IAQ INFRASTRUCTURE ASSOCIATION OF QUEENSLAND

GPO Box 2146
Brisbane Qld
[redacted]
www.iaq.com.au

7 August 2018

Committee Secretary
By email: tollroads@parliament.gov.au
The Transport and Public Works Committee
Parliament House
George Street
Brisbane QLD 4000

Dear Secretary,

Submission to the Inquiry into the Operations of Toll Roads in Queensland

We thank the Transport and Public Works Committee for the opportunity to provide our submission to the Inquiry into the Operations of Toll Roads in Queensland (**Inquiry**). \

1. ABOUT IAQ

The Infrastructure Association of Queensland (**IAQ**) was formed in 1994. We are designed to encourage private sector participants involved in the development, ownership or operation of infrastructure projects to meet their industry peers, potential clients and customers to discuss and act upon infrastructure issues which affect the industry as a whole.

Today, IAQ is committed to connecting, informing and developing Queensland's infrastructure industry. Working within its four strategic priorities of Process, Pipeline, Private Sector Engagement and Industry Advocacy, IAQ is focused on understanding best practice from around the world and engaging with all tiers of government to shape important policy to benefit all Queenslanders.

2. SUMMARY OF OUR SUBMISSION

Overview

IAQ submits that toll roads play a vital role in establishing an efficient and diverse Queensland transport network, and that toll roads provide a positive contribution to individual toll road users and the broader South-East Queensland economy.

Direct user charging, such as in the form of tolls, provides an alternative source of revenue in times of constrained public spending, allowing private sector investment in infrastructure delivery. This investment assists Governments in the delivery of first-class transport projects that mitigate the effect of rising urban congestion levels in Greater Brisbane.

Submission to the Inquiry into the Operations of Toll Roads in Queensland

Terms of Reference Considered by IAQ

In making these submissions, IAQ have responded to items (a), (b) and (d) in the terms of reference of the Inquiry, referenced in the Legislative Assembly motion passed on 13 June 2018:

(a) *the operation of existing toll roads in South-East Queensland;*
(b) *toll pricing and incentive options to deliver better outcomes for Queenslanders; and*
(d) *possible measures to continue to improve customer service standards.*
*(**Terms of Reference**).*

Where IAQ have referred to supporting material in these submissions, for convenience extracts of any relevant material have been provided in the attachments to this document. However, due to the complexity and research based nature of this material, the full report (and not only the extracts) should be relied upon.

3. FUNDING ROAD PROJECTS

This section addresses the following items of the Terms of Reference:
(a) the operation of existing toll roads in South-East Queensland; and
(b) toll pricing and incentive options to deliver better outcomes for Queenslanders.

Growth in Queensland

Population growth in South-East Queensland is rapid, with total population projected to be 5 million by 2030.[1] This growth will increase congestion levels in Greater Brisbane, creating a genuine need for quality road infrastructure assets. Growth at this scale will require Greater Brisbane to transform itself, with the State Government facing increasing pressure to provide quality infrastructure assets which are delivered efficiently.

IAQ's view is that rising population provides an exciting opportunity to implement policies that will transform Greater Brisbane and strengthen future planning of public transport projects.

Funding Required to Deliver Road Projects

Transport infrastructure is inherently challenging to fund due to competing budgetary policies. The recurrent annual cost of operating and maintaining the existing public transport networks, combined with the limited policy options available to Governments to increase revenue (e.g. via new taxes or asset sales), places financial constraints upon Queensland's ability to promptly deliver new transport projects.

Tolling is a form of direct user charging, meaning that the ultimate customer (the toll road user) by choice pays for the benefit received from using the transport asset (i.e. time savings). The Revenues collected from tolls allow such projects to be funded by private sector debt and equity, usually with a contribution from traditional public sector funding sources. This additional source of private sector funds generated by tolling has enabled the delivery (and often maintenance) of major road projects where government sector funding has been constrained. In terms of future policy development, the Australian Infrastructure Plan 2016 endorses a transition to a user pays approach as a "*priority for Australia's governments to provide greater fairness and equity in how we pay for roads*".[2] The

[1] The 2016 Australian Infrastructure Plan noted that the four largest cities (including Brisbane) are set to undergo higher density urban transformation: http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian_Infrastructure_Plan.pdf.
[2] 2016 Australian Infrastructure Plan, page 9: http://infrastructureaustralia.gov.au/policy-publications/publications/files/Australian_Infrastructure_Plan.pdf.

endorsement of this policy approach in Queensland is critical to securing the efficient development of future projects by linking toll charges with the required level of funding.

It is clear that many of Australia's major road projects could not have been developed without assistance from the private sector. A study by KPMG (2015) estimated a delayed implementation of road projects of about 10 years without private sector investment.[3] For this reason, IAQ submits that tolling should continue to be used as a method of partnering with the private sector to cover the cost of constructing, maintaining and operating first-class road assets.

4. ECONOMIC AND SOCIAL BENEFITS OF TOLL ROADS

Terms of Reference:

(a) the operation of existing toll roads in South-East Queensland; and

(b) toll pricing and incentive options to deliver better outcomes for Queenslanders.

Congestion Costs

Congestion imposes significant costs on individuals and the community, including extra travel time, increased vehicle operating costs, and environmental costs such as poorer air quality. Reducing congestion by improvement of road infrastructure is likely to be a growing and key concern of Queensland commuters which it will expect the Government to respond to.

The Bureau of Infrastructure, Transport and Regional Economics studied the long-term trends in traffic growth, and estimated the consequent impacts and projected costs of traffic growth on road network congestion in Australian capital cities. Broadly, the report found that projected traffic delay increases mean that the 'avoidable cost' of congestion for Australian capital cities will be at around $30 billion by 2030. In Brisbane, the projected avoidable cost accounts for approximately $4.1 billion – $5.9 billion by 2030.[4]

The development of future toll roads in Queensland as a city-shaping benefit has the potential to reduce journey times and the strain on Greater Brisbane's transport network. This will significantly reduce the projected avoidable congestion costs.

Individual and community benefits

Two studies in the last decade show an economic and community benefit of Australian toll roads to the wellbeing of Australia, in particular the ability to directly reduce urban congestion.[5]

These studies have shown that on a cost-benefit analysis, there is a net positive contribution received from toll roads. The benefits received by toll users and community as a whole outweighs the cost (i.e the toll price). Commonly cited social and economic benefits include:

- travel time savings;
- vehicle operating cost savings;
- crash cost savings; and
- reduced vehicle emissions.[6]

[3] KPMG 2015, *Economic Contribution of Australia's Toll Roads*, report prepared for Transurban Limited, 11 August: https://www.transurban.com/content/dam/transurban-pdfs/02/news/report_economiccontributionaustollroads.pdf.

[4] Bureau of Infrastructure, Transport and Regional Economics, Information Sheet on Traffic congestion cost trends for Australian capital cities: https://bitre.gov.au/publications/2015/files/is_074.pdf/

[5] Ernst and Young (2009), *The economic contribution of Sydney's toll roads to NSW and Australia;* KPMG (2015) *Economic Contribution of Australia's Toll Roads*, report prepared for Transurban Limited, 11 August 2015: http://infrastructureaustralia.gov.au/policy-publications/publications/files/Eco_contribn_of_sydney's_Toll-Roads_EY2008.pdf

In relation to individual toll road users, KPMG (2015) estimated that in 2014 the total discounted road user benefits of toll roads in Australia were about $38.3 billion. Of this figure, 60% were due to travel time savings and travel time reliability benefits experienced by toll road users.

Case Study - NSW
Additionally, a report by EY (2009) considered the economic contribution of Sydney's toll roads on NSW. The report found that toll roads led to a positive economic contribution to the NSW economy of circa $22.7 billion.

The report estimated that the environmental benefit (from reduced greenhouse gas emissions) was to the value of $1.1 billion. Significantly, in relation to individual toll road users, the report estimated an overall increase in the value of vehicle operating cost benefits (+20%), travel time savings (+19%) and accident reduction benefits (+41%).[7]

Other benefits included greater connectivity, enhanced business and residential development, and increased employment opportunities.

5. LOOKING AHEAD

Term of Reference – (d) measures to continue to improve customer service standards.

In Queensland, it is IAQ's understanding that tolls are set under the Road Franchise Agreements and the PPP Project Deeds between the State and the owners of the toll roads.

IAQ also would expect that the commercial arrangements under which the current owners acquired the toll roads required the contribution of debt and equity, with fixed rates of repayment or return. These fixed level of financial commitments would require servicing via the toll payments that were agreed when the toll assets were acquired.

Therefore it is IAQ's understanding that under the toll agreements, if the State were to require a toll road owner to collect tolls lower than the approved maximum levels, the State would be required to provide compensation. This compensation would have to be paid from consolidated revenue and would have the effect of reducing the public funding available for other transport and social infrastructure projects in Queensland.

In light of the above circumstances, IAQ submits that there is opportunity for Government to play a leadership role if it wishes to drive changes to the tolling system in South-East Queensland. For example, incentivising variable tolling through Government contributions or subsidies would be a welcomed innovation for improving toll users' experience. However, the private sector funding arrangements currently in place would likely preclude the existing owners of Queensland's toll roads from implementing these changes on their own.

---

[6] Ernst and Young note the three main quantifiable direct benefits are travel time savings, vehicle operating cost savings, and crash cost savings; Ernst and Young (2009), *The economic contribution of Sydney's toll roads to NSW and Australia,* page 20: http://infrastructureaustralia.gov.au/policy-publications/publications/files/Eco_contribn_of_sydney's_Toll-Roads_EY2008.pdf.

[7] Ernst and Young (2009), *The economic contribution of Sydney's toll roads to NSW and Australia: http://infrastructureaustralia.gov.au/policy-publications/publications/files/Eco_contribn_of_sydney's_Toll-Roads_EY2008.pdf.*

Yours faithfully
Infrastructure Association of Queensland

Steve Abson
CEO

Attachment 1

Extract from the Australian Infrastructure Plan 2016, pages 6 and 7

Productive cities, productive regions

For Australia's economy to continue to support our quality of life, our cities and regions need to evolve as productive sources of growth, jobs and opportunity.

While Australia's prosperity over recent decades has been built on the strength of our manufacturing and resources industries, changing global markets mean we need to create new sources of growth and productivity to provide opportunities for all Australians. Across our cities and regions, we need to specialise in what we as a nation do best – as a knowledge-based economy of highly-skilled thinkers, innovators and producers.

Our cities will need to be vibrant, liveable and efficient centres of growth and prosperity. The most important resource in these cities is our people. And getting the best from our people means providing them with high-quality infrastructure to support their lives.

Between 2011 and 2031, almost three-quarters of our population growth will occur in Sydney, Melbourne, Brisbane and Perth. This means our biggest four cities will collectively need to accommodate 5.9 million more people. This growth presents challenges and opportunities. Growing communities need places to live, work and enjoy our great Australian way of life, placing pressure on existing infrastructure networks.

But if we plan for this growth now, we can further develop our cities as thriving, world-class centres of growth and prosperity.

The pace of growth in our four largest cities will require a rethink of the built environment and connecting infrastructure. Medium to high-density development within established urban areas provides a viable mechanism to meet the needs of rapidly-growing urban populations.

But densification alone is not enough. Part of making our cities world-class is creating dynamic communities where people want to live. We should ensure that higher density housing offers high-quality design, is well-connected by infrastructure to jobs and education, and provides access to high-quality public spaces, including parks, community facilities and cultural precincts.

Workers need high-frequency, interconnected public transport systems to move them efficiently and comfortably. We will need to change the structure, operation and use of our passenger transport to deliver services required by a 21st century population. Australia's largest cities should start planning for integrated, timetable-free, 'turn up and go' train and bus services – similar to that of New York, Singapore, London and Paris.

Our smaller cities offer many advantages. They are renowned for their liveability with more affordable housing, accessible green spaces, less congestion, and a strong sense of community. In some cases, their

close proximity to the big four cities means these cities can ease the pressure on our larger cities. We should capitalise on the character and appeal of these cities to grow their populations.

Getting the governance right in all our cities will be central to their success. The Australian Government needs to play a more active role in the development and governance of cities than ever before. Planning for population growth is too great a task to leave to chance. That is why we need a *National Population Policy* to guide decisions on how to best manage and capitalise on our growing population over coming decades.

Technology will transform our cities and how we interact with our infrastructure. Disruptive devices and applications can make a positive change to how, when and where we work. We need to anticipate and plan for the impact of these changes on the operation and use of infrastructure. Regulators will need to be responsive to emerging technologies and new service delivery models that may challenge existing practices, ensuring users' long-term interests are put first.

Maximising the productivity of our cities means making better use of existing infrastructure through technologies and integrated systems that drive greater efficiency across networks. For example, intelligent transport systems can triple the utilisation of an asset – through better management of the road network and the vehicles using it.

Investing in the right infrastructure is also critical. We should target those elements of a network that deliver the highest productivity gains and quality services to customers. New ways of generating, collecting, sharing and analysing data will help us determine where investment is most required, while connecting users with operators and ensuring the customer is at the centre of every decision on infrastructure.

The story in our regions is similar – we need to better plan and prioritise infrastructure to support greater productivity. The booming economies of south-east Asia and China will boost demand for our resources, services, produce and tourism. Efficient and reliable regional infrastructure will help us take advantage of this opportunity for growth.

Our regions are often characterised by vast distances and unique environments. Outside our east coast, Australia is one of the most sparsely populated countries in the world. In northern Australia, seasonal weather also contributes to the high cost of delivering infrastructure in the regions. This means our regions face unique challenges that need careful planning to build their productive capacity. A 'one size fits all' approach will not work.

Many regional industries rely upon freight supply chains to transport their goods to market. Clearance of containers can be delayed through some regional ports, while many regional roads cannot handle heavier, more productive vehicles. This is worsened by the fragmented oversight of Australia's freight network. The planning, delivery and operation of infrastructure occurs largely in isolation and lacks a wider network perspective.

If not addressed, these issues will prevent our regions from reaching their potential in the long term.

Governments, businesses and communities should develop long-term infrastructure plans for higher growth regions. These plans should identify the types of infrastructure and service delivery levels that will be needed to support growing populations and business in coming decades.

This should be supported by the delivery of a *National Freight and Supply Chain Strategy* which would map nationally significant supply chains and their access to supporting infrastructure, and recommend a series of reforms and investments to enable the more efficient movement of freight.

Technology will also play a key role in the regions. High-speed broadband will improve access to domestic and global markets, opening up new possibilities for regional producers. Emerging technologies will help identify the most efficient route from farm to market, meaning investments can be targeted to these routes. Meanwhile, developments in the energy sector could create new ways to power our regions. Governments should also look to improve the quality and financial sustainability of regional infrastructure services by encouraging efficient scale and co-sharing of assets.

Efficient infrastructure markets

Infrastructure provides best outcomes when it is delivered within robust, well-regulated market structures and funded through an efficient and equitable balance of user and taxpayer dollars.

Building and enhancing our infrastructure to meet the challenges of growth over the next 15 years will require more funding, from both taxpayers and users. The balance between what users and taxpayers pay will also need to be fairer, recognising that those who benefit the most – the users of infrastructure – should make a greater contribution.

In most cases, users should fund the greatest possible proportion of costs, freeing up taxpayer dollars to invest in other priorities like social services, health and education. However, governments should carefully consider the implications of increased user charges on individuals and families on lower incomes. Where governments consider this burden unreasonable, they should utilise the tax and welfare systems to redress disadvantage, as they will be significantly more effective and efficient than individual adjustments at the infrastructure service level.

With the right incentive and regulatory structures, infrastructure markets can deliver a better deal for customers. In some infrastructure sectors, Australia has established a good balance and developed the right structures to deliver efficient and responsive services. In others, there is work to be done to achieve the right funding mix and market structure.

In the energy sector, we have a world-leading market structure, where the costs of provision are typically met by users. Public sector monopolies have been separated into corporatised generation, network and retail components, a number of which are now in private ownership. Despite this success, reform of the energy sector is incomplete. Substantial sections remain in public ownership and regulatory frameworks need to be refined to meet emerging challenges. Electricity generation, network and retail businesses still in public ownership should be transferred to private ownership as soon as practicable. Similarly, regulators and governments should deregulate retail energy prices where this has not already occurred.

In telecommunications, reforms over the past few decades have moved the sector away from a government-owned fixed-line monopoly structure, allowing Australians to enjoy access to competitive and well-regulated telecommunications infrastructure. The next challenge for the Australian Government will be to ensure the efficient rollout of an open-access, wholesale-only fixed-line and fixed wireless broadband network; with capabilities that will cater for ever-increasing demand.

Over the medium term, the National Broadband Network Company should be transferred to private ownership. To achieve this, the Australian Government should commission a scoping study to define a pathway to privatise an appropriately-structured National Broadband Network into an efficiently-regulated market.

In the water sector, the pace of reform is broadly divided between metropolitan and regional markets. For water services in metropolitan areas, reforms over the past 30 years have enhanced service quality and reduced cost. Costs are generally recovered from users, but there is scope for even greater efficiency and improvements in service quality. Subject to efficient economic, safety and environmental regulation, there is no continuing case for public ownership of Australia's metropolitan water utilities. Private ownership and operation of water utilities can deliver substantial benefits for users through higher quality water, more reliable supply and lower bills.

In many regional towns and surrounding areas, the costs of potable water services are not recovered from users, and instead rely on allocations from local council rates and other taxpayer top-ups. In these areas, governments should focus on achieving the appropriate scale to deliver efficient, safe and customer-focused regional water services.

Australia's rural productive water markets have been largely a success story. But barriers to efficient trading still exist, or are creeping back, where markets are in place. Large parts of Australia, particularly in the north, are still without secure, tradeable water rights. A new national body and water reform plan is needed to energise governments and communities to complete water reforms, building on the success of the National Water Initiative.

Funding and market reform of the transport sector represents the most significant infrastructure challenge for Australia's governments. In the case of road networks, the *Australian Infrastructure Audit* revealed that there is a shortage of funding available to meet current and future needs. Access and usage charges are opaque and blunt, bearing a very limited relationship to actual use and costs of the road network. For public transport, the

Submission to the Inquiry into the Operations of Toll Roads in Queensland

gap between what users pay and the cost of provision is even more acute. Public transport operators in Australia typically recover a small fraction of costs from users, with taxpayers contributing the difference.

On road networks, the transition to a more user pays approach would allow charging to be linked to funding and supply to be linked to demand. This will be fundamental to securing the required funding and sustainably improving the level of service.

That is why the introduction of direct heavy vehicle charging within five years, and direct user charging for all vehicles within 10 years, alongside the removal of existing taxes and charges, should be a priority for Australia's governments to provide greater fairness and equity in how we pay for roads.

Reform in transport should not be isolated to roads. Efficient and effective public transport is crucial to our productivity and quality of life. Where public transport has been franchised through a competitive process, such as Sydney's ferries and Melbourne's trams, consumers have benefitted from increased investment and higher quality services. All public transport operators in Australia should be routinely and periodically exposed to a competitive process, to ensure that users are provided with the best possible service at the most efficient price.

Maintaining and renewing existing infrastructure will also be crucial. Infrastructure is generally characterised by long-dated assets for which the operational costs are often many multiples of the funding required in the planning and building phase. The majority of infrastructure Australians will use in the next 15 years has already been built, but this infrastructure will require substantial additional funding for maintenance, renewal and upgrade as our population grows.

Across all sectors, we should diversify the pool of funding we apply to infrastructure to meet the needs of a growing economy. Public finances cannot support substantial subsidies in perpetuity, while also providing the services our growing population requires. That is why we need to use broader options such as value capture, increased cost recovery in public transport and better use of governments' borrowing capacity.

Achieving the right balance of user pays, reforming our infrastructure markets and continually refining our approach will not be easy. The existing structures are familiar and the reforms are complex, but the rewards are substantial and the imperative for change is clear.

Sustainable and equitable infrastructure

Infrastructure can do more than just get us from A to B or provide power, telecommunications or water when we need it. It can also provide broader social and environmental benefits and help to create a more sustainable and fairer Australia.

Infrastructure decisions should anticipate the long-term implications of decisions for our economy, society and environment, and provide solutions that meet our needs today without compromising our future. Our infrastructure should promote and incentivise behaviours that are in our best interests over the long term.

We therefore need to improve the sustainability of our infrastructure. The electricity and transport sectors account for half of all our greenhouse gas emissions. While we have made strong progress in improving the efficiency of our infrastructure, further work is required if our electricity and transport sectors are to help us meet our 2030 target of reducing national emissions by 26 to 28 per cent below 2005 levels. Governments should set long-term reduction targets and maintain consistent regulatory frameworks to encourage industries to innovate and plan for a reduction in emissions.

Making infrastructure more sustainable often means using networks more efficiently. When planned and operated well, infrastructure minimises the resources required by people and businesses, reducing emissions, waste and costs. For instance, shifting people from cars to public or active transport, or freight from trucks to trains, can reduce emissions, improve air quality, and lift the broader efficiencies of road and rail networks.

Attachment 2

Extract from Ernst and Young (2009), *The economic contribution of Sydney's toll roads to NSW and Australia;* pages 5 and 7, and 20 to 23 (inclusive).

Submission to the Inquiry into the Operations of Toll Roads in Queensland

1. Summary

Today there are nine toll roads in Sydney that form the Sydney toll road network.

This report provides an overview of the outcomes of our study into the economic contribution of Sydney's network of toll roads to New South Wales (NSW) and Australia.

This reflects not only an analysis of the direct benefits and costs of the nine toll roads as a connected network, but further explores the socio-economic impacts on the wider community.

1.1 Key findings

- **Contribution of Sydney's toll road network to the NSW economy.** Sydney's network of toll roads has been:
  - increasing Gross State Product over time, ranging from $1.6 million in 1986 to $3.4 billion in 2020 (or 0.89% of NSW GSP), by increasing real private consumption, real investment and overseas trade.
  - increasing employment over time, ranging from an additional 100 jobs per annum in 1986 to 4,000 jobs per annum in 2020.
- **Contribution of Sydney's toll road network in comparison with other infrastructure investments.** The contribution of Sydney's toll road network to the NSW economy is comparable in size to the economic contribution of Sydney's Port Botany container terminal and around 1.5 times the economic contribution of Port of Melbourne (evaluated on a 2007 individual year net economic impact basis).
- **Direct benefits of Sydney's toll road network.** The primary direct benefits from toll roads include: travel time savings; vehicle operating cost savings; and reduced accidents and vehicle emissions.

Our review and recalculation of the total economic contribution of Sydney's toll road network indicated a net present value of $22.7 billion, approximately 15% greater than the sum of the initial valuations undertaken as part of the Environmental Impact Statements (EIS).

Our recalculation of the direct benefits of Sydney's toll road network takes into account a range of factors including:

- **Higher than forecast traffic flows.** Actual traffic flows were around six percent higher than the original EIS forecasts. This resulted in an overall increase in the value of the following benefits:
  - vehicle operating cost benefits (+ 20%)
  - travel time savings (+19%)
  - accident reduction benefits (+41%)
- **Higher than forecast environmental benefits.** By appropriately accounting for the environmental implications of Sydney's toll road network it was calculated that the environmental benefit, associated with minimising greenhouse gas emissions and noise is $1.1 billion which represents an 83% increase on initial assessments.
- **Higher than forecast costs.** Actual capital costs were 33% higher than forecast and actual operating and maintenance costs were 30% higher than forecast. These higher costs partially offset the additional benefits arising from the higher than forecast traffic flows.
- **Increased congestion costs in the future.** When recalculating the direct benefits arising from toll roads, we have taken into account the extent to which increased congestion of toll roads in the medium to longer term is likely to reduce the benefits derived by users of those toll roads.

The total economic contribution of Sydney's toll road network to the NSW economy was calculated as a net economic present value of $22.7 billion.

Submission to the Inquiry into the Operations of Toll Roads in Queensland

- **Additional external benefits of Sydney's toll road network.** Traditional evaluation methods have mainly concentrated on the direct benefits and costs of toll roads. The study has found that there are a number of net external benefits that had not been accounted for, largely due to the difficulty of quantifying those net benefits. These external benefits include:
  - **Network benefits** – the direct benefits that current and potential road users derive from an expansion in the geographic coverage of the network, which provides accessibility to new places by vehicle (i.e., the value of the option of being able to use the road). These benefits include improved operability within the network where greater connectivity enables current and potential users to reach their destinations more efficiently. The results of the study estimated that network benefits, relating to improved connectivity, business and residential development, and employment opportunities were in the order of $600 million in 2007 growing to $900 million in 2020.
  - **Economy-wide benefits** – the indirect benefits to the community include:
    - The establishment of the toll road network has been a major enabler of significant socio-economic change including population expansion by facilitating improved access to areas of employment, industrial and commercial change.
    - The provision of a robust network provides reduced accidents and congestion, which in turn produce the benefit of increased reliability of deliveries for businesses with improved productivity from reduced time delays.
    - Facilitation of new residential development areas and impacts on property prices for existing residential areas.
    - Our study identified, but did not value, additional net benefits to the community from the use of private finance, including toll revenue, rather than public finance to fund road construction and maintenance. In particular, the use of private finance can enable the earlier construction of toll roads than would be possible under more traditional, publicly funded, approaches to procurement.

Submission to the Inquiry into the Operations of Toll Roads in Queensland

5.1 Investment decision benefit-cost outcomes

The first part of the analysis involved establishing the investment decision benefit-cost outcomes, produced as part of the original EIS studies, which support the Government's decision to approve the construction of a particular road. For comparability the benefit and cost estimates were updated to 2007 values.

5.1.1 Direct costs incurred by toll road operators – capital costs

One of the most obvious costs associated with toll roads are the capital costs of construction. For the purpose of the analysis, all costs of construction were brought up to current prices, inflation adjusted. The NPV of the capital investment, adjusted for 2007 dollars, was estimated at $5.7 billion.

5.1.2 Direct costs incurred by toll road operators – operating and maintenance costs

Toll road operators also incur ongoing operating and maintenance costs associated with the day-to-day running of a toll road including, but not limited to, toll operating systems and infrastructure, pavement maintenance, maintenance of areas immediately surrounding the road (such as grassed areas) and operating and traffic management systems.

Estimates of the operation and maintenance costs based on the original EIS studies adjusted for 2007 values are $1.4 billion in NPV terms.

5.1.3 Direct net benefits derived by toll road users

There are three main quantifiable direct benefits that can arise from the establishment of a new toll road. The quantifiable net benefits, largely based on resource costs, have traditionally included:

- **Travel time savings** – measured as the total travel time saved multiplied by an explicit value of time. The time value differentiated between private individuals, business (operators) and freight consignees.
- **Vehicle operating cost (VOC) savings** – the VOC savings or costs are calculated based on standardised per kilometre vehicle costs, adjusted for estimated average vehicle speed, and differences in vehicle kilometres travelled.
- **Avoided accident costs (accident savings)** – standardised (published) values for accidents are estimated based on historical estimates of costs for a range of fatal injury, serious injury or other injury categories. The costs are differentiated by road type and vehicle class. Accident cost savings are generally linked to travel on safer, better designed roads and reduced kilometres travelled (where applicable).

The original valuations of road user benefits and costs have been converted into 2007 values to give an indication of the forecast benefits of the Sydney toll road network in current dollar terms. The direct benefits estimated for toll road network users and any flow on benefits to the overall road network, in terms of reduction in traffic on other roads, such as local roads, are:

- $21.0 billion in travel time savings.
- $3.7 billion in vehicle operating costs.
- $1.0 billion in accident reductions.

5.1.4 Direct costs incurred by toll road users and direct benefits for toll road operators

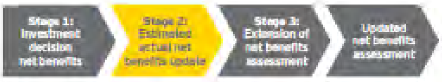
One of the obvious costs associated with using a toll road is the toll that must be paid. In the traditional road user economic study, the impact of the toll on road users and on toll road operators is not considered from an economic perspective. The standard argument for the adoption of this approach is that tolls are simply a transfer from one economic agent to another and do not result in a net change in economic welfare. However, there are additional benefits and costs associated with the use of tolls that should at least be recognised. These benefits and costs of using tolls to finance roads are considered in the next stage of the analysis, where the initial evaluations are updated and re-evaluated.

5.1.5 External costs borne by toll road users

Toll road users do not just bear the costs arising from their own use of the road. They also bear some of the external costs arising from the actions of other toll road users. The provision of toll roads is generally accepted to reduce the level of these external costs through reduced emissions, congestion and accident damages.

In the initial studies undertaken for the economic justification of Sydney's toll roads, only three of the toll roads included external, or non-user, impacts such as environmental impacts. The external cost value, in NPV terms, when converted to 2007 dollars is valued at approximately $800 million over the course of the evaluation period. In this section of the report, environmental impacts are calculated for all toll roads. No additional analysis has been done on the remaining external impacts as they tend to be road/ location specific and outside the scope of this study.

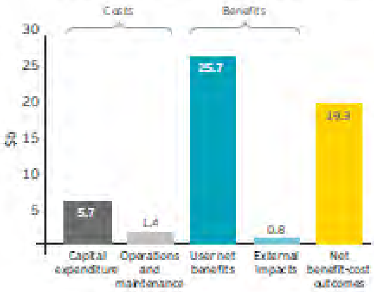
Submission to the Inquiry into the Operations of Toll Roads in Queensland



5.1.6 Initial benefit-cost summary outcomes

The original toll road network evaluations were undertaken as separate (incremental) analysis rather than as an overall network analysis. In order to consolidate these for the purpose of valuing the network as a whole, the individual toll road results, taken from the EIS studies, were converted to 2007 values and aggregated. Based on the initial investment and traffic information, the total network value was calculated to be a **net present value of $19.3 billion.**

Figure 7: Initial benefit-cost summary outcome



Source: Ernst & Young analysis

5.2 Estimated actual net benefits: updating and re-evaluating the benefit-cost studies

The next step in the research was to consider whether the original estimates (as detailed in Table 3 in sub section 5.3) were realised after the toll road was constructed and became operational. The extension of the existing benefit-cost studies to take account of actual performance, where known, involved the following adjustments:

- Updating the existing traffic modelling outcomes for actual traffic realised since the opening of the toll roads.
- Adjusting the economic benefits and costs experienced by road users depending on whether the road being considered had experienced higher or lower traffic levels.
- Inputting actual capital and operating costs where they differ from those that were planned.
- Undertaking an assessment of congestion effects based on changes in traffic levels.
- Converting into 2007 dollars in order to allow comparisons across the road network.

5.2.1 Updated traffic data

Traffic estimates used in the revised analysis were based on actual levels of traffic on toll roads supplied by toll road operators, the RTA or were obtained from other publicly available sources. To update the traffic modelling, used in the calculation of the original benefit-cost studies, the actual traffic results were compared with the forecast traffic levels used in the EIS data and analysis. The percentage change across the years of actual operation was calculated. These percentage changes were then applied to the traffic inputs of the benefit-cost model, as the traffic forecasts are the major driver of the benefit and cost streams of the road

The original toll road evaluations produced at the EIS phase estimated a net economic present value to the economy of $19.3 billion when updated to 2007 dollar values.

Submission to the Inquiry into the Operations of Toll Roads in Queensland

user benefit-cost analysis. This method of updating the traffic numbers for actual and forecast traffic levels, outlined above, was considered to be the most appropriate approach to traffic revision. A more definitive outcome could only be achieved by undertaking detailed network traffic modelling.

Figure 8 shows the average percentage change in traffic over the evaluation period, when the actual levels of traffic are compared with the modelled forecasts used in the initial investment decision economic study.

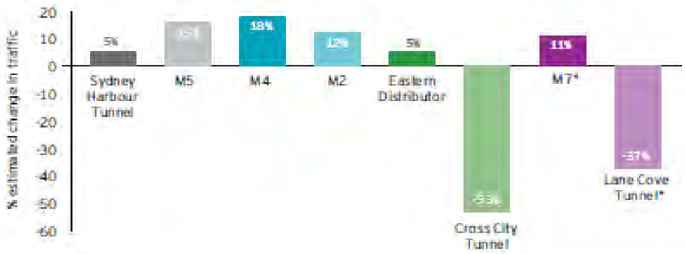
A review of the EIS traffic forecasts relative to actual traffic numbers for most of Sydney's toll roads, in Figure 8, indicate that there have been deviations that were not considered in the original planning for the toll roads. Factors that may have influenced changed traffic patterns include population and income shifts and changes in demand elasticities for toll road use as acceptance and understanding increases. These factors combined have contributed to significant deviations of actual from estimated demand.

The deviations of planned from actual traffic volumes may result in:

- The selection of non-preferred design options, resulting in a less efficient and equitable toll road outcomes.
- Decision makers being provided with incomplete information to be able to evaluate complementary or supplementary transport infrastructure needs and answer questions such as:
  - How should public transport be linked in with the new toll road infrastructure?
  - How will the toll road impact upon alternatives such as provision of rail infrastructure?
  - Should there be associated park and ride/kiss and ride facilities provided at nearby public transport interchange points?
  - How many lanes should there be and what are the options for future expansion?
  - How will alternative traffic routes be impacted?
- Detrimental impacts for air quality and traffic congestion on surface streets following construction, particularly where the traffic numbers are in excess of those used in the design parameters.

Further to this, where the traffic figures are used during financing discussions there may also be impacts on the bidding process that could influence the level of fees paid and toll charged and ultimately the financial viability of projects.

Figure 8: Adjustment in traffic levels based on actuals



Source: NSW RTA, Transurban and the NSW Auditor General, Connector Motorways and media reports.

* It should be noted that as the Westlink (M7) and the Lane Cove Tunnel (LCT) are still relatively new toll roads, the traffic levels shown in Figure 8 may not necessarily represent the long term trend traffic levels. Consequently, these numbers were not used in updating the benefit streams in the subsequent analysis, only using the original EIS modelled inputs.

5.2.2 Direct capital costs of toll roads

To update the direct capital cost inputs, a review was undertaken on the actual level of capital expenditure involved in constructing Sydney's toll road network. This information was obtained through a variety of sources including the RTA, toll road operators and other NSW government agencies, such as the Treasury and the Department of Planning.

The NPV of actual expenditure on the Sydney toll road network is estimated at $7.6 billion in 2007 dollars. The actual total expenditure on capital was 33% greater than the planned capital expenditure contained in the initial economic evaluations. The difference between actual and planned capital expenditure across the individual toll roads ranged from -40% to +85% across the toll roads.

Submission to the Inquiry into the Operations of Toll Roads in Queensland

The results show most toll road developments have eventually required a higher capital cost than was initially included in the EIS economic studies. EIS studies are conducted at the approval stage. After the approval stage of the assessment the project typically goes through a design and construction phase, either privately or internally within government. At this time the project budget is set, and in the case of private construction, project contracts are agreed. There is often a difference between the cost assessments at the EIS stage and the detailed costing/bid process due to scope or time changes. This is not a surprising result given the nature of planning and the possibility for contingencies to arise during the final design and construction process.

5.2.3 Direct costs incurred by toll road operators

The operating and maintenance cost component of the benefit-cost studies have been updated using actual cost data from toll road operators. Where actual information was not available the operating and maintenance costs were adjusted based on changes in traffic volumes.

The initial investment decision valuations for operating and maintenance direct costs were NPV $1.4 billion in 2007 dollars. When adjusted for actual results or changes in traffic volumes, the NPV of those costs increase to $1.9 billion over the evaluation period, an increase of approximately 30% over the initial economic evaluations.

5.2.4 Direct net benefits derived by toll road users

The net user benefits have been updated using the difference in actual and EIS planned traffic volumes.

The updated valuations were then converted into 2007 dollars to produce the following outcomes:

- vehicle operating cost savings of $4.4 billion, an increase in benefits of 20%;
- travel time saving savings valued at $24.9 billion, an increase in benefits of 19%; and
- accident reduction benefits valued at $1.4 billion, an increase of 41%.

It is generally understood that traffic growth results in increased congestion. Where a toll road has experienced more than 10% growth in traffic levels (over the modelled EIS traffic forecasts used in the original economic assessments), a congestion factor of 25% was applied to account for the reductions in overall user net benefits caused by the increased congestion. In other words, the congestion factor limits the growth in user benefits in recognition that there may be some reduction in the transit time savings, for example. This congestion impact has not been applied to the accident cost savings since these savings already account for congestion.

5.2.5 Direct costs to toll road users and direct benefits to toll road operators

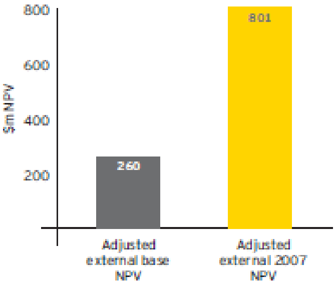
The application of tolls to a road network does not simply redistribute revenue from one section of the community to another, which is the common assumption made when assessing the effect of tolls on the economic benefits and costs of a road investment. Rather, in the course of redistributing that revenue, a deadweight cost is imposed on the community.

For example, to raise sufficient revenue to fund the high cost of constructing a new toll road, it may be necessary to charge road user tolls that exceed the efficient price of using those toll roads i.e., above the perceived benefit they receive from use. This may have the unintended effect of discouraging some motorists from using those roads, reducing the efficiency with which the economy operates. As noted previously, where a toll road is funded by taxation, these deadweight costs of using tolls to raise revenue are replaced by the deadweight costs of taxation, a cost that would normally be greater. The deadweight costs associated with tolls or taxation to raise revenue have generally been ignored in previous evaluations of the net benefits of toll roads.

5.2.6 External costs borne by road users

In the initial evaluation, only three of the toll road economic studies included a valuation for external impacts. These external impacts included environmental impacts, property values and public transportation impacts. Based on the actual traffic levels, the external impacts not including environmental, which is undertaken later in this Section, were updated. Figure 9 shows the updated level of external impacts in evaluation dollars and 2007 dollar values.

Figure 9: Adjusted external impacts – updated for traffic and time



Source: Ernst & Young analysis

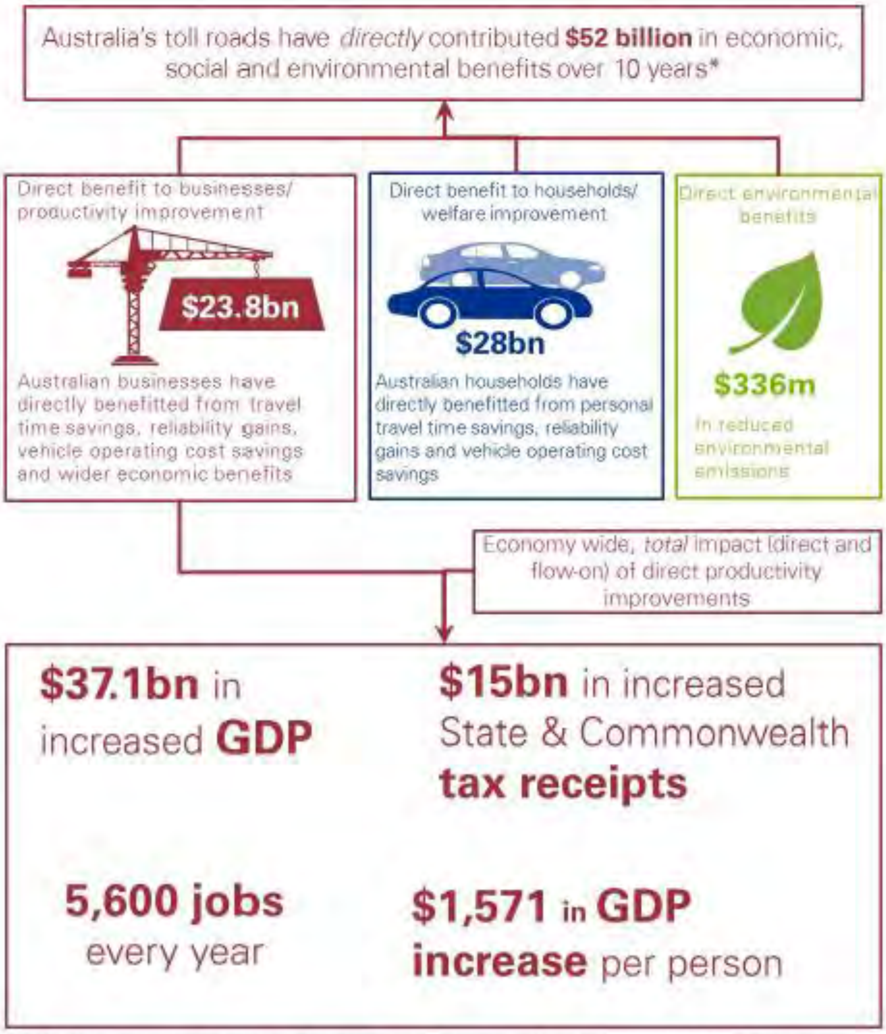
Attachment 3

Extract from KPMG (2015) *Economic Contribution of Australia's Toll Roads;* pages 1, 2, 32 and 33

Submission to the Inquiry into the Operations of Toll Roads in Queensland

KPMG

Executive Summary



* All $ values are reported in present value terms using Infrastructure Australia recommended real discount rate of 7 per cent, which equates to a nominal discount rate of 9.7 per cent.

KPMG

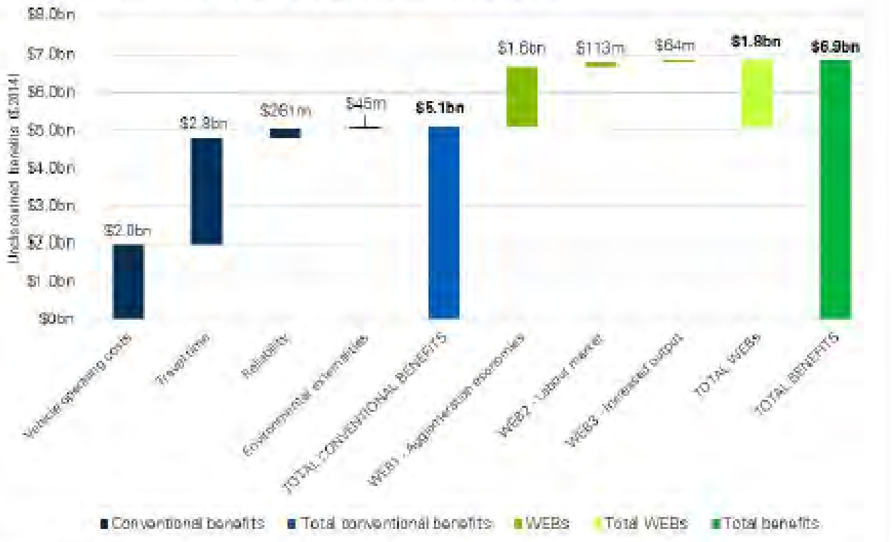
An efficient transport network is critical to sustaining economic success in modern economies. Transport, together with urban form, facilitates physical mobility and enhances communities' access to a wide range of economic, social, cultural and recreational activities. It also provides businesses with access to other businesses and customers as well as the labour force – which are critical to the operation of an efficient and productive economy.

Australian cities are becoming increasingly congested, which is impacting our productivity and standard of living. Analysis of population and congestion levels demonstrates that ***users of roads in Australian cities, whilst having relatively smaller populations when compared to international counterparts, spend a disproportionately large amount of time in congestion.*** A recent audit of Australia's infrastructure[1] estimated that ***congestion in the largest capital cities in Australia costs $13.7bn per year, and is projected to grow to $53.3bn by 2031.***

Australia currently has 16 toll roads operating in the three most populous cities of Sydney, Melbourne and Brisbane. ***Implementing a toll on these roads has enabled infrastructure projects to be delivered earlier than they would have been under the government funded, no user charge traditional model.***

This report estimates the Total Economic Contribution (TEC) of the toll roads in Australia. The economic analysis demonstrates that ***annually Australian toll roads directly contribute approximately $7bn per year in economic, social and environmental benefits.*** The estimated $7bn can be interpreted as the direct loss in benefit associated with delaying the delivery of these toll roads by every single year.

Figure 1: Annual direct economic benefits of toll roads in Australia

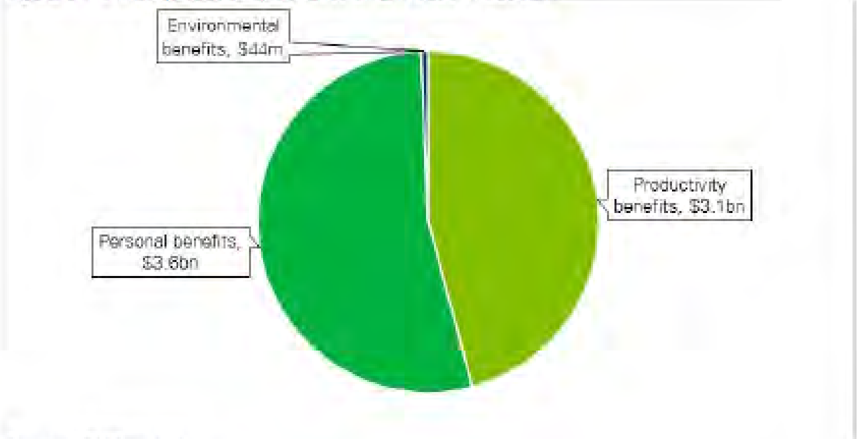


Source: KPMG analysis.

The analysis postulates that the absence of tolls would have resulted in the 16 toll roads currently operating in Australian cities being delayed by 10 years (central scenario). Sensitivity analysis has been undertaken for a scenario where the toll roads would have been delayed by at least five years (low scenario) and 30 years (high scenario).

[1] Infrastructure Australia, 2015, Australian Infrastructure Audit Report

Figure 17: Annual productivity benefits of toll roads in Australia



Source: KPMG analysis.

3.6.2 Beneficiaries of toll roads

Australia's toll roads have substantially increased accessibility to employment zones in Queensland, NSW and Victoria. The most pronounced effect is in Brisbane, where the Gateway Motorway, Gateway Extension Motorway and Logan Motorway connect major employment zones at Brisbane's airport, port and south-west industrial areas, leading to an almost doubling accessibility to these areas relative to non-tolled routes. The communities around the Bowen Hills portals of CLEM7 and AirportlinkM7 have also benefitted significantly from the delivery of the two toll roads.

The M5 South West and Westlink M7 Motorways in Sydney have enhanced the accessibility of south-west Greater Sydney around Campbelltown. Areas along the Westlink M7 corridor from Prestons to Baulkham Hills have also experienced accessibility improvements of 25 per cent on average. Eastern Distributor and Sydney Harbour Tunnel have enhanced the accessibility of the area around Sydney Airport by between 20 and 30 per cent.

In Greater Melbourne, the majority of the benefits of the toll roads have been realised by the north-west Melbourne (due to CityLink – Western Link), the communities along the M1 (Monash Freeway) corridor as well as the communities along the southern half of south-east Melbourne.

3.6.3 Economic contribution of accelerated delivery of toll roads

Table 7 shows the foregone benefits had delivery of Australia's toll roads been delayed by 10 years. Overall, the foregone benefits from a 10-year delay is estimated to be approximately $52 billion in present value terms. Of this total, approximately $24 billion is attributable to direct productivity benefits.

CGE modelling reveals that the total economic contribution of the timely delivery of the existing toll roads in Australia is equivalent to $37 billion of GDP (in present value terms) and supported 5,600 jobs per annum. This increase in economic activity contributed to State and Commonwealth tax receipts being higher by $15 billion in present value terms. The additional tax receipts could be used to deliver an equivalent of 8 Sunshine Coast Public University Hospital 'type' medical facilities, or 1,250 additional secondary colleges.[28]

[28] KPMG estimate based on http://www.lendlease.com/scuh and Victorian Government 2014-15, Budget Paper No.4

Submission to the Inquiry into the Operations of Toll Roads in Queensland

Table 7: Benefits of 10-year accelerated delivery time – all Australian toll roads, Present value

Present value over 10 years		QLD[29]	NSW	VIC	Australia
1	**Benefits to business and freight users**	**$8.1b**	**$2.8b**	**$1.6b**	**$10.5b**
1a	Vehicle operating cost savings	$3.2b	$1.6b	$0.9b	$6.6b
1b	Travel time savings	$2.6b	$1.2b	$0.6b	$4.3b
1c	Travel time reliability benefits	$0.3b	$0.1b	$0.1b	$0.6b
2	**Benefits for personal users[30]**	**$16.5b**	**$7.1b**	**$4.2b**	**$27.8b**
2a	Vehicle operating cost savings	$6.6b	$2.6b	$1.4b	$9.6b
2b	Travel time savings	$10.0b	$4.2b	$2.6b	$16.8b
2c	Travel time reliability benefits	$0.9b	$0.3b	$0.2b	$1.6b
3	**Other benefits**	**$0.2b**	**$0.1b**	**$0.1b**	**$0.3b**
3a	Environmental externalities	$0.2b	$0.1b	$0.1b	$0.3b
4=1+2+3	**TOTAL CONVENTIONAL BENEFITS**	**$22.8b**	**$9.9b**	**$5.9b**	**$38.6b**
5	WEB1 – Agglomeration economies	$6.8b	$3.7b	$2.6b	$12.0b
6	WEB2 – Labour market deepening	$0.4b	$0.3b	$0.2b	$0.9b
7	WEB3 – Increased output	$0.3b	$0.1b	$0.1b	$0.6b
8=5+6+7	**TOTAL WIDER ECONOMIC BENEFITS**	**$6.5b**	**$4.1b**	**$2.8b**	**$13.3b**
9=4+8	**TOTAL BENEFITS**	**$29.2b**	**$14.0b**	**$8.6b**	**$51.9b**
10=1+8	Productivity benefits	$12.6b	$6.9b	$4.4b	$23.8b
11=CGEx10	Gross Domestic Product	$19.4b	$9.6b	$6.6b	$37.1b*
12=CGEx10	Gross Domestic Product per capita	$4,098	$1,263	$943	$1,671*
13=CGEx10	Annual employment	3,100	1,200	860	5,600*
14=CGEx10	Change in capital stock	0.83%	0.21%	0.16%	0.29%*
15=CGEx10	State and Commonwealth tax receipts	n/a	n/a	n/a	$16b

*Source: KPMG analysis. Monetary values presented in Q2 $2014. Monetary values discounted at 7% *Economic impact results for QLD, NSW and VIC will not add up to that presented in Australia. Some economic gains from the toll roads operating in QLD, NSW and VIC also accrue to other states which is not presented here.*

[29] Economic benefits attributable to toll roads in Queensland is relatively higher than NSW and Victoria. This is because of the nature and function of the toll roads as well as the land use in Queensland. As noted in Section 3.1.3 the Gateway Bridge functions as a major river crossing in Brisbane (the next best non-tolled alternative being the Storey Bridge). The Gateway Bridge connects two large employment bases either side of the Brisbane River – the airport to the north, and the Port of Brisbane to the south of the river. Furthermore, the Gateway and Logan motorways connect major employment hubs at the Brisbane Multimodal Terminal and the South West Industrial Precinct.

[30] Consistent with the NGTSM Productivity Metrics paper, personal travel time, vehicle operating costs and reliability benefits are not included in the productivity benefits. Refer to Appendix, Section C.3.2 for further detail on productivity metrics.

Attachment 4

Extract from Bureau of Infrastructure, Transport and Regional Economics, *Information Sheet on Traffic congestion cost trends for Australian capital cities*; pages 1 and 30

74

Information sheet

Australian Government

Department of Infrastructure and Regional Development

Bureau of Infrastructure, Transport and Regional Economics

Traffic and congestion cost trends for Australian capital cities

At a glance

This Bureau of Infrastructure, Transport and Regional Economics (BITRE) Information Sheet updates the results of a previous Bureau study (BTRE 2007, Working paper 71) identifying long-term trends in urban traffic growth and estimating the consequent impacts of that traffic growth on road network congestion levels within the Australian capital cities. Such studies attempt a suitable quantification of the aggregate social costs arising from those traffic congestion levels. Like Working paper 71 (BTRE 2007), this study presents order of magnitude estimates for the current (hypothetically avoidable) social costs of congestion, and describes possible base case, or 'business-as-usual' (BAU), projections of these congestion costs for Australian metropolitan road traffic trends.

- Total passenger travel in Australian cities has grown almost ten-fold over the last 70 years, with private road vehicles currently accounting for 87 per cent of the aggregate urban passenger task.
- Under currently expected patterns of metropolitan population growth, an overall trend of relatively linear increases in aggregate urban traffic is likely over the next decade and a half, with total vehicle-kilometres travelled (VKT) forecast to increase around 2 per cent per annum out to 2030 (roughly similar to the average historical trend experienced over the last three to four decades).
- BITRE estimates of the 'avoidable' social costs of congestion (where the benefits to road users of some travel in congested conditions are less than the costs imposed on other road users and the wider community) for the 8 Australian capitals (using an aggregate modelling approach) total approximately $16.5 billion for the 2015 financial year, having grown from about $12.8 billion for the 2010 financial year[1].
- This 2015 metropolitan total is comprised of approximately $6 billion in private time costs, $8 billion in business time costs, $1.5 billion in extra vehicle operating costs and $1 billion in extra air pollution costs.
- Under scenarios of future urban road provision roughly continuing at average historical levels, expected traffic increases would typically lead to average delays on metropolitan road networks continuing to increase at a fairly comparable rate to VKT (around 2 per cent per annum out to 2030; also roughly similar to the historical average trend).
- These traffic delay increases have BITRE base case projections of the avoidable social costs of metropolitan congestion rising to around $30 billion by 2030—with the various baseline modelling scenarios conducted giving aggregate 2030 results of between $27.7 and $37.3 billion, depending upon the chosen input assumptions.
- The upper value of this plausible range for BAU congestion cost increases (reaching $37.3 billion, totalled across all 8 Australian capital cities, by 2030) is composed of: estimates for Sydney rising from current (2015) levels of about $6.1 billion to approximately $12.6 billion by 2030; Melbourne values rising from around $4.6 billion (2015) to $10.2 billion (2030); Brisbane rising from $2.3 to $5.9 billion (2015–2030); Perth rising from $2 to $5.7 billion; Adelaide rising from $1.1 to $2.3 billion; Canberra rising from $0.2 to $0.4 billion; Hobart rising from $0.09 to $0.16 billion; and Darwin rising from $0.03 to $0.07 billion.

[1] Real cost estimates are given in terms of 2010 Australian dollars throughout this Information Sheet since the most complete coverage of road user unit costs available at the time of the analysis (Austroads 2012) provided unit values in A$2010. This also happens to facilitate comparisons with several other relevant studies (such as Infrastructure Australia 2015, which provides estimates in terms of A$2011).

1

Submission to the Inquiry into the Operations of Toll Roads in Queensland

numbers, the Metrolinx study derived aggregate dollar values for the probable reduction in regional GDP (i.e. to a level below would exist in the absence of excess congestion) of a similar magnitude to their estimates of deadweight losses due to traffic delay (with their mean "reduction of regional economic output" estimate, at about $2.7 billion for 2006, approximately 80 per cent the size of their mean "annual excess cost of congestion" estimate, at about $3.3 billion for 2006)[17]. If these Canadian results are also applicable to Australian conditions, then perhaps the DWL values for avoidable congestion costs derived by this BITRE study correspond to a roughly similar magnitude in GDP decreases due to congestion effects.

Projecting avoidable congestion costs

The BITRE base case projections of urban travel, and consequent increases in average traffic delays, result in modelled BAU values for the avoidable social costs of metropolitan congestion roughly doubling from 2015 levels, of $16.5 billion, by 2030; rising to around the order of $30 billion—with the various baseline modelling scenarios having aggregate 2030 results ranging from $27.7 to $37.3 billion, depending upon the chosen input assumptions and model parameters.

The plausible range for aggregate BAU congestion cost increases is plotted in Figure 18; with time-series estimates, for each capital city, given in Table 4a (for the upper baseline scenario) and Table 4b (for the lower baseline scenario). In summary, the city-specific projections have avoidable cost estimates for Sydney rising from current (2015) levels of about $6.1 billion to between $9.5 billion (lower baseline estimate) and $12.6 billion (upper baseline estimate) by 2030; Melbourne values rising from around $4.6 billion (2015) to between $7.6 and $10.2 billion (2030); Brisbane rising from $2.3 to $4.1–$5.9 billion (2015–2030); Perth rising from $2 to $4.4–$5.7 billion; Adelaide rising from $1.1 to $1.7–$2.3 billion; Canberra rising from $0.2 to about $0.3–$0.4 billion; Hobart rising from $0.09 to $0.12–$0.16 billion; and Darwin rising from approximately $0.03 to $0.05–$0.07 billion.

Numerically, the aggregate base case values (national cost estimates out to 2020, averaged across BAU scenarios) happen to be very similar to those previously published in BTRE (2007) Working Paper 71. This is not totally unexpected, given that the same overall methodology (with only a few alterations to model inclusions during the update process) has been used for both studies—though how very close the results appear at first is actually partially coincidental. This is due to the Working paper 71 results being given in terms of older Australian dollars, and inflation effects (as well as underlying trends such as income growth changing road user unit costs) have to be allowed for. A more consistent comparison is given in Figure 19, where the BAU results from Working Paper 71 have been scaled, to agree with the updated costings on the earlier study's base year (2005). This re-based trend, though still roughly similar to the current study's results, makes it apparent how the earlier Bureau study (BTRE 2007) somewhat over-estimated expected congestion costs after 2008 (largely due to unforeseen effects—principally travel demand reductions flowing from the economic slowdown after the Global Financial Crisis).

Figures 20 and 21 provide plots of the upper baseline projections of avoidable congestion costs (based on estimated DWL trends), respectively by city and by primary cost components.

The proportion of the estimated cost totals due to *extra air pollution* declines during the projection period (see Figure 21), primarily due to the modelled emissions performance of the Australian vehicle fleet improving over time, and counteracting the underlying BAU increases in projected VKT (and average congestion intensity). This effect is less apparent for the *extra vehicle operating cost* component—since even though the average energy efficiency of the vehicle fleet is also forecast to improve over the projection period (e.g. see BITRE 2010, 2014d), consequent reductions in average vehicle running costs are offset to some extent by higher future fuel prices in the base case scenarios.

[17] Accounting for uncertainty in the valuation, Metrolinx 2008 had the annual 'estimated cost of congestion' for Greater Toronto falling within a 90 per cent confidence interval ranging from $2.9 to $3.8 billion (2006 Canadian dollars); and the estimated 'decreased GDP due to congestion' within a 90 per cent confidence interval ranging from $2.1 to $3.6 billion.