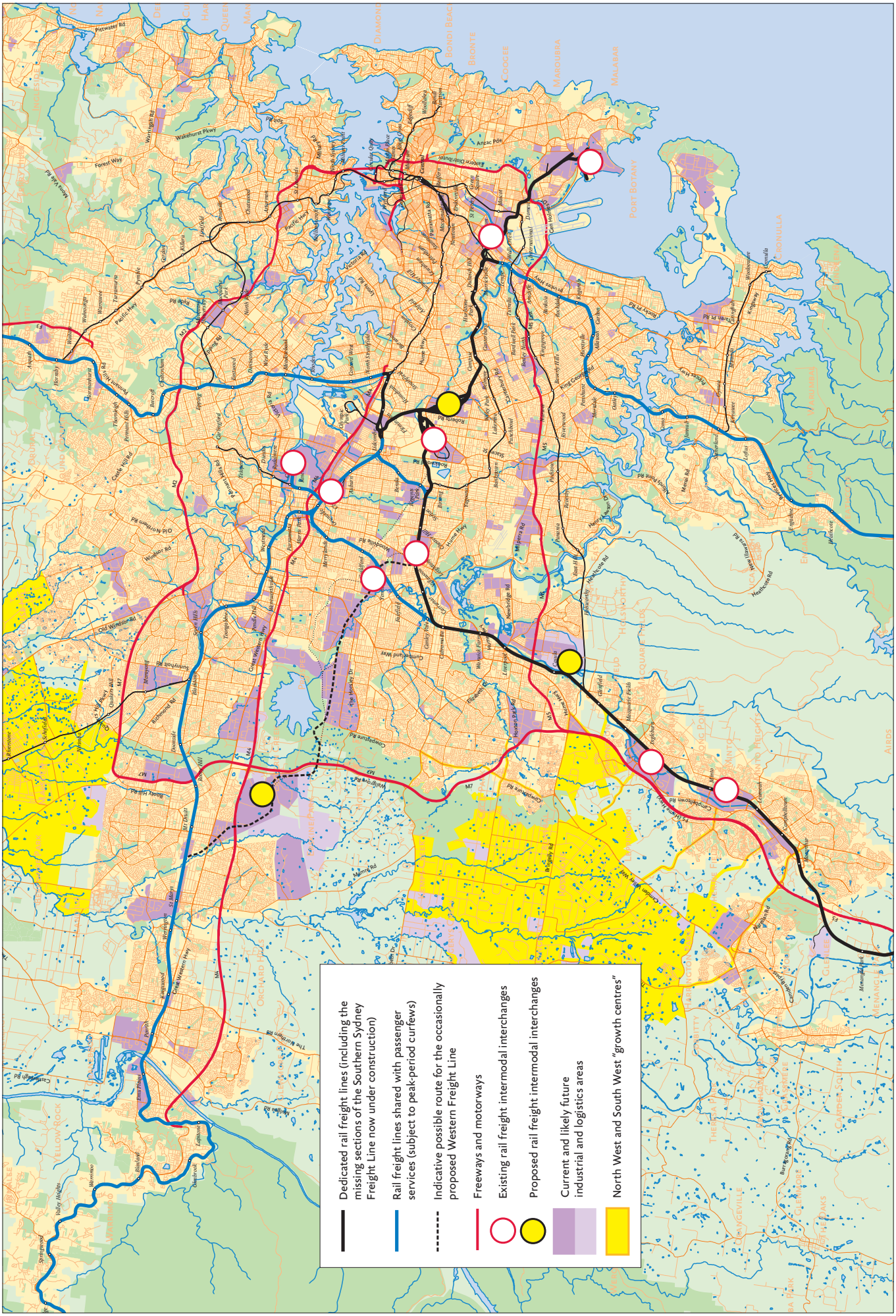


Figure 2.22. *Existing and possible future freight transport infrastructure in Sydney.*

This has undermined the ability of the rail industry to compete with trucks for interstate traffic and in some cases port-related traffic.

In addition, the main rail lines between Sydney, Melbourne and Brisbane are sub-standard, with slow, tightly curved 19th century alignments and requirements to "cross" other trains. Transit times for interstate and long-distance intrastate freight trains are therefore longer than for trucks, and trucks have captured 80–90% of interstate freight in these key corridors. By comparison, rail handles 75% of the intermodal freight on the route between Sydney and Perth, where rail is much more time-competitive with trucks.

Recognising Australia's over-reliance on roads for long-haul freight movements, the Commonwealth government is moving to upgrade the interstate rail corridors and has progressively installed new signalling, new tracks and improved alignments.

As part of these measures, a new "Southern Sydney Freight Line" is under construction from Macarthur, at the southwestern edge of Sydney's electrified rail system, through to Chullora (parts of this line already exist). This will allow freight trains to and from Melbourne and Perth to avoid the curfew and provide additional freight train paths and much greater reliability for the critical overnight freight market.

There are also plans to progressively upgrade the Main Northern line from North Strathfield to Hornsby. Although no details have been released for many years, this is expected to involve selective triplications and quadruplications of two-track sections of this route, enabling faster trains to overtake slower trains, and will need to be flexibly managed to maximise overall capacity, reliability and speed for both freight and passenger traffic.

A new (but relatively small) intermodal terminal or "inland port" has been approved for Enfield. When completed, this will allow shuttle container trains from Port Botany to unload onto trucks, helping to reduce the very rapid rate of increase in truck volumes into and out of the port.

There have also been proposals from time to time—so far without any firm commitments—for upgrading the dedicated freight line between Marrickville and Port Botany and, in particular, the rail terminal facilities at Port Botany, whose current design and operations impose serious constraints on the overall capacity and efficiency of this line.

A very large new intermodal terminal is planned for Moorebank, connected to the Southern Sydney Freight Line via a new railway bridge across the Georges River, although information on this proposal is scarce and until the May 2010 Commonwealth budget no firm commitments had been made (indeed, the NSW government's February 2010 *Metropolitan Transport Plan, Connecting the City of Cities* misplaced this terminal many kilometres north of its actual proposed site and promised only "investigations"). The Commonwealth has now promised to spend $71 million to prepare environmental impact statements and "business cases" for the project, move defence facilities from the site, clear up site debris and establish a project office, but no decision on when the facility will be built has yet been made and no details on the proposed facilities have been released.

Similarly, a few years ago there were preliminary investigations into options for a new dedicated freight line, probably via Yennora, to another large new intermodal terminal in the "Western Sydney employment lands" near the M7–M4 interchange, which would allow both port and interstate freight trains to service

the growing logistics and warehousing industries in this area. However, this proposal appears to have been quietly abandoned, as the February 2010 *Metropolitan Transport Plan, Connecting the City of Cities* makes no mention of this project.

Projects such as these would complement the rail-based public transport upgrades discussed later in this chapter, and would allow further increases in passenger as well as freight traffic.

For example, the Southern Sydney Freight Line will reduce passenger train operational constraints at Liverpool and Cabramatta, while the proposed upgrading of the Northern line might allow additional passenger trains to travel from the Central Coast and points further north.

Any freight-related upgrades of the main interstate lines within Sydney will need to be designed to cater for future high-speed rail services as well as existing and new suburban and interurban passenger services and freight services.

3.4.2 Inter-regional and high-speed links

While Sydney is likely to remain Australia's largest city for some time, there is also expected to be population growth in the Hunter, Illawarra and Southern Highlands, and potentially inland as well.

All of these areas are sufficiently distant from Sydney to operate in a largely self-contained fashion from a commuting point of view, and this should be encouraged through growth in employment in these areas.

However, there is also some commuting into Sydney from all of these areas, and there is significant business and recreational traffic between the regions.

Currently some of the long distance commuting occurs by rail, but most of the business and recreational travel is road- based.

Road connections have improved significantly over the last few decades to the north, south, southwest and west, but have hardly improved for rail. The rail corridors in all four directions suffer from 19th century alignments which limit train speeds, and there is significant coal, grain, container and/or other freight traffic on all of these lines, causing capacity and speed constraints for both freight and passenger movements.

Many other countries have moved to" high speed" passenger rail services, with top speeds of 250 km/h and above, in the last 30 years. This has usually, but not always, involved dedicated infrastructure to allow the segregation of high-speed rail services from freight and slow-speed passenger services.

Countries with high-speed rail systems include Japan, France, Germany, Sweden, Spain, Italy, Korea, Taiwan, China, Argentina, the UK and the United States.

To take but two examples, France has developed an extensive network of "TGV" trains which now operate at up to 330 km/h on both internal and international routes, and Spain has also built an extensive high-speed system which will ultimately connect all the large cities in the country. As a result, high-speed rail is already replacing air travel on journeys of up to 400–600 km.

The most dramatic developments at present are occurring in China. China's first two high-speed lines, from Beijing to Tianjin and from Wuhan to Guangzhou, have recently opened, operating at up to 350 km/h. The next major extension, due to open in 2011, will allow trains to travel the 1,300 km between Beijing and Shanghai in four hours.

Beijing–Tianjin line, China.

Several submissions to the Inquiry, including those by Peter Egan and the Rail Technical Society, have suggested there is a very real potential for high speed rail services in Australia and for links to and from Sydney in particular.

Over the last two decades there have been many proposals for, and studies of, high-speed rail links in Australia, including links between Sydney and Canberra, between Sydney and Melbourne and along the entire east coast between Brisbane and Melbourne (see, for example, Rail CRC 2010).

The most recent comprehensive study in this field was undertaken by the Commonwealth Department of Infrastructure, Transport, Regional Development and Local Government (DOTARS, 2002). This study looked at coastal and inland corridors between Brisbane and Melbourne and various possible technologies (500 km/h maglev systems and 350 km/h, 250 km/h and 160 km/h conventional wheel-on-rail systems).

This study concluded that:

> *"The most viable component of the entire corridor for commencing an East Coast Very High Speed Train system was that in which Australia's greatest conurbation lies, from Newcastle through Sydney to Canberra, and that this, rather than an inter-capital project, was the place to start."*

For the Sydney–Canberra corridor, the most likely access routes for high-speed wheel-on-rail trains within the Sydney basin would be along the Hume Highway corridor from the south to the vicinity of Macarthur, then to Wolli Creek via the East Hills line, and then to Central via the Airport line or via the Illawarra line, assuming in the latter case that this section of the Illawarra line would be upgraded to six tracks.

For the Sydney–Newcastle corridor, two broad groupings of options for high-speed corridors into Sydney have been investigated:

- A new tunnelled route south from Gosford or Woy Woy to the Hawkesbury River, crossing the river on or next to the existing rail bridge, followed by a new high-speed line, again in a tunnel, under the Cowan Bank to the vicinity of Mt Kuring-gai. The route into Sydney would then follow the existing heavy rail alignments, with some deviations between Mt Kuring-gai and Hornsby to permit higher speeds.
- A tunnel from south of Woy Woy to Chatswood under Broken Bay, via Terry Hills or Mona Vale and then Frenchs Forest, with a high-level bridge over Middle Harbour.

Under both options the high-speed trains would then approach Central station using tracks shared with urban rail services, in the first case via Strathfield or North Sydney and in the second via North Sydney.

The two-way patronage estimates for possible east coast high-speed services prepared by the 2002 DOTARS study ranged from the equivalent of 5,000 passengers per day to around 22,000 passengers per day. Assuming a typical train capacity of around 400 seats and an average seat occupancy of 75%, this translates to a service requirement of between 8 and 36 trains per day in each direction.

This suggests that a maximum of three high-speed services would be approaching Sydney on any track shared with urban rail services during the morning peak hour, and more likely there would be only two trains per hour.

It should therefore be possible to accommodate any conventional wheel-on-rail high-speed rail services on the Sydney–Canberra and Sydney–Newcastle corridors using Sydney's existing rail infrastructure, particularly if there were a new (second) heavy rail line from Chatswood to Central, as proposed by the Inquiry under one of the long-term scenarios discussed in section 3.5 below.

3.5 Proposals for public transport infrastructure improvements under two specific land-use and transport scenarios

3.5.1 Introducing the alternative scenarios

While there is general agreement on the need for major enhancements of Sydney's public transport, the question of the most appropriate options and priorities over the next 30 years is somewhat more complex.

The Inquiry has therefore developed and investigated two specific scenarios to assist and encourage debate on some of the choices facing Sydney.*

The first of these, termed the **"European" scenario**, represents a continuation of the 2005 *Metropolitan Strategy*, which sees Sydney's developing as a "City of Cities", but assumes significant additional population and employment growth, so as to accommodate 6 million people by 2040.

This extra growth would require some additional new "greenfield" development, which the Inquiry has assumed would occur around the Badgerys Creek area, plus additional consolidation across a wider area of the city.

The public transport required to match this development pattern would involve both extensions of existing networks and the construction of new networks, using a combination of heavy rail, metros, light rail, ferries, busways and "Bus First" roads, as well as high frequency bus services on other roads.

The second scenario, termed the **"East Asian" scenario**, addresses the same overall additional population and employment growth but focuses more heavily on the traditional city centre and inner areas of Sydney, with very strong employment growth (higher than under the "European" scenario) in the City of Sydney

* The names used for these scenarios are purely indicative. Sydney is a unique city, with characteristics which differ from those of typical cities in both Europe and eastern Asia. The labels are meant merely to highlight key differences between the directions in which Sydney might evolve in the future.

Table 3.9. Alternative scenarios for Sydney.		
	"European" scenario"	**"East Asian" scenario**
Population focus	Consolidation in established areas, but with some new "greenfield" development in the Badgerys Creek area in addition to the North West and South West Growth Centres	No new "greenfield" areas beyond those in the *Metropolitan Strategy*, but increased urban consolidation, especially along new metro lines
Employment focus	Multi-centred city	Reinforcement of CBD
Transport focus	Mixture of heavy rail, metro, busways, "Bus First" roads and light rail	Heavy focus on metros

and high levels of residential development along major new metro lines focussing on the CBD.

Although job and population growth in western Sydney would be slower under this scenario than under the "European" scenario, the diversion of most of the public transport infrastructure investments to the metro network in eastern Sydney, with fewer (and often deferred) investments in western Sydney, means western Sydney would be relatively handicapped under this scenario.

Table 3.9 summarises the main features of the two scenarios.

These features are considered in more detail below.

3.5.2 The scenarios' population distribution assumptions

As indicated in section 3.2.1, the NSW government's Transport Data Centre's 2005-07 forecasts of population growth in Sydney, to 2031, predicted Sydney's population would increase to 5.3 million by that year.

These forecasts have been used by the Inquiry as a base for developing its own population forecasts to 2040, but for the reasons discussed in section 3.2.3 the Inquiry has assumed a further population growth of 700,000, to 6 million, by that date. In comparison, the latest (April 2010) NSW government forecasts now predict this figure will be reached by 2036 (see section 3.2.2).

In updating the 2005-07 Transport Data Centre 2031 population estimates to generate forecasts of likely future population distributions in 2040, the Inquiry has taken account of:

- Existing accessibility to public transport
- The accessibility provided by new transport links, and
- The potential for redevelopment to offset expected population declines, in some older suburbs, associated with demographic changes such as the ageing of the population.

Thus the land use assumptions have been linked to the transport assumptions, and *vice versa*, for both scenarios (see section 2.4).

To assist readers to compare the estimated 2040 population densities and distributions under the two scenarios, ***Figure 3.23*** shows these patterns in 2006. (The closer the dots, the higher the population density.)

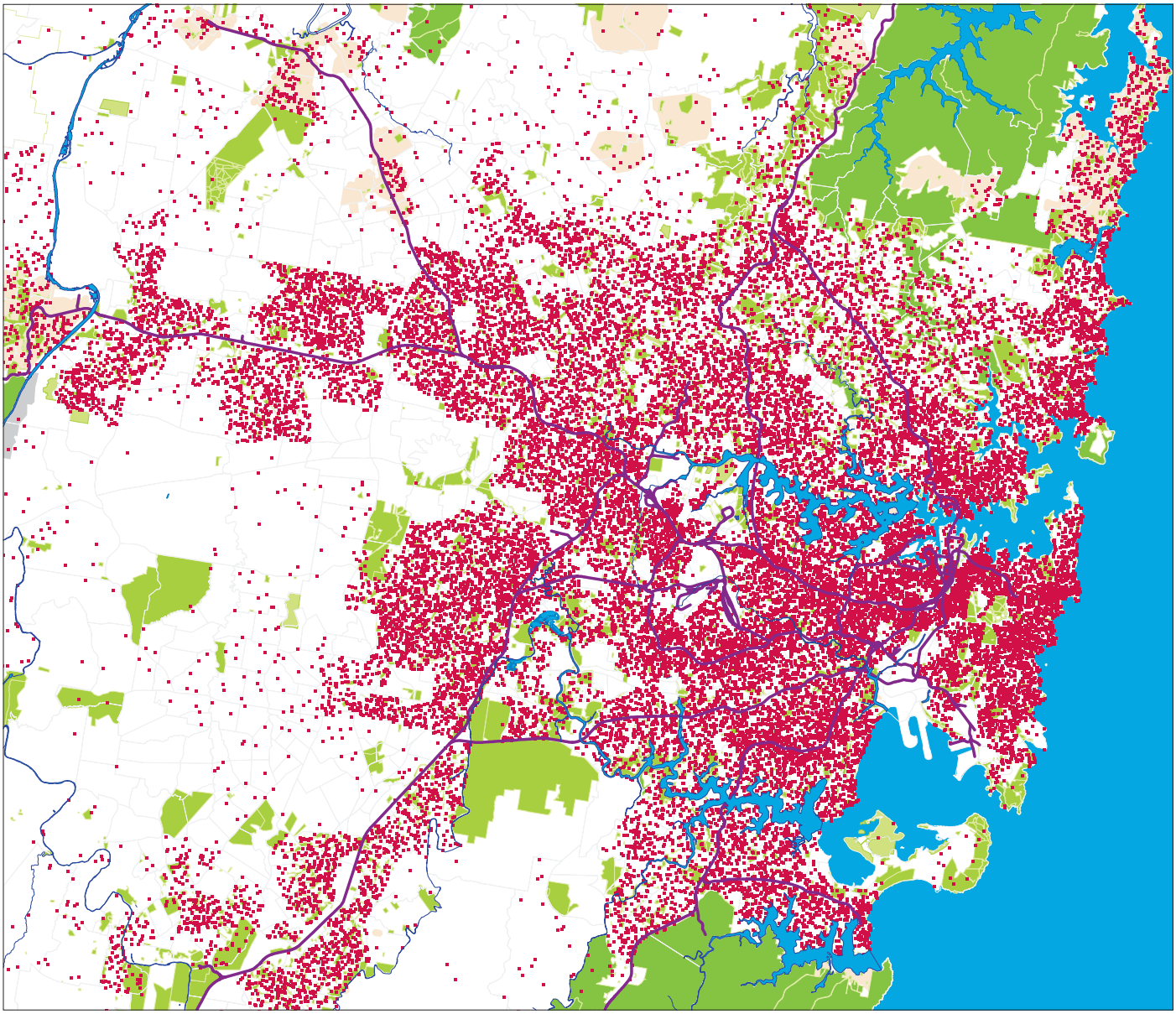


Figure 3.23. *Population distribution in Sydney in 2006.*

"European" scenario

Under this scenario (***Figures 3.24 and 3.25***), approximately 28% of the population growth to 2040 would occur in greenfield areas and 72% in established urban areas in both western and eastern Sydney. The former would necessitate some extension of the South West Growth Centre to encompass land at Badgerys Creek.

Much of the growth in established urban areas would occur along existing rail lines, as well as new heavy rail, metro and light rail lines and upgraded public transport routes (light rail and busways) as described in section 3.5.6 below.

"East Asian" scenario

Under this scenario, only around 22% of population growth to 2040 has been assumed to occur in greenfield areas, with about 78% in established urban areas, mostly in eastern Sydney.

This would involve significantly higher densities, particularly along the proposed metro lines (see section 3.5.6) (***Figures 3.26 and 3.27***).

Table 3.10 shows the estimated shares of Sydney's overall population growth in various regions in Sydney under the two scenarios.

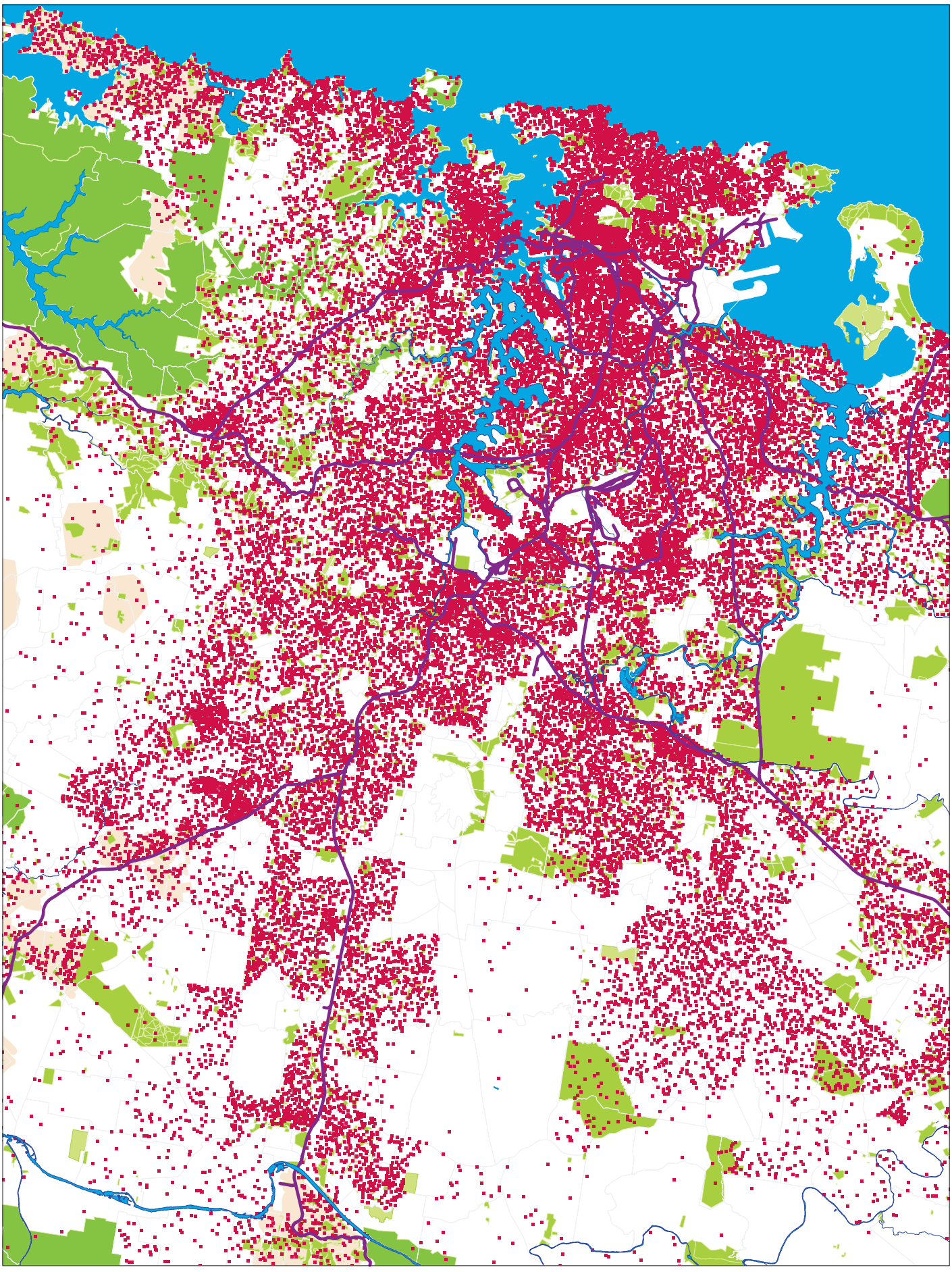


Figure 3.24. *Forecast population distribution in Sydney in 2040 under the "European" scenario.*

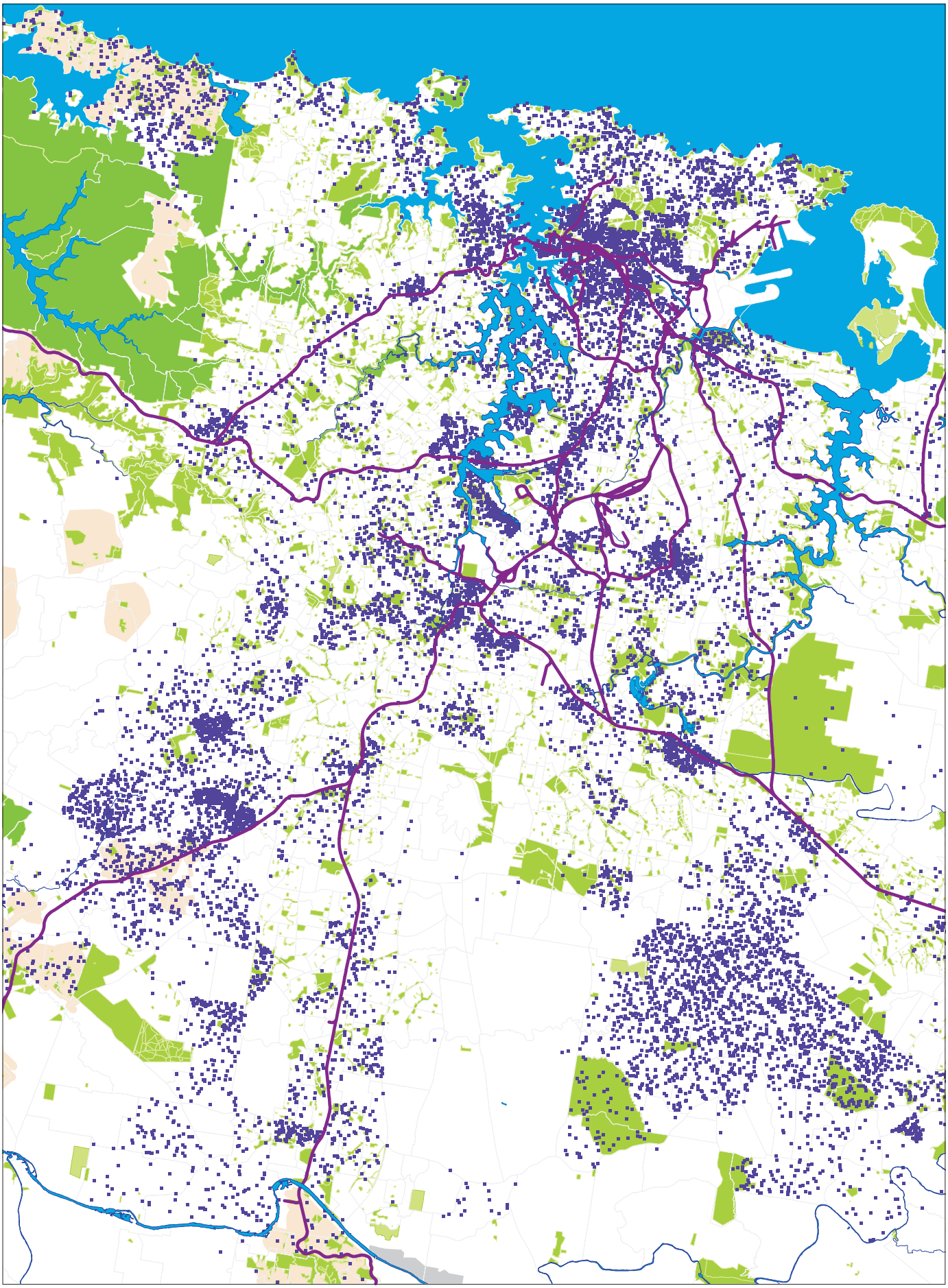


Figure 3.25. *Forecast distribution of population* ***growth*** *in Sydney between 2006 and 2040 under the "European" scenario (i.e. the differences between Figures 3.23 and 3.24). Note the greater growth in Sydney's west and southwest under this scenario.*

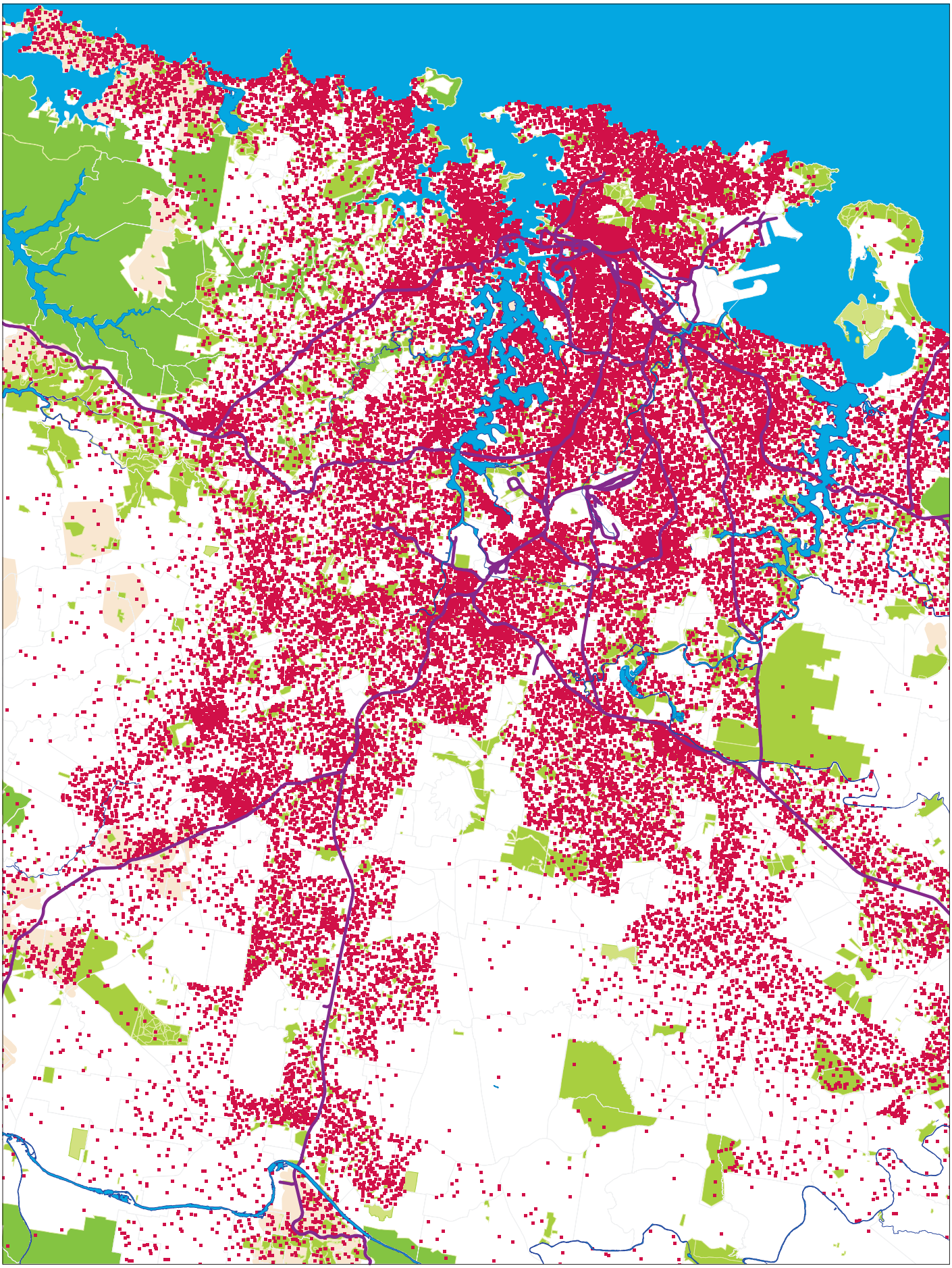


Figure 3.26. *Forecast population distribution in Sydney in 2040 under the "East Asian" scenario.*

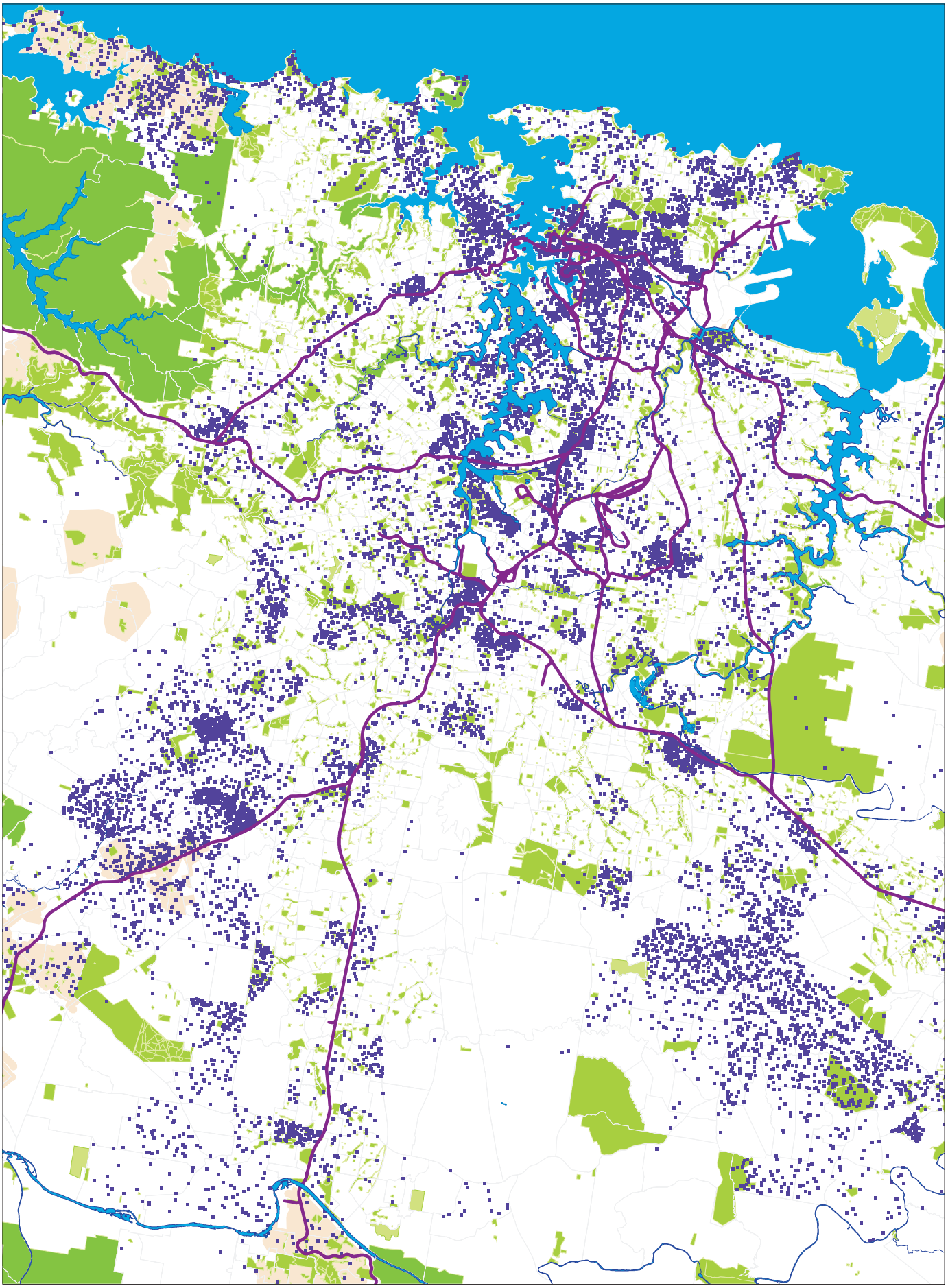


Figure 3.27. *Forecast distribution of population* ***growth*** *in Sydney between 2006 and 2040 under the "Easy Asian" scenario (i.e. the differences between Figures 3.23 and 3.26), with greater growth in Central Sydney and the NE, SE and Parramatta–CBD corridors.*

TABLE 3.10.
ESTIMATES OF POPULATION GROWTH IN DIFFERENT "SUBREGIONS" OF SYDNEY BETWEEN 2006 AND 2040 UNDER THE TWO SCENARIOS EXAMINED BY THE INQUIRY.

NSW Dept of Planning subregion (*Figure 3.6*)	Population in 2006	Forecast population in 2040		Share of Sydney's total 2006-40 population growth	
		"European" scenario	"East Asian" scenario	"European" scenario	"East Asian" scenario
Sydney City	165,596	332,551	324,599	10%	9%
Inner North	302,948	369,912	442,112	5%	8%
Inner West	227,425	323,851	363,302	6%	8%
South	651,395	720,042	719,586	4%	4%
East	281,789	377,803	385,203	6%	6%
North East	235,021	309,613	333,041	4%	6%
North	261,911	311,461	312,392	3%	3%
North West	761,078	1,103,775	1,089,260	20%	19%
West Central	679,565	917,807	904,354	14%	13%
South West	410,516	781,711	704,703	22%	17%
Eastern Sydney	**2,126,085**	**2,772,233**	**2,880,235**	**38%**	**44%**
Western Sydney	**1,851,159**	**2,803,293**	**2,698,317**	**55%**	**49%**
Central Coast	304,744	424,474	421,448	7%	7%
All of Sydney	**4,281,988**	**6,000,000**	**6,000,000**	**100%**	**100%**

3.5.3 THE SCENARIOS' EMPLOYMENT DISTRIBUTION ASSUMPTIONS

For both scenarios it has been assumed that:

- There would be a total growth in employment in Sydney of approximately 700,000 jobs between 2006 and 2040
- 400,000 of these additional jobs would occur in Sydney's key centres, taking their share of total employment from 41% to 45%, and
- Around 300,000 of the additional jobs would be located in smaller centres and dispersed throughout the region (many jobs, such as teaching, local services and small scale retail jobs are located outside centres and always will be).

The key differences between the two scenarios in employment terms is the greater focus of job growth in Central Sydney under the "East Asian" scenario and the greater growth in Parramatta and other western Sydney centres assumed under the "European" scenario.

These differences are illustrated in ***Figure 3.28***, which compares them with the equivalent locational distributions of new *centres-based* jobs under the latest projections from the Transport Data Centre (section 3.2.8 and *Table 3.5*).

Figure 3.29 presents a more detailed view of the resultant estimates of total employment in each centre in 2040 under the two scenarios.

3.5.4 TRANSPORT NETWORK ASSUMPTIONS UNDER THE TWO SCENARIOS

The location of both population and employment growth in relation to each other are the key drivers of peak hour travel demand, and hence the need for new public transport infrastructure.

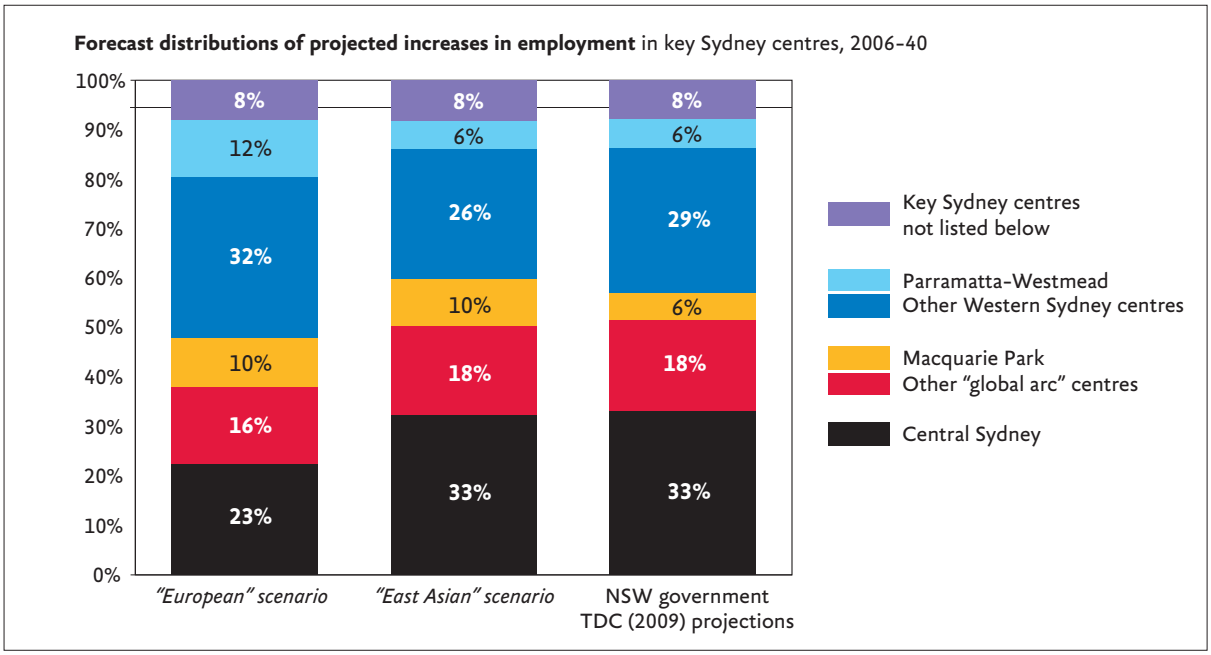


Figure 3.28. *Share of additional employment in key Sydney centres under the two scenarios and under the latest projections by the NSW government's Transport Data Centre.*

With a population increase to 6 million and a corresponding increase in employment, as described above, there is clearly a need for a general expansion of public transport capacity across Sydney, as well as selected specific capacity enhancements.

The need for specific public transport links in Sydney has been explored in numerous previous reports, including:

- The 2001 "Christie Report" into long-term rail options for Sydney, *Long-Term Strategic Plan for Rail, Greater Sydney Metropolitan Region*
- The 2004 "Unsworth report", *Review of Bus Services in New South Wales*, which identified "strategic" bus corridors for Sydney
- A series of reports into light rail extensions and the needs of the city centre
- The 2005 *Metropolitan Strategy* and its accompanying transport plans
- The 2009 "Glazebrook plan", *Designing a Thirty Year Public Transport Plan for Sydney*, and
- More recent NSW government documents proposing the establishment of the now-cancelled CBD Metro and West Metro and the recently announced "Western Express" heavy rail stub line into the CBD (see pages 205–207).

As a result of these and other reports, there is now a growing consensus on the key physical transport enhancements required for Sydney.

In broad terms, they include:

- Extensions of the heavy rail network to the outer suburbs, and particularly the northwest and southwest, which are experiencing substantial population growth and which are remote from the rail network
- A new high-quality link between Parramatta and Epping, which is vital for Sydney as a whole because it would provide access to Parramatta from the

North Shore *and* access to jobs in the northern "global arc" from the large population areas in western and southwestern Sydney

- A new heavy rail route through the CBD and across Sydney Harbour between Eveleigh/Redfern/Central and St Leonards/Chatswood, an equally vital pre-requisite for increases in rail service frequencies and capacities throughout the CityRail network, including (but far from limited to) the new northwest and southwest rail links
- Upgraded links to the Sydney CBD on key bus corridors which are currently congested and close to capacity, including Military Road, Oxford Street, Parramatta Road and Victoria Road
- Additional ferry services to a new CBD ferry terminal at Barangaroo
- New transport arrangements within the CBD to improve efficiency and amenity
- Improved public transport services into Parramatta generally, reflecting its role as Sydney's second CBD
- Improved cross-regional services linking various other key centres in Sydney, including Liverpool, Bankstown, Olympic Park and Macquarie Park
- Higher frequency bus services, in areas which can support them, to provide a genuine high-frequency network capable of providing real competition to the car for a wide variety of trips.
- A network of enhanced cycleways and safe cycle routes for both local and medium-distance trips
- Expanded local bus services and demand-responsive travel options to provide improved local accessibility, especially for people with a mobility difficulty or with limited access to cars
- Expanded "park and ride" and cycle parking facilities at stations and other key public transport stops, to improve access opportunities to the system.

At the metropolitan scale these new and enhanced links will help shift Sydney's public transport system from a radial system, focussing primarily on the CBD, to a "double cobweb" system, with a secondary set of radial spokes serving Parramatta, plus a series of circumferential routes for cross-regional travel (***Figure 3.30***).

3.5.5 Assumptions about funding constraints under both scenarios

Many of the types of improvements outlined above, to extend Sydney's public transport networks, enhance capacity and provide more direct routes, will require *very* substantial capital investments.

Not all of projects which might be desired will realistically be able to be completed within the budget likely to be available over the next 30 years, even if significant new sources of funding became available.

The public attitude surveys described in Part A (Chapter 1) of this *Final Report* have clearly demonstrated that Sydneysiders want a much-enhanced public transport system, regard this as a high priority and, very importantly, are willing to pay for it through a mixture of increased fares and new taxes and charges.

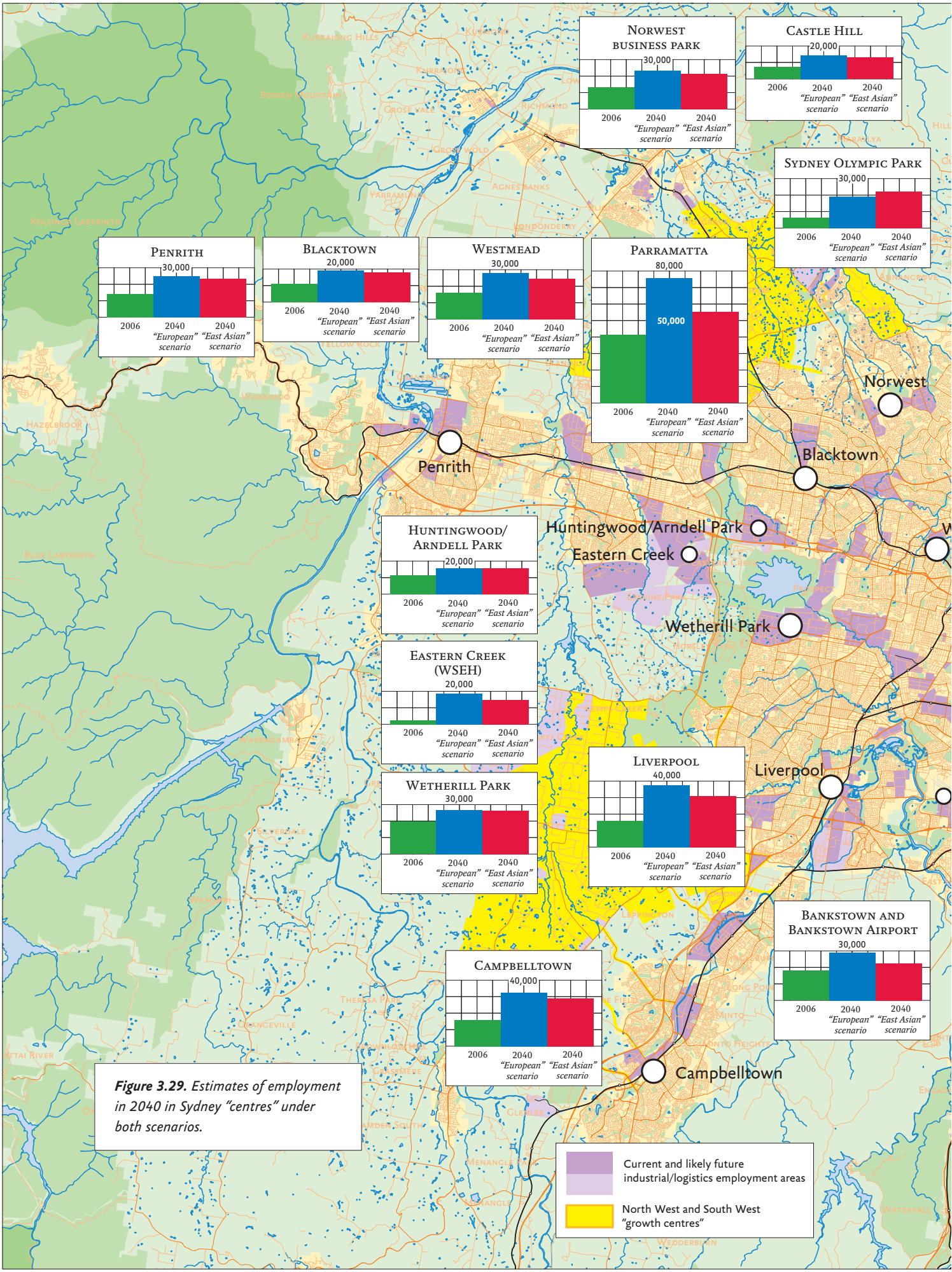
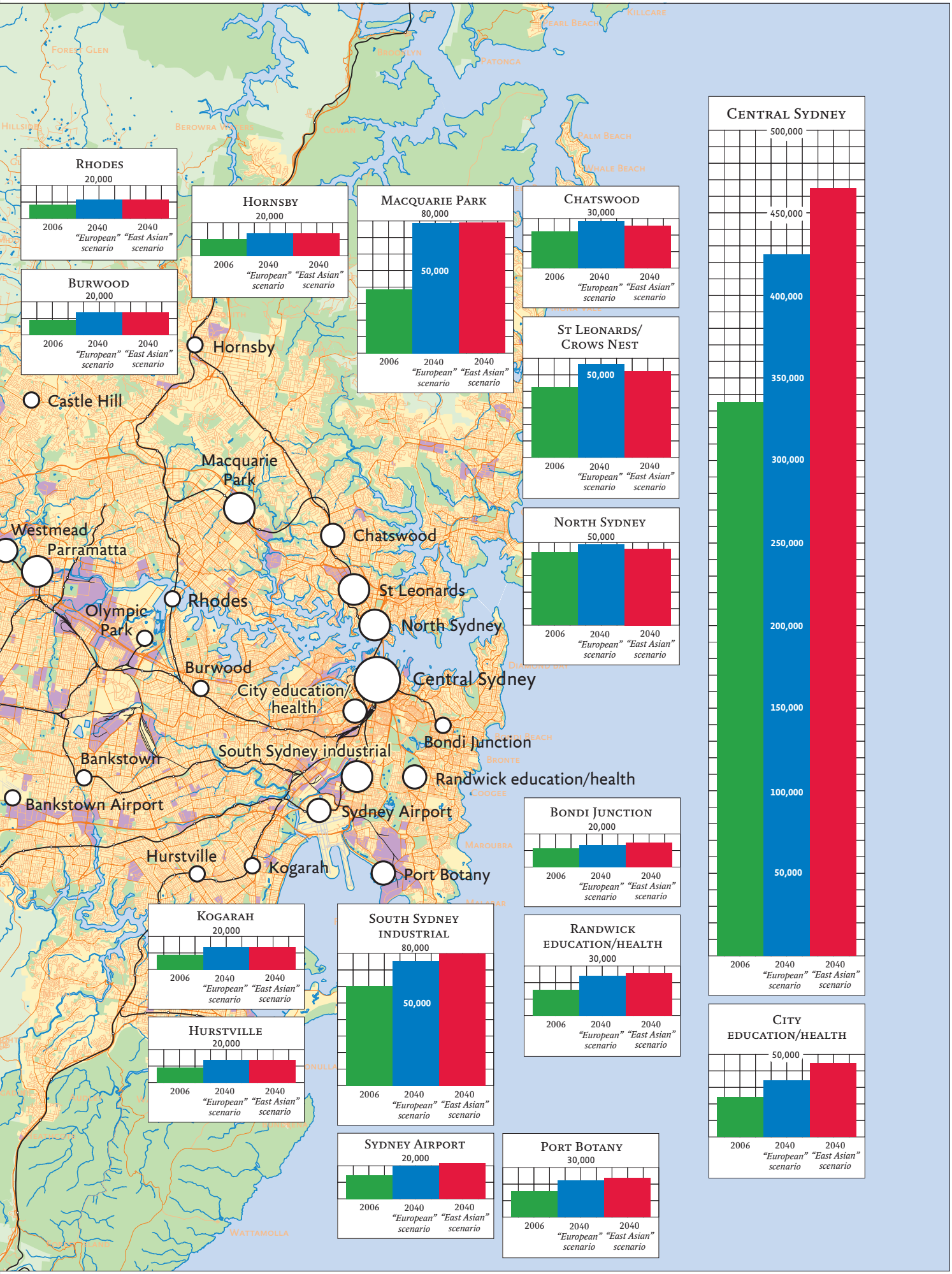
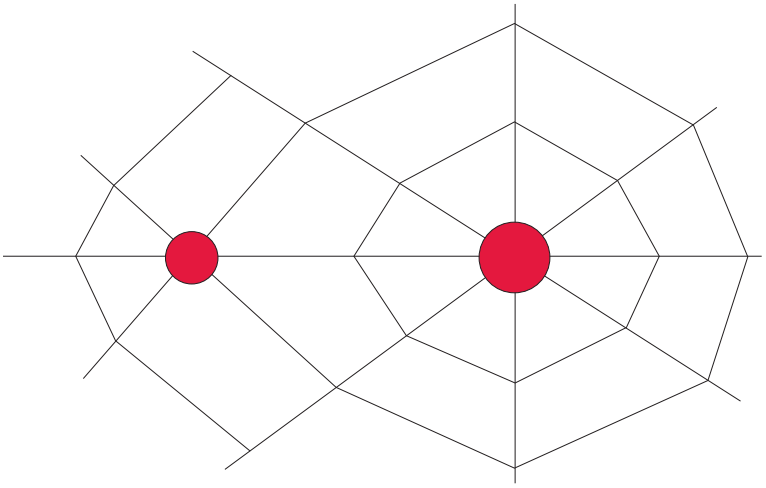


Figure 3.29. *Estimates of employment in 2040 in Sydney "centres" under both scenarios.*


Rhodes
20,000
2006
2040 "European" scenario
2040 "East Asian" scenario
Hornsby
20,000
Burwood
20,000
Macquarie Park
80,000
50,000
Chatswood
30,000
St Leonards/ Crows Nest
50,000
North Sydney
50,000
Central Sydney
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
Hornsby
Castle Hill
Macquarie Park
Westmead
Parramatta
Chatswood
Rhodes
St Leonards
Olympic Park
North Sydney
Burwood
Central Sydney
City education/ health
Bondi Junction
Bankstown
South Sydney industrial
Randwick education/health
Bankstown Airport
Sydney Airport
Hurstville
Kogarah
Port Botany
Bondi Junction
20,000
Randwick education/health
30,000
City education/health
50,000
Kogarah
20,000
Hurstville
20,000
South Sydney industrial
80,000
50,000
Sydney Airport
20,000
Port Botany
30,000

A "double cobweb" design for Sydney's major public transport network links



The Sydney CBD is "off centre". A secondary network is needed for Parramatta. Sydney's road and rail layouts make a strict geometric grid system impracticable, but more cross-regional links are needed.

Figure 3.30. *"Double cobweb" design for Sydney's "strategic" transport network.*

However, neither their willingness to pay nor their practical ability to pay is unlimited.

Similarly, while the government has the ability to borrow to fund new capital works, this must be backed by adequate funding sources to repay the capital and interest, and total borrowings need to be limited to financially prudent levels.

Chapter 6 of this report, which examines funding options, addresses these constraints in much more detail.

The Inquiry has concluded that a responsible level of new spending between 2010 and 2041 on new capital projects for Sydney's public transport, within the limits of both Sydneysiders' willingness to pay and the government's ability to repay, would be of the order of $36 billion (2010 $).

This conclusion takes account of the growth in revenue sources from population growth etc, as well as the growth in operating costs associated with rising patronage levels, and is **a figure *over and above the current spending levels*, which have been assumed to continue**, backed by current fares and subsidies, for operating and maintaining the current system and continuing the current level of capital works (***Table 3.11***).

Table 3.11. **Sources of finance for existing public transport systems and enhancements.**

	Costs	Sources of funding
Existing systems	Operating and capital costs (note 1)	Current fares plus current subsidies (in today's dollars)
New extensions and major capacity enhancements	Operating and capital costs (note 2)	Additional fares from increases in patronage over 2009 levels, plus new funding sources as identified in Chapter 6.

1. "Operating costs" include such items as the costs of train/bus operations, fuel costs, ticketing and fare protection costs, marketing costs and infrastructure and rolling stock maintenance.

"Capital costs" for existing systems include such items as the costs of new trains, trams, buses and ferries to serve the existing network and upgrades to infrastructure (e.g. accessible stations, power and signalling updates and relatively small-scale enhancements such as Clearways projects, depot facilities, train stabling yards, etc).

2. Includes the capital expenditure required to *extend* the network and provide major new capacity, including associated costs such as additional trains, light rail vehicles, buses and ferries.

3.5.6 Priority public transport projects under each of the scenarios

An analysis by the Inquiry of the costs likely to be associated with projects of the types listed in section 3.5.4 above, limited to those judged likely to be of real value in addressing the community's public transport needs under each of the two scenarios, has suggested that under each scenario the total capital cost between 2010 and 2040 would probably be of the order of $52 billion, excluding additional operating costs.

This is well beyond the likely funding envelope limit of around $36 billion.

Accordingly, the projects proposed by the Inquiry under the two scenarios have been further limited to those major projects which:

- Are considered affordable within the next 30 years, and
- Focus on serving population and employment growth, under the assumptions described above for each scenario.

Table 3.12 and ***Figures 3.31 and 3.32*** (on pages 184–187) highlight the major projects suggested by the Inquiry as those most suited to Sydney's needs under the two scenarios.

The Inquiry has neither the facilities nor the access to information required for detailed project costings. In several cases the estimates presented in *Table 3.12* are project cost estimates published by the government, but in most they have had to be estimated from the costs of other projects.

While both scenarios assume about the same total capital investment in transport, there are marked differences in the types and locations of investment.

Under the "European" scenario there would be a mix of spending across different transport modes, with 44% being allocated to heavy rail projects, 28% to a major metro project and the remainder split between light rail, busways/bus priority works and motorways (***Figure 3.33***). (The small allocation towards new motorways in western Sydney has been included in response to the higher

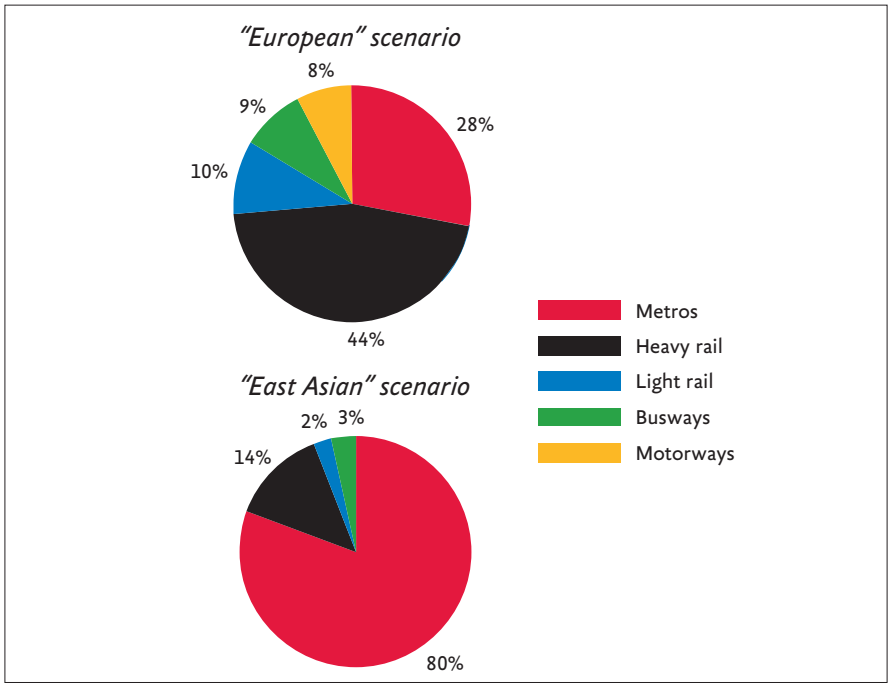


Figure 3.33. *Allocations of capital investment by mode under the two scenarios.*

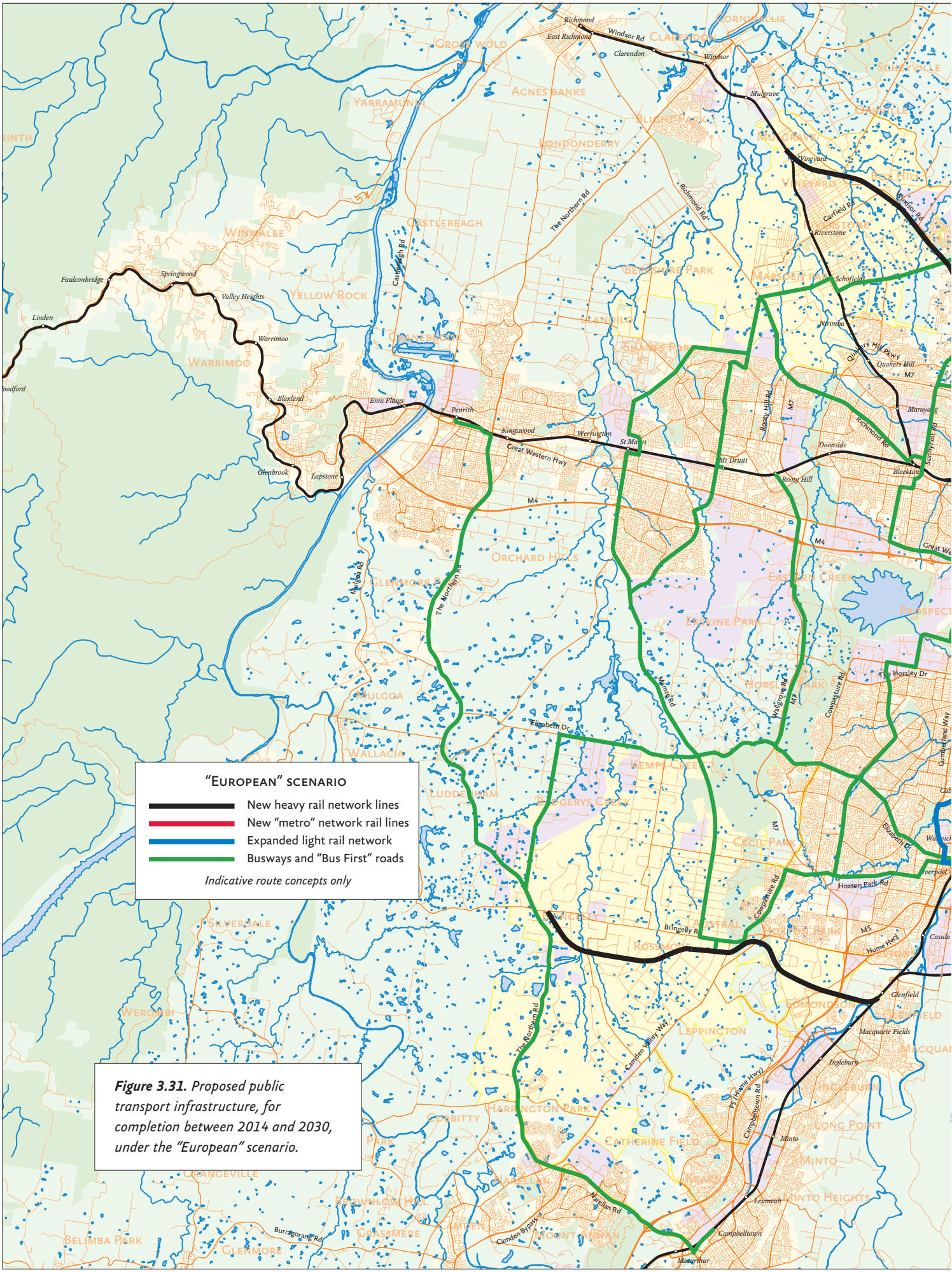
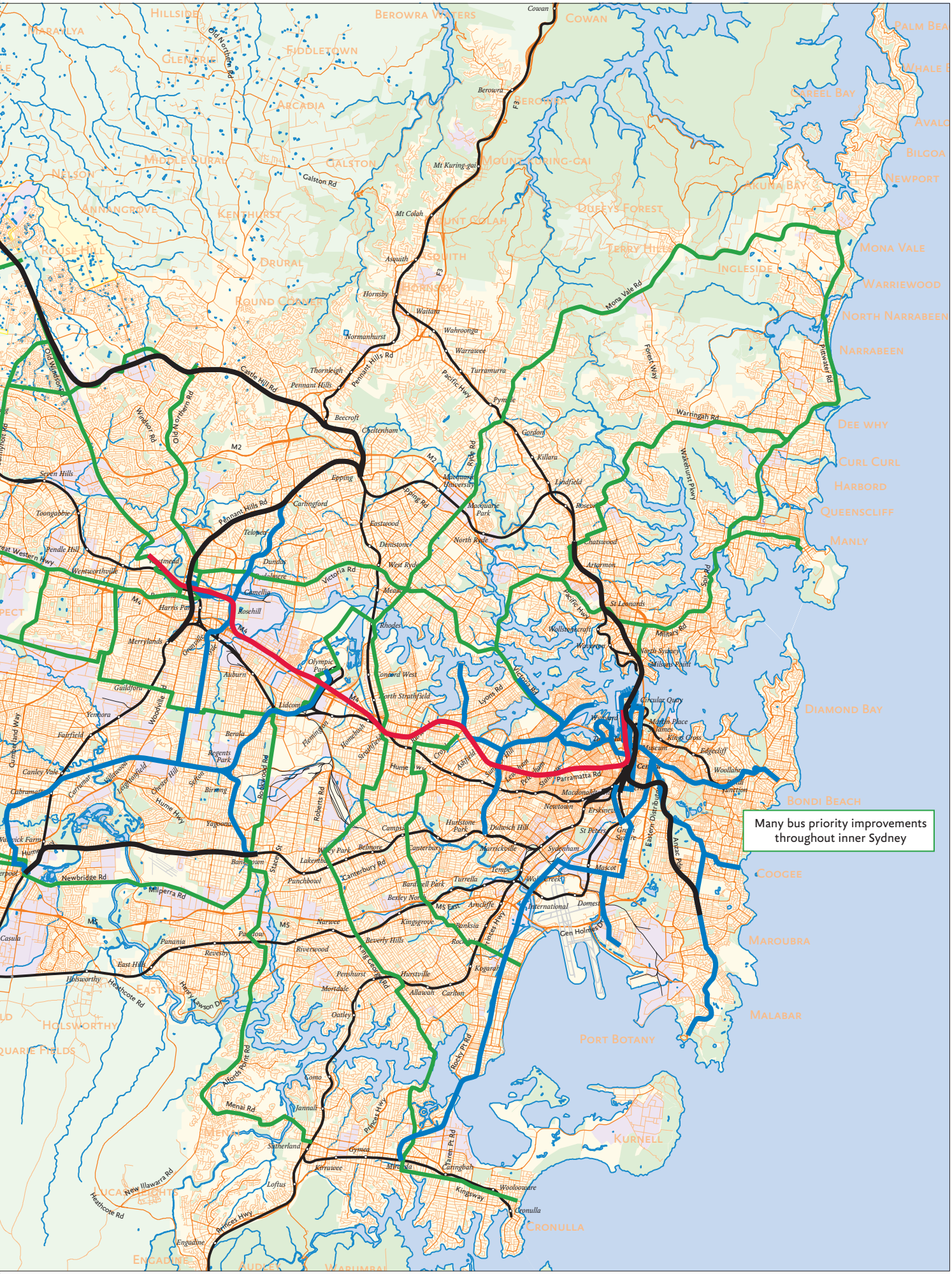


Figure 3.31. *Proposed public transport infrastructure, for completion between 2014 and 2030, under the "European" scenario.*


Many bus priority improvements throughout inner Sydney

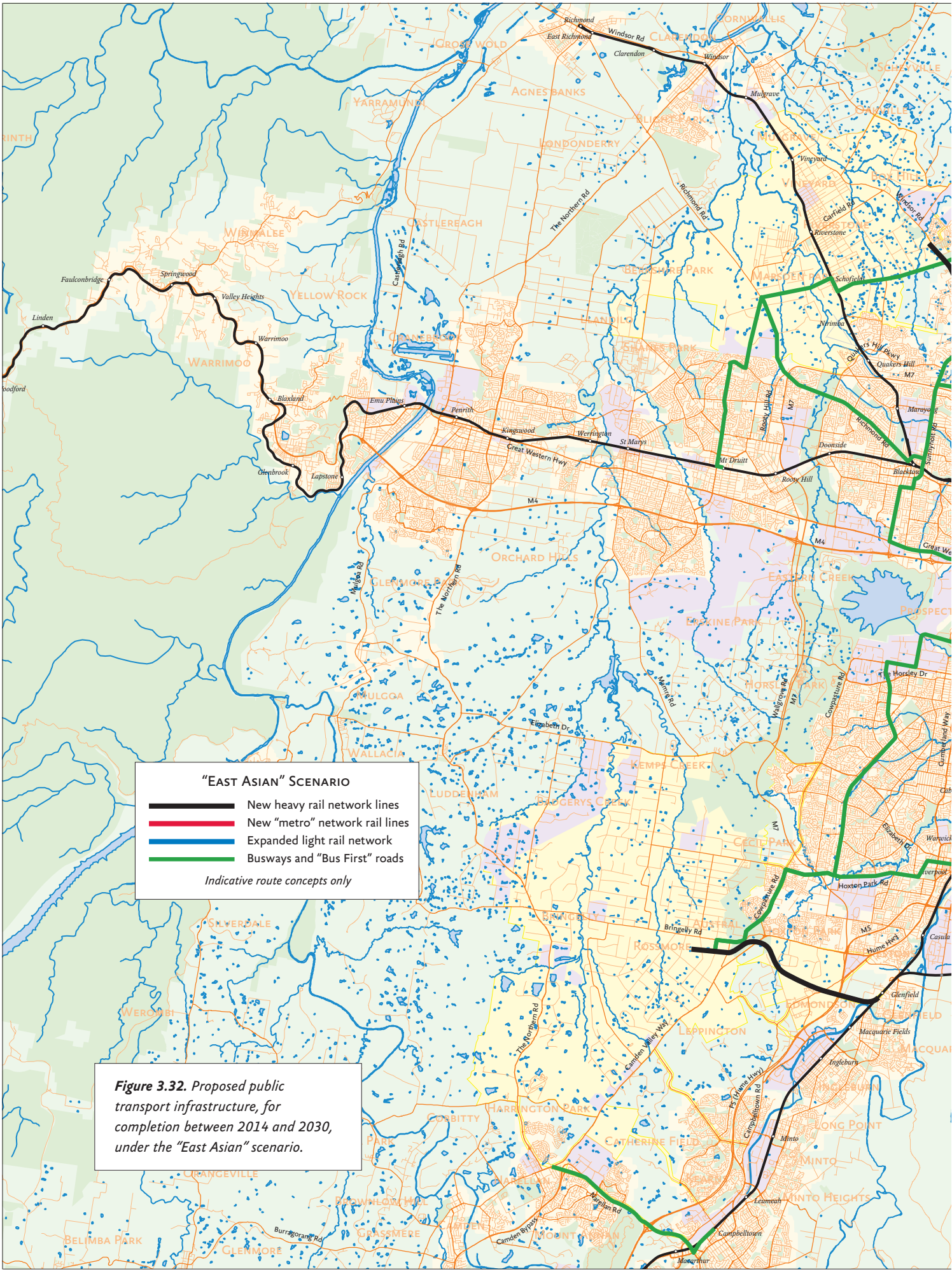


Figure 3.32. *Proposed public transport infrastructure, for completion between 2014 and 2030, under the "East Asian" scenario.*


Bus priority improvements throughout inner Sydney

population and employment growth assumptions adopted for that area under this scenario.)

Under the "East Asian" scenario 80% of the expenditure would be on new metro systems.

There is also a marked difference between the geographical patterns of expenditure under the two scenarios. Under the "European" scenario the proposed investments would be split almost equally between the western and eastern halves of Sydney, while under the "East Asian" scenario 75% of the capital expenditure would be directed to the eastern half of the city (***Figure 3.34***).

Table 3.12.
Key capital cost breakdowns under the two scenarios.

Type of infrastructure	Project	"European" scenario (2008-09 $)	"East Asian" scenario (2008-09 $)
Metros	CBD Metro, Central to Rozelle		$5.3 bn
	West Metro, Westmead to Central (under the "European" scenario, including a Central to Barangaroo western CBD extension)	$10.1 bn	$8.0 bn
	North East Metro, including new metro Harbour crossing, Martin Place to Dee Why		$9.0 bn
	South East Metro, Martin Place to Maroubra Junction		$3.0 bn
	Rozelle-Macquarie Metro		$4.0 bn
Heavy rail	North West Rail Link, Epping to Rouse Hill	$3.7 bn	$3.7 bn
	North West Rail Link, Rouse Hill to Richmond Line extension	$ 0.4 bn	
	South West Rail Link, Glenfield to Leppington	$1.3 bn	$1.3 bn
	South West Rail Link extension, Leppington to Bringelly	$0.3 bn	
	Parramatta-Epping line	$2.0 bn	
	New cross-CBD cross-Harbour line, Central to Chatswood (costs are based on recommended route option for investigation)	$3.4 bn	
	New Bankstown-Liverpool line	$2.0 bn	
	New South East line, Central to Maroubra Junction	$3.0 bn	
Light rail/ferry	Light rail/ferry projects (inner suburbs)	$3.0 bn	$0.75 bn
	Light rail projects (outer suburbs)	$0.6 bn	$0.15 bn
Busways/ bus priority works	Busways and "Bus First" road projects (inner and middle suburbs)	$1.2 bn	$0.6 bn
	Busways and "Bus First" road projects (outer suburbs)	$2.1 bn	$0.65 bn
Motorways	Allowance for western Sydney motorways	$2.7 bn	
Total		**$35.9 bn**	**$36.4 bn**

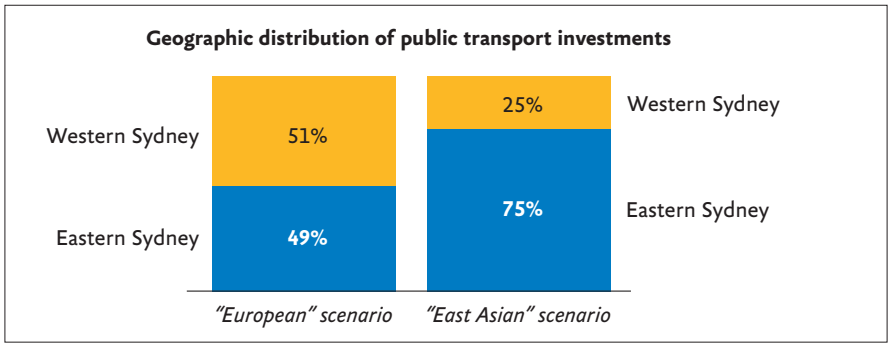


Figure 3.34. *Geographic distributions of the proposed transport investments under the two scenarios.*

3.5.7 Priorities and timing

Not all of the proposed projects under either scenario could be commenced at once, and they would need to be staged.

For example, it is unlikely that Sydney could manage to handle more than three major rail projects simultaneously, and even this could stretch the limits of management capabilities and the availability of specialist expertise, skilled labour and construction equipment—not to mention cash flows.

The project priorities and timings suggested by the Inquiry for major projects under the two scenarios are discussed below and summarised in ***Figure 3.35***.

More details on the cash flows assumed by the Inquiry for the two scenarios are provided in Part D (Chapter 6) of this *Final Report*, along with assessments of the additional operating costs required to meet patronage forecasts and the funding sources and borrowings required to fully finance the works program by 2040 (i.e. with no residual debt by that time).

"European" scenario

The North West and South West Rail Links

The "European" scenario responds directly to the reality of the problems faced by the many residents with poor public transport services in western Sydney, and hence both the **North West Rail Link** and the **South West Rail Link** are considered high priorities, with the construction of both listed for commencement in 2010–11.

The North West Rail Link would not only provide a critically important new public transport link for existing and new urban areas in northwestern Sydney, but would provide considerable congestion relief on the Western and Richmond lines, as many commuters currently having to travel to (say) Blacktown to catch a train would switch to using the new line instead.

A new CBD and Harbour crossing rail link

The next early priority for heavy rail under this scenario would be the most important of all, **a new cross-CBD, cross-Harbour line** between Central and St Leonards/Chatswood.

This new CBD and Harbour crossing line would provide a very large "step change" increase, of the order of 30%, in the total capacity of all the railways running into and through the CBD.

This would provide decades-long benefits, equivalent to those provided by the last significant step change in CBD rail capacity, the opening of the Eastern Suburbs Railway in the 1970s.

This project is a critical pre-requisite for increasing train frequencies and patronage capacity *throughout* Sydney's heavy rail network (***Figures 3.36 to 3.39***). By far the largest numbers of beneficiaries of the project would be people living in outer and middle-distance suburbs, not just those living and working in inner areas and the CBD.

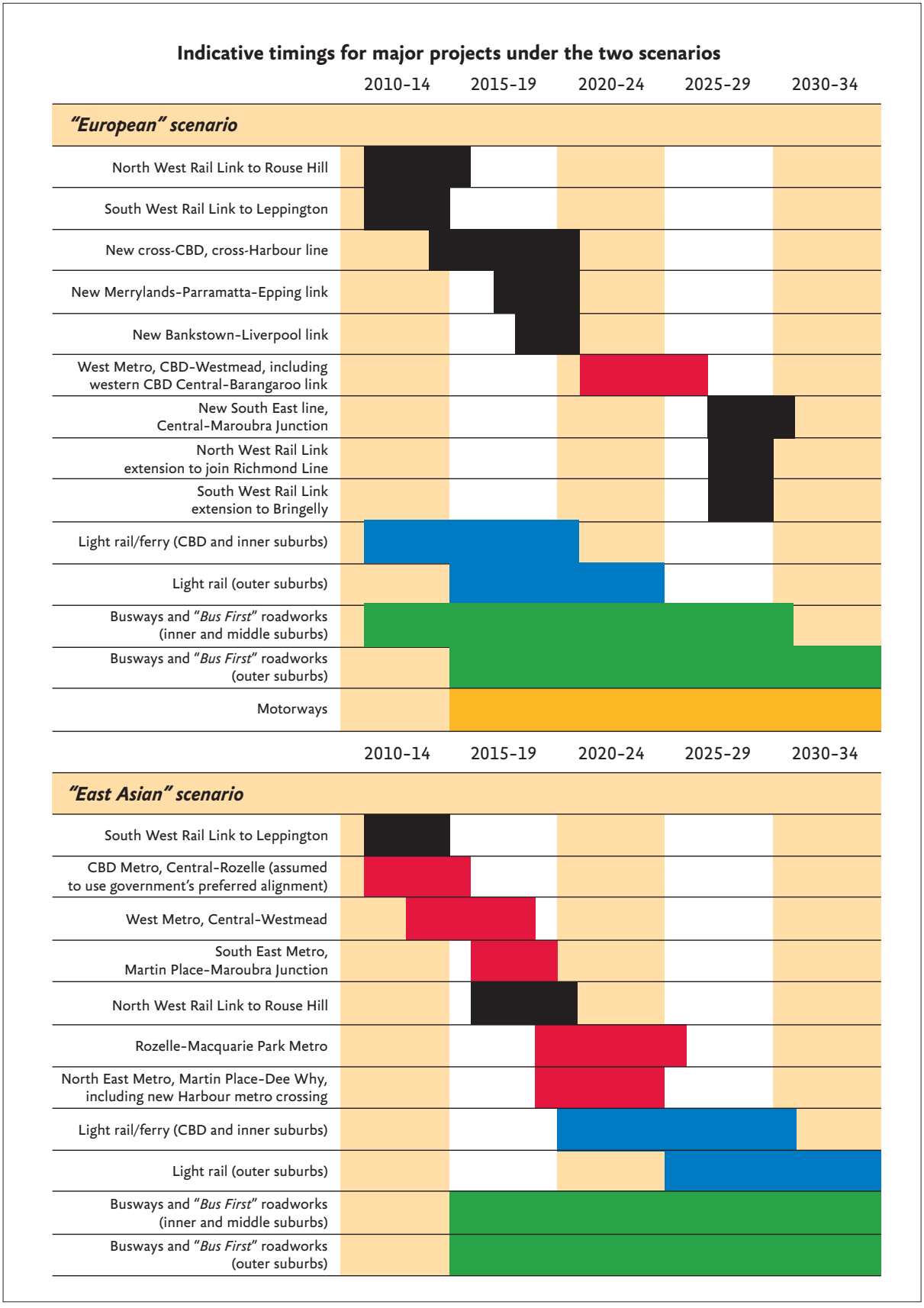


Figure 3.35. *Proposed broad timings of the recommended major projects under the two scenarios.*

More specifically, **the new line is essential for, and would provide,**

- **The capacity required for increased heavy rail train frequencies from the North West, the Central Coast, North Shore and Parramatta via Epping.**

  Prior to its construction, some CityRail services from Rouse Hill via the new North West Rail Link and the Epping-Chatswood line, and/or some services from the Central Coast and/or some services from Parramatta via the new Parramatta-Epping line, will have to terminate and turn back at Chatswood or St Leonards, as there will simply be insufficient capacity on the North Shore line—which is already operating close to its maximum capacity—for these trains to continue through to the CBD.

  Passengers on these terminating services would have to transfer to already crowded suburban services from Berowra and Hornsby via Gordon and Epping.

  Indeed, the proposed quadruplication of the North Shore line between Chatswood and St Leonards, announced by the NSW government in its February 2010 *Metropolitan Transport Plan, Connecting the City of Cities*, is intended precisely for this purpose, recognising that there is insufficient room for all of these terminating services to terminate and turn back at Chatswood. The new *Metropolitan Transport Plan* disingenuously describes this quadruplication project as "supporting" the North West Rail Link by "allowing a seamless connection into the existing rail network".

- At least equally importantly, **adequate "reverse flow" capacity back to North Sydney, St Leonards, Chatswood and the rapidly growing employment areas in Macquarie Park,** both from the CBD itself and, via connecting heavy rail, tram and bus services, from the west, the inner west and southern, southwestern and eastern suburbs.

  There are already at least as many northbound as southbound CityRail services across the harbour in the morning peak hour, and this "reverse flow" patronage demand will inevitably, and rapidly, continue to increase.

- **Additional capacity into and through the CBD from the western and southwestern suburbs of Sydney in particular, and also on the Illawarra and Bankstown lines.**

- Depending on the route option adopted,

  - **Direct rail services linking all the major centres around the "global arc" between Macquarie Park and Sydney Airport,** including Chatswood, St Leonards, North Sydney and the CBD, without the currently required transfer (between separate platforms) within the CBD

  - **New, easy and direct interchange facilities linking the Illawarra line/Eastern Suburbs Railway and the new route across the Harbour** at Central station (and also potentially at a new Pitt Street Mall station)

  - **Significant congestion relief within Central and Town Hall station** through improvements to many of the remaining passenger transfers, thereby reducing the line-capacity-sapping effects of these "transfer passenger" movements on top of exiting/entering passenger movements, and

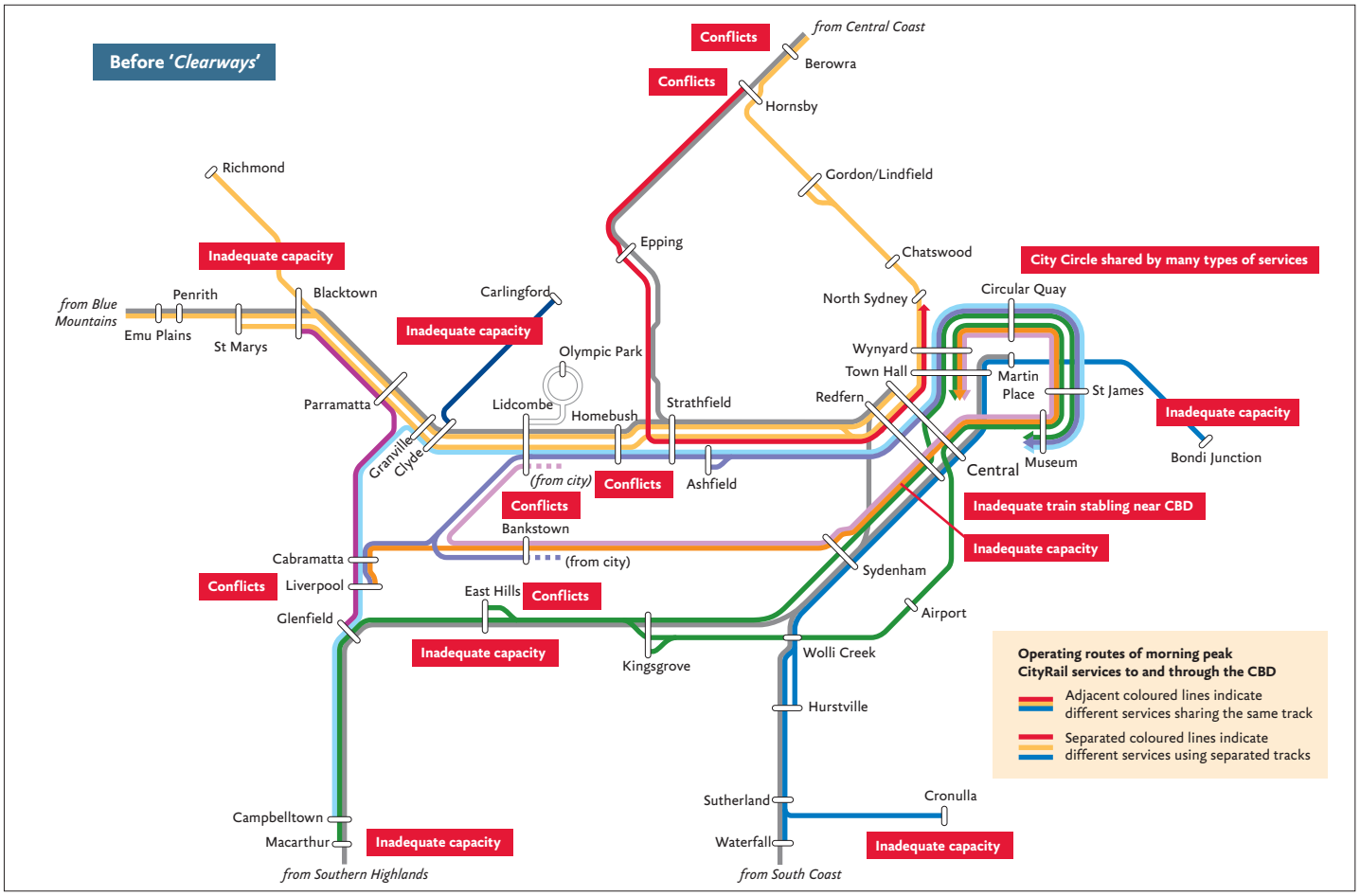


Figure 3.36. *Capacity constraints on the CityRail network within the Sydney suburban area prior to the current 'Clearways' projects.*

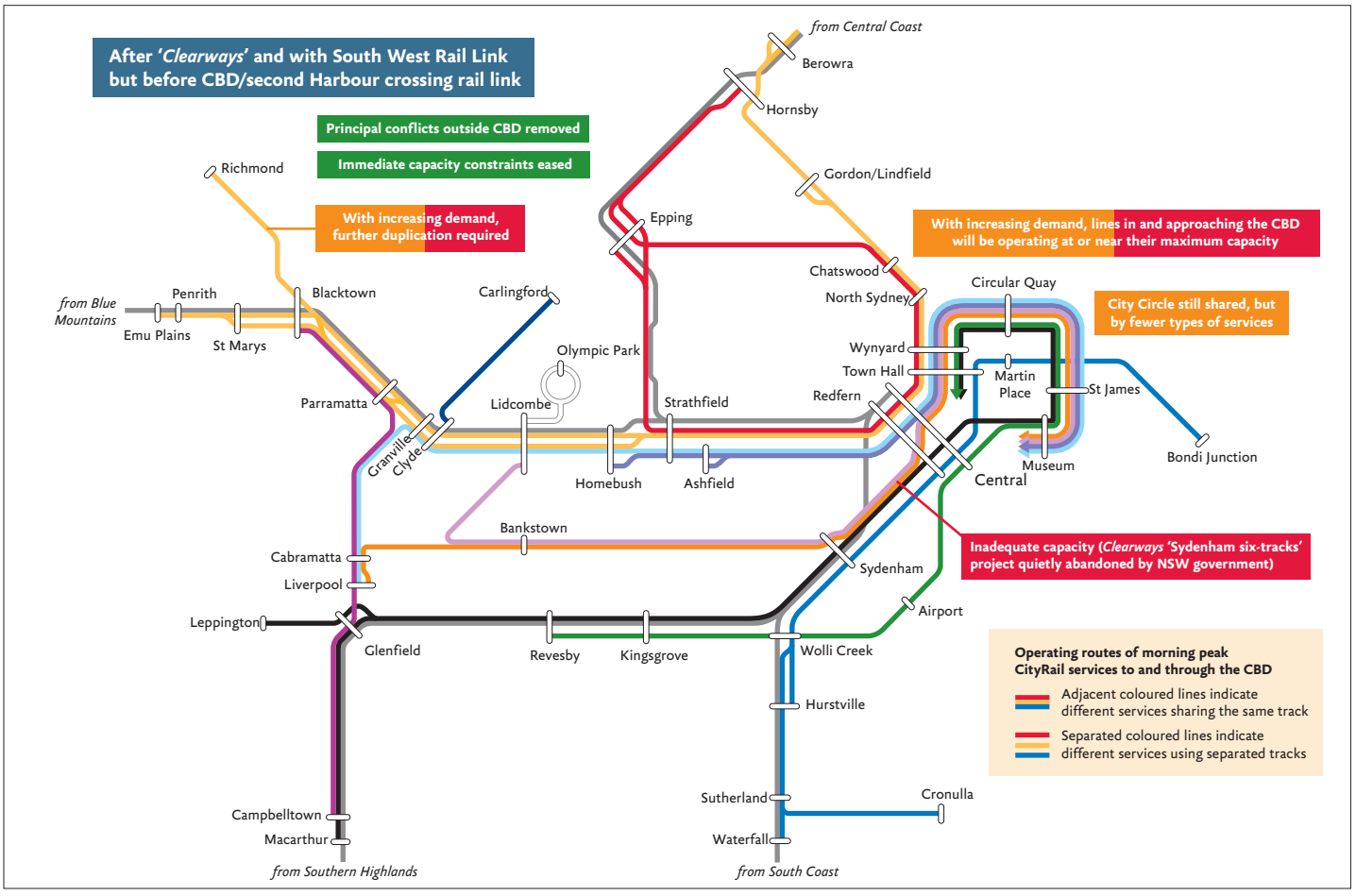


Figure 3.37. *Continuing capacity constraints on the existing CityRail network (with the South West Rail Link) after the current 'Clearways' projects.*

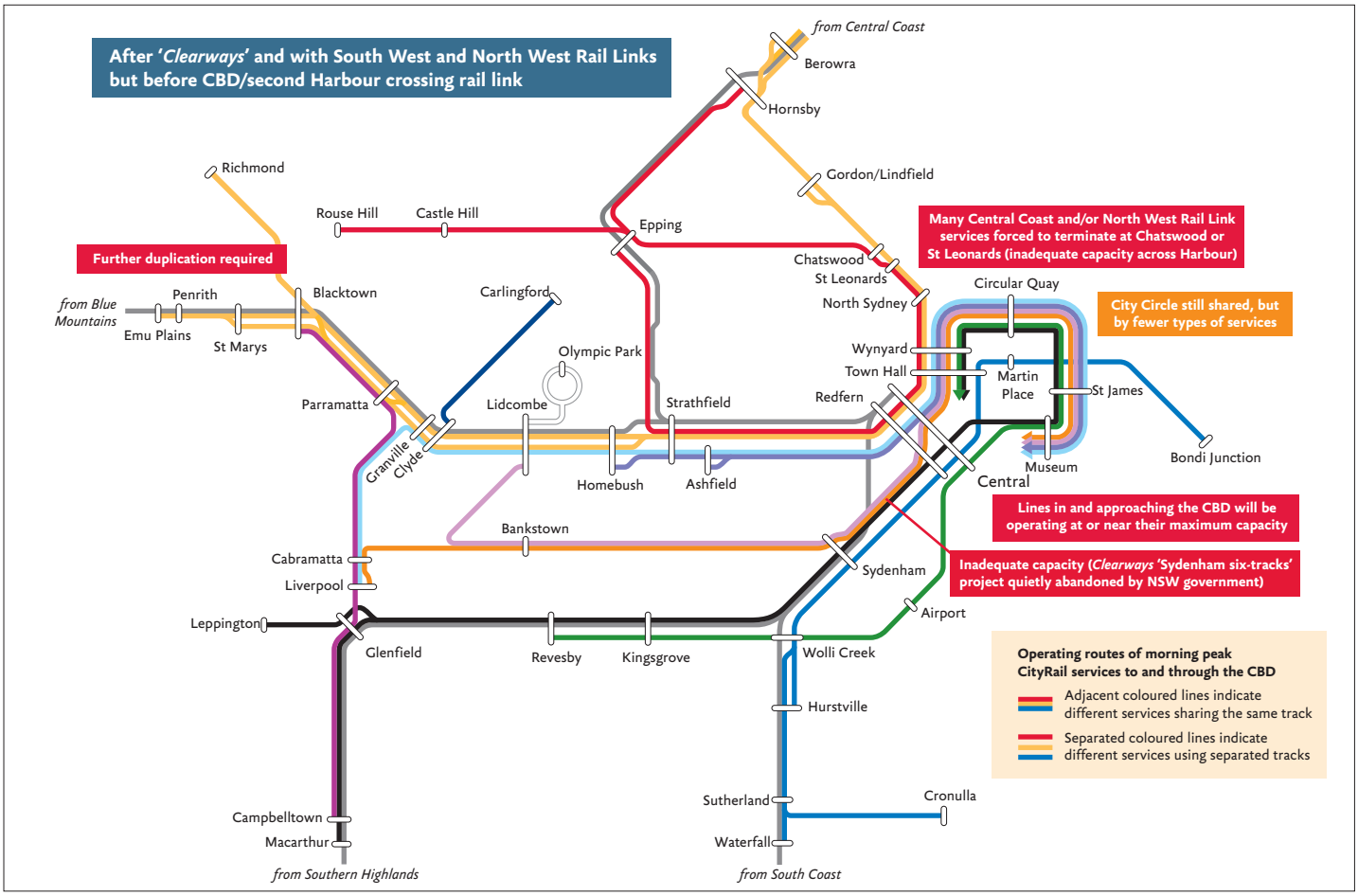


Figure 3.38. *Worsening capacity constraints on the CityRail network as demand on all lines increases, including demand on the SW and NW Rail Links.*

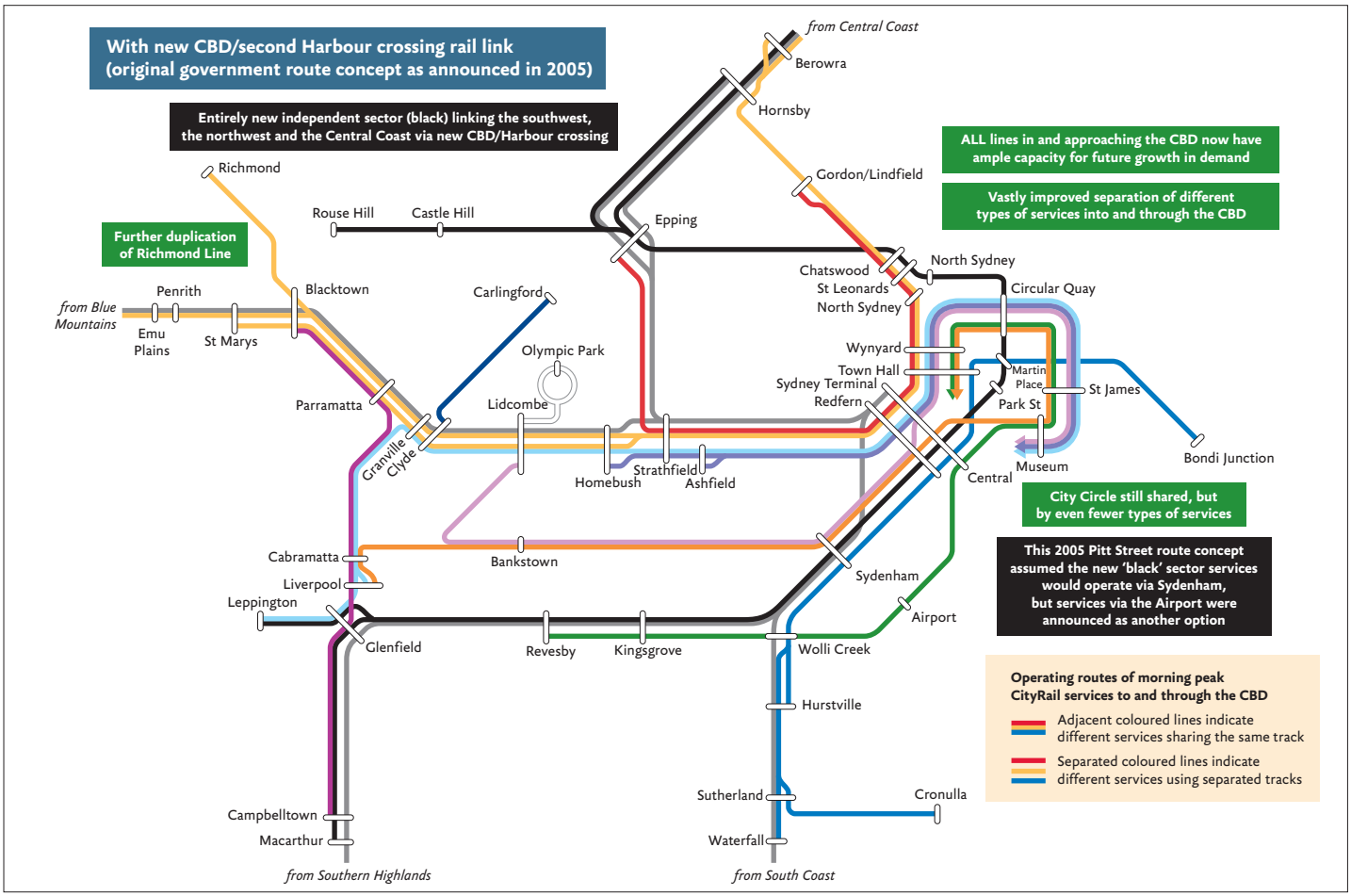


Figure 3.39. *Significant capacity relief on all of the CityRail network, lasting decades, with the construction of a new CBD and Harbour crossing line.*

- **Additional station capacity at Wynyard** to help handle the traffic expected to be attracted to, and produced by, Barangaroo.

☞ ***Thought Provoker #3*** at the end of this chapter provides a more detailed analysis of the capacity constraints that will cripple the CityRail network unless this new CBD and Harbour crossing line is constructed.

When the NSW government announced in 2005 that it would construct a new CBD and Harbour crossing rail link in conjunction with the North West and South West Rail Links (*Figure 3.39*), it indicated it would use one of two route options identified in a series of engineering and operational studies, the first under the central spine of the CBD (the "Pitt Street option", then preferred by RailCorp) and the other under Kent and Sussex Streets on the western flank of the CBD (***Figures 3.40 and 3.41***).

Both of these route options would have necessitated new railway tunnels under the harbour and very deep tunnels and stations north of the Harbour, an expensive proposition.

The NSW government subsequently added other impediments, first in 2008 by announcing that its proposed (and now abandoned) "CBD Metro" between Rozelle and Central station would take over the preferred "Pitt Street" route reserved and protected for the proposed new CBD and Harbour crossing heavy rail link—which it "indefinitely deferred"—and then, in February 2010, by quietly taking over the western Kent and Sussex Streets route for a new stub rail line, called the "City Relief Line" and terminating at Wynyard, as part of a proposed new "Western Express" railway (***Figure 3.42***) (for more details, see pages 205–207).

The Inquiry believes both of the original route options for a new CBD and Harbour crossing rail link, along with all other viable heavy rail route alternatives *and* all viable potential routes for "metro" lines through the CBD in the longer term, now need to be seriously, independently and transparently investigated as a matter of urgency, before the options are forever closed off or compromised by further *ad hoc* NSW government decision-making.

To assist in this process, the Inquiry has identified a potential new alignment option for the link, as shown in ***Figure 3.43*** and described in more detail in ***Thought Provoker #4*** at the end of this chapter.

This option, based on a submission to the Inquiry, would involve the construction of a new lower railway-only deck on the Harbour Bridge, almost entirely within the existing structural supports under the existing road and rail deck, thereby all but eliminating the new deck's visual impacts and impacts on the movements of large ships

If it proved viable, this option would:

- Be significantly cheaper than all the other options previously developed by the government, most of them necessitating expensive cross-Harbour tunnelling
- Provide superior connections and greater congestion relief than the government's earlier proposals, including one and potentially two direct inter-

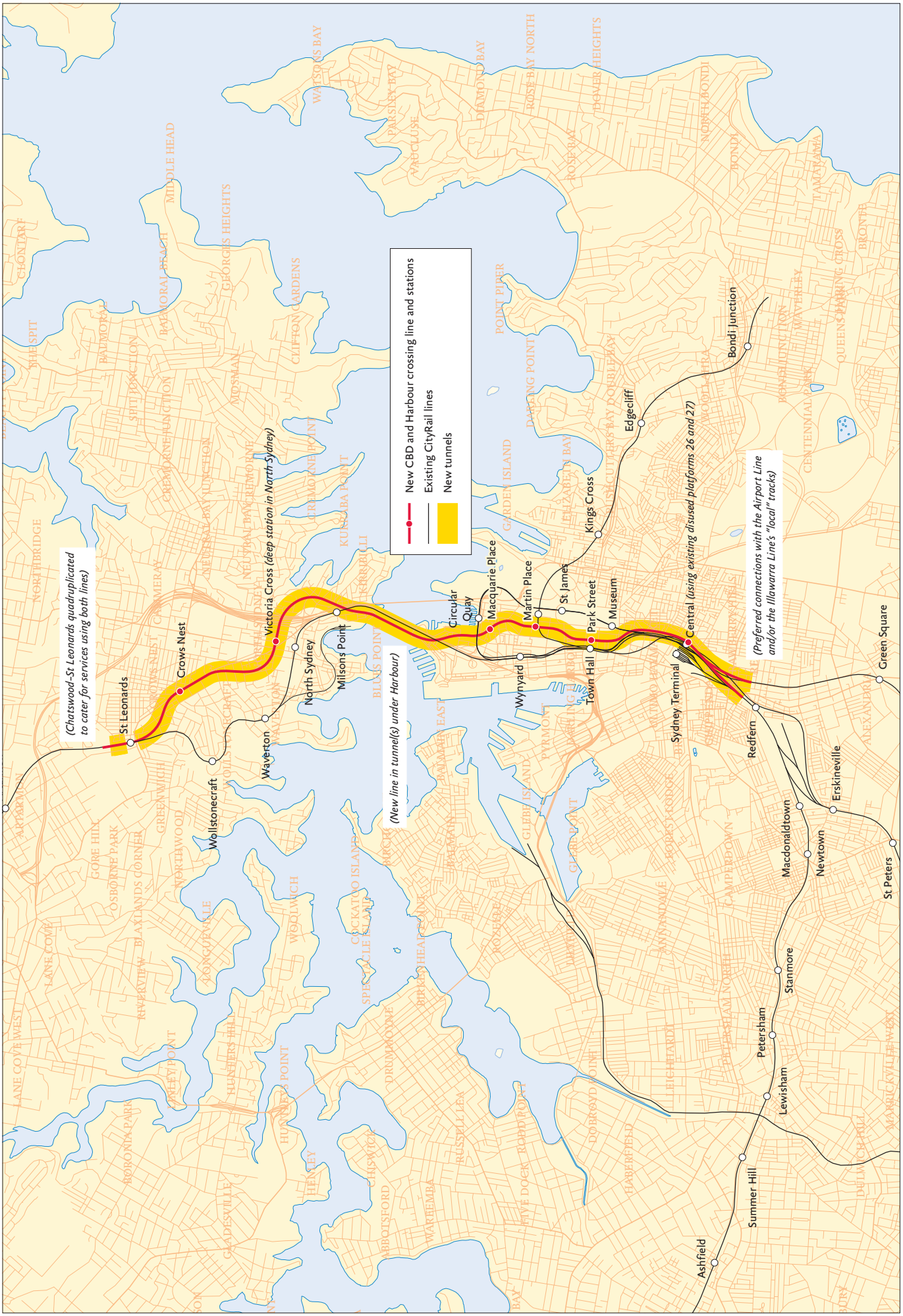


Figure 3.40. *Indicative route of the NSW government's 2005 "Pitt Street option" for a new CBD and Harbour crossing rail link.*

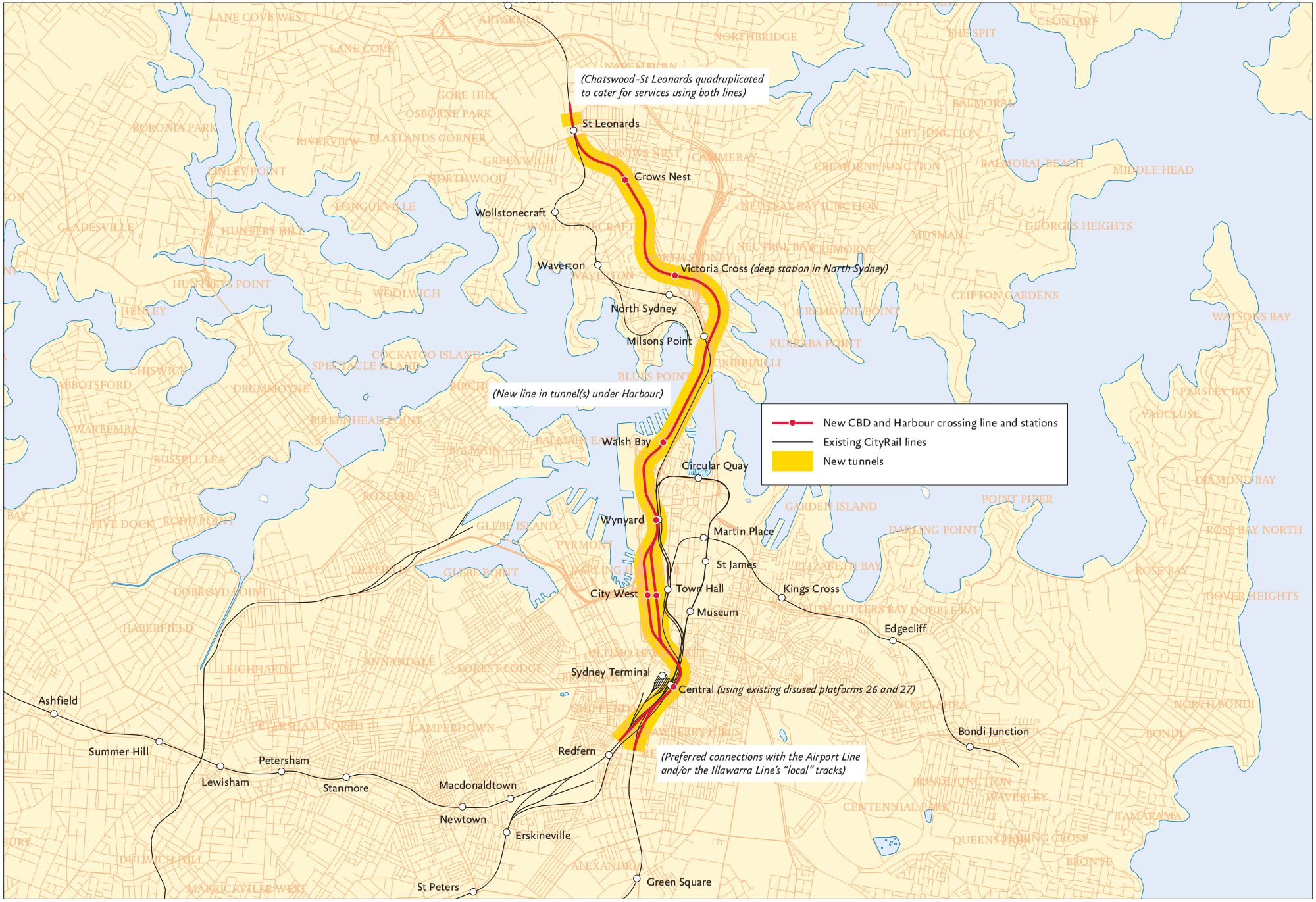


Figure 3.41. *The NSW government's 2005 "Kent and Sussex Streets option" for a new CBD and Harbour crossing rail link.*

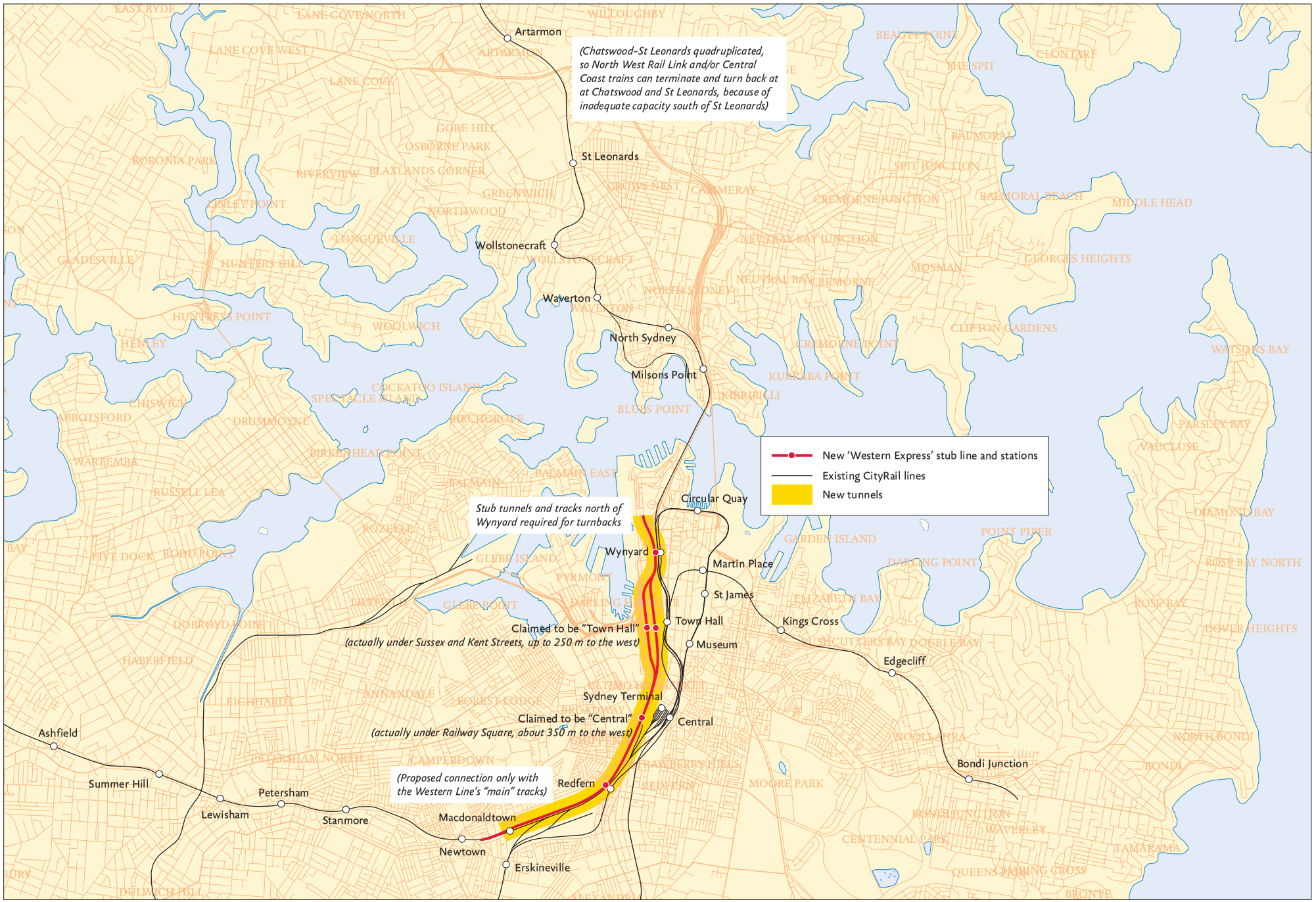


Figure 3.42. *The NSW government's February 2010 "Western Express"/City Relief Line stub railway concept (see pages 205–207).*

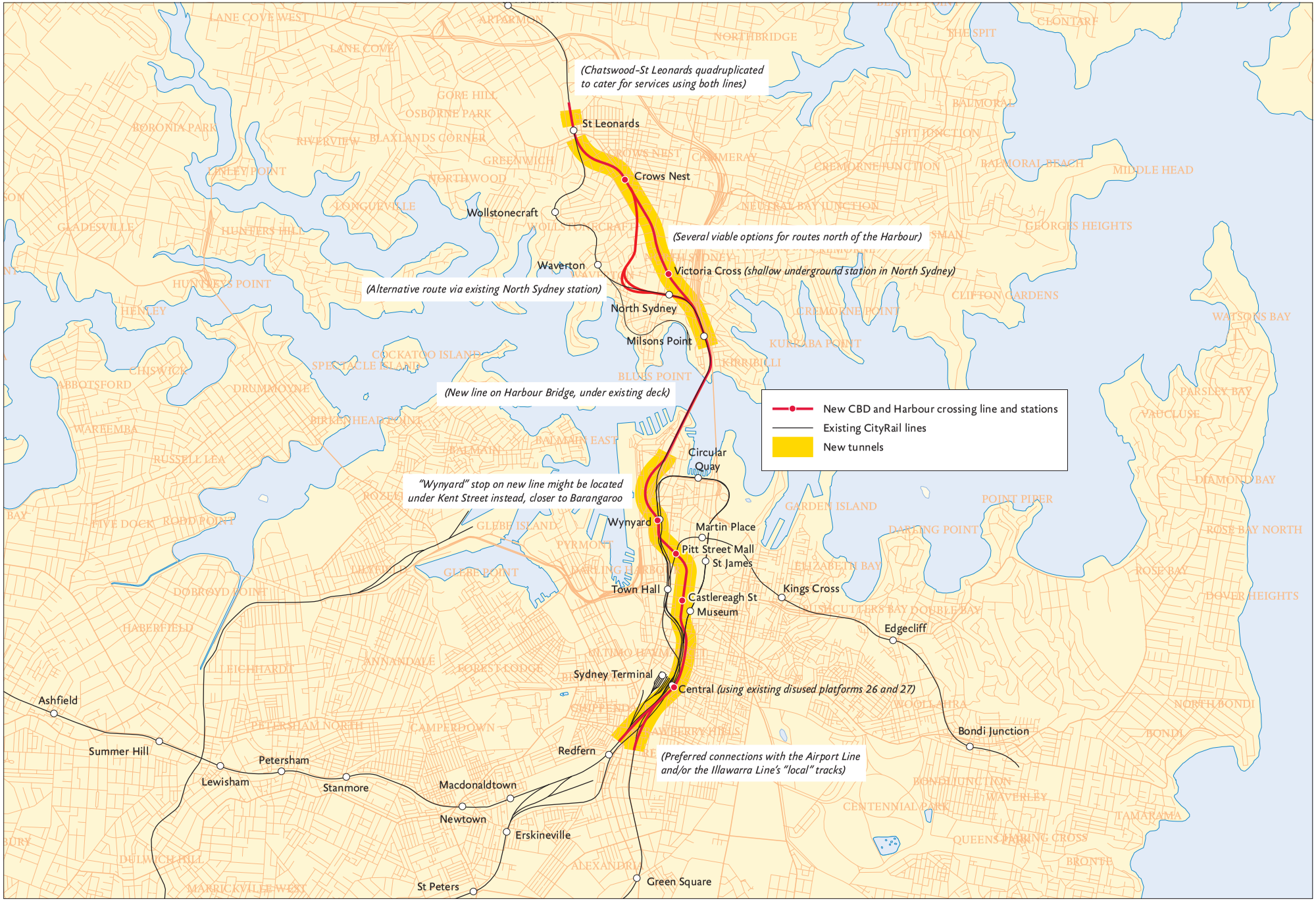


Figure 3.43. *An alternative, much cheaper concept for a new CBD and Harbour crossing rail link, recommended by the Inquiry for serious investigation (for details, see* ***Thought Provoker #4*** *at the end of this chapter).*

changes with the Eastern Suburbs Railway and substantial reductions in interchange congestion within Town Hall station

- Greatly facilitate a cheap and easy *third* harbour rail crossing in the longer term, and
- Provide the connections needed at Central station for a potential future South East railway line to Moore Park, Kensington and Maroubra Junction.

The Inquiry recommends immediate, serious, independent and "transparent" investigation of this option by the new integrated public transport authority recommended in Chapter 2, Transport for Sydney, in conjunction with stakeholders such as Sydney City Council and Infrastructure Australia.

A fast Merrylands–Parramatta–Epping rail link

The fourth early heavy rail project recommended under the "European" scenario, **a new Merrylands–Parramatta–Epping line**, would help strengthen Parramatta as Sydney's second CBD and provide good access between Parramatta and the rapidly growing centre of Macquarie Park.

It would adopt a much faster alignment than previous concepts for a Parramatta–Epping link which have relied on using the existing slow Carlingford line, and would feature a better route through Parramatta itself, including a station in North Parramatta, and a direct connection to the South line near Merrylands for services to and from Liverpool and Glenfield.

This project would therefore complete the rail linkages on the "global arc" and **provide direct access for people living in Sydney's southwest to access both Parramatta and jobs within the northern sweep of the global arc.**

West Metro

All of the four heavy rail projects described above are seen as higher priorities than a **West Metro** between Westmead and Central station (and, under this "European" scenario, on to Barangaroo via the western side of the CBD, under Sussex Street, with an intermediate stop near Town Hall station).

This project would commence around 2021, perhaps with construction starting at the western end, with stabling facilities in low-cost industrial land in the western suburbs, and continuing towards the city centre.

Again, the Inquiry has identified an alternative alignment for the portion of this project west of Strathfield, potentially with surface sections along the M4 motorway corridor. This would be likely to provide equivalent connectivity but much superior land-use development benefits, better park-and-ride opportunities and lower costs than the wholly underground route promoted by the NSW government prior to its abandonment of the West Metro project in February 2010.

Other new and extended heavy rail lines

Several additional heavy rail lines are also proposed by the Inquiry within the next 20 years under the "European" scenario:

- **A new direct link between Liverpool and Bankstown via Bankstown Airport**, enabling additional *and faster* services between Liverpool and the CBD.

  This project, suggested for completion by 2021, would support the growth of jobs in both the existing Bankstown and Liverpool centres and the proposed business park in the vicinity of Bankstown Airport.

Not *that* CBD Metro...

The NSW government's February 2010 decision not to proceed with its Rozelle to Central "CBD Metro" is supported by the Inquiry, because, as argued in the Inquiry's *Preliminary Report* just before this decision was announced,

- The proposed "CBD Metro" route would have jeopardised, perhaps fatally, future heavy rail capacity-expansion and congestion-relief options within the CBD and across the harbour, thereby effectively dooming almost all of the CityRail network never to be able to cater for the inevitable and rapid growth in patronage demand in the future.

  This would have become an especially important consideration if the innovative "CBD Metro-compatible" alignment concept identified by the Inquiry for the recommended new heavy rail line through the CBD and across the Harbour ultimately proves not to be viable, leaving the routes taken over by the CBD Metro as the only alternatives for heavy rail.
- The expenditures on even the "CBD Metro" alone would have effectively forced major delays in the delivery of the much higher priority heavy rail projects (if Sydney followed an approach closer to the "European" scenario than now planned).
- No comprehensive plan for an overall future "metro" network in Sydney has ever been released and only extremely sketchy (and often inconsistent) descriptions of possible future lines have ever been made available, so the project's public transport contexts were most unclear. The government seemed—once again—to be relying on "winging it" on a project-by-project basis.
- No proposed metro fare structures had ever been released, and allowing the CBD and West Metros' private sector operator(s) to choose their own fare structures, as proposed by the government, would have fundamentally jeopardised the essential introduction of fully integrated fares, without financial interchange penalties, in Sydney (see Part C, Chapter 4).
- Even if the "CBD Metro" were regarded simply as the "core" of a future metro network and its very low patronage forecasts were ignored, the designs for it adopted by the government incorporated several critical flaws that would have rendered the proposal most unsuitable for this "core of network" purpose. These included grossly inadequate allowances for likely future train and station length capacity requirements (see ***Thought Provoker #2*** at the end of this chapter) and severe constraints on the routes available for other future metro lines through the CBD.

... but metros *will* be needed.

The Inquiry does, however, believe "metro" rail services will be needed in Sydney in the longer term, as first publicly recognised and argued for in the 2001 "Christie Report" into long-term rail options for Sydney, *Long-Term Strategic Plan for Rail, Greater Sydney Metropolitan Region*, which suggested relatively high seating capacity forms of metros, reflecting the trip distances involved.

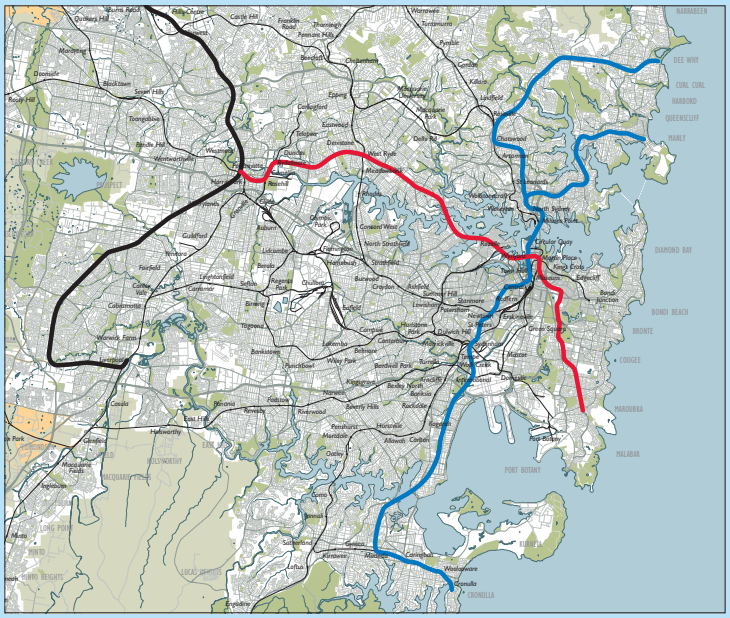
The highest priority will probably be a "West Metro" between Westmead and Barangaroo, as proposed by the Inquiry under the "European" scenario.

The development of metros should be the result of a clear public conversation, through the *Public Transport Network Plan's* cyclical development and finalisation processes described in section 2 of this report, about the desired shape of Sydney and the best public transport solutions, recognising that:

- Metros have a fundamentally different relationship to urban density than Sydney's existing and future heavy rail, bus and light rail modes, and
- Sydney's challenging geography and the small size but tight development of its CBD mean a poorly conceived metro can easily cripple opportunities for essential improvements to the heavy rail network, and *vice versa*.

In addition to overcoming the deficiencies of the government's original "metro" concepts, the technologies ultimately selected for a Sydney "metro" system should seek to maximise—rather than deliberately minimise, as was proposed for the CBD Metro—the system's compatibility with Sydney's existing and future heavy rail systems.

The aim should be to ensure that crucial and expensive pieces of infrastructure, such as harbour crossings, can be used with maximum flexibility and efficiency. **The last thing we need is a 21st century version of different gauges.**



Possible longer-term metro routes based on 2001 "Christie Report" concepts.

Job growth in this area is considered vital, under the "European" scenario, for more equitable access to employment, and particularly more highly skilled jobs, for residents in southwestern Sydney.

- In the longer term, by around 2029 (or earlier if Richmond becomes a "temporary" second major Sydney airport), an **extension of the North West Rail Link** from Rouse Hill to join the existing (and upgraded) Richmond line and an **extension of the South West Rail Link** from Leppington into the new "greenfield" development areas around Bringelly.

- Also in the longer term, by around 2030, a new **South East line**, preferably starting at Central station, to the Moore Park sporting facilities, the Randwick education/health precinct (and in particular the University of NSW), Kingsford and Maroubra Junction.

  If the new concept identified by the Inquiry for the route of the second cross-Harbour rail line proves to be viable, it would be possible for South East line services to join this line and travel directly through the central CBD "spine" and across the harbour to North Sydney and Macquarie Park —and also, potentially, an analogous longer-term (post-2030) new North East line off the cross-Harbour line to Dee Why.

  The Inquiry has examined the desirability of using "metro-style" single deck trains on the South East and North East lines, but has concluded that it would be premature to pre-judge this issue at this stage, as many innovative new types of urban trains are now being developed around the world, both single deck and double deck, and in any event both lines would need to be fully compatible with the more generally applied heavy rail system's engineering and passenger safety standards.

  (The pros and cons of single and double deck suburban trains and various styles of "metro" and "metro-like" trains are discussed in ***Thought Provokers #2 and #3*** at the end of this chapter and are examined in detail in ***Appendix 3***.)

Busways, "Bus First" roads, light rail, ferries and taxis

Under the "European" scenario the construction of busways, "Bus First" (bus priority) roadworks and a significant expansion of the light rail network would proceed through a series of relatively small-scale projects which could be undertaken sequentially over most of period examined.

These projects would provide improved accessibility across wide areas of Sydney, facilitating population growth and improved sustainability.

The extension of the existing light rail system, both to Dulwich Hill and into the CBD proper via either George Street or Pitt/Castlereagh Streets, is seen as an immediate (i.e. short-term) priority, in combination with a re-jigging of bus routes through the city centre and a major restructuring of the inner Sydney bus network, as discussed in section 5.2.4 of Chapter 5 of this report.

Under the longer-term approaches considered here, **further extensions of the inner Sydney light rail network, to the east, the southeast and the inner west**, should then follow progressively, in conjunction with the creation of the high-frequency bus network and "Bus First" roads in these areas.

Similarly, the **light rail network proposed for western Sydney** could commence with the conversion of the Carlingford line to light rail, followed by extension

south to meet the existing Cabramatta-Sefton railway line at Chester Hill station. Once the proposed new Liverpool-Bankstown Airport-Bankstown rail line was completed, the existing lines between Lidcombe, Bankstown and Cabramatta could be converted to light rail, with an extension from Lidcombe to Olympic Park, thereby forming a network of high-frequency, high-quality links.

(There might still need to be some provision for freight trains to use the Cabramatta-Sefton leg, perhaps through the retention of one of the tracks, as the Inquiry understands that some very heavy freight trains will not be able to join this section of the new dedicated Southern Sydney Freight Line track.)

The suggested **busway and "Bus First" projects** could often start simply with the provision of bus priority measures such as signal priority at intersections, followed by the provision of bus lanes or T3 lanes and, where feasible, building up to full busways with segregated lanes and high-quality busway stations similar to those on the existing T-Ways in western Sydney.

Incremental improvements to **ferry and taxi services**, including the construction of an additional CBD ferry terminal at Barangaroo, are also expected throughout the period, but the Inquiry's analyses to date have focussed more on the major capital items beyond the scope of current capital works budgets.

"East Asian" scenario

Under the "East Asian" scenario the first priority would probably have to be the provision of a major new metro route through the CBD (a "**CBD Metro**"), although not necessarily using the same route as the concept proposed by the NSW government in 2009 and abandoned by it in February 2010.

This would be followed by a **West Metro** to which it would be linked.

Another early project has been assumed to be the **South West Rail Link**, primarily because it has recently been re-announced by the government.

The sheer scale of expenditure required for these three projects, some $14.6 billion, has forced the Inquiry to assume that the commencement of other projects—which many people, and the Inquiry, frankly regard as higher priorities—would have to be delayed until at least 2016.

These delayed projects would include the **North West Rail Link**, which under the "East Asian" scenario would not be extended in the longer term to join the Richmond line.

The heavy rail network's future would also be limited under this scenario because the very heavy expenditure on metros would effectively prevent the construction of a new heavy rail link through the CBD and across the Harbour. As already discussed, this "missing" project is a pre-requisite for serious future augmentations of the heavy rail system's capacity throughout most of its network, including the provision of more frequent services in Sydney's west.

The next priorities under the "East Asian" scenario would include a **South East Metro** between Martin Place and Maroubra Junction, a **North East Metro** (including a new metro-only Harbour crossing) from Martin Place to Dee Why, a **Rozelle-Macquarie Park extension of the CBD Metro** and various **light rail or bus projects**.

Because of the high cost of the "East Asian" scenario's multiple metro projects, most of which would involve extensive tunnelling, the funding available for heavy rail, bus and light rail projects would be strictly limited throughout the 30-year period under investigation.

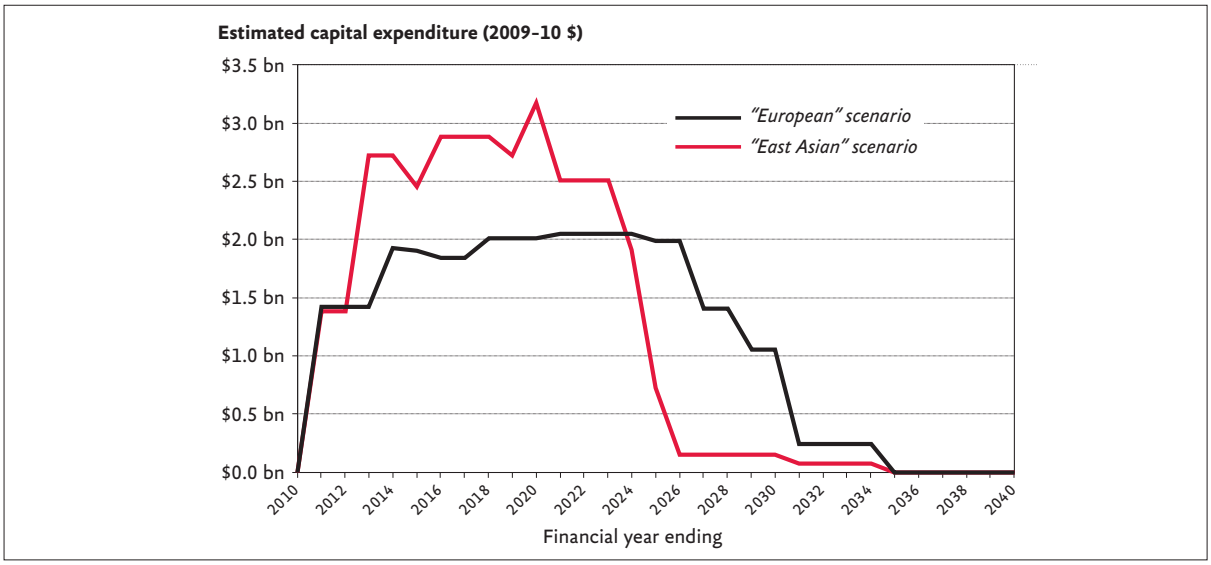


Figure 3.44. *Estimated annual capital spending profile for major public transport improvement projects under the two scenarios.*

As a result, it has been assumed that only one-quarter of the light rail projects and 40% of the bus-related projects suggested under the "European" scenario would be implemented under the "East Asian" scenario.

In addition, and as already indicated, the scenario's focus on employment and population growth in eastern Sydney would mean that expenditures on western Sydney infrastructure enhancements would have to be curtailed, as well as delayed.

Figure 3.44 highlights the differences between the spending profiles likely to be required for the projects identified by the Inquiry as best addressing the differing needs of Sydney under the "European" and "East Asian" scenarios. The massive and early absorption of most of the available funding by the metro projects under the "East Asian" study is very evident in this graph.

3.5.8 The next five years

As we have seen, under either scenario a number of major infrastructure projects would be scheduled to commence construction in the near term.

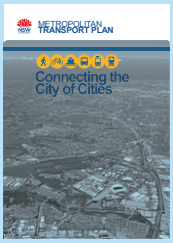
This applies particularly (but not always) to projects for which there has already been substantial planning and design work, such as the North West Rail Link (if the "European" scenario were followed), the South West Rail Link, the initial extensions to the light rail system, and the CBD Metro (if the "East Asian" scenario were followed).

However, in addition to these longer-term enhancements there is also a general consensus on the need for short-term improvements, including:

- Integrated fares and ticketing
- Improved public transport information and interchanges
- Higher frequency off-peak services
- Additional peak services to enhance capacity
- Immediate inner Sydney and CBD light rail projects, and
- Reductions in travel times, particularly on the rail system.

These short-term improvements, all of which should be able to be implemented over the next five years and generally without major capital expenditures, are discussed in Chapters 4 and 5 below.

COMMENT:
THE NSW GOVERNMENT'S NEW *METROPOLITAN TRANSPORT PLAN*



The NSW government's latest transport plan for Sydney, the *Metropolitan Transport Plan, Connecting the City of Cities*, was released on 21 February 2010, shortly after the Inquiry published its *Preliminary Report*.

This new *Metropolitan Transport Plan* represents a massive retreat from the grand long-term vision previously promised by the government for Sydney's "*Transport Blueprint*", which was "reviewed and finalised" after the sudden abandonment of its planned public release early in December 2009.

It is no longer a "long term" plan. The future now ends in 2020—and the government has made it clear there will be no supplementary longer term transport plan.

Despite its subtitle, it is not a plan for a "city of cities", because, as already discussed in section 3.2.8, its core assumptions include an unannounced retreat from the 2005 *Metropolitan Strategy's* focus on developing employment in Sydney's "centres" other than the Sydney CBD—especially those in western Sydney and along the Airport-Macquarie Park "global arc"—and a substantial increase in the proportions of employment growth occurring at dispersed locations which are much more difficult to serve attractively with public transport.

And despite its spin about a new $50.2 billion "10-year funding guarantee", it is a plan which:

- **Commits only $7 billion**, over ten years, to *"new or expanded"* transport infrastructure and services
- **Massively *reduces and defers* public transport expenditure in Sydney over the next ten years**, starting with the unexplained disappearance of the $5 billion previously claimed to be immediately available for the now-abandoned CBD Metro, and
- **Entrenches further massive spending on roads,** which will get State and Commonwealth funding of $21.9 billion over the next ten years for motorway widenings and other (mostly unspecified) projects, *not counting* up to $536 million for future motorway corridor land acquisitions and, "if additional funding becomes available", duplication of the M5 East, the M4 East extension and the F3 to M2 link.

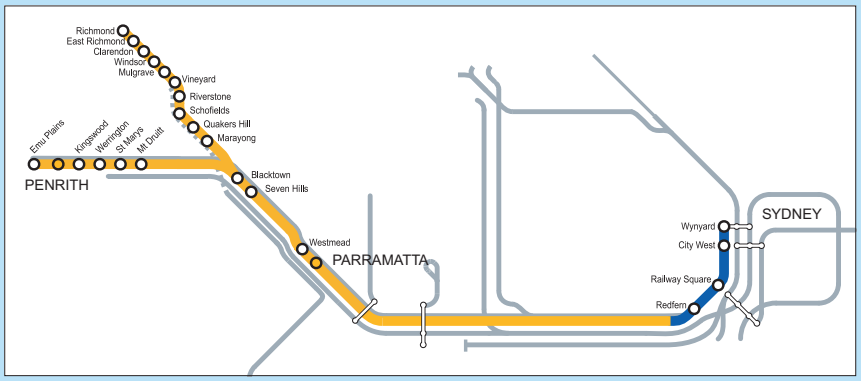
Over the next ten years the new *Metropolitan Transport Plan* promises public transport expenditures (most of them *re-announced* rather than *new*) of:

- $7.289 billion on four heavy rail projects:
  - A new $4.53 billion underground "City Relief" stub railway line from Eveleigh to Wynyard under Kent and Sussex Streets along the western fringe of the CBD, with construction not starting until 2015 and no specified completion date (see *Figure 3.42* and pages 205-207)
  - The 11 km South West Rail Link, previously costed at $1.3 billion but now costed at $2.1 billion, which is now expected to be completed by 2016
  - The North West Rail Link, with construction starting only in 2017 and no specified completion date (again, the total cost estimate has blown out from $3.7 billion to $6.7 billion, and only a small and unspecified portion of this sum—*at most* about 10%—has been "guaranteed" to be available within the next ten years), and
  - Quadruplication of the North Shore line from Chatswood to St Leonards, with no specified timeframes or budget. As discussed on pages 191, 206 and 248-249, the unannounced purpose of this project is to permit trains from the Central Coast and/or the North West Rail Link to be terminated at St Leonards, because the absence of any plans by the government for a new CBD and Harbour crossing line means there will be insufficient capacity for all these trains to travel south of St Leonards and there is not enough room at Chatswood to turn them all back there.
- No West Metro, leaving forecast high employment growth areas in inner and mid-western Sydney without any significant new public transport.
- $3.1 billion on an unspecified number of new and replacement CityRail trains at unspecified times.
- $500 million on two light rail extension projects, from Lilyfield to Dulwich Hill and from Haymarket to Barangaroo and Circular Quay, but with no more than six trams per hour, no specified timeframes, no commitment to integrated fares and no funding of the important George Street line within the CBD.
- $2,878 million on new buses (including Newcastle and Wollongong buses), previously promised but still undelivered bus priority projects and unspecified new STA and private bus depots, all at unspecified times.
- $158 million on unspecified "off-road" cycling infrastructure at unspecified times.

  (The latest *NSW Bike Plan*, subsequently released on 16 May 2010, lists "missing link" bike network projects, costed at $80 million, and "river city" network projects in Parramatta, Liverpool and Penrith, costed at $78 million, which the government promises to "introduce, implement or start developing" within one year, but provides no details and specifies no construction or completion dates for any of these projects.)
- $225 million on six replacement ferries and unspecified "real time timetabling" (!) and wharf upgrades, again without any specified timeframes.
- $400 million on five previously budgeted rail commuter car parks, again without timeframes.
- Other generally unspecified, uncosted and untimed (but in all cases previously announced) projects, including another attempt to introduce electronic ticketing.
- "If additional funding becomes available", an unspecified Parramatta to Epping rail link and an unspecified "commencement of Sydney's Metro network".

The precise nature of the *Metropolitan Transport Plan's* so-called "funding guarantee" is not specified. The only *new* source of funding referred to in the *Plan* is a new "weight tax" on motor vehicles, which is expected to generate only $500 million over the next ten years, well short of the estimated $7 billion cost of the "new" projects over the same period.

COMMENT:
THE NSW GOVERNMENT'S PROPOSAL FOR A 'CITY RELIEF' RAIL STUB LINE TO WYNYARD



The February 2010 *Metropolitan Transport Plan*'s commitment to a "Western Express" CityRail line from Emu Plains and Richmond to Wynyard, including a new $4.53 billion underground "City Relief" stub railway line from Eveleigh to Wynyard under Kent and Sussex Streets along the western fringe of the CBD, provides a classic illustration of the dictum **"Ask the wrong question and you'll get the wrong answer."**

The "City Relief Line" concept first emerged in the December 2009 *Transport Blueprint*, copies of which were leaked to the Inquiry and the mass media around the time of its planned but suddenly cancelled public release by the former Premier, Mr Nathan Rees.

The preparation of this *Transport Blueprint* was heavily constrained by prior (and very public) NSW government commitments to the "CBD Metro" and "West Metro", and also by other core assumptions adopted by the State's transport bureaucracies (as revealed in a document leaked by RailCorp and/or the Department of Transport and Infrastructure shortly after the Inquiry's *Preliminary Report* was released), including dictates that:

- These and other specified new metro lines should simply be *assumed* to be operational by specified dates (in other words, these projects were not to be challenged)
- Specified new and augmented motorways should likewise be assumed to be operational by specified dates, and
- Concepts for future CityRail services should be based on there being no "second Harbour rail crossing" until after 2036–2041.

With these as "givens", it is not surprising the government's heavy rail planners, seemingly desperate for something new, came up with the "City Relief Line" concept—an idea which was first raised at least 30 years ago.

And now, ironically, under the February 2010 *Metropolitan Transport Plan* all of the "metro" projects and most of the new motorway projects the planners were told to assume would be definitely be built have now been cancelled unless "additional funding becomes available"—and the government has locked itself into spending almost two-thirds of its entire ten-year expenditure on "new" transport infrastructure and services on a project which:

- Was borne out of these now-discarded core "metro" and motorway assumptions
- Had not been compared on a fair and equal basis with options involving a second Harbour crossing (i.e. using *consistent* train operational and travel time assumptions, instead of much more favourable assumptions for modelling of the "City Relief Line"), and
- Had not been thoroughly tested or comprehensively and fairly compared with other options under other heavy rail, "metro" and motorway assumptions.

WHAT IS PROPOSED?

The "Western Express" concept involves:

- The allegedly dedicated use of two of the four and then six tracks on the Western Line from St Marys to Eveleigh for new "Western Express" CityRail services. (The track diagrams in the *Transport Blueprint* and *Metropolitan Transport Plan* actually show Blue Mountains and Newcastle intercity services to and from the "country" platforms at Sydney Terminal (Central) as using these tracks as well.)
- A new twin-track underground railway, the "City Relief Line", solely for "Western Express" services, branching off these tracks at Eveleigh, with new underground stations claimed to be at Redfern, "Central" (actually under Railway Square, some 350 m west of the suburban CityRail platforms), "Town Hall" (actually under Sussex and Kent Streets, up to 250 m west of the existing platforms) and Wynyard (at an undisclosed location).
- A massive and very expensive reorganisation of other CityRail services onto other tracks and lines in order to accommodate these changes, as shown (without costings!) in the *Transport Blueprint* and as obliquely referred to (but again without any costings, and also without any funding commitments) in the *Metropolitan Transport Plan*. These changes are summarised in the diagram on page 207 and discussed in more detail below.

A *Metropolitan Transport Plan* diagram, reproduced above, shows the "Western Expresses" would stop at all stations west of Mt Druitt, or all stations on the Richmond Line, and then only at Blacktown, Seven Hills, Westmead, Parramatta and Redfern to Wynyard. They would not stop at Granville, Lidcombe or Strathfield.

THE CLAIMED BENEFITS

The *Metropolitan Transport Plan* claims the "Western Express"/City Relief Line project will:

- "Ultimately" deliver more than 5,000 extra train seats from Parramatta to the CBD in the morning peak hour (i.e. in total, and by who knows when, the equivalent of about 5½ eight-car double deck trains or 4½ ten-car double deck trains).

  But there are many other ways this or much greater increases in capacity could be provided, none of them acknowledged in the Metropolitan Transport Plan (see the ***Thought Provokers*** *at the end of this chapter).*
- Produce travel time savings of (if you believe the *Metropolitan Transport Plan*) 5 minutes from Parramatta to Wynyard and 10 minutes from Penrith or Richmond to Wynyard, *or* (if you believe the Premier's accompanying media release) 6 minutes from Parramatta, 9 minutes from Penrith and 15 minutes from Richmond.

As with previous claims about "metro" travel speeds, many of these claims are frankly unbelievable, especially for the longer distance services with multiple stops to pick up passengers. The more realistic of the claimed travel time savings could largely be achieved simply by restoring the timetable patterns that applied before CityRail trains were all deliberately slowed down in 2005, without spending $4.53 billion.

The extra time required by large numbers of passengers for interchanging at Wynyard to and from services across the Harbour has been conveniently ignored. (These interchanges are not required at present, because all Western Line services currently continue on to the North Shore and vice versa.)

- "Result in" four extra services (over an unspecified period) from Epping to the CBD via Strathfield, two from Cabramatta via Granville, two from Homebush and two on the Illawarra Line.

  *Again, there are many other ways these or much greater increases in services could be provided. Several could be provided **immediately** if more trains were acquired (see chapter 5). They do **not** depend on the "Western Express"/City Relief Line concept.*

The unacknowledged consequences

The *Transport Blueprint* and the *Metropolitan Transport Plan* both refer to **major changes in *other* CityRail services** associated with —and in many cases necessitated by—the "Western Express"/City Relief Line concept, but notably fail to provide details, costings or funding commitments.

As summarised in the diagram on page 207, which reproduces information presented in the December 2009 *Transport Blueprint* (in its "Actions 3.11 and 3.12" and its *Figures 19 and 21*) and the February 2010 *Metropolitan Transport Plan* (on its pages 30-32 and in its accompanying media releases), the government appears to be planning, either deliberately or unwittingly, for these to include:

- **The introduction of "metro style" single deck trains with limited seating, replacing double deck trains, on many lines** (shown in red in the diagram on page 207), with an *assumption*—and nothing more, in the absence to date of serious investigations into other constraints, especially at CBD stations—that this would permit up to 30 trains per hour to use the North Shore line through the CBD during peak periods (although, under the *Blueprint*, there would be as few as six trains per hour at other times, the same minimum as then planned for the "metros").

  *As discussed in more detail in **Thought Provokers #2 and #3** at the end of this chapter and in **Appendix 3**, even if it proved possible to operate these trains this frequently, overall **patronage** capacity on the North Shore Line would be unlikely to be increased, because each train would carry fewer passengers.*

  *And to achieve train frequencies of 30 or so trains per hour there would have to be major and expensive changes to signalling and train control systems—which could equally serve to facilitate increased double deck train frequencies, a point seldom acknowledged by advocates of single deck trains—and major and expensive changes to both Town Hall station, which would become even more congested, and Wynyard station, which would become much more congested than at present because of the forced interchanging of all Western Express passengers travelling across the Harbour (see **Thought Provokers #2 and #3**).*

  *The proposed "metro style" single deck trains would force many passengers to stand for long distance trips of an hour or more in some cases (e.g. Rouse Hill and Berowra via Epping). As discussed in **Thought Provokers #2 and #3** and **Appendix 3**, this would be quite contrary to normal, world-wide "metro" operational practices, under which "metros" are used for relatively short trips.*

  *The reintroduction of a mixed single and double deck CityRail train fleet would make the operation of the CityRail network considerably more complex, as occurred during the transition to a double deck fleet in the 1970s and 1980s, and necessitate major additional train maintenance and train "stabling" (parking) facilities (see **Thought Provoker #3**).*

- **A massive reorganisation of almost all suburban CityRail services, both single-deck and double-deck, onto different tracks and lines, necessitating major and very expensive changes to signalling and train control systems, numerous junctions (including grade separations), the complex "dives" and "flyovers" west of Central, several important stations and several major train maintenance and stabling facilities.**

  *Apart from the changes forming part of the "Western Express"/City Relief Line concept itself, none of these major infrastructure changes has been acknowledged, announced or publicly costed, let alone supported by funding commitments. But without these changes, or equivalents under other possible operating patterns not included in the government's plans, the "Western Express"/City Relief Line and "metro style" plans developed by the government **cannot** properly work—and in the interim "sectorisation" will largely be destroyed.*

  The junctions and stations likely to require major changes are shown in the diagram on page 207.

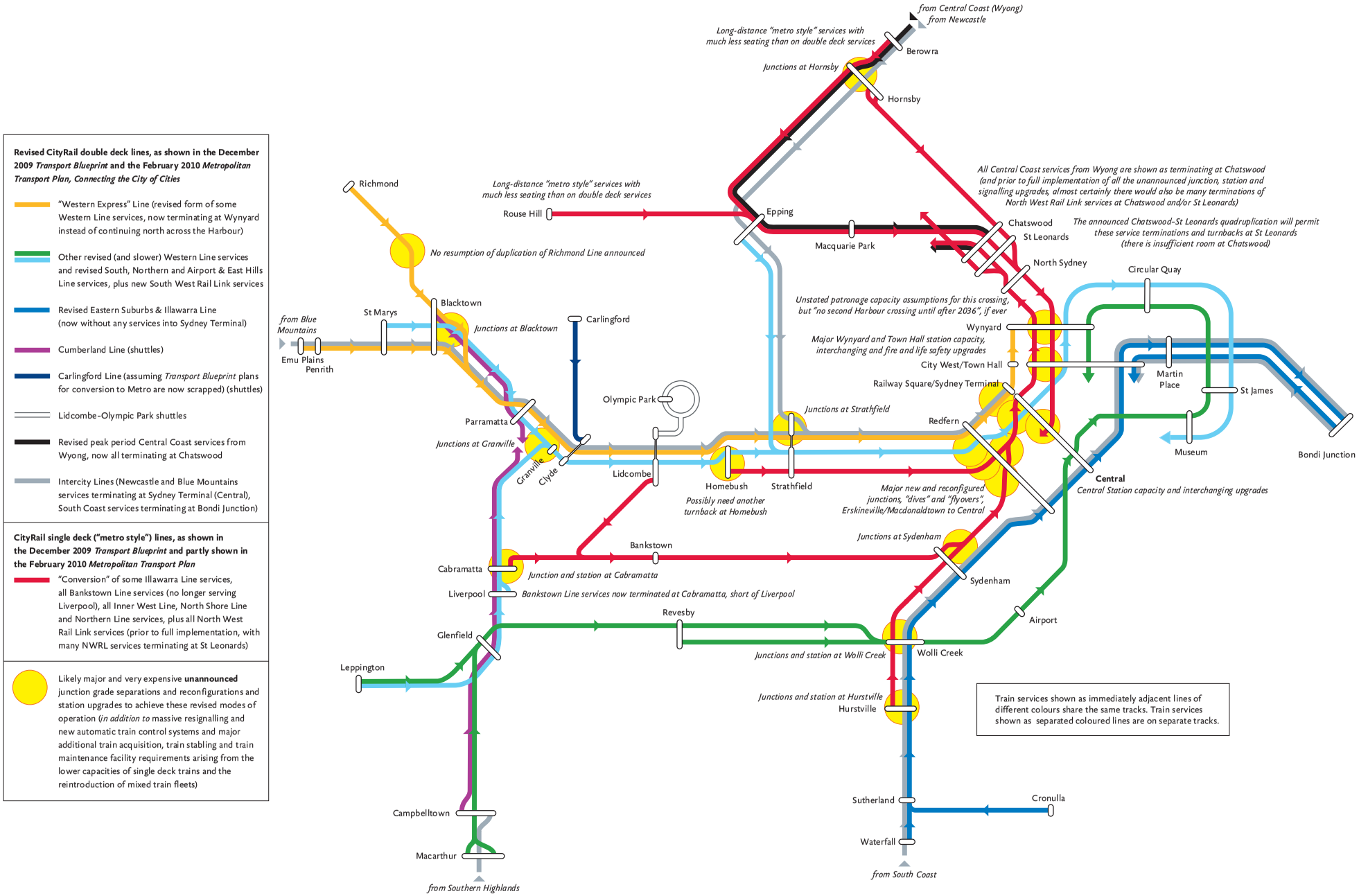
  The changes required will be extremely disruptive and inevitably expensive. For example, the proposed "metro style" connection of the Illawarra Line tracks from Hurstville with the North Shore line tracks at Central, on the far side of many other busy tracks, will necessitate new grade separations, dives and flyovers and a major rebuilding of the complex Illawarra Line, Western Line, Inner West Line and South Line trackwork between Erskineville/Macdonaldtown and Central, probably with prolonged closedowns.

  *And **for all the expense and disruption, these works would not significantly increase CityRail's overall patronage capacity!** (See **Thought Provoker #3**.) The cost could well exceed that of a second Harbour crossing which **would** greatly increase patronage capacity —an option this scheme has been assiduously designed to avoid.*

- **No more Liverpool-CBD services via Bankstown** and **the termination of all Central Coast (Wyong) services at Chatswood** (the latter services are shown in black in the diagram on page 207).

  The termination of these services at Chatswood—and/or St Leonards, following the track quadruplication between Chatswood and St Leonards announced in the Metropolitan Transport Plan—would be necessary because there would be insufficient capacity for these trains south of Chatswood/St Leonards, there being no second Harbour crossing under the government's plans. At present Central Coast services travel right through to the CBD and are heavily patronised both north and south of Chatswood/St Leonards. These passengers would be forced to transfer to North Shore Line and Epping-Chatswood trains that would already be full by the time they reached Chatswood.

  *And prior to the full implementation of all the unannounced junction, station, signalling and train control upgrades, there would almost certainly also need to be **many terminations of North West Rail Link services at Chatswood and/or St Leonards**.*



The apparently proposed revisions to CityRail train operations under the Transport Blueprint and the Metropolitan Transport Plan's "Western Express"/City Relief Line concept, with "metro style" trains (with limited seating) replacing double deck trains on many lines (red), forced terminations of all Central Coast (Wyong) services (black) (and in the interim many North West Rail Link services) at Chatswood/St Leonards and forced interchanges for Western Line passengers at Wynyard. An uncosted and totally unfunded series of very major changes to the network's signalling, train control systems, junctions and stations would be required for these operational changes, which would not significantly increase overall CityRail capacity! The cost could well exceed that of a second Harbour crossing, which this scheme was designed to avoid.

To summarise ...

There are many ways in which Sydney can develop over the next 30 years.

Two particular scenarios, termed a "European" scenario and an "East Asian" scenario, have been developed by the Inquiry to highlight different possible approaches to the population distribution, employment distribution and transport infrastructure implications of these options.

Constraints on the funding realistically likely to be available (Chapter 5) indicate that not all of the potentially useful public transport projects under either scenario could be built over the next 20–30 years. Consequently, some projects have had to be eliminated under each scenario, to stay within the likely funding limit.

Sydney's public transport needs under the "European" scenario would involve a mix of heavy rail, metro, light rail, busway and "Bus First" road projects, with an approximately equal expenditure in western and eastern Sydney.

By contrast, under the "East Asian" scenario there would have to be a strong focus on metros serving the CBD, with 75% of the expenditure on major new public transport improvement projects being in eastern Sydney.

Both scenarios would include the North West and South West Rail Links, which are seen by the Inquiry as "backlog" projects. However, the high cost of the metro focus under the "East Asian" scenario would necessitate yet more delays to the North West Rail Link project, because of cash flow and financing constraints.

The two scenarios developed and investigated by the Inquiry are, of course, not the only options open to Sydney.

They do, however, serve to illustrate the difficult trade-off decisions Sydneysiders must now make in moving to a more sustainable transport future within reasonable and realistic funding limits.

3.6 Public transport capacities and mode shifts and indicative future rail operating plans under the two scenarios

3.6.1 Capacity and mode shift analyses

As noted earlier, under either scenario the proposed upgradings of Sydney's public transport would have to cater for a doubling of overall (i.e. all-day) patronage over the next 30 years.

The biggest capacity challenge for urban transport, especially public transport, is handling peak periods and trips to major centres. If a system can handle demand at these times and these locations it will generally have ample capacity at other times and locations, the main exception being major events such as New Year's Eve and sporting finals.

The discussion below therefore focuses on trips to the key job concentrations of Central Sydney, Parramatta/Westmead and Macquarie Park. These are the job locations most likely to be affected by any capacity constraints.

It has been assumed in the Inquiry's analyses of capacity issues, for the reasons discussed in section 3.3.2 above, that the travel mode shifts generated over the next 30 years will be:

- 10% of car drivers/passengers switching to walking, cycling or scooters

- 25% of car drivers and passengers to key centres switching to public transport, and
- 10% of car drivers and passengers to other destinations switching to public transport.

Capacity into Central Sydney

Figure 3.45 shows the actual and estimated numbers of trips to work in Central Sydney by public transport, cars and walking/cycling in 2006 and under each of the scenarios in 2040.

Under the **"European" scenario** there would be a drop in car-based commuting to Central Sydney but a 37% increase in public transport and a significant increase in walking/cycling as well.

Under this scenario the proposed heavy rail and metro rail network would have capacity for up to around 175 trains per hour entering the CBD, compared to 107 now, during the busiest morning peak hour (see section 3.6.2 below).

The North West Rail Link would reduce bus volumes from that direction, freeing up capacity on the Harbour Bridge for an enhanced busway on the Military Road corridor.

The public transport improvements described in section 3.5 would therefore provide ample capacity enhancements from all directions.

In addition, a large reduction in bus volumes within the CBD as a result of the reduction in northwest services and the inner suburban changes proposed in

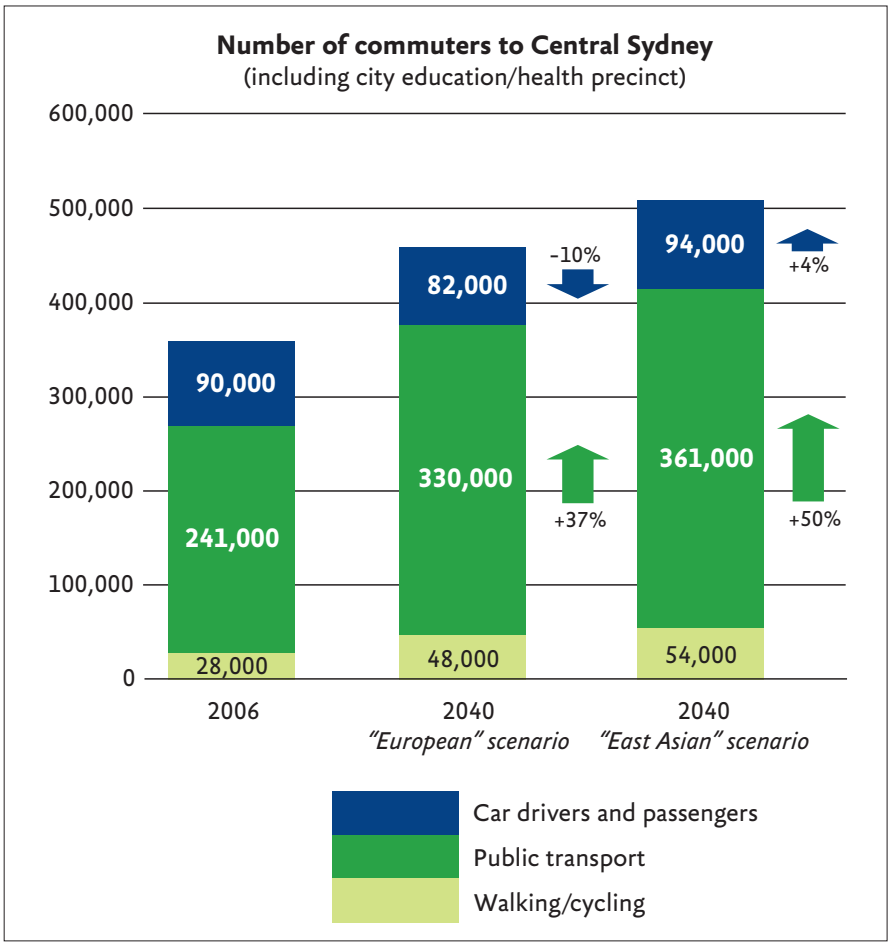


Figure 3.45. *Journeys to work in Central Sydney (including the city education/health precinct) in 2006 and forecast for 2040 under both scenarios.*

section 5.2.4, plus the use of light rail ultimately in three north–south corridors in the city centre (Sussex Street/Hickson Road, George Street and Pitt and Castlereagh Streets), would provide for efficient movements within the CBD itself.

It should be noted that the capacity enhancements proposed under the "European" scenario would assist inner, middle and outer suburbs, not just the inner areas, so (for example) the more than two million people living west of Olympic Park would not be restricted in accessing the extensive job markets and other activities in the CBD and wider city centre. At the same time, the strong growth in employment in Parramatta and other western Sydney centres and the proposed enhancements to public transport services in the west would improve their access to more local employment.

Finally, the reduction in car-based commuting to the city centre generated under this scenario would make it more feasible to provide roadspace for cyclists and pedestrians, a key objective of the City of Sydney.

Under the **"East Asian" scenario**, the "transport task" to Central Sydney would grow more strongly, because of the greater concentration of employment in this area assumed under this scenario.

The task for public transport would be to increase capacity by 50%.

Depending on the actual designs and service frequencies of their trains and stations (see ***Thought Provoker #2*** at the end of this Chapter), the four metros into the CBD proposed under this scenario would probably provide sufficient capacity for 80,000 to 100,000 passengers per hour entering the CBD, compared with the 100,000 or so currently entering on heavy rail trains during the busiest hour.

This would permit a substantial reduction in bus volumes on key corridors and, in common with the improvements proposed under the "European" scenario, assist in enhancing amenity within the CBD.

However, the sheer size of the assumed increase in employment in the CBD under this scenario means that car volumes would probably increase slightly, notwithstanding the mode shifts from cars. This would limit the opportunities to increase space for pedestrians and cyclists, unless severe restrictions on motor vehicles were adopted.

Another consideration is that **the "East Asian" scenario metros would serve predominantly inner and middle suburbs, only out as far as 15 to 20 km from the CBD, and there would be little increase in capacity from the outer suburbs.** (As we have seen, because of funding constraints and the high cost of the metros there are not proposed to be any heavy rail enhancements in the CBD under this scenario.)

Consequently access to the rapidly growing "global arc" jobs in and around the CBD by residents from outer Sydney would not significantly improve. There would be a danger that outer Sydney residents would face limited employment prospects, particularly as there would be only limited job growth in western Sydney under the "East Asian" scenario.

So while the *technical* capacity to serve the CBD could be achieved under this scenario with the construction of four new metros, **the access able to be provided under this scenario would be noticeably less equitable than under the "European" scenario.**

And without the network-wide capacity relief provided by a new cross-CBD, cross-Harbour *heavy* rail line, the "East Asian" scenario would see increasingly

serious capacity constraints on the ability of the heavy rail network to meet demand in middle and outer areas beyond the reach of the "metro" network.

Capacity into Parramatta/Westmead

Parramatta and Westmead will also grow, particularly under the "European" scenario, under which the public transport task would almost triple and walking /cycling would quadruple. Under the "East Asian" scenario the public transport would double (***Figure 3.46***).

Under the multiple public transport improvements proposed for the Parramatta/Westmead area under the **"European" scenario** the number of heavy rail and metro rail platforms would increase from eight at present (four at Parramatta station and four at Westmead) to 16 (eight at Parramatta, six at Westmead and two at North Parramatta), and the number of rail services approaching Parramatta/Westmead during the busiest morning peak hour would increase from around 36 now to potentially 90 (see section 3.6.2 below).

If it is assumed that these heavy rail and metro services would handle 80% of the incoming public transport load, with the remaining 20% using buses, light rail and ferries, the average incoming train in the busiest hour would deliver around 200 passengers per hour across the three stations (any particular service would, in practice, use only two of these stations). The network enhancements proposed under this scenario would therefore be more than adequate to accommodate the forecast growth to 2040.

One concern, however, would be the potential growth in car-based commuting. This would degrade the quality of the Parramatta/Westmead area and

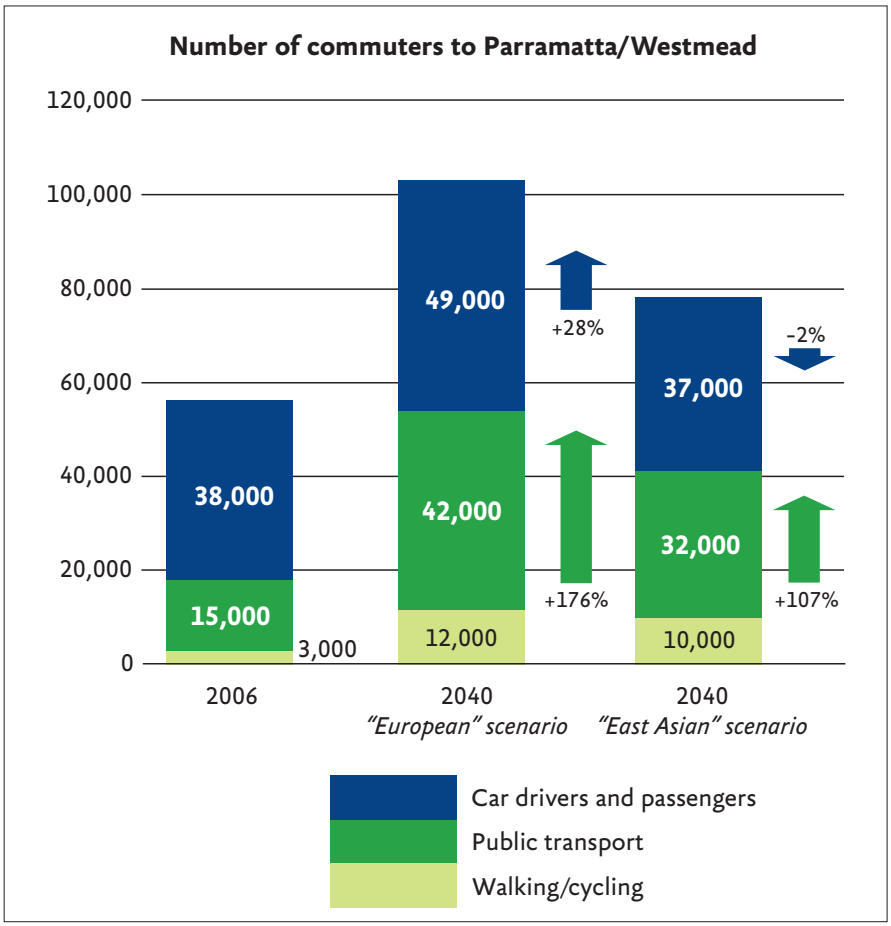


Figure 3.46. *Journeys to work in Parramatta and Westmead in 2006 and forecast for 2040 under both scenarios.*

require more space to be wasted on car parking structures, when the preferred alternative would be to gradually reduce commuter car parking.

It would therefore be desirable, in the case of Parramatta, to encourage an even greater mode shift to walking, cycling and public transport than has been assumed here for the purposes of the Inquiry's initial investigations. There would be ample capacity to achieve this.

Under the **"East Asian" scenario** the growth in public transport-based commuting would be lower, as the only improvements proposed for Parramatta/Westmead under the scenario would be the West Metro and one light rail line. As a result, the ability to fully integrate North Parramatta into the Parramatta CBD would be more limited.

There should not be any actual public transport capacity constraints, however, given the lower employment growth assumptions under this scenario.

Capacity into Macquarie Park

As already discussed, the Macquarie Park area would be likely to grow strongly under either scenario, and indeed considerably faster than has been assumed in the Transport Data Centre's forecasts.

As a consequence, journeys to work by public transport, cars and walking/cycling would all also grow strongly under either scenario (***Figure 3.47***).

There would also be a significant number of university students travelling to Macquarie University, as well as trips by local residents.

The public transport improvements proposed under the **"European" scenario** would provide greatly enhanced access to the Macquarie Park area.

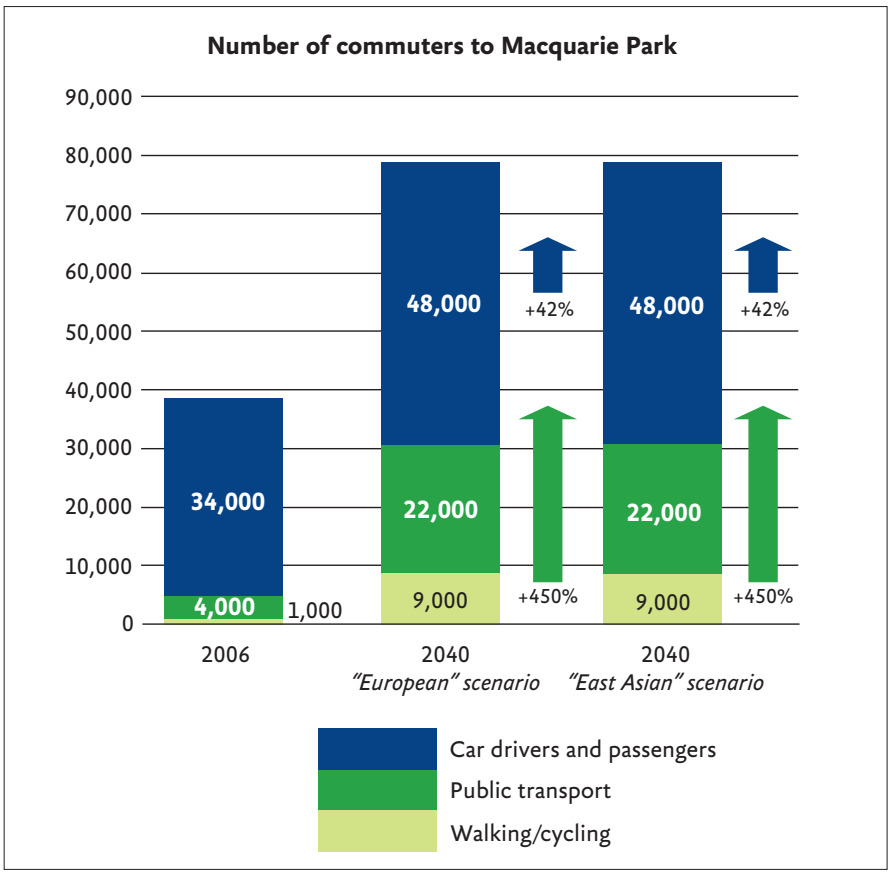


Figure 3.47. *Journeys to work in Macquarie Park in 2006 and forecast for 2040 under both scenarios.*

The number of trains through the three Macquarie stations would substantially increase, from eight per hour (four in each direction) at present to at least 30 per hour, and potentially up to 48 per hour, by 2040 (see section 3.6.2).

The public transport links proposed under the "European" scenario would therefore provide ample capacity to handle the forecast transport task. For example, the average train could expect to be delivering approximately 300–400 passengers to the three Macquarie stations in the peak hour by 2040. (As an aside, this means the eastbound trains would have spare capacity on arriving at Chatswood, so they could take additional passengers to the city.)

In practice the transport enhancements could (and should) enable a larger mode shift than that envisaged above, thus relieving the area of increased traffic.

Under the **"East Asian" scenario** the main enhancements for the area, the North West Rail link and a metro connection from Macquarie Park station to the city via the Victoria Road corridor, would again provide improved access and capacity.

However, the increase in capacity would not be as large as under the "European" scenario, and there would be no improvements in access from the western or south-western suburbs. There would also be less scope to reduce traffic by achieving additional mode shifts.

Overall capacity into "key" centres

Figure 3.48 shows the actual and estimated numbers of trips to work in all of Sydney's "key" centres (as listed in *Tables 3.3 and 3.4*) by public transport, cars and walking/cycling in 2006 and under each of the scenarios in 2040.

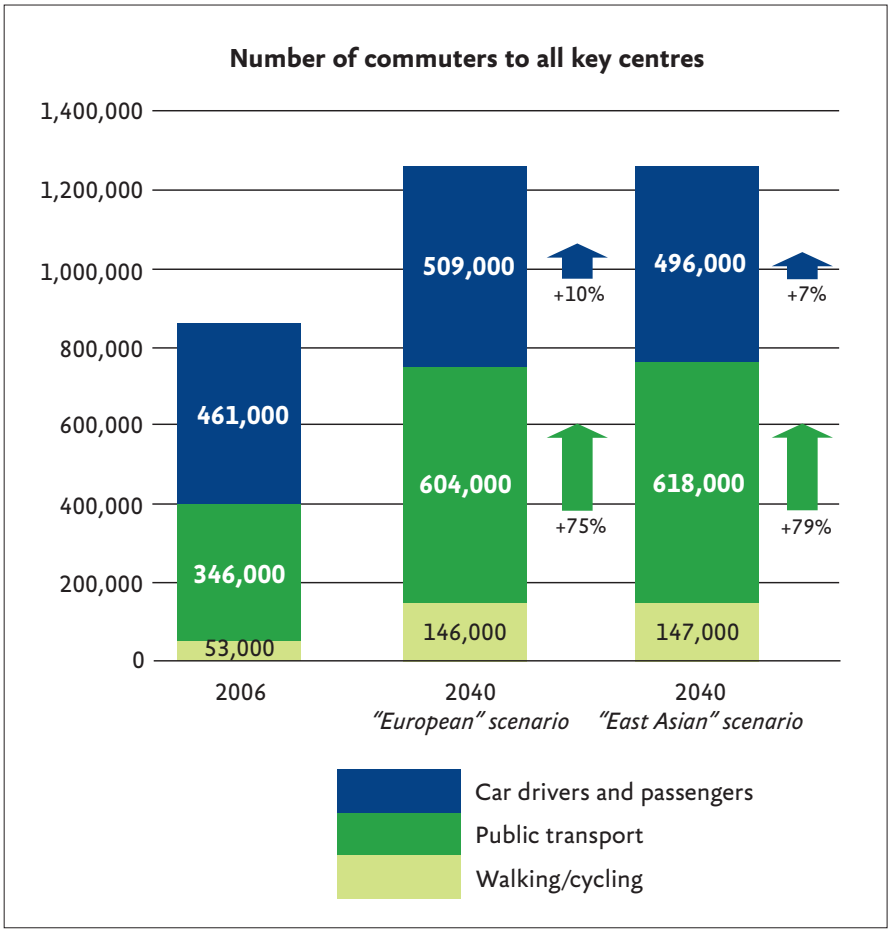


Figure 3.48. *Journeys to work in the "key" Sydney centres in 2006 and forecast for 2040 under both scenarios.*

It may be seen that the number of people walking or cycling to work is expected to roughly triple, while the number using public transport is expected to rise by around 75% (under the "European" scenario) to 79% (under the "East Asian" scenario).

(The increase for public transport would slightly higher under the latter scenario because it focuses more on the CBD and the CBD already has a very high public transport mode share.)

By contrast, there would be only small increases in car commuting to these key centres (10% under the "European" scenario and 7% under the "East Asian" scenario). This suggests that the assumed mode shifts would be able to counter the effects of employment growth, so there would be very little need for increased parking in the centres or investments in roads leading to these centres.

Indeed, under *any* scenario limiting the amount of parking should be a key strategy for achieving a shift to a more sustainable transport system for Sydney.

Sydney's overall commuting task

Finally, ***Figure 3.49*** shows to total commuting task in all of Sydney, including commuting to dispersed locations and smaller centres.

Under both scenarios walking and cycling journeys to work are forecast to triple and public transport journeys are forecast to increase by around 90%, but the number of people commuting to work by car would rise by less than 5%.

This reinforces the Inquiry's earlier analysis on the total Sydney travel task (section 3.3.2) and highlights the scope for Sydney to minimise increases in traffic

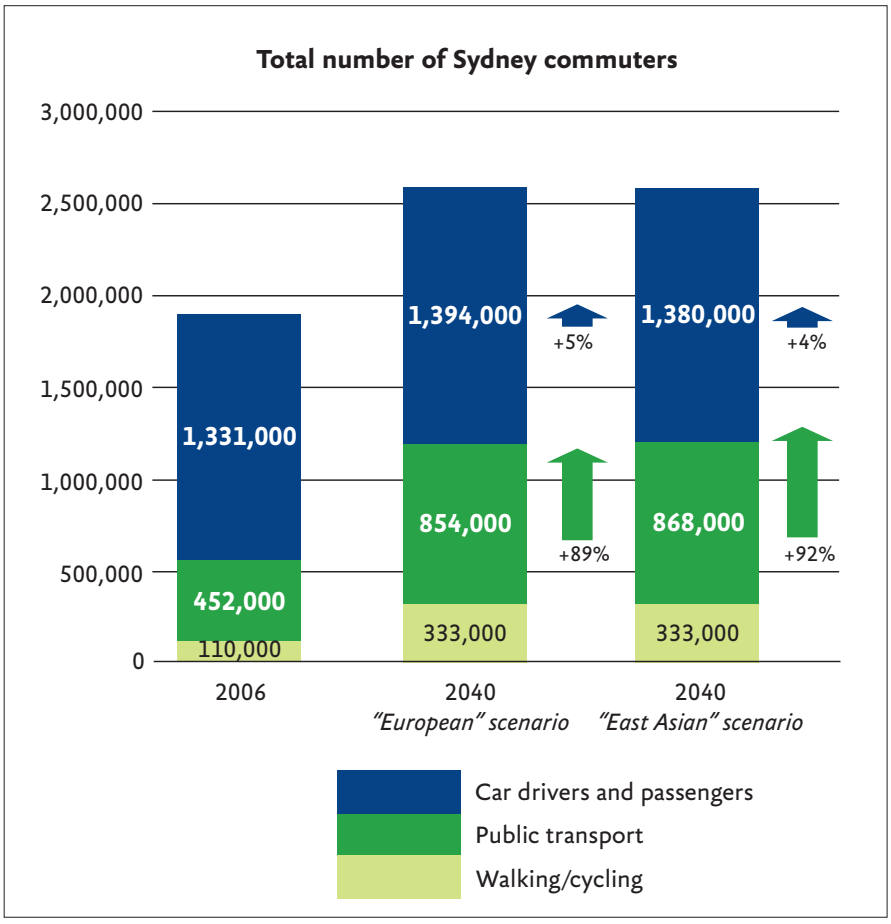


Figure 3.49. *All journeys to work in Sydney in 2006 and forecast for 2040 under both scenarios.*

if it can achieve the mode shifts assumed in these initial investigations, notwithstanding the expected rapid growth in Sydney's population and jobs.

Although *Figure 3.49* shows that there would be similar *overall* travel tasks under both scenarios, **the geographic consequences would be quite different.**

The "European" scenario would improve public transport access across a wide area of Sydney, while the "East Asian" scenario would significantly improve access and mode shares in the east but make much less difference in western or outer Sydney.

The choice between the two scenarios is thus more one of social equity than Sydney-wide environmental benefits.

3.6.2 Indicative heavy rail and metro rail operating plans

Figures 3.50 and 3.51 present *highly indicative* initial concepts for possible weekday morning peak period rail operating plans for 2040 under the two scenarios.

These "train plans" summarise the number of trains providing different services which might be travelling along different sections of the heavy rail and metro rail network during a weekday morning peak hour in 2040.

Each of the train plans seeks to take advantage of the extra capacity and improved route options created by the new heavy rail lines and metro lines proposed under each of the scenarios, all of which are assumed under the scenarios to have been completed by 2030 (section 3.5.7).

The required frequencies of train services have been calculated from forecast levels of patronage demand in 2040 at various locations on the network, *subject to* constraints imposed by the relatively limited capacity of key sections of the heavy rail network under the "East Asian" scenario.

These train plans are presented simply to illustrate the features of two possible ways of operating Sydney's future rail network.

Many other "train plan" approaches would be possible under each scenario, and all would need to be explored and refined before choices were made.

In common with most public transport decisions, each "train plan" option will have its pros and cons, and sometimes difficult community decisions about the trade-offs will inevitably be involved.

To summarise ...

The proposed enhancements to public transport under both scenarios would be capable of accommodating Sydney's forecast population and job growth as well as a significant mode shift, and could double the number of trips on the public transport system by 2040 (with a 90% increase for commuting trips).

More specifically, they would provide the required capacity to the CBD and other key centres, in some cases for well beyond the Inquiry's 30-year planning horizon.

Both scenarios would essentially remove the necessity for more parking or roadspace to be provided for cars, and would help to limit any growth in road congestion.

As such, the public transport improvements proposed under both scenarios would have substantial economic and environmental benefits.

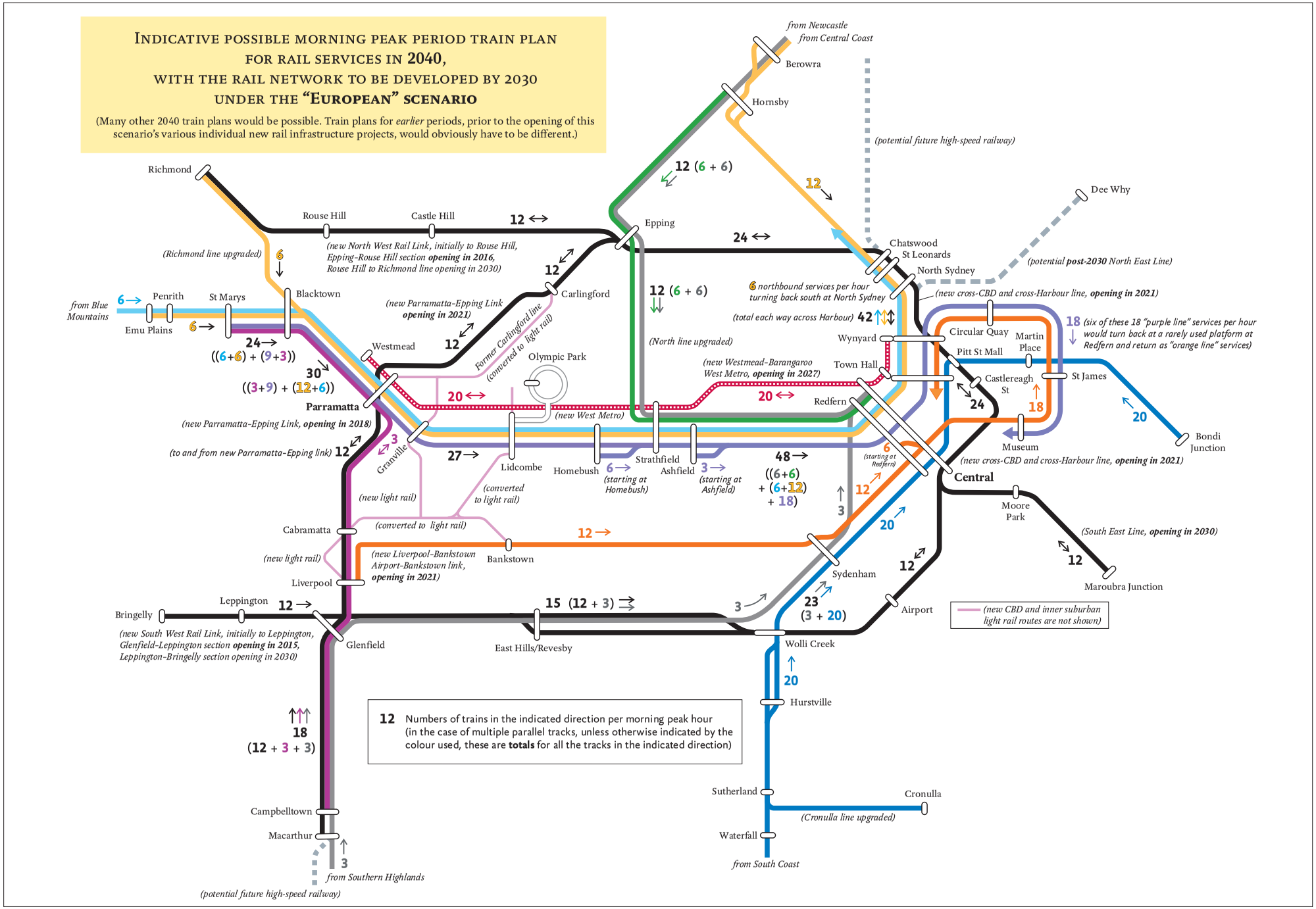


Figure 3.50. *Indicative 2040 morning peak period rail operating plan under the "European" scenario. Numerous alternative train plans would be possible.*

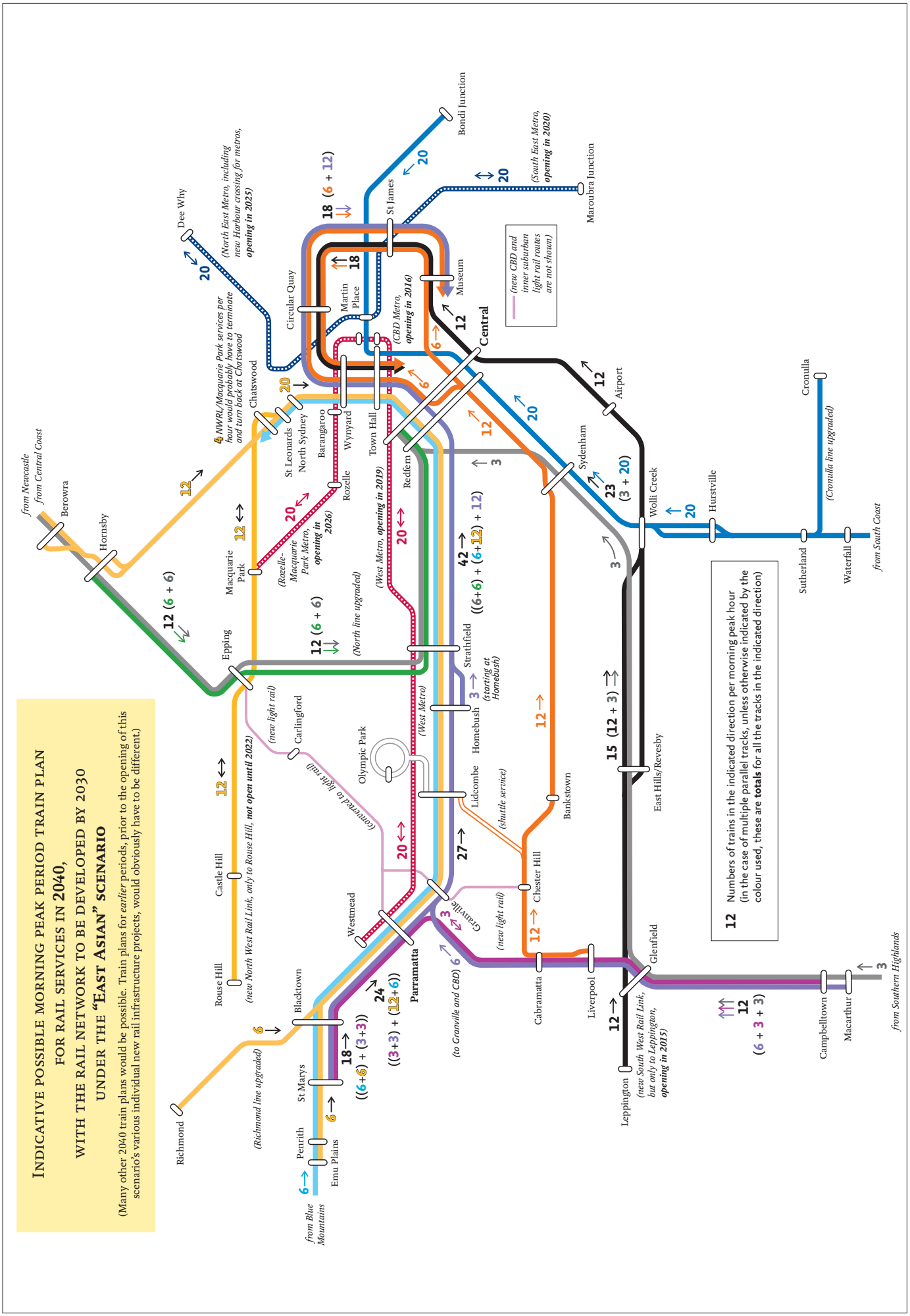


Figure 3.51. Indicative 2040 morning peak period rail operating plan under the "East Asian" scenario. Numerous alternative train plans would be possible.

The main difference between the scenarios would lie in their relative provisions for western and eastern Sydney and the equity of access provided. In this respect the "European" scenario would be superior.

Because the "European" scenario's proposed projects include an extra heavy rail crossing of the harbour, they would cater better for potential high-speed rail services from north of Sydney in the future.

Similarly, because the "European" scenario's proposed projects include an extension of the North West Rail line to link with the Richmond line, they would provide better access to the Richmond air force base if this were developed as an "overflow" airport for Sydney.

3.7 Sustainability: social, economic and environmental assessments

3.7.1 Key "sustainability" objectives

The community's priorities for expanding and enhancing Sydney's public transport system should reflect key social, economic and environmental sustainability objectives, including:

- **Social objectives** (section 3.7.2):
  - To improve accessibility by public transport to employment and other services, particularly for those areas of Sydney with the lowest accessibility
  - To improve access to public transport for those individuals facing access or mobility difficulties or on low incomes, and
  - To improve housing affordability and housing choice.
- **Economic objectives** (section 3.7.3):
  - To support Sydney's economy, including its role as a "global" economic city
  - To reduce the "external" economic costs to Sydney of congestion, accidents and the costs of parking and roadspace
  - To maximise the cost-effectiveness of the transport system by using the most appropriate modes for any specific task, taking into account long-term requirements, whole-of- life costs and the full range of benefits, including options to achieve land-use and planning goals
  - To minimise financial risks and financing costs, and
  - To reduce Sydney's oil consumption and oil vulnerability.
- **Environmental objectives** (section 3.7.4):
  - To reduce greenhouse gas emissions from passenger transport in Sydney, and
  - To reduce local air pollution and other environmental impacts.

3.7.2 Social objectives

Currently the **access provided by Sydney's public transport system** varies greatly across the region, as shown in ***Figure 3.52***.

Sydney's outer suburbs, particularly those furthest from the rail system, have very poor accessibility. Areas with especially low accessibility include the north-western and southwestern suburbs, which are destined to accept significant population growth over the next 30 years.

From a social equity perspective, clearly the first priorities for enhancing the public transport system should be to extend the rail network to the northwest and southwest of the city and more generally to improve public transport services in the outer suburbs, especially western Sydney.

The "European" scenario would contribute to these priorities more strongly than the "East Asian" scenario, as it would involve earlier completion of the North West Rail Link and greater expenditure in western Sydney, reflecting the greater employment growth in key centres in western Sydney under the the "European" scenario. This is illustrated in ***Figures 3.53 and 3.54***.

In addition, and more specifically, the public transport system should be more **accessible for people with a disability**. Current measures to achieve this need to continue, and indeed to be extended. For example, in addition to providing lifts or ramps at rail stations, all new systems should be designed to be accessible (e.g. low floor light rail vehicles and buses should be used), while new forms of door-to-door, affordable demand-responsive transport should be introduced (see section 5.4.2).

The "European" scenario would have an advantage over the "East Asian" scenario in this respect, as it would include more comprehensive and extensive networks of light rail lines, busways and "Bus First" roads, providing wider geographic coverage of conventional (but accessible) public transport. This would mean the distances having to be travelled by more expensive door-door specialised services would be reduced.

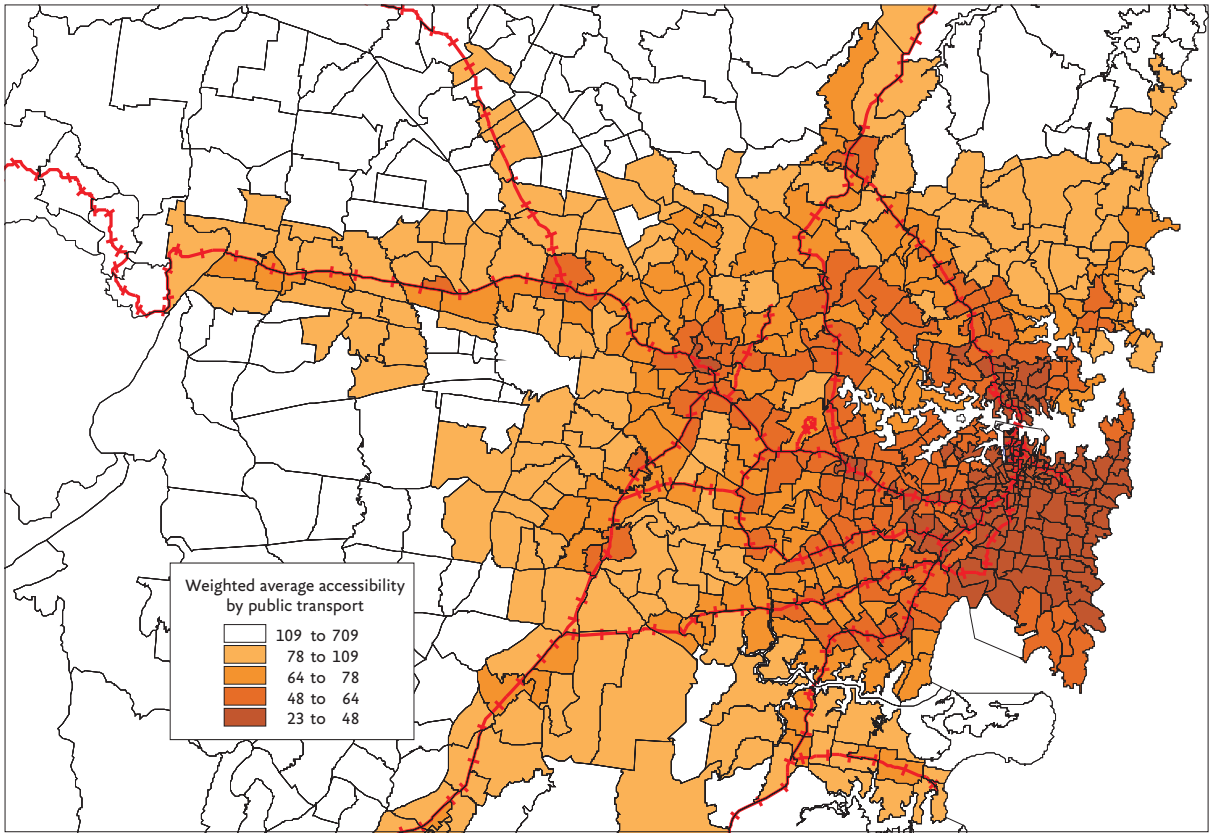


Figure 3.52. *Public transport accessibility in Sydney in 2001, measured in terms of a weighted average of accessibility by public transport to employment, shops, hospitals, university places and the population. Source: Glazebrook 2004.*

The **fare structures** for public transport need to reflect its overall social roles and be affordable for those on lower incomes. This implies the use of appropriate concession fares for pensioners, children, students and the unemployed. Currently such concessions are not available, for example, on the light rail system, an anomaly which needs to be addressed.

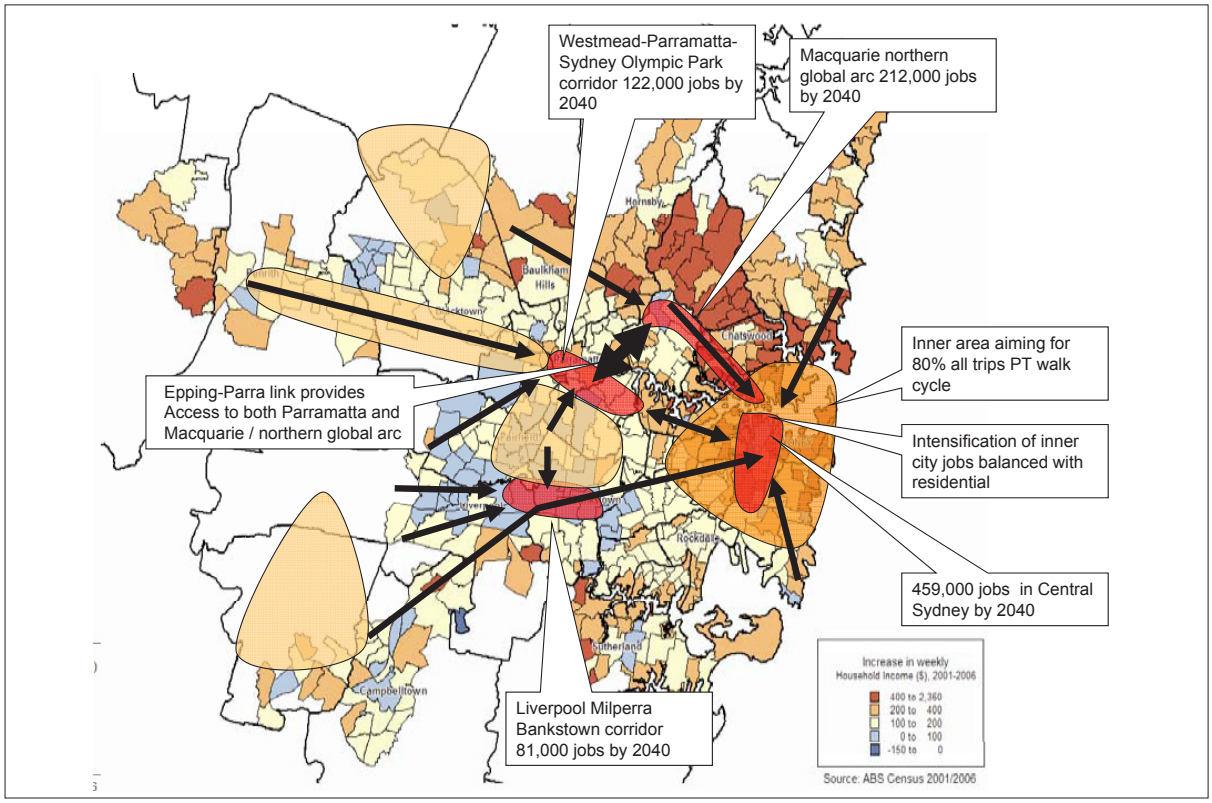


Figure 3.53. *Key accessibility benefits under the "European" scenario.*

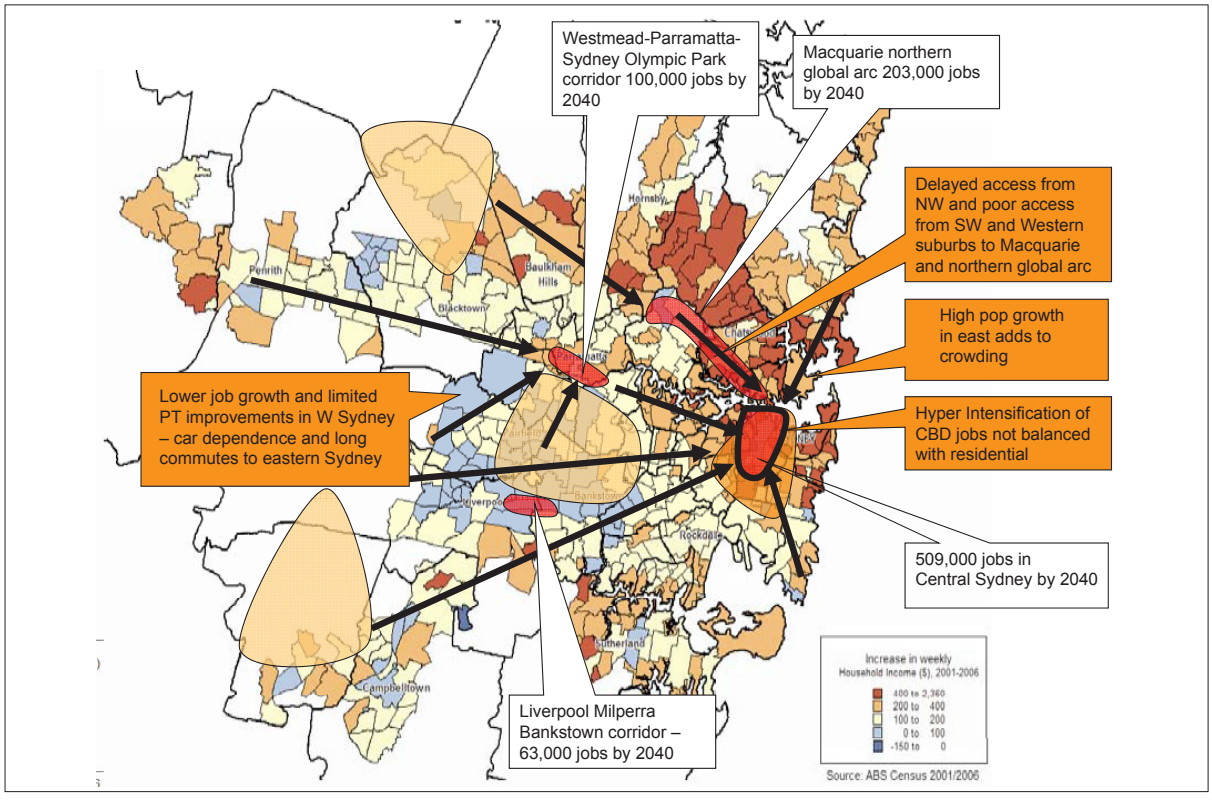


Figure 3.54. *Key accessibility benefits under the "East Asian" scenario.*

There would be no particular difference between the two scenarios in relation to fare structures, provided that the recommendations of this Inquiry in relation to integrated fares are implements (see Chapter 4). However, there might be a danger that the focus on metros under the "East Asian" model would lead to greater increases in fares to cover the high capital costs involved (see Chapter 6).

In terms of **housing affordability and housing choice** objectives, the "European" scenario assumes a higher proportion of housing would be provided in new release areas and generally in western Sydney, where land and housing prices are lower than in eastern Sydney. These developments would include some new detached housing, even though there would need to be substantial numbers of new apartments and town houses.

By contrast, the "East Asian" scenario would rely much more on high-rise apartments. Although they suit some household types, such apartments do not cater for the full range of families.

The "European" scenario would therefore be preferred on housing affordability and choice grounds.

In this context, it needs to be remembered that when the costs of travel are included, the apparent gains from cheaper housing can often be lost through higher petrol and travel costs.

However, by extending the public transport networks further (e.g. with more rail, busway and light rail networks in western Sydney), the "European" scenario would provide more opportunities for people in western Sydney to reduce their reliance on motor vehicles, with some even being able to reduce their car ownership. This would help to offset their higher petrol and travel costs.

3.7.3 Economic objectives

A key function of public transport is to support the economy, including Sydney's role as a "global" city.

In this context both scenarios would **support the "global arc"**, although with slightly different emphases. The "East Asian" scenario would have higher job growth in the CBD and higher population growth in the east, while the "European" scenario would provide a much strengthened public transport spine linking all the components of the global economic arc, from Macquarie Park to the Airport. Importantly, it would also extend the arc to incorporate Parramatta.

From the perspective of **supporting the *wider* Sydney economy**, the "European" scenario is preferred, as it would encourage and facilitate growth in employment in Parramatta, Liverpool, Bankstown/Milperra and other parts of western Sydney.

It would therefore be less risky and produce a transport system more able to cope with shifts in the fortunes of particular industry sectors. As demonstrated by the recent Global Financial Crisis, "even" industries such as banking and finance can experience cyclical downturns.

It is also not clear how the world economy, and hence the economies of cities like Sydney which are tightly enmeshed with the global economy, will cope with "peak oil" and climate change, which are expected to throw up both opportunities and challenges.

Accordingly the "European" scenario is slightly favoured on this criterion.

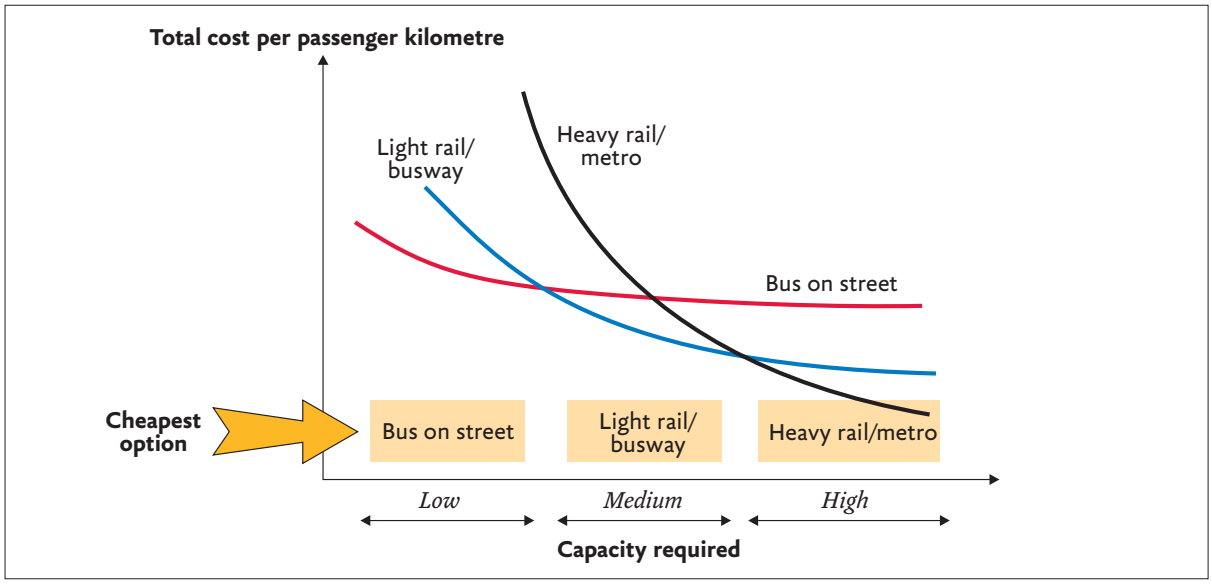


Figure 3.55. *Choosing the most cost-effective mode.*

Reducing or managing road congestion is one key role of public transport. This is particularly important for travel in peak periods, and especially for the journey to work, and for travel to major centres.

As discussed earlier, both scenarios would provide similar overall increases in capacity, so they are considered equivalent in this respect.

Another economic objective is to **maximise the cost-effectiveness of the system**.

Among other things, this requires the use of the most appropriate mode for any particular task.

As shown in ***Figure 3.55***, modes with high fixed costs, like rail systems, tend to have the lowest costs per passenger kilometre for high volume corridors but the highest costs per passenger kilometre for low volume corridors.

Conversely, buses operating in ordinary streets are the lowest cost option for low demand corridors, but are inefficient and expensive for high-volume corridors or situations like the Sydney CBD.

The modes suggested for specific links under each of the scenarios have been chosen by the Inquiry so as to produce the most cost-effective result. In other words, the differences in mode choice on specific links reflect the differences in demand on these links under the different land-use assumptions.

Both scenarios are therefore considered equivalent in terms of this criterion.

However, as discussed in Chapter 5, the "East Asian" scenario's focus on very expensive metro projects would necessitate a higher **level of debt and debt servicing** than the "European" scenario. This in turn would require additional taxes to underpin the borrowings and ensure that future generations were not left with major outstanding loans to repay. The recent financial collapses of the Cross City and Lane Cove Tunnel projects have highlighted the risks to equity investors and even banks in such capital-intensive projects. The "European" scenario is preferred in this context.

A further economic objective is to **reduce Sydney's reliance on oil**, which is increasingly imported. Although the likely timing of the "peaking" of global oil supplies is hotly debated, this factor, coupled with the rapid increase in oil

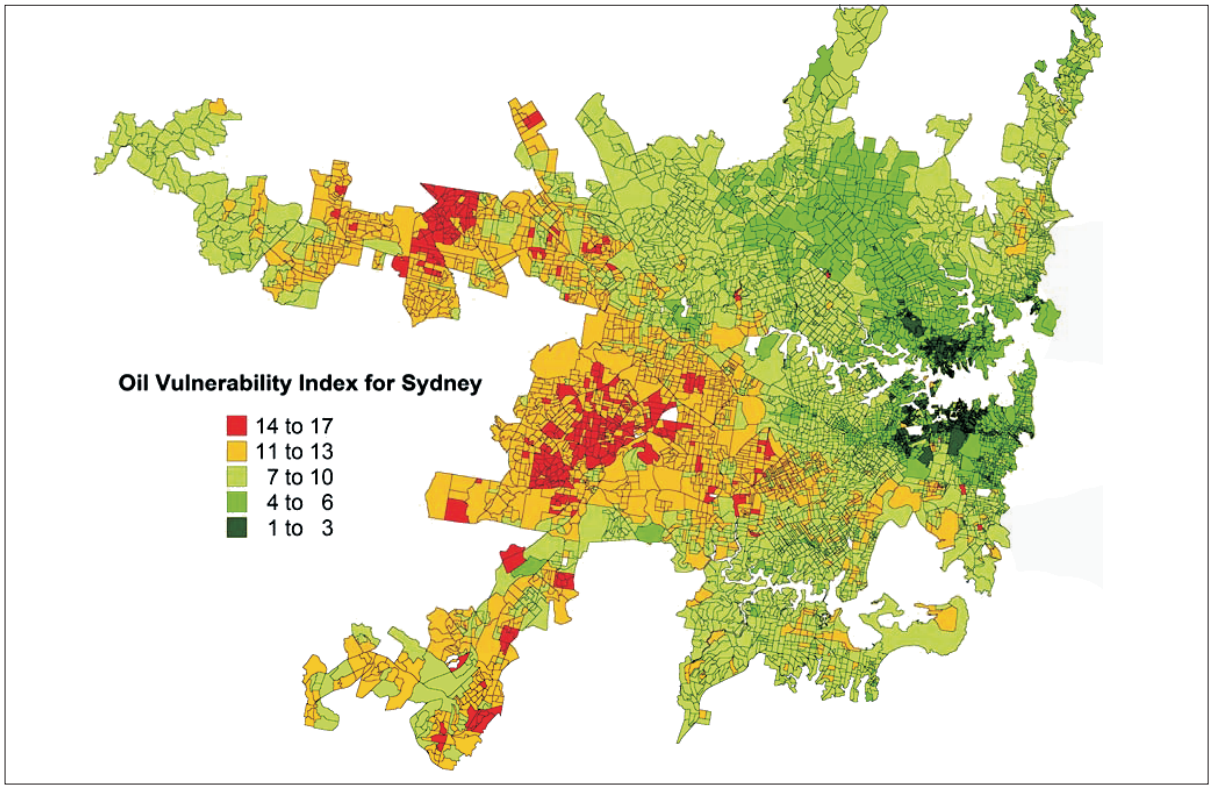


Figure 3.56. *Oil Vulnerability Index for Sydney. Source: Dodson and Sipe (2005 and 2008).*

demand in China and India, suggest that oil prices could well rise sharply again in future, as they did in 2008.

Trains and light rail vehicles use virtually no oil, while buses use only one-third as much, per passenger kilometre, as cars, so again public transport has a key role to play here. In Sydney the biggest benefits will come from the expansion of the city's rail systems, particularly if this can replace large numbers of long car journeys.

The "East Asian" option is considered slightly superior to the European scenario in its ability to reduce public transport's own overall use of oil use, because a higher proportion of the transport task would be undertaken by electrically powered metros and a lower proportion by diesel and CNG powered buses.

On the other hand, the "East Asian" scenario would provide less protection against future oil shocks, as illustrated by the patterns of variation in an "Oil Vulnerability Index"— based on a combination of how far people drive per household and household incomes—in different parts of Sydney, as shown in ***Figure 3.56***.

The most vulnerable households are those in outer suburbs and on low incomes, notably the southwestern and far western suburbs.

3.7.4 Environmental objectives

As noted earlier, public transport in Sydney uses only about 38% as much primary energy per passenger kilometre as cars.

In addition, the electrified modes (heavy rail and light rail) could be converted to 100% use of "greenpower" very quickly, therefore reducing their carbon footprint even further.

Electric buses are a possibility in the future, with various models now coming onto the market. Electric cars are also beginning to appear in larger numbers,

although full replacement of the current petrol car fleet will take at least 30-40 years.

Consequently, a switch to greenpower for rail—which has been estimated to cost only of the order of $30 m per year, on top of what CityRail currently pays for electricity ($53.7m in 2008-09)—should be made immediately, so **10% of current travel in Sydney would be "carbon free".** With appropriate expansion of the heavy rail and light rail systems this could reach 25% of Sydney's total travel by 2040.

Another environmental objective is to reduce air pollution, which in Sydney is responsible for an estimated 600 to 1,400 deaths per year, more than car accidents.

Very high proportions of most of the common air pollutants in Sydney arise from emissions from road vehicles.

Shifting some of our travel to public transport, and especially to greenpower electrified public transport, would help to reduce both local pollutant concentrations, which are particularly important in the CBD and other centres with many pedestrians, and regional pollutants such as particulates and photochemical smog.

To summarise ...

Comparison of the scenarios' "sustainability" performances.

Sustainability objective	Criterion	"European" scenario	"East Asian" scenario
Social	Access *by* public transport	Preferred	
	Access *to* public transport	Preferred	
	Housing affordability and choice	Slightly preferred	
Economic	Support for Sydney as a "global" city		Slightly preferred
	Support for the wider Sydney economy	Preferred	
	Reduced "external" costs	Similar	
	Maximised cost-effectiveness	Similar	
	Minimised financial risk	Preferred	
	Reduced oil consumption and vulnerability	Preferred from perspective of *individual* oil vulnerability	Preferred from perspective of *overall* oil vulnerability (at least in terms of public transport's *own* use of oil)
Environmental	Reduced greenhouse gas emissions		Slightly preferred
	Reduced local and regional environmental impacts	Slightly preferred	
Overall assessment		**Preferred**	

These assessments are unavoidably subjective to some extent, and different people will rate the scenarios differently, apply different weightings to different criteria or use different criteria altogether.

3.8 Conclusions

While the two scenarios developed and investigated by the Inquiry by no means exhaust the alternatives open to Sydney for the development of its public transport networks over the next 30 years, they do provide two realistic sets of alternatives, both limited by the likely availability of funding, and illustrate some of the key "strategic" choices Sydney needs to make.

Both recognise that it is simply not possible to fund all potentially useful public transport projects.

To assist readers in evaluating the relative merits of the two scenarios, and/or others, it is worth making a few concluding observations:

- The **"European" scenario** is close to the government's 2005 *Metropolitan Strategy*, which is still the official long-term plan for Sydney.

  The major changes made by the Inquiry in developing the "European" scenario have been its significantly higher updated population projections and their longer timeframe, the provision of more comprehensive public transport and, very importantly, the identification of hard-edged proposals for specific governance and funding mechanisms to enable these improvements to be implemented (see Chapters 2 and 6).

- By contrast, the **"East Asian" scenario** is close to the approach adopted more recently by the State government, with its emphasis on an extensive new metro system.

  This scenario highlights that in order to be justified, such a shift in public transport priorities would need to be matched by a large-scale increase in employment and population forecasts for the CBD and eastern Sydney and a *reduction* in employment opportunities and public transport provision in western Sydney.

  Neither of these pre-requisites for and consequences of the focus on metros during 2008 and 2009 was ever made clear by the government.

  But building around $30 billion of new metros would simply not be viable or "sensible" unless it were matched by major shifts in land uses and changes in employment patterns disadvantaging the west.

  Further, such a level of expenditure will inevitably "crowd out" expenditure on existing heavy rail and bus systems, limit expansions of these systems and limit the development of new systems such as light rail.

The ultimate choices between such alternatives are, of course, political. But they carry long-term implications for the future of this city.

The Inquiry has concluded that the "European" scenario, or something similar to it, would:

- Generate the best opportunities to provide the greatest benefit to the greatest number of people

- Provide more balanced and robust land uses, with less reliance on the CBD, and

- Provide a real opportunity to double total public transport patronage, with consequent reductions in road congestion across Sydney compared with a situation under which there was less public transport investment.

The "East Asian" scenario would provide opportunities for radically changing the city, maximising the benefits of some new technologies and emphasising Sydney's role as a "world city", with a focus on the "global arc" and those who live and work in the east.

But it would also be likely to further reinforce social and economic divisions which already exist in Sydney—and, in particular, the divide between the north/east and the south/west—and limit the opportunities for several million people in western Sydney to avoid the potential risks from peak oil, which could lead to significantly higher fuel prices and lower land values in areas remote from good public transport.

Ultimately it is the people of Sydney who should decide the sort of city they want to live in, what sort of transport system they want and what sort of transport system they are willing to pay for.

3.9 Recommendations

The need for a long-term plan

Recommendation LT 1:

The development of public transport in Sydney should be governed by a well-considered, integrated long-term *Public Transport Network Plan for Sydney*, developed and updated as described in **Recommendation Gov 2**.

Land-use planning, pricing and a renewed focus on Sydney's 'centres'

Recommendation LT 2:

Public transport planning should be integrated with the other two essential components of successful urban transport management, land-use planning and pricing (see **Recommendations Gov 2 to Gov 4, Fares 1 to Fares 7** and **Funding 1 to Funding 7**), and both of these other two components should always actively support the attractiveness, viability and development of integrated public transport.

In particular, Sydney's updated *Metropolitan Strategy* and other land-use plans should restore strong emphases on:

- Public transport friendly "centres"-based development, and
- Transit-oriented development near stations and other major public transport nodes and along routes with frequent public transport services,

to at least the levels adopted in the 2005 *Metropolitan Strategy* and assumed in the "European" scenario examined by the Inquiry.

The NSW government's recent unannounced drift away from these strategies to a greater dispersion of future employment locations should be halted and reversed.

Planning targets for public transport, walking, cycling and demand management

Recommendation LT 3:

The *Public Transport Network Plan for Sydney* should adopt:

- Objectives and timeframes for increased mode shares for public transport, walking and cycling, and
- Travel demand management measures linked to specific timeframes

as part of its contribution to the development of a more liveable, efficient, sustainable and economically competitive city.

Public transport, not roads

Recommendation LT 4:

In view of the backlogs in the provision of public transport in Sydney, the projected growth of Sydney's population to 6 million by 2036–2040, the increase in the density of development in Sydney which this inevitably implies, the needs to enhance sustainability and manage transport congestion and the strong support of Sydneysiders for greater investments in public transport in preference to roads, **public transport should have priority over road spending for at least the next three decades**.

Recommendation LT 5:

Transport planning in Sydney should recognise that investments in road widenings and new roads for the provision of access to the CBD and other dense centres in Sydney are destined to fail, and that high-quality public transport solutions are essential for this transport task.

Any major new road investments in Sydney, beyond maintenance, should only be in the form of circumferential rather than radial connections, enabling travel between lower density areas, and the principles and procedures recommended in **Recommendations Gov 2 and Gov 5** should apply.

Application of the Inquiry's recommendations to the first *Public Transport Network plan for Sydney*

Recommendation LT 6:

The initial draft long-term *Public Transport Network Plan for Sydney* prepared by Transport for Sydney under the processes described in **Recommendation Gov 2** should adopt, develop and refine the Inquiry's proposals and priorities for major public transport projects over the next 30 years under the "European" scenario examined and preferred by the Inquiry, recognising that these proposals and priorities reflect:

- An updated application of the land-use planning principles of the 2005 *Metropolitan Strategy* (see **Recommendations Gov 2 and LT 2**)
- A comprehensive but realistic approach to essential longer-term public transport improvements, integrated with and supported by the Inquiry's recommendations on fares and short-term and continuous improvements (**Recommendations Fares 1 to Fares 7** and **Recommendations ST 1 to ST 30**), and
- The public's willingness to pay for real public transport improvements (Chapters 1 and 6 of this *Final Report*) and the funding principles, opportunities and constraints described in Chapter 6 and **Recommendations Funding 1 to Funding 7**.

The highest priority large-scale heavy rail projects

Recommendation LT 7:

Four major heavy rail projects are essential and should receive the highest priority in the immediate future:

- The North West Rail Link (see **Recommendation LT 8**)
- The South West Rail Link (see **Recommendation LT 9**)
- A new cross-CBD, cross-Harbour Rail Link (see **Recommendations LT 10 and LT 11**), and
- A new Merrylands–Parramatta–Epping rail link (see **Recommendation LT 12**).

North West Rail Link

Recommendation LT 8:

Construction of the North West Rail Link from Epping to Rouse Hill should be commenced and fully completed as soon as practicable. Alignment, operational and environmental studies should be finalised and all necessary approvals obtained to permit construction to start by no later than 2011–12.

South West Rail Link

Recommendation LT 9:

The design and construction of and operational planning for the South West Rail Link, initially from Glenfield to Leppington, should continue as a high priority, in conjunction with planning for the Leppington and Edmondson Park town centres.

Essential and urgent: A new cross-CBD, cross-Harbour rail link

Recommendation LT 10:

Transport planning in Sydney should once again recognise:

- The critical importance of a new cross-CBD, cross-Harbour heavy rail link as a pre-requisite for increasing train frequencies and patronage capacity throughout Sydney's heavy rail network, and
- The inabilities of the "alternatives" adopted (and in the case of "metros" discarded) by the government in recent years to provide this essential additional patronage capacity

and should therefore take urgent action to ensure this link will be available by the time it is needed (on the Inquiry's analyses, by around 2022).

Recommendation LT 11:

All the route, station and operational options for a new cross-CBD, cross-CBD heavy rail link should now be seriously, independently, fairly and transparently investigated as a matter of urgency, before the options are forever closed off or compromised by further *ad hoc* decision-making.

The route options to be investigated should include the two options originally developed and adopted by the NSW government—a "central CBD" (Pitt Street) alignment and a "western CBD" (Sussex and Kent Streets) alignment—and the alternative route utilising the Harbour Bridge proposed to this Inquiry (see *Thought Provoker #4*), plus all other viable heavy rail route alternatives.

The investigations should also take account of, and seek to protect, all viable potential routes for and interchanges with surface public transport, especially within the CBD (including light rail services), and future "metro" lines and/or lines for medium and long-distance high-speed rail services into and through the CBD in the longer term.

Opportunities for the new link to be shared with high-speed services should also be explored, along with all the other relevant considerations discussed by the Inquiry in this *Final Report.*

The investigations should be conducted in conjunction with the Commonwealth government (including Infrastructure Australia, as a potential contrib-

utor to the funding of this project), Sydney City Council and other stakeholders, and should incorporate genuine public consultations and real opportunities for significant and well informed public inputs.

The "City Relief Line" stub rail link proposed by the NSW government in its February 2010 *Metropolitan Transport Plan, Connecting the City of Cities* should not proceed until these investigations have been completed, and should then proceed, as an interim measure only, *only* if:

- The ultimately preferred option for the new cross-CBD, cross-Harbour heavy rail link is a "western CBD" (Sussex and Kent Street) route with connections to the "Main" tracks to and from Sydney's west, rather than the Airport Line and southwest connections previously considered superior by the government and currently considered superior by the Inquiry, and
- The investigations conclude it is cost-effective and desirable to construct and operate the necessary major (but interim) underground turnback and passenger interchange facilities at Wynyard.

A new Merrylands–Parramatta–Epping rail link

Recommendation LT 12:

All the route, station and operational options for a new Merrylands–Parramatta–Epping heavy rail link should immediately be seriously, independently, fairly and transparently investigated, with particular emphasis on:

- Maximising employment access for residents of Sydney's southwest
- Identifying the best alignment and station options within and near the Parramatta CBD, and
- Providing the best synergies and connections with existing and possible future surface public transport services (including light rail) and possible

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Thought provoker #2

Choosing the 'right' types of rail systems for Sydney

Over the last couple of years there has been a tremendous amount of hype in Sydney, from the State government and others, about the supposedly innate superiority of one type of rail system (in particular, "metro" trains on an entirely new and separate metro rail network, plus possible future "metro-like" trains on the CityRail network) over another (in particular, "heavy" "suburban" railways such as CityRail's double deck network and the Paris Réseau Express Régional)—and *vice versa*.

In 2009 the Sydney Metro Authority went so far as to claim that "*only* a new metro network and operating system would provide a modern, customer-focussed service with service standards in keeping with the competitive needs of a world city" and that metros "would offer a higher frequency and higher capacity service than would be achievable with heavy rail" (*CBD Metro Environmental Assessment*, August 2009, emphasis added).

These sorts of claims are self-serving nonsense—and the Metro Authority was far from alone in trying to protect and expand its own territory, almost at all costs, in this way.

Indeed, the claims illustrate, more than anything else, the inevitably disjointed, fragmented results of the multiple transport agency "silos" philosophy fostered in Sydney by governments of both political persuasions over many decades.

Bureaucracies and politicians thrive on these conflicts. But where does the rest of the community get a look-in?

The successful development of a truly efficient and integrated public transport network in Sydney will necessitate a far more careful and considered examination of the potential roles (and pros and cons) of a wide range of different types of rail services for Sydney, from light rail to a variety of types of "metro" and "suburban" rail services.*

As discussed in Chapters 3 and 5 of this *Final Report*, the Inquiry has concluded that all three of these rail modes will have essential roles to play, *at different stages*, as Sydney grows to a city of some six million people over the next 30 years.

The community will need to make some very difficult decisions in choosing the "right" mode—and the "right" investment priorities between modes and between different combinations of modes—for many different possible applications over this period.

So what are some of the basics? Here are seven suggestions...

*** The term "metro" has been widely misused in recent debates in Australia.**

Advocates of single-deck trains have tended to use the term as a "sexy" descriptor of almost any type of single-deck train. (These days, some of their spin doctors would probably try to sell Sydney's old "red rattlers" as "metros"!)

Others have used the term largely as a synonym for underground railways, even though key parts of Sydney's existing heavy rail system are also (obviously) underground railways and many overseas "metros" have lengthy above-ground components.

In this report the terms "metro" and "metro-like" are applied to trains—on any network, new or old, above or below ground level—which feature three core characteristics of "metro" rolling stock around the world: **smaller and lighter carriages** than those currently used on Sydney's suburban network, **a greater ability to climb steep grades** (making future metro route alignments better able to respond to Sydney's challenging topography), and **design features specifically catering for shorter journeys, sometimes severe short-distance passenger loadings, relatively frequent stops and large patronage turnovers** (such as limited seating, more doors and faster acceleration), generally with relatively little emphasis on passenger comfort.

*CityRail's current double deck trains have relatively high seating capacities, for passengers' comfort on trips now averaging about 19.6 km in length, but only two doors per side per carriage, one of several factors increasing train "dwell times" during peak periods at the busiest CBD stations. Single-deck trains with fewer seats and more doors are often cited as an "answer" to long station dwell times, but might well reduce the capacity of the rail system (see **Appendix 3**), and better solutions need to be investigated. The highly successful use in Paris of large double deck trains with more seating (as well as more standing room) and three (wider) doors per side per carriage has demonstrated the possibilities (see page 236).*

*Most overseas "metros", such as those in Hong Kong (above), have four to six doors per side per single-deck carriage and only limited seating, reflecting typical journey lengths of only 5 to 8 km. (The previously proposed "longer term" "deseating" of Sydney's metros would have produced a layout like the ones shown here.) Multi-door single-deck trains such as these can help shorten station "dwell times", but **only** if **all** the prerequisites for this, including high-capacity station designs and operations, are satisfied. Depending on the sizes, layouts and frequencies of the trains, "'metro" and "metro- like" services may **(but equally, and frequently, may not)** provide greater overall patronage capacities than double deck "suburban" rail services.*

Please be seated...if you can

CityRail's current suburban double deck trains, with eight carriages per train, have seating for around 900 passengers and theoretical maximum "crush loading" capacities of around 1,740 passengers per train. In practice, however, a more realistic maximum capacity assumption is around 1,350 passengers per train, because once this loading is exceeded there are increasingly severe effects on "dwell times" at busy stations, with passengers having to wait longer and longer to move within, exit and enter the trains, which have only two doors on each side of each carriage.

In comparison, the five-carriage single-deck trains previously proposed by the government for Sydney metro lines—some of them traversing *much* longer distances than those usually applying for "metro" services—were publicised as having seating for only 360 passengers (i.e. about 40% of the number of seats on a current CityRail train) and theoretically sufficient standing room for a further 605 passengers (i.e. 965 passengers per train in total, or about two-thirds of the "crush loaded" capacity of a current CityRail train). Each of the carriages would probably have had three or perhaps four doors per side. Worse, the Sydney Metro Authority foreshadowed that "in the future" the capacities of these metro trains could be increased by reconfiguring the seating (i.e. by further reducing the number of seats, to as few as 40 per carriage or 200 per train), by "accepting" higher loadings levels (!) and/or by changing to six-car train sets (*CBD Metro Environmental Assessment Technical Paper No 1*, page 45).

The very short platforms of the station designs adopted for the previously proposed CBD "core" of Sydney's future metro network and the previously proposed "West Metro" line, plus other design limitations such as the location of immovable access and plant facilities at both ends of platforms, meant these stations would never have been able to accommodate trains with more than six carriages. This shortsightedness inevitably meant that within the next 30 or so years "deseating" and serious overcrowding would have become the norm on many metro trains—and the capacity of this so-called "core" of the metro network, and thus even the busiest of the lines feeding into it, would never have been able to be further increased.

1. Count what really counts (putting people before machines)

In considering a rail system's peak period capacity constraints transport planners very frequently focus almost immediately on issues like "What type of train?" and "How many trains can we run?"

But in addressing the capacity requirements of a rail system it is the system's ***patronage* capacity** which is the most fundamental consideration, even though the focus in both populist and technical discussions is more commonly on the *train* capacity of the system (e.g. the number of trains per hour).

For example, a "metro" or "metro-like" service provided by "frequent" small trains with relatively low patronage capacities, such as the Sydney metro services previously proposed by the government with "up to 20 to 30" small (five-car) trains per hour (in other words, anything from zero to 30 trains per hour), could well provide an *inferior* total patronage capacity than a slightly less frequent service by larger trains—which, in any event, with modern signalling and control systems etc, can also easily run at frequencies of between 24 and 30 trains per hour, depending on factors described below, compared with the generally applicable limit of 20 to 24 trains per hour for CityRail services today.

These and similar issues are discussed in more detail in *Thought Provoker #3* and in *Appendix 3* of this *Final Report*.

2. Avoid a one-track mindset

In recent years there have been many passionate claims about the benefits of particular types of trains, sometimes extending to some quite ludicrous assertions.

Everyone needs to take a cold shower and recognise that **choices between different types of rail services are almost always *not* "either/or" choices**. Indeed, as already indicated, in the long run Sydney will almost certainly need the lot.

There are, however, two very important provisos:

- First, **what is developed for one type of rail system should not *inherently* exclude another—for example, by "building out" available route options.**

  This is one of the most important and obvious faults of the alignment previously proposed by the government for its "CBD Metro", which would have completely eliminated the possibility of heavy rail's using the more attractive of the two previously reserved heavy rail routes for a new underground "suburban" rail route under the CBD, and would also have severely compromised sections of the other.

  This is why, prior to the cancellation of the "CBD Metro" project in February 2010, the Inquiry was forced to search for other route options through the CBD for the essential new cross-CBD, cross-Harbour heavy rail line, as described in *Thought Provoker #4*.

- Secondly, **what is developed for one type of rail system should not *indirectly* exclude another**—for example, by:

  - Effectively monopolising or otherwise dominating the application of limited sources of public transport funding and construction industry resources (as early construction of the "CBD Metro" would inevitably have done, pushing aside funding and resourcing much more urgently needed for other projects such as the North West, South West and Parramatta-Epping rail links and the additional rail CBD and harbour crossing), or

  - In the case of so-called "public private partnership" (PPP) projects, through the use of contract provisions prohibiting any new "competitive" transport services beyond any agreed specific services or necessitating substantial compensation if they were introduced.

(As the Airport line's sad history of under-use has demonstrated, PPP projects can also introduce many other impediments to successful integration of the city's entire public transport network, especially if they are free to set their own fares or establish incompatible ticketing systems or inferior service standards and frequencies.)

3. See all the shades of grey

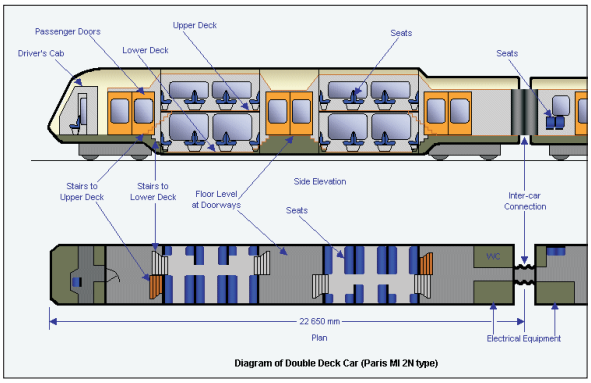
Notwithstanding all the rhetoric from vested interests over the last couple of years, **there is no sharp dividing line between "metros" and "suburban railways"/"heavy rail"**.

Rather, there is **a continuum of options**, from light rail systems, light metro systems, heavier metro systems (such as the system previously proposed for Sydney), lighter single-deck "suburban rail" systems and heavier single and double deck "suburban rail" systems.

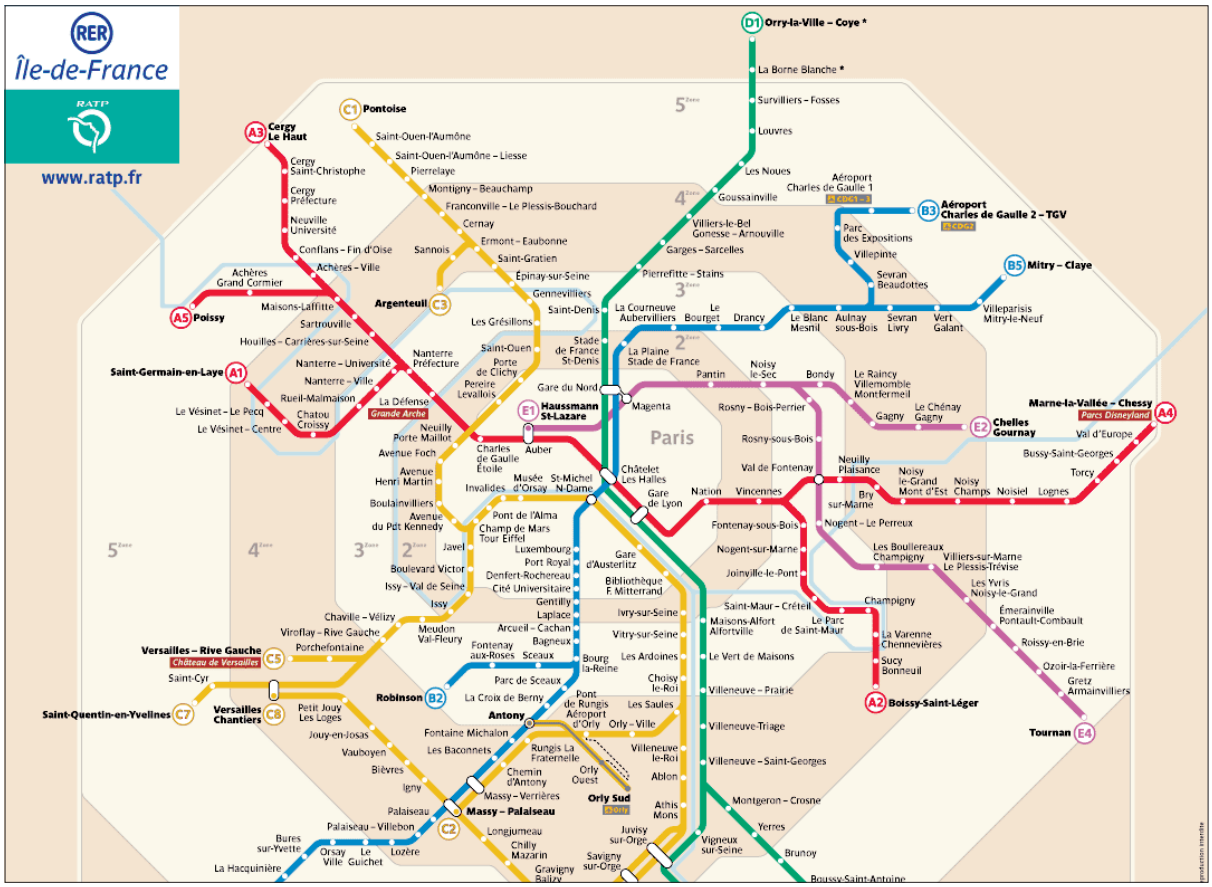
And all of these options have a wide range of seating and standing room characteristics, access and egress characteristics, passenger comfort characteristics, crashworthiness and other safety characteristics, train control systems and train performance characteristics.

Despite the government's propaganda from 2008 to February 2010, metros are *not* the only "way of the future" for Sydney. Neither "metros" nor "suburban railways" are inherently more modern or "world class" than the other. There are old and new—and good and bad—examples of both in major cities around the world.

With good design and adequate modern infrastructure, trains and control systems, plus real integration with other modes of public transport, integrated fares and good interchange facilities, **both** of these supposedly separate categories are capable of providing much higher patronage capacities, much higher service frequencies and much more attractive and efficient services than current CityRail services.



The Sydney CityRail network's combination of an inner underground intra-CBD and cross-CBD core and longer distance suburban services—avoiding the need to interchange at "cordon points" around the CBD, and allowing "suburban" services to travel all the way into the CBD—is now being actively mimicked in major cities overseas, including cities with very well established and often superb metro networks such as Paris. The "suburban'" RER network in Paris (map below) has achieved great success, with patronage demands among the highest for any railway lines in the world, and is being rapidly expanded. To help accommodate the growth in demand its original single-deck trains are being replaced by innovative ten-car, high-capacity double deck trains (above), with ample seating as well as standing room and three wide doors per side per carriage. A modern train control and signalling system permits closely spaced trains, and wide platforms with well designed, high-capacity access routes (top) are also important in reducing station "dwell times" and catering for this patronage demand.



4. Know your horses for courses

Different types of rail systems are generally, but not always, better or worse than others in:

- Addressing particular types of shorter and longer distance travel needs, and
- Serving particular types and densities of residential and employment development.

In most major cities of the world,

- **"Metros"** of varying types and capacities, typically with relatively limited seating, are generally used for shorter (4 to 8 km) trips within urban environments with much higher densities than those envisaged for Sydney, even after its forecast rapid population growth, within the next 30 years, and
- **"Suburban"** rail services are generally used for longer journeys, often through both high and medium density areas as well as lower density suburbs like most of Sydney's, and therefore typically provide more seating and higher levels of passenger comfort.

In this context it should be noted that the average CityRail trip length is already about 19.6 km, well above average rail trip lengths in almost all comparable European, North American, Asian and Australian cities—and this is *before* the establishment of essential new lines serving northwestern, western and southwestern areas of Sydney and the planned development of major new residential areas in the northwest and southwest.

While capacity requirements are obviously important, they are not the only important consideration in choosing the most suitable form(s) of rail service. For example, passenger comfort—a factor frequently receiving relatively little attention in planning for short-distance services, for which many passengers are simply assumed to be willing to stand for much or all of their trip and for which train ride quality is often ignored—is a much more significant factor in cities such as Sydney, where average rail trip lengths are high by world standards and rail has to compete with private vehicular travel.

5. Recognise Sydney already has some key elements of "the best of both worlds"

CityRail's infrastructure within and through the Sydney CBD already has many of the characteristics of equivalent infrastructure for "metros", reflecting the fact that it was largely designed in the 1920s and 1930s with the lessons learnt overseas in developing earlier "metros" very much in mind.

The CityRail network's combination of this inner "metro"-like core and longer distance suburban services —avoiding the need to interchange at "cordon points" around the CBD, and allowing "suburban" services to travel all the way into the CBD—was (and in many ways still is) a world- leading concept, envied by many other so-called "world class" cities.

It has been actively mimicked in major cities overseas.

Examples include the S (suburban) systems in German and Swiss cities, such as Zurich, which are now widely regarded as world leaders in public transport.

The concept has also been applied extensively in cities which have very well established "metro" networks, including Berlin, Paris (with the "suburban" Paris Réseau Express Régional (RER) network achieving great success and being rapidly expanded) and London (where the north-south *Thameslink* "suburban" line is to be joined by a lengthy underground *Crossrail* line, now under construction, which will boost London's rail capacity by 40%).

6. Consider everything, no matter how "difficult"

The patronage capacity of *any* metro or suburban rail system depends on many factors, not just the few that the government has chosen to focus on in its "metro", "metro-like" and "western express" promotions.

And in designing a successful system it's not just a matter of taking all of these factors into account, it's also a matter of **identifying and addressing all of the *limiting* factors and getting them "right".**

In simple terms, the patronage capacity of a metro or suburban rail system is determined by:

- The number of passengers able to be carried on each train, and
- The number of trains able to use each part of the system during any defined period of time.

In turn, the number of passengers able to be carried on each train depends on:

- **The inherent design characteristics of the trains** (e.g. the numbers of carriages, the sizes of the carriages, whether they have double deck or single deck layouts, their seating and standing room layouts and their passenger access and egress layouts, and
- **Station design factors** and **train service frequencies**, both of which affect the numbers of passengers able to alight and board while the trains are stopped at stations for any given "dwell" time.

Similarly, the number of trains able to use each part of the system during any defined period of time depends on:

- **Signalling and train control system capabilities** (more modern systems, now available in standardised forms for both "metros" and "suburban rail" services, safely permit shorter "headways" between trains and thus more frequent services)
- The presence or absence of **"conflicting" train movements at junctions and turnbacks** (grade separations, line separations and other operational and infrastructure changes, such as those being carried out under the *Clearways* program, will often be prerequisites for increased train frequencies)

A study of contrasts. Above: *Platform 2 of Town Hall station* ***immediately after*** *the departure of a train during the evening peak, with much of the narrow platform—and especially the areas aligned with train doors—already occupied by passengers waiting to board a later express service.* ***Below:*** *What can be done if foresight is applied. In Hong Kong it has long been recognised that the achievement of higher rail capacities and operation of frequent train services is not merely a matter of choosing the "right" types of trains and introducing modern train control and signalling systems; inadequate station capacities, such as those at Sydney's Town Hall and Wynyard stations and some of Melbourne's underground stations, can often be a more fundamental constraint. This island platform at a relatively new station in Hong Kong is very wide and easily accessible, and also features "platform doors" to improve passenger safety and reduce the energy consumption of station air conditioning and ventilation systems. It is time to reopen serious investigations into upgrading the capacities —and fire and life safety—of the busiest of Sydney's existing CBD stations.*

- **The number of trains available**, reflecting not only the size of the total fleet (and thus funding constraints) but also:
  - **Timetabling constraints** (e.g. as demonstrated over the last few years in Sydney, timetable changes which deliberately slow train services and increase "recovery times" at stations, in order to boost the reported "reliability" of services as measured against the timetable, can significantly increase the number of trains required to deliver any given frequency of service, especially during peak periods)
  - **The locations of train maintenance and train "stabling" (parking) facilities**, particularly for the storage of trains between the peaks, and
  - **Staffing constraints** (e.g. the number of train drivers available and their locations)
- **The trains' station stopping ("dwell") times**, which in turn are affected by:
  - **The trains' passenger access and egress layouts** (including, but not limited to, the numbers and widths of doors and the ease of movements within crowded trains)
  - **The numbers of passengers boarding and alighting from each individual train** (reflecting not only total patronage demand but also service frequencies and the numbers of passengers occupying platform space while waiting for a different type of service, such as an express or a train to a different destination)
  - **The separation, or otherwise, of boarding and alighting passenger flows** (i.e. whether the passengers waiting to board a train obstruct passengers wishing to alight from the train, and/or have to wait until alighting passengers are clear of the doors and the immediate platform area before they can start to board)
  - **The effectiveness of management of passengers flows**, including information systems, "platform door" systems, platform marking systems and the use of passenger "marshals" (such as those now guiding passenger movements on the most crowded CityRail CBD platforms during evening peak periods)
  - **Platform crowding more generally**, reflecting all of the factors listed above plus platform widths, the capacities, placement, design and operation of stairs, escalators and lifts to and from the platforms (and also *between* the platforms, an increasingly important factor in Sydney, where the rapid growth in **interchanging between different train services at the busiest CBD stations** has led to serious congestion caused by "conflicting" passenger movements), the capacities and designs of the station concourses and many other aspects of platform and station designs, such as obstructions to flows by stairs, escalators and lifts to other platforms, retail facilities and/or safety equipment, and
  - **The duration of the station "recovery times" assumed in timetabling** in order to cater for forecast "normal" perturbations in train flows
- **Inherent train performance characteristics** (primarily the trains" acceleration capabilities, maximum speed and deceleration capabilities, reflecting not only the trains' traction power and suspension systems but also the trains' crashworthiness and thus their mass), and
- **Passenger comfort, safety, timetabling "reliability" and/or energy consumption restrictions** on the application of these inherent performance capabilities.

7. Focus on the *Limiting* Factors

In designing any future rail systems in Sydney it will be vital to **assess the relative importance of all the various constraints** on greater service frequencies and greater patronage capacities at different locations on the system's network, in order to determine the current and likely future **limiting factor(s) at each location**.

There would obviously be little point in implementing changes addressing *other* constraints—by, for example, introducing single deck trains with limited seating designed primarily for faster access and egress—if the *limiting* constraint(s) on service frequencies and capacities still applied, preventing the realisation of most or all of the potential benefits and rendering the sacrificing of many passengers' comfort entirely worthless.

To take but one example, although the station congestion factors contributing to long "dwell times" at the busiest CityRail stations in the CBD are clearly already major constraints (see *Appendix 3*)—and are almost certain to continue to be serious constraints in the future—these constraints appear not to have been seriously investigated in any recent studies and the government has backed away from all its previous promises to upgrade these stations.

It has certainly not yet been established that these existing stations will be able to cope with likely future levels of interchanging within the stations and movements into and out of the stations, even with an additional stub heavy rail line into the CBD.

Much more serious investigations of these station congestion factors will therefore be essential in the future, along with, in particular,

- **More systematic reviews of the relative merits of single deck and innovative double deck train designs**, including "articulated" designs with bogies shared by adjacent shorter carriages, potentially permitting a combination of continued high seating and standing capacities with a greater number of doors (and thus *potentially* assisting shorter station "dwell times"), and
- **Fresh investigations** of many of the other factors listed above, many of which have been studiously ignored by the government's transport agencies in recent years.

Thought provoker #3

An absolute necessity:

A new CBD and cross-Harbour rail link

Introduction

As indicated in section 3.3.2 of this report, the NSW government's February 2010 *Metropolitan Transport Plan* forecasts a 135% increase in CityRail's average weekday patronage between 2006 and 2036.

This forecast is equivalent to a sustained 3% *per annum* compound growth rate over this period, close to the growth rate that CityRail has been experiencing in practice over the last three years, and would take CityRail's annual patronage from 281.5 million in 2006-07 to around 660 million in 2036.

For the purposes of developing its recommendations for longer-term investments under the scenarios described in Chapter 3, the Inquiry has assumed a slightly less aggressive growth rate for Sydney's public transport, with a doubling of total public transport patronage between 2006 and 2040 (see section 3.3.2). On this basis, and even assuming (contrary to recent experience) that CityRail's patronage grows no faster than the patronage of other modes of public transport, CityRail's patronage—which currently accounts for about half Sydney's total public transport patronage*—would again exceed 600 million by 2036.

Whichever of these sets of assumptions is adopted, it is clearly likely that over the next 25 to 30 years there will be a *massive* increase in patronage demand for CityRail services, and probably at least a doubling of this demand.

These types of growth forecasts raise questions such as:

- Will the existing railway system be able to carry the forecast passenger volumes?
- If not, when, where and how will the capacity of the existing system be exceeded?
- Where might the additional passengers come from and go to?
- Will the patronage growth only occur on existing lines, or only on new lines, assuming they are built, or on both?
- How many more trains, and what types of trains, might be required to carry these passengers?
- What infrastructure will be required to accommodate these additional trains?
- When might this upgraded or additional infrastructure be required?

The Inquiry cannot provide definitive answers to all of these questions, because of its limited resources and restrictions on public access to vital planning and operational information.

However, the Inquiry *can* look at the issues at a "strategic" level and direct the community's attention to projects that *will* need to be included in any infrastructure and operational mix developed to serve projected future patronage.

This *Thought Provoker #3* focuses on the need for, and timing and essential characteristics of, the most critically important of these projects: a new cross-CBD and cross-Harbour rail link designed to relieve congestion and increase patronage capacity throughout the suburban CityRail network.

Current CityRail patronage

CityRail's most recent publicly available statistical compilation, *A Compendium of CityRail Travel Statistics* (6th edition, June 2008), reports annual patronage of 281.5 million passengers throughout the CityRail network in 2006-07. RailCorp's 2008-09 *Annual Report* variously reports CityRail's 2008-09 patronage as 304.8 million and 305.3 million, and it is likely that annual patronage will reach about 314 million in 2009-10.

In broad terms CityRail carried one-third of its 2006-07 passengers during the morning peak period, one-third

* Peter Moore from UITP has systematically recorded public transport statistics throughout Australia from 1997 to 2009. His Sydney statistics show heavy rail carried 45% of Sydney's public transport travellers in 1997, rising to 49% in 2009.

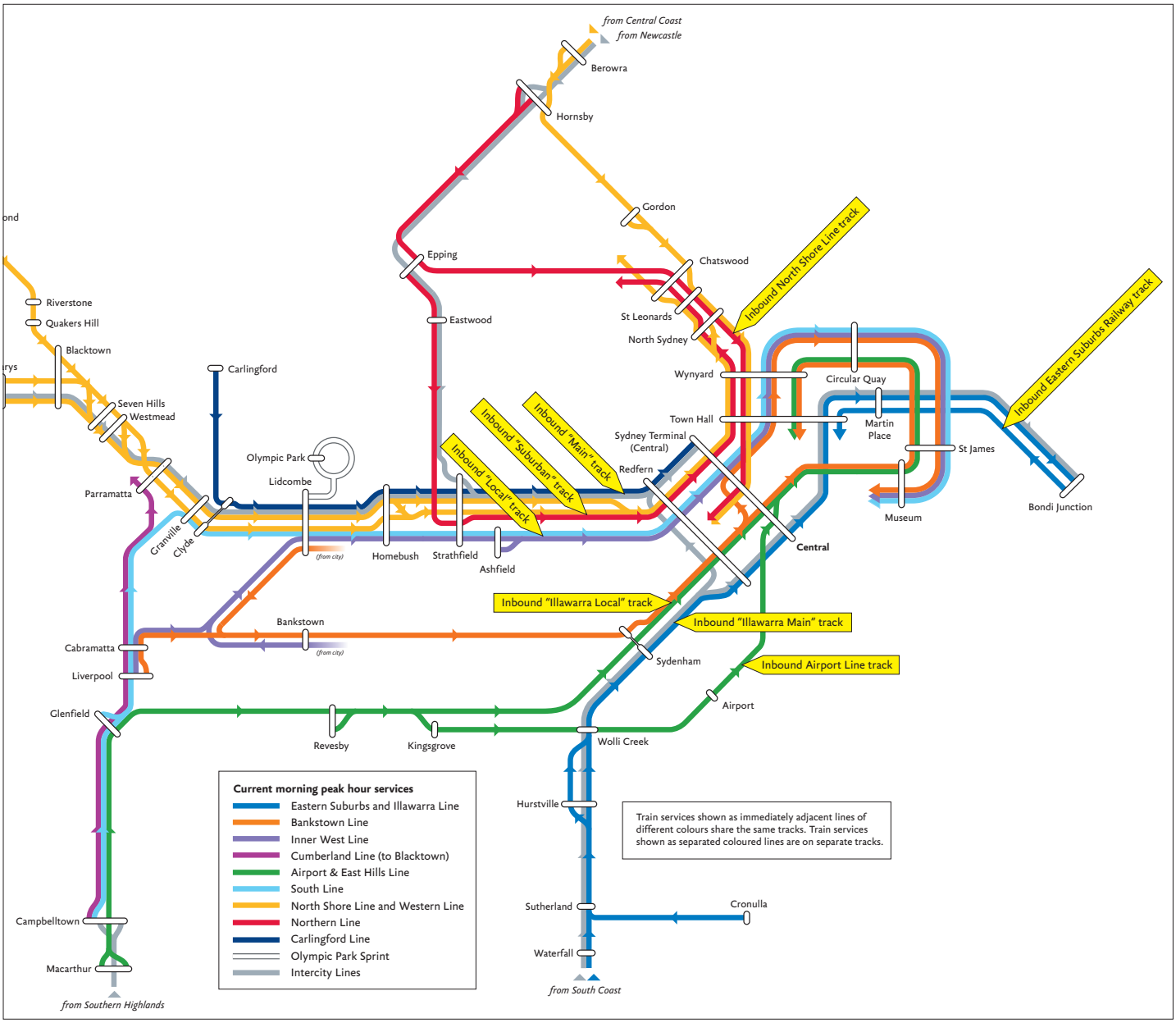


Figure #3.1. *There are currently eight individual inbound tracks approaching the CBD, on the North Shore Line (across the Harbour Bridge), the Eastern Suburbs Railway (from Bondi Junction), the Airport & East Hills Line (via the Airport Line's inbound track), the Illawarra and South Coast Lines (the inbound "Illawarra Main" track), the Bankstown Line and the East Hills Line via Sydenham (the inbound "Illawarra Local" track), and the Western, Blue Mountains, Northern, Newcastle, South and Inner West Lines (the inbound "Main", "Suburban" and "Local" tracks approaching the CBD from the west).*

during the afternoon peak and one-third throughout the rest of the day, predominantly in the six hours between the morning and afternoon peak periods.

22% of all weekday CityRail trips were trips to just three stations: Central, Town Hall and Wynyard.

In 2007-07 there were 945,000 CityRail trips on a typical weekday, 310,000 of them during the morning peak period.

Roughly 190,000 of these morning peak passengers were on trains approached the CBD, but only 145,000 of them exited at CBD stations, 103,000 of them (70%) at Central, Town Hall and Wynyard. So about 45,000 of the trips approaching the CBD either stopped short of the CBD or passed through the CBD. It is estimated that perhaps 30,000 of the "through" passengers crossed Sydney Harbour Bridge, heading north, during the typical weekday morning peak.

In 2006-07 the overall average morning peak hour loading of trains approaching the CBD was 991 passengers, but the averages on the eight individual tracks approaching the CBD (***Figure #3.1***) varied between 541 and 1,236 passengers per train (***Table #3.1***).

Current peak CityRail services

Reported 2007 data

CityRail's latest *Compendium of CityRail Travel Statistics* (6th edition, June 2008) indicates that 103 trains approached the Sydney CBD during the weekday morning peak hour in mid-2007.

TABLE #3.1.
2007 AND ESTIMATED 2010 MORNING PEAK HOUR TRAIN AND PASSENGER MOVEMENTS APPROACHING THE CBD.

Track approaching the CBD (*Figure #3.1*)	Track through the CBD (*Figure #3.1*)	2007 morning peak hour			Estimated 2010 morning peak hour		Estimated current morning peak hour system limits	
		Trains	Passengers	Average load per train	Trains	Passengers	Trains	Passengers
"Illawarra Main" from Sydenham	Eastern Suburbs Railway to Bondi	14	16,210	1,158	18	17,800	20	24,000
Eastern Suburbs Railway from Bondi	Eastern Suburbs Railway to Central	15	8,120	541	14	8,900	20	11,000
"Local" from west	City Circle "Outer" (clockwise)	12	13,265	1,105	12	14,600	12	15,000
"Illawarra Local" from Sydenham	City Circle (both directions)	10	10,940	1,094	10	12,000	16	20,000
Airport Line	City Circle "Inner" (anti-clockwise)	8	7,510	939	8	8,300	12	15,000
"Suburban" from west	North Shore northbound	20	24,725	1,236	19	25,700	20	26,000
North Shore	North Shore southbound	13	14,325	1,102	20	18,000	20	24,000
"Main" from west	Terminating at Sydney Terminal	11	7,015	638	10	7,000	20	19,000
Total		**103**	**102,110**	**991**	**111**	**112,300**	**140**	**154,000**

Notes: 1. Total 2010 passenger flows have been assumed to be 10% higher than the 2007 flows, reflecting current patronage growth trends.
2. The "system limit" estimates are based, conventionally, on 20 trains per hour and 1,100 passengers per train, but have been varied across the services using the individual approach tracks according to existing peak loadings and the prospects for future patronage.

Setting aside the fact that there are some time shifts in when the morning peak hour occurs on different lines—for example, patronage on the southbound North Shore Line track peaks as much as half an hour later than on the "Suburban" track from the west which feeds into the northbound North Shore Line track, and patronage on the inbound Eastern Suburbs Railway peaks at least a quarter of an hour later than on the inbound "Illawarra Main" track which feeds into the outbound Eastern Suburbs Railway—the morning peak hour occurs roughly between 7:30 am and 8:30 am at Central, Martin Place or Wynyard, whichever is the entry station.

As *Figure #3.1* illustrates, although there are eight two-way lines converging on the CBD there are physically only three two-way lines that run through the CBD, plus the stub line to Sydney Terminal station (the "country platforms" at Central).

This means some approaching train flows have to be redistributed, either to gain access to the CBD stations or to terminate at Central. Accordingly, even if the tracks *through* the CBD were run to the limits of their physical capacities, not all of the approach tracks could possibly be run to the limits of their physical capacities.

Table #3.1 summarises train flows, passenger flows and average train loadings for a typical 2007 morning peak hour.

The most noticeable feature is the variation in average train loads for trains using the various inbound tracks. In particular, in 2007:

- The inbound Eastern Suburbs Railway simply did not serve a large enough catchment to fully "back-load" all the trains fed to it from the inbound "Illawarra Main" track.
- Most of the trains entering Sydney Terminal via the "Main" track from the west were long-distance, medium-capacity interurban trains from Newcastle and the Central Coast, the Blue Mountains and the South Coast. These trains were designed to carry seated rather than standing passengers over long distances.
- The Airport Line train loads were probably understated, because of the non-reporting of net changes in passenger flows on trains using this line and its four privately owned and operated (non-CityRail) stations between Wolli Creek and Central.
- At other end of the scale, over the peak hour the "Illawarra Main", "Illawarra Local", "Local" and North Shore tracks' trains were loaded, on average, to 120% of the number of seats on these trains, and the "Suburban" track's trains were loaded on average to 135% of their number of seats.

2010 ESTIMATES

On the basis of personal correspondence with CityRail, the Inquiry estimates there has probably been a 10% growth in overall Cityrail patronage from 2007 to 2010.

It has therefore been assumed, in *Table #3.1*, that the total average weekday morning peak hour passenger flow approaching the CBD will have risen from 102,110 in 2007 to around 112,300 in 2010.

CityRail's October 2009 timetable increased the number of morning peak hour trains approaching the CBD from 103 to 111. This largely resulted from the redirection of Hornsby-Epping trains onto the new Epping-Chatswood Rail Link and thence into the Sydney CBD via North Sydney, but there was also an increase in the number of "Illawarra Main" trains, with a redirection of outer suburban trains from Sydney Terminal to the Eastern Suburbs Railway.

As in 2007, the "Local", "Illawarra Local" and Airport Line trains are still routed, via the "flying junctions" southwest of Central, to feed both directions of the City Circle, using some 75% of the City Circle's latent capacity.

Current capacity limits

The "conventional" capacity limits for the sustainable and reliable services on each of the three CityRail lines through the CBD are 20 trains per hour in each direction, assuming a ruling "dwell time" at each station of 80 seconds (this "dwell time" is the longest station stop time, including passenger turnovers and "recovery time", as discussed in *Appendix 3* of this report.)

Table #3.1 presents the Inquiry's estimates of the likely limits on the numbers of trains able to run on the eight existing CBD approach tracks and the three existing two-way lines through the CBD, assuming there are no signalling changes other than the foreshadowed introduction of Automatic Train Protection (ATP), which despite some recent ill-informed claims will *not*, by itself, increase the lines' capacities.

These estimates are based on:

- The retention of line capacities of 20 trains per hour per track within the CBD.
- The retention of line capacities of 20 trains per hour per track on the following approach lines between the CBD and their first major junctions outside the CBD, as indicated:
  - The North Shore Line to/from Chatswood
  - The Eastern Suburbs Railway to/from Bondi Junction and the "Illawarra Main" tracks on the Illawarra and South Coast Line to/from Sydenham (assuming the Bondi Junction terminus can in fact achieve the 20 trains per hour turnaround for which it was ostensibly designed, notwithstanding recently expressed doubts about this), and
  - The "Main" and "Suburban" tracks on the Western, Blue Mountains, Northern and Newcastle Lines to/from Strathfield (assuming, perhaps heroically, that Sydney Terminal could be driven to accept 20 trains per hour off the inbound "Main" track, with only 8 to 10 of these trains per hour being suburban services requiring only short stops at this terminus).
- The retention of a line capacity of 12 trains per hour on the "Local" tracks on the South and Inner West Lines between Homebush and the CBD, constrained by the mixture of all-stops and limited-stops services on these tracks.
- The retention of a line capacity of 16 trains per hour on the "Illawarra Local" tracks on the Bankstown Line and the East Hills Line between Sydenham and the CBD, again reflecting these tracks' mixture of all-stops and limited-stops services.
- The constraining of the Airport Line's capacity to 12 trains per hour, so that the combination of the "Local", "Illawarra Local" and Airport Line services arriving at Central does not exceed 20 trains per hour for either direction of travel around the City Circle.

The patronage "system limits" presented in the far right column of *Table #3.1* are generally based an overall (not line by line) average load of 1,100 passengers per train. This represents an average increase of 10% in train loadings over the whole system, which should still allow about 70% of passengers to be seated during the peak hour on the most heavily used lines.

However, it is considered unlikely that the Eastern Suburbs Railway could carry the same train loads as the "Illawarra Main" tracks without a significant change in its catchment, such as an extension of this line, as originally planned, to the University of NSW. It has therefore been assumed that average train loads on the Eastern Suburbs Railway would remain as they are at present.

Similarly, although the termination of a substantial number of suburban trains in Sydney Terminal would definitely improve the passenger yield of the "Main" tracks from the west, it is likely that average "Main" track train loads to this relatively unattractive destination would be no greater than the current overall average for these tracks.

The "system limit" passenger flows presented in *Table #3.1* are consistent with those predicted under a "high growth" scenario in the 2001 "Christie Report", *Long-Term Strategic Plan for Rail, Greater Sydney Metropolitan Region*, without factoring in the North West or South West Rail Links. It should be noted, however, that the "high growth" scenario considered in that report assumed an average long-term patronage growth rate of 2% per annum, well below the average of 3% per annum experienced in the last few years and now forecast by the government, and broadly accepted by the Inquiry, as the likely average growth rate to be planned for over the 30 years from 2006 to 2036.

Future patronage growth

The forecast changes in total CityRail patronage, with at least a doubling of CityRail's patronage by 2036-2040, have already been summarised above.

It is immediately apparent, from a comparison of the 2007-2010 and "system limits" columns *Table #3.1,* that this scale of increase cannot possibly be accommodated on the existing CBD approaches/through-CBD rail systems, which would struggle to cater for even *half* this scale of increase.

If current growth rates are maintained, as assumed by the NSW government's forecasts and broadly accepted by the Inquiry, the current Sydney CBD rail system will reach its limits by around 2022, so significant capacity enhancement(s) will need to be in place by no later than 2022.

In developing capacity-enhancement responses to the overall patronage growth forecasts, the first questions to be asked—*before* delving into possible applications of different railway technologies and trains and/or options for additional or upgraded infrastructure—are:

- Where and when are the patronage changes likely to occur?
- More specifically, what are the expected patronage growth rates and patronage demands for different trip origins and destinations on different existing and new suburban lines? (This information will have a major role to play in determining both the priorities for capacity enhancements and the types of enhancements best provided.)
- What will drive these changes in the various lines' patronage demands, and what are the associated uncertainties?

Likely Residential Patronage Drivers

Sydney's current suburban rail system simply does not penetrate large and increasingly important portions of the Sydney region.

In particular, there are no rail lines to:

- The outer northwest (the Castle Hill/Windsor Road corridor in the Baulkham Hills local government area (LGA) and part of the Blacktown LGA)
- The outer southwest (parts of the Liverpool and Campbelltown LGSa and the Camden LGA)
- The inner northwest (the Victoria Road corridor in parts of the Leichhardt , Canada Bay and Ryde LGAs)
- The southeast (the Anzac Parade, Alison Road and Bunnerong Road corridors in part of the Waverley LGA and the Randwick and Botany Bay LGAs), or
- The northeast (the Military Road/Spit Road/Pittwater Road corridor and the Warringah Road corridor in the Mosman, Manly, Warringah and Pittwater LGAs and parts of the Willoughby and Ku-ring-gai LGAs).

Further, there are many areas flanked by rail lines but not served by them, such as the General Holmes Drive/The Grand Parade corridor and the Rocky Point Road/Taren Point Road corridor around the rim of Botany Bay.

Extensions of the railway network into unserved areas —and especially those forecast to undergo rapid and large-scale residential growth (see the government's forecasts summarised in section 3.2.3 of this report and in ***Figures #3.2 and #3.3*** on page 246)—should therefore provide a significant component of CityRail's patronage growth.

It may be seen from section 3.2.3 and *Figures #3.2 and #3.3* that the strongest population growth is expected in Sydney's North West and South West subregions, followed by the western corridor (the West Central and Inner West subregions), the northern corridor (including the Central Coast subregion) and the southern corridor (including the Illawarra region).

The Inquiry has therefore:

- Strongly recommended the early construction of the North West Rail Link, serving the North West subregion of Sydney, which is expected to account for 23% of Sydney's population growth to 2036 (*Table 3.2 and Figure #3.3*).

  The development of this railway through the spine of the North West Growth Centre should substantially increase this area's public transport modal split, which is currently the lowest in the Sydney region.

  The patronage generated by the North West Rail Link will feed patronage growth on the Epping-Chatswood link and North Shore line, and potentially also the Northern line (*Figure #3.1*).
- Endorsed and called for the acceleration of construction of the South West Rail Link, serving the South West subregion of Sydney, which is expected to account for 27% of Sydney's population growth to 2036 (*Table 3.2* and *Figure #3.3*).

  The patronage generated by the South West Rail Link will feed patronage growth both on the East Hills & Airport line and on the South line via Liverpool and Granville (*Figure #3.1*).

These two projects would still leave gaps in rail's coverage in the inner area along Victoria Road, the southeast and the northeast. These areas would be served only by buses (and in the first two cases, under the Inquiry's "European scenario" proposals, in the intermediate and longer term also by light rail).

Elsewhere, the other projected population growth patterns summarised in *Figures #3.2 and #3.3* should:

- Rejuvenate patronage on the Bankstown and Lidcombe-Cabramatta-Liverpool lines
- Significantly increase patronage on the Western line from Penrith/Emu Plains and Richmond and patronage from the Central Coast and
- Top up patronage from the Campbelltown/Macarthur area, patronage on the North Shore and Northern lines, reinforcing patronage on the Epping-Chatswood link, and patronage on the Illawarra line, and

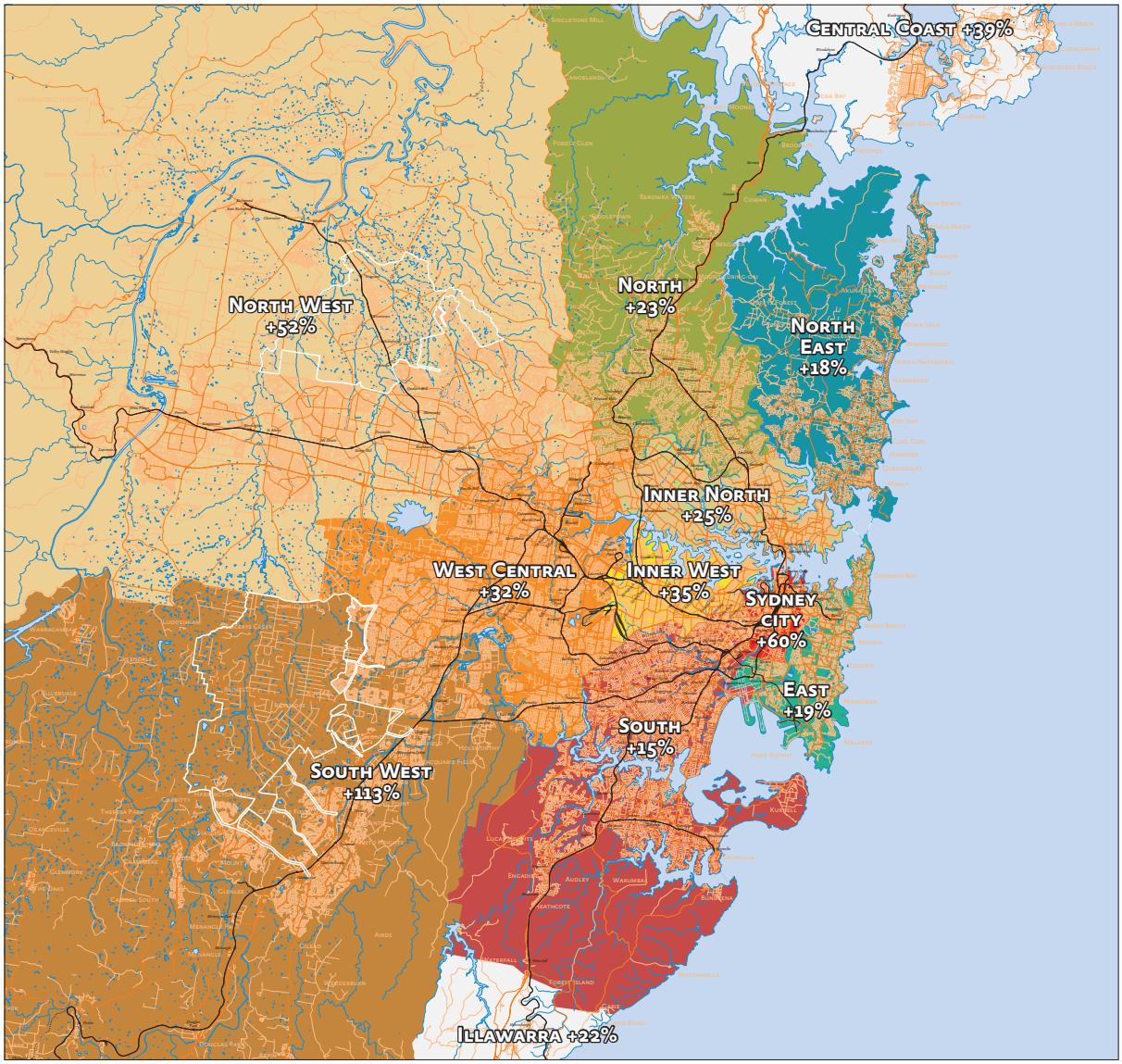


Figure #3.2. *The NSW Department of Planning's "subregions" within the Sydney Region, with the Illawarra Region to the south, showing the NSW government's latest forecasts of population growth rates in these subregions between 2006 and 2036.*

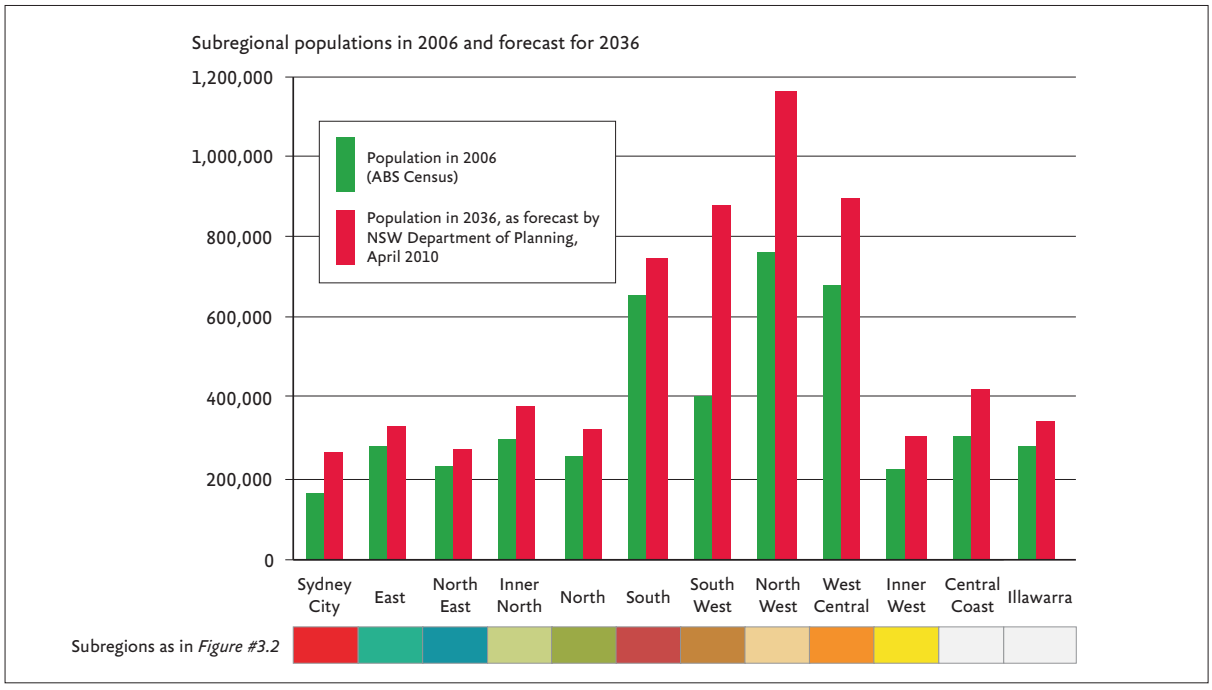


Figure #3.3. *The NSW Department of Planning's latest (2010) forecasts of population growth in different "subregions" of Sydney and in the Illawarra (Figure #3.2) between 2006 and 2036 (sources as described in Table 3.2 in this report).*

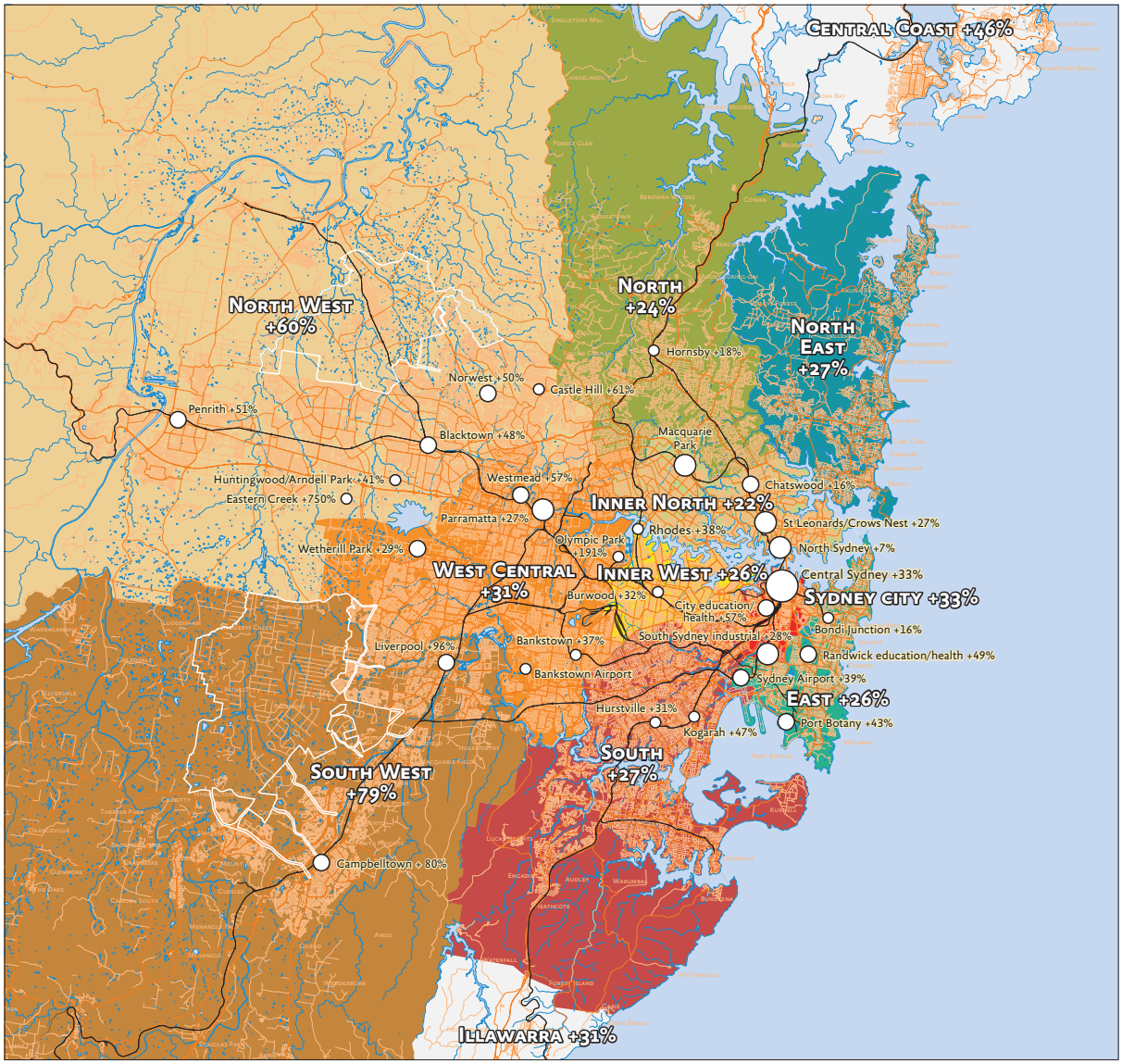


Figure #3.4. *"Subregions" and "centres" within the Sydney Region, with the Illawarra Region to the south, showing the NSW government's latest forecasts of employment growth rates in these subregions and in Sydney "centres" between 2006 and 2036.*

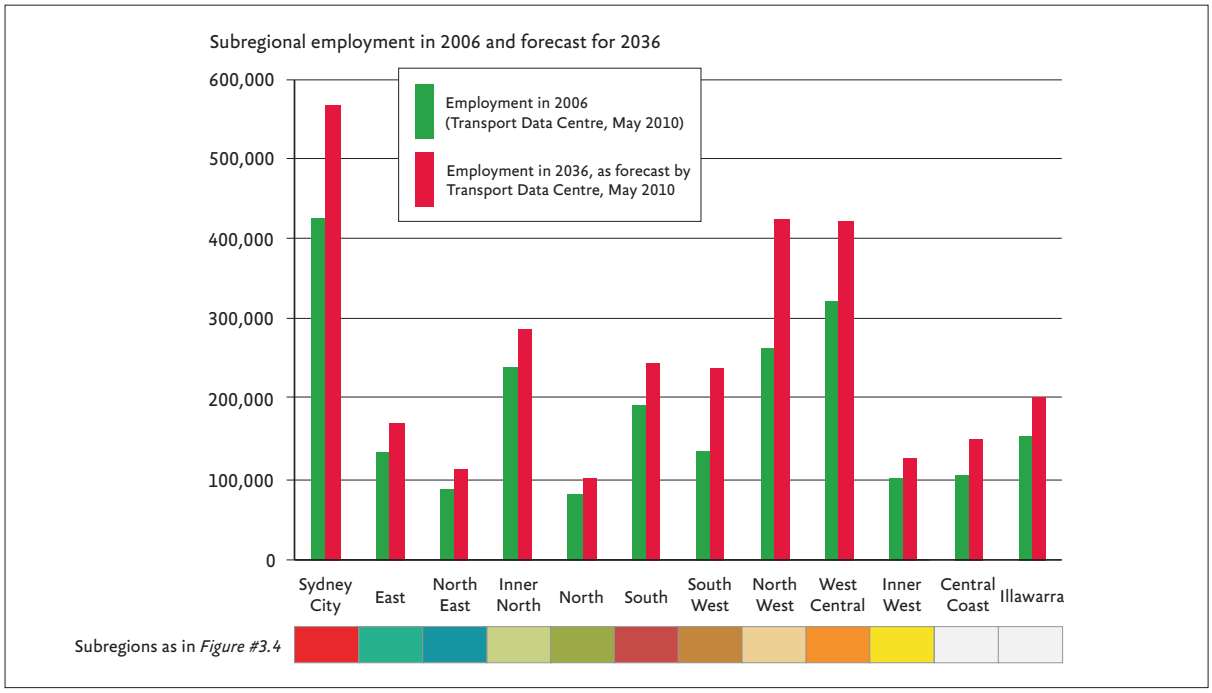


Figure #3.5. *The NSW government's latest (May 2010) forecasts of population growth in different "subregions" of Sydney and in the Illawarra (Figure #3.4) between 2006 and 2036 (sources: 2005 Metropolitan Strategy and Transport Data Centre website).*

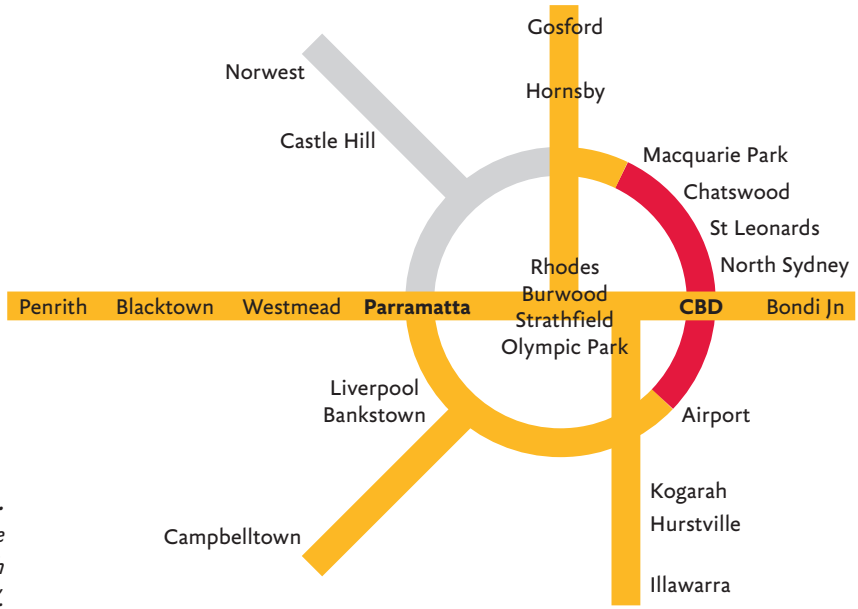


Figure #3.6.
The immediate "missing links" in the rail network's connections with Sydney's major "centres".

- Produce some growth in "counter peak" directional travel as a result of the forecast rapid population growth in the City of Sydney.

Likely Employment Patronage Drivers

The NSW government's latest (December 2009 and May 2010) forecasts of 2006–36 employment growth in Sydney's "centres" and "subregions" are summarised in section 3.2.8 of this report and in ***Figures #3.4 and #3.5*** on page 247.

Although the 2005 *Metropolitan Strategy's* targets for employment growth in Sydney's "centres" other than the CBD have been quietly relaxed in the latest forecasts, permitting a greater proportion of the city's employment growth to occur at dispersed locations which will be much more difficult to serve with attractive public transport, there is still forecast to be substantial growth in almost all of Sydney's "centres", many of which are on the existing rail network or the proposed North West Rail Link, and much higher employment growth than previously forecast is now predicted for the CBD itself. The centres forecast to experience significant growth, *albeit* generally less than previously forecast, include those in western, northwestern and southwestern Sydney and all the centres on the "global arc" from the Airport to Macquarie Park (section 3.2.8 and *Figure #3.4*).

At a broader "subregional" level, the greatest increases in employment and the fastest rates of employment growth are forecast to occur in the North West subregion (with 21% of the Sydney region's total forecast employment growth), the City of Sydney (18%), the South West (14%) and the West Central subregion (13%) (section 3.2.8 and *Figures #3.4 and #3.5*).

These patterns reinforce the importance of the North West and South West Rail Links and the provision of additional rail capacity into the CBD itself and around the global arc, along with the need to establish much better public transport links from rapidly growing residential areas to existing and new employment centres—including, in particular and in addition to higher capacity and more frequent links via the CBD, the need for a fast and frequent Liverpool–Parramatta–Macquarie Park rail link, as recommended by the Inquiry (***Figure #3.6***).

The latest *Metropolitan Transport Plan's* 'solutions' to an unacknowledged problem

The NSW Government's February 2010 *Metropolitan Transport Plan, Connecting the City of Cities* offers no analysis of Sydney's future public transport "tasks", beyond a bald assertion that average weekday CityRail patronage will increase by 135% by 2036 and the announcement of a "target" of increasing public transport's share of all journeys to work in "metropolitan" Sydney from 22% in 2006 to 28% by 2016. Nor does it present any analysis of the abilities of Sydney's rail systems to handle any future task.

However, as already indicated on page 204, the *Metropolitan Transport Plan*:

- Re-announces the construction of the South West Rail Link "by 2016" and a start to the construction of the previously "indefinitely deferred" North West Rail Link in 2017, with no indicated completion date other than a reference to a patronage estimate for this link in 2024.

  Both of these projects will inject more CBD-bound trains into the CityRail network.

- Re-announces the upgrading of the line between Chatswood and St Leonards from two to four tracks, again by an unspecified date.

  This project is described in the *Metropolitan Transport Plan* as "allowing a seamless connection" [of the North West Rail Link] into the existing rail network" —which it will actually already have joined at or near Epping. In practice, as discussed below, it appears to be intended to allow Central Coast trains from Wyong and/or North West Rail Link trains from Rouse Hill to be terminated and turned back at St Leonards,

there being insufficient capacity on the lower North Shore Line for them to continue on to the CBD and insufficient room at Chatswood to turn back more than a few trains at that location.

- Announces "Western Express" CityRail services, using a new $4.53 billion stub underground railway, called the "City Relief Line", along the western fringe of the CBD, from Eveleigh to Wynyard.

  This project, which the government claims will "ultimately" deliver the equivalent of 5½ extra eight-car double deck trains from Parramatta in the peak hour, is described and discussed more fully on pages 205-207 of this report. The discussion of it below is therefore confined to whether it will provide real additional capacity for the CityRail system.

Impacts of South West Rail Link trains in combination with growth on associated lines

It is assumed here, consistently with CityRail's previously announced intentions, that trains and patronage from the South West Rail Link will travel to the CBD:

- On the East Hills Line, via Sydenham or the Airport Link, approaching the CBD on the inbound "Illawarra Local" track or the inbound Airport Line track, *and*
- On the South Line, via Liverpool and Granville, approaching the CBD on the inbound "Local" track from the west (*Figure #3.1*).

Assuming there are no changes to the CityRail network other than those announced in the *Metropolitan Transport Plan*, these trains will, at a minimum, consume all the remaining capacity of the City Circle.

A proportion of their passengers will want to travel to north of the Harbour, and will therefore have to transfer, at Central or Town Hall, onto northbound North Shore Line services, whose average peak hour loads are already predicted to have grown by around 10%.

In addition, there will be increasing numbers of transfers to these northbound services:

- At both Central and Town Hall by passengers from Illawarra Line trains approaching the CBD on the inbound "Illawarra Main" track (patronage on these services is expected to increased by around 35% by 2036), and
- At Town Hall by passengers from inbound Eastern Suburbs Railway trains, whose patronage is assumed to grow by around 24%.

A rapid increase in the numbers of transferring passengers at CityRail's CBD stations has been a major contributor to the worsening of congestion experienced at these stations in recent years, and is now a significant constraint on the overall patronage capacities of CityRail's lines (see *Though Provoker #4* and *Appendix 3*).

The further increases in CBD station exits and transfers described above are therefore likely to produce some very poor station congestion and management outcomes at Central, Town Hall and Wynyard, *even before* the effects of the proposed "City Relief Line" are taken into account.

Impacts of North West Rail Link trains in combination with growth on associated lines

Again consistently with CityRail's previously announced intentions, it is assumed that North West Rail Link trains heading towards the CBD will be funnelled down the Epping-Chatswood Rail Link to Chatswood (there is little spare capacity between Strathfield and the CBD for these trains to travel via Strathfield, and the originally proposed concept of a connection with the Main North Line at Cheltenham was abandoned several years ago).

While some of these passengers would exit at the stations from Epping to Chatswood, the publicly released patronage studies for the North West Rail Link suggest a substantial portion will be heading to North Sydney and the Sydney CBD, and other passengers will be joining these trains on the way.

There is, however, insufficient capacity on the existing North Shore Line south of Chatswood for the North West Rail Link trains simply to be added to the existing North Shore Line trains from Berowra via Gordon, Northern Line trains from Hornsby via Epping and Central Coast trains from Wyong.

The government's December 2009 *Transport Blueprint* responded to this problem by adopting a changed rail operating pattern under which all Gosford and Wyong trains would terminate at Chatswood (see pages 205-207). The February 2010 *Metropolitan Transport Plan* offers no express guidance on this matter, but as already indicated its re-announcement of the previously abandoned quadruplication of the North Shore Line from Chatswood to St Leonards strongly suggests it is now intended that Central Coast and/or North West Rail Link services will be terminated and turned back at St Leonards, where there are already two spare surface platforms. Indeed, in the absence of a continuation of the two extra tracks south to the CBD via a new second Harbour rail crossing, there can be no other rationale for the Chatswood-St Leonards quadruplication project.

The termination of some or all Central Coast and/or North West Rail Link services at Chatswood and/or St Leonards appears to be based on two dubious assumptions: (a) that Central Coast patronage demand will not significantly increase, even though the population of the Central Coast is forecast to increase by 39% by 2036, and (b) space for the displaced passengers will be able to be found on other trains through Chatswood/St Leonards, even though the number of North Shore services will not be able to be increased to match even the forecast demand growth on the North Shore corridor alone, so the trains will have little if any spare capacity for transferees off the terminating services. (Claims that spare capacity will be created because most passengers will exit before they reach North Sydney are spurious, because in practice there is a continuous turnover of North Shore Line passengers between Roseville and North Sydney, maintaining train loads at relatively constant levels.)

The termination of Central Coast and/or North West Rail Link services at Chatswood and/or St Leonards, well short of North Sydney and the CBD, will render the terminating services unattractive to many passengers, who will either return to their cars or return to using other CityRail services that approach the CBD from the west (Western Line services, including Richmond line services, and intercity services via Strathfield).

This in turn will fundamentally undermine one of the main potential benefits and objectives of the North West Rail Link/ Epping–Chatswood rail link combination, the diversion of a significant proportion of northwestern and Central Coast patronage growth off the already congested western CBD approach tracks, thereby freeing up these tracks to handle growth from the west and southwest.

The myth of 'improved capacity' from the stub 'City Relief Line' from Eveleigh to Wynyard

In essence, the newly proposed stub "City Relief Line" will provide a new underground stub line route to a new underground terminus, further north in the CBD at Wynyard, to replace an existing surface stub line route to an existing surface terminus at Sydney Terminal station (the "country" platforms at Central).

This $4.53 billion project may permit some minor travel time savings if interchange times are ignored (see pages 205–207), *albeit* at great expense, and depending on the design and operation of the new underground terminal station platforms and tracks at Wynyard it *might* also slightly increase the capacity of the stub line itself. (No information about this Wynyard terminus has been released, but there is only limited room for this underground terminus so the Inquiry has assumed its capacity will at best be that of a two-track terminus like Bondi Junction (i.e. 20 trains per hour, assuming 20 trains per hour could in fact be fed into and out of it).)

However,

- The "City Relief Line" project will not inherently increase the train capacities of any of the CityRail tracks approaching the CBD (as discussed on pages 205 to 207, under the *Metropolitan Train Plan's* concepts, without a second Harbour crossing this can occur only with *other* additional, large-scale, very disruptive, very expensive and as-yet-unannounced infrastructure works), and
- At best the project can only very marginally increase the capacity of the three two-way lines that run *through* the CBD—all of which will continue to serve parts of Sydney forecast to undergo much faster population growth than the areas served by the new stub line—because:
  - Although the new stub line will draw some of the forecast growth in passenger numbers away from already congested Central and Town Hall platforms, it will still leave these platforms at least as busy as they currently are, and almost certainly considerably busier, so significant reductions in trains' "dwell times" at these stations are unlikely (see *Thought Provoker #4* and *Appendix 3*), and
  - The operation of the new stub line for "Western Express" services will dramatically worsen congestion at Wynyard and thus tend to reduce capacity on the North Shore Line, because the large numbers of passengers on these trains wishing to continue north across the Harbour to the North Sydney–St Leonards–Chatswood–Macquarie Park "global arc" employment areas will now need to change trains at this station. (These interchanges are not required at present, because all Western Line services currently continue on to the North Shore and *vice versa*.)

So where are we now?

To summarise the discussion so far,

- There are forecast to be massive increases in CityRail patronage demand over the next 25–30 years.
- The current and "post-*Clearways*" CityRail systems will be quite unable to provide the capacity required to accommodate this growth, and would barely be able to cope with half of the forecast growth.
- The critical capacity constraints are and will be on the eight CityRail tracks approaching the CBD and the four lines within the CBD itself (i.e. the three twin-track lines through the CBD and the single stub terminus line at the southern end of the CBD.
- The capacity of several of the eight CBD approach tracks is fundamentally constrained by the fact that they feed into fewer tracks within the CBD.

  These capacity-constrained approach tracks include those serving Sydney's southwest, whose population is expected to more than double, to some 875,000 residents, by 2036, and the new South West Rail Link will feed a greater proportion of this increased population towards the CBD.
- In addition, even if there were extra tracks within the CBD the patronage and train capacity limits on critical sections of the CBD approaches would still be simply too low to cope with forecast increases in patronage demand.

  In particular,
  - If the government persists with its quiet abandonment of the long-promised "Sydenham six tracks" *Clearways* project to add extra tracks between Wolli Creek Junction/ Sydenham and Erskineville, there will be inadequate capacity on the "Illawarra Local" and "Illawarra Main" approach tracks to cater, even in combination with the Airport Line, with the forecast growth in patronage demand from Sydney's southwest and south and the Illawarra, and
  - There will also be very large increases in CityRail patronage demand from the northwest, via the re-announced North West Rail Link, and the Central Coast, but if the government persists with its current plans not to increase patronage capacity south of St Leonards and across the Harbour

many of these additional trains will be forced to terminate at Chatswood/St Leonards, dumping their passengers to join other already crowded trains.

- An effective solution to the CityRail network's capacity problems on the approaches to the CBD and within the CBD will therefore need to tackle *all* of these aspects, both on the approaches and within the CBD.
- The proposed "City Relief Line" stub railway fails to do this. It cannot more than marginally improve some aspects of the network's capacity problems, and will actively worsen others.

Developing real options for increasing rail system capacity to meet the forecast growth in rail patronage demands

(a) Increasing peak hour train loads

Average CityRail trip lengths have been increasing over time. 20 years ago the average was about 15 kilometres, but by 2007 CityRail was estimating an average of 19.8 kilometres.

There are also significant variations in the trip lengths of different passengers. The averages are taken across a wide range of journey types and itineraries.

Sydney's average rail trip length of around 20 kilometres is about five times the average trip length experienced on European metros and 2½ times the averages on the London Underground and the Washington Metro.

It is similar to the average for BART in San Francisco but less than that experienced on the Long Island Rail Road (LIRR) operating out of Manhattan and Brooklyn. These two commuter railways aspire to seat all their passengers in public transport markets which primarily compete with private vehicular travel.

Sydney's suburban rail passengers also expect to be seated, especially for trips lasting more than 20 minutes. (Indeed, the NSW government used to set this as a standard for CityRail services, before quietly dropping this requirement.)

However, like Sydney's road network, Sydney's rail system cannot be expected to run free of congestion during peak hours. In the case of the rail system it is realistic to expect shorter distance travellers—those travelling less than 20 minutes—to stand if necessary during peak periods.

Sydney's suburban trains have therefore been designed to accommodate significant numbers of standing passengers. Generally, CityRail's existing double deck suburban train fleet has the capacity to accommodate roughly as many standing passengers (at four persons per square metre) as sitting passengers.

In practice, however, the loading of trains is almost never uniform over their lengths or over the duration of peak periods. At present, about 75–80% of passengers on peak hour CityRail trains (other than those on the Eastern Suburbs Railway) are seated and 20–25% are standing on the approaches to the Sydney CBD.

There is some spare practical capacity to accommodate more standing passengers (for example, so only 65–70% of passengers are seated), but at these levels some peak hour trains will be approaching their aptly named "crush capacity".

Running trains at their crush capacity should generally be avoided, as their station "dwell times" blow out because of the difficulty of passenger movements within the trains, and longer dwell times tend to *reduce* train frequencies and thus reduce overall patronage capacity (see *Thought Provoker #4* and *Appendix 3*).

In short, there is some potential for peak period trains to be further loaded up in order to increase Sydney CBD approach passenger flows, but this must not be at the expense of terminally congesting key CBD stations where there are major boarding as well as alighting passenger movements.

(b) 'Sweating the assets' and operational reliability

The principal problem with commuter peak travel is not simply that it is significantly heavier than out-of-peak travel but that it takes place over short periods, cumulatively amounting to probably no more than 20% of the working week.

This means that in order to maximise efficiency and value for money the necessary infrastructure and rolling stock have to be pushed as far as possible towards their limits during peak periods.

More specifically, train frequencies have to be pushed towards their practical operating limits before additional track should be added to the network.

However, "sweating the assets" in this way should not come at the expense of reliable operations. Otherwise, unreliability will rob the system of passenger and train throughput.

Accordingly, if we want to push Sydney's CBD approach railways and cross-CBD railways to their limits we also need to keep operations as simple and conflict-free as possible. There should be simple connections between the Sydney CBD's approach railways and the lines through the CBD, and as far as possible each should match the other's train capacity.

This is difficult in the case of the City Circle, because at least two of the lines feeding into the City Circle cannot be run up to their maximum potential train flows because they run capacity-sapping mixtures of all-stops and limited-stops train services.

Fortunately, Dr Bradfield left us with the legacy of the grade-separated "flying junctions" on the Redfern side of Central station. Used properly, these "flying junctions" can merge and separate approaching and departing train flows heading to or from the City Circle.

(c) Resignalling and a switch back from double deck to single deck trains

The NSW government's December 2009 *Transport Blueprint* and various public transport industry and commuter lobbyists have suggested the answer to such dilemmas is the replacement of double deck suburban trains with single deck trains—which they often (and often incorrectly) describe as "metros" or "metro style trains"—coupled with changes to signalling and train control systems.

The theory is that because single deck trains can have more doors they will have shorter station "dwell times" and the new signalling and train control systems will cater for more closely spaced and more frequent train services. The proponents have suggested, usually simply by asserting "overseas experience", that as many as 30 or even 40 single-deck trains per track per hour would be possible in Sydney.

The argument is superficially attractive, but fails to take full and proper account of the multiplicity of relevant factors listed in *Thought Provoker #2* and described in more detail in *Appendix 3*.

There are many issues involved, including the comfort of passenger services competing with the private car, but only the strictly capacity-related issues are discussed in this *Thought Provoker #3*.

All things being equal, running thirty 600-seat single deck suburban passenger trains per hour would offer the same seating capacity as twenty 900-seat double deck suburban passenger trains per hour, and possibly greater standing capacity, if offered with comparable levels of sustainability and reliability.

But all things are not equal.

A train flow of 30 trains per hour would eliminates 60 seconds out of every 80-second station dwell time available at 20 trains per hour. So instead of there being 1,600 seconds available for stops at each CBD station during the peak hour there would only be 600 seconds. (A full discussion of the time components of "headways" between trains can be found in *Appendix 3*, and more particularly in its *Figure 3* and the associated discussion.)

It gets worse. Of this total station stop time, ten seconds would be lost at every stop for door opening and closing and circuit proving. So a single-deck train flow of 30 trains per hour would have only 300 seconds per hour per station for passengers to alight and board, whereas a double deck train flow of 20 trains per hour has 1,400 seconds. The only way to compensate for this would be to quadruple the number of doors along the full length of each single deck train (i.e. have eight double doors per side per carriage, rather than two). But then these single deck trains would have no seats...

If substantial portions of the railways approaching the Sydney CBD were resignalled, headway reductions amounting to 30 seconds per train could be effected.

Of course, the benefits of any such resignalling would flow equally to single and double deck trains.

A single deck train flow of 30 trains per hour could then have a nett 1,200 seconds available for alighting and boarding at every station, whereas a double deck train flow of 24 trains per hour could have a nett 1,680 seconds available. The single deck trains would then only need three doorways per side per carriage, compared with the double deck trains' two doorways per side per carriage. However the double deck train flow would actually be carrying, and have turned over at the stations, 20% more passengers...

In another argument, it has sometimes been asserted that single deck trains would be more energy-efficient than double deck trains. Intrinsically, double deck trains weigh less per seated passenger than single deck trains, especially if they have to meet the same crashworthiness standards. On the other hand, a double deck train will be heavier than a single deck train of a similar length, so the single deck train will draw less energy in operation. However, if energy consumption is normalised to the number of passengers being carried, there appears to be essentially no difference between the energy consumption per passenger kilometre over a range of different duty cycles.

In summary, then, wholesale or large-scale conversion of CityRail's double deck suburban passenger train fleet to a single deck fleet would offer no real solution to the Sydney CBD rail systems' capacity problems.

It would, however, create immense logistical problems, by requiring up to a 50% increase in the length of train stabling sidings and up to 50% more train crew—and all for no gain in patronage capacity if the current levels and quality of passenger accommodation were maintained.

(d) Maximising the capacity relief provided by a new cross-CBD line and providing the capacity needed between Wolli Creek Junction and the CBD

Any new line into and through the CBD can only be effective if it creates a nett increase in the CBD rail systems' line capacity.

This means it must connect to at least one approach line which is unable to run to its practical capacity because of capacity constraints within the CBD (or, equivalently, it must take over the role(s) of an existing line within the CBD which could then itself be connected to the constrained approach line).

The most likely candidate for this approach line is the Airport Line, currently used by East Hills Line services.

The "Illawarra Local" tracks , currently used for both East Hills Line and Bankstown Line services, could also be a candidate if the "Sydenham six tracks" *Clearways* track amplification project, described below, were implemented. (As already indicated, the NSW government has quietly omitted this project from the promised series of *Clearways* projects, without announcement or explanation.)

Both of these candidate approach lines will be increasingly important in the future, because they provide linkages to and from the South West Growth Centre.

If there were no change to the current configuration of tracks along the Illawarra corridor between Sydenham and Erskineville,

- The inbound "Illawarra Main" track (used by Illawarra Line and south Coast Line services) would continue to have a somewhat "flaky" capacity of 20 trains per hour, four of which could be directed into Sydney Terminal via the Illawarra Dives under Illawarra Junction
- The inbound "Illawarra Local" track would continue to be restricted to 16 trains per hour, because of its mixture of all-stops and limited-stops Bankstown and East Hills Line services, and
- Since the Airport Line's trains merge with the "Local" and "Illawarra Local" tracks' flows at Central, a nett flow of 8 trains per hour could be directed to the new cross-CBD line.

However, if the currently abandoned "Sydenham six tracks" Illawarra sextuplication *Clearways* project were resurrected, the two extra tracks between Sydenham and Erskineville would permit:

- An additional 12 City Circle suburban trains per hour between Sydenham and Redfern
- An additional four interurban trains per hour to run between Wolli Creek Junction and the Illawarra Dive (which connects with the "Main" tracks from the west and thence Sydney Terminal) via the "Illawarra Local", freeing up rail access from the South Coast
- The "Illawarra Main" tracks to run at their full potential of 20 suburban trains per hour between Wolli Creek Junction and Bondi Junction, allowing the Illawarra Line to serve its expected residential growth

and *either*

- The Airport Line to run up to 20 trains per hour, if these trains were directed to the new cross-CBD line, *or*
- The "Illawarra Local" tracks to run up to 16 East Hills Line suburban trains per hour, with these trains directed to the new cross-CBD line (as shown in *Figure 3.39*).

(e) Providing the capacity needed between St Leonards and the CBD for North West Rail Link and Central Coast services

For the reasons already discussed (on pages 245 to 249) it will be essential to increase the patronage capacity of the CityRail network's approaches to the CBD from the north, between the Chatswood junction of the Epping–Chatswood Rail Link and North Shore Line and the CBD.

Quadruplication of this approach from Chatswood to St Leonards has already been announced in the *Metropolitan Transport Plan*, albeit for the quite different purposes of terminating trains at St Leonards, so what is required now is an additional pair of tracks from the southward extension of the Epping–Chatswood tracks at St Leonards to the new cross-CBD line within the CBD, including a new second Harbour crossing.

Putting it all together: the new cross-CBD and cross-Harbour rail link

A new would provide a joint resolution of the twin challenges of:

- Maximising the capacity of a new cross-CBD line, and
- Handling the forecast massive growth in patronage demand from Sydney's southwest (in combination with growth from the south and the Illawarra), Sydney's northwest and the Central Coast (in combination with growth from the north and inner north) and west (through the diversion of some of its patronage growth onto the North West Rail Link, thereby freeing up space for patronage growth from the west).

Because it would be double-ended—in other words, a through line, unaffected by any intermediate terminus—and would effectively increase the number of inbound approach tracks from eight to ten (including the extra Sydenham–Erskineville track) and the number of twin-track lines through the CBD itself from three to four (not counting the Sydney Terminal stub line), the new cross-CBD, cross-Harbour rail link would **boost the capacity of CityRail lines within the CBD by up to 40 double deck trains per hour, or almost 30%**, as shown in ***Table #3.2*** on page 254).

This would **take the total patronage capacity of the Sydney CBD rail system to almost double the number of peak hour passengers currently entering the Sydney CBD rail system, without *necessitating* a change in the type of rolling stock or a very expensive upgrading of the signalling and train control system** (which could provide a *further* boost later, by which time the technologies and systems involved should be *proven* and standardised).

In addition to its inherent patronage capacity benefits, the new cross-CBD, cross-Harbour line would **significantly improve arrangements for passengers transferring between different CityRail services, thereby alleviating one of the most important causes of congestion within CityRail's CBD stations.**

It may be seen from *Table #3.2* that while ever there is only one line across the Harbour the only transfer-free cross-Harbour passenger movements will be those between the North Shore Line and the "Suburban" tracks to and from the west.

However, with both the North Shore Line and the new cross-CBD, cross-Harbour line crossing the Harbour,

- Passenger movements could be divided between both lines
- More passengers would have direct access across the Harbour
- More transfers could take place at stations other than Town Hall, the most critically congested station in the CityRail network, and

TABLE #3.2. ESTIMATED MORNING PEAK HOUR SYSTEM LIMITS IN 2010 AND IF THERE WERE A NEW CROSS-CBD, CROSS-HARBOUR RAIL LINK.

Track approaching the CBD	Track through the CBD	Estimated current morning peak hour system limits		Estimated future morning peak hour system limits	
		Trains	Passengers	Trains	Passengers
"Illawarra Main" from Sydenham	Eastern Suburbs Railway to Bondi	20	24,000	20	24,000
Eastern Suburbs Railway from Bondi	Eastern Suburbs Railway to Central	20	11,000	20	11,000
"Local" from west	City Circle "Outer" (clockwise)	12	15,000	12	15,000
"Illawarra Local" from Sydenham	City Circle (both directions)	16	20,000	16	20,000
New extra track from Sydenham	City Circle (both directions)	-		12	15,000
Airport Line	City Circle "Inner" (anti- clockwise)	12	15,000	Diverted onto new cross-CBD, cross-Harbour line	
"Suburban" from west	North Shore northbound	20	26,000	20	26,000
North Shore	North Shore southbound	20	24,000	20	24,000
Airport Line	Northbound track on new cross-CBD, cross-Harbour line	-		20	24,000
New cross-Harbour line from Chatswood/St Leonards	Southbound track on new cross-CBD, cross-Harbour line			20	24,000
"Main" from west	Terminating at Sydney Terminal (Central)	20	19,000	20	19,000
Total		**140**	**154,000**	**180**	**198,000**

Note: As in *Table #3.1*, these "system limit" estimates are based, conventionally, on 20 trains per hour and 1,100 passengers per train, but have been varied across the services using the individual approach tracks according to existing peak loadings and the prospects for future patronage.

- More specifically, the new line would:
  - Offer transfer-free access across Sydney Harbour for East Hills, Campbelltown, South West Rail Link and Airport passengers who currently have to transfer at Central, Town Hall or Wynyard
  - If it passed through Central via the existing but disused Platforms 26 and 27, as recommended by the Inquiry, offer easy, rapid and "compact" transfers for "Illawarra Main" passengers (from the Illawarra and South Coast Lines) wishing to cross Sydney Harbour, via direct vertical connections from Platforms 24 and 25 (the existing underground Eastern Suburbs Railway platforms)
  - Free the North Shore Line to much more effectively handle transfers at Central by passengers whose trains terminate at Sydney Terminal and transfers at Town Hall by passengers from Eastern Suburbs trains
  - Enhance Wynyard's ability to handle the growth in passenger demand that will be generated by the Barangaroo development, and
  - Provide direct, transfer-free access around the "global arc", between the North West Rail Link, the Epping-Chatswood rail link (including Macquarie Park), the lower North Shore, the CBD, the Green Square redevelopment, Sydney Airport and any future major commercial developments attracted to Mascot.

The specific route that the new cross-CBD, cross-Harbour line would take through the Sydney CBD and the means by which it crossed Sydney Harbour still have to be resolved.

It is vital, however, for any new cross-CBD line and any new cross-Harbour line to be physically connected, and the routes *must* be protected from development until the line has been constructed.

In addition, irrespective of the route adopted, the new line should offer at least the equivalent of stations at Central, Town Hall and Wynyard for the passengers using it, providing its passengers with CBD access opportunities similar to those currently afforded to North Shore and Western Line passengers. An extra station might also be feasible under some route options.

The investigations into route options should also seek to preserve and interact efficiently with route and station options for future separate "metro" lines through the CBD, and investigate the feasibility of running ten-car trains on the new cross-CBD, cross-Harbour CityRail line, as was originally planned by the government when it first announced it would construct a second Harbour crossing, in conjunction with the North West and South West Rail Links, in 2005.

A W Wardrop, May 2010

Thought provoker #4

Well worth investigating:

A fresh concept for a new CBD and cross-Harbour rail link

Cost has always been one of the major barriers to building a new "suburban" (CityRail) rail link under the CBD and across the harbour.

As discussed in section 3.5 of this *Final Report*, this new link is essential if the CityRail network *as a whole* is to be able to increase the capacity and frequency of its services *throughout* the metropolitan area, as almost all of these services, even in outer areas, are increasingly throttled by congestion in inner areas and within the CBD.

In 2005 the NSW government announced it would go ahead with this link, despite its cost, using one of two route options identified in a series of engineering and operational studies, the first under the central spine of the CBD (the "Pitt Street option") and the other under Kent and Sussex Streets on the western flank of the CBD.

Both of these route options would have necessitated new railway tunnels under the harbour, a very expensive proposition.

The NSW government subsequently added another impediment, by announcing that its proposed alignment for a "CBD Metro" between Rozelle and Central station would take over the preferred "Pitt Street" route reserved and protected for the proposed heavy rail link—which it "indefinitely deferred".

This decision left the community with only three choices if the CityRail network were not to be left to wither on the vine, assuming for the moment that the necessary money *could* be found:

- A change in the "CBD Metro" alignment (or the scrapping of this metro, as subsequently announced by the government in February 2010)
- A new heavy rail link along the much less preferable western CBD alignment, perhaps for many years with no harbour crossing and thus only a new stub line from Central to Wynyard, sometimes referred to as the "CBD relief line" (as subsequently announced by the government in February 2010), or
- Finding a new route down the central spine of the CBD, avoiding the land grab executed by the CBD Metro.

One of the submissions to the Inquiry, by Australian Infrastructure Solutions Pty Limited, focussed on the last of these approaches. It proposed a new route concept which, if it proves viable, could simultaneously overcome both the cost and "metro route" barriers to a much higher capacity CityRail network—and also provide a direct Airport Line to North Shore rail link and better interchange connections and greater congestion relief at Town Hall station than would have been possible under the government's original two options.

The concept explored in this submission is broadly summarised in the maps and diagrams on the next few pages, which are presented with Australian Infrastructure Solutions' permission. It would involve:

- A new central route through the CBD, at a depth sufficient to avoid building basements and obstacles such the "CBD Metro" and the Cross City Tunnel, linked to the existing rail network south of Central station. Preferably this link would be with the Airport Line, so trains could travel directly from the airport to the lower North Shore, Macquarie Park and beyond, but alternatively the new line could connect with the Illawarra or Western line.

The disused Platform 27 at Central station

- Stops at the existing disused platforms 26 and 27 at Central station, a new station under Castlereagh Street, a new station under the Pitt Street mall (preferably with direct connections to other new platforms at this location on the Eastern Suburbs Railway) and new platforms under the existing City Circle platforms at Wynyard station or possibly further to the west and nearer to Barangaroo, under Kent Street.
- A harbour crossing using a new lower railway-only deck on the Harbour Bridge, constructed almost entirely within the existing structural supports under the existing road and rail deck, thereby all but eliminating the new deck's visual impacts and impacts on the movements of large ships.
- A new direct and fast underground route from the Harbour Bridge to St Leonards via North Sydney and Crows Nest, broadly equivalent to the line previously proposed by the government for this area, after which the new line would utilise the quadruplication of the existing line from St Leonards to Chatswood announced by the government in February 2010.

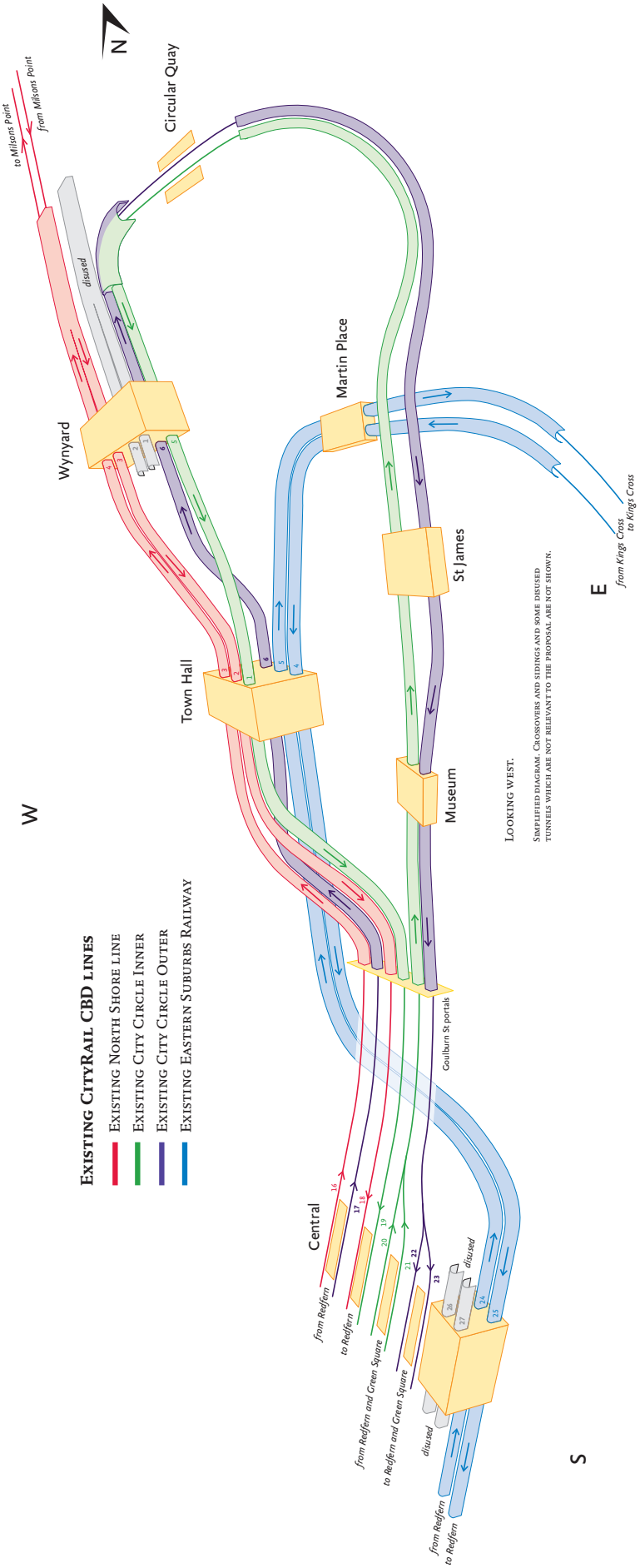
In the longer term the new link could also be connected at its southern end, via a grade-separated underground junction just south of Central, to a new line to the south east, serving the Moore Park facilities, the University of NSW, Kingsford and Maroubra Junction. A new north east connection, from the lower North Shore to Dee Why, might also be feasible.

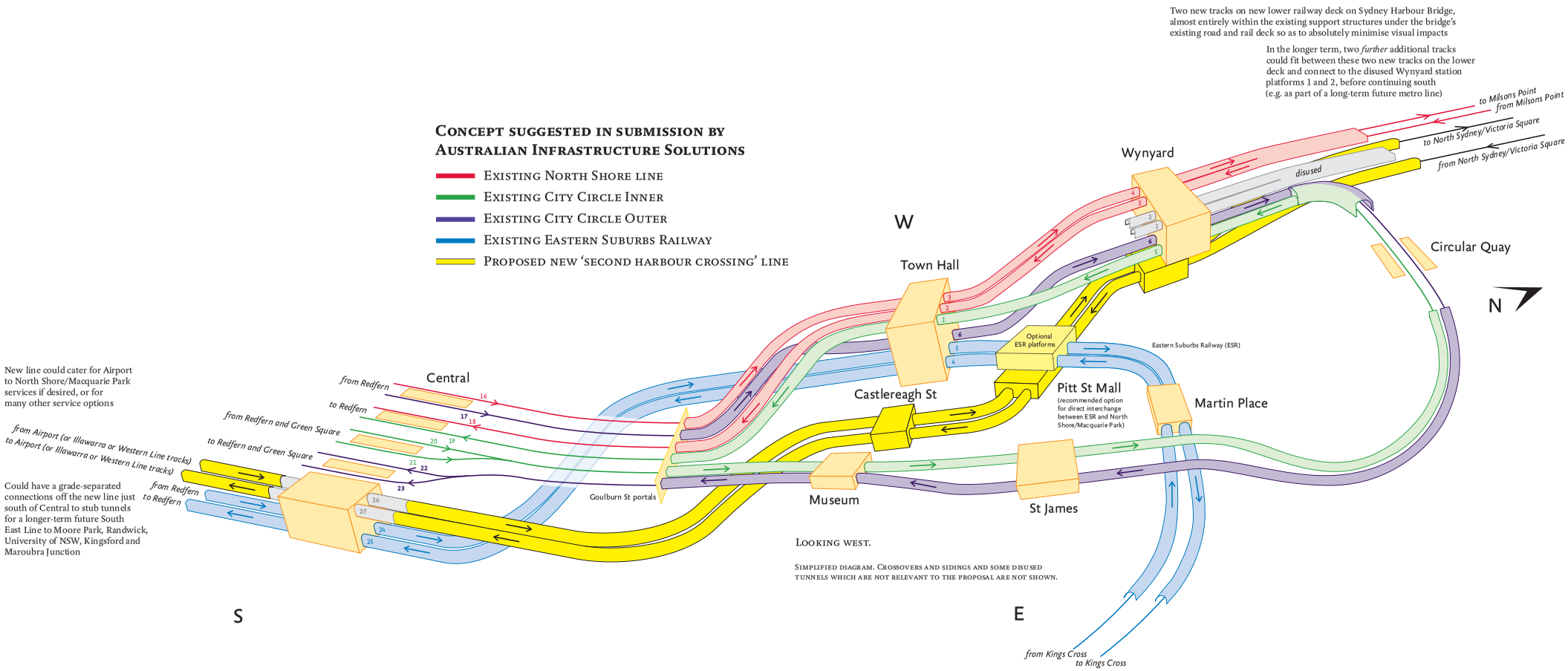
If it proves to be viable to use the Harbour Bridge for the new link, rather than constructing long rail tunnels under some of the deepest parts of the harbour, the cost of the project should be significantly lower than under the government's earlier schemes.

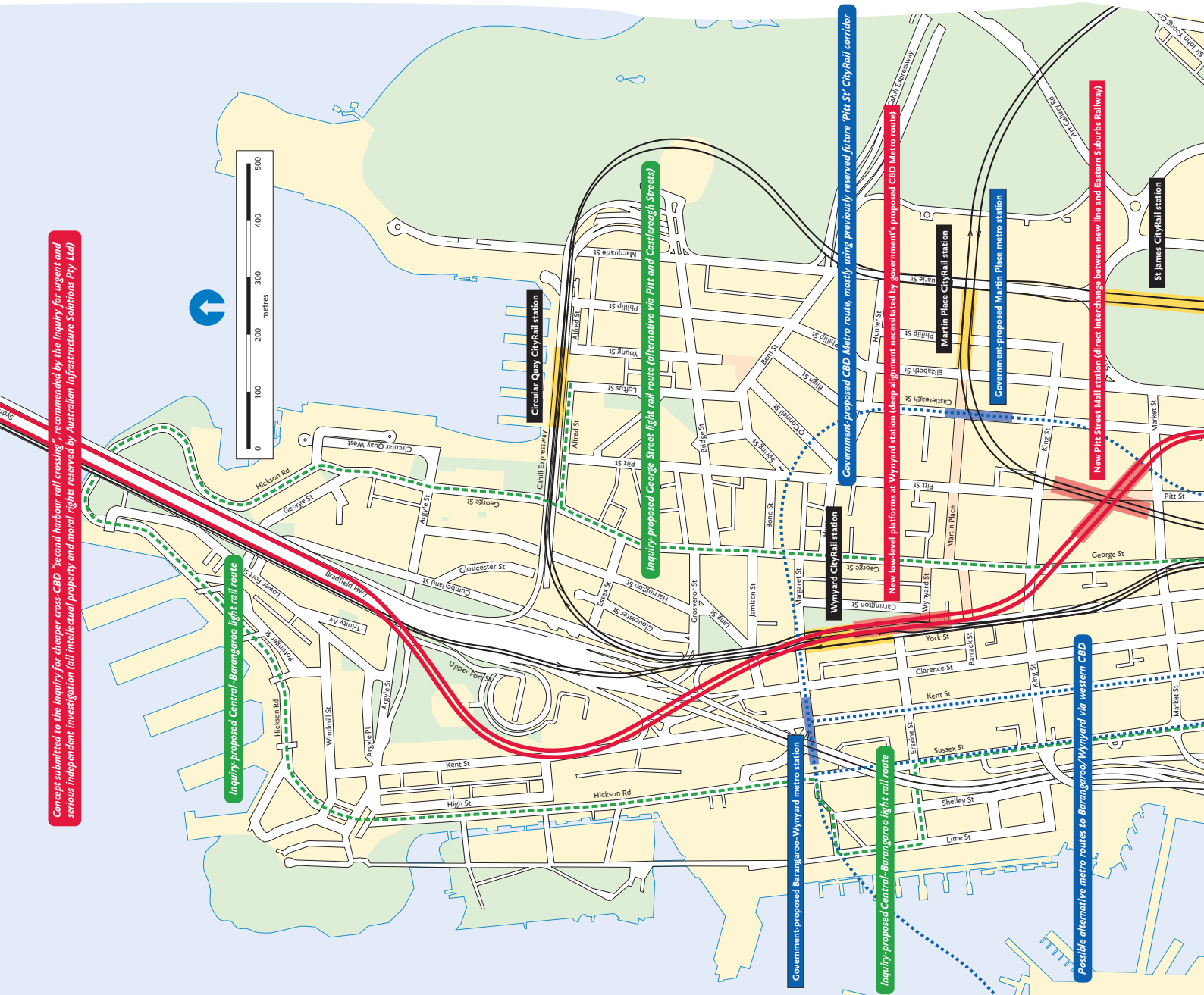
The structural ability of the bridge to handle the proposed extra deck has already been demonstrated in independent expert studies several years ago—which incidentally led to the RTA's current strengthening of the vertical "hangers" attaching the existing deck to the arch.

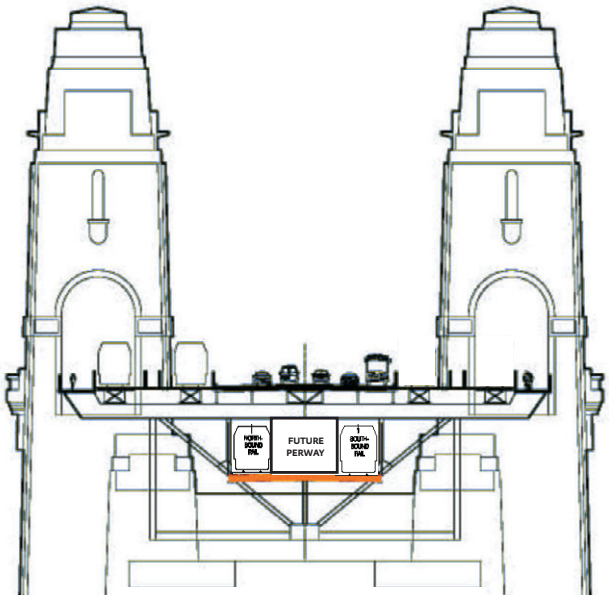
Initial investigations suggest it should be feasible for this new bridge deck ultimately to carry four train tracks, with the two longer-term central tracks entering the existing disused platforms 1 and 2 at Wynyard station before proceeding south of Wynyard, perhaps as part of a new north-south "metro" route.

The Inquiry recommends immediate, serious and independent investigation of the concept suggested in Australian Infrastructure Solutions' submission. These investigations should be conducted, without political interference, by

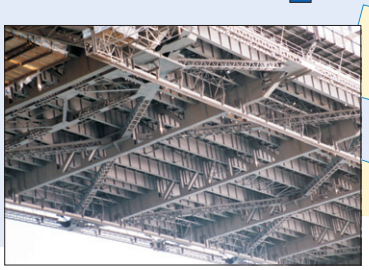


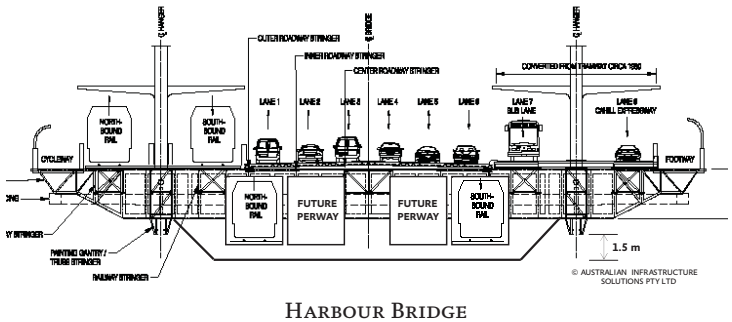

Concept suggested in submission by Australian Infrastructure Solutions
Existing North Shore line
Existing City Circle Inner
Existing City Circle Outer
Existing Eastern Suburbs Railway
Proposed new 'second harbour crossing' line
Two new tracks on new lower railway deck on Sydney Harbour Bridge, almost entirely within the existing support structures under the bridge's existing road and rail deck so as to absolutely minimise visual impacts
In the longer term, two further additional tracks could fit between these two new tracks on the lower deck and connect to the disused Wynyard station platforms 1 and 2, before continuing south (e.g. as part of a long-term future metro line)
to Milsons Point
from Milsons Point
to North Sydney/Victoria Square
from North Sydney/Victoria Square
Wynyard
disused
Circular Quay
W
N
Town Hall
Optional ESR platforms
Eastern Suburbs Railway (ESR)
Central
from Redfern
to Redfern
from Redfern and Green Square
to Redfern and Green Square
from Redfern
to Redfern
Castlereagh St
Pitt St Mall
(recommended option for direct interchange between ESR and North Shore/Macquarie Park)
Martin Place
New line could cater for Airport to North Shore/Macquarie Park services if desired, or for many other service options
from Airport (or Illawarra or Western Line tracks)
to Airport (or Illawarra or Western Line tracks)
Could have a grade-separated connections off the new line just south of Central to stub tunnels for a longer-term future South East Line to Moore Park, Randwick, University of NSW, Kingsford and Maroubra Junction
Goulburn St portals
Museum
St James
Looking west.
Simplified diagram. Crossovers and sidings and some disused tunnels which are not relevant to the proposal are not shown.
S
E
from Kings Cross
to Kings Cross



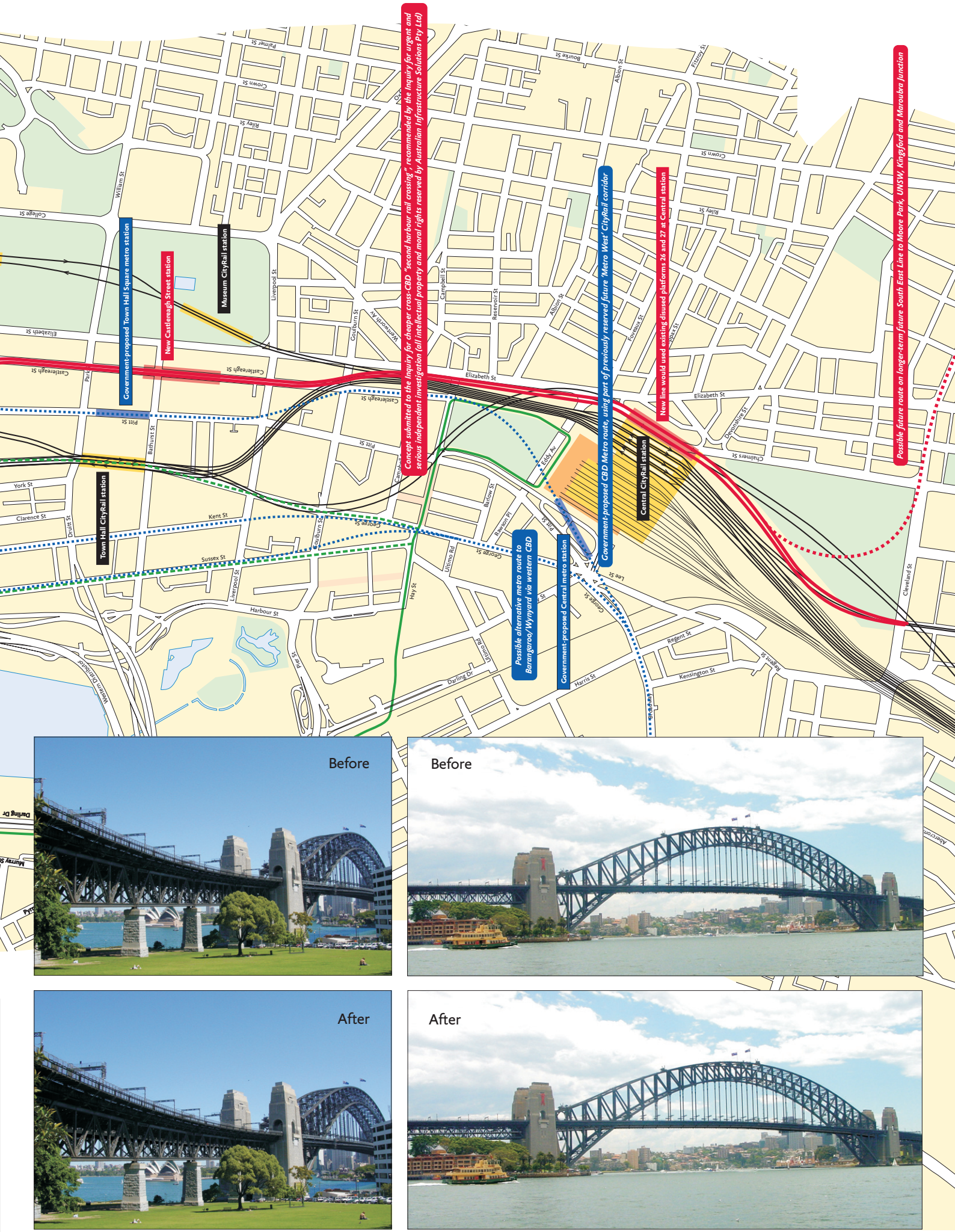


Harbour Bridge arrangement at pylons,
including reservation for longer-term additional rail tracks





Harbour Bridge
Arrangement at typical cross girder,
including reservations for longer-term additional rail tracks


Government-proposed Town Hall Square metro station
New Castlereagh Street station
Museum CityRail station
Town Hall CityRail station
Central CityRail station
Concepts submitted to the Inquiry for cheaper cross-CBD "second harbour rail crossing", recommended by the Inquiry for urgent and serious independent investigation (all intellectual property and moral rights reserved by Australian Infrastructure Solutions Pty Ltd)
Government-proposed CBD Metro route, using part of previously reserved future 'Metro West' CityRail corridor
New line would used existing disused platforms 26 and 27 at Central station
Possible future route on longer-term future South East Line to Moore Park, UNSW, Kingsford and Maroubra Junction
Possible alternative metro route to Barangaroo/Wynyard via western CBD
Government-proposed Central metro station
Before
Before
After
After

Transport for Sydney, the new public transport coordination authority recommended in Chapter 2 of this report, in conjunction with key stakeholders such as Sydney City Council and Infrastructure Australia.

The immediate transport benefits of this project, if it proves to be viable, would include:

- In common with almost all the other route options for the essential new cross-CBD, cross-Harbour heavy rail link, **a very large (~ 30%) "step change" increase in the capacity of the railways running into and through the CBD.**

  This would bring benefits lasting for decades. **Extra CBD and cross-Harbour capacity is *vital* for increasing train frequencies (and hence patronage capacity) *throughout* Sydney's heavy rail network.**

  For example, the new line would permit frequent services on the new North West Rail Link without any forced terminations of these services short of the CBD at Chatswood or St Leonards.

- The ability to provide **direct rail services linking all the major centres around the "global arc"** between Macquarie Park and Sydney Airport, including Chatswood, St Leonards, North Sydney and the CBD, without the currently required transfer (between separate platforms) within the CBD.

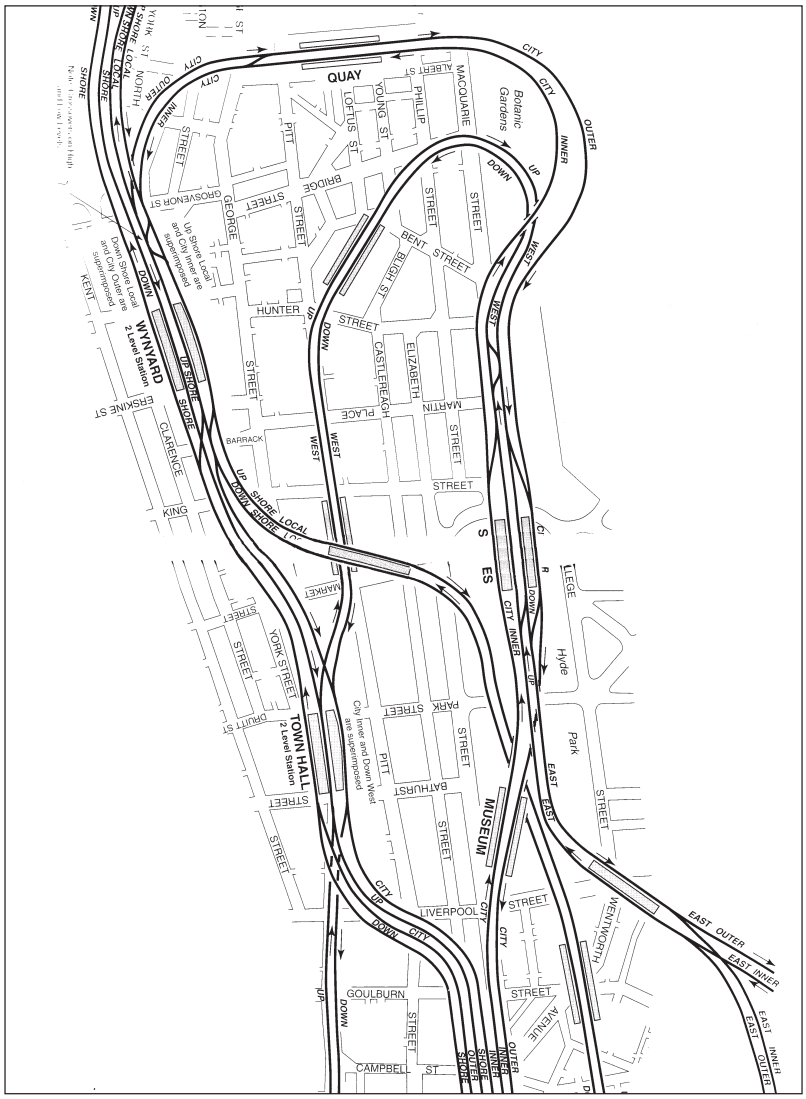
- **Two new stations right along the busy central north-south "spine" of the CBD**, one providing an attractive alternative to the highly congested Town Hall station and the other located right under the CBD's retail heart at Pitt Street Mall.

- **New, easy and direct** "vertical movement only" interchange facilities linking the Illawarra line/Eastern Suburbs Railway and the new route across the Harbour at Central station and the proposed new Pitt Street Mall station.

- **Significant congestion relief** within Central and Town Hall stations through improvements to many of the remaining passenger transfers. This would reduce the capacity--sapping effects of these "transfer passenger" movements, which clash with exiting and entering passenger movements.

- The provision of **additional station capacity at or near Wynyard** to help handle the traffic expected to be attracted to, and produced by, Barangaroo.

- **Full compatibility,** if it were needed, with the NSW government's previous CBD Metro alignment and station locations.



1926 Bradfield concepts for future CBD underground railways

Source: *Sydney's Forgotten City Railways*, John Oakes, Australian Railways Historical Society NSW Division, 2003, pages 14-15, reproduced from submission by John Pagett

Part C

4

Fixing the fares

4 Fixing the fares

The incoherence of Sydney's public transport fares is a major obstacle to the creation of attractive and cost-effective public transport services.

Some difficult choices will have to be made in establishing a coherent system of fares, but many other cities have now shown the way. There is little excuse for NSW's reluctance to face the issue.

This chapter summarises the findings of several months of analyses by the Inquiry of current and possible future public transport fare structures in Sydney and presents recommendations for major reforms.

It was largely prepared before the NSW government's announcement of the so-called *MyZone* fare structures from 18 April 2010, but has been updated in this *Final Report* to reflect the *MyZone* changes.

The changes involved in this updating have been disturbingly minor. **Despite the *MyZone* brand-name and some associated misleading advertising claims,**

- **A general zone-based fare system has *not* been introduced**
- **Only a few relatively minor problems with Sydney's previous fare systems have been addressed**, and even then usually only in part
- **Numerous serious deficiencies remain**, both for passengers and for the developers of viable and efficient future integrated ticketing systems, and
- **Some very important failings of Sydney's public transport fare systems, and especially the fare penalties associated with interchanging between services, have actually been made worse.**

The *MyZone* changes are summarised in the box on pages 262 and 263.

4.1 What's wrong now?

4.1.1 Complexity

Sydney's current fares are so complicated that it would take 20 pages or more to explain them all. (Fortunately, Alan Miles of *Action for Public Transport* has offered a detailed explanation of the pre-*MyZone* fare structures in "Sydney's Public Transport Tickets: From Here to Ticketopia", *Transit Australia*, December 2009.)

Key features include the facts that, even after the recent *MyZone* changes,

- Separate fares are charged by bus, rail and ferry operators
- Fares are generally determined by the distance travelled, calculated using small increments (1.6 km in the case of bus fares), and

- The only inter-agency and inter-modal fare offerings at present are the *Pensioner Excursion Ticket*, exclusively for pensioners, and the *MyMulti*, which recently replaced a more limited multi-modal fare system branded *TravelPass* and *DayTripper*.

The *MyMulti* offers unlimited rail travel within one, two or three specified zones and unlimited bus and government ferry travel throughout the greater metropolitan area, but it is available only for daily, weekly, quar-

Comment: The State government's *MyZone* changes to Sydney's public transport fares maze

The "*MyZone*" fare system introduced in Sydney from 18 April 2010 were primarily concerned with:

- **Changing the *levels* of fares**, including reductions in long-distance rail fares and increases in shorter distance bus fares and ferry fares, **but no real changes to the fundamental fare structures**, which generally perpetuate previous systems and are definitely *not* "integrated" as claimed, and
- **Marketing** an impression of greater simplicity, but generally without *actually* making the systems simpler *from the public transport user's perspective*.

Some of the *MyZone* changes are positive and to be applauded. This applies particularly to improvements to the previous *TravelPass* multi-modal zone-based fare system. Its replacement, rebadged as *MyMulti*, has been widened to include private buses and areas outside metropolitan Sydney and simplified by permitting unlimited travel on buses and ferries, effectively introducing a single, metropolitan-wide zone for these modes under these tickets. (Fare "zonal" systems are discussed in detail in section 4.6 of this report.)

But numerous *serious* deficiencies remain.

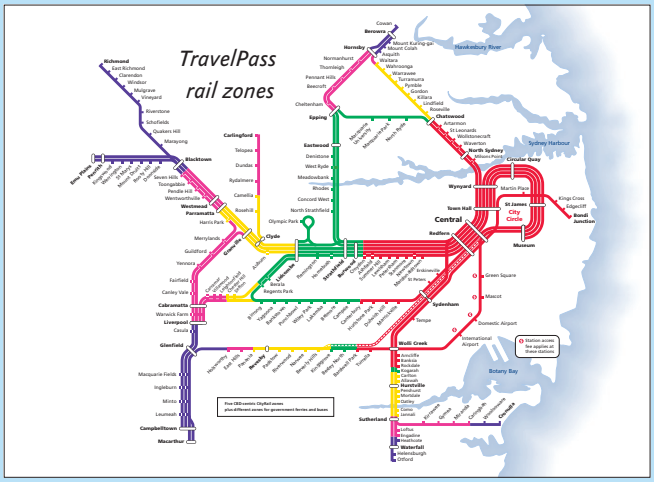
For example, even the new *MyMulti* system—which for shorter rail trips is now more expensive than *TravelPass* was—still does not cover light rail or private ferry services. And its CBD-centric rail zonal system, coupled with its failure to offer multi-modal tickets for trips whose rail components are solely within the middle and/or outer areas of Sydney at prices comparable with those available for travel closer to the CBD, entrenches a strong bias against middle and outer areas, especially western Sydney. (For details, see below.)

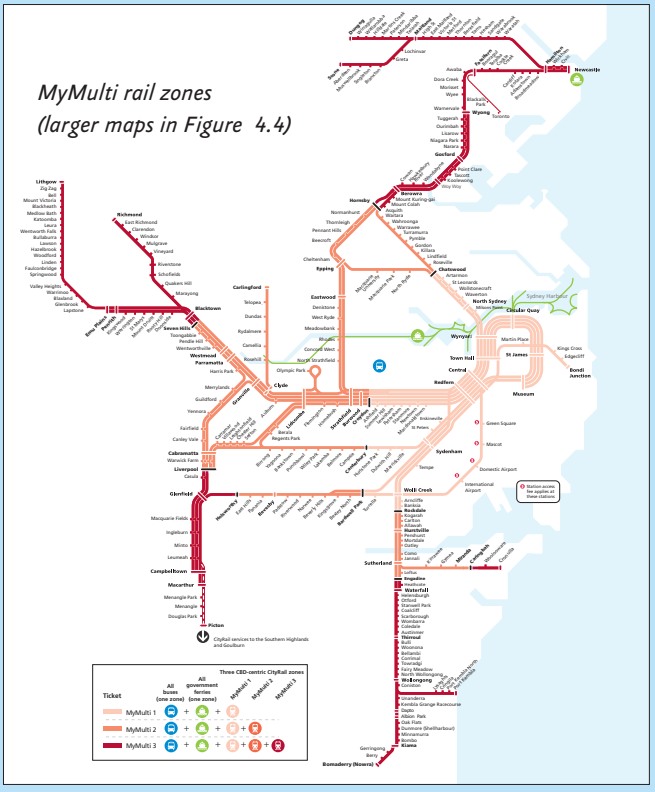
By far the most important problem with the new *MyZone* fare systems, however, is their **complete failure, beyond the still very limited *MyMulti* system, to tackle the fare penalties associated with connections between public transport services.**

For trips of the same length it still costs more if you can't use just one public transport vehicle and have to swap between a train and a bus, tram or ferry, between a ferry and a bus or between one bus and another.

This interchange fare penalty therefore remains as a massive barrier to improving public transport in Sydney, as discussed in Chapter 5 of this report.

Worse, **the average interchange fare penalty has actually been increased.** The new *MyZone* fare levels increase the proportion of the total fare revenue obtained from shorter trips, so, on average, the difference between the fare for a journey on a single public transport vehicle and the total fare for a journey of the same length involving two shorter legs on different public transport vehicles has been increased.





MyMulti multi-modal tickets

These have replaced *TravelPasses* and *DayTrippers*. Despite the *MyZone* name's implications, *MyMultis* are still the *only* zone-based tickets in Sydney. Everything else is based on trip *distances*.

terly and yearly periods and only for limited ranges of rail zone combinations, as described in the box below.

While regular commuters can and do use these tickets, anyone making any other kind of trip generally has to pay multiple times if their trip requires multiple public transport vehicles.

As indicated above, *MyMultis* now cover private buses as well as State Transit Authority (STA) buses. There are now only three zones on the rail component, instead of five, and the previous (different) zones on the bus and ferry components have been abolished, effectively creating a single zone and permitting unlimited travel on these modes, throughout Sydney, for these components.

So far so good. But the rail zones are still all centred on the CBD, Zone 1 being the closest to the CBD and Zone 3 the most distant. It is possible to buy tickets only for zone 1, zones 1+2 or zones 1+2+3. There are no tickets for zone 2 alone, zone 3 alone or zones 2+3 alone, even though this could easily have been done, so multi-modal trips whose rail component are solely within middle and outer areas now cost much more than equivalent trips in inner areas.

There is no reason why the government couldn't have fixed these anomalies, which were all pointed out before the new fare structures were introduced. They just chose not to.

Further, unlike other Australian cities and numerous comparable overseas cities, there are no multi-modal tickets for periods of less than one day, and the only one-day ticket available is a 1+2+3 ticket and also relatively expensive ($20, much more than its interstate counterparts).

So there are no cheaper multi-modal tickets for trips within (say) two hours, or for trips (within either a day or a shorter period) whose rail components fall within only one or two of the three rail zones.

Again, there is no reason why the government couldn't have fixed these deficiencies and made these types of tickets available. Had they done so, they would have overcome several of the most serious fare structure hurdles to a more efficient and integrated public transport network in Sydney. But again they just chose not to.

And there are still no multi-modal tickets of any description that include light rail or any privately operated ferries, including those operating to Manly.

MyTrain train fares

Except in the case of *MyMulti* tickets, train fares are still based on the distance travelled, not "zones".

The fare levels are now calculated using larger trip distance increments (0–10 km, 10–20 km, 20–35 km, 35–65 km and more than 65 km, instead of 0–5 km, 5–10 km, etc).

Passengers will not have noticed any of the ostensible benefits of this "simplification". You continue to tell the same complex ticket machine or CityRail's ticketing staff the station you want to go to. They just calculate the resultant fare differently. The ticket you get is called something different and is a different colour, but it is still be just a train ticket, useless on other modes.

Some passenger are, however, experiencing one of the problems associated with any fare system, zone-based or distance-based, which involves very large zones or distance increments: there are now much bigger step changes in fares at the "boundaries" (i.e. for trips of around 10 km, 20 km, 35 km and 65 km), producing greater anomalies for these trips.

The April 2010 newspaper headlines about Liverpool passengers paying $10 extra to travel to Town Hall rather than Central said it all—and also illustrated another unaddressed fault in the rail fare system: the failure to treat all CBD stations on an equal footing for passengers travelling from outside the CBD, as is generally the case in other large cities.

MyBus bus fares

Except in the case of *MyMulti* tickets, bus fares are still based on the distance travelled, not "zones".

Again, fare levels are now calculated using larger trip distance increments but passengers will not have noticed any of the ostensible benefits of this "simplification".

The *MyZone* website makes it clear: you (or your driver) still need to know how many so-called fare "sections" (each about 1.6 km long) there will be on your trip before the type of ticket (and thus the fare) can be determined. Few people—least of all the drivers—can remember how many sections a particular hypothetical trip will cover. So the STA tells you to get hold of a route map for the specific bus route in question (assuming you know its number) and count the sections, or phone 131500 and select option 1 and then option 2, or visit a "TransitShop" for advice! *C'est la vie*.

And while the ticket you finally get is called something different, and may be a different colour, it is still just a bus ticket, useless on other modes.

Moreover, you still have to pay all over again for the next bus you catch, even if you change to this bus immediately as part of your overall journey.

MyFerry ferry fares

Except in the case of *MyMulti* tickets, ferry fares are still based on the distance travelled (0–9 km or more than 9 km), not "zones".

And they're still just ferry tickets and still only for government ferries, just more expensive than they used to be (so much so that there are now some glaring new anomalies: it is cheaper to buy unlimited ferry and bus travel, plus unlimited rail travel up to 10 km from the CBD, with a $41 weekly *MyMulti* ticket, than it is to buy *any* ten-trip *MyFerry* ferries-only ticket ($42.40 for 0–9 km and $52.80 for longer trips).

And these are just the lowlights. To go into even cursory detail on the distance calculations, discounts, multiple-ride tickets, concessions and student arrangements would exhaust the patience of most readers. There have been some "simplifications" with the *MyZone* changes, and these greater efficiencies should be supported, but these are mainly simplifications that benefit the public transport bureaucrats who determine, process and administer fare systems, not passengers, for whom most of the complexity remains (see pages 262 and 263).

As Alan Miles has noted,

> *"The complete* CityRail Passenger Fares and Coaching Handbook *fills 113 pages... Computer people say that about 90% of the transactions in any system are handled by 10% of the code. The non-standard items, though small in number, require most of the work."*

4.1.2 Penalties for connections, both within and between modes

The largest and most perverse disincentive in Sydney's fares is the penalty for connections: your trip from *A* to *B* costs more if it requires two vehicles than if it requires just one.

CityRail is the only part of the network on which your fare depends only on distance and not on the number of connections required. For everything else, including transfers from one bus and another and between rail and buses, you must pay again and again as you change from one vehicle to another to complete your trip.

Every single-ride fare can be understood has having two parts, analogous to taxi fares:

- A "flagfall," which is constant regardless of the length of the trip, and
- A distance-based charge.

In a taxi, for example, the price displayed on the meter when you begin your trip is the flagfall, and the increases in this price as you travel represents the distance-based part of the charge (in taxis there can also be a time-based component). Although public transport passengers do not see the two numbers separately, public transport fares also have these two elements.

A "correct" distance-based fare system would charge everyone for the distance they travel, but would charge the flagfall only once. **The current system, by contrast, charges a new flagfall whenever the rider must get off one vehicle and onto another, thus making connective trips more expensive than single ride trips.**

The new *MyZone* system is no better than the previous fare system in this regard, and overall it is probably worse, because a higher proportion of the total fare revenue is now being collected from the flagfall component (see pages 262 and 263).

Same distance, different fare

This connection penalty or "second flagfall" creates significant differences in the fares for trips of essentially the same linear distance.

Table 4.1 presents a few examples. In each case, it compares a trip that can be made by rail to one that requires rail plus a bus connection. For ease of comparison, all of these sample trips are from Central station.

Table 4.1. Same distances, different fares: Examples of single adult fares, from Central station to various destinations at the same distance.				
Destination		Straight-line distance	Fare	
Rail only	Rail plus bus		Rail only	Rail plus bus
Wiley Park	Roselands	14 km	$4.00	$6.00
Turramurra	St Ives	18 km	$4.00	$6.00
East Hills	Menai	22 km	$4.60	$7.90
Blacktown	Bonnyrigg	30 km	$4.60	$7.90
Rooty Hill	Rouse Hill	35 km	$6.00	$8.90

The sample locations that need bus connections are not "secondary" or less important. In fact, in each example the "rail plus bus" destination is an equivalent or higher-order centre, either today or in terms of their significance in the future under the *Metropolitan Strategy*. To take the last example, Rouse Hill is a much larger destination than Rooty Hill, but Rooty Hill happens to be on the rail system while Rouse Hill requires a long bus connection (from Westmead or Parramatta stations). The required connection is already a disincentive to patronage, but the substantial fare penalty makes this disincentive much worse.

Penalties for speed and efficiency

Another perverse consequence of the connection penalty is that customers are often encouraged to take a slower route even though it would be better—both for the customer and for the efficiency of the network—if they took a faster one.

This issue comes up in situations where a single continuous bus route is available for the entire desired trip, but there is also a bus-rail connection option that is significantly faster.

Table 4.2 provides a range of examples. All are based on travel options around midday, as identified through 131500.com.au and transport operators' websites.

Rouse Hill again stands out as disadvantaged. A trip from Rouse Hill to Central takes only 70 minutes if you do it the fast way, taking a North West T-Way bus and changing to the Western Line at Westmead, but with the connection penalty this trip costs almost $9. But there is also a bus the whole way, which takes 97 minutes and costs $4.60 less.

The same pattern can play out in the inner city. Consider, for example, a trip from the Marrickville shops to Circular Quay. A single bus route will take you the whole way, through Newtown and past Central station, but this route is understandably slow. Alternatively, you can get off this bus at Newtown, catch the train from there and get to Circular Quay considerably sooner.

These situations arise in many parts of the network. In each case, the option requiring a connection is substantially faster than the single-ride option, but the fare system encourages the rider to make the slower choice.

On one level, it might seem to make sense to charge more for a faster trip, but in public transport this can be counterproductive, for two reasons:

- In urban public transport, a faster trip is not just good for the customer, it is also usually more efficient for the public transport provider.

Table 4.2. Penalties for speed and efficiency: Fare comparisons between single ride trips and faster trips with connections.

From			To	Single ride	Trip with connections			Travel times (minutes)*		Total fare (adult single)	
Suburb	Street	Cross-street		Service	Service 1	Change at:	Service 2	Single ride	Connecting	Single ride	Connecting
Marrickville	Marrickville Road	Illawarra Road	Circular Quay	423 bus	423 bus	Newtown	Inner West Line	41	34	$4.30	$5.20
Enfield	Liverpool Road	The Boulevard	Town Hall	480 bus	415 bus	Strathfield	Northern Line	43	35	$4.30	$6.00
Balmain	Darling Street	Elliott Street	Town Hall	433 bus	433 bus	Rozelle	506 bus	32	22	$4.30	$5.30
Leichhardt	Norton Street	Marion Street	Randwick Hospital	370 bus	440 bus	Railway Square	372 bus	57	49	$4.30	$6.60
Parramatta	Victoria Road	Macarthur Street	Wynyard	L20 bus	L20 bus	Parramatta	Western Line	63	42	$4.30	$6.60
Rouse Hill	Station and shopping centre		Central	610 bus	T65 bus	Westmead	Western Line	97	70	$4.30	$8.90
Homebush	Underwood Road	DFO	Parramatta	525 bus	525 bus	Strathfield	Western Line	38	31	$4.30	$6.00
Bronte	Bronte Beach Shops		Central	378 bus	378 bus	Bondi Junction	Eastern Suburbs Railway	41	36	$3.30	$5.20

*Excludes waiting time at start of trip, but includes waiting time at interchange.

Public transport costs are dominated by labour costs, charged by the hour. A customer who has got to his or her destination faster has consumed less of this resource. Fast travel times are thus a win-win deal for the customer and the public transport operator—but the connection penalty discourages this deal by overcharging for it.

- If the faster trip option is bus plus rail, as opposed to bus only, the capacity benefits of rail also come into play. A bus plus rail trip puts more of the trip onto a high-capacity train. At most times of day, in most parts of the city, rail has spare capacity to absorb new riders without additional service costs. Buses, by contrast, have only a limited ability to take on more riders before they reach their capacity and a new bus has to be added.

  In the case of the sample trip from Marrickville to Circular Quay, for example, encouraging Marrickville customers to change at Newtown would have the effect of opening up some space on the bus so that, as it continues into the city via the University of Sydney, it has room to take on new riders without becoming overcrowded. The result would be a more even high loading along the entire length of the bus line.

A barrier to good network design

A network, by definition, is a set of services that all work together, enabling people to go where they want to go by whatever combination of services best serves that need.

Penalising connections is hostile to this most basic idea of network thinking.

Efficient network design *encourages* connections (see section 5.2)—and because it discourages connections, the current fare system *discourages* better network design.

For example, when redesigning a bus system to make it more efficient or cost-effective, it is sometimes necessary to break up an existing route into two or more pieces, often reconnecting these pieces in different ways. Whenever this is done there are likely to be a few people who previously had direct service but will now have to make a connection. Such redesigns can dramatically improve the frequency and simplicity of the network, but for these particular people the inconvenience of the new interchange is compounded by their having to pay a new fare penalty. The connection penalty intensifies the political cost of doing even the most basic improvements to network design, thus reducing the likelihood of improvements.

Journeys or rides?

Several submissions to the Inquiry have explored the issues discussed above in some detail, often highlighting the basic problem of connections.

Joseph Vnuk's submission, for example, has noted that while a passenger wants to purchase a *journey*—a complete trip from origin to destination—the fare system usually only sells *rides*: a single use of a single vehicle.

This also calls into question the ways in which the Independent Pricing and Regulatory Tribunal (IPART) has determined whether fares are reasonable:

> *"Whenever IPART compared fares, either between Sydney and other Australian cities or between various modes in Sydney (trains, government buses, private buses), it always compared a ride of a certain length, and concluded that the fare*

> *under consideration was reasonably priced. It did not look at the cost of a whole journey, which may well consist of a bus ride and a train ride ... It is with regard to journeys such as these that Sydney is much more expensive than other Australian cities."* (submission by Joseph Vnuk)

In the current system the only way to buy a *journey*, as distinct from a series of individual *ride* fares, is to have one of the specialised concession tickets, such as a Pensioner Excursion Ticket, or buy a *MyMulti* covering a full day (an expensive option, as these tickets are not available for trips covering only one or two of the three rail "zones") or a week or more (with problems for trips not centred on the Sydney CBD, as discussed on pages 262 and 263).

Like its predecessors (the *TravelPass* and the *DayTripper*) the *MyMulti* is an important tool, but unfortunately it still solves the problem only for commuters and then only for *some* commuters. It has nonetheless taken some of the heat out of the issue, because people who use public transport only for commuting and can take advantage of a *MyMulti* don't experience the problem.

But commuting trips to work or school are only a small part of the work that public transport needs to do. Modern, useful public transport systems work hard to be available for spontaneous use for all kinds of travel purposes, not just rigidly scheduled commuting. This convenience is especially important in Sydney's denser centres, where the viability of high-density housing depends heavily on its minimal parking requirements, and those requirements, which, in turn, depend on how easy it is to use public transport for most of the needs of life, not just commuting.

A barrier to new patronage

Another aspect of the problem becomes obvious when you think about the new public transport rider.

Someone trying public transport for the first time—whether or not they are new to Sydney—will form many indelible judgments based on their first experience. A fare system that is especially onerous for new riders, as Sydney's is, may well be pushing new customers away.

This barrier is an example of the common "existing rider fallacy" in public transport management.

It is always tempting to listen to existing riders and focus on their needs. By definition, existing riders are people who find the current system acceptable, given their options. But this tells us *nothing* about whether the system is meeting the whole city's needs or constituting a good return on the government's investments.

An authority, operator or government that listens only to existing riders will never discover how to attract new riders. To do that, it is essential to sample survey the *whole* population and study the experience of similar cities. Both have been done in this Inquiry.

4.1.3 Fare 'sections'

Another key problem is that even though the re-branding and advertisements associated with the April 2010 introduction of the *MyZone* changes have implied a "zone"-based fare system has been introduced, fares on buses are still being calculated using very small units of distance, called fare "sections" or "stages".

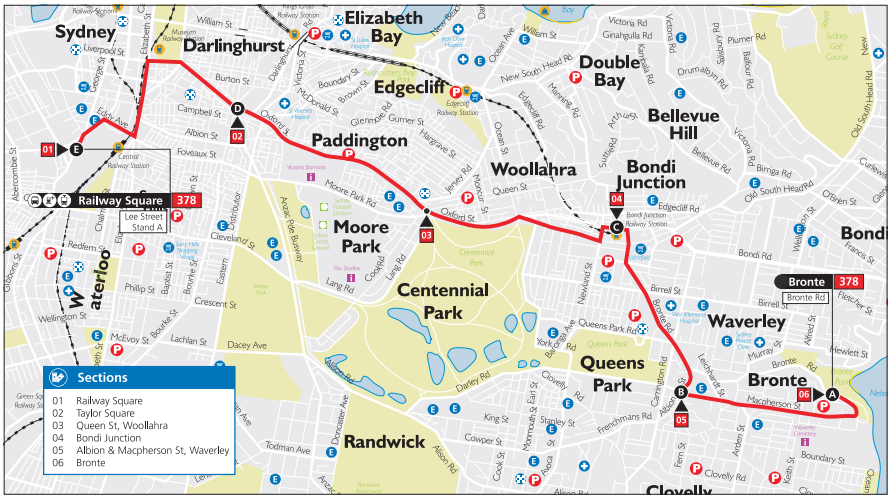


Figure 4.1. *An example of an STA route with its section points, numbered 1 to 6.*

On every bus route, fares are supposed to be computed on the basis of the number of "sections" traversed. Each section on each route is about 1.6 km on average, although the section lengths do vary between about 1.3 km and about 1.9 km. Few people—least of all the drivers—can remember how many sections a particular hypothetical trip will cover. It is very easy for law-abiding citizens to "over-ride" (i.e. ride further than their fare allows), because the fare sections are simply too complex to describe, remember or enforce. Even the bus operators' websites find it hard to present this information.

It is not clear whether anyone has tallied the labour costs of describing and enforcing fare sections. Note, for example, the directions to customers on the STA website for figuring out the number of sections your trip requires are:

> *"To work out the number of sections you travel:*
>
> - *"Count the number of sections on the route [map].*
> - *"Call 131500 Transport Info, select options 1 then 2.*
> - "*Visit* TransitShop *for personal assistance.*
> - *"Ask the bus driver when you board the bus."*

Three of the four options presented require staff time, and the fourth, of course, also consumes the time of other passengers.

Again the new rider is especially discouraged. For example, visitors or migrants from cities with integrated fares are invariably astounded to learn that to buy a multiple-ride bus ticket, the *MyBus TravelTen*, they have to decide how far they are usually going to travel. For people living car-free lifestyles in the inner city, there *is* no answer to the question "How far do you usually travel?" These people are moving about the inner city for all kinds of purposes all the time, making long trips and short ones. Sydney's fare system pushes them away.

4.1.4 Different fares for different modes

As we have seen, connection penalties under Sydney's current (post-*MyZone*) fares system still mean that you pay more for a bus plus rail trip of any given distance than for a trip of the same length on a single bus, and this encourages the rider to make choices that (a) take longer to get to his or her destination and (b) consume more of the public transport resource.

A similar problem arises when different modes charge different fares for the same trip.

For example, the single-ride adult fare from Manly to the CBD is currently $5.10 on the STA's bus and $6.60 on the STA's ferry, and there are multiple examples of different fares on "competitive" bus and rail services, because the different modes still use quite different ways of calculating their distance-based fares. Why?

In an integrated network such as Brisbane's and Melbourne's, the fare from point *A* to point *B* is the same regardless of whether it's by rail, tram, bus or ferry, and Sydney should aspire to the same simplicity.

Surcharges might be justified for technologies that are retained mainly as tourist attractions or designed for a particularly high standard of luxury, but only if there are alternative services available to make the same trip. San Francisco's historic cable cars, for example, have a premium fare.

One might argue that a premium fare should also apply to some ferries or ferry stops that have high costs, low patronage and good alternative services, but it is not clear that there are any of these in Sydney, except perhaps the Darling Harbour and Parramatta wharves. It should be noted that Brisbane's scenic ferry system runs entirely on standard, integrated fares.

4.2 Impacts on other problems

The introduction of an integrated fare system is the key to unlocking numerous other seemingly unrelated problems.

For example,

- A network useful for travel to **non-CBD destinations** *has* to rely on connections, and this in turn requires a fare system that encourages connections rather than penalising them.

  The CityRail system already relies on connections between rail lines for this purpose, and these connections are possible only because CityRail charges fares based on the origin and destination station and allows passengers to change trains within the system.

  However, non-CBD origins or destinations that are not on the rail network often need a combination such as rail plus bus, ferry plus bus or two buses. The current fare system massively penalises these trips, unless they are trips for which a *MyMulti* is usefully available, such as regular commuting trips centred around the CBD.

- The **excessive bus volumes clogging the Sydney CBD** (especially at its northern end) and the inefficient bus networks in the CBD more generally are partly a result of a fare system that discourages connections and therefore makes it impossible to combine more passengers onto fewer buses. Since every part of inner Sydney generates some market to the northern CBD, the practice has been to run most routes all the way to Circular Quay, even though most buses on those routes are far below capacity north of Park Street. (Recent changes shifting a few routes to a new Domain terminus have reduced this problem only slightly.)

- **Poor off-peak frequencies** of trains, buses and ferries reflect a narrow conception of these services' markets that misses the patronage potential

unlocked by connections. So long as a particular railway station or ferry terminal is viewed as serving only its immediate area, its market is limited. But if it is viewed as serving all the places that are connected to it by bus, its market expands substantially, and so does the level of service that it can support.

- An adequate bus network, especially for **mobility-disadvantaged outer suburbs**, requires strategies that build the market, and these must include easy connections to rail and the ability to use the bus system for complicated trips with multiple stops that are a normal part of life. But the fare system penalises this kind of travel.

4.3 Submissions on integrated fares and ticketing

The Inquiry received numerous submissions on fares and ticketing. In particular, many institutions, including local governments, noted how the current fare system is undermining other policy objectives.

> *"Integrated ticketing must be introduced to help streamline the transfer and general movement of passengers across the public transport network."* (Sutherland Council)

> *"A simple, integrated ticketing system is an obvious pre-requisite."* (Warren Centre's Sustainable Transport Project of 2002)

> *"Currently ... there is no attempt to address the fare structure. The complications of the multiple fares on offer undermines attempts to introduce integrated ticketing."* (Western Sydney Community Forum)

> *"There has been a great deal of talk and considerable expenditure in NSW on Smart Ticketing, with little result. The major failure in this exercise to date has been the failure to accept that there is no benefit to be had in a Smart Ticket system which is linked to a Dumb Fare system... [The] total bias against any form of through ticketing is not only morally repugnant but essentially prevents the adoption of any sensible and operationally effective fare system. The gross inequalities inherent in such a system, where a passenger must pay more when shortcomings in the transport system force the passenger to use more than one transport service to travel between two points and the passenger then has to pay significantly more than another passenger who can cover the same direct distance in one trip, should not be countenanced in this day and age."* (Greg Sutherland)

> *"There is a need to introduce integrated ticketing across all public transport. This would help speed up effective journey times as users would spend less time buying multiple tickets. Buses particularly would benefit with less standing time issuing tickets."* (Liverpool Council)

> *"Zones not only avoid the problem of multiple flag falls but also have the appeal to the purchaser similar to unlimited talk phone plans.... This encourages people to use public transport more frequently."* (Western Sydney Community Forum)

> *"To ensure an equitable system, a consistent bus fare scale should be progressively implemented across all metropolitan bus services and operators should be required by contract to offer the same core fares, concessions, and ticketing arrangements."* (Western Sydney Community Forum)

"...the current flag fall/distance based fare system makes interchanging costly and undermines the optimisation and integration of existing transport operations. I am at a loss to understand why it persists." (Julie Walton)

"An integrated ticketing system would not only benefit commuters but would also encourage tourists to use public transport during off-peak periods thereby increasing utilization during this period. Flexible ticketing would also encourage greater use between different transport modes particularly between rail services and privately owned bus services which is the primary public transport mix in outer Sydney." (BAG)

4.4 The smartcard project: a path or an obstacle?

"Smartcards" are "stored value" cards that enable passengers to pay fares by swiping a card over a contactless reader, either at fare gates or on board the public transport vehicle.

They are used successfully for automated fare collection in many places around the world. Examples include London's Oyster card, Hong Kong's Octopus card, EZ-Link in Singapore and the Navigo card in Paris. There are also many smaller systems, especially in Europe.

After the prolonged delay and ultimate failure of its first efforts at a smartcard, the "T-Card" program, the NSW government is now once again pursuing a public transport smartcard.

Discussions of fares in Sydney are often hampered by **confusion between *fares* and *ticketing*.** This confusion is apparent even in some of the submissions quoted above.

To make progress, it is essential to fully distinguish integrated ticketing from integrated fares:

- **Integrated ticketing** means that a single stored value card can be used to pay for fares on all modes and services. Integrated ticketing, by itself, says nothing about how these fares are calculated and does not respond to most of the problems outlined above.
- **Integrated fares** are fares that are calculated on the basis of a consistent and reasonably simple method covering all public transport offerings, without any fare variations based on whether a connection is required.

Hopefully fully integrated ticketing will ultimately be provided in Sydney by the new smartcard systems that are now being developed, although this is expected to occur, at best, only after an extended period of technological development, currently estimated to be some three to five years.

The real difficulty is that the government has still expressed *no* intention to integrate fares, even though the lack of integrated fares is the much more important problem.

An integrated ticketing system that retains complex and incoherent fares will achieve little, even if implemented with the convenience of smartcards, at least for those people who need to know how much they are spending.

The NSW government seems to think its smartcard program will somehow solve the problems of non-integrated fares, but it cannot and will not.

> *"There seems to be no grasp in Sydney of the technical issues related to smartcards. The statements in [the Inquiry's February 2010 Preliminary Report] that 'smartcards will make it possible to administer and enforce incredibly complex fare systems' is seriously wrong and ill-informed. And therein lies the problem in Sydney and NSW.* ***The opposite is so****. Whilst ever the fare system is 'incredibly complex', there cannot be and will not be a smartcard system. There is no system software on earth that would accommodate the Sydney [fare] system, nor will there ever be, due to its very complexity. To attempt it will be ERG all over again. Massive expense. No outcome.*
>
> *"For smartcard technology to work, fare calculation must be purely distance-based or purely zonal, not a mix. But distance-based can be dismissed, due to route geometry and probably billions of potential anomalies. (Distance-based could work for stand-alone operators running linear routes, but this is not the Sydney scenario.) And of course the ticket types (or products) would have to be massively streamlined and completely assigned with respect to business rules: precisely identical for all operators. It is not evident that IPART has a grasp of this whatsoever...*
>
> *"In summary, the [Inquiry's Preliminary Report's] strong drive for fare integration is totally supported. Desirably, it should form part of a full fare and ticketing package which includes smartcards. Regrettably, I have seen nothing to suggest that the Sydney people know what they're doing with respect to smartcards, or how to bring it home. Until the bigger picture is perceived, it is unlikely that headway will be made on smartcards."* (final submission to the Inquiry from Bob Lutherborrow, retired former Director of Public Transport Integration, Queensland)

Technology is never a good substitute for thinking or consensus-building, and smartcard technologies will not save us from the need to think through and implement a coherent fare system.

In Melbourne, Brisbane and Perth—and in most European examples—coherent, integrated fare systems were established long before smartcards were introduced or in some cases even contemplated. These integrated fare systems were developed and implemented using magnetic stripe and/or paper tickets, the ticketing technologies of the day, and appropriate equipment was acquired to operate these systems, based on the overwhelming goal of an integrated fare system.

Only then did these cities pursue an integrated ticket or smartcard technology to implement their rational and simplified fare structure.

Today's fare equipment in Sydney has been purchased at a variety of times by a variety of operators, and mirrors the chaotic nature of Sydney's fare systems. Some of the equipment will be hard to adapt to a new integrated fare system. If a smartcard were not (once again) on the horizon, the right course of action now would be to design a new fare system and then procure the right equipment to run it. Unfortunately, however, the long-term "imminent introduction" of a smartcard for Sydney has caused an ongoing assumption, over many years, that new non-smartcard equipment upgrades should be deferred. In some cases, especially among the private bus operators, old equipment that should have been replaced long ago is still being used, with declining reliability, because for years smartcards have supposedly been going to replace them "soon".

This saga of the ever-deferred but "inevitable and imminent" smartcard means the Sydney region as a whole now faces two hard questions:

- Should we wait for a smartcard system to come online in order to have integrated fares? Or should we try to solve as much as possible of the integrated fare problem with the tools that we already have?
- Is a smartcard system for Sydney so problematic that we would do better to invest in more reliable magnetic-stripe ticketing technologies that could support integrated fares, and defer a smartcard for 10 to 20 years?

The possibility of deferring attempts to introduce smartcards in Sydney has not been widely discussed, and the NSW government is now attempting yet again to introduce smartcards "within two years", but a deferral could well have advantages, especially if other step changes in technology are imminent.

London, for example, is now looking beyond its Oyster card to consider how smartcard functions might be integrated into other widely used cards. This raises the possibility that smartcards, e-tags and other similar devices could become a standardised private sector product before long, with standardised reading capabilities compatible with any reader.

Deferral is also clearly the lower-risk path, given the low level of confidence in the current smartcard project generated by the sad history of earlier attempts.

The Inquiry has not conducted a detailed review of existing ticketing equipment, but it may be that much of it could be adapted for an integrated fare system, and in those cases where it might not, such as gated entrances to CityRail stations and ferry wharfs, a more labour-intensive solution, such as more intensive and disciplined staffing of "wide gates", might be viable for a decade or so. This would be expensive, but quite possibly nowhere near as expensive as a smartcard program that is severely delayed, over-budget or unreliable.

The Inquiry has concluded that:

- Few tasks are more urgent than to do the analysis and consensus-building needed to establish an integrated fare system in Sydney
- An imminent smartcard *might* be a valid reason to delay the implementation of some aspects of the integrated fare system, if they would be hard to implement with current equipment, but
- The smartcard implementation debate should be separated from the fare structure debate, and the smartcard project should not be used as an excuse for delaying the introduction of integrated fares.

This suggests Sydney needs to:

1. Define and adopt a coherent policy of integrated fares, not constrained by the capabilities of existing equipment. Our first priority should be to get the structure right for the long term.
2. Determine whether portions of this new integrated fare policy can be introduced prior to the advent of smartcards, using existing paper and magnetic-stripe equipment, possibly with some increase in staffing for fare inspections. If so, we should introduce these elements as quickly as possible.
3. Bring the entire system online with a smartcard—***or***, if a smartcard does not appear realistic within three to five years, postpone the smartcard for at least a decade and procure appropriate new magnetic-stripe ticketing technology to implement the completely integrated fare system.

The Inquiry's underlying philosophy is that **technology should serve the community's goals, not dictate them.** In other words, first we must decide what we want, and only then should we procure the technology that will support what we want.

The rest of this chapter suggests a line of thought for reaching a coherent and durable integrated fare system that will serve the community's public transport goals for the long term.

4.5 What do we want from a fare system?

4.5.1 Commonly expressed goals

Commonly expressed goals for a public transport fare system usually include:

- **Fairness.** People want to know that if they are paying a fare, others are paying their fare share.

  This is why people are often frustrated when they see obvious fare evasion, such as people jumping CityRail turnstiles, although of course most fare evasion is not so obvious.

  Fare structures need to make a fairness-based argument. This usually turns out to be harder than it looks, and for this reason it is discussed more fully below.

- **Revenue goals.** A fare structure needs to bring in a certain amount of revenue.

  The most useful way to think about this is to distinguish between a fare *structure* and a fare *level*. The fare structure is the whole system of charges, surcharges, fare "zones" and fare concessions. It needs to be defined and made permanent, but obviously the price *level* within this structure can be adjusted, as needed in the future, without changing the structure.

  So it makes no sense to dismiss a fare structure idea because of its revenue impact, as IPART has been known to do, because there is always *some* pricing level at which *any* structure will deliver the expected revenue.

- **Impact of a new fare structure on existing riders.** Any new fare structure will inevitably change the fares of some existing riders, and if the same total revenue has to be obtained from the system some of these changes will be upward.

  This is a difficult issue that requires leadership. Fare increases caused by a new fare system obviously cause pain, but they have many compensating benefits that need to be clearly explained.

  It can sometimes be appropriate to cushion the pain by creating transitional arrangements and rules, but exceptions to a fare structure created for this reason must always have a built-in expiry date. One of the reasons Sydney's current fare system has become impossibly complex has been the fact that numerous "exceptions", invented years ago to solve some transient political problem, have become permanent.

It should be noted that the "impact on existing riders" issue sometimes conflicts with the "fairness" issue.

For example, prior to the fare changes introduced with *MyZone* a series of fare changes on CityRail had increased the incremental cost of longer-distance trips.

Essentially, this meant a higher share of the revenue was coming from the distance-based part of the fare rather than the constant or "flagfall" charge. This change could have been defended in terms of fairness, because long rail trips *do* cost more to provide and the alternative would have been to more uniformly increase all fares, which would have meant that short-distance rail trips would have become much more expensive than the same short trips made by bus. So in these cases the State's fare regulators showed a willingness to aggravate existing customers in order to implement a "fairness" principle.

Under the *MyZone* changes, the reverse has happened. As explained on pages 262 and 263, long-distance train and bus fares have been significantly reduced, so now a lower share of the revenue is coming from the distance-based part of the fare and a higher proportion is coming from the constant or "flagfall" charge.

What is needed now is a willingness to confront the principal unfairness of the existing fare system (and one that has been *worsened* by the MyZone changes): the penalty for connections.

4.5.2 *A thought experiment:* What would be perfectly fair?

"Fairness" can only be approximate—and what we as a community want from fares is also quite different from the notion of fairness that we use to divide up other shared costs.

To see why, let us consider the following "**thought experiment**".

> *Suppose a fare policy really did charge everyone for exactly their fair share of the cost of providing the service that they use. In this situation, you'd do exactly what you'd do if you and a few other people were sharing a ride in a private vehicle: you'd split the cost evenly among you. You'd want everyone to pay the cost of running the trip, divided by the number of people riding.*
>
> *Clearly your fare would depend on the distance you travel. But it would also depend, much more dramatically, on the number of other passengers on your bus, train, tram or ferry. If you were the only passenger on a 40-seat bus, your fare would be 40 times higher than if every seat were filled.*
>
> *Your fare would be calculated in tiny increments, extending from one bus (or tram) stop or train station to the next. As the bus or train filled up, the increments would get cheaper. As it emptied out, their cost would go up. The sum of all these increments is what you'd pay for the trip.*
>
> *As ticketing technologies continue to develop, it is not hard to imagine a future smartcard system that could actually calculate this "perfectly equitable fare" in real time. It would know not just where you started and ended your trip, but also how many other smartcards were on the same vehicle with you. At the end of your trip it would debit your card for the cost of each increment of the trip, divided by the number of people who used that increment.*
>
> *As a practical policy it would have some striking and unacceptable consequences. People would stop cursing the shortage of peak-hour capacity. Instead, they'd try to pack themselves onto already-crowded buses, trams and trains. At the other extreme, low-patronage services would become prohibitively expensive to ride—more expensive than taxis, in fact—so these services would die out.*

For better or worse, the policy would certainly yield a very high-patronage public transport system, because high-patronage services would be the only services most people could afford to use.

Yet this system could only be called "perfectly fair" in the sense that everyone, at every moment, would be paying exactly their fair share of the costs of running their service.

4.5.3 The 'fairness' versus complexity tradeoff

This thought experiment suggests several important lessons:

- **As a community we don't actually want "fair" public transport fares as much as we might think or say we do.**

  Relatively empty buses and trains, such as those in low-density suburbs and semi-rural areas, cost much more per passenger to operate than crowded ones. Yet we as a community appear to be comfortable with the notion that these low-patronage services should be subsidised, in part, by the fares collected on high-patronage services, even though the riders on these services might prefer their money to be spent on improvements that would benefit themselves more directly, such as more capacity.

- **Fairness begets complexity.** The more precisely equitable a fare system tries to be, the more complicated it becomes.

  The thought experiment's hypothetical "perfectly fair" system would calculate the fare for tiny increments of distance, literally the distance from one bus, tram or rail stop to the next, and add them all up to determine our total fare. This is the same principle as the existing "fare section" system, but taken to an extreme. The "perfectly equitable fare" would also achieve the extreme of complexity: it would be so intricate that nobody could know, when they set out, what their fare would turn out to be.

  So if we want fares that we can understand, predict, remember and enforce, we shall need to sacrifice an obsession with microscopic "fairness", such as that in the thought experiment or Sydney's "fare section" system.

- **With smartcards, "complexity" for the passenger will become different from complexity for the government or public transport operator.**

  Prior to smartcards, public transport operators and their customers have a shared interest in fare simplicity, because a system that is too complex for customers to understand is usually also too complex to administer and enforce.

  Smartcards will make it *theoretically* possible to administer and enforce complex fare systems, as the NSW government currently intends to do, although the serious *practical* difficulties of developing and implementing software and hardware systems capable of handling these complexities on a very large scale are often overlooked—as they have been by the NSW government in the past, with entirely predictable results, and now appear likely to be, once again, in the future, as pointed out in Bob Luther-borrow's final submission (section 4.4).

  (It should be noted here, in passing, that the "simplifications" of the fare structures introduced by the April 2010 *MyZone* changes will not, by themselves, lessen the immense processing loads with which a Sydney smartcard system is likely to be asked to cope, because the sizes of the

"look up tables" required for calculating all the different distance-based fares for each mode, with hundreds of thousands of combinations of trip origins and destinations for train and bus trips (section 4.1), have essentially remained unchanged, as has the inherent complexity of a system combining zone-based *TravelPass/MyMulti* fare structures with distance-based rail, bus and ferry fare structures.)

But even if these practical limitations could be overcome and the theoretical benefits realised, this does not necessarily mean we should welcome these systems, because...

- **Even with smartcards, fare complexity will still be a major problem for people who need to know their fare in advance.**

  Some customers have sufficient financial security not to have to worry about small increments in costs. For these customers, the hassle of figuring out complicated fares is a much bigger patronage deterrent than the amounts of money involved, and smartcards will liberate them from this difficulty, regardless of the fare system used.

  Many passengers, however, will always need the ability to predict what they will spend. Others might not need this ability but will nonetheless insist they have a right to it. Continued fare complexity would continue to weigh heavily on these customers—and if the public transport operator chose instead to value simplicity in its fare structure, it is these customers who would benefit.

Fairness in the sense of a "fair share of cost" is clearly related to how many people are using a given service, yet this enormously important factor is almost never expressed in conventional fare structures. It can be crudely approximated by (for example) charging more for services that carry fewer passengers by design, such as demand-responsive services and other small bus services, but this is a rarely done in current fare practice. As noted above, with each such factor increasing the equity of a fare structure complexity is also increased.

In summary, then, any fare system that is simpler than the one described in the "thought experiment" can be based on only a crude approximation of absolute fairness. Any reasonably simple fare system *will* be unfair to *someone* under any commonsense definition of "fairness". This does not mean that the decision is unimportant or can be taken lightly, but it does mean that the community must accept that Sydney's future fare system cannot be perfectly fair.

Most cities have decided to accept this imperfection, because they have goals that are more important than perfect fairness. In particular, they are trying to increase public transport patronage by **making public transport easy to use**. Fare complexity is a barrier to this goal, and eliminating this complexity is simply more important than getting the "fairness" exactly right.

4.6 Practical fare structure options

As already discussed, notwithstanding the implication of the *MyZone* name the April 2010 *MyZone* fare changes have not introduce general zone-based fares in Sydney. Train, bus and ferry fares continue to be distance-based and continue to use different distances to determine their fares, and the only zone-based system is the successor to the zone-based *TravelPass*, now called *MyMulti*.

So what are the options now?

4.6.1 The extreme of simplicity: flat fares

The "thought experiment" in section 4.5.2 involved a hypothetical fare system that would be massively complex but perfectly fair.

With "flat fares" we are looking at the option of a fare system that embodies the opposite extreme.

Some fare systems charge the same flat fare for a ride of any distance, including free connections. In these systems, the fare usually purchases a pass that is good for one to two hours.* Once you have paid the fare, you can ride any number of buses, trains, trams or ferries to complete your journey. A side effect of the free connections, which some people consider a real benefit, is that you can make brief stopovers during the trip without paying another fare.

As observed above, simplicity and fairness pull in opposite directions. The flat fare—the simplest fare of all—is the least fair, in the sense that you pay the same fare to ride 1 km as you do to ride 30 km.

Understandably, flat fares tend to be most common in smaller urban areas. but there are exceptions.

Los Angeles, for example, has a flat fare on most of its buses, light rail and metro services, easily used for trips of 40 km or more. Higher fares are charged for commuter rail and express buses.

The largest Australian urban area with a completely flat fare is Canberra, where the longest possible transit trip is a bit over 30 km. The base single ride fare in Canberra is currently $3.80, much higher than Sydney's because Sydney's lowest fare is only for a short distance while Canberra's flat fare must be averaged over all trips of all distances.

This presents both a fairness issue and a problem with transitioning. If a flat fare were suddenly introduced in Sydney there would be dramatic fare increases for most people making relatively short trips (to some extent this has already happened with the *MyZone* changes, which have introduced a flat fare component for buses and ferries, albeit only for *MyMulti* tickets). The larger the area covered by the flat fare, the bigger this sudden increase would be.

One compensation for customers making short errand trips, such as trips to the local shops, would be that the entire return trip would often be able to be done with only one fare. This is generally considered a positive feature of such systems, as it provides value to people whose fares are higher than they would be under a graduated, distance-based system.

A flat fare over the whole of Sydney would clearly represent an excess of simplicity, because Sydney's distances are so great that this would require a massive cross-subsidy of longer trips by shorter ones, even greater than the cross-subsidy involved in the *MyZone* changes' reductions in longer distance fares.

Encouraging local public transport use is just as important as encouraging long-distance use, especially in dense areas where there simply isn't room for everyone to drive. Sydney's future fare system must make sense for *both* kinds of trips.

* Some North American systems do not offer a free transfer but do offer a day pass, purchased from any driver, that is priced around, or just above, twice the base fare. This has the effect of providing a free transfer for return trips.

4.6.2 A compromise between simplicity and fairness: 'zone' systems

As cities throughout the developed world have addressed these tradeoffs, by far the most common response has been some form of "fare zone" system.

Zone-based fares are almost universal in local public transport systems in Europe and North America, although, as noted above, some North American cities do have flat fares, the equivalent of a zone system with just one zone.

As in flat fare systems, under a zone system the base fare usually buys a one to two hour pass that allows you to ride multiple vehicles to complete your trip.* However, your travel is limited to travel between origins and destinations located within or between the particular pair of geographically defined zones for which you've paid your fare. For example, in Melbourne's simple two-zone system, you can pay a one-zone fare for travel entirely in Zone 1 or entirely in Zone 2. To go between Zone 1 and Zone 2, you pay a two-zone fare.

Zone systems are sometimes discussed as though they are an alternative to distance-based fares, but this is not quite right. Zone systems are *simplifications* of distance-based fares. They do keep track of distance, but in a way that is cruder and therefore easier to understand.

A particular benefit of using zones is that in the innermost part of the city, where local public transport demand is highest, passengers effectively enjoy the simplicity of a flat fare because all their trips are in the same zone. The same, of course, is also true of most areas.

There are many kinds of zone systems. They generally differ in two ways: the *shape* of the zones and their *size*.

The size-related tradeoffs are simple: smaller and more numerous zones yield a finer calculation of distance at the expense of increased complexity.

The shape-related tradeoffs are also important, and often the most critical choices.

4.6.3 Zone shape options: concentric, irregular or grid?

Concentric zones

In a concentric zone system, the CBD or core part of the city is "Zone 1" and the other zones are concentric bands extending outward.

Concentric zone fare systems therefore charge more or less for different distances travelled towards or away from the CBD, but offer a flat fare for travel in orbital directions.

Examples of cities with integrated fare systems using concentric zones include Perth, Brisbane, Melbourne, London and Paris. In North America, cities that do not have flat fares usually have concentric zones.

The tradeoffs involved in a concentric zone system can be illustrated by considering an example from Perth (***Figure 4.2***). Fremantle, in the southwest portion of this map, is in Zone 2, so a two-zone fare must be paid to reach the Perth CBD,

* Once again, some American systems do not offer this free transfer but instead offer a day pass priced at not much more than two one-way trips. Passengers who need to transfer can benefit from these passes if they are making a round trip.

Figure 4.2. *Perth's concentric fare zone system.*

which is in Zone 1. However, it is possible to travel due east from Fremantle for a similar or even longer distance while remaining in Zone 2, paying only a single-zone fare.

One important and common modification of the concentric system can be to have a very large Zone 1 covering most of the core of the city. ***Figure 4.3***, for example, shows a portion of the zone map for London. All of central London, including the entire loop of the Underground's Circle Line, is in Zone 1, generating a flat fare for local trips throughout this area.

The argument usually advanced for simplifying distance-based fares by using concentric zones is that the most expensive public transport infrastructure is

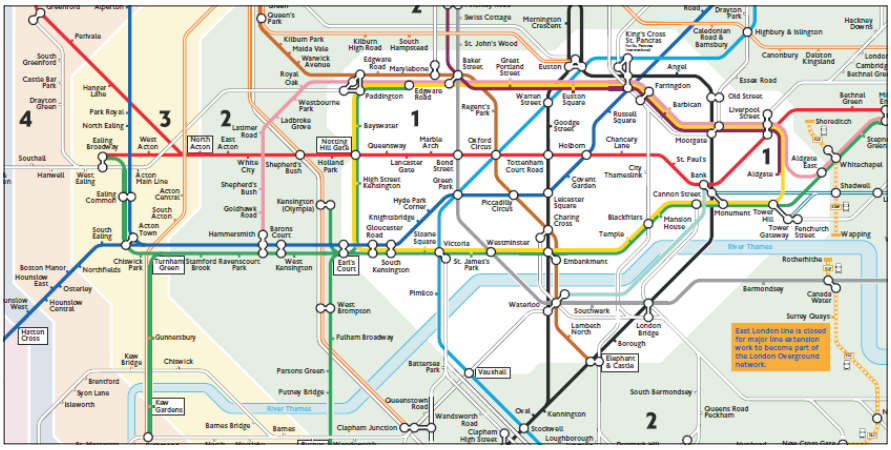


Figure 4.3. *Portion of London fare zone map.*

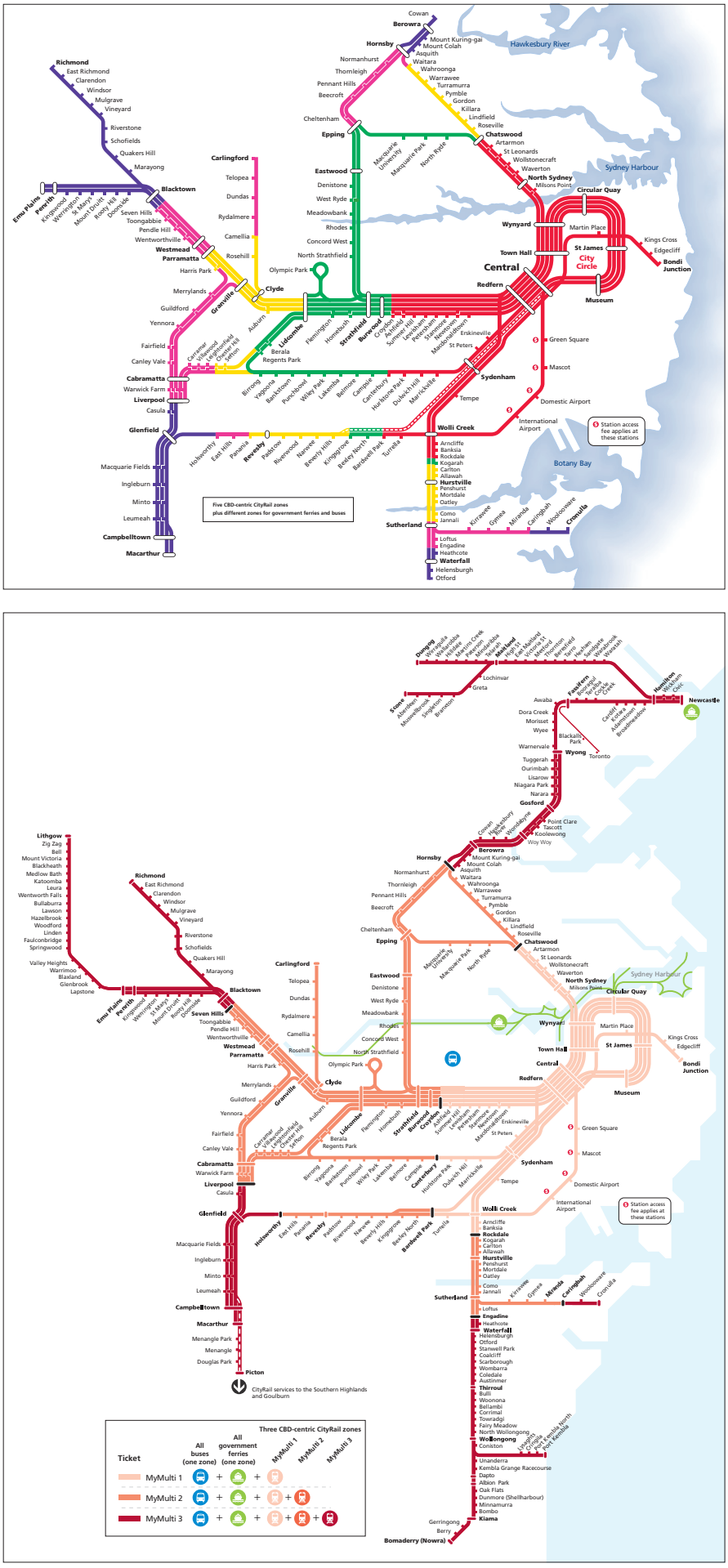


Figure 4.4. *The old TravelPass rail zones (top) and new MyMulti rail zones (bottom), both for multi-modal tickets only: two examples of concentric fare zones, strongly focussed on the CBD.*

designed for access to the CBD and the most expensive services to operate are peak-only services which are driven mostly by commuting to and from the CBD, so it makes sense to charge a higher fare for trips that use this capacity.

This argument is easy to make in regions that have a single dominant CBD, like Melbourne and Perth. But it is harder to apply in Sydney, because Sydney has many centres of employment and much of the expected growth is in non-CBD centres such as Macquarie Park (see sections 2.2.8 and 2.3). Indeed, Parramatta, which is often called Sydney's "second CBD", is near Sydney's geographic centre, so there is certainly room for debate about where the centre of a set of concentric fare zones in Sydney might be.

It can still be argued that even though there are other centres in Sydney, the main Sydney CBD is still the centre that requires the most expensive infrastructure and peak services (see sections 3.2.8, 3.3 and 3.5). There is also a reasonable case that if the goal is to stimulate the growth of other centres such as Parramatta, a fare system that discounts travel into these centres, compared to trips to the CBD, can help to serve this purpose. A concentric system with the Sydney CBD as Zone 1 would certainly help to achieve this goal.

There is already a precedent for concentric zones in Sydney. Like its predecessor, *TravelPass*, the *MyMulti* multi-modal ticket system uses concentric fare zones for its rail system component (***Figure 4.4***). It is not hard to imagine the possible application of these or similar concentric zones to all modes—not just rail, but also ferries, trams and buses—as part of changes to create an integrated fare structure. Possible CBD-centric zones for one of several such concepts examined by the Inquiry during its investigations in 2009 is shown in ***Figure 4.5***.

However, the multi-centricity of Sydney calls for at least the consideration of other types of zone systems which would be better at keeping track of distances in any direction.

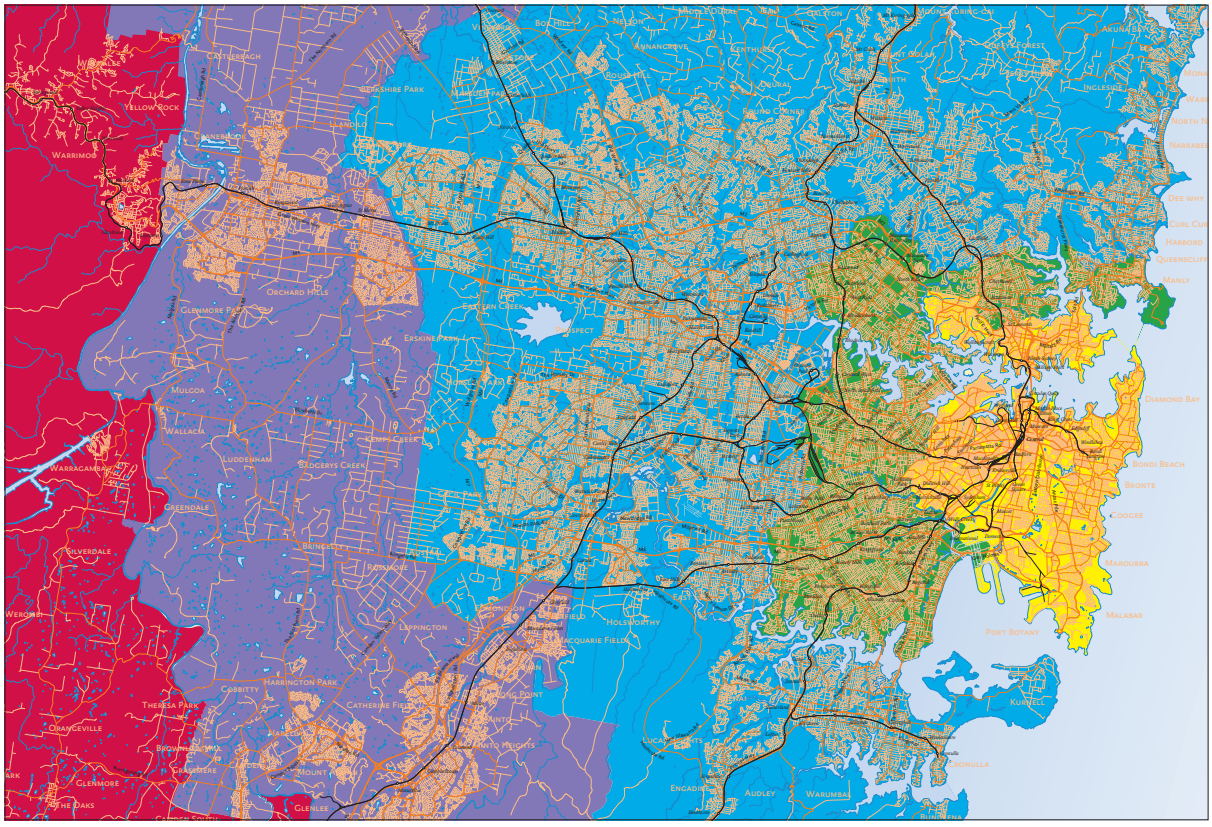


Figure 4.5. *Possible CBD-centric zones for one of several integrated fare concepts, for all modes, examined by the Inquiry.*

Irregular zones

An opposite extreme in the shaping of zone systems is provided by the system in Zurich (***Figure 4.6***). Its zones are best described as "patches", and have no particular shape. A trip from one zone to another may cross a number of other zones, and the zones' numbers are of no use in figuring out the number of zones that a trip requires.

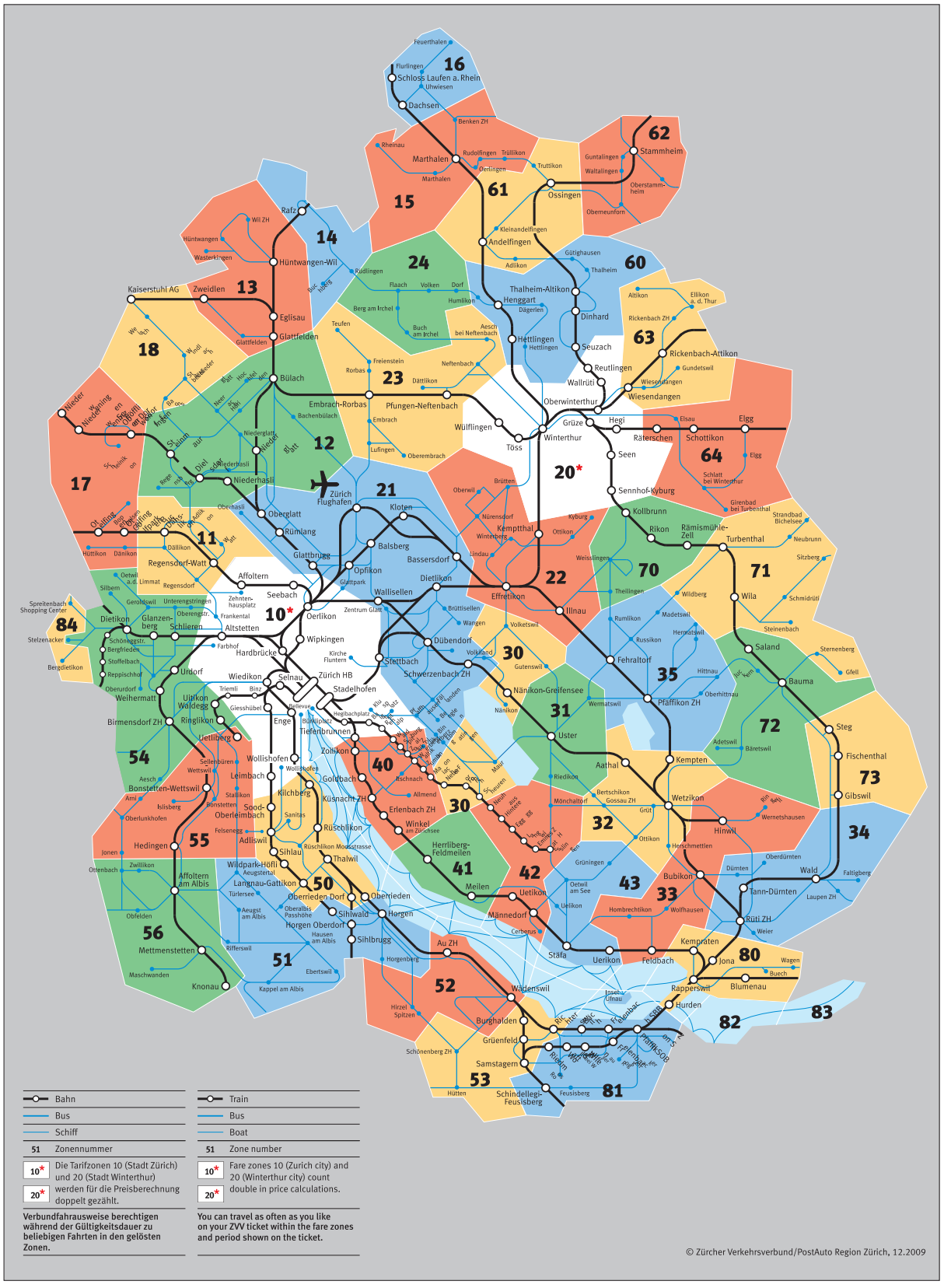


Figure 4.6. *Zurich's irregular zone system.*

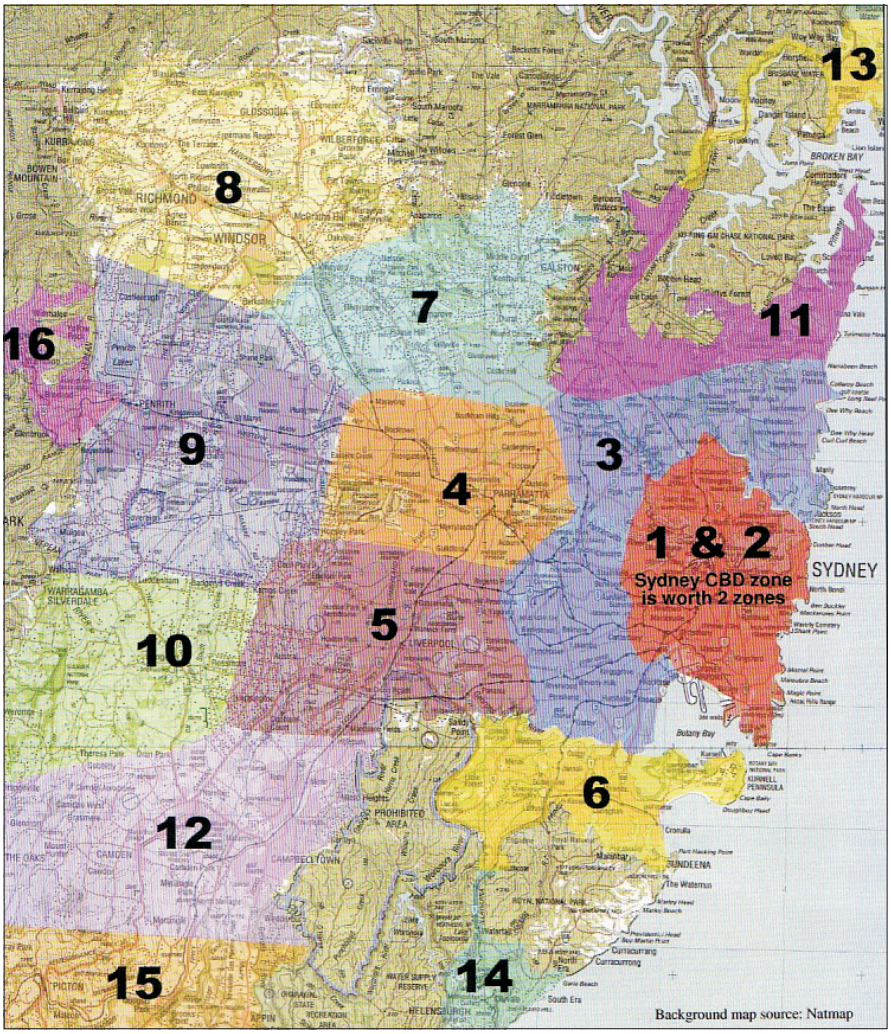


Figure 4.7. *David Caldwell's concept for a Zurich-style zone system for Sydney.*

This system is close to being "fair" in approximating distance-based fares in any direction—but as always, fairness is achieved by sacrificing simplicity. It is a relatively complex system whose logic is generally not apparent to the new user.

Clearly, a non-concentric fare zone system can be substantially more complex than a concentric system. In a concentric zone system, for example, the number of zone boundaries you are crossing is simply the difference between the origin and destination zone numbers. No such simplicity is possible in Zurich.

In some cases, irregular zones such as Zurich's can be acceptably legible if they correspond to geographic units with which most users can be expected to be familiar. In Sydney, for example, Local Government Areas might conceivably be used as zones.

In a recent *Transit Australia* article David Caldwell suggested a concept for an irregular zone system for Sydney, based on the Zurich model (***Figure 4.7***).* Under this scheme, as in Zurich, your fare or pass cost would depend on the number of contiguous zones you need to pass through on your trip, including your origin and destination zones. The lowest base fare would buy a "1-2 Zone" ticket, thereby ensuring that short trips that happened to cross a zone boundary would not be penalised.

* David Caldwell, "A Ticketing Revolution Part 4: Fair Fares for NSW Public Transport", *Transit Australia*, April 2008

Grid zone systems

A possible compromise between "simple but arguably unfair" concentric zones and the "fairer but arguably confusing" irregular zones of Zurich would be to lay out zones in a more formal and regular grid pattern. A rough example of what this might look like for Sydney is shown in ***Figure 4.8***.

This is not a proposal, but it might be a useful starting point for one.

Under this system, zones would have "co-ordinate numbers", such as C20 for the City of Sydney. You would pay for all the zones through which you pass, but your first zone boundary crossing would be free, to avoid having to pay a two-zone fare on very short trips which happened to cross a boundary.*

To further reduce zone penalties on short trips, major centres could be sited on zone boundaries so that they could be reached from either zone. For example, in the scheme shown in *Figure 4.8*, the Chatswood station and bus-rail interchange could be on the border between zone B22 and zone C22, so that it could be reached for , using only the base fare, from as far west as Epping (D22, because the first zone is free) or as far east as Manly (A22).

This would be a more complicated system than using concentric zone numbers, but easier to use than Zurich-style irregular zones, because it would be possible to figure out how many zones you need to cross directly from the zone numbers. For example, a trip from the City of Sydney to Parramatta would be a trip from zone C20 to zone F21, which is four zones (three over and one up).*

The grid system sketched in *Figure 4.8* would obviously need to be refined so that its actual zone boundaries would work well with their local and network

	etc. west-ward	H	G	F	E	D	C	B	A
etc. north-ward						*zone system can continue northward*			
24						Berowra Cowan			Palm Beach
23		Richmond	Windsor	Vineyard		Hornsby	Gordon, St. Ives	Terrey Hills	Narrabeen, Mona Vale
22	*zone system can continue westward*	Castlereagh, Londonderry	Marsden Park	Rouse Hill, Schofields	Hills Shire	Epping, West Ryde	Lane Cove, Macquarie, Ryde	North Sydney, Mosman	Manly, Brookvale
21	*zone system can continue westward*	Penrith	Mount Druitt	Blacktown	Parramatta	Homebush, Rhodes	Sydney Harbour (no internal destinations)		
20			Badgery's Creek	Wetherill Pk	Granville Fairfield	Strathfield	Ashfield, Leichhardt LGAs, Enmore	City of Sydney	Woolhara, Waverly LGAs, Randwick-Coogee
19				Bonnyrigg, Hoxton Park	Liverpool	Bankstown	Dulwich Hill, Marrickville	Mascot, Airport, Botany	Maroubra to La Perouse
18				Leppington	Glenfield	East Hills	Padstow, Hurstville	Wolli Ck, Rockdale	
17				Narellan, Camden	Campbelltown		Sutherland, Menai	Miranda, Cronulla	
etc. south-ward				*zone system can continue southward*	*zone system can continue southward*		*zone system can continue southward*		

Figure 4.8. *A highly indicative concept for a possible grid fare zone system to Sydney.*

geography. The purpose here is simply to illustrate a possible way of defining zones that would be (a) easy for a customer to understand and (b) fair in the sense of applying more or less equal charges to travel in any direction. Grid zones might well be the best solution for achieving both of these objectives.

Of course, for the reasons already discussed the "fairness" of such a system would still be approximate. As always, simplicity could be sacrificed for fairness by making the zones smaller or fairness could be sacrificed for simplicity by making them larger.

It's all relative

The Inquiry recognises that many readers may find it hard to identify the pros and cons of all the possible new Sydney-wide fare zone systems and, at least initially, to understand the indicative maps of the various types of options for the shaping and sizing of zones.

However, it should be remembered that ***any* of the systems discussed above would represent a huge improvement over the existing Sydney fare systems, which are vastly too complicated to attempt to map in a system-wide way at all.**

***Any* zone system would be radically simpler than what we have today.**

In addition, although the purpose of the zone map would be to enable people to work out their fare in advance, passengers would always also have the option of looking up their fare using (for example) CityRail's ticket machines or 131500 on the web. Public transport staff would still have to answer questions about calculating fares, but after a transition period there would be fewer of these questions, and in all cases the answers would be simpler and thus easier and faster to provide.

4.6.4 Common tweakings of zone systems

Many of problems potentially created by fare zone systems can be resolved in their detailed design, without creating difficult exceptions or complexity.

For example, one common complaint is that a very short trip that happens to cross a zone boundary is hit with an unfairly large fare. As already discussed, this can be addressed by making the first zone boundary crossing of any trip free, assuming the system has relatively small zones, such as the grid concept presented above.

Two other common solutions to the problem of short trips across zone boundaries are to:

- Ensure major centres located near a zone boundary can be reached without a fare penalty from either zone (e.g. the Chatswood example under the grid zone concept presented above). This can be especially helpful if the centre is also an interchange point.
- Include small overlap areas that are in both zones, as is sometimes done in Melbourne.

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* (*previous page*) One potential problem arises with "C-shaped" trips, where the physical network forces you to go through more zones than the direct distance would suggest. Examples of this in Sydney might include a trip from Manly to Bondi, which would have to through the City of Sydney zone, or one via rail from the City of Sydney zone to Cronulla, where the geography of the rail network would force you to go through Sutherland, a zone further west. A grid zone system might best handle this by requiring you to buy a zone fare between the zones occupying the *opposite corners* of a rectangle drawn around all the zones your trip would use. For example, for a trip from Manly (A22) to Bondi (A20), which would have to go through the B column, the required fare would be the fare for a trip from zone A22 to zone B20, or three zones.

The imposition of zone boundaries on a dense inner city area can impose zone fares on a large number of trips that are all relatively short, in areas where high demand means that simplicity is particularly valued. As noted in the London example above, many European cities deal with this by having a very large central zone, within which the fare is flat, and imposing zone fares only for travel further out, where demand is lower. Again, because complexity has a cost in terms of the staff time needed to explain it, if a large share of patronage can be handled using a flat fare both staff time and customer time would be able to be used more efficiently.

4.6.5 Sydney Light Rail and the Airport Line

Fare integration in Sydney will obvious have to include the integration of fares on privately owned public transport services that currently have premium fares, so that they can function as integral parts of the network.

Because private bus operators already pay all their fare revenues to the government, there would be no major private sector impacts in switching to standard fares on their services.

The privately operated (and premium-priced) Sydney Metro light rail services and stations on the Airport rail line and Sydney's private ferries are also vital parts of any future integrated public transport network in Sydney, and must therefore also be included within the integrated fare system.

Ideally, the government should either buy out the interests of the private sector operator of the Airport Line stations or pay shadow fares on the entire Airport Line in the same way that it now subsidises tolls on the M5 motorway, so that users of all of the Airport Line stations would have to pay only standard fare for their zone(s). *At the very least* a surcharge should apply to the Airport stations only, and even then all multiple-ride fares not intended for tourists should be excluded from the surcharge.

4.7 Recommendations

Recommendation Fares 1:

Integrated fare levels and structures for all public transport services in Sydney should be developed, reviewed and amended by Transport for Sydney (**Recommendation Gov 1**) in a public and transparent way through the initial development processes and subsequent four-yearly updating processes established for the *Public Transport Network Plan for Sydney* under **Recommendation Gov 2**, with inputs from and approvals by the NSW government and agencies such as IPART as recommended in **Recommendation Gov 4**.

Recommendation Fares 2:

The first priority in fixing Sydney's public transport fares and ticketing should be to develop and implement immediate improvements to Sydney's fare systems, using currently installed ticketing technologies, which will, as much as possible,

- Overcome the critical problem of interchange fare penalties
- Cover both multi-modal and multi-vehicle trips
- Apply the same fares structure and levels to all modes of public transport, including light rail and ferries, without surcharges for private sector stations or operations
- Remove the current *MyMulti* system's discrimination against western Sydney journeys by introducing additional rail zone combinations
- Introduce shorter term *MyMulti* tickets (e.g. two-hour and four-hour)
- Introduce cheaper daily and shorter term *MyMulti* tickets that do not force passengers to unnecessarily buy expensive tickets covering the entire rail network
- Genuinely simplify fare structures and practical day-to-day fare-paying experiences *from the passenger's perspective*, and
- Significantly reduce the data processing loads imposed on existing ticketing systems and any future smartcard ticketing systems.

Recommendation Fares 3:

The option of a single and potentially free public transport fare zone in the Sydney CBD should be examined as a way of immediately simplifying fare structures, eliminating CBD interchange fare penalties, eliminating other CBD fare anomalies and maximising the efficiency, convenience and attractiveness of CBD public transport systems for both users and operators.

Recommendation Fares 4:

Any long-term, permanent integrated fare structure for Sydney should:

- As an essential prerequisite for efficient public transport network design, cover all modes of public transport in Sydney and imposes fares that do *not* depend on the mode(s) or number of connections required, and
- While acknowledging that a tradeoff between simplicity and fairness is unavoidable, emphasise simplicity, so that customers can readily calculate their fares in advance and the fare system is easy to implement and enforce and transparent, both before and after smartcard ticketing.

Recommendation Fares 5:

Once a long-term fare policy has been established (**Recommendations Fares 1 and Fares 4**), every effort should be made to identify aspects of this policy that can be implemented sooner rather than later. (For example, even measures that did nothing more than eliminate fare connection penalties within the STA bus system would unlock significant possibilities for network efficiencies, improved services, improved mobility and reduced CBD bus congestion.)

Recommendation Fares 6:

Any smartcard ticketing system should be based on the immediate-term fare principles described in **Recommendation Fares 2** (as relevant) and the permanent fare principles described in **Recommendation Fares 4**.

Recommendation Fares 7:

If it is not possible to have a high degree of confidence that a smartcard ticketing system will be *fully and successfully* operational within three to five years, consideration should be given to the option of delaying smartcards for a decade or more and instead proceeding, in the interim, with the next generation of magnetic stripe ticketing technologies.

The Inquiry would have dwelt less on the short-term possibilities for changes to Sydney's fare systems if it had been able to be more confident that Sydney will have a fully workable smartcard within three to five years.

But the history of Sydney's efforts on this front is far from encouraging, and even Melbourne, with its far simpler fare system, is having numerous delays and disappointments with the implementation of its own new smartcard system. So at this stage a multiple-pronged approach is essential.

Fare issues are always difficult, but because Sydney's current fare structures are such a major obstacle to much of what the Inquiry seeks to achieve they simply *have* to be addressed.

A FLAT FARE AND NO CONNECTION PENALTIES FOR MOST BUSES?

The Inquiry has given serious attention to a proposal to charge a flat fare on buses, while eventually going to a zone-based system for trains, trams and ferries.

London does this, in the context of a network where buses play a huge role in short-distance public transport but rarely run long-distance express trips, especially into or out of the city.

The great attraction of a flat fare on buses is that it could be implemented quickly and quite easily, as the new *MyMulti* ticket's "flat" bus fare component has illustrated, and would achieve immediate benefits, especially within the STA area, where service could be substantially redesigned to take advantage of the free bus-to-bus transfers.

Such a network (sketched in section 5.2.4 in Chapter 5) could reduce CBD bus volumes, improve frequencies between non-CBD destinations and generally improve travel times throughout much of the inner city.

Under the concepts developed by the Inquiry the only exception to the "flat fare" policy would have been certain routes that carry large numbers of passengers over long distances, really doing what a rail line normally does. The largest such market is the M2 corridor, but the STA's Palm Beach-CBD corridor could also fall into this category, as could the direct Parramatta-Chatswood and Parramatta-CBD services.

Charging a flat fare on very long bus routes would intensify the problem that arises where a long bus route duplicates what a railway line does: the flat bus fare would make the bus even cheaper than today's fares do. This fare differential would shift more patronage from rail to bus, which is usually not desirable from an overall cost-effectiveness perspective.

With these possible exceptions, **under the concepts developed and investigated by the Inquiry a single flat fare would buy a two-hour pass, permitting unlimited use of the buses within two hours of the passenger's initial boarding.**

Under this arrangement drivers and inspectors would no longer be concerned with keeping track of passenger destinations. Only the two-hour validity period would need to be checked. On boarding a non-Prepay bus, a passenger would need to either pay a fare or show an existing fare receipt (or validated *TravelTen*) to the driver. The driver would simply check that the receipt was less than two hours old.

A flat fare on buses would be much higher than today's minimum fare, which is currently $2.00 for trips up to about 3.2 km. For revenue-neutrality it would be likely to be between $3.20, CityRail's current (April 2010) adult single minimum, and $3.70, which is the current minimum in Melbourne.

An additional possibility examined by the Inquiry, and still worth considering, would be to set the *cash-on-boarding* fare to $4.00, to further encourage prepayments. (The rounded dollar amount would also simplify cash handling, speeding up cash transactions.) If this approach were adopted the *prepaid* cash fare (e.g. the *Travel Ten's* cost per ride) could be a bit lower than it would otherwise be.

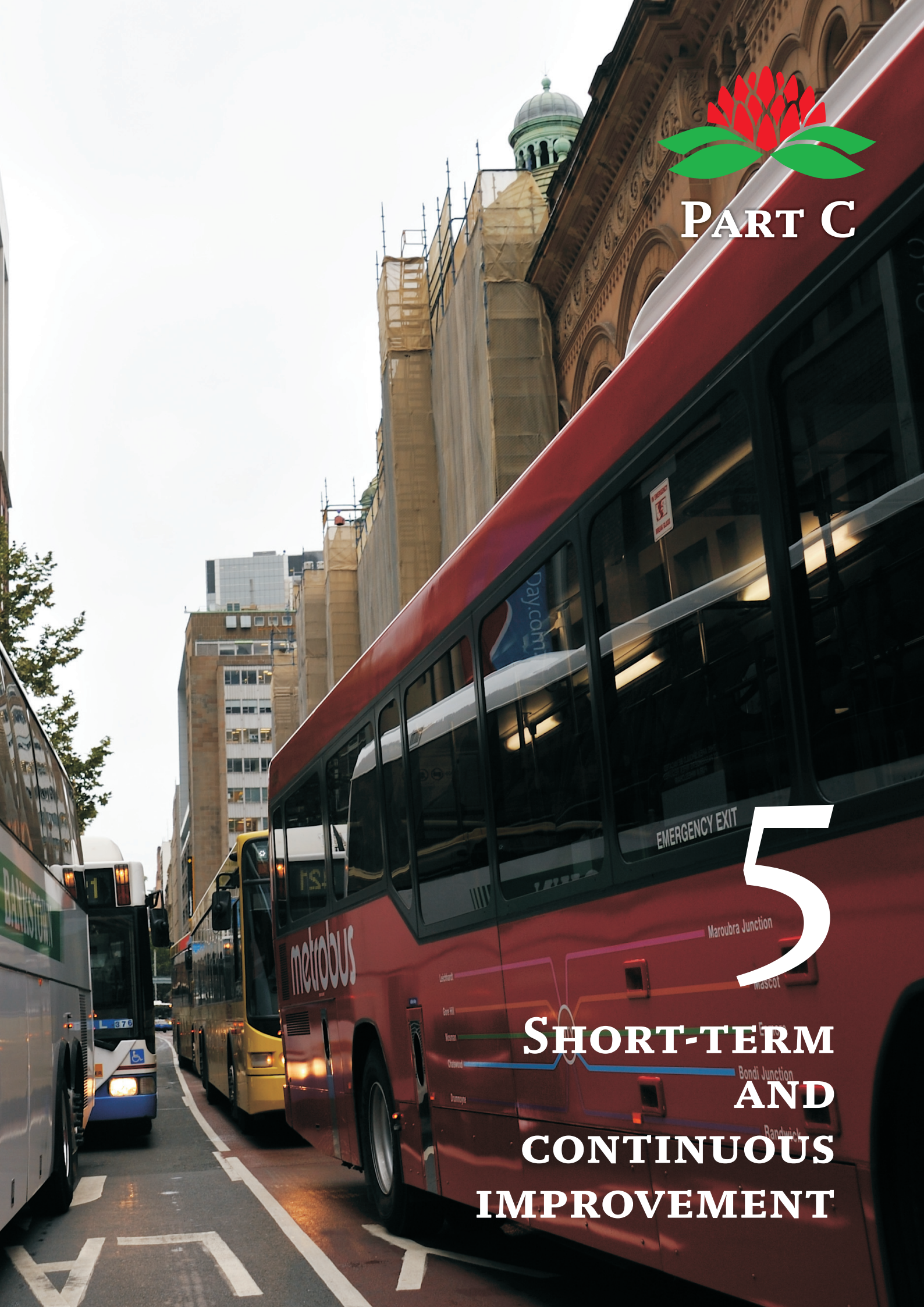
As with any change, there would be winners and losers. The losers would include users currently making short trips, who would see their fares rise substantially. However, many of these users would benefit from the two-hour validity of the new fare; in many cases they would be able to spend up to an hour and a half at their destination and return to their origin just using the one ticket at a fair price. They would also be able to make stopovers along the way, facilitating the use of public transport for the more complex multi-stop errand trips that are a common part of urban life.

There would be no restrictions on passengers' routes or number of interchanges. All that would matter would be the requirement for the final boarding to be within two hours of the date/time printed on the ticket or on the validation of a *Travel Ten*. *Travel Ten* and prepay users would not dip their ticket when interchanging.

The possibility of introducing a free fare on buses, at least within the STA area, is intriguing, because the concept's execution would be simple enough not to require a firm decision about a smartcard system.

The primary reason the Inquiry has decided in the end not to recommend the rapid introduction of flat fares on buses in this *Interim Report* is that **the Inquiry would rather see a permanent logical system than a short-term "fix".**

An interim flat fare on buses might effectively preempt the community debate on the best long-term public transport fare structures for Sydney, by setting up a system for just one mode with relatively large zones. It could prove very difficult to move in the future from flat bus fares to a zone system if that were ultimately identified as the best possible solution.



Part C

5

Short-term and continuous improvement

5 Short-term and continuous improvement

It's been easy, in Sydney, to get the impression that the only debate about transport is about major infrastructure projects that will take many years to build.

In fact, however, *effective* public transport planning not only researches and develops long-term options but pays equal attention to **a short-term process of continuous improvement**, both to meet increasing customer expectations and to provide a viable alternative to the private motor vehicle for a significant number of trips.

There also needs to be a focus on opportunities to improve the experience for cyclists and pedestrians, two modes that strongly complement public transport. The pedestrian experience, in particular, is an essential part of almost every public transport experience—yet, as the Gehl study for the City of Sydney has confirmed, this is a field in which Sydney lags well behind global "best practice".

In short, in addition to planning for the longer term a successful integrated public transport authority—such as the Transport for Sydney authority proposed by the Inquiry (see Chapter 2)—will be *always* asking itself the question: ***"What relatively inexpensive innovations and improvements to the existing systems will yield benefits in the short term?"***

Although Sydney has serious public transport infrastructure needs, it also has many pieces of infrastructure that are not being used to their fullest potential, including railway stations, busways, ferry terminals and, of course, the train, bus and ferry fleets themselves.

Sometimes short-term improvements can be approached as experiments. As Professor David Hensher has suggested in his submission to the Inquiry,

> *"Well, let us recognise that there may be some very low cost initiatives that can be tested, and if they succeed then build on them; if they do not succeed then stop doing it... There may well be some initiatives that can be tested immediately that might be the basis of identifying if there is a serious market of patronage growth that is worth focussing on, even with longer term, more costly investments involving non-reversible commitments."*

Not all short-term improvements can be approached so experimentally, of course, but the spirit suggested by Professor Hensher should certainly be applied as part of Sydney's thinking about continuous improvement.

For example, when a new type of vehicle, shelter or other infrastructure item becomes available, the first impulse is often to spread them evenly around the system so everyone has a chance of using one. The "experimental" approach might suggest the opposite: it might be better to concentrate the first rollout in

one area so they become the norm there, making it possible to measure the vehicles' effects on patronage. Localised experiments such as this, undertaken in different parts of Sydney, would be newsworthy for all of Sydney, thereby helping to maintain both the reality and the community's awareness of continuous, constructive efforts to improve the system.

An effective Transport for Sydney authority (Chapter 2) should therefore include staff and budgets devoted to delivering short-term improvements on a continuous basis.

And even while Transport for Sydney is being established, the Government could achieve some relatively quick "wins" if it focussed its energy and political leadership on some of the key recommendations discussed in this chapter.

Recommendation ST 1:

In addition to addressing longer term issues, the *Public Transport Network Plan for Sydney* (**Recommendation Gov 2**) should set out plans and processes for short-term and continuous improvements to Sydney's public transport services, including improvements to the utilisation, usefulness, reach and attractiveness of existing public transport infrastructure and resources.

The rest of this chapter examines the opportunities for short-term improvements in rail services (section 5.1), bus services (section 5.2), the Sydney CBD, including new light rail services and amended bus services (section 5.9), other inner Sydney light rail services (section 5.4), ferry services (section 5.5), taxi services and demand-responsive transport services (section 5.6), public transport interchanges (section 5.7), public transport information systems (section 5.8), cycling facilities (section 5.9), pedestrian facilities (section 5.10) and the application of funding raised by the Parking Levy (section 5.11).

5.1 More and better rail services

In the "short-term improvements" component of the public opinion survey commissioned by the Inquiry (Chapter 1) the single most desired improvement was increased service frequencies on the rail network.

Improvements in both peak period and off-peak rail service frequencies in Sydney cannot, need not and should not wait for the decades-long process of building a "metro" network.

As detailed in section 3.5 of this *Final Report*, in the longer term improvements in peak period service frequencies throughout the existing and future heavy rail network will be feasible only if there is additional track capacity into and through the CBD and across the Harbour.

But in the short term there is much can be done to provide significant improvements in peak period train frequencies in the interim.

Sydney should be looking *now* at how to run its existing rail system at frequencies that would deliver "metro-style" mobility wherever we already have railways and high enough urban densities to generate the demand.

And in the short term there is also a very great need, and many opportunities, to:

- Increase train service frequencies during off-peak periods as well, and
- Significantly improve rail travel times in both peak and off-peak periods.

Sydney's existing rail system needs to be re-invigorated with a sense of urgency and a real appreciation of the importance of its customers' time, comfort and convenience.

Recommendation ST 2:

Peak period rail service frequencies should be improved as soon as possible, with minimum service frequencies of 20 trains per track per hour, where feasible, in the core of the rail system (from Parramatta, Chatswood, Hurstville, the Airport and Bondi Junction into and through the CBD), utilising measures to reduce station "dwell" times and other measures discussed in this *Final Report*.

All of this is possible with leadership, resolve and a renewed sense of pride in the application of expertise to serve the needs of the community.

5.1.1 Improving peak period rail service frequencies

Even without expensive (and not yet completely proven) new train control and signalling technologies, the core parts of Sydney's existing rail network can operate reliably at 20 trains per track per hour or one train every three minutes (in the case of some lines through the highly congested Town Hall and Wynyard stations, only just).

On many sections up to 24 trains per track per hour would be possible (see ***Thought Provokers #2 and #3*** and ***Appendix 3***).

These high service frequencies are very close to the frequencies associated with driverless "metros", and Sydney already has sufficient population and employment densities to support such frequencies on many key segments, especially in the inner areas.

Some sections of the CityRail network, including the North Shore and Western line through the CBD and across the Harbour Bridge, already operate at almost 20 trains per track per hour during peak periods.

Achieving service frequencies of 20 trains per hour more generally, without adversely affecting the "on-time running" performance of these services, would require additional trains plus careful attention to the details which help make or break efforts to run a truly efficient and modern railway.

In inner Sydney areas the signalling system itself is technologically very competent, capable of supporting up to 30 trains per track per hour, but train frequencies (and thus peak patronage capacities) are limited by the combined impacts of other factors, including the lengths of time trains have to stop at congested stations, as outlined in ***Thought Provokers #2 and #3*** and discussed in more detail, for some of these factors, in ***Appendix 3***.

Crucial details which need to be addressed include:

- A wide range of measures—many of them small, but cumulatively important—to reduce the time trains have to spend stopped at stations (in railway parlance, station "dwell times").

  Station dwell times at congested CBD stations like Town Hall, Wynyard and parts of Central are a critical limiting factor in determining the service frequencies able to be achieved in practice on lines through the CBD.

  The short-term measures to improve station dwell times can start with very simple things, such as:

  - Timetable changes that more evenly space express and slower (i.e. more frequently stopping) services, so there is less congestion caused by passengers waiting on the platforms for later services (some tentative improvements of this nature were introduced in the 2009 CityRail timetable, but much more could be done)
  - Incremental improvements to the layouts of congested stations, to improve passenger flows to, from, between and along the platforms (as discussed in Chapter 2, in the longer term much larger scale station layout and capacity improvements will be required)
  - Improved automatic train door opening and closing arrangements (see section 5.1.3 and *Appendix 3*)
  - Customer education and improved "real time" passenger information to:
    - Instil habits that lead to more efficient train boarding/alighting and (for example) encourage passengers to board near the less crowded ends of their trains and then move away from the doorways so others may more quickly board and alight, and
    - Encourage passengers to interchange between different services at the less crowded stations, thereby reducing one of the most important causes of congestion at CBD stations like Town Hall (in many cases these interchanges are possible at several stations), and

- Much clearer on-board announcements to ensure passengers are ready to alight.

- Train operating pattern and timetabling changes to reduce the constraints on peak service frequencies associated with:
  - "Conflicting" train movements at junctions and the entrances to and exits from train "stabling" (parking) yards
  - The deliberate slowing of trains since 2005 (as the changes made then clearly demonstrated, when Sydney's trains are slowed, ostensibly to improve service "reliability", more trains are required for any given service frequency, so when these additional trains are not available—as they haven't been to date—the result is inevitably a reduction in service frequencies as well: overall, slower and fewer trains, all in the name of "improved" customer service!), and
  - Other features of train operating patterns, including unnecessarily extended runs, which reduce the proportion of the train fleet able to run two peak-direction services during the peak period, again producing the same effect.

A determined and immediate effort is now required to address all of these issues.

The box on page 298 summarises the train service frequencies that could realistically be achieved in practice in the short term, if these types of improvements were implemented, following the completion of the *Clearways* projects which have not yet been cancelled (such as two extra tracks between Sydenham and Erskineville, a project originally started in the 1940s) or "indefinitely deferred" (such as the continued duplication of the Richmond line).

It needs to be recognised, however, that these would only be theoretical improvements if there were still insufficient trains to provide the more frequent services.

Indeed, Sydney is already experiencing the constraints of inadequate train numbers. CityRail's 2009 timetable has failed to utilise all of the extra capacity on the Western line created by the opening of the Epping-Chatswood because there simply aren't enough trains available.

In order to actually realise the potential improvements in peak period train frequencies, approximately 20 additional eight-car trains—over and above the number the government currently has on order—would be required.

Recommendation ST 3:

In order to better exploit the latent capacity of the existing rail network and realise the potential improvements in peak period train frequencies, 20 additional eight-car trains, over and above the number the government currently has on order, should be purchased immediately.

This would permit approximately 15 more trains per hour—and therefore about 18, 000 more people per hour—to run on CityRail routes into inner Sydney areas and the CBD during the morning peak period.

How frequent can *Clearways* make us?

The rail *Clearways* program is a set of projects—some now operational, some completed but not yet in operation, some under construction and some still to commence—which are designed to remove several of the operating constraints that have prevented full and reliable use of existing CBD rail infrastructure at a peak frequency of 18 to 20 trains per hour.

Some of the benefits have already become available, and others will emerge in the next few years as the remaining projects are completed.

As discussed in Chapter 3, once these *Clearways* capacity benefits have been exhausted, a new heavy rail route through the CBD and across the Harbour will be essential if the rail system is to cope effectively with the patronage demand expected throughout Sydney.

So what can be expected of the *Clearways* projects, in the short term, in different part of the system?

The Illawarra and Eastern Suburbs line

The two basic projects on this line have been an enhanced "turnback" at Bondi Junction (completed) and duplication of the Cronulla line (under construction). (A third *Clearways* project announced for the line, two extra tracks between Sydenham and Erskineville, has been quietly cancelled.)

The Bondi turnback has increased the capacity of Bondi Junction to turn round trains from the city from 12 to 14 per hour to 20 per hour. It is now physically possible to run trains on the Eastern Suburbs Railway only three minutes apart, only marginally below the frequencies achieved by automated "metros" and by heavy rail systems, such as those in Paris, with highly sophisticated new train control and signalling technologies.

The current maximum service frequency to and from Bondi Junction is only 16 trains per hour, because of capacity constraints at the other end of the line. The Cronulla line's duplication will permit the operation of up to eight trains per hour from this branch line and up to 18 per hour into Bondi Junction, but any further increase would necessitate the elimination of capacity constraints associated with the Sutherland-Hurstville section of the Illawarra line and the merging of services at Wolli Creek.

Southwestern Sydney (the Bankstown, Inner West, South and Airport & East Hills lines)

The routes from Campbelltown, Liverpool via Bankstown and Liverpool via Granville all converge on the City Circle through Circular Quay.

Each route has a combination of local trains and "outer suburban" services which have limited stops in the inner suburbs. This results in complex and potentially unreliable operations, seriously limits train frequencies (and thus patronage capacity) and produces very poor travel times from Liverpool in particular.

Accordingly, the *Clearways* projects for this sector—new "turnbacks" on tracks separated from the "through" lines at Homebush, Lidcombe, Liverpool and Revesby, quadruplication of the East Hills line from Kingsgrove to Revesby and grade separation of the junction at Glenfield— have sought primarily to permit simplified operations.

The turnbacks at Homebush and Lidcombe will reduce the complexity caused by "conflicting" train movements at the at-grade junction at Lidcombe and will allow more reliable and attractive operations on the local line from Strathfield to the CBD, which currently suffers from irregular peak period stopping patterns.

On the East Hills line, the new turnback at Revesby means there is no longer a need for terminating local services to cross in front of express trains from the city at East Hills, where political expediency originally forced the provision of an inadequate turnback at a location known to be undesirable by rail operators. Subsequent works on the line will provide a second terminating platform at East Hills, permitting services to be timed to optimise their arrival times on the City Circle, and additional tracks that will completely separate "limited stop" and "all stops" services.

In conjunction with the extra platform at Liverpool and the freeing up of movements by grade-separating Glenfield Junction, these enhancements will enable capacity through the City Circle to be lifted to 36–40 trains per hour.

Northern, Western & North Shore lines

The commencement of through services on the Epping-Chatswood line in 2009 has released capacity for more Western line services between Strathfield and the CBD, because suburban services from Hornsby now use the new line rather than the route via Epping.

Supporting works under the *Clearways* program have included an extra terminating platform at Berowra, to avoid delays to through services to and from the Central Coast, and duplication of the Richmond line from Quakers Hill to Schofields. The previously announced duplications beyond Schofields, to permit more services to and from the expanding northwest sector, have, however, been "deferred".

Under the 2009 timetable an additional three Western line morning peak trains now enter the central CBD (one of them is a service which previously terminated at Central), and if sufficient trains were available the increase in Western line service frequencies could be extended to four per hour over a longer period.

Additional trains could also be operated into the Sydney Terminal platforms at Central station as an interim measure, but this would be limited to only about six additional trains per hour and they would not be attractive for many commuters, as they would have to change to another train on a different platform to continue further north into the CBD.

Conclusion

If the completion of the *Clearways* program were accompanied by the acquisition of approximately 20 additional eight-car trains, over and above what the government currently has on order, approximately 15 more trains, and therefore about 18, 000 more people, would be able to access the CBD by rail in the morning peak hour.

This would equate to roughly an 18% increase in the rail system's patronage capacity into the CBD, probably sufficient to cater in the short term for six to eight years' growth, depending on fuel prices and trends in the economy.

Much larger opportunities will exist to increase peak capacity to destinations other than the CBD. For example, there is no physical limit to a substantial increase in Cumberland line services from Campbelltown and Liverpool to Parramatta, and this line should be operated all day, at least to Westmead if not to Blacktown.

This would equate to roughly an 18% increase in the rail system's patronage capacity into the CBD, probably sufficient to cater in the short term for six to eight years' growth, depending on fuel prices and trends in the economy.

The additional trains would also permit improved peak period services—or, in some cases, the restoration of completely cancelled peak period services—on other lines, including the Cumberland line from Campbelltown and Liverpool to Parramatta, Westmead and Blacktown.

The Inquiry strongly recommends the rapid acquisition of the necessary additional trains. The government's current contracts for the supply of the new Waratah suburban trains already have provisions for such additional orders.

In the meantime, to ensure there is an adequate train fleet as soon as possible for these higher peak period frequency operations, it may be best to delay the retirement of some of the older non-air-conditioned fleet.

While the Inquiry looks forward to the retirement of the non-air-conditioned fleet as much as anyone, in the immediate future, pending the acquisition of the recommended additional new trains, service frequencies and patronage capacities are frankly more important than having air conditioning on absolutely every train at the peaks of the peak periods.

Peak-period rail benefits of the Inquiry's proposals for bus changes

In a rational transport planning process bus and rail networks are always thought about together.

Among other things, this allows planners to observe the ways bus service options might enhance rail service efficiency and *vice versa*.

One of the key principles behind the long-term busway and "Bus First" road options presented in section 3.5, the integration of all public transport fares as recommended in Chapter 4 and the short-term bus operational improvements recommended in section 5.2 below is the establishment and development of much stronger *orbital* services around the inner parts of Sydney.

Some of these routes will enable inbound rail passengers from outer areas to connect to buses at an earlier point, thus freeing up some capacity on these trains for the last parts of their trips into the CBD.

To take just one example, Bankstown line passengers destined for southeastern areas such as Gardeners Road and Eastgardens would have a frequent bus connection at Sydenham and would thus no longer have to ride all the way to Central to make good bus connections. Similarly, those destined for business parks around Alexandria, Green Square and Waterloo would have new frequent bus connections at Erskineville and St Peters that would be faster than going all the way into Redfern or Central to connect with a bus or train at these locations. This interchanging would, in turn, free up capacity on Bankstown line trains for local passengers to the city boarding at St Peters and Erskineville.

Very similar benefits would arise on the Inner West line.

In short, the Inquiry's bus and rail improvement recommendations reflect i*ntegrated thinking* about how the two modes can best work together—a kind of thinking that is almost impossible under current public transport governance structures in Sydney (see Chapter 6).

Each mode can create either benefits or problems for the other. This is a major reason why Sydney need a single public transport authority responsible for all public transport services, including integrated fares, and all public transport investments for the future, as recommended in Chapter 2 of this *Final Report*.

5.1.2 Improving off-peak rail service frequencies

Probably the greatest "low-hanging fruit" opportunities for short-term improvements in CityRail services arise in the area of improvements to off-peak service frequencies.

Some improvements in off-peak frequencies would be valuable throughout the system, but the denser inner parts of the city need to be thought about separately.

In a number of areas off-peak frequencies have not kept pace with population increases. In many cases they have not changed for half a century, and in others they have actually worsened in recent years.

High-density areas generate all-day demand, yet Sydney's rail system still serves some high-density destinations as though they were low-density outer suburbs for which significant demand can usually be expected only during the peaks.

Near-term investments in operating budgets could turn much of the inner CityRail network into something that feels much more like a "metro," with trains coming within a few minutes of each other all day and into the evening every day of the week.

Priorities for more "metro-style" off-peak frequencies should include:

- Eastern Suburbs and Illawarra line, Bondi Junction-CBD-Redfern-Wolli Creek: at least eight trains each way per hour (currently six on weekdays and four on weekends)
- North Shore line, Chatswood-North Sydney-CBD: at least ten trains per hour each way (currently six)
- Western line, Parramatta-Granville-Strathfield-Redfern-CBD: at least ten trains per hour each way (currently six), and
- Airport line, Wolli Creek-Airport-Green Square-CBD: at least eight trains per hour each way (currently six on weekdays and four on weekends). (This takes account of both forecast airport growth and redevelopment plans around Green Square.)

More moderate frequency improvements should also be sought across the entire system.

Another area of particular focus should be the three intercity lines, the Newcastle and the Central Coast line, the South Coast line and the Blue Mountains line, which cater for a complex mixture of trip purposes which call for good service frequencies well outside the traditional commuting peak period.

For example, all three of these lines serve major recreational destinations, such as national parks, where demand peaks on the weekend, and all compete with freeways which can experience significant congestion, even on weekends.

Many people would welcome an alternative to having to rely on their private car for trips in these corridors. The convenience of a good rail service—and

particularly the ability to do other things while travelling—is especially attractive for the long journeys these lines serve.

In general, longer trips tolerate lower frequencies, but the current gaps, often of 120 minutes and more, are excessive and should be reduced where possible.

Finally, CityRail's practice of performing track inspections on foot around midday on weekdays has entrenched a series of off-peak timetabling limitations and restricted the development of higher service frequencies.

No normal busy suburban railway regularly closes its tracks for inspections during daytime operating periods.

Recommendation ST 4:

The following improvements in off-peak rail frequencies should be introduced as soon as possible :

- Weekend daytime frequencies should match weekday mid-day frequencies
- There should be:
  - At least eight trains per hour each way on the Eastern Suburbs and Airport segments and at least ten trains per hour each way on the Chatswood–CBD and Parramatta–CBD segments, all with reasonably even headways
  - At least four trains per hour (i.e. a train roughly every 15 minutes) each way for most other suburban stations within 25 km of Central (including almost all of the area built before World War 2, which generally has a much higher average density than areas built later)
  - Eight trains per hour each way stopping at Newtown, a significant all-day, every-day activity centre and by far the busiest station currently served only by Inner West line trains, and
  - All-day services on the Cumberland line direct from Glenfield/Liverpool to Parramatta, Blacktown and Riverstone, with at least two trains each way per hour.
- There should be no daytime track closures for track inspections. Modern technologies should be used to carry out all track inspections safely at night.

The recommended increase in the number of trains stopping at Newtown could be achieved by stopping all South Line trains at Newtown. It would be an almost no-cost improvement which would immediately provide an incentive for increased off-peak patronage between Newtown and the CBD stations, while also opening up Newtown's extensive bus connections to rail travellers from the west.

5.1.3 Improving rail travel times

Travel time is important, not just "on-time running".

It is essential for Sydney to move beyond the almost exclusive (and often politically driven) focus on "on-time running" that has prevailed for CityRail services for several years.

The 2005 timetable revision's "solution" to the on-time running problem was crude in the extreme: it simply scheduled trains to run much slower, so they'd be less likely to be "late", and ran fewer services, again helping fewer of them to be "late".

For example, a trip from Central to Hornsby via Gordon took about 44 minutes before 2005, and now takes about 51 minutes. Bondi Junction to Waterfall, all stops, went up from 65 minutes to 73 minutes. This intentional slowness is now entrenched all over the system.

Anyone who pays any attention to what's happening when they ride on a train in Sydney will have noticed times when the train seems to wait at stations much longer than necessary, providing clear evidence that the schedule is slower than it needs to be.

In short, **an excessive focus on a single indicator of rail service performance, on-time running, has been at the expense of another equally important indicator, competitive travel times.**

Modern, successful public transport systems have to be managed so as to address several key indicators at once. On-time running is important, but so are service frequencies and travel times—especially when rail services are competing with private cars, as they are in Sydney.

Recommendation ST 5:

Rail journey times should be restored to those prevailing before 2005 within one to two years at most, and further continuous improvements should be identified in the *Public Transport Network Plan for Sydney* and implemented in the following years.

As already indicated in Chapter 3, these travel time reductions would go a long way towards achieving the types of time savings being claimed by the NSW government for its proposed "Western Express" services, *without* depending on the construction of a $4.53 billion western CBD "City Relief" stub railway line.

Several of the factors needing to be addressed are discussed below. ***Appendix 3*** provides more background detail on some of these issues.

Optimisation of "recovery times"

"Recovery times" are typically built into timetables so that trains can leave major stations "on time" even though they have experienced minor delays.

Some would argue that all such "recoveries" should be at Central, in the case of trains proceeding to or from the City Circle, or at terminating stations. However, the Inquiry accepts the CityRail view that some "recovery time" should be built in at other major stations and junctions.

The problem is that these recovery times are excessive, especially in off-peak periods.

In the days before Sydney's trains had automatic sliding doors their station dwell times could be as low as 15 seconds without affecting the safety of alighting and boarding passengers alighting. It is understood that for its timetabling

purposes CityRail now assumes dwell times of 30 seconds generally and one minute for major stations.

What is happening in practice, however, is that trains are now spending up to three minutes at major stations, even though in almost all cases 30 seconds is all that is necessary for the passengers.

Dwell times

The Inquiry believes more could be done to minimise dwell times generally (and not just at the congested CBD stations discussed in section 5.1.1).

Saving five seconds at 12 stations means gaining a minute. It all helps.

Door opening and closing arrangements should be reviewed. Tangara doors, which are of the plug type, are very slow to open, and generally there is a distinct wait after the doors close before the train actually starts.

Speed limits

In view of the very large sums already spent on upgrading track and infrastructure in the Sydney system, the Inquiry recommends that City Rail should now comprehensively review the level and length of permanent speed limits throughout the system, and advise the public of progressive reductions achieved in overall journey times.

Improvements in this area must obviously be consistent with both safety and passenger comfort requirements. (The speed limits which would apply if only safety were a concern would be much higher than those applying when passenger comfort is also taken into account.) However, the Inquiry believes it should be possible, within the limits imposed by both factors, to take advantage of the improved performance characteristics of newer rolling stock.

In most cases the individual differences in travel times on different track sections are likely to be relatively small, but once again they will add up and it all helps.

Curving speeds

Curving speeds could be increased if extra super elevation could be applied to tracks or if higher cant deficiencies could be accepted.

CityRail operates trains around curves with a wide margin of safety. It may well be that an extra 5 km/h would be acceptable without causing any comfort problem for passengers. Much upgrading of track has taken place in recent years, without any apparent benefit for passengers in terms of journey times.

Slower performing trains

The Inquiry understands that timetables are set on the basis of using the slowest train type that might be used. For suburban trains, this means CityRail's oldest air-conditioned trains, the C and K sets.

Once more new trains (Oscars and Waratahs) have been delivered and the older S, R and L sets (without air conditioning) have been retired, the C and K sets should be quarantined to particular lines and services, so that timetables for all the other services can reflect the superior performance of the newer trains.

5.1.4 Costs, impacts and mitigations

The Inquiry is not in a position to quantify the costs of the short-term changes proposed above, but accepts that the changes would increase power, crewing and maintenance costs and that these would be unlikely to be fully recovered from the farebox.

However, the resultant improvements in both peak and off-peak service frequencies and travel times would address several of the community's principal concerns and priorities, as confirmed by the Inquiry's market research (Chapter 1), and would greatly facilitate inter-modal connections. With road congestion becoming a greater and greater problem, even at weekends, the modal shift to public transport would bring significant wider community benefits.

Recommendation ST 6:

Cost increases should be ameliorated by restoring the practice of using four-car trains instead of eight-car trains on weekends and maybe at night.

This might slightly increase crewing costs, because of the need to split and rejoin trains, but would have a significant impact on rolling stock and infrastructure maintenance costs.

The running of eight-car trains at weekends often achieves very little, as passengers tend to bunch up in the middle of the train. The cars in the middle can be quite full but the outer ones almost empty.

The security of passengers would be greatly enhanced if guards and transit officers only had to deal with four cars, not eight.

The Inquiry does not believe that the service enhancements proposed above would adversely affect the operation of freight trains during off-peak periods. This is, however, a matter that would have to be addressed.

5.2 Better bus services

Bus services might not attract as much attention from the public or politicians as huge new rail or metro infrastructure projects, but they are *not* a "detail" or "afterthought".

As shown in *Figure 3.2* in Chapter 3, **bus travel accounts for almost half of all the public transport trips in greater Sydney.***

In the west buses are not just feeders to railway stations but also provide their own rapid longer-distance services along the three western Sydney transitways. In the denser inner parts of Sydney buses are the primary mode of transport for shorter trips , often carrying intense volumes of passengers over short distances.

As with most aspects of public transport in Sydney, buses are an area of under-investment and disorganised planning.

* In 2007-08 public transport patronage in Sydney totalled almost 590 million, with some 296 million on trains, 206 million on State Transit Authority (STA) buses, 65 million on non-STA buses, 14.5 million on ferries, 4 million on the monorail and 3.5 million on light rail.

They also suffer from the lack of integrated fares. As discussed in detail in Chapter 4, this greatly handicaps the ability of bus services to partner with the heavy rail, light rail and ferry systems to offer complete journeys.

> *"It is going to take years to deliver Metros, no matter the quantity of Federal funding. In the meantime we can quickly achieve metro-like services on major bus corridors (Oxford St/Anzac Pde, Parramatta Rd, Victoria Rd, Military Rd to Northern Beaches, Gore Hill Freeway/LCT/M2 and perhaps cross-regional routes)."* (submission by Peter Egan)

5.2.1 How we got here: the Unsworth reforms and Sydney's bus *Service Planning Guidelines*

Although it still falls short of global "best practice", bus network design in Sydney is now much better than it was a decade ago, thanks to the "Unsworth reforms" of the early 2000s (*Review of Bus Services in New South Wales*, February 2004).

Prior to these reforms, individual bus networks were designed almost entirely by individual bus operating companies which had varying levels of expertise and varying degrees of interest in working across their territorial boundaries.

Under the Unsworth reforms, the previous operator "territories" have been replaced by an arrangement under which the State government pays bus operators for each service kilometre operated, regardless of its location. The operators no longer keep fare revenue, but return it to the government in return for their payments for kilometres operated and, in some cases, a small bonus based on patronage.

This change has eliminated the operators' financial interests in guarding their particular territories and made it easier to plan across the operator boundaries. The Ministry of Transport (and more recently its successor, the Department of Transport and Infrastructure) has taken responsibility for managing network design, with the stated intention of creating an integrated network that will reflect patterns of demand and will no longer be driven by the traditional boundaries between operators.

Under the Unsworth reforms, Sydney is divided into 15 regions, each of which may contain several operators. Each region must have a "lead" operator, which contracts with the government, but may also have "subcontract" operators which report through the lead operator.

The Unsworth report also specified that the number of regions should gradually diminish, with the regions being merged into larger ones, thereby reducing the number of contracts managed by the government while increasing the interdependence of operators and encouraging them to integrate their systems more fully.

The Unsworth reforms have been implemented through *Service Planning Guidelines* published in June 2006, referred to below simply as "the *Guidelines*".*

As this document guides the planning of all bus routes in Sydney, its contents have a great impact and it deserves a larger audience and critique.

Many of the problems with bus network planning in Sydney can be traced to problems in the *Guidelines*.

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* http://www.transport.nsw.gov.au/abouttrans/planners-guidelines.html

Many others reflect a failure to implement the spirit of the *Guidelines* fully, often because, in practice, the Department of Transport and Infrastructure and its predecessors have lacked the staffing and mandate to follow the spirit of the *Guidelines* to its logical conclusion: a bus network that looks, feels and operates like a single integrated system covering all of Sydney.

These problems are explored in detail below.

Between 2006 and 2009, the then Ministry of Transport developed *Integrated Network Plans* for each of the 15 regions. To its credit, it sometimes anticipated the future merger of regions by combining certain regions in one planning effort. Typically this was done because of a need to focus on particular markets that crossed regional boundaries.

To take one example, the direct service linking Macquarie Park, Gordon, St. Ives, Auslink, Terrey Hills and Mona Vale cuts across three regions but could only be conceived and planned if the three regions were considered as a single unit.

This route is an example of the Unsworth process at its best, encouraging inter-operator co-operation to create a much-needed service that would have been unthinkable if each operator had remained confined to its own territory.

5.2.2 What still doesn't work

Despite the progress that has been made, now that the initial *Integrated Network Plans* have all been completed—though not all implemented—it is possible to see that Sydney is still a long way from having a single integrated bus network.

The gaps between the vision and the reality are most apparent in:

- **Staffing and expertise of government.** As already indicated, the Unsworth process shifted primary network design responsibilities to the Ministry of Transport (now the Department of Transport and Infrastructure) and thus should have led to a concentration of Sydney's best senior network design expertise within this department.

  In fact, however, much of Sydney's planning expertise is still in the various operating companies, perhaps partly because that is where the real power of network design is still perceived to lie.

- **Unreasonable constraints on growth.** During the development of the *Integrated Network Plans*, the NSW Treasury generally directed that there should be no increase in service kilometres, except where "greenfield" growth areas were being added.

  This policy expressed a remarkable bias against additional residents in already built areas: a new citizen in a new subdivision was entitled to new government resources, but a new citizen in any existing built area of Sydney was not, no matter how quickly the area's population was growing.

  The "no new kilometres" direction effectively prohibited long-deferred growth in bus service frequencies throughout the network, even in areas where the population was rapidly growing.

- **Concurrent service reductions.** As noted in the Rail, Tram and Bus Union's submission to the Inquiry, bus services were being cut during the same period, at least in the STA area:

  > *"It should be pointed out that in the last 2 years the State Government has reduced services in the middle of the day and the peak shoulders as a cost*

cutting exercise. Hundreds of trips have been eliminated, in all of State Transit's bus regions. Recent service reviews have resulted in fewer trips with some routes having been eliminated all together.

"This appears to make public transport less attractive, and encourages people to look for other alternatives. A 30 minute or hourly service is not a service that will attract people to public transport."

- **The lack of integrated fares.** This remains an obstacle both for trips that cross operator boundaries and for trips that require connections even within the State Transit Authority (STA) area.

  Around the edges of the STA area, there are cases where a wasteful duplication of services has been retained in the relevant *Integrated Network Plan* because there is no way to integrate the fares between the operators, and thus no way to prevent riders' fares from going up if they have to connect between one operator's services and another's, given current fare policies and practices.*

  As discussed in Chapter 3 and considered further below, fare policy is intimately connected with network design, and can easily undermine its objectives.

- **Insufficient clarity about the "rules" of network design.**

  Ideally, network planning should follow policy principles that can be approved by the government and documented to the public, so that citizens can see why a certain proposal is consistent with the principles even if it's isn't convenient for them personally.

  The *Guidelines* do provide some rules, but these are insufficient, in practice, to guide the real decisions that arise in network planning.

In addition, although the *Guidelines* provide good guidance on many of the best practices in network design, they remain confused in several respects.

The core problem is a lack of clarity about two concepts: connections and frequency. Both are insufficiently appreciated in Sydney's transport planning.

5.2.3 Connections and frequency: the missing bits of the puzzle

Overall policy and practice in Sydney public transport planning displays a striking lack of interest in how different services work together.

Nowhere in the NSW *Service Planning Guidelines*, for example, will you find any mention of the need for bus services to connect with each other in order to form a complete network which people can use to go wherever they're going.

Connections can be politically difficult to talk about, because everyone would prefer a single-seat ride. But the geometry of urban public transport networks around the world makes connections unavoidable, and sometimes even preferable, for reasons which need to be more widely understood.

* For example, the STA and Forest Coach Lines both operate between Chatswood and Warringah Mall, mostly along the same streets. In a system with full integrated fares, these two services could probably be replaced by a single, simpler one, running at a higher frequency.

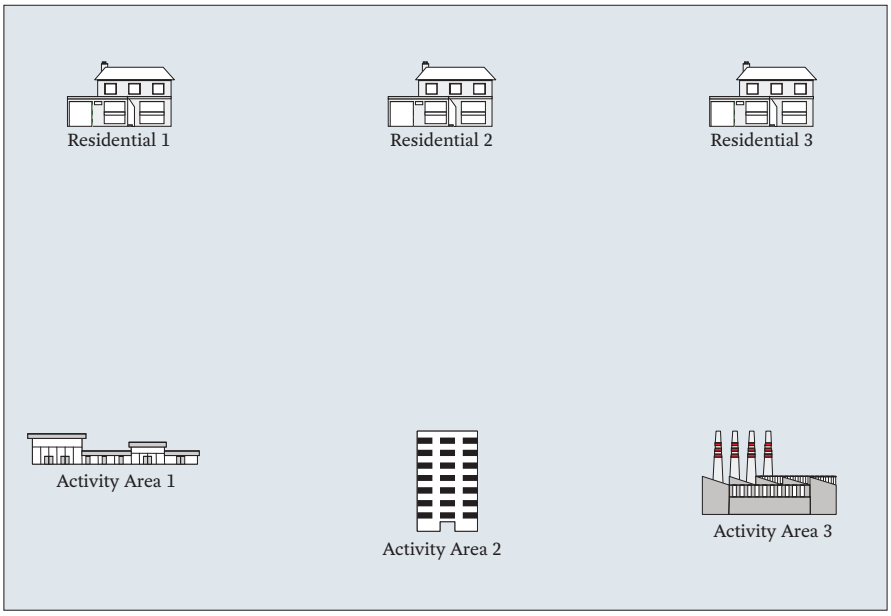


Figure 5.1. *Abstract city layout.*

How connections and frequency **improve** travel time

Public transport networks almost always begin by emphasising direct services between key origins and destinations, but as a city grows the number or origins and destinations grows and it becomes impossible to serve all of these markets directly.

Continuing to do this—as the STA network in inner Sydney largely attempts to do—inevitably results in a complex tangle of overlapping but inferior services. The spreading of finite resources over so many lines results in low frequencies and short spans of service, yielding services which are **just not useful** for many high-demand travel needs.

In fact, **tangles of direct but infrequent services are often slower, in terms of overall travel time, than networks of connective but frequent services.**

An abstract example might help readers understand this issue. Imagine a simple town that has three primary residential areas, along the top of the diagram in ***Figure 5.1***, and three primary centres of employment or other activity, along the bottom.

In designing a network for this city, the first impulse is to try to run direct service from each residential area to each activity centre. Since there are three of each, this yields a network of nine routes (***Figure 5.2***).

Suppose now that the city can afford to run a bus on each route every 30 minutes. We shall call this the "no change" option, because nobody has to change buses to get from any residential area to any activity centre.

Now let us consider another way of serving this market for the same cost. Instead of running a direct route between every residential area and every activity centre, suppose there is a direct route from each residential area to just one activity centre, but the network designers make sure that all the resulting routes connect with each other at a strategic point (***Figure 5.3***).

Because there are now only three routes instead of nine, buses can run on each route three times as frequently as under the "no change" option, at the same total cost. So instead of a service every 30 minutes, there is a service every 10 minutes.

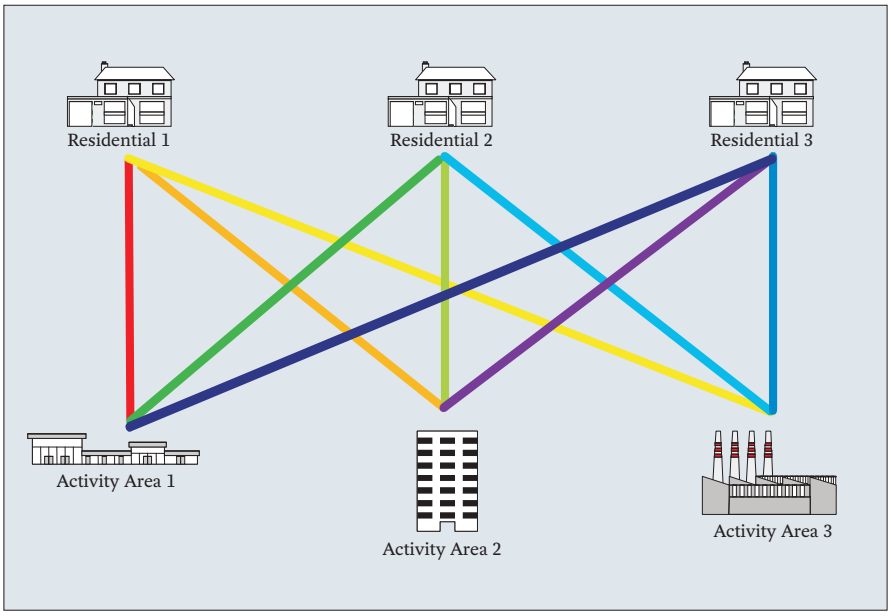


Figure 5.2. *The "no change" option: nine routes, each with a service every 30 minutes.*

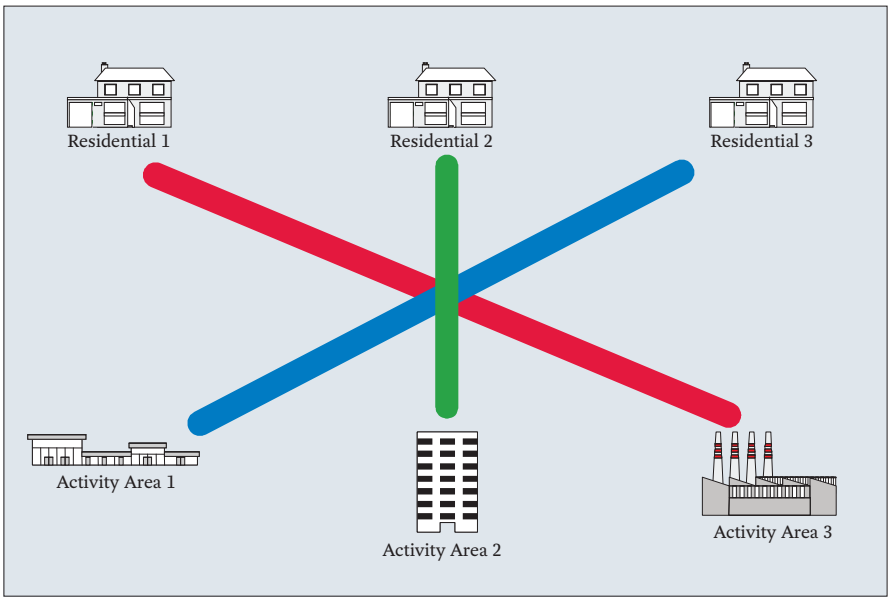


Figure 5.3. *The "connective" option: three routes, each with a service every ten minutes.*

Asking people to change buses is politically unpopular, so the "no change" option is the politically safe solution, but from the standpoint of mobility it is the inferior one.

Let us consider how long a typical trip takes under each scenario, for a person who needs to leave or arrive at a particular time. Suppose we arbitrarily look at trips from Residential Area 1 to Activity Area 2, and make one further assumption: the travel time for a single bus route from any residential area to any activity centre, under any of these scenarios, is 20 minutes.

With the "connective" network, the middle of the diagram is halfway, so it is 10 minutes from there to any residential area or activity centre.

Under the "no change" scenario, a service runs directly from Residential Area 1 to Activity Area 2 every 30 minutes, so on average the waiting time is 15 minutes. Once the person is on the bus, the travel time is 20 minutes. So the average trip time takes 35 minutes.

Under the "connective" option a services leaves Residential Area 1 every 10 minutes, so the average waiting time is 5 minutes. There is then a 10 minute ride to the interchange point. The person gets off this bus and waits for the next bus to Activity Centre 2, which also runs every 10 minutes, so the average wait time at the interchange point is again 5 minutes. Finally, the ride from the interchange point to Activity Centre 2 takes 10 minutes. So the average trip time is 30 minutes.

This simple illustration shows that **a network that requires passengers to change can get them to their destination faster than a network with the same total operating cost that does not.**

But the advantages of connective networks are not limited to shorter travel times. Connections are crucial for resolving some of the most widely observed problems in bus networks, especially in inner city areas:

- **Frequency.** "Connective" networks are made of more frequent services. This has other patronage benefits, especially when we consider people who have to make several trips in a day, or who want to travel spontaneously, and who therefore need to **know that service is there whenever they need it**.

  Frequent services are capable of attracting a much wider range of patronage with their "turn up and go" convenience, especially when they are advertised properly, as suggested in section 5.6 below.

- **Simplicity.** "Connective" networks are simpler.

  Even in our illustration, a network of three frequent lines would be much easier to remember than a network of nine infrequent and overlapping ones.

  At the scale of Sydney, the attempt to run direct service from everywhere to everywhere has resulted in a network of dizzying complexity that discourages people from learning how to use it for a range of different purposes (***Figure 5.4***).

As the inner Sydney *Case Study* in section 5.2.4 below illustrates, a connective network can be simple enough for it to be easy to remember and thus easy to use spontaneously.

Most public transport networks start out as "no change" networks with relatively little focus on interchanging, but as the city grows bigger and more complex interchanging becomes much more important.

If a city recognises the importance of simple, frequent routes, interchange-oriented design is more likely. In most cases, though, there is usually a transition from a "no change" network to an interchange-based one.

This transition often requires the severance of certain "no change" services which people have become used to, in order to create an interchange-based structure of frequent services that is more broadly useful and legible.

So the transition is always politically difficult—but it is an unavoidable step in the process of building a broadly attractive public transport system.

Resistance to connections

Research carried out in London indicates that in addition to the time actually spent interchanging, passengers are willing , on average, to spend four minutes longer

on their journeys if this means they will avoid having to make a connection (*Intermodal transport interchange for London, Best Practice Guidelines*, January 2001).

A person's dislike of interchanging may, of course, be stronger or weaker than this, depending on the type of trip being made and the type of passenger involved.

Figure 5.4. *STA Eastern Region route map, Sydney.*

People who rarely use public transport, people who have impaired mobility and people who are making a particular journey for the first time are all more likely to have a particular strong aversion to interchanging.

Most of these problems can be managed, however, through a combination of good network design, good scheduling and careful attention to the quality of the interchanges (see section 5.5).

The London finding that "interchange inconvenience" is worth only four minutes of travel time is intriguing, since in practice (as in the simple hypothetical example above) it is often easy to replace a direct service with an interchange in a way that is more than four minutes faster, even for trips where the interchange is required.

"Interchanging will be necessary to provide coverage across what is now a very large region. There is often concern, well placed, about the consequences of interchanging for patronage. Patronage losses can be averted if and only if services are frequent, decreasing waiting time and total journey times." (submission by Julie Walton)

5.2.4 *A case study:* Fixing inner Sydney's fragmented 'frequent network'

Recommendation ST 7:

Sydney's current inner city bus network, focussed overwhelmingly on radial services to and from the CBD, should be reviewed and developed into a *connective* network with much more frequent (and orbital as well as radial) services.

The network today

If Sydneysiders want to create a public transport system on which they will willingly rely, especially in the denser inner areas, this service must run frequently all day—so frequently that they do not feel they are building their lives around the timetable.

The aim must be for a user to be able to go to a bus stop and *know* that a bus will come within a few minutes. Only then feel will inner city residents start to feel comfortable owning fewer cars.

Along with integrated fares (Chapter 3), service frequency is also a critical foundation of connections.

Some low-frequency services can make fast connections if there are coordinated schedules, as is commonly attempted between buses and trains in outer suburban Sydney, but this can only be done at one or two points on each route.

If we want a group of routes in a system to work together as *a network*, so that it is easy to connect between them *wherever* they intersect, all these routes must be so frequent that a passenger can get off one bus with confidence that the connecting bus will be along soon.

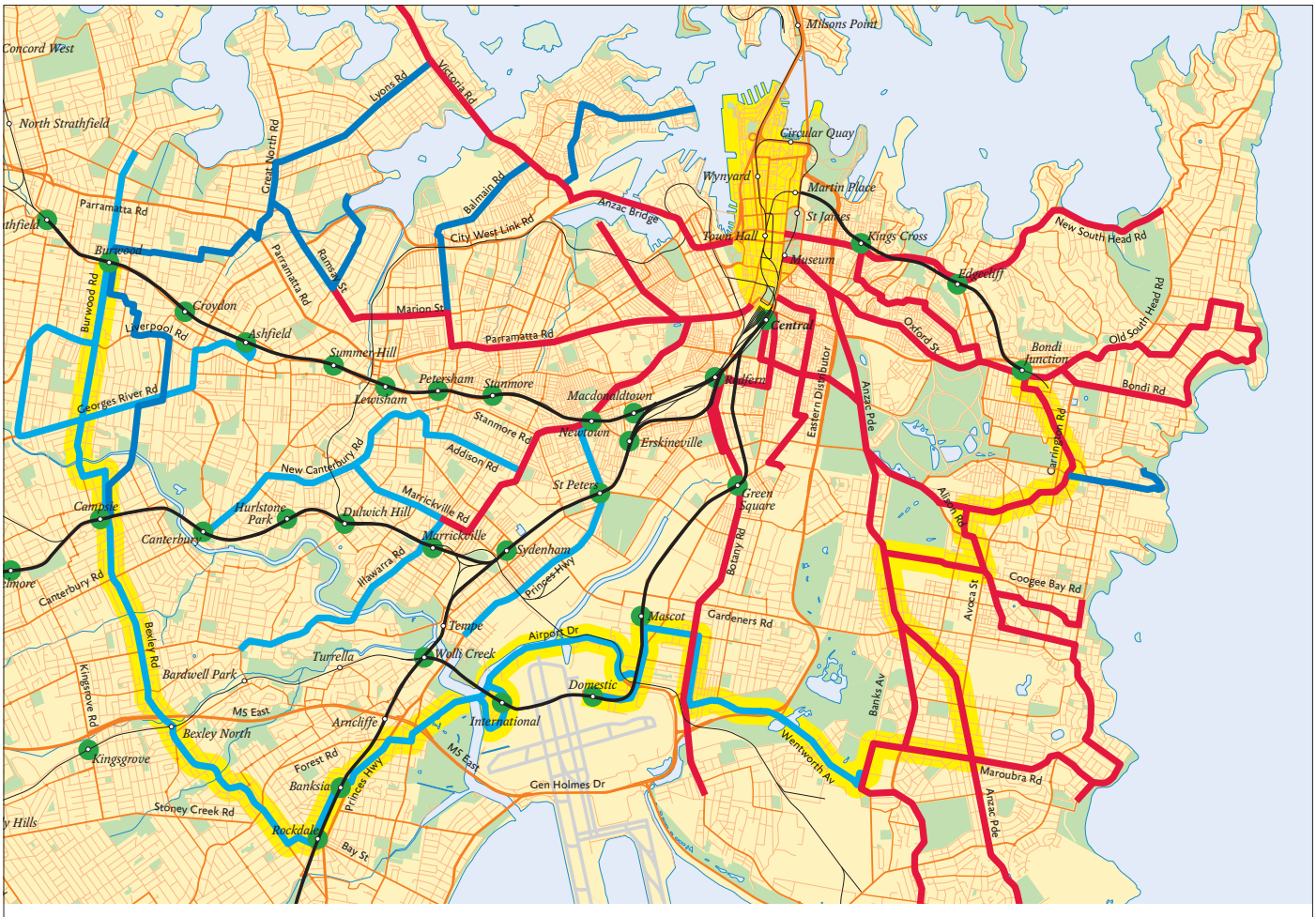
Such a network is especially important in extensive areas of high density, such as the inner parts of Sydney, because these areas generate high volumes of travel to many origins and destinations all over the area.

In most comparable cities in Europe and North America, an area this dense would be covered with a grid-like lattice of intersecting high-frequency routes, ensuring that it is possible to travel between almost any two points on high-frequency service(s) with at most a single connection. Sydney is *unusual* in lacking such a network.

Figure 5.5 shows the current network of "frequent" services in inner Sydney south of the Harbour. It shows only those bus and rail routes that have services every 15 minutes or better throughout the day on weekdays and every 20 minutes or better on weekends. This frequency is the absolute floor below which a public transport system will serve only those people who are willing to plan their lives around timetables.

It may be seen from *Figure 5.5* that if you want to travel on a high-frequency service within this inner part of Sydney, you almost always have to go through the CBD, or at least via Central station.

There are no high-frequency and reasonably direct bus services for some key linkages between major activity centres in the inner city. If you want to go from



"Frequent" bus services in inner suburbs south of the Harbour in 2010

Buses at least every 15 minutes during the day

- Seven days a week
- Mondays to Saturdays only (20 minutes on Sundays)
- Mondays to Fridays only (20 minutes on Saturdays and Sundays)

(The routes of numerous less frequent local bus services are not shown.)

"Frequent" rail services in inner suburbs south of the Harbour in 2010

Stations with services at least every 15 minutes during the day seven days a week

Figure 5.5. *Current "frequent" bus and rail service routes in inner Sydney, south of the Harbour.*

Darlinghurst to Newtown, or from Marrickville to Randwick, the only frequent service options require you to go through the CBD. The densest residential suburbs in Australia are around Kings Cross, but they have frequent services only in an east-west direction. There are no frequent services extending south from these suburbs to link them to nearby high-density areas such as Surry Hills or to provide reasonably direct connections to other likely destinations such as Randwick.

The lack of interaction between rail and bus services is also striking. One of the most intensely served railway stations outside the immediate CBD area is at Wolli Creek, a major new node of high-rise housing which lies at the junction of two frequent railway lines. But no frequent bus route goes there to connect with these services.*

For people who have invested in a high-density, low-car-dependence urban lifestyle in the towers of Wolli Creek, it is still almost impossible to travel, with reasonable frequency and directness, to obvious nearby activity centres such as the Marrickville Road shops, Marrickville Metro or Newtown.

But *Figure 5.5* also shows Sydney's one and only frequent orbital, the "400", a large U-shape extending all the way around the city from Burwood in the west to Bondi Junction in the east via Rockdale, the airport, Randwick and many other key nodes. This route is highlighted in *Figure 5.5*.

The 400 is one of STA's most successful services. (In many North American cities, too, the highest performing routes, in passengers per revenue hour of service, are inner city orbitals just like this one.)

On its eastern segment between Bondi Junction and Eastgardens, the 400 reaches high all-day frequencies with gaps between its services of well under ten minutes, providing one of the few situations in Sydney where it is easy to connect between intersecting routes.

The 400 is succeeding despite the severe handicap of a fare system that penalises connections (see Chapter 3). If there were no fare penalty for connections, many similar orbital services would probably become viable.

Indeed, it is possible to envisage a whole grid of them, so that most parts of the dense inner city would be within walking distance of both a *radial* frequent line to the CBD and an *orbital* frequent line serving many other possible trips.

A CONNECTION-BASED ALTERNATIVE

If the obstacles of Sydney's archaic fare system were set aside, it would be possible to create a much more versatile bus network for Sydney's dense core.

Such a network would be **designed to offer frequent services all day for travel from anywhere to anywhere within the area.** These same primary routes would also run late into the evening.

Some of these trips would require a connection, while some would not. In some cases, someone who has a direct trip now might have to connect in the future.

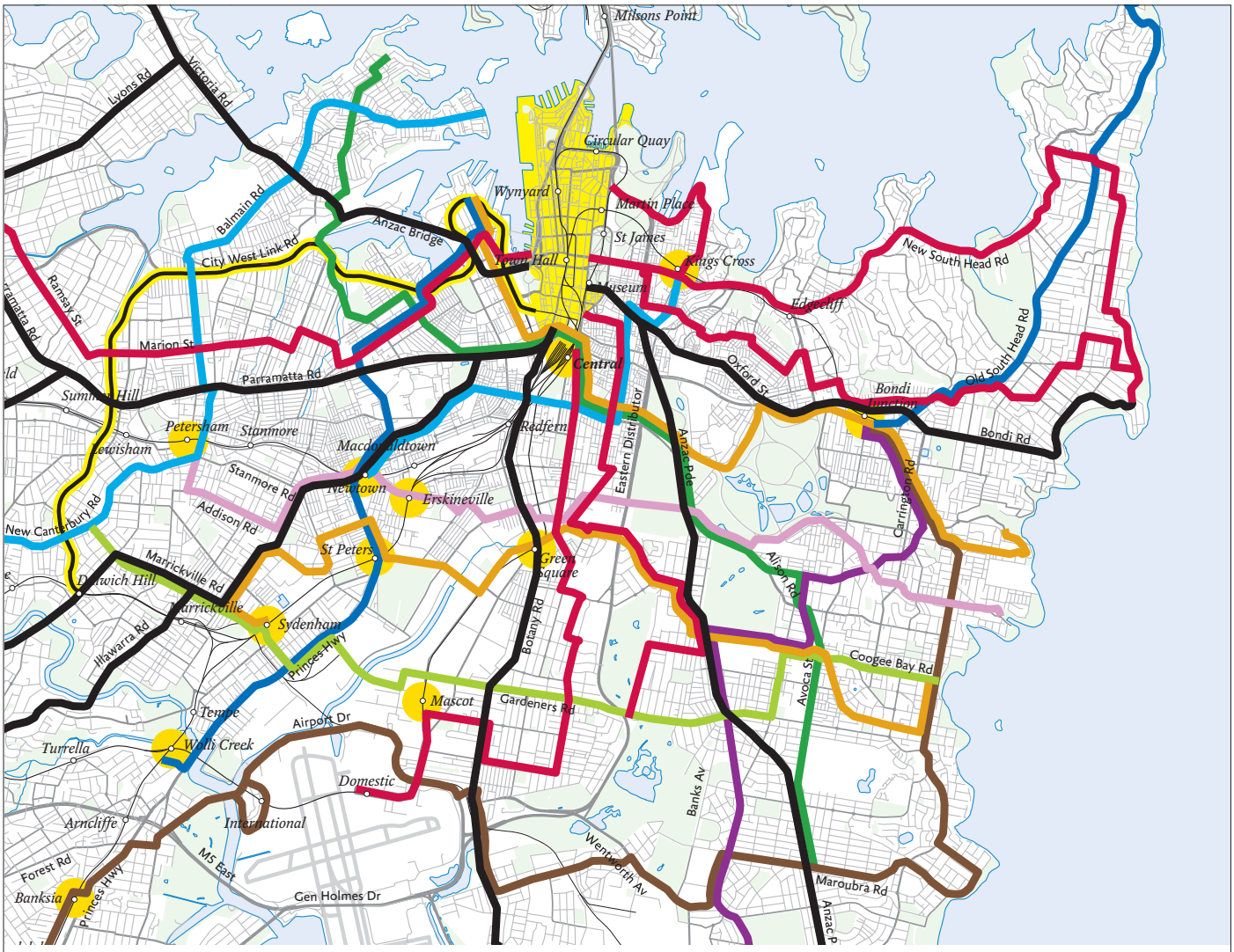
But the payoff would be tremendous. Such a network would let you go anywhere, by a reasonably direct route, on services that would run every few

* Extensions of bus service to Wolli Creek have been proposed in the *Region 6 Integrated Network Plan*, which is still under review, but it is not clear whether these services would be frequent.

minutes, so that the next one would always be coming very soon. **This is what successful inner city networks do.**

Figure 5.6 sketches just one version of what such a system might look like.

This is not a specific proposal. It is merely an illustration of the degree of mobility that a multi-destination (as opposed to overwhelmingly CBD-focussed) network might offer, *without* requiring many additional buses or much higher operating costs.



A *HIGHLY INDICATIVE* POSSIBLE SET OF OPTIONS FOR A FUTURE "FREQUENT SERVICES" BUS NETWORK IN INNER SUBURBS SOUTH OF THE HARBOUR

Major radial trunk corridors to and from the CBD, with services every 3 to 5 minutes, or better, all day

Other frequent radial services to and from the CBD, with services every 5 minutes, or better, all day

Non-CBD frequent services, generally with services every 10 minutes, or better, all day, designed to connect with the radial srervices, and each other, to provide a complete network with easy and rapid interchanges between services

Key bus-rail interchange points

Dulwich Hill-Lilyfield-CBD light rail

This map shows only potential all-day frequent services.
There would continue to be less frequent local routes to serve areas not covered by this network.
Direct peak period commuter services to and from the CBD would also be much more extensive.

Figure 5.6. *One indicative concept for a potential future "frequent service" bus network in inner Sydney, south of the Harbour.*

Similar levels of service would be possible in other extended dense areas, but the area between the Harbour and Botany Bay is the largest extended area where density is high enough to support such a dense connective network, and it should therefore be the first priority for creating one in Sydney.

There would continue to be two other kinds of services, not shown in *Figure 5.6*:

- "Secondary" services, every 15 to 30 minutes, serving the less dense pockets throughout the area or using more circuitous routes to access hard-to-reach places like Darling Point and Waverley, and
- "Peak only" services, providing additional direct links and express services only when demand warrants.

The main ways in which planning for this type of network would differ from current bus network planning in Sydney would be as follows:

- High frequencies would be the starting point for the design of these services.

  The network would be intended to cover all the areas that are dense enough to support high frequencies and provide a reasonably direct routing between *any* two such areas, the road network permitting.

- To maximise the frequency of services, the total length of each route would be kept to a minimum.

  Overlapping of routes would be avoided, and the network would strive to be as simple as possible, given Sydney's difficult geography. The duplication of rail services would also be avoided.

- No effort would be made to guarantee direct frequent service to the CBD from every part of the area or to maintain all the direct links that are provided now.

  For example, under the concept shown in *Figure 5.6* some areas such as Coogee, Balmain and Belmore Road in Randwick would have no direct bus services to the northern CBD at *all-day* high frequencies, but they would have many options for getting to the CBD on all-day high-frequency services with one connection. (They would continue to have some direct peak period express services, not shown.)

  In return, they would have a hugely expanded range of places that they could get to directly or with one transfer, all at high frequency.

- Major radial corridors (black on the map) would be "held together" as far as possible, generally branching further out from the CBD than they do now. This would extend the segments of extreme frequency to include additional areas where densities indicate a high patronage potential, such as Marrickville and Maroubra.

  For example, under the concept shown in *Figure 5.6* all CBD–Newtown (420 series) buses would continue together to Marrickville, rather than branching four ways at Newtown.

  However, the outer ends of these major corridors would probably still have some branching as they leave the denser areas, generally near the edges of this map (e.g. Parramatta Road corridor west of Norton Street and the Anzac Parade corridor south of Maroubra Junction).

- Railway stations would have extensive frequent connecting bus services, to maximise trip opportunities.

  Key inner city stations for this purpose would include Green Square, Newtown, Petersham, St Peters, Sydenham, Wolli Creek and (of course) Bondi Junction.

For a typical example of how this might play out under the concept shown in *Figure 5.6*, consider Newtown and Enmore.

Newtown currently has a very frequent service to the CBD, about every five minutes all day. This would be retained, but (as indicated above) would be streamlined into a single route CBD–Newtown–Enmore–Marrickville. (Beyond Marrickville, some branching would still occur.) Other branches of the current CBD–Newtown corridor would be attached to new crosstown services. These might require a transfer to get to the CBD, but in some cases this could be a transfer to the train (e.g. at Newtown), taking advantage of the higher inner-city rail frequencies proposed in the section 5.1.

The result would often be a faster trip with more frequent services. For example, someone going from, say, Addison Road to Circular Quay would no longer have a direct bus, but they could change at Newtown or Petersham to a train and get there faster than their current direct-but-slow bus service. Meanwhile, Addison Road would get a range of new places that could be reached without a transfer (Petersham, Alexandria, Green Square, Randwick and Coogee) and a still-larger range of places that could be reached, much more directly than now, with one transfer.

Here are some other examples of the changes that would occur under the "grid-like" network concept shown in *Figure 5.6*:

- Glebe is currently served by U-shaped routes which take Glebe passengers all the way south on Glebe Point Road to Parramatta Road and then all the way back north through the CBD.

  Under the new concept Glebe Point Road would becomes part of a crosstown route, while a radial Bridge Road line would provide a more direct service to the city. (A second crosstown route on Bridge Road would connect Newtown and Pyrmont directly.)

- A new direct radial route would be provided for Potts Point and Woolloomooloo via Bent Street and Cowper Wharf. This short route could be attached to the northern end of some radial route entering the CBD from the south.

- An inner city crosstown route would link Kings Cross, Darlinghurst, Surry Hills, Cleveland Street and Newtown. These are some of the densest places in Sydney, and yet travel between them can be very difficult with the current network, especially in the evenings when these suburbs become major centres of nightlife.

It is stressed, again, that this is not intended as a detailed and final proposal, but simply an illustration of the type of network that would be possible once the fare barriers described in Chapter 3 have been removed.

The adaptation of the "grid" principle to Sydney's road network and geography will be challenging, and the map shown in *Figure 5.6* is certainly not the only solution.

It is offered by the Inquiry primarily to give Sydneysiders a sense of **the degree of mobility which could be possible if we encouraged connections rather than penalising them.**

The inner parts of Sydney, served by the STA, have substantial inefficiencies in their bus network design.

The STA area is currently getting a substantial infusion of new services in the form of the STA's *"Metrobus"* product, discussed below in section 5.2.9, but this is being overlaid on the existing network.

In short, the STA area has quite a bit of service but an incoherent and inefficient structure that needs to be rethought along the lines presented above. Unlocking the inefficiencies by introducing a connection-oriented network could achieve substantial improvements in mobility without necessarily adding substantial cost.

The benefits for both liveability and the redevelopment potential in inner Sydney could be substantial. A network of this extent, combined with existing limitations on parking throughout much of the area and supplemented by car-sharing programs, could substantially expand the attractiveness of living in inner Sydney *without needing to own a car*. In turn, reducing the need for cars in the city would not only address many sustainability objectives but would also make inner city life more affordable. Lower car ownership expectations could also reduce parking requirements for residential developments, another key element of affordability.

5.2.5 Service concepts for outer suburbs

The situation in the outer suburbs is quite a bit different.

Densities are lower, so these areas cannot expect the continuous web of high-frequency services that the inner city can support.

However, there *are* key corridors that can support high-frequency services, while less frequent services, running every 30 minutes, would cover most of the developed area.

The government's *Integrated Network Plan* process for these areas has been able to make substantial improvements to the route structures of these areas. Routes have been streamlined in ways that make them ready to form very attractive services once they have sufficient frequencies and service spans.

Unfortunately, NSW Treasury's prohibition of adding new kilometres of service except where "greenfield" growth areas are being added, notwithstanding any population growth, has led to continued under-investment in service frequencies.

The outer suburbs present a diverse range of communities, but in areas where there is (a) considerable density and (b) reasonably efficient street networks, the ingredients are there for high patronage.

Poor frequencies and poor service "spans" (the times of the day during which services are provided) are the primary problem in these areas, and their under-investment problems should definitely be remedied.

Recommendation ST 8:

Significant improvements should be made to bus service frequencies in outer Sydney suburbs, especially on key corridors able to support high-frequency services, and the times of the day during which bus services are provided in outer suburban areas.

To assist this, there should be an immediate end to any NSW Treasury or other government policies prohibiting increases in bus service kilometres in existing urban areas.

5.2.6 The "strategic bus corridor" concept and its limitations

The *Guidelines* that emerged from the Unsworth review recognised a need to **highlight the highest-quality services** so that customers could see them and land-use and road planning could respond to them. This led to the concept of "strategic corridors".

The definition in the *Guidelines* is more than a little circular:

> *"Strategic Transit Corridors are essentially the roads over which strategic transport corridor routes operate. Strategic transport corridor routes are the group of routes that operate on all or part of a Strategic Transport Corridor to form high service frequencies on the corridor."*

However, the core idea, clearly, is "high frequencies".

"Strategic corridors" were meant to be the most important links in the citywide network, particularly in the case of links between "regional centres" and other major nodes. They were intended to guide the installation of major infrastructure and also to be first in the queue for bus priority treatments that would make services more reliable.

The concept has proven, in practice, to be too vague, because despite the reference to "high frequencies" the term "strategic corridor" does not promise any particular level of service and thus has no meaning to the customer.

Some "strategic corridors" (e.g. Oxford Street) have services every few minutes all day, while others (e.g. Mona Vale Road) still have no services during the middle of the day at all and may not have much demand for such services because of very low densities in these areas. And some, such as one along The Comenarra, have never been implemented at all, because their patronage potential is so small.

Furthermore, many segments that are not "strategic corridors" have more frequent services than others that are, because they serve much more intense travel markets.

As a commitment to service, then, the term "strategic corridor" means nothing.

The term's lack of meaning is a direct result of a perceived need for the "strategic corridors" to appear to be evenly spread across the region (***Figure 5.7***).

This map provides a superficial appearance of equity. Across the urbanised area of Sydney, the spacing of corridors is strikingly uniform, as though every suburb, regardless of density, has an equal entitlement to be close to one.

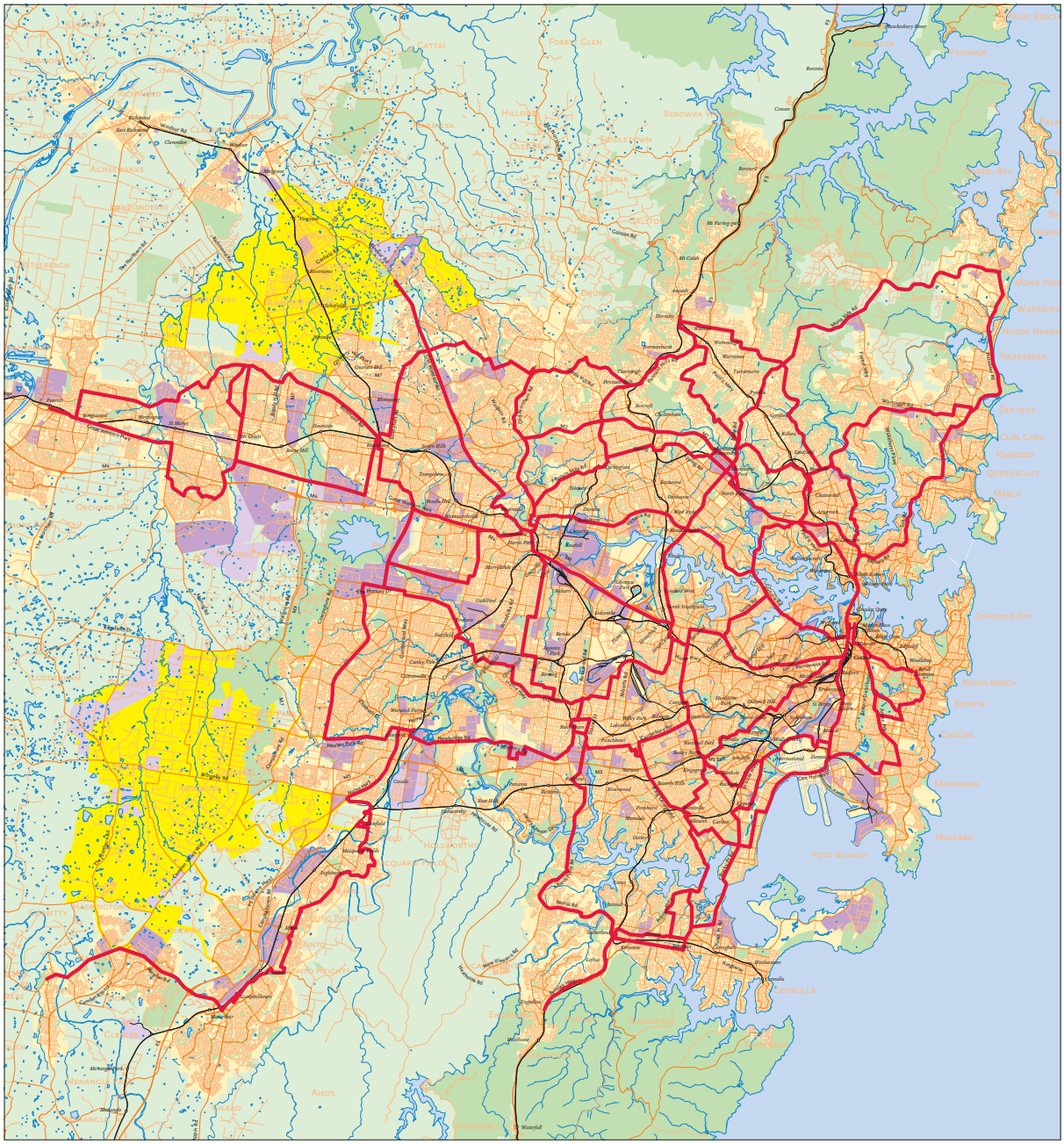


Figure 5.7. *"Strategic bus corridor" routes in Sydney.*

Citizens and their activity destinations are not, however, uniformly distributed across Sydney. Density is quite high in the pre-1945 areas of inner Sydney, and also in certain suburbs elsewhere. A "strategic corridors" map that was designed to be equitable for the citizens of Sydney and reflect their destinations would thus be much more concentrated in the areas where densities are high and sparser where densities are low.

In fact, Sydney's bus services *are* distributed that way, regardless of the "strategic corridor" definitions, because density is such a dominant driver of patronage.

A more effective planning tool than the "strategic corridor" concept would be a clear system of service types that would refer to the actual level of service provided, and thus have meaning for the customer.

Section 5.2.7 lays out what this might look like, based on "best practices" elsewhere.

5.2.7 Making sense of the chaos: more meaningful bus service 'types'

Recommendation ST 9:

Sydney's "strategic bus corridor" concept should be replaced by a network which presents customers with **a clear hierarchy of the service types actually provided**, each of which is clearly useful for particular kinds of trips and appropriate for particular settings and all of which work together via connections.

For each of these service types there should be:

- A definition in terms of its minimum levels of service frequency and "span" (times of the day during which it operates).
- A definition in terms of its stopping pattern (close, wide) and thus its speed.
- A guideline on the types of land-use situations, distances and road types that typically warrant this particular type of service.
- Clarification of whether the type of service is intended for high patronage or to serve a "social inclusion" need. (Services should be judged on the purpose they are designed to meet. The key performance indicators for a service that is not trying to maximise patronage should not emphasise patronage.)
- Guidelines on the level of amenity that can be expected for the type of service.

One easy way to visualise a coherent system of service types is to consider the table shown in ***Figure 5.8***. This table is formed by the two distinctions that are most fundamental in determining the actual usefulness of service to a passenger:

- Frequency/span distinctions ("Is it running when I need it?"), and

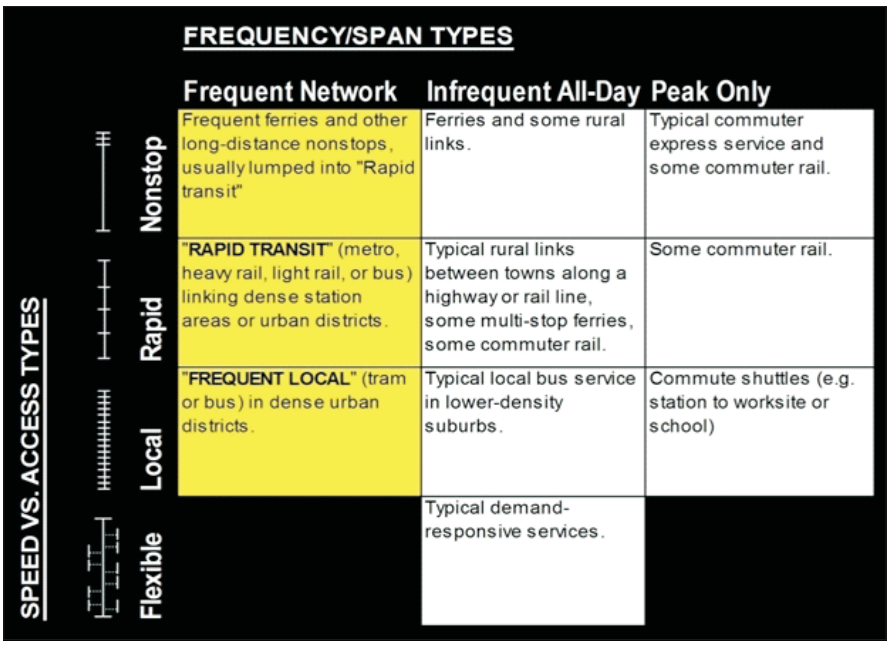


Figure 5.8. *Ten types of bus services, based on frequency/span and speed/access distinctions.*

- Speed/access distinctions ("Does it run quickly by making few stops, or slowly by making many stops?")

Each of the ten cells of this table defines a substantially different kind of service, useful for quite different purposes and markets.

One advantage of looking at services this way is that there is a direct and obvious link between these categories and some key popular concerns about public transport.

In particular,

- **Land-use synergies and reduced car dependence.** Frequent all-day service is the foundation of most transit-orientated development. It is also necessary if people are to voluntarily choose to own fewer cars as one of the tradeoffs of life in a dense city. High service frequencies both support and require high density and pedestrian-friendly urban design.

- **Broad *v.* specialized markets.** "Peak only" is the most specialised category of service, appealing narrowly to those who can commit to going and returning in the scheduled range of times. "High-frequency service" is the broadest category, capable of serving peak commuters while also serving many other kinds of trips. Public transport services which serve a broad market are much more likely to be widely appreciated by the community as elements of civic infrastructure.

- **Simplicity *v.* complexity.** "Peak only" services tend to consist of many routes with relatively few services on each route. These routes can overlap each other and also overlap the all-day network. As a result, "peak only" services are often a major contributor to the overall complexity of a public transport system.

  In contrast, all-day high-frequency services built around fast connections are easy to make simple. Simplicity is an important issue if we want customers to be able to use public transport for a range of purposes. In a complex system, while customers learn how to make a single trip that they make routinely, learning to make any other trip is simply not worth the effort required.

The single most important distinction, however, is frequency. Particular attention should be paid to the "frequent network": the network of services which run frequently all day, in the evenings and on weekends.

This "***Frequent Network***" has a distinct policy purpose and a distinct role:

- It aims to be available to customers whenever they need it, with only a short waiting time.

- Through this frequency, it supports the needs of people with complex travel needs beyond traditional peak period commuting.

- It can therefore support "voluntary public transport dependence", making it easy for people to own fewer cars if they live close to a frequent service. This can have knock-on effects in improving the prospects for sustainable dense development, for example by reducing parking requirements.

Like "strategic corridors" in the current scheme, the *Frequent Network* would be a crucial tool for managing the relationship between public transport planning, land-use planning and road design.

For example,

- *Frequent Network* corridors would have potential synergies with dense land uses, so they should be defined and updated in consultation with the Department of Planning and councils, and
- *Frequent Network* corridors would have the greatest need for traffic signal priority and bus lanes, so they should be defined in consultation with the Roads and Traffic Authority (RTA).

An "existing and planned" map of Sydney's *Frequent Network* should be on the wall in the office of anyone who routinely decides where activities and facilities should be located—whether they are a real estate developer, a council planner, a social service agency or a business.

The basic bus maps available today (such as the one reproduced in *Figure 5.4*) give the false impression that all services are equally useful, and thus make it hard for people to see where to locate to enjoy the best public transport mobility.

In short, **the concept of a *Frequent Network* should be developed and used in Sydney as a crucial tool for building a two-way relationship between public transport and the city's urban form**, because ultimately the urban structures will be much more important than any public transport plan in determining the potential for public transport to contribute to the sustainability of the city.

5.2.8 Recommended *Frequent Network* priorities

Recommendation ST 10:

Priority should be given to developing a "***frequent network***" of bus services which run frequently all day, in the evenings and on weekends. This *Frequent Network* should comprise two types of service, deployed as discussed in this *Final Report*:

- "*Frequent rapid*" services, running every 10 minutes or better all day and serving relatively widely spaced stops (every 500–1,000 m) in order to achieve high average speeds, and
- "*Frequent Local*" services, running every 12 minutes or better all day but stopping more frequently, generally every 200–400 m, to provide continuous local coverage.

Particular attention should be paid to maximising the extent to which the *Frequent Network* routes connect with each other to serve useful trips in many directions, instead of all converging on single destinations such as the CBD.

Frequent Rapid services

As indicated above, *Frequent Rapid* services would have relatively widely spaced stops (every 500–1,000 m) in order to achieve a high average speed. The key tradeoff with such a wide spacing of stops is to achieve a speed and a service quality that are *worth* walking an extra few hundred metres for.

Frequent Rapid services should be deployed:

- On major radial corridors not yet served by rail, including:
  - Northern Beaches–CBD (existing L90, upgraded)

- Parramatta-Victoria Road-CBD (existing L20, upgraded), and
- Maroubra Junction-Anzac Parade-CBD (existing 390, upgraded).

- On urban corridors where demand is high enough to support both "rapid" and "local" services ***or*** where the pattern of development and/or patronage suggests that there is a need for *Frequent Rapid* services with only infrequent local services or no local services at all.

  An example would be Bondi Beach-Oxford Street-CBD (existing 333, upgraded).

- On major orbital corridors connecting regional centres, or places of a comparable magnitude, to each other, including:
  - Macquarie Park-Ryde-Strathfield-Kingsgrove-Hurstville-Miranda, and
  - Lidcombe-Bankstown-Padstow-Menai-Sutherland.

- On the western Sydney T-Ways, where the infrastructure already supports a "rapid" stopping pattern:
  - Rouse Hill-Parramatta
  - Rouse Hill-Blacktown, and
  - Liverpool-Bonnyrigg-Prairiewood-Parramatta.

Frequent Local services

Frequent Local services would run every 12 minutes or better all day, and would be designed to stop more frequently, generally every 200-400 m, to provide continuous local coverage along a corridor.

These services should be deployed:

- On direct links between town centres and regional centres. (All links from one town centre to another should also be provided as part of these routes.)

- On urban corridors where continuous density is sufficient or where existing patronage already exhibits sufficient demand.

The entire inner city case study network suggested in section 5.2.4 and illustrated in *Figure 5.6* would be of this *Frequent Local* category.

Grid patterns

As recommended above, particular attention should be paid, in organising *Frequent Network* services, to maximising the extent to which the routes connect with each other to serve useful trips in many directions—as opposed to all converging on single destinations such as the CBD. The case study of inner Sydney in section 5.2.4 provides one such example.

> *"FirstGlasgow launched a simplified network of a more limited number of high frequency bus routes (every 10 minutes) - modelled on the London Underground tube map, and dubbed the "Overground" ... The result has been increased patronage, and the system has been hailed as a "blueprint for all major UK cities". FirstGroup have already replicated the strategy in Manchester and Leicester."* (submission citing the Warren Centre's *Sustainable Transport Project* of 2002)

Metrobuses: *A step in the right direction—but for the most part, just another bus on streets which already have lots of buses ... a distinction without a difference, a brand that doesn't signify any particular new service quality or mobility.*

5.2.9 A STEP IN THE RIGHT DIRECTION: THE STA'S *METROBUS* PRODUCT

The distinctive red STA buses which began appearing in inner Sydney early in 2009 represent an important, if small, step in the right direction.

Metrobus is an STA product that aims to provide a network of very simple high-frequency routes covering the major corridors of inner Sydney. The goal of simplicity is clearly captured by the two-digit route numbers, a refreshing change from the tangle of three-digit numbers and number-letter codes that most Sydney bus riders must learn.

The initially proposed *Metrobus* routes all flow through the CBD but do not terminate there. Instead, routes on opposite sides of the CBD are combined into a single service, providing new opportunities to ride across the city without interchange.

For example, the first corridor, Route 10, runs into the city along Parramatta Road and then onward via Anzac Parade. This "through routing" has two benefits: (a) it reduces the need to interchange in the city and (b) it reduces the need to use valuable CBD road space for the end-of-line driver break and schedule "recovery time" that all bus routes require.

Metrobus seeks to be a significant break from the existing bus products, and thus demonstrates STA's understanding that the incremental way bus services have evolved in Sydney in the past is not going to work in the future.

Notwithstanding these positive aspects, the Inquiry believes the *Metrobus* program, as currently defined, cannot deliver the efficient, high-frequency network that inner Sydney needs, for the reasons already discussed in this report.

The main problem is that *Metrobus* services are being added on top of other services, without any rethinking of the existing network. This is a continuation of the familiar Sydney habit of adding things incrementally without ever thinking about the whole structure.

Because *Metrobus* was added without changing other services, the STA was not able to take the obvious step of re-branding existing services as *Metrobus* services where they fulfil the Metrobus criteria.

A coherent network design would have simplified the whole structure so that the *Metrobus* became the primary product on the major roads it serves. Instead, what we have now on Parramatta Road is a red *Metrobus* every 10 minutes while ordinary blue buses go up and down the same road, stopping at the same stops, doing essentially the same thing, every two to five minutes. People get on whatever bus comes first, so some end up on the *Metrobus*, but this doesn't really tell anyone anything about the *Metrobus* program's value.

Indeed, apart from the direct service across the CBD, the *Metrobus* Route 10 offers remarkably little new mobility for its substantial additional cost. For the most part, it is just another bus on streets which already have lots of buses.

In short, **the *Metrobus* as it operates today is a distinction without a difference**, a brand that doesn't signify any particular new service quality or mobility.

One thing could have been done to make the *Metrobus* worth waiting for: it could have been defined as a limited-stops or "rapid" service, stopping perhaps once per kilometre rather than at every local stop. Such an approach would have repeated the success of the Route 333 on Oxford Street, a 2007 service upgrade that offered faster travel to customers willing to walk a few hundred metres further to catch it. Many North American agencies have had considerable success with this type of product, led by the *Metro Rapid* initiative in Los Angeles.

Each corridor is different, of course, and STA planners can articulate reasons why "rapid service" stops might not have been appropriate, but this would have been a bold step. It might just have been too bold for an operator like the STA to take without the support of a clear government transport strategy. That, ultimately, is the problem.

The STA is to be commended for its *Metrobus* initiative, because it provides an illustration of what a coherent high-quality urban bus route might finally look like.

However, the limitations of its implementation clearly illustrate the limitations of what an operating company, however dedicated and creative, can do on its own. Unable to eliminate the fare penalty for connections—a crucial barrier to designing a more coherent and frequent network—the STA has ended up creating a product that is more a symbol of possibilities than a real mobility improvement.

The symbolism may prove to have been worth it, but only if the government takes the next step: a plan for addressing the fare barriers that prevent the creation of a logical network with the red *Metrobuses* as its very high frequency spines.

5.3 Bus and light rail initiatives in the Sydney CBD

5.3.1 Current contexts

The CBD and adjacent areas in the City of Sydney are the biggest single concentration of employment, education, entertainment and tourist facilities in Australia.

Over 300,000 people worked in the City of Sydney in 2006, one-sixth of the Sydney workforce, and the City of Sydney produces 25% of the State's GDP.

Ease of access to and within the CBD is crucial if the CBD is to remain a competitive location for these businesses and Australia's largest retail precinct, with more than 900,000 m^2, is to continue to function.

Table 5.1. Mode used for journeys to work in the City of Sydney, including the CBD, in 2006.				
	Employment (2006)	Mode of travel to work		
		Public transport	Walk/cycle	Car
City of Sydney (total)	**300,067**	**67%**	**8%**	**25%**
City: Education/health	20,393	47%	12%	41%
City: Redfern	5,408	42%	9%	49%
City: Surry Hills/Kings Cross	29,981	48%	13%	39%
City: Sydney CBD	**230,049**	**74%**	**7%**	**20%**
City: Ultimo/Pyrmont	14,236	38%	10%	53%

With nearly one million pedestrians in the city each day, the needs of pedestrians are particularly significant and are far more important than those of the relatively few car users (see section 5.10 below).

The Sydney CBD has significant geographical constraints in the form of the Harbour, Darling Harbour and Hyde Park and the Domain. The densities of its employment and other activities are thus very high. In addition, the streets in the CBD are relatively narrow, having been laid out in the convict era.

Consequently there is intense competition for the limited roadspace between cars, buses, delivery vehicles, taxis, pedestrians and cyclists. This will only increase with further growth in employment, retail activity and the number of CBD residents.

There is also significant use of underground space for rail, road, water, sewerage, electricity, gas and telecommunications infrastructure, deep building basements and some pedestrian tunnels. While the Hawkesbury sandstone underlying the city provides a good tunnelling environment, physical conflicts with all these different services and basements limits the corridors potentially available for future public transport needs, as discussed in Chapter 3.

The Sydney CBD is the hub of the city's public transport system, including its heavy rail, bus, ferry, light rail and monorail services. Public transport not only carries people *to* the city centre but also *through* the city to neighbouring areas such as North Sydney, Bondi Junction, Pyrmont and the Airport. While the Inquiry's suggestions in section 5.2.4 for "crosstown" bus services and in section 5.5 for improved ferry services would reduce some of this pressure, the geography of Sydney and the limited opportunities for harbour crossings imply that this situation will continue.

While the high concentration of activities in the Sydney CBD causes some congestion problems, it is also a key reason for the relatively high use of public transport in Sydney compared with other Australian cities and US cities. In all, 74% of people working in the CBD travel to work by public transport, with a further 7% walking or cycling. Only 20% come by car (***Table 5.1***).

The relative compactness of the CBD is also highly efficient for business, although the north-south axis is too long to walk comfortably

Figure 5.9 shows key movements into the Sydney CBD on an average weekday, by mode and corridor.

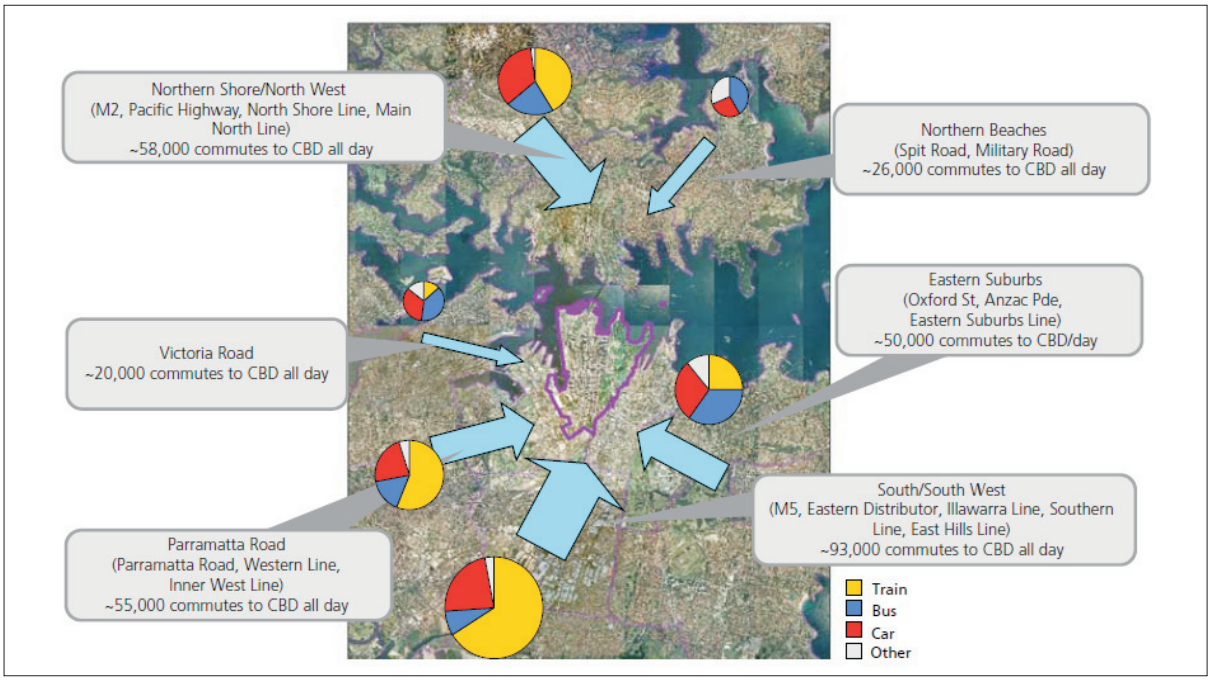


Figure 5.9. *Key movements into the Sydney CBD. Source: NSW Transport Data Centre (2008).*

Rail is the principal mode for journeys to work in the CBD from the middle and outer suburbs, apart from suburbs in Sydney's northwest and the Mona Vale area, which are currently served only by buses. Buses are the main mode from the inner suburbs. Ferries provide an important link from harbourside suburbs, while the light rail system links Pyrmont and selected inner western suburbs.

The CBD has a relatively low level of parking spaces per employee, but it still experiences significant road congestion and its roads are close to, or at, their capacity in peak periods.

Unfortunately traffic has grown strongly in recent years, while public transport use has been static. This trend needs to be reversed if the city is to maintain its efficiency as a place to do business and remain an attractive place to work, shop, recreate and visit.

Although the Sydney CBD has the highest mode share for public transport of any city in Australia, and one of the highest in the world, public transport has not been keeping up with demand and most of the growth in travel since 1990 has been by car.

For many years the prime focus of improvements to public transport services for journeys into the CBD has been on buses. Extensive bus lanes have been installed in many streets in the city and on the approach roads to the city, off-bus ticketing has been introduced and high-capacity buses have been purchased.

However, the limitations of this approach are now clear. Bus volumes in the CBD are now excessive, with over 730 buses entering the CBD in the morning between 8:00 am and 9:00 am and over 7,000 buses driving through the city on weekdays (***Figure 5.10***).

Many buses are now routed to run through the length of the city, with very high volumes in George Street, Elizabeth Street and York Street. Most of these buses are largely empty north of Market Street, and are simply travelling to reach bus "layover" (parking) areas around Circular Quay, which in turn do nothing to enhance one of Australia's prime tourist destinations.

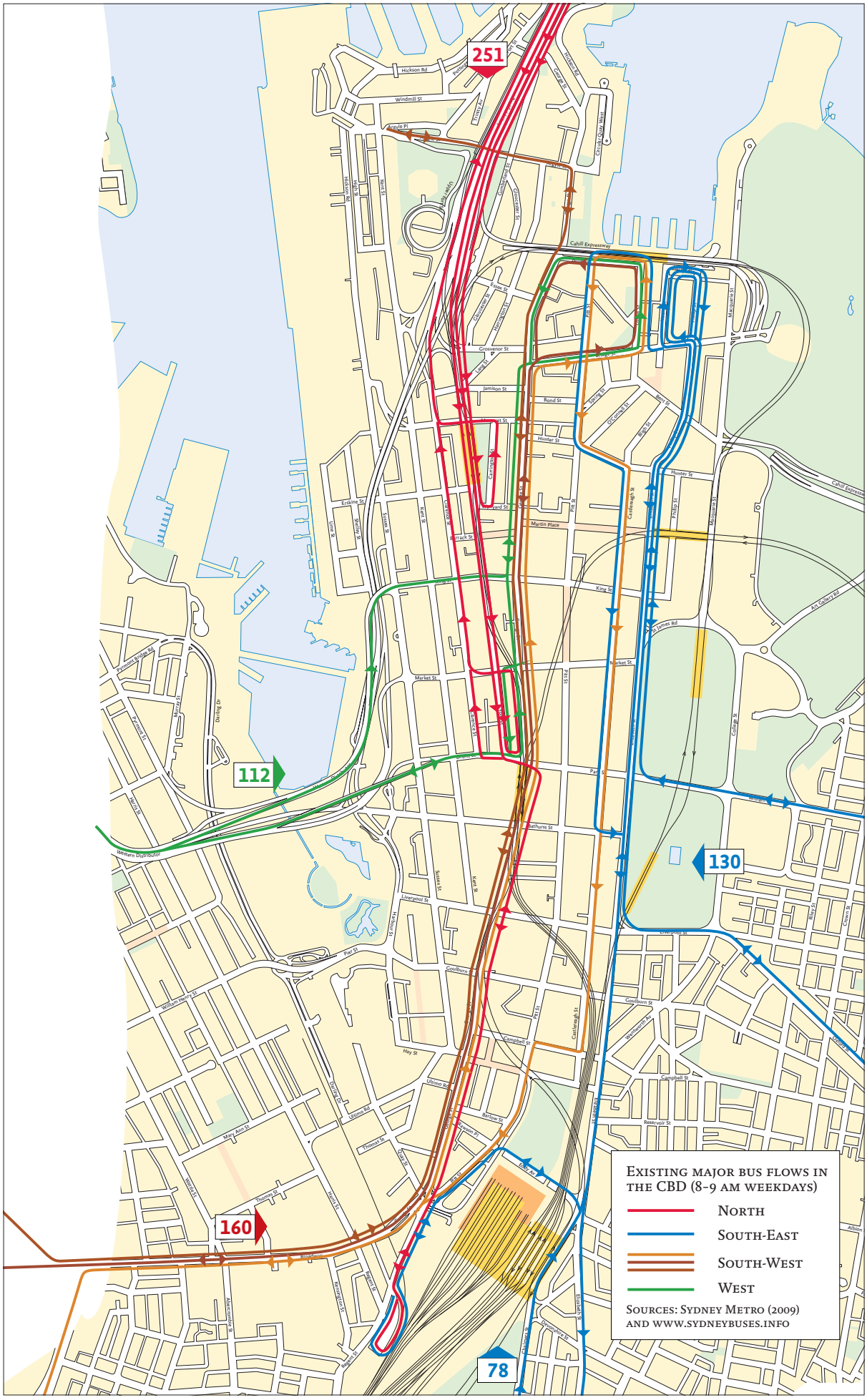
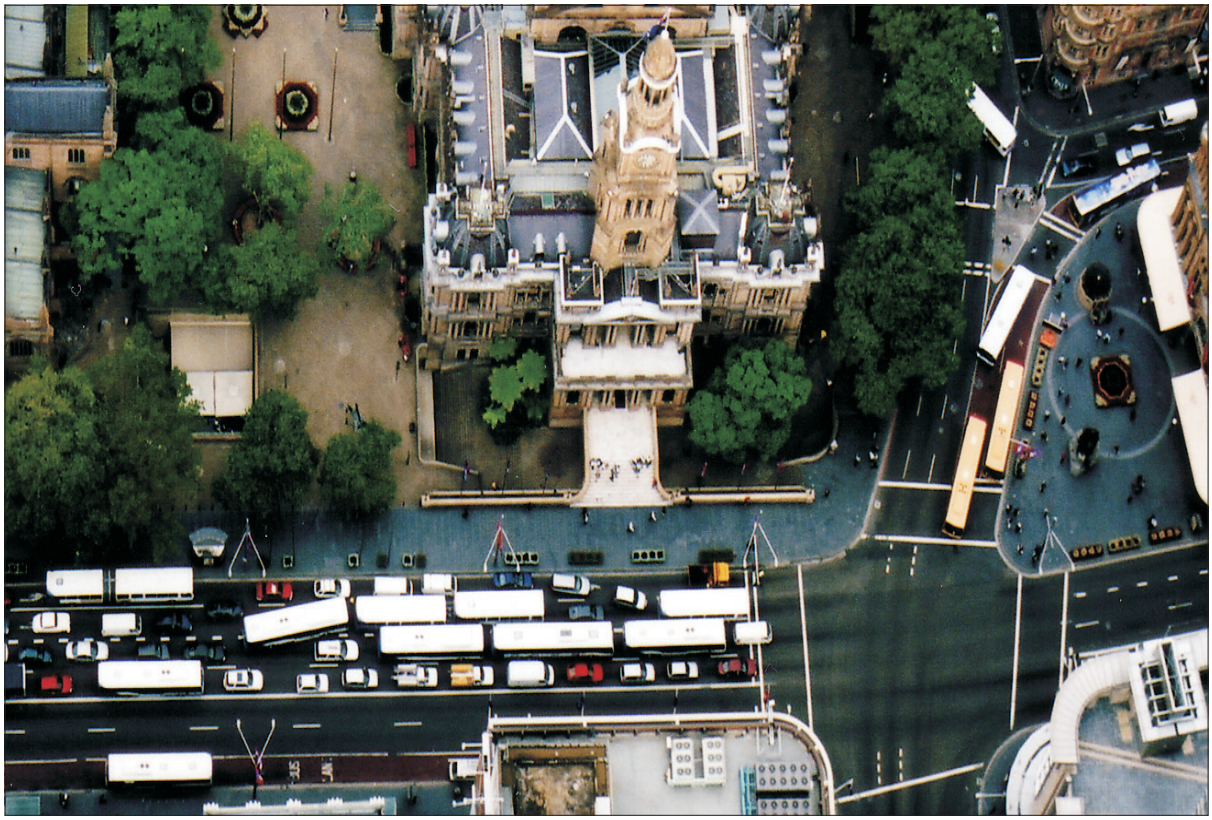


Figure 5.10. *Current bus volumes approaching the CBD in the weekday morning peak hour.*



In addition to their noise and diesel emissions, the buses clogging the CBD provide a barrier to pedestrians and a danger to cyclists.

The volume of buses now exceeds street capacity in many places, causing bus congestion, inefficient use of vehicles and drivers and slow journeys through the city centre.

This bus congestion also contributes to pedestrian congestion, on the roads as well as on the footpaths, and results in inconvenient arrangements for boarding passengers, with multiple stops which are confusing and difficult to manage.

5.3.2 Short-term priorities

There have been many studies of the current transport problems in the CBD and inner areas of Sydney and the best ways to solve them.*

The broad conclusion from all of these studies has been that there is a need to:

- **Re-route buses so they do not spend as much time in the city centre, and**
- **Extend the light rail system, which currently serves only the southern part of the CBD, into the city proper.**

The latter measure would provide better internal circulation as well as better access from the areas currently served by light rail. It would also facilitate the expansion of facilities for pedestrians and cyclists.

Both sets of short-term priorities should be implemented within four to five years.

* See, for example, NSW Department of Transport (1995 and 1997), Metro Transport Sydney (2002), Transport NSW (2003) and City of Sydney (2005).

Figure 5.11 illustrates one way this could be achieved, using George Street as a key north-south access for light rail and re-routing buses to greatly reduce their impacts on the city.

Under this concept there would be seven key interchanges in the city, connecting heavy rail, buses, ferries and light rail and providing convenient connections for travel within and through the CBD (***Table 5.2***).

This concept would substantially reduce the volumes of bus movements in the city centre and free up sites like the Lee Street bus layover for redevelopment. It would also greatly increase the operating efficiency of the bus fleet, with many buses saving 20-30 minutes on their current cycle times.

An alternative option would be to utilise Pitt and Castlereagh Streets for a one-way light rail loop, as proposed in most (but not all) previous CBD light rail studies (***Figure 5.12***).

This concept would retain some buses in George Street.

Both options have advantages and disadvantages, and there will need to be further discussions between the State government (and especially Transport for Sydney, the new integrated public transport authority proposed by the Inquiry in Chapter 2), the City of Sydney and key stakeholders to finalise the best approach. At present, however, the Inquiry favours the George Street option.

There would be many ways to achieve the necessary bus re-routing under each of the concepts shown in *Figures 5.11 and 5.12*.

For example, under the "George Street" concept one option would be to:

- Re-route most or all of the buses entering the city from the Western Distributor to run through Druitt Street and out to the southeast or east

Table 5.2.
Key connections within the CBD.

Interchange		Connections
I_1	Circular Quay	Ferry passengers arriving at Circular Quay will have a choice of bus, light rail and heavy rail for distribution through the city centre and beyond.
I_2	Wynyard	Provides an interchange between buses and heavy rail, with additional connections to light rail in George Street.
I_3	Martin Place	Provides an interchange location between heavy rail and buses.
I_4	Barangaroo Wharf	A new ferry terminal would be built at the southern end of the Barangaroo development, with new ferry services from the Parramatta River and the Harbour (see section 5.3). It would serve the growing office concentrations on the western side of the city centre, and connect with the new light rail route along Sussex Street/Hickson Road, which ideally would deviate to pick up and set down passengers right at the wharf.
I_5	Park Street	Park Street would become a major interchange zone, with connections between heavy rail (Town Hall station), buses and light rail.
I_6	Hay Street	A new interchange zone in George Street, between buses and light rail, would be created in the vicinity of Hay Street.
I_7	Central station colonnade	Long-distance and intercity passengers arriving at Central station could use the existing convenient light rail interchange for travel right into the city centre and to Pyrmont and other locations, or interchange in Eddy Avenue to buses for destinations like the University of NSW.

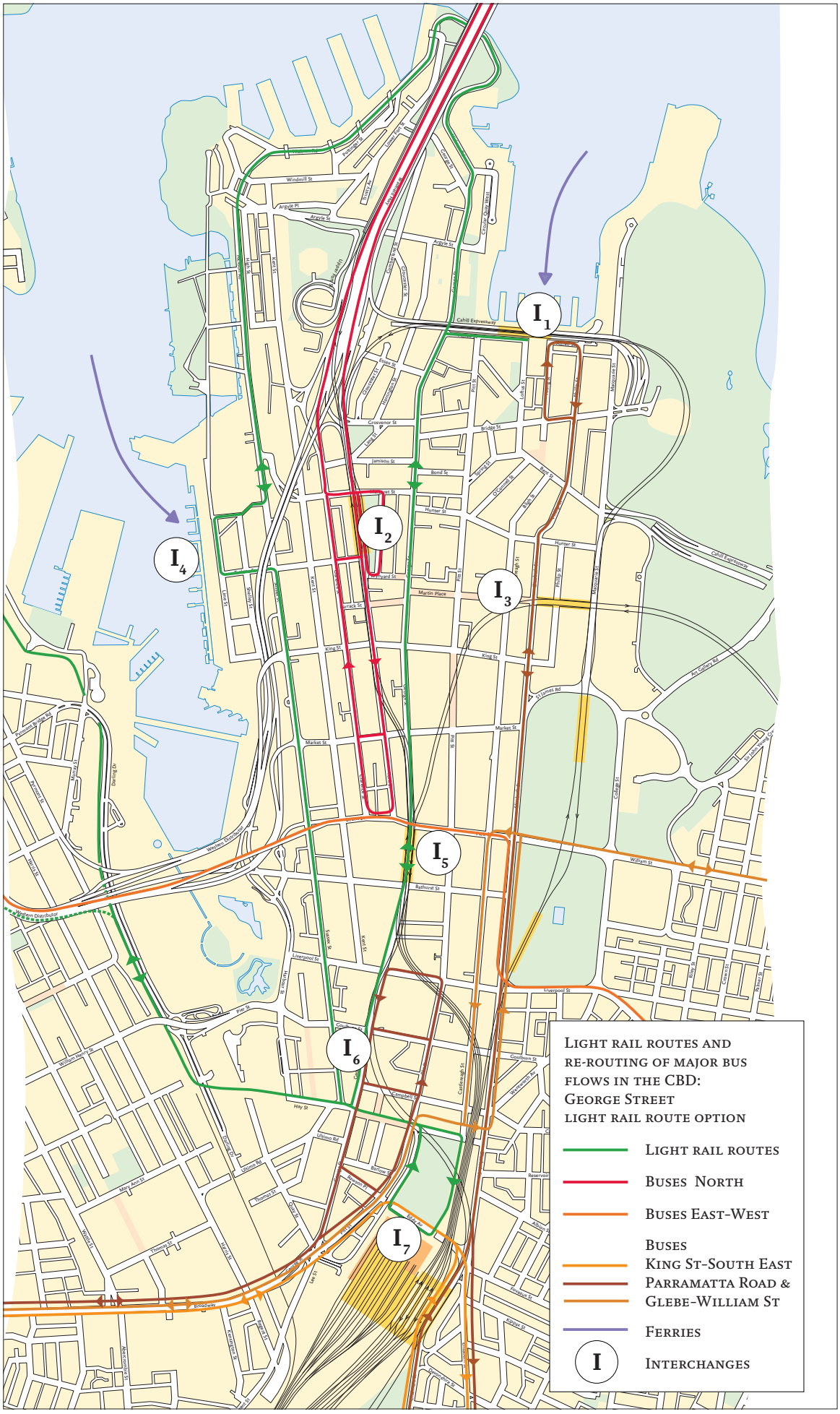


Figure 5.11. *A "George Street" option for short-term public transport improvements in the Sydney CBD.*

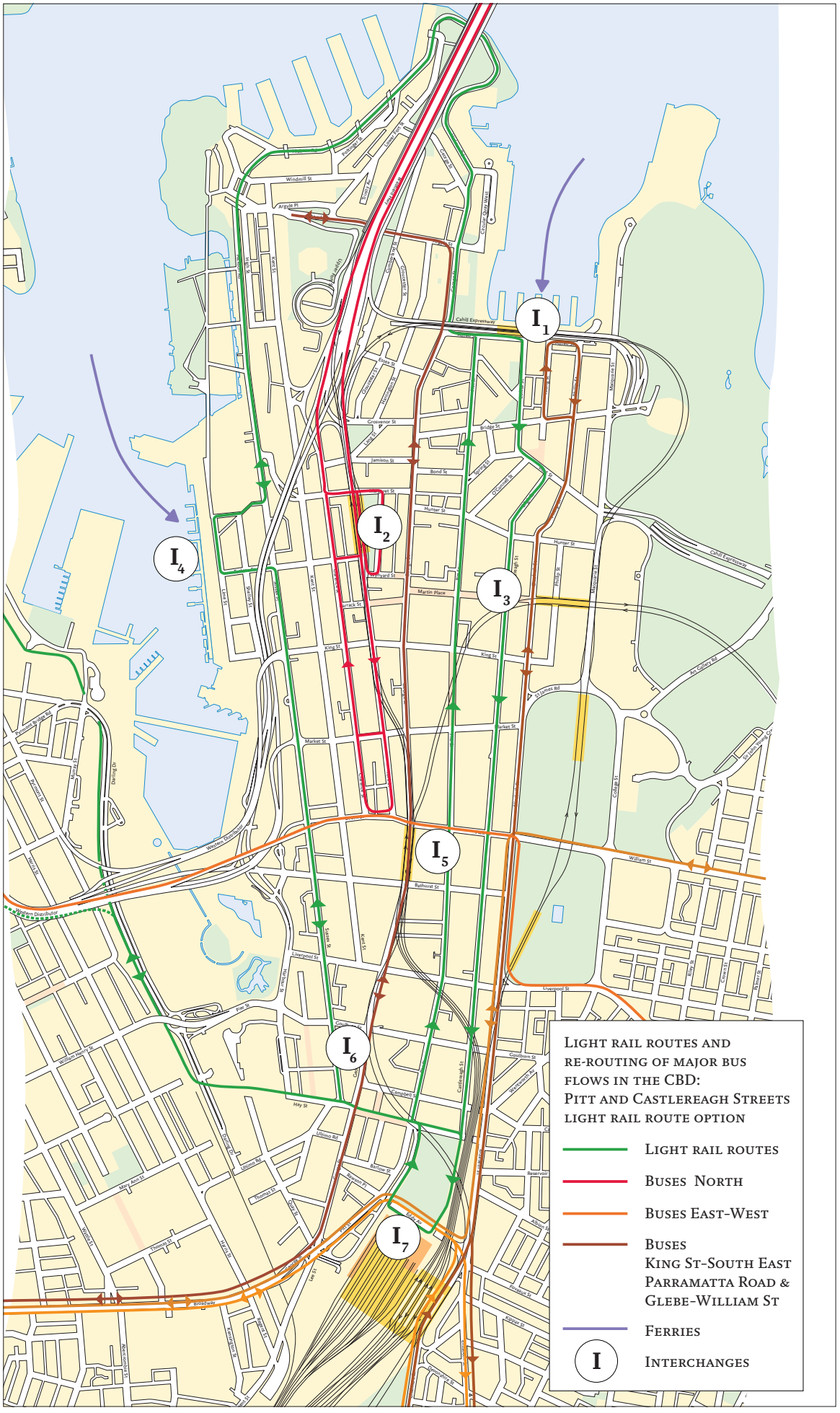


Figure 5.12. *A "Pitt Street and Castlereagh Street" option for short-term public transport improvements in the Sydney CBD.*

via Oxford Street (and *vice versa*). This would reduce the number of buses in the northern parts of both George and Elizabeth Streets.

- Terminate all buses entering the city from the Harbour Bridge north of Park Street, turning them around at Carrington Street, Erskine Street, Market Street or Druitt Street. The main layover areas would be Wynyard Park and along the western side of the Queen Victoria Building. This would reduce the number of buses in the southern part of George Street.
- Though-run buses from Glebe to William Street and *vice versa*, using Broadway, Pitt Street and Elizabeth/Castlereagh Streets. This would reduce the number of buses in the northern part of the city.
- Terminate the Parramatta Road buses south of Park Street, using Pitt Street (northbound) and George Street (southbound), with layovers in Rawson Place, Barlow Street, Campbell Street and Liverpool Street. This would provide an easy transfer to the light rail lines (George Street, Sussex Street and inner west).
- Through-run City Road/Broadway buses to the southeast using Eddy Avenue (for example, to UNSW) and *vice versa*. This would allows easy interchanges to both light rail and heavy rail from Eddy Avenue.

The inner city high-connectivity "grid-like" frequent bus network proposals discussed in section 5.2.4 would also greatly assist in reducing the numbers of services having to travel into and out of the CBD.

Either of the short-term CBD public transport improvement concepts presented above would provide significantly more space for pedestrians and cyclists in the city centre, as desired under the City of Sydney's plans. In particular, they would remove almost all buses from George Street and many from Elizabeth Street.

George Street would be able to be completely transformed as the CBD's major north-south boulevard, with some sections of the street car-free as well.

Both concepts would also facilitate a much stronger east-west pedestrian connection from Town Hall to Hyde Park via the new Town Square proposed between George and Pitt Streets and other parts of the city, including the Circular Quay area, would also be transformed, with most of the buses removed.

Recommendation ST 11:

In addition to the Sussex Street/Hickson Road light rail extension from Hay Street to Barangaroo and Circular Quay announced in the NSW government's February 2010 *Metropolitan Transport Plan*, there should be a **light rail extension from Hay Street to Circular Quay via George Street**, connecting with the Barangaroo-Circular Quay extension at Circular Quay.

The George Street extension should be accompanied by a rationalisation of bus services and private vehicle access in the CBD, to enhance the efficiency, amenity and liveability of the city centre and provide capacity for further, longer term light rail extensions to the inner suburbs.

This project should proceed as an immediate priority.

5.4 Other short-term light rail initiatives

Recommendation ST 12:

The existing light rail system from Central to Lilyfield should immediately be extended to Dulwich Hill utilising the unused freight rail line, in conjunction with the provision of a regional cycleway and "greenway" habitat regeneration.

Construction of this project should be commenced as soon as possible, without delay. It will increase the attractiveness of the light rail system, support higher frequency services and facilitate proposed medium-density developments at locations such as the Summer Hill flour mill site, the Rozelle goods yard and Harold Park. Good interchanges with bus and heavy rail services will be essential.

5.5 Ferries

5.5.1 A particular need for integrated planning

The 2007 Report of the Special Commission of Inquiry into Sydney Ferries Corporation by Bret Walker SC recommended smaller ferry vessels and improved frequencies:

> *"74 In order to make a socially useful and environmentally preferable use of our waterways, especially for commuter traffic, routes for ferry services must become better, both in frequency and location. There should be capacity, therefore, for the ferry service to experiment with new and different routes, without any diminution of presently useful routes.*
>
> *"75 None of these hoped-for developments can realistically happen unless a better fleet—new and well-designed for Sydney—is acquired to replace the present fleet. Otherwise, stagnant passenger numbers, mounting maintenance costs and problematic reliability will compound the present unsatisfactory state of affairs."*

This Inquiry does not agree that no hoped-for developments can occur without a new fleet, but does agree that the existing fleet is an obstacle on which leadership is needed.

Most importantly, though, **the problems with Sydney's ferry services provide an example of an issue where integrated planning of *all* public transport modes is required.**

There have been too many studies of buses, heavy rail, metros, light rail and ferries in isolation, and not enough about how they can fit together into an attractive and useful network.

The failure to think in integrated terms has been especially disadvantageous to the ferries, because **ferries intrinsically rely on connections.**

So long as ferries continue to be thought about in terms of individual markets depending mainly on locally generated demand at each wharf, much of their potential will never be discovered.

The *local* catchment around any public transport stop can be visualised as a circle of a fixed radius around the stop. For a ferry terminal, half of that circle is

usually in the water, so the other half needs to be especially dense if the ferry is to have a market based solely on walking access. **Ferry markets can be greatly extended, however, by reliable, well marketed bus connections.**

These connections need to be either frequent—as is the case with some connections at Manly and Circular Quay—or else timed to the ferry schedule with the flexibility to wait if a ferry is delayed, as is already done on a limited way at several North Shore wharves.

Recommendation ST 13:

Ferry services should be fully integrated with the rest of the public transport network. In particular, the market for ferry services should be extended through reliable, well marketed bus connections.

5.5.2 High-frequency ferries for the inner Harbour

Frequency is the best guarantee of good connections *and* the best way of ensuring high patronage on the ferries themselves. Short routes are easiest to run frequently, so attention should focus first on markets where higher frequency could achieve dramatic improvements in travel times for significant numbers of people. These tend to be markets where:

- There is high density around the wharf, *plus*
- A large secondary catchment which can logically be routed via bus connections to the wharf, and
- There is no competing land transport route that is close to being as direct and reliable.

By these measures, the single strongest market, as Barangaroo develops, may well be a direct link between Balmain East and Barangaroo. Depending on the location of the Barangaroo wharf, this route could be less than 500 m long, which suggests a market for a ferry shuttle where turnaround time is optimised. (Although the publicly released plans for the Barangaroo development show no ferry wharf at all, the Inquiry understands one is being planned for the southernmost end of the development, close to the existing King Street wharf, so the distance from Balmain East might be greater.) Balmain East happens to be a strategic site for a bus-ferry interface, because the Darling Street bus spine logically ends here and could support a high enough bus service frequency to make this an easy connection all day. Even some passengers from Rozelle and Leichhardt would find this a convenient way to travel if the northern CBD were their destination.

Similar opportunities probably exist for other short routes among wharves across from the CBD, including McMahons Point and Pyrmont Bay. By contrast, Darling Harbour is an example of a wharf that is unlikely to support frequent services, because there are more direct land routes from there to most of the places a ferry could go.

Recommendation ST 14:

An aggressive "frequent ferry" strategy should be developed and implemented, focussing on short, competitive routes that can be run very frequently and can thus encourage spontaneous use. Most of these opportunities will be close around the CBD.

5.5.3 'Buses on the water': inner Harbour boats and crewing

Ferries running very frequently on short routes, such as around the inner harbour, might well be smaller than the current boats and this, in turn, might mean they do not require two employees.

While legal requirements vary, New Zealand has examples of single-employee ferries that carry up to 49 passengers on short runs on Auckland's harbour (http://q-west.com/clipper-iii-detail-sheet).

The Inquiry is not endorsing this particular product, but merely referring to it as an illustration of the scale and type of service needed on these dense inner harbour markets.

Recommendation ST 15:

Inner Harbour ferries should operate like "buses on the water". They should be designed for a low unit operating cost and fast turnarounds, so that they can be run frequently and intensively.

An expanded ferry system would still have a growing workforce, even if the staffing of boats were reduced in line with "best practices" elsewhere. Insisting on the current staffing levels would leave the ferries in their current state: fun for tourists, useful for some commuters, but unable to really develop their potential markets, especially around the inner Harbour where the opportunities will be greatest.

Finally, as a new fleet is introduced it may be sensible to retain some or all of the existing smaller ferries for tourist purposes. These vehicles have considerable character and a long history. London, for example, continues to use some of its red double-deck "Routemaster" buses for tourist purposes.

5.5.4 New bus–ferry markets: Manly to Bondi Junction?

Recommendation ST 16:

Longer ferry services should have more of a peak and/or commuter focus, should retain or increase their current service frequencies and should again be closely integrated with bus services. New longer distance services should also be investigated and developed where feasible.

The Manly-CBD services would probably continue to be the strongest of these routes, because of its strong bus connections at both ends, proposed future light rail connections at Circular Quay (see section 5.3) and the lack of an attractive road route.

Even at half hourly frequencies, there may be cases where thinking about bus and ferries together, and operating them with an intense focus on good interchanges, would expand a potential market to the point of feasibility.

The most obvious and intriguing possibility of this type would be a ferry from Manly to Watsons Bay or Rose Bay, integrated with timed connecting buses to

Bondi Junction. The lack of any other option for direct travel between the Northern Beaches and the Eastern Suburbs might make this an effective and successful service despite the connection required, but only once bus and ferry services and fares are integrated.

While markets such as this may seem peripheral, this is a chance to build a public transport market for which there is no road-based alternative. There may be similar opportunities elsewhere.

5.6 Taxis and demand-responsive transport

5.6.1 Taxis

Although taxis are not a form of mass public transport, they form a vital part of the transport system for a city, by catering for:

- Urgent trips, particularly by business people
- Trips to destinations or at times of the day for which public transport is not convenient
- Trips by people who either don't own a car or who have difficulty driving, and
- Trips where door-door access is important, for example for people with a mobility handicap.

For many purposes, taxis are almost as convenient as a car, and in some cases they can be much more convenient because they avoid having to find a parking spot. This is becoming increasingly important in higher density areas or for trips to locations such as major restaurant strips (for example King Street in Newtown, Military Road or the Crows Nest area).

Taxis account for around 1% of trips in Sydney, and would be more popular were it not for their high cost (a typical 10 km trip costs around $25, compared to less than a fifth of this for a trip of the same length by public transport).

In addition, taxis suffer from lack of capacity at peak times. The very times when people most want to find a taxi, such as after a major sporting event or when returning home on a Friday or Saturday evening, can be the very time when it is hardest to find a vacant cab.

The difficulty is that if more taxi plates were made available to cover these peak demands—the "solution" usually suggested by the public to solve this problem—the average productivity per driver and vehicle would fall as more taxis spent idle time on ranks during low demand periods. Similarly, simple deregulation of taxis, as has been tried in a number of countries overseas, tends to lead to an initial over-provision of taxis and extremely low wages for drivers, followed by a contraction in the fleet as forces of supply and demand are rebalanced.

So while the taxi industry could certainly be improved, the fundamental economics of single hire vehicles are difficult to alter, given the fluctuations in demand across the week and the limitations on productivity from traffic congestion and other factors.

However, the need for flexible public transport options is likely to grow as the population ages and as housing densities increase, leading more people to reduce their car ownership.

The solution to providing for this demand economically is to move to "demand-responsive transport".

5.6.2 Demand-responsive transport options

"Demand-responsive transport" (DRT) is a term used to described a variety of services which provide much of the flexibility and door-door capability of a taxi but at a lower cost.

It covers services like dial-a-ride buses, multi-hire taxis and various forms of community-based transport which operate in accordance with specific travel requests, rather than a fixed route and timetable.

In countries like Sweden or Japan, where the ageing of society and long life expectancies are producing a major social need for mobility for people for whom walking to the local bus stop can be difficult, a number of new forms of DRT have been developed in recent years.

One example is the *Flexlinjen* (*Flexroute*) services developed in Gothenberg in Sweden, which now cover much of the city. These variable-route services provide local access to major transport terminals, shopping centres and hospitals.

Countries such as the Netherlands and Germany have also developed multi-hire taxi services such as the "Train Taxi", which picks people up from home and delivers them to rail stations (and *vice versa*). This avoids having to drive to the station and reduces the space required for parking at stations, yet still provides a highly convenient and affordable service. Local taxi operators are contracted to provide the service to the rail operator, within a certain catchment area of a station. By sharing the ride with others, the cost per passenger can be significantly reduced.

Some of the potential types of DRT service are illustrated in ***Table 5.3***, which compares them with conventional fixed-route, fixed-timetable bus services and conventional single hire taxis.

It may be seen that DRT can fill some of the gaps between the two extreme ends of public transport.

Flexlinjen (Flexroute) buses in Gothenberg. Flexroute) is an advanced demand-responsive minibus system originally developed as part of a European telematics program in 1996–98. This demonstration project was a great success and the city decided to proceed to gradual full-scale implementation. Now, 12 years later, 30 minibuses, each able to carry for 10 to 12 passengers, ensure that 90 % of the city's elderly live within 200 m walking distance of public transport.

TABLE 5.3.
COMPARISON OF "DEMAND-RESPONSIVE TRANSPORT", CONVENTIONAL BUS AND CONVENTIONAL TAXI SERVICE CHARACTERISTICS.

Type	Buses	Examples of demand-responsive services			Single hire taxis
		Flexroute	Area-based services	Continuous multi-hire services	
Timetable/ schedule	Fixed	Usually uses a timetable with specific departure times. Timetable includes an allowance to cover any deviations.	Can be operated at particular times (e.g. every 30 minutes) or as required.	No timetable. Operates purely in response to demand.	No timetable. Operates purely in response to demand.
Route	Fixed	Fixed, but with deviations to allow pickups and set-downs off-route.	No route, but covers a specific catchment area, usually with one or more fixed points.	Anywhere within a given zone or service area.	Anywhere.
Typical vehicle used	Bus (40 passengers)	Conventional bus or smaller (midi / mini bus) (11-40 passengers)	Small bus or maxi taxi (6-20 passengers)	Maxi taxi or taxi (4-10 passengers)	Standard taxi (4 passengers)
Typical operator	Bus company	Bus company	Bus company, taxi operator or community transport	Taxi operator or community transport	Taxi operator
Typical fare structure	Standard bus fares	Bus fares, possibly with a supplement for door-door service option	Zone-based fare	% of single hire fare, or fixed fare based on origin and destination	Based on meter (flag fall plus distance plus time)
Typical application	Mass transit	Low density area and/or low demand periods	Special-needs customers	Affordable, flexible transport	Individual transport
Booking	None	Required for customers wishing to be picked up off the fixed route	Required for all customers except those at key stops	Essential for all customers	Required except for hail or rank trips

Source: *Analysis of DRT options for the ACT Government*.

The rapid development of mobile phones, computers, GPS and other technologies over the last 15 years has made the implementation of advanced DRT services relatively simple. There are now a number of commercially available booking and dispatching systems which can effectively link customers, with their individual travel demands, so as to share a vehicle and driver. This can lead to a 30-40% reduction in costs per passenger compared to a single hire taxi, but with very little loss of convenience, as the matching process can ensure that passengers already on a vehicle are not deviated by more than a certain amount to pick up or set down another passenger.

Possible applications for DRT in the future are likely to include:

- Local access services linking lower density areas and customers with special mobility needs to their local shopping centre or transport interchange
- Late night link services, providing added convenience and security, and
- Multi-hiring to and from key locations such as the airport, which can help balance the disparities between arrivals and departures at different times of the day, reduce the queues of taxis and wasted driver time and reduce waiting times for passengers during peak periods

The main obstacles to the deployment of these new services are likely to be institutional barriers. Traditionally the taxi and bus industries have been regulated separately, and see each other as potential competitors rather than as collaborators in a wider transport system. Thus attempts to introduce DRT services using the bus industry (e.g. with minibuses) have tended to be resisted by the taxi industry,

while attempts to introduce DRT services using maxi-taxis have tended to be resisted by the bus industry.

In some overseas countries there is not the same rigid division. For example, in Singapore Comfort Del Gro operate both buses and taxis.

The introduction of DRT will become increasingly pressing in the future with the ageing of the population, because a growing percentage of the population will be unable to drive but will still need affordable mobility.

Recommendation ST 17:

Transport for Sydney should work with potential customers for demand-responsive transport (DRT) services, and with existing and potential new operators, to undertake pilot DRT services.

This could be done in conjunction with local government, as many councils, including the Willoughby, Manly, Sutherland, Ryde and Blue Mountains councils, have shown an interest in this in the past.

5.7 Interchanges

As observed throughout this chapter, the lack of attention to public transport connections has been one of the principal shortcomings of public transport network planning in Sydney to date.

Networks that efficiently move people to multiple destinations are always based on connections: different services working together to help a person complete a journey.

While fare penalties (Chapter 4) are the single largest barrier to good and attractive connections, the quality of interchanges—the locations where connections occur—is also critical.

Two routes meeting without a functional interchange are as useless as two motorways crossing each other without connecting ramps.

Reducing the inconvenience and uncertainty that many people currently face or perceive when making an interchange would be a substantial step forward.

Recommendation ST 18:

One of the key goals of Transport for Sydney should be to achieve better integration between all modes of public transport and between public transport modes and other modes, especially walking (section 5.10), cycling (sections 5.7.4 and 5.9), taxis and demand-responsive transport (section 5.6) and private vehicle used for "park and ride" and "kiss and ride" access to public transport facilities (section 5.7.4).

There should be a strong emphasis on removing barriers to interchanging and ensuring that passengers are provided with consistent levels of service as they interchange.

Improved integration can offer quicker, more convenient journeys by public transport and, by extending network flexibility and coverage, open up new journey opportunities. This will both benefit existing passengers and enable and encourage others to leave their cars at home.

> *"There is a need to investigate ways to make transit stops and stations more user friendly, including ancillary retail uses, cycle parking, route information and real time information."* (submission by Liverpool Council)

> *"Interchanges can promote access to the public transport network with good waiting environments and fast transfers. But poor interchanges, with long walks, stairs, long waits, poor travelling information, and poor weather protection can substantially discourage access to public transport."* (NSW Audit Office 2007, *Connecting with Public Transport*)

Sydney has several major purpose-built interchange facilities, especially at major rail stations where many buses connect. Some of these are of a high quality.

However, interchanging frequently takes place in locations with few formal interchange facilities and where the design of streets, waiting areas and pedestrian links has not taken the interchange activity into account.

A more intensive bus network, as envisaged in section 5.2, would generate many new interchange points at many urban intersections. At these locations interchanging passengers would have to rely on the same footpaths and pedestrian signals as those used for other purposes, so it will be important, for each location, to review all of the movements required of interchanging passengers and ensure the street design, signals and signage and locations of bus stops make these movements as clear, easy and legible as possible.

Transport for Sydney (Chapter 2) will need the active co-operation of local government and the RTA—which has repeatedly given vehicles a higher priority than pedestrians in the design and operation of its major intersections—if it is to achieve good interchanges at these sites.

Poor co-operation and differing priorities between the organisations can often result in barriers to interchange and the creation of physical and organisational "tidemarks". This can make the journey complex and disjointed, and people may be confused about who is responsible for dealing with any queries and problems.

> *"There are numerous instances where even minor modifications to interchanges, such as the installation of parking signs (Holsworthy station) or the provision of shelter near a taxi rank (Liverpool station), are held up by disputes or uncertainty over land ownership, issues of liability and budgeting priorities of individual agencies or landowners."* (submission by Western Sydney Community Forum)

In these circumstances, the interchange experience will fall short of the operators' aspiration of providing the "seamless journey" and the level of convenience that public transport offers will compare unfavourably with the door-to-door convenience offered by the private car.

The challenge is to work to *remove* barriers to interchange, and ensuring that passengers are provided with consistent levels of service as they interchange.

> *"[T]he interchange between various modes of transport needs to be designed to minimise interchange times .... as well as making them more user friendly."* (submission by Liverpool Council)

5.7.1 Key needs at interchanges

Passenger needs at interchanges are broadly understood within the public transport industry. They include:

- General appearance: adequacy of lighting and levels of graffiti, litter and cleanliness
- Physical environment: the availability of shelter, its condition and its extent of weather protection
- Safety and security: cctv, uncluttered spaces and sight lines
- Accessibility: number of steps and the presence, location and condition of a lift
- Information: signage, announcements and opportunities to talk with staff.

These attributes need to be addressed not just at the interchange facilities themselves but also to any walking routes that interchanging may require, such as routes from one bus stop to another at an urban intersection.

Appropriate levels of investment in these attributes can be assessed using qualitative research involving small study groups, while current performance can be assessed not just by field surveys but also by commissioning independent "mystery rider" surveys that examine the whole interchange experience.

5.7.2 Categorising interchanges

Interchanges have differing characteristics depending on their roles, their volumes of passengers and the ranges of services available.

Recommendation ST 19:

For ease of comparison by customers, every interchange location should be categorised in a way that reflects the type of role it plays in the transport network.

These categories might be:

- **Category A: Major interchanges and termini.** These are generally associated with especially high volumes of passengers and usually also feature multiple modes and especially complex or high-volume interchange possibilities. Examples in Sydney include Central, Martin Place, all the City Circle stations, Parramatta, Chatswood, Bondi Junction and Strathfield.
- **Category B: Other strategic interchanges**, currently of three types:
    - **B1. Major rail-bus interchanges.** This is a large category, including everywhere that the rail network intersects with (say) five or more bus routes or any "strategic corridor" or "frequent network" bus service.
    - **B2. Major ferry-bus interchanges.** Circular Quay would be in Category A, so Manly may initially be alone in this category.
    - **B3. Major bus-bus interchanges.** These occur in areas where bus corridors are serving the primary long-distance transit function. Ex-

amples include Warringah Mall, Eastgardens, Randwick and (pending the completion of the North West Rail Link) Rouse Hill.

These subcategories focus on potentially problematic intermodal interchanges, and in the future will be joined by major interchanges with light rail as Sydney's light rail network is developed (sections 3.5, 5.3.2 and 5.4).

Of course, there are also numerous rail-rail interchange stations. The quality of information and wayfinding guiding these intra-rail interchanges should be a minimum goal for the interchange experience generally, regardless of mode.

- **Category C: Frequent grid interchanges.** This category would cover all the on-street intersection points between frequent bus (or light rail) services. These have potentially high demand but the locations is typically near street corners and thus require interchange needs to be integrated with the needs of other modes around the intersections, as described above.

  There would be many of these locations, especially in inner parts of Sydney that would support a rich grid of frequent services. They are already common on Melbourne at junctions in the tram network, but in Sydney they have received insufficient attention. In the existing bus network, examples of such locations include Maroubra Junction., Belmore Road in Randwick and the corner of Crown and Cleveland Streets. The conceptual inner city network suggested in section 5.2.4 would create many more.

- **Category D: interchanges of local significance only.** These would be where small volumes of feeder service connect with rail, ferry or trunk bus services for access only to the surrounding few suburbs. They would require basic information and shelter, but would not require the level of design attention that the other categories would demand.

Recommendation ST 20:

Transport for Sydney should:

- Develop minimum design and operational standards and 'best practice' guidelines for each interchange category, to guarantee passengers a consistent experience
- Develop packages for improving particular aspects of interchanging, such as "real time" information across the network, and
- Audit and review interchanges against its standards and co-ordinate work programs to develop the interchanges so full compliance is achieved.

"NSW Transport and Infrastructure has responded to the Audit Office's Report with 'Guidelines for the Development of Public Transport Interchange Facilities' 2008. However these are not mandatory and are largely a set of design guidelines." (submission by Western Sydney Community Forum)

Transport for Sydney should also act as a leader of and catalyst for interchange management, working with and co-ordinating other parties to developing ideas and enable others, where appropriate, to take the lead on specific projects.

It will be essential to get best value for money by maximising the funding available for interchanges from the private sector and commercial organisations. Implementation will also need to create a balance between low-cost short-term schemes and those which will take longer to implement.

5.7.3 Managing conflicts between interchanges and other uses

The major public transport interchanges will usually be at locations which also have a high potential for high-density urban development. But when planners and civic leaders envisage a major centre around a rail station or ferry wharf, they sometimes do not adequately account for the volume of buses that will need to converge there. These buses will often require a significant amount of space, and can also arouse objections to their emissions and noise.

Buses converging on a major centre have two essential functions for the surrounding area: direct access to destinations in the centre and direct connections to other public transport services, including rail or ferry lines. These functions are both met only when the buses can reach the rail station directly, with (a) minimum exposure to traffic delays, (b) adequate space for arrival and departure bays and (c) space for buses to "lay over" for their end-of-line breaks.

Managing these conflict is difficult, but denying them is even worse.

Interchange needs have to be understood in the early stages of the design of any major centre. Often, underground facilities can be developed to meet these needs. Sometimes, too, the break time can be moved to an adjacent site less affected by development. There are a range of solutions, but the problems are always easiest to solve in advance.

Recommendation ST 21:

Transport for Sydney should monitor and plan for future interchange needs, liaise with the developers of projects potentially affecting interchanges and ensure conflicts between interchanges and other uses are minimised.

5.7.4 "Park and ride" and "bike and ride" interchanging

Figure 5.13 shows the modes of transport currently used by CityRail customers to access CityRail stations.

It may be seen that one in seven CityRail passengers uses "park and ride", while a further 17% arrive or depart from the train as a vehicle passenger (mostly "kiss and ride").

This reflects the geography of Sydney, especially in the outer suburbs, where much of the population lives beyond a convenient walking distance of a station and bus services are not extensive.

In peak times the proportion of trips using park and ride is even higher (17% for the morning peak). Most of these people park near a station and so combine the flexibility and convenience of a car, for the suburban end of the journey, with the ability of the train to deliver them to key employment or retail centres.

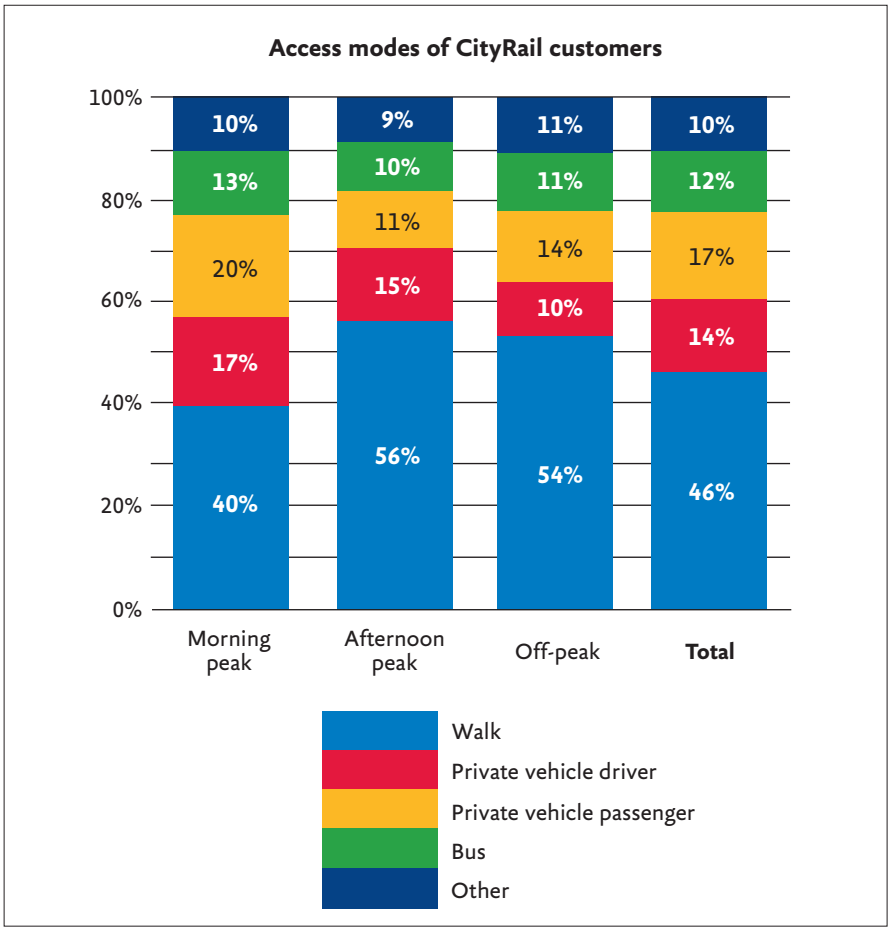


Figure 5.13. *Access mode for CityRail customers. Source: A Compendium of CityRail Travel Statistics, RailCorp, June 2008.*

Future increases in the use of public transport in Sydney will inevitably necessitate increases in parking facilities and the use of "park and ride" around stations, since many people in outer areas will still be well outside the walking catchments of these stations.

It would not be possible or desirable to locate "park and ride" facilities everywhere, however, particularly in town centres where land is valuable.

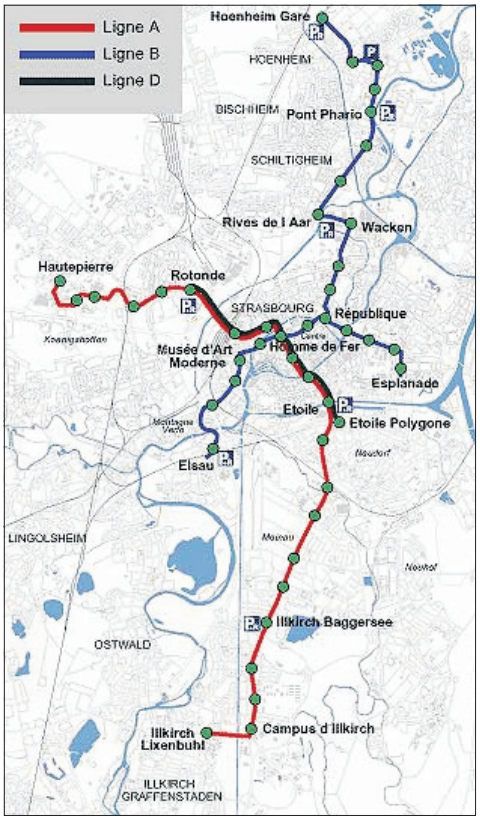
Recommendation ST 22:

Additional "park and ride" facilities should be concentrated:

- Where high-quality roads (including motorways) pass close to stations which have low-cost land suitable for the development of these facilities, and
- High-quality bus and light rail stops, again where there is good access and suitable low-value land is available.

All stations and other major public transport stops should be designed to facilitate "kiss and ride", so people can be dropped off or picked up safely and easily.

It is far better to have part of a trip made by public transport than none at all. If these options are not provided, the alternative for many people will be to use a car for the whole of their trip.



Light rail network in Strasbourg, showing "park and ride" locations.

Integrated system for cycle storage, with change rooms and lockers.

Bicycles outside Karlsruhe station, Germany.

In the future it is likely that many more people will be cycling and using small electric vehicles (see section 5.9 below). Parking space for bicycles etc can be provided much more cheaply and efficiently than for cars, particularly where land is expensive or restricted.

New developments in secure bicycle parking, including the provision of change rooms, showers and lockers, are emerging rapidly overseas, including the development of complete modular systems which can cut the cost of these facilities.

5.8 Information services

5.8.1 Information for the total journey

Customer information needs to be viewed as **a whole-of-journey process**.

It begins with the trip planning phase, but also includes a range of communications throughout the journey to assure passengers that they are on the right course, direct them through any interchanges they require and help them identify where to alight for their destination.

Information issues can have a direct impact on public transport services' speed and reliability. For example, clear on-board announcements about the next stop location can help passengers to be in position to alight more rapidly, reducing "dwell" times, and clear and complete network information at bus stops can reduce the need for customers to ask drivers for information, also saving time.

Currently there is no shortage of information being published by the different modes in Sydney, but it suffers from not being co-ordinated in its type or quality and it is often limited to the services of one operator.

What is needed is a customer-orientated, multi-modal, whole-of-journey based suite of solutions.

> *"The customer does not want to spend his [sic] precious time noting down all the many possible trip timetables, even if he can access these quickly and electronically. The customer is thinking of jumping in the car, and needs to quickly know:*
>
> - *"are there services from A to B and B to home?*
> - *"how frequent are the services to/from A, B & home, throughout the afternoon and evening?*
> - *"what is the approximate cost?"* (Warren Centre's *Sustainable Transport Project* of 2002)

This quotation is typical of many submissions to the Inquiry.

Recommendation ST 23:

Public transport information services should always be customer-orientated and always be multi-modal, covering whole journeys and not just individual trip components or individual modes.

They should provide people with simple, easy-to-access information which is based on their whole journey and delivered in "real time" as much as possible.

> *"A number of [UK] studies have reported values of 4 pence - 9 pence [8-18 cents] per journey for real time passenger information at stops. Studies consistently show that real time information is valued higher than other potential improvements. Recent work for London has estimated that the provision of electronic displays and the next stop announcements on buses are worth around 4 pence per journey."* (UK Cabinet Office, An Analysis of Urban Transport)

5.8.2 Phone and web information (131500)

Trip planning services offered by phone and on the web are a crucial element of any information system.

The existing system in Sydney represents a serious effort to create a single portal to all of Sydney's public transport offerings.

The Inquiry has used 131500.com.au extensively to examine existing services, but has encountered several instances in which the website did not identify an obvious option for a requested trip. This suggests a need for further improvement in the underlying algorithm and/or data inputs.

Historically, the route and schedule data needed for trip planning have been maintained by operators rather than the government. This function will need to be centralised in a database which both public transport operators and Transport for Sydney (Chapter 2) can use.

Google Transit also offers a standardised trip planning product to public transport agencies worldwide. The major barrier to using *Google Transit* is the need for schedule and route data to be fed to Google in a standardised format. Currently only the Sydney light rail and monorail services are included, although the entire Adelaide and Perth networks are covered.

Transport for Sydney would be in a better position than individual operators to make these data available to Google and to other third-party purveyors of information services, with the goal of maximising the ways information about public transport can reach the public and become integrated with other information needs.

One crucial improvement to 131500 would be to include ticket options and fares. At present obtaining this information requires at least two separate operations, and more if multiple operators are involved.

131500 also has the ability to expand its practical content. For example,

> *"... details of interchange layouts, transport services, kiss and ride facilities, park and ride facilities, taxi ranks and amenities. Adding an ability to plan part of the journey by taxi or car, as a means of encouraging a change in travel behaviour."* (submission by Western Sydney Community Forum)

Recommendation ST 24:

Transport for Sydney should maintain a centralised database of routes, schedules, fares, ticketing options and interchange facilities for all public transport services in Sydney, accessible by all public transport operators.

This information should be made available in standardised formats to *Google Transit* and other third-party information providers.

5.8.3 Maps still matter

No matter how good navigational aids become, some customers will still want maps of their public transport network, just as they want maps of their city.

For people who think in spatial terms, maps are an important way to conceptualise not just how to make a trip, but also what the possibilities are for tripmaking from any particular point.

Good maps do more than help you figure out which service to use; they present the system in a way that highlights its usefulness for many kinds of trips.

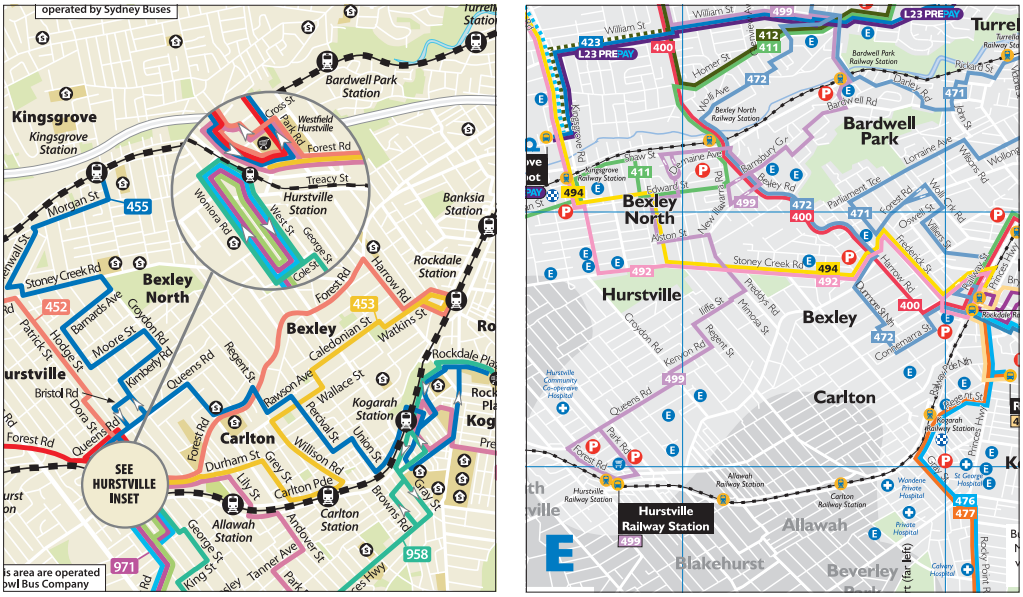
Network maps should be concerned with attracting customers to the whole public transport system, not individual operators' territories.

A good set of network maps should include a "zoomed out" map of the Sydney-wide network for long-distance travel and maps of local subareas with frequent services highlighted. There is no need for maps that emphasise the operating company responsible for each service.

There is currently no map of the entire Sydney public transport network, either in print or online. There are diagrams of the rail/light rail and ferry networks in isolation, and maps of each bus operator's services provided by each operator, but no information showing how all these systems fit together.

> *"...with a route map of Sydney's present bus services—for which "spaghetti" is a not uncommon description. Demand for Sydney's present bus services suffers significantly from customer confusion about the services available."* (Warren Centre's *Sustainable Transport Project* of 2002)

Bus operators' maps, for example, suggest that the network simply ends where the operator's territory ends, even though the network may in fact be interwoven



Veolia and STA maps of the same area in Hurstville. Each gives the impression that there are no bus services beyond its operator's own territory and makes it impossible to see how both operators' services fit together into one system.

with the adjacent operator's services in a way that would be useful if people could see it. The *Integrated Network Plans* described in section 5.2 revised services in many of these "border zones" so that adjacent operators' services now work together more effectively, but the prevailing style of mapping conceals these benefits from the public.

Ultimately, it does not make sense for operating companies to have the lead role in developing mapping, because they cannot be responsible for each other's territories.

Transport for Sydney, as the planner and purchaser of all services (Chapter 2), should be responsible for presenting them to the public as a unified system.

Another map which only Transport for Sydney can produce is a regional structure diagram, showing not just the rail system but all the services useful for long-distance travel between major centres. The "strategic corridor" system for buses visualised by the Unsworth review was designed to be the bus component of such a network, but while there is a "strategic corridor" map in the *Service Planning Guidelines* there is no such map for the customer. Such a map would need to cover all of Sydney and show all operators' services, and could therefore only be a Transport for Sydney product.

"Frequent network" mapping: advertising the most useful services

The drawings of the inner city bus network presented in *Figures 5.5 and 5.6* are simple examples of a "frequent network" map, an important tool which many cities comparable to Sydney are using to make their most frequent services visible not just to customers but also to themselves.

The principle behind a "frequent network" map is simple. Many customers will use public transport only if they know it's coming soon, whenever they need it. "Frequent network" maps show everyone where this level of mobility is available.

"Frequent network" maps are useful for a wide range of audiences:

- For potential customers, especially people who are highly time-sensitive and will not wait long for a service, these maps show that there is a network of services that can be useful to them.

  Not all potential customers respond to maps—some need narratives—but many people do think about their city in map-based terms and would benefit from knowing their "frequent service" options in this form.

- For anyone making decisions about where to locate anything that will need good public transport, a "frequent network" map is a quick guide to where to locate if you want high-frequency service. It is of great value to a range of actors, including the real estate industry, other government departments, councils and, of course, the Department of Planning.

RECOMMENDATION ST 25:

TRANSPORT FOR SYDNEY should produce maps of:

- The entire Sydney public transport network, including "regional structure" maps catering especially for longer-distance travellers and showing not just the rail system but all the services useful for long-distance travel between major centres
- The "*FREQUENT NETWORK*" (see **RECOMMENDATION ST 10**), and
- All public transport services in smaller areas, with the highlighting of *FREQUENT NETWORK* services (**RECOMMENDATION ST 10**) and "major" and "strategic" interchanges (**RECOMMENDATION ST 19**).

These maps should be widely displayed at public transport stops and interchanges and on vehicles, and should be made available free of charge, both in print form and on-line (in both interactive and downloadable formats).

A "frequent network" map can be a separate diagram, or it can be as simple as (for example) yellow highlighting on an existing system map, something that could easily be done right now. ***Figure 5.14*** shows an example of the latter approach, from Metro Transit in Minneapolis, Minnesota, USA.

5.8.4 INDIVIDUALISED ASSISTANCE: THE *TRAVELSMART* MODEL

One tool that is already used in Australia, but could be expanded substantially, is the *TravelSmart* model. *Travel Smart* is a program which helps individuals and employers understand their own transport needs and options so they can make better decisions about their own travel.

In his submission to the Inquiry Professor David Hensher has described the spirit of *TravelSmart* in these terms:

> *"How does the travel smart program work? There are various versions, but essentially, a telephone survey can be used to sample individuals and then to classify them as 'regular users' (R) of alternatives to the car, and for householders to nominate themselves as 'interested' (I) in reducing their car use. The sampled households so classified can be offered access to a range of maps and brochures on*

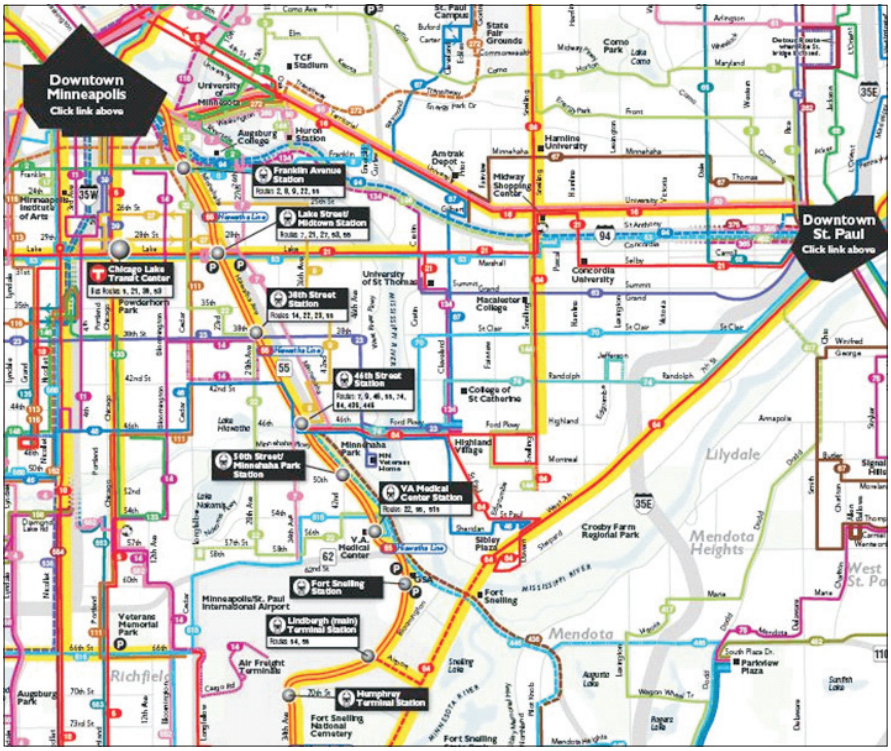


Figure 5.14. *An example of "frequent network" mapping, in this case with the "frequent network" simply highlighted in yellow (Minneapolis, USA).*

> *travel options. Following the delivery of the information ... they might be provided with a free travel pass for one month as an expression of interest. Importantly all participants who ordered information must be given a reward. ... Following the identification of the sample of interested persons, a follow-up meeting to take a close look at the person's current trip activity and where public transport may be able to be used would be worked through, and the free pass used to encourage trying a particular bus and/or rail service."*

A major investment in these types of assistance at the individual level should arguably wait until public transport services are considerably improved. However, as a form of outreach to employers and organisations who make "bulk" decisions about travel, these techniques can have great value.

Recommendation ST 26:

Transport for Sydney should make a major investment in outreaching to employers, to ensure they have the means to encourage good transport decisions by their staff.

5.8.5 Signage and navigational aids

Signage and other navigation aids are important areas of research in the public transport industry and in urban design generally.

Public transport customers in Sydney currently experience a range of signage systems, executed to varying standards at varying levels of quality.

Regular commuters need key information to be displayed where they expect it and in a form that can be quickly understood, while infrequent users and visitors require basic information at decision points throughout a station or other public

transport interchange or stop. Additional information such as line diagrams and platform numbers can reduce confusion and help people to move more quickly.

Information "accessibility guidelines" also need to be developed in consultation with disability groups. As the population ages our ability to read and understand information will diminish, so clear and simple information will be essential.

RECOMMENDATION ST 27:

TRANSPORT FOR SYDNEY should:

- Develop a consistent "look" for all public transport signage in Sydney, to convey and reinforce the message that all public transport services are part of one integrated network.
- Work with appropriate disability and stakeholder groups to produce guidelines on how information is displayed and presented (e.g. the minimum size of text and the use of colours and symbols).

5.9 CYCLING

Travelling by bicycle has become increasingly popular around the world, and in many cities comparable to Sydney cycling is well integrated into the overall transport "mix". Indeed, in some European cities such as Amsterdam and Copenhagen cycling is the *first* mode of choice for many people.

However, fewer than 1% of trips in Sydney are made by bicycle.

In 2007 the City of Sydney undertook research to try to better understand why cycling rates were so low:

> *"75% of City non-regular cyclists said having bicycle dedicated lanes and off-road routes would make them cycle more regularly and 71% of residents in adjoining Councils within 10 km said the same."* (submission by City of Sydney)

Although Sydney City Council and other councils have successfully completed a great deal of work, and much more is planned, Sydney lacks the co-ordination and unification of effort needed, between all councils and the RTA, to provide a truly integrated cycling network of infrastructure, facilities and support.

TRANSPORT FOR SYDNEY, the integrated public transport authority proposed by the Inquiry in Chapter 2 of this report, would be in the ideal position to provide this co-ordination, establish "best practices" and work with the councils, the RTA and public transport operators to achieve such a network.

Another highly significant factor is *health* sustainability, including the promotion of ...

> *"... the personal health benefits of riding. Positive impact on the healthcare system and the reduction of pollutants in the atmosphere and on the ground [resulting in] reduced medical and remediation costs."* (submission by Tom Parker)

Periodic stories of "wars" between cyclists and motorists may help sell newspapers, but it is worth remembering that:

> *"I pay my car registration, insurance and also pay for my car and motorcycle licence. More and more I choose to ride my racing bicycle, as it is usually no slower than the car around the city suburbs."* (Tom Parker)

In fact, **over 70% of cyclists in Sydney are also car drivers.**

The point is that regardless of mode, sometimes *everyone* appears to believe they have the dominant right to be on the road. A major exercise must be undertaken to break down sometimes aggressive attitudes towards fellow road-users.

In other words, "winning hearts and minds" is a critical first step in bringing together all road-users, both physically and ideologically.

In the end, however, Sydney as a whole must have co-ordinated, integrated, fit-for-function infrastructure for cycling in advance of, or at least in tandem with, any advocacy of cycling.

5.9.1 Some suggested cycling roles for Sydney's new integrated public transport authority

Sydney already has a rich program of cycling initiatives, but they appear to the public to be disconnected and unrelated to a bigger picture.

Transport for Sydney could potentially take on the primary responsibility for co-ordinating cycling programs across all of Sydney, with councils continuing to have a lead role in developing their own infrastructure.

Under this concept Transport for Sydney would work to co-ordinate and integrate activities, events, temporary initiatives and permanent projects, thereby helping to ensure that long-term objectives are met and new infrastructure etc provides the best overall value.

> *"Cycling is a cheap, efficient, clean and healthy mode of transport. It is well suited to trips of less than ten kilometres. If people are to be encouraged to use bicycles instead of cars, they need to be convinced that cycling is reasonably safe, convenient and comfortable way to travel. This means providing an easy to follow and direct network of roads/paths, spaces, lighting (where feasible), direction signs, and storage and other facilities at destinations."* (DUAP, RTA and Transport NSW, 2002, *Integrating Land Use and Transport Planning Policy Package, Sydney: Improving Transport Choice – Guidelines for planning and development*, Principle 7, Improve cycle access)

More specifically, under the approach suggested above Transport for Sydney would unify and coordinate the production and enforcement of cycling-related design codes, standards and guidelines.

> *"Develop better ways to better align local, state and federal government resources and projects to becoming bicycle friendly, ensure accountability mechanisms for application of appropriate guidelines by decision makers."* (submission by BicycleNSW)

Other key tasks on which Transport for Sydney might lead include:

- **A "strategic" bicycle network.** Transport for Sydney would work with other State government agencies to identify alternative sources of funding for this long-proposed network, so it can be completed within a short but realistic time.

> *"Most councils in the outer and middle rings are financially unable to provide significant monies.... towards construction of cycleways."* (submission by Liverpool Council)

- **Bicycle hire schemes.** Until it has an accessible bicycle hire scheme Sydney will continue to lag behind other "world cities" in being able to offer the ability to cycle to occasional users, visitors and those who just want to "give it a go" and perhaps consider cycling more regularly.
- **Cycle parking.** Transport for Sydney should co-ordinate and integrate cycle parking at stations and interchanges, in conjunction with all Sydney councils and public transport operators (see section 5.7.4).

  This might include valet-style parking, as demonstrated by volunteers from Sydney Cyclist.

  Some Brisbane busway stations now have major staffed "Cycle Centres". These are concession opportunities for bicycle repair businesses, and the presence of their staff means there is security for the parked bicycles.

  > *"[T]his needs to be a facility where anyone, on the spur of the moment, can leave their bike safely and supervised... In the Netherlands, these are known as Fietsstalling (pronounced feetstolling). They have already been operating for decades all over the world, very successfully."* (submission by Lucy Bal)

More generally, Transport for Sydney should integrate provisions for cycling in all of its plans (see Chapter 2), following the lead provided by the City of Sydney's *Road Space Management Plan* and *UK Transport 2010*, which set up multi-mode studies which, in its own terms,

> *"... reject the old approach of focussing on one-dimensional solutions and instead look at the contribution that all modes of transport and traffic management might make - including road, rail bus and light rail, as well as walking and cycling."*

Recommendation ST 28:

Transport for Sydney should have primary responsibility for co-ordinating cycling programs across all of Sydney, with councils continuing to have a lead role in developing their own infrastructure.

Transport for Sydney should:

- Coordinate the production and enforcement of cycling-related design codes, standards and guidelines
- Develop a "strategic" bicycle network
- Implement a city-wide bicycle hire scheme, and
- Coordinate and integrate cycle parking at stations and interchanges, in conjunction with all Sydney councils and public transport operators.

5.10 Pedestrians

People should be able, as a basic right, to walk around easily, and to the benefit of their health, in a clean, safe environment which enriches their experience of Sydney.

In practice, however, pedestrians in Sydney face significant challenges. As a result of decades of attempts to facilitate the movement of motor vehicles, pedestrians have increasingly found themselves treated as second-class citizens.

Although Jan Gehl's 2007 report *Sydney Public Spaces, Public Life* was commissioned to review only the CBD and its immediate City of Sydney surroundings, it has identified many problems which are important *throughout* Sydney.

This report has also identified many achievements, such as Sydney's heritage preservation, its development of world-iconic structures and coherent open spaces and the introduction of design codes for streets and associated tree planting.

> *"Emphasising walking as a viable mode of transportation, with a strong impact on health, is leading towards a more sustainable city where energy consumption and focus on a lively city—also at night—are part of the new city strategies."* (Jan Gehl, *Sydney Public Spaces, Public Life*, 2007).

In addition to considering infrastructure, amenities and other ways of facilitating pedestrian movements, it is important not to forget the significance of the health care issues involved.

> *"Australia's adult obesity rate is high among OECD countries, while Australia's mortality rates for coronary heart disease, stroke, lung cancer and transport accidents have improved significantly in terms of our ranking with other OECD member countries, this is not the case for our obesity ranking. The new Preventative Health Taskforce Paper, 'Australia: The Healthiest Country by 2020' (Oct 2008), identifies that the total financial cost in Australia of obesity alone, not including overweight, was estimated at $8.3 Bn in 2008. It says that 'the Australian healthcare system could save $1.5 Bn annually if more people were physically active for 30 mins per day.'"* (submission by City of Sydney)

5.10.1 Short-term projects

There are many opportunities to improve people's ability to walk around Sydney. Many of these will be vital to the success of transport interchanges, a core concern of public transport (see section 5.5), as well as the life and health of the city.

Improvements in pedestrian flows at signalised intersections and crossings

The policies that determine the ways Sydney's pedestrian signals operate are far from "state of the art".

On a recent visit to Sydney the former Mayor of London, Ken Livingstone, reportedly questioned why Sydney treats its pedestrians so badly in forcing them to wait and wait to cross the street.

Significant improvements could be made to provide "people equity", with little impact on vehicle journey times.

At present pedestrians in the city centre face, at times, a 60 to 90 second red-light wait at pedestrian crossings before they are granted 7 to 10 seconds to dash across the street.

The *Sydney Public Spaces, Public Life* study found that, on average, these delays for pedestrians accounted for 30 to 50% of their journey times in the east-west streets and about 20% in the north-south streets.

> *"Increase green time be provided to pedestrians.... to facilitate improved access for elderly and less mobile pedestrians."* (submission by North Sydney Council)

Recommendation ST 29:

Additional and longer "green times" should be provided for pedestrians at signalised intersections and other signalised pedestrian crossings, not just within the CBD but throughout Sydney.

A countdown timer in San Francisco, indicating that the light will change to "walk" in six seconds.

Countdown timers are becoming standard in many cities. By displaying the time remaining before the signal changes, countdown timers can reduce unsafe crossings. These timers also convey a respect for the citizen: rather than applying an arbitrary policy on how long an average person should have to cross, countdown timers invite each citizen to make their own informed judgment about whether it is safe for them to begin crossing.

Recommendation ST 30:

Pedestrian countdown timers should be installed at signalised intersections and other signalised crossings to increase pedestrians' tolerance of waiting and thereby reduce jay-walking.

Improved signage

Sydney does have a network of information and direction totems. However, they are too infrequent, too discreet, too limited in their orientation and provision and too difficult to read (in the last case, because of their choice of reflective materials, small text sizes and choice of materials).

The centre of Sydney is very well street signed, but outside this area, as any visitor or infrequent car user will testify, many streets and roads are unsigned.

Common signage problems include the facts that:

- At intersections of major and minor streets, only the minor street will be signed. While this is adequate for locals, it is problematic for visitors and new arrivals who cannot be assumed to know the name of the major street.
- Where a minor street is one-way for traffic, it is common for it not to be identified by a sign at its *outlet* point. This reflects **an assumption that street signs are only for motorists**—even though they are also for pedestrians, for whom all streets are two-way. Pedestrians need signs that identify a street at all points along the street, regardless of its direction.

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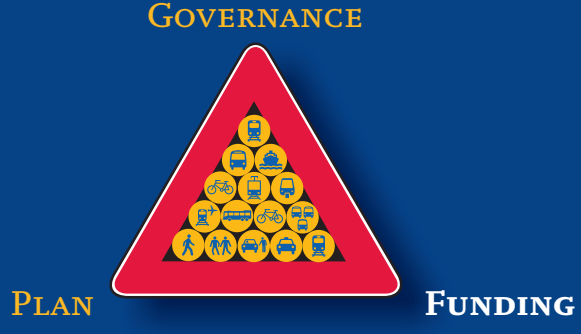
Final Report

Part D



Chapter 6: Funding certainty

Part D

6

Funding certainty

6 Funding certainty

6.1 Introduction

As discussed throughout this report, one of the critical issues facing Sydney is its continuing failure to invest in sufficient public transport infrastructure to meet the needs of its growing population. Large parts of Sydney lack effective public transport options to connect with the city's commercial and cultural hubs.

And again as already discussed, Sydney has a sad history of failures to implement public transport plans and infrastructure promises.

Just in the last decade numerous public transport plans embracing major upgrades have been developed and many grand government promises have been made, but only a few of the projects included in these plans and/or announced by the government have actually been delivered. Many have been cancelled or "deferred".

A key reason behind these failures to fully implement transport visions and plans has been money, or rather the lack of it.

A public infrastructure plan without adequate funding—and/or without sound and efficient governance, the third essential component of the "iron triangle"—typically breaks down into piecemeal change or no change at all.

Indeed, the lack of long-term funding commitments, coupled with ineffectual strategic planning, has seen ambitious public transport projects become dominated by budget circumstances, producing suboptimal projects, disjointed delivery, cancellations and/or partial completions.

This has translated in an inefficient, suboptimal and disjointed transport network, with Sydney falling behind other Australian and world cities in its public transport performance.

Many public transport infrastructure projects that have been analysed exhaustively and found to be worthy are on hold or cancelled because of a lack of funds. This situation is unsustainable. It is bringing new meaning to the term "government failure".

In this context, the Inquiry believes one of the most important contributions it can make is to demonstrate how the funding deadlock can be broken and thus how the essential element of certainty about "where the money is coming from" can be re-introduced.

Investigations by the Allen Consulting Group, commissioned by the Inquiry, have shown very clearly that **it *is* feasible to have a robust, long-term public transport plan for Sydney that *fully funds* the changes required for Sydney's transport network to meet the needs of the 21st Century.**

RECOMMENDATION FUNDING 1:

Any long-term public transport plan for Sydney, such as the *Public Transport Network Plan for Sydney* recommended by the Inquiry (**RECOMMENDATION GOV 2**), should be fully funded to ensure projects are delivered on time and in accordance with the plan.

Additional funds therefore need to be raised to cover all additional costs of the *Plan*.

To ensure these funds are directed to the purposes for which they are raised and not reallocated to other government activities, a clear governance and accountability mechanism is required (see **RECOMMENDATIONS GOV 1 TO GOV 4**).

This chapter:

- Identifies the funding methods available for the longer-term (and expensive) projects identified in Chapter 3 of this *Final Report*, under both of the long-term urban growth, land-use and transport scenarios developed by the Inquiry, the "European" and "East Asian" scenarios (section 3.5), plus a third scenario with more low-density urban sprawl and a heavy emphasis on motorways rather than public transport, dubbed the "US" scenario
- Estimates the magnitude of the funds that may be available using these methods under each of these three scenarios
- Sets out an illustrative funding plan that would align payments with benefits, improve decision-making, promote the desired behaviours, provide steady revenue and be sustainable in the long-run
- Analyses this illustrative funding plan in the light of data on the community's willingness to pay for improvements in public transport systems, derived from the market research surveys commissioned by the Inquiry and described in Chapter 1 and *Appendix 2*
- Identifies and evaluates the key risks of the illustrative funding plan
- Assesses the impact of the illustrative funding plan on the State's debt and credit rating, and
- Discusses the capacity of the construction and transport industries to deliver the projects proposed by the Inquiry.

Several limitations need to be mentioned at the outset.

The first is that the illustrative funding plan presented in this chapter assumes that the Inquiry's recommended strategy under each of the scenarios would achieve its proposed objectives—for instance, in terms of patronage growth in each transport mode—and would do so at the costs identified by the Inquiry. Any changes in the outcomes or costs of the strategies would need to be reflected in changes to the illustrative funding plan.

Secondly, it should be recognised that in preparing this *Final Report* the Inquiry has not attempted to develop a detailed financial model for the proposed projects or the identified potential revenue sources.

The funding plan presented in this chapter is *illustrative*. It uses estimates based on averages (for instance, it uses average transport fare estimates instead of modelling all fare types and discounts). Its increases in fares, charges and taxes are *illustrative*, based on data on the community's willingness to pay, and are not being *recommended* by the Inquiry, as many other options and combinations of options would be available. And the funding plan considers financing in a broad, generic sense, related to the overall cost of access to capital (e.g. for simplicity, external capital contributions are viewed as debt).

The Inquiry is not attempting to provide fully fledged benefit cost analyses or business cases to support a financial commitment to any particular projects. If the NSW government or Transport for Sydney (the new integrated public transport authority recommended by the Inquiry in Chapter 2) wished to pursue ideas advanced by the Inquiry, numerous processes would need to occur, including relevant environmental assessments and the completion of benefit cost studies business cases, prior to the identification of the most appropriate funding and delivery models for particular projects.

6.2 The funding task

The first step in assessing the feasibility of sustainable funding arrangements for any proposed plan for Sydney's public transport is to establish the size of the "funding task"—in other words, the total amount of money that delivery of the strategy would require.

It is important to distinguish between what the strategy needs to fund, on the one hand, and what needs to be funded, regardless of the strategy, from the normal processes of government in the future.

Naturally, transport costs are expected to rise in the future whatever happens, given Sydney's continuing population growth and the demand for additional services. There will also be an *underlying* need for additional capital spending, enhancing the system and its capabilities to enable it to maintain functionality. These are all *baseline* costs.

In contrast, **the focus of this analysis is on funding the *additional* costs imposed by the recommended transport changes.**

As already indicated, in developing its illustrative funding plan the Inquiry has analysed three different scenarios of capital costs for major investment projects (***Figure 6.1***):

- The **"European" scenario** described in section 3.5 of this report, which would broadly balances investments across all the public transport modes, supplemented by a relatively small amount of investment on roads
- The **"East Asian" scenario**, also described in section 3.5 of this report, which would focus on investments in metros, and
- A third scenario, a **"US" scenario**, which would involve much lower density residential development with more urban sprawl, more dispersed employment locations and a heavy focus on road development, with only half of its funding being directed to public transport.

  This scenario was rejected by the Inquiry early in its investigations as counterproductive and hostile to the long-term sustainability of the city,

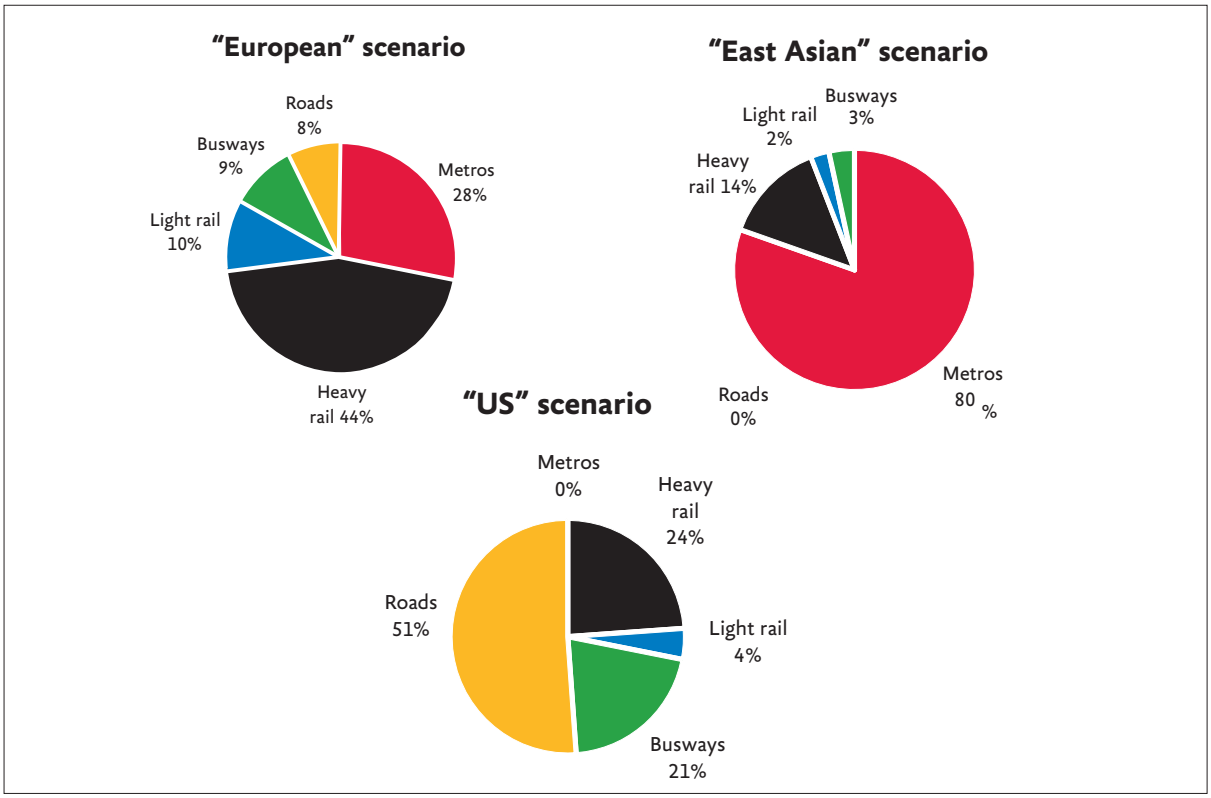


Figure 6.1. *Percentage of investment across public transport modes and roads under the three different investment scenarios.*

and has not been developed to anything like the detail of the other two scenarios described in Chapter 3.

However, it has been included in the Inquiry's investigations into funding options *for the purposes of comparison*, to permit an understanding of the likely effects on funding viability of a greater emphasis on roads and a lesser emphasis on public transport (in other words, very much a continuation of what has occurred in Sydney over the last couple of decades).

6.2.1 Capital or infrastructure costs

The estimated capital costs for the projects under each scenario are presented in ***Table 6.1***. The start and completion dates for each of the projects are in parentheses. (For the "European" and "East Asian" scenarios, these costs and timeframes have already been discussed in sections 3.5.6 and 3.5.7 of Chapter 3. As explained there, the Inquiry has neither the facilities nor the access to information required for detailed project costings. In some cases they are project cost estimates published by the government, but in most they have had to be estimated from the costs of other projects.)

Notably, all three scenarios would involve similar capital expenditure requirements of around $36 billion (in real terms, expressed in 2008-09 $) over the 30-year period to 2040.

6.2.2 Operating costs

In addition to capital costs, additional operating costs would be associated with each of the scenarios.

These would arise in areas where, for example, there was an increased provision of services or patronage increases generated by the projects generated additional costs.

TABLE 6.1.
CAPITAL EXPENDITURE ON INFRASTRUCTURE PROJECTS UNDER THE DIFFERENT SCENARIOS (2008-09 $).

Project	Type	Costs (2008-09 $) and timeframes		
		"US" scenario	"European" scenario	"East Asian" scenario
North West Rail Link	Heavy rail	$3.7 bn (2015-19)	$3.7 bn (2011-15)	$3.7 bn (2016-20)
South West Rail Link	Heavy rail	$1.3 bn (2011-14)	$1.3 bn (2011-14)	$1.3 bn (2011-14)
New cross-CBD, cross-Harbour line	Heavy rail	$3.4 bn (2020-24)	$3.4 bn (2014-20)	
New Merrylands-Epping-Parramatta rail link	Heavy rail		$2 bn (2016-20)	
Liverpool-Bankstown Airport-Bankstown link	Heavy rail		$2 bn (2018-20)	
South East line, Central-Maroubra Junction	Heavy rail		$3 bn (2027-30)	
North West Rail Link Richmond line extension	Heavy rail		$0.4 bn (2027-29)	
South West Rail Link Bringelly extension	Heavy rail		$0.3 bn (2027-29)	
CBD Metro	Metro			$5.3 bn (2011-15)
West Metro (under the "European" scenario, with extension from Central to Barangaroo)	Metro		$10.12 bn (2021-26)	$8 bn (2013-18)
South East Metro	Metro			$3 bn (2016-19)
Rozelle-Macquarie Park metro	Metro			$4 bn (2019-25)
North East Metro, including metro harbour crossing	Metro			$9 bn (2019-24)
Light rail and ferry projects (inner suburbs)	Light rail/ferry	$0.9 bn (2015-24)	$3 bn (2011-20)	$0.75 bn (2021-30)
Light rail (outer suburbs)	Light rail	$0.6 bn (2025-34)	$0.6 bn (2015-24)	$0.15 bn (2025-34)
Busways and "Bus First" roads (inner/middle)	Busways and bus priority	$3 bn (2011-30)	$1.2 bn (2011-30)	$0.6 bn (2015-34)
Busways and "Bus First"roads (outer)	Busways and bus priority	$4.3 bn (2011-30)	$2.15 bn (2015-34)	$0.65 bn (2015-34)
Motorways	Motorways	$18 bn (2011-30)	$2.7 bn (2015-34)	
Total		**$35.2 bn**	**$35.87 bn**	**$36.45 bn**

Note: Excludes ongoing investment in things like clearways, upgrading stations to be accessible, etc. Numbers in parenthesis are start and completion dates for the projects. Some of the cost estimates in this table are project cost estimates published by the government, but most have had to be estimated from the costs of other projects.

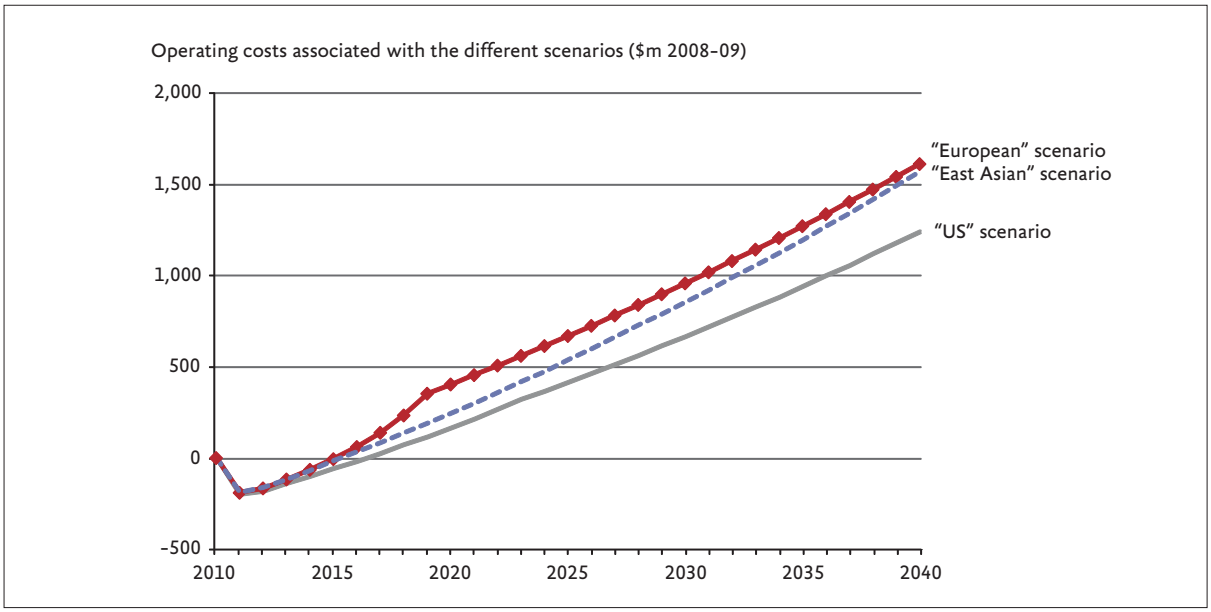


Figure 6.2. *Additional annual operating costs for the heavy rail, metro, light rail and bus projects associated with the different scenarios ($m 2008-09). Source: Allen Consulting Group estimates based on information provided by the Inquiry (see box below).*

It is, of course, important to fund the additional operating costs of infrastructure projects. A failure to do so could mean that service frequencies or other aspects of the quality of services would not be maintained, reducing the benefits of the projects.

The additional annual operational costs presented in ***Figure 6.2*** are based on the Inquiry's views about likely operating costs per passenger and patronage

Assumptions used to estimate operating costs under the different scenarios

The following assumptions have been used to estimate the operating costs of each transport mode.

Heavy rail and metros

- Baseline rail operating costs have been obtained from IPART (2008a). IPART has forecast efficient operating expenditure for 2009-10 to be $2,036 billion in total.
- Additional operating costs under each scenario have been calculated assuming patronage would grow by 2.0% pa under the "US" scenario, 2.5% pa under the "European" scenario and 3.0% pa under the "East Asian" scenario.
- It has been assumed under all the scenarios that there would be efficiency gains equivalent to 1% pa in the operating cost per passenger. These gains have been included as a cost offset.

Light rail

- Baseline operating costs have been assumed to be $1.70 per passenger kilometre.
- Additional operating costs under each scenario have been calculated using the following patronage growth assumptions:
  - For the "US" scenario, 20% pa until patronage reaches 40 million per year, then 2.5% pa
  - For the "European" scenario, 50% pa until patronage reaches 100 million per year, then 2.5% pa, and
  - For the "East Asian" scenario: 10% pa until patronage reaches 20 million per year, then 2.5% pa.
- Again, it has been assumed under all the scenarios that there would be efficiency gains equivalent to 1% pa in the operating cost per passenger. These gains have been included as a cost offset.

Buses

- Baseline operating costs for bus services have been obtained from IPART (2008b).
- Additional operating costs under each scenario have been calculated assuming patronage would grow by 3.0% pa under the "US" scenario, 2.5% pa under the "European" scenario and 2.0% pa under the "East Asian" scenario.
- It has been assumed under all the scenarios that there would be efficiency gains equivalent to 0.5% pa in the operating cost per passenger. These gains have been included as a cost offset.

growth under each scenario, assuming a continuation of current fare structures for CityRail and the use of the same current fare structures for any new metros (see the box on page 364). The last of these assumptions has been made in the absence of any published information by the government on fares for its previously proposed metros, other than an implied invitation to the private sector parties bidding for the right to operate the CBD Metro to propose their own fares. (As discussed in Chapter 4, this approach was previously adopted, with highly counterproductive results, for the privately owned and operated Airport rail line's stations.)

Figure 6.2 shows that operational costs in the initial years under all three scenarios would be lower than they would be if nothing were done, because under all three scenarios the Inquiry's illustrative funding plan would increase public transport fares, as described below, to help fund the investment projects and this would produce an initial fall in patronage. Total operational costs are directly proportional to patronage, so these costs would be lower by almost $200 million (2008–09 $) in 2011.

From then on, however, the investment projects would improve public transport frequencies and capacities and extend the public transport network, leading to patronage increases.

It may be seen from *Figure 6.2* that the scenario with the highest additional operating costs would be the "European" scenario, reaching to $1,613 million per year (2008–09 $) in 2040. (As discussed later, it would also produce the highest fare revenue.) Part of the increase in operating costs under the "European" scenario would arise from its significant early expansion of the light rail system, which is currently very small.

The lowest incremental operating costs would be for the "US" scenario, reflecting its lack of emphasis on public transport. Operating costs under the "US" and "East Asian" scenarios would be higher by $1,242 million and $1,573 million, respectively, in 2040 (2008–09 $).

6.2.3 Finance costs

The very nature of infrastructure provision means that capital expenditure generally occurs well before services are provided and fares can be collected.

This difference in time between the infrastructure expenditure and the receipts results in a funding gap that needs to be financed.

The Inquiry has included the cost of finance in its illustrative funding plan because any long-term plan for Sydney's public transport *must be fully funded*. In other words, the funding plan should be designed so that the revenue generated through all the various funding sources discussed below eventually offsets the total costs of the projects—and these costs include the costs of finance (including capital repayment and servicing costs).

The "cost of finance" is an opportunity cost: even if a government could pay all of a capital investment within its existing budget revenue—which is unlikely in practice—the cost of doing this would be that the government would then be prevented from using that money to deliver *other* public services or to repay its debts.

Finance costs are shaped by many factors. One is the length of the gap between the time the costs are incurred and the time revenues become available. During these years, the costs of the transport projects under each of the scenarios would

need to be financed through contributions from investors, in the form of debt or equity or a mixture of both. Whatever the form of these contributions, there would be a cost of finance that would have to be met: the investors would have to be paid (through interest on debt or through dividends) and would also expect to have their contribution repaid.

So the costs of finance become apparent only after assessing all the other costs and how much revenue would be raised and when. They are therefore analysed later in this chapter, after the possible sources of funds have been examined.

6.3 General principles for funding public infrastructure

Recommendation Funding 2:

The funding plan should be based on the principles of "good taxation" and sound infrastructure funding.

A number of broad principles have provided useful guidance to the Inquiry when selecting possible funding approaches:

- **The principles that apply to "good taxation" should apply to the funding mechanism.** These include:
  - **Effectiveness.** *Does the mechanism have the capacity to raise the funds required when they are needed?*
  - **Efficiency.** This goal seeks to ensure an optimal allocation of resources. *Does the mechanism provide appropriate signals or incentives? Does it apply prices that reflect the true or full costs?*
  - **Equity.** This goal seeks to ensure that the mechanism is fair. Views about fairness are often shaped by attitudes towards "beneficiary pays" concepts and considerations of capacity to pay (or affordability). The adoption of a range of funding mechanisms spreads the cost burden and makes the impost on any particular stakeholder more affordable.
  - **Low administration costs.** Funding approaches have to be practical. Greater simplicity makes it cheaper for a government to collect or raise the funds required.
  - **Stability and reliability of the revenue base.** A consistent and predictable source of revenue is preferable to a source subject to shifting and unforeseeable influences. A source of revenue that grows as the economy grows—and can thus move broadly in line with the attendant demands for services—is also preferred.
  - **Low compliance costs plus certainty and transparency.** Greater transparency generally results in simpler, lower cost and more efficient arrangements.
  - **Stakeholder support.** Ultimately, every funding approach means making someone pay, and this inevitably involves discontent from some people in the community. Revenue collection is an unpopular func-

tion of government which good governments get on with. However, governments typically give consideration to stakeholders' reaction to funding options.

- **Beneficiaries should pay.** Arrangements which align payments with benefits tend to be more acceptable and efficient in the longer term.

- **Widespread benefits suggest a wide funding net.** Good public transport systems tend to have a range of beneficiaries, so it is often the case that a good funding plan will draw on a number of funding mechanisms, seeking contributions from this full range of beneficiaries. For example, non-users of public transport, such as car drivers, may benefit from reduced congestion and improved air quality.

- **Efficiency is assisted by useful price signals.** Funding mechanisms can provide signals about behaviours that ought to be encouraged or discouraged. Unsustainable activities or activities that impose large costs on other parts of the community should face higher costs.

- **Sustainable funding arrangements for public infrastructure have to take a whole-of-life perspective.** They have to look beyond the initial capital expenditure and cover the anticipated additional ongoing costs as well.

- **"Appropriateness".** The chosen funding sources should be directly linked to the infrastructure, both in terms of their physical proximity and in terms of the timing of both. In addition, costs should be allocated so that the contributing population only pays for its share of the total demand (the concept of apportionment).

- **Funding mechanisms must work in tandem with other elements of the public transport strategy to raise efficiency.** Examples include user charges which encourage people to reduce congestion or factoring social and environmental "externalities" into prices, especially where use of the facility or service is currently unpriced.

- **No free lunches.** Cross subsidies can change who pays for public transport, but in the end the whole community pays. No funding sources are costless.

- **Costs should be aligned with willingness to pay.** The incremental costs of improving the public transport system should be kept to within the amount that users and other beneficiaries and stakeholders indicate they are willing to pay. This should be based on *evidence* about people's willingness to pay, obtained through a transparent and robust examination.

The order of the guiding principles presented above is not an indication of their relative importance.

For instance, the Inquiry views Sydneysiders' willingness to pay for improved public transport systems in Sydney as a critical consideration, and one of the features of its investigations has been the Inquiry determination to seek insights, directly from the community, about the community's needs, preferences and willingness to pay, as described in Chapter 1 and *Appendix 2*.

6.4 Revenue sources

Recommendation Funding 3:

Because both public and private transport users are likely to enjoy the benefits of improved public transport services, through reduced congestion, reduced energy costs, reduced emissions and improved air quality, a *broad* range of funding sources should be used, to obtain contributions from this wide range of beneficiaries.

In accordance with the principles recommended in Recommendation Funding2 and reviewed in section 6.3, the Inquiry has concluded that the mechanisms used to raise funds for improved public transport services in Sydney must be based on a *broad* range of revenue-raising instruments.

The instruments which could be used to fund the Inquiry's recommendations include:

- Heavy rail and "metro" rail fares
- Bus fares
- Light rail fares
- Ferry fares
- The parking space levy
- Congestion charges (in the CBD and/or on existing tollroads or other roads)
- A vehicle registration levy
- Land value capture levies ("betterment taxes")
- A metropolitan levy for households
- A metropolitan levy for businesses
- A carbon tax, and
- Commonwealth government support under the *Building Australia Fund.*

The following sections briefly analyse each of these potential funding sources and provide an illustration of how much money might be raised from each.

The Inquiry has not made any assumptions about possible part-funding of its recommended public transport improvement projects through the sale of other publicly owned assets such as NSW electricity assets. If this were to occur, the funds needing to be acquired from the sources could obviously be reduced, or additional projects might be carried out.

6.4.1 Heavy rail and metro fares

Public transport users are likely to receive significant benefits from a sound long-term public transport plan, through more frequent services and better, faster and easier transport links to where they want to go.

The Inquiry's market research studies (Chapter 1) have confirmed that people who regularly use rail transport in Sydney consistently see aspects of Sydney's existing rail services as a problem and place a high value on improving the system,

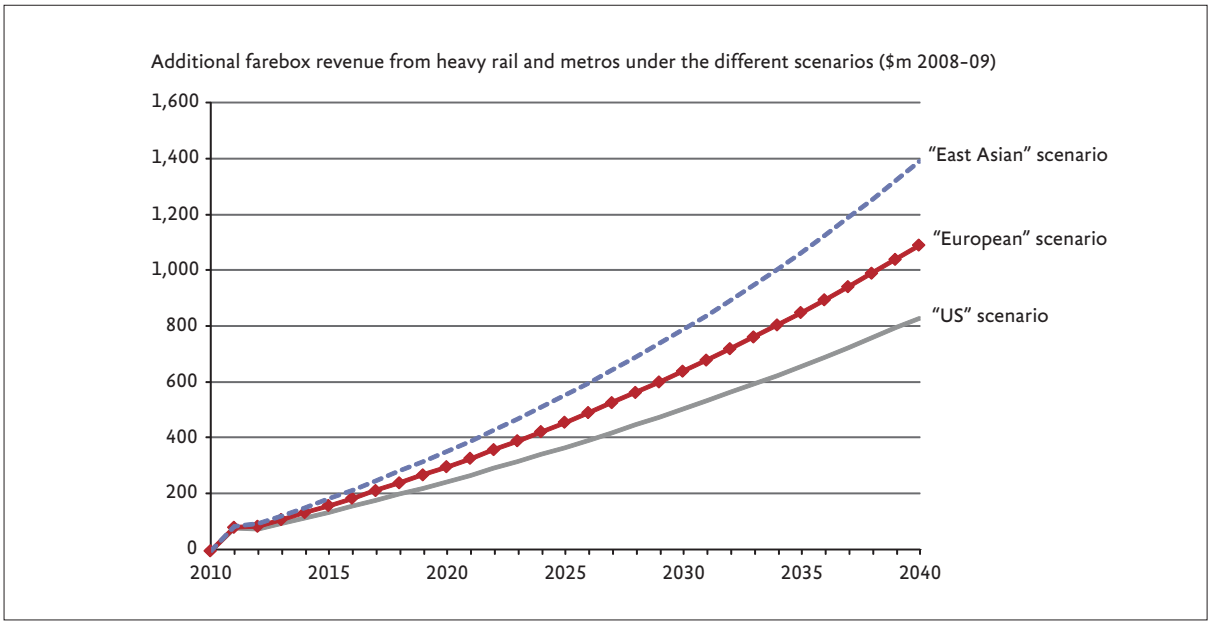


Figure 6.3. *Additional farebox revenue generated as a result of heavy rail and metro projects under the different scenarios, assuming both heavy rail and metros would use the current CityRail fare structures. Source: Allen Consulting Group estimates, based on IPART (2008a) and information provided by the Inquiry.*

while others are deterred from using the system, or unable to use the system at all, because of its deficiencies. Accordingly, it is appropriate for rail fares, on both the expanded and improved heavy rail system and on any new metro rail system, to contribute to the cost of a long-term transport plan.

In the Inquiry's illustrative funding plan, an increase of approximately 38 cents (real) in "single" rail fares in 2011 has been modelled, to help pay for improvements in services. This increase in fares is based on data from the community's "willingness to pay" survey (see section 1.3.1 in Chapter 1 and section 6.6 below).

Subsequently, the additional fare has been assumed to increase by 1.3% per year in real terms for the period from 2012 to 2040. This annual increase is in line with the historical increase in real fares between 1999 and 2009.

These assumed fare increases would increase average real single rail fares from around $2.37 in 2010 to $2.75 in 2011 and $2.93 by 2040 (all 2008-09 $).

To put these illustrative fare increases in perspective, under IPART's 2009 CityRail fare determination (IPART 2008a), IPART determined that the prices of CityRail tickets should be increased by a weighted average of 12% in real terms over four years (from 4 January 2009 to 31 December 2012). The increases modelled in the Inquiry's illustrative funding plan would be on top of these IPART increases.

Rail patronage is expected to grow at different rates under the three scenarios, so the revenue collected under each scenario would also be different (***Figure 6.3***).

Under the "US" scenario, the increase in rail fares would collect approximately $12 billion in additional revenue (2008-09 $) over 30 years, under the "European" scenario it would collect around $15 billion and under the "East Asian" scenario it would collect approximately $19 billion. These estimates have been adjusted to account for a reduction in passenger journeys as a result of the increases in fares.

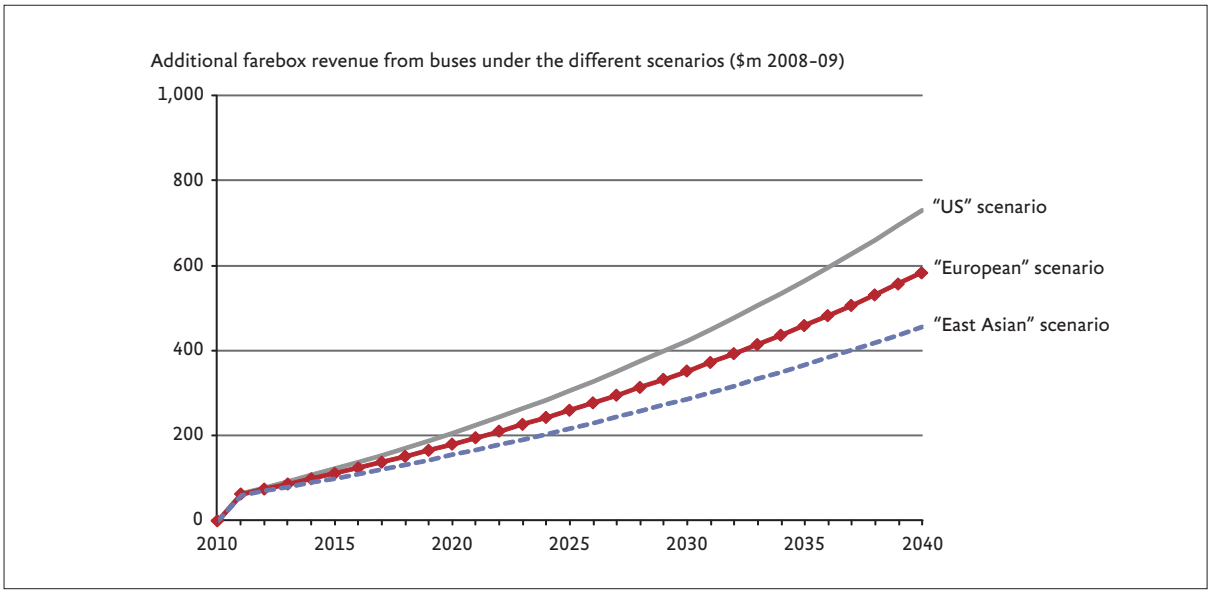


Figure 6.4. *Additional farebox revenue generated as a result of the busway and "Bus First" road projects under the different scenarios. Source: Allen Consulting Group estimates based on IPART (2008b) and information provided by the Inquiry.*

6.4.2 Bus fares

As direct beneficiaries of the proposed public transport improvements bus passengers should also make a contribution to their funding.

In line with the rail fare increases described above, the illustrative funding plan includes an increase in bus fares of 38 cents in 2011, followed by a 1.3% per annum real increase in the additional fare for the period from 2012 to 2040.

This would mean an increase in average bus fares from around $1.27 in 2010 to $1.65 in 2011 and $1.82 by 2030 (2008-09 $).

The additional revenue from bus fares would grow over time in line with patronage growth, which would be different under each scenario (***Figure 6.4***).

Under the "US" scenario, the increase in bus fares would collect approximately $10 billion in additional revenue (2008-09 $) over 30 years. Under the "European" scenario it would collect around $9 billion and under the "East Asian" scenario it would collect approximately $7 billion. Again, these estimates account for a reduction in passenger journeys caused by the increased fares.

6.4.3 Light rail fares

Light rail fares have been modelled to go up by similar increments to the fares for other public transport modes, to contribute fairly towards the cost of Sydney's public transport plan.

There are currently about 4 million passenger journeys per year on light rail in Sydney, at an average fare per passenger of $1.70.

From this base it has been estimated that under the "US" scenario, the increase in light rail fares would collect approximately $2 billion in additional revenue (2008-09 $) over 30 years (***Figure 6.5***). Under the "European" scenario it would collect around $9 billion, and under the "East Asian" scenario it would collect approximately $849 million. These estimates have been adjusted to account for a reduction in passenger journeys as a result of the increased fares.

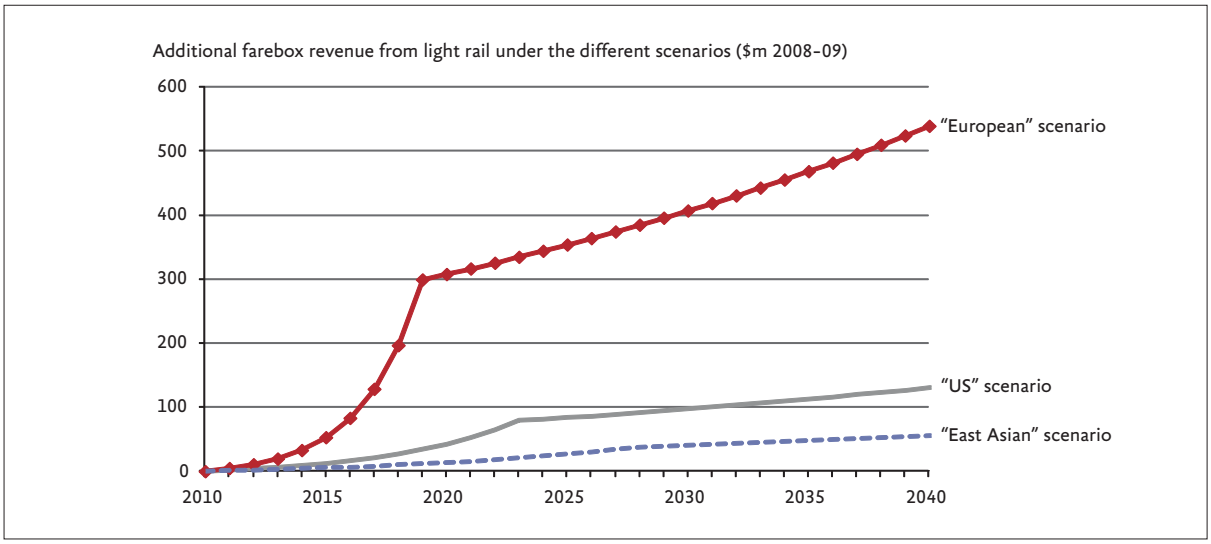


Figure 6.5. *Additional farebox revenue generated as a result of the light rail projects under the different scenarios. Source: Allen Consulting Group estimates based on light rail data provided by the Inquiry.*

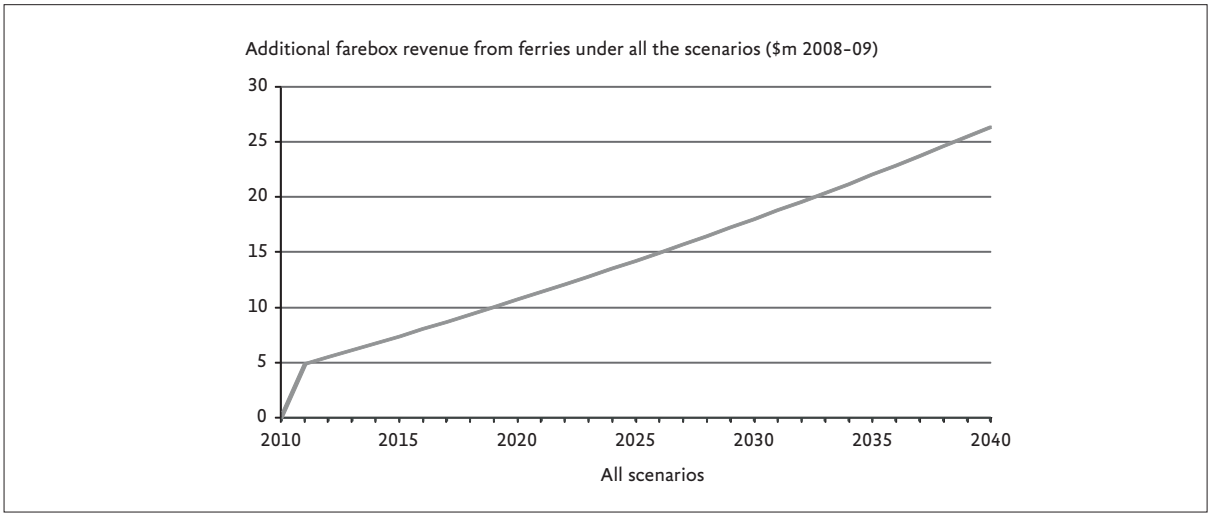


Figure 6.6. *Additional revenue from ferries under all of the scenarios. Source: Allen Consulting Group estimates based on Sydney Ferries (2008) and data provided by the Inquiry.*

6.4.4 Ferry fares

While there are few direct additional investments for ferries in the Inquiry's recommended long-term transport plan, it is expected that ferry passengers will obtain a range of benefits from increased connectivity with bus and light rail services, integrated fares without any interchange penalties and other wider public transport improvements. Ferry passengers should therefore make a contribution to the costs of the system-wide public transport improvements.

Budgeted farebox revenue from ferry passengers for the year 2008-09 was $49.4 million (Sydney Ferries, 2008).

From this base it has been estimated that increases in ferry fares similar to those applied to the fares for other transport modes would generate around $448 million in additional revenue (2008-09 $) over 30 years under all three scenarios (***Figure 6.6***). (The revenue would be the same under all the scenarios because they share the same assumptions regarding ferry patronage growth.) Again, this estimate accounts for a reduction in passenger journeys as a result of the increased fares.

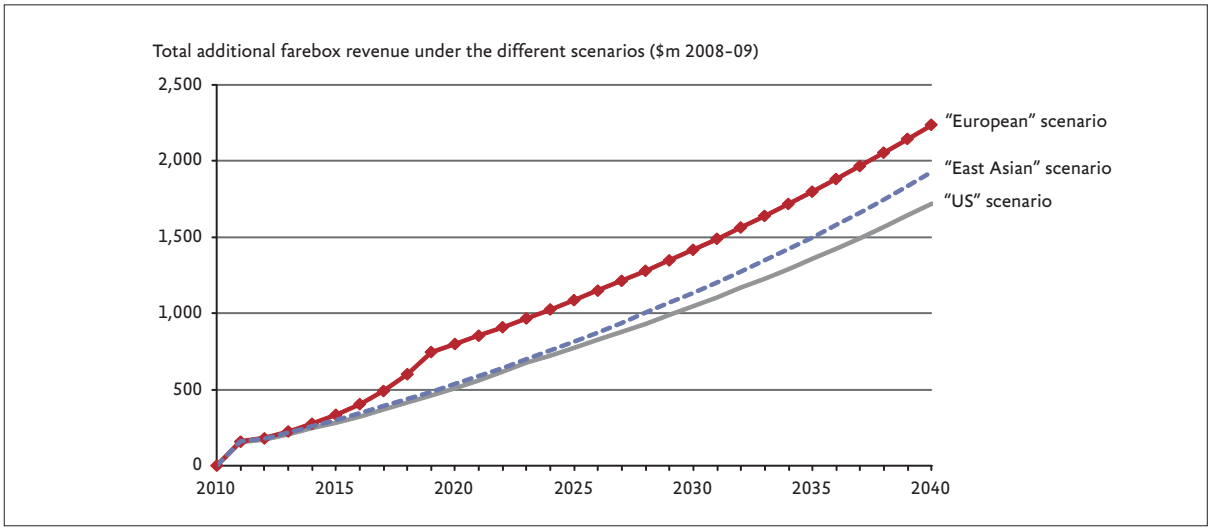


Figure 6.7. *Total additional farebox revenue resulting from the heavy rail, metro, light rail and bus projects associated with the different scenarios, assuming current fare structures and the use of current CityRail fare structures for the new metros ($m 2008-09). Source: Allen Consulting Group estimates, based on data provided by the Inquiry.*

6.4.5 Total additional farebox revenue

The total modelled additional farebox revenues from the various public transport modes under the three scenarios are shown in ***Figure 6.7***.

6.4.6 Metropolitan public transport levies

This funding option would involve the application of levies on households and businesses in Sydney's metropolitan areas that would benefit from the new integrated public transport network.

These levies would help "capture" part of the benefits of some of the positive "externalities" associated with public transport infrastructure—such as reduced congestion, improved air quality and reduced greenhouse gas emissions—which accrue to households and businesses *regardless* of whether they individually use the public transport infrastructure and services. In addition to these general community benefits, businesses are also likely to benefit more specifically from becoming more accessible to both clients and employees.

The levies would be applied on top of existing council rates. This would reduce administrative costs, as there are already systems for collecting council rates, and would align well with existing governance structures. It would also add to the fairness of the approach, as wealthy landowners generally pay higher rates and they would therefore make a larger contribution to the costs of the transport improvements.

Household public transport levy

Data from the NSW Department of Local Government show that Sydney metropolitan councils collected $1.2 billion from 1.6 million rateable residential properties households in 2007-08.*

The average rate for residential properties was therefore $756 per year in 2007-08, or around $779 per year in 2008-09, assuming an average increase in line with the Sydney CPI.

* The 43 local government areas counted are those covered by the NSW government's 2005 *Metropolitan Strategy*.

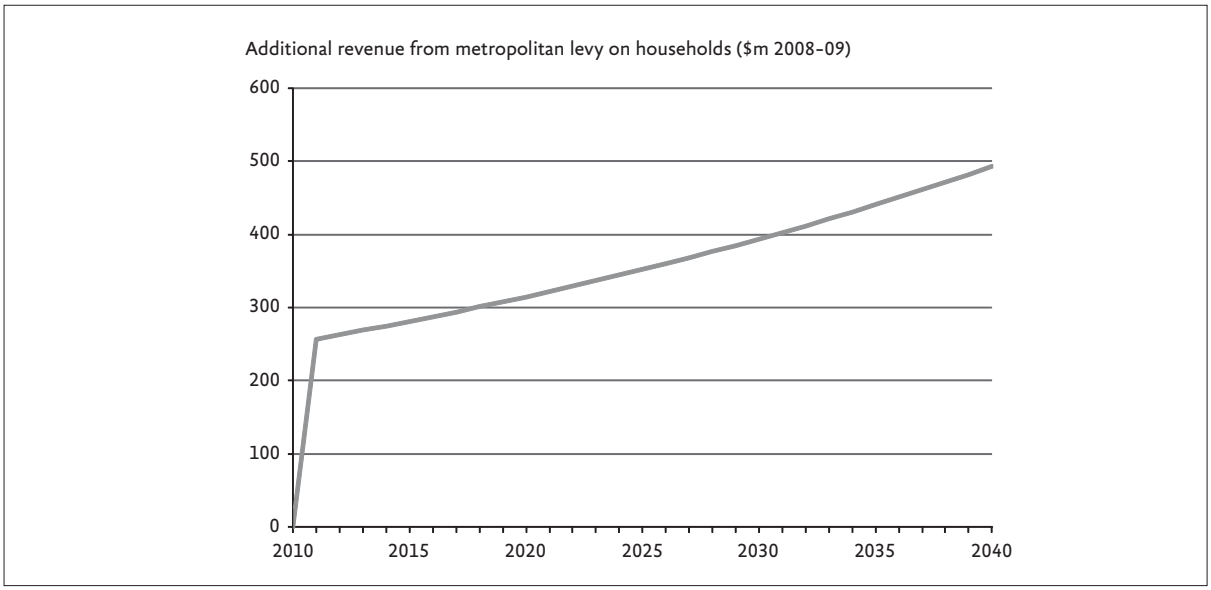


Figure 6.8. *Additional revenue from a metropolitan levy on households. Source: Allen Consulting Group estimates based on data from DLG NSW (2009) and ABS (2004).*

It has been assumed that in the future councils will increase their rates by an average of around 1% per year in real terms, in line with the growth in Sydney's economy. On this basis, the average residential rate has been assumed to be $795 in 2010-11, $878 in 2020-21 and $1,061 in 2040 (all 2008-09 $).

Under the illustrative funding plan, the public transport levy on rateable residential properties, applied on top of their rates, would be equal to 20% of their rates from 2011.

This means the average public transport levy would be around $157.70 per residential property in 2010-11. This amount is in line with data on the community's willingness to pay such a levy, derived from the Inquiry's market research survey on long-term public transport improvements (see section 1.3.1 in Chapter 1 and section 6.6 below).

This levy would take the total of the average council rate plus the levy to around $953 per residential property. Over time, the average public transport levy would increase gradually to around $210 per residential property in 2040 (taking the total of the average council rate plus the levy to about $1,271 per residential property in 2040). All of these estimates are expressed in 2008-09 $.

The Australian Bureau of Statistics (ABS 2004) has estimated that the number of households in Sydney will increase at a compound annual growth rate of 1.25% between 2001 and 2026.

If it is assumed that this increase in the number of households will lead to a proportional increase in the number of rateable residential properties, the metropolitan residential property public transport levy would deliver a total of an additional $10.9 billion in funds over the 30-year period to 2040 (***Figure 6.8***).

Businesses public transport levy

Under the illustrative funding plan, the public transport levy on rateable business properties, applied on top of their rates, would be equal to 15% of their rates between 2011 and 2020 and 22% from 2021.

Data from the NSW Department of Local Government show that Sydney metropolitan councils collected $506 million from 108,824 rateable business

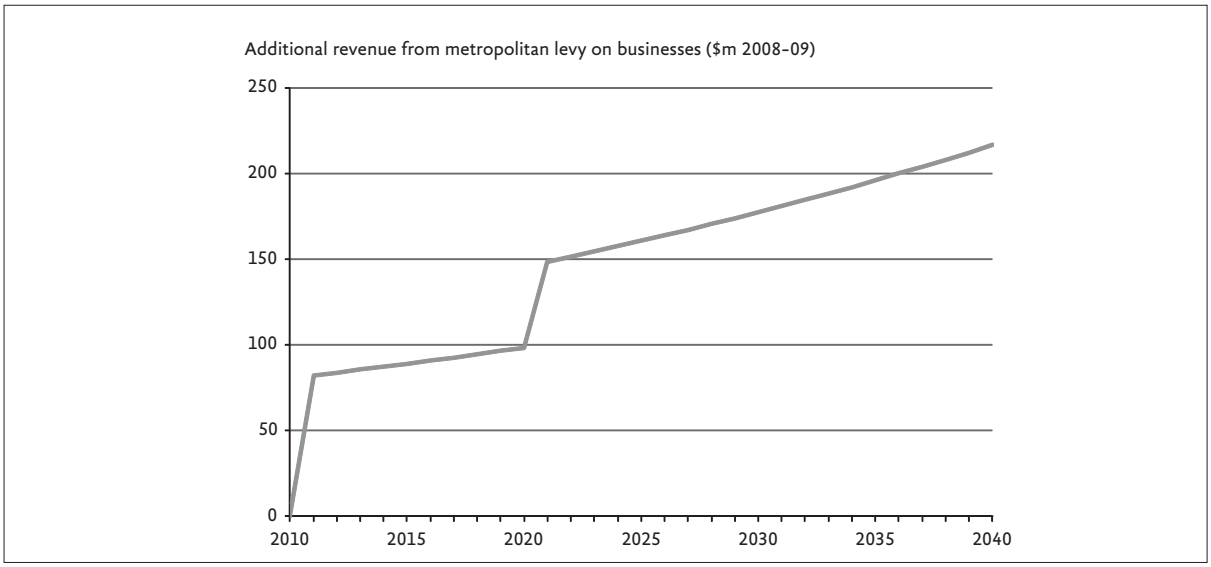


Figure 6.9. *Additional revenue from metropolitan levy on businesses. Source: Allen Consulting Group estimates, based on data from DLG NSW (2009) and Ernst & Young (2008).*

properties in 2007-08. The average rate for business properties that year was therefore $4,650.

After adjusting for inflation and applying an assumed real 1% per annum increase in business rates, the average business property rate is estimated to be $4,891 per property in 2010-11, $5,402 in 2020-21 and $6,526 in 2040 (all 2008-09 $).

Assuming for the moment that there would be no exemptions for (say) small businesses, this means that under the illustrative funding plan the average business property public transport levy would be around $734 per rateable business property in 2010-11 (taking the total of the average council rate plus the levy to around $5,624 per business property), about $1,198 per business property in 2020-21 (taking the total of the average council rate plus the levy to about $6,600 per business property) and around $1,447 per business property in 2040 (taking the total of the average council rate plus the levy to about $7,974 per business property). All of these estimates are expressed in 2008-09 $.

It is emphasised that these figures are indicative and refer to *average* business rates and levies. In reality, would almost certainly be exemptions for small businesses.

According to Ernst & Young (2008), Sydney's average economic growth rate over the next 30 years or so is expected to be approximately 0.9% per annum.

If it is assumed that the number of business properties will increase in line with this growth in the economy, the new metropolitan business property public transport levy would raise an additional $4.5 billion in funds over the 30-year period to 2040 (***Figure 6.9***).

6.4.7 Parking space levies

This funding method would entail increases in the parking space levies that are currently applied, to help fund public transport projects, in the CBD, North Sydney, Milsons Point, Bondi Junction, Chatswood, Parramatta and St Leonards.

These increases would reflect the facts that the proposed public transport investments would improve the public transport options available to car users and

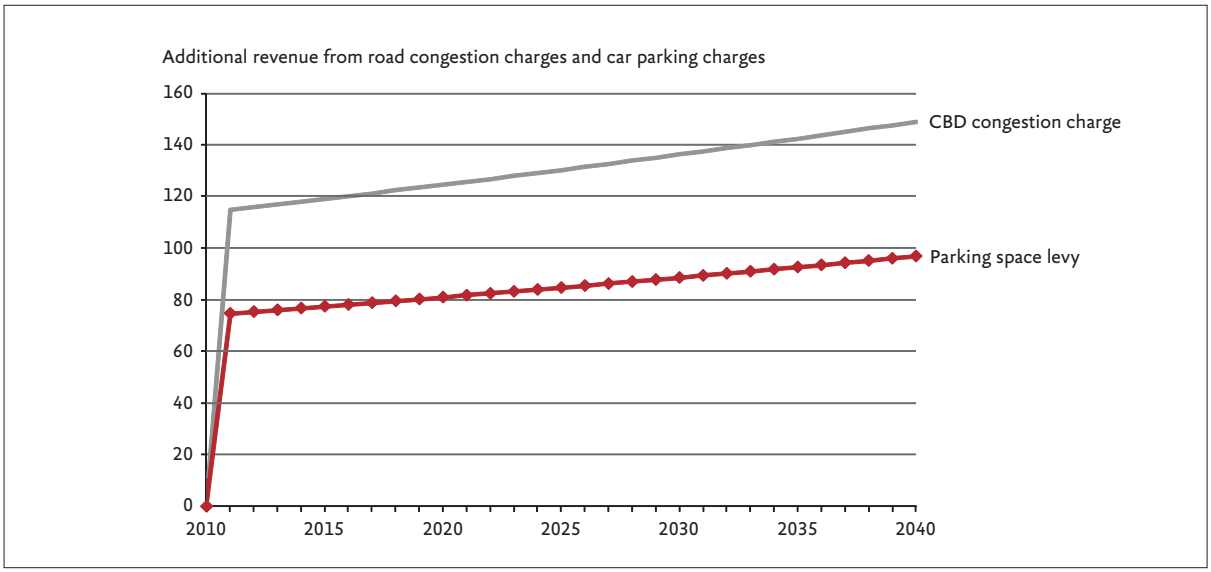


Figure 6.10. *Additional revenue from increases in car parking and road congestion charges. Source: Allen Consulting Group estimates, based on data from EY (2008) and ABS.*

the increase in the parking space levies would encourage them to switch to public transport.

This measure would be effective in terms of creating a relatively stable revenue base, unless parking spots were converted to something else, and would also provide a direct incentive for people to use public transport.

The potential to increase the parking levy is, however, somewhat limited, as the State government recently increased the levy quite substantially. Indeed, as shown in ***Table 6.2***, between 2008-09 and 2009-10 the parking space levy more than doubled in its "Category 1" areas (the CBD, North Sydney and Milsons Point) and increased by more than 50% in "Category 2" areas (Bondi Junction, Chatswood, Parramatta and St Leonards).

The Inquiry's illustrative funding plan has modelled a $7.19 per day real increase in the parking levies from 2021. Again, this amount is in line with data on the community's willingness to pay such an increase, derived from the Inquiry's market research survey on long-term public transport improvements (section 1.3.1 in Chapter 1 and section 6.6 below).

The number of car parking spaces in the areas subject to the parking levy has been assumed to increase by 0.9% per annum, in line with Ernst & Young's 2008 estimates of Sydney's average growth.

This means the increase in parking levies would generate some $3.9 billion of additional revenue over the period to 2040 (***Figure 6.10***).

Table 6.2.
Recent increases in parking space levies. Source: NSW Office of State Revenue (OSR).

	2008-2009	2009-2010
CBD, North Sydney and Milsons Point	$950	$2,000
Bondi Junction, Chatswood, Parramatta and St Leonards	$470	$710
Average	**$710**	**$1,355**

6.4.8 Congestion charges

CBD congestion charge

CBD congestion charges have been introduced in a number of cities around the world, including London, Singapore and Stockholm.

The type of CBD congestion charge modelled for the Inquiry's illustrative funding plan is a "cordon" charge for vehicles entering the CBD, other than buses, taxis and commercial vehicles.

It has been estimated that in 2010–11 10 million vehicles of types that would be subject to this charge will enter the Sydney CBD region. This is a conservative estimate, based on the work of Glazebrook (2003).

The number of cars entering the CBD in the future has been assumed to increase by 0.9% per annum, in line with Ernst & Young's 2008 estimates of Sydney's average growth.

On this basis, if a $7.46 per vehicle congestion charge were applied, in line with the findings of the Inquiry's "willingness to pay" survey, this measure would raise around $2.6 billion in additional revenue by 2040 (*Figure 6.10*).

Congestion charges on existing tollroads

This potential funding mechanism would entail the raising of additional revenue through levies on existing road tolls in Sydney

Average daily traffic flows on Sydney's eight existing tollroads in 2007 are shown in ***Table 6.3***. These figures indicate that roughly 243 million vehicle trips made use of Sydney's tolled motorways in 2007.

The Inquiry's illustrative funding plan does not factor in any such levies at present, however, because the Inquiry's market research survey questions did not expressly explore respondents' willingness to bear additional road toll charges as one of the measures which might help fund significant long-term public transport improvements.

So while it is quite possible that additional road congestion charges in the future will include congestion charges on tollroads, the Inquiry's modelling exercise has excluded this possibility from the indicative funding plan in order to avoid any potential for double counting or other overstatement of the community's willingness to pay.

Table 6.3.
Average daily traffic on Sydney's tollroads in 2007.
Source: Ernst and Young (2008).

Toll road	Average daily traffic
Sydney Harbour Tunnel	98,000
M4	111,642
M5	116,000
M2	92,691
Eastern Distributor	47,779
Cross City Tunnel	20,000
M7	127,871
Lane Cove Tunnel	53,100
Total	**667,083**

6.4.9 Registration levy

Because investments in public transport infrastructure are expected to reduce congestion and a proportion of the funds under two of the three scenarios would be directed towards roads, a vehicle registration levy is an appropriate mechanism to capture some of the benefits of the long-term public transport improvements.

In the Inquiry's illustrative funding plan this levy has been modelled as an annual charge on all registered passenger vehicles in the Sydney metropolitan area.

The illustrative funding plan assumes no additional vehicle registration levy in the initial period from 2011 to 2020. This is because the Inquiry's "willingness to pay" survey suggests that on average households would only be willing to bear an additional $157.70 in tax as part of the funding of major long-term public transport improvements, and in the Inquiry's indicative funding plan this amount has already been assumed to be raised through the household public transport levy added to collected with residential rates (section 6.4.6). Any further public transport tax on households, even if in the form of a vehicle registration levy, would therefore exceed the community's willingness to pay such a household tax.

However, the illustrative funding plan assumes that from 2021 a vehicle registration levy would be applied—effectively as a "balancing item"—if this were necessary to ensure the overall package of funding measures for each scenario would fully recovery the costs associated with the scenario, including its costs of debt repayments and interest.

As such, the levy would be different under each of the three scenarios.

No vehicle registration levy would be needed under the "European" scenario. The levy would have to be around be $47 per vehicle under the "US" scenario, and would have to be much higher under the "East Asian" scenario, at $287 per vehicle, in order to cover the higher financing costs associated with this scenario (all 2008-09 $)

It is estimated that this registration levy would raise:

- Approximately $2.8 billion of additional revenue (2008-09 $) over the period to 2040 under the "US" scenario
- Nothing under the "European" scenario, and
- Approximately $16.9 billion under the "East Asian" scenario (***Figure 6.11***).

6.4.10 'Land value capture' levies

"Land value capture" levies—also known as "betterment taxes"—are regularly proposed by some stakeholders as a means of capturing a public return from the increases in property values created by a major public investment in infrastructure.

They are often seen as particularly relevant when developers and property owners are expected to benefit from increases in land values resulting from public investments in new transport corridors.

However, value capture levies are *not* necessarily a guaranteed means of raising finance, because:

- In practice is difficult to discern the change in property values associated with the infrastructure improvements. Indeed, it is not a simple exercise

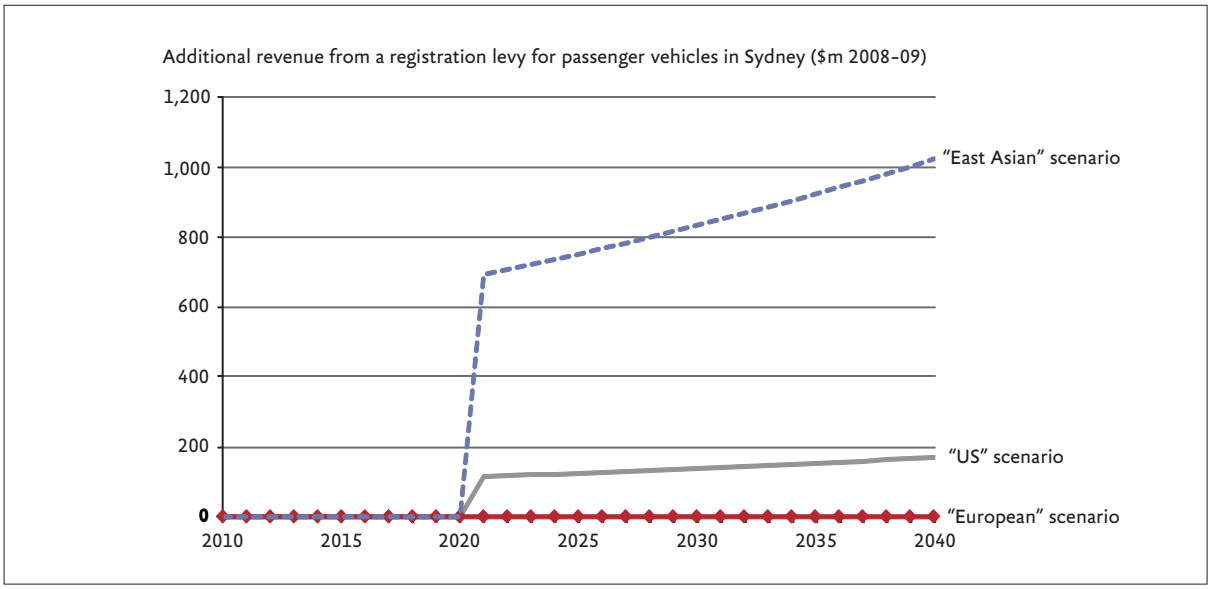


Figure 6.11. *Additional revenue from a registration levy for passenger vehicles in Sydney. Source: Allen Consulting Group estimates, based on data from the RTA.*

to identify and accurately quantify the benefits attributable to new infrastructure, both geographically and over time, and define a "benefit area". It is especially problematic if the benefits accrue quite widely.

- Most land value capture levies distort the efficient allocation of resources. The difficulty mentioned above tends to make most measures arbitrary and not cost-reflective.

- These types of levies can discourage the very type of behaviour that the Inquiry is trying to encourage: for people to live in areas well connected to the public transport network. The use of land capture value levies risks providing an incentive for people to move to areas that are not levied, and hence not so well serviced by the improvements to the public transport network.

- Land value capture levies have equity effects that are generally regressive, because developers generally pass these changes on to customers.

  For instance, in the case of developer charges the levy is passed on to new homebuyers or to the tenants of new developments. When the price of new houses rises as a result, so does the price of its close substitute, existing housing. So existing homeowners are made wealthier, while renters and prospective homebuyers face increased prices for their new homes.

- Land value capture levies often involve a high level of disputation, because they tend not to be "transparent" and there is considerable scope for arbitrary, *ad hoc* administrative decision-making. This adds significantly to uncertainty about outcomes and commercial risk, and ultimately raises the cost of capital to the underlying industry.

In view of the risks and uncertainties associated with this type of financing instrument, the Inquiry's illustrative funding plan has *not* included this mechanism as a source of revenue.

However, the Inquiry does not have a definite view about whether this instrument should be ruled in or out as a source of revenue in the future. Under other funding plans it might be included.

6.4.11 Carbon taxes and other Commonwealth government funding support

Carbon taxes etc

The Commonwealth government could contribute using funds collected from the emerging Carbon Pollution Reduction Scheme or an equivalent scheme.

The Garnaut *Climate Change Review* observed that land-use improvements and the provision of public transport were two of only a very small number of ways to combat urban land transport's greenhouse emissions, and that "support for public infrastructure" was one area to which revenue from the scheme could be directed.

Although it was originally proposed that fuel for road transport would be excluded from the now-deferred emissions trading scheme, this was to have been subject to a review after the opening years.

Instead of exempting transport fuel in this way, it may be more beneficial to apply a specific, set premium to the existing fuel excise and then recycle these funds by investing in transport options which are less greenhouse gas intensive.

The Inquiry's "willingness to pay"surveying has indicated that the community would be willing to bear a "car carbon tax" of up to 8 cents per litre of petrol as part of the funding of major long-term public transport improvements.

If a car carbon tax of this magnitude were adopted, Sydney's "share" of this funding source might amount to around $334 million in 2011, with passenger cars and commercial vehicles contributing $262 million and $72 million respectively.

The *Building Australia Fund*

In its 2009–10 budget the Commonwealth government budgeted $22 billion for the *Building Australia Fund* to improve the quality, adequacy and efficiency of transport, communications, energy, education and health infrastructure across Australia.

Victoria received $3.2 billion from this fund in 2009 for major rail projects.

The Commonwealth government has a long history, dating back well before the establishment of the *Building Australia Fund*, of funding major transport infrastructure projects around Australia, particularly projects deemed worthy of the Commonwealth's support. It is therefore entirely reasonable to expect some Commonwealth government support for the public transport projects proposed by the Inquiry.

In the Inquiry's illustrative funding plan it has been assumed that the Commonwealth government would contribute about $3.5 billion over the next four years, or an average of $875 million per annum. This amount is comparable to the $3.2 billion given to Victoria in 2009, but conservatively assumes a lower *per capita* grant.

As discussed in Chapter 2, the preconditions for any *Building Australia Fund* or similar grant by the Commonwealth government would include significant improvements in the NSW government's land-use and transport planning for Sydney, including compliance with the new national criteria for Australian capital city strategic planning systems adopted by the Council of Australian Governments (COAG) in December 2009 (see section 2.4.3).

Overall Commonwealth assistance

If both of these sources of Commonwealth assistance were realised, the Commonwealth government's funding of public transport improvements for Sydney could amount to $15.3 billion over the 30-year period to 2040.

This would represent between 19% and 24% of the total cost of the Inquiry's various investment plans under the three different scenarios.

In recent times the Commonwealth government has openly acknowledged the massive costs of congestion in Australia's cities and the importance of assisting Australia's largest city and global gateway to function efficiently. The Commonwealth funding contributions assumed in the Inquiry's illustrative funding plan would represent a very cost-effective form of assistance in addressing these issues.

6.5 Funding flows and financial balances

As noted earlier, a key characteristic of infrastructure, and especially transport infrastructure and services, is that there are large initial costs and that revenues from fares and other sources follow only later and over a much longer term, generating a funding gap and a need for finance.

The funding gaps and costs of finance associated with the Inquiry's illustrative funding plan under each scenario are presented in ***Figures 6.12 to 6.17***.

Figure 6.12 to 6.14 show projected capital and operating costs and the total funds obtained from the funding mechanisms under each scenario, while *Figures 6.15 to 6.17* show the overall financing picture under each scenario.

The fact that costs would outstrip revenue funds for many years under every scenario (*Figure 6.12 to 6.14*) means there would be a funding gap (as shown in *Figures 6.15 to 6.17*). In many cases this funding gap would continue for many years, so the Inquiry's public transport improvements would be in deficit and would only be able to continue with the assistance of additional funds from an outside source. The dotted grey lines in *Figures 6.15 to 6.17* reflect the capital charges that would have to be paid to these outside sources of funds. The "balance" lines in *Figures 6.15 to 6.17* are the total amounts that would be outstanding to external parties in each year. These amounts would initially grow over time, but would peak when revenues began to be larger than expenditures and would then, over time, reduce to zero as the external creditors were fully paid off.

Analyses by the Allen Consulting Group indicate that the Inquiry's illustrative funding plan would involve the accumulation and eventual repayment of liabilities that would peak at around $12 billion (in 2030) under the "US" scenario, $11 billion (also in 2030) under the "European" scenario and $20 billion (much earlier, in 2025) under the "East Asian" scenario.

However, as shown in the charts for all three scenarios, these additional liabilities would be able to be paid in full under all three scenarios by the end of the 30-year study period.

The financial trajectory under each scenario would be influenced by three factors:

- **The cost of capital.** For the sake of simplicity, the cost of capital—the Weighted Average Cost of Capital or WACC—has been assumed to be 7.5% (real).

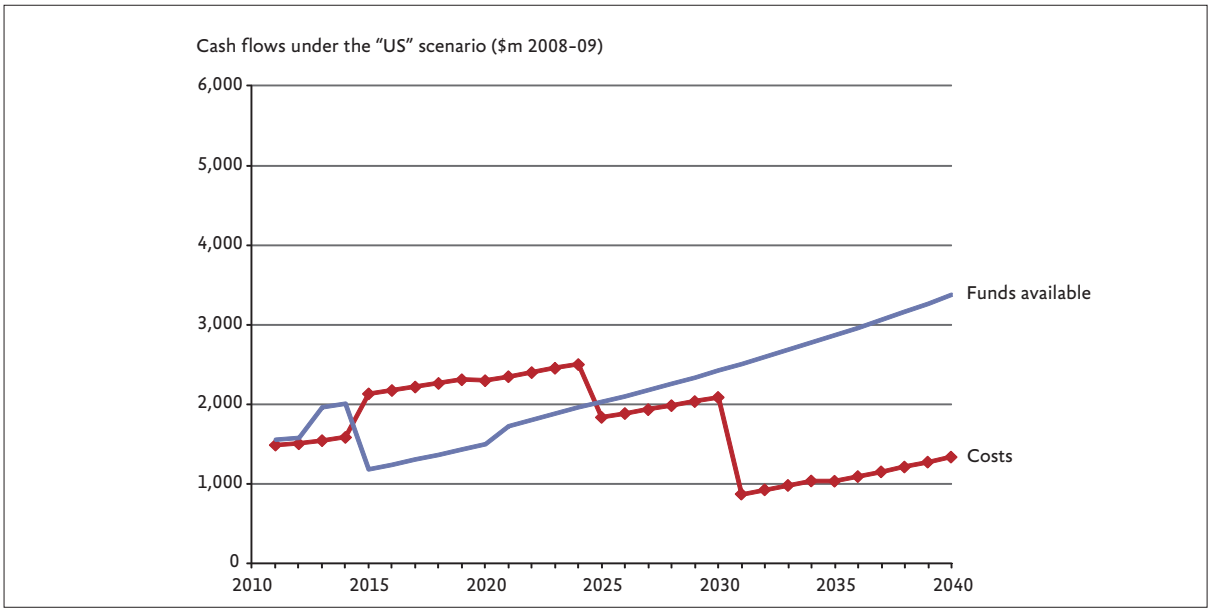


Figure 6.12. *Cash flows under the "US" scenario. Source: Allen Consulting Group.*

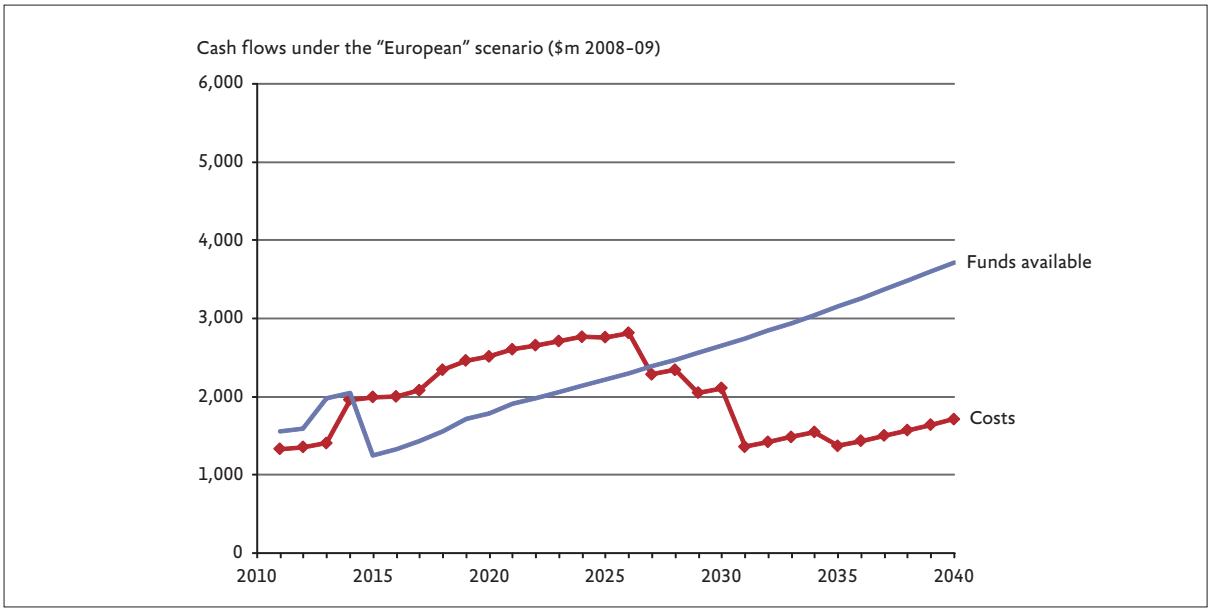


Figure 6.13. *Cash flows under the "European" scenario. Source: Allen Consulting Group.*

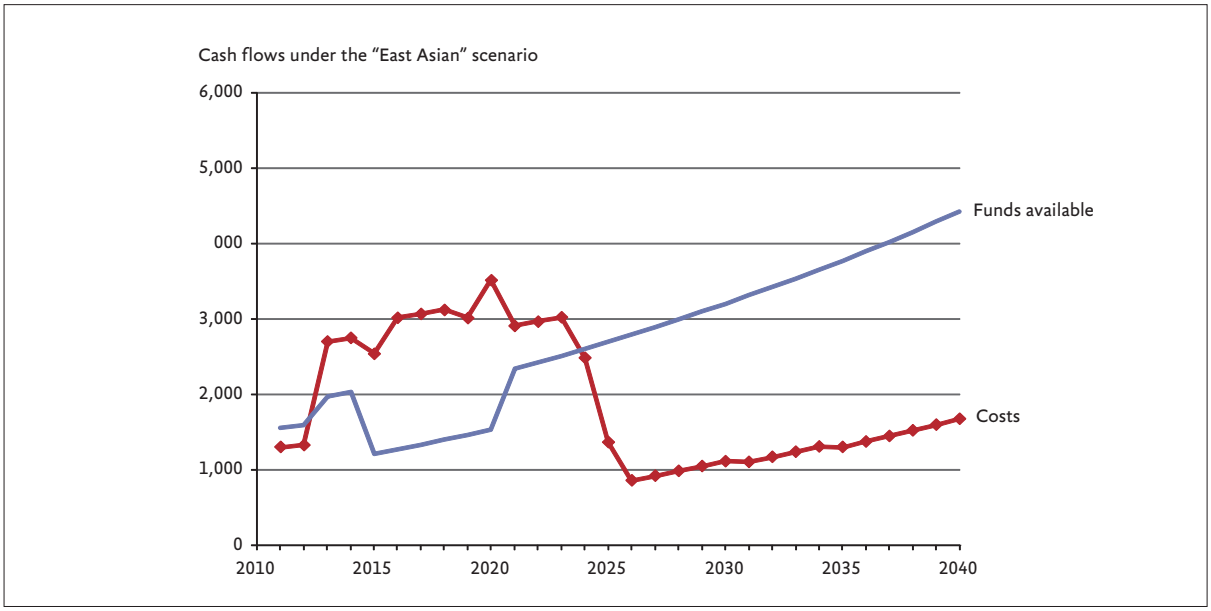


Figure 6.14. *Cash flows under the "East Asian" scenario. Source: Allen Consulting Group.*

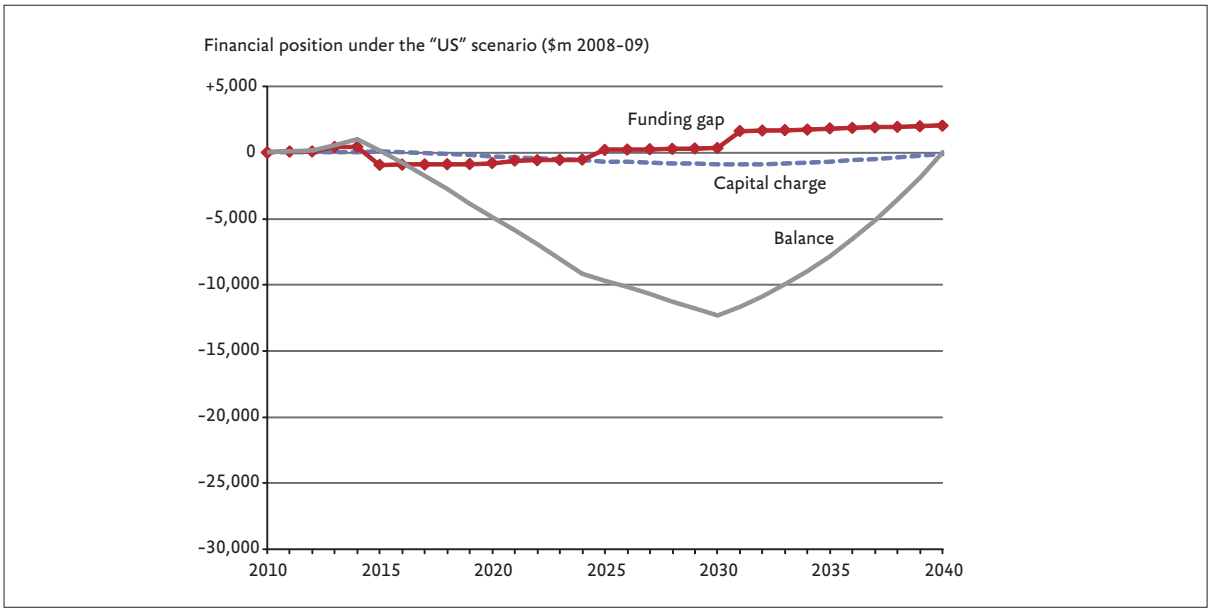


Figure 6.15. *Financial position under the "US" scenario. Source: Allen Consulting Group.*

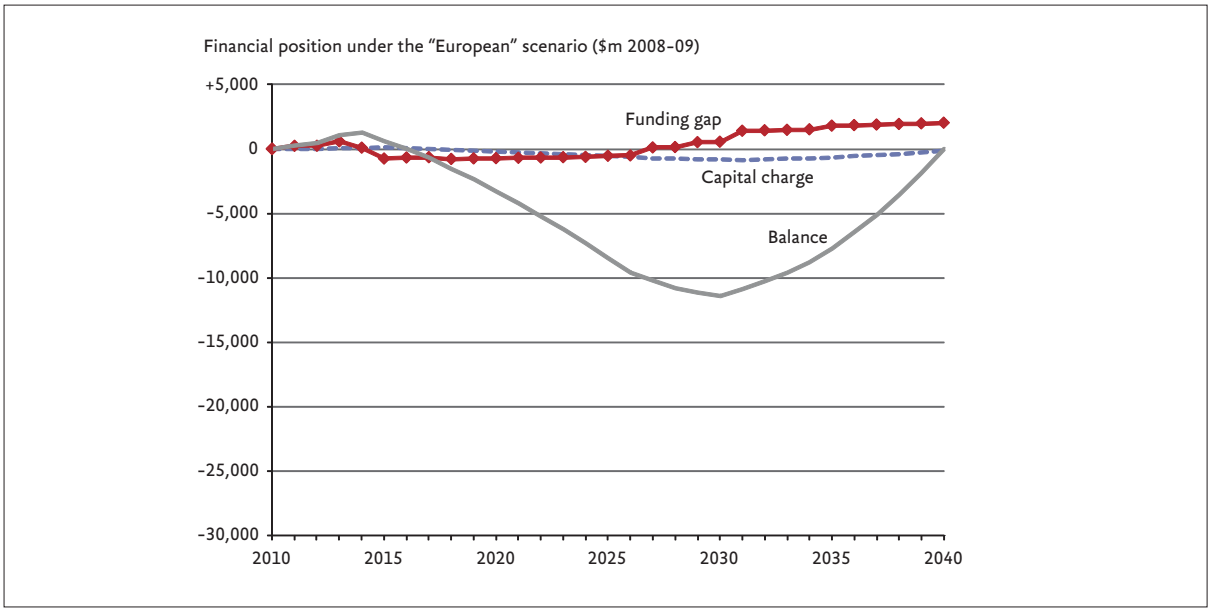


Figure 6.16. *Financial position under the "European" scenario. Source: Allen Consulting Group.*

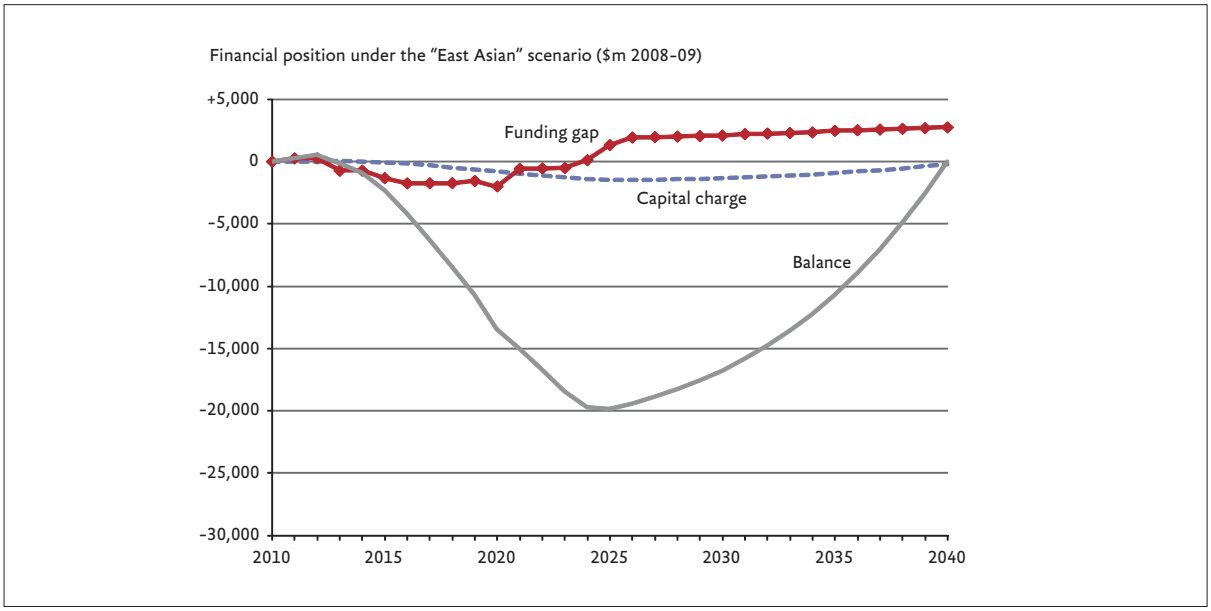


Figure 6.17. *Financial under the "East Asian" scenario. Source: Allen Consulting Group.*

This is in line with the costs of capital used by the Independent Pricing and Regulatory Tribunal (IPART), the price regulator for RailCorp, the STA, NSW water and electricity utilities and several other broadly comparable groups. It is also in line with the preliminary WACC used in recent transport infrastructure evaluations such as the Eddington report on future east-west transport investment options in Melbourne (2008).

If it were assumed that the government would finance the funding gap using public sector debt the cost would be much lower, possibly around 3%. (15-year indexed treasury bonds are currently around 2.7%.)

- **The expenditure profile.** How much is spent on the infrastructure projects, and when, will determine when the costs are incurred under any infrastructure scenario.

  If project spending were brought forward to the beginning of the period the debt load would be higher, increasing interest costs and the amount of funds that would need to be raised.

  On the other hand, if project expenditure were deferred towards the end of the period less debt would be incurred and less total funding would need to be raised. However, as indicated earlier, yet more deferrals of expenditure on major public transport improvements in Sydney, after years of broken promises, would be problematic to say the least, especially as Sydneysiders would be forced to pay for projects whose construction, operation and benefits would not be seen for many years.

- **Revenue.** The amount of revenue raised and the time when it is collected will also affect the financial position. If less revenue than expected were received higher debts would be incurred, and this in turn would necessitate greater increases in fares or levies to ensure the public transport plan continued to be fully funded.

It should be emphasised that this early conceptual stage the Inquiry's illustrative funding plan has considered financing issues only in a broad, generic sense. It is not possible at this stage to be clear about what the best actual mix of debt and/or equity might be under each scenario.

To take a conservative view, however, the "balance" could be thought of as debt in this initial analysis. On this basis the balances reported in *Figures 6.15 to 6.17* for each scenario could then be viewed as increments in State government debt.

This simplification is conservative because the illustrative funding plan has been calculated taking account of the likely expense of an equity contribution. While 100% debt financing is probably impractical, it would be significantly less costly than this.

Should the State government proceed further with the Inquiry's recommended projects—preferably through Transport for Sydney, the new integrated public transport authority recommended by the Inquiry in Chapter 6—it would need to identify the most appropriate funding and delivery model at the "business case" stage. There would also need to be refinements to many factors, including shifting from real to nominal terms, the consideration of an appropriate residual value (rather than simply running down to zero after an arbitrary 30 years) and the mix of debt and equity.

The results of the funding analysis in this chapter do, however, provide a broad insight into how the additional costs could be met.

Table 6.4 shows the costs associated with each of the three scenarios and the funds required, under the Inquiry's illustrative funding plan, to fully meet these costs. The figures reported in this table are all at 2008-09 prices (that is, they remove the effect of inflation).

It should be noted that the sum of each scenario's capital costs, operating costs and financing costs is exactly matched by the proposed additional funding under the scenario (that is, that the final balance is zero).

Table 6.5 shows the percentage of the operating costs that would recovered through fares under each of the transport scenarios.

It may be seen from *Tables 6.4 and 6.5* that:

- The total costs and total revenue under each scenario would be in balance. This includes meeting the capital charge (similar to debt interest payments and repayments). If there were changes in one item, say a reduction in farebox revenue, there would need to be greater revenue from other sources to compensate, in order to remain fully funded.

- The "European" scenario would involve the largest contribution to costs from farebox revenue, while the amount collected under the "US" and "East Asian" scenarios would be lower and similar in magnitude.

  Under the "European" scenario farebox revenue would be around 48% of the total revenue, compared with about 39% under the "US" scenario and about 33% under the "East Asian" scenario.

- The "East Asian" scenario would be particularly reliant on other revenue sources, especially the registration levy proposed for private cars. Under the illustrative funding plan the funds obtained from this source would be substantially higher under the "East Asian" scenario (at $17 billion) than under the "US" scenario ((3 billion) and the "European" scenario (nil). It is not clear that the registration levy amount collected under the "East Asian" scenario would be sustainable or acceptable to the community.

- Under all the scenarios, the farebox revenue over 30 years would more than offset the total incremental costs of the recommended transport scenarios.

- The share of operating costs funded by passengers through fares would increase over time under all of the scenarios. For example, under the "European" scenario the percentage of operating costs funded through rail fares would increase from 38% in 2010 to 71% in 2040. This implies that, over time, the amount of operating costs funded by government subsidies would be reduced.

Table 6.4.
Cash flow positions under the three scenarios over 30 years ($M 2008–09).
Source: Allen Consulting Group.

	"US" scenario	"European" scenario	"East Asian" scenario
Capital expenditure			
Metros	$0	$13,120	$29,300
Heavy rail	$8,400	$13,100	$5,000
Light rail	$1,500	$3,600	$900
Busways	$7,300	$3,350	$1,245
Roads	$18,000	$2,700	$0
Total capital expenditure	**$35,200**	**$35,870**	**$36,445**
Incremental cost			
Rail	$6,221	$11,252	$16,800
Bus	$9, 142	$6,357	$3,835
Light rail	$1,294	$5,991	$469
Ferries	$150	$150	$150
Total incremental cost	**$16,807**	**$23,751**	**$21,254**
Capital charge	**$13,075**	**$11,484**	**$23,714**
Total cost	**$65,082**	**$71,104**	**$81,414**
Farebox revenue*			
Heavy rail and metro fares	$12,130	$15,341	$18,891
Bus fares	$10,364	$8,638	$7,079
Light rail	$2,144	$9,470	$849
Ferries	$448	$448	$448
Total farebox revenue	**$25,086**	**$33,897**	**$27,267**
Other revenue sources			
Metropolitan levy on household rates	$10,876	$10,876	$10,876
Metropolitan levy on business rates	$4,509	$4,509	$4,509
Parking space levy	$3,934	$3,934	$3,934
CBD congestion charge	$2,556	$2,556	$2,556
Registration levy	$2,789	-	$16,939
Total revenue from other sources	**$24,664**	**$21,876**	**$38,815**
Commonwealth government support: carbon tax	$11,832	$11,832	$11,832
Commonwealth government support: *Building Australia Fund*	$3,500	$3,500	$3,500
Total revenue	**$65,082**	**$71,104**	**$81,414**
Surplus/deficit	$0	$0	$0

* The breakdown of revenue across the transport modes would be altered if integrated zone-based fares were introduced, but the total farebox revenue would not change.

Table 6.5.
Farebox recoveries under the three scenarios. Source: Allen Consulting Group.

Farebox revenue	Fares collected 2009-10 ($ m)	Fares collected 2039-40 ($ m)	Fares collected as % of operating cost; 2009-10 (a)	Fares collected as % of operating cost 2039-40 (a)
"US" scenario				
Heavy rail	$769	$1,637	38%	71%
Bus	$349	$1,079	40%	67%
Light rail	$7	$137	100%	179%
Total	**$1,125**	**$2,853**		
"European" scenario				
Heavy rail and metros	$769	$1,896	38%	71%
Bus	$349	$932	40%	67%
Light rail	$7	$544	100%	179%
Total	**$1,125**	**$3,372**		
"East Asian" scenario				
Heavy rail and metros	$769	$2,194	38%	71%
Bus	$349	$805	40%	67%
Light rail	$7	$63	100%	179%
Total	**$1,125**	**$3,062**		

(a) Cost recovery ratios across the transport modes would be altered if integrated zone-based fares were introduced, but the overall farebox revenue would not change.

6.6 Comparisons between revenues and the community's willingness to pay

Recommendation Funding 4:

The funding mechanisms for the *Public Transport Network Plan for Sydney* (**Recommendation Gov 2**) should ensure that:

- Any charges and levies are in line with the community's willingness to pay for the planned public transport improvements, and
- The funds are dedicated to implementation of the *Plan*.

A key concern for the Inquiry has been to ensure, as much as possible, that funding arrangements fall within what the community would be willing to pay for the proposed improvements in public transport systems.

As discussed in Chapters 1 and 3 and detailed in *Appendix 2*, the Inquiry's market research studies indicate that clear majorities of people would be prepared to pay for transport improvements through a range of possible fare increases, taxes and charges.

Table 6.6. Community willingness to pay, at 52% level of support (2008-09 $). Source: Centre for the Study of Choice (CenSoC) (see Chapter 1 and *Appendix 2*).	
Fare increase ($ per single trip)	$0.38
CBD congestion charge ($ per entry)	$7.46
Parking fee increase in major centres ($ per day)	$7.19
Carbon charge ($ per litre of petrol)	$0.08
Additional tax e.g. vehicle registration or metropolitan levy ($ per household)	$157.70

For instance, analyses of the survey's responses suggest that 52% of Sydney-siders would be prepared to pay the following combination of increased costs to gain major public transport improvements: a fare increase of approximately 38 cents per single trip, a CBD congestion charge of around $7.46 per entry, a parking fee increase of approximately $7.19 per parking space per day in major centres, a carbon tax on petrol of 8 cents per litre and an additional tax (for instance, a vehicle registration levy or a metropolitan household levy) of $157.70 per year (***Table 6.6***). Support levels of 52%, or more or less, would also be achievable with other combinations of increases; *this is just an example*.

Table 6.7 shows that the charges under the illustrative funding plan in 2011 would be broadly in line with the community's willingness to pay, as indicated by this particular example of a combination which the survey suggests would produce a 52% level of support.

It should be noted that *Table 6.7* does not include the revenues collected under the funding plan from businesses or the *Building Australia Fund*, because the "willingness to pay" surveying was concerned with the *individual's* willingness to pay for the improvements in transport systems and therefore did not address business sources and sources like the *Building Australia Fund*.

It may be seen that if the "willingness to pay" findings of the survey reflect the attitudes of most people in the community—and statistical analyses conducted as part of the market research studies suggests they probably do—the community's overall willingness to pay additional *individual* revenues in 2011 would be between $865 million and $870 million, depending on the scenario, and the revenue generated by the funding options would be around $266 million *less* than these amounts.

Over time, and under all three of the scenarios, the charges contained in the illustrative funding plan would change , as already described, to meet the costs of the recommended transport projects. The community's implicit willingness to pay for transport improvements would also be likely to change over time, as population, economic activities and incomes increase.

Table 6.8 compares the charges under the illustrative funding plan at the end of the 30-year study period, in 2040, with predictions of the community's willingness to pay in that year. Again, for the reasons just presented, this table does not address any of the charges on businesses or any support from the *Building Australia Fund*.

As already discussed, the illustrative funding plan assumes that the community's willingness to pay increased public transport fares will increase in line with the annual average increase in real transport fares in Sydney over the last ten years

Table 6.7.

Comparison of charges and revenue generated by the community's willingness to pay and the illustrative funding plan in 2010–11.

Sources: Allen Consulting Group and the Centre for the Study of Choice (CenSoC).

Community willingness to pay, at 52% level of support			
	Revenue base in 2010–11	**Charge**	**Revenue generated in 2010–11 (2008–09 $)**
Fare increase ($ per single trip)	"US" scenario: 585 million passenger journeys (a)	$0.38	"US" scenario: $152.0 m
	"European" scenario: 587 million passenger journeys (a)		"European" scenario: $156.6 m
	"East Asian" scenario: 586 million passenger journeys (a)		"East Asian" scenario: $155.7 m
CBD congestion charge ($ per entry)	10 million vehicle entering CBD per year	$7.46	$74.6 m
Parking fee increase ($ per day)	72,590 parking lots	$7.19	$114.8 m (b)
Carbon tax ($ per litre of petrol)	3,136 million litres petrol per year	$0.08	$251.3 m
Additional tax (e.g. vehicle registration or metropolitan household levy) ($ per household)	1.7 billion household in Sydney per year	$157.70	$272.2 m
Total additional revenue from these sources in 2010–11			**"US" scenario $864.9 m "European" scenario $869.5 m "East Asian" scenario $868.6 m**

Illustrative funding plan (2010–11)						
	Charge ($2008–09)			**Revenue generated in 2010–11 ($2008–09)**		
	"US" scenario	**"European" scenario**	**"East Asian" scenario**	**"US" scenario**	**"European" scenario**	**"East Asian" scenario**
Fare increase, averaged across all modes ($ per single trip) (b)	$0.39	$0.39	$0.40	$152.0 m	$156.6 m	$155.7 m
CBD congestion charge ($ per entry)	$7.46	$7.46	$7.46	$74.6 m	$74.6 m	$74.6 m
Parking fee increase ($ per day) (note c)	$7.19	$7.19	$7.19	$114.8 m	$114.8 m	$114.8 m
Carbon tax ($ per litre of petrol)	*Assumed to apply only from 2013*			*Assumed to apply only from 2013*		
Additional tax • Metropolitan levy ($ per household)	$157.70	$157.70	$157.70	$257.3 m	$257.3 m	$257.3 m
• Vehicle registration ($ per household)	–	–	–	–	–	–
Total additional revenue from these sources in 2010–11				**$598.7 m**	**$603.3 m**	**$602.4 m**

Notes: (a) These estimates take account of reductions in patronage from 626.3 million passenger journeys as a result of the fare increases. (b) In the model, averaging across all modes produces a marginally higher increase (especially after rounding to the nearest cent) than the 38 c increase assumed for the major modes. (c) The parking levy revenue estimates assume parking only on 220 working days.

(1.3% pa, ABS 2009), and that the willingness to pay for an additional tax will also increase, by 1% pa in real terms, partly as a result of real growth in the economy and real growth in incomes).

On this basis, by the end of the study period in 2040 most of the additional charges under the illustrative funding plan would still be broadly in line with the community's projected willingness to pay.

For instance, while the projected community willingness to pay through higher fares in 2040 is estimated to be around 55 cents per single fare on average (2008-09 $), the fare increases under the illustrative funding plan in the same year would be 46 cents, 51 cents and 62 cents under the "US", "European" and "East Asian" scenarios, respectively.

The "US" and "East Asian" scenarios would, however, have to involve car registration levies to cover their costs, as discussed in section 6.4.9, and this would take their revenues past the "willingness to pay" limits for additional tax payments.

Table 6.9 and ***Figures 6.18 to 6.21*** compare the revenue that would be generated, over time, by new charges in line with the community's projected willing-

Table 6.8.
Comparison of charges between the the community's willingness to pay and the illustrative funding plan in 2039-40.
Source: Allen Consulting Group estimates, based on information provided by the Inquiry and the Centre for the Study of Choice (CenSoC).

	Willingness to pay, at 52% level of support (2008-09 $)	Illustrative funding plan (2008-09 $)		
		"US" scenario	"European" scenario	"East Asian" scenario
Fare increase, averaged across all modes ($ per single trip)	$0.55 (a)	$0.46	$0.51	$0.62
CBD congestion charge ($ per entry)	$7.46	$7.46	$7.46	$7.46
Parking fee increase ($ per day)	$7.19	$7.19	$7.19	$7.19
Carbon tax ($ per litre of fuel)	$0.08	$0.08	$0.08	$0.08
Additional tax (e.g. vehicle registration or metropolitan levy) ($ per household)	$210.45 (b)	$282.12 Metropolitan levy on households: $210.45 in 2040 Car rego levy: $71.67 per household from 2021 (c)	$210.45 Metropolitan levy on households: $210.45 in 2040 Car rego levy: nil	$645.87 Metropolitan levy on households: $210.45 in 2040 Car rego levy: $435.37 per household from 2021 (c)

Notes: (a) The market survey indicates a willingness to bear an additional $0.38 now. Historically, transport fares (in real term) have increased by 1.3% per annum between 1999 and 2009. Applying the same 1.3% growth rate into the future, the equivalent estimated increase in real fares in 2040 would be $0.55. (b) The market research survey findings indicate that households are willingness to bear an additional $157.70 now. This figure is expected to increase by 1% per annum in real term in the future, partly reflecting the real growth in the economy. (c) In 2039-40 there are expected to be 3.57 million passenger vehicles and 2.35 million households. The public transport registration levy per car would be $47 under the "US" scenario, $0 under the "European" scenario and $287 under the "East Asian" scenario.

Table 6.9.
Total additional revenue collected from individuals over the period 2010-11 to 2039-40 ($ m 2008-09).
Source: Allen Consulting Group estimates.

	Willingness to pay, at 52% level of support	Illustrative funding plan	Difference (negative amounts indicate the revenue collected would exceed the community's willingness to pay)
"US" scenario			
Fares	$25,086	$25,086	$0
CBD congestion charge	$2,556	$2,556	$0
Parking fee increase	$3,934	$3,934	$0
Carbon tax	$10,324	$9,816	$508
Additional tax (e.g. vehicle registration or metropolitan household levy)	$11,314	$10,876 (metropolitan levy) + $2,789 (registration levy)	**-$2,351**
Total revenue from these sources	**$53,214**	**$55,057**	**-$1,843**
"European" scenario			
Fares	$33,897	$33,897	$0
CBD congestion charge	$2,556	$2,556	$0
Parking fee increase	$3,934	$3,934	$0
Carbon tax	$10,324	$9,816	$508
Additional tax (e.g. vehicle registration or metropolitan levy)	$11,314	$10,876 (metropolitan levy) (no registration levy)	$438
Total revenue from these sources	**$62,025**	**$61,079**	**+$946**
"East Asian" scenario			
Fares	$27,267	$27,267	$0
CBD congestion charge	$2,556	$2,556	$0
Parking fee increase	$3,934	$3,934	$0
Carbon tax	$10,324	$9,816	$508
Additional tax (e.g. vehicle registration or metropolitan levy)	$11,314	$10,876 (metropolitan levy) + $16,939 (registration levy)	**-$16,502**
Total revenue from these sources	**$55,395**	**$71,388**	**-$15,994**

ness to pay and by the charges for each of the three scenarios under the Inquiry's illustrative funding plan, again not counting the revenue collected under the funding plan from businesses and the *Building Australia Fund*.

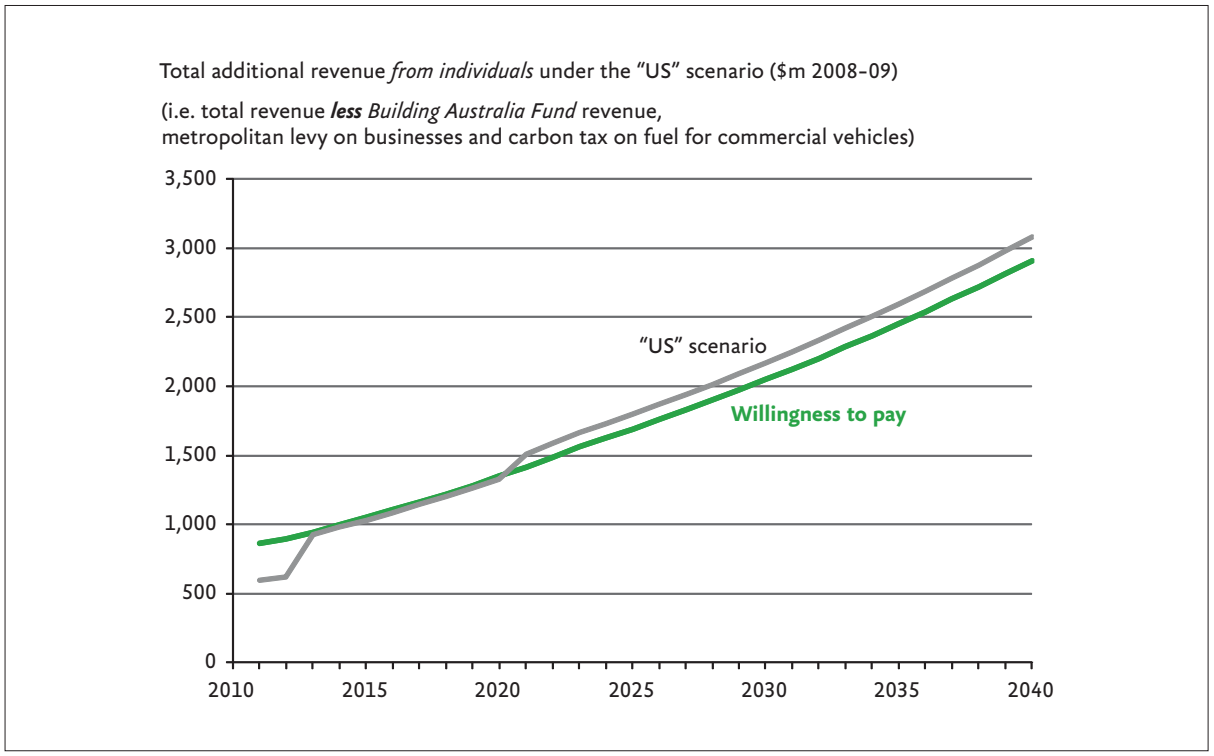


Figure 6.18. *Comparison of community-wide willingness to pay and revenues from individuals under the Inquiry's illustrative funding plan under the "US" scenario. Source: Allen Consulting Group estimates, based on information provided by the Inquiry and CenSoC.*

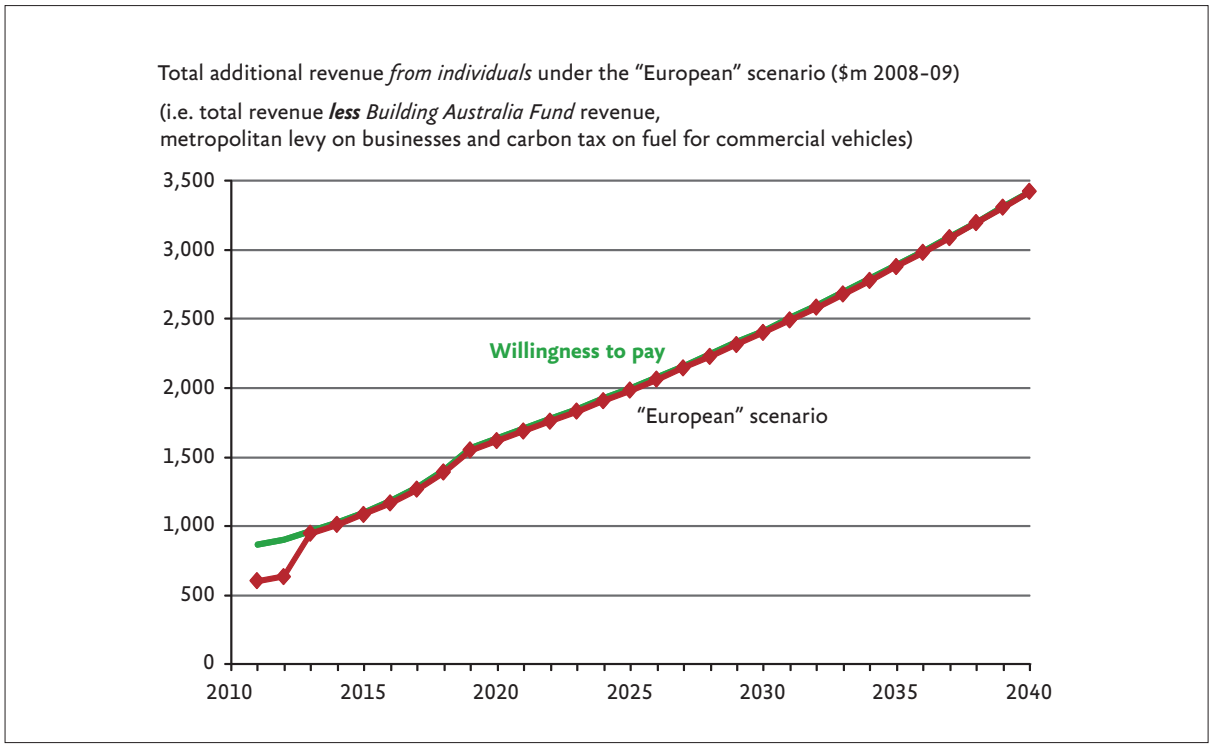


Figure 6.19. *Comparison of community-wide willingness to pay and revenues from individuals under the Inquiry's illustrative funding plan under the "European" scenario. Source: Allen Consulting Group estimates, based on information provided by the Inquiry and CenSoC.*

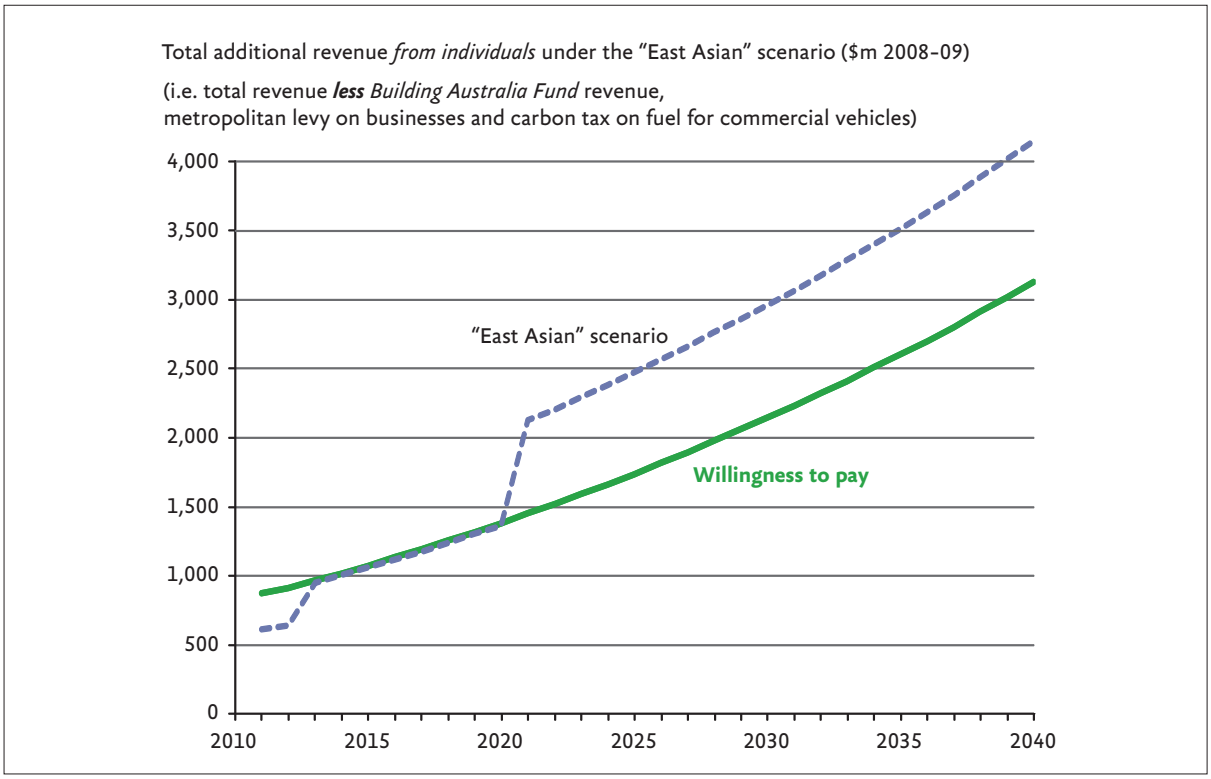


Figure 6.20. *Comparison of community-wide willingness to pay and revenues from individuals under the Inquiry's illustrative funding plan under the "East Asian" scenario. Source: Allen Consulting Group estimates, based on information provided by the Inquiry and CenSoC.*

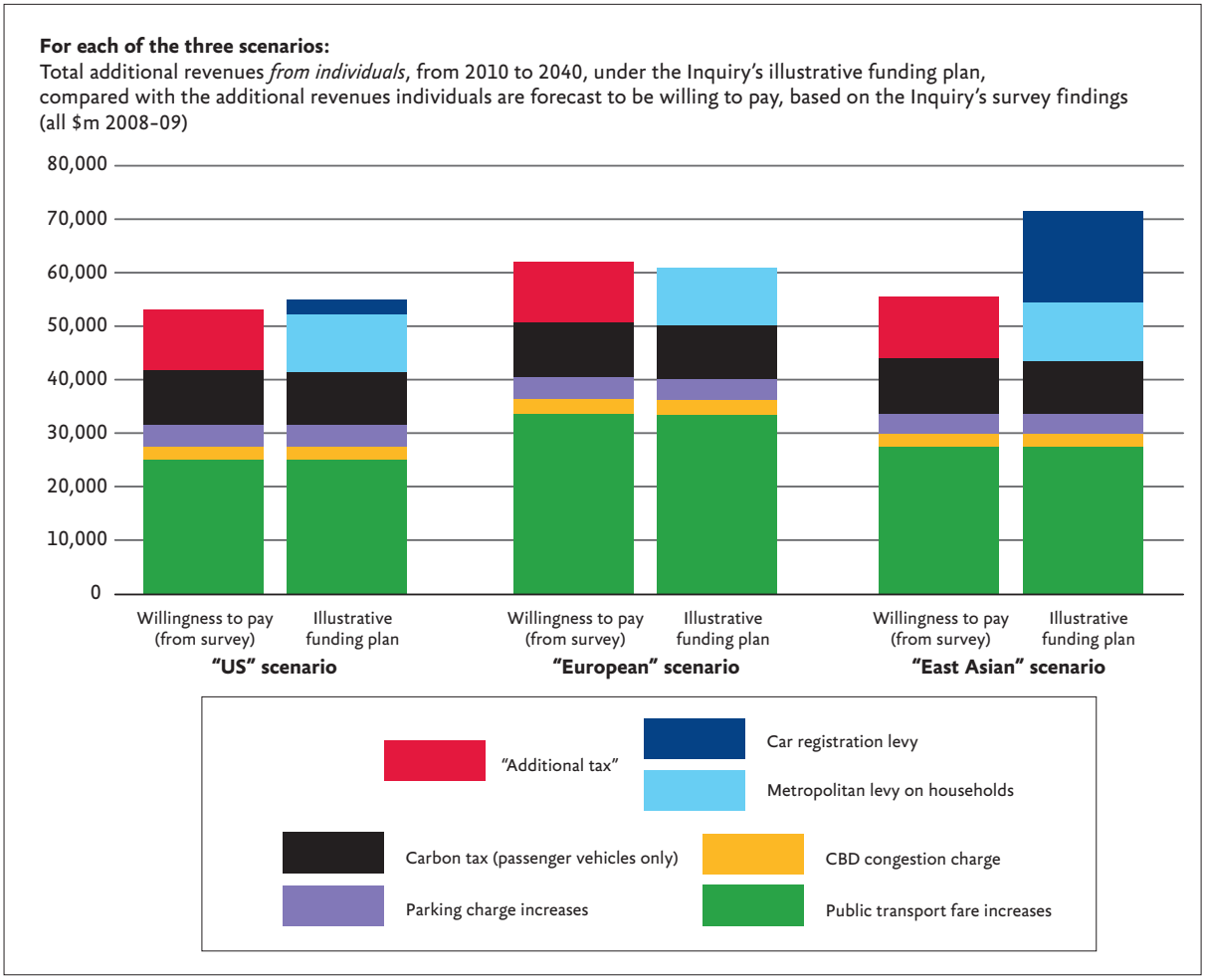


Figure 6.21. *Comparisons of community-wide willingness to pay and total 2010–2040 revenues from individuals under the Inquiry's illustrative funding plan for all three scenarios. Source: Allen Consulting Group estimates, based on information provided by the Inquiry and CenSoC.*

It may be seen from *Table 6.9* and *Figure 6.21* that the total revenue contributed by the community under the Inquiry's illustrative funding plan would be:

- Lower than the revenue the community is projected to be willing to pay (at the 52% level of support) under the "European" scenario, by around $946 million, but
- Higher than the revenue the community is projected to be willing to pay (at the 52% level of support) under the "US" and "East Asian" scenarios, by around $1.8 billion and $16 billion respectively.

Figures 6.18 to 6.20 show that:

- **At the beginning** of the 30-year study period, the revenue contributed by the community under the Inquiry's illustrative funding plan would be slightly less than the amounts the community would be willing to pay under all three scenarios, and
- **In later years** the revenue contributed by the community under the illustrative funding plan would:
    - Remain very close to the amounts the community would be willing to pay under the "European" scenario (*Figure 6.19*), but
    - Exceed the community's willingness to pay under the "US" scenario (*Figure 6.18*) and (to a greater extent) under the "East Asian" scenario (*Figure 6.20*).

It should be noted, again, that the Inquiry has used the survey findings merely to examine *thresholds* for the community's "willingness to pay" under *one of many* possible combinations of funding sources and funding levels that would win community support. The Inquiry is *not* recommending that the quantities tested in the surveys and reported and discussed above should be charged in practice if the public transport improvement recommendations in this report were adopted.

Spreading the load

The broad range of funding instruments incorporated within the indicative funding plan developed by the Inquiry would help to spread the costs of providing improved public transport services across all three levels of government and between different community groups.

Table 6.10 summarises this mix under the "European" scenario.

Under this scenario, the NSW government—including Transport for Sydney, through the collection of public transport fares—would raise 57% of the funding, assisted by the local and national levels of government (about 22% each). This broadly reflects the funding capabilities and responsibilities of the different levels of government.

The Inquiry considers it reasonable to expect the Commonwealth government to contribute to improved transport outcomes for Sydney, given the national interest in ensuring that Australia's largest cities are efficient and sustainable. Indeed, as already discussed, the Commonwealth government has made significant infrastructure investments in other capital cities in recent years. Although NSW failed to receive a significant grant for public transport improvements under the 2009 *Building Australia Fund*, if realistic, thorough, comprehensive and detailed land-use and transport plans were developed NSW would be highly likely to receive more Commonwealth support.

Table 6.10.
Illustrative funding mix matrix under the "European" scenario over the period 2010-11 to 2039-40 (2008-09 $). Source: Allen Consulting Group estimates.

Source	Collected by			Paid by
	Local government	State government (including Transport for Sydney)	Commonwealth government	
Household levy	$10.9 bn			Households (20%)
Building Australia Fund			$3.5 bn	Commonwealth taxpayers (20%)
Business levy	$4.5 bn			Businesses (6%)
Parking Space Levy		$3.9 bn		Car users (26%)
Congestion charge		$2.6 bn		Road vehicle users (26%)
Carbon tax			$11.8 bn	Road vehicle users (26%)
Public transport fares		$33.9 bn		Public transport users (48%)
Total	**$15.4 bn (22%)**	**$40.4 bn (57%)**	**$15.3 bn (22%)**	**$71.1 bn (100%)**

It is also notable that over recent decades Commonwealth governments have funded broadly similar levels of investment in major road projects. In this respect, the Inquiry is simply seeking to shift some of this funding towards public transport.

As *Table 6.10* also shows, the broad range of funding instruments would also help to spread the costs among different groups in the community.

Under the indicative funding plan public transport users would be expected to contribute to around 48% of the total costs. This would be higher than current cost recovery levels from public transport farebox revenue, but would be in line with what the community is willing to pay.

Road users would also make a contribution, but again this would be in line with their willingness to pay.

Since households and businesses in Sydney would also benefit from public transport improvements, they would be required to contribute 20% and 6% of total costs respectively, not counting the indirect contributions of all taxpayers to the Commonwealth's *Building Australia Fund* and their contributions as road users.

By seeking contributions from all of those who are expected to benefit, the funding approach of the Inquiry's indicative funding plan not only emphasises fairness but also illustrates the importance of good governance in ensuring those who pay *will* receive public transport services that meet their needs.

6.7 Choice of funding instruments

Recommendation Funding 5:

The choice of funding instruments should ultimately be a decision for the NSW government.

It should clearly understood that Public Private Partnerships (PPPs) do not provide a "magic bullet". Nonetheless, PPPs could be incorporated, where suitable, *within* an "iron triangle" approach based on an effective long-term public transport plan, an effective public transport governance framework and an effective public transport funding plan.

As stressed already, the Inquiry's illustrative funding plan is not intended to be a definite funding plan or to prescribe a particular funding model. Rather, it aims to illustrate how a robust, long-term and fully funded approach *could* work to support the transport improvements recommended by the Inquiry.

There is no single source of finance which can be used to pay for the infrastructure that is vital to the continued economic, environmental and social health of our community.

Instead, there is a need for a *mix* of instruments to raise these monies.

The analysis in this chapter presents one of many options to fund and finance the Inquiry's public transport recommendations. If the NSW government wished to pursue these recommendations—preferably through Transport for Sydney, the new integrated public transport authority recommended by the Inquiry in Chapter 2—the funding and financing options would obviously need to pass a broader test than just "Is it possible?" Only with a soundly based understanding of the broader consequences can the appropriate mix be determined by government decision-makers.

There is also scope for private sector involvement in funding the recommended transport improvements. This includes the possible use of "Privately Financed Projects" (PFPs) or, more generally "Public Private Partnerships" (PPPs), not all forms of which rely on private sector finance. PPP structures include various arrangements under which the private sector might build, own and/or operate the infrastructure.

Private sector involvement is likely to be a particularly effective financing option when public sector debt financing is not considered feasible. Further, transferring some risks to the private sector can unleash the private sector's greater potential to innovate (and achieve efficiencies) in a range of areas, ranging from project design to construction, operations and maintenance. However, most PFPs tend to be in economic areas where user charging is likely, so the private sector's natural emphasis on profit maximisation rather than public benefits constitutes an area of concern.

One potential source of inefficiency with PFPs arises when, as a consequence of the need to ensure adequate revenues flow to the private sector, there is a deliberately sub-optimal supply of substitutes. A contractual commitment by the public sector to not proceed with, say, a rail line which has the potential to reduce a PFP

motorway's traffic, or the deliberate closure of alternative routes, can obviously reduce the net efficiency gains otherwise available from PFPs.

An example of this is the Melbourne City Link project, where the private sector sued the Victorian government because upgrades of the State-controlled road network had the potential to reduce the number of CityLink users anticipated under the agreement (LGAQ, 2002). There are similar restrictions concerning new "competitive" public transport services and roads under the contracts for the M2 motorway in Sydney.

Additionally, there is less of a case for private sector financing of public transport if this would generate distortions in pricing (such as the high fares for trips to the four privately owned and operated stations on the Airport rail line, which have contributed to the under-utilisation of these important stations).

Overall planning and integration of the public transport system is a role best undertaken by the public sector, under arrangements such as those recommended by the Inquiry in Chapter 2.

While this chapter does not suggest a clear "leading" or "best" approach to funding the proposed projects, it is clear from the analyses conducted for the Inquiry by the Allen Consulting Group that the use of funding approaches which *smooth out the payment over time and are less distorting* would significantly enhance the tangible gains able to be obtained from the proposed transport infrastructure investments.

This certainly implies a greater preparedness or capacity to use government debt.

> *"The whole point of having a credit rating is to obtain credit! A long and successfully managed tradition of public sector debt funding has left the State with excellent examples of public works in many forms over time. The Sydney Harbour Bridge, built during the Great Depression, is perhaps the prime example. Only recently (last 20 years or so) has debt funding been abandoned, due to the influence of ... State Treasury."* (submission by Greg Sutherland)

6.8 Impact on credit rating

Recommendation Funding 6:

The government should not be timid about increasing public sector debt as part of the public transport funding plan. The additional funding requirements and sources should not lead to an increase in debt levels sufficient to trigger a review of the State's AAA credit rating.

It is *not* necessary for NSW to lose its AAA credit rating while accommodating the increase in debt likely to be associated with the transport plans advanced by the Inquiry and their related funding mechanisms.

The increment of State debt arising from the Inquiry's public transport recommendations would be unlikely to push the State over the threshold levels that raise concerns by the credit rating agencies.

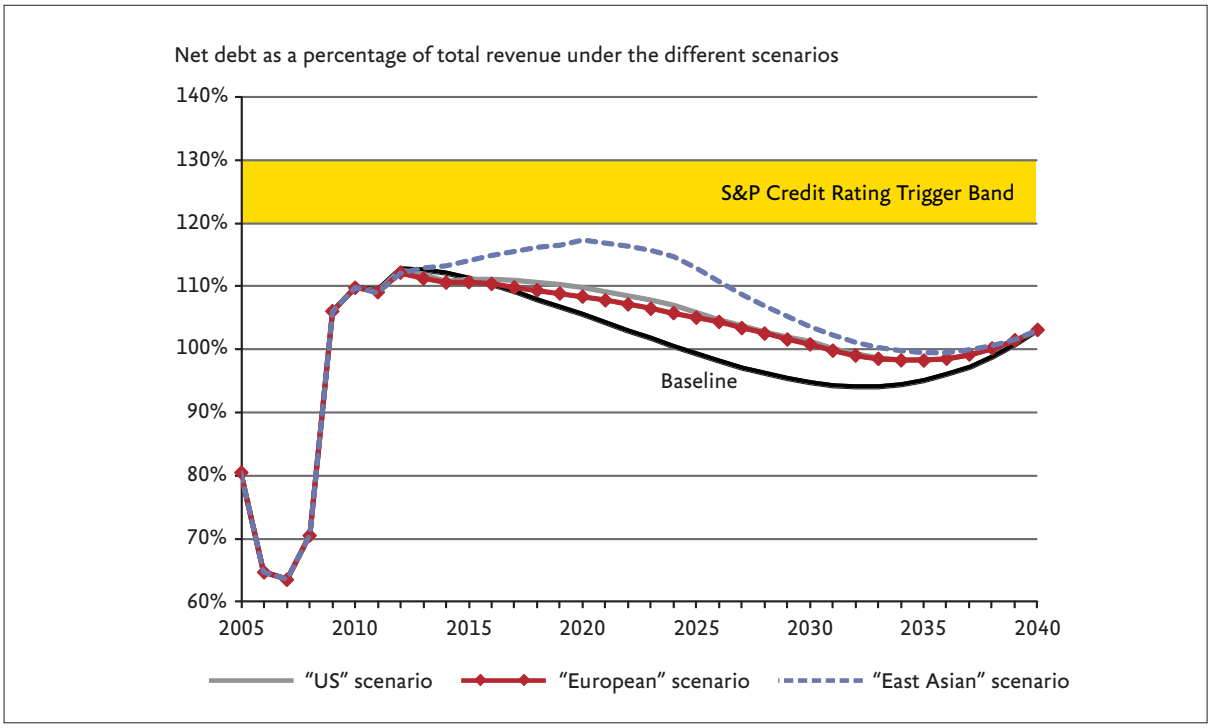


Figure 6.22. *State debt and credit rating review thresholds (net debt and unfunded superannuation liabilities as a percentage of total revenue). Source: Allen Consulting Group estimates.*

In addressing this issue the Inquiry has examined how NSW debt levels may change over time. This analysis has made many conservative assumptions. As already indicated, it has examined the balance of liabilities under each scenario as if it were all debt, while at the same time taking into account a (higher) cost of funds based on an assumption that a high share would also be financed by equity. All of the increase in liabilities have been assessed on the assumption that the debt would be incurred by NSW government agencies or the NSW general government sector (i.e. that none would be held by the private sector through the use of PPPs, for example).

Figure 6.22 illustrates some of the key findings of this analysis.

It may be seen that:

- Under the "baseline" scenario, State debt as a share of total revenue is projected to fall from the relatively high levels that prevail at present, reflecting continued fiscal prudence on behalf of the State government, before swinging up in the late 2030s as a result of the ageing of the population, higher public spending requirements and a contraction in the number of taxpayers.
- **The increment in debt under the three scenarios examined would *not* be sufficient to push debt levels into the trigger band for a review and possible downgrading of the NSW credit rating.**

In practice, the potential to rely on some private sector investment, rather than finance *all* of the investment through State government debt, suggests that the debt outlook would be likely to remain below the trigger band under all three scenarios.

6.9 Key risks and sensitivities

As with any project, the Inquiry's recommendations and the illustrative funding plan presented in this chapter are subject to risks and sensitivities.

These risks and sensitivities include, but are not limited to,

- Changes in the weighted average cost of capital (WACC)
- Changes in capital and/or operational costs
- Delays in the start and/or delivery of the recommended projects
- Changes in underlying projections, such as changes in population growth, economic activity, etc, and
- Changes in the amount of revenue collected.

Some of these risks have been analysed within the illustrative funding plan's framework. Because this sensitivity analysis has been conducted primarily to examine the robustness of the funding arrangements, it has been undertaken only for the "European" scenario. However, similar conclusions can be drawn with respect to the other two scenarios.

Two key insights from this analysis are summarised below

First, the WACC used in the analyses presented in previous sections of this chapter has been a conservative estimate. In reality, the WACC is likely to be lower than 7.5%. The sensitivity analysis indicates that under the "European" scenario a WACC of 3% real could, without further increasing the taxes and charges included in the illustrative funding plan, accommodate:

- Elimination of the metropolitan levy for businesses and the parking space levy, *or*
- A 26% increase in capital costs, *or*
- A 39% increase in operational costs, *or*
- A 13% decrease in overall revenue collection.

Second, a higher contribution from the Commonwealth government (for instance, an additional $100 million per year) would mean, under the "European" scenario, that:

- The parking space levy and the CBD congestion charge could be eliminated and the metropolitan levy on households halved, *or*
- Capital costs could increase by 29% without having to increase the taxes and charges included in the illustrative funding plan.

The main message emerging from this analysis is that the illustrative funding plan presented in this chapter is robust when the balance of risks and sensitivities are considered.

An independent, integrated governance structure like the one proposed by the Inquiry in Chapter 2 (Transport for Sydney) would be important in managing these risks, as it would help to eliminate the types of perverse incentives that exist when accountabilities for service provision, revenue and expenditure are separated.

Indeed, managing these accountabilities within the same single governance structure would ensure that changes in any service delivery, revenue and/or expenditure would be balanced. For instance, an increase in operational costs would be balanced through an increase in revenue using one of the funding mechanisms and reflected in improved or continued delivery of services.

The structure of the Inquiry's illustrative funding plan has been built in a way that would fundamentally improve transparency and accountability for policy decisions.

Decisions that would raise the costs of developing and improving public transport services in Sydney would have a transparent effect in the funding plan's accounts.

It would not be feasible to obscure and shuffle funds between the short and long terms without revealing the effects that this would have on the financial balance and full repayment. **Decision-makers would therefore *be accountable.***

The necessary high degree of transparency is, however, grounded on maintaining **the illustrative funding plan's most critical and clear linkage: the delivery of improved transport services *in exchange for* payments from the community.**

6.10 Managing the construction and transport industries' capacities to deliver

Recommendation Funding 7:

The long-term *Public Transport Network Plan for Sydney* (**Recommendation Gov 2**) should contain a clear timeline of projects designed both to minimise capacity constraints in the construction industry and to manage debt-servicing costs, so that projects can be delivered on time and within their budgets.

The Inquiry is concerned about the capacity of the construction industry and the transport industry in Australia to complete the proposed major projects and the impacts that any consequential higher demand for labour and materials might have on the outlook for cost inflation.

In the course of the Inquiry's public consultations some interlocutors have noted that the large number of infrastructure projects underway throughout Australia, combined with the additional construction activity proposed by the Inquiry, might stretch the capacity of the local construction industry.

Key areas of concern reported to the Inquiry include:

- Tunnelling (there are few machines and firms able to safely tunnel and a relatively large number of concurrent projects)
- Equipment (the shortages of heavy lift cranes are a particular issue), and
- Pre-cast concrete elements (there is a surge in demand for these facilities at present).

6.10.1 The relative size of the projects

The three infrastructure scenarios developed and examined by the Inquiry propose projects entailing capital expenditures of between $35.2 billion ("US" scenario) and $36.4 billion ("East Asian" scenario) over a 30-year period (or between $1.17 billion and $1.21 billion respectively per annum, on average although the "East Asian" scenario, in particular, would require substantially more capital than this in the early years).

While these represent significant, large-scale projects, the considerable growth experienced by the construction industry in Australia over the last decade has resulted in an improved ability by the private sector to undertake projects of such a scale within reasonable timeframes.

Indeed, projects costing around $200 million that would have been considered "significant" a decade ago have been replaced in the "significance" stakes by projects worth more than $2 billion today (Eddington, 2008).

Sydney, in particular, has (generally successfully) undertaken the design and construction of a number of large construction projects in recent decades, including the Sydney Olympic Park facilities, motorways such as the M2, M4, M5, M7, Lane Cove tunnel, Cross City tunnel and Eastern Distributor and the Epping to Chatswood rail link.

As a further way of putting the costs associated with the Inquiry's proposals for Sydney's public transport into perspective, it is useful to compare them with existing infrastructure spending in the State budget.

According to the 2009–10 Budget, during 2009–10 the NSW government will invest $18 billion in infrastructure, as part of a $62.9 billion investment over the next four years.

So the total capital expenditures associated with any of the three scenarios examined by the Inquiry, averaging between $1.17 billion and $1.21 billion per year to 2040, are relatively minor in the context of the existing State budget, representing around only a 6.5–6.7% increase in spending on infrastructure.

6.10.2 What can be done

Although the scale of additional construction activity is not itself likely to be a barrier, it should be recalled that the increment in activity will follow some turbulent times in the construction industry, which is still adjusting to the mining boom, the global financial crisis and fiscal stimulus measures.

The experience of several members of the Inquiry team with the Sydney Olympics suggests that while the additional activity can be accommodated, the costs could be punitive in the absence of good planning and coordination.

To avoid difficulties with construction bottlenecks, it will be essential to:

- **Plan well in advance.** Spreading the projects over a longer period, as described in section 2.5 of this report and summarised in *Table 6.1*, would both maximises the ability of the construction industry to plan for and complete the projects on time and minimise the effect of price distortions in the economy (as well as spreading the financial risk).

  It would allow construction companies to plan well in advance in terms of the human resources, equipment and capital required. Typically, equipment like tunnel borers can take up to 18 months to deliver and build, and

even routine equipment such as bulldozers and graders can take up to 12 months to deliver, so advance notice is critical to projects' being completed on time.

- **Raise certainty.** In order to provide the human and physical resources necessary to complete all the projects envisioned under any of the three scenarios it would be necessary for the construction industry to have a detailed timeline of future projects. This "pipeline" would help create sufficient certainty for the industry to invest in the human resources, training and development and the equipment required to complete large projects.

  Indeed, one of the messages coming out of the Eddington report on transport infrastructure in Melbourne was that a *continuum* of projects is needed for firms to retain and develop staff. At the same time there is a need to ensure projects are appropriately spaced out so that the most talented design staff are available to assist in designing proposals.

6.10.3 A construction-led boom?

Much of this chapter has focussed on the costs of implementing a long-term public transport plan for Sydney.

It should be recognised, however, that these costs will not only lead to an improved transport system but also create significant economic benefits for the construction industry.

The Eddington report (2008) indicates that, to date, Australian construction companies have been primarily responsible for the delivery of local construction projects and that although this may change, any international firms are still likely to require local labour resources. So much of the funding for a long-term public transport plan is likely to be returned to the local economy and enhanced via economic multiplier effects.

To summarise ...

There is no shortage of worthwhile proposals to improve Sydney's public transport system, but funding remains a key barrier to the development of a long-term public transport plan.

The capital expenditures required to fund the infrastructure projects recommended by the Inquiry are expected to amount to around $36 billion over the next three decades. It is unlikely that these infrastructure projects can be delivered within the NSW government's existing budget. New sources of finance (including debt) to fund their construction and operation will be needed.

This chapter has presented an *illustrative* funding plan developed by the Inquiry to test whether it would be realistic to fully fund proposed long-term improvements to Sydney's public transport on the scale recommended by the Inquiry.

This illustrative funding plan has been designed so that the revenue, generated through a mix of revenue sources, eventually offsets the total costs of the plan, including the capital and operational costs and the costs of debt repayment and interest.

The analyses reported in this chapter have demonstrated that by using a mix of funding methods it would be possible to raise between $65 billion and $81 billion (2008-09 $) over three decades to meet the additional funding needs of Sydney's upgraded public transport network (capital costs, additional operation costs and finance costs).

In addition, the illustrative funding plan has been designed so that its additional taxes and charges align directly with the delivery timeframes for the proposed transport projects. In this way, the illustrative plan has tried to align the timing of the community's costs and benefits as closely as possible.

The illustrative funding plan has been built around relatively modest increases in public transport fares and household rates, along with other new or expanded revenue sources such as congestion charges, and deliberately spreads the economic burden over a wide range of funding sources.

This approach provides stability in the revenue base and ensures that the wide social benefits of public transport are properly reflected in the funding mechanism.

The necessary increase in liabilities, especially debt, should not result in any downgrading of the State's AAA credit rating.

One of the key challenges for the projects will be to ensure that they are appropriately spread out to minimise debt-servicing costs and avoid capacity constraints in the construction industry.

In conclusion, it is clear from these studies that the sorts of long-term public transport projects that are needed to lift Sydney's liveability and sustainability are *not* unattainable.

Provided suitable projects are spread over a reasonable time horizon, with priority being given to the most pressing projects, only moderate increases in rates, charges and fares would be needed to fund the recommended long-term public transport improvements.

Improving Sydney's transport system remains very much an attainable goal.

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What *were* they thinking? (1)

What they said

On 3 December 2009, the planned date for the public release of the State government's heavily promoted *Transport Blueprint*, the former Premier, Mr Nathan Rees, said, in his resignation speech,

> *"And before recent events intervened I was intending today to launch the government's Transport Blueprint, a **fully funded** $180 billion plan for Sydney's and New South Wales' transport needs for the next 30 years."* (emphasis added)

The unreleased *Transport Blueprint* was subsequently "reviewed and finalised" by the government—see *What **were** they thinking? **(2)***—but this is what a widely leaked draft of the *Transport Blueprint* due to be released on 3 December 2009 had to say about this "full funding":

> *"The current estimated cost of delivering the projects and services in the Transport Blueprint is broadly around $350 billion, comprising around $200 billion in funding for operations and services and around $150 billion in project funding for infrastructure.*
>
> *"The new infrastructure projects in the Blueprint will cost around $150 billion to deliver. A further $30 billion of projects provide opportunities for future private sector involvement.*
>
> *"Operating costs are assumed to be able to be met from within existing funding sources. The $140 billion [sic] for infrastructure comprises:*
>
> - *"$100 billion of continued government funding assuming that current revenue sources including traditional funding sources, such as Commonwealth grants, State own source revenues, user charges along with a prudent level of borrowings. This is an increase of current transport capital commitments over the next 25 years, including 'business as usual' expenditure, totals around $70 billion. Available funding for new capital commitments over the next 25 years is therefore $30 billion.*
> - *"Up to $15 billion through a sustained improvement in the productivity of the delivery of all government services, with growth in expenses across all government agencies being kept below the projected growth in revenues.*
> - *"However, additional Budget funding alone will not be sufficient to meet the cost of proposed transport infrastructure investments. Prudent economic management means that the Government cannot simply borrow all of the funds required to finance investment.*
>
> *"Therefore to fund the $150 billion identified for project funding an additional $35 billion will need to be raised from additional investment by the Australian government in major projects, and an innovative approach to raising funds including additional value capture for housing, retail and commercial development along transport corridors, Public Private Partnerships and improved efficiency within the transport sector...*
>
> *"The Government's Budget objectives are to keep debt to a sustainable level and retain the State's AAA credit rating to the benefit of all residents. New funding sources will therefore be required to bridge this funding gap.*
>
> *"These will include:*
>
> - *"directing value capture revenue from owners of properties adjacent to new or upgraded transport infrastructure into the NSW transport budget;*
> - *"reducing the cost of new infrastructure by adhering to the Government's policy and improving project management; and*
> - *"reducing the cost of road and public transport operations through both technological and operational reform—this will provide better services at a lower cost and deliver major infrastructure works using best practice efficient delivery mechanisms.*
>
> *"To make sure these reforms are successfully implemented, provision of the additional $35 billion in project funding for Blueprint projects will be **conditional** on the increased revenue and improved efficiency stemming from these measures."* (emphasis added)

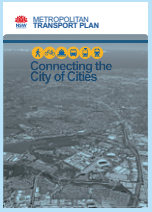
What did they *mean*?

The Inquiry is unsure what was actually meant by all this, but it *appears* that instead of "full funding" of the estimated $80 billion of additional funding required for the *Blueprint's* then-proposed list of new and resurrected road and public transport infrastructure projects,

- Only $30 billion of funding (over 25 years) was to be "available" through the listed types of "traditional" funding sources, including government borrowings, user charges and Commonwealth government grants.
- A further amount of "up to" $15 billion was to be sourced through unspecified efficiency improvements in State government services.
- The only specified source of additional funds for the "funding gap" of (at least) $35 billion over 25 years was to be "land value capture" revenue (a mechanism discussed in section 6.4.10 of this report), and the $35 billion bill was to be reduced through *further* efficiency improvements, on top of the "up to $15 billion" already gained this way.
- If this $35 billion could not be raised, an unspecified selection of the projects promised by the government in the draft *Transport Blueprint*, all ostensibly "fully funded", would simply not proceed.

The Inquiry's illustrative funding plan has been developed to help ensure that whatever the funding plan for major public transport investments in Sydney finally adopted in the future, there will be a **serious** approach to "full funding" commitments.

WHAT *WERE* THEY THINKING? (2)



The successor to the unreleased *Transport Blueprint*, the *Metropolitan Transport Plan, Connecting the City of Cities*, was released by the NSW government on 21 February 2010, shortly after the Inquiry published its *Preliminary Report*.

As discussed in a separate commentary in Chapter 3, this new *Metropolitan Transport Plan* is no longer a "long term" plan. The future now ends in 2020—and the government has made it clear there will be no supplementary longer term transport plan.

The *Metropolitan Transport Plan* trumpets a new $50.2 billion "10-year funding guarantee", but in fact:

- **Commits only $7 billion**, over ten years, to *"new or expanded"* transport infrastructure and services
- **Massively *reduces and defers* public transport expenditure in Sydney over the next ten years**, starting with the unexplained disappearance of the $5 billion previously claimed to be immediately available for the now-abandoned CBD Metro, and
- **Entrenches further massive spending on roads,** which will get State and Commonwealth funding of $21.9 billion over the next ten years for motorway widenings and other (mostly unspecified) projects, *not counting* up to $536 million for future motorway corridor land acquisitions and, "if additional funding becomes available", duplication of the M5 East, the M4 East extension and the F3 to M2 link.

The precise nature of the *Metropolitan Transport Plan's* "funding guarantee" is not specified.

The only *new* source of funding referred to in the *Plan* is a new "weight tax" on motor vehicles, which is expected to generate only $500 million over the next ten years—well short of the extra $7 billion which the *Plan* claims has been added to the government's previous spending commitments for this ten-year period.

So ... *(ahem)* ... where's the money coming from?

Final Report

Appendices

Appendix 1

Submissions to the Inquiry

Individuals and organisations who made submissions

Initial submissions

Lachlan Regional Transport Committee

North Sydney Council

Alex Long

Victor Bivell

Michael Sobb

Noel Reed

Michael Grosvenor

Alex Wardrop

David Thorp

Ian Neilson

Camden Council

Noel Thompson

Rosemary Sharples

Peter Egan

Barking Mad

Marcel Kunath

Alex Stoney

Peter Young

Peter Mills

Philip Laird

Professor David Hensher

NRMA Research

Robert Scott

Adam Takesce

Matt Mushalik

Dr Keith Mitchell

John Aquilina

Garry Smith

Sydney Airport

Rail Tram and Bus Union

Cr Nick Berman (Mayor - Hornsby Council)

Western Sydney Community Forum

Western Sydney Regional Organisation of Councils (WSROC)

John Morandini

Michael Dunn

Leichhardt Bicycle Users Group

Dr Hank de Bruyn

Pyrmont Community Group

David Wilson

Board of Airline Representatives of Australia

Metropolitan Transport Forum

Philip Irwin

Pennant Hills District Civic Trust

Kevin Cobley

Victor Taffa

Anonymous

Richard Kirwan

Penrith City Council

David Kilsby

Michael Lomas

Gosford City Council

Richard Lowson

Glenda Sandars

Julie Walton

David Bell

Andrew Kendall

Windana Research

Tim Buckler

Paul Nolan

Peter Compagnoni

John Edward Harrington

John Joseph

David Hart

Warringah Council

The Benevolent Society

Maurie Brown

Warren Yates

Canberra Business Council

Joseph Vnuk

Scott Hamilton

Matthew Doherty

The Australia Institute

Philip Howell

Margaret Whalen

Metro Transport Sydney

Local Government and Shires Associations of NSW (LGSA)

Greg Sutherland

NSW Aged Care Alliance

Planning Institute of Australia (NSW Division)

Railway Technical Society of Australasia (RTSA)

Bev Atkinson

Nathan Yau

Bike North

Sutherland Shire Council

The Greens NSW

Malcolm Harper

City of Ryde

Hornsby Shire Council

Jana Milosovicova

Willoughby City Council

Newcastle Transport for Business Development (NTBD)

Max Blanco

Northern Sydney Regional Organisation of Councils (NSROC)

James Semple

Waverley Council

Blue Mountains Joint Submission

Hugh Pattinson

Robert Senior

Fabian Watson

Geoffrey Stanford

Daniel Fowler

East Liverpool Progress Association (ELPA)

BikeSydney

Pascal Sueess

Anne Kennedy

Chris Burrell

NSW Liberals/National Coalition

Chris Stapleton

BicycleNSW

Robert Gibbons

Marcus Kollington

Nick Daniels

Ian Thackeray

Robert Cortis-Jones

Ray Laverack

Max Michell

Raul Baonza

Combined Pensioners & Superannuants Association NSW (CPSA)

Benjamin Lukic

International Society of City and Regional Planners (ISOCARP) - Sydney Group

NSW Treasury

David Hunt

City of Sydney

Graeme Tychsen

Thomas Leoni

Caroline Kades

Byron Shire Council

Robert Gibbons

Liverpool City Council

A Maclurcan

Peter Bozic

Urban Taskforce

Hills Greens NSW

Leichhardt Council
Michael Richardson MP, Member for Castle Hill
Urbis
Roy Leembruggen (confidential)
Hawkesbury City Council
Graham Hoskin
Hills Shire Council
Mrs Denise Hofman
Two Wheels Institute
W.S. Chesnut
Catherine Martin
David Rose
Bruce Wilson
Peter Fuller
W.R. Dawson
Julia Horne
Jeff Davies
Kate McAlpine
Andrew Ngai
Lincoln Alphonso
Chris Walsh
Peter Nixon
Shampa Acharya
Angela Dunnett
Russell Mills
Julie Walsh
Barking Mad
Andrew McDermott
Tom Parker
Alex McDougall
John Benz
Rob Cazas
Maureen Kingston
Maria Craig
Ian MacNeill
Francis McQuade
John Crowe
Neil Topham
Graeme Jessup
Mike Powter
Kate McCabe
Mick Chamley
Kara Moeller Laird
Deborah Blay
Mike Burden
Michael van Langenberg
Peter Lain
Jerry Tyrrell
Ricardo Ameneiro
Alex Mozejko
Anonymous
Robyn Gower
Clive Gard
Milan Terzic
Simon Alderton
Michel Gompes
Mandy Reeks
John Duggan
Divyesh Shah
Penny Knudson
Ed Oberg
Platon Theodoris
Michael Hodgetts
Mark Rea
Lucy Bal
Frank Enzanic
Tony Woodland
Mike Smart
David Pike
Bob Masters
Graham Linnell
Damien Quinnell
Bangaruswamy Swaminatha
Lindsay Foyle
Col Blake
Marvin Campbell
Eve Spence
Greg Smith
Sandra Cuming
Kirstie Heath
Diana Choquette
David Davies
Marilyn Irons
Howard & Margaret Friend
Andrew McPherson
Michael Green
Sue Hoad
Gary Cook
David Hazelden
Gabi Thomassian
Robin Wilkinson
Mark Millington
Khurshed Nabi
Aldo Mostacci
Nigel Hall
Christian Wolf
Robert Williams
Geoff North
Pat Skenridge
Marshall Wilkinson
Bruce Johnson
David Arthur
Fiona Smith
Ian McAuley
Andrew Murphy
Andy Shaw
Julie Little
Kate Noble
Tim Tyrrell
Michael Schien
Scott Lowe
Bob Haebich
Dawn Belton
Eric Darley
Garth Luke
Andrew Kelly
Stephen Titus
R.J. Pool
Robert Caldwell
Edna Duncanson
V.R. Littlewood
Australiasian Railway Association (ARA)
Anthony Simpson
Gavin McConnell
Llewellyn Newlyn
Ian Bowie
Jon Rickard
Elek Pafka
Andrew Howell
Helen Jordan
Brian Harland
Julia Archer
Neil Austen
Helen Harper
Lynne & Jim De Weaver
Justine Geake
Cotton Ward
Nichols Street Community Group
Jennie Brand-Miller
Jenny McNaughton
Ken Weatherly
Brendon Hyde
Bill Sherwin
Warren Grzic
Michael Kiddle
John Sidebotham
Michael Krahl
Mark Murphy
Ben Sand
Joseph Capolupo

Mike Steel
Richard Nicol
David Claxton
Diane Parslow
J Minnett
David Brown
John Curteis
Mrs M.E. Hilsden
Michael Sheekey
STEP Inc
Qantas
Derek Low
Beachside Scaffolds
Mimi Neave
Judy Fennell
Philip Whaite
Judith LeVine
Malcolm Powell
Dr Antony Howe
Robyn Short
Colin Bailey
Michael Fredericks
Sandra Missingham
Stephan Gyory
Bruce Preston
Adam Sebire
Bruce Watson
Action for Public Transport NSW
Andy Hawkins
Marc Russell
Norbert Kelvin
David Lewis
Andrew Hayne
Ian Spring
A.W. Perry
Anonymous
Andrew Coster
James Docking
Richard Pointet
R Vowels
R.T. Webster
Jennifer Crew
Kevin Eadie
Bruce Tabor
Richard Baird
Lewis (no surname provided)
Philip Dowling
John Fallon
Access Australia
Daniel Gunning

John Evernden
Claire Paul
David Rozenman
Marc Marusic
Elizabeth Paul
William Alan Vine
John Pagett
David Allen
Mark Harris
David Harrington
Tim Wearne
John Lewis
Michael Frommer
Maxwell Condon
Elna Teoh
Irma Havlicek
John Wiggin
Joan King
Paul Trevaskis
Linda Martin
Matthew Clarke
Caroline Minogue
Malcolm Cluett
Ian Brady
Jim Wells
Margaret Swan
Paul Nederlof
John Mant
Tim Anderson
Malcolm Mills
Leigh Howlett
Richard Sharp
Tony Gregory
Philip Howell
James McCredie
Len Harper
Phil Leijten
Mike Price
NSW Government
Julius & Felicity Grover
Simon Luckhurst
Gail Broadbent
Peter Neve
Beecroft-Cheltenham Civic Trust
Clive Troy
Beecroft-Cheltenham Civic Trust
Judith Parker
Mitch Geddes
Rob Walter
Noel Godfrey

Kent Hayman
Beecroft-Cheltenham Civic Trust
Brad Powe
Evan Higgins
Marcia & Garry Horvai
Dr Rhonda Daniels
Phillip Johnston
Rick Kreeck
John Apthorp
David Honer
Emma Brooks Maher
Ann Sharp
Robert Iacopetta
Maree Williamson
Michael Trask
Chris Rayment
Peter McCallum
Dennis Workman
Leichhardt Council
Ben Zoffman
Dr Michelle Zeibots
Rowen Clark
Paula Williams
Alan Kelley
Bill Holliday
Lesley Carnus
Aravind Krishnan
Bill Pearce
Dr James Thompson
David Richardson
Warwick Pearse
Jaden Harris
Rex Secombe
Lane Cove Council
Margaret Kearney
Charles Casuscelli
Marina Garlick
Brian Hogan
Deirdre Mason
Chris Cummins
Bob Pierce
Anne Carroll OAM
Mike Perrott
Terrill Riley-Gibson
Carolyn van Langenberg
Craig McCaughey
Fiona Cameron
James Fiander
Robert Barry
Darren Kennedy

Hari Arunachalam
Stefan Jarnason
Helen Bersten
Thomas Walder
Mark Allen
Christine Stewart
Simon Pallavicini
Vic Vorobieff
Graham Hunt
John Longton
Uli Schmidt
Amanda Emmerson
Timothy Schuster
Michael Smithers
Jennifer Revell
Saman Jebeli-Javan
Anthony Tam
Ian Hendy
Pavel Pospisil
Albert Pulie
Heather Turner
George Varvaressos
Andrew Eckhold
Fergus Doyle
Peter Gibson
Liam Schutz
Lee Tran
Glenn Badrick
Heidi Maier
Gabriel Felkai
Fifee Liu
John Crawford
David Harper
Ian Roffey
Andrew Greenway
Harmeet Bhullar
M Moffat
Judy Leary
Peter Wargent
Geoffrey Barnes & Valerie Roantree
Stuart Swinton
Joan Dawson
Dr Richard Mohr
Judy Seaburn
Ela Ostovary
Les Lainson
Brett Johnstone
Cam Wilkinson
Geoff Power
Gayle Walker
Graham Hill
Richard Black
Judy Finlason
Westinghouse Rail Systems Australia
Andrew Pullen
Blue Mountains Sustainable Transport Alliance
Paul McKenzie
Daniel Fleming
Carol Flanagan
Len Regan
Brian Burleigh

Final submissions

Bern (no surname provided)
Jim Reid
Blake Bardowski
Yvonne Bartels
Helmut Rohde
Vic Deeble
Dr Damian Grace
Audrey Parsons
Raymond Byrne
Bill Storer
Ian Laney
Nell Campbell
Natasha Serventy
Jason Blaiklock
James Tedder
Dagmar Feldmann
Graeme Jessup
Fred Sinclair
J. Mahony
David Griffiths
Patrick Campbell
Margaret Chaldecott
Peter Mills
Arthur Boyd
Rex Secombe
Bob Hudson
Barry Hindess
John Lain
Richard Ure
Chris Wong
Sharon Pfenninger
Russell Edwards
Tony Rogers
Ray Soper
Bob Lutherborrow
John Nairn
Harmeet Singh Bhullar
Stephen Buck
Anthony Brauer
Helen Bersten
Sharon Calcraft
George Slominski
Ian Grant
Ron Wilson
Athol Mullen
Stephen Miller
Keith Anderson
John Morandini
Kevin Connor
John Sowden
Marrickville Council
Dorin Suciu
Action for Public Transport
Warren Yates
William Chapman
Elvis Maio
Michael van Langenberg
Carolyn van Langenberg
Matthew Bogunovich and Cameron Andrews
Philip Laird
Laurence Taylor
Stephen Corbett
Robert Cortis-Jones
Grant Eckett
Chris Cunliffe-Jones
Penrith City Council
Dennis Workman
Matt Mushalik
Robert Iacopetta
Fabian Watson
Chloe Mason
BicycleNSW
Ray Laverack
Pascal Sueess
Tony Prescott
A person who supplied their name but asked to remain anonymous
Northern Sydney Regional Organisation of Councils (NSROC)
Graham Hoskin
Barry Skelton
North Sydney City Council
Sydney City Council

The NSW government's submission

NSW Government Submission
Sydney Morning Herald – Independent Inquiry
Sydney's Long Term Public Transport Plan

An effective transport system is without doubt one of the cornerstones of any global city. We all rely on our roads, buses, trains, ferries and taxis to take us where we need to go safely and reliably.

As a Government we continuously look at ways to improve the delivery of vital transport infrastructure and services and any inquiry or report that can contribute to and assist that goal is something that I welcome.

It is important when examining an issue as important to the community as transport that we all communicate in facts to ensure any conclusions that are made, are done so reliably and with strong evidence.

Since 1995, the Government has invested $120 billion in infrastructure, with $63 billion more to come over the next four years – a total of $183 billion.

At a glance, we've built five major motorways, completed three railway lines, delivered over 270 train carriages and built the north west and south west T-ways.

The Premier has made it clear that more will be done to ensure NSW and Sydney has a transport system that is of a world standard.

This is why we announced a major government restructure, bringing together planning for public transport, roads and housing development and having them work towards one goal, the Transport Blueprint that will shape the way we travel now and in the future.

The Blueprint is expected to be completed by the end of the year, with the assistance of a reference panel of transport experts.

The Blueprint will incorporate current projects, such as the delivery of the South West Rail Link, the Sydney Metro, 7000 additional commuter car spaces, 450 new buses, 626 Waratah train carriages and will aim to build on current performance such as CityRail's On Time Running of 95.4% against a benchmark of 92%.

The Sydney Morning Herald is right to say that Sydney needs a long term plan that guides the way in which services and infrastructure are planned and delivered.

That work is well underway, and builds on the infrastructure, and planning that this Government has already delivered.

People are choosing to use our public transport system in record levels and the NSW Government will continue to improve it and invest in it to make it even more appealing.

We are listening to the community everyday and we look forward to hearing there ideas and suggestions through this worthwhile initiative of the Sydney Morning Herald.

Regards,

David Campbell

Minister for Transport
Minister for the Illawarra

Appendix 2

Final market research report

UTS:CenSoC
Centre for the Study of Choice

UTS:CenSoC
Centre for the Study of Choice

Independent Transport Inquiry into Sydney's transportation systems

Final report on CenSoC survey: 18 January 2010

Jordan Louviere, Terry Flynn, Stephen Bush, Karen Cong

Executive Summary – Choice Experiments to model demand

Three discrete choice experiments were conducted among 2400 randomly sampled residents of Sydney to estimate their relative preferences and willingness to pay for improvements to the city's transportation system. The first study elicited respondents' preferences for nine improvements to public transport that could be introduced within a 3-5 year timescale.

- For 48% of respondents the top three priorities were improvements to peak rail services, bus services and off-peak rail services.
- 27% of respondents thought integrated ticketing and integrated fares were top priorities, although these were only marginally more important than improvements in peak rail and bus services.
- 25% of respondents thought that improvements to peak rail services and using green power for all rail services were top priorities.

We could not identify any sociodemographic factors, or respondents' own use of transport modes that strongly differentiated these groups or their preferences.

> ***Improving peak rail services would command widespread support among residents of Sydney. Whilst there is some disagreement as to the relative importance of other improvements, this disagreement is not large and policy makers will not disadvantage any particular sociodemographic groups if they must select only a subset of improvements for priority completion.***

The second choice experiment investigated the level of support for the nine short-term improvements when respondents also faced potential funding implications. This study also shows that improvements to peak rail, off-peak rail and bus services were valued the most, receiving over 70% support. However, such strong support depended on petrol prices exceeding $2.00 per litre together with funding these via fare increases and congestion charges rather than tax increases. Majority support remains when petrol prices and fares are as now, but this requires increases in tolls (of $1.05).

> ***All nine improvements are valued by a majority of respondents when introduced in the right combination, but policy makers should be aware that generally the amount residents have to pay should remain the same as now for at least one payment mechanism.***

The third choice experiment elicited how much respondents were willing to pay to have one of two proposed large-scale long-term investment plans, one in public transport and one in roads. The median voter is only willing to pay to achieve the former (for example $109 per annum per household in additional property taxes). This largely reflects the finding that over two-thirds of respondents expressed much stronger support for investment in public transport than investment in roads.

> ***There is majority support for a large investment to improve and expand Sydney's public transportation systems. There are only small minorities (each around 15% of residents) who are strongly in favour of roads investment or who strongly opposed to paying for any type of investment.***

Chapter 1 – Aims and design of the choice experiments

This chapter reports the aims and designs of three *discrete choice experiments* administered online via a web panel to a random sample of 2400 Sydney residents. Discrete choice experiments offer survey respondents hypothetical, but realistic, scenarios (or alternative possible specifications of a good or service) and ask them to make choices, such as their most and/or least preferred options in each set offered. Characteristics ('attributes') of the scenario or specified good are varied in a systematic way across different questions to determine how they impact respondents' choices. We observed how respondents changed their preferred options in response to these changes across questions, which in turn allows us to infer how much value they derived from the attributes that describe the goods that they evaluated.

> ***How often a respondent chooses something indicates how much he/she values it.***

Discrete choice experiments are used by several disciplines, including marketing, transportation, mathematical psychology, health economics and environmental economics. The analysis of choices made in discrete choice experiments relies on various types of discrete choice models pioneered by Daniel McFadden, who won the Nobel Prize for Economics in 2000 for his work in that area. McFadden successfully predicted the demand for the San Francisco Bay Area Rapid Transit system before it was built using discrete choice data on relevant transport choices of Bay Area residents. Discrete choice experiments in transport often are used to predict demand for alternative routes, frequency and fares of proposed new transportation systems. For example, we can systematically alter the fares and service frequencies of a proposed new light rail service, and we can infer the respondent's willingness to pay (WTP) for the key characteristics of that service (such as its frequency at peak and off-peak times) by analysing how their choices change as we change the fare and frequencies.

> ***Thus, if we conducted a discrete choice experiment to value a light rail service, we would not ask potential passengers explicitly how much they are willing to pay for it. Instead, we would observe at what level of fare potential passengers choose not to use the service, but instead switch back to their existing mode of transport (e.g. car).***

Discrete choice experiments in transport also can be used to investigate more 'top level' issues, such as the relative priorities of a number of potential different transport improvements, or how much respondents are willing to pay for major changes in the nature of the transportation system. It is issues of the latter type that the research reported here sought to inform:

> ***The overall aim was to elicit respondents' relative preferences for a number of short-term improvements to the transport network, together with their willingness to pay for two alternative major long term investment programmes – one in public transport versus one in the road network.***

Thus, these discrete choice experiments were fundamentally different from traditional opinion (or political) polls since they presented respondents with the implications (financial and congestion and ease of travel) of a variety of investment strategies. In so doing, the results provide:

- The trade-offs that respondents' choices reveal that they are willing to make between alternative investment strategies, and how they would vote when faced with the full implications of alternative strategies, instead of a mere 'wish-list' that does not require tradeoffs and choices; and
- A clear indication of what citizens of Sydney are willing to pay to significantly improve the city's transportation options relative to continuing to 'muddle through' in the approach to investment.

To inform these issues, we administered three discrete choice experiments:

1. 2400 respondents answered a discrete choice experiment to elicit their relative priorities for nine short-term improvements that required tradeoffs among the improvements offered, but did not require them to make financial choices at the same time.
2. One half of respondents (1200) answered a discrete choice experiment that also elicited their relative priorities for nine short-term improvements; however, in this case they were asked if they would vote for or against those improvements, when told the amounts of money they actually would be required to pay to have them.
3. The other half of the respondents answered a discrete choice experiment that elicited their relative priorities for three alternative longer term visions of Sydney: one characterised by significant improvements to the public transportation systems, one characterised by significant investment in the road network and one characterised by a continuation of current relatively low investment policies. This choice experiment also required the respondents to vote for the future that they would support and each future had associated costs that they would have to pay to have it.

The sample of respondents was randomly selected from the online panel provider, PureProfile. A range of postcodes acquired from Australia Post were used to identify respondents who reside within the Sydney region.

In comparison to the 2006 Census data collected by the Australian Bureau of Statistics (ABS), the demographics of the respondents form a satisfactory representative sample of the Sydney population. Chapter two contains tables with further demographic information.

Chapter 2 – Respondent characteristics and current travel patterns

This chapter presents a summary of the characteristics of respondents and their patterns of travel. Wherever possible, the distribution across key sociodemographic factors is compared with that across the wider population of Sydney from the 2006 Census ABS data.

Gender	Sample %	ABS%
Male	48.4%	49.4%
Female	51.6%	50.6%

Age	Sample %	ABS%
Under 18 years	0.6%	1.9%
18-24 years	15.0%	14.0%
25-29 years	11.1%	10.4%
30-34 years	12.5%	11.2%
35-39 years	12.2%	10.9%
40-44 years	11.1%	10.7%
45-49 years	10.8%	10.1%
50-54 years	10.2%	9.0%
55-59 years	7.5%	8.2%
60-64 years	5.4%	6.3%
65-69 years	2.7%	4.8%
70 years and over	1.1%	2.4%

Marital Status	Sample %	ABS%
Single	29.9%	34.4%
Married/Couple	61.4%	49.7%
Separated/Divorced/Widowed	8.7%	15.9%

Work Status	Sample %	ABS%
Employed Full time	59.9%	43.1%
Employed Part Time	16.0%	17.6%
Unemployed	3.4%	3.6%
Not in the labour force	20.7%	35.8%

It can be seen that the PureProfile sample is representative of the wider Sydney population in terms of gender, but slightly under-represents people of retirement age and slightly over-represents people in relationships. Compared to the ABS Census data the panellists are also slightly more likely to be employed full time than not be in the labour force.

Home ownership	Sample %	ABS%
Own home with mortgage	41.0%	30.1%
Own home without mortgage	20.8%	31.1%
Rent	28.2%	29.7%
Other	10.0%	9.1%

Respondents who own their home are slightly more likely to have a mortgage than those in the Census, probably reflecting the slightly lower average age.

Personal Income (Annual)	Sample %	ABS%
Below $20,000	16.2%	37.9%
$20,000 to $65000	36.6%	38.5%
$65000 to $100000	20.0%	8.4%
Over $100000	11.1%	5.3%
Not stated	16.1%	9.9%

Household income (Annual)	Sample %	ABS%
Below $20,000	4.0%	5.6%
$20000 to $34999	4.3%	13.4%
$35000 to $64999	14.9%	20.0%
$65000 to $100000	22.5%	21.5%
$100000 to $200000	30.4%	23.9%
Over $200000	6.2%	3.2%
Not stated	17.7%	12.3%

In conclusions, the PureProfile sample of 2400 respondents was broadly representative of the wider population of Sydney.

Chapter 3 – Relative priorities of short-term service improvements

Study Aim

The aim of this study was to elicit all 2400 respondents' relative preferences for a number of short-term improvements (presented in Table 1 below) so that regardless of which of the other two discrete choice experiment surveys they received, we would have common preference and trade-off information for all respondents. Respondents were not asked to consider the financing of these improvements. The intention was to:

1. Establish the numerical priority that respondents would give to each improvement relative to the others: for example, more frequent bus services on major routes should receive the same priority as extensions of light rail services;
2. Determine whether respondents generally agreed on the relative priorities, or whether there were particular groups (such as bus users, older people, etc) with different views.

Table 1:Short-term improvements to Sydney transportation network

Name of Improvement	*Detailed Information About The Improvement*
1. **More frequent off-peak trains between major centres**	Between 7am & 7pm trains will run every 10 minutes to/from the City and 1) Chatswood, 2) Bondi Jct, 3) Parramatta & 4) the Airport
2. **Improved peak rail capacity**	There will be 20% more peak hour trains with improved capacity on all major routes
3. **More frequent bus services on major routes**	Between 7am & 7pm buses will run every 6 minutes to/from the City and 1) Bondi Beach, 2) Dee Why, 3) Top Ryde, 4) University of New South Wales & 5) Leichardt AND Between 7am & 7pm buses will run every 10 minutes to/from Parramatta Interchange and 1) Castle Hill, 2) Rouse Hill (T-Way) & 3) Liverpool (T-Way)
4. **Extensions of light rail services**	Light Rail will be extended from Lilyfield to Dulwich Hill on the goods line & from Central Station to Barangaroo along Sussex Street
5. **Integrated fares**	The fare structure will be simplified by removing penalties for transferring between modes (eg, bus to rail; ferry to bus; rail to light rail, etc)
6. **Integrated ticketing**	A smart card system will be used to let people pay automatically on entering a station or boarding a bus, ferry or light rail service, eliminating the need to buy tickets
7. **Real-time arrival information**	Real-time information (also available on smartphones) about arrivals posed in all stations, light rail stops & busiest 200 bus stops that display the actual arrival time of the next service
8. **New cycleways; more bike & scooter parking**	500 km of new, safe cycleways across the Sydney Metro Area + at least 5km additional in each local government area; 5,000 secure bike & scooter spaces provided across Sydney, especially at train stations, major bus stops & town centres
9. **Trains use green power**	All trains and light rail lines converted to use clean, green electricity

Research Approach

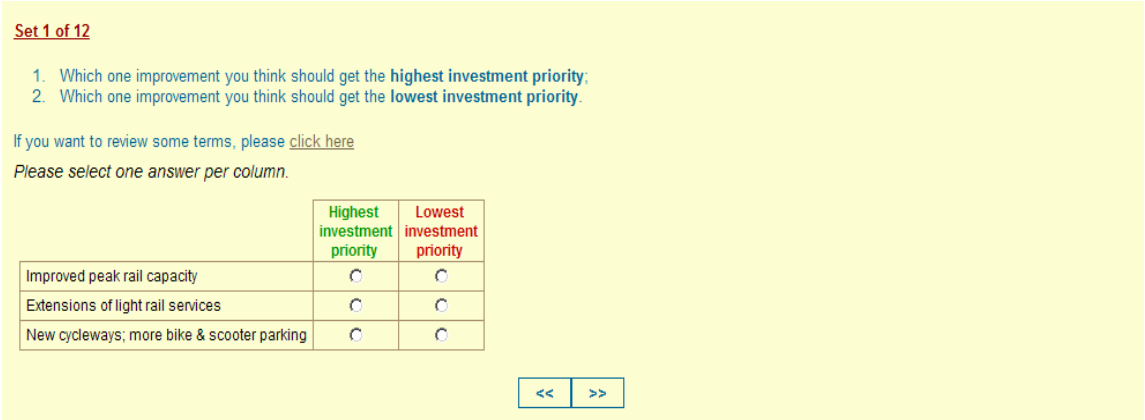
Many consumer surveys ask respondents to rate how important they think each of several options is, for instance on a scale of 1 to 7, where '7' is very important and '1' is unimportant. Unfortunately:

- This does not force respondents to make choices: if (s)he has rated most things as '7', how do we know which of those is most important if all cannot be provided?

- Different people use rating scales differently, for instance, due to cultural background.

Some surveys avoid these problems by asking respondents to rank the options of interest – most important, second most important, etc. Whilst this forces respondents to decide on the relative importance of the options, it has other problems. First, respondents tend to find ranking exercises difficult, and they pay less attention to 'middle' rankings. Second, rankings tell us only that option x is preferred to option y; but tell us nothing about how much more preferred option x is to option y.

To avoid these problems, we used a type of discrete choice experiment called *best-worst scaling*. The best-worst experiment asked respondents 12 questions. Each question offered them a subset of three of the nine short-term improvements; the 12 questions and the three options in each question were based on a type of experimental design known as a balanced incomplete block design. Balanced incomplete block designs are used to ensure that every option appears equally often and also appears with each other option equally often. For each of the 12 subsets or questions, respondents were asked which improvement should receive the highest priority and which should receive the lowest priority. An example question is given below.



Set 1 of 12

1. Which one improvement you think should get the **highest investment priority**;
2. Which one improvement you think should get the **lowest investment priority**.

If you want to review some terms, please click here

Please select one answer per column.

	Highest investment priority	Lowest investment priority
Improved peak rail capacity	○	○
Extensions of light rail services	○	○
New cycleways; more bike & scooter parking	○	○

<< >>

Each respondent effectively provides a full ranking (first, second and third) of the three potential improvements on offer by making highest and lowest investment priority choices. We pooled (added together) each respondent's answers to the 12 sets , which gives us not only a full ranking of all nine improvements, but also the relative importance of all nine on a numerical scale: thus, an improvement with an importance score of 0.6 is twice as important as one with an importance score of 0.3. These scores can be summed across all respondents, and we can investigate whether the priority scores for each improvement vary for different categories of respondents – for instance men versus women, train users versus non-users. The purpose of the latter analyses is to gain insights into the degree of agreement/disagreement among respondents about the relative priorities.

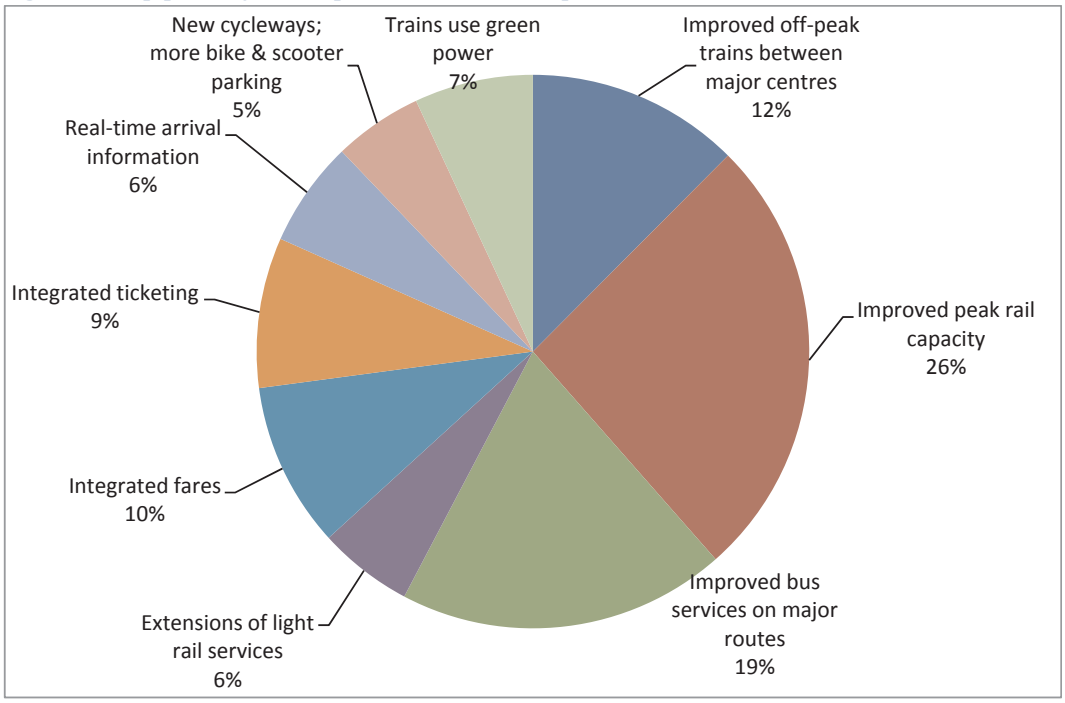
Results

Results are presented first for the entire sample, then by type of respondent (according to gender, use of transport etc).

Sample level top priorities

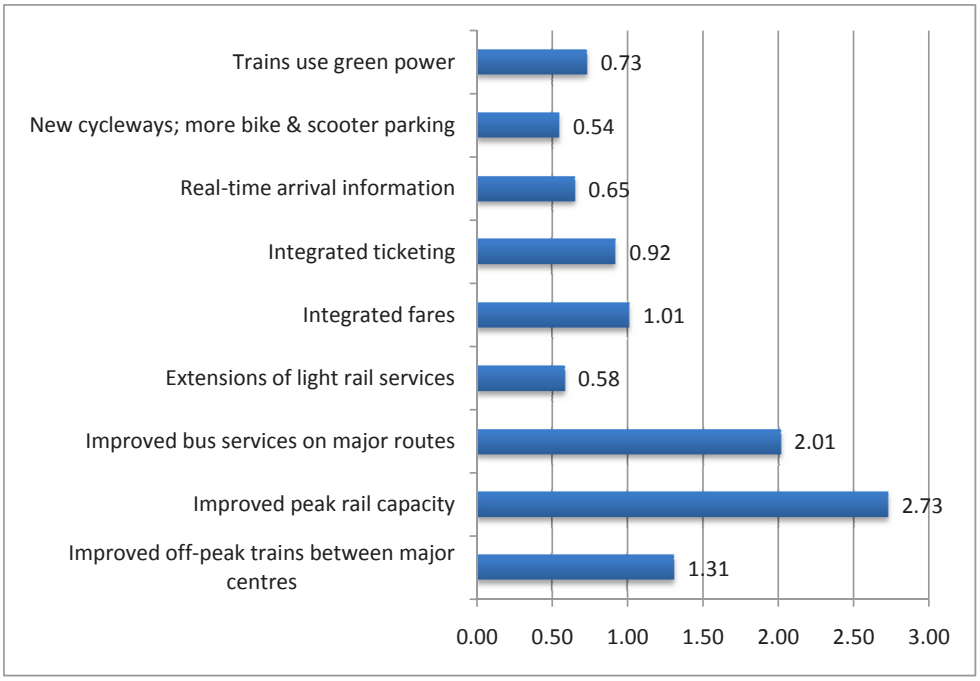
Percentages of respondents rating each improvement as highest investment priority are shown in figure 1.

Figure 1: Top priority for improvement – all respondents



It is notable that 57% (26% + 19% + 12%) of respondents consider that train and bus services themselves should receive top priority in investment. These data can also be represented in terms of priority scores, telling us how important one improvement is relative to another:

Figure 2: Priority scores for improvements – all respondents



These scores come from the same figures used to construct Figure 1. We can make statements such as "more frequent bus services (2.01) are approximately twice as important as integrated fares (1.01)" or "if asked on several occasions, the average resident of Sydney would pick more frequent bus services about twice as often as integrated fares if asked to choose the most important priority from the full set of nine". This format is useful when analysing the data by subgroup (see below).

Sample level correlations between priority scores

The best-worst choice exercise yields a set of 9 priority scores for every respondent. This provided insights into which short-term improvements are correlated in people's minds: in other words, when a given improvement is regarded as a priority, which other improvements tended also to be priorities? Table 2 presents the correlations between the priority scores of the nine improvements. Correlations lie between -1 and +1. For a given pair of improvements:

- The closer the correlation is to +1, the more the pair of improvements tend to be similar in priority;
- The closer the correlation is to -1, the more the pair of improvements tend to have different priority values; and
- A correlation of zero indicates no relationship between the priorities of the two improvements in the pair.

Table 2: Correlations between priority scores – all respondents

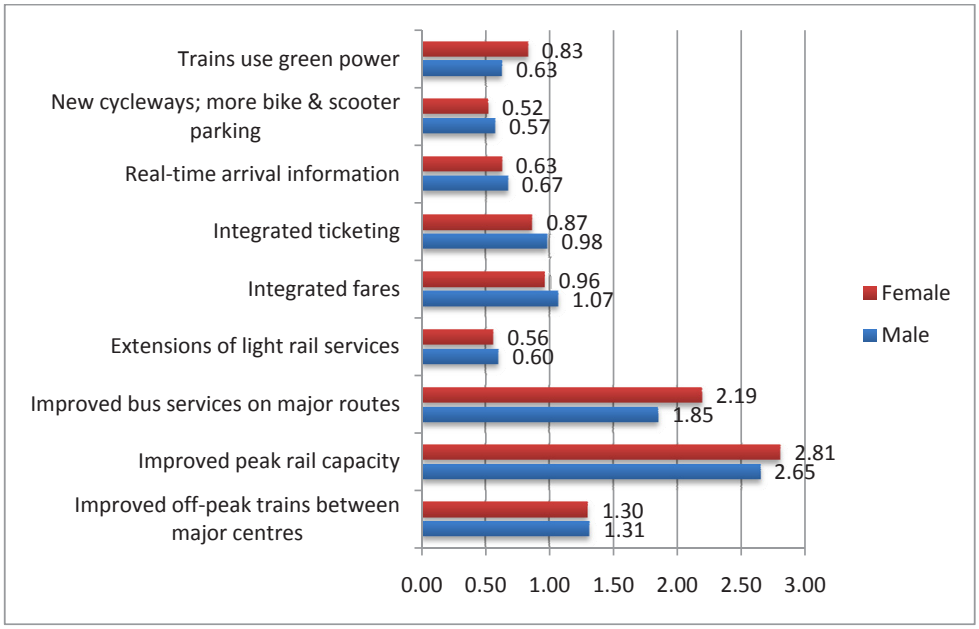
Transport Improvements	More frequent off-peak trains between major centres	Improved peak rail capacity	More frequent bus services on major routes	Extensions of light rail services	Integrated fares	Integrated ticketing	Real-time arrival information	New cycleways; more bike & scooter parking	Trains use green power
More frequent off-peak trains between major centres	1	**0.44**	0.20	**0.34**	*0.02*	0.04	**0.34**	0.11	-0.19
Improved peak rail capacity		1	0.23	0.28	*-0.00*	0.09	0.25	0.12	0.20
More frequent bus services on major routes			1	0.15	**-0.37**	-0.23	*0.04*	*0.03*	**-0.51**
Extensions of light rail services				1	*-0.01*	0.06	0.18	0.20	0.12
Integrated fares					1	**0.62**	0.17	*-0.04*	**-0.61**
Integrated ticketing						1	0.23	0.07	**-0.38**
Real-time arrival information							1	0.12	0.19
New cycleways; more bike & scooter parking								1	*0.01*
Trains use green power									1

Red figures are relatively large correlations, italicised are non-significant at conventional 5% level

The correlations indicate that people who gave a high priority to more frequent off-peak rail services also gave a high priority to improved peak rail services, extensions of light rail services and real-time arrival information. Those who gave high priority to more frequent bus services on major routes gave low priority to integrated fares and very low priority to green power for trains. People who gave high priority to integrated fares gave low priority to more frequent bus services on major routes, and very low priority to green power for trains, but gave high priority to integrated ticketing. Other correlations in the table can be interpreted in a similar manner.

Top priorities by subgroup

Figure 3: Highest improvement priority – males versus females



The results for men versus women in Figure 3 indicate few differences in relative priorities for improvement. Indeed, we also found little difference when splitting the sample into subgroups defined by:

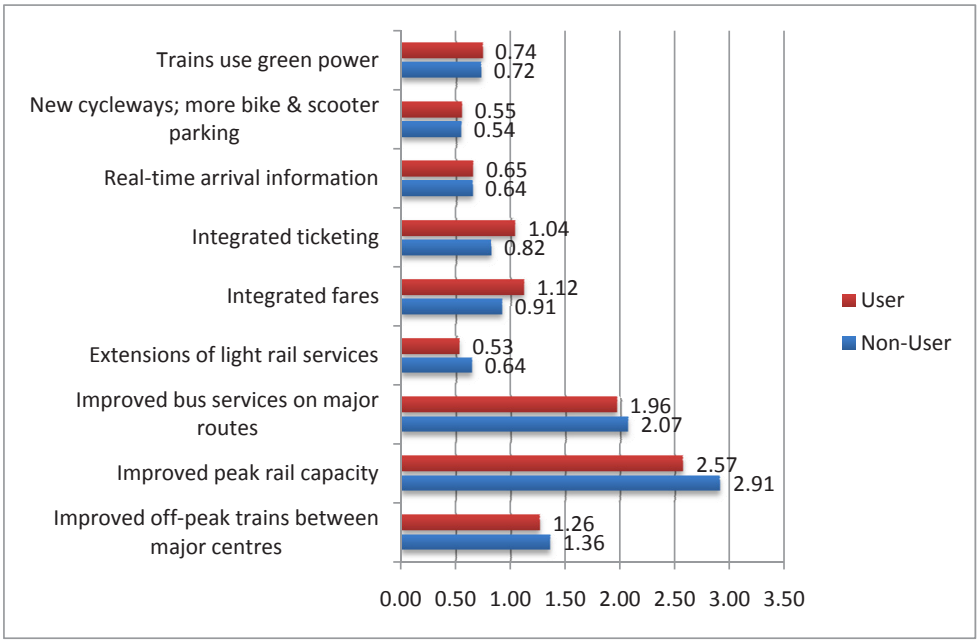
- Age
- Marital status
- Income

In fact, if subgroups of the Sydney population exist that have different views, our results suggest that such groups cannot be easily characterised by traditional sociodemographic variables, such as age, gender etc.

> ***Thus, there are no 'constituencies' in Sydney based on sociodemographic factors with different views as to the importance of the nine improvements.***

Consequently, we used respondents' answers to their own use of transport questions to determine whether use of transport mode was associated with differences in improvement priorities. In particular, we asked whether users of public transport differed in their relative priorities from non-users.

Figure 4: Highest improvement priority; users of public transport versus non-users



This comparison suggests that users give slightly more priority to integrated fares and ticketing than non-users (relative to service improvements per se). However these differences are small:

- ***There is a high level agreement among residents of Sydney as to which short-term improvements should receive the highest priority: those relating to improvements in rail and bus services per se.***

- ***If there are subgroups of the Sydney population who have different relative priorities in terms of short-term improvements, those subgroups cannot be easily identified in terms of their sociodemographic characteristics or their current travel patterns.***

We verified the second statement above using a different and more sophisticated method of analysis, described below.

Subgroups in Sydney

Another way to identify differences in the sample is to use a new analytical method known as *scale-adjusted latent class* analysis. This approach is a type of choice model that statisticians call a "finite mixture model". The latter refers to the fact that the approach identifies a small number of subgroups of people who are relatively similar in their choices, and expresses all the choices in the sample as a mixture of these (finite number of) types. The method works by identifying subgroups in the sample of 2400 respondents who answered this particular survey. The idea is that people with broadly similar preferences should tend to choose the same improvements as most important and least important, across the various sets of three options they evaluated. At the same time, different subgroups should tend to choose differently; for instance one group might value green power for trains particularly highly, whilst another might value improvements in peak and off-peak rail services.

We used scale-adjusted latent class analysis to identify three distinct subgroups of people in our sample:

1. A subgroup whose top priorities are peak rail services, off-peak rail services and bus services. Approximately 48% of respondents are in this group.
2. A subgroup whose top priorities are integrated ticketing and integrated fares (although improvements in peak rail and bus services came a very close third and fourth). 27% of respondents are in this group.
3. A subgroup whose top priorities are peak rail services and trains using green power. 25% of respondents are in this group.

Figure 5: Highest improvement priority; three types of Sydney respondent

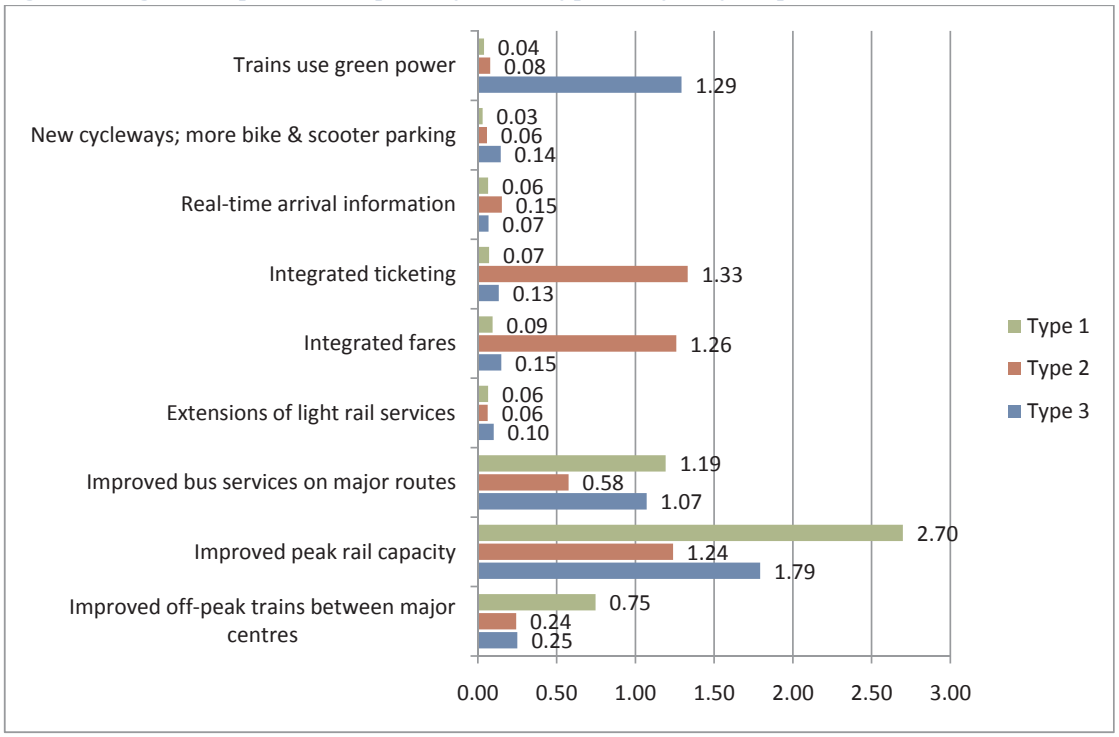


Figure 5 shows that subgroup 2 only just prefers integrated fares and ticketing to improved peak rail capacity. It is also important to note that although around 25% of respondents believe integrated ticketing and fares should receive higher priority than other improvements, these people cannot be easily identified in terms of their sociodemographic characteristics or use of transport. For instance the first group (prioritising improvements in peak rail services, off-peak rail services and bus services) is not 'more male' or 'more female': half of men and half of women fall into that group. The only difference by gender is that whilst 31% of women are in group three (valuing peak rail and green power), only 18% of men are in that group. Thus, men are slightly more likely to value integrated ticketing and fares whilst women are slightly more likely to value green power and peak rail.

> ***Compared to the approximately one half of respondents for whom improvements in rail and bus services are top priorities, the 25% of respondents who had green power for rail and better peak rail services as top priorities were slightly more female, whilst the 27% of respondents who put integrated fares and ticketing as top priorities had slightly higher levels of education and tended to use trains and buses more.***

It may be the case that the three groups are quite distinct in terms of where they live and/or work, but the current sample size of 1200 provides too few people in postal codes or suburbs to give statistically reliable or accurate results.

Conclusions

There is a widespread belief (*among both users and non-users*) that improvements in peak rail, bus and off-peak rail services should receive the highest priority. As expected, people who favour improvements in off-peak services also tend to favour improvements in peak services. Although there appear to be three distinct subgroups of respondents with different priorities, these groups are fairly evenly distributed across age groups, income levels, type of employment, marital status etc. In terms of public policy, these results suggest that:

- As a first priority, improvements to peak rail services will be attractive to everyone.
- As a second (and third) priority:
    - improvements to off peak rail and bus services would be attractive to around half of the population, whereas
    - introduction of integrated fares and ticketing would appeal to around one quarter of the population, whereas
    - using green power for all trains would appeal to the remaining one quarter of the population.
- Failure to satisfy all three of the above groups would not hit particular sociodemographic groups of the population harder than others.

Chapter 4 – Willingness to pay for short-term improvements

Aim

The aim of this study was to understand which of the short-term improvements described earlier citizens are willing to pay for.

Table 1 (reproduced):Short-term improvements to Sydney transportation network

Name of Improvement		*Detailed Information About The Improvement*
1.	**More frequent off-peak trains between major centres**	Between 7am & 7pm trains will run every 10 minutes to/from the City and 1) Chatswood, 2) Bondi Jct, 3) Parramatta & 4) the Airport
2.	**Improved peak rail capacity**	There will be 20% more peak hour trains with improved capacity on all major routes
3.	**More frequent bus services on major routes**	Between 7am & 7pm buses will run every 6 minutes to/from the City and 1) Bondi Beach, 2) Dee Why, 3) Top Ryde, 4) University of New South Wales & 5) Leichardt AND Between 7am & 7pm buses will run every 10 minutes to/from Parramatta Interchange and 1) Castle Hill, 2) Rouse Hill (T-Way) & 3) Liverpool (T-Way)
4.	**Extensions of light rail services**	Light Rail will be extended from Lilyfield to Dulwich Hill on the goods line & from Central Station to Barangaroo along Sussex Street
5.	**Integrated fares**	The fare structure will be simplified by removing penalties for transferring between modes (eg, bus to rail; ferry to bus; rail to light rail, etc)
6.	**Integrated ticketing**	A smart card system will be used to let people pay automatically on entering a station or boarding a bus, ferry or light rail service, eliminating the need to buy tickets
7.	**Real-time arrival information**	Real-time information (also available on smartphones) about arrivals posed in all stations, light rail stops & busiest 200 bus stops that display the actual arrival time of the next service
8.	**New cycleways; more bike & scooter parking**	500 km of new, safe cycleways across the Sydney Metro Area + at least 5km additional in each local government area; 5,000 secure bike & scooter spaces provided across Sydney, especially at train stations, major bus stops & town centres
9.	**Trains use green power**	All trains and light rail lines converted to use clean, green electricity

Methods

This second discrete choice experiment presented 16 scenarios, one at a time to a randomly chosen subsample of 1200 people from the PureProfile online panel. Each respondent was given a particular set of three of the above nine improvements that remained constant for all 16 questions in order not to over-burden him/her. While the three improvements a respondent faced was held constant, the scenarios varied the amounts payable to achieve the improvements under four payment mechanisms: fares, tolls, congestion charges and a transport levy (tax). Respondents were randomised to one of 48 versions of this discrete choice experiment, and the particular package of three improvements varied systematically across the versions according to an experimental design. Levels of petrol prices also were varied by version, from 'as it is now' up to 'a price of $3 to $3.50 per litre'. In this way, by aggregating across different versions, respondents' average willingness to pay for each of the nine improvements can be estimated. Respondents were asked whether they would vote for or against such a package in each case. They also were asked if they would make

more/fewer trips by public transport compared to the past 7 days if the scenario actually came to pass. The instructions and an example question from one of the 48 versions is presented below.

Q13. Now we will show you several types of public transport improvements that could be put in place in the Sydney Metropolitan Area in the next 3-5 years. Naturally, there are costs associated with these improvements or enhancements, and these costs have to be recovered from fares, tolls and/or taxes. Thus, each combination of improvements has an associated set of costs that everyone will have to pay in the form of taxes (levied on every household in Sydney) as well as extra fees that you may or may not have to pay, depending on whether you use public transport and/or you drive your own vehicle.

We want you to think about the improvements and associated costs, and tell us two things:

1. If a vote was held, would you actually vote in favour of the combination of improvements shown and pay the amount(s) shown?
2. Would the combination of improvements change how much you use public transport?

Before evaluating the public transport improvements, please read the following information about what planning experts think is likely to happen in Sydney in the next 5 years:

Over the next 5 years Sydney's population is expected to increase by 5%. Currently, Sydney has 4.3 million people, and this would add 215,000 people. If trends continue as they have for the past decade or more, this population increase is likely to lead to more traffic congestion and slower travel times on streets, roads and highways. It also will lead to more pollution and carbon emissions. Improvements to the public transport system may be able to reduce some of the growth in traffic and congestion, and lessen the amount of pollution and carbon emissions. Naturally, this will occur only if people choose to use the public transport system. You also should expect petrol prices to be **$2.50-$3 per litre** during this period.

The purpose of the following questions is to understand if Sydney residents will use public transport less than they do now, about the same as they do now or more than they do now if a combination of improvements is put in place.

Please click on " >> " to continue.

<< >>

Set 2 of 16:

Costs you will pay if the improvements are in place in the next 3-5 years	1. Improved off-peak trains between major centres 2. Improved peak rail capacity 3. Improved bus services on major routes
Additional Public transport fares (includes travel passes)	• same as now
Additional Tolls on Harbour bridge/toll roads (motorways)	• **increase by $0.70** per trip
Congestion charge to drive vehicles into Sydney Central Business District (but not if bypassing the city centre on the Eastern/Western Distributors or Cross-City Tunnel)	• **increase by $3** per trip
Transport Levy per household/year (property, rego, etc)	• **increase by $35** per year

*You also should expect petrol prices to be **$2.50-$3 per litre** during this period.*

If you want to review some terms, please click here

I would most likely

( ) Vote for these improvements ( ) Vote against these improvements

Think again about the number of trips you said you made on public transport in the last 7 days, if these improvements had been available when you made those trips, what would you have most likely done? (Please select one answer only)

( ) make **fewer** public transport trips ( ) make **same** number of public transport trips ( ) make **more** public transport trips

How many FEWER public transport trips would you make? (Please select one answer only)

( ) 1 ( ) 2-3 ( ) 3-5 ( ) more than 5

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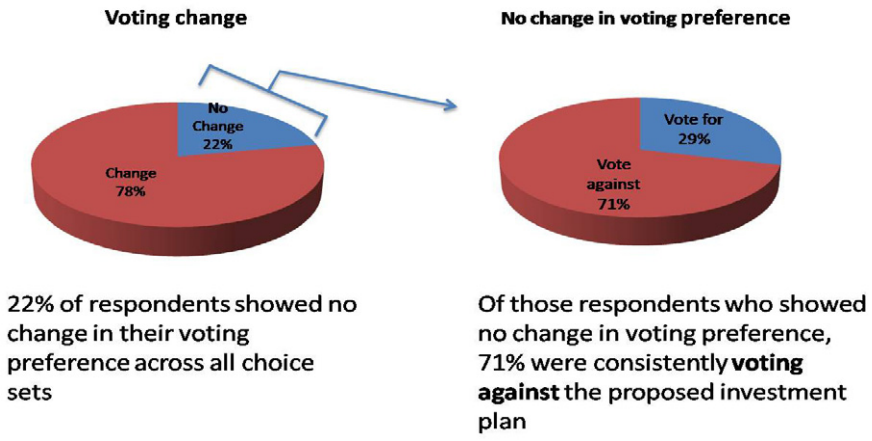
Results

Figure 6 presents the overall voting results. The first chart shows that a large majority of respondents changed their vote according to what improvements were offered and how much they had to pay for them.

Figure 6: voting behaviour



Approximately 15% (71% of 22%) of respondents consistently voted against the proposed improvements. The fares, tolls, etc, presented to respondents did *not* represent the cost of providing the improvements on offer. They merely provided a common denominator – money – that allowed us to infer the value that an individual associates with each improvement. In particular, we calculated what economists call the "willingness to pay" for each improvement, which is the change in money required to compensate for a difference in improvements or a difference in other charges. Policy makers can compare this with the cost of providing the improvement: provided the cost does not exceed the willingness to pay then providing it should be politically acceptable (as well as beneficial to society).

Average willingness to pay for individual improvements when funded by one method only

Tables 3 through 6 present the **mean** willingness to pay (WTP) for each short-term improvement.

Table 3: Average additional amount on a single ticket that the public are willing to pay for each of the 9 improvements

Improvement	$
More frequent off-peak trains between major centres	$ 0.74
Improved peak rail capacity	$ 0.73
More frequent bus services on major routes	$ 0.72
Extensions of light rail services	$ 0.43
Integrated fares	$ 0.46
Integrated ticketing	$ 0.50
Real-time arrival information	$ 0.39

18

New cycleways; more bike & scooter parking	$ 0.53
Trains use green power	$ 0.71

The value of off-peak rail, peak rail and buses is apparent. There also is a very high willingness to pay for trains to use green power; however, when funding is recouped through other payment mechanisms (tolls, congestions charges or tax) green power is no longer a top priority. It should be noted that these figures are averages (not the median) and are relevant when each of the nine improvements is funded entirely by additional fares. Results when funded entirely by one of three other payment mechanisms – tolls, congestion charges or tax – are presented below.

Table 4: Average additional toll that the public are willing to pay for each of the 9 improvements

Improvement	$
More frequent off-peak trains between major centres	$ 1.40
Improved peak rail capacity	$ 1.39
More frequent bus services on major routes	$ 1.37
Extensions of light rail services	$ 0.82
Integrated fares	$ 0.87
Integrated ticketing	$ 0.96
Real-time arrival information	$ 0.74
New cycleways; more bike & scooter parking	$ 1.00
Trains use green power	$ 1.35

Table 5: Average congestion charge that the public are willing to pay for each of the 9 improvements

Improvement	$
More frequent off-peak trains between major centres	$ 7.68
Improved peak rail capacity	$ 7.58
More frequent bus services on major routes	$ 7.48
Extensions of light rail services	$ 4.49
Integrated fares	$ 4.75
Integrated ticketing	$ 5.25
Real-time arrival information	$ 4.04
New cycleways; more bike & scooter parking	$ 5.49
Trains use green power	$ 7.37

Table 6: Average additional tax (per household per annum) that the public are willing to pay for each of the 9 improvements

Improvement	$
More frequent off-peak trains between major centres	$ 25.45
Improved peak rail capacity	$ 25.14
More frequent bus services on major routes	$ 24.81
Extensions of light rail services	$ 14.88
Integrated fares	$ 15.74
Integrated ticketing	$ 17.40
Real-time arrival information	$ 13.41
New cycleways; more bike & scooter parking	$ 18.20
Trains use green power	$ 24.44

The above figures represent the average willingness to pay, and averages can conceal important differences. The other two choice experiments successfully identified 'types' of Sydney residents; each type valued different things and voting/choosing differently. Each respondent's values (how much benefit (s)he gained from a feature of the transport scenario on offer) could be estimated. Unfortunately, in this case the need to value so many improvements by so many payment mechanisms (with their associated levels) meant that it was not possible to estimate stable individual level willingness to pay figures. In particular, in order to fully identify and obtain reliable estimates of preferences and tradeoffs we had to vary sets of improvements and possible future petrol price levels across survey versions rather than within survey versions. In turn, this means that we cannot determine individual differences in preferences for these variables; we only can identify sample aggregate responses to them. Thus, below we present the percentages of respondents who will support each of the most popular transport improvement plans.

Short-Term Improvement Scenario Results

Table 7 below summarises the short-term improvement results by bands of respondent support. Each band covers a particular percentage interval, and all bands are 10% intervals, except for Band 8 which covers 70%-84%. The average vote percentage (proportion) is in the shaded column; each row refers to a band of support. Hence, row one is the band that applies to 70%+; the bottom row is the band of 0% to 9.99%. The table can be used to understand what cost levels and short-term improvements are associated with a particular level of support (band of Average Vote Percentage). So, for example, to achieve 75% vote, petrol prices would typically be around $2.50, the additional fare charged to use public transport would be 17 cents, the additional toll on the Harbour Bridge and toll roads would be 45 cents, there would be a congestion charge to enter the City of $2.29 and each household would be charged an annual transport levy of $1.67. Each other row in the table can be read in the same way. For example, to achieve approximately 54% of the vote, petrol prices would be around $2, there would be an increase in public transport fare of 21 cents, the bridge and toll roads tolls would increase by 47 cents, the congestion charge would be $4.08, and the annual household transport levy would be around $10.60. It is worth noting that higher voting percentages are associated with improvements in off-peak trains, peak rail capacity and improved bus services; there is a minority strongly in favour of green power for trains.

Table 7: Typical characteristics of plans in each of a number of bands defined by average support (voting %)

Ave Vote%	Cost Variables					Short-Term Improvements – Percent of Scenarios that have this Improvement Present								
	petrol prices	+ PT fares	+ bridge tolls	Con-gestion chgs	Transp levy per HH	Improve off-peak trains	Improve peak rail capacity	Improve bus services	light rail	Inte-grate fares	Inte-grate ticketing	Real-time arrival info	Cycle ways bike parking	Green power trains
0.75	2.50	0.17	0.45	2.29	1.67	0.57	0.48	0.52	0.29	0.1	0.33	0	0.29	0.43
0.63	1.91	0.19	0.47	3.16	6.84	0.35	0.37	0.37	0.23	0.35	0.35	0.18	0.39	0.42
0.54	2.06	0.21	0.47	4.08	10.62	0.37	0.37	0.39	0.29	0.29	0.27	0.36	0.3	0.35
0.44	2.21	0.24	0.47	4.08	28.26	0.31	0.33	0.32	0.35	0.33	0.36	0.33	0.31	0.37
0.34	1.77	0.22	0.50	4.50	42.38	0.41	0.38	0.34	0.36	0.33	0.25	0.34	0.26	0.33
0.24	1.83	0.21	0.58	5.13	64.33	0.3	0.32	0.32	0.3	0.35	0.35	0.39	0.37	0.29
0.14	1.84	0.29	0.64	5.06	90.73	0.28	0.26	0.29	0.39	0.38	0.36	0.34	0.39	0.3
0.06	1.73	0.25	0.55	5.68	96.35	0.22	0.22	0.24	0.49	0.35	0.46	0.38	0.35	0.3

We now graphically illustrate the trends in each cost variable by graphing them one-at-a-time. We note however, that they are strongly correlated, such that they can be thought of as packages. For example, as petrol prices increase respondents were less willing to pay additional public transit fares or bridge and roadway tolls or a transport levy; however, they were willing to pay higher congestion charges, which may imply that if public transit is improved and provided at little additional cost to now, they would use it and so not have to pay congestion charges.

Proportions of voters are given on the x-axis, the blue symbols are the averages (labelled "mean"), the green symbols are the upper bound of the 95% confidence interval and the red symbols are the lower bound of the 95% confidence interval associated with the values in the table shown on the graph.

Figure 7: Support for increases in the price of a single ticket

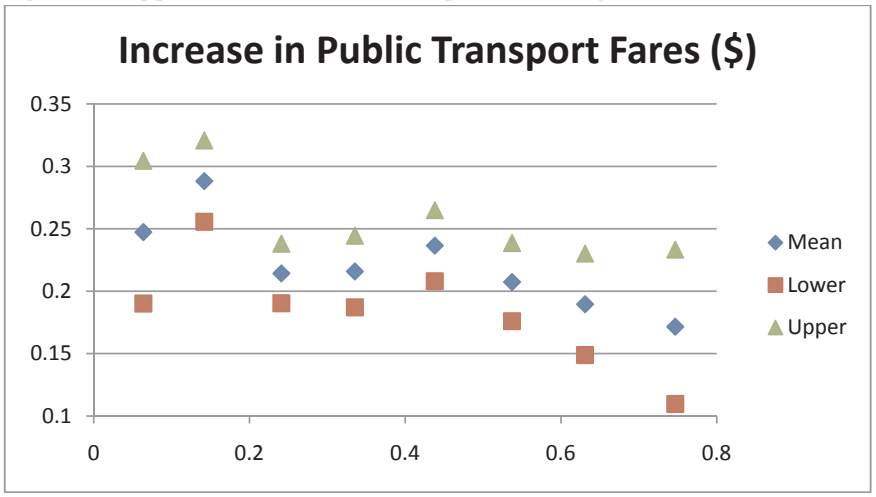


Figure 8: Support for increases in tolls

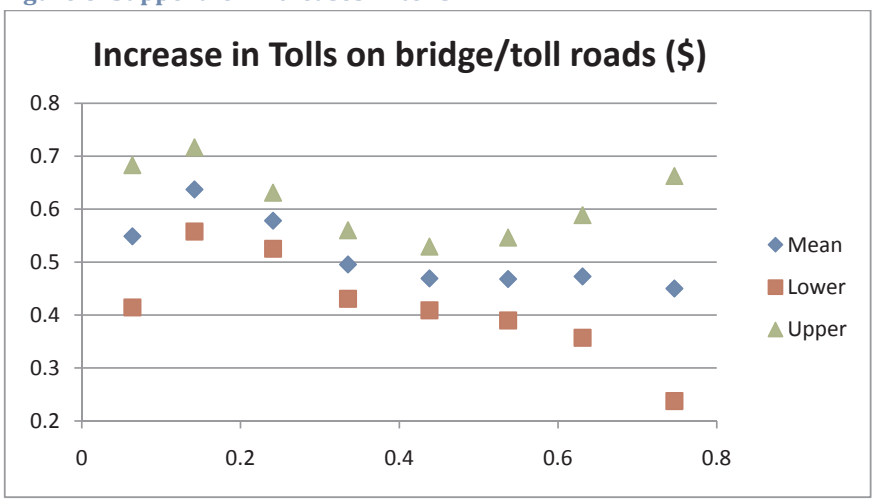


Figure 9: Support for congestion charges to drive in CBD

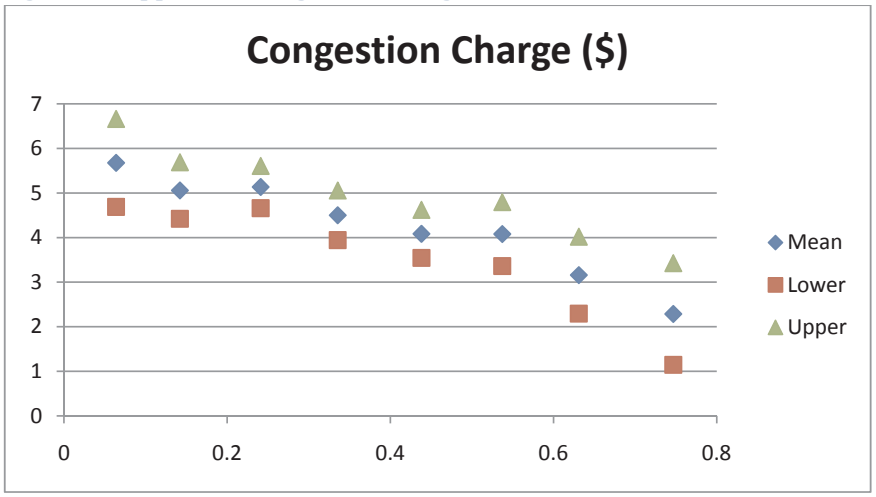


Figure 10: Support for petrol prices

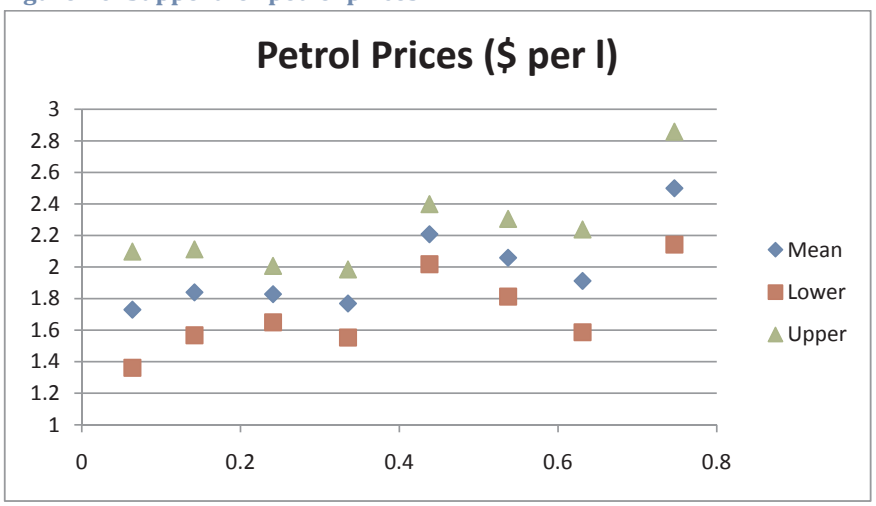
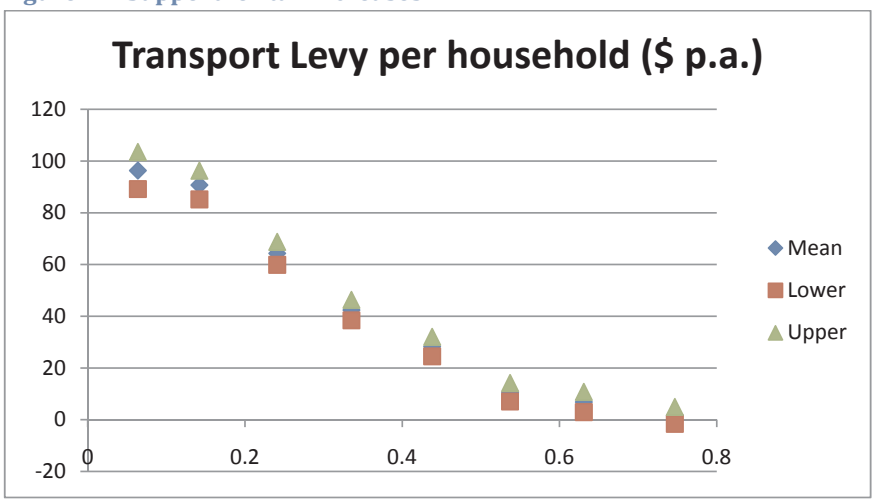


Figure 11: Support for tax increases



Finally, Tables 8 and 9 present some characteristics of the most popular packages of improvements, together with what respondents were asked to pay for them.

Table 8: Transport plans likely to receive over 75% support in a referendum

Vote	Petrol /L	Transport fares	Tolls on bridge/roads	Congestion charge	Transport levy	Improve 1	Improve 2	Improve 3
84%	$1.50-$2	Same as now	+$1.05	Same as now	Same as now	Off-peak trains	New cycleways	Green power trains
80%	$1.50-$2	+$0.30	Same as now	+$3/trip	Same as now	Off-peak trains	New cycleways	Green power trains
80%	$2.50-$3	+$0.30	Same as now	+$3/trip	Same as now	Off-peak trains	Peak rail capacity	Bus services
80%	$2.50-$3	+$0.30	Same as now	+$3/trip	Same as now	Peak rail capacity	Integrate ticketing	Green power trains
76%	$1.50-$2	Same as now	+$1.05	Same as now	Same as now	Off-peak trains	Peak rail capacity	Bus services
76%	$1.50-$2	+$0.30	Same as now	+$3/trip	Same as now	Off-peak trains	Peak rail capacity	Bus services
76%	$2.50-$3	+$0.15	+$0.35	+$9/trip	Same as now	Off-peak trains	Peak rail capacity	Bus services
76%	$2.50-$3	+$0.30	Same as now	+$3/trip	Same as now	Off-peak trains	New cycleways	Green power trains
76%	$3-$3.50	+$0.30	Same as now	+$3/trip	Same as now	Off-peak trains	Peak rail capacity	Bus services

The results in Table 8 are notable in several ways. First, although none of the plans involves a tax increase, 7 of the 9 plans involve a congestion charge for driving into the CBD. Second, the three improvements that are most popular in the first discrete choice experiment (improvements in off-peak and peak rail and buses) also receive strong support in this experiment. Extensions to light rail services, integrated fares and real-time arrival information are not present in any of the highly popular plans. Finally, all the plans are characterised by increased petrol prices.

Table 9: Transport plans likely to receive between 70% and 75% support in a referendum

Vote	Petrol /L	Transport fares	Tolls on bridge/roads	Congestion charge	Transport levy	Improve 1	Improve 2	Improve 3
72%	$2.50-$3	+$0.15	+$0.35	+$9/trip	Same as now	Bus services	Light rail services	Integrate ticketing
72%	$1.50-$2	+$0.30	+$0.35	Same as now	+$35/year	Off-peak trains	New cycleways	Green power trains
72%	$2.50-$3	Same as now	+$1.05	Same as now	Same as now	Peak rail capacity	Integrate ticketing	Green power trains
72%	$3-$3.50	+$0.30	Same as now	+$3/trip	Same as now	Bus services	Light rail services	Integrate ticketing
72%	Same as now	Same as now	+$1.05	Same as now	Same as now	Bus services	Light rail services	Integrate ticketing
72%	$3-$3.50	Same	+$1.05	Same as now	Same as now	Bus services	Light rail services	Integrate ticketing
72%	$3-$3.50	Same as now	+$1.05	Same as now	Same as now	Off-peak trains	Peak rail capacity	Bus services
72%	$3-$3.50	+$0.30	Same as now	+$3/trip	Same as now	Peak rail capacity	Integrate ticketing	Green power trains
72%	$2.50-$3	Same as now	+$1.05	Same as now	Same as now	Off-peak trains	New cycleways	Green power trains
72%	$1.50-$2	Same as now	+$1.05	Same as now	Same as now	Off-peak trains	Light rail services	Integrate fares
72%	$3-$3.50	+$0.30	Same as now	+$3/trip	Same as now	Peak rail capacity	Light rail services	New cycleways
72%	$3-$3.50	+$0.30	Same as now	+$3/trip	Same as now	Bus services	Integrate fares	Green power trains

These plans are again heavily dominated by higher petrol prices and no increase in tax. Generally fares or tolls or congestion charges should be maintained at current levels (zero in the case of the latter). Since petrol prices appear to be important in determining support for the improvements, the main findings will be summarised with respect to the various future prices of petrol. The full results, containing the percentage of Sydney residents who would support each plan, is given in a separate appendix. Of 768 distinct plans varied in the survey, 167 produced a majority in favour of the plan.

Leaving petrol prices and taxes unchanged

When petrol prices and taxes remain unchanged, policy makers generally have several alternative funding options that would gain majority support:

- Increase tolls by $1.05, leave fares unchanged and no congestion charge
- Increase tolls by $0.35, increase fares by $0.15 and introduce a $9 congestion charge
- Leave tolls unchanged, increase fares by $0.30 and introduce a $3 congestion charge

Any of these sets of funding packages would be acceptable to the public, if used to fund three of the nine improvements.

Rises in petrol prices

If petrol prices were to rise to $1.50-$2 per litre, there would be support for a tax increase of $35 per annum, provided fares ***or*** tolls ***or*** a congestion charge remained at the current levels. Again, however, there is greater public support when the burden of funding does not fall on tax at all. Even higher petrol prices ($2.50 upwards) again increase the number of improvement packages that would receive majority support, even with a tax rise. However, as before, respondents generally prefer to fund improvements from some mixture of tolls, congestion charges and fare increases.

Stated changes in use of public transport if the improvements are made

Respondents were asked if they would make fewer, the same, or more trips on public transport than they do already, if the hypothetical scenario on offer were the case in real life. In other words, the respondent had to consider the set of three improvements on offer, the petrol price, and levels of fares, taxes etc and decide how their use of public transport would change, if at all.

Since there were 48 versions of the discrete choice experiment, each with only 25 respondents answering it, problems of small numbers arise when analysing a given version. Thus, it is important to aggregate across versions so as to reduce the potential for statistical 'noise' to produce misleading results. However, consider what happens when analysing the data for improvement one (more frequent off-peak trains). Since:

- this improvement always occurs with two other improvements
- on average across the versions that have been combined, the additional tolls, congestion charges and taxes being paid are not zero,

then when considering what would happen to usage for various petrol prices and fares we must bear in mind that some people will state 'fewer' trips, *even when fares and petrol prices do not rise*. This is because we have had to include scenarios in which (for instance) tolls, congestion charges and taxes are rising. Therefore, it is *trends* in the data that are important, rather than absolute numbers. This is illustrated in Table 10 below which presents, for various petrol prices and fare increases, the proportion of respondents making fewer/same/more trips by public transport were off-peak rail services to be improved.

Table 10: What would residents do following hypothesised more frequent off-peak trains between major centres given fare changes and petrol prices

Petrol Prices	Fares	More Trips	Same Trips	Fewer Trips
Same as now	same as now	10%	78%	13%
	increase by $0.15 per single ticket	6%	78%	16%
	increase by $0.30 per single ticket	5%	80%	15%

	increase by $0.45 per single ticket	4%	80%	16%

Table 10 demonstrates that the percentage of people making more trips by public transport falls as fares increase. The percentage of people making fewer trips generally increases (with one exception at $0.15 increase in fares). As noted above, we would expect there to be people making fewer trips, even when fares and petrol prices are as now, since these people observe increases in other charges, such as tolls etc, as part of the package on offer. Table 11 presents similar results, but when looking at increases in the price of petrol.

Table 11: Public transport usage following hypothesised more frequent off-peak trains between major centres given fare changes and increased petrol prices

Petrol Prices	Fares	More Trips	Same Trips	Fewer Trips
	same as now	11%	80%	9%
$1.50-$2 per litre	increase by $0.15 per single ticket	9%	83%	9%
	increase by $0.30 per single ticket	10%	82%	8%
	increase by $0.45 per single ticket	8%	82%	11%
	same as now	12%	77%	12%
$2.50-$3 per litre	increase by $0.15 per single ticket	10%	78%	12%
	increase by $0.30 per single ticket	9%	80%	12%
	increase by $0.45 per single ticket	7%	81%	12%
	same as now	16%	71%	13%
$3-$3.50 per litre	increase by $0.15 per single ticket	13%	74%	14%
	increase by $0.30 per single ticket	10%	77%	13%
	increase by $0.45 per single ticket	7%	79%	14%

Again, there is a tendency for people to shift away from public transport as fares increase. However, when looking at a given fare increase at different levels of petrol price, there is some tendency for higher petrol prices to *discourage some people and encourage others* to use public transport: higher petrol prices are probably reducing people's use of transport generally, as well as prompting some respondents to switch from using their car to using public transport. This pattern is observed across the other eight improvements (not reported here).

Conclusions

The average willingness to pay for the nine improvements that could be implemented in the short-term appears large, but conceals significant differences between groups. This study was not designed to provide robust inference for these groups. However, much useful information is provided on which packages of improvements would command majority support. Whilst all nine improvements could potentially do so, residents of Sydney are sensitive to how much they would be asked to pay and what payment mechanism is to be used.

There is relatively strong support for a congestion charge to drive into the CBD but any increase in tax would be unlikely to secure majority support at current petrol prices.

However, if petrol prices were to rise to $1.50-$2 per litre, there would be support for a tax increase of $35 per annum, provided fares ***or*** tolls ***or*** a congestion charge remained at the current levels. Again, however, there is greater public support when the burden of funding does not fall on tax at all.

Responses from the likely future usage question further support the finding that petrol prices are a major determinant of the demand for public transport improvements.

Chapter 5 – Long-term improvements study

Aim

The aim of this discrete choice experiment was to elicit 1200 respondents' willingness to pay for a number of long-term improvements to Sydney's transportation systems. In particular, to estimate how much respondents are willing to pay for two possible future Sydneys – one which invests heavily in public transport and one which invests heavily in roads – relative to a future which largely follows current (low investment) trends.

Methods

The discrete choice experiment presented 8 sets of scenarios (questions); each set offered three possible future Sydneys characterised as 1) a high investment in public transport future, 2) a high investment in roads future and 3) a low investment in both future. An example question is presented below.

Set 1 of 8:

Types of benefits and costs that you would experience if implemented	High Investment in Roads	High Investment in Public Transport	Low Investment in Both
Travel times on roads/motorways	Time taken in mins (now) / Time taken in mins (expected): 10 / 9; 20 / 18; 30 / 27; 60 / 54; 90 / 81	Time taken in mins (now) / Time taken in mins (expected): 10 / 13; 20 / 26; 30 / 39; 60 / 78; 90 / 117	Time taken in mins (now) / Time taken in mins (expected): 10 / 14; 20 / 28; 30 / 42; 60 / 84; 90 / 126
Travel times on public transport	Same as now	Time taken in mins (now) / Time taken in mins (expected): 10 / 9; 20 / 17; 30 / 26; 60 / 51; 90 / 77	Time taken in mins (now) / Time taken in mins (expected): 10 / 11; 20 / 21; 30 / 32; 60 / 63; 90 / 95
Coverage by public transport	Same as now	Much better coverage in off-peak periods and also in Western Sydney and outer suburbs	Same as now
Crowding on public transport	Somewhat more crowded than now	No more than now	Much more crowded than now
* Fares on public transport	Same as now	increase by $0.50 per single ticket; relevant increase applies to other tickets/passes	Same as now
* Tolls on bridge/toll roads	increase by $1.00	Same as now	Same as now
* Congestion charges to drive vehicles into the City	$4	$10	$8
* Parking costs in major centres	Same as now	increase by $10 per day	Same as now
* Taxes per household (property, rego)	increase by $170 a household per year	increase by $135 per household a year	None
* Carbon taxes per litre of petrol	10¢	10¢	10¢

** Prices are in today's dollars and are subject to CPI Increase. If you want to review some terms, please click here*

Petrol prices are expected to be *the same as now*.

Please evaluate the above three transport scenarios and select the one you would vote for.

- ○ High Investment in **Roads**
- ○ High Investment in **Public Transport**
- ○ Low Investment in **Both**

Some attributes were always constant within a particular future; thus, under a high road investment future, the following did not vary:

- travel times on, coverage of, fares and crowding on public transport

Under a high public transport investment future, the following did not vary:

- crowding on and coverage of public transport
- Tolls on roads

Under a low investment future the following did not vary:

- coverage of, crowding on and fares on public transport
- tolls, parking costs
- taxes

Under each possible future, the other attributes could vary (such as travel times on roads under a high road investment future). Respondents were asked to vote for one of the three investment plans. There were 24 versions of the questionnaire that reflected the need to divide a large number of scenarios/questions into a number that respondents can respond to without being overburdened.

Sample level willingness to pay

Willing to pay (WTP) for each of the two 'high investment' futures was calculated for each of the different payment mechanisms. For example:

> *What is the average WTP in **property taxes** to achieve a **high public transport investment** Sydney rather than a low investment Sydney?*
>
> *What is the average WTP in **fare increases** to achieve a **high public transport investment** Sydney rather than a low investment Sydney?*
>
> *...etc... and*
>
> *What is the average WTP in **property taxes** to achieve a **high road investment** Sydney rather than a low investment Sydney?*
>
> *What is the average WTP in **congestion charges** to achieve a **high road investment** Sydney rather than a low investment Sydney?*
>
> *...etc...*

Individual level willingness to pay

The methods above estimate the willingness to pay and voting behaviour for the 'average resident of Sydney'. However, this may not be a meaningful concept because we might be averaging across 'apples and oranges'. For instance, there are likely to be at least two distinct groups, one broadly in favour of a roads based future, another broadly in favour of a public transport based future. There also may be a third group who opposes paying for either future and is willing to accept the likely deterioration in congestion and crowding resulting from a continuation of current policies. These two, three (or more) groups are likely to have different willingness to pay for the two high investment futures and would be likely to vote differently, depending on:

- which option(s) were put to a public vote
- what additional features were to characterise each option (such as whether public transport investment were to be funded primarily out of general taxation or out of user fares)

It would be helpful to policy makers to use this information to ascertain the extent to which any proposed investment in Sydney's transport infrastructure would be acceptable to residents. In other words, is there a majority within key stakeholder groups who are willing to pay for such investment? To identify differences in the sample, we used *scale-adjusted latent class* analysis to identify groups with different preferences. The scale-adjusted latent class approach works by finding subgroups who make similar choices in the sample of 1200 respondents who answered this particular survey. Members of a given subgroup would have broadly similar preferences (in other words, would tend to vote the same way, given the options presented), but different subgroups would vote in different ways (for instance one group tending to vote for heavy investment in public transport, another for heavy investment in roads, etc).

Suppose that the scale adjusted latent class analysis finds two 'types' of people, one favouring investment in public transport, another favouring roads. It provides information on how much alike (or different) each of these two types of respondent are, and provides a measure of how closely each respondent matches one or the other group. Thus, whilst some people, with very strong preferences, will be a '100% pro-roads' or '100% pro-public transport' type person, others may be a mixture. For instance, some people might be 50% pro-roads and 50% pro-public transport. The latter type of respondents typically would have frequently switched their votes between the two investment strategies on offer, depending on perceived value for money and other aspects of the particular plans on offer.

Once it is known how much each respondent is characterised by each 'type' (such as 60:40, 80:20 etc), the results allow us to develop a decision rule for each respondent based on an appropriate mix of the types identified in the analysis. This can be made clear using an artificial example. Suppose a large investment in public transport is proposed. A particular respondent is calculated to be 70% like a pro-roads type and 30% like a pro-public transport type. The analysis adds together:

- 70% of the value a (totally) pro-roads type person derives from such a policy (which is likely to be low, since that type of person dislikes public transport investment) and
- 30% of the value a (totally) pro-public transport type person derives from such a policy (which is likely to be high, since that type of person likes public transport investment

The resulting total value the respondent derives from the proposed investment is compared with that of the low investment option (again, weighted 70/30 to take account of how bad different types of people think that is). We then can predict a respondent's WTP or individual voting behaviour. In particular, the hypothetical 70/30 respondent would be more likely to vote against the investment than someone who is a '100% pro-public transport' person, but not as likely to vote against it as someone who is '100% pro-roads'.

> ***The analysis provides a decision rule – the value derived from every aspect of the proposed investments – for each of the 1200 respondents in the sample. We then calculate how many respondents will vote for any particular proposed investment in Sydney's transportation systems.***

Results

The figures below display the percentage of the overall votes that went to each of the three potential Sydney futures. Figure 12 displays that result for the entire sample; Figures 13-15 present the results for some key demographic groups.

Figure 12: Overall voting behaviour

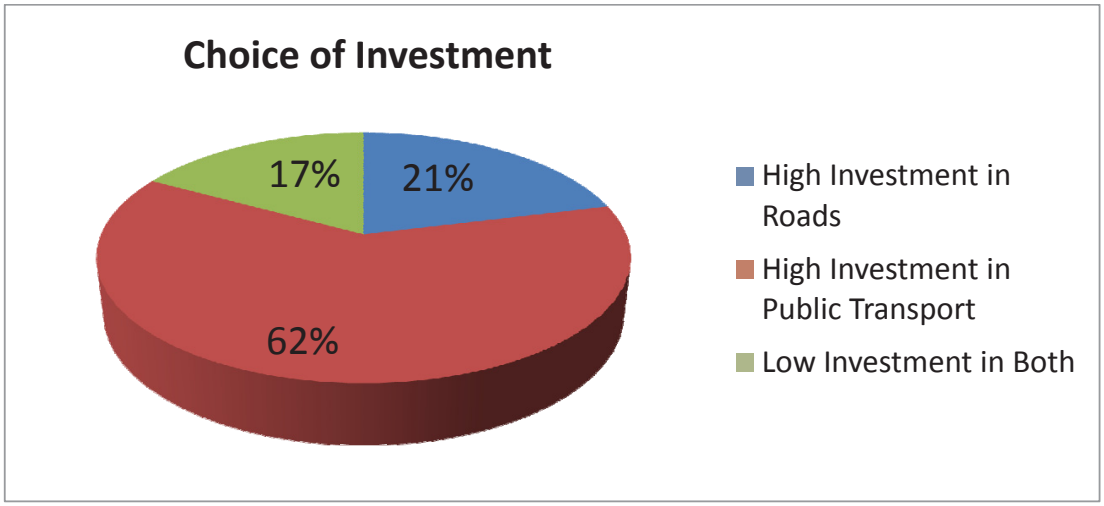


Figure 12 shows that there was strong support for the high investment in public transport future. As shown below, there was little variation across key sociodemographic variables.

Figure 13: Voting behaviour by gender

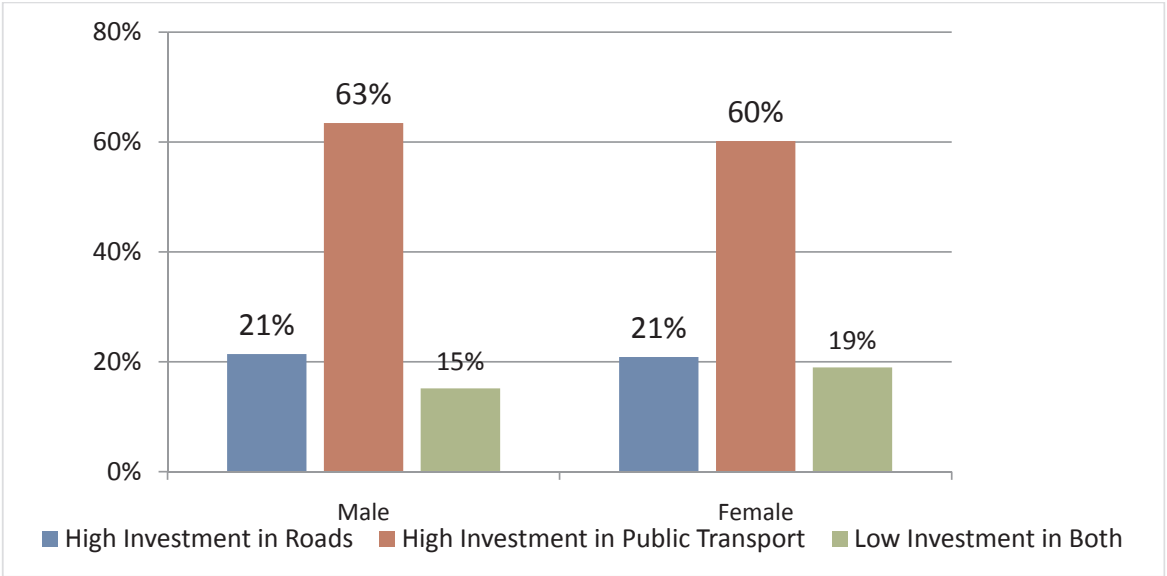


Figure 14: Voting behaviour by age

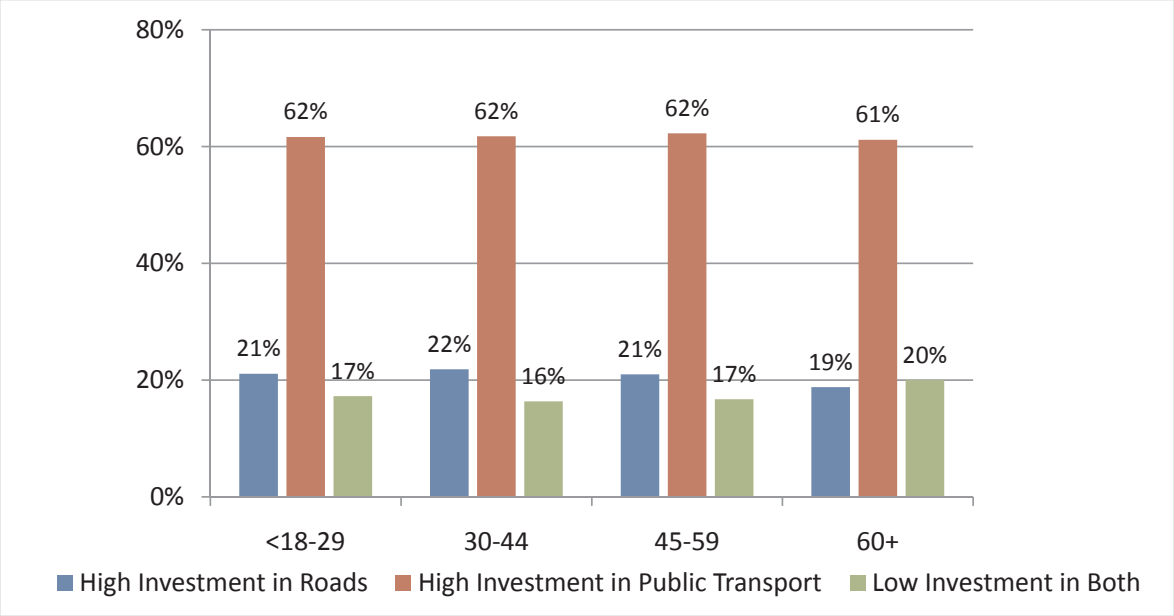
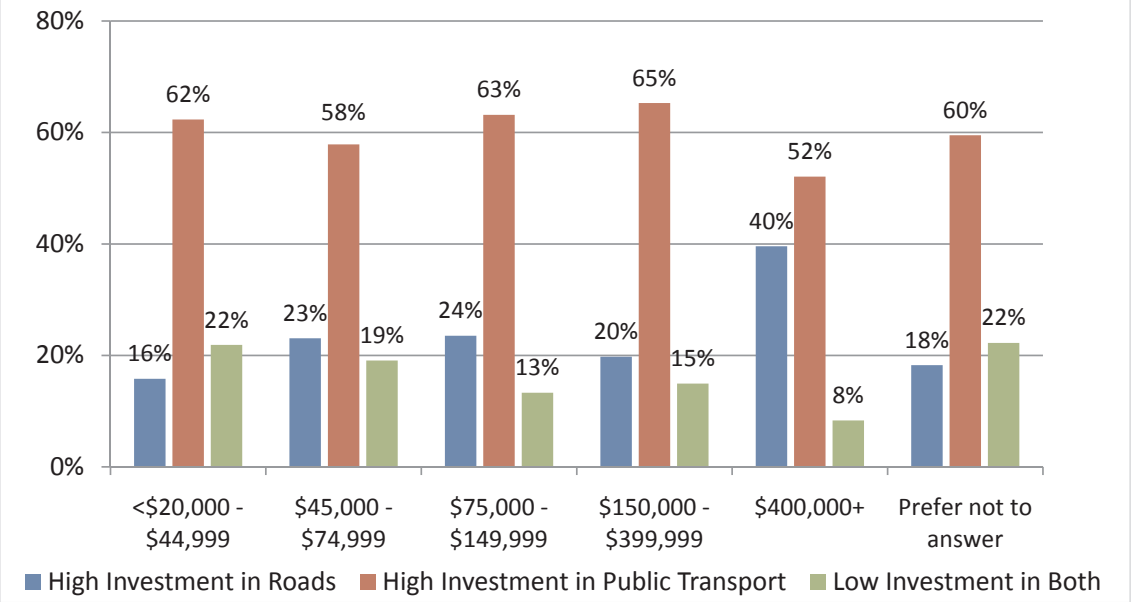


Figure 15: Voting behaviour by household income



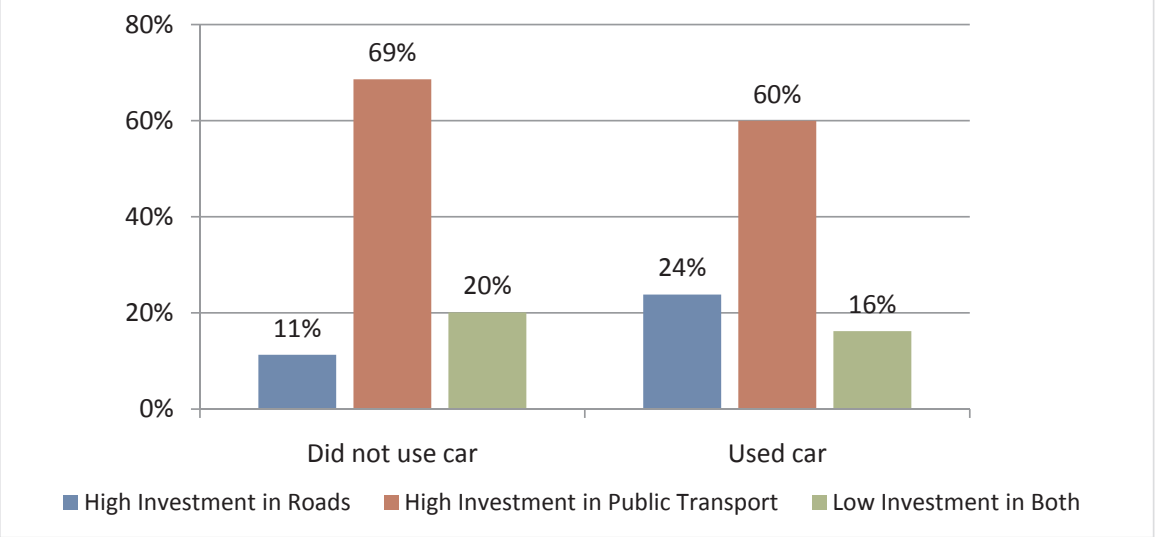
There also was little variation by relationship status or education level.

There does not appear to be substantial disagreement across the main sociodemographic groups as to which long-term investment Sydney should follow.

Own use of trains, buses and cars were the only factors associated with any non-trivial difference in voting behaviour. Support for the high investment in public transport future was:

- 58% (non-users of buses) versus 70% (users of buses)
- 56% (non-users of trains) versus 72% (users of trains)

Figure 16: Voting behaviour by use of car in last 7 days



These results suggest that there is strong support for a future Sydney characterised by high investment in public transport. The next section reports how much the average Sydney resident is willing to pay to achieve either of the two high investment futures.

Average willingness to pay in tax

Table 12 presents the average willingness to pay in tax to achieve:

- a high public transport investment Sydney or,
- a high roads investment Sydney,

and thereby avoid a low investment future.

Table12: Average WTP in tax per annum for alternative Sydney futures to avoid a low investment future

	Public Transport	Roads
Tax	$79.94	$29.30

Respondents were willing to pay more in tax when it is funding heavy investment in public transport than when it is funding heavy investment in roads. These average WTP figures conceal important

differences: most notably, that support for funding of public transport was far more widespread than that for funding roads. The following section reports WTP figures for various proportions of the population, based on individual level data.

Individual level willingness to pay

As already noted, average willingness to pay can be misleading, particularly if there exist subgroups with different preferences. A scale-adjusted latent class analysis discovered three types of respondents:

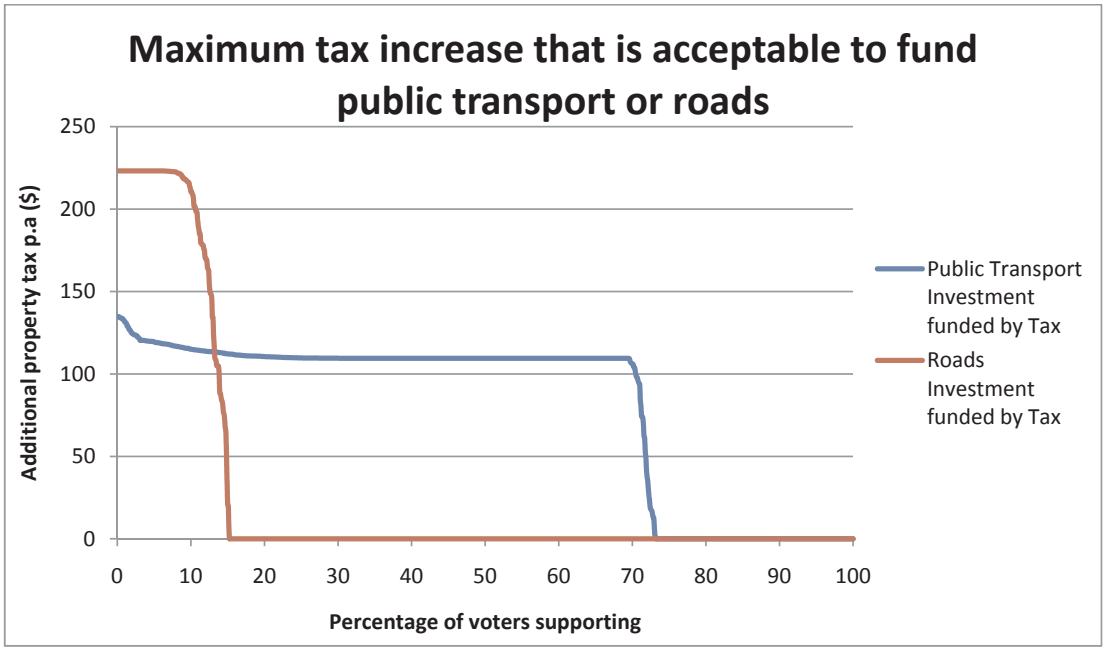
1. The first type, comprising 72% of respondents, was basically in favour a future characterised by high investment in public transport.
2. The second type, comprising 15% of respondents, was basically in favour of a future characterised by high investment in roads.
3. The third type, comprising 13% of respondents, was strongly against paying additional amounts in tax, fares or any charges associated with use of roads. Interestingly the number of respondents characterised as this type is approximately equal to the number of respondents in study 2 who consistently voted against the short-term improvements.

It should be noted that these percentages do not exactly match those in Figure 12. That is because whilst the 13% of 'anti-payment' respondents virtually always voted against both investment plans, they were sometimes joined by 'pro-public transport' and/or 'pro-roads' respondents (typically, when the particular set of improvements and prices were not considered sufficiently good value for money). Similarly, some 'pro-public transport' respondents were willing to endorse a high investment in roads in order to avoid further 'muddling through'. Thus the percentages of all choices provided in Figure 12 have averaged across some plans that 'pro-investment' respondents did not consider good value for money.

The results that follow account for these three groups: thus, for example, getting 60% of Sydney residents to support a large investment in public transport is comparatively easy, providing the amount they are asked to pay does not get too large. However, getting support up to 80% will require the amount they are asked to pay to go down dramatically, in order to attract support from the 'pro-roads' or 'anti-payment' type people.

Figure 17 presents the WTP across the distribution of all 1200 respondents. For example, 60% of the population are willing to pay up to $109.48 in tax (per household per annum) to fund a large investment in public transport, whilst at most, 15% of voters would support any tax to fund road investment.

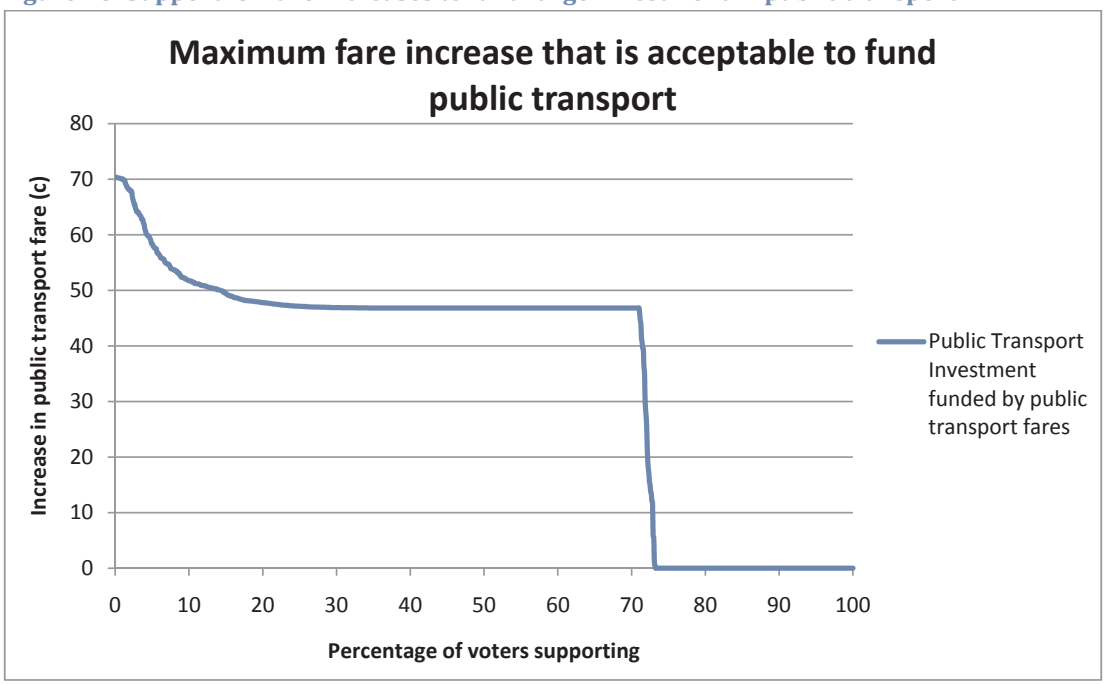
Figure 17: Support for tax increases to fund large investment in public transport or roads



It should be noted that because the model used includes the three different 'types' of respondent, there is no need to split out willingness to pay by group: the results automatically factor in the greater sensitivity of (for instance) 'pro-roads' individuals to tax to fund their less desired future (public transport).

Figure 18 presents the willingness to pay for a high investment in public transport in terms of the additional amount on a single ticket. It can be seen that 60% support should be received for a 46 cent increase in fares, though respondents become highly sensitive to any increases that exceed that.

Figure 18: Support for fare increases to fund large investment in public transport



Figures 19 and 20 present the WTP by carbon taxes or congestion charges. It is important to note that in many cases, these numbers are derived from very small numbers of choices due to the lack of switching; hence, are statistically unreliable. On the other hand, the extreme lack of switching of choices indicates very firm preferences and very consistent choices. In turn, this suggests that the vast majority of respondents in this sample strongly prefer a public transport based future for transport in the Sydney Metropolitan Area.

Figure 19: Support for carbon taxes (cent/l) to fund large investments in public transport or roads

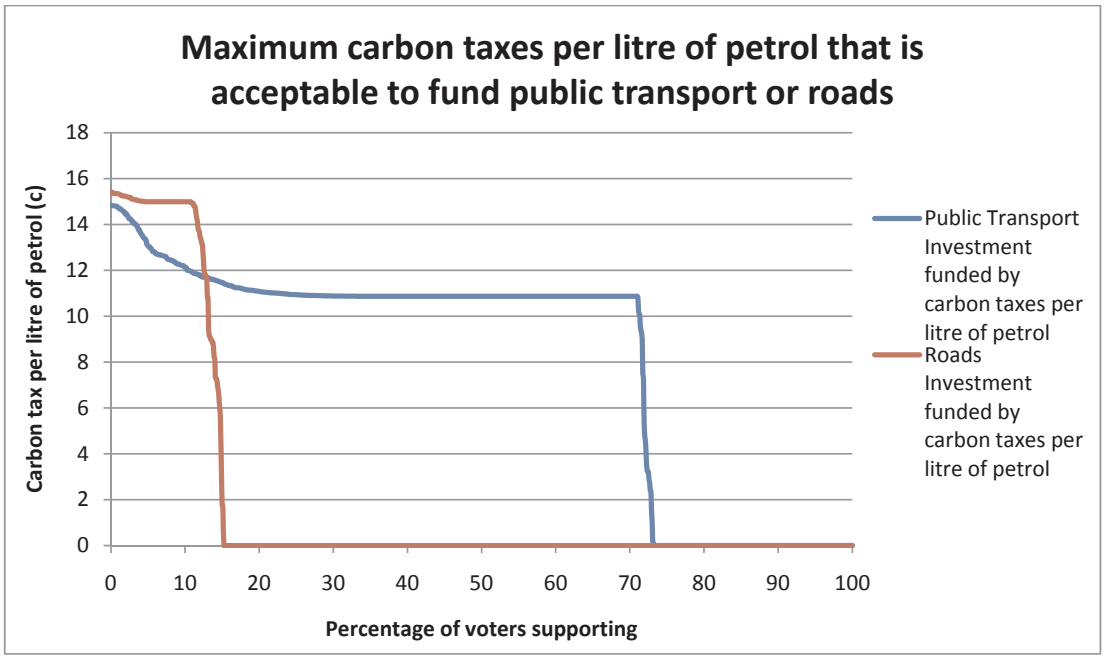
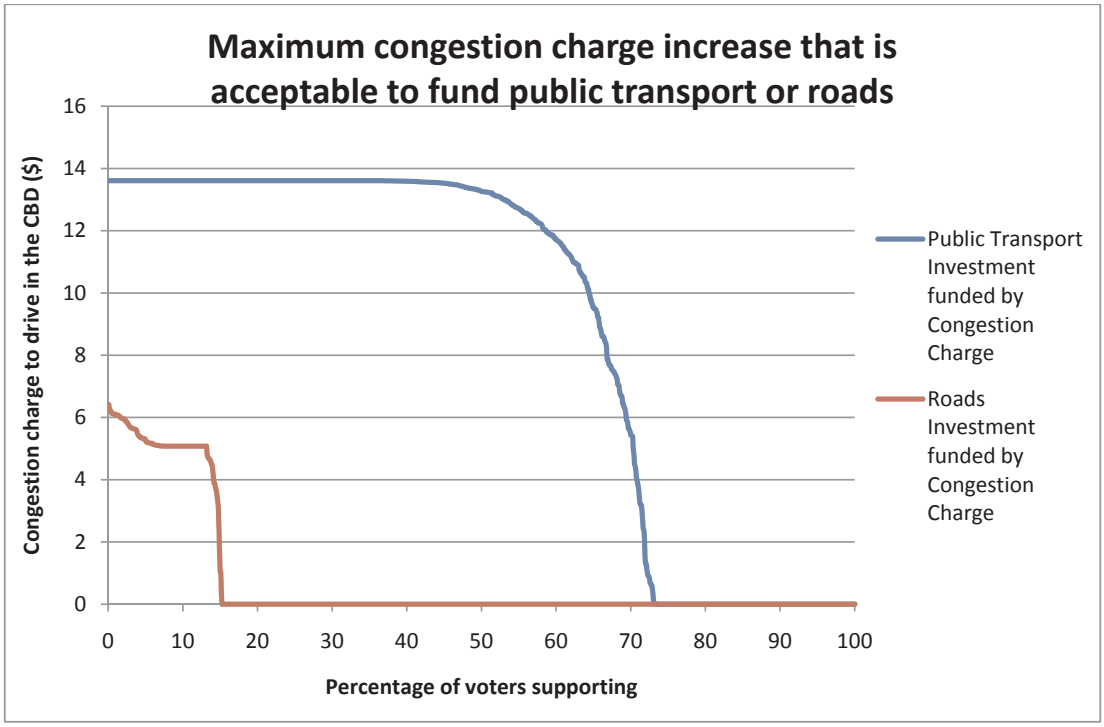


Figure 20: Support for congestion charge to fund large investments in public transport or roads



Figures 21-24 below present the WTP to reduce road travel times by 10% on average. Fare increases and additional parking charges only appear in the public transport based future so there are no comparable figures for a future characterised by large investment in roads. A 60% majority of respondents are generally willing to pay only a cent in additional fares but up to around $1.50 more in parking charges to achieve this.

Figure 21: Support for fare increases to achieve a 10% reduction in driving times in a high investment in public transport future Sydney

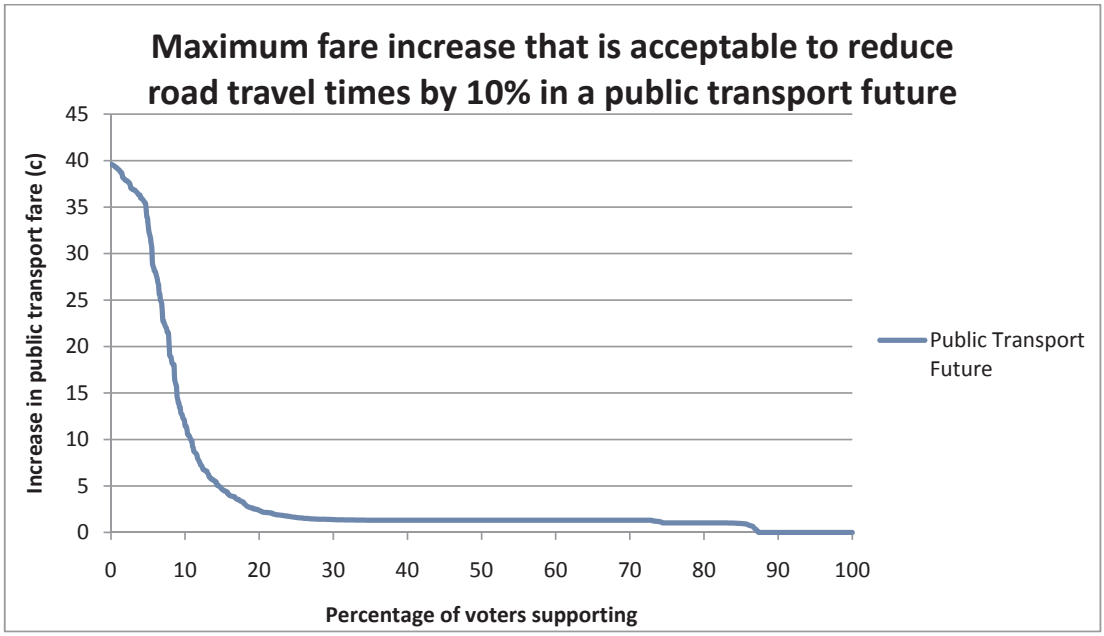


Figure 22: Support for parking charge increases to achieve a 10% reduction in driving times in a high investment in public transport future Sydney

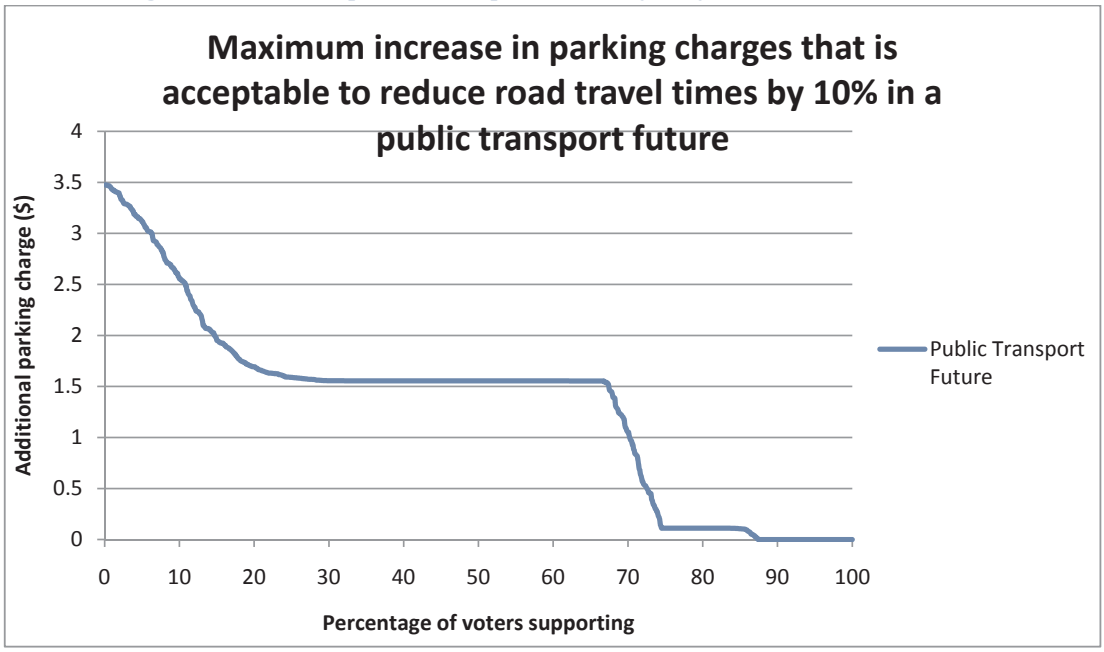


Figure 23 below illustrates that again, respondents are not willing to pay tax to improve roads. There is a 60-80% majority willing to pay $3-$4 in tax to achieve a 10% reduction in average road travel times.

Figure 23: Support for a tax increase to achieve a 10% reduction in driving times

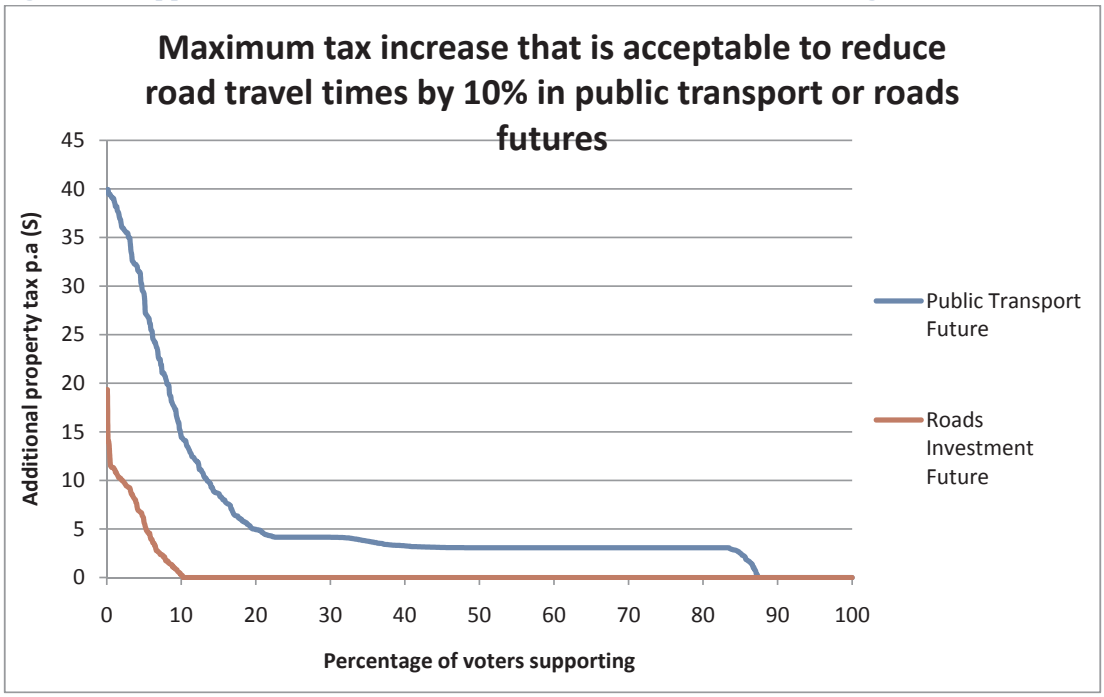


Figure 24: Support for a congestion charge to achieve a 10% reduction in driving times

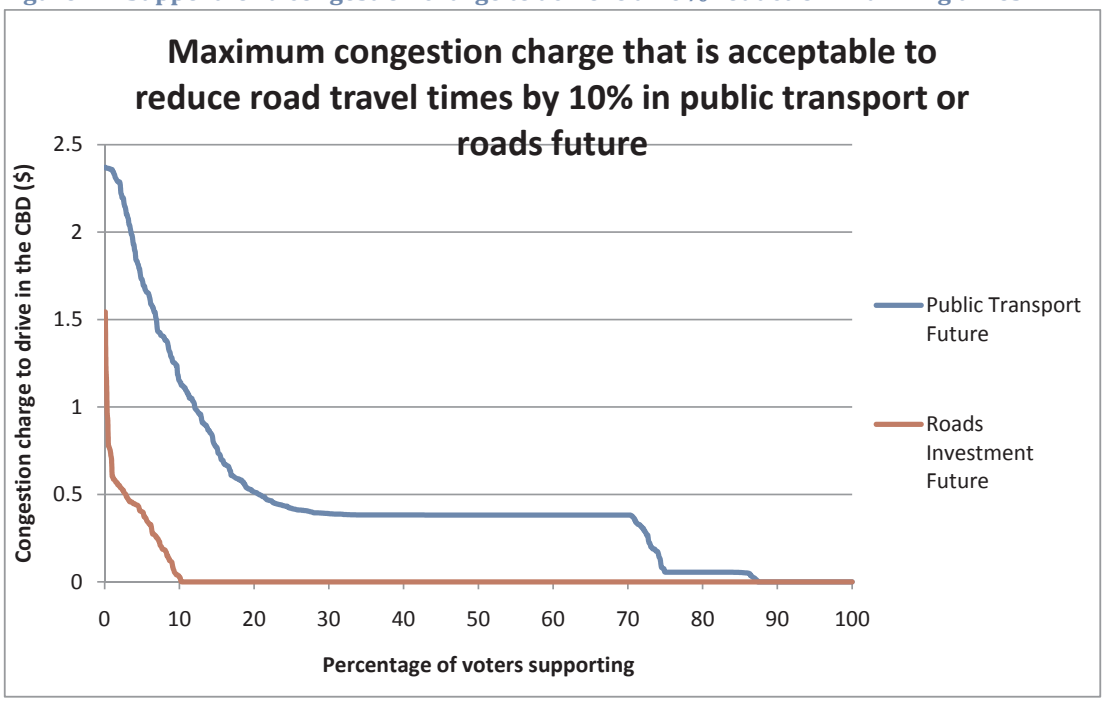


Figure 24 shows the low WTP to achieve a reduction in road travel times in both possible high investment futures. Support for reductions in travel times by public transport in a future characterised by high investment in public transport is not presented because most respondents (certainly those who valued a public transport future) did not choose on the basis of that attribute.

Support for packages of investment

Table 13 below provides information about bands of support (average percentage vote) for long-term investments in public transport. The bands are in 10% increments, except for the band represented by the first row of the table, which includes all scenarios that received greater than 70% vote support. We can simply read off the values in any row to understand the likely combination of costs that would be associated with a particular average vote percentage. For example, the first row pertains to the highest vote support level, namely greater than 70%. To achieve this level of voting support, there would be a 26% increase in travel time on roads, a 20% decrease in public transit travel times, a fare increase of approximately 25 cents, a congestion charge of $4.20, parking costs of $10.20/hour in major centres, a public transport levy per household per year of $132 and a carbon tax on petrol of 7 cents per litre. All other rows can be read in the same manner.

Table13: Typical characteristics of PT investment packages characterised by various levels of voter support

Choice Band	PT Vote	PT road time	PT pt time	PT fares	PT congest	PT parking	PT prop tax	PT carb tax	Petrol price
1	0.52	0.25	-0.20	0.38	7.46	7.19	157.70	0.08	3.11
2	0.58	0.25	-0.20	0.36	7.17	6.93	160.67	0.07	2.28
3	0.65	0.26	-0.20	0.35	6.85	6.92	148.05	0.08	3.69
4	**0.73**	**0.24**	**-0.20**	**0.31**	**6.50**	**7.06**	**140.83**	**0.07**	**2.62**
Overall Average	0.62	0.25	-0.20	0.35	7.00	7.00	152.50	0.08	2.94

There are trends in the data evident in Table 13, with the band of highest average support for public transport shown in bold in the table. For example, voting percentages show little to no systematic relationship with petrol costs and parking costs and are relatively flat in travel times on roads and public transport. There is evidence of a systematic trend in a) fares, with lower fares associated with higher voting percentages, b) congestion charges, with lower congestion charges associated with higher vote percentages, and c) property and rego taxes, with higher voting percentages associated with lower tax levels.

Table14: Typical characteristics of All investment packages characterised by various levels of voter support for PT (showing only variables with systematic effects on PT vote)

Choice Band	PT Vote	PT fares	PT congest	PT proptax	Roads time	Roads tolls	Roads proptax
1.00	0.52	0.38	7.46	157.70	0.01	1.47	144.46
2.00	0.58	0.36	7.17	160.67	0.01	1.50	150.75
3.00	0.65	0.35	6.85	148.05	0.01	1.51	153.39
4.00	**0.73**	**0.31**	**6.50**	**140.83**	**0.02**	**1.65**	**162.22**
Overall Average	0.62	0.35	7.00	152.50	0.01	1.53	152.50

As in Table 13, we highlight the highest choice band. The interpretation of public transport (PT) fares, congestion tax (PT congest) and property/rego tax (PT proptax) is the same as in Table 13. The last three columns in Table 14 indicate that there also are systematic effects associated with three variables that were varied under the Long-Term Investment in Roads packages. These variables are travel times on roads (Roads time), tolls on bridges and motorways (Roads tolls) and property/rego tax for roads investments (Roads proptax). As average travel times on roads increases in roads investment scenarios, there is a slight trend to vote for public transport (the figures in the table are rounded, three digits shows a trend), as the average cost of tolls increases in roads scenarios, there is a trend to a higher vote for public transport and as the property/rego tax amounts increase in roads scenarios, there is a trend towards voting more for public transport. There were no other systematic trends evident in the data.

Conclusions

When considering long-term improvements that involve major capital projects (which have the potential to change Sydney into a far more public transport based city), respondents are willing to pay in tax;

> ***There is a solid majority of at least 60% of respondents who are willing to pay via tax, fares, congestion charges or carbon taxes to fund a large investment in public transport. There is only a small minority who are willing to pay for large-scale investment in Sydney's road network.***

Sydney residents' willingness to pay for incremental improvements in journey times is (unsurprisingly) small. The percentages who would support a given increase take into account the three different types of resident in Sydney:

- 72% who are basically 'pro public transport',
- 15% who are 'pro roads'
- and the remaining 13% who dislike paying for anything.

These findings should be encouraging to policy makers: a majority of residents strongly desires, and is willing to pay for, large changes to Sydney's public transportation networks and services. Considerable care was taken to ensure that the behaviour of individual respondents in the sample was properly modelled: what it took to make each type of Sydney resident 'switch' to one of his/her less preferred options was naturally accounted for in the analyses.

> ***Policy makers can be reassured that these strong preferences cut across age, gender and other sociodemographic divides.***

Appendix 3

Fitness for duty: The capabilities of double and single deck rolling stock

In recent years the proposition has periodically been advanced that single deck trains—sometimes dubbed "metro style" trains—can provide more capacity for Sydney's metropolitan railways than double deck trains.

The ostensible basis for this proposition is that single deck trains need shorter station stops ("dwell times") and that this translates into:

- More trains being run per hour over a given stretch of railway, and "consequently"
- More passengers per hour being delivered to the Sydney CBD.

However, this argument raises (and often tends to ignore) several questions in its own right, such as:

- What duties are expected of peak period trains on Sydney metropolitan railways?
- Where is the critical passenger activity and what dwell times are generated at these locations?
- How sensitive is line capacity to changes in these critical dwell times?
- What is the relationship between train configuration and dwell times?
- What are respective capacities and performances of double and single deck trains of types that can physically run on Sydney's metropolitan railways?

Peak period duties

At present Sydney's metropolitan railways are normally placed under stress only during the morning and afternoon peak periods. As a rule of thumb, for weekdays,

- One-third of the daily patronage is carried during the morning peak period (6 am to 9:30 am at Central)
- One-third is carried during the afternoon peak period (3 pm to 6:30 pm at Central), and
- One-third is carried throughout the rest of the weekday, predominantly between the morning and afternoon peak periods.

The Sydney CBD, including Redfern, is the single most important destination for this travel.

However, according to CityRail's *6th Statistical Compendium* (2007 morning peak period origin-destination matrix, page 53), during the morning peak period approximately:

- 33% of rail travel takes place wholly outside the CBD
- 4% is for trips originating in the CBD and going to other destinations
- 3% takes place entirely within the CBD
- 48% is for trips from other origins to CBD destinations, and
- 12% of rail travel passes through the CBD but terminates outside it, predominantly on the lower North Shore.

On-board passenger volumes can therefore be expected to turn over to a considerable degree.

Despite this, maximum train loads, except on the North Shore line, can be expected to peak on the approaches to the Sydney CBD. In the particular case of the North Shore line, maximum train loads peak and then plateau between Roseville and North Sydney, as passenger numbers turn over at Chatswood and St Leonards, and a lesser flow—but still possibly 80% of the maximum load—then crosses Sydney Harbour Bridge after passengers alight at North Sydney.

Figure 1 and ***Table 1*** summarise the line-by-line morning peak period flows entering the Sydney CBD in 2007, as reported in CityRail's *6th Statistical Compendium*. (The "peak hour" for different lines varies between 0730-0830 and 0800-0900, while the "peak period" for all lines runs from 0600 to 0930.)

The important statistics are that in 2007 the Suburban line (from the west) ran 20 trains carrying 24,725 passengers at an average load of 1,236 passengers per train during the morning peak hour. This represented the most onerous duty experienced on the Sydney metropolitan rail network. However, the North Shore, Illawarra Main, Illawarra Local and Local lines also all carried an average of 1,100 or more

TABLE 1.
2007 LINE-BY-LINE INBOUND MORNING PEAK PASSENGER AND TRAIN FLOWS AND AVERAGE LOADS.

Approach line	Morning peak hour			Morning peak period		
	Passengers	Trains	Average train load	Passengers	Trains	Average train load
North Shore line	14,325	13	1,102	25,245	35	682
Eastern Suburbs line	8,120	15	541	14,400	35	411
Airport line	7,510	8	939	18,630	27	690
Illawarra Main	16,210	14	1,158	32,000	37	865
Illawarra Local	10,940	10	1,094	18,555	23	807
Main (from west)	7,015	11	638	11,085	26	426
Suburban (from west)	24,725	20	1,236	46,065	51	903
Local (from west)	13,265	12	1,105	25,985	39	666
Total	**102,110**	**103**	**991**	**191,965**	**275**	**698**

SOURCE: *A Compendium of CityRail Travel Statistics, 6th Edition*, June 2008

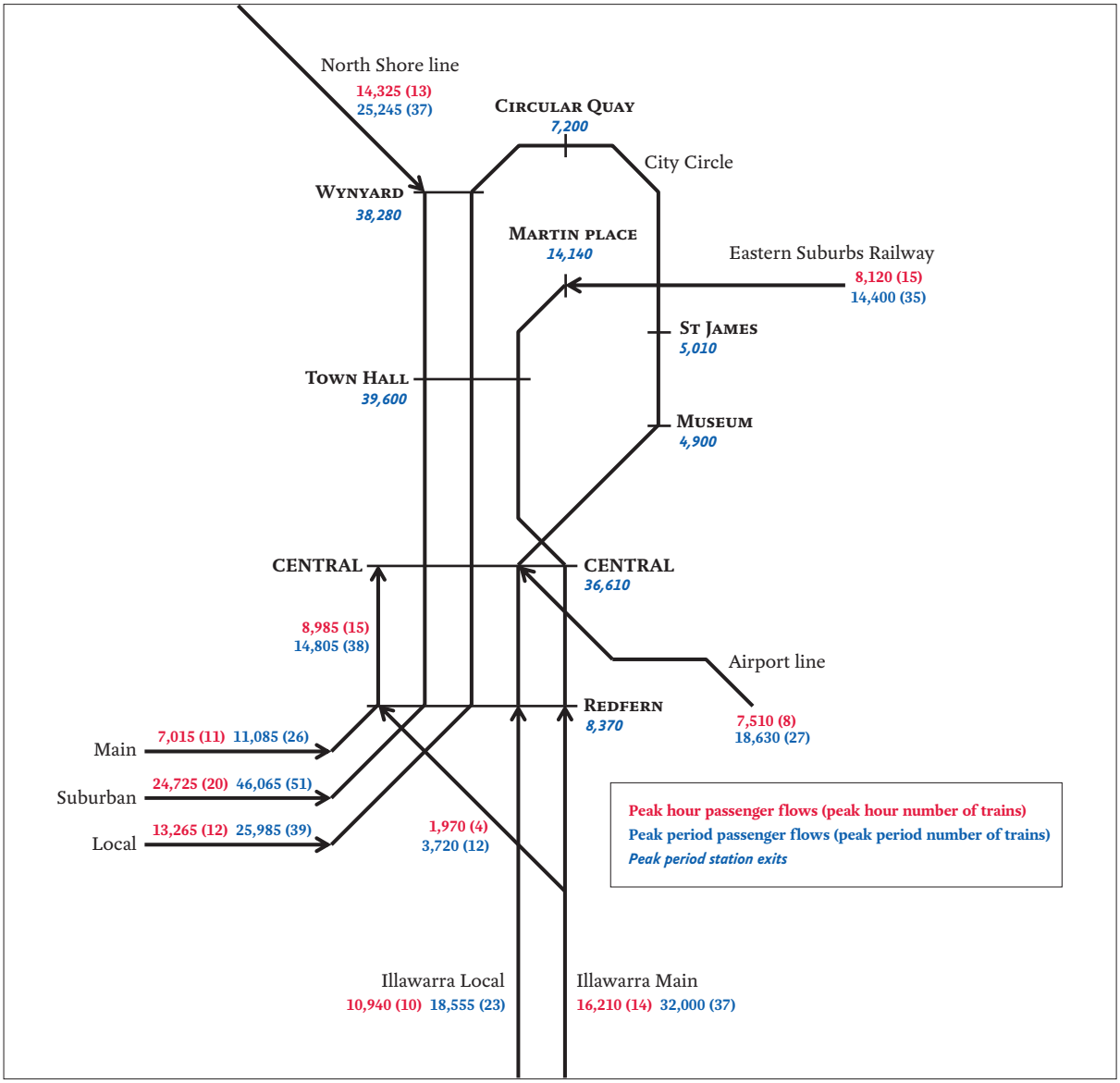


FIGURE 1. 2007 morning peak hour and morning peak period passenger flows and station exits around the Sydney CBD.

passengers per train during the morning peak hour, so that substantial average loads were being experienced on most approach lines.

Patronage has increased since 2007, so even greater average loads are likely today.

Coupled with these peak hour loads and an average trip distance of 19.6 kilometres (as computed in 2005), this means we need to be looking for trains with high levels of seating *and* high levels of standing room.

The seating is required for the comfort of longer distance passengers. The standing room is required for the shorter distance passengers, including those passengers who transfer between services within the Sydney CBD.

Passenger activity and station dwell times

One of the usual arguments for single deck trains is that "they have shorter station dwell times than double deck trains".

This is a misleading argument, because it is the number of effective "channels" for passengers' access and egress movements through the doors along the length of a train that actually influences dwell times at stations, not the specific configuration of the train, as discussed later.

Nevertheless, the durations of station dwell times are fundamentally driven by the numbers of passengers expected to board and alight at particular platforms.

Table 2.
"Top 20" CityRail stations in 2007, arranged in descending order of morning peak period activity.

Station	Number of "through" platforms	All-day patronage ranking	Morning peak period passenger movements			
			Entries	Exits	Transfers	Total
Central	10 + 15	1	7,940	36,610	16,670	61,220
Town Hall	6	2	5,190	39,600	13,330	58,120
Wynyard	4	3	3,600	38,280	1,670	43,550
North Sydney	2	7	2,430	16,240	-	18,670
Strathfield	8	4	7,420	3,310	6,670	17,400
Redfern	10	6	2,770	8,370	5,000	16,140
Parramatta	4	5	5,510	9,880	-	15,440
Martin Place	2	9	390	14,140	-	14,530
Bondi Junction	2	8	8,660	3,610	-	12,270
Chatswood	2	10	3,940	6,260	-	10,200
Blacktown	6	12	6,380	2,930	670	9,980
St Leonards	2	14	2,650	7,170	-	9,820
Circular Quay	2	11	1,480	7,200	-	8,680
Lidcombe	4	21	4,410	1,930	2,000	8,340
Hurstville	4	13	6,280	1,940	-	8,220
Hornsby	4	16	4,860	2,220	-	7,080
Kogarah	4	20	4,090	2,920	-	7,010
Burwood	6	15	4,240	2,470	-	6,710
Ashfield	4	19	4,780	1,410	-	6,190
Epping	3	26	4,240	1,830	-	6,070

Source: Appendix 2(a) of *A Compendium of CityRail Travel Statistics, 6th Edition*, June 2008

Notes: 1. This tabulation excludes data for the four Airport line stations. 2. The numbers of through platforms exclude terminal platforms, except at Central and Bondi Junction. Chatswood and Epping are reported in their state before the opening of the Epping-Chatswood rail link. 4. The daily ranking is based on all-day passenger entries, exits and transfers. 5. Morning peak period transfers have been estimated from the passenger interchange at stations table on page 66 of the *6th Statistical Compendium*.

TABLE 3.
ESTIMATED 2003 MORNING PEAK PERIOD SYDNEY CBD TOTAL PLATFORM MOVEMENTS, BY LINE.

Station	Suburban line (from west) and North Shore line		Local line (from west) and City Circle		Illawarra Local line and City Circle		Illawarra Main line and Eastern Suburbs Railway	
	Northbound	*Southbound*	*Northbound*	*Southbound*	*Northbound*	*Southbound*	*Northbound*	*Southbound*
Redfern	5,720	2,570	3,580	1,040	2,040	720	4,970	1,190
Central	20,230	7,200	10,170	1,850	13,100	3,070	9,070	3,250
Museum					4,700	1,130		
St James					3,770	1,390		
Town Hall	20,019	8,369	12,310	4,820			15,770	5,780
Martin Place							6,760	6,360
Wynyard	11,370	11,610	10,600	6,250				
Circular Quay			5,450		3,340			

Table 2 documents the 2007 "activity rankings" of stations around the Sydney metropolitan rail network, based on the observed numbers of station entries and exits and estimated internal transfers.

The busiest stations were all in the Sydney CBD, as indicated by the yellow shading. St James and Museum stations were outside the "top 20" but were still among the "top 30" stations.

It is possible that Chatswood and Epping could now be promoted up this table, following the opening of the Epping-Chatswood rail link, particularly with respect to passenger transfers.

Curiously, neither Hornsby nor Granville, both key junction stations, have been recorded as having significant passenger transfer movements.

In 2007 there was clear daylight between Central, Town Hall and Wynyard and the next closest stations. Thereafter, there was a rapid attenuation of activity to below 10,000 passenger movements during the morning peak period.

Central aside, Wynyard, Town Hall and North Sydney clearly had very high average peak period passenger movements per platform. In the case of Central, passenger surveys carried out by CityRail after 2003 have pointed to Platforms 16, 17, 18 and 19 as being the busiest of the "through" platforms. Central station's terminal platforms (at "Sydney Terminal") can also be busy when trains terminate, but these terminations are much less frequent, per platform, than the "through" train movements, and are generally handled on wider platforms over longer dwell times.

Most of the stations reported in *Table 2* are already used to regulate train movements in CityRail's Working Timetables. This means trains using these stations, including Central, are generally timetabled to have one-minute dwell times, to assist trains to recovery from any *en route* delays. Hornsby is often given two or more minutes' "recovery time".

This leads us to examine the timetables' treatment of Town Hall and Wynyard.

In 2003 CityRail embarked on detailed modelling of passenger movements around the Sydney CBD as part of a general examination of requirements for future CBD rail lines. This work, anchored to passenger counts collected in 2003 for the *4th Statistical Compendium*, involved synthetic modelling which took account of passenger transfers at Redfern, Central, Town Hall and Wynyard, and allowed analysts to estimate morning peak period platform-by-platform boardings and alightings throughout the Sydney CBD.

Table 3 summarises the modelled estimates of 2003 morning peak period total platform movements (i.e. boardings plus alightings), by station and by line.

The heaviest morning peak period passenger transactions were estimated as occurring at Central and Town Hall on their northbound Suburban line and North Shore line platforms, followed by the northbound Eastern Suburbs Railway platform at Town Hall.

If it is assumed that peak hours account for roughly 50% of total peak period passenger movements (see the AM peak one and two hour multipliers reported on page 76 of the *6th Statistical Compendium*), these estimates suggest that in 2003 roughly 10,000 passenger movements had to be handled during the peak hour at the most heaviest used platforms in the Sydney CBD.

Furthermore, a comparison of station entry and exit data between the 4th and 6th *Statistical Compendia* (i.e. from 2003 to 2007) suggests that between these two years there was probably a 10% growth in passenger activity at Central, Town Hall and Martin Place and a 15% growth at Wynyard —and CityRail's overall patronage has grown since 2007, so the passenger movements at the busiest CBD station platforms are likely to be even higher today.

In the light of these estimates, the outstanding question is: how long should trains "dwell" at each of the key CBD stations of Central, Town Hall or Wynyard?

On page 69 of its *6th Statistical Compendium* CityRail reports measurements it made in 2006 on boarding and alighting times on Town Hall Platform 3 (the northbound

Table 4.
Morning peak period alighting and boarding transactions through double deck carriage doors at Town Hall station's platform 3 in 2006.

Movement activity	Maximum observed passenger flows per door	Total time for these transactions (seconds)	Average time per transaction per 'channel' (seconds)
Alighting	34	33	1.94
Boarding	37	34	1.84
Both	**71**	**67**	**1.89**

North Shore line) during the morning peak period. ***Table 4*** summarises the results for the maximum number of passenger movements observed for an individual carriage door (noting that one double door is equivalent to two access/egress "channels").

If it is conservatively assumed that passengers take two seconds to board or alight through a single door channel, these data are in line with CityRail's own observations for passenger movements through automatic gates and J J Fruin's estimates for the time it would take a person to pass through a threshold (observed entrance headways, *Pedestrian Planning and Design*, John J Fruin, New York 1971, page 53).

In summary, then, in 2007 CityRail was faced during the morning peak hour with having to turn over around 11,000 passengers per hour, off 20 trains per hour, at key platforms (for northbound Suburban and North Shore line trains) at an average of 2 seconds per person through 32 channels (i.e. 16 doors) per 8-car train.

To compensate for the facts that passengers are unlikely to be uniformly distributed along the length of a train or uniformly loaded across successive trains, the bare transaction time of 34.4 seconds should be divided by 0.7, producing a weighted average transaction time of 49.1 seconds (say 50 seconds) per double deck train.

This is without allowing for train door opening and closing times, which also need to be taken into account as discussed below.

The sensitivity of line capacities to critical stations' dwell times

In 2001 CityRail engaged TMG International to assess the impact that Automatic Train Protection (ATP) might have on train movements. (At that time ATP and Automatic Train Control were being touted as a means in increasing line capacity. Following the 2003 Waterfall disaster, CityRail is now expected to adopt ATP, in its European Train Control System (ETCS) guise, to improve safety.)

This study included:

- An analysis of how signalling layouts regulate the passage of trains
- Measurements of actual peak period operations through the Sydney CBD, and
- Assessments of the impacts different styles of ATP might have on the passage of trains.

We are not directly interested in the ATP issues here. However, we *are* interested in knowing, more generally, how signalling controls the passage of trains and, more specifically, in validating a model of the signalling system against actual peak-period train movements.

How does signalling work?

Briefly, "plain track" automatic signalling layouts space trains apart so that there should always be enough space for a following train to stop behind a stationary preceding train if the former obeys the signalling "aspects" (red, green, etc) presented to it by successive signals.

Physical signal layouts therefore have to take account of the Full Service braking performance of all the different types of train expected to use a line, over the different grades along the line and within the permanent speed limits along the line. CityRail currently uses the GE62 (Full Service) braking curves for LRS-sets for setting out signal layouts for its suburban trains.

Figure 2 displays the challenging vertical profile of the North Shore line between Central and Chatswood.

While low speed limits reduce train braking distances, steep grades down hills increase them. So the "hump" profiles between Central, Town Hall and Wynyard stations should shorten braking distances on the approaches to these stations but lengthen them on departure. However, the very steep fall from the summit of the Sydney Harbour Bridge to Wynyard station—steepening from 1:40 (2.5%) to 1:30 (3.3%)—means that braking distances, and therefore separation times, have to be long. In these circumstances, short-block six-aspect signalling is necessary to reduce signal clearance times.

This is especially so because the Sydney metropolitan rail system uses mechanical "train stops" to enforce safe separations between trains. These train stops require braking overrun distances (also known as "overlaps"), beyond the signals that they protect, which are sufficiently long to absorb an emergency stop from line speed (see the GE57A (Trip Stop) braking curves for LRS sets' emergency stopping distances). This further spaces the trains apart under close headway conditions.

When trains have to stop at stations, the times to decelerate from their free speed, stand in the station and then accelerate back to their free speed all have to be added to the time required simply to keep the trains safely apart between stations.

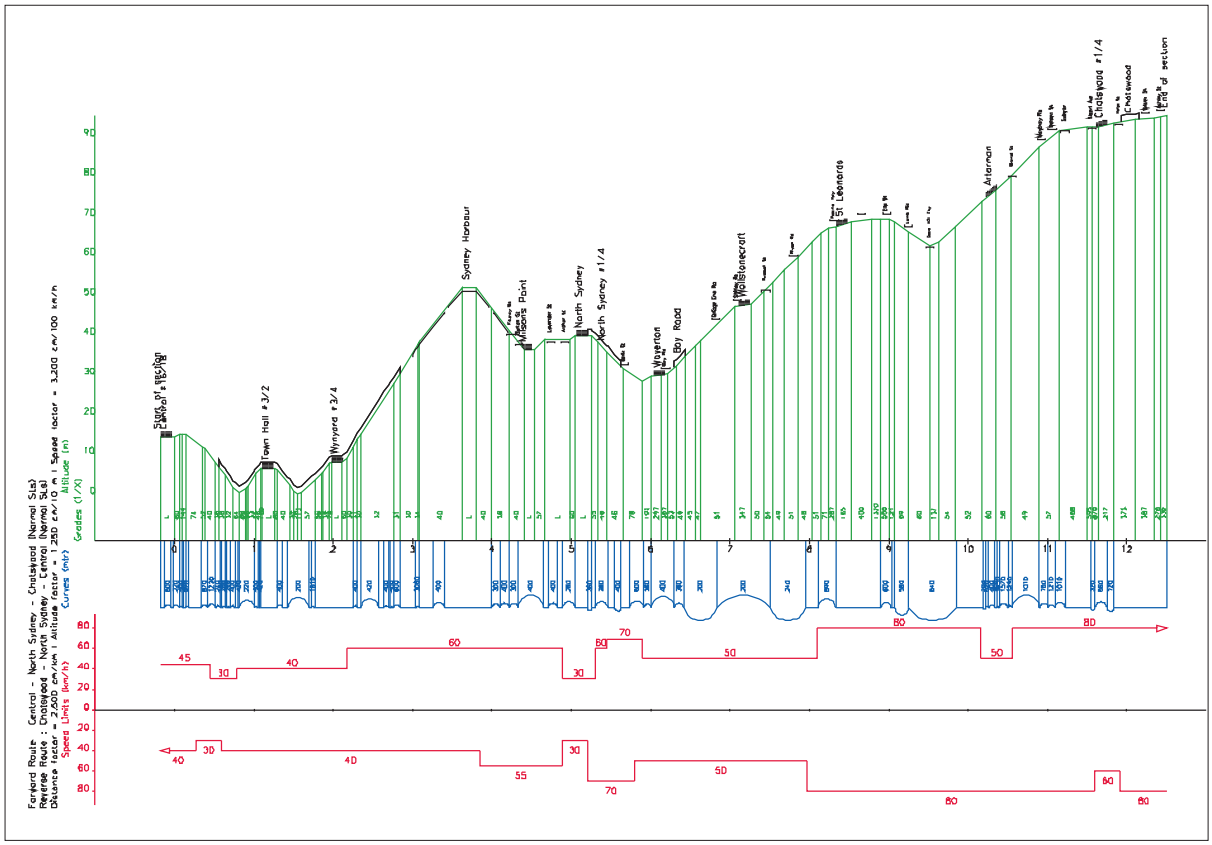


Figure 2. Vertical profile of the North Shore line between Central and Chatswood.

Not all signals are affected by station stops. If the distances between stations are long and the clearance distances between signals are short—as they are, for example, for northbound services between Wynyard and Milsons Point—the signals can clear quite quickly. However, train operations cannot be planned on the basis of these shorter clearance times, because there would then be an insufficient time allowance for the next station stop.

Signal clearance times—which are specific to the trains that produce them, and should be distinguished from headways, a general concept about the time separation of trains without specifying their performance—can be disaggregated into their "running" and "stationary" components, each of which can be separately measured.

The running component (the "intrinsic" clearance time) comprises the times for:

- Acceleration from a stop
- Cruising between stops, and
- Deceleration to the next stop.

Clearly this component is affected by the performance of a particular type of train. Sydney's double deck trains now all have an initial load-independent acceleration of roughly 0.8 m/s^2 and load-independent Full Service deceleration of 0.90-0.95 m/s^2, but the duration of the initial constant acceleration does vary between trains; the less powerful older LRS-sets top out earlier than the younger —, H- and A-sets and are thus some 5% slower in their overall journey times.

The stationary component comprises:

- A door opening time (including the guard's reaction time)
- The time for passengers to alight and board
- A "float" or "recovery" time (including an announcement time), and
- A door closing time (including a "rest time" before the train starts moving).

All of Sydney's suburban and interurban trains have centrally operated automatic doors. The older trains have doors sliding in and out of pockets in the car body, and the newer trains have "plug" doors which fill the door opening when closed but move outwards and along the side of the car body when open.

There is some debate about how fast or slowly these plug doors operate. However, 10 seconds is a fair average time for the combined door opening and closing time.

Door closing announcements, which eat into the float time, take 3-4 seconds. After the doors close there is a further period before the train moves off while the guard checks that all the doors have been proved closed, gives the right-of-way to the driver and the driver reacts.

Observations of actual peak period operations through the Sydney CBD

The 2001 TMG International study for CityRail examined operations on the North Shore line between Central and North Sydney. Intrinsic clearance times were calculated through train performance simulations using *Mtrain* and actual morning and afternoon peak period train headways and station dwell times were observed and logged in both directions.

More specifically, the intrinsic clearance times were estimated from cumulative signal clearance time tallies produced from Mtrain simulation runs of S-set trains running in both directions. Each reference train was

TABLE 5.
MODELLED INTRINSIC SIGNALLING CLEARANCE TIMES (SECONDS) FOR S-SET AND M-SET DOUBLE DECK TRAINS BETWEEN STRATHFIELD AND CHATSWOOD.

Line section	Length (km)	Northbound			Southbound		
		Number of signals	S-set trains	M-set trains	Number of signals	S-set trains	M-set trains
Strathfield-Burwood	1.2	5	98-104	98-102	5	98-104	98-103
Burwood-Redfern	9.3	33	83-91	83-91	33	98-107	98-106
Redfern-Central	1.2	7	83-129	83-128	6	98-105	98-102
Central-North Sydney	5.2	36	98-143	98-142	36	98-118	98-118
North Sydney-Chatswood	6.5	21	143-154	128-148	23	113-145	98-142

assumed to run "all stops" but with zero station dwell times. This made it possible to obtain the minimum time for each in-scope signal to return to a "clear" (green) aspect after being placed at "stop" (red) by the passage of the reference train. Mtrain then produced cumulative tallies and distributions for all the signals in each nominated line section. Each station-to-station run was long enough for the signal clearance times generally to be affected by no more than one station dwell time.

Table 5 extends this analysis all the way from Strathfield to Chatswood in both directions, over the Suburban and North Shore lines. It also records the intrinsic clearance times behind M-set trains, as representative of the performance of the newer —, H- and A-sets which will form the fleet that is expected ultimately to replace the old LRS-sets.

Table 5 reports "minimum" and "maximum" green-to-green clearance times. The "minimum" clearance time is the time required for at least 85% of signals in each section to be cleared to green, and the "maximum" clearance time is the time required for all of the signals to be cleared to green.

Generally when a signal has not fully cleared to green it displayed a "medium" aspect within the minimum clearance time.

The upshot of this analysis was that an intrinsic clearance time of 100 seconds seems supportable between Strathfield and North Sydney in both directions of travel, but a longer intrinsic clearance time, of around 120 seconds, would be more realistic between North Sydney and Chatswood in both directions, with some "tweaking" between Artarmon and Chatswood.

The 2001 study also examined the difference impacts aggressive and moderate braking might have on intrinsic clearance times, taking account of the fact that drivers would not normally use Full Service braking for a station stop. It seems that moderate braking probably extends the maximum clearance time by about 3%.

During the survey aspects of the study, carried out in May 2001, actual train arrival and departure times and platform starting signal aspects were recorded for each train and each train was tracked from Central to North Sydney and *vice versa*. The morning and afternoon peak hours, plus run-in and lead-out times, were surveyed so that data for at least 60 minutes' running were available for each track during each peak period.

During the survey periods trains maintained close to uniform three-minute headways for at least 75 minutes in the heaviest direction of travel (Central to North Sydney in the morning and North Sydney to Central in the afternoon).

The recorded station dwell times varied considerably between stations and between trains. However, the longest dwell times, of 80 seconds, were recorded at Town Hall and Wynyard. Unfortunately, there were no accompanying estimates for passenger boardings and alightings to help us understand the causes for these dwell times.

Notwithstanding these long maximum dwell times, the heaviest train flows were still able to sustain steady 3-minute headways.

(CityRail's 2006 timetable required constant northbound three-minute headways between 0738 and 0847 at Central during the morning peak period and constant southbound three-minute headways between 1622 and 1731 at Central during the afternoon peak period.)

Figure 3 summarises the findings of all these investigations by illustrating the components of the signal clearance times and showing their relationships to train flow rates, based on measurable and observable data for the Sydney metropolitan rail system.

In this illustration the intrinsic clearance time has been assumed to be 100 seconds, the combined door opening and closing time has been assumed to be 10 seconds and the average passenger alighting and boarding time has been assumed 50 seconds, as discussed above, while the "float" or "recovery" time has been back-calculated from the observed maximum dwell time, as also discussed above.

Train flows (i.e. the numbers of trains per hour) are simply the reciprocals of the signal clearance times.

It may be concluded from these analyses that *under the Sydney network's current signalling systems* it is probably not possible to run more than 24 trains per hour on lines while handling any meaningful number of passenger alightings, boardings and transfers at the busiest CBD stations.

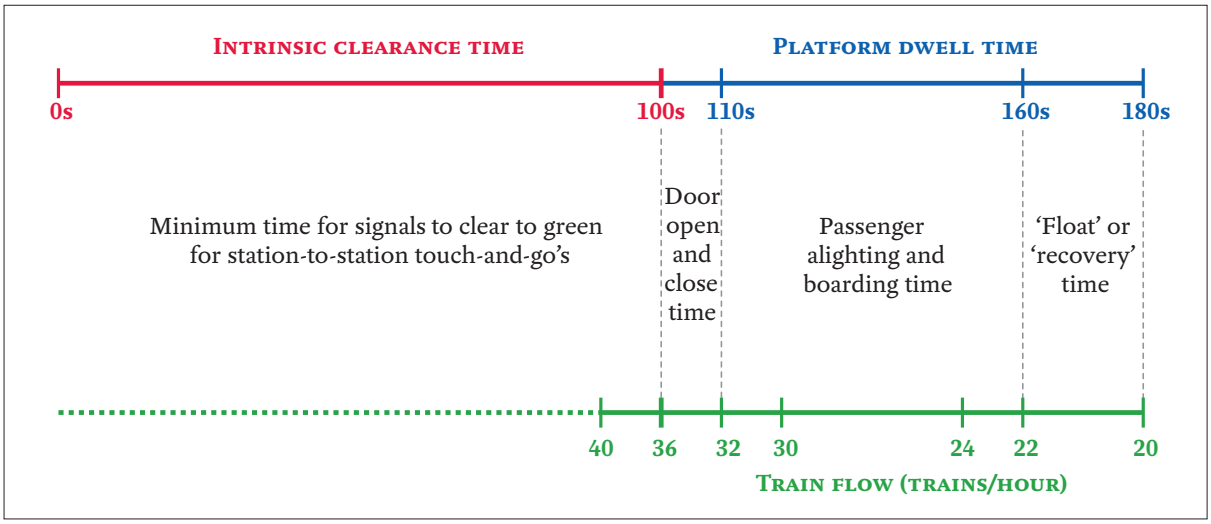


FIGURE 3. Time components of signal clearance times (seconds).

TRAIN CONFIGURATIONS AND STATION DWELL TIMES

Suburban and commuter passenger trains are especially intended to carry large numbers of travellers during peak periods, seating as many as possible of them commensurate with their expected journey lengths.

As we have seen, station dwell times affect travel times and train throughputs. They also affect service reliability.

And as the CBD station analyses have demonstrated, these dwell times can themselves be significantly affected by the numbers of passengers boarding and alighting at individual stations.

So, how busy are Sydney's stations?

CityRail's *6th Statistical Compendium* (*Appendix 2: Barrier Counts*, and particularly *Appendix 2(b)*) reports that for 169 suburban stations (excluding the four Airport line stations) during an average 2007 weekday morning peak period,

- At 43% of suburban stations there no more than 1,000 passengers entering the station
- 27% of suburban stations had between 1,000 and 2,000 entering passengers
- 15% had between 2,000 and 3,000 entering passengers
- 6% had between 3,000 and 4,000 entering passengers
- 5% had between 4,000 and 5,000 entering passengers, and
- 4% had between 5,000 and 6,000 entering passengers

and:

- At 77% of suburban stations there were no more than 1,000 exiting
- 10% of suburban stations had between 1,000 and 2,000 exiting passengers
- 4% had between 3,000 and 5,000 exiting passengers
- 4% had between 5,000 and 10,000 exiting passengers
- Two had between 10,000 and 20,000 exiting passengers, and
- Three had between 35,000 and 40,000 exiting passengers.

These data suggest that at 70% or more of Sydney's suburban stations there are unlikely to be more than 250 passengers per train boarding or alighting at the station even during the morning peak hour—or, putting it another way, station dwell times are unlikely to have to exceed 30 seconds at 70% of Sydney's suburban stations.

At the other end of the scale, the "heavy lift" suburban stations, with (say) 3,000 or more morning peak period entries, are already likely to experience 60 second dwell times, as much for timetable "recovery" purposes as for passenger handling purposes.

The three standout CBD stations of Central, Town Hall and Wynyard all show up as major entry stations during the morning peak, as well as extreme "exit" stations, warranting dwell times of 60 seconds or more.

To summarise, it appears that:

- At 70% of stops, at minor suburban stations, dwell times of 30 seconds should easily cover both alightings and boardings
- At 20% of stops, at major suburban stations, dwell times of 60 seconds should easily cover alightings, boardings and "recovery", and
- At 10% of stops, at key CBD stations, dwell times of 60 seconds or more will be necessary to cover both alightings and boardings.

The desirable properties for a Sydney suburban train should therefore include:

- **Plenty of seating for longer-distance travellers**
- **Plenty of standing room for short distance travellers, particularly those transferring at CBD stations, and**
- **Generous access and egress arrangements to handle high passenger turnovers at the key CBD stations.**

Table 6 compares an instructive range of "metro", suburban and inter-urban trains to illustrate the trade-offs between accommodation levels, standing spacing and access/egress arrangements (i.e. the numbers and widths of the trains' doors).

Prior to 1962 Sydney only had single deck trains. The progressive replacement of single deck trains with double deck trains has meant the current 8-car suburban trains now

offer almost a 50% increase in seating accommodation compared to that offered in Sydney's original suburban train fleet.

The Melbourne rail system originally acquired a fleet of compartmented suburban trains, typified by the Tait cars referred to in *Table 6*, which prospectively offered more seating and potentially much quicker loading and unloading rates than contemporary Sydney trains. However, the Tait cars were very limited in their overall capacity, and were eventually replaced by more conventional open saloon cars, typified by the Comeng cars. These offered slightly higher seating levels than Sydney's single deck trains and slightly less standing room, but had much poorer access/egress arrangements because of their narrow door widths and the lack of set backs at the doors, effectively reducing each door to a single "channel".

The current replacement trains from Alstom and Siemens seem to offer less seating and standing room than the Comeng cars but more effective doorways. The Alstom cars have three doors per side per car and the Siemens cars two.

There are two instructive US trains: the Washington Metro 3000 series cars and the Long Island Rail Road (LIRR) M-7 cars.

The Washington Metro has quite long average journey lengths because it performs like a suburban system outside central Washington. The Metro cars accordingly have a comparatively high level of seating for a subway system. Their seating and standing levels are comparable to Sydney's original single deck trains but they suffer from having narrow doorways. This illustrates one of the principal train design trade-offs: wider doorways, fewer seats and *vice versa*. Nevertheless, they are trains designed to carry both

Table 6.
Comparison of a range of Australian and overseas metro, suburban and inter-urban trains.

Location	Sydney		Melbourne		US		UK		France
Operator/system	CityRail		VicRail/Connex		WMATA	LIRR	LU	L&SE	RER
Class of train	Standard	M-set	Tait	Comeng	3000	M-7	T73	375	Z22500
Duty (i.e. types of suburbs served)	Inner and middle suburbs	Inner and middle suburbs	Inner and middle suburbs	Inner and middle suburbs	Inner and middle suburbs	Middle and outer suburbs	Inner and middle suburbs	Middle and outer suburbs	Inner and middle suburbs
Single or double deck?	Single deck	Double deck	Single deck	Single deck	Single deck	Single deck	Single deck	Single deck	Double deck
Number of cars per unit	4	4	6	3	2	2	6	4	5
Number of units per train	2	2	1	2	4	4	1	2 or 3	2
Length of unit (m)	77.6	81.5	111.0	71.0	45.7	51.8	106.0	81.9	112.0
Car widths (m)	3.15	3.03	2.90	2.90	3.09	3.20	2.63	2.81	2.90
Doors per side per unit	8	8	51	9	6	4	17	8	15
Door widths (mm)	1,524	1,800	560	1,100	1,200	1,270	1,470	1,010	2,000
Access/egress "channels" per side per unit	16	16	51	9	9	6	34	8	30
Access/egress "channels" per 100 m	20.6	19.6	45.9	12.7	13.1	11.6	32.2	9.8	26.8
Seats per unit	285	452	524	290	160	211	264	267	550
Seats per metre	3.7	5.5	4.7	4.1	3.5	4.1	2.5	3.3	4.9
Standing area per unit (m^2)	95.3	96.0	28.8	68.8	56.5	43.0	155.0	67.4	183.0
Standees per unit (assuming 4 per m^2)	381	410	115	275	226	172	620	270	730
Total number of passengers per unit	666	862	639	565	386	383	884	537	1,280
Total number of passengers per metre	8.6	10.6	5.7	8.0	8.4	7.4	8.4	6.6	11.4
Total number of passengers per train	1,332	1,724	639	1,130	1,544	1,532	884	1,074 or 1,611	2,560

Double deck Millennium (M-set) trains (Sydney)

London Underground tube trains

Comeng train (Melbourne)

London & Southeast Class 375 train

WMATA 3000 Washington Metro train

Long Island Rail Road M-7 train

Double-deck RER trains with three doors per car side (Paris)

commuters from the suburbs and short distance travellers within central Washington.

The LIRR is the largest commuter system in the US and operates somewhere in the realm between Sydney's middle and outer suburban areas. Its trains are primarily designed to carry seated passengers. Standing passengers are most likely to be carried between Manhattan and Jamaica, the only interchange station at which commuters can change for a variety of Brooklyn and Manhattan destinations. Dwell times are counted in minutes at Jamaica, so the narrow doors are not an embarrassment.

There are two instructive UK trains: the London Underground (LU) T73 tube train and the London & Southeast (L&SE) Class 375 train.

The London Underground has a rigorous design process, under which the carrying capacity of a train is determined by its floor area rather than by its volume. Doorways have been carefully designed to provide sufficient width for passengers to easily move in and out of the cars and "set back" areas intended to keep standing passengers, as much as possible, out of the door openings. Journey lengths are short because, although tube trains carry passengers from the suburbs, they also handle high volumes of interchanging passengers within Central London. Because of the large number of interchange stations within Central London a regular turnover of passengers can be expected at most stations within this area. Accordingly, tube trains have less than half the seating levels of a Sydney double deck train but have 50% more doorways.

The Class 375 (Electrostar) trains serve a similar commuter catchment to the LIRR's M-7 trains. They would have higher levels of seating, were the trains not so narrow and if they did not carry first class as well as economy class passengers. Once again, there is a design struggle between providing seating and access/egress. *Modern Railways* (Volume 66, Number 735, December 2009) has reported that the proposed *Thameslink* (i.e. north-south cross-London) rolling stock, derived from the Class 375, will have 1,500 mm or wider doors, in order to deliver 45 second dwell times in the Central London core.

The last of the train types compared in *Table 6* are the tri-door double deck trains of Réseau Express Régional (RER) lines A and B in Paris.

These impressive trains combine duties similar to those expected of Sydney's suburban trains. They are intended both to carry commuters from the suburbs, outside the city of Paris, and to distribute commuters within central Paris. There are inter-connections with other RER lines and with the Paris Metro.

The RER trains combine high seating levels—although not as high as Sydney's double deckers—with high standing levels, primarily concentrated in each car's three wide door vestibules. Since there are no set backs, each wide vestibule has to double as a standing area and a transit area. Personal experience of the 3+2 seating in the upper and lower saloons is that it is a little "squeezy".

These cars do not appear to be able to easily handle passengers with wheelchairs, because the end vestibules, which are level with the outer doorways, are largely used to house equipment. Furthermore, their bogie spacing might make it difficult for the cars to fit into Sydney's "loading gauge", and there might be platform-gap safety problems with the centre doors on some sharply curved platforms.

So how well might these various types of designs perform the duties expected of a suburban train in Sydney during the morning peak (primarily, to pick up passengers from wayside stations, exchange passengers at major suburban stations and set down and exchange passengers at a small number of busy CBD stations)?

As we have seen, dwell times are a really critical factor only at the key CBD stations. The trains which will have the shortest dwell times will be those with the greatest number of access and egress "channels". However, the train with the most channels, the Melbourne Tait train, is an obsolete design, while the London Tube train has less than half the seating capacity of a current Sydney suburban double deck train, length for length. The Comeng train offers the prospect, if its doorways were redesigned, of a good compromise between seating levels and access/egress arrangements for a single deck train. The Paris RER double deck train superficially offers both good seating capacity and superior access/egress arrangements, but there might be problems about its compliance with train size and other limitations of the Sydney network.

The capacities and performance of double deck and single deck suburban trains suitable for Sydney

As we have seen, in 2007 the "duty summary" for Sydney suburban trains was that they had to:

- Carry up to 24,730 passengers per track per hour during the morning peak hour on the approaches to the Sydney CBD, and
- "Transact" up to 11,230 passengers per hour per stop at Central and Town Hall during the morning peak hour.

Because of recent patronage increases these requirements would be somewhat more demanding than this today.

Sydney's suburban trains have to fit nominally 160 metre platforms. Current 8-car double deck suburban trains are 163 metres long, seat 904 passengers and have a standing area of 192 m^2, theoretically sufficient for an additional 820 standing passengers. They have 16 competent doors and 32 access/egress "channels" down their length.

As we have seen, in 2007, they carried an *average* of up to 1,240 passengers per train during the morning peak hour and turned over an average of up to 560 passengers per train at each of Central and Town Hall, with 20 trains stopping at these stations per hour, during the morning peak. Again these figures would probably be higher today.

Setting aside for the moment the reservations expressed above about their handling of passengers with wheelchairs and the safety of their middle doors on some of Sydney's many curved platforms, the Paris RER Z22500 train could be configured as a seven-car train that would be 156.8 m long, seat 770 passengers and provide a standing area of 256 m^2, sufficient for an additional 1,024 passengers standing passengers. It would have 21 competent doors and 42

access/egress channels down its length, significantly more than Sydney's current double deck trains.

Similarly, from examinations of the Melbourne Comeng train it seems that a 165.7 m (but hopefully shorter) seven-car train could be created with more competent doors. While this train would be unlikely to seat more than about 570 passengers if it had 21 doors and 42 access/egress channels per side, it should be able to carry 780 standing passengers. If it had only 14 doors and 28 access/egress channels, it could seat 640 passengers and carry 640 standing passengers.

Transilien (the Paris suburban railway administration) and Bombardier recently announced a new articulated single deck train designed expressly for suburban services, based at Gare St Lazare in Paris. This 112.5 m long eight-section train will seat 418 passengers and stand 493 passengers with eight wide doors (1,950 mm wide) and 16 access/egress channels per side. A 152.2 m, eleven-section variant could seat 580 passengers and stand 678 passengers, with 11 doors and 22 access/egress channels per side.

It is quite likely that other conventional or articulated double deck or single deck train designs based on current designs could also be conceived.

Again, however, it is essential to understand how well the "reference" designs can meet Sydney's limiting duty requirements before conclusions can be drawn about other potentially desirable train configurations.

Table 7 compares the potential performance of concepts discussed above for current operations, assuming they would all need to carry 24,730 passengers per hour and be able to turn over at least 11,130 passengers per hour at the critical CBD station stops (i.e. the patronage and turnover equivalent to those achieved by CityRail trains in 2007 with 80-second dwell times at the critical CBD stations).

In this comparison the Parisian double deck train would be able to achieve a similar load factor to the Sydney double deck train by being able to run three more trains per hour, because of its superior access/egress arrangements. On the other hand, the Parisian single deck train would have a vastly worse load factor, because it would have to run five fewer trains per hour to compensate for its much worse access/egress arrangements. As a result it could not carry the required number of passengers even at crush capacity.

The three-door version of the Melbourne train would have a significantly poorer load factor than the Sydney double deck train, because of its low seating capacity, notwithstanding its much better access/egress arrangements. It is also possible that it might not be able carry all the presenting passengers during the height of the peak hour, because of its high average load factor.

Converting the Melbourne train to a two-door configuration would only worsen the situation. The increase in seating capacity could not compensate for the reduction in the number its doors, and the average peak hour passenger load would exceed the crush capacity of this train.

There is scope for all of the trains examined in this comparison to be able to run two or three more services per hour, but this would not improve the conditions of travel on the single deck trains.

Fundamentally, double deck trains will always carry more passengers because they have probably 50% more floor area than single deck trains. Moreover, they use this additional floor area to seat more passengers. Double deck trains therefore offer better travelling conditions and fundamentally make better use of the available line capacity.

On the other hand, both the Parisian double deck train and the three-door Comeng train would have to run more frequent services simply to match the passenger load of the existing Sydney double deck train. In other words, they would consume extra line capacity just to match the *status quo*.

The Sydney-style double deck train thus performs very well in Sydney!

Conclusions

What all this illustrates is that **single deck trains, with their significantly lower seating capacities, cannot meet the transportation duties expected of Sydney suburban trains which need to carry passengers long distances (currently about 20 kilometres on average).**

It can also be concluded that it might also be difficult to better the transportation performance of the current double deck suburban trains with alternative double deck designs, because the creation of extra doors along the length of a double deck train comes at the expense of seating capacity and the required passenger throughput can then be achieved only by running more trains, thereby consuming latent line capacity.

In summary, there seems to be relatively little scope to increase rail capacity using the Parisian design, whereas **there is still some scope to increase flows achievable by Sydney trains without a significant change in signalling technology.**

However, increased train flows and passenger turnovers through critical platforms *will* require screen doors for passenger safety, passenger flow management and faster train entries.

Other factors which need to be considered in choosing future rolling stock configurations in Sydney include:

- The logistics of running suburban railways
- The efficient re-use of peak period rolling stock, and
- The division of lines into discretely separate operations.

If double deck rolling stock were to be replaced by single deck rolling stock, between 15% and 50% more trains would be required, depending upon whether the design requirement was to match the peak passenger flows or to match seating load factors.

In turn, this would necessitate the provision of correspondingly more stabling sidings and the land on which to build them, more train crews and more maintenance facilities. Crewing, energy and maintenance-related operating costs would inevitably have to increase—all without having carried any more passengers.

Like many other suburban railways, the Sydney rail system runs both long and short distance services. Because it is a "through" system, with few trains terminating at the network hub, early peak period trains can pass through the

CBD, out onto another line, and then return later in the peak period with more passengers. Generally, early long-distance services can be run out and then back again as later peak short-distance services.

This system efficiency would be lost if rolling stock were hypothecated to long and short distance service, as is usually proposed by the proponents of introducing mixed fleets with single deck as well as double deck trains. Any such operational hypothecation would also increase the numbers of trains in the inner areas of the network, and therefore require additional and complex infrastructure to separate different train flows—again, all without carrying any additional passengers.

There are limits to how far existing peak period operations can be pushed before "Sector 3" (i.e. the Northern, North Shore and Western line services running to and from

Table 7.
Comparison of 'reference' trains for 2007 Sydney CBD morning peak hour operations, assuming the current signalling system.

Source location	Sydney	Paris		Melbourne	
Train	**M-set**	**Z22500**	**Francilien**	**Comeng A**	**Comeng B**
Configuration	Double deck	Double deck	Single deck	Single deck	Single deck
Cars per train	8	7	13	7	7
Length	163 m	157 m	152 m	166 m	166 m
Doors per side	16	21	11	21	14
Access/egress "channels" per side	32	42	22	42	28
Seats	904	770	580	570	640
Crush standees	820	1,024	678	780	640
Door opening and closing times (seconds)	10	10	10	10	10
Required provisions for passenger access/egress time at busiest CBD stations (seconds)	70	45	130	45	90
Total dwell times at busiest CBD stations (seconds)	80	55	140	55	100
Minimum passenger access/egress time at busiest CBD stations (seconds)	50	33	96	33	63
Spare dwell times at busiest CBD stations (seconds)	20	12	34	12	27
Signal clearance times (seconds)	100	100	100	100	100
Headways (seconds)	180	155	240	155	200
Trains per hour	20	23	15	23	18
Assumed passenger flows per hour, for the purposes of this comparison (2007 data)	24,730	24,730	24,730	24,730	24,730
Average number of passengers per train	1,237	1,065	1,649	1,065	1,374
Absolute train capacity	1,724	1,794	1,258	1,350	1,280
Seat load factor	137%	138%	**284%**	**187%**	**215%**
Theoretical station platform passenger turnover per hour	15,680	15,364	15,015	15,364	15,876
Theoretical passenger turnovers per train stop	784	662	1,001	662	882
Assumed actual (i.e. 2007) platform turnovers per hour	11,130	11,130	11,130	11,130	11,130

the North Shore) will be overwhelmed by passengers from the east, the inner and outer southwest and the Illawarra needing to travel across Sydney Harbour to employment between North Sydney and Macquarie Park.

There are real limits on how long this growth will be able to be accommodated, even without considering the impacts of the Barangaroo developments. In essence, one Sydney line is being expected to do the duty of two or three London Tube lines in redistributing passengers.

As discussed in chapter 3 of the Inquiry's report, **there is an urgent need for a second heavy rail crossing of Sydney Harbour to spread the passenger load, reduce the levels of passenger transfers and streamline train flows. The need for this has been masked to date by the capacity of double deck trains, but without early action to provide a second crossing the reliability of the Sydney system will be pulled down by burgeoning passenger transfer activity in the successive Central, Town Hall and Wynyard stations**.

If people seriously want "metro-style" operations on a suburban railway system, they need look no further than the Paris RER, which runs high capacity "heavy rail" trains, both double deck and single deck, at close headways, right through central Paris. With only five lines so far, it already carries over twice as many passengers as the Sydney system.

A W Wardrop

May 2010

Appendix 4

Funding and Financing report

The Allen Consulting Group

The Allen Consulting Group

Funding Sydney's new public transport strategy

February 2010

Report to the Independent Public Inquiry into Sydney's Long Term Public Transport Plan

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Contents

Key Points

- Sydney remains heavily car dependent, imposing significant social and economic costs on the city. Many plans to improve Sydney's public transport system have been developed, but the lack of funding has been a key barrier to the development of a practical long-term plan.
- An Independent Public Inquiry (the *Independent Public Inquiry into Sydney's Long Term Public Transport Plan*, 'the Inquiry') has been established to create a Long Term Public Transport Plan for Sydney to inform decisions by future governments on the priorities over the next 30 years.
- The Inquiry seeks to show that it is feasible to *fully fund* the changes necessary to raise the Cities transport system to meet the needs of the 21st Century. The Inquiry analyses three different scenarios of capital costs for major investment projects. These scenarios amount to a similar amount of around $36 billion to 2040 (real 2008-09 $).
- The Inquiry proposes that a principled and effective funding approach is also the fairest approach. That is, that the beneficiaries of new services should contribute towards the cost of those services. Evidence from extensive research carried out for the Inquiry shows that there are many different groups in the community that are expected to benefit from transport system-wide improvements and that they are in fact willing to pay for these improvements.
- As the benefits are spread widely it is natural that there is a wide range of funding instruments. Funding approaches should draw upon moderate increases to transport fares, application of metropolitan and registration levies as well as a range of other funding sources including parking space levies, a CBD congestion charge and support from the Commonwealth Government including through the Building Australia Fund. This captures contributions from users of public transport, people who live in areas serviced by improved transport facilities, car users who benefit from reduced congestion, and the wider community who benefit through making Australia's largest city and major gateway to the rest of the world, work more efficiently.
- Inevitably there will be a gap between when major expenditures are incurred and when funding contributions are raised. This gap is bridged by the use of finance, including debt. The illustrative funding plan presented in this report is robust because it is *fully funded*. That is, it raises sufficient money to meet all the costs, including financial costs and the repayment of debt and interest over the life of the funding mechanism.
- Projects will need to be planned in advance and a pipeline of projects will be required to prevent capacity constraints in the construction industry. Prioritisation between competing projects will be necessary to prevent these capacity constraints arising.

- The costs of the projects will re-enter the economy via the construction industry and will spill over into the economy at large leading to a positive effect on State output to 2040. This additional growth can be expected to drive a growth dividend in public sector finances. In order to produce a conservative approach to being fully funded, this fiscal growth dividend has not been included as a funding stream. It can be looked upon as a pool of resources that helps meet any unexpected contingencies that may add to costs or delay the collection of funds.
- The structure of the illustrative funding mechanism has been built to fundamentally improve transparency and accountability for policy decisions. Decisions that raise the cost of the development and improvement of transport services in Sydney will have a transparent effect in the funding plan accounts. It will not be feasible to obscure and shuffle funds between the short and long terms without revealing the effect that this would have on the financial balance and full repayment. Decision makers will therefore be accountable. The high degree of transparency, however, is grounded on the clear linkage between obtaining transport service in exchange for payment from the community.
- An independent governance structure like the one being put forward by the Inquiry will also be important to manage the risks and sensitivities of the illustrative funding mechanism as it will help to eliminate the type of perverse incentives that exist when accountability for service provision, revenue and expenditure is separated. Indeed, managing these accountabilities within the same governance structure would ensure that changes in any service delivery, revenue and/or expenditure are balanced.
- The analysis reported here shows that funding a long-term transport plan that raises Sydney and NSW to the standards required of a global, competitive and liveable city is an attainable goal.

Chapter 1

This study

An Independent Public Inquiry (the *Independent Public Inquiry into Sydney's Long Term Public Transport Plan*, hereafter referred to as 'the Inquiry') has been established to create a Long Term Public Transport Plan for Sydney to inform decisions by future governments on the priorities over the next 30 years. The Allen Consulting Group was commissioned by the Inquiry to prepare this study.

The ultimate objective of this report is to develop an illustrative plan to *fully fund* the Long Term Public Transport Plan for Sydney recommended by the Inquiry. In particular, the study:

- identifies the available funding methods for a series of transport scenarios developed by the Inquiry and estimates the magnitude of the funds that may be available using these methods;
- sets out an illustrative funding plan that aligns payment with benefits, improves decision making, promotes the desired behaviours, provides steady revenue and that is sustainable in the long-run;
- analyses this illustrative funding plan in the light of data on the community's willingness to pay for improvements in public transport systems, derived from market research surveys commissioned by the Inquiry;
- identifies and evaluates the key risks of the proposed funding plan;
- assesses the impact of the illustrative funding plan on the State debt and credit rating; and
- discusses the capacity of the construction industry to deliver the projects proposed by the Inquiry.

There are some limitations in the scope of this report. The first is that the illustrative funding plan presented in this report assumes that the Inquiry's recommended strategy under each of the scenarios would achieve its proposed objectives —for instance, in terms of patronage growth in each transport mode— and would do so at the costs identified by the Inquiry. Any changes in the outcomes or costs of the strategies would need to be reflected in changes to the illustrative funding plan.

Secondly, this report did not involve developing a detailed financial model of the proposed projects or the identified potential revenue sources. The funding plan presented in this report is illustrative. It uses estimates based on averages (for instance, it uses average transport fare estimates instead of modelling all fare types and discounts). Its increases in fares, charges and taxes are illustrative, based on data on the community's willingness to pay researcj, and are not being recommended by the Inquiry, as many other options and combinations of options would be available. And the funding plan considers financing in a broad, generic sense, related to the overall cost of access to capital —for simplicity external capital contributions are viewed as debt.

Overall, the Inquiry does not intend to provide a fully-fledged business case to support a financial commitment to any particular project. If the NSW Government wished to pursue some of the ideas advanced by the Inquiry, numerous processes would need to occur, including relevant environmental assessments and the completion of business cases to identify the most appropriate funding and delivery models for particular projects.

The remainder of the report is structured as follows.

- Chapter 2 provides a background to this study.
- Chapter 3 discusses the expected costs associated with three different scenarios for Sydney's Long Term Transport Plan.
- Chapter 4 analyses potential funding sources for the proposed transport plan and how these different sources will contribute to the total funding mix.
- Chapter 5 discusses the mechanism to fully fund Sydney's long-term transport plan.
- Chapter 6 discusses the construction industry capacity to implement to undertake the infrastructure projects proposed by the plan.
- Chapter 7 provides our conclusions.

Chapter 2

Background and context

Sydney is Australia's largest city. As at June 2008, this urban centre had a resident population of around 4.4 million and employed approximately 2.2 million people and is still growing. The Australian Bureau of Statistics (ABS) forecasts that by 2036, around 6 million people are expected to call Sydney home. However, one of the critical issues facing Sydney is a continuing failure to invest in sufficient public transport infrastructure to meet the needs of its growing population. Large parts of Sydney lack effective public transport options to connect with the city's commercial and cultural hub.

Sydney has a history of failure to implement public transport plans and infrastructure promises. Just in the last decade a range of transport plans embracing major upgrades to public transport for the city have been developed, including Action for Transport 2010 (released in 1998), the 2001 Christie Report, the Metropolitan Rail Expansion Plan (MREP), the Rail Clearways Plan and most recently, a 30-year plan for Sydney's public transport created by Dr. Garry Glazebrook (Glazebrook 2009). However, only a few projects included in these plans have actually been delivered, and many have been cancelled or deferred. Examples include the Parramatta – Epping Rail Link, the North West Rail Link, the South West Rail Link, the Harbour Rail Link, and the North West Metro (Glazebrook 2009).

A key reason behind the failure to fully implement transport visions and plans of the past is money, or the lack of it. A public infrastructure plan without funding typically breaks down to piecemeal change or no change in the system. Indeed, the lack of long term funding commitments and strategic planning have seen ambitious transport projects become dominated by budget circumstances and resulted in suboptimal projects, disjointed delivery, cancellations and/or partial completions. This has translated in an inefficient, suboptimal and disjointed transport network that has seen Sydney falling behind other Australian and world cities in its public transport performance.

The situation where many public transport infrastructure projects that have been analysed exhaustively and found to be worthy, but are on hold or cancelled because of a lack of funds, is unsustainable — it is bringing new meaning to the term 'government failure'.

In light of this, a key contribution of the Inquiry is that it shows how to break the funding deadlock and reveals how it is feasible to have a robust long-term plan that *fully funds* the changes necessary to raise the capacity of Sydney's transport network to meet the needs of the 21st Century.

Chapter 3

The funding task

The first step in assessing the feasibility of sustainable funding arrangements for any proposed plan for Sydney's public transport is to establish the size of the "funding task"—in other words, the total amount of money that delivery of the strategy would require.

It is important to distinguish between what the strategy needs to fund, on the one hand, and what needs to be funded, regardless of the strategy, from the normal processes of government in the future.

Naturally, transport costs are expected to rise in the future whatever happens, given Sydney's continuing population growth and the demand for additional services. There will also be an underlying need for additional capital spending, enhancing the system and its capabilities to enable it to maintain functionality. These are all *baseline* costs. In contrast, the focus of this analysis is on funding the additional costs imposed by the recommended transport changes.

The Inquiry analyses three different scenarios of capital costs for major investment projects (see Figure 3.1): [1]

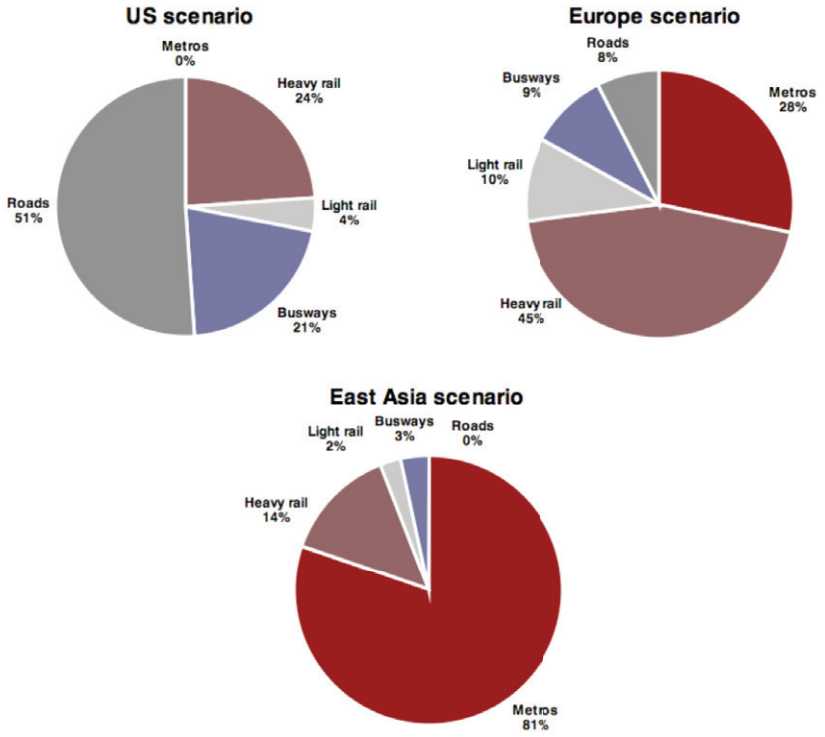
- *European scenario* — this scenario broadly balances investments across all the public transport modes, supplemented by a relatively small amount of investment on roads;
- *East Asian scenario* — the focus of this scenario is in investing in metros; and
- *US scenario* — this scenario would involve much lower density residential development with more urban sprawl, more dispersed employment locations and a heavy focus on road development, with only half of its funding being directed to public transport.

Notably, the US scenario was rejected by the Inquiry early in its investigations as counterproductive and hostile to the long-term sustainability of the city. However, it has been included in this report for the purposes of comparison, to permit an understanding of the likely effects on funding viability of a greater emphasis on roads and a lesser emphasis on public transport.

[1] More details on these scenarios are provided in the Inquiry's report.

Figure 3.1

PERCENTAGE OF INVESTMENT ACROSS PUBLIC TRANSPORT MODES ACROSS DIFFERENT INVESTMENT SCENARIOS



Source: Transport Public Inquiry.

3.1 Capital or infrastructure costs

The estimated capital costs for the projects under each scenario are presented in Table 3.1 and Figure 3.2. The start and completion dates for each of the projects are in parentheses. Notably, all three scenarios involve similar capital expenditure requirements of around $36 billion (real 2008–09 $) over the 30-year period to 2040.

Table 3.1

CAPITAL EXPENDITURE ON INFRASTRUCTURE PROJECTS UNDER THE DIFFERENT SCENARIOS

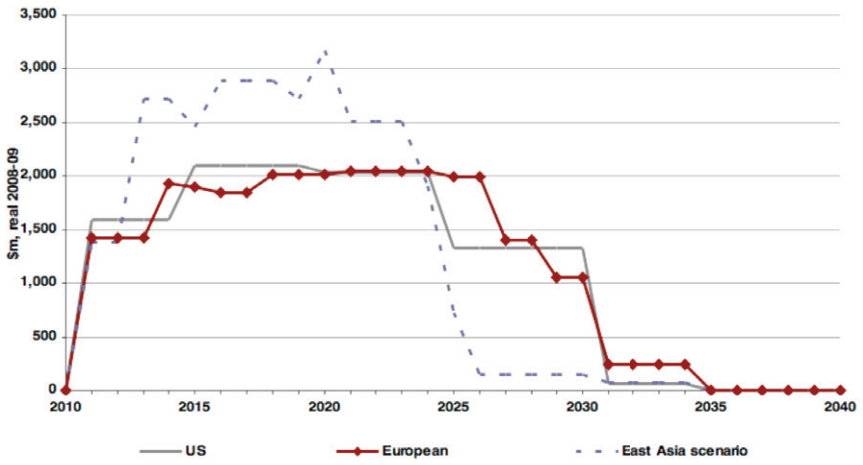
Project	Type	Costs (2008-09 $) and timeframes		
		US scenario	European scenario	East Asian scenario
North West Rail Link	Heavy rail	$3.7 bn (2015-19)	$3.7 bn (2011-15)	$3.7 bn (2016-20)
South West Rail Link	Heavy rail	$1.3 bn 2011-14	$1.3 bn (2011-14)	$1.3 bn (2011-14)
Epping-Parramatta Rail Link	Heavy rail		$2 bn (2014-17)	
New cross-CBD, cross-Harbour line	Heavy rail	$3.4 bn (2020-24)	$3.4 bn (2016-20)	
Liverpool-Bankstown Airport-Bankstown link	Heavy rail		$2 bn (2018-20)	
South East line	Heavy rail		$3 bn (2027-30)	
North West Rail Link line extension	Heavy rail		$0.4 bn (2027-29)	
South West Rail Link Bringelly extension	Heavy rail		$0.3 bn (2027-29)	
CBD Metro	Metro			$5.3 bn (2011-15)
West Metro (under European scenario, with extension from Central to Barrangaroo)	Metro		$10.12 bn (2021-26)	$8 bn (2013-18)
South East Metro	Metro			$3 bn (2016-19)
Rozelle-Macquarie Park metro	Metro			$4 bn (2019-25)
North East Metro, including metro harbour crossing	Metro			$9 bn (2019-24)
Light rail and ferry projects (inner suburbs)	Light rail/ferry	$0.9 bn (2015-24)	$3 bn (2011-20)	$0.75 bn (2021-30)
Light rail (outer suburbs)	Light rail	$0.6 bn (2025-34)	$0.6 bn (2015-34)	$0.15 bn (2025-34)
Busways and 'Bus First' roads (inner/middle)	Busways and bus priority	$3 bn (2011-30)	$1.2 bn (2011-30)	$0.6 bn (2015-34)
Buswaysand 'Bus First' roads (outer)	Busways and bus priority	$4.3 bn (2011-30)	$2.15 bn (2015-34)	$0.65 bn (2015-34)
Motorways	Motorways	$18 bn (2011-30)	$2.7 bn (2015-34)	
Total		**$35.2 bn**	**$35.87 bn**	**$36.45 bn**

Note: Excludes ongoing investment in things like clearways, upgrading stations to be accessible, etc. Numbers in parenthesis are start and completion dates for the projects. Some of the cost estimates in this table are project cost estimates published by the government, but most have had to be estimated from the cost of other projects.

Source: Transport Public Inquiry.

Figure 3.2

CAPITAL COSTS ASSOCIATED WITH DIFFERENT SCENARIOS ($M 2008-09)



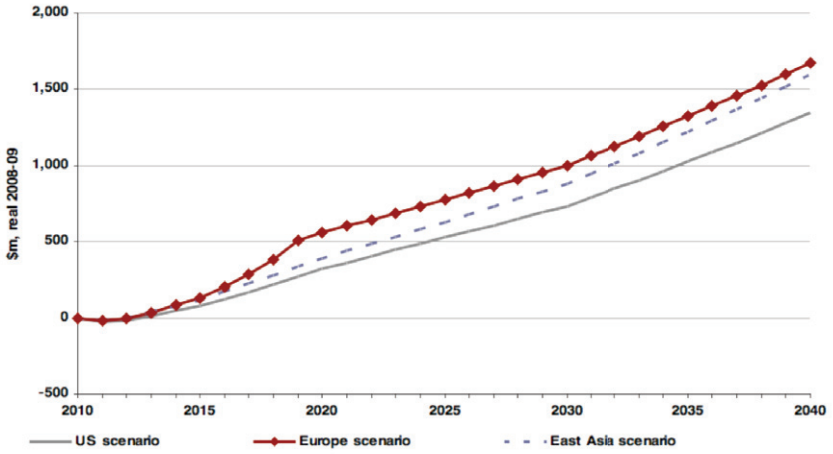
Source: Transport Public Inquiry.

3.2 Operating costs

In addition to capital costs, additional operating costs would be associated with each of the scenarios (see Figure 3.3). These would arise in areas where, for example, there was an increased provision of services or patronage increases generated by the projects generated additional costs. It is, of course, important to fund the additional operating costs of infrastructure projects. A failure to do so could mean that service frequencies or other aspects of the quality of services would not be maintained, reducing the benefits of the projects.

Figure 3.3

OPERATING COSTS ASSOCIATED WITH DIFFERENT SCENARIOS ($M 2008-09)



Note: Includes heavy rail/metro, bus and light rail. Based on current fare structure.

Source: Estimated by the Allen Consulting Group based on information provided by the Transport Public Inquiry.

These operational costs are based on the Inquiry's views about likely operating costs per passenger and patronage growth under each scenario, assuming a continuation of current fare structures for CityRail and the use of the same current fare structures for any new metros (see Box 3.1).

Box 3.1

ASSUMPTIONS USED TO ESTIMATE OPERATING COSTS UNDER DIFFERENT SCENARIOS

The following assumptions have been used to estimate the operating costs of each transport mode.

Heavy rail/ Metro

- Baseline rail operating costs were obtained from IPART (2008a) — IPART forecasts efficient operating expenditure for 2009-10 to be $2,036 billion in total.
- Additional operating costs under each scenario were calculated using the following patronage growth assumptions:
  - US scenario: 2.0 per cent growth per annum.
  - European scenario: 2.5 per cent growth per annum.
  - East Asian scenario: 3.0 per cent growth per annum.
- It was assumed that there will be efficiency gains equivalent to 1 per cent per annum in operating cost per passenger. These gains have been included as a cost offset.

Light rail

- Baseline operating costs = $1.70 per passenger.
- Additional operating costs under each scenario were calculated using the following patronage growth assumptions:
  - US scenario: 20 per cent growth per annum until patronage reaches 40 million, then 2.5 per cent growth per annum.
  - European scenario: 50 per cent growth per annum until patronage reaches 100 million, then 2.5 per cent growth per annum.
  - East Asian scenario: 10 per cent growth per annum until patronage reaches 20 million, then 2.5 per cent growth per annum.
  - It was assumed that there will be efficiency gains equivalent to 1 per cent per annum in operating cost per passenger. These gains have been included as a cost offset.

Buses

- Baseline operating costs for were obtained from IPART (2008b).
- Additional operating costs under each scenario were calculated using the following patronage growth assumptions:
  - US scenario: 3.0 per cent growth per annum.
  - European scenario: 2.5 per cent growth per annum.
  - East Asian scenario: 2.0 per cent growth per annum.
- It was assumed that there will be efficiency gains equivalent to 0.5 per cent per annum in operating cost per passenger. These gains have been included as a cost offset.

Source: Transport Public Enquiry.

As shown in Figure 3.3, the operational costs in the initial years under all three scenarios would be lower than they would be if nothing were done, because under all three scenarios the Inquiry's illustrative funding plan would increase public transport fares, as described in following sections, to help fund the investment projects and this would produce an initial fall in patronage. Total operational costs are directly proportional to patronage, so these costs would be lower by almost $200 million (2008–09 $) in 2011.

From then on, however, the investment projects would improve public transport frequencies and capacities and extend the public transport network, leading to patronage increases. It may be seen from Figure 3.3 that the scenario with the highest additional operating costs would be the European scenario, reaching to $1,613 million (2008–09 $) in 2040. (As discussed later, it would also produce the highest fare revenue.) Part of the increase in operating costs under the European scenario would arise from its significant early expansion of the light rail system, which is currently very small.

The lowest incremental operating costs would be for the US scenario, reflecting its lack of emphasis on public transport. Operating costs under the US and East Asian scenarios would be higher by $1,242 million and $1,573 million, respectively, in 2040 (2008–09 $).

3.3 Finance costs

The very nature of infrastructure provision means that capital expenditure generally occurs well before services are provided and fares can be collected. This difference in time between the infrastructure expenditure and the receipts results in a funding gap that needs to be financed.

The logic behind including the cost of finance is that the illustrative long-term plan for Sydney's public transport should be *fully funded*. That is, the funding plan should be designed so that the revenue generated through all the various funding sources eventually offsets the total costs of the projects and that that must include the costs of finance (including capital repayment and servicing costs — debt and interest). The cost of finance is grounded on the importance of opportunity cost. Even if a government could pay all of a capital investment within its existing budget revenue (which is unlikely in practice), it is important to keep in mind that the cost of doing this is that the government is then prevented from using that money to deliver other public services, or repay debt.

Finance costs are shaped by many factors. One factor is the length of the gap in time between when costs are incurred and when funds become available. During these years, the costs of the transport projects would need to be financed through contributions from investors. Investors may make contributions in terms of debt or equity or a mixture of both. In any case there is a cost of finance that must be met: investors have to be paid (in terms of interest on debt or dividends) and investors may also expect to have their contribution repaid. The costs of finance becomes apparent after assessing other costs and how much revenue is raised and when. This factor is therefore analysed separately and later in the study after the sources of funds are examined.

3.4 Total costs

The total costs of the transport plan in terms of capital and operating expenditures (excluding finance costs) will amount to between $52 and $60 billion over 30 years (real 2008-09 $), depending on the investment scenario (see Table 3.2).

Table 3.2

CAPITAL AND OPERATIONAL COSTS ASSOCIATED WITH DIFFERENT SCENARIOS, $B 2008-0

	Capital expenditure	Operational cost	Total	Annual average
US scenario	$35.2	$16.8	$52.0	$1.7
Europe scenario	$35.9	$23.8	$59.6	$2.0
East Asia scenario	$36.4	$21.3	$57.7	$1.9

Source: Estimated by Allen Consulting Group based on information provided by the Transport Public Inquiry.

Chapter 4

Funding approach

4.1 Key funding principles

A number of broad principles have provided useful guidance to the Inquiry when selecting funding approaches. These are summarised in the points below.

- *Principles that relate to good taxation should apply to a funding mechanism* — these principles include:
  - effectiveness — does the mechanism have the capacity to raise the funds required when they are needed?;
  - efficiency — this goal seeks to ensure an optimal allocation of resources. A key questions is, does the mechanism provide appropriate signals or incentives? Does it apply prices that reflect the true or full costs?;
  - equity — this aim seeks to ensure that the mechanism is fair. Views about fairness are often shaped by attitudes towards beneficiary pays concepts and consideration of capacity to pay (or affordability). The adoption of a range of funding mechanisms spreads the cost burden and makes the impost on any particular stakeholder more affordable;
  - low administration costs — funding approaches have to be practical. With greater simplicity it is cheaper for government to collect or raise the funds required (low administration costs);
  - stability/reliability of the revenue base — a consistent and predictable source of revenue is preferred to a source that is subject to shifting and unforeseeable influences. Moreover, a source of revenue that grows as the economy grows (and can thus broadly move in line with the attendant demands for services that this entails) is also preferred;
  - low compliance costs, certainty and transparency — more transparency, generally results in simpler, lower cost, more efficient arrangements; and
  - stakeholder support — ultimately, every funding approach requires making someone pay and this inevitably involves discontent from some in the community. Revenue collection is an unpopular function of government that good governments get on with, however, governments typically give consideration to stakeholders' reaction to funding options.
- *Beneficiary pays* — payment arrangements that align payment with benefits tend to be more acceptable and efficient in the longer term.
- *Widespread benefits suggests a wide funding net* — good public transport systems tend to have a range of beneficiaries, so it is often the case that a good funding plan will draw on a number of funding mechanisms seeking contributions from this range of beneficiaries. For example, non-users of public transport (such as car drivers) may benefit from reduced congestion and improved air quality.

- *Efficiency is assisted with useful price signals* — funding mechanisms can provide signals about behaviour that ought to be encouraged or discouraged. Unsustainable activities or activities that impose large costs on other parts of the community should face higher costs.
- *Sustainable funding arrangements for public infrastructure have to take a whole of life perspective* — they have to look beyond initial capital expenditure and cover additional ongoing costs that can be expected.
- *Appropriateness* — funding should be linked to the infrastructure taking into account spatial and temporal issues — arrangements should have nexus. In addition, costs should be allocated so that the contributing population only pays for its share of the total demand (the concept of apportionment).
- *Funding mechanisms must work in tandem with other elements of the strategy to raise efficiency* — examples include altering user charges that encourage people to reduce congestion or factoring in social and environmental externalities into prices, especially where use is currently unpriced.
- *No free lunch* — cross subsidies can change who pays for public transport, but in the end the whole community pays. There are no funding sources that are costless.
- *Costs should be aligned with willingness to pay* — the incremental costs of improving the transport system should be kept to within the amount that stakeholders indicate they are willing to pay. This should be based on evidence about people's willingness to pay obtained within a transparent and robust examination.

Notably, the order or the guiding principles presented above is not an indication of their relative priority. For instance, the Inquiry views that the willingness to pay for improved transport systems in Sydney is a critical consideration. In light of this, a key feature of the Inquiry has been to seek insights directly from the community about its needs and willingness to pay. The findings of an independent study conducted to assess willingness to pay are reported more fully in the Inquiry report.

4.2 Types of funding mechanisms

The main options for financing public urban infrastructure are as follows.

- Budget — this source of finance relies upon the government's revenue base (i.e. taxes and other sources of revenue) or by reordering of expenditure plans (i.e. budget cuts).
- Debt — in the case of NSW, this involves borrowing through NSW Treasury Corporation.
- User charges — includes charges for services such as electricity as well as tolls on facilities such as roads.
- Infrastructure levies — this approach also includes development charges. Under this approach levy proceeds are generally linked or hypothecated to spending on specific activities (in this case the infrastructure to be provided). Compulsory contributions, in cash or in kind, are closely related. Infrastructure levies typically indirectly capture an element of value uplift.

- Value capture (betterment) — benefit or betterment charges. In these arrangements charges are applied to individuals that benefit from the provision of infrastructure as reflected by (and proportional to) uplift in land value.
- Private financing — involves private investors taking responsibility for the financing and often the development of infrastructure services. Public-private partnerships (PPP) in various forms are common in infrastructure provision.

4.3 The illustrative funding approach

The illustrative funding approach presented in this report sought funding from a variety of sources, reflecting the variety of benefits. The broad alignment is reflected below:

- transport fares — transport users who benefit from improved services;
- a metropolitan levy for households and businesses — seeking a contribution from people in the community who can expect to see a lift in property values due to improved access to transport services, even if they do not actually use them;
- parking levies — obtaining a contribution from businesses and people who access the city and other commercial areas who benefit from improved transport services and reduced congestion;
- congestion pricing — this arrangement places a price signal to encourage people to avoid adding to congestion and applies a charge to people when they do add to congested facilities;
- registration levies — obtains a contributions that is inexpensive to collect from car and motor vehicle users who can expect to benefit from a more efficient transport system, including improved public transport, which improves the efficiency of the system at large; and
- government funds — seeking a contribution from the wider community in proportion to the gains they will obtain from making the city of Sydney function with less transport friction.

The broad approach applying a range of collection tools maximises the stability of the revenue base while limiting the amount of funds that have to be raised from any specific transport user. Moderate fare and levy increases are matched congestion charges and registration levies to minimise the likelihood of public transport users switching to private motor vehicles. This approach also ensures that low-income individuals are not priced out of accessing public transport.

The use of metropolitan levies on households and businesses reflects the fact that all citizens will benefit from an improved public transport system through reduced congestion, reduced greenhouse gases, improved air quality and more vibrant communities. Such levies also provide a more stable funding base.

Furthermore, by relying primarily on existing sources of revenue (with the exception of a CBD congestion charge) the proposed funding approach minimises the administrative costs associated with revenue collection and improves transparency.

4.4 Revenue sources

Reflecting the principles reviewed above, the Inquiry views that the mechanism used to raise funds for improved transport services in Sydney must be based on a broad range of revenue raising instruments. The range of instruments that are used in the illustrative funding approach to fund the Inquiry's recommendations includes the following:

- heavy rail fares;
- metro rail fares;
- bus fares;
- light rail fares;
- ferry fares;
- parking space levy;
- congestion charges (in the CBD and/or on existing tollroads or other roads);
- vehicle registration levy;
- land capture levies (betterment taxes);
- metropolitan levy for households;
- metropolitan levy for businesses; and
- Commonwealth Government support (including, in particular, the Building Australia Fund and possible future carbon taxes).

The following sections briefly analyse each of the potential funding sources and provide an illustration of the possible quantum of funds that might be raised from each of these sources.

Heavy rail and metro fares

Public transport users are likely to receive significant benefits from a sound long-term public transport plan, through more frequent services and better, faster and easier transport links to where they want to go.

The Inquiry's market research studies have confirmed that people who regularly use rail transport in Sydney consistently see aspects of Sydney's existing rail services as a problem and place a high value on improving the system, while others are deterred from using the system, or unable to use the system at all, because of its deficiencies. Accordingly, it is appropriate for rail fares, on both the expanded and improved heavy rail system and on any new metro rail system, to contribute to the cost of a long-term transport plan.

In the Inquiry's illustrative funding plan, an increase of approximately 38 cents (real) in single rail fares in 2011 has been modelled, to help pay for improvements in services. This increase in fares is based on data from the community's willingness to pay survey undertaken by the Inquiry (see section 5.2 below).

Subsequently, the additional fare has been assumed to increase by 1.3 per cent per year in real terms for the period from 2012 to 2040. This annual increase is in line with the historical increase in real transport fares in Sydney between 1999 and 2009. Consequently, these assumed fare increases would increase average real rail fares from around $2.37 in 2010 to $2.75 in 2011 and $2.93 by 2040 (all 2008–09 $).

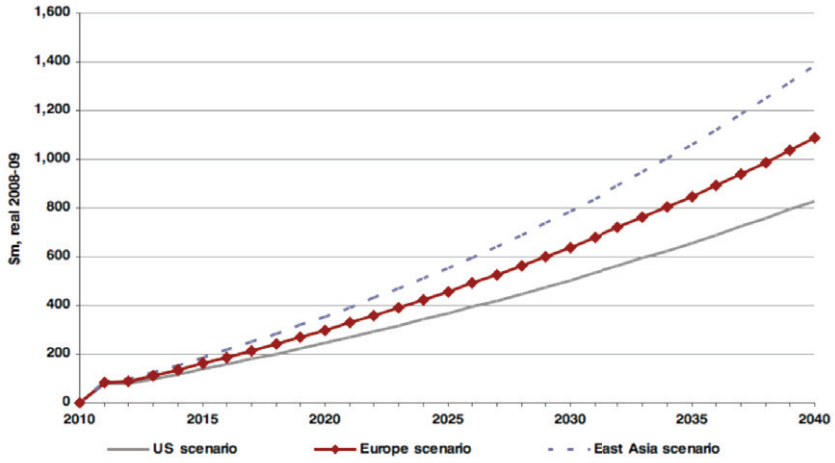
To put these illustrative fare increases in perspective, under IPART's 2009 CityRail fare determination (IPART 2008a), the prices of CityRail tickets are currently being increased by a weighted average of 12 per cent in real terms over four years (from 4 January 2009 to 31 December 2012). The increases modelled in the Inquiry's illustrative funding plan would be on top of these IPART increases.

Rail patronage is expected to grow at different rates under the three scenarios, so the revenue collected under each scenario would also be different (Figure 4.1).

Under the US scenario, the increase in rail fares would collect approximately $12 billion in additional revenue (2008–09 $) over 30 years, under the European scenario it would collect around $15 billion and under the East Asian scenario it would collect approximately $19 billion. These estimates have been adjusted to account for a reduction in passenger journeys as a result of the increases in fares.

Figure 4.1

ADDITIONAL FAREBOX REVENUE FROM HEAVY RAIL AND METROS UNDER DIFFERENT SCENARIOS



Note: Additional farebox revenue generated as a result of heavy rail and metro projects under the different scenarios, assuming both heavy rail and metros would use the current CityRail fare structures.
Source: Allen Consulting Group estimates based on IPART (2008a) and information provided by the Inquiry.

Bus fares

Users of bus services in Sydney reported in the survey conducted for the Inquiry that they would value improvements in the transport system at large, including buses. Further, as direct beneficiaries of the proposed public transport improvements bus passengers should also make a contribution to their funding.

In line with the rail fare increases described above, the illustrative funding plan includes an increase in bus fares of 38 cents in 2011, followed by a 1.3 per cent per annum real increase in the additional fare for the period from 2012 to 2040.

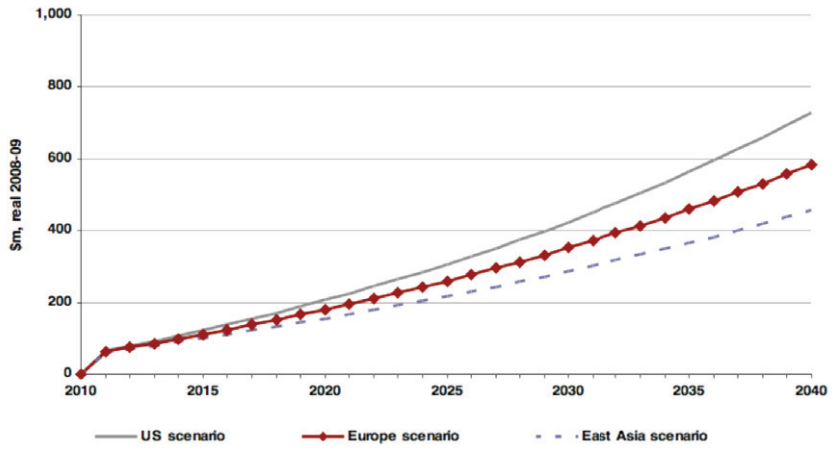
This would mean an increase in average bus fares from around $1.27 in 2010 to $1.65 in 2011 and $1.82 by 2030.

The additional revenue from bus fares would grow over time in line with patronage growth, which would be different under each scenario (see Box 3.1).

As shown in Figure 4.2, under the US scenario, the increase in bus fares would collect approximately $10 billion in additional revenue (2008–09 $) over 30 years. Under the European scenario it would collect around $9 billion and under the East Asian scenario it would collect approximately $7 billion. Again, these estimates account for a reduction in passenger journeys caused by the increased fares.

Figure 4.2

ADDITIONAL FAREBOX REVENUE FROM BUSES UNDER DIFFERENT SCENARIOS



Note: Additional farebox revenue generated as a result of the busway and "Bus First" road projects under the different scenarios.

Source: Allen Consulting Group estimates based on IPART (2008b) and information provided by the Inquiry.

Light rail fares

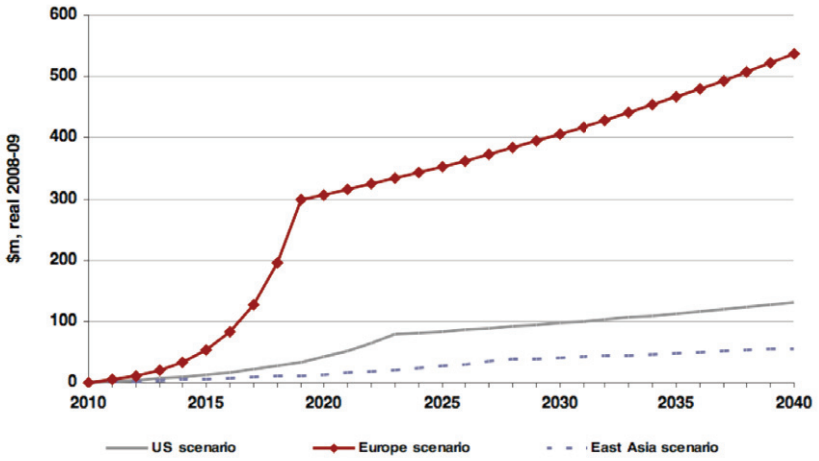
Light rail fares have been modelled to go up by similar increments to the fares for other public transport modes, to contribute fairly towards the cost of Sydney's public transport plan.

There are currently about 4 million passenger journeys per year on light rail in Sydney, at an average fare per passenger of $1.70.

From this base it has been estimated that under the US scenario, the increase in light rail fares would collect approximately $2 billion in additional revenue (2008–09 $) over 30 years (Figure 4.3). Under the European scenario it would collect around $9 billion, and under the East Asian scenario it would collect approximately $849 million. These estimates have been adjusted to account for a reduction in passenger journeys as a result of the increased fares.

Figure 4.3

ADDITIONAL REVENUE FROM LIGHT RAIL UNDER DIFFERENT SCENARIOS



Note: Additional farebox revenue generated as a result of the light rail projects under the different scenarios.

Source: Allen Consulting Group estimates based on light rail data provided by the Inquiry.

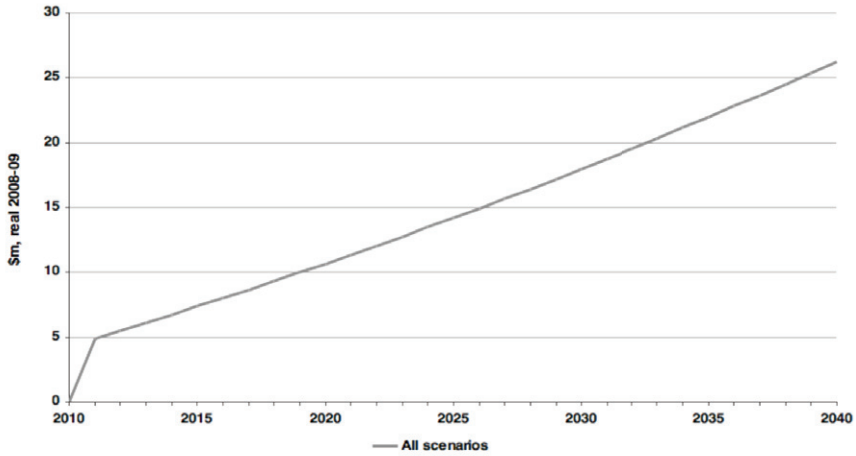
Ferry fares

While there are few direct additional investments for ferries in the Inquiry's recommended long-term transport plan, it is expected that ferry passengers will obtain a range of benefits from increased connectivity with bus and light rail services, integrated fares without any interchange penalties and other wider public transport improvements. Ferry passengers should therefore make a contribution to the costs of the system-wide public transport improvements.

Budgeted farebox revenue from ferry passengers for the year 2008–09 was $49.4 million (Sydney Ferries, 2008). From this base it has been estimated that increases in ferry fares similar to those applied to the fares for other transport modes would generate around $448 million in additional revenue (2008–09 $) over 30 years under all three scenarios (Figure 4.4). (The revenue would be the same under all the scenarios because they share the same assumptions regarding ferry patronage growth.) Again, this estimate accounts for a reduction in passenger journeys as a result of the increased fares.

Figure 4.4

ADDITIONAL REVENUE FROM FERRIES UNDER ALL SCENARIOS

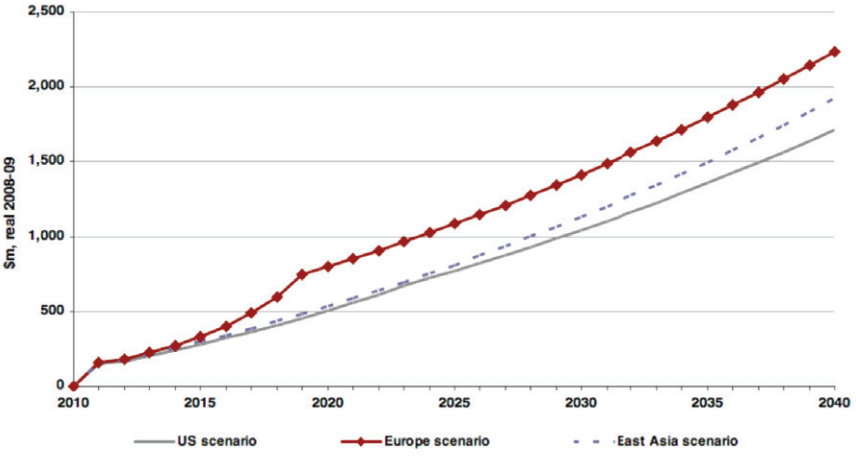


Source: Allen Consulting Group estimates based on Sydney ferries (2008) and data provided by the Inquiry.

The total additional farebox revenue from different transport modes under different scenarios is shown in Figure 4.5.

Figure 4.5

TOTAL ADDITIONAL FAREBOX REVENUE UNDER DIFFERENT SCENARIOS ($M 2008-09)



Note: Total additional farebox revenue resulting from the heavy rail, metro, light rail and bus projects associated with the different scenarios, assuming current fare structures and the use of current CityRail fare structures for the new metros

Source: Allen Consulting Group estimates based data provided by the Inquiry.

Metropolitan public transport levies

This funding option would involve the application of levies on households and businesses in Sydney's metropolitan areas that would benefit from the new integrated public transport network.

These levies would help "capture" part of the benefits of some of the positive externalities associated with public transport infrastructure—such as reduced congestion, improved air quality and reduced greenhouse gas emissions—which accrue to households and businesses regardless of whether they individually use the public transport infrastructure and services. In addition to these general community benefits, businesses are also likely to benefit more specifically from becoming more accessible to both clients and employees.

The levies would be applied on top of existing council rates. This would reduce administrative costs, as there are already systems for collecting council rates, and would align well with existing governance structures. It would also add to the fairness of the approach, as wealthy landowners generally pay higher rates and they would therefore make a larger contribution to the costs of the transport improvements.

Household public transport levy

Data from the NSW Department of Local Government shows that Sydney metropolitan councils[2] collected $1.2 billion from 1.6 million rateable residential properties households in 2007-08. The average rate for residential properties was therefore $756 per year in 2007–08, or around $779 per year in 2008–09, assuming an average increase in line with the Sydney CPI.

It has been assumed that in the future councils will increase their rates by an average of around 1 per cent per year in real terms, in line with the growth in Sydney's economy. On this basis, the average residential rate has been assumed to be $795 in 2010–11, $878 in 2020–21 and $1,061 in 2040 (all 2008–09 $).

Under the illustrative funding plan, the public transport levy on rateable residential properties, applied on top of their rates, would be equal to 20 per cent of their rates from 2011. This means the average public transport levy would be around $157.70 per residential property in 2010–11. This amount is in line with data on the community's willingness to pay such a levy, derived from the Inquiry's market research survey on long-term public transport improvements.

This levy would take the total of the average council rate plus the levy to around $953 per residential property. Over time, the average public transport levy would increase gradually to around $210 per residential property in 2040 (taking the total of the average council rate plus the levy to about $1,271 per residential property in 2040). All of these estimates are expressed in 2008–09 $.

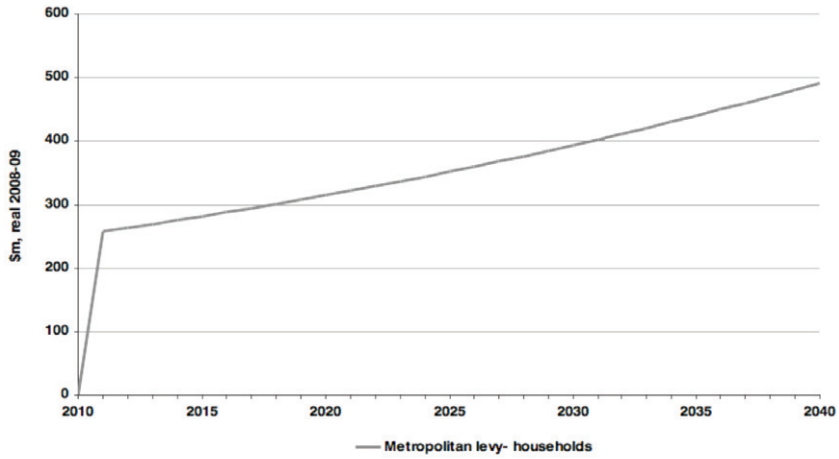
The Australian Bureau of Statistics (ABS 2004) has estimated that the number of households in Sydney will increase at a compound annual growth rate of 1.25 per cent between 2001 and 2026.

[2] The 43 local government areas included in this report are consistent with those used in the NSW Government's Metropolitan Strategy.

If it is assumed that this increase in the number of households will lead to a proportional increase in the number of rateable residential properties, the metropolitan residential property public transport levy would deliver a total of an additional $10.9 billion in funds over the 30-year period to 2040 (Figure 4.6).

Figure 4.6

ADDITIONAL REVENUE FROM METROPOLITAN LEVY ON HOUSEHOLDS



Source: The Allen Consulting Group estimates based on data from DLG NSW (2009) and ABS (2004).

Businesses public transport levy

Under the illustrative funding plan, the public transport levy on rateable business properties, applied on top of their rates, would be equal to 15 per cent of their rates between 2011 and 2020 and 22 per cent from 2021.

Data from the NSW Department of Local Government show that Sydney metropolitan councils collected $506 million from 108,824 rateable business properties in 2007–08. The average rate for business properties that year was therefore $4,650.

After adjusting for inflation and applying an assumed real 1 per cent per annum increase in business rates, the average business property rate is estimated to be $4,891 per property in 2010–11, $5,402 in 2020–21 and $6,526 in 2040 (all 2008-09 $).

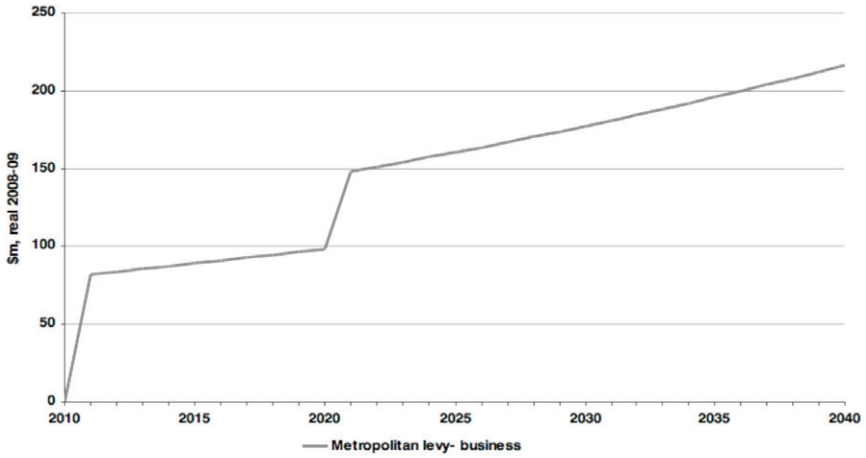
Assuming for the moment that there would be no exemptions for (say) small businesses, this means that under the illustrative funding plan the average business property public transport levy would be around $734 per rateable business property in 2010–11 (taking the total of the average council rate plus the levy to around $5,624 per business property), about $1,198 per business property in 2020–21 (taking the total of the average council rate plus the levy to about $6,600 per business property) and around $1,447 per business property in 2040 (taking the total of the average council rate plus the levy to about $7,974 per business property). All of these estimates are expressed in 2008–09 $.

It is emphasised that these figures are indicative and refer to average business rates and levies. In reality, would almost certainly be exemptions for small businesses.

According to Ernst & Young (2008), Sydney's average economic growth rate over the next 30 years or so is expected to be approximately 0.9 per cent per annum. If it is assumed that the number of business properties will increase in line with this growth in the economy, the new metropolitan business property public transport levy would raise an additional $4.5 billion in funds over the 30-year period to 2040 (Figure 4.7).

Figure 4.7

ADDITIONAL REVENUE FROM METROPOLITAN LEVY ON BUSINESS



Source: The Allen Consulting Group estimates based on data from DLG NSW (2009) and Ernst & Young (2008).

Parking space levies

This funding method would entail increases in the parking space levies that are currently applied, to help fund public transport projects, in the CBD, North Sydney, Milsons Point, Bondi Junction, Chatswood, Parramatta and St Leonards.

These increases would reflect the facts that the proposed public transport investments would improve the public transport options available to car users and the increase in the parking space levies would encourage them to switch to public transport.

This measure would be effective in terms of creating a relatively stable revenue base, unless parking spots were converted to something else, and would also provide a direct incentive for people to use public transport.

The potential to increase the parking levy is, however, somewhat limited, as the State government recently increased the levy quite substantially. Indeed, as shown in Table 4.1, between 2008–09 and 2009–10 the parking space levy more than doubled in its Category 1" areas (the CBD, North Sydney and Milsons Point) and increased by more than 50 per cent in "Category 2" areas (Bondi Junction, Chatswood, Parramatta and St Leonards).

Table 4.1

PARKING SPACE LEVY, NSW

	2008-2009	2009-2010
Category 1 Areas	$950	$2,000
Category 2 Areas	$470	$710
Average	$710	$1,355

Note: Category 1 areas include Sydney, North Sydney and Milsons Point. Category 2 areas include Bondi Junction, Chatswood, Parramatta and St Leonards.

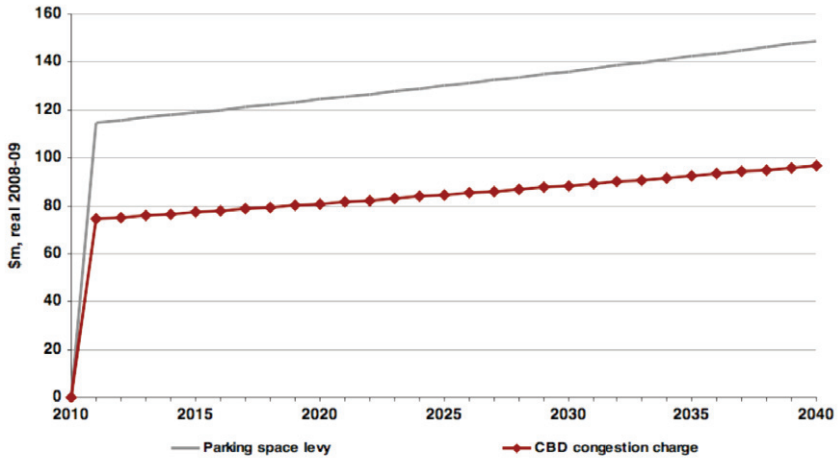
Source: Office of State Revenue (OSR) of NSW.

The Inquiry's illustrative funding plan has modelled a $7.19 per day real increase in the parking levies from 2021. Again, this amount is in line with data on the community's willingness to pay such an increase, derived from the Inquiry's market research survey on long-term public transport improvements.

The number of car parking spaces in the areas subject to the parking levy has been assumed to increase by 0.9 per cent per annum, in line with Ernst & Young's 2008 estimates of Sydney's average growth. This means the increase in parking levies would generate some $3.9 billion of additional revenue over the period to 2040 (Table 4.1).

Figure 4.8

ADDITIONAL REVENUE FROM AN INCREASE IN ROAD CHARGES



Source: Allen Consulting Group estimates based on data from EY (2008) and ABS.

Congestion charges

CBD congestion charge

CBD congestion charges have been introduced in a number of cities around the world, including London, Singapore and Stockholm. The type of CBD congestion charge modelled for the Inquiry's illustrative funding plan is a "cordon" charge for vehicles entering the CBD, other than buses, taxis and commercial vehicles.

It has been estimated that in 2010–11 10 million vehicles of types that would be subject to this charge will enter the Sydney CBD region. This is a conservative estimate, based on the work of Glazebrook (2003).

The number of cars entering the CBD in the future has been assumed to increase by 0.9 per cent per annum, in line with Ernst & Young's 2008 estimates of Sydney's average growth. On this basis, if a $7.46 per vehicle congestion charge were applied, in line with the findings of the Inquiry's willingness to pay survey, this measure would raise around $2.6 billion in additional revenue by 2040 (Figure 4.8).

Congestion charges in existing tollroads

This potential funding mechanism would entail the raising of additional revenue through levies on existing road tolls in Sydney.

The Inquiry's illustrative funding plan does not factor in any such levies at present, however, because the Inquiry's market research survey questions did not expressly explore respondents' willingness to bear additional road toll charges as one of the measures which might help fund significant long-term public transport improvements.

So while it is quite possible that additional road congestion charges in the future will include congestion charges on tollroads, the Inquiry's modelling exercise has excluded this possibility from the indicative funding plan in order to avoid any potential for double counting or other overstatement of the community's willingness to pay.

Vehicle registration levy

Because investments in public transport infrastructure are expected to reduce congestion and a proportion of the funds under two of the three scenarios would be directed towards roads, a vehicle registration levy is an appropriate mechanism to capture some of the benefits of the long-term public transport improvements.

In the Inquiry's illustrative funding plan this levy has been modelled as an annual charge on all registered passenger vehicles in the Sydney metropolitan area.

The illustrative funding plan assumes no additional vehicle registration levy in the initial period from 2011 to 2020. This is because the Inquiry's willingness to pay survey suggests that on average households would only be willing to bear an additional $157.70 in tax as part of the funding of major long-term public transport improvements, and in the Inquiry's indicative funding plan this amount has already been assumed to be raised through the household public transport levy added to collected with residential rates. Any further public transport tax on households, even if in the form of a vehicle registration levy, would therefore exceed the community's willingness to pay such a household tax.

However, the illustrative funding plan assumes that from 2021 a vehicle registration levy would be applied—effectively as a "balancing item"—if this were necessary to ensure the overall package of funding measures for each scenario would fully recovery the costs associated with the scenario, including its costs of debt repayments and interest.

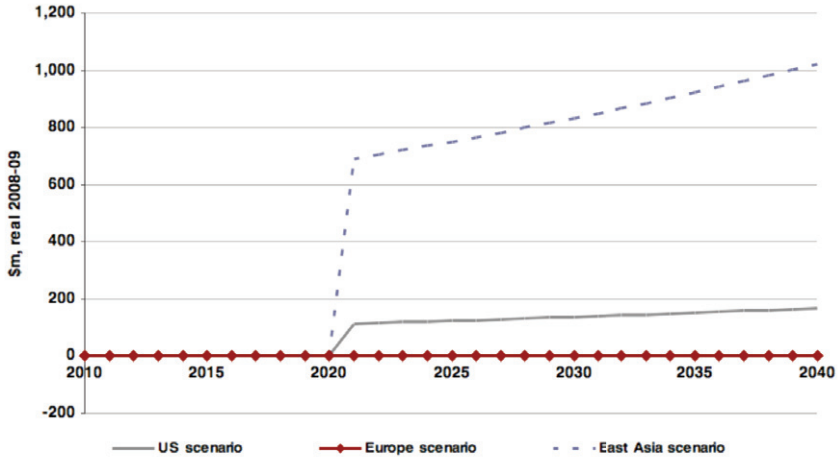
As such, the levy would be different under each of the three scenarios. No vehicle registration levy would be needed under the European scenario. The levy would have to be around be $47 per vehicle under the US scenario, and would have to be much higher under the East Asian scenario, at $287 per vehicle, in order to cover the higher financing costs associated with this scenario (all 2008–09 $)

It is estimated that this registration levy would raise:

- approximately $2.8 billion of additional revenue (2008–09 $) over the period to 2040 under the US scenario;
- nothing under the European scenario; and
- approximately $16.9 billion under the East Asian scenario (Figure 4.9).

Figure 4.9

REVENUE FROM A REGISTRATION LEVY FOR PASSENGER VEHICLES IN SYDNEY



Source: Allen Consulting Group estimates based on data from RTA.

Land value capture levies

Land value capture levies (also known as betterment taxes) are regularly proposed by some stakeholders as a means to capture a public return from the increase in property value created as a result of a major public investment in infrastructure. They are seen as particularly relevant where developers and property owners are expected to benefit from increases in land values from public investment in new transport corridors.

However, value capture levies are not necessarily a guaranteed means of raising finance. Key issues related to value capture mechanisms include the following.

- In practice is difficult to discern the change in property values associated with the infrastructure improvements. Indeed, identifying and accurately quantifying the benefits attributable to new infrastructure (both geographically and over time) and defining a benefit area is not a simple exercise. The latter is especially problematic if benefits accrue quite widely.

- Most land value capture levies distort the efficient allocation of resources. The difficulty mentioned above tends to make most measures arbitrary and not cost reflective.
- These levies can discourage the type of behaviour that the Inquiry is trying to encourage, that is, for people to live in areas well connected to the public transport network. Using land capture value levies entails the risk of providing an incentive for people to move to areas that are not levied, and hence, not serviced by the proposed improved public transport network.
- Land value capture levies have equity effects that are generally regressive as developers generally pass these changes on to customers. For instance, in the case of developer charges this implies that the incidence of the levy is passed on to new homebuyers or tenants of commercial developments. When the price of new houses rise, so does the price of its close substitute, existing housing. Thus existing homeowners are made wealthier while renters and prospective homebuyers face increased prices for new homes.
- Land value capture levies involve a high level of disputation because they tend to be not transparent and there is considerable scope for arbitrary, ad hoc administrative decision making. This adds significantly to uncertain outcomes, commercial risk and ultimately raises the cost of capital to the underlying industry.

In view of the risks and uncertainties associated with this type of financing instrument, the Inquiry's illustrative funding plan has not included this mechanism as a source of revenue.

However, the Inquiry does not have a definite view about whether this instrument should be ruled in or out as a source of revenue in the future. Under other funding plans it might be included.

Commonwealth Government Support

In its 2009–10 budget the Commonwealth Government budgeted $22 billion for the Building Australia Fund to improve the quality, adequacy and efficiency of transport, communications, energy, education and health infrastructure across Australia. In 2009 Victoria received $3.2 billion from this fund for major rail projects.

The Commonwealth Government has a long history, dating back well before the establishment of the Building Australia Fund, of funding major transport infrastructure projects around Australia, particularly projects deemed worthy of the Commonwealth's support. It is therefore reasonable to expect some Commonwealth Government support for the public transport projects proposed by the Inquiry.

In the Inquiry's illustrative funding plan it has been assumed that the Commonwealth Government would contribute about $3.5 billion over the next four years, or an average of $875 million per annum. This amount is comparable to the $3.2 billion given to Victoria in 2009, albeit at a lower per capita rate.

In addition, the Commonwealth Government could contribute using funds collected from the emerging Carbon Pollution Reduction Scheme (CPRS).

The Garnaut Climate Change Review observed that land-use improvements and the provision of public transport were two of only a very small number of ways to combat urban land transport's greenhouse emissions, and that "support for public infrastructure" was one area to which revenue from the scheme could be directed.

At present it is proposed that fuel for road transport will be excluded from the proposed emissions trading scheme, but this is subject to a review after the opening years. Instead of exempting transport fuel in this way, it may be more beneficial to apply a specific, set premium to the existing fuel excise and then recycle these funds by investing in transport options which are less greenhouse gas intensive.

The Inquiry's willingness to pay survey has indicated that the community would be willing to bear a "car carbon tax" of up to 8 cents per litre of petrol as part of the funding of major long-term public transport improvements. If a car carbon tax of this magnitude were adopted, Sydney's "share" of this funding source might amount to around $334 million in 2011, with passenger cars and commercial vehicles contributing $262 million and $72 million respectively.

If both of these sources of Commonwealth assistance were realised, the Commonwealth Government's funding of public transport improvements for Sydney could amount to $15.3 billion over the 30-year period to 2040. This would represent between 19 per cent and 24 per cent of the total cost of the Inquiry's various investment plans under the three different scenarios.

In recent times the Commonwealth Government has openly acknowledged the massive costs of congestion in Australia's cities and the importance of assisting Australia's largest city and global gateway to function efficiently. The Commonwealth funding contributions assumed in the Inquiry's illustrative funding plan would represent a very cost-effective form of assistance in addressing these issues.

4.5 Total available funds

Table 4.2 show estimates of the total available funds that can be collected though the different sources mentioned above under each of the studied infrastructure scenarios. Figure 4.10, Figure 4.11 and Figure 4.12 show the annual funds from the various funding sources.

Table 4.2

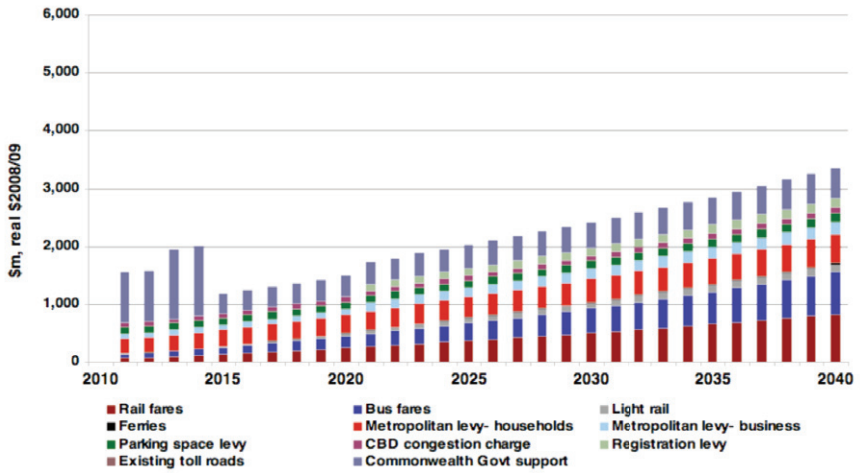
TOTAL AVAILABLE FUNDS

Scenario	Total funds available over 30 years (2010-2040), $b 2008-09
US Scenario	$65.1
European Scenario	$71.1
East Asian Scenario	$81.4

Source: Allen Consulting Group estimates.

Figure 4.10

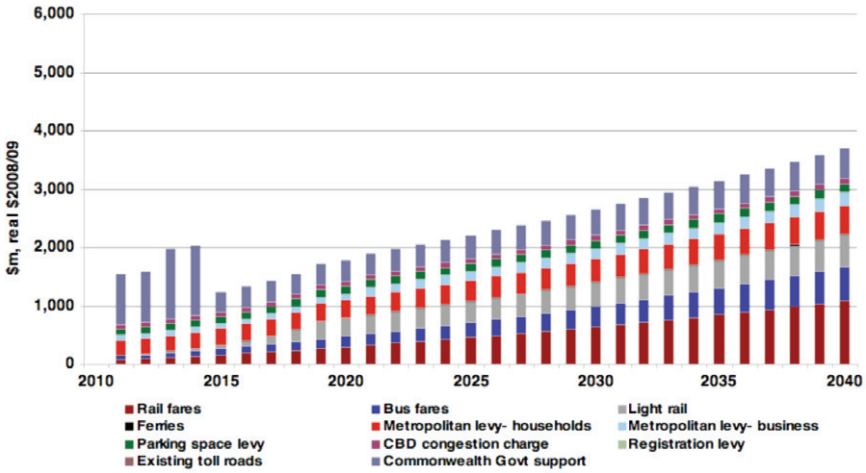
TOTAL REVENUE COLLECTED UNDER THE US SCENARIO



Source: Allen Consulting Group estimates.

Figure 4.11

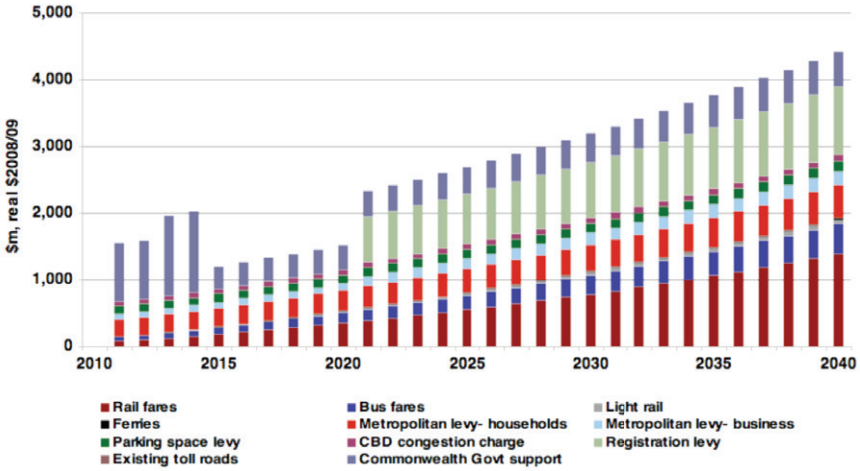
TOTAL REVENUE COLLECTED UNDER THE EUROPEAN SCENARIO



Source: Allen Consulting Group estimates.

Figure 4.12

TOTAL REVENUE COLLECTED UNDER THE EAST ASIAN SCENARIO



Source: Allen Consulting Group estimates.

Chapter 5

A fully funded plan for Sydney's public transport

5.1 The funding flows and financial balance

As noted earlier in the report, a key characteristic of infrastructure and especially transport services is that there are large initial costs followed by revenues that are collected from fares and other means over a much longer term, generating a funding gap and a need for finance. The funding gap and the cost of finance for each transport scenario is reflected in Figure 5.1.

The fact that costs would outstrip revenue funds for many years under every scenario (in the left hand column) means that there would be a funding gap that appears in the charts on the right hand column. In many cases this funding gap would continue for many years, so the Inquiry's public transport improvements would be in deficit and would only be able to continue with the assistance of additional funds from an outside source. The dotted grey line reflects the capital charge that would have to be paid to these outside sources of funds. The balance line in the charts reflects the total amount outstanding to external parties in each year. These amounts would initially grow over time, but would peak when revenues began to be larger than expenditures and would then, over time, reduce to zero as the external creditors were fully paid off.

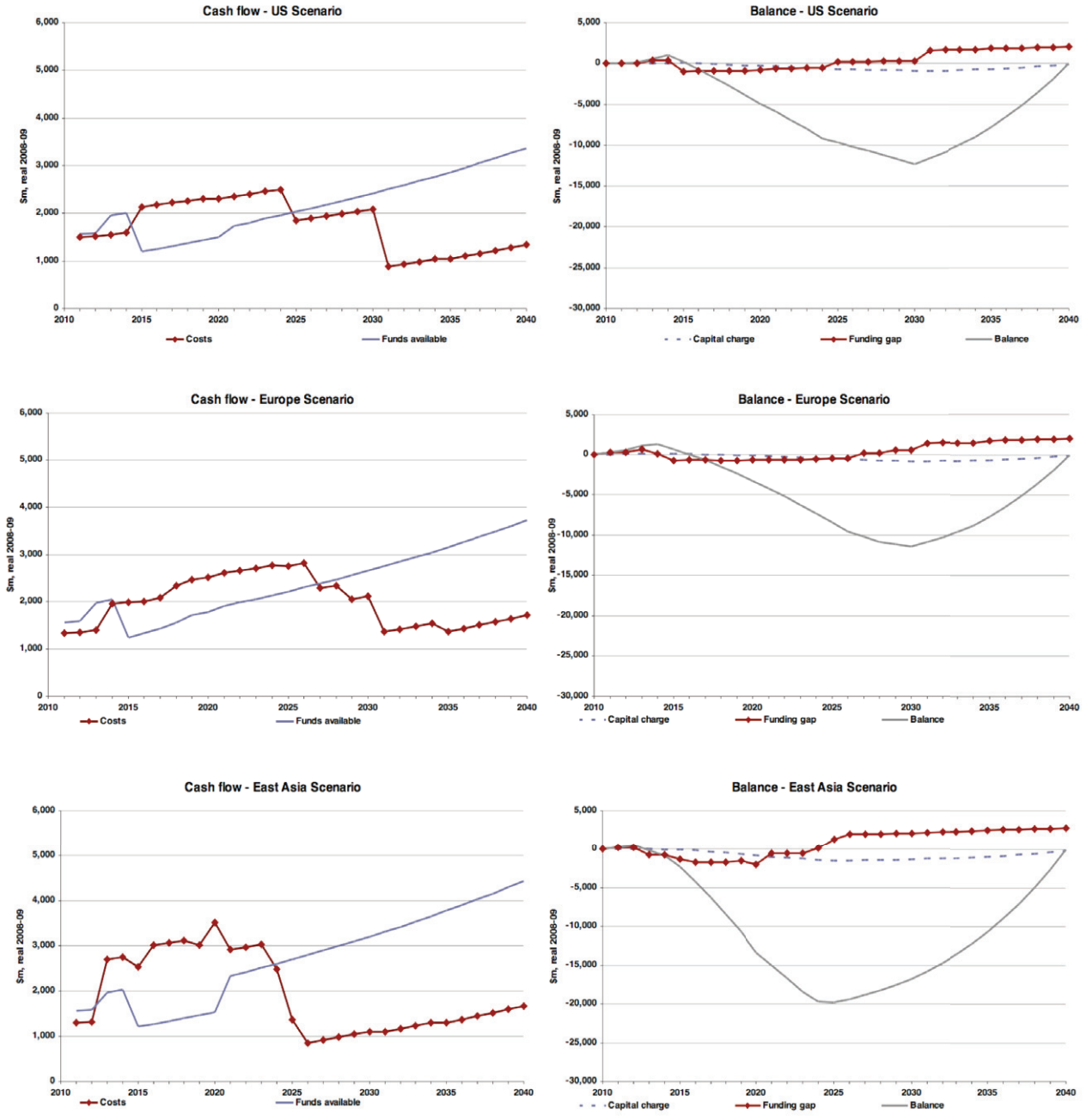
The analysis indicates that the Inquiry's illustrative funding plan would involve the accumulation and eventual repayment of liabilities that peaks at around:

- $12 billion in 2030 under the US scenario;
- $11 billion in 2030 under the European scenario; and
- $20 billion in 2025 under the East Asian scenario.

However, as shown in the charts for all three scenarios, these additional liabilities would be able to be paid in full under all three scenarios by the end of the 30-year study period.

Figure 5.1

CASH FLOW AND FINANCIAL POSITION, $M REAL 2008-09



Source: Allen Consulting Group.

The financial trajectory under each scenario is influenced by three factors:

- *the WACC* — for simplicity, the cost of capital (the Weighted Average Cost of Capital or WACC) has been assumed to be 7.5 per cent (real). This is in line with the cost of capital used by IPART, the price regulator supervising other broadly similar facilities including State Rail, water and electricity utilities and is in line with the preliminary WACC used in recent transport infrastructure evaluations such as the Eddington report (2008). If it were assumed that the government financed the funding gap using public sector debt the cost would be much lower — possibly around 3 per cent (15-years indexed treasury bonds are roughly 2.7 per cent, AFR 22 January 2010);
- *the expenditure profile* — how much is spent on the infrastructure projects, and when, will determine when the costs are incurred under any infrastructure scenario. If project spending were brought forward to the beginning of the period the debt load would be higher, increasing interest costs and the amount of funds that would need to be raised. On the other hand, if project expenditure were deferred towards the end of the period less debt would be incurred and less total funding would need to be raised. However, as indicated earlier, deferring expenditure is problematic because it requires Sydney residents to pay for projects whose benefits they may not see for some years; and
- *revenue* — the amount of revenue raised and the time when it is collected will also affect the financial position. If less revenue than expected were received higher debts would be incurred, and this in turn would necessitate greater increases in fares or levies to ensure the public transport plan continued to be fully funded.

It should be emphasised that this early conceptual stage the Inquiry's illustrative funding plan has considered financing issues only in a broad, generic sense. It is not possible at this stage to be clear about what the best actual mix of debt and/or equity might be under each scenario.

The three charts in the left hand column show projected capital and operating costs as well as total funds obtained from the funding mechanism in each scenario. The three charts on the right hand side show the financing picture in each scenario.

To take a conservative view, the balance could be thought of as debt in this initial analysis. On this basis the balance reported in Figure 5.1 for each scenario could be viewed as an increment in state government debt. This simplification is conservative because the funding plan has been calculated taking into account the expense of an equity contribution (while 100 per cent debt financing is probably impractical, it would be significantly less costly).

Should the NSW Government proceed further with the Inquiry's recommended projects, it would need to identify the most appropriate funding and delivery model through the business case stage. There would also be a need to refine many factors including shifting from real to nominal terms, consideration of an appropriate residual value (rather than running down to zero after an arbitrary 30 years), and the mix of debt and equity. The results of the funding analysis in this report are intended to provide a broad insight into how the additional costs could be met.

Table 5.1 shows the costs associated with each of the three scenarios and the funds required, under the Inquiry's illustrative funding plan, to fully meet these costs. The figures reported in this table are all at 2008–09 prices (that is, they remove the effect of inflation). It should be noted that the sum of each scenario's capital costs, operating costs and financing costs is exactly matched by the proposed additional funding under the scenario (that is, that the final balance is zero). Table 5.2 shows the percentage of the operating costs that would recovered through fares under each of the transport scenarios.

Key points from Table 5.1 and Table 5.2 are summarised as follows.

- The total costs and total revenue under each scenario would be in balance. This includes meeting the capital charge (similar to debt interest payments and repayments). If there were changes in one item, say a reduction in farebox revenue, there would need to be greater revenue from other sources to compensate, in order to remain fully funded.
- The European scenario would involve the largest contribution to costs from farebox revenue, while the amount collected under the US and East Asian scenarios would be lower and similar in magnitude. Under the European scenario farebox revenue would be around 48 per cent of the total revenue, compared with about 39 per cent under the US scenario and about 33 per cent under the East Asian scenario.
- The East Asian scenario would be particularly reliant on other revenue sources, especially the registration levy proposed for private cars. Under the illustrative funding plan the funds obtained from this source would be substantially higher under the East Asian scenario (at $17 billion) than under the US scenario ($3 billion) and the European scenario (nil). It is not clear that the registration levy amount collected under the East Asian scenario would be sustainable or acceptable to the community.
- Under all the scenarios, the farebox revenue over 30 years would more than offset the total incremental costs of the recommended transport scenarios.
- The share of operating costs funded by passengers through fares would increase over time under all of the scenarios. For example, under the European scenario the percentage of operating costs funded through rail fares would increase from 38 per cent in 2010 to 71 per cent in 2040. This implies that, over time, the amount of operating costs funded by government subsidies would be reduced.

Table 5.1

CASH FLOW POSITION OVER 30 YEARS, $M REAL 2008-09

	US Scenario	European Scenario	East Asian Scenario
Capital expenditure			
Metros	$0	$10,120	$29,300
Heavy rail	$8,400	$16,100	$5,000
Light rail	$1,500	$3,600	$900
Busways	$7,300	$3,350	$1,245
Roads	$18,000	$2,700	$0
Total capital expenditure	***$35,200***	***$35,870***	***$36,445***
Incremental cost			
Rail	$6,221	$11,252	$16,800
Bus	$9,142	$6,357	$3,835
Light rail	$1,294	$5,991	$469
Ferries	$150	$150	$150
Total incremental cost	***$16,807***	***$23,751***	***$21,254***
Capital charge	***$13,075***	***$11,484***	***$23,714***
Total cost	**$65,082**	**$71,104**	**$81,414**
Farebox revenue [(a)]			
Heavy rail and metro fares	$12,130	$15,341	$18,891
Bus fares	$10,364	$8,638	$7,079
Light rail	$2,144	$9,470	$849
Ferries	$448	$448	$448
Total farebox revenue	***$25,086***	***$33,897***	***$27,267***
Other revenue sources			
Metropolitan levy- households	$10,876	$10,876	$10,876
Metropolitan levy- business	$4,509	$4,509	$4,509
Parking space levy	$3,934	$3,934	$3,934
CBD congestion charge	$2,556	$2,556	$2,556
Registration levy	$2,789	-$0	$16,939
Existing toll roads	$0	$0	$0
Total revenue from other sources	***$24,664***	***$21,876***	***$38,815***
Commonwealth govt support	$15,332	$15,332	$15,332
Total revenue	**$65,082**	**$71,104**	**$81,414**
Surplus/Deficit	**$0**	**$0**	**$0**

(a) The breakdown of revenue across the transport modes would be altered if integrated zone-based fares were introduced, but the total farebox revenue would not change.

Source: Allen Consulting Group.

Table 5.2

FAREBOX RECOVERY — US SCENARIO

Farebox revenue	Fare collected 2009-10 ($ m)	Fare collected 2039-40 ($ m)	Fare collected as % of operating cost 2009-10 [(a)]	Fare collected as % of operating cost 2039-40 [(a)]
Heavy rail	$769	$1,637	38%	71%
Bus	$349	$1,079	40%	67%
Light rail	$7	$137	100%	179%
Total	**$1,125**	**$2,853**		

FAREBOX RECOVERY — EUROPE SCENARIO

Farebox revenue	Fare collected 2009-10 ($ m)	Fare collected 2039-40 ($ m)	Fare collected as % of operating cost 2009-10 [(a)]	Fare collected as % of operating cost 2039-40 [(a)]
Heavy rail and metro	$769	$1,896	38%	71%
Bus	$349	$932	40%	67%
Light rail	$7	$544	100%	179%
Total	**$1,125**	**$3,372**		

FAREBOX RECOVERY — EAST ASIAN SCENARIO

Farebox revenue	Fare collected 2009-10 ($ m)	Fare collected 2039-40 ($ m)	Fare collected as % of operating cost 2009-10 [(a)]	Fare collected as % of operating cost 2039-40 [(a)]
Heavy rail and metro	$769	$2,194	38%	71%
Bus	$349	$805	40%	67%
Light rail	$7	$63	100%	179%
Total	**$1,125**	**$3,062**		

(a) Cost recovery ratios across transport modes would be altered if integrated zone-based fares were introduced (but not overall revenue).

Source: Allen Consulting Group.

5.2 Revenue and willingness to pay

A key concern for the Inquiry has been to ensure, as much as possible, that funding arrangements fall within what the community would be willing to pay for the proposed improvements in public transport systems. As mentioned before, to ensure that the views of the community were examined, the Inquiry commissioned an independent study that assessed the public willingness to pay to secure permanent transport improvements through a range of possible fare increases, taxes and charges.

For instance, analysis of the survey's responses suggest that 52 per cent of Sydney-siders would be prepared to pay the following combination of increased costs to gain major public transport improvements: a fare increase of approximately 38 cents per single trip, a CBD congestion charge of around $7.46 per entry, a parking fee increase of approximately $7.19 per parking space per day in major centres, a carbon tax on petrol of 8 cents per litre and an additional tax (for instance, a vehicle registration levy or a metropolitan household levy) of $157.70 per year (Figure 5.6).

Table 5.3

COMMUNITY WILLINGNESS TO PAY AT 52 PER CENT LEVEL OF SUPPORT

Funding source	Willingness to pay
Fare increase ($ per single trip)	$0.38
CBD congestion charge ($ per entry)	$7.46
Parking fee increase ($ per day)	$7.19
Carbon charge ($ per litre of petrol)	$0.08
Additional Tax – e.g. vehicle registration or metropolitan levy ($ per household)	$157.70

Source: Centre for the Study of Choice (CenSoC).

Table 5.4 shows that the charges under the illustrative funding plan in 2011 would be broadly in line with the community's willingness to pay, as indicated by the survey findings.

It should be noted that Table 5.4 does not include the revenues collected under the funding plan from businesses or the Building Australia Fund, because the willingness to pay surveying was concerned with the individual's willingness to pay for the improvements in transport systems and therefore did not address business sources and Commonwealth sources like the Building Australia Fund.

It may be seen that if the willingness to pay findings of the survey reflect the attitudes of most people in the community—and statistical analyses conducted as part of the market research studies suggests they probably do—the community's overall willingness to pay additional individual revenues in 2011 would be between $865 million and $870 million, depending on the scenario, and the revenue generated by the funding options in the Inquiry's illustrative funding plan would be around $266 million less than these amounts.

Over time, and under all three of the scenarios, the charges contained in the illustrative funding plan would change, as already described, to meet the costs of the recommended transport projects. The community's implicit willingness to pay for transport improvements would also be likely to change over time, as population, economic activities and incomes increase.

Table 5.4

COMPARISON OF CHARGES AND REVENUE GENERATED BY THE COMMUNITY WILLINGNESS TO PAY AND THE ILLUSTRATIVE FUNDING PLAN IN 2010-11

COMMUNITY WILLIGNESS TO PAY AT 52 PER CENT LEVEL OF SUPPORT			
	Revenue base in 2010-11	**Charge**	**Revenue generated 2010-11 ($ m 2008-09)**
Revenue by source			
Fare increase ($ per single trip)	Passenger journeys: [a] US scenario = 585 million European scenario = 587 million East Asian scenario = 586 million	$0.38	Revenue generated: [b] US scenario = $152 European scenario = $156.6 East Asian scenario = $155.7
CBD congestion charge ($ per entry)	10 million vehicle entering CBD per year	$7.46	$ 74.6
Toll increase ($ per trip)	250 million vehicles per year	$0.00	$0.0
Parking fee increase ($ per day)	72,590 parking lots	$7.19	$114.8[c]
Carbon charge ($ per litre of petrol)	3,136 million litres petrol per year	$0.08	$251.3
Additional Tax – e.g. vehicle registration or metropolitan levy ($ per household)	1.7 billion household in Sydney per year	$157.70	$272.2
Total revenue			
US scenario			$864.9
European scenario			$869.5
East Asian scenario			$868.6

ILLUSTRATIVE FUNDING PLAN (2010-11)	Charge			Revenue generated 2010-11 ($ m 2008-09)		
	US Scenario	Europe Scenario	East Asia Scenario	US Scenario	Europe Scenario	East Asia Scenario
Fare increase ($ per single trip)	$0.39[(d)]	$0.39[(d)]	$0.40[(d)]	$151.98[(b)]	$156.56[(b)]	$155.69[(b)]
CBD congestion charge ($ per entry)	$7.46	$7.46	$7.46	$74.60	$74.60	$74.60
Toll increase ($ per trip)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Parking fee increase ($ per day)	$7.19	$7.19	$7.19	$114.82[(c)]	$114.82[(c)]	$114.82[(c)]
Carbon charge ($ per litre of petrol)	$0.00[(e)]	$0.00[(e)]	$0.00[(e)]	$0.00	$0.00	$0.00
Additional Tax ($ per household)						
- metropolitan levy ($ per household)	$157.70	$157.70	$157.70	$257.30	$257.30	$257.30
- vehicle registration ($ per household)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total				**$598.7**	**$603.3**	**$602.4**

Note: (a) As mentioned in previous sections of the report, patronage number varies across transport scenarios. (b) This figure takes into account the change in passenger journeys (due to elasticity – price increase- effects) from 626.3 million to 585.5 million under the US scenario, 586.9 million under the Europe scenario and 585.7 million under the East Asian scenario. (c) Assumes that it only applies to 220 working days. (d) Average fare increase per passenger journey across all transport modes. (e) Carbon tax only applies from 2013.

Source: The Allen Consulting Group and the Centre for the Study of Choice (CenSoC).

Table 5.5 compares the charges under the illustrative funding plan at the end of the 30-year study period, in 2040, with predictions of the community's willingness to pay in that year. Again, for the reasons just presented, this table does not address any of the charges on businesses or any support from the Building Australia Fund.

As already discussed, the illustrative funding plan assumes that the community's willingness to pay increased public transport fares will increase in line with the annual average increase in real transport fares in Sydney over the last ten years (1.3 per cent pa, ABS 2009), and that the willingness to pay for an additional tax will also increase, by 1 per cent pa in real terms, partly reflecting the real growth in the economy and in incomes.

On this basis, by the end of the study period in 2040 most of the additional charges under the illustrative funding plan would still be broadly in line with the community's projected willingness to pay.

For instance, while the projected community willingness to pay through higher fares in 2040 is estimated to be around 55 cents per single fare on average (2008-09 $), the fare increases under the illustrative funding plan in the same year would be 46 cents, 51 cents and 62 cents under the US, European and East Asian scenarios, respectively.

The US and East Asian scenarios would, however, have to involve car registration levies to cover their costs, as discussed in section 4.4, and this would take their revenues past the willingness to pay limits for additional tax payments.

Table 5.5

COMPARISON OF CHARGES BETWEEN THE ILLUSTRATIVE FUNDING PLAN AND THE COMMUNITY'S WILLINGNESS TO PAY, 2039-40

	Willingness to pay	Illustrative funding plan		
	(52% level of support)	US scenario	Europe scenario	East Asia Scenario
Fare increase ($ per single trip)	$0.55[(a)]	$0.46[(b)]	$0.51[(b)]	$0.62[(b)]
CBD congestion charge ($ per entry)	$7.46	$7.46	$7.46	$7.46
Toll increase ($ per trip)	$0.00	$0.00	$0.00	$0.00
Parking fee increase ($ per day)	$7.19	$7.19	$7.19	$7.19
Carbon tax ($ per litre of petrol)	$0.08	$0.08	$0.08	$0.08
Additional Tax – e.g. vehicle registration or metropolitan levy ($ per household)	$210.45[(c)]	*Metropolitan levy on household: $210.45 in 2040.*		
		Car rego: $71.67 per household from 2021.[(d)]	*$0.00*	*Car rego: $435.37 per household from 2021.[(d)]*

Note: (a) The market survey indicates a willingness to bear an additional $0.38 in transport fares. Historically, transport fares (in real term) have increased by 1.3 per cent per annum between 1999 and 2009. Thus, applying the same 1.3 per cent growth rate into the future, the estimated increase in fare would be $0.55 in 2040. (b) Average fare increase per passenger journey across all transport modes. (c) The market survey indicates that households are willingness to bear an additional $157.70 now. This figure is expected to increase by 1 per cent per annum in real term in the future, partly reflecting the real growth in the economy. (d) In 2039-40, there would be 3.57 million passenger vehicles and 2.35 million households. Rego per car would be $47 under the US scenario, $0 under the Europe scenario and $287 under the East Asian Scenario.

Source: Allen Consulting Group estimates based on information provided by the Inquiry and the Centre for the Study of Choice (CenSoC).

Table 5.6 and Figure 5.2 to Figure 5.5 compare the revenue that would be generated, over time, by new charges in line with the community's projected willingness to pay and by the charges for each of the three scenarios under the Inquiry's illustrative funding plan, again not counting the revenue collected under the funding plan from businesses and the Building Australia Fund.

It may be seen from Table 5.6 and Figure 5.5 that the total revenue contributed by the community under the Inquiry's illustrative funding plan would be:

- lower than the revenue the community is projected to be willing to pay (at the 52 per cent level of support) under the European scenario, by around $946 million, but;
- higher than the revenue the community is projected to be willing to pay (at the 52 per cent level of support) under the US and East Asian scenarios, by around $1.8 billion and $16 billion respectively.

Table 5.6

TOTAL REVENUE COLLECTED OVER THE PERIOD 2010-11 TO 2039-40, $M 2008-09

	Willingness to pay (52 per cent support)	Illustrative funding plan	Difference [(a)]
US scenario			
Fares	$25,086	$25,086	$0
CBD congestion charge	$2,556	$2,556	$0
Toll increase	$0	$0	$0
Parking fee increase	$3,934	$3,934	$0
Carbon tax	$10,324	$9,816	$508
Additional Tax (e.g. vehicle registration or metropolitan levy)	$11,314	$10,876 (metropolitan levy) + $2,789 (registration levy)	($2,351)
Total revenue	**$53,214**	**$55,057**	**($1,843)**
European scenario			
Fares	$33,897	$33,897	$0
CBD congestion charge	$2,556	$2,556	$0
Toll increase	$0	$0	$0
Parking fee increase	$3,934	$3,934	$0
Carbon tax	$10,324	$9,816	$508
Additional Tax (e.g. vehicle registration or metropolitan levy)	$11,314	$10,876 (metropolitan levy) (no registration levy)	$438
Total revenue	**$62,025**	**$61,079**	**$946**
East Asian scenario			
Fares	$27,267	$27,267	$0
CBD congestion charge	$2,556	$2,556	$0
Toll increase	$0	$0	$0
Parking fee increase	$3,934	$3,934	$0
Carbon tax	$10,324	$9,816	$508
Additional Tax (e.g. vehicle registration or metropolitan levy)	$11,314	$10,876 (metropolitan levy) + $16,939 (registration levy)	($16,502)
Total revenue	**$55,395**	**$71,388**	**($15,994)**

Note: (a) Numbers is parenthesis are negative and indicate that the revenue collected under the illustrative funding plan exceed the community's willingness to pay.

Source: Allen Consulting Group estimates based on information provided by the Inquiry and the Centre for the Study of Choice (CenSoC).

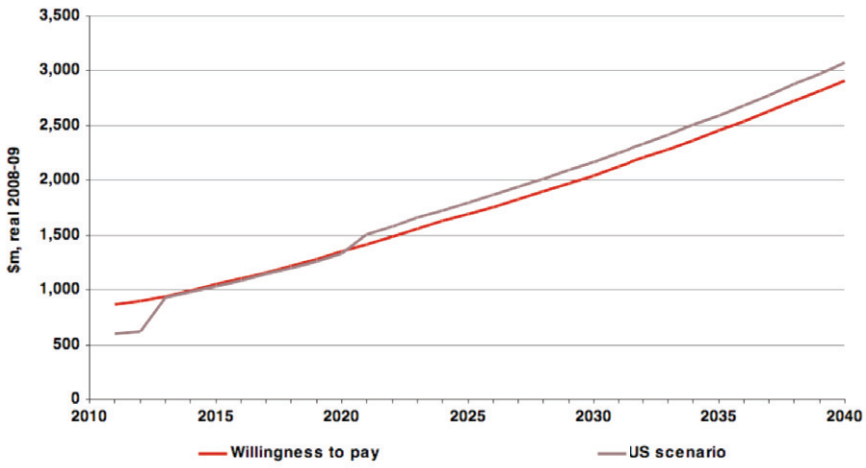
Figure 5.2 to Figure 5.5 show that:

- at the beginning of the 30-year study period, the revenue contributed by the community under the Inquiry's illustrative funding plan would be slightly less than the amounts the community would be willing to pay under all three scenarios; and
- in later years the revenue contributed by the community under the illustrative funding plan would:
  - remain very close to the amounts the community would be willing to pay under the European scenario (Figure 5.3), but
  - Exceed the community's willingness to pay under the US scenario (Figure 5.2) and (to a greater extent) under the East Asian scenario (Figure 5.4).

It should be noted, again, that the Inquiry has used the survey findings merely to examine thresholds for the community's willingness to pay under one of many possible combinations of funding sources and funding levels that would win community support. The Inquiry is not recommending that the quantities tested in the surveys and reported and discussed above should be charged in practice if their public transport improvement recommendations were adopted.

Figure 5.2

COMMUNITY-WIDE WILLINGNESS TO PAY AND REVENUES FROM INDIVIDUALS UNDER THE ILLUSTRATIVE FUNDING PLAN UNDER, US SCENARIO ($M 2008-09)

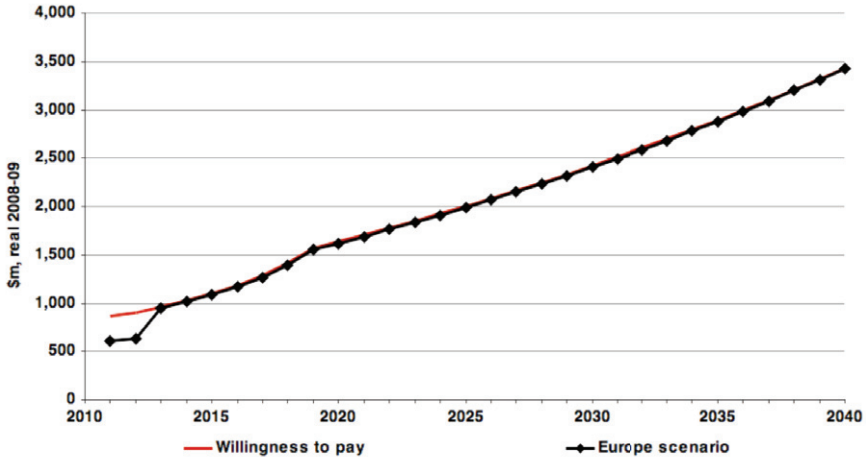


Note: Revenue under the Inquiry's illustrative funding plan excludes revenue from the Building Australia Fund, the metropolitan levy on business and carbon tax on fuel for commercial vehicles.

Source: Allen Consulting Group estimates based on information provided by the Inquiry and CenSoC.

Figure 5.3

COMMUNITY-WIDE WILLINGNESS TO PAY AND REVENUES FROM INDIVIDUALS UNDER THE ILLUSTRATIVE FUNDING PLAN UNDER, EUROPEAN SCENARIO ($M 2008-09)

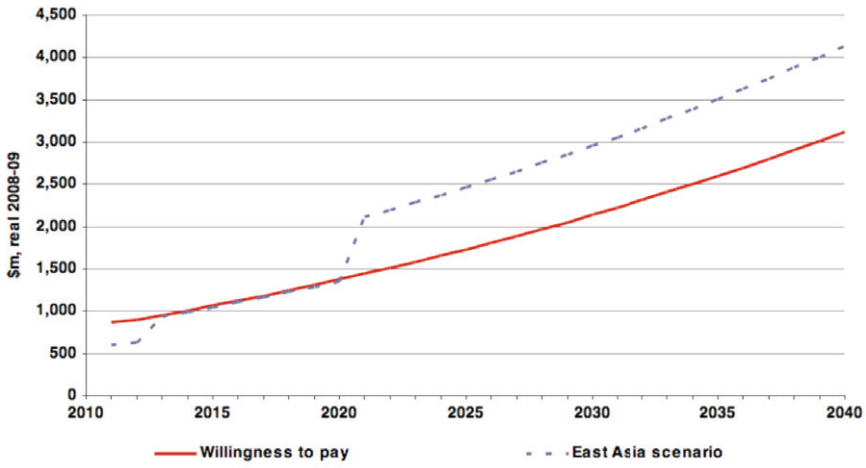


Note: Revenue under the Inquiry's illustrative funding plan excludes revenue from the Building Australia Fund, the metropolitan levy on business and carbon tax on fuel for commercial vehicles.

Source: Allen Consulting Group estimates based on information provided by the Inquiry and CenSoC.

Figure 5.4

COMMUNITY-WIDE WILLINGNESS TO PAY AND REVENUES FROM INDIVIDUALS UNDER THE ILLUSTRATIVE FUNDING PLAN UNDER, EAST ASIAN SCENARIO ($M 2008-09)

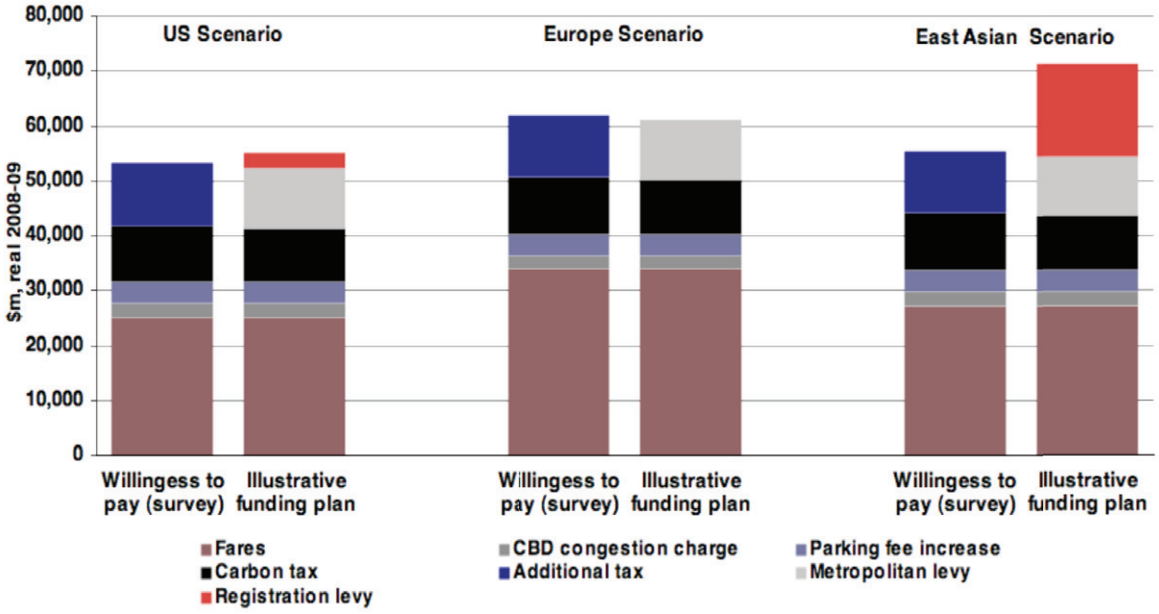


Note: Revenue under the Inquiry's illustrative funding plan excludes revenue from the Building Australia Fund, the metropolitan levy on business and carbon tax on fuel for commercial vehicles.

Source: Allen Consulting Group estimates based on information provided by the Inquiry and CenSoC.

Figure 5.5

COMPARISON OF COMMUNITY-WIDE WILLINGNESS TO PAY AND REVENUES FROM INDIVIDUALS UNDER THE ILLUSTRATIVE FUNDING PLAN, TOTAL REVENUE FROM 2010 TO 2040, ($M 2008-09)



Note: Total revenue under the Inquiry's illustrative funding plan excludes revenue from the Building Australia Fund, the metropolitan levy on business and carbon tax on fuel for commercial vehicles.

Source: Allen Consulting Group estimates based on information provided by the Inquiry and CenSoC.

5.3 Choice of funding models

As stressed early, the funding approach presented in this report does not intend to provide a definite funding plan or prescribe a particular funding model. Rather, it aims to illustrate how a robust, long-term and fully funded approach *could* work to support the transport improvements recommended by the Inquiry.

There is no single source of finance that can be used to pay for the infrastructure that is vital to the continued economic, environmental and social health of our community. Instead, there is a need for a mix of instruments to raise those monies. The analysis in this report presents one of the many options that exist to finance the Inquiry's recommended transport plan. If the NSW Government wished to pursue some of the recommendations advanced by the Inquiry, sound governance and getting the best value for the community would require that any financing options pass a broader test than just "Is it possible?" Only with a soundly based understanding of the broader consequences can the appropriate mix be determined by government decision-makers.

There is also scope for private sector involvement in funding the recommended transport improvements. This includes the possible use of Privately Financed Projects (PFPs) or, more generally Public Private Partnerships (PPPs), not all forms of which rely on private sector finance. PPP structures include various arrangements under which the private sector might build, own and/or operate the infrastructure.

Private sector involvement is likely to be a particularly effective financing option when public sector debt financing is not considered feasible. Further, transferring some risks to the private sector can unleash the private sector's greater potential to innovate (and achieve efficiencies) in a range of areas, ranging from project design to construction, operations and maintenance. However, most PFPs tend to be in economic areas where user charging is likely, so the private sector's natural emphasis on profit maximisation rather than public benefits constitutes an area of concern.

A potential source of inefficiency arises where, as a consequence of the need to ensure adequate revenues flow to the private sector, there is a deliberate sub-optimal supply of substitutes. The contractual commitment to not proceed with, say, a rail line which has the potential to reduce motorway traffic, or the deliberate closure of alternative routes can reduce the net efficiency gains otherwise available from PFPs. An example of this is the Melbourne City Link project, where the private sector sued the State Government because upgrades of the State-controlled network had the potential to impact on the number of city link users anticipated under the agreement (LGAQ, 2002, p. 43).

Additionally, there is less of a case for private sector financing of public transport if this would generate distortions in pricing (such as the high fares for trips to the four privately owned and operated stations on the Airport rail line, which have contributed to the under-utilisation of these important stations).

Overall planning and integration of the public transport system is a role best undertaken by the public sector.

While this report does not suggest a clear leader or best approach to funding the proposed projects, it is clear from the analysis that the use of funding approaches that smooth out the payment over time and are less distorting would significantly enhance the tangible gains that are obtained from the proposed transport infrastructure investments. This implies a greater preparedness or capacity to use government debt.

5.4 Impact on credit rating

It is not necessary for NSW to lose its AAA credit rating while accommodating the increase in debt likely to be associated with the transport plans advanced by the Inquiry and their related funding mechanisms.

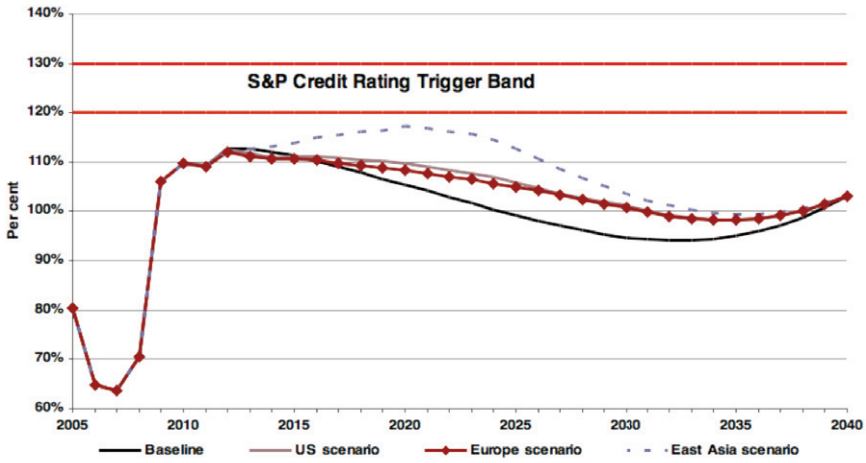
The increment of State debt arising from the Inquiry's public transport recommendations would be unlikely to push the State over the threshold levels that raise concerns by the credit rating agencies.

In addressing this issue this report has examined how NSW debt levels may change over time. This analysis has made many conservative assumptions. As already indicated, it has examined the balance of liabilities under each scenario as if it were all debt, while at the same time taking into account a (higher) cost of funds based on an assumption that a high share would also be financed by equity. All of the increase in liabilities has been assessed on the assumption that the debt would be incurred by NSW Government agencies or the NSW general government sector (i.e. that none would be held by the private sector through the use of PPPs, for example).

Figure 5.6 illustrates some of the key findings of this analysis.

Figure 5.6

STATE DEBT AND CREDIT RATING REVIEW THRESHOLDS (NET DEBT & UNFUNDED SUPERANNUATION LIABILITIES AS % OF TOTAL REVENUE)



Source: Allen Consulting Group estimates

Key insights from this analysis are summarised in the points below.

- Under the baseline scenario, State debt as a share of total revenue is projected to fall from the relatively high levels that prevail at present, reflecting continued fiscal prudence on behalf of the State government, before swinging up in the late 2030s as a result of the ageing of the population, higher public spending requirements and a contraction in the number of taxpayers.
- The increment in debt under the three scenarios examined would not be sufficient to push debt levels into the trigger band for a review and possible downgrading of the NSW credit rating.
- In practice, the potential to rely on some private sector investment, rather than finance all of the investment through State government debt, suggests that the debt outlook would be likely to remain below the trigger band under all three scenarios.

5.5 Key risks and sensitivities

As with any project, the Inquiry's recommendations and the illustrative funding plan presented in this report are subject to risks and sensitivities. Some of these risks and sensitivities include (but are not limited to):

- changes in the weighted average cost of capital (WACC);
- changes in capital and/or operational costs;
- delays in the start and/or delivery of the recommended projects;
- changes in underlying projections, such as changes in population growth, economic activity, etc; and
- changes in the amount of revenue collected.

Some of these risks have been analysed within the funding plan framework. Because this sensitivity analysis has been conducted primarily to examine the robustness of the funding arrangements, it has been undertaken only for the European scenario. However, similar conclusions can be drawn with respect to the other two scenarios. Key insights from this analysis are summarised below.

- The WACC used in the analysis presented in previous sections of this report is a conservative estimate. In reality, the WACC is likely to be lower that 7.5 per cent. The sensitivity analysis conducted for this report indicates that a under the European scenario a WACC of 3 per cent real[3] could accommodate (without further increasing the taxes and charges included in the illustrative funding plan):
  - elimination of the metropolitan levy for businesses and the parking space levy; or
  - a 26 per cent increase in capital costs; or
  - a 39 per cent increase in operational costs; or
  - a 13 per cent decrease in overall revenue collection.
- A higher contribution from the Commonwealth Government (for instance, an additional $100 million per year) would mean, under the European scenario that:
  - the parking space levy and the CBD congestion charge could be eliminated and the metropolitan levy on households halved; or
  - capital costs could increase by 29 per cent without having to increase the taxes and charges included in the illustrative funding plan.

The main message emerging from this analysis is that the illustrative funding plan presented in this report is robust when the balance of risks and sensitivities are considered.

An independent, integrated governance structure like the one proposed by the Inquiry (and described in more detail in the Inquiry's report) will also be important to manage these risks as it would help to eliminate the types of perverse incentives that exist when accountabilities for service provision, revenue and expenditure are separated. Indeed, managing these accountabilities within the same single governance structure would ensure that changes in any service delivery, revenue and/or expenditure would be balanced. For instance, an increase in operational costs would be balanced through an increase in revenue using one of the funding mechanisms and reflected in improved or continued delivery of services.

[3] This would be equivalent to financing the funding gap using public sector debt. Currently, 15-years indexed treasury bonds are roughly 2.7 per cent (Source: AFR 22 January 2010).

The structure of the Inquiry's illustrative funding plan has been built in a way that would fundamentally improve transparency and accountability for policy decisions. Decisions that would raise the cost of the development and improvement of public transport services in Sydney would have a transparent effect in the funding plan's accounts. It would not be feasible to obscure and shuffle funds between the short and long terms without revealing the effects that this would have on the financial balance and full repayment. Decision-makers would therefore be accountable. The high degree of transparency, however, is grounded on the clear linkage between obtaining transport service in exchange for payment from the community.

Chapter 6

Industry Capacity to deliver change

The Inquiry is concerned about the capacity of the construction industry and the transport industry in Australia to complete the proposed major projects and the impacts that any consequential higher demand for labour and materials might have on the outlook for cost inflation.

In the course of the Inquiry's public consultations some interlocutors have noted that the large number of infrastructure projects underway throughout Australia, combined with the additional construction activity proposed by the Inquiry, might stretch the capacity of the local construction industry. Key areas of concern reported to the Inquiry include:

- tunnelling — there are few machines and firms able to safely tunnel and a relatively large number of concurrent projects;
- equipment — shortages of heavy lift cranes are a particular issue; and
- pre-cast concrete elements — there is a surge in demand for these facilities at present.

6.1 The relative size of the projects

The three infrastructure scenarios developed and examined by the Inquiry propose projects entailing capital expenditures of between $35.2 billion (US scenario) and $36.4 billion (East Asian scenario) over a 30-year period (or between $1.17 billion and $1.21 billion respectively per annum, on average, although the East Asian scenario, in particular, would require substantially more capital than this in the early years).

While these represent significant, large-scale projects, the considerable growth experienced by the construction industry in Australia over the last decade has resulted in an improved ability by the private sector to undertake projects of such a scale within reasonable timeframes.

Indeed, projects costing around $200 million that would have been considered significant a decade ago have been replaced in the significance stakes by projects worth more than $2 billion today (Eddington, 2008).

Sydney, in particular, has (generally successfully) undertaken the design and construction of a number of large construction projects in recent decades, including the Sydney Olympic Park facilities, motorways such as the M2, M4, M5, M7, Lane Cove tunnel, Cross City tunnel and Eastern Distributor and the Epping to Chatswood rail link.

As a further way of putting the costs associated with the Inquiry's proposals for Sydney's public transport into perspective, it is useful to compare them with existing infrastructure spending in the State budget.

According to the 2009–10 Budget, during 2009–10 the NSW government will invest $18 billion in infrastructure, as part of a $62.9 billion investment over the next four years.

So the total capital expenditures associated with any of the three scenarios examined by the Inquiry, averaging between $1.17 billion and $1.21 billion per year to 2040, are relatively minor in the context of the existing State budget, representing around only a 6.5–6.7 per cent increase in spending on infrastructure.

6.2 What can be done

Although the scale of additional construction activity is not itself likely to be a barrier, it should be recalled that the increment in activity will follow some turbulent times in the construction industry, which is still adjusting to the mining boom, the global financial crisis and fiscal stimulus measures. The experience of several members of the Inquiry team with the Sydney Olympics suggests that while the additional activity can be accommodated, the costs could be punitive in the absence of good planning and coordination.

Key actions to avoid difficulties with construction bottlenecks include the following.

- Plan in advance — spreading the projects over a longer period both maximises the ability of the construction industry to plan for and complete projects on time and minimises the effect of price distortions on the economy (as well spreading the financial risk). It will allow construction companies to plan well in advance in terms of human resources, equipment and capital required. Typically, equipment like tunnel borers can take up to 18 months to deliver and build and even routine equipment such as bulldozers and graders can take up to 12 months to deliver so advance notice is critical to projects being completed on time.
- Raise certainty — to provide the human and physical resources necessary to complete all the projects envisioned under any of the three scenarios it would be necessary for the construction industry to have a detailed timeline of future projects. This "pipeline" would help create sufficient certainty for the industry to invest in the human resources, training and development and the equipment required to complete large projects. Indeed, one of the messages coming out of the Eddington report on transport infrastructure in Melbourne was that a continuum of projects is needed for firms to retain and develop staff. At the same time there is a need to ensure projects are appropriately spaced out so that the most talented design staff are available to assist in designing proposals.

6.3 A construction-led boom?

Much of this report has focused on the costs of implementing a long-term transport plan for Sydney. It should be recognised, however, that these costs will not only lead to an improved transport system but also create significant economic benefits for the construction industry. The Eddington report (2008) indicates that, to date, Australian construction companies have been primarily responsible for the delivery of local construction projects and that although this may change, any international firms are still likely to require local labour resources. So much of the funding for a long-term public transport plan is likely to be returned to the local economy and enhanced via economic multiplier effects.

Chapter 7

Conclusion

There is no shortage of worthwhile proposals to improve Sydney's public transport system, but funding remains a key barrier to the development of a long-term public transport plan. The capital expenditures required to fund the infrastructure projects recommended by the Inquiry are expected to amount to around $36 billion over the next three decades. It is unlikely that these infrastructure projects can be delivered within the NSW government's existing budget. New sources of finance (including debt) to fund their construction and operation will be needed.

This report has developed an illustrative funding plan to test whether it would be realistic to fully fund proposed long-term improvements to Sydney's public transport on the scale recommended by the Inquiry. This illustrative funding plan has been designed so that the revenue, generated through a mix of revenue sources, eventually offsets the total costs of the plan, including the capital and operational costs and the costs of debt repayment and interest.

The analysis in this report shows that by using a mix of funding methods is would be possible to raise between $65 billion and $81 billion (2008–09 $) over three decades to meet the additional funding needs of Sydney's upgraded public transport network (capital costs, additional operation costs and finance costs).

The illustrative funding plan has been built around relatively modest increases in public transport fares and household rates, along with other new or expanded revenue sources such as congestion charges, and deliberately spreads the economic burden over a wide range of funding sources. This approach provides stability in the revenue base and ensures that the wide social benefits of public transport are properly reflected in the funding mechanism. The necessary increase in liabilities, especially debt, should not result in any downgrading of the State's AAA credit rating.

One of the key challenges for the projects will be to ensure that they are appropriately spread out to minimise debt-servicing costs and avoid capacity constraints in the construction industry.

A key message of this report is that the sorts of long-term transport projects that are needed to lift Sydney's liveability are not unattainable. Provided suitable projects are spread over a reasonable time horizon, with priority being given to the most pressing projects, only moderate increases in rates, charges and fares would be needed to fund the recommended long-term public transport improvements. Improving Sydney's transport system remains very much an attainable goal.

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