Nation Building Projects for Australia's Capital Cities

Securing our cities' future

Report to the Council of Capital City Lord Mayors
2 July 2013

The Allen Consulting Group

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Executive summary

Cities today are the great engines of economic growth. With their aggregation of people, services, businesses, educational institutions and supporting infrastructure, cities are the focal points for economic development and activity. Australia's major cities contribute to approximately 80 per cent of Australia's economic activity and employ 75 per cent of its workforce (IA, 2010). Further, the built environment, which is concentrated in cities, has been assessed as contributing 40 per cent of the nation's total asset base (ABS 2003).

Cities are also the gateways to the movement of goods and services in international trade and finance in investment, serving all regions. The services they provide raise the competitiveness and viability of activities throughout Australia.

Infrastructure plays a critical role in supporting economic activity and productivity in our cities and across Australia, and supports service activities that underpin economic activity. Improvements in infrastructure result in productivity gains, not only in cities themselves, but also gains in other regions that are economically linked to cities, and therefore to the nation as a whole.

To strengthen their contribution to Australia's wellbeing and capture new opportunities, cities must respond positively to new and significant challenges, including finding ways to become more productive. In this context, infrastructure is critical to raising cities' productivity, improving their competitiveness and building a sustainable environment for Australia's future.

The Council of Capital City Lord Mayors (CCCLM) is aware of the importance of infrastructure for cities and is working to help transform and improve our cities. It is in this context that the CCCLM has commissioned the Allen Consulting Group (ACG) to conduct this study examining the economic impacts that key nation building projects would have on Australia's cities and the national economy. The objective of this project is to encourage ongoing Australian Government investment in urban infrastructure and promote nation building projects to be funded by a future Commonwealth Government.

The infrastructure projects evaluated in this study were selected by capital cities. Cities were asked to provide up to three projects for this evaluation. These projects are outlined in Table ES 1.1. The total capital expenditure for all of the projects put forward by the capital cities is estimated to amount to around $5.44 billion dollars in Present Value (PV) terms. This investment is expected to deliver significant economic benefits to the Australian community. In particular, it has been estimated that the operation of all these infrastructure projects would increase real Gross Regional Product (GRP) of the capital cities by about $1.81 billion each year, every year.

This potential contribution to growth was evaluated using a general equilibrium framework that captures economy-wide and distributional effects. This approach allows an aggregate estimation of how the improved services associated with the infrastructure investment would ripple through the economy, capturing direct and indirect effects on numerous economic sectors and regions. Further details about the methodology used to measure the impacts of these projects are provided in Chapter 4.

Table ES 1.1

NATION BUILDING PROJECTS SELECTED BY CAPITAL CITIES

City	Project	Proponent / Delivery level of Government	Project cost (NPV, $m, 2011-12)
Adelaide	Adelaide Inner-City Tram Loop & Squares Regeneration	SA Government	464.1
Brisbane	Suburbs 2 City Buslink (Stages 1 & 2)	Brisbane City Council	1,817.1
	Kingsford Smith Drive Corridor Upgrade (Stages1, 2 &3)	Brisbane City Council	419.4
	Tilley Road Extension Project (Stages 2, 3 and Lindum Road crossing)	Brisbane City Council	313.9
Hobart	Hobart Inner City Linkage Infrastructure Project	Hobart City Council	81.0
Melbourne	Melbourne Metro Project*	Victorian Government	n.a.
Perth	Airport Rail Link – Perth	WA Government	670.4
Sydney	Green Square Eastern Light Rail Corridor	NSW Government	339.7
	Inner Sydney Regional Bicycle Network	City of Sydney	159.6
	George Street Transformation	City of Sydney	816.5
Canberra	Majura Parkway	ACT Government	269.0
Darwin	Barneson Street Link and McMinn St Duplication	NT Government	90.9

Note: Due to lack of publicly available information about key aspects of the Melbourne Metro, it was not possible to include it in the economic impact analysis undertaken for this report. However, given its importance for the city, a summary of the benefits identified by third parties is included in this report.

Source: Allen Consulting Group based on information provided by CCCLM.

Contribution to growth: impacts of project delivery

Economic modelling results indicate that the delivery of the proposed infrastructure projects would substantially boost economic activity in Australian cities and raise the community's welfare. As the material and lasting effects of productive infrastructure arise from its use, these benefits would be enjoyed into the future well beyond the projects' construction phases, when productivity gains from the infrastructure kick in and translate into lower costs, increased competitiveness and economic activity.

In particular, the analysis shows that the *operation* of all the infrastructure projects advanced by the capital cities would increase their real GRP *permanently* by between 4 and 64 basis points *annually*, depending on the project and the city. This is equivalent to an increase in today's GRP of about $1.81 billion each year, every year. [1,2,3]

[1] All the results of the economic analysis are in 2011-12 dollars and all net present valuations of the impacts of infrastructure projects refer to Net Present Values (NPVs) in the year 2013 using a 7 per cent real discount rate. Results are explained in terms of basis points. A basis point is a unit that is equal to 1/100th of 1 per cent. More details about the methodology used to estimate these economic impacts are provided in Chapter 4.

[2] To provide the results of completing all the proposed infrastructure projects together, the individual project impacts have been added together. This assumes that there are no complementarities from implementing the various projects at the same time or offsetting impacts of the projects. This assumption has been adopted to simplify this analysis. In reality, 'transport systems are networks and undertaking multiple projects may provide greater or lesser economic impacts than implied by adding the individual assessments for each project' (PCA 2011, p.13).

While it is not anticipated or realistic to assume that all the infrastructure projects will all proceed or occur at the same time, the $1.81 billion annual impact gives a sense of the magnitude of the difference that they could collectively bring about for the nation as a whole. This number is illustrative of the net gain in economic output in the long term that may occur as a consequence of operating the capital cities more efficiently through more efficient and expanded infrastructure facilities.

Furthermore, over the twenty year period from 2013 to 2033, if usage of the projects grows with the size of the cities' economies, these benefits would be equivalent to a one off increase in GRP of $25.2 billion in 2013 (in NPV terms). One way of putting this impact into context is to look at the Benefit Cost Ratio (BCR) of this change. Given the cost of the 'package' of infrastructure projects ($5.44 billion) and the benefits over twenty years outlined above ($25.2 billion), this would imply a BCR of approximately 4.6. A BCR of 4.6 implies that the selected infrastructure projects would provide a benefit that is 4.6 times higher than the alternative investment (say, repaying government bonds).

Consumption, the best indicator of the impact of the selected infrastructure projects on the community, is also expected to rise as a result of the delivery of the projects. It is estimated that the delivery of all the infrastructure projects proposed by cities would increase real consumption *permanently* by between 2 and 32 basis points *annually*, depending on the project and the city.

Another way in which the community would benefit from the infrastructure projects is via wages. Compared with a BAU scenario, productivity improvements stemming from these projects would lead to an increase in real wages of between 1 and 15 basis points *annually*, depending on the project and the city.

Importantly, the analysis also suggests that, in a complex and interconnected economy, investments in one city provide benefits in other regions and nationally. This lift in economic activity reflects a combination of an income effect and a supply side effect. Raising the economic performance of a city raises incomes of residents, which in turn stimulate demand for goods in regions outside the city. Raising the efficiency of a city means that it can provide services to the surrounding areas more efficiently. This greater efficiency is realised as a reduction in costs to businesses in the surrounding regions. This can be thought of as improvements in the 'gateway' services that a city provides to the hinterland regions (including services such as accounting, finance and marketing) that are vital to external competitiveness.

While the material and lasting benefits of infrastructure arise from its use, the expansion in expenditure during construction of the projects would also *temporarily* boost the economic output, consumptions and employment of cities. The key impacts of the construction phase of the proposed infrastructure project are summarised in the points below.[4]

[3] The measures presented for the operational phase of the infrastructure projects reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

[4] It is important to note that the results of the construction phase represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).

- The construction phase of the projects will produce a temporary shift in expenditure within the capital cities. Total capital expenditure for all of the projects combined is estimated to be around $5.44 billion dollars (PV). This will not be spent all at once in any one year in the future.[5] This expansion in expenditure within cities would increment economic output, consumption and employment.
- The capital expenditure and development activities from the proposed infrastructure projects would increase economic activity in cities *in a typical year of construction* by between 0.2 and 6 basis points, depending on the project and the city, when compared to a 'Business as Usual' (BAU) scenario where the infrastructure projects do not exist.
- While the impacts on cities' economic output may look small in percentage terms, it is estimated that the total benefit of all projects across all cities over the three-year period from 2013 to 2015 is equivalent to a one off boost in GRP of $459 million in 2013.
- It is clear that the increment in economic output and employment in each capital city that results from the development of infrastructure is substantial. It is also clear that the increase in GRP is not the same as the capital cost. Essentially, development expenditure 'leaks out' across the economy at large. This reflects payments to suppliers of equipment in other parts of Australia and as imports.
- The construction of the selected infrastructure projects would also have a significant impact on consumption (the best indicator of wellbeing of city households) and employment. Indeed, consumption and employment are estimated to be between 0.2 and 8 basis points higher *in a typical year of construction* (depending on the project and the city), when compared to the BAU scenario.

Conclusion

The results described above demonstrate that investing in infrastructure projects that generate productivity gains would raise prosperity of Australian cities. The extent of the economic impacts of particular investments would depend, in the first instance, on the benefits they directly generate for workers and businesses through reductions in travel time, cost of freight, accident costs, etc. As the infrastructure reduces the costs of its users, this would generally translate into reduced costs of doing business and living in the area, raising our cities' competitiveness.

A clear message stemming from this analysis is that investing in infrastructure that delivers productivity gains to cities would make a significant difference to economic performance of cities, surrounding areas, and Australia overall.

[5] To simplify the analysis and aid comparison it is assumed that the average capital expenditure phase occurs over three years.

Chapter 1

About this study

1.1 This report

Infrastructure, in particular economic infrastructure, plays a key role in supporting economic activity in Australia's cities, providing the vital transport links and connectivity which physically moves people and goods, and facilitates service industry activity. Historically, much of this infrastructure has been planned and/or financed by state governments (or their public trading enterprise or through Public Private Partnerships — PPPs). More recently the Commonwealth Government has begun investing in urban infrastructure, as outlined in Box 1.1.

Box 1.1

THE COMMONWEALTH GOVERNMENT'S RECENT INVESTMENT IN URBAN INFRASTRUCTURE

In 2008, the Commonwealth Government established the Building Australia Fund (BAF) to fund critical infrastructure in the transport, communications, water and energy sectors of the economy. Infrastructure Australia (IA) was asked to conduct a National Infrastructure Audit and to develop and maintain an Infrastructure Priority List to guide public and private investment and inform Commonwealth Government decisions on priority projects. IA's Infrastructure Priority List was subsequently considered in determining the 2009–10 Federal Budget.

The Commonwealth Government allocated $22 billion in the 2009-10 Budget to invest in nation building infrastructure with some $8.5 billion allocated to road, rail and port infrastructure. Of these, $7.6 billion were funded through the Building Australia Fund (including $4.6 billion to improve metropolitan rail networks in six of Australia's major cities: Sydney, Melbourne, Brisbane, Perth, Adelaide and the Gold Coast).

The Commonwealth Government also announced separate funding for two major cities projects with a focus on public transport links:

- Brisbane Cross River Rail — $20 million in 2008–09 towards a detailed feasibility and business case study of the optimal route for a new rail tunnel corridor through inner city Brisbane, from Bowen Hills to Yeerongpilly; and
- Perth City Link — $236 million over five years (including $7 million in 2008 09) towards the sinking of the central city section of the Perth to Fremantle railway line and construction of new rail platform.

The Gillard Government has committed to deliver a second round of funding for nation building projects under its Nation Building II Program to be delivered over the years 2014-17. Work is underway between the Commonwealth, State and Territory Governments to identify potential projects. To date, the Commonwealth Government has committed to several key projects for investment under the next phase of the Nation Building Program, including:

- Moorebank Intermodal Terminal, NSW;
- Parramatta to Epping Rail Link, NSW;
- Moreton Bay Rail Link, QLD;
- Inland Rail, VIC, NSW and QLD;
- Torrens and Goodwood Junctions, SA;
- Princes Highway West, VIC;
- Gateway, WA;
- Tasman Highway, TAS; and
- Majura Parkway, ACT.

Source: CCCLM.

The Council of Capital City Lord Mayors (CCCLM) has commissioned the Allen Consulting Group (ACG) to conduct this study examining the economic impacts that key nation building projects would have on Australia's cities and the national economy. The objective of this project is to encourage ongoing Commonwealth Government investment in urban infrastructure and promote specific nation building projects to be funded by a future Commonwealth Government.

The terms of reference for this study are to:

- identify nation building projects that would impact on a city's productivity;
- identify the costs of delivering such projects; and
- quantify the economic impacts associated with the delivery of these projects.

1.2 The structure of this report

This remainder of this report is structured as follows:

- Chapter 2 discuses the importance of both cities and infrastructure to prosperity and productivity, as background to the project;
- Chapter 3 explains the methodology used in this report to estimate the economic impacts of nation building projects;
- Chapter 4 to Chapter 11 outline the economic impacts of nation building projects for the following capital cities:
  - Sydney (Chapter 4);
  - Melbourne (Chapter 5);
  - Brisbane (Chapter 6);
  - Perth (Chapter 7);
  - Hobart (Chapter 8);
  - Adelaide (Chapter 9);
  - Canberra (Chapter 10); and
  - Darwin (Chapter 11); and
- Chapter 12 presents the conclusion of the study.

Chapter 2

Cities and infrastructure: engines of economic growth

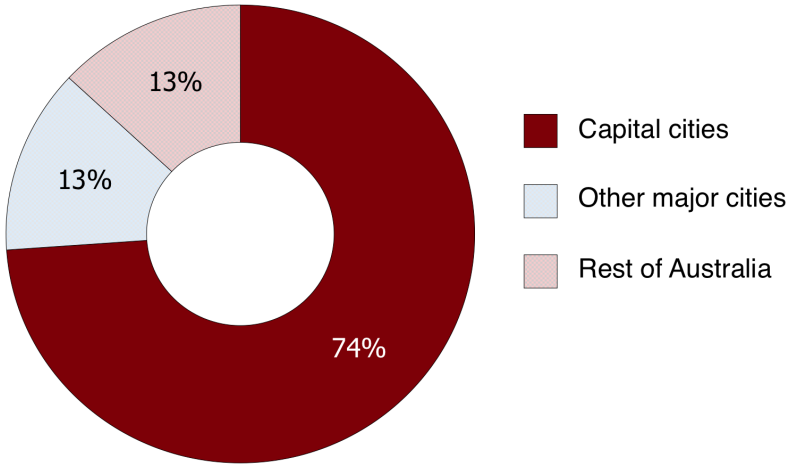
This chapter provides background and context to the project by exploring the urbanisation of Australia and the contribution of Australia's capital cities to prosperity. It then examines the role of infrastructure in the economy, including the Government's role in infrastructure provision, concluding by outlining the impact infrastructure can have on productivity.

2.1 The urbanisation of Australia

Australia continues to become increasingly urbanised. Between June 2001 and June 2011 Australia's population grew by 2.9 million people to a total of 22.3 million (ABS, 2012). Australian capital cities accommodated 74 per cent of Australia's additional population between 2001 and 2011, as seen in Figure 2.1. Today, more than 14.8 million people or 66 per cent of the Australian population, live in a capital city.

Figure 2.1

POPULATION INCREASE 2001-11

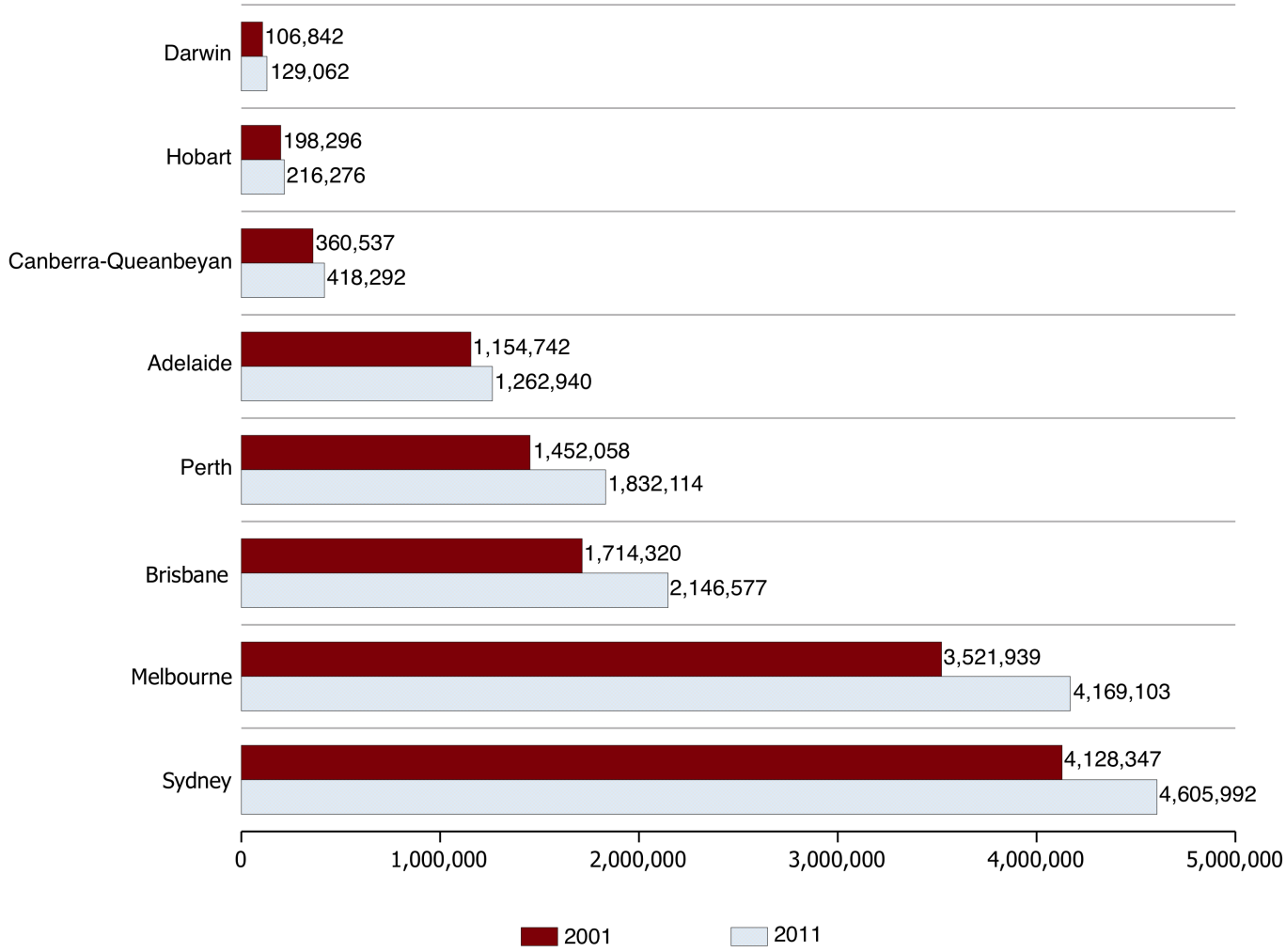


Source: ABS, 2012.

While over the course of the 20th century some capital cities have experienced declines in population numbers at some time — for example, Adelaide and Melbourne in the Great Depression and Darwin after cyclone Tracy (ABS 2008, cited in DIT 2012), all of Australia's capital cities have grown over the last decade as shown in Figure 2.2.

Figure 2.2

POPULATION GROWTH IN MAJOR CITIES 2001-11



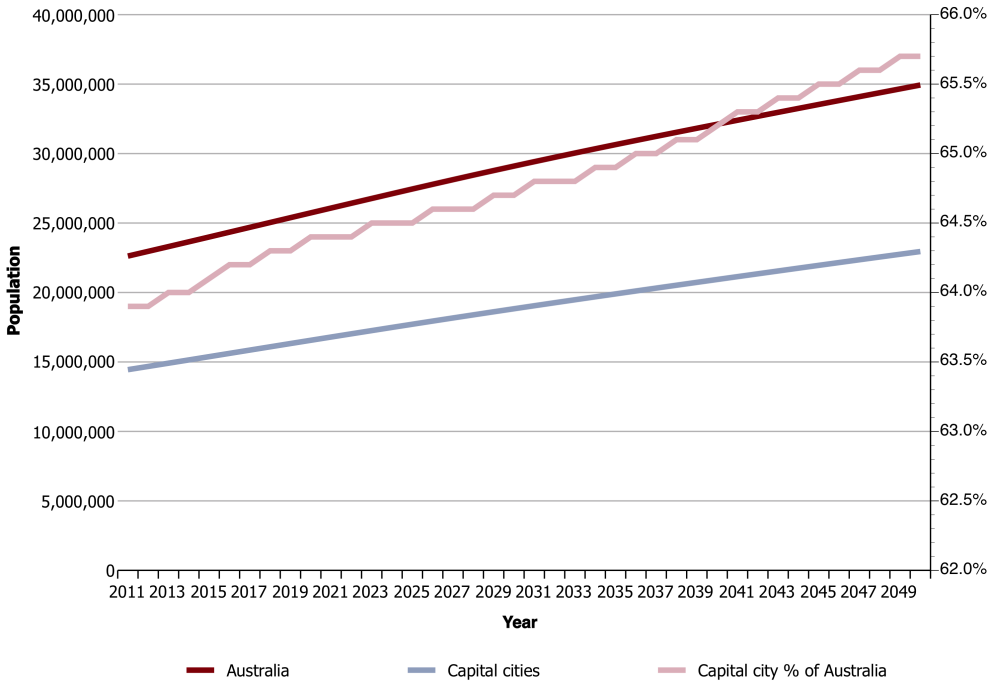
Source: Department of Infrastructure and Transport, 2012.

Australia's total population is projected to grow by 54.4 per cent between 2011 and 2050, from 22.6 million to 34.9 million[6] (PCA 2012), as shown in Figure 2.3. Estimates suggest that the population of Australia's capital cities will grow by 58.9 per cent over this period, from 14.4 million in 2011 to 22.9 million in 2050 (PCA 2012). The percentage of Australians living in capital cities is therefore expected to increase from around 63.9 per cent to 65.7 per cent over this period (PCA 2012).

[6] Australian and capital city population forecasts assume net migration into Australia of 190,000 persons per annum.

Figure 2.3

POPULATION PROJECTIONS 2011-2050



Source: Our Nation 2013

2.2 Contribution of Australian capital cities to Australia's prosperity

Australia's cities are engines of economic growth and wellbeing. As stated in ACG 2002, 'with their aggregation of people, services, business, educational institutions and supporting infrastructure, cities are the focal points for economic development and activity'. Cities have long held strategic importance in Australia. Indeed, cities:

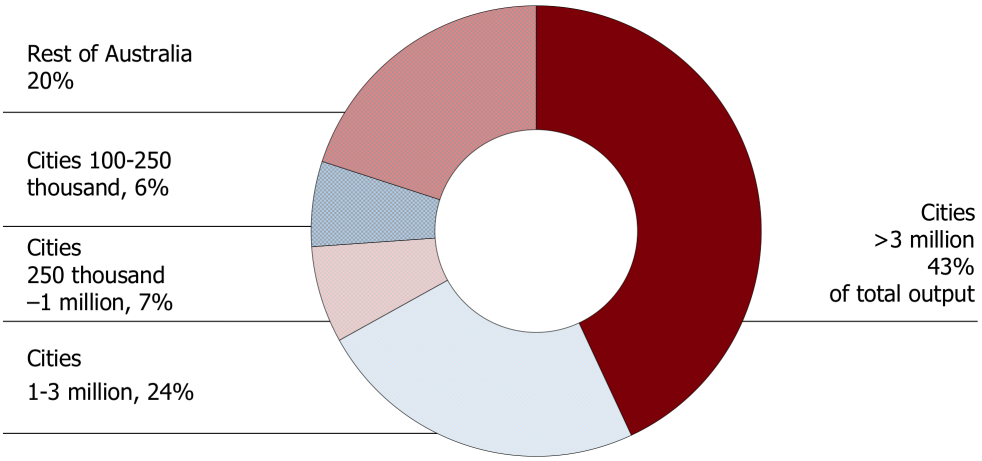
- are centres of economic activity and where the vast majority of Australians live and work;
- are the gateways to the movement of goods and services in international trade and finance in investment, serving all regions;
- are also gateways for the important economic and cultural contribution of regional Australia;
- are the cradles of national creativity and innovation and centres of opportunity, attracting people, business and investment from around the world; and
- play a pivotal role in securing national social, economic and environmental wellbeing.

According to Infrastructure Australia (2010), Australia's major cities contribute approximately 80 per cent of Australia's economic activity and employ 75 per cent of its workforce. Furthermore, Infrastructure Australia estimates that between 2003-2008 the major cities were responsible for contributing 84 per cent of the nation's economic growth. Additionally, between 2001 and 2006 the major cities contributed 81 per cent of employment growth.

Different cities contribute differently to economic output (see Figure 2.4). Infrastructure Australia (2010) estimates that over half (53 per cent) of Australia's economic activity occurs in Sydney, Melbourne and Brisbane, and a further 15 per cent in Adelaide and Perth. Other cities with between 250,000 and 1 million population contribute 7 per cent, while smaller major cities (with a population between 1000,000 and 250,000) generate around 6 per cent of activity.

Figure 2.4

MAJOR CITY CONTRIBUTION TO ECONOMIC OUTPUT

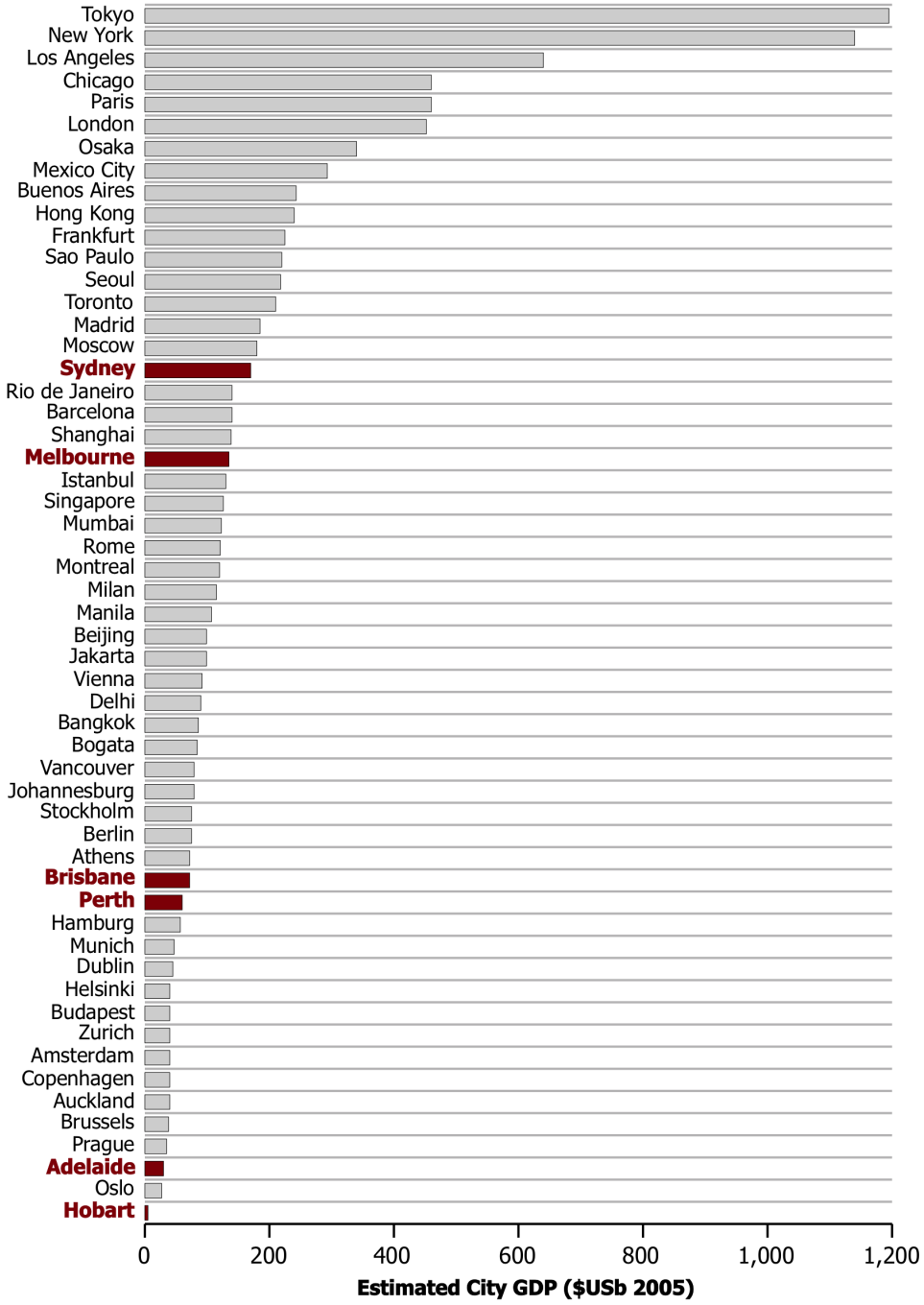


Source: Infrastructure Australia, 2010.

Some Australian cities also rank amongst the world's 150 major cities in terms of economic activity (see Figure 2.5). A study produced by PricewaterhouseCoopers (PwC, 2007) estimated that Sydney produced a total of $172 US billion in output in 2005 and ranked 26th amongst the world's 150 major cities, while Melbourne produced an estimated $135 US billion in output and was ranked 33rd in the world by the same measure. According to calculations by Infrastructure Australia, using a similar methodology to the PwC study, Brisbane and Perth would rank relative to Athens, and Hamburg, and Adelaide would rank similarly to Oslo and Prague.

Figure 2.5

GDP OF INTERNATIONAL AND AUSTRALIAN CITIES

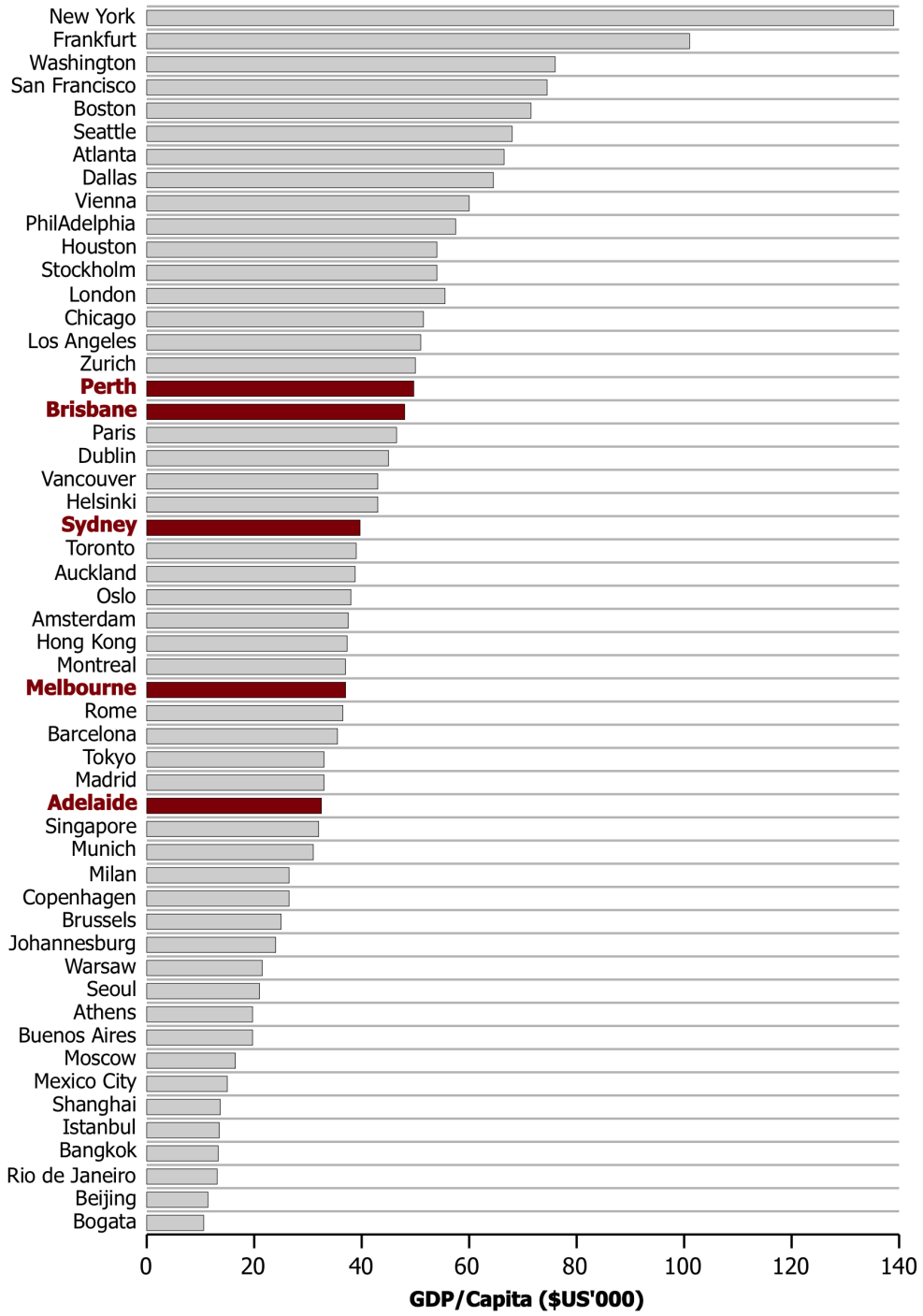


Note: Figure only shows a subset of cities that were included in the original PwC study.
Source: Infrastructure Australia, 2010.

When differences in population size are accounted for (allowing a more valid basis for comparison of the economic performance of world's cities), the ranking of Australian cities changes considerably (see Figure 2.6). Indeed, using per capita GDP to rank cities we find that Perth and Brisbane ranked close to Los Angeles, Paris and Zurich and that Sydney and Melbourne also rank slightly higher, behind New York and other US cities, as well as major European Centres such as London, Paris, and Frankfurt.

Figure 2.6

COMPARISON OF INTERNATIONAL CITIES BY GDP PER CAPITA



Note: Figure only shows a subset of cities that were included in the original PwC study.
Source: Infrastructure Australia, 2010.

2.3 The role of infrastructure in the economy

Infrastructure can be broadly defined as either 'social or 'economic' in nature. Social infrastructure refers to physical assets that support the social development of a community, such as education, health and public housing facilities. Economic infrastructure refers to the physical assets available for conducting business activities, such as communication, transportation and distribution networks.

Infrastructure plays a critical role in supporting economic activity and productivity within Australia. It allows the movement of goods and people and can support the provision of services (e.g. through internet networks). It also supports service activities that underpin economic activity, such as energy networks, heavy rail, ports, and water. Microeconomic reforms over the last decades in these sectors have sought to improve their productivity, and thereby enhance the productivity of the wider Australian economy.

There is increasing recognition of the interconnected roles played by public infrastructure. In addition to underpinning economic performance, public infrastructure also features in social and environmental capital that binds our communities and makes them liveable. Failure to provide sufficient or appropriate infrastructure undermines the competitiveness of a place and its social and environmental sustainability.

2.4 Government's role in infrastructure provision

Government has a role in infrastructure provision because, while markets can generally be relied on for the efficient provision of goods and services, there are circumstances where normal market forces may not deliver goods and services or fail to do so at efficient prices.

Key reasons markets may fail to deliver goods and services or fail to deliver them at efficient prices include:

- Public goods — these are goods or services where consumption has to be decided by the community as a whole rather than by each individual. 'Public goods' are goods and services for which one person's use does not prevent others from using them. Public parks, beaches, the courts, and the police are examples of services, which have characteristics of public goods. Competitive markets will tend to underproduce public goods because investors will not obtain sufficient returns.
- Externalities — the consumption or production of some goods or services can result in 'spillover' effects on third parties — that is, parties other than the buyer and seller of the good or service. These externalities can be positive or negative. Examples of negative externalities effects include pollution, noise, and congestion. Competitive markets will tend to overproduce goods and services with negative externalities, and underproduce goods and services with positive externalities.
- Natural monopolies — the existence of a natural monopoly, where one provider is able to meet total market demand at a lower unit cost than two or more providers, was once viewed as a key reason why the public sector should own and operate infrastructure. Technological change, however, may be challenging this rationale.

2.5 Infrastructure's impact on productivity

In addition to direct economic activity resulting from infrastructure projects, investment in public infrastructure can significantly improve the productivity of the economy, which can lead to higher growth in output and employment. This link has been established both at an international level and within the Australian economy.

International studies have indicated that public infrastructure has large direct and spin-off benefits to productivity, across a variety of types of investment including transportation, utility services, industrial infrastructure, and non-military public capital. Table 2.1 summarises the results of a number of studies examining the contribution of public infrastructure to private productivity in various countries at the economy-wide level.

Table 2.1

RESULTS FROM STUDIES OF INFRASTRUCTURE PRODUCTIVITY

Sample	Elasticity[a]	Author/year
United States	0.39	Aschauer 1989
United States	0.34	Munnell 1990
48 states, United States	0	Holtz-Eakin 1992
5 metro areas, United States	0.08	Duffy-Deno and Eberts 1991
Regions, Japan	0.20	Mera 1973
Regions, France	0.08	Prud'homme 1993
Taiwan, China	0.24	Uchimura and Gao 1993
Korea	0.19	Uchimura and Gao 1993
Israel	0.31–0.44	Bregman and Marom 1993
Mexico	0.05	Shah 1988, 1992
Multi-country, OECD	0.07	Canning and Fay 1993
Multi-country, developing	0.07	Canning and Fay 1993
Multi-country, OECD and developing	0.01–0.16	Baffes and Shah 1993
Multi-country, developing	0.16	Easterly and Rebelo 1993
Australia	0.27	The Allen Consulting Group 1993
Australia	0.40	Otto and Voss 1994
Australia	0.17	Otto and Voss 1996
12 OECD countries including Australia	1.80 (for Australia)	Demetriades and Mamuneas 2000
12 OECD counties	0.17 (for Australia)	Pereira 2001
Australia	0.10	Kam 2002
Australia	0.27-0.386	Song 2002
Mexico	1.01–1.03	Mamatzakis 2007
Japan	0.073–0.086	Mizutani and Tanaka 2008
Latin America (Argentina, Brazil, Mexico, Chile)	0.04–1.4	Mussolini and Teles 2010

a. Percentage changes in output with respect to a 1 per cent change in the level of infrastructure. Source: World Bank 1994, *World Development Report 1994: Infrastructure for development*, p.15, the Allen Consulting Group & the Australian Automobile Association 1993, *Land Transport Infrastructure: Maximising the Contribution to Economic Growth*, Canberra.

It has been found that cross-country differences in productivity growth can be partly explained by differences in levels of infrastructure spending. There is also evidence of a statistically significant positive relationship between productivity and infrastructure and that infrastructure appears to be a key determinant of comparative advantage between countries.

A number of studies have also established the relationship between capital investment and private sector productivity in the Australian economy as illustrated in Table 2.2. Such studies have shown that investments in economic and social infrastructure generated positive macroeconomic benefits and that, comparatively, the returns from road investment are higher than for almost all other infrastructure types. They have also shown that there is evidence that the accumulation of public infrastructure can have positive short to long-term effects through inducing permanently higher levels of output and private investment.

Table 2.2

SOME STUDIES OF INFRASTRUCTURE 'SPILLOVERS' IN THE AUSTRALIAN ECONOMY

Sample	Output elasticity[a]	Author/year
Australia	0.27	The Allen Consulting Group 1993
Australia	0.40	Otto and Voss 1994
Australia	0.17	Otto and Voss 1996
12 OECD countries inc. Australia	1.80 (for Aust.)	Demetriades and Mamuneas 2000
12 OECD countries	0.17 (for Aust.)	Pereira 2001
Australia	0.10	Kam 2002
Australia	0.27-0.386	Song 2002

a. The percentage increase in private output generated by a 1 per cent increase in public capital. Source: The Allen Consulting Group & the Australian Automobile Association 1993, *Land Transport Infrastructure: Maximising the Contribution to Economic Growth*, Canberra.

Further, productivity has been found to be linked to economic density. For example, SGS (2012a) quoted the World Bank in summarising key evidence relating productivity to economic density — as shown in Table 2.3.

Table 2.3

PRODUCTIVITY BENEFIT OF DENSITY

Finding	Data Sources
Doubling economic density increases productivity by 6 per cent	1988 data on output per work in U.S. states (Ciccone and Hall 1996)
Doubling employment density increases productivity by 4.5-5 per cent	Data for the late 1980s on non-agricultural private value added per worker in European NUTS regions (Ciccone 2002)
A one-standard deviation increase in the share of own-industry local employment in the first period will raise that industry's employment level by 16-31 per cent in a later period	Data on five traditional manufacturing industries in 224 U.S. metropolitan areas between 1980 and 1987 (Henderson, Kuncoro and Turner 1995)
A 10 per cent increase in local own-industry employment results in a 0.6-0.8 per cent increase in plant output, for the same level of inputs.	Republic of Korea city-industry data for 1983, 1989, 1991-93 (Henderson, Lee and Lee 2001)

Source: World Bank 2009, quoted in SGS 2012a.

Infrastructure can also enhance the economic benefits arising from the agglomeration of firms within cities — i.e. firms locating close to each other (either physically or in terms of transport costs). Firms may locate themselves in ways that enhance agglomeration for a range of reasons (SGS 2012a), including:

- input sharing — multiple firms may benefit from lower prices for their inputs arising from economies of scale;
- knowledge and technological spillovers — information can be shared non-commercially between firms, and physical proximity may make it easier to share information and technology;
- labour market pooling — larger labour markets may make it easier to hire suitable employees by better job matching;
- home market effect — if a firm locates near similar firms, it will increase the market for supplies to the firm's industry. This may encourage suppliers to locate nearby, enhancing agglomeration; and
- consumption — the range of services and activities in larger cities (such as specialised leisure activities), relative to smaller cities, may encourage consumption, further increasing economic activity in larger cities.

Agglomeration of firms can also enhance productivity by improving human capital — employee knowledge and skills that can be used to contribute to economic activity. Human capital can be strengthened through education and experience, which can be enhanced by people working in industries and geographic areas benefitting from the impacts of agglomeration.

2.6 Key points

Cities today are the great engines of economic growth. With their aggregation of people, services, businesses, educational institutions and supporting infrastructure, cities are the focal points for economic development and activity. Some three quarters of value added in Australia is produced in the major urban regions of Australia (ABS, 2003). Further, the built environment, which is concentrated in cities, has been assessed as contributing 40 per cent of the nation's total asset base (ABS 2003).

Cities are also the gateways to the movement of goods and services in international trade and finance in investment, serving all regions. The services they provide raise the competitiveness and viability of activities throughout Australia.

Infrastructure plays a critical role in supporting economic activity and productivity within Australia and supports service activities that underpin economic activity. Improvements in infrastructure result in productivity gains, not only in cities themselves, but also gains in other regions that are economically linked to cities, and therefore to the nation as a whole.

Chapter 3

Exploring the opportunity: approach to measuring the impacts of infrastructure

3.1 Projects assessed in this report

The infrastructure projects evaluated in this report were selected by capital cities. Cities were asked to provide up to three projects for this evaluation. The parameters for the selection of the projects were the following:

- projects did not need to physically lay within capital city Local Government Areas or metropolitan areas – the importance of projects relates to their impact on a city's productivity;
- each project costs in excess of $100 million in total (as per existing Infrastructure Australia criteria); and
- projects involve economic infrastructure that will drive national productivity.

Table 3.1 outlines the infrastructure projects identified by each city for analysis.

Table 3.1

NATION BUILDING PROJECTS SELECTED BY CAPITAL CITIES

City	Project	Proponent / Delivery level of Government
Adelaide	Adelaide Inner-City Tram Loop & Squares Regeneration	SA Government
Brisbane	Suburbs 2 City Buslink (Stages 1 & 2)	Brisbane City Council
	Kingsford Smith Drive Corridor Upgrade (Stages1, 2 &3)	Brisbane City Council
	Tilley Road Extension Project ((Stages 2, 3 and Lindum Road crossing)	Brisbane City Council
Hobart	Hobart Inner City Linkage Infrastructure Project	Hobart City Council
Melbourne	Melbourne Metro Project*	Victorian Government
Perth	Airport Rail Link – Perth	WA Government
Sydney	Green Square Eastern Light Rail Corridor	NSW Government
	Inner Sydney Regional Bicycle Network	City of Sydney
	George Street Transformation	City of Sydney
Canberra	Majura Parkway	ACT Government
Darwin	Barneson Street Link and McMinn St Duplication	NT Government

Note: Due to lack of publicly available information about key aspects of the Melbourne Metro, it was not possible to include it in the economic impact analysis undertaken for this report. However, given its importance for the city, a summary of the benefits identified by third parties is included in this report.

Source: CCLM.

3.2 Modelling approach

When making infrastructure investment decisions, governments should undertake cost-benefit analysis (CBAs) to assess the economic merits of an investment. Good CBAs asses a broad range of important factors and have many valuable benefits. They provide an understanding about how the returns from an investment weigh-up against its costs and incorporate broader welfare indicators into the assessment.

At this time detailed Cost Benefit Analysis information is not available for most of the projects selected by the capital cities. Undertaking a comprehensive CBA is outside the scope of this study and could not be completed for all projects within the next year or so. As a consequence, this report uses an alternative approach to assess the likely economic impact of the high priority infrastructure projects: Computable General Equilibrium (CGE) modelling.

A CGE modelling approach has many advantages. It can be used to provide a broad illustrative map of the economic changes brought about by major projects without all of the detailed information normally included in a detailed CBA. Furthermore, it specifically factors in 'ripple' effects. A CGE framework can estimate how change fully flows through the economy as indicated by aggregate measures such as productivity, household consumption, employment, wages, investment and government revenue. It also provides insight into distributional effects, measuring how a project can impact on specific industry sectors or regions.

Several CGE models exist. This study uses The Enormous Regional Model (TERM) – see Box 3.1 for a brief description.

TERM is a high-level representation of the Australian economy, facilitating measurement of the wider effects of changes in economic activity in key industries and regions. To the extent that economic activity is interlinked, the model captures any indirect effects that arise from direct measures. The model takes into account changes in productivity through the supply chain, as well as the leakage of value through imports from other regions and overseas, and account for impacts upon competitiveness.

TERM is particularly suited to assessing the broader implications of productivity changes. The fabric of the model is aligned with the fabric of the economy and interconnections between industries and regions, so it is readily useful to assess the implications of a change in productivity stemming from improved infrastructure services in a particular region.

Using the TERM model we are able to calculate the impacts of the proposed infrastructure projects on key macroeconomic variables.

Box 3.1

THE ENORMOUS REGIONAL MODEL (TERM)

TERM is a multi-sector multi-regional CGE model of the Australian economy, containing up to 172 industrial sectors. Notably TERM is a bottom-up model from the statistical division (SD) level, and models each SD as an economy in its own right, with region-specific prices, region-specific consumers, region-specific industries, and so on. The TERM model is a high-level representation of the Australian economy, facilitating measurement of the wider effects of changes in economic activity in key industries and regions. To the extent that economic activity is interlinked, the model captures any indirect effects that arise from direct measures. In this instance, the areas of economic

activity that rely on new and improved infrastructure services can be expected to see changes directly in increased productivity. The model captures the flow-on impacts of this improvement in output from capital cities, and the flow on impacts to other regions, the state and Australia overall. Importantly, the TERM model is widely known and has been used for a wide range of policy studies particularly in the areas of agricultural economics and water trading.

Underlying assumptions

At the national level, total employment (which is determined by the total work force and the natural unemployment rate) is expected to remain unchanged from its baseline forecast level, while real wages will adjust according to changes in the demand of the sectors. Essentially this reflects a view that you would not normally expect an infrastructure project in a city to change the future level of labour supply or the underlying national population. The workforce and population can be relocated between regions and cities reflecting changes in the attractiveness of living and working in different cities, but the overall population will remain in line with future projections.

The capital stock is expected to adjust between the baseline and new equilibrium position in the economy.

These underlying assumptions are consistent with the classic long-run assumption where national labour supply is fixed, while wages and capital are flexible. Policy changes would have a greater impact on investment as producers adjust their capital needs in view of changes in the demand and cost of their products.

Source: Allen Consulting Group, 2013.

3.3 Basis for analysis

The approach to modelling the economic impacts of selected infrastructure projects across Australia's capital cities is as follows.

- TERM model simulations have been performed to estimate the economic impacts of the individual projects of cities, regions, states and Australia as a whole.
- It is important to understand that the assessment of the economic impacts of infrastructure projects involves a comparison of two futures:
  - *BAU scenario* — this refers to the 'business as usual' (BAU) scenario where there are no changes to the level of investment in infrastructure in cities.
  - *Infrastructure investment scenario* — this refers to a scenario where the selected projects go ahead and there is additional infrastructure investment in the cities.
- The economic impacts of projects have been assessed for each capital city taking each project one at a time. That is, the impact is assessed on the basis of having the project compared to the circumstances of not having the project. This simplifies the analysis as it is removes the complexities about what would happen if projects occurred in differing order and differing combinations.
- The assessment also looks at two separate phases: the *construction phase* and the *operations phase*.

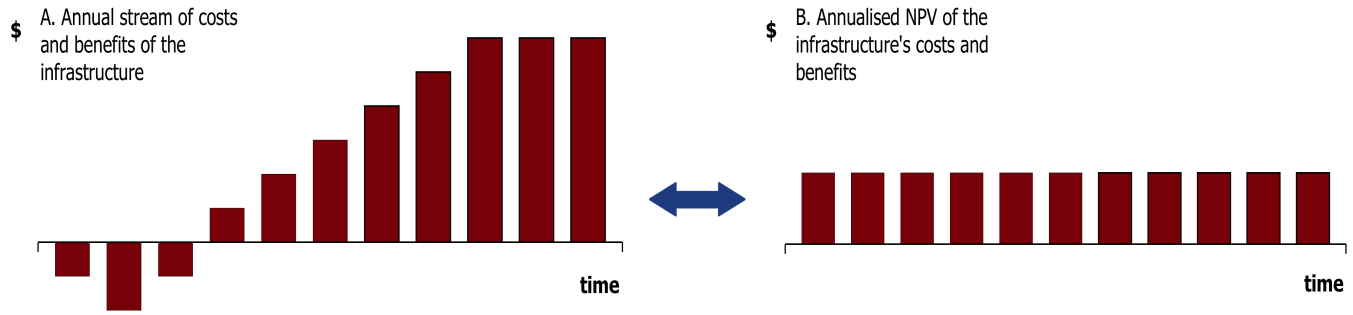
- In the *construction phase* the analysis focuses upon the economic impact of the capital expenditure and development activities in a typical year. It is not clear how long it will take to develop all of the projects or when they will be completed, so to simplify the analysis and aid comparison it is assumed that the average capital expenditure phase occurs over three years. The main economic impact of construction in a region is to increase demand a proportion of which inevitably leaks out to other regions (and to imports).
- The construction phase is modelled using short run closure assumptions as it is expected to take place over a relatively short period and the economic impacts of the construction activity itself is not expected to have lasting long term impacts on the economy.
- In the *operations phase* the analysis looks at what happens in a typical year in the future when the infrastructure facilities are providing service. It reflects the expected or average change in the medium to longer term when all of the various changes have fully worked their way through the economic system.
- There is no such thing as a free lunch and the capital and development spending in a region through infrastructure investment give rise to the need to make repayments for the use of those funds and capital. Where repayments are made outside of a region they are not a transfer, but a material economic loss to the region. In the model the capital repayment costs are paid over time when the infrastructure facilities become operational.
- To simplify the analysis it is assumed that the costs of constructing each individual project are financed through public sector debt to foreign providers of capital. Another way of looking at this is that it is not clear that any one infrastructure project will change the level of savings that the Australian community makes and so, either directly or indirectly, Australian governments would draw down (e.g. borrow) from overseas to fund the increase in investment represented by each infrastructure investment project. It is assumed that annual repayments equalling 7 per cent (in real terms) of the total project construction costs need to be made.
- Construction repayments are assumed to be financed by government through increased taxation. While in other studies ACG has shown that a tax will have different effects than a toll, reflecting the impact of distortions and the effect of pricing some users out of using the new infrastructure facilities, and it is true that in the case of some infrastructure projects some or all of the capital cost will be recovered from users through tolls or fares, it substantially reduces analytical complexity to assume the consistent application of taxes.
- Economic impacts in the operations phase are taken into account in net terms. That is, the analysis focuses on identifying the productivity gain, which is the difference between economic resource savings and economic resource costs. The net change is reflected as a labour productivity enhancing 'shock' to the host city. Thus, the analysis accounts for where infrastructure projects are expected to increase the *effective* supply of labour by making more workers available through better transport, raising the productivity of existing workers by giving them better tools, making them healthier, or reducing their travel time or reducing the need to use as much transport, for example.

- In the case of some projects information has been provided by cities' representatives about initial estimates of benefits such as vehicle operating cost savings or travel time savings, changes in congestion and use of parking etc.
- For projects where limited information was provided, the Allen Consulting Group drew on studies on productivity gains from the stock of public sector investment in infrastructure (see Chapter 2) and other public documents (e.g. government reports, submissions and past planning documents) to quantify the possible operating costs and benefits of the proposed projects.
- Development expenditure for most of the proposed infrastructure projects was provided by cities' representatives (a list of the documents provided by the cities through the CCCLM is provided in Appendix A). In some cases it has been necessary to use estimated capital costs reported in public sources including the media. In others ACG has made estimates of the likely capital costs reflecting experience with similar projects in other locations.
- To assess all the projects in a consistent way, we have made a number of assumptions where project specific information has not been available.
  - All project expenditure is converted into Present Value (PV) using a real discount rate of 7 per cent.
  - When no specific project information was available we have assumed that a project takes three years to be constructed (starting in 2014) and that its benefits last 25 years.
  - All monetary values have been estimated in, or adjusted to 2011-12 prices.
  - When no operational expenditure estimates were available, we assumed that these would be equivalent to 5 per cent of the capital expenditure per annum.
  - To estimate the potential magnitude of the benefits, guidance was obtained from the thorough process of vetting infrastructure projects in Australia. It is unlikely that projects with a Benefit Cost Ratio (BCR) significantly below 1.3 would proceed and so net gains have been estimated for each project where information is limited at this time to achieve this benchmark BCR.
- An infrastructure asset generates both costs and benefits (see Panel A in Figure 3.1). It imposes costs upfront during its construction and provides benefits over time when the infrastructure is fully operational. This study calculates the Net Present Value (NPV) of each infrastructure project based on the discounted stream of costs and benefits. It then converts the NPV into an 'average' annualised figure (see Panel B in Figure 3.1). The average annualised figure indicates what the infrastructure's return would be if it provided a constant return in each year. The NPV of the stream of costs and benefits in Panel A is equal to the sum of benefits in Panel B.

- The results of the economic modelling undertaken for this study are expressed as an average annual percentage change from the baseline (i.e., future scenario without the additional infrastructure investment). This measure reflects the net expected effect, that is the average expected gain after considering both the costs and benefits of the infrastructure, spread evenly over time. It should be interpreted as characterising the magnitude of a potential permanent boost to the economy stemming from the use of the infrastructure assets.

Figure 3.1

INTERPRETATION OF THE REPORTED ESTIMATED ECONOMIC IMPACTS OF INFRASTRUCTURE PROJECTS



Source: Allen Consulting Group based on PCA (2006).

The modelling shocks used to estimate the economic impacts of the proposed infrastructure projects are set out in Appendix B.

Chapter 4

Sydney

4.1 Project snapshot

The projects shortlisted for analysis by the City of Sydney are:

- the Green Square Eastern Light Rail Corridor;
- the Inner Sydney Regional Bicycle Network; and
- the George Street Transformation project.

The following sections provide further information about these projects.

Green Square Eastern Light Rail Corridor

The Green Square Eastern Light Rail Corridor represents a major project and transformation of the city. It involves the establishment of a light rail connection between the CBD and Sydney Airport. It is hoped that this will reduce traffic congestion and facilitate urban consolidation in the Eastern suburbs. This is particularly important because the suburbs affected by this development are projected to share a large proportion of the growth in dwellings in Sydney over the near future.

Green Square is a band of suburbs 4.5 kilometres southwest of Sydney that is designated for major urban renewal. The area covers 292 hectares, and 20,000 new homes are planned for the area.

The City of Sydney has supported plans for a light rail line that runs from Central Station to Zetland, Alexandria, Beaconsfield and Waterloo, running down Crown and Baptist streets and then parallel to South Dowling Street. At present the main issue with the plan is the acquisition of the land corridor necessary for the development in order to enable optimal construction routes.

The level of current and proposed development focussed on the Green Square area has made the acquisition of this Corridor a pressing concern for the State Government. Large tracts of formerly industrial and warehousing areas are being transformed into urban areas with neither an existing transport system, nor a consistent and defined plan for transport in the area. The requested investment in Green Square represents a low-risk investment because the majority of funds will be used to buy property assets, which are very likely to retain or increase value.

A reliable light rail system is expected to significantly reduce the Central City area car usage, as well as create a better street environment for non-motorised transport system users. Light Rail extensions for Inner Sydney should provide high levels of comfort, reliability and frequency, such that they become a genuine alternative to private car use for all travellers.

The Green Square development is a unique urban renewal opportunity in a nationally strategic location. With the required infrastructure investment, Green Square will deliver a model project, supporting national urban renewal agendas and playing an important role in transforming our cities.

Additional high-level information about this project is provided in Table 4.1.

Table 4.1

GREEN SQUARE EASTERN LIGHT RAIL CORRIDOR PROJECT SNAPSHOT

Category	Summary information
Project type	Rail Transport, new rail line and railway stations.
Purpose of project	• Provide direct linkage between Sydney CBD and Sydney Airport, reducing travel time for commuters. • Increases access to rail transport for residents in areas along the line. • Reduce congestion on roads, and free up capacity on other sections of commuter rail network.
Location of project	Sydney CBD, and Mascot
Locations affected by project	Mascot, inner city CBD, Redfern, Waterloo, Surry hills/Darlinghurst.
Capital cost of project	$340 million (PV, $2011-12, includes land costs)
Operating cost of project	$100 million per year (PV, $2011-12)
Expected construction timeframe	2013 – 2017
Expected benefits of project	• Reduce average travel time between Sydney CBD and Sydney Airport, hence improving labour productivity. • Reduce motor vehicle traffic on roads in the CBD and Airport regions as well as the eastern corridor and improve road transport sector productivity through faster travel time and reduced accidents. • Reduce passenger numbers on sections of rail network connecting Mascot to the city by reducing delays and congestion on network, improving rail transport productivity.

Source: Allen Consulting Group (based on information provided by cities).

Inner Sydney Regional Bicycle Network

The Inner Sydney Regional Bicycle Network is a radial and orbital network of strategic bike routes created by improving the use of the existing road network to provide commuters with a safe alternative to motorised transport. It involves a 284 kilometres network of safe cycleways, mainly additional bi-directional travel lanes, through the construction of 214 kilometres of separated cycle ways and 70 kilometres of upgraded shared paths.

International and domestic experience demonstrate that the provision of separated cycleways, paths provided for the exclusive use of cyclists whereby cyclists are segregated from general traffic by a physical barrier, can significantly reduce safety concerns potential cyclists may have. The provision of separated cycleways can have immediate and long term impacts on usage, with strong shifts in cycling demand observed where separated cycleway infrastructure has been constructed. For instance:

- the development of two cycleways by the City of Sydney on King Street and Bourke Road saw cycling levels increase by up to 30 per cent immediately after opening; and
- demand on cycleways monitored by the RTA has shown that average daily usage on inner Sydney cycleways has increased at an average rate of 12.4 per cent per annum between 2003 and 2008.

Although the take up of cycling is growing, the network in Sydney is currently fragmented and there has been limited cooperation between various levels of Government to develop a cohesive network. The development of a cohesive network will help the NSW Metropolitan Transport Plan to achieve it's goal of cycling sharing 5 per cent of the share of trips less than 10 kilometres in length.

The main benefits from increased levels of cycling accrue through:

- travel time savings;
- environmental savings including greenhouse gas emissions, air pollution, and noise;
- savings on public transport vehicle operations and purchase;
- infrastructure investment timing and budget; and
- cycling specific benefits including health and journey ambience.

A study of the costs and benefits of the Inner Sydney Regional Bicycle Network by CoS (2010) found that the network is estimated to generate net economic benefits of $507 million in 2010 prices, at a cost benefit ratio of 3.88. Significant components of this benefit include the decongestion benefit, travel time savings, vehicle operating cost savings, train long run marginal cost savings, productivity benefits and journey ambience.

Additional high-level information about this project is provided in Table 4.2.

Table 4.2

INNER SYDNEY REGIONAL BICYCLE NETWORK PROJECT SNAPSHOT

Category	Summary information
Project type	Network of Cycle paths around the city
Purpose of project	• To improve transportation options throughout the city • Reduce congestion and the burden on other forms of transport • Encourage healthy transport choices for Sydney's population. • Encourage sustainable , environmentally friendly transport .
Location of project	Inner Sydney
Locations affected by project	King street, Bourke Road Sydney, other parts of inner Sydney
Capital cost of project	$160 million (PV, $2011-12)
Operating cost of project	$23 million (PV, $2011-12)
Expected construction timeframe	Staggered over the period 2010-2017
Expected benefits of project	• Economic benefits for government, individuals and general economy, • Travel time savings, avoided car costs, • Journey ambience and health benefits • Congestion reduction, environmental benefits

Source: Allen Consulting Group (based on information provided by cities).

The George Street transformation project

The aim of this project is to transform George Street into a coherent, attractive and walkable link with priority for public transport, cyclists and pedestrians. This north-south central 'spine' will link important squares at Circular Quay, Town Hall and Central Station and provide wider footpaths, vibrant and externally focussed retail frontages and canopies of trees. It will achieve this by closing George Street to private vehicles, restricting service vehicles and allowing only light rail, bicycles and pedestrian traffic between Liverpool and Alfred Streets.

The main benefits will come in the form of reduced travel times, decongestion and increased safety (accident reductions). Further benefits include amenity values and increased retail property values, particularly in the retail core precinct of George Street. A study commissioned by the City of Sydney estimated that $428 million in retail property capital values would arise from the pedestrianisation of George Street and the introduction of light rail. In percentage terms this represents around 14 per cent along the entire stretch of the development. The bulk of this increase will be concentrated in the retail core precinct (17 per cent) and a minimum increase of 6 per cent in the commercial precinct.

Investment from world-class retailers is expected to grow, with the recent establishment of flagship stores on George Street from Apple, Louis Vuitton and Topshop in anticipation of the light rail. The pedestrianisation of George Street between Hunter and Bathurst Streets will further enhance the attractiveness of the main thoroughfare in Sydney and serve to attract greater numbers of shoppers and tourists.

Another key area that will benefit Sydney's economy comes through reduced congestion, which costs Sydney businesses and residents an estimated $5.1 billion a year (CoS, 2012). The light rail network from Randwick to Circular Quay will be able to transport some 9,000 people an hour in both directions (O'Farrell, 2012). This will help to ease pressure particularly during peak hour traffic when 360 buses converge on Circular Quay down George Street.

The plan also incorporates a redesigned bus network, which, combined with the introduction of light rail will be able to significantly reduce the number of buses clogging the city's streets and provide fast reliable links for people to key destinations throughout the city. Journey times from Central to Circular Quay will be cut by 50 per cent, and routes out to Randwick and Kingsford will also be reduced, particularly during major sporting events.

Additional high-level information about this project is provided in Table 4.3.

Table 4.3

THE GEORGE STREET TRANSFORMATION PROJECT SNAPSHOT

Category	Summary information
Project type	George Street transformation project
Purpose of project	• Transform George Street into a walkable link with priority for public transport, cyclists and pedestrians, through the centre of Sydney • Increase the amenity value of George Street for retail tourism and trade
Location of project	George Street Sydney
Locations affected by project	George Street and neighbouring Streets, Sydney CBD
Capital cost of project	$816.5 million (PV, $2011-12) – includes George St pedestrianisation and light rail locate along George St
Operating cost of project	$40.4 million (PV, $2011-12)
Expected construction timeframe	2014-2020
Expected benefits of project	• An efficient transport route through the city centre • A pedestrian focussed boulevard • Improved links between the city and the harbour

Source: Allen Consulting Group (based on information provided by cities).

4.2 Exploring the opportunity: impacts of project delivery

The following sections present estimates of the economic impacts that each of the selected projects would have on Sydney, the regions near Sydney, the rest of the State and on Australia as a whole.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).
- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The total capital expenditure for all the projects in Sydney combined is estimated to amount around $1.3 billion ($2011-12). This expansion in expenditure within Sydney would increment economic output, consumption and employment. The results in Table 4.4 show that the capital expenditure and development activities from these infrastructure projects would increase economic activity in Sydney by 1 basis point[7]. While the impacts on the city economic output may look small in percentage terms, it is estimated that this benefit over a three-year period (from 2013-14 to 2015-16) is equivalent to a one off increase in real Gross Regional Product (GRP) of $44.4 million in 2013 ($2011-12).

The construction of the selected infrastructure projects would also have a significant impact on consumption, the best indicator of wellbeing of Sydney's households. Indeed, consumption and employment are estimated to be 2 basis points higher on a typical year of construction, when compared with a 'Business as Usual' (BAU) scenario.

Table 4.4

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE SYDNEY ECONOMY DURING THE CONSTRUCTION PHASE (SHORT RUN, DEVIATION FROM BASELINE)

Project	Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
Green Square Eastern Light Rail Corridor	27.0	0.004	0.004	0.006
Inner Sydney Regional Bicycle Network	11.6	0.002	0.002	0.002
George Street Transformation	5.8	0.008	0.009	0.012
All projects	***44.4***	***0.01***	***0.02***	***0.02***

Source: TERM simulation results.

Operations phase

Table 4.5 provides a summary of the average annual impacts of the operations of three proposed infrastructure projects on the Sydney economy in the long run on key economic variables. These results show that the projects would have a positive effect on the economy of Sydney at large. Indeed, the projects separately would grow the economy of Sydney by between four and 9 basis points per annum in the long run (that is, after the economy has fully responded), depending on the project. This is equivalent to an increase of between $340 and $817 million of GRP in 2013-14 ($2011-12). In total, the long lasting effects of the three proposed projects would be to increase Sydney's GRP by 20 basis points (or 0.2 per cent) per annum, when compared to the baseline scenario.[8] Similarly positive results can be seen in other economic indicators, as outlined in the table below.

[7] A basis point is a unit that is equal to 1/100th of 1 per cent.

[8] To provide the results of completing all the proposed infrastructure projects together, the individual project impacts have been added together. This assumes that there are no complementarities from implementing the various projects at the same time or offsetting impacts of the projects. This assumption has been adopted to simplify this analysis. In reality, 'transport systems are networks and undertaking multiple projects may provide greater or lesser economic impacts than implied by adding the individual assessments for each project' (PCA 2011, p.13).

Table 4.5

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE SYDNEY ECONOMY (LONG RUN, DEVIATION FROM BASELINE)

Project	Modelled cost (NPV, $m 2011-12)	GRP (%)	Consumption (%)	Employment (%)	Wages (%)
Green Square Eastern Light Rail Corridor	339.7	0.04	0.03	0.01	0.02
Inner Sydney Regional Bicycle Network	159.6	0.04	0.02	0.01	0.01
George Street Transformation	816.5	0.09	0.05	0.02	0.03
All projects	***1,315.7***	***0.2***	***0.1***	***0.04***	***0.1***

Source: TERM simulation results.

These effects come about mainly from improved labour productivity stemming from the proposed infrastructure projects (e.g. reduced travel costs, travel time savings, vehicle operating cost savings, reduced freight costs, etc.). In the long run, the effect of higher productivity in industries is passed on to consumers in the form of lower prices for consumer goods and services. Lower consumer prices arising from the productivity growth translate into higher real private consumption.

Additional discussion about the economic impact of individual projects is provided in the following sections.

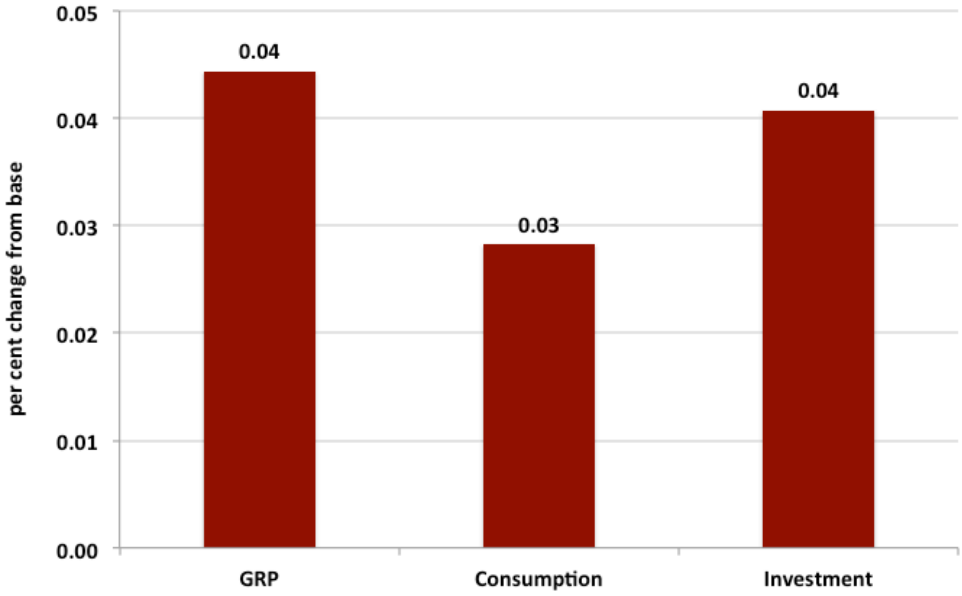
Green Square Eastern Light Rail Corridor

Figure 4.1 illustrates the economic impact of the Green Square Eastern Light Rail Corridor on the Sydney economy. As can be seen from this figure, this infrastructure project has positive benefits on the Sydney economy at large. In the long run Sydney's GRP, a measure of the region's economic activity, increases by an average of 4 basis points per annum (compared to the baseline scenario where the project does not exist). Similarly, consumption in the region (an indicator of living standards) increases by 3 basis points per annum when compared to the baseline. An increase in private consumption indicates an increase in welfare of Sydney's residents.

Investment, an indicator of the future productive capacity of the economy, would also be boosted by the project. Indeed, a higher investment profile in Sydney is responsible for much of the boost to GRP under the project scenario. Compared to the baseline scenario, the modelling results show that investment in Sydney is expected to be higher by around 4 basis points per annum in the long run.

Figure 4.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON SYDNEY (PER CENT DEVIATION FROM BASELINE)

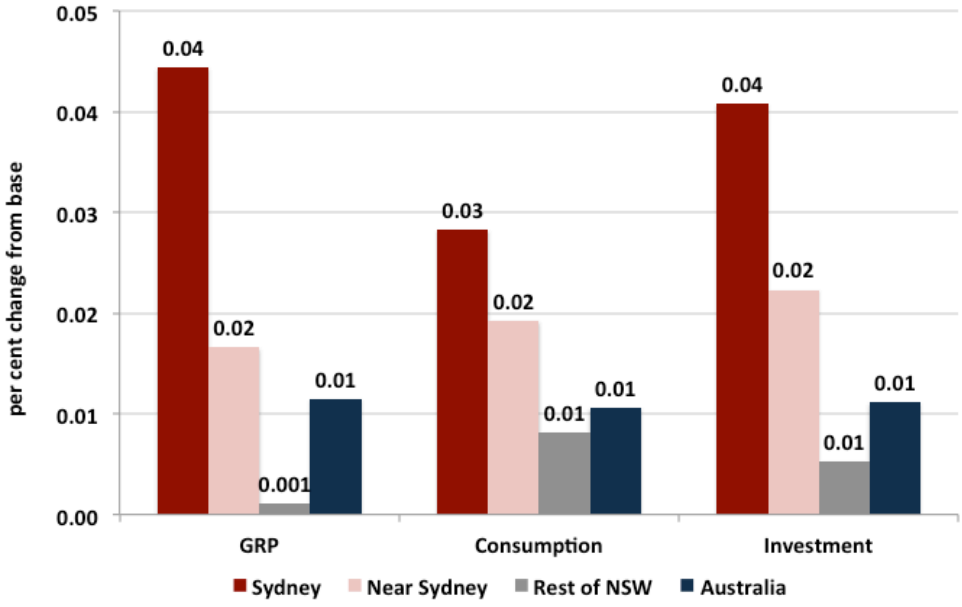


Source: TERM simulation results.

Figure 4.2 shows that the Green Square Eastern Light Rail Corridor would have positive benefits beyond Sydney. Indeed, regions near Sydney, the rest of New South Wales and Australia as a whole would benefit from this infrastructure project.

Figure 4.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND SYDNEY (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

The lift in economic activity reflects a combination of an income effect and a supply side effect. Raising the economic performance of Sydney at large raises incomes of residents, which in turn stimulate demand for goods in regions outside of Sydney. Raising the efficiency of Sydney as a city means that it can provide services to the surrounding areas more efficiently. This greater efficiency is realised as a reduction in costs to businesses in the surrounding regions. This can be thought of as improvements in the 'gateway' services that the city provides to the hinterland regions (including services such as accounting, finance and marketing) that are vital to external competitiveness.

Notably, the flow on gains to regions near and more distant to Sydney is smaller than the gains for Sydney because distance imposes a barrier to the spread of the flown on benefits. This also reflects the fact that resources (such as capital) are attracted from other regions to Sydney as it grows reflecting increased economic efficiencies. However, the overall effect still results in a boost to productivity and output in Sydney that spills over to neighbouring regions, providing a net stimulus.

Furthermore, the higher output levels in Australia as a whole demonstrate that the gains stemming from this infrastructure project are not merely about redistribution. Indeed, Australia's output (as measured by Gross Domestic Product, GDP) is estimated to be 1 basis point per annum higher, compared to baseline. Consumption and investment would also be higher by approximately the same magnitude.

However, a redistribution of resources is evident in the expected labour market outcomes presented in Figure 4.3. This figure shows that the Green Square Eastern Light Rail Corridor would create more employment opportunities, with higher number of jobs in Sydney and near Sydney.

Figure 4.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)

Source: TERM simulation results.

In the long run, total employment in Australia remains unchanged. This indicates that employment in other states and territories will be lower than it would otherwise be with labour shifting from interstate to NSW, and Sydney in particular.

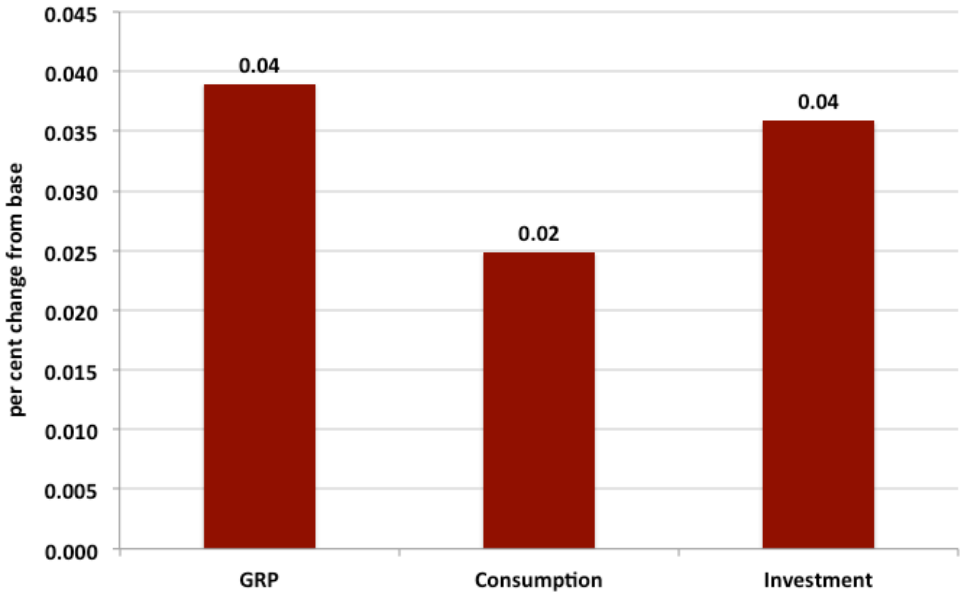
The productivity gains stemming from the project would lead to higher real wages in Sydney by around 2 basis points per annum, with overall wages in Australia expected to be higher by 1 basis point per annum on average. Wages are one of the key ways in which the benefits of increased productivity are distributed through the economy.

Inner Sydney Regional Bicycle Network

Similar to the Green Square Eastern Light Rail Corridor, the Inner Sydney Regional Bicycle Network would increase Sydney's economic activity, consumption and investment in the long run. In particular, as shown in Figure 4.4, compared to the baseline this project would increase GRP by 4 basis points per annum, private consumption by 2 basis points per annum and investment by 4 basis points.

Figure 4.4

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON SYDNEY (PER CENT DEVIATION FROM BASELINE)



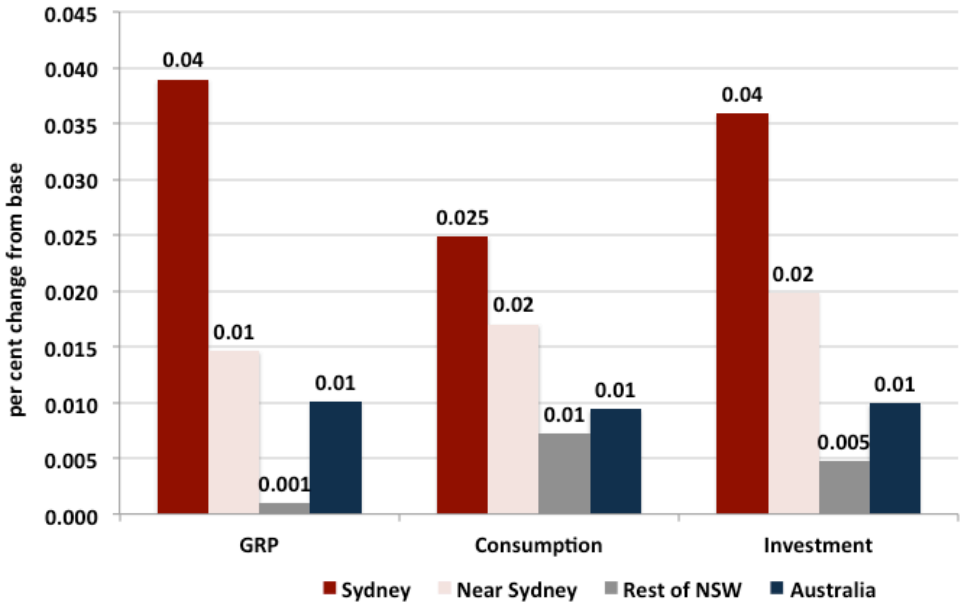
Source: TERM simulation results.

The economic modelling shows that regions near Sydney are also likely to experience a lift in economic activity as a result of this infrastructure project (see Figure 4.5). Indeed, in the long run areas near Sydney would experience an increase in output of around 1 basis point per annum (compared to the baseline scenario), while the rest of NSW would experience a very small, but positive lift in economic activity too. As mentioned before this is because distance imposes a barrier to the spread of the flown on benefits. Consumption in regions across NSW would be higher by between 1 and 2 basis points per annum than would otherwise be without this infrastructure project.

The economic gains of this project would not be limited to Sydney and NSW. It is estimated the productivity gains stemming from this project would lift Australia's GDP by 1 basis point per annum in the long run. Consumption and investment Australia wide would also be higher by approximately the same magnitude.

Figure 4.5

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND SYDNEY (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

Figure 4.6 shows the impacts that the Inner Sydney Regional Bicycle Network would have on the labour market across different regions in NSW and Australia. As shown in this figure this infrastructure project would create more employment opportunities in the state, with the higher number of jobs created in Sydney. As mentioned above, national employment remains relatively unchanged in the long run as a result of redistribution of employment across states and territories (higher wages and improved quality of life would lead to more people leaving other states and choosing to live and work in Sydney).

Real wages in Sydney and other regions in NSW and across Australia are expected to be higher in the long run as a result of the increased productivity stemming from this infrastructure project. Real wage increases are estimated to be, on average, about 1 basis point per annum higher across NSW.

Figure 4.6

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)

Source: TERM simulation results.

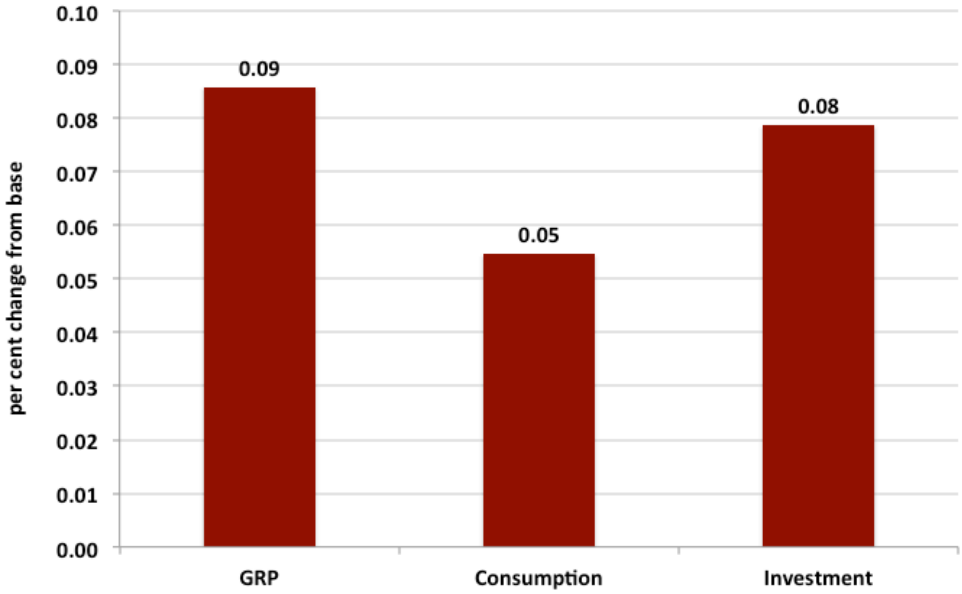
George Street Transformation

As outlined above, this project aims to transform George Street into an attractive and walkable link with priority for public transport, cyclists and pedestrians. It will achieve this by closing George Street to private vehicles, restricting service vehicles and allowing only light rail, bicycles and pedestrian traffic between Liverpool and Alfred Streets. The full capital costs of the pedestrianisation are estimated to be $816.5 million ($2011-12, including the pedestrianisation of George Street and the light rail). Figure 4.7 summarises the economic impacts of this project on Sydney's economy at large and Figure 4.8 also presents results that characterise how other NSW regions fair against Sydney.

The productivity gains stemming from this project would raise the economic efficiency of Sydney, ultimately delivering an expansion of output (GRP) of 9 basis points per annum in the long run. In today's economy this is equivalent to approximately $226 million each year in every year.

Figure 4.7

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON SYDNEY (PER CENT DEVIATION FROM BASELINE)



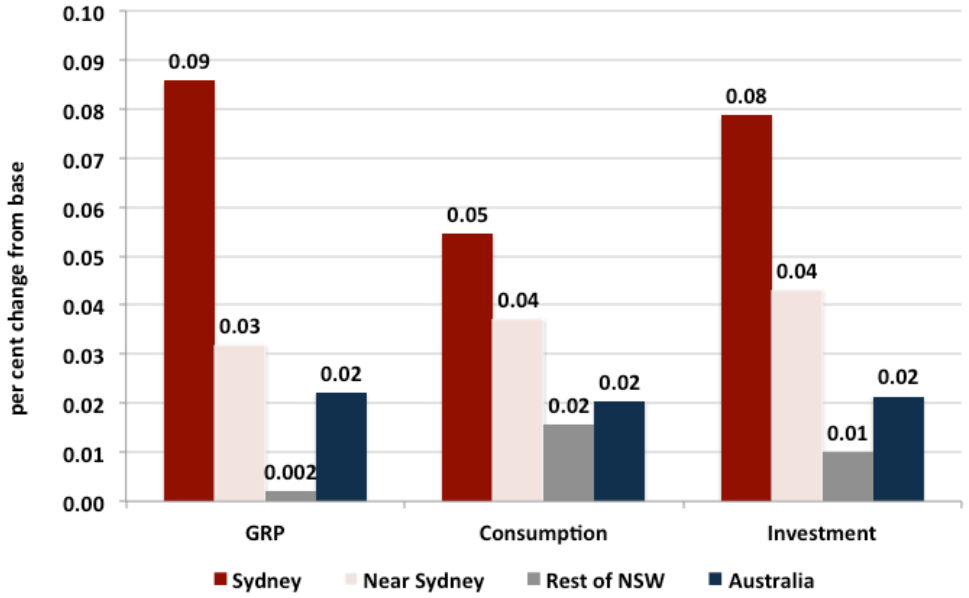
Source: TERM simulation results.

Sydney households are also expected to experience significant gains. Household consumption is projected to increase by 5 basis points per annum, compared to the baseline scenario where the project does not exist. While Sydney households are expected to receive the greatest gains (reflecting the direct benefits obtained from hosting the expansion in infrastructure services), the economic modelling suggest that the flow on effects result in benefits that are enjoyed in all regions of the state and Australia overall. The estimated average annual growth in consumption for households in regions near Sydney and more distant regions from Sydney is 4 basis points per annum and 2 basis points per annum, respectively (see Figure 4.8).

Investment in Sydney, other NSW regions and Australia overall is also projected to be higher than under the baseline scenario. Higher investment in the economy reflects the expectation that over time there is an incentive to use more capital. This is due to the fact that raising labour productivity leads in time to a higher cost of labour, and thus producers would switch to use more capital over time. Importantly, higher investment leads to faster capital accumulation, which creates a larger capital stock in the economy. This implies that the economy would have greater production capacity, and thus boost output.

Figure 4.8

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND SYDNEY (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

The increase in consumption in Sydney is supported by higher incomes reflected in increase employment and higher wages in the region (see Figure 4.9). Average employment in Sydney is estimated to experience an average increase of 2 basis points per annum. An expansion in Sydney is an expansion in demand for many suppliers in the other regions. The net effect is higher wages and greater employment opportunities throughout the state, as shown in the figure below.

Figure 4.9

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)

Source: TERM simulation results.

Chapter 5

Melbourne

5.1 Project snapshot

The City of Melbourne put forward one project to be included in this report, the Melbourne Metro Project. Due to lack of publicly available information about key aspects of the Melbourne Metro, it was not possible to include it in the economic impact analysis undertaken for this report. However, given its importance for the city, a summary of the benefits identified by third parties is included in this report.

The Melbourne Metro is a critical city-shaping project that can address the increasing demand for train services in Melbourne's growth areas in the north, west and south-east, as well as create the capacity needed for future expansion of the rail network.

The project would involve the construction of a nine-kilometre rail tunnel between South Kensington and South Yarra through the heart of Central Melbourne and five new stations to be located at Arden (in North Melbourne), Parkville, CBD North, CBD South and the Domain.

The Melbourne Metro rail tunnel would link the northern and western suburbs of Melbourne with the southeast of Melbourne and would allow independent rail lines to be created, improving train punctuality and delivering increased passenger capacity across the network and in particular capacity into Central Melbourne. It is estimated that by 2021 the Melbourne Metro would increase transport capacity into Central Melbourne by as many as 60,000 passengers (SKM 2012, p.8).

Some of the expected benefits of this project include (SKM 2012, PTV 2013a):

- *improving the performance of Melbourne's rail system* — this project would reduce crowding on the rail system through inner Melbourne, and improve punctuality and reliability by dividing Northern Group services into two separate lines that can operate independently;
- *increasing the capacity of Melbourne's transport system* — the Melbourne Metro would reduce congestion on the road system and the tram network by providing efficient, reliable rail transport options;
- *facilitating the effective use of land within Melbourne for housing and development* — the Melbourne Metro would facilitate urban renewal in underutilised land in North Melbourne and improve the accessibility of north-western areas of Melbourne to increase the stock of human capital in the city's north-west. It could also improve social equity within Melbourne and in particular would improve access to employment and services for residents of the north west;
- *increasing growth prospects for the city at large* — these prospects would be amplified by the fact that growth is tied to the centre of the city. The Melbourne Metro would facilitate the provision of less expensive housing that is well connected to the city and provide extra opportunities for development closer to the city centre near the train lines; and

- delivering infrastructure vital for the future expansion of Melbourne's public transport network.

Notably, while an analysis of the economy-wide contributions of the Melbourne Metro could not be undertaken given the lack of publicly available data on the costs of the project, its significant benefits have been noted before.

- A study by Public Transport Victoria (PTV 2013b) estimates that the Melbourne Metro would deliver a BCR between 1.8 and 1.9 when the whole of life benefits, including traditional transport benefits and wider economic benefits (WEBs) are quantified. Removing WEBs and whole of life benefits from this calculation results in a BCR of between 1.2 – 1.3.[9]
- A study by SKM (2012) estimates that the Melbourne Metro would increase public transport capacity by 20 per cent (equivalent to an additional 60,000 trips) into the central city in the AM peak in 2021. This capacity increase translates into 17,500 additional central city jobs that would otherwise be located in other competing world-class cities such as Sydney or Singapore, increasing to 76,000 additional jobs by 2046. SKM estimates that by enabling these jobs to locate in the central city, Victoria's economic output would increase by $23.5 billion[10].

[9] BCRs calculated using a 7 per cent real discount rate, residual value calculated via straight-line depreciation and a 30-year evaluation period.

[10] Discounted over a 50-year appraisal period.

Chapter 6

Brisbane

6.1 Project snapshot

The projects shortlisted for analysis by the City of Brisbane are:

- Suburbs 2 City Buslink;
- Kingsford Smith Drive Corridor Upgrade; and
- Tilley Road Extension Project.

The following sections provide further information about these projects.

Suburbs 2 City Buslink

Suburbs 2 City Buslink is a 3.6 kilometres route from South Brisbane to Fortitude Valley through the CBD. The route could potentially improve travel times by up to 30 minutes. The route would involve some major infrastructure changes including a bus-only bridge across the Brisbane River. The project would be particularly effective during peak traffic periods and accommodate the significant predicted economic growth in the city. It is estimated that traffic congestion costs the Brisbane economy some $1.3 billion dollars per year (Schrinner, 2011).

The Suburbs to City Buslink aims to provide improved access and capacity to and within the inner city for road based public transport in a dedicated 'right of way' infrastructure facility. The project will reduce congestion and safety issues at the Cultural Centre Bus Station and the Melbourne Street Bus Portal. The route will link up with the existing underground public transport network at King George Square and Queen Street Bus Stations on the north side, and the South-East Busway south of the Brisbane River.

It is estimated that the Buslink could take 8,000 buses off the CBD streets per day and create a cleaner, greener CBD (Schrinner, 2011). Indeed, it is expected that the project will:

- provide fast, efficient and reliable public transport options for the inner city growth centres;
- contribute to environmental and social sustainability by minimising the negative impacts of the transport system on carbon emissions, the environment, stakeholders and the community; and
- complement other modes of transport, in particular heavy rail and Cross River Rail in resolving CBD public transport access and capacity.

The project is aligned with the higher order policy goals at the national, state and regional levels. At the national level the Suburbs 2 City Buslink is aligned with:

- Nation Building;
- National Urban Policy; and
- National Infrastructure Priorities.

At the State level the project is aligned with Queensland Government State and Regional goals, and at the city level the project aligns with the priorities of the Brisbane City Council *Living in Brisbane 2026, Brisbane Long term infrastructure Plan,* and the *Brisbane Transport Plan.*

Additional high-level information about this project is provided in Table 6.1.

Table 6.1

SUBURBS 2 CITY BUSLINK PROJECT SNAPSHOT

Category	Summary information
Project type	New Bus transport route
Purpose of project	• Improve transport by reducing trave times from South Brisbane to Fortitude Valley • Reduce congestion during peak hour traffic
Location of project	South Brisbane through to Fortitude Valley.
Locations affected by project	Brisbane CBD. South Brisbane, Fortitude Valley.
Capital cost of project	$1.8 billion ($2011-12, PV)
Operating cost of project	• Ongoing maintenance costs = 3 per cent of capex per annum • Periodic refurbishment costs = 5 per cent of capex every 10 years
Expected construction timeframe	2018-2021
Expected benefits of project	• Reduced congestion during peak hour traffic in Brisbane • Improved travel times from outskirts of Brisbane • Cleaner, more environmentally friendly CBD area.

Source: Allen Consulting Group (based on information provided by cities).

Kingsford Smith Drive Corridor Upgrade

The Kingsford Smith Drive (KSD) Corridor Upgrade is a major road linking Brisbane CBD to the Airport, Port of Brisbane, Northshore Hamilton and the Australia TradeCoast (ATC) area. Capacity improvements in the corridor will benefit freight movements to existing industry in the ATC and Brisbane Airport precincts and will assist in realising the development potential of the Northshore Hamilton and ATC regeneration areas.

Stage one of the upgrade, between Harvey Street and Theodore Street, is complete. The Brisbane City Council is now working towards designing the next stages of the upgrade, from Theodore Street to Riverview Terrace (stage two) and Riverview Terrace to Breakfast Creek Road (stage three).

The Kingsford Smith Drive upgrade will:

- improve safety for all road users;
- increase road capacity for existing and future traffic demands (up to 2026);
- improve public transport facilities;
- improve facilities for cyclists and pedestrians, including the provision of continuous footpaths and on-road bike lanes;

- minimise property impacts;
- minimise environmental impacts; and
- improve access to and from major developments.

The main economic benefits of the KSD (i.e. those that can be monetised) will accrue through:

- maintenance cost savings;
- travel time savings for both passenger and freight transport;
- vehicle operating cost savings;
- accident savings; and
- external benefits such as noise pollution reduction and air pollution reduction.

Furthermore, the Kingsford Smith Drive project is also of great strategic significance to the city as a:

- transport and freight corridor;
- a place where significant employment and population growth is expected to occur; and
- an area that has, and links, regionally significant land uses, infrastructure and coastal dependent industries.

The sections below further highlight the importance of the KSD to Brisbane's economy and its strategic significance to unlocking new economic development in the ATC precinct.

KSD and Brisbane's draft new City Plan

The strategic framework of the draft new City Plan identifies KSD as a strategic growth corridor for Brisbane. Significant population and employment growth is expected in this corridor. The draft new City Plan also identifies the KSD corridor as an economic development corridor. An economic development corridor is a connection between significant economic generating areas of the city. KSD connects the city centre with the ATC and Brisbane Airport. These two are the largest employment areas in South East Queensland and account for a significant share of the region's economic output. Ensuring an accessible and congestion free connection between these areas is critical to ensure the continued economic development within the city centre, ATC and within the KSD corridor.

The KSD corridor also includes the Racecourse Road Neighbourhood Plan that outlines the intent for significant development uplift at the Eagle Farm and Doomben race tracks. Master plans for these two developments have only recently been approved and will see significant increase in residential, commercial, short-term accommodation and racing facilities within the area. The Racecourse Road Neighbourhood Plan also identifies Nudgee Road as the primary access street to these new developments. This land use and access change will have significant implications for traffic volumes and transport movements along the KSD.

The draft new City Plan also outlines that the KSD corridor, and areas proximate to it, have a number of unique land uses. These unique land uses include the Eagle Farm, Doomben and Albion racecourses, existing and proposed cruise ship terminals, Brisbane Airport, Skills Tech TAFE, Myrtletown Heavy Industrial Precinct and army stores. These areas can generate infrequent, high volume and heavy vehicle movements trips during specific events. If the KSD is not upgraded to ensure the road is safe to use and can cater for irregular high volume traffic during events in the future, there would be implications for the effectiveness of these land uses.

Transport movement behaviours

The 2011 Census indicates that 7 per cent of residents within the KSD corridor use active transport to commute to work. A preliminary analysis of commuting behaviours of residents within the Coronation Drive corridor (Milton, Auchenflower, Toowong which is approximately the same length as the KSD) has an active transport profile of approximately 16 per cent. While is recognised that there are many factors influencing people to commute by active transport, an upgrade to the KSD could help achieve a modal shift towards active transport similar to that observed in the Coronation Drive corridor.

Emergency and critical infrastructure

As outlined above, there are a number of unique and sensitive land uses within and adjacent to the KSD corridor (e.g. the Portside Cruise Ship Terminal, the proposed Luggage Point cruise ship terminal, Brisbane Airport, the Myrtletown Heavy Industrial Precinct, a BP Oil refinery and Caltex's petroleum facility). Should an emergency situation occur at one or more of these locations, it will require quick access by a large volume of emergency response vehicles and personnel. Congestion on these roads would limit the ability for emergency response vehicles to rapidly deploy and respond to an emergency situation. An upgrade to the KSD that relieves congestion and improves accessibility to these sensitive land uses during an event can reduce potential damages associated with a delayed emergency response. Furthermore, an upgrade to the KSD could potentially improve the flood resilience of the area and ensure areas within the KSD corridor have improved accessibility during a flood event.

Brisbane Airport growth

Brisbane Airport currently services 21 million passengers and is experiencing a passenger growth rate of 4.7 per cent per annum (including all outgoing and incoming passengers). The introduction of a parallel runway in 2020 is expected to allow for increased capacity (in excess of 40 million passengers). The expected long-term passenger growth rates for Brisbane Airport are 4.8 per cent for the international airport and 4 per cent for Brisbane's domestic airport. This would result in passenger numbers reaching 35 million by 2022 and 45.1 million by 2029. In addition to passenger growth, airfreight is expected to increase over the next two decades.

Brisbane Airport currently services 12 per cent of all international airfreight and 15 per cent of all domestic airfreight in Australia. The quantity of freight processed at the airport is set to increase to almost 300,000 tonnes by 2029 (approximately double what is currently processed). The projected rapid growth in passenger and freight movement to and from Brisbane Airport will place significant pressure on the KSD from 2020. Against this background, ensuring the KSD can cater a significant increase in traffic volumes from 2020 and beyond is critical to ensure the economic development of the airport and supporting businesses across South East Queensland.

Freight movements and the KSD corridor business profile

The move towards online retail and more streamlined manufacturing supply chains has resulted in strong growth in warehousing and distribution facilities. The viability of these businesses is increasingly associated with the delivery and distribution times of their freight network. Congestion on key freight routes increases the cost of goods.

The ATC has a number of warehouse and distribution based businesses because of its proximity to the airport, port and motorways. The KSD is the key transport link from these freight-handling facilities to the city centre and the surrounding commercial and industrial fringe areas. With the trend of online retailing between businesses and customers and businesses to businesses expected to continue, increases in freight volumes on the KSD linking the growing ATC and city centre precincts are to be expected.

The KSD and development of the ATC

The KSD project will not only help Brisbane to meet the challenges of population growth in the long term (South East Queensland is currently the fastest growing region, attracting on average over 55,000 residents per year) but will also have a key role in enabling growth in the ATC through improved road and freight transport networks.

The ATC region has experienced major growth over the past decade and this is forecast to continue into the medium term. This region is second only to the Brisbane CBD in terms of its importance as an employment centre for Queensland. The draft Brisbane City Plan (2012) makes clear predictions of future employment and commercial development of the ATC (see Table 6.2). As shown in this table, over the 2011-2031 period, employment in this region is expected to increase by 31,000 (100 per cent), and employment floor space is projected to increase by 3.2 million squared metres (75 per cent). The Pinkenba-Eagle Farm precincts are the portions of the Australia Trade Coast that are directly impacted by the KSD.

Table 6.2

GROWTH PROSPECTS FOR PINKENBA-EAGLE FARM

	2011 (est)	2016	2021	2026	2031
Employment					
Retail	7,250	9,006	10,862	12,552	12,889
Commercial	5,553	8,111	11,116	14,220	15,024
Industrial	22,328	26,690	29,699	32,233	31,242
Community	1,807	2,884	4,233	5,714	6,262
Other	1,035	1,537	2,151	2,816	2,723
Total	37,973	48,228	58,061	67,535	68,140
Non-Residential GFA (sqm)					
Retail	507,500	630,280	760,270	878,570	902,090
Commercial	833,100	1,216,650	1,667,700	2,132,550	2,253,900
Industrial	2,790,625	3,336,500	3,712,625	4,029,625	3,905,375
Community	54,180	86,550	126,990	171,390	187,860
Other	93,240	138,420	193,500	253,350	244,890
Total	4,278,645	5,408,400	6,461,085	7,465,485	7,494,115

Source: Brisbane City Council 2012.

Additional high-level information about this project is provided in Table 6.3.

Table 6.3

KINGSFORD SMITH DRIVE CORRIDOR UPGRADE PROJECT SNAPSHOT

Category	Summary information
Project type	Road upgrade
Purpose of project	• To improve road linkages between Brisbane and Airport, Port of Brisbane, Northshore Hamilton and Australia TradeCoast area. • Improved traffic flow, capacity at intersections, road user safety and pedestrian and cyclist access
Location of project	Kingsford Smith Drive Corridor
Locations affected by project	Brisbane CBD, Brisbane Airport, Port of Brisbane, Northshore Hamilton, Australia TradeCoast Area
Capital cost of project	$420 million ($2011-12, PV) (for Stages 1, 2 & 3)
Operating cost of project	n.a. (project is estimated to deliver operating cost savings)
Expected construction timeframe	T.b.a Stage one complete – detailed design stage is underway.
Expected benefits of project	• Reduced traffic congestion and improved traffic flow leading to environmental benefits, increased productivity and workforce efficiency • Improved freight efficiency leading to cheaper travel costs and overall efficiency

Source: Allen Consulting Group (based on information provided by cities).

Tilley Road Extension Project

The Tilley Road Extension Project will address a missing north-south road link in the Eastern Corridor network. This is a strategic road link between the major growth areas and workforce of Brisbane's southeast and northern parts of the Redlands City Local Government Area to the Australian TradeCoast (ATC) South precinct.

The Tilley road project has been identified as a key strategic development of the road network needed to support growth in outer east Brisbane. The main intention of the project is to ensure that the surrounding growing areas, both residential and business, have access to the major road network. As well as the new residential growth areas, there are several major growth points in the city, in particular the Australia TradeCoast (including Brisbane Airport and the Port of Brisbane) that is expected to experience major employment growth through to 2018 and beyond.

The overarching goal of the Tilley Road Extension Project is to realise the economic growth potential of the Australia TradeCoast to contribute to Brisbane achieving long term economic success. The project is strongly aligned with *Transforming Brisbane,* the overriding Infrastructure Australia theme for the city and region. Key aspects of this include:

- the improvements between north south connectivity from Redlands City to the Port of Brisbane and Australian TradeCoast South, which will lead to efficiency gains for freight movements and thereby improve industrial an commercial development in the area;
- integration with land use planning will support the efficient movement of traffic and freight in the south eastern suburbs of Brisbane and the northern suburbs of Redlands City Council to support the growth of the Port of Brisbane;
- the upgrade to the Lindum open level rail crossing will improve the reliability and safety of freight movements;
- improving the network in this area of Brisbane will take local traffic movements off the Gateway Motorway;
- public transport in this corridor will also be improved due to increased efficiency and reliability; and
- enhancements to pedestrian and cycling facilities will encourage alternative sustainable transport choices for travel between the high growth suburbs in the eastern parts of the city and around the commercial and industrial development at Australia TradeCoast.

This project is of national significance in that it provides important access to the Port of Brisbane, which is the fastest growing capacity port on the East Coast, and also improves the efficiency of the National Highway Network.

At a national level, the Tilley Road Extension will contribute to Infrastructure Australia's national objectives and the project will result in efficiency improvements for over 1,500 businesses and 60,000 employees that are based in the Australia TradeCoast. Improvements to labour access in this region will ensure labour supply and employment for local workers.

Additional high-level information about this project is provided in Table 6.4.

Table 6.4

TILLEY ROAD EXTENSION PROJECT SNAPSHOT

Category	Summary information
Project type	Road extension
Purpose of project	• Address a missing north-south road in the Eastern Corridor network.
Location of project	Tilley Road, Brisbane.
Locations affected by project	Brisbane's South East, northern parts of Redlands City, Australia TradeCoast South Precinct
Capital cost of project	$314 million ($2011-12, PV)
Operating cost of project	Not currently available but assumed to be 5 per cent of total capex per annum for modelling purposes.
Expected construction timeframe	Stage 1 completed, Stage 2 & 3 to be constructed during 2013-14 to 2016-17
Expected benefits of project	• Continuous link between port of Brisbane and Old Cleveland Road • Relieve traffic congestion, increase productivity and improve road safety in Manly West, Wynnum West, Wakerly and Chandler Areas.

Source: Allen Consulting Group (based on information provided by cities).

6.2 Exploring the opportunity: impacts of project delivery

The following sections present estimates of the economic impacts that each of the selected projects would have on Brisbane, the regions near Brisbane, the rest of Queensland and on Australia as a whole.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).
- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The main impacts of the infrastructure projects in Brisbane during the construction phase are outlined in Table 6.5. It is estimated that during a typical year of construction, the infrastructure projects in Brisbane would increase the economic output of the city by about 8 basis points. Over a three-year period (from 2013-14 to 2015-16) this benefit is equivalent to a one off increase in real Gross Regional Product (GRP) of about $250 million in 2013 ($2011-12). This gain reflects the following three impacts:

- the stimulus to the construction industry supply chain, which boosts revenue (or sales) in industries that are important local suppliers to the construction industry;
- the stimulus to consumer spending by additional construction industry workers, which boosts revenue (or sales) in other industries (such as retail trade); and
- the loss of revenue (or sales) for industries that experience a loss in competitiveness due to higher costs.

The construction phase of the projects would also have significant positive benefits to households in Brisbane, with consumption increasing during a typical year of construction by 10 basis points and employment estimated to increase by 12 basis points.

Table 6.5

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE BRISBANE ECONOMY (SHORT RUN, DEVIATION FROM BASELINE)

Project	Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
Suburbs 2 City Buslink	183.7	0.06	0.08	0.08
Kingsford Smith Drive Corridor Upgrade	35.0	0.01	0.01	0.02
Tilley Road Extension Project	31.7	0.01	0.01	0.01
All projects	***250.4***	***0.08***	***0.10***	***0.12***

Source: TERM simulation results.

Operations phase

Table 6.6 provides a summary of the impacts of the three proposed infrastructure projects on the Brisbane economy in the long run on key economic variables. These results show that economy of Brisbane would experience large positive changes as a result of the additional infrastructure investment. In total, the long lasting effects of the three proposed projects would be to increase Brisbane's GRP by 66 basis points (0.66 per cent) per annum, when compared to the baseline scenario.[11] In today's economy this boost is equivalent to approximately $1.7 billion ($2011-12) each year, every year.[12] Similarly positive results can be seen in other economic indicators, as outlined in the table below.

[11] To provide the results of completing all the proposed infrastructure projects together, the individual project impacts have been added together. This assumes that there are no complementarities from implementing the various projects at the same time or offsetting impacts of the projects. This assumption has been adopted to simplify this analysis. In reality, 'transport systems are networks and undertaking multiple projects may provide greater or lesser economic impacts than implied by adding the individual assessments for each project' (PCA 2011, p.13).

[12] In reality, the infrastructure investments would result in costs in initial years and benefits in the subsequent years that grow over time with the economy. This figure shows the constant annual rate of change that is equal to the variable changes that are actually expected.

Table 6.6

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE BRISBANE ECONOMY (LONG RUN, DEVIATION FROM BASELINE)

Project	Modelled cost (NPV, $m 2011-12)	GRP (%)	Consumption (%)	Employment (%)	Wages (%)
Suburbs 2 City Buslink (Stages 1 & 2)	1,817.1	0.51	0.27	0.12	0.14
Kingsford Smith Drive Corridor Upgrade	419.4	0.05	0.03	0.01	0.01
Tilley Road Extension Project	313.9	0.10	0.06	0.02	0.03
All projects	***2,550.3***	0.66	0.36	0.16	0.18

Source: TERM simulation results.

The large increase in Brisbane's GRP primarily reflects the effects from improved labour productivity stemming from the proposed projects which effectively increases what workers can produce for each work-related hour (which translates into a lower production costs for businesses). In the long run, the effect of higher productivity in industries is passed on to consumers in the form of lower prices for consumer goods and services.

Lower consumer prices arising from the productivity growth translate into higher real private consumption. Indeed, consumption in Brisbane (an indicator of living standards) increases by 36 basis points per annum in total with the three projects. An increase in private consumption indicates an increase in welfare of Brisbane's residents.

Decreasing production costs in Brisbane translates into increased demand for goods and services, and consequently higher demand for capital and labour to produce those products. This ultimately translates into higher rate of return to capital. Faced with increasing returns, investment flows in Brisbane expand by 60 basis points per annum in the long run, when compared with the baseline scenario.

The increased demand for goods and services and higher investment and capital in Brisbane translate into increased demand for labour and a consequent increase in real wages. Table 6.6 shows that the proposed infrastructure projects would deliver an increase in real wages in Brisbane of 18 basis points in total. With labour being mobile, there is an increase in employment of 16 basis points as labour comes to Brisbane in search of higher wages.

Additional discussion about the economic impact of individual projects is provided in the following sections.

Suburbs 2 City Buslink

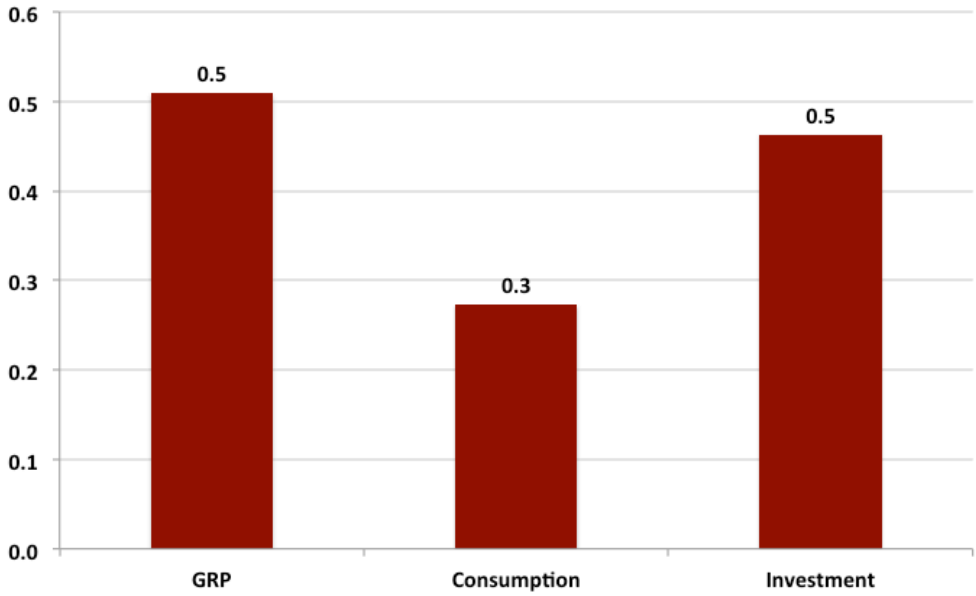
Figure 6.1 presents the estimated economic impacts that the Suburbs 2 City Buslink project would have on the Brisbane economy at large. It is estimated that on average in the long run this project would:

- lead to an expansion of Brisbane's economic output by 50 basis points (0.5 per cent) per annum;
- deliver an increase in household consumption of 30 basis points (0.3 per cent) per annum; and

- produce an expansion to investment that is equivalent to 50 basis points (0.5 per cent) per annum.

Figure 6.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON BRISBANE (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

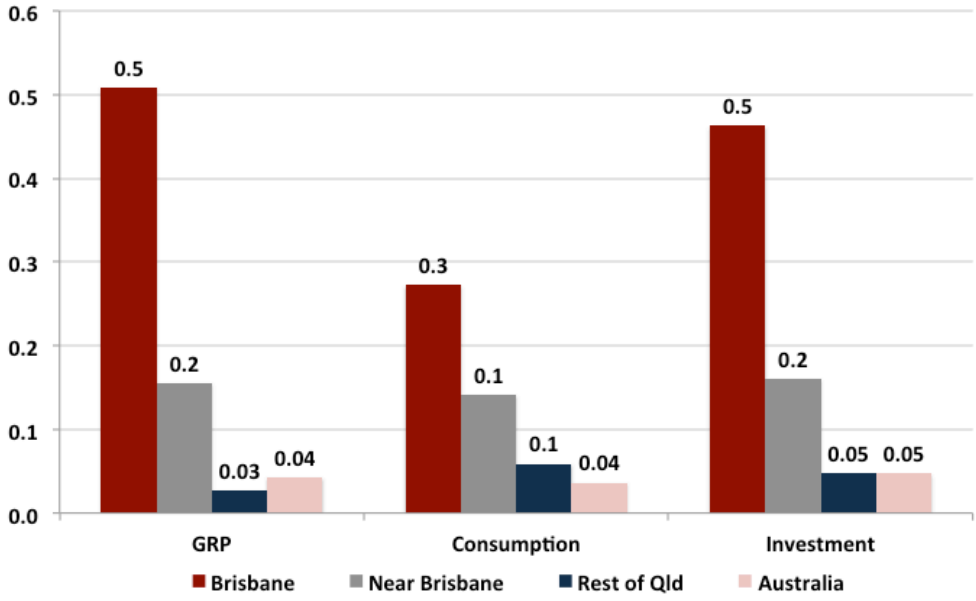
Figure 6.2 shows that the Suburbs 2 City Buslink would have positive benefits beyond Brisbane. Other regions in Queensland are expected to experience a lift in output, with regions near Brisbane experiencing an increase in economic activity of about 20 basis points per annum on average and regions further away experiencing an increase of about 3 basis points per annum. Consumption and investment across Queensland are also higher as a result of the operation of this infrastructure project.

This lift in economic activity reflects a combination of an income effect and a supply side effect. Raising the economic performance of Brisbane at large raises incomes of residents, which in turn stimulates demand for goods in regions outside of Brisbane. Raising the efficiency of Brisbane as a city means that it can provide services to the surrounding areas more efficiently. This greater efficiency is realised as a reduction in costs to businesses in the surrounding regions. This can be thought of as improvements in the 'gateway' services that the city provides to the hinterland regions (including services such as accounting, finance and marketing) that are vital to external competitiveness.

The economic gains of this project would not be limited to Queensland. It is estimated the productivity gains stemming from this project would lift Australia's GDP by 4 basis points per annum in the long run. National consumption and investment would also be higher by approximately the same magnitude.

Figure 6.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND BRISBANE (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

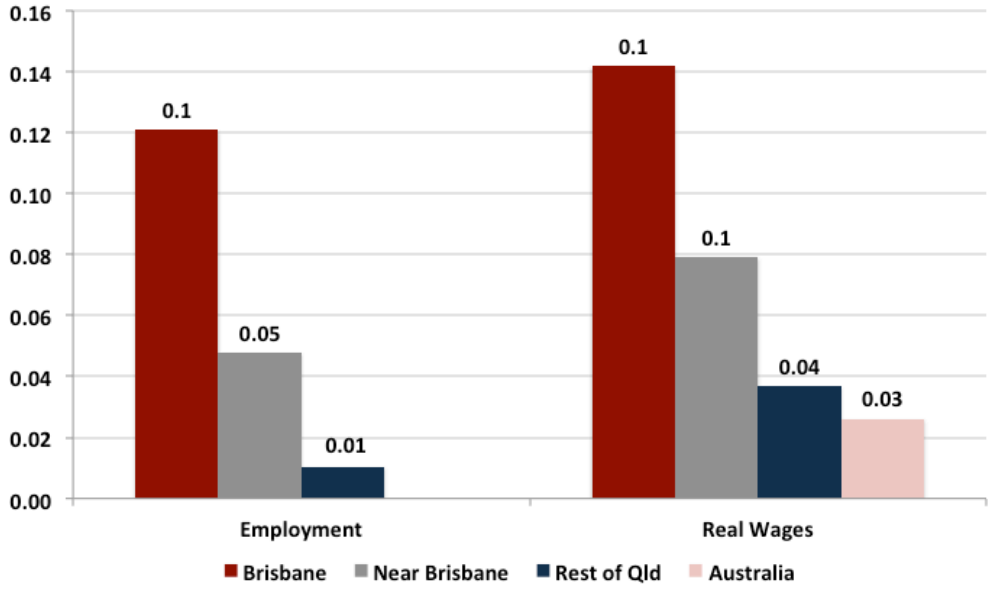
The effects of the Suburbs 2 City Buslink on the labour market for different regions in Queensland and Australia are illustrated in Figure 6.3.

The investment in the Suburbs 2 City Buslink would enhance Brisbane's competitiveness relative to other states and territories. This increase in competitiveness and associated growth would attract capital and labour from other states. This is evident in the employment impacts illustrated in Figure 6.3. While this infrastructure project would create a higher number of jobs in Brisbane, other regions in the state also benefit. Total employment in Australia remains unchanged. This indicates that employment in other states and territories will be lower than it would otherwise be with labour shifting from interstate to Queensland, and Brisbane in particular.

Real wages in Brisbane are estimated to increase by around 10 basis points per annum, with overall wages in Australia expected to be higher by 3 basis points per annum on average. Wages are one of the key ways in which the benefits of increased productivity are distributed through the economy.

Figure 6.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

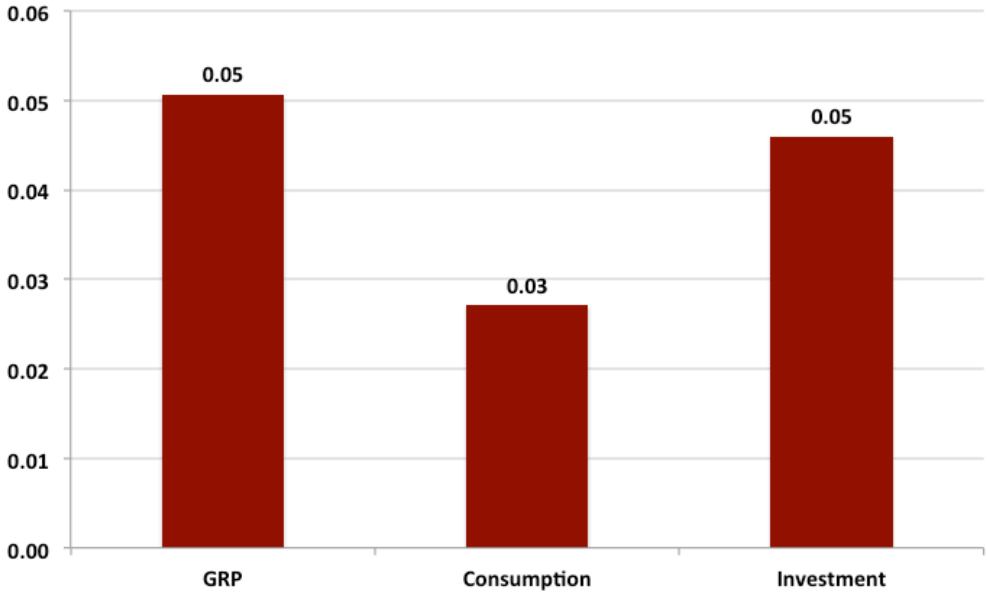
Kingsford Smith Drive Corridor Upgrade

The economic results show that the Kingsford Smith Drive Corridor Upgrade would have a important lasting benefits on the Brisbane economy (see Figure 6.4). In the long run (that is, after the economy has fully adjusted), the city's economic output (GRP) is estimated to increase by 5 basis points per annum, compared to a baseline scenario where this infrastructure project does not exist. The welfare of Brisbane households would also be lifted, with household consumption projected to increase by 3 basis points on average over the coming years.

The productive capacity of the Brisbane economy (as illustrated by investment) would also be boosted by the project. Compared to the baseline scenario, it is expected that investment in Brisbane would be higher by around 5 basis points per annum in the long run.

Figure 6.4

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON BRISBANE (PER CENT DEVIATION FROM BASELINE)



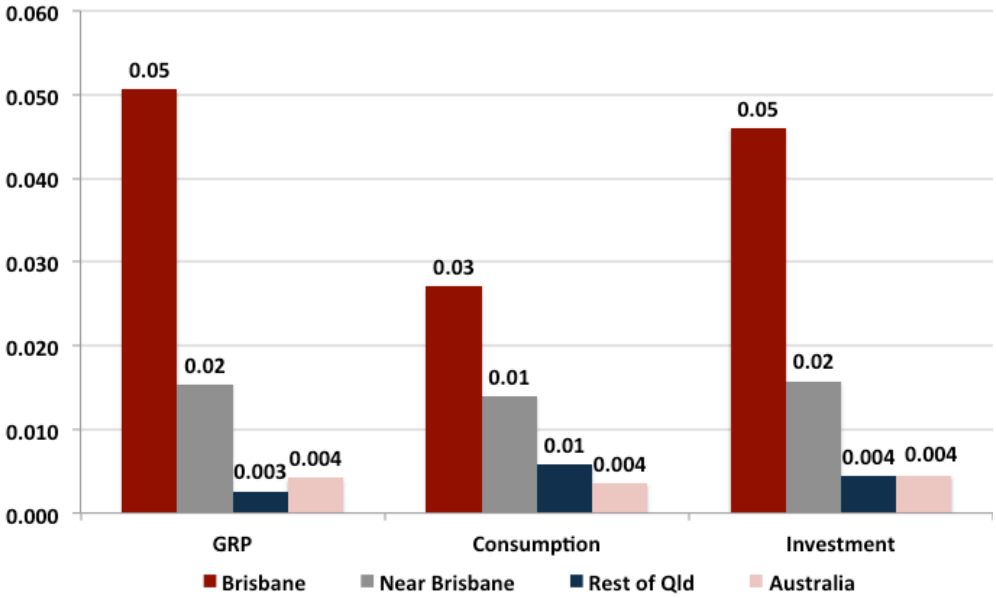
Source: TERM simulation results.

While Brisbane is expected to receive the greatest gains (reflecting the direct benefits obtained from hosting the expansion in infrastructure services), the economic modelling suggest that the flow on effects result in benefits that are enjoyed in all regions of the state and Australia overall (see Figure 6.5). In particular, the modelling results show that:

- output for regions near Brisbane and more distant regions from Brisbane would be higher by 2 basis points and 0.3 basis point per annum, respectively;
- household across the state would also experience increases in consumption, with regions near Brisbane and more distant regions experiencing an average increase of about 1 basis point per annum;
- investment in Brisbane and across other Brisbane regions is also projected to be higher than under the baseline scenario; and
- the whole of Australia benefits from this project, with GDP estimated to be 0.4 basis points per annum higher, compared to baseline. Consumption and investment would also be higher by approximately the same magnitude.

Figure 6.5

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND BRISBANE (PER CENT DEVIATION FROM BASELINE)

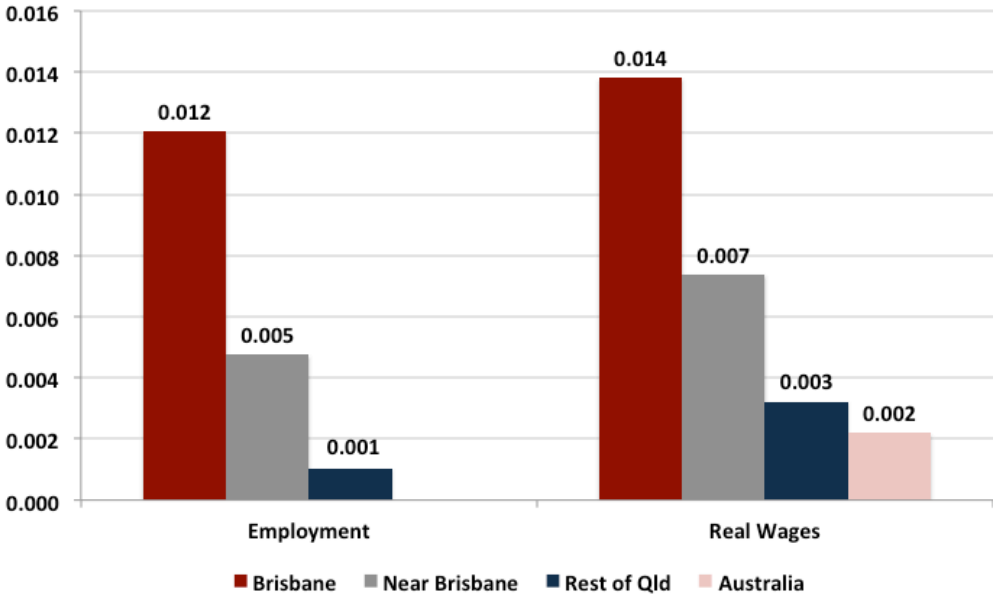


Source: TERM simulation results.

The increased demand for goods and services and higher investment and capital in Brisbane translate into increased demand for labour and a consequent increase in real wages. Figure 6.6 shows that real wages in Brisbane would be 1 basis point higher than otherwise. With labour being mobile, there is also an increase in employment of 1 basis point as labour comes to Brisbane in search of higher wages.

Figure 6.6

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

Real wages and employment in other regions of Queensland and across Australia are also expected to be higher in the long run as a result of the increased productivity stemming from this infrastructure project.

Employment in other Queensland regions is also expected to lift, with national employment remaining unchanged (this is a result of the redistribution of employment across states and territories that occurs as higher wages and improved quality of life lead to more people leaving other states and choosing to live and work in Brisbane).

Tilley Road Extension Project

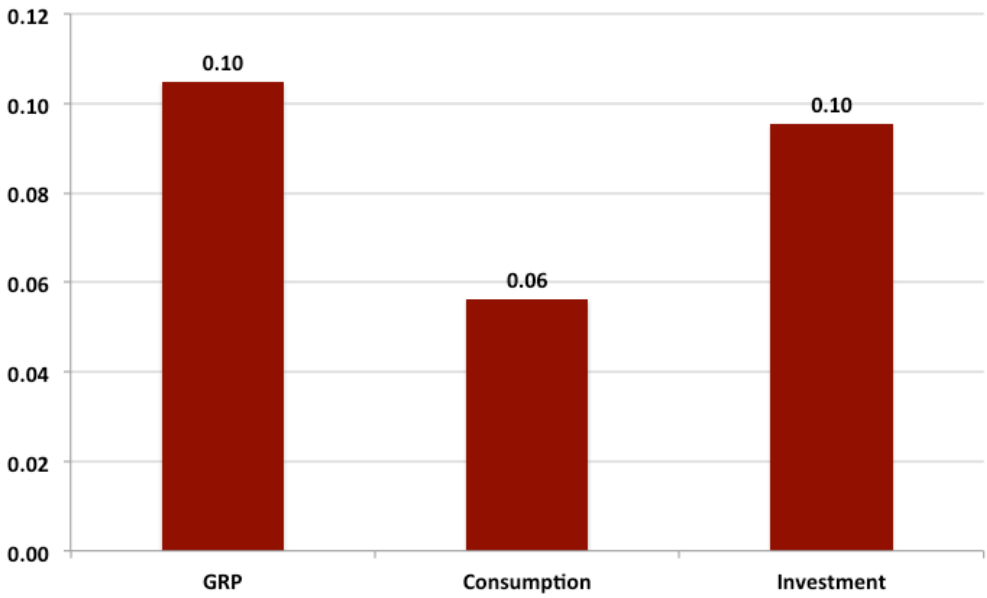
Figure 6.7 summarises the economic impacts of the Tilley Road Extension Project on the Brisbane economy and Figure 6.8 presents results that characterise how other Queensland regions fair against Brisbane.

The productivity gains stemming from this project would raise the economic efficiency of Brisbane, ultimately delivering an expansion of output (GRP) of 10 basis points per annum in the long run. In today's economy this is equivalent to approximately $121 million ($2011-12) each year in every year.

Brisbane households are also expected to experience significant gains. Household consumption is projected to increase by 6 basis points per annum, compared to the baseline scenario where the project does not exist.

Figure 6.7

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON BRISBANE (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

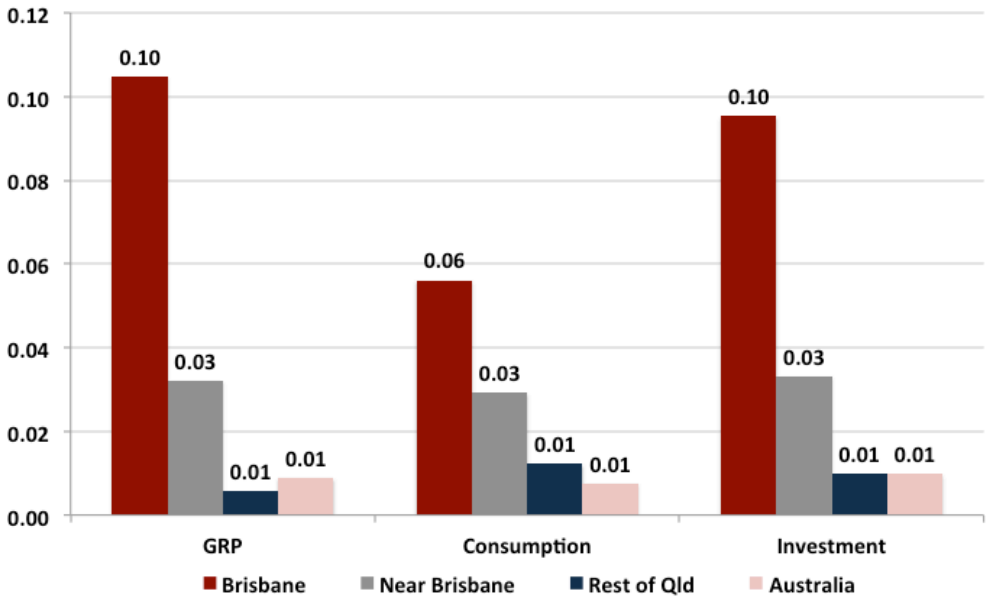
While Brisbane households are expected to receive the greatest gains (reflecting the direct benefits obtained from hosting the expansion in infrastructure services), the economic modelling suggests that the flow on effects result in benefits that are enjoyed in all regions of the state and Australia overall (see Figure 6.8). As shown in this figure, the economic output of other regions in Queensland is expected to increase by between 1 and 3 basis points per annum on average, while Australia's output (GDP) is projected to be 1 basis point per annum higher.

Households across the state would also experience increases in consumption, with regions near Brisbane experiencing an average increase of 3 basis points per annum and more distant regions increasing by 1 basis point per annum.

Investment in Brisbane, other Queensland regions and Australia overall is also projected to be higher than under the baseline scenario where the project does not exist.

Figure 6.8

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND BRISBANE (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

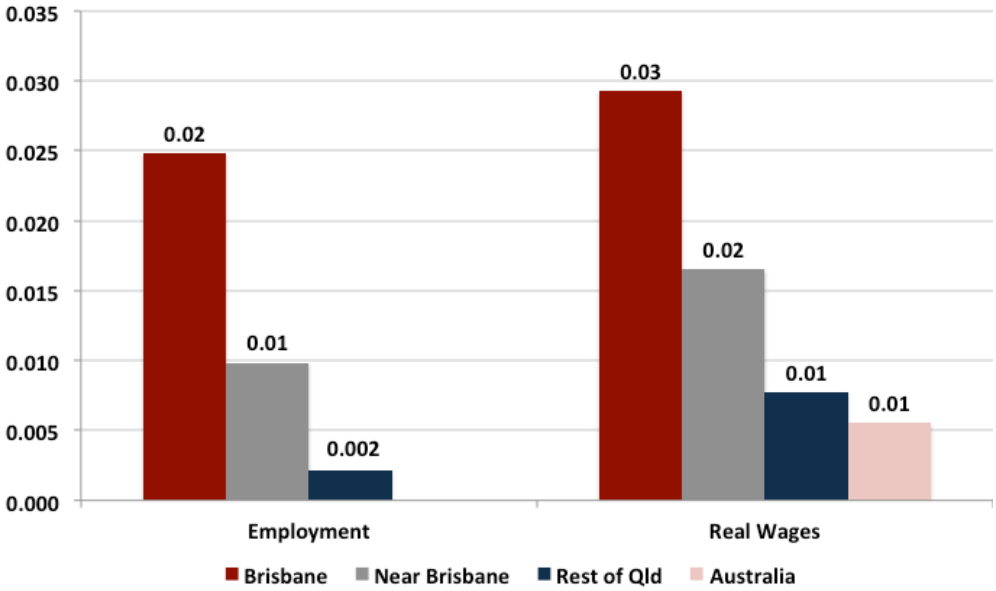
Figure 6.9 shows the impacts that the Tilley Road Extension Project would have on the labour market across different regions in Brisbane and Australia. Key points are as follows:

- this infrastructure project would create more employment opportunities in the state, with the higher number of jobs created in Brisbane. This reflects the direct benefits obtained from hosting the expansion in infrastructure services;
- total employment in Australia remains relatively unchanged in the long run. This indicates that employment in other states and territories will be lower than it would otherwise be with labour shifting from interstate to Queensland, and Brisbane in particular; and

- real wages in Queensland and across Australia are expected to be higher in the long run as a result of the increased productivity stemming from this infrastructure project. These changes in wages are one of the key ways in which the benefits of increased productivity are distributed through the economy.

Figure 6.9

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

Chapter 7

Perth

7.1 Project snapshot

The city of Perth put forward one project to be analysed: the Airport Rail Link. This project entails a heavy rail line for commuters and travellers from Perth Airport to the CBD. This line is deemed critical in supporting passenger growth at Perth Airport. The Western Australia (WA) Government has approved the reservation of the surface route on land under control of the state and has ensured ongoing discussions between the Public Transport Authority and stakeholders to ensure the route is protected.

The route will run down the middle of Tonin Highway and connect the Midland rail line to the planned consolidated international and domestic airport terminal train station. The proposal also includes three new stations; at Airport West/Redcliffe, Perth Airport and Forrestfield/High Wycombe. These stations will be designed and laid out to encourage cycling, including bike shelters with CCTV cameras and local cycle networks.

The rail line will ease road congestion and provide better services for tourists and business travellers as well as every day residents of the city. The project is expected to have the following benefits:

- reduced congestion and travel times to the City from the eastern dormitory;
- expected congestion reduction on the Great Eastern Highway (reducing the need for future upgrades and future-proofing the current 'Gateway WA' and other improvements currently underway);
- facilitate tourism and business air travel;
- improve CBD/City access to interstate and international business travel enhancing the business credentials of the City and the State; and
- reduced private vehicle and road travel to the airport for Fly In Fly Out (FIFO) work (note that the existing northern suburb rail link to city would connect to fast link to the airport where currently the northern suburbs are the largest trip generators to the domestic airport for FIFO operations in Australia's North West).

Additional high-level information about this project is provided in Table 7.1.

Table 7.1

AIRPORT RAIL LINK PROJECT SNAPSHOT

Category	Summary information
Project type	Rail transport, augmentation of existing route, new rail line and stations
Purpose of project	• Provide fast and direct linkage to international and domestic terminals (and future TWA) at Perth Airport • Increase rail access for commuters to City (from eastern suburbs/regions) • Reduce congestion • Promote WA tourism
Location of project	Bayswater Station to Perth Airport (mainly non-City of Perth)
Locations affected by project	Bayswater, Redcliffe, Perth Airport environs
Capital cost of project	$670.4 million ($2011-12, PV)
Operating cost of project	$20 millions per annum
Expected construction timeframe	2015-2018
Expected benefits of project	• Reduce congestion and travel times to city from eastern dormitory • Expected congestion reduction on Great Eastern Highway (reducing need for future upgrade, future proofing current 'gateway WA' and other improvements currently underway) • Facilitate tourism and business air travel • Improve CBD/City Access to interstate and international business travel enhancing business credentials of city and state • Reduction of private vehicle and road travel to airport for FIFO (NB Existing northern suburb rail link to city would connect to fast link to airport – currently northern suburbs are largest trip generators to domestic airport for FIFO ops in NW)

Source: Allen Consulting Group (based on information provided by cities).

7.2 Exploring the opportunity: impacts of project delivery

This section presents estimates of the economic impacts that the Airport Rail Link would have on Perth, the regions near Perth, the rest of the State and on Australia as a whole.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).
- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The total capital expenditure for the Airport Rail Link is estimated to amount around $670.4 million in present value terms ($2011-12). This expansion in expenditure within Perth would increment economic output, consumption and employment. The results in Table 4.4 show that the capital expenditure and development activities from this infrastructure project would increase economic activity in Perth by 2 basis points. While the impacts on the city economic output may look small in percentage terms, it is estimated that this benefit over a three-year period (from 2013-14 to 2015-16) is equivalent to a one off increase in real Gross Regional Product (GRP) of about $91 million in 2013 ($2011-12).

The construction of the Airport Rail Link would also have a significant impact on consumption, the best indicator of wellbeing of Perth's households. Indeed, consumption is estimated to be 3 basis points higher on a typical year of construction, when compared with a 'Business as Usual' (BAU) scenario. Employment in the city would also increase by 4 basis point in a typical year of construction.

Table 7.2

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE PERTH ECONOMY (SHORT RUN, DEVIATION FROM BASELINE)

Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
$91.1	0.02	0.03	0.04

Source: TERM simulation results.

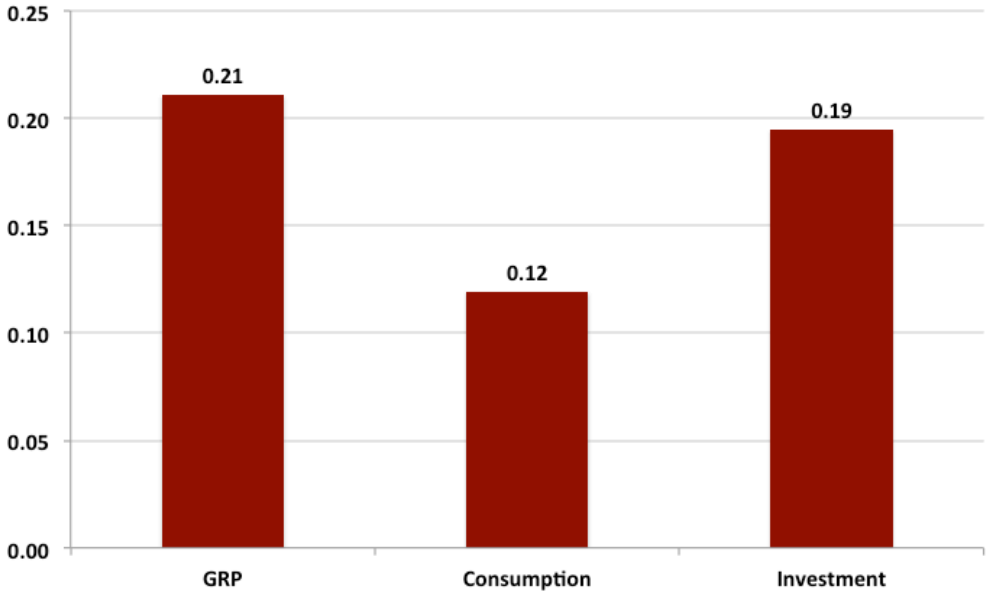
Operations phase

Figure 7.1 summarises the projected economic impacts that the Airport Rail Link would have upon Perth in the operations phase in the longer term. These results show that the proposed project would have a significant positive effect on the economy of Perth at large. In particular, this figure shows that in the long run (that is, after the economy has fully adjusted):

- Perth's economic activity (measured through GRP), would increase by around 20 basis points (0.2 per cent) per annum, compared to the baseline scenario where the project does not exist;
- households in Perth are also projected to experience significant gains, with the Airport Link increasing private consumption by around 10 basis points (0.1 per cent) per annum; and
- investment flows in Perth expand by 20 basis points per annum, when compared with the baseline scenario.

Figure 7.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON PERTH (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

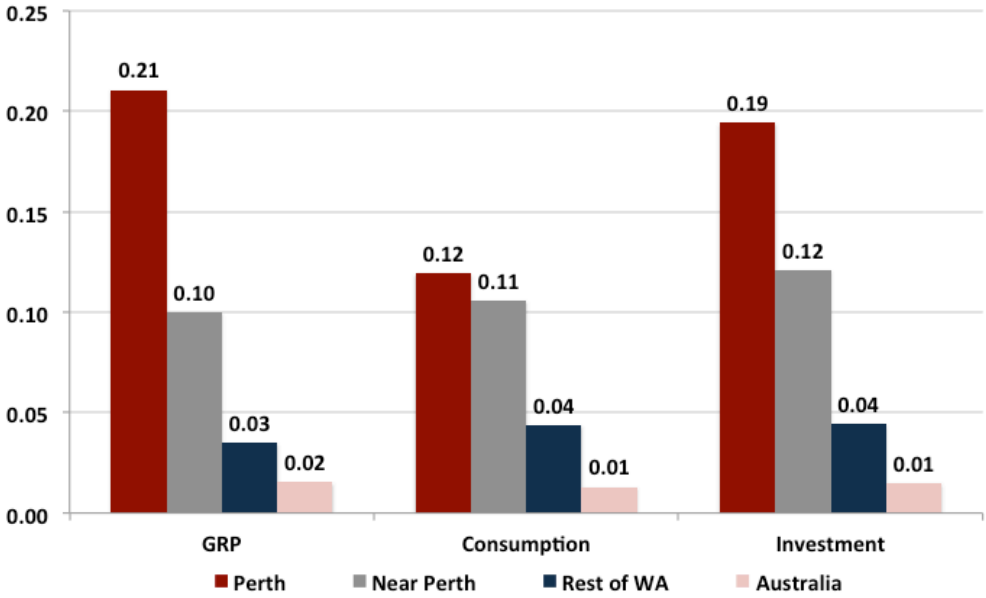
While Perth is expected to receive the greatest gains from the Airport Rail Link, the economic modelling suggests that the flow-on effects result in benefits that are enjoyed in all regions of the state and the rest of Australia (see Figure 7.2). These flow on gains are smaller than the gains for Perth because distance imposes a barrier to the spread of the flown on benefits. This also reflects the fact that resources (such as capital) are attracted from other regions to Perth as it grows reflecting increased economic efficiencies. However, the overall effect still results in a boost to productivity and output in Perth that spills over to neighbouring regions, providing a net stimulus. In the long run, areas nearby Perth and in the rest of Western Australia would experience an increase in output of 10 basis points per annum and 3 basis points per annum, respectively.

Household consumption in nearby areas is also expected to be higher, with consumption projected to increase, on average, by 11 basis points per annum in regions near Perth and by 4 basis points per annum in the rest of Western Australia (compared to a baseline scenario where the Airport Rail Link does not exist).

Notably, the economic gains of this project would not be limited to Western Australia. It is estimated the productivity gains stemming from this project would lift Australia's economic output (GDP) by 2 basis points per annum in the long run. Consumption and investment across the nation would also be higher by approximately the same magnitude. This demonstrates that the gains stemming from this infrastructure project are not merely about redistribution.

Figure 7.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND PERTH (PER CENT DEVIATION FROM BASELINE)

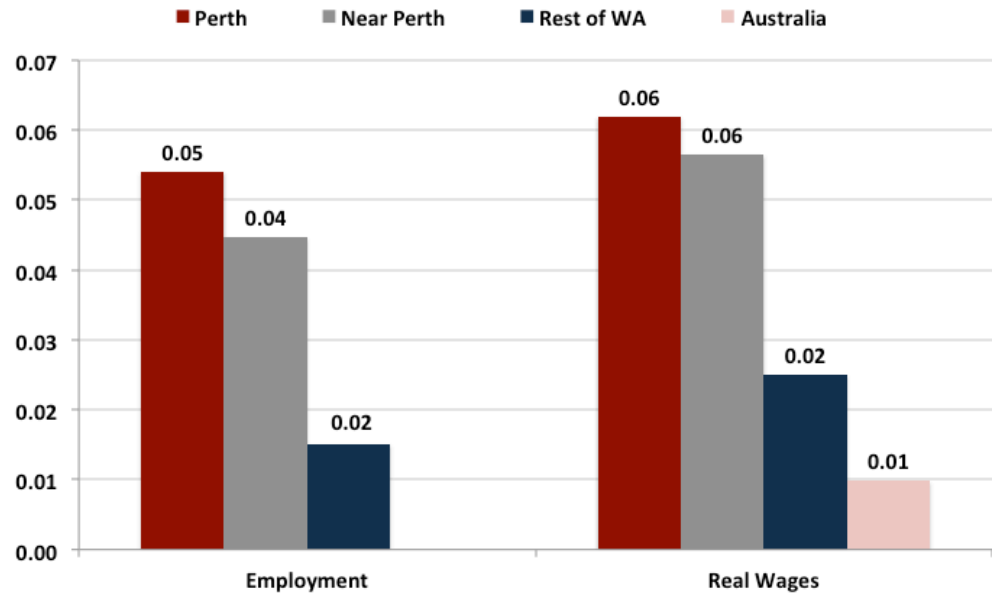


Source: TERM simulation results.

A redistribution of resources is evident in the projected labour market outcomes presented in Figure 7.3. This figure shows that the Airport Rail Link would create more employment opportunities, with higher number of jobs in Perth and across the whole state.

Figure 7.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

In the long run, national employment remains relatively unchanged as a result of redistribution of employment across states and territories. This indicates that employment in other states and territories will be lower than it would otherwise be with labour shifting from interstate to Western Australia, and Perth in particular.

The productivity gains stemming from the project would lead to higher real wages in Perth, other regions in Western Australia and across Australia overall. Real wage increases are estimated to range, on average, from 6 basis points per annum in Perth and nearby regions, to 2 basis points in more distant regions from Perth, with overall wages in Australia expected to be higher by 1 basis point per annum on average. Wages are one of the key ways in which the benefits of increased productivity are distributed through the economy.

Chapter 8

Hobart

8.1 Project snapshot

The city of Hobart put forward one project to be analysed, the Inner City Linkage project. This project entails the development of efficient pedestrian, cycling and alternate transport systems linking the separate development and activity areas of the inner city (Macquarie Point, the Waterfront and the Queens Domain).

The project is aimed at reducing problems related to poor connectivity between the inner city and the major surrounding areas. The links are poorly defined, difficult to understand and are often inefficient, ineffective and time consuming. Further, there is expected to be increased pressure on these links due to other major development projects such as the redevelopment of obsolete rail yards at Macquarie Point, the Parliament Square Development, and the restructuring and expansion of the Franklin Wharf ferry piers.

This project aims to provide a fully integrated linking infrastructure system that facilitates easy, safe and convenient people movement to, through and around inner Hobart. Expected benefits are:

- improved access and movement for pedestrians, cyclists and people using suitable low impact alternate passenger movements devices without the restrictions imposed by major roadways and other obstructions;
- improved vehicular movement and safety on the main roads transiting the inner city which will be achieved by reducing or eliminating at grade pedestrian crossings;
- reduced reliance on passenger motorcars;
- improved public transport, park and ride systems and perimeter car parking facilities; and
- increased economic activity directly linked to the potential increase in pedestrian movement.

Three major projects will be undertaken as part of this development.

Grade separation between the inner city and Sullivans Cove — The most cost effective means of improving conditions for all users of the intersection between the Macquarie Street/Davey Street Couplet and the two main cross streets (Elizabeth Street and Murray Street) is by grade separation.

Grade separation will allow uninterrupted flow of traffic along stretches of the main thoroughfares, and improved traffic flow for buses. Street beautification and wider footpaths will also provide greater opportunities for retail frontages and kerbside occupation and activities.

All people access system linking the City to the Macquarie Point Development Area (MPDA) — The proposed development on the 8.4 hectare MPDA site includes a range of residential and commercial projects. Connectivity is currently not ideal and this proposal calls for a high quality grade separated link between the MDPA and the inner city across the Tasman Highway and other connections to Collins Street and across Liverpool Street to Aberdeen Street. This link would function as both a pedestrian and cyclist connection and would enhance the economic viability of other major projects in the area (including the University development in the City and the Royal Hobart Hospital upgrade).

Inner City Traffic Relief Link — This proposal involves the conversion of Barrack Street into a two way street between Davey Street and Brisbane Street. This would further relieve traffic pressure through the city centre, and assist in diverting a significant proportion of traffic for the business, retail and education areas of the City. This will facilitate other developments occurring in the city centre such as the UTAS expansion and accommodation projects.

Hobart is a major administration centre for the state, has a growing international educational presence and is the support centre for a growing number of national and international research facilities for the Southern ocean and the Antarctic. The Australian and French Antarctic fleets use Hobart as their support and resupply base and there are regular visits by the US, Russian, Chinese and Japanese fleets. Therefore, it is important to maintain the International image of Hobart as a secure place to carry out commercial activity and research.

These developments will allow the City Centre of Hobart to advance through to the 21st century and achieve a clean, safe and bustling City Centre at the heart of economic growth in Tasmania.

Additional high-level information about this project is provided in Table 8.1.

Table 8.1

INNER CITY LINKAGE PROJECT SNAPSHOT

Category	Summary information
Project type	Infrastructure to facilitate economic development and sustainability through efficient pedestrian, cyclist and alternate transport systems linking the separate development and activity areas of the inner city.
Purpose of project	• To ensure that the disparate parts of the inner city, Macquarie point, the Waterfront and the Queens Domain are efficiently linked.
Location of project	Hobart Inner City, Macquarie point, Waterfront and Queens Domain.
Locations affected by project	Hobart city centre and surrounding areas as above, including other major development areas of Hobart such as Parliament Square, Princess Wharf and the franklin Wharf piers.
Capital cost of project	$81 million ($2011-12, PV)
Operating cost of project	$6 million per annum
Expected construction timeframe	2015-2025
Expected benefits of project	• Improved access and movement for pedestrians, cyclists and people using suitable low impact alternate passenger movement devices, which will enable them to be able to move throughout the city without restrictions imposed by major roadways and other obstructions. • Improved vehicular movement and safety on main roads transiting the inner city, which will be achieved by reducing or eliminating at grade pedestrian crossings. • Reduced reliance on passenger motorcars to deliver people around obstructions and allowing for improved use of public transport, park and ride systems and perimeter car parking facilities. • Increased economic activity directly linked to the potential increase in pedestrian movement.

Source: Allen Consulting Group (based on information provided by cities).

8.2 Exploring the opportunity: impacts of project delivery

The Inner City Linkage project is projected to translate into large positive changes on the Hobart economy, the rest of the state and Australia overall. This section reports these impacts.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).
- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The Inner City Linkage project is expected to make a significant contribution to the Hobart economy during its construction phase through a boost in economic activity, consumption and employment (see Table 8.2). Specifically, the modelling results estimate an annual gain in economic activity in Hobart during a typical year of construction of around 1 basis point. While the impacts on the city economic output may look small in percentage terms, it is estimated that this benefit over a three-year period (from 2013-14 to 2015-16) is equivalent to a one off increase in real Gross Regional Product (GRP) of $3.5 million in 2013 ($2011-12).

These gains reflect the following three impacts:

- the stimulus to the construction industry supply chain, which boosts revenue (or sales) in industries that are important local suppliers to the construction industry;
- the stimulus to consumer spending by additional construction industry workers, which boosts revenue (or sales) in other industries (such as retail trade); and
- the loss of revenue (or sales) for industries that experience a loss in competitiveness due to higher costs.

Table 8.2

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE HOBART ECONOMY (SHORT RUN, DEVIATION FROM BASELINE)

Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
3.5	0.016	0.022	0.023

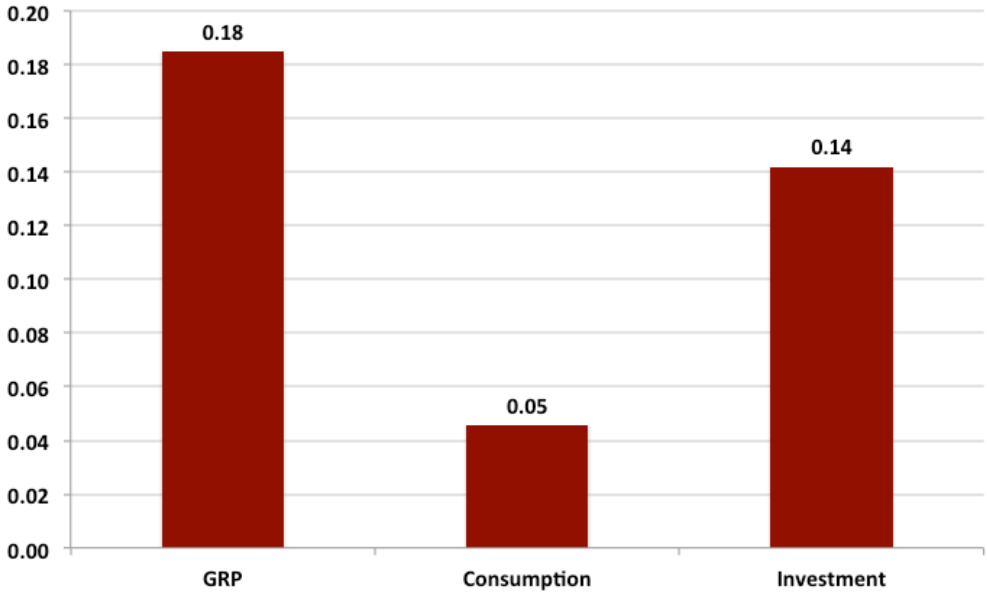
Source: TERM simulation results.

Operations phase

Figure 8.1 shows that the services provided by the Inner City Linkage would stimulate a significant lift in the performance of the Hobart economy. As shown in this figure, it is estimated that in the long run this project would grow the Hobart economy by around 18 basis points per annum (compared to the baseline scenario when the project does not exist).

Figure 8.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON HOBART (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

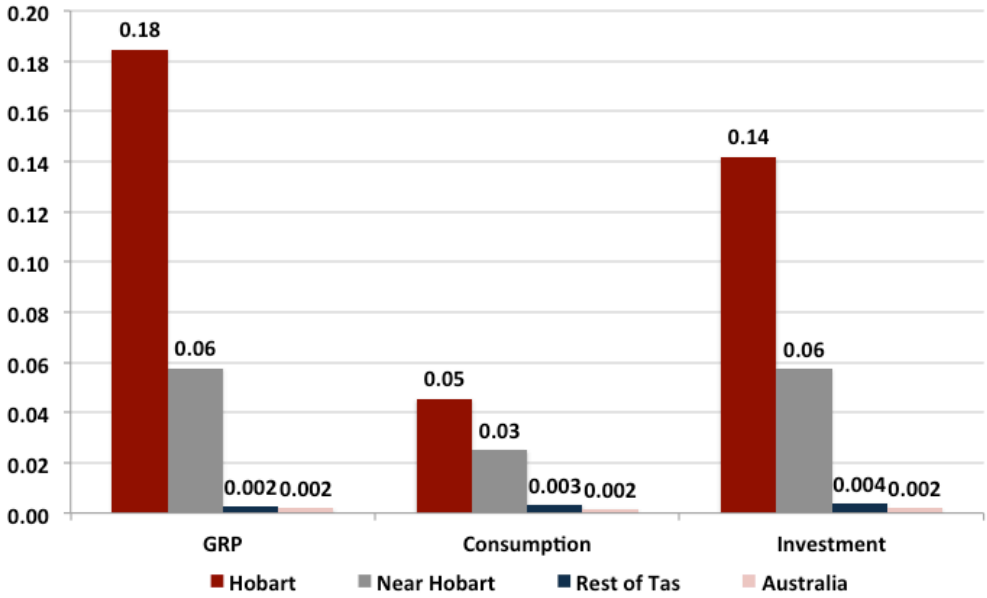
The projected increase in Hobart's economic activity primarily reflects the effects from improved labour productivity stemming from the Inner City Linkage. Because this project would allow people to move more efficiently, it effectively increases what workers can produce for each work-related hour (which translates into a lower production costs for businesses). In the long run, the effect of higher productivity in industries is passed on to consumers in the form of lower prices for consumer goods and services. Lower consumer prices arising from the productivity growth translate into higher real private consumption. Indeed, the project leads to an increase in consumption in the region (an indicator of living standards) of around 5 basis points per annum, when compared to the baseline. An increase in private consumption indicates an increase in welfare of Hobart's households.

Decreasing production costs in Hobart translates into increased demand for goods and services, and consequently higher demand for capital and labour to produce those products. This ultimately translates into higher rate of return to capital. Faced with increasing returns, investment flows in Hobart expand by 14 basis points per annum in the long run, when compared with the baseline scenario.

While Hobart is expected to receive the greatest gains from the Inner City Linkage, the economic modelling suggests that the flow-on effects result in benefits that are enjoyed in all regions of the state and the rest of Australia. An expansion in Hobart is an expansion in demand for many suppliers across the state and in other regions. The net effect is an increase in output, consumption and investment throughout the state and nationwide, as shown in Figure 8.2.

Figure 8.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND HOBART (PER CENT DEVIATION FROM BASELINE)

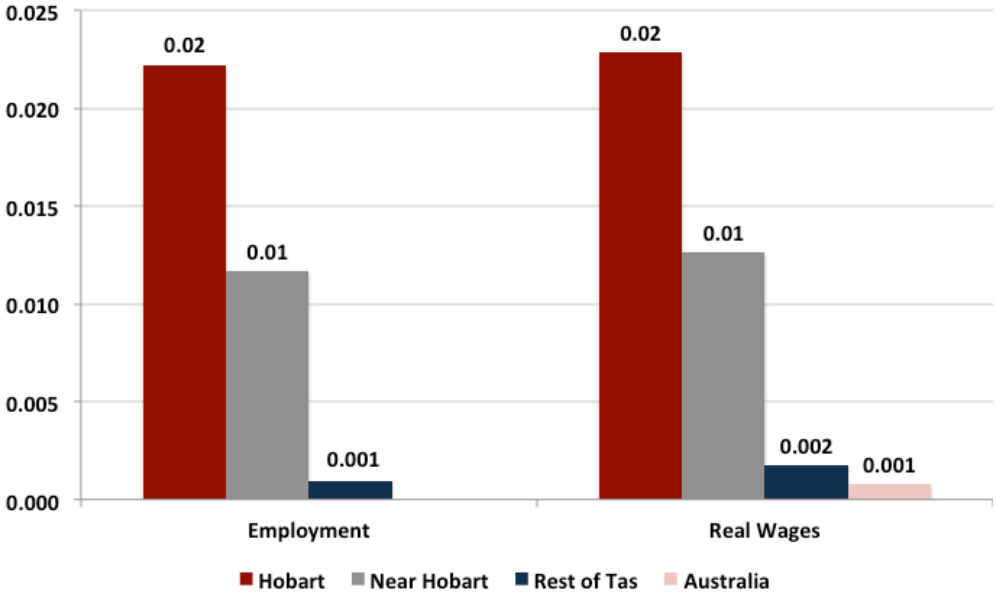


Source: TERM simulation results.

Figure 8.3 shows the impacts that the Inner City Linkage project would have on the labour market across different regions in Tasmania and Australia. As shown in this figure, this infrastructure project would create more employment opportunities in the state, with the higher number of jobs created in Hobart.

Figure 8.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

In the long run, total employment in Australia remains unchanged. This indicates that employment in other states and territories will be lower than it would otherwise be with labour shifting from interstate to Tasmania, and Hobart in particular.

The productivity gains stemming from the Inner City Linkage would lead to higher real wages in Hobart by around 2 basis points per annum, with overall wages in Australia expected to be higher by 0.1 basis points per annum on average. Wages are one of the key ways in which the benefits of increased productivity are distributed through the economy.

Chapter 9

Adelaide

9.1 Project snapshot

The City of Adelaide put forward one major project to be analysed, the Inner-City Tram Loop and Squares Regeneration Project. This project entails the development of a sustainable transport for city users through the provision of an inner city tram service and the creation of people-focussed streetscapes and squares. The project specifically involves a system of 5.3 kilometres of light rail and upgrades to four City Squares (road and cycling, shelter and community facilities, among other things).

The higher aim of the project is to serve as a catalyst for regeneration in the City West and City East areas. In addition to improving Adelaide's public transport network, the project will also add value to the community, economy and the environment.

The Tram Loop builds upon the existing tram network and will add value to the community, economy and the environment. In particular the project will:

- provide convenient access to the new redevelopment areas of the city and vital open space;
- assist in reducing local air pollution and greenhouse gas emissions;
- provide accessible and equitable public transport and transport choice;
- reduce congestion and noise pollution;
- contribute to broader economy of South Australia by creating jobs and stimulating development and investment;
- enhance the streetscape and squares through green planning, tree planting and public art, wider footbaths, cycle paths, etc.;
- increase rental values;
- save journey travel times; and
- increase employment and business activity from increased tourism.

The project is aligned with all of the state and local strategies and plans which have been developed through extensive community engagement. These include for example:

- the City of Adelaide Strategic Plan;
- Adelaide City Council's Transport and Movement Strategy;
- The 30-year Plan for Greater Adelaide; and
- South Australia's Strategic Plan.

These policies provide a sound platform for development and investment and will serve to stimulate more activity and vibrancy in the heart of the city and around the Adelaide Park Lands.

Additional high-level information about this project is provided in Table 9.1.

Table 9.1

INNER-CITY TRAM LOOP AND SQUARES REGENERATION PROJECT SNAPSHOT

Category	Summary information
Project type	Light rail development and public works redevelopment/restoration of public areas of the city.
Purpose of project	• Provide transport infrastructure in the inner city of Adelaide • Connect the major squares (for which the city of Adelaide is famous) • Enhance the amenity value of the major public spaces in Adelaide
Location of project	Adelaide inner city, City East and City West areas, Light Square, Victoria Square, Whitmore Square and Hurtle Square.
Locations affected by project	Adelaide inner city and CBD areas, as well as surrounding areas (transport network will impact links to regions such as Glenelg, Norwood, tea tree plaza, Prospect Entertainment Centre, Henley Beach and the Airport.
Capital cost of project	$464 million ($2011-12, PV)
Operating cost of project	$3.75 million per annum (tram operations) $1.2 million per annum (approximate street and squares operation)
Expected construction timeframe	T.b.a. Victoria Square Stage one currently underway.
Expected benefits of project	• Convenient access to the new redevelopment areas of the city • Reducing air pollution and greenhouse emissions • Provide accessible public transport and reduced congestion • Broad economic contribution, increased vestment • Enhanced streetscapes, increased amenity value of public spaces.

Source: Allen Consulting Group (based on information provided by cities).

9.2 Exploring the opportunity: impacts of project delivery

This section presents estimates of the economic impacts that the Inner-City Tram Loop and Squares Regeneration Project would have on Adelaide, the regions near Adelaide, the rest of the State and on Australia as a whole.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).

- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The expansion in expenditure for the construction of this project would boost economic output, consumption and employment in Adelaide. Specifically, results of the economic modelling estimate that this infrastructure project would increase Adelaide's output (GRP) by 2 about basis point in a typical year of construction. This benefit over a three-year period construction period (from 2013-14 to 2015-16) is equivalent to a one off increase in real Gross Regional Product (GRP) of about $27.1 million in 2013 ($2011-12).

The construction of this project would also have a significant impact on consumption, the best indicator of wellbeing of Adelaide's households. Indeed, consumption is estimated to be 3 basis points higher on a typical year of construction, when compared with a 'Business as Usual' (BAU) scenario. Employment in the city would also increase by about the same magnitude.

Table 9.2

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE ADELAIDE ECONOMY (SHORT RUN, DEVIATION FROM BASELINE)

Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
27.1	0.02	0.03	0.03

Source: TERM simulation results.

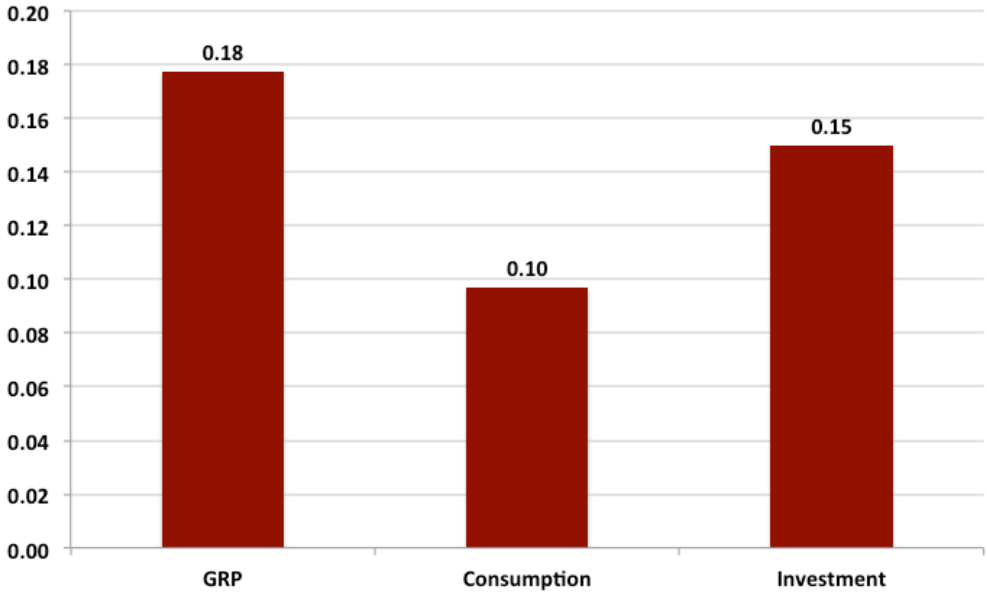
Operations phase

The lasting impacts that the Inner-City Tram Loop and Squares Regeneration Project would have on Adelaide's economy at large are presented in Figure 9.1. These results show that this project would grow the economy of Adelaide and have significant positive impacts on its residents. More specifically, the economic modelling results show that in the long run (that is, after the economy has fully adjusted) the Inner-City Tram Loop and Squares Regeneration Project would:

- grow Adelaide's economy by 18 basis points per annum (compared to the baseline scenario where the project does not exist);
- boost the welfare of Adelaide's households. Indeed, household consumption is projected to increase by 10 basis points per annum; and
- expand investment flows in Adelaide by 15 basis points annually.

Figure 9.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON ADELAIDE (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

The Inner-City Tram Loop and Squares Regeneration Project would have positive benefits beyond Adelaide. As shown in Figure 9.2, regions near Adelaide, the rest of South Australia and Australia as a whole would benefit from this infrastructure project.

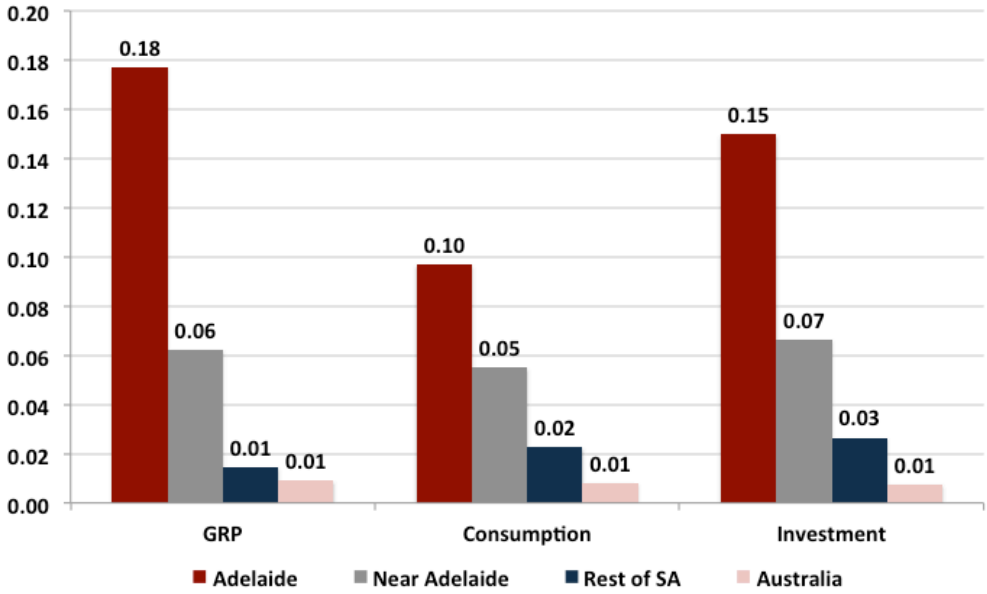
This lift in economic activity reflects a combination of an income effect and a supply side effect. Raising the economic performance of Adelaide at large raises incomes of residents, which in turn stimulate demand for goods in regions outside of Adelaide. Raising the efficiency of Adelaide as a city means that it can provide services to the surrounding areas more efficiently. This greater efficiency is realised as a reduction in costs to businesses in the surrounding regions. This can be thought of as improvements in the 'gateway' services that the city provides to the hinterland regions (including services such as accounting, finance and marketing) that are vital to external competitiveness.

Notably, the flow on gains to regions near and more distant to Adelaide is smaller than the gains for Adelaide because distance imposes a barrier to the spread of the flown on benefits. This also reflects the fact that resources (such as capital) are attracted from other regions to Adelaide as it grows reflecting increased economic efficiencies. However, the overall effect still results in a boost to productivity and output in Adelaide that spills over to neighbouring regions, providing a net stimulus.

Furthermore, the higher output levels in Australia as a whole demonstrate that the gains stemming from this infrastructure project are not merely about redistribution. Indeed, Australia's output (as measured by GDP) is estimated to be 1 basis point per annum higher, compared to baseline. Consumption and investment would also be higher by approximately the same magnitude.

Figure 9.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND ADELAIDE (PER CENT DEVIATION FROM BASELINE)

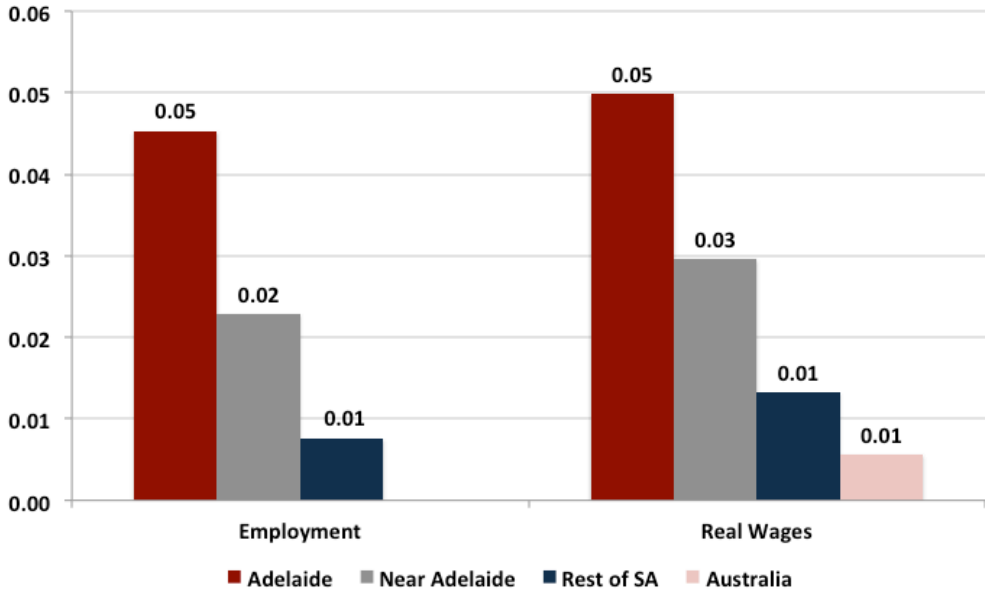


Source: TERM simulation results.

However, a redistribution of resources is evident in the expected labour market outcomes presented in Figure 9.3. This figure shows that Inner-City Tram Loop and Squares Regeneration Project would create more employment opportunities, with higher number of jobs in Adelaide and near Adelaide.

Figure 9.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

In the long run, total employment in Australia remains unchanged. This indicates that employment in other states and territories will be lower than it would otherwise be with labour shifting from interstate to South Australia, and Adelaide in particular.

The productivity gains stemming from the project would lead to higher real wages in Adelaide by around 5 basis points per annum, with overall wages in Australia expected to be higher by 1 basis point per annum on average. Wages are one of the key ways in which the benefits of increased productivity are distributed through the economy.

Chapter 10

Canberra

10.1 Project snapshot

The ACT Government put forward one major project to be analysed, the Majura Parkway Project. This proposal involves the construction of 11.5 kilometres of dual carriageway parkway commencing at the Monaro Highway in the vicinity of Pialligo and ending at the Federal Highway.

This important north-south transport link will cater for growing traffic demand in Canberra and the expansion of the Canberra Airport as a significant freight hub is realised. These functions are currently served by Majura Road, which does not have the capacity to accommodate future predicted freight traffic trends. The project, once completed will also provide improved access to the industrial estates of Fyshwick and Hume in the ACT and regional areas of NSW.

The Majura Road investment would represent the single largest road infrastructure investment in the ACT and would radically transform the movement of freight along the north south corridor by removing a significant bottleneck along the Sydney Canberra freight corridor. Given that freight traffic is expected to double by 2020 (ACTG, 2010), this development will have a significant impact on the efficiency and economic activity of the Canberra Region as a whole and provide better connections with the National Network (including the Federal, Barton and Hume Highways).

The project is strongly aligned with the Infrastructure Australia's major strategic land use plans. These include *Planning for Rail and Road Freight Networks, Transforming our Cities,* and *Competitive National Gateways.* The Parkway has also been identified in various Canberra land use planning studies and has been on the agenda for Canberra since the 1970s. *Tomorrow's Canberra* (1970) first identified the Parkway as a component of Canberra's peripheral road system and Metropolitan Canberra 1984 and the Canberra Spatial Plan (2004) have identified and retained the Parkway as a key component of the primary road network.

The project is aligned with policy goals at both the macro and micro levels. Majura Park is consistent with the seven strategic goals of Infrastructure Australia and also considers local impacts such as:

- the impact for the Majura Parkway on the natural and cultural heritage of the Majura Valley;
- access for existing and future development in the Majura Valley from Majura Road;
- providing for future planning options such as a high speed train line;
- avoiding major constraints on long term land uses;
- limiting the impacts of the Parkway on other land uses; and
- constructing the road at a realistic cost to the community.

Additional high-level information can be found in Table 10.1

Table 10.1

MAJURA PARKWAY PROJECT SNAPSHOT

Category	Summary information
Project type	Road construction: 11.5 kilometres of dual carriageway parkway.
Purpose of project	• Provide transport infrastructure to connect the Federal Highway and the Monaro Highway. • Improving freight bottlenecks and efficiencies that currently exist along the corridor. • Relieve traffic congestion and provide better access to the Majura Valley and beyond. • Support the expansion of the Airport as a major international freight and commuter hub. • Enabling better traffic from the north to the south side of Canberra. • Provide other benefits like better fuel consumption and reduce greenhouse gases.
Location of project	Canberra, west of Majura Road including separated interchanges with the Federal Highway, Fairburn Avenue and Monaro Highway.
Locations affected by project	Canberra city, in particular Canberra International Airport, the industrial estates of Fyshwick and Hume and regional areas of NSW.
Capital cost of project	$269 million ($2011-12, PV)
Operating cost of project	$10 million ($2011-12, PV)
Expected construction timeframe	2013-2016
Expected benefits of project	• Convenient access to the new redevelopment areas of the city • Reducing air pollution and greenhouse emissions • Provide accessible public transport and reduced congestion • Broad economic contribution, increased investment • Better access for freight and enhanced attractiveness of Canberra Airport as a freight and commuter hub

Source: Allen Consulting Group (based on information provided by cities).

10.2 Exploring the opportunity: impacts of project delivery

The following sections present estimates of the economic impacts that the Majura Parkway would have on Canberra and on Australia as a whole.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).

- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The construction of the Majura Parkway would have a significant impact on Canberra's economy and the wellbeing of its residents. Indeed, this project would boost economic activity, consumption and employment in the region (see Table 10.2). In particular, it is estimated that on a typical year of construction, when compared with a 'Business as Usual' (BAU) scenario, this project would:

- lead to an expansion of Canberra's economic output by 5 basis points. This benefit over a three-year period (from 2013-14 to 2015-16) is equivalent to a one off increase in real Gross Regional Product (GRP) of $39.2 million in 2013 ($2011-12);
- deliver an increase in household consumption of 7 basis points; and
- produce an expansion to employment that is equivalent to 7 basis points.

Table 10.2

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE CANBERRA ECONOMY (SHORT RUN, DEVIATION FROM BASELINE)

Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
39.2	0.05	0.07	0.07

Source: TERM simulation results.

Operations phase

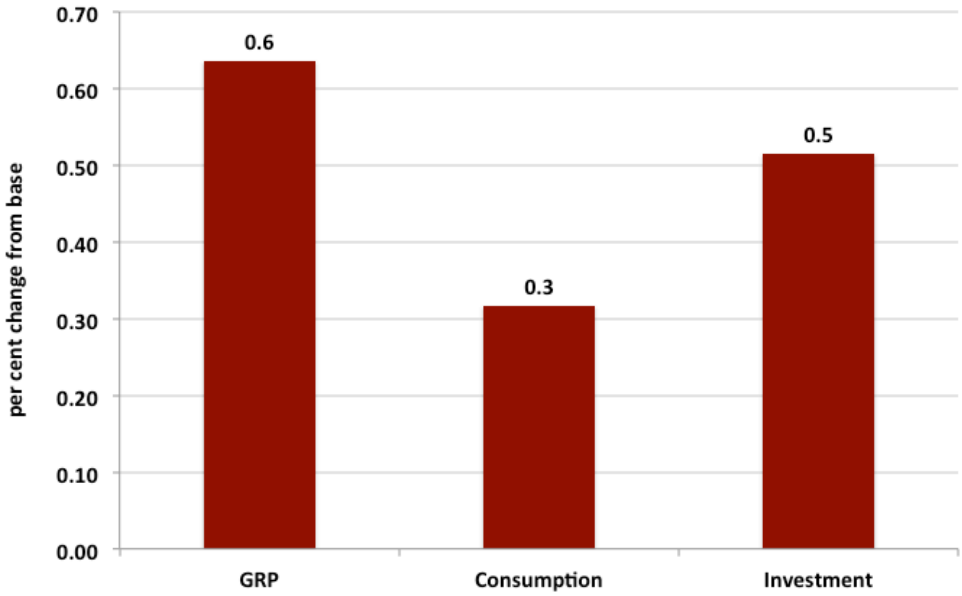
The services provided by the Majura Parkway would stimulate a significant lift in the performance of the Canberra economy. Figure 10.1 illustrates these potential impacts. As can be seen from this figure, it is estimated that in the long run this infrastructure project would increase Canberra's GRP, a measure of the region's economic activity, by 60 basis points (0.6 per cent) per annum (compared to the baseline scenario where the project does not exist).

The large increase in Canberra's GRP primarily reflects the effects from improved labour productivity stemming from the project. Saving time effectively increases what workers can produce for each work-related hour (which translates into a lower production costs for businesses). In the long run, the effect of higher productivity in industries is passed on to consumers in the form of lower prices for consumer goods and services. Lower consumer prices arising from the productivity growth translate into higher real private consumption. Indeed, consumption in the region (an indicator of living standards) increases by 30 basis points per annum with the Majura Parkway, when compared to the baseline. An increase in private consumption indicates an increase in welfare of Canberra's residents.

Decreasing production costs in Canberra translates into increased demand for goods and services, and consequently higher demand for capital and labour to produce those products. This ultimately translates into higher rate of return to capital. Faced with increasing returns, investment flows in Canberra expand by 50 basis points per annum in the long run, when compared with the baseline scenario.

Figure 10.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON CANBERRA (PER CENT DEVIATION FROM BASELINE)



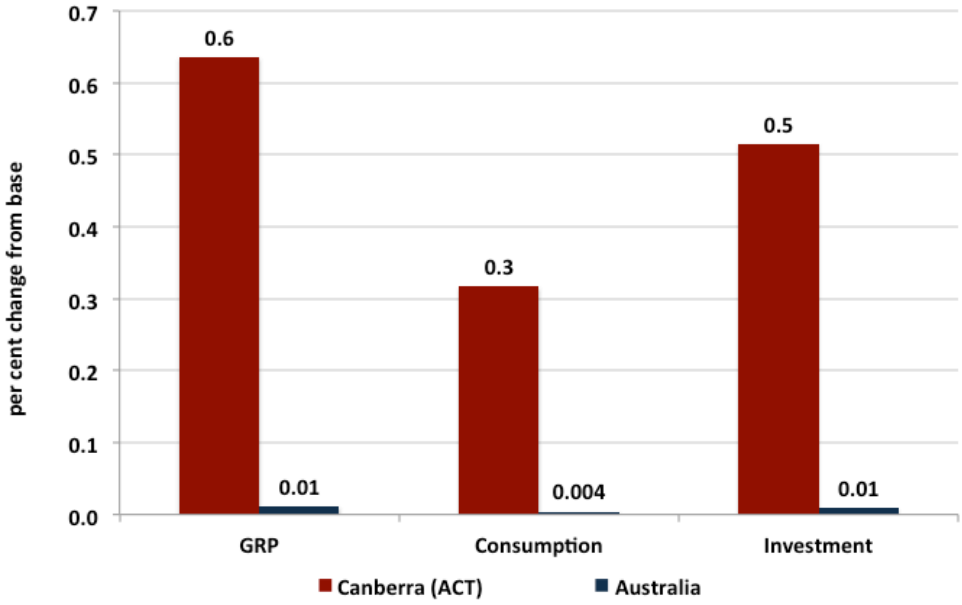
Source: TERM simulation results.

The Majura Parkway would also lead to a lift in economic activity across Australia (see Figure 10.2). These flow on gains are smaller than the gains for Canberra because distance imposes a barrier to the spread of the flown on benefits. This also reflects the fact that resources (such as capital) are attracted from other regions to Canberra as it grows reflecting increased economic efficiencies. However, the overall effect still results in a boost to productivity and output in Canberra that spills over to neighbouring regions, providing a net stimulus. In the long run, there would be an increase in national output of 1 basis point per annum (compared to the baseline scenario).

Household consumption across Australia is also expected to be higher, with consumption projected to increase, on average, by 0.4 basis points per annum (compared to a baseline scenario where the Majura Parkway does not exist). Investment Australiawide would also be higher by approximately 1 basis point. This demonstrates that the gains stemming from this infrastructure project are not merely about redistribution.

Figure 10.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND CANBERRA (PER CENT DEVIATION FROM BASELINE)

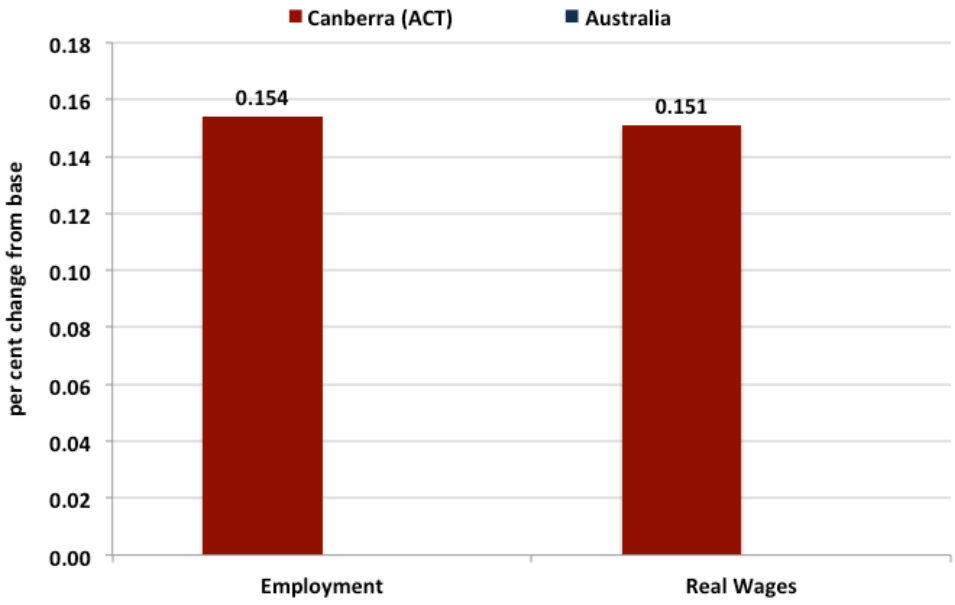


Source: TERM simulation results.

The increased demand for goods and services and higher investment and capital in Canberra translate into increased demand for labour and a consequent increase in real wages. Figure 10.3 shows that real wages in Canberra would be around 15 basis points per annum higher than otherwise. With labour being mobile, there is also an increase in employment of around 15 basis points per annum as labour comes to Canberra in search of higher wages. The labour market impacts of the project across Australia are negligible.

Figure 10.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

Chapter 11

Darwin

11.1 Project snapshot

The city of Darwin put forward one project to be analysed, the Barneson Street Link and McMinn Street Duplication Project. Darwin is currently experiencing short to medium term accelerated growth, and there is a solid foundation for long term growth prospects due to its proximity to Asia, its strategic location in a geo-political sense as well as due to the significant oil and gas resources located close to the city.

A number of major oil and gas development projects are scheduled to commence over the next few years, in particular, the Ichthys $28 billion gas development being undertaken by Inpex and Total, which has selected Darwin as the base for its on-shore process location. Because a significant proportion of the trade and commerce activities revolve around the waterfront, there is a natural barrier limiting the expansion of the city. As a result the CBD is becoming constricted and congested.

In order to ensure the city's long-term health, productivity and efficiency, a step-change improvement in the city's traffic management system is being proposed. A more sophisticated traffic flow solution to improve efficiency for commercial and residential activities is currently being proposed and involves the following major initiatives:

- a new intersection with Tiger Brennan Drive (an arterial road linking Palmerston to Darwin CBD);
- a new divided road along the alignment of Bareson Street; and
- duplication of McMinn Street.

This will provide greater access to the Darwin CBD, and encourage quicker distribution into the CBD road network.

The project contributes to Nation Building through developing Australia's cities and regions, improving social equity and quality of life, and increasing Australia's productivity and reducing Australia's greenhouse gas emissions.

The plan also aligns closely with the objectives outlined under the CBD Master plan under the National Urban Policy — *Our Cities, Our Future.* The project will have the following specific benefits:

- high level of service and confidence to commuters for route selection travelling between Palmerston and Darwin;
- consistent and reliable travel times;
- free flow traffic from Dinah Beach Road to CBD;
- less vehicle Hour Travelled (hence carbon emissions, fuel savings);

- relief of traffic demand at key areas of the city including Stuart Highway and Stuart Park, Bennett Street entry, Daly Street entry;
- efficient dispersion and circulation of commuter traffic in the CBD;
- separation of local traffic and commuter traffic in the CBD;
- opportunities to introduce rapid public transport services; and
- improved infrastructure will attract businesses and tourism.

Additional high-level information is provided in Table 11.1.

Table 11.1

BARNESON STREET LINK AND MCMINN STREET DUPLICATION PROJECT SNAPSHOT

Category	Summary information
Project type	Road construction: A new divided road along the alignment of Barneson Street; new intersection with Tiger Brennan Drive; and duplication of McMinn Street.
Purpose of project	• Increase the traffic flow to Darwin harbour • Cater for growth in commercial and residential areas surrounding the CBD • Encourage quicker distribution of vehicles into the CBD network and provide new principal entry to the Darwin CBD • Support economic and population growth
Location of project	Darwin CBD to Darwin Harbour Connection.
Locations affected by project	Darwin is becoming a nationally strategic city due to its proximity to Asia and natural deep-water harbour. Major gas and mineral developments in the area would also be impacted
Capital cost of project	$91 million ($2011-12, PV)
Operating cost of project	$1 million per annum
Expected construction timeframe	There is an estimated 5 year construction period
Expected benefits of project	• Convenient access to the new redevelopment areas of the city • Reducing air pollution and greenhouse emissions • Provide accessible public transport and reduced congestion • Broad economic contribution, increased investment • More scope for Darwin to grow into it's position as a strategic link to Asia • Cater for growth in commercial and residential efficiencies in Darwin • Improve access to Darwin CBD and energise further development within the CBD.

Source: Allen Consulting Group (based on information provided by cities).

11.2 Exploring the opportunity: impacts of project delivery

The following sections present estimates of the economic impacts that each of the selected projects would have on Darwin, the rest of the Northern Territory and on Australia as a whole.

The economic modelling results are presented as average annual percentage change from the baseline – that is, they show the annual average change in a particular economic indicator from the value that would otherwise have been observed in the absence of the selected infrastructure project.

- For the *construction phase*, the results represent the impact of the capital expenditure and development activities in a *typical year* on key economic indicators in the *short run* (the construction activity itself is not expected to have lasting long term impacts on the economy).
- For the *operations phase*, the measures presented reflect the *net expected effect*, that is, the average expected gain after considering both the costs and benefits of the infrastructure investment, spread evenly over time. They should be interpreted as characterising the magnitude of a potential *permanent boost* to the economy or a stepped increase in the scale or base of economic activity that arise from the use of the infrastructure in the *long run*.

Construction phase

The expansion in expenditure within Darwin from the Barneson Street Link and McMinn Street Duplication project would boost economic output, consumption and employment. The results in Table 11.2 show that the capital expenditure and development activities from this infrastructure project would increase economic activity in Darwin by 1 basis point. While the impacts on the city economic output may look small in percentage terms, it is estimated that this benefit over a three-year period (from 2013-14 to 2015-16) is equivalent to a one off increase in real Gross Regional Product (GRP) of $3.1 million in 2013 ($2011-12).

The construction of the selected infrastructure project would also have a significant impact on consumption, the best indicator of wellbeing of Darwin's residents. Indeed, consumption and employment are estimated to be 2 basis points higher on a typical year of construction, when compared with a 'Business as Usual' (BAU) scenario.

Table 11.2

IMPACT OF PROPOSED INFRASTRUCTURE PROJECTS ON THE DARWIN ECONOMY (SHORT RUN, DEVIATION FROM BASELINE)

Change in output over 2013-14 to 2015-16 (NPV, $m, 2011-12)	GRP (%)	Consumption (%)	Employment (%)
3.1	0.01	0.02	0.02

Source: TERM simulation results.

Operations phase

The services provided by this infrastructure project would stimulate a significant lift in the economic performance of Darwin. Figure 11.1 summarises these potential effects on key macroeconomic variables. As shown in this figure, this infrastructure project would raise economic efficiency of the city, ultimately delivering an expansion to GRP that is projected to be of around 17 basis points. In today's economy, this boost is equivalent to around $17.3 million ($2011-12) each year in every year.[13]

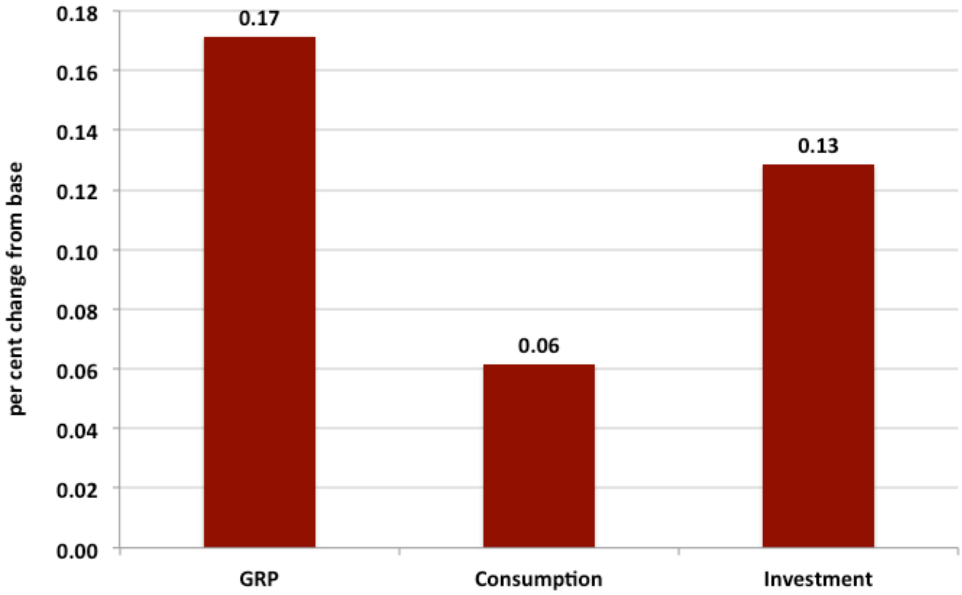
[13] As mentioned before, in reality, the infrastructure investments would result in costs in initial years and benefits in the subsequent years that grow over time with the economy. This figure shows the constant annual rate of change that is equal to the variable changes that are actually expected.

Households in Darwin are also expected to experience significant gains. Household consumption, a measure of welfare that is preferred over GRP, is projected to increase by 6 basis points on average over coming years.

Investment, an indicator of the future productive capacity of the economy, would also be boosted by the project. Indeed, a higher investment profile in Darwin is responsible for much of the boost to GRP under the project scenario. Compared to the baseline scenario, the modelling results show that investment in Darwin is expected to be higher by around 13 basis points per annum in the long run.

Figure 11.1

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON DARWIN (PER CENT DEVIATION FROM BASELINE)

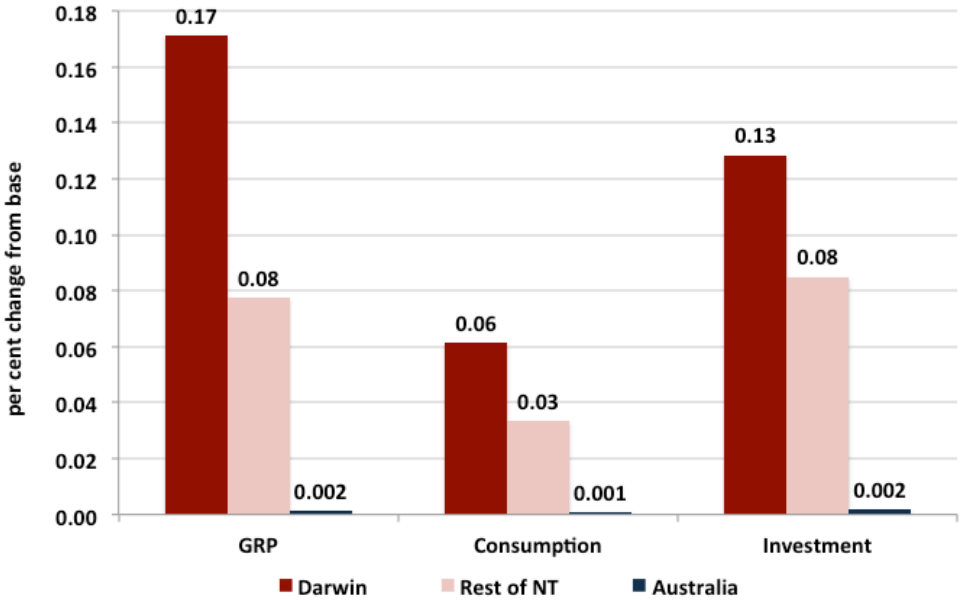


Source: TERM simulation results.

Figure 11.2 shows that the Barneson Street Link and McMinn Street Duplication project would have positive benefits beyond Darwin. Indeed, the rest of the Northern Territory and Australia as a whole would benefit from this infrastructure project. While Darwin is expected to receive the greatest gains (which reflects the direct benefits obtained from hosting the infrastructure expansion), the rest of the state would see GRP grow around 8 basis points every year and consumption grow around 3 basis points annually. Positive impacts on GDP, consumption and investment are also projected Australiawide as a result of this project.

Figure 11.2

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT BEYOND DARWIN (PER CENT DEVIATION FROM BASELINE)

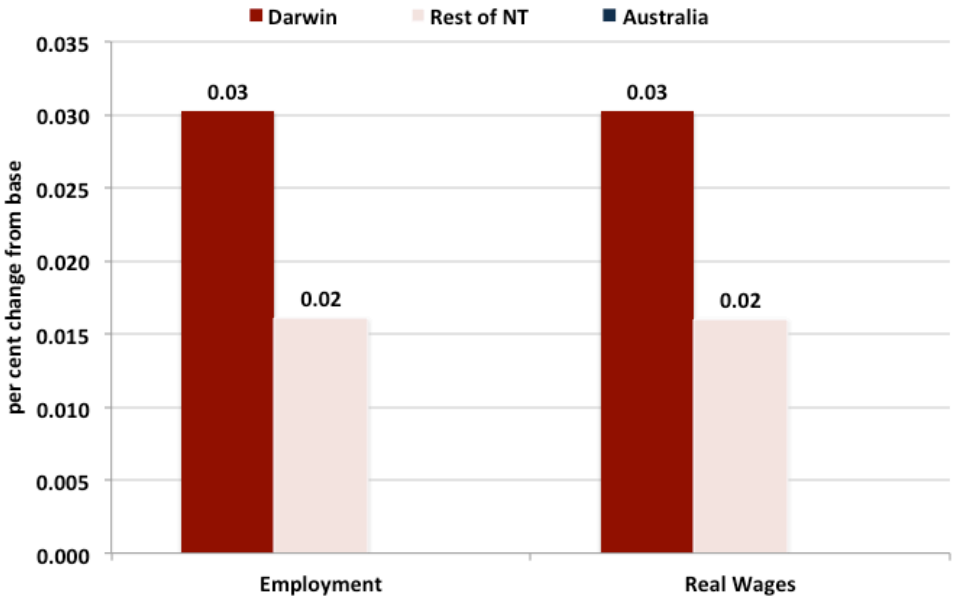


Source: TERM simulation results.

Figure 11.3 presents the expected labour market outcomes stemming from this project. An expansion in Darwin is an expansion in demand for many suppliers the other regions. The net effect is higher wages and greater employment opportunities throughout the state. The estimated average annual growth in employment across the Northern Territory is around 3 basis points annually. The average annual real wages increase is estimated to be around 2 basis points across the state.

Figure 11.3

IMPACTS OF PROPOSED INFRASTRUCTURE PROJECT ON LABOUR MARKET OUTCOMES (PER CENT DEVIATION FROM BASELINE)



Source: TERM simulation results.

Chapter 12

Conclusion

This research has identified a range of projects nominated as being of high priority to the national interest by the Council of Capital City Lord Mayors. The research involved identifying the capital expenditure of the projects, and the benefits that will accrue from these projects over time.

The analysis distinguishes the impact of the nominated infrastructure projects in two phases.

In the construction phase there will a temporary shift in expenditure within the capital cities. The total capital expenditures for all of the projects combined is estimated to amount to around $5.44 billion dollars (NPV, $2011-12). Of course this will not be spent all at once in any one year in the future. The estimated economic impact measured in terms of changes in Gross Regional Product (GRP), consumption and net employment in each capital city is reported in Table 12.1.

Table 12.1

PROJECT IMPACTS – SUMMARY (CONSTRUCTION PHASE)

City	Project	Annual output change in 2013-14 ($m, 2011-12)	Change in output over 3 years (NPV, $m, 2011-12)	GRP (% change)	Consumption (% change)	Employment (% change)
Adelaide	Adelaide Inner-City Tram Loop and Squares Regeneration	10.2	27.1	0.019	0.025	0.013
Brisbane	Suburbs 2 City Buslink	67.2	183.7	0.058	0.077	0.024
	Kingsford Smith Drive Corridor Upgrade	12.8	35.0	0.011	0.015	0.005
	Tilley Road Extension	11.6	31.7	0.010	0.013	0.004
Hobart	Hobart Inner City Linkage Infrastructure	1.3	3.5	0.016	0.022	0.009
Perth	Airport Rail Link	33.6	91.1	0.025	0.035	0.014
Sydney	Green Square Eastern Light Rail Corridor	10.0	27.0	0.004	0.004	0.002
	Inner Sydney Regional Bicycle Network	4.3	11.6	0.002	0.002	0.001
	George Street Transformation	21.6	5.8	0.008	0.009	0.004
Canberra	Majura Parkway	14.7	39.2	0.052	0.066	0.020
Darwin	Barneson St Link &McMinn St Duplication	1.1	3.1	0.011	0.018	0.004
Total		**188.5**	**458.7**			

Source: TERM simulation results.

It is clear that the increment in economic output and employment in each capital city that results from the development of infrastructure is substantial. It is also clear that the increase in GRP is not the same as the capital cost. Essentially, development expenditure 'leaks out' across the economy at large. This reflects payments to suppliers of equipment in other parts of Australia and as imports.

The material and lasting benefits of infrastructure arise from its use. That is, the economic value does not depend on what infrastructure costs but what it what it does for the economy and the community. This has been measured in the operational phase in terms of the net change in the economy (i.e. taking into account the costs and benefits of the infrastructure) when the economy has fully adjusted to all of the changes brought about by the additional facility.

Our analysis shows that the list of projects advanced by the capital cities will result in a substantial expansion of the economy. Also, the benefits accrue not just locally to the capital city alone, but to the surrounding region and the nation as a whole.

The following table summarises the key impacts.

Table 12.2

PROJECT IMPACTS – SUMMARY (OPERATIONAL PHASE)

City	Project	Project cost (NPV, $m, 2011-12)	Annual output change in 2013-14 ($m, 2011-12)	GRP (% change)	Consumption (% change)	Employment (% change)	Wages (% change)
Adelaide	Inner-City Tram Loop & Squares Regeneration	464.1	96.0	0.177	0.097	0.045	0.050
Brisbane	Suburbs 2 City Buslink	1,817.1	586.8	0.509	0.272	0.121	0.142
	Kingsford Smith Drive Corridor Upgrade	419.4	58.4	0.051	0.027	0.012	0.014
	Tilley Road Extension	313.9	120.8	0.105	0.056	0.025	0.029
Hobart	Hobart Inner City Linkage Infrastructure	81.0	15.0	0.185	0.046	0.022	0.023
Perth	Airport Rail Link	670.4	288.5	0.211	0.119	0.054	0.062
Sydney	Green Square Eastern Light Rail Corridor	339.7	117.2	0.044	0.028	0.010	0.017
	Inner Sydney Regional Bicycle Network	159.6	102.8	0.039	0.025	0.009	0.015
	George Street Transformation	816.5	226.3	0.086	0.055	0.019	0.032
Canberra	Majura Parkway	269.0	180.2	0.636	0.317	0.154	0.151
Darwin	Barneson St Link & McMinn St Duplication	90.9	17.3	0.171	0.061	0.030	0.030
Total		**5,441.4**	**1,809.4**				

Source: TERM simulation results.

While it is not anticipated or realistic to assume that these projects will all proceed or happen at the same time, looking at the $1.81 billion annual impact gives a sense of the magnitude of the difference that they could together bring about for the nation as a whole. This number is illustrative of the net gain in economic output in the long term that may occur as a consequence operating the capital cities more efficiently through more efficient and expended infrastructure facilities.

Appendix A

Project information provided by CCCLM

Table A.1

INFORMATION PROVIDED BY THE CCCLM

City	Project	Information provided by city
Adelaide	Adelaide Inner-City Tram Loop & Squares Regeneration	Adelaide City Council, 2012, "CCCLM Nation Building Projects for Australia's Capital Cities: Adelaide Inner-City Tram Loop & Squares Regeneration", Information for Council of Capital City Lord Mayors, December.
Brisbane	Kingsford Smith Drive Corridor Upgrade	Brisbane City Council, 2012, "Kingsford Smith Drive Corridor Upgrade", Information for Council of Capital City Lord Mayors, December. (Template for Stage 7, Draft revision 2- 7 December, 2012).
		Brisbane City Council, 2012, "Kingsford Smith Drive Corridor Upgrade", Information for Council of Capital City Lord Mayors, December. (Draft revision 5- 5 December, 2012).
	Tilley Road Extension Project	Ernst & Young Australia, 2009, "Preliminary assessment of the economic costs and benefits of four infrastructure initiatives for Brisbane" Report to Brisbane City Council, Sydney, January.
		Brisbane City Council, 2012, "Tilley Road Extension Project", Information for Council of Capital City Lord Mayors, December.
	Suburbs 2 City Buslink	Brisbane City Council, 2012, "Suburbs 2 City Buslink", Information for Council of Capital City Lord Mayors, December.
Hobart	Hobart Inner City Linkage Infrastructure Project	Hobart City Council, 2012, "Nation Building Project - Hobart" Information for Council of Capital City Lord Mayors.
		Hobart City Council, 2012, "Nation Building Project - Hobart" Information for Council of Capital City Lord Mayors. *Additional information*
Melbourne	Melbourne Metro Project	SGS Economics & Planning, 2012, "Agglomeration Benefits of the Melbourne Metro" Report to Public Transport Victoria, July.
		SKM 2012, "Central Melbourne Productivity and the Role of Melbourne Metro" Report to the Department of Transport Victoria, August.
		Public Transport Victoria 2013, "Melbourne Metro Economic Evaluation Report", January.
		Veitch Lister Consulting 2012, "Melbourne Metro Business Case", Report to Public Transport Victoria, July.
Perth	Airport Rail Link – Perth	City of Perth, 2012, "CCCLM 3 Projects over $100m" Information for Council of Capital City Lord Mayors.
Sydney	Green Square Eastern Light Rail Corridor	City of Sydney, "CCCLM Nation Building Projects Research" Information for Council of Capital City Lord Mayors.
	Inner Sydney Regional Bicycle Network	City of Sydney, "CCCLM Nation Building Projects Research" Information for Council of Capital City Lord Mayors.
	George Street Transformation	City of Sydney, "CCCLM Nation Building Projects Research" Information for Council of Capital City Lord Mayors.
Canberra	Majura Parkway	ACT's submission to infrastructure Australia, December 2010.
Darwin	Barneson Street Link and Duplication of McMinn Street	Darwin City Council, 2013.

Source: Allen Consulting Group.

Appendix B

Modelling inputs

Two sets of shocks were applied to the TERM model to estimate the economic impacts of the proposed projects, one refers to the costs of the project and the other to the benefits (reflected as labour productivity shocks). These shocks were applied to the areas (in this case, individual cities) that are expected to benefit from this infrastructure.

In addition, the capital costs were used to estimate the economic impacts of the construction phase of the project.

The modelling inputs used to shock the TERM model are provided in Table B.1 below.

Table B.1

MODELLING SHOCKS

City	Project	Labour productivity shock (%)	Project cost (NPV, $m, 2011-12)
Adelaide	Inner-City Tram Loop & Squares Regeneration	0.18	464.1
Brisbane	Suburbs 2 City Buslink	0.51	1,817.1
	Kingsford Smith Drive Corridor Upgrade	0.05	419.4
	Tilley Road Extension	0.10	313.9
Hobart	Hobart Inner City Linkage Infrastructure	0.24	81.0
Perth	Airport Rail Link	0.20	670.4
Sydney	Green Square Eastern Light Rail Corridor	0.04	339.7
	Inner Sydney Regional Bicycle Network	0.04	159.6
	George Street Transformation	0.09	816.5
Canberra	Majura Parkway	0.69	269.0
Darwin	Barneson St Link & McMinn St Duplication	0.22	90.9
Total			**5,441.4**

Source: Allen Consulting Group based on information provided by the CCCLM.

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