



Port Botany - Sydney Airport Precinct Scoping Study

Prepared for Infrastructure NSW

December 2011

Oliver Steele  
Project Director  
Infrastructure NSW  
GPO Box 5341  
Sydney NSW

25 September 2012

**Re: Port Botany - Sydney Airport Precinct Scoping Study**

Dear Oliver

I am pleased to provide you and the Infrastructure NSW (INSW) Steering Committee with our Port Botany - Sydney Airport Precinct Scoping Study. As agreed, we have removed certain pieces of confidential information from this version of the report compared to the final report sent to you on 2 December 2011. In reading this reissued report, it should be noted that our work concluded on 2 December 2011 and the report was constructed based on information, data and analysis current at that date. We have not sought further information and our report has not been updated since that date. As a result, material events may have occurred since we originally issued our final report in December 2011 that are not reflected in this reissued report and this may impact our analysis, findings and the solutions discussed herein.

Port Botany and Sydney Airport are critical economic assets to Australia which in the short to medium term will retain their economic pre-eminence. However, they face capacity constraints, a growing passenger and freight task, and surface access challenges that are caused by competing demands on the infrastructure network in the Precinct.

In a precinct where private vehicles and road freight dominate modal choices, available capacity on freight and passenger rail suggest there is potential to shift travel demand to more efficiently use the existing infrastructure network. This will require an integrated approach to tackling the transport task, addressing the public transport service offering, and improving rail freight competitiveness.

Our report finds that the usual approach of focusing on mega infrastructure projects will not deliver relief in the short term. Whilst such mega projects may be required in due course, a more efficient approach also requires short term, better use measures.

This report takes a fresh approach to identifying solutions. In particular, it identifies a package of small, pinch-point focused, productivity enhancing measures to improve public transport use, to relieve road congestion and to improve the efficiency and cost of rail freight.

Since the evidence base for these measures is weak in places - particularly how they fit together - we recommend that Transport for NSW lead the development of a short term Action Plan. An integrated program of reform and work could be implemented in three to five years.

We would welcome comments from you and the Committee.

Yours sincerely



Oliver Jones  
Partner

## Release Notice

Ernst & Young ("**Consultant**") was engaged on the instructions of Infrastructure NSW ("**Client**") to undertake a scoping study for the Port Botany Sydney Airport Precinct ("**Project**"), in accordance with the engagement agreement dated 10th February 2012 including the General Terms and Conditions ("**the Engagement Agreement**").

The results of the Consultant's work, including the assumptions and qualifications made in preparing the report, are set out in this Consultant's report dated 5<sup>th</sup> December 2011 ("**Report**"). You should read the Report in its entirety including the Engagement Agreement, disclaimers and attachments. A reference to the Report includes any part of the Report. No further work has been undertaken by the Consultant since the date of the Report to update it.

Unless otherwise agreed in writing with the Consultant, access to the Report is made only on the following basis and in either accessing the Report or obtaining a copy of the Report the recipient agrees to the following terms.

1. Subject to the provisions of this notice, the Report has been prepared for the Client and may not be disclosed to any other party or used by any other party or relied upon by any other party without the prior written consent of the Consultant.
2. The Consultant disclaims all liability in relation to any other party who seeks to rely upon the Report or any of its contents.
3. The Consultant has acted in accordance with the instructions of the Client in conducting its work and preparing the Report, and, in doing so, has prepared the Report for the benefit of the Client, and has considered only the interests of the Client. The Consultant has not been engaged to act, and has not acted, as advisor to any other party. Accordingly, the Consultant makes no representations as to the appropriateness, accuracy or completeness of the Report for any other party's purposes.
4. No reliance may be placed upon the Report or any of its contents by any recipient of the Report for any purpose and any party receiving a copy of the Report must make and rely on their own enquiries in relation to the issues to which the Report relates, the contents of the Report and all matters arising from or relating to or in any way connected with the Report or its contents.
5. Subject to clause 6 below, the Report is confidential and must be maintained in the strictest confidence and must not be disclosed to any party for any purpose without the prior written consent of the Consultant.
6. All tax advice, tax opinions, tax returns or advice relating to the tax treatment or tax structure of any transaction to which the Consultant's services relate ("**Tax Advice**") is provided solely for the information and internal use of Client and may not be relied upon by anyone else (other than tax authorities who may rely on the information provided to them) for any purpose without the Consultant's prior written consent. If the recipient wishes to disclose Tax Advice (or portion or summary thereof) to any other third party, they shall first obtain the written consent of the Client before making such disclosure. The recipient must also inform the third party that it cannot rely on the Tax Advice (or portion or summary thereof) for any purpose whatsoever without the Consultant's prior written consent.
7. No duty of care is owed by the Consultant to any recipient of the Report in respect of any use that the recipient may make of the Report.
8. The Consultant disclaims all liability, and takes no responsibility, for any document issued by any other party in connection with the Project.
9. No claim or demand or any actions or proceedings may be brought against the Consultant arising from or connected with the contents of the Report or the provision of the Report to any recipient. The Consultant will be released and forever discharged from any such claims, demands, actions or proceedings.

# Contents

<b>1. Executive summary .....</b>	<b>1</b>
<b>2. Introduction .....</b>	<b>5</b>
2.1 Background to the Scoping Study.....	5
2.2 Aim and Purpose .....	5
2.3 Our Approach .....	6
<b>3. Sydney's International Precinct Today.....</b>	<b>7</b>
3.1 Economic Importance of the Precinct .....	7
3.2 Land Transport Network .....	8
3.3 Current Infrastructure Proposals.....	10
3.4 Governance in the Precinct.....	11
<b>4. Problem Identification: The fruits of growth .....</b>	<b>12</b>
4.1 Capacity Constraints on International Gateways .....	12
4.2 Current and Growing Road Congestion in the Precinct .....	15
4.3 Inadequate Public Transport Provision.....	21
4.4 Unreliable and Uncompetitive conditions for Rail Freight .....	26
<b>5. Findings and Initial Conclusions .....</b>	<b>34</b>
<b>6. Recommendations for Next Steps .....</b>	<b>37</b>
6.1 A Short Term Action Plan to 2015 or 2017.....	37
6.2 Developing the Long Term Transport Improvement Plan for the Precinct .....	40
<b>Appendix A Solution Identification .....</b>	<b>43</b>
Short Term Solutions (0-3 years).....	43
Medium Term Solutions (3-5 years) .....	51
Longer Term Solutions (5+ years).....	52
<b>Appendix B RMS corridor capital works proposals.....</b>	<b>57</b>
<b>Appendix C References .....</b>	<b>58</b>

© 2012 Ernst & Young, Australia. All Rights Reserved.

This report was prepared at the request of Infrastructure New South Wales ("INSW") solely for the purposes of analysing the Port Botany - Sydney Airport Precinct and its transport issues, and developing potential options to address these.

It is not appropriate for use for other purposes. This report may only be provided to the New South Wales Government ("NSW Government") for the purposes of advising on the development of short term and long term program for infrastructure development in New South Wales.

However, the NSW Government and any other party other than INSW who access this report shall only do so for their general information only and this report should not be taken as providing specific advice to those parties on any issue, nor may this report be relied upon in any way by any party other than INSW. A party other than INSW accessing this report should exercise its own skill and care with respect to use of this report, and obtain independent advice on any specific issues concerning it.

In carrying out our work and preparing this report, Ernst & Young has worked solely on the instructions of INSW, and has not taken into account the interests of any party other than INSW. The report has been constructed based on information current as of 2 December 2011 or otherwise indicated. Since that date, material events may have occurred since completion which are not reflected in this report.

No original work or research was undertaken by Ernst & Young in the preparation of this report. Ernst & Young cannot verify the accuracy, reliability, or completeness of the information provided to us. Ernst & Young does not accept any responsibility for use of the information contained in this report and makes no guarantee nor accepts any legal liability whatsoever arising from or connected to the accuracy, reliability, currency or completeness of any material contained herein. Ernst & Young expressly disclaims all liability for any costs, loss, damage, injury or other consequence which may arise directly or indirectly from use of, or reliance on, the report.

This report (or any part of it) may not be copied or otherwise reproduced except with the written consent of Ernst & Young. Limited liability under a scheme approved under the Professional Standards Legislation.

# 1. Executive summary

## **The Port Botany - Sydney Airport Precinct is of huge economic importance to the State and the Nation.**

Today, the Port Botany - Sydney Airport Precinct (the "Precinct") is Australia's gateway to the world - with the busiest airport and second busiest container port in the country - and it is a critical interstate and intrastate transport hub. Furthermore, it is home to heavy industry, manufacturing industries, major distribution centres, major road and rail arteries to the Sydney CBD, and hundreds of thousands of local residents.

The Precinct is vital to the New South Wales and Australian economies. Each year, its two international gateways alone generate some \$10.5 billion of economic activity<sup>1</sup> and handle close to \$100 billion of freight.<sup>2</sup> The airport handles 35.6 million domestic and international passengers and the port handles more than 1.9 million containers.

The Precinct's success is no accident. Its location at the edge of Australia's most important business district offers NSW a clear competitive advantage. Industries and businesses seek the Precinct's economies of scale, activity clusters, lower freight costs and fast connections.

However, the Precinct's location is also its biggest challenge. In addition to the transport task created by its two gateways, it hosts key arterials to the Sydney CBD and is an important origin and destination in its own right for freight due to intensive economic activity in the local area. The Precinct is increasingly a victim of its own success: jobs growth, housing growth, new business precincts and urban development add further demands to the Precinct's infrastructure.

Looking ahead, there can be little doubt that over the next 20 years, the two gateways, and therefore the wider Precinct, will retain their pre-eminence, with passenger numbers at the Airport forecast to more than double, and container volumes at the Port to more than triple.

## **The Precinct faces a growing transport challenge that, if unmet, will have serious economic consequences for NSW and Australia.**

Each day, users of the Precinct compete for access to its transport network: inbound international bankers, manufacturing workers, school children, wine and speciality grain exporters, and containers with goods destined for Australian homes all seek access. They compete for the same road space, train paths, and airport and port slots - and often, at the same time of day.

As a result, congestion on the Precinct's roads is amongst the worst in Australia. The Precinct is home to four of Sydney's five most congested links and congestion is no longer a peak-only phenomenon, with congestion lasting over 13 hours each day on three of these routes. On the M5 East, the average inbound travel speed on some sections is just 22 kilometres per hour, one fifth the speed limit.<sup>3</sup> And connectivity from the Precinct to Western Sydney is poor, with the majority of road freight travelling on aging arterial roads unsuited to the task.

Whilst not all transport markets can readily switch between modes, an important reason for road congestion is that public transport and rail freight play a relatively minor role in meeting the Precinct's overall transport task. Only 15 per cent of travel to and from the airport is by rail or bus, a very low figure by international standards. Only 10 per cent of commuters living in the Botany Bay area travel

---

<sup>1</sup> 2009-10 BITRE, ATRF 2011 - no 0031, June 2011 and [www.sydneyports.com.au/corporation/port\\_facilities/port\\_botany](http://www.sydneyports.com.au/corporation/port_facilities/port_botany)

<sup>2</sup> Gilfillan (2011), *The Future of Sydney's Ports - a 30 year horizon*, Presentation for Sydney Ports Corporation, August 2011; SACL 2009 Master Plan.

<sup>3</sup> pp42-48, Road and Traffic Authority (2010), *M5 West Widening Project - Traffic and Transport Report*, September 2010.

by rail to work.<sup>4</sup> And rail freight carries a declining share of the freight task, with 14 per cent mode share of containers travelling to and from the Port.

As Sir Rod Eddington (the Chairman of Infrastructure Australia) and others have powerfully argued, transport problems are, in fact, economic and social problems. Given the nature and scale of economic activity supported by this Precinct, addressing its transport problems well matters to both the New South Wales and Australian economies.

The NSW Government's announcement to sell Port Botany by 2013 adds urgency to solving the growing transport challenge. As we have seen on the Port of Brisbane sale process, the market will place a significant value on the facility having a committed plan to develop adequate land side transport links.

**The Government has a golden opportunity to meet this challenge with a new approach that treats the Precinct as one system, and that prioritises high impact, short term measures.**

In recent years, attention has focused on relieving road freight congestion in the Precinct. Significant investment has been undertaken or is planned to encourage more freight to move by rail and to reduce road congestion, such as the Enfield Intermodal Terminal, which will double Sydney's intermodal capacity, and make rail freight a more competitive and reliable proposition in the medium term. Yet despite these efforts, the proportion of container freight moved by rail has dropped in recent years, and some parts of the rail freight network are underutilised.

Importantly, road freight's contribution to the transport task is relatively minor. Only 1,700 trucks a day access Port Botany, whereas 100,000 people a day travel to Sydney Airport. Therefore, while it is important that rail plays a greater role in transporting freight, equal focus is needed to address the passenger transport challenge in the Precinct, particularly journeys to and from the Airport.

If the modal share of public transport to Sydney Airport was comparable to that at London Heathrow airport, 25,000 fewer people would be travelling on the roads around the Airport each day. However, there have been few improvements to public transport in the Precinct except for the recent removal of station access fees at Green Square and Mascot stations, and few improvements to road infrastructure since the completion of the M5 East tunnel in 2001.

There are many reasons why these transport issues have emerged, including confusing governance arrangements across Federal, State and Local Governments, contractual requirements on the Airport Line, and a focus on major investment rather than better use strategies. While the M4 Extension and M5 East Duplication have been advocated as the solution to congestion in this Precinct, little assessment has been made of less expensive short term options, despite the cost and complexity of these "mega projects".

An effective response must treat the Precinct's transport network as one system. The Government must take an integrated approach to solving the Precinct's problems, rather than modally siloed approaches, factoring in local, Federal and private-sector assets also. Also, it must also take an approach that prioritises efficient use of existing assets rather than simply focusing on large scale capacity enhancements to the transport network.

Large scale road and rail capacity enhancements are likely to be key parts of a long term solution in the Precinct. However, in the short and medium terms the Government has an opportunity to implement quickly a series of coordinated actions that will complement these major works and support the productivity of the Precinct before these longer term projects are able to come online. Further, many of these measures are likely to come at relatively low cost to the public purse, or could be considered for user payments or wider infrastructure charges and levies.

---

<sup>4</sup> 2010 Compendium of RailCorp Travel Statistics

**A circuit breaker for the Precinct is needed: a short term Action Plan should be launched in the first half of 2012.**

This report has identified a number of short term actions that could make a difference to the transport networks around the Precinct. These measures are at different stages of development and further work is needed to bring most of them forward for implementation.

This report therefore recommends a concentrated period of activity to progress the identified actions for delivery as soon as possible. The Government should publish a short term Action Plan for the Precinct in early 2012.

The Action Plan should be based around three key themes, within an integrated approach:

1. Actions to relieve road congestion by relieving pinch points and better managing road space;
2. Actions to boost the capacity and attractiveness of public transport services; and
3. Actions to improve the reliability and efficiency of the rail freight network.

The Action Plan should be developed by a dedicated Program Manager and Project Team (or teams) in Transport for NSW, working with other Government departments and Infrastructure NSW.

The Action Plan should be focused on those measures that can be implemented in the short term that will make an immediate difference to transport in the Precinct. From our analysis we recommend that the Action Plan include:

**1. Immediate measures to relieve road congestion:**

- ▶ Two or three immediately deliverable projects from a list of 17 small scale road works identified by Roads and Maritime Services to fix pinch points in the Precinct. For example widening O’Riordan Street at Mascot to reduce congestion around the Domestic Terminal, or converting Bourke Road and O’Riordan Street to one-way roads from Gardeners Road to Green Square to increase road capacity north of the Airport.
- ▶ Actions to improve the productivity of existing roads, including additional bus lanes near the airport and higher occupancy lanes.

**2. Immediate measures to improve public transport services:**

- ▶ Prepare the economic case for, and assess the financial and legal implications of, providing additional bus routes to/from the Airport, in view of the Airport Link contract.
- ▶ Prepare and cost a proposal to reduce or remove the station access fee on the Domestic and International Terminal stations.
- ▶ Improve passenger amenity on existing airport rail and bus services, including improved signage and luggage racks.

**3. Immediate measures to increase rail freight use:**

- ▶ A fresh public commitment by the Government to PBLIS’ voluntary rail strategy, committing to regulatory approaches if voluntary measures do not produce tangible results.
- ▶ Urgently unlock Enfield as a staging facility for Port Botany, and tackle ‘pinch points’ on the rail network including the at-grade level crossing on General Homes Drive.
- ▶ Bolster the independence and governance arrangements for the PBLIS rail team to drive improvements to rail reliability and efficiency.
- ▶ Identify and progress the optimal ownership/operation arrangement for the Port Botany freight line to incentivise efficient use of the Metropolitan Freight Network.

**Work should also begin on a long term Transport Improvement Plan that contains integrated solutions that improve access, capacity and coordination over the longer term.**

The NSW Government has applied for Federal co-funding for the development of a long term Transport Improvement Plan for the Port Botany - Sydney Airport Precinct in its 2011 submission to Infrastructure Australia. This would complement the NSW Government's Transport Master Plan for Sydney and Infrastructure NSW's 20-Year State Infrastructure Strategy, and would address intergovernmental issues such as land usage and urban renewal. It is recommended that the long term Plan be delivered by the end of 2012, given the urgency of the challenges facing the Precinct and its relationship to the Port Botany refinancing.

This report does not try to prejudge the conclusions of the Transport Improvement Plan on the longer-term transport solutions for the Precinct. However, it does recommend a balance of long term and short term measures, and recommends that a Short Term Action Plan be prepared to complement and maximise the benefits of future investments in the Precinct and in the Sydney Motorway Network.



## 2. Introduction

### 2.1 Background to the Scoping Study

Infrastructure NSW (INSW) was established in 2011 as a statutory body to oversee and coordinate the development of state infrastructure strategies and plans, establishing priorities, and oversee the implementation of major infrastructure plans, programs and projects.

The Cabinet Standing Committee on Infrastructure requested INSW to advise the Government on infrastructure priorities and solutions in the Port Botany - Sydney Airport Precinct. This recognised the Precinct's fundamental importance to the NSW and Australian economies, and its infrastructure network as a critical economic driver of growth and economic activity. While much analysis of the problems facing this Precinct already been undertaken, this study was intended to take a holistic view of the Precinct, assessing its two international gateways and their connecting landside infrastructure from an integrated, network perspective.

INSW undertook to deliver a *Port Botany - Sydney Airport Precinct Infrastructure Strategy Statement* in 2012, analysing the economic role of the Precinct, focusing on its international gateways, and identifying issues it faces now and will face 20 years in the future, with potential options to address these.

A Steering Committee, chaired by Max Moore-Wilton, a member of the board of INSW, was formed to progress this Strategy. Officials on the Committee are drawn from Treasury, Department of Premier and Cabinet, Department of Planning and Infrastructure, Department of Tourism, Regional Development and Industry, and Transport for NSW (TNSW).

This Scoping Study is the first step in the preparation of a Strategy. It is intended to assist the Government by providing an overview of key issues and possible options for action, and to:

- ▶ Assess the vital economic role this precinct and its international gateways play in the State and national economy.
- ▶ Set out a high level analysis of infrastructure challenges facing the Precinct based on existing demand forecasts.
- ▶ Identify options for action that might resolve these challenges in the short, medium and longer term.

INSW appointed Ernst and Young (EY) as its advisor for the development of the Scoping Study.

In November 2011, the NSW Government announced it would be progressing a detailed Transport Improvement Plan for the Precinct, with co-funding sought from the Commonwealth in support of this. It is expected that the Precinct Infrastructure Strategy Statement will form part of this broader analysis once it is launched.

### 2.2 Aim and Purpose

The purpose of this Scoping Study is to provide an objective and succinct assessment of the Precinct's infrastructure needs, and to assist the Government to formulate an effective response to these. The Study is intended to be a succinct perspective that galvanises whole of government effort around the Port Botany - Sydney Airport Precinct.

In view of the Government's plans to develop the longer term Transport Improvement Plan, the Study is focused on the immediate, more targeted solutions for the Precinct, to kick start early and tangible improvements to the Precinct. It therefore complements efforts to progress long term solutions in transport in NSW, and begins work in advance of longer term approaches to planning, financing and delivering major infrastructure.

The Port Botany - Sydney Airport Precinct is at a critical juncture. In the next year or so, the refinancing process for the Port will be developed, Stage 1 of the PBLIS reforms will end, and Stage 2 (rail reforms) will begin, and the Federal Government will publish the findings of its studies into the Moorebank Intermodal Terminal and a second airport for the Sydney basin. Targeted, immediate measures now will provide investment and planning certainty, maximise investments, and optimise the network's performance.

## 2.3 Our Approach

This Scoping Study takes a 'first principles' approach, in five steps.

First, evidence of the Precinct's performance, and its economic importance, was examined. This data reviewed included asset level master plans, ABS data, and data from the NSW Bureau of Transport Statistics and the Federal Bureau of Infrastructure and Transport Regional Economics.

Second, the transport and connectivity problems in the Precinct were identified. This involved high level analysis of publicly available modelling, internal documents provided by agencies, and detailed interviews with NSW Government agencies, including TfNSW, INSW, Treasury, Roads and Maritime Services (RMS, formerly RTA), the Sydney Airport Corporation Limited (SACL), RailCorp, Department of Trade and Investment, Moorebank Program Office, Australian Rail and Track Corporation, Independent Rail, Qube Logistics and Sydney Ports and PBLIS. This Study also considered international best practice.

Third, a wide net was cast across the types of solutions that could address or alleviate these problems. Key landside and transport interface problems that would compound into the future were identified, as were the policy drivers that underpin each of these.

The Study sought to validate these findings as far as possible with agencies through follow up discussions and by attending INSW Steering Committee meetings. There has generally been strong support for these findings from state, federal and private-sector entities involved in the Precinct.

Fourth, potential solutions were categorised as one of four types: better use strategies, measures to unlock pinch points, measures to improve productivity, and transformational major investment. This schema enables solutions to be considered against each other.

Finally, those measures that could be implemented in the short term, and at relatively low expense, were highlighted for immediate consideration by the NSW Government.

Solution Category	Timeline
<ul style="list-style-type: none"> <li>▶ <b>Better use of existing assets</b> - Regulatory and Pricing measures to drive behavioural change and public transport provision</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Short Term</b> - 0-3 years</li> </ul>
<ul style="list-style-type: none"> <li>▶ <b>Unlock capacity at 'pinch points'</b> - Unlocking infrastructure capacity through minor/ medium term capex investments</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Medium Term</b> - 3-7 years</li> </ul>
<ul style="list-style-type: none"> <li>▶ <b>Raise productivity</b> - Strengthening governance, technology, people and innovation</li> </ul>	<ul style="list-style-type: none"> <li>▶ <b>Long Term</b> - 7+ years</li> </ul>
<ul style="list-style-type: none"> <li>▶ <b>Transformational investment</b> - Longer term strategic projects in port, road and rail infrastructure</li> </ul>	

### 3. Sydney's International Precinct Today

This section is a snapshot of the Precinct as it operates today - its contribution to the economy, its integrated land transport network, and the plans and governance arrangements that drive its development. The map below shows how Port Botany sits within Sydney's wider transport network.

This is Australia's most important transport precinct.

It is home to two premier international gateways - Australia's largest airport and second largest container port - and these are key to growth and productivity in the national economy. And it is Sydney's biggest employment centre after the CBD.

The Precinct is heavily utilised, connecting the north and south of Sydney, and providing a strategic corridor from west to east. Its proximity to the CBD (ten kilometres away), is both a blessing in terms of the competitive advantage it offers NSW, and a curse in terms of the competing demand it places for land and transport usage. On any given day, road, passenger and freight rail, port and airport users utilise the corridor.

Governance of this infrastructure is complex - with overlapping local, state and federal government involvement in planning, operating, and investing in the network. These complexities have hindered resolution of the transport and broader infrastructure issues that this Precinct experiences. Outside of the freight sector, little has been done in recent years.

#### 3.1 Economic Importance of the Precinct

Sydney's International Precinct is a major driver of the NSW and national economy, with the busiest airport in Australia and the country's second largest container port. Together, these assets currently generate some \$10.5 billion of economic activity,<sup>5</sup> and handle close to \$100 billion worth of freight every year.<sup>6</sup> The Airport alone is estimated to contribute \$7.4 billion each year to NSW household incomes.<sup>7</sup>

Sydney Airport handles around 45 per cent of all international passengers in Australia - meaning that the Precinct is the major entry point to Australia for international travellers. It also handles 30 per cent of total Australian domestic passenger volumes.<sup>8</sup>

Port Botany is the State's major international gateway for container freight. Port Botany handles 95 per cent of NSW container trade, or roughly 30 per cent of all container trade in Australia.<sup>9</sup> Of this, 98.5 per cent of inbound containers are bound for the Sydney metropolitan area, whereas 38.5 per cent of outbound containers come from non-metropolitan areas,<sup>10</sup> making Port Botany a gateway to overseas markets for regional NSW.

The Precinct is also the largest jobs centre in Sydney after the CBD, with 65,000 workers there in 2006.<sup>11</sup> Activity generated by Sydney Airport contributes some 44,389 FTE jobs directly, and a further 75,774 FTE indirect jobs.<sup>12</sup> The NSW Metropolitan Plan 2036 estimated that by 2036

<sup>5</sup> URS Australia (2008), *Port Botany Supply Chain Efficiency*, presentation by Sydney Ports and [www.sydneyairport.com.au/corporate/about-us/economic-impact-report.aspx](http://www.sydneyairport.com.au/corporate/about-us/economic-impact-report.aspx).

<sup>6</sup> Gilfillan (2011)

<sup>7</sup> URS (2008), *Economic Impact of Growth at Sydney Airport*, prepared for SACL, 9 January.

<sup>8</sup> SACL (2009) Master Plan

<sup>9</sup> Lubulwa, G, Malarz, A & Wang, SP (2011), *An investigation of Best Practice Landside Efficiency at Australian Container Ports*, ATRF 2011 Proceedings; and [http://www.sydneyports.com.au/corporation/port\\_facilities/port\\_botany](http://www.sydneyports.com.au/corporation/port_facilities/port_botany)

<sup>10</sup> Gilfillan (2011)

<sup>11</sup> Xu, B., and Milthorpe, F. (2010), *Analysis of Journey to Work Patterns in Sydney*, Bureau of Transport Statistics, ATRF Proceedings, Sydney.

<sup>12</sup> URS (2008). *Economic Impact of Growth at Sydney Airport*.

Sydney Airport and its surrounds would generate an additional 18,000 jobs.<sup>13</sup> Over 5000 people are directly employed at Port Botany, with total direct and indirect employment of over 13,000<sup>14</sup>.

The Precinct is adjacent to other vital economic clusters, including the Sydney CBD and Randwick, which has one of Australia's main hospitals and one of its largest universities. It forms the southern end of the Global Economic Arc, NSW's primary economic cluster, that contains 40 per cent of the metropolitan region's jobs and stretches up to Macquarie Park in North West Sydney

Australian governments recognise the Precinct's strategic and economic contribution. Infrastructure Australia's 2011 Report to COAG identified landside connections to the Port and Airport as a nationally significant infrastructure issue. Likewise, a major reform program is underway in NSW to improve the supply chain operational response to container growth.<sup>15</sup>

While uncertainties in the macro economy may have short term impacts on volumes moving through the Precinct, economic activity will continue to grow strongly in the long run, and the Precinct will continue to be a significant driver of economic growth for New South Wales and Australia.

### Key Statistics

Each year, the Port and Airport generate \$10.5 billion of activity and handle \$100 billion of freight.

Each year, the Airport serves 35.6 million passengers, and the Port moves 1.8 million twenty foot equivalent units (TEUs) in trade.

Precinct is Sydney's 2<sup>nd</sup> largest jobs centre with 65,000 workers in 2006.

98.5% of all inbound containers are bound for Sydney's metropolitan area, but 38.5% of outbound containers originate in

## 3.2 Land Transport Network

The proximity of the airport, port, road, passenger and freight networks in the Precinct, and their co-dependence, are major competitive advantages for the Precinct and for NSW. Industries and businesses in the Precinct seek its relative economies of scale, activity clusters, lower freight costs and faster connections.

Sydney Airport handles more than 97,000 airline passengers each day, or 35.6 million passengers a year. Every day, some 16,000 airport workers travel to and from the airport site,<sup>16</sup> and tens of thousands of 'meeters and greeters' arrive at the airport. In total, some 100,000 trips are made to and from the airport every weekday, of which 85 per cent of journeys involve a car or taxi.<sup>17</sup> Public transport use to the airport is low by international standards despite its proximity to the CBD.

One kilometre away from the airport's runways, Port Botany moves more than 5000 containers on average every day. The Port currently has two Terminals operating, with two stevedores, and four landside rail operators. The Port expansion involves a new \$1 billion T3 (third) terminal which will be operational in early 2013.<sup>18</sup>

The Metropolitan Freight Network (MFN) is a dedicated 80 kilometre freight network that forms part of Sydney's metropolitan rail network. The MFN has dedicated freight connection from Port Botany to Chullora, Sydney's major domestic container terminal, and to Enfield, a major intermodal terminal under development. Elsewhere, freight and passenger trains share the same network.

The Precinct is the meeting point of key freeways, including the M4 and M5 East, whose combined catchment includes one-third of Sydney's population and half of Sydney's jobs. Much of the freight

<sup>13</sup> SACL Master Plan 2009

<sup>14</sup> Bureau of Transport Statistics NSW (2011)

<sup>15</sup> IPART (2008), *Reforming Port Botany's links with Inland Transport – Final Report*, March 2008

<sup>16</sup> <http://www.sydneyairport.com.au/corporate/community-environment-and-planning/ground-transport-information.aspx>

<sup>17</sup> Sydney Airport (2006), *Airport Ground Travel Plan*; SACL 2009 Master Plan.

<sup>18</sup> ACCC (2011), *Container Stevedoring Monitoring Report no.13 – October 2011*

leaving Port Botany travels by truck along the M5 East and the M5 West, bound for Sydney's west and south west.<sup>19</sup>

Connectivity between the Precinct and Western Sydney is poor. Some 48.7 per cent of all inbound containers are bound for the West and inner west of Sydney. For the share that travels by road, there is no direct motorway from the airport to the M4, relying instead on King Georges Road/Fairfield Road or the longer M7 route.

Each day, the M5 East carries over 100,000 vehicles including more than 8000 trucks.<sup>20</sup> Road congestion on the M5 East is amongst the worst in Australia. The most congested segment of the M5 is along Fairford Road to King Georges Road, which averages speeds of 22 km/h towards the city in the morning peak - one fifth of the speed limit - and 33 km/h heading out of the city in the evening peak, one third of the speed limit.<sup>21</sup>

Competition for land and infrastructure use is considerable in the Precinct. Major (non-freeway) roads through the Precinct such as Southern Cross Drive, Princes Highway, and Botany Road, have significant traffic flows comprising Airport users, commuters and business travellers. The nearby suburbs in south Sydney are marked by increasing residential and industrial density particularly in the business precincts of Green Square, Victoria Park, Cooks Cove, and the South-West Growth corridor.



Source: Transport for NSW

<sup>19</sup>ABS (2011), *Information Paper: Experimental Statistics on International Shipping Container Movements 2009-10*.

<sup>20</sup>Internal data supplied by Transport for NSW, *Classified Traffic Counts, NSW Port Botany Freight Data, BTS update, 2011*.

<sup>21</sup>Pages 42-48, Road and Traffic Authority (2010)

### 3.3 Current Infrastructure Proposals

A number of recent policy developments demonstrate the co-dependence of landside infrastructure in the Precinct. Most recent activity has focused on improving freight movements to and from the Port. In contrast, little has been done to increase road capacity or improve public transport in the Precinct (and particularly around the Airport) in recent years.

The Port expansion has created extra pressure on the capacity and efficient movement of vehicles along surrounding roads, as large volumes of materials were delivered to the site by heavy vehicles.

A Project Traffic Management Plan was put in place to manage a range of road impacts and upgrades, and to manage those roads particularly affected, including Foreshore Road, Botany Road, Penrhyn Road, the Inter-terminal Access Road and local access roads. In early 2011, a restriction was put on truck access to Botany Road, being redirected through the new Hale St.

In 2008, the NSW Government announced the Port Botany Landside Improvement Strategy (PBLIS) reforms process, with the regulation to be adopted in stages. This was developed from the findings of IPART's 2008 study, *Reforming Port Botany's Links with Inland Transport*. Sydney Ports has led the introduction of PBLIS, which was launched in late 2010.

There is also a patchwork of forward looking investment plans and proposals in the Precinct that are at varying levels of development and construction. A snapshot of these is in the text box above.

This investment 'pipeline' attests to the Precinct's ongoing importance. Further investment by the public and private sectors will be needed to address the demands placed on Precinct infrastructure over the longer term. A number of major projects that have been considered over many years are currently under review, including the M4 East Extension and widening of the M5 East.

In November 2011, the NSW Government announced that it would consider these options through the development of a detailed Port Botany - Sydney Airport Transport Improvement Plan, subject to co-funding from the Federal Government.

In 2011, Airport Link's station access fee was removed from Green Square and Mascot stations along the Airport line. This led to a rapid increase in rail patronage at those stations, and was followed by a new express bus service trial from Green Square Station to the University of NSW.

#### A Multibillion Dollar Investment Pipeline in the Precinct:

- ▶ Southern Sydney Freight Line (2013) to connect the Metropolitan Freight Network at Sefton Park to Glenlee and the freight corridor to Melbourne.
- ▶ Enfield intermodal facility (2013)<sup>1</sup> to increase NSW intermodal an additional 300,000 TEUs per year.
- ▶ The \$1 billion new Port Terminal T3 (2012), to add 1850 metres of quay line and five new shipping berths.
- ▶ Sydney Airport plans \$1.2 billion of investment over 20 years to terminals, hangars, freight facilities, and roads.<sup>1</sup>
- ▶ Negotiation to widen the M5 West from Camden Valley Way to King Georges Rd with Interlink.
- ▶ Proposed Moorebank and Eastern Creek Intermodal Terminals, each with capacity of 1 million TEUs per year.
- ▶ The South West Rail Link is under construction, to service Sydney's South West Growth Centre.
- ▶ Kingsgrove to Revesby Quadruplication is underway, to support more frequent train services to the airport.
- ▶ The Joint Study of Aviation Capacity in the Sydney Region is underway by NSW and Commonwealth Governments.

### 3.4 Governance in the Precinct

There is a tension between Precinct level planning and the diverse, overlapping governance arrangements in the Precinct. These arrangements are complex and dispersed, complicating infrastructure development and planning.

The Federal Government has responsibility for aviation regulation and airport planning, while NSW Government is responsible for surrounding land use planning. Both levels of government have interests in supporting land transport networks.

The Port is currently owned by the Sydney Ports Corporation, a NSW Government owned body, and a process has begun for a long term lease for its operation.

The Port's surrounding land transport network is governed by local councils, the NSW Department of Planning, Federal and State environmental agencies, and Federal and State rail agencies RailCorp and the ARTC. The Federal Government also has Customs and Defence related interests at ports.

There are several local councils with an interest in the Precinct - Botany Bay, Rockdale, Marrickville and Randwick Councils in the immediate vicinity of the international gateways, and others more broadly along the Precinct's connecting corridors.

Decentralised governance arrangements can lead to arguably sub-optimal land planning outcomes. For example there is a STA Bus Depot in Bumborah Rd located in the heart of the Port Precinct, which adds to non-port related traffic at the site.

It can also cause conflict over land and infrastructure use, such as noise, truck weights and traffic management around the Port. Scheduling and layovers parking has historically created disagreements over local amenity and congestion. And there are restrictions on heavy vehicle access in the corridor, particularly around Bunnerong Rd and Qantas Drive.

## 4. Problem Identification: The fruits of growth

This section examines current and future problems in the Port Botany - Sydney Airport Precinct. This is an important first step towards identifying potential solutions that better manage growth and improve productivity for the Precinct.

Demand for passenger and freight services into and out of NSW will grow rapidly over the next 20 years. Port Botany and Sydney Airport are best placed to accommodate this growth, since both have the capacity to grow volumes strongly, and both enjoy a strategic location at the heart of Australia's global city.

However, a failure to prepare for rapid growth and to plan efficient landside connections would hamper economic growth and productivity in NSW, and threaten the Precinct's international competitiveness and resilience.

Without action, freight and passenger journeys to and from the Precinct will lengthen, congestion worsen, productivity growth slow, and the port and airport become less capable of meeting daily demand.

Given the close proximity of infrastructure in the Precinct, there is modal contestability for many segments of market demand, making these problems highly interrelated. For example, low rates of public transport usage and a declining share of freight being transported by rail both contribute to increasing road congestion.

This report identifies four transport infrastructure and interface 'problems' in the Port Botany - Sydney Airport Precinct:

1. Capacity at the gateways to service a growing freight and passenger task
2. Current and growing road congestion throughout the area
3. Inadequate public transport services, particularly to and from the airport
4. Unreliable and Uncompetitive conditions for rail freight services to and from the Port

This report finds that common policy drivers underpin these problems, and affect their severity. For example, poor regulation or policies can cause underutilisation of the infrastructure network, the wrong price signals can promote inefficient investment or use, and poor governance drives piecemeal approaches to reform and infrastructure planning.

### 4.1 Capacity Constraints on International Gateways

#### Demand and Growth Forecasts

Over the next 20 years, demand for freight and aviation services in NSW will continue to grow rapidly. Governments will need to decide how best to accommodate this growth.

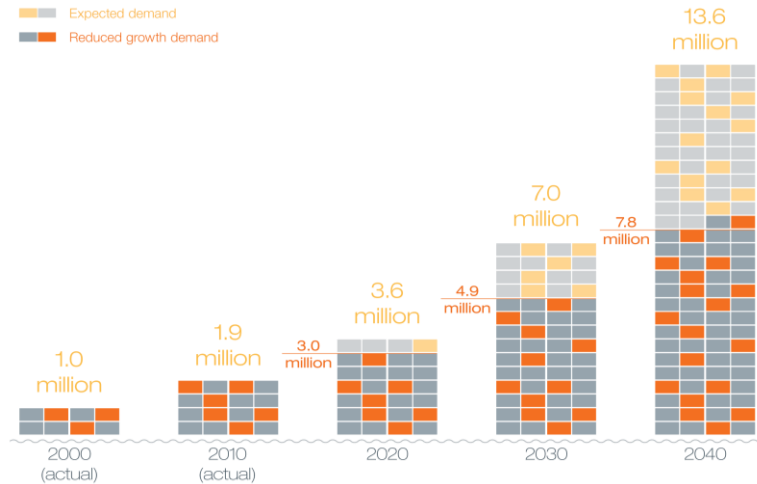
Container trade through Port Botany will nearly quadruple by 2030, reaching 7 million TEUs in 2030, up from 1.9 million TEUs in 2010. This represents a grow rate of 5 to 7 per cent each year for the next 20 years, consistent with the growth rate since containerised trade began in 1971 of 7.9 per cent.<sup>22</sup>

Air freight volumes, while much smaller than land container freight, are forecast to double from present levels to reach over 1 million tonnes per year by 2030.

<sup>22</sup> Sydney Ports Corporation (2011), Container Movement and Port Task Information. Unpublished Data  
Infrastructure NSW  
Port Botany - Sydney Airport Precinct Scoping Study



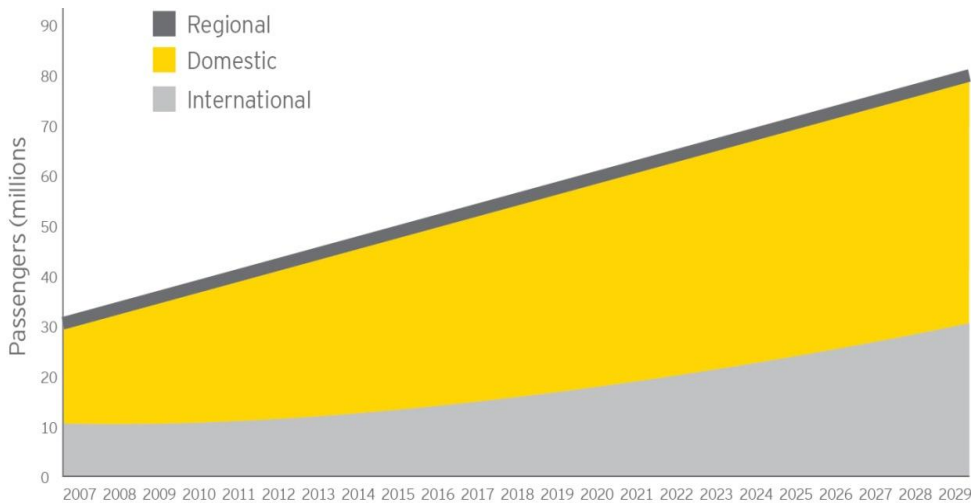
Figure 1: Container Trade Forecast



Source: Sydney Ports Corporation

Likewise, passenger volumes at Sydney Airport are set to more than double from present levels over the next 20 years. Sydney Airport forecasts that 79 million passengers will pass through the airport in 2029, up from 36 million in 2010, representing around 402,000 passenger aircraft movements.<sup>23</sup>

Figure 2: Airport Passenger Forecast 2009-2029



Source: SACL 2009 Master Plan

Forecasts are, of course, inherently uncertain. A small difference in compound annual growth rates makes an enormous difference over a 20 year period. However, evidence from the recent past suggests complacency would be misplaced. For example, when planning approval was given for the Port Botany Expansion in 2005, it was foreseen that the port's planning cap of 3.2 million TEUs would be reached in 2025. Sydney Port's most recent forecast is for 3.2 million TEUs to be reached by 2017.

While these levels of growth are challenging, both Port Botany and Sydney Airport argue that they have capacity to accommodate it without the need for significant infrastructure investment.

Sydney Ports estimates that once the third Terminal is opened, the Port could service 7 million TEUs per annum, based on available land area and berth length. Significantly improved

<sup>23</sup> pages 45 - 55, SACL 2009 Master Plan

productivity (the rate at which containers move from portside to landside) is needed to achieve this, as well as planning approval.

The 2009 Sydney Airport Master Plan indicates it has runway capacity to meet a doubling in passenger numbers. Upgrades are planned to 2029 to airport facilities including terminals, hangars, freight facilities, aircraft parking, and airport roads to support this.<sup>24</sup>

Optimising the supply chain into and out of Port Botany will require more modern, just in time systems, and the introduction of electronic supply chain technologies. All of these efficiencies involve decisions around how to assist the industry to transition, to support structural adjustment. Sydney Ports are leading the Port Botany Landside Improvement Strategy to drive productivity improvements around the port precinct.

Future growth could also be absorbed through investment in new port and airport capacity elsewhere in NSW. For example, the Federal and State Governments have been considering the issue of Sydney's long term aviation capacity and are due to report in early 2012. The previous State Government's ports policy, which dates from 2003, noted that the Port of Newcastle could be developed as a container port once capacity at Port Botany was exhausted.

However, over the next 20 years, Port Botany and Sydney Airport will remain the pre-eminent international gateways for NSW because they serve NSW's core market: Sydney, where two-thirds of the state's population live. In addition, the current lack of alternative capacity elsewhere and the long lead times for developing new capacity suggest that alternative sites cannot be relied upon in the short to medium term. Boosting the Precinct's performance is more efficient than seeking to redirect demand elsewhere.

## **Regulatory Constraints**

While Port Botany and Sydney Airport have the theoretical capacity to accommodate growth in the freight and aviation task, a number of regulatory and land use constraints limit their capacity.

Foremost amongst regulatory constraints is the planning approval limit under which Port Botany operates. This cap sets the maximum throughput capacity at 3.2 million TEUs per annum subject to environmental assessment and approval. Urgent consideration is needed to lifting this limit substantially if future demand is to be met at the Port. In the 2010 Metropolitan Plan, the previous State Government announced it would "review the current capacity limit of 3.2 million container movements through Port Botany and determine the need for additional capacity."<sup>25</sup>

With 3.2 million TEUs forecast to be met by 2017, time is pressing given the long lead times associated with major infrastructure planning consents. Lifting the planning cap will require evidence that the transport task created by the growth in freight demand can be accommodated (alongside other elements, such as environmental performance). Work that is underway by Transport for NSW to develop a State Ports policy and improve landside transport will be critical to demonstrating the Precinct's ability to meet this transport task.

At Sydney Airport, a number of regulatory constraints exist, including a flight cap of 80 movements per hour, operational curfews, fixed access arrangements for regional airlines, and a constrained footprint on the site.<sup>26</sup> Increasingly, congested aircraft scheduling reduces the resilience of the aviation network to shocks and adverse events. For example, bad weather causing flight capacity to reduce to 55 per hour during the morning would take the airport schedule three hours to recover in 2015, or five hours to recover by 2021.

---

<sup>24</sup> Pages 63-85, SACL 2009 Master Plan

<sup>25</sup> Page 154, Metropolitan Plan for Sydney 2036

<sup>26</sup> pages 27 -35, SACL 2009 Master Plan

## Land Use Constraints

Sydney's growing population will lead to pressure on surrounding land use and infrastructure development in the Precinct.<sup>27</sup> These pressures could limit the ability of the International Precinct, particularly the port, to effectively meet the freight and aviation task.

The expected growth in port throughput will lead to increased demand for land around the port, including for freight and stevedoring infrastructure such as large warehousing and distribution centres, container parks, intermodal terminals, and container processing, as well as space for high performance vehicles. Many of these things can and should be co-located at intermodal terminals, away from Port Botany, which is a long term objective of the 30 Port Plan.

More intense port activity will also require larger buffers to check encroachment on the port. Currently there is a State Significant port zone around Port Botany, but there has been some instances where land has been rezoned for non port purposes.

Particularly as the supply chain moves towards 24/7 operations, adequate buffer zones will be required not just behind the Port estate but along key freight rail and road routes such as Foreshore Road and the rail corridor. This may at times conflict with urban planning objectives to encourage densification along public transport corridors.

At the same time, there will be increasing urban and industrial density in the Precinct, with an additional 480,000 people expected to live in the Precinct by 2036, or an extra 377,000 commuters,<sup>28</sup> and with new business precincts developing in once industrial spaces. Community resistance may centre on heavy vehicles on public roads or noise and air quality impacts,<sup>29</sup> such as concern about the noise impacts of increased air traffic.

Preserving corridors and buffer zones will mean some tough decisions to prevent residential and sensitive uses development and to limit densification on what is valuable land close to the city. However, to fail to do so would mean that critical infrastructure in the Precinct in the long term cannot operate efficiently.

Therefore, poor alignment between planning and infrastructure objectives can cause urban encroachment on the port and threaten to constrain growth and expansion long term. Consideration through State planning processes will need to manage competing demands between industrial and residential usage so as not to adversely affect NSW's economy.

Ensuring the most effective use of surrounding port land will be critical. A concrete example of this is the co-location at the port of the STA Bus Depot. This is unlikely in the long term to be sustainable. Locating the bus depot so close to the port is arguably not an efficient use of valuable port land and is a major contributor for additional traffic.

## 4.2 Current and Growing Road Congestion in the Precinct

The Precinct is home to four of Sydney's five most congested roads. Congestion is no longer a peak-only phenomenon, with congestion lasting over 13 hours each day on three of these routes. Congestion across the Precinct and beyond is the visible result of high, sustained levels of demand for road space from both passenger and commercial vehicles.

While the problem of congestion is often blamed on freight travel, particularly to and from the Port, the reality is that less than 10 per cent of road trips around the Precinct are freight related. Freight travel is, however growing faster than general travel. Morning peak freight trips on the key

---

<sup>27</sup> P69, Road and Traffic Authority (2010).

<sup>28</sup> NSW Bureau of Transport Statistics (2011), *Container Movement and Port Task Information*, unpublished data.

<sup>29</sup> NSW Transport - Stakeholder Workshop - Sydney CBD to Sydney Airport/Port Botany. *Stakeholder Engagement - Port Botany*

artery, the M5, are forecast to double by 2031,<sup>30</sup> while general traffic is forecast to grow around 80 per cent over the same period.

High rates of private vehicle use for commuting on the key corridors around this Precinct and travelling to the airport are key factors driving road congestion, although road freight can magnify congestion more than actual volumes would suggest.

The critical problem is “coinciding demand”, where passenger journeys to and from the airport, freight journeys to and from the port and educational and employment trips around the Precinct happen at broadly the same time of day.

**Table 1: Congestion on Sydney's Roads**

Corridor (bold – within Precinct)	Section	Total Duration of Congestion (Hours)	Total Freight Trips per Section per Lane
Eastern Distributor (M1)	Eastern Distributor (M1)	13.5	773.8
M5 East Motorway	M5 East Motorway	13.3	2224.1
Western Motorway (M4)	Concord to Lapstone	13.0	2833.2
General Holmes Drive and Southern Cross Drive	SCD Link Rd Zetland to GHD the Grand Parade	11.0	1185.7
South Western Motorway (M5)	South Western Motorway (M5)	10.0	1053.4
Hills Motorway (M2)	Hills Motorway (M2)	9.9	1160.4
Sydney Harbour Tunnel	Sydney Harbour Tunnel	8.6	435.1
Westlink Motorway (M7)	Westlink Motorway (M7)	7.8	1829.6
Lane Cove Tunnel	Lane Cove Tunnel	7.5	356.0
Hume Highway (F5)	Prestons to Belanglo	6.3	1095.3
Sydney to Newcastle Freeway (F3)	Wahroonga to Somersby Interchange	2.9	434.6

Source: Infrastructure Australia

## Private Vehicle Use

Private vehicle use for commuting, airport related travel and other purposes, is high across the Precinct and its connecting corridors.

Airport-related traffic is a significant factor in generating congestion around this precinct. Some 85 per cent of air passengers and those who meet them travel to and from the airport by private vehicle or taxi - a high modal share for road travel by international standards.<sup>31</sup> Almost 80 per cent of employees at the airport travel to work by car.<sup>32</sup>

Half the traffic on Qantas Drive, which joins the international and domestic airport terminals, is non-airport commuter traffic.<sup>33</sup> Traffic modelling indicates 65 per cent of travel on the M5 East is for commuting travel to areas around the port and airport - to employers such as freight distribution centres, airport retailers, hotels, and Government agencies.

<sup>30</sup> Page 27, M5 Transport Corridor Study, Preliminary Overview Report, 2009

<sup>31</sup> [www.sydneyairport.com.au/corporate/community-environment-and-planning/~media/Files/Corporate/GrndTrnsprtTravelPlan/Travelplan.ashx](http://www.sydneyairport.com.au/corporate/community-environment-and-planning/~media/Files/Corporate/GrndTrnsprtTravelPlan/Travelplan.ashx)

<sup>32</sup> Sydney Airport, Ground Travel Plan (2006)

<sup>33</sup> Productivity Commission (2011), Draft report on *Economic Regulation of Airports in Australia*.

Table 2: Destination of trips made by M5 Users

	Driver trips using the M5		
	All day	Total Duration of Congestion (Hours)	Total Freight Trips per Section per Lane
Fairfield-Liverpool	19.8%	23.0%	20.3%
Canterbury-Bankstown	17.3%	19.4%	17.3%
Outer South Western Sydney	16.3%	11.7%	16.8%
Inner Sydney	13.9%	16.0%	12.8%
St George-Sutherland	12.6%	8.9%	13.1%
Eastern Suburbs	5.8%	4.6%	6.0%
Central Western Sydney	3.3%	4.8%	3.4%
Blacktown	2.3%	2.1%	2.9%
Other	8.7%	9.5%	7.4%
	100%	100%	100%

Source: Household Travel Survey - 5 years 05/06 to 09/10

This traffic growth is symptomatic of rising commuter car travel across Sydney, where the number of private car users travelling to work is growing at a rate almost three times that of public transport users.<sup>34</sup>

Even so, the proportion of people travelling to work by private vehicle in this precinct is still high relative to Sydney as a whole. One factor in this is the M5 Cashback scheme, introduced in 1997, that reimburses private motorists for the toll, removing a key demand management tool on the motorway. Another, as discussed below, is inadequate public transport from these regions.

## Road Freight

Road freight has grown rapidly in recent years. It has picked up almost all the growth in freight volumes, increasing 2.5 times, as rail modal share has dropped from 25 per cent in 2000-01 to 14 per cent in 2010-11.

However, while road congestion is increasing, the numbers of vehicles accessing the port are a relatively small share of overall traffic. There are around 1,700 daily truck arrivals at the two stevedores.<sup>35</sup> Along the M5, truck traffic represents 8 per cent of daily eastbound traffic and 7 per cent of westbound traffic.<sup>36</sup> A number plate survey conducted in June this year found that only 1.8 per cent of all M5 East east- and west-bound traffic goes directly to Port Botany.<sup>37</sup>

Therefore, as a share of the total transport task, road freight is a contributor, but is not the primary cause of congestion in the Precinct. While there is a benefit to the community from removing trucks from the road in terms of safety and amenity, it should not be assumed that the solution to road congestion in the Precinct is simply moving freight volumes from road to rail.

Nonetheless, the rate of growth in road freight is forecast to be rapid. Even with the Government meeting its target to double current rail share by 2021, truck traffic from the port is forecast to grow 60 per cent over the next decade and to triple by 2030.

Without intervention, this growth will further erode reliability on the M5 East, the road used by most trucks to and from Port Botany, and on connecting arterial and minor roads ill-suited to heavy vehicle use. The impacts caused by trucks on arterial and minor roads can be disproportionate to their numbers. For example, the right turn onto O'Riordan Street from Joyce Drive can be backed up with trucks already at present, interfering with wider traffic flows at peak hours.

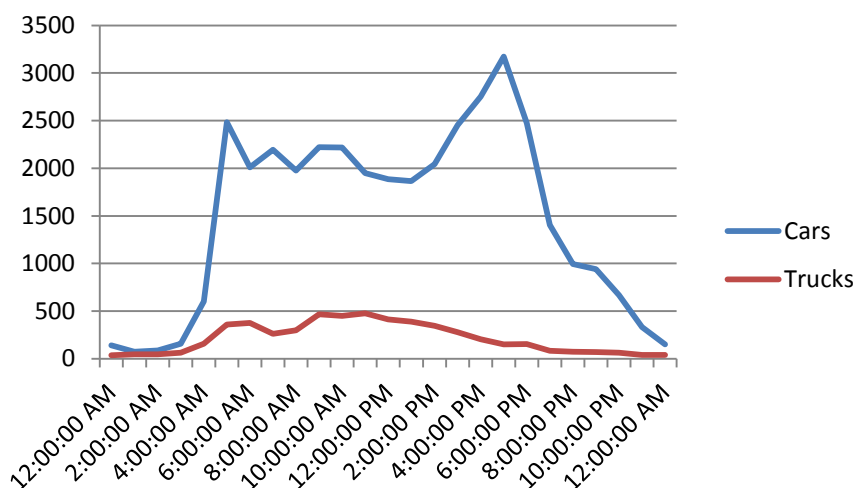
<sup>34</sup> Xu & Milthorpe (2010). Data shows a 43% growth rate for car travel to work versus 15% growth for public transport.

<sup>35</sup> NSW Urban Road Freight Movements Dataset, 2006 data, TfNSW internal data. NSW Freight Evidence Base BTS Update, and TfNSW, *Port Botany Freight Data*, internal data.

<sup>36</sup> TfNSW, *Port Botany Freight Data*, internal data.

<sup>37</sup> Provided by RMS informally.

Figure 2: M5 Daily Traffic



### Coinciding Demand

The challenge for roads is that peak travel demand by the various road users tend to coincide. Road freight largely travels at the same times as other traffic and airport-related traffic coincides with commuter traffic. This phenomenon exacerbates congestion on already crowded roads.

The reasons for this “coinciding demand” are complex, but include:

- ▶ International flights arriving at Sydney Airport disproportionately arrive during the AM peak due to flight curfews where they originate in Europe. These flights generate a high proportion of “meeters and greeters” traffic;
- ▶ Domestic air travel is dominated during the week by business travel which is concentrated at each end of the business day. Roughly 70 per cent of airport travellers during the morning and afternoon peak are business travellers; and
- ▶ End destinations for road freight originating at the Port work largely office/retail hours. Even though Port Botany and stevedores now operate 24 hours a day (24/7), the rest of the supply chain still does not.

This last point is worth examining in more detail, because it has wider implications for the productivity of the whole supply chain. In addition, it may be easier to influence freight travel times than general transportation.

Freight carriers, empty container parks and Beneficial Cargo Operators (BCOs) do not open at all times to collect freight travelling from the Port. BCOs mostly open from 6am to 3pm, and empty container parks do not open in off-peak periods. Only a couple of distribution centres are open 24/7. The industrial products sector centres tend to open between 6am and 10pm (5 to 7 days a week), and mid size businesses tend to open between 7am and 7pm (5 or 6 days a week).

There is poor demand by freight carriers for off-peak time slots offered by stevedores. The data shows only 11 per cent of demand is for slots offered by stevedores between 12am and 4am.<sup>38</sup> Twice the share of road freight is moved at night in the UK than in Australia.<sup>39</sup>

There are several reasons why this is the case in Sydney. One reason is that road transporters lack the commercial incentives to collect freight off-peak if end customers are not open to drop and

<sup>38</sup> TfNSW internal data, *Port Botany Truck Trip Arrivals and Processed Containers by Hour of Day, 28 February - 28 August 2011 in NSW Port Botany Freight Data BTS Update.*

<sup>39</sup> McKinnon A.C. and Piecyk M. I. (2009) 'Logistics 2050: Moving Freight by Road in a very Low Carbon World.'

drive at marshalling points or to receive or despatch containers at night or on weekends - and if they then have to pay for additional overnight storage costs and staff costs.

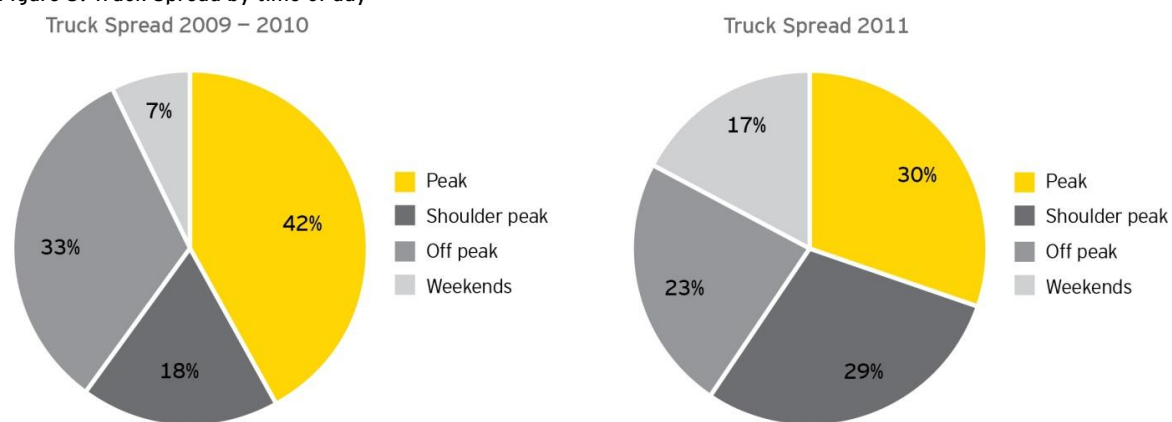
One factor driving why the rest of the supply chain does not operate 24/7 is that volumes are highly dispersed among many players at these points in the supply chain. The result is that there are not sufficiently high volumes to sustain longer operating hours, given the additional costs of afternoon, night and weekend shifts. The combined result of these factors is a higher marginal cost per carton at Port Botany to operate out of normal business hours. These factors are specific to the Australian market when compared to high volume ports overseas.

This has productivity costs for the whole network: congestion during peaks, underutilisation in off-peak periods, and costs associated with unnecessary delay and disruption, such as where a road transporter does not deliver an empty container before the container park closes and incurs overnight storage costs.

Prices and regulation must play a role in addressing the mismatch in operational incentives that occurs throughout the supply chain. From the road transporters' perspective, there are higher costs to operating at night and it is more efficient to use the port facilities during the day. From the stevedores' perspective, it is most efficient if the facilities are used around the clock. From a supply chain perspective, having all stakeholders operating longer hours will smooth use of the port, and be more efficient overall. From the perspective of other transport users, moving truck journeys outside the working day will improve their travel experience.

Promisingly, the Port Botany Landside Improvement program has had some initial success in spreading truck patterns more evenly. In 2010, 75 per cent of all movements were undertaken in the peak and peak shoulder periods of the day (6am to 10pm, Monday-Friday). By February 2011, this had dropped to 59 per cent.<sup>40</sup> More needs to be done, however, to address this problem.

Figure 3: Truck Spread by time of day



(SPC, Port Botany Supply Chain Efficiency presentation)

## Connectivity

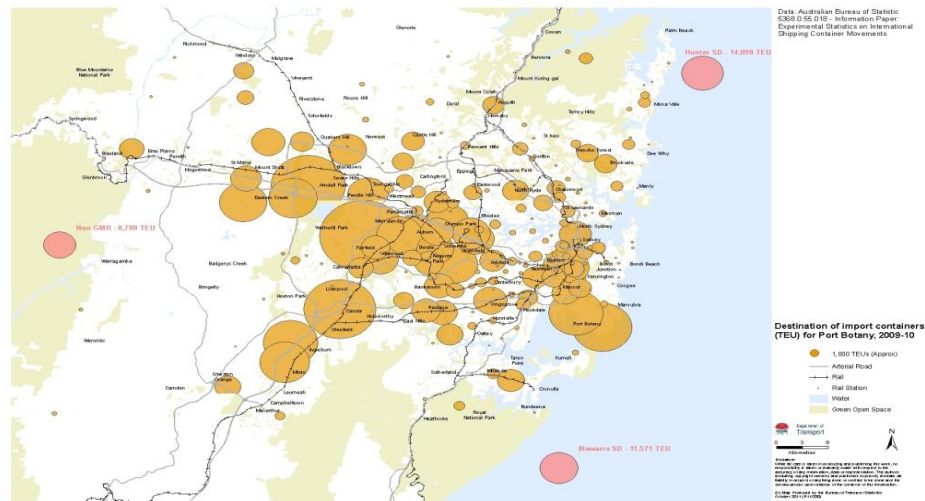
There are additional connectivity issues in the Precinct which worsen road congestion and increase journey times to some destinations significantly.

The absence of a direct motorway connection between the port/airport and Western Sydney has implications for airline passengers from inner West and Western Sydney, although they form a relatively low share of air travellers (11%).<sup>41</sup>

<sup>40</sup> Gunn & Noon (2011).

<sup>41</sup> Sydney Airport Transport Plan (2006)

Figure 4: Distribution of import containers across New South Wales.



Source: Transport for NSW

The more significant implications are for freight vehicles, which have to access the M4 via King Georges Road/Fairfield Road - aging arterial roads ill-suited to sustained heavy vehicle traffic - or by the much longer M7 route. This is a key issue for the distribution of Port Botany containers as a significant majority are destined for locations along the M4 corridor, as the map below indicates.

Other network access constraints between the Precinct and Western Sydney restrict the operation of higher productivity vehicles in terms of their height, length and/or mass. Addressing these constraints would increase productivity and reduce congestion by allowing a greater volume of goods to be moved in fewer trips.

There are also a series of traffic 'pinch points' within the Precinct that lower the productivity of the entire road network, such as the at grade rail level crossing over General Holmes Drive which causes traffic to bank along General Homes Drive/Botany Road.

### Road Planning in the Precinct

A number of factors have limited moves to address the congestion problems in this Precinct.

A key capability 'gap' in agencies' strategic planning is that the NSW Roads and Maritime Services (RMS) cannot assess the potential impacts of small road works on traffic around this Precinct and on its connecting corridors.

Currently there is no mid-level modelling capability that measures traffic impacts, and current low-level modelling cannot manage the traffic volumes being considered. This means that agencies cannot effectively target pinch points on the road network, to improve flows and congestion around the airport or port. They also cannot provide early network performance information on the impacts of short term road works.

### Key pinch points and freight restriction issues:

- High grade exit ramps slowing trucks down on M5E
- Bourke Road capacity
- General Holmes Drive level rail crossing
- Heavy vehicle and height restrictions on Airport Drive
- Foreshore Road-General Holmes Drive intersection
- Height restrictions on Southern Cross Drive, M5 East main tunnel and Cooks River tunnel, and Airport Tunnel.
- Dangerous goods prohibited in all tunnels
- Monthly maintenance on M5 East prevents high performance vehicles operating in off-peak.
- High volume restrictions on bridges on M4, Marsh St, and rail line at Sydenham.



Another hindrance to effective congestion management has been navigating competing interests across the State Government, local councils, Sydney Ports, SACL, and the RMS. In particular, efforts to secure cooperation over land use around the airport for road works have been slow and will require effective coordination and governance to balance the interests of all parties.

### Long Term Capacity

Whilst there are measures that can be taken to spread peak travel around the day, over the longer term, pressure for additional road capacity will continue to grow.

Future growth requirements need to be considered in the context of longer term increases in population and car ownership:

- Sydney continues to see net migration with year-on-year population growth of 1.3% (FN1).<sup>42</sup>
- Vehicle registrations are growing nationally faster than population. In 2009, there were 720 vehicles for 1000 Australian residents, from 674 in 2004.<sup>43</sup>

Relative to similar roads in Melbourne and Brisbane, and to other major roads in Sydney, the M5 struggles with high traffic densities with the highest average number of vehicles per lane.

Table 3: Comparison of Sydney Roads by Average Number of Vehicles per Lane

	AADT	No. lanes	Avg Vehicles/lane
M2	103,000	4 and 6	17167
Sydney Harbour Bridge	161,000	8	20125
Sydney Harbour Tunnel	80,000	4	20000
Eastern Distributor	115,000	4 and 6	19167
Southern Cross Drive	130,000	6	21667
M5 East	103,000	4	25750
M5	95,000	4	23750
M7	90,000	4	22500
M4	105,000	6	17500
F3	75,000	6	12500

The NSW Government proposes an expansion of the M5 West Motorway from Beverly Hills to Arncliffe. Other projects that have been developed (currently under review) to improve road capacity and connectivity in the Precinct include the duplication of the M5 East Freeway to provide four lanes in each direction, and the M4 motorway extension project which would extend the motorway from North Strathfield to the western end of Sydney's CBD and near to the airport.

Large scale capital projects are facilitators of the city's long term growth prospects. It is unlikely that the transport task generated by this Precinct can be accommodated over the long term without investment in new motorway capacity.

### 4.3 Inadequate Public Transport Provision

The Precinct faces a complex passenger transport task - with workers travelling to and from the port and airport, 'meeters and greeters' at the airport, business travellers, leisure travellers, and commuters passing through the Precinct on their way to the CBD or to the north or east of the city.

A major contributing factor to the widespread road congestion set out above is the low level of public transport usage in this Precinct. Currently only 10 per cent of commuters living in the Botany Bay area use rail to travel to work<sup>44</sup> and only 15 per cent of travel to and from the airport is

<sup>42</sup> [www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features10Jun+2010](http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4102.0Main+Features10Jun+2010)

<sup>43</sup> [www.goauto.com.au/mellor/mellor.nsf/story2/68BDBD4C65FBFC15CA25767D007E39DD](http://www.goauto.com.au/mellor/mellor.nsf/story2/68BDBD4C65FBFC15CA25767D007E39DD)

<sup>44</sup> 2010 Compendium of RailCorp Travel Statistics

by rail or bus.<sup>45</sup> This compares poorly to average public transport use by Sydney commuters of around 24 per cent.<sup>46</sup>

As a comparison, 40.4 per cent of passengers to Heathrow airport in 2008 caught public transport. The airport is on track to lift public transport patronage to 45 per cent by 2013. Airport employees have access to subsidised rail and local bus journeys, prioritised car parking for car sharers, incentives for cycle purchase, and a free travel zone around Heathrow.<sup>47</sup>

If 40 per cent of journeys to Sydney Airport were made by public transport, there would be around 25,000 fewer people travelling on the roads around the International Precinct every day, significantly reducing road congestion in the area.

The primary cause for public transport's low modal share appears to be the lack of adequate and well-priced bus and rail services for commuters and travellers travelling accessing the Precinct. Public transport is not a competitive or attractive alternative to car use in this part of Sydney.

### Access and Service Levels

There is only one bus route to the Airport, the 400 bus route, and one passenger rail line. This means that for the vast majority of travellers to and from the airport, public transport requires multiple connections and is inconvenient.

The 400 bus service, the only route stopping at the Airport terminals, does not travel to the CBD. Several other bus services pass near the Airport but do not stop, for example the 410, M20 and M30. The 410 service stops at the Qantas jet base, not the airport. The M20 terminates at the Mascot shops, 1 kilometre from the domestic terminal. And the M30 terminates at Sydenham, 2 kilometres from the international terminal.

By comparison to other regions in the Sydney Metropolitan area, this is a poor bus service offering.<sup>48</sup> For example, North Sydney has 49,000 employees commuting there every day, and 62 bus routes to the region. Sydney Airport has some 140,000 people travelling there every day - nearly three times the number of people - and one bus route.

Airport bus service levels are also far below those offered at comparable international airports.<sup>49</sup>

Table 4: International Comparison of Bus Routes to/from Airports

Airport	Patronage	Number of Bus Services
Sydney	12,000 on-airport workers 97,400 passengers per day	1 bus route
London Heathrow	72,000 on-airport workers 183,000 passengers a day	29 bus routes
Manchester Airport	19,000 on-airport workers 60,000 passengers per day	8 bus routes

Airport passengers and workers therefore have limited public transport options. Some 34 per cent of employees at Sydney Airport live in the St George, Southern Illawarra region, and do not have rail or bus access to the airport precinct. A bus route proposal from the St George area was proposed by the 2004 Unsworth Review but not implemented. Employees and passengers travelling from inner and mid west Sydney to the Airport also have few public transport options.

<sup>45</sup> Sydney Airport Master Plan 2009

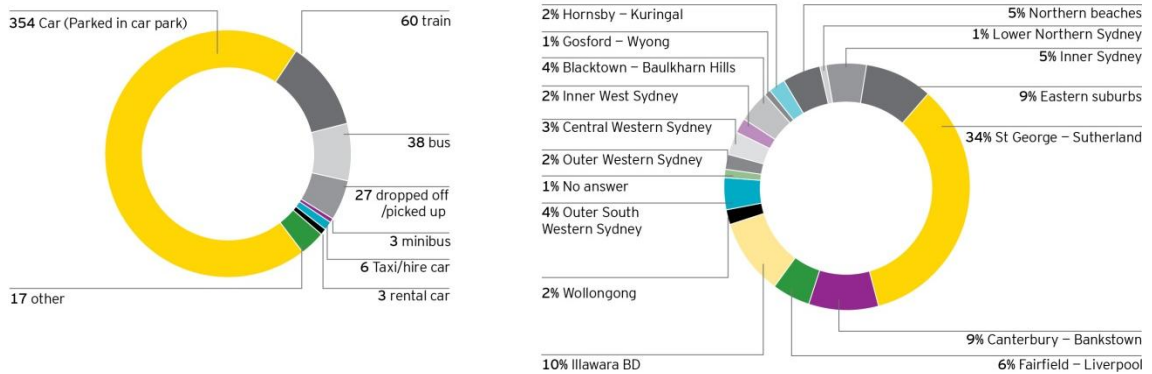
<sup>46</sup> Xu, M, Milthorpe, F., & Tsang, K. (2011), *Detailed Analysis of the Travel Patterns of Rail Users in Sydney*, Bureau of Transport Statistics, ATRF Proceedings, Sydney.

<sup>47</sup> BAA(2008), Corporate Responsibility Report 2008

<sup>48</sup> Sydney Airport Corporation submission to the Transport Blueprint for NSW, September 2009

<sup>49</sup> SACL, prepared by Booz (2011), *Economic Regulation of Airport Services, Submission to the Productivity Commission Inquiry*, 8 April 2011.

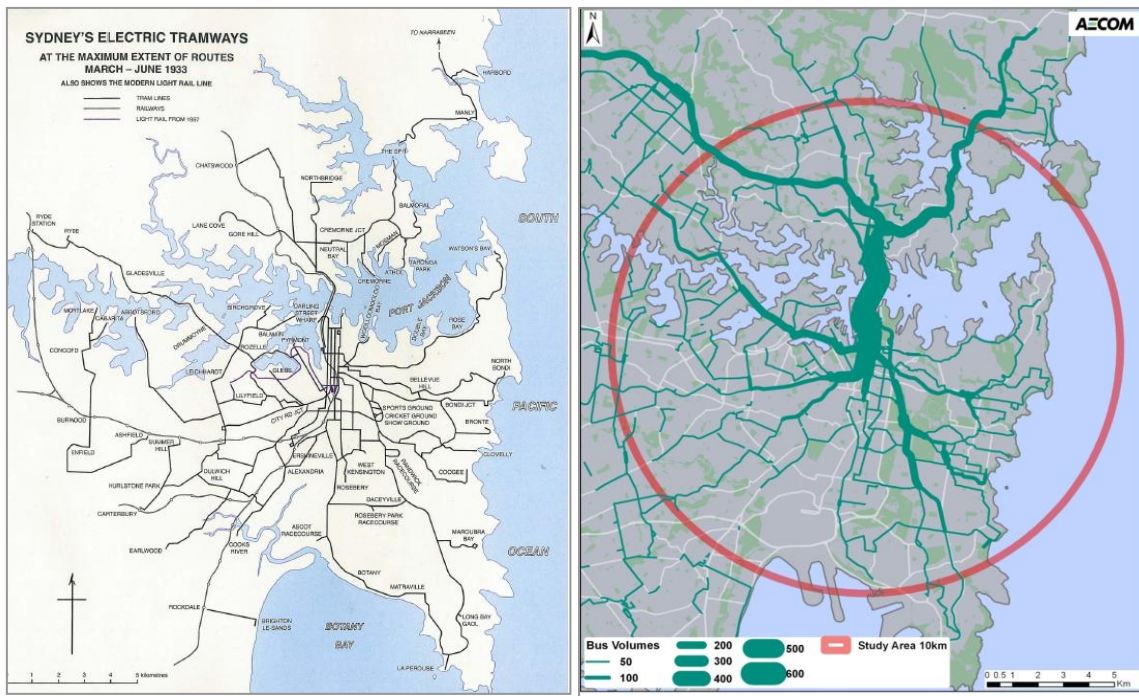
Figure 5: Sydney Airport employee mode travel and origin/destination



Source: 2009 Sydney Airport Master Plan

More broadly, there is a lack of bus services from the east to west of Sydney. Poor public transport connections between the east and west of Sydney may be a key factor in road congestion through the Precinct. Today's bus map shows that little has changed since the 1930s in terms of Sydney's radial transport network, which is still largely focused on moving people into and out of the city rather than between non-CBD centres.

Figure 6: Historical Map of Sydney's Tram Network versus Map of Sydney Bus Routes in 2011



Source: Infrastructure NSW

Bus services in the Precinct are slow and can be unreliable. While the Sydney rail network prioritises passenger trains during peak times, road infrastructure around the Precinct does not. There are no bus lanes or priority bus signalers on the M5 or on the roads around the airport. There are also few incentives to reduce private vehicle use, such as HOV/HOT lanes. Anecdotally, the 400 service from Bondi Junction can take 90 minutes in peak periods for a journey of 17km.

### Passenger Rail

The Airport Link service is a non-dedicated rail line that is part of the East Hills Airport service on the CityRail network. The service is a partnership between the private sector and RailCorp. Under the arrangements, RailCorp provides the rolling stock and services<sup>50</sup> and the private provider owns

<sup>50</sup> Airport Link submission to Productivity Commission Inquiry into the economic regulation of Airport Services.

and operates the train stations and markets the service. The timetable provides 8 trains in each direction per hour during peaks, with gaps between trains ranging between 3 and 12 minutes.

While the service is the same as ordinary CityRail services, it charges a premium ticket price. The fare structure for passengers using the terminal stations incorporates a station access charge applied by the Sydney Airport Rail Link Company under the concession agreement of \$11.80 per adult on top of the standard fare of \$3.20.

For a 6.7 kilometre train trip to the domestic airport, a passenger pays \$15 (single) or \$23 (return). This compares with the equivalent distance on the normal CityRail service of \$3.20 (single) or \$4.40 (return).

The resulting fare is relatively high, especially for airport workers, and encourages substitution with car travel. Previous experience suggests that removing the access fee would increase patronage growth. When this was done at Mascot and Green Square stations, it led to a 50 to 70 per cent increase in passengers through those stations.<sup>51</sup>

As a comparison, two travellers going from Town Hall to Sydney airport together would pay around the same for a taxi as for the train, and would arrive at roughly the same time either way, making the convenience of a taxi more attractive. Two travellers heading to Paris' Charles de Gaulle Airport together would pay (combined) less than a third the amount to take a train than a taxi, and would arrive in half the time.

**Table 5: Comparison of Rail and Taxi Service Provision**

Airport	Rail			Taxi			
	Trip time	Fare	Frequency	Mode	Trip time	Fare	Frequency
Sydney (Airport Link)	11 minutes to Central, 26 minutes to Town Hall	\$15 per person	Typically every 10 minutes	Taxi	30-45 minutes	\$30-\$40 per cab	On demand
London (Heathrow Express)	15 minutes to Paddington (Heathrow Express)	£17.50 per person	Every 15 minutes	Taxi	1 hour	£50 per cab	On demand
Paris (Charles De Gaulle)	30 minutes to Gare du Nord	8.00€ per person	Every 4-15 minutes	Taxi	50-60 minutes	50.00€ per cab	On demand
Chicago (O'Hare)	40 minutes	US\$2.50 per person	Every 7-10 minutes	Taxi	Variable	US\$40 per cab minimum	On demand
Tokyo (Narita Express)	55 minutes to Tokyo Station	¥2,940 per person	Every 30 minutes	Taxi	90 minutes	¥17000-19000 per cab	On demand

The Airport Line remains underutilised with train path utilisation is reportedly at 70 per cent, which is low by CityRail standards.<sup>52</sup> The challenge for public transport in the Precinct is therefore to address areas of underutilisation.

Passenger rail services also have amenity issues that discourage public transport use to the airport. The trains on the Airport Line are not equipped with luggage racks or other airport passenger fittings, and signage around the airport to the train station is poor. The availability of services, and seats on services, particularly in peak times, can also be an issue. In addition, customers perceive trains to travel the wrong way around the city circle (via Museum), adding to journey time.

More broadly, passenger rail usage is affected by the differences between road and rail pricing. Road passenger transport along the M5 corridor is effectively untolled since the introduction of the Cashback scheme in 1997. The absence of tolling on this corridor impacts on the patronage of the

<sup>51</sup> SMH, *Ticket sales rocket on airport line as prices plunge* (9 June 2011)

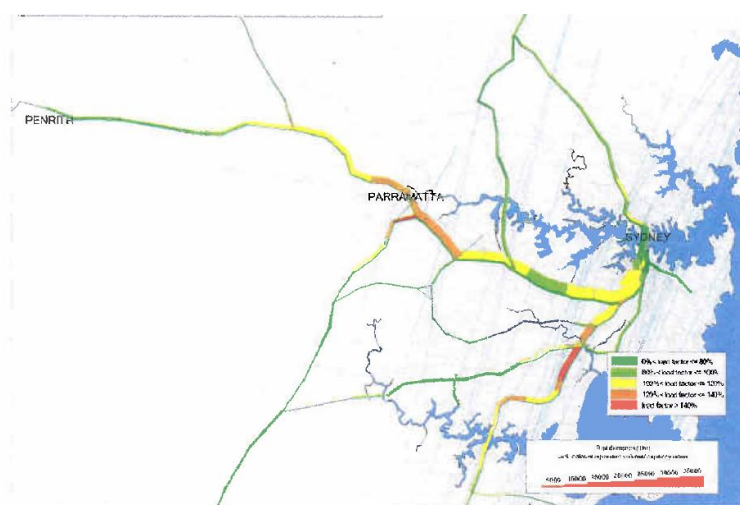
<sup>52</sup> Consultations with Transport for NSW. Sydney's rail network is based on almost all services travelling through the CBD, making the CBD the bottleneck. The Airport line joins into the one part of the CityRail network in the CBD that is not running near capacity. This is the City Inner (from Central via Museum and St James) which is currently at only 70 per cent of capacity.

East Hills Line. The opening of the M5 East, in 2001, reduced patronage on the line by 13 per cent or almost 100,000 journeys per day<sup>53</sup>. The average load factor of East Hills services during the morning peak remains 10 per cent lower than the average for the CityRail network<sup>54</sup>.

While there is capacity on the East Hills - Airport Line, overcrowding for the lines coming from Southern Sydney to the CBD is currently second only to the Western approaches from Parramatta to the CBD (see map below). These lines, whilst not directly affecting many of the Precinct's transport issues, do form the best, albeit indirect, public transport route into the precinct from southern Sydney for Precinct workers and other travellers and are therefore relevant.

Additional or dedicated passenger rail services from Southern Sydney to the Precinct have to date been hampered by small scale network constraints, including the lack of a turnback that could be used either at Wollie Creek or Revesby to reduce service congestion along the line.

Figure 7: Rail Load Factors 2006 AM Peak - Volume/Seat Capacity



## Airport Link Contract

The pricing and access issues discussed above for passenger rail and bus travel to Sydney Airport stem in large part from the Airport Link contract, the original Stations Agreement - New Southern Railway. The Airport Link contract is in place until 2030.

The Productivity Commission, in its draft report on the economic regulation of Australia's airports in 2011 argued that anti-competitive provisions in the contract are a key reason for insufficient mass transit options to Sydney Airport.<sup>55</sup>

Under the terms agreed in the original contract, and retained in the 2005 Restated Stations Agreement, the NSW Government is liable to compensate Airport Link Company (ALC) for any material changes to the timing and level of Airport Link revenues, for 'events' that discriminate against the ALC, or for changes that impact the reliability of the RailCorp network.<sup>56</sup>

These provisions are seen by agencies to preclude measures that improve public transport services to the airport because they might 'compete' with Airport Link, that is, there can be no additional bus routes to the airport or more intensive scheduling of rail services until the end of the concession period without public compensation.

In 2011, the station access fee was removed for Green Square and Mascot stations, under an arrangement whereby NSW Government paid the fee on behalf of station users, less an adjustment

<sup>53</sup> Sydney Morning Herald, *Motorway Takes it Toll on Rail Trips*, April 2, 2003

<sup>54</sup> Railcorp, *Review of Peak Train Loads*. 2007 data

<sup>55</sup> Productivity Commission 2011, *Draft report on Economic Regulation of Airports in Australia*.p266

<sup>56</sup> Sections 4.1 and 4.2

for increased patronage. The result was a 50 to 70 per cent increase in patronage - demonstrating a higher price elasticity than expected for travellers to these stations.

Consultation with NSW Government agencies indicates that to date, there seems to have been little examination of the economic or financial case for reopening contract negotiations to improve a bundle of public transport services - rail and bus - and to relieve congestion around the airport.

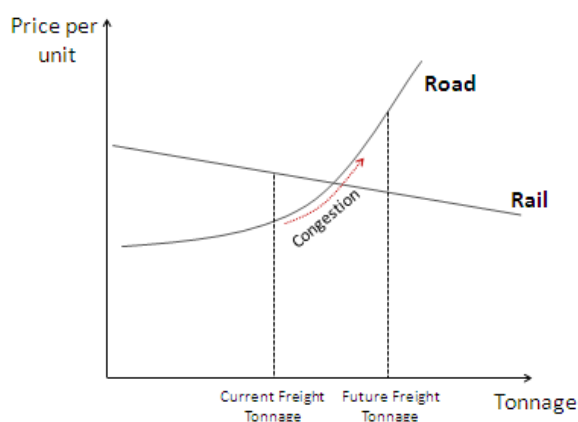
It also appears there has also been limited internal assessment of the legal limits of this contract. For example, it is not clear if services that are not directly competing would require compensation. Longer term, the Government may need to consider a wide range of options for managing this constraint on public transport provision.

## 4.4 Unreliable and Uncompetitive conditions for Rail Freight

Rail will need to play a bigger role in the transport task as freight volumes increase. At the current 14 per cent rail share, the expected demand of 7 million TEUs at the Port by 2030 would significantly worsen congestion around the Precinct. Better use of the rail network will place less traffic strain on the Precinct's road network, without significant new expenditure.

While growing volumes raise capacity problems for roads and increase congestion costs, growing volumes on rail offer a cost advantage to be exploited as economies are achieved. On Port Botany's rail assets, volumes do present challenges around coordination and capacity, but also offer opportunities for better use of the rail network, such as enabling dedicated train loads that go to one stevedore and do not require time consuming 'splitting' operations across two stevedores.

Figure 8: Theoretical marginal cost curve for road versus rail.



Arguably, most attention has focused on lifting rail share by boosting rail supply capacity, without a similar level of focus on demand generators. This can be traced back to at least the 2005 report of the Freight Infrastructure Advisory Board, which recommended that the then 40 per cent rail share target be met through additional intermodal terminal capacity, without adequately assessing the factors that drove freight users to travel by road.<sup>57</sup>

A focus on boosting supply assumes (not incorrectly) that over time, rail operators will incorporate higher volumes into their pricing models, bringing rail freight costs down, and improving its relative competitiveness. In addition, the development of intermodal facilities opens the opportunities for where freight on the network can go to.

However, in the short term, weak demand is a pressing problem. The freight line into Port Botany is underutilised and many trains are partly full, which increases the average cost per container for moving freight by rail.

<sup>57</sup> Freight Infrastructure Advisory Board (2005), *Railing Port Botany's Containers, Proposals to East Pressure on Sydney's Roads*.

Currently, there is some capacity on the rail freight network. While there are instances where demand is higher than supply, RailCorp and the Australian Rail Track Corporation (ARTC) report that the Port Botany freight line to Enfield has on average 14 trains scheduled in each direction each day, out of a total 36 potential train paths.<sup>58</sup> Reasons for this poor uptake by commercial decision makers of rail transport include perceived or actual higher prices for rail freight and poor reliability. However, using the rail network more intensively is not a simple matter of scheduling more trains. Underutilisation of the network reflects fragmentation along the rail logistics chain.

Therefore, in the medium to long term, and as rail volumes increase, additional supply capacity will be required to service higher volumes and drive lower rail costs, but supply is just one part of the picture. In our view, increasing demand is *critical* to shift volumes onto the rail network, and the targeted doubling of rail share by 2021 will not occur without a major step change in the level of reliability and price competitiveness of rail freight in Sydney.

## Rail Freight Price Competitiveness

Rail freight volumes have been relatively static for some time, declining as a share of growing total freight volumes.<sup>59</sup> Successive reports point to pricing as a key determinant of rail competitiveness. However, to lift rail share, NSW policy makers will need a far more nuanced understanding of the degree to which road and rail share respond to pricing, which markets are most price elastic, and how to price rail competitively.

Table 6: Road versus Rail volumes

Year	Rail Volume (TEUs)	Road Volumes (TEU)	Trade less Transhipments (TEU)	Port Botany Rail Mode Share %
1997/98	123,000	583,168	706,168	17.4%
1998/99	141,500	618,540	760,040	18.6%
1999/00	190,500	657,877	848,377	22.5%
2000/01	213,500	639,549	853,049	25.0%
2001/02	225,000	673,789	898,789	25.0%
2002/03	255,000	817,660	1,072,660	23.8%
2003/04	250,000	940,341	1,190,341	21.0%
2004/05	253,000	1,049,227	1,302,227	19.4%
2005/06	288,000	1,067,212	1,355,212	21.3%
2006/07	298,000	1,211,602	1,509,602	19.7%
2007/08	311,000	1,328,392	1,639,392	19.0%
2008/09	305,000	1,267,270	1,572,270	19.4%
2009/10	317,000	1,370,840	1,687,840	18.8%
2010/11	250,000	1,533,376	1,783,376	14.0%

Source: data provided by SPC (6/10/11), by email.<sup>60</sup>

On the one hand, it is argued that road infrastructure is more heavily subsidised, which distorts competition and consumption choices. This argument states that economic costs are passed through to rail freight users more efficiently than to road freight users, and that externalities such as congestion are not factored into road pricing, making rail freight uncompetitive against road options.

IPART identified that road freight's cash cost at Port Botany does give it an advantage. Road congestion which has

<sup>58</sup> ARTC advised that there are 14 trains paths on an average weekday, but that current capacity is 36 practical paths, or 27 saleable paths. Capacity once resignalling and Enfield staging are complete will be 48 practical paths and 36 saleable paths (calculated as 75% of practical).

<sup>59</sup> Sydney Ports ascribe the decline in rail freight patronage in 2010 to the closure of the Camellia Intermodal Terminal.

<sup>60</sup> Internal data from *NSW Port Botany Freight Data BTS update*.

associated costs for passenger vehicles and accidents is not included in the freight cost, and the illegal (and free) use of Foreshore Drive as a parking lot for trailers allows more responsive road pick-ups without the costs of providing additional yards and empty container parks.<sup>61</sup>

It has been argued that factoring in externalities could justify an extra charge of between \$10 and \$20 per TEU for road freight.<sup>62</sup> The FIAB report concluded that a freight infrastructure levy should be applied to road freight - a concept that has been applied elsewhere such as the PeerPass system in Los Angeles, USA. Even so, a hypothetical \$10-20 charge might not be enough to make rail competitive in most circumstances.

Currently, rail is charged an access charge and a mass-distance based charge, while road freight vehicles pay fuel charges and licence fees. Both rail and road pay wharfage costs at the Port, while rail alone pays a crane lift fee. Road users instead pay a VBS fee, for booking a stevedore slot.

In addition to these differences, road freight is a more competitive market, with lower barriers to entry and with many small carriers that do not provide differentiated or value-added services, meaning that their prices tend to reflect marginal costs only.<sup>63</sup>

On the other hand, the 2006 Productivity Commission (PC) Inquiry into Road and Rail Freight Infrastructure Pricing found limited price distortions between road and rail once registration and fuel charges were accounted for, and factoring in externalities.<sup>64</sup> The Commission argued that road and rail have unique advantages and therefore substitutability is low: road freight is flexible and suited to short distances and time-sensitive items, while rail freight has higher fixed costs, with lower marginal costs for higher volumes and longer hauls.<sup>65</sup> The Federal Bureau of Transport Economics (BITRE) likewise estimated that rail only competes with road on freight journeys over 1000 kilometres.<sup>66</sup>

A higher degree of substitutability may exist around Port Botany than the PC and BITRE analysis would suggest, despite most containers remaining within the metropolitan region.

For example, a 2010 report on the proposed intermodal logistics centre in Enfield found that a rail-road transport solution from Port Botany to the Enfield catchment would deliver a similar level of service to a staged carrier service (where containers are consolidated at a staging facility before delivery), and would be 33 per cent less expensive. The rail-road option would even be 20 per cent cheaper than direct road transport.<sup>67</sup> Similarly, recent analysis commissioned by the PBLIS team suggests that there is already a \$15 per TEU premium on road freight around the MFN compared to rail.<sup>68</sup>

It can be assumed that some geographical or product markets such as highly time sensitive freight are fundamentally better served by road transport alone, but that other markets with access to the Metropolitan Freight Network enjoy some contestability between road and rail. For these markets, freight decision makers would decide the right transport mix on the basis of factors like price, reliability and travel time.

### Case Study: Los Angeles Long Beach Port

In 2005, limited operating hours at the Port caused extensive queuing along I710 (an arterial corridor). Movements were 8% off peak, peak movements 92%.

A \$100 per container levy was introduced on movements between 3am and 6pm Monday to Friday. Revenue raised was hypothecated to recompense stevedores for longer service hours.

By 2010, the Port had achieved a swing to 60% of movements completed between 6pm and 3am Monday to Friday.

<sup>61</sup> IPART (2008)

<sup>62</sup> P75, Deloitte Access Economics (2011), *Cost Benefit Analysis of Rail Performance Standards and Pricing*, for SPC, April.

<sup>63</sup> See IPART (2007)

<sup>64</sup> Productivity Commission (2006), *Road and Rail Freight Infrastructure Pricing Inquiry*, No.41, 22 December.

<sup>65</sup> BITRE (2009), *Where and how do road and rail freight compete with or complement each other?*, Fact Sheet, April.

<sup>66</sup> Bureau of Infrastructure, Transport and Regional Economics (2009) - Information Sheet 34

<sup>67</sup> Access Economics (2010), *Economic Evaluation of the Proposed ILC at Enfield*, Commercial in Confidence, 16 August 2010.

<sup>68</sup> Deloitte Access work commissioned by PBLIS, findings reported informally through consultation, 1 December 2011.



Price elasticity and substitutability between rail and road has not been properly tested for Port Botany. There is no detailed modelling of the tipping point at which rail becomes more attractive, for key geographic and product markets. Having an understanding of these price responses would enable a more effective (and potentially more interventionist) pricing policy to shift more volumes onto rail, and to trigger potential economies as a result of these extra volumes.

Lifting demand for rail on the Port Botany freight line requires an understanding of what price signals would incentivise businesses to transition. This may involve removing pricing distortions that exist, or actively developing market *incentives* for carriers and Freight Forwarders, who make their money out of cartage using their road assets (trucks), to shift to rail. In the latter case, pricing could arguably distort the market *towards* rail transport. While this may not be the most ideal economic outcome, the current policy to double rail share has an implicit economic price in terms of structural adjustment which may warrant stronger price signals towards rail use.

There may be opportunities to target product markets that are more suited to rail – those for which just-in-time delivery is less important, have higher volumes or the 15 per cent of freight that travels beyond 40 kilometres of Port Botany. Options for short-haul freight on a high volume shuttle-type service are also untested.

An issue noted above is that the regulated price for booking a slot for a container lift onto rail is \$15, a 50 per cent premium on the cost of a truck lift of \$9-10. While trucks do pay Vehicle Booking System charges, shipping lines pay for the costs of loading and unloading in their contract, meaning the additional price is hard to justify and is a competitive distortion towards road. There are no additional lifts or movements to put a container onto a train compared to a truck.<sup>69</sup>

There are also pricing levers within the government's control that could encourage rail volume acquisition, such as peak pricing, or preferential charges for wharfage for containers which relate to charges per container for import/export, storage, port security, and berthing rights.

A carbon price could also impact the relative competitiveness of road versus rail freight. Road freight vehicles make up 4 per cent of the Australian vehicle fleet but contribute 22 per cent of total road transport emissions.<sup>70</sup>

## **Reliability of Rail Freight**

Poor rail coordination and reliability are a lead factor in rail's competitive disadvantage with road freight. In fact, reliability is potentially a greater issue than price for some markets.

The IPART Review in 2008 found reliability and slow delivery to be key problems for the Port Botany supply chain. Its rail findings are largely valid today, and may explain why rail volumes have remained static in the past few years.

It is very common for trains to run late. Currently, overall on time running to Port Botany is around 43 per cent – that is, 57 per cent of trains are late.<sup>71</sup> The result is that required lifts of containers on and off trains are not completed and operators still pay for their time window without the work being done. In extreme cases, where there is not the space on the network to stage the train until another time slot is available, consignments are returned to their owners unsent or partially serviced. Export containers often miss sailings while imports are late vacating the terminal.

Poor alignment between train paths to Port Botany and stevedoring windows mean that small delays on the track can cause large delays at the port. Rail operators currently purchase a stevedore rail window in advance to schedule their freight load at the port, rather than loads being dynamically scheduled. However, to get to Port Botany, they may have to run the gauntlet of multiple network providers and restrictions, including the MFN, the passenger service and the Hunter Valley Coal Chain, to make a narrow window at the port.

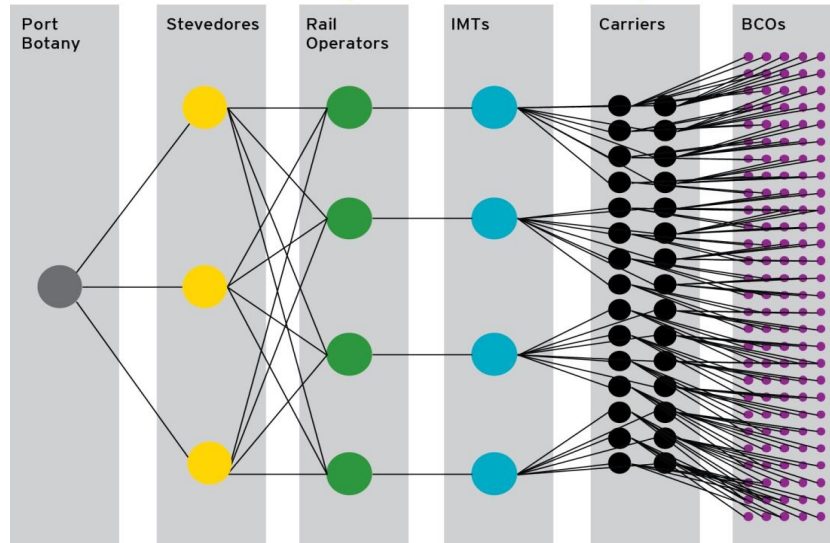
---

<sup>69</sup> For example, see Access Economics (2010)

<sup>70</sup> BITRE (2009) *Greenhouse gas emissions from Australian transport: Projections to 2020*, Working Paper 73, Department of Infrastructure, Transport, Regional Development and Local Government, Canberra, Australia

<sup>71</sup> Reported in consultation by PBLIS Team, Sydney Ports Corporation.

Figure 9: Depiction of the Port Botany Supply Chain



To illustrate how this impacts on productivity and operating costs, it is not uncommon for a regional train to purchase two stevedore windows in case it runs late for the first slot (it may even need to purchase two time slots for two stevedores if it has a split loading). If the train is late, it is penalised for missing the first slot, on top of the added cost of purchasing the second slot. This 'hoarding' also crowds out the use of the second time slot by another user. These factors undermine certainty, with stevedores sometimes being reluctant to schedule crews to work trains.

A factor in freight trains' unreliability is that they cannot operate on shared lines during peak hours. The full curfew applies for around 7 hours a day, with restricted operation for all other times but the middle of the night. The curfew affects the entire journey, meaning that trips must be planned around getting trains out of the way in time. The result is regional services are highly unreliable.

There is a mismatch between regional and metropolitan freight trains, and rail infrastructure at the port. Currently, trains ranging from shorter 600m long "shuttle" trains to 1263m regional trains arrive at the port yard. However, the two stevedores and the empty container park (POTA) all have different length sidings (DP World has three 330m sidings; Patrick two 630m sidings; POTA has two 475m sidings). The ARTC is considering a 650m port shuttle service.

*"Rail transporters face challenges with poor coordination of train paths, and difficulties in coordinating spending on infrastructure, leading to slow delivery. While there seems to be a willingness to invest in upgrades to the rail infrastructure, there is a need for better coordination of investment decisions and day-to-day rail operations."*

IPART Report 2008

The result is that trains are split at Port Botany Yard across the stevedores, which is an inefficient and time-consuming operation which blocks access to the terminals. It also makes logistics more complex as trains need to align stevedore windows at the same time to get the right containers into the right stevedore - and if they do not, they need to leave the Port, park and find an opportunity to re-enter the Port. The PBLIS team informally reported that DP World can lose up to 11 hours of every day through shunting trains. This problem will worsen when T3 is operational with the addition of a third port operator (Hutchinson Port Holdings).

Therefore, there is an urgent need to better manage different length trains accessing the Port, and train splitting activities, to sweat the network more effectively and accommodate longer trains where possible. The shorter trains are in general around 30 per cent more expensive to run per TEU.<sup>72</sup>

<sup>72</sup> Information provided by Independent Rail informally during consultations.

SPC notes that quantitative modelling proves the supply chain can cope with future volumes if trains are required to be less than 650 metres long, port shuttles (including push-pull where feasible) are introduced between intermodals and the port, and penalties and incentives through the OPM framework are regulated to drive efficiencies.<sup>73</sup>

One suggestion by Independent Rail is to use the existing long North Road rail lines at Enfield yard for a staging and marshalling facility. This would provide somewhere for regional services to consolidate dedicated loads for the port, reducing congestion at Port Botany yard and enabling the line between Enfield and Port Botany to be used more intensively.

It is estimated that with resignalling works and a staging yard, there would be up to 48 potential train paths into Port Botany. However, clear decisions would be required about the use of these RailCorp assets for that purpose.

Having four different individual rail operators increases the complexity of landside operations and dilutes volumes. Currently, Patricks has a siding that can accommodate a 600m train, and Hutchison has a condition of its lease to build one. DP World has identified options to do so, but is not proceeding.

Given the complexity of the rail supply chain in and around Port Botany, and the substantial growth task ahead, substantial improvements in coordination require strategic top-down interventions in order to manage approximately 10 stakeholders (stevedores, rail operators, ARTC, Railcorp, IMTs).

In 2008, IPART recommended a logistics coordination team be established similar to the Hunter Valley Coal Chain Coordinator to drive efficiencies and identify ways to make rail operations more flexible "so that trains arrive at and leave the port facilities fully loaded".<sup>74</sup>

The Government's response established the two-stage PBLIS reform process.

Stage 1 has involved a Regulated Operational Performance Management (OPM) process for Roads, and a voluntary approach for Rail. Road performance regulations set performance benchmarks between stevedores and road carriers. Already, this has delivered consistent improvements to truck turnaround times, increased take up of off peak and weekend time slots, and greater transparency around stevedores' time slots.

It was intended that Stage 2 would be introduced in 2012 if voluntary measures in Stage 1 are not proven to be effective. Stage 2 measures could include a Demand Management System (peak period pricing), options to improve empty container parks' operating hours and performance, and a regulated OPM Rail Framework.<sup>75</sup>

It is understood that at this time, no further work will be completed for a Demand Management System at the Port. Instead, limited regulation was introduced in December 2010 and updated in August 2011 which sets industry benchmarks around lift rates, and provides industry with an incentive to perform above these. The other options are still live pending review of Stage 1.

Currently, the Sydney Ports Rail team continue to work through voluntary measures to improve rail performance, and to seek stakeholder agreement. Among other things, these reforms would move rail users away from a punitive system of stevedore windows to more dynamic scheduling and queue management at the port. PBLIS is seeking to implement these in early 2012.

A voluntary approach to rail performance improvement ensures a flexible and least cost transition for businesses, and is therefore an appropriate way forward. However, given the imperative of increasing rail freight volumes, the *prospect* of regulation (should voluntary efforts fail) is equally important, to apply both a 'carrot and stick' approach to rail performance improvements.

---

<sup>73</sup> Gunn (2011), *Congestion Versus Landside Reform at Port Botany*.

<sup>74</sup> Recommendation 15, IPART (2008), *Reforming Port Botany's Links with Inland Transport*.

<sup>75</sup> Gunn (2011), *Congestion Versus Landside Reform at Port Botany*.

Arguably, given the more complex logistics chains in and out of Port Botany than in the Hunter Valley, the Port itself may be constrained by its degree of influence over participants in the supply chain beyond the immediate Port vicinity.

It is understood that PBLIS may remain independent following the refinancing arrangement for Port Botany. In our view, the Sydney Ports Rail team should have a robust mandate across the whole of Government to drive the rail strategy, and independent governance arrangements would be required to balance the views of all participants along the rail logistics chain.

## **Rail Supply and Capacity**

In the medium to longer term especially, measures to boost long term rail capacity will be important to achieve the targeted doubling in rail mode share and to take freight volumes off the road network. For instance, a 28 per cent rail share of 7 million TEUs a year would require more than 40 trains servicing Port Botany each day, an increase of 12 per cent on current capacity.

Measures that will increase rail capacity include the Southern Sydney Freight Line (under construction), the Enfield Intermodal facility (due 2013), and the competing proposals (from the Federal Government and the private SIMTA consortium) for an intermodal terminal at Moorebank. It is planned that Enfield will be able to handle 300,000 TEU and Moorebank up to 1,000,000 TEU per year.

A key issue is the location of planned intermodal terminal capacity, based on the potential catchment it would service. New IMTs in effect open new geographic markets to the rail network, by giving trains somewhere to go.

Intermodal Terminals (IMTs) are facilities that enable the transfer of freight between road and rail infrastructure, and as such are an essential enabler to increase the potential capacity of freight that can be moved by rail. IMTs offer a way to decentralise the port's peripheral operations, and to transfer some container movements onto rail, rather than being carried by trucks through metropolitan and urban areas. This is why the IMTs are often referred to as 'moving the port gate inland'.

A terminal has been proposed at the Moorebank Precinct for many years. The Federal Government are conducting a major study of the potential for land in the area to be redeveloped as a major intermodal facility. The land is currently occupied by the Department of Defence. The terminal would initially service NSW freight, and be expanded over the longer term to cater for interstate freight also. This study is expected to report at Budget 2012.

At the same time, SIMTA, a consortium made up of Stockland, Qube Logistics and QR National is developing plans for an intermodal terminal on privately leased land that adjoins the Federal Government's site. SIMTA's proposal is currently going through the early stages of the planning approval process.

It is too early to determine, from the State's perspective, which proposal is preferable. Both require some degree of investment by NSW in connecting road and rail infrastructure. The Moorebank Precinct as a whole is well located to become a major freight terminal for south western Sydney (a major freight market), and there are few alternative sites that could play this role. Economically viable proposals to develop this precinct as an IMT should be supported, pending agreement on funding arrangements for supporting infrastructure enhancements and ongoing operating costs.

Longer term, consideration is also needed of the proposed Eastern Creek intermodal terminal. While this would require substantial investment in connecting rail infrastructure, it would serve a very large catchment - Western Sydney - that is currently underserved by rail freight. It is located at the junction of the M4 and M7, so has an excellent road distribution network. Its proposed annual capacity is 1 million TEU. Currently, there is vacant land and a range of industrial sites including warehouses and distribution centres that are served by road freight transport. However, work would need to begin soon to preserve the site and corridor.

IMTs for moving metropolitan freight are rare however. Around the world IMTs are primarily used for regional and interstate freight. It remains to be seen if a high volume, rapid turnover shuttle model at IMTs can shift smaller, time-sensitive volumes onto rail to the levels forecast by their proponents. The imminent opening of the Enfield IMT, which will double IMT capacity in the metropolitan region, will help to demonstrate whether the proposed IMTs at Moorebank and Eastern Creek will be economically and commercially viable.

# 5. Findings and Initial Conclusions

## Overall Conclusions

The case for action is clear. Rising transport demand in the Port Botany - Sydney Airport Precinct, while a welcome result of economic growth, is also threatening long term productivity and economic growth.

The previous chapter highlighted existing problems with infrastructure performance within the Precinct and how these problems are set to worsen over the next 20 years. As a result, the Precinct will need to find innovative ways to service substantial growth so that NSW's critical international gateways remain competitive, continue to be major centres of employment and sustain their economic value to the local, state and national economies.

Making the right decisions now about infrastructure and land transport in the Precinct requires an evidence based assessment of the different ways of lifting infrastructure and network capacity, and recognition of the many opportunities to improve network performance without large scale investment. Chief among lower cost strategies is targeting the productivity of existing assets and improving the coordination of the logistics chains.

The focus in recent years has been to address the transport challenges created by road freight, principally through encouraging greater movement of freight on the rail network and outside of peak periods. This is not misguided *per se*. Road freight can have significant safety and public amenity impacts, and there is available capacity on the Metropolitan Freight Network. However, only 1,700 trucks per day access Port Botany whereas 100,000 vehicles per day travel on the M5 and 100,000 people per day access Sydney Airport.

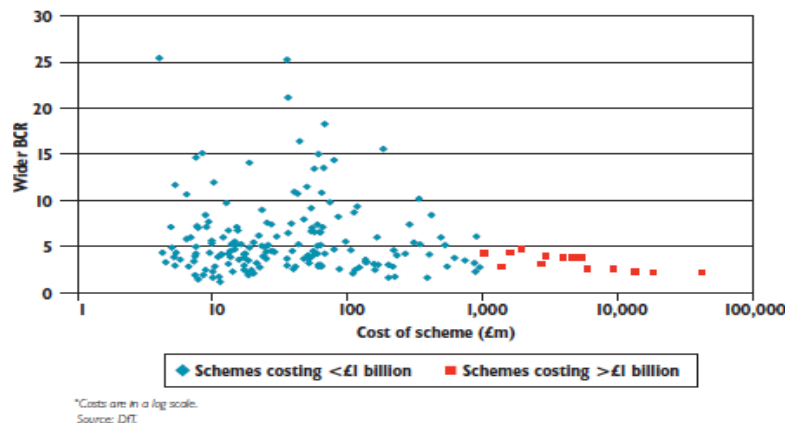
In the case of the Precinct, which is integrated and where each piece of infrastructure is in close proximity to others, there is a wide degree of infrastructure contestability. For example, lifting public transport use to and from the airport takes cars off the road and reduces congestion. This means that a holistic view and a problem-guided approach can rise above a 'modal' or siloed approach, to reveal lower cost alternatives and trade-offs.

This Scoping Study found that in fact, significant and often overlapping work had been done by agencies. But without whole of government coordination or budget priority, many proposals were not implemented, out of date, or not considered against lower cost or short term alternatives.

## The 'Small is Beautiful' Principle

The UK Eddington Transport Study articulated a 'Small Can be Beautiful' principle, an approach that demonstrates small scale projects and better use strategies can offer higher economic benefits, are quicker to implement, and are lower cost than larger capacity enhancement projects.

Figure 10: Economic returns of smaller schemes relative to larger schemes (over £1B)



Source: UK Department for Transport - Eddington UK Transport Study December 2006

Historically, too great a focus has been placed on 'big ticket' capacity enhancements - so called "megaprojects" - to the exclusion of other options. Little has been done to address road congestion in the Precinct since the opening of the M5 East in 2001, largely because it has been assumed that the M4 East extension (first announced in 2002) and the M5 widening (first announced in 2005) would solve this problem once built.

This review identified a much wider 'menu' of solutions to the problems defined in Section 4 than is usually canvassed in relation to the Precinct.

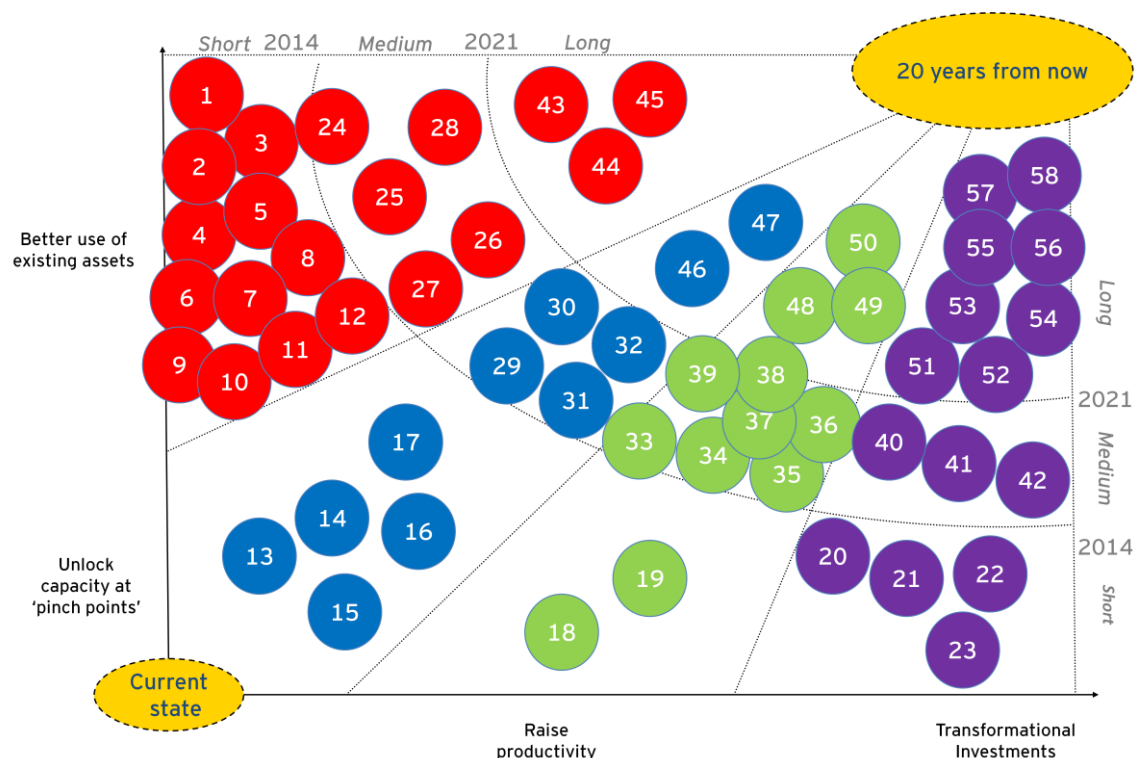
A positive finding of our review was that the majority of potential solutions involve better use or minor works to unlock pinch points on the network. These measures have the potential to promote better use of public funds, better value for taxpayer dollars, and to stave off investment on lower-priority infrastructure. This is good news for governments, and suggests that far more can be done with less.

Importantly, better use and small scale investments are often shorter term solutions and are not perfect substitutes for long term major investments. Nonetheless, they are an important and legitimate option in any government's toolbox. They have the potential to optimise existing infrastructure and provide governments with 'breathing room' to prioritise investments and stage these appropriately.

### Solutions Identified

Our report identifies almost 60 potential short, medium and long term solutions, which address the challenges we identified in the Precinct (listed in Appendix A). These are categorised as falling under one of four types of solutions: better use strategies, measures to unlock pinch points, measures to improve productivity, and transformational major investment.

A summary of all solutions by their type and likely phasing is depicted below, showing a promisingly wide spread across the spectrum of types of solutions and their phasing (numbers refers to their order in Appendix A).



The recommendations in this report focus on measures that can be introduced now or in the near future without, in the most part, major investment.

A more detailed piece of work is required to rigorously assess competing longer-term alternatives, and determine the optimal mix of responses for the Precinct. Logically, this requires an interdepartmental approach that spans agency budgets and policy bailiwicks. While in the short term, many of the solutions are transport related, the issues to be addressed over the long term are broader. They include issues such as urban regeneration and industrial development.

### **Three high priority areas for further work**

In examining the problems set out in Section 4, it is important to differentiate between things that can be done now and things that should be picked up in longer term work. It is considered that there are three areas where immediate work is warranted and where significant progress could be made in the short to medium term.

- ▶ **Current and growing road congestion through the area: High Short Term Priority.** A number of small to medium term capital projects and regulatory changes have been identified, which may improve overall road network performance and vehicle movement for freight and passengers.
- ▶ **Inadequate public transport services, particularly to and from the airport: High Short Term Priority.** The current public transport service offering in the Precinct does not give passengers genuine choice about how they travel to the airport, but there are immediate actions now which could raise patronage and change travel behaviour in the short term.
- ▶ **Unreliable conditions for rail freight services to and from the Port: High Short Term Priority.** Work is already in progress through PBLIS but improvements to its structure would give it a stronger mandate across strategic, operational *and* tactical issues, and could be put in place as soon as possible, alongside other steps to improve rail's competitive position.

These three priority areas are explained in detail in chapter 6.

### **Data Reliability Issues**

In addition, this review brought to light inconsistent data in infrastructure planning across the Precinct. For example, the port expansion EIS and the M5 widening traffic review contained different forecasts of the number of trucks servicing the port each day, and there were different estimates of likely freight growth at the Port. While some of these inconsistencies are immaterial, others are not. It stands to reason that good quality data on the Precinct can focus effort between parties, prioritise projects, and enable stakeholders to recognise when their efforts are effective. It also is a critical ingredient to supply chain perspective transparency and coordination, because it can align stakeholders' long term planning and capacity.



## 6. Recommendations for Next Steps

### 6.1 A Short Term Action Plan to 2015 or 2017

This Scoping Study proposes the development of a Short Term Action Plan which would be finalised in early to mid 2012 and deliverable within three to five years. The Action Plan would deliver concrete, early improvements to public transport, road congestion and rail freight competitiveness.

The Action Plan will inform longer term policy and investment settings for this Precinct that are being developed through the Port Botany - Sydney Airport Transport Improvement Plan that was recently submitted to Infrastructure Australia. It is therefore recommended that this Action Plan be developed through the same governance arrangements as those that are being put in place for the longer-term Transport Improvement Plan.

This Action Plan should be led by a dedicated Program Manager and Project Team (or series of teams) in Transport for NSW, working with other Government departments and Infrastructure NSW as necessary. We propose the Action Plan Project Team will test, cost and prioritise three distinct solutions packages that improve the way the Precinct functions day to day by:

1. Addressing road congestion by attacking pinch points on the network;
2. Improving public transport services and usage in the Precinct; and
3. Improving the reliability and competitiveness of rail freight services.

To maintain momentum, the Action Plan should be submitted to the Cabinet Infrastructure Committee in the first half of 2012.

#### **Why in the first half of 2012?**

This review found many potential solutions that are at various stages of development. Very few have a fully worked up business case. A few months would enable the Project Team to properly cost and test measures for potential effectiveness, and examine if (and how) agencies can reprioritise their work and resources to better serve the Port Botany Sydney Airport Precinct. Measures which enhance land transport access and operations to and around the port will be seen as a welcome public commitment to the Precinct.

#### **Getting the Governance right**

Given the complex problems identified in Section 4, it is recommended that the next phase of the study have a clear and robust governance framework around solution development and project prioritisation.

The Project Team should have senior cross-agency leadership, clear Terms of Reference on roles and responsibilities, and a Study Charter that defines what success looks like. For this second stage of work, it is essential that representatives from delivery agencies, who know the situation "on the ground" and who will implement preferred solutions are engaged.

The Project Team would drive implementation of the actions in the Plan across public transport, rail use and road congestion.

#### **Funding the Action Plan**

The 4-6 month timeframe will enable detailed costs to be assessed for preferred options, prioritisation of new funding proposals, and identification of possible offsets from existing budgets (through reprioritisation) where possible, in line with the Government's fiscal strategy.

Funding new measures will be challenging. Importantly, many of these measures are low cost, and alternative funding streams can be considered.

However, there will be costs involved in implementing the full package of measures outlined below.

This report has not assessed in any detail potential funding sources for the package of measures it recommends. It is likely a combination of state, federal and private funding will be required. Consideration will need to be given to how far costs can be met either by user payments or by infrastructure levies, for example at the port or airport.

### **6.1.1 RECOMMENDATION 1: Immediate work to combat road congestion**

Efforts to address road congestion in the short term must start by identifying pinch points and regulatory changes that can unlock capacity and improve traffic flows along the corridor and around the airport and port.

Our discussions with Roads and Maritime Services (RMS) developed to develop a identify of 17 small to medium sized capital works projects that could be implemented as an integrated program (Appendix C), and which together with better use road strategies could provide short term relief on the road network.

The new Working Group should develop a short term strategy of congestion busting options that:

1. **Manage congestion more effectively**, by examining opportunities to better use the road network through clearways, bus lanes, freight peak restrictions. These might include:
  - a. Performance Based Standards (PBS) and Higher Mass Limits (HML) in relation to Heavy Vehicle operations
  - b. Allowing more types of Heavy Vehicles to use Qantas Drive
  - c. Greater use of clearways in the Precinct
  - d. Smart infrastructure enhancements to motorway infrastructure (eg ramp metering, variable speed limits, freight priority), building on the NSW Managed Motorways submission to Infrastructure Australia.
2. **Unlock pinch points and improve traffic flows** by assessing and prioritising the initial set of 17 RMS projects and proposing a single program of works. Priority projects in this list include:
  - a. Grade Separation at Qantas Drive/Joyce Drive/O’Riordan Street/Reginald Ansett Drive to relieve traffic around the Domestic Airport.
  - b. Converting Bourke Road and O’Riordan Street to one-way roads from Gardeners Road to Green Square, to improve capacity on a major route north of the Airport.
  - c. Widening Bourke Road from Coward Street to Gardeners Road at Mascot to allow its use by all vehicles.
  - d. Widening Foreshore Road to 6 lanes (and/or provide parking bays and intersection improvements).
  - e. Replacing the General Homes Drive level crossing.
  - f. Providing ramps between Gardeners Road and Southern Cross Drive at Kensington.
  - g. Re-invigorating negotiations between SACL and RMS over land acquisition for road works.

3. **Launch the development of MESO traffic modelling capability** to support appraisal of longer-term options in the Precinct. This modelling will take up to 12 months.

### 6.1.2 RECOMMENDATION 2: Immediate work to improve public transport use

Currently, the level of public transport services in the Precinct is insufficient to allow passengers to make real choices about how they travel. The challenge is to identify which solutions will have the most impact in terms of patronage and travel behaviours.

The new Working Group should develop a short term strategy that:

1. **Fixes public transport price and service issues by:**
  - a. Preparing and costing a proposal to reduce or remove the station access fee on the Domestic and International Terminal stations.
  - b. Preparing the economic case for, and assessing the financial and legal implications of, providing additional bus routes to/from the Airport, in view of the compensation requirements that may result from changes to the Airport Link contract. This may also involve testing the scope of the Airport Link contract's 'no compete' clause, to identify wider transport options that may not be subject to compensation, including new east-west bus routes, and staff/private bus services.
2. **Improves passenger amenity over time** by providing luggage racks and other facilities on buses and trains that access the airport as part of a refurbishment of the existing asset base, and by providing additional signage and passenger indicators at airport terminals.

For each option, a brief assessment should be made as to feasibility, likely scope, timeframes, stakeholders, and the benefits that might be delivered. Based on these assessments, a prioritised set of recommendations for enhancements - and a robust government case for action - should be developed.

### 6.1.3 RECOMMENDATION 3: Immediate work to improve rail freight use

In the short term, driving increases in rail freight share will need a concerted push towards making rail an economically more attractive transport option. Options which remedy competitive distortions in favour of road, and options that actively promote rail competitiveness, should be considered. Short term measures to improve rail reliability should be identified and implemented.

The new Working Group should develop a short term strategy that:

1. **Drives coordination along the rail logistics chain** by reaffirming the Government's commitment to voluntary rail reforms, or regulatory approaches where voluntary measures do not produce tangible results.
2. **Better uses the rail network by** urgently unlocking Enfield as a staging facility for Port Botany, and tackling 'pinch points' on the rail network including the at-grade level crossing on General Homes Drive, and the pedestrian overbridge at Banksia Street.
3. **Improves rail coordination** by establishing a new, independent Logistics Supply Chain organisation with a formal mandate to drive improvements to rail reliability and efficiency, incorporating the existing PBLIS.
4. **Incentivises efficient use** by Identifying and progressing the optimal ownership/operation arrangement for the Port Botany freight line.
5. **Targets demand generators of rail freight**, through a study of pricing and elasticity in Port Botany that assessing potential changes to rail pricing arrangements including lift rates and

wharfage costs. This could be developed through the Port Botany leasing process that NSW Treasury will lead.

## **6.2 Developing the Long Term Transport Improvement Plan for the Precinct**

This Scoping Study found that there is much that can be done in the short to medium term to fix the landside transport issues facing the Precinct. These measures range from better managing demand to unlocking hidden capacity on the existing transport system.

Over the medium to longer term, accommodating the scale of growth at Port Botany and Sydney Airport will require major investment in the fixed infrastructure of the Precinct and its connecting corridors. Bringing forward the right solutions in a timely manner is essential to the ongoing success of this Precinct and the NSW economy.

While the focus of this work is not on evaluating individual proposals over this longer time frame, but rather on identifying key challenges and an immediate way forward on these, there are a number of broad pieces of work that will be required in the Precinct, which can be picked as part of the proposed Port Botany - Sydney Airport Transport Improvement Plan that Transport for NSW intends to develop in 2012. The measures advocated in the approach set out below are explained in more detail in Appendix A.

### **6.2.1 Wider Infrastructure Measures**

Over the long term, the broader infrastructure challenges in this Precinct need to be addressed. These include emerging capacity constraints at the port and airport and, land usage and planning around the Precinct. These issues are complex in that they involve many different stakeholders including commercial operators, where the State Government has less direct influence.

Addressing constraints at the port requires significant reform to portside operations by the stevedores and across the wider supply chain to make Port Botany's productivity comparable to the best ports in the world. The regulatory constraints on Sydney Airport will need to be reviewed for their appropriateness as Sydney's aviation needs grow.

Land use development raises critical issues for the Precinct. Urban encroachment around the airport and port not only limit the growth potential of these assets, but also put pressure on restrictions to the utilisation of the airport and port to manage noise and air quality issues for residents.

The development of intermodal capacity will allow some of this to be located away from Botany Bay, although it is likely further industrial zoning will be needed in land adjacent to the Gateways also. Tough decisions will be required around appropriate use of adjacent port land, such as the bus depot near the Port.

There is also significant potential for redevelopment around the Precinct and its corridors. For example, investment to improve the connectivity of western Sydney to the Precinct via the M4 extension would open up the corridor around Parramatta Road for urban regeneration.

### **6.2.2 Improving Demand Management**

In the medium and longer term, more can be done to better manage transport demand around the Precinct. While this report has focused on short term options to manage traffic flows and congestion, regulation and pricing signals can play a more effective role in demand management.

In the context of this Precinct, consideration will be needed as to whether measures such as the M5 Cashback scheme should remain in place and whether untolled road sections, such as the M4 and M5 East, should be tolled. Ideally such tolling would be on a time of day basis so congestion costs are “priced in” to road users’ decision-making. And importantly, these could also provide an ongoing revenue stream for future infrastructure and road investment.

The case for greater implementation of demand management measures at the Port on both road and rail will also need to be assessed, given the demonstrable benefits seen already in NSW and across the world where a greater proportion of freight traffic is moved outside of peak hours.

### **6.2.3 Investing in road and rail capacity**

The vast majority of passenger and freight travel around this Precinct is by road. Over the next 20 years, the scale of forecast growth means that even with substantial mode shift to public transport and rail freight, the growth in demand for road travel will be substantial.

Long term, the road network lacks the capacity or connectivity to accommodate this growth. There can be little doubt that further investment in the road network will be required. This approach should not be seen as undermining investment in public transport and rail freight solutions. Further investment will be required to the rail network and steps should be taken now to reserve corridor and precinct space as required. Most notably, site and corridor preservation is needed for the proposed Eastern Creek IMT and its connecting rail infrastructure.

However, most investment in recent years has been in rail - including the Southern Sydney Freight Line, the Enfield Intermodal Terminal and the South West Rail line. By comparison, road investment in the Precinct has been limited, with the last major scheme being the M5 East, which opened in 2001.

Road investment is invariably contentious. It is clear that road transportation has amenity and wider environmental impacts, particularly for the local communities where this travel takes place. So, however, do all transportation solutions. Doing nothing cannot be an option as this would mean worsening the economy and quality of life for all NSW.

In fact, road investment can offer some of the best economic and social returns of any transport measures. As Sir Rod Eddington noted in his study on the economics of transportation for the UK Government, “even after accounting for environmental effects, road investment is able to offer among the highest returns [of any measures] if it is well targeted on...surface access links to ports and airports where traffic volumes are very high and congestion is a persistent problem.”<sup>76</sup>

### **6.2.4 Issues with existing road schemes in the Precinct**

Much work has been done over many years on the potential options to address motorway capacity and connectivity around this Precinct. Numerous versions have been developed of the M5 East widening scheme or the M4 Extension scheme, and struggled due to cost, complexity and/or public opposition. It is likely however that none is “ready to go.”

Cost cannot be overlooked. The estimated \$16 billion needed to complete the Inner Sydney Motorway Network is greater than the estimated \$10.5 billion cost (in present value terms) of the existing metropolitan motorway network. The majority of these costs will not be recoverable through tolling, and so will require subsidy from the public purse.

Complexity is also a major factor. Each of the schemes faces a number of engineering challenges. The lack of existing reserved corridors means that for most of their length, these roads will need to be tunnelled or slotted. The interrelationship of the M4, M5 and the existing motorway network is not clear; neither is the preferred phasing of these schemes.

---

<sup>76</sup> Eddington volume 3 pp 40

Finally, local community interests have opposed the schemes proposed on various grounds, including opposition to growth of the port and airport, concern over placement of tunnel ventilation stacks and opposition to road travel for environmental reasons.

### 6.2.5 Towards a Sydney Motorway Network Strategy

Overcoming these issues means taking a fresh look at the long term transport needs of the Precinct and their implications for the infrastructure of the area and its corridors. This means:

- ▶ **Starting with the land-use strategy for the Precinct.** Each of the major infrastructure options for the Precinct will have implications for how the area develops. Maximising the social and economic returns for these major investments means considering the future shape of inner and mid-western Sydney - residential densities, industrial zoning etc - as well as public transport provision in these areas, and the role of existing corridors once new motorway links are in place.
- ▶ **Developing a motorway network strategy.** Consideration is needed of the interrelationship of the different schemes proposed for this Precinct in particular in relation to their impact on traffic flow both to and from the port and airport, and more broadly across the metropolitan area. The schemes should be seen as forming part of a greater network strategy - a successor to the Sydney Orbital scheme that will complete the Inner Sydney Motorway Network.
- ▶ **Investigating options to minimise construction costs.** Too great a focus has been on minimising community impacts without adequate assessment of the costs associated with this. Innovative options will need to be considered that include surface and slotted construction in places instead of tunnelling, which is generally much more expensive. Such analysis will need to consider both the implications for local stakeholders - as well as the wider costs and benefits to the State as a whole.
- ▶ **Considering alternative sources of funding and financing.** Experience overseas has demonstrated the potential for other funding and financing of infrastructure to be provided through other sources other than general taxation and user fares. Options that could be considered include infrastructure levies at the port and airport, special infrastructure contributions and value capture charges. However important these issues are, these are not within the scope of this paper, and will need to be considered in future federal and state work.

### 6.2.6 Developing the Precinct's Longer Term Transport Improvement Plan

Taking account of these issues, this report recommends that, alongside the development of the Short Term Action Plan outlined above, the NSW Government rapidly progress the development of the longer-term Transport Improvement Plan for the Port Botany - Sydney Airport Precinct - that was recently submitted to Infrastructure Australia. This Plan needs to take account both of the transport task for this Precinct and its connecting corridors, and also the wider infrastructure issues, particularly in relation to land usage.

The scale of the task faced in this Precinct and the timetable of the lease of Port Botany suggests that this work should aim to deliver a preferred direction during 2012. The modelling activity recommended in this Study will support this analysis - but should not delay it. As outlined above, the broad outlines of a recommended approach can be ascertained from existing data.

It is recommended that those parts of the longer-term delivery strategy that can be progressed while the preferred direction is underdevelopment, are taken forward concurrently. For example, the environmental approvals for the Eastern Distributor were progressed at the same time as its detailed design. There is no reason why such an approach cannot be applied here.

The issues faced in this Precinct cut across sectoral, state and federal, public and private lines. The development of the Infrastructure Strategy Statement will require cross-departmental collaboration within the NSW Government, as well as the engagement of the Federal Government, the port and airport, and local and other stakeholders.

## Appendix A Solution Identification

The measures contained in these tables are not all recommendations to Government. They are a scan of available policy and investment options that may or may not be used to respond to transport challenges in the Port Botany - Sydney Airport Precinct. The intention of this section is to map a full range of interventions that may be considered, as a first step in developing a program of optimal responses for Port Botany.

### Short Term Solutions

*These measures should be considered in the Short Term Action Plan, or are already under construction or at an advanced stage of development. Action Plan measures could be announced in early 2012, with full implementation within three to five years, subject to advice from government agencies.*

#### Better Use of Existing Assets

Ref	Solution description	Status	Purpose and Background
1	Develop a multi-modal Meso transport model for the Port /Airport Precinct	Preliminary work is now underway	<p>The Meso traffic model provides a way to measure dynamic traffic flow patterns such as peak flow demand and the impact of road geometry, in addition to macro and micro modelling techniques. It is an enabler that can measure the potential corridor-level traffic benefits resulting from targeted small scale works or short term initiatives.</p> <p>This model would assist road planners to better manage road congestion, target pinch points and encourage better use of the road network. It would also enable the evidence based prioritization of the 17 RMS projects in Appendix B.</p> <p>RMS has not previously prepared a mesoscopic model for the Sydney network. Preparations are now underway to engage a mesoscopic software supplier and traffic modelling contractor to prepare a model of Sydney's Road Network.</p>

\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.

Ref	Solution description	Status	Purpose and Background
2	Strengthen the independence and mandate of the PBLIS rail team	Work commenced within Sydney Ports following IPART report 2008	<p>An independent PBLIS team would drive rail reform and performance, and improve coordination across the supply chain. However, a clear and authoritative Government mandate is required.</p> <p>The Rail strategy would introduce Operational Performance Measures at Port Botany to improve efficiencies between stevedores and rail operators and to remove time servicing windows. Instead of windows, a dedicated independent PBLIS team will operate a dynamic scheduling team 24/7, managing the "queue of trains" from Enfield to Port Botany and effectively pulling trains through so stevedores have a continual flow of work and trains will be fully serviced. The scheduling operation will be based on forward plans that are prepared one month ahead, 48 hours before, and daily.</p> <p>With the Port refinancing process, consideration is needed of where this team should sit. It is possible that PBLIS may remain with SPC, rather than with the new Port operator, retaining some independence.</p> <p>Priorities for the team include implementing rail reforms, supporting the shift to 24/7 operations at the Port and across the supply chain, advising Government on competitive interaction between road and rail and pricing reforms, coordinating responses to capacity constraints and operations and testing new ways of doing things, for example dedicated port shuttles and dedicated loading/unloading at the stevedore terminals.</p>
3	Issue a strong Government Statement of support for the voluntary rail strategy, with the prospect of regulation should these be unsuccessful	Proposed	<p>Regulation should be put in place if agreement by all stakeholders to voluntary measures is not reached, or if a voluntary approach does not achieve the outcomes expected. A 'carrot and stick' approach to the PBLIS rail strategy, would strengthen the negotiating hand of PBLIS and send a clear signal to the rail logistics chain to cooperate.</p>

*\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.*



Ref	Solution description	Status	Purpose and Background
4	Conduct a study of pricing and demand elasticity at the Port and recommend pricing reforms to help achieve the targeted doubling of rail share by 2021.	Proposed	<p>The study would consider pricing policies and regulatory levers including wharfage charges, the cap on receivables, charges on road versus rail freight. Recommendations should include options that are budget neutral, with reductions on rail commensurate with increases on road freight, and a re-pricing of road to reflect externalities such as road provision.</p> <p>Consideration should be given to the planned ARTC differential charging arrangement, which will be introduced in 2012 and its potential to distort competition between road and rail. If it does, options to delay introduction could be considered.</p> <p>There has been some recent work done by PBLIS on pricing, but further work is required to test elasticities, and verify findings. The Freight and Regions Division of Transport for NSW is developing an assessment of the freight value chain which may consider these issues. Additionally, this could be developed through the Port Botany leasing process that NSW Treasury will lead.</p>
5	Prepare a proposal to reduce/remove the Station Access Fee at the two Airport stations on the Airport Link line.	Proposed	<p>This measure seeks to improve patronage of the passenger rail service to the Airport by travellers and by employees.</p> <p>Removal of the fee would require commercial negotiations with the Airport Link Company (ALC) under the contract, as was done to remove the fee from Mascot and Green Square stations.</p> <p>Careful forecasting of expected patronage increases would be required. Initial estimates by Booz &amp; Co anticipated that removing the station access fee for these two stations would increase rail usage to Sydney Airport by 23 per cent.<sup>77</sup></p>
6	<p>Prepare the economic case for additional bus routes and services within the Precinct, and to/from the airport.</p> <p>Examine the financial and legal implications of this in respect of the Airport Link Contract 'no compete' clause.</p>	Proposed	<p>This would improve the public transport service offering and improve customer choices to travel to/from the airport. Options for additional bus services to the airport include:</p> <ul style="list-style-type: none"> <li>- M20 - terminating at airport, not Mascot Shops, with a setdown/layover at T2 and at Terminal Court. A shared Metrobus/Route 400 stop at T3 would be required (minimal changes to stopping area, kerb line, footpath).</li> <li>- M30 - terminating at the airport rather than Sydenham station</li> <li>- Direct shuttle services from Wolli Creek and Sydenham stations</li> <li>- Additional bus stop at Terminal on the 410 route at airport</li> <li>- A new bus route from St George/Sutherland/Miranda.</li> <li>- Additional timetabling of 400 bus route.</li> <li>- Bus lanes and priority bus signallers around the Precinct.</li> </ul> <p>Testing should also be undertaken around which services improvements would fall within scope of the Airport Link contract, and which might not, such as staff shuttle services or east-west bus routes. As with measure 5 above, a case for NSW Government action should be prepared.</p>

<sup>77</sup> SACL (2011), Submission to the Productivity Commission Inquiry into the Economic Regulation of Airport Services, April 2011.

*\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.*

Ref	Solution description	Status	Purpose and Background
7	Develop transport options to enable airport staff to travel to work	Proposed	<p>Addresses problem of inadequate public transport services &amp; current and growing road congestion</p> <p>Options identified include:</p> <ul style="list-style-type: none"> <li>- improving connections at Wolli Creek for interchange between Cronulla and Airport / East Hills trains to provide commuter access to a significant staff catchment area</li> <li>- Bus links from Sydenham or Wolli Creek stations</li> <li>- Extending off-peak operating hours to encourage use by shift staff and improving connections at Wolli Creek for upgraded Cronulla line trains which provide commuter access to a significant staff catchment area.</li> <li>- Sydney Airport also encourages the introduction of new rail-based products such as a dedicated Airport Shuttle running directly from the Sydney CBD to the Airport and improved connecting services from Western Sydney and other centres such as the Central Coast, Newcastle and Wollongong.</li> </ul>
8	Urgently establish an Enfield train marshalling yard.	Ready to proceed. Progress is currently held up by agreement being negotiated for transfer of the MFN to ARTC control.	<p>This project will assign siding space at Enfield Yard to stage and re-marshall up to four trains away from the congested Port Botany Rail Yard, improving the capacity of the Yard and promoting efficient utilisation of the line between Enfield and Port Botany.</p> <p>This would allow trains to park, shunt, and arrange dedicated loads directly into the Port - supporting better coordination, timely delivery, and less congestion around Port Botany. Port trains brought to Port on a demand basis. The project also provides a buffer between train operations on the MFN (to be managed and controlled by ARTC) and other influences including RailCorp operations and peak time curfews.</p> <p>Early implementation of this measure would support implementation of the PBLIS Rail Strategy.</p> <p>It will require removal of current empty carriages being stored at Enfield.</p> <p>A construction compound has been established at Enfield, materials are on-site and the Alliance partner, Downer EDI Works, is mobilised and ready to commence construction.</p>
9	Review Heavy Vehicle (HV) operations and restrictions in the Precinct, as well as network governance arrangements.	Proposed	<p>The aim of this review is to more efficiently use the existing road network, tackle HV network pinch points and manage growing road congestion. Changes to current arrangements should encourage more efficient vehicle and freight movements in the Port area.</p> <p>The review would cover Performance Based Standards (PBS) and Higher Mass Limits (HML) relating to HV operations in the Precinct as well as the PBS and HML network Governance Arrangements for the Precinct. For example, the potential to use high productivity vehicles (B Double, Super B fleet) on the network in off peak hours.</p> <p>Such guidelines will need to be informed by an analysis of the impact of HPV on safety, road wear and maintenance, and road design and performance.</p>
10	Review of High Occupancy Vehicle/Tolled Lanes (HOV/HOT) to service the airport	Proposed	<p>Aim to mitigate congestion in the short to medium term as part of an integrated strategy for Sydney Airport's transport needs.</p> <p>HOV lanes on Sydney Airport operated roads should be included in this review.</p>

*\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.*

Ref	Solution description	Status	Purpose and Background
11	Implement Managed Motorway systems	Proposal submitted to Infrastructure Australia assessed as 'Ready to Proceed'	<p>Enables better use of the existing road network, and real time traffic flow management, to ease peak road congestion.</p> <p>The submission investigates the benefits of implementing a Managed Motorway system for motorway-standard roads in the Precinct and for the Sydney Orbital.</p> <p>'Smart technologies' have the potential to offer significant benefits, relative to their cost, for traffic flows in peak conditions. Examples include automatic vehicle and incident detection systems, electronic variable speed limits, closed circuit television cameras and systems to manage the operation of Motorway on-load ramps, to enhance the operational efficiency and safety of motorways and to get more out of the motorway network.</p>

### Unlock Capacity at 'Pinch Points'

Ref	Solution description	Status	Purpose and Background
12	Signal Control separation	Ready to proceed, pending negotiations for MFN transfer to ARTC	<p>This ARTC project will enable network control of the MFN from ARTC's control centre, to support the transfer of management responsibility to ARTC.</p> <p>This project is the first of two projects that ARTC has 'shovel ready' to enhance rail freight capacity. Together with the Enfield facility, these projects would increase capacity from 36 paths per direction per day to 48 paths per direction per day. An estimated 75% of possible paths are saleable, meaning train paths would increase from 27 to 36.</p>
13	Wardell Road - Cooks River resignalling	Ready to proceed, pending negotiations for MFN transfer to ARTC	<p>This ARTC project will put additional signalling on the Mascot Master Siding and convert the siding to two tracks, extending the duplication from Cooks River to Mascot, and halving the length of the single line section.</p> <p>Together with the Enfield facility, these projects would increase capacity from a theoretical 36 paths per direction per day to 48 paths per direction per day.</p>
14	Provide additional signage and passenger indicators at airport terminals to encourage passenger	Not started	<p>This would promote the use of public transport services by arriving travellers. Currently, the rail service does not have high profile at the Airport.</p> <p>Options include additional, eye-catching signage to train station, and additional passenger displays with the time of the next</p>

\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.

Ref	Solution description	Status	Purpose and Background
	rail use		train at the airport and other locations (e.g. Central, Town Hall, and Wynyard).
15	RMS Roads Package  SEE APPENDIX B FOR FULL PROJECT LIST	Early consideration	<p>A full list of 17 small to medium road works were identified for the Precinct which would unlock pinch points and improve freight and private vehicle traffic flows around the Precinct, to relieve congestion.</p> <p>These are achievable in the short to medium term, but many would require approvals processes, and longer term staging may be required given budget constraints. The wider network impacts on traffic flow from these smaller measures should be tested, and can be done once the meso model is established (see 1 above).</p> <p>There is likely to be community sensitivity around conversion of Bourke Rd and O'Riordan St, as well as the widening of Bourke Rd which requires land acquisition.<sup>78</sup> Projects should be considered in light of a wider Precinct Road Network strategy. However, an initial set of priority works could be progressed by NSW Government and/or SACL, including the grade separation of Qantas Drive/Joyce Drive/O'Riordan St/Reginald Ansett Drive near Domestic Terminal, and widening of O'Riordan St at Mascot from Robey St to Bourke Rd.</p>
16	Rail works package	Early consideration	<p>There are a range of medium size freight rail works for the Precinct which could be prioritized in a similar way to the RMS package above. Immediate options include:</p> <ul style="list-style-type: none"> <li>• Removing the level crossing at General Holmes Drive. All freight movements to/from the Port travel across this crossing which impacts the efficiency of the rail freight system and causes delays on the road network.</li> <li>• Duplicating the Port Botany Rail Line between Mascot and Port Botany. The single line of 3km limits the line's operational capacity.</li> <li>• Replace the existing pedestrian crossing at Banksia Street with a pedestrian overbridge.</li> <li>• Provide additional signaling and passing loops on the Southern Sydney Freight Line (after completion).</li> </ul>

## Raise Productivity

Ref	Solution description	Status	Purpose and Background
17	Identify and ensure optimal ownership/ operation arrangements for the Port Botany Freight Line	Proposed	<p>RailCorp is discussing with ARTC the handover of the Metropolitan Freight Network. The Scoping Study's consultations brought to light varying views of the merit of this proposal. There was concern about whether the ARTC's commercial framework, which seeks a return on investment, is the right model for the MFN which has a policy objective of maximising rail throughput. The proposed arrangement could be tested against other ownership/operational arrangements.</p> <p>Examples of options to consider:</p> <ul style="list-style-type: none"> <li>• Alternative owners/operators such as Country Rail Infrastructure Authority, RailCorp (existing), or Sydney Ports.</li> <li>• Competitive tender or franchise arrangements for a single party to operate the service</li> <li>• Incentives for ARTC to maximize throughput on rail.</li> </ul>

<sup>78</sup> [http://www.botanybay.nsw.gov.au/images/stories/pdf/cityplanning/zoning/draftBBLEP\\_S64%20Stage/1100\\_COM\\_LRA\\_001\\_010\\_20110710.pdf](http://www.botanybay.nsw.gov.au/images/stories/pdf/cityplanning/zoning/draftBBLEP_S64%20Stage/1100_COM_LRA_001_010_20110710.pdf)

\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.

Ref	Solution description	Status	Purpose and Background
18	Enhanced train services through Sydney Airport	Proposed	<p>A range of measures to improve public transport services could be considered for the Sydney Airport rail services, to relieve growing road congestion. Current service levels to Sydney Airport are a maximum of 8 trains per hour, with intervals between trains ranging between 3 and 12 minutes. This is as a result of the interspersed slow/fast services on the East Hills Line, and that some services use the Sydenham line.</p> <p>Completion of the Kingsgrove to Revesby Quadruplication Project (see below) will enable more frequent and more reliable train services to the airport, and would allow a dedicated airport service with minimal impact on commuters.</p> <p>Other options include:</p> <ul style="list-style-type: none"> <li>- More frequent train services, more consistent train spacing, or or divert existing crowded trains from Campbelltown via Sydenham.</li> <li>- Dedicated or premium airport shuttle rolling stock could also be considered - for example operating from Kingsgrove to Macdonaldtown.</li> <li>- Better connections at Wolli Creek to improve services to/from Hurstville, Sutherland, Cronulla and Wollongong.</li> </ul>

*\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.*

## Transformational Investment (all projects currently underway)

Ref	Solution description	Status	Purpose and Background
19	Southern Sydney Freight Line (SSFL)	Under construction	<p>In the short term, the SSFL will relieve congestion on the rail network by servicing the existing relatively small Villawood intermodal terminal, and providing a dedicated freight line from Macarthur to Port Botany, bypassing the RailCorp network. This will improve access to Port Botany for freight from Southern NSW and address a key gap and constraint on the current rail freight network.</p> <p>Over the medium term, the SSFL enables new rail terminals at Moorebank, which will help to achieve the NSW Government's target of doubling the proportion of freight moved by rail through NSW Ports by 2020.</p> <p>This ARTC project will construct a 31km dedicated freight line between Macarthur and Leightonfield in South Sydney, allowing passenger and freight services to operate independently of each other and improving rail freight reliability. This addresses a key bottleneck on the existing network. ARTC puts this Line's capacity at 24 trains per direction per day, although shorter IMEX trains would achieve greater than this.</p> <p>ARTC's commercial model has the party requiring additional capacity as paying for the necessary works. It is unlikely that Moorebank or SIMTA are allowing for this cost.</p>
20	Enfield Intermodal Terminal (IMT)	Under construction	<p>The Enfield Intermodal Terminal will provide the potential to move more than double the current rail throughput between Port Botany and metropolitan intermodal terminals. It will play a significant short term role in moving toward the NSW Government's target of doubling the proportion of freight moved by rail through NSW Ports by 2020. This addresses a key issue for rail freight capacity.</p>
21	South West Rail Link (SWRL)	Under construction	<p>The South West Rail Link will extend the reach of the CityRail network to the new development areas in Leppington and Edmondson Park.</p> <p>The project will help manage road demand and shift discretionary road users onto public transport around the South West Growth Centre. Use of the SWRL is likely to include trips to major centres including Parramatta, the CBD, North Shore Corridor and Sydney Airport. Will potentially reduce some vehicle traffic on the M5 and M5 East corridor and others.</p>
22	Kingsgrove to Revesby Quadruplication Project (Airport and East Hills Rail Line)	Under construction	<p>The Kingsgrove to Revesby Quadruplication Project will enable more efficient and effective services on the Airport and East Hills Rail Line.</p> <p>The planned service pattern following implementation separates express services from local services (commencing from Revesby), allowing for more frequent and more reliable services for both. This has the potential to reduce pressure on the M5 and M5 East corridor, and other routes, particularly in the critical peak times for travel to and from the CBD. It also will allow for the increase in frequency and consistency of train services to the Airport terminals. Maximum capacity on the corridor would be in the order of 15 to 20 trains per hour (every 3 - 4 minutes).</p>

*\* Unless specifically referenced to another report, all financial estimates provided herein are high level heuristic estimates only, and provided only for broad comparative purposes. These figures may reflect informal discussions and are not based on considered analysis. Estimates herein should not be quoted outside this report, or for any other purpose.*

## Medium Term Solutions

*These measures would require more than three years to implement or are measures which could be done relatively quickly but would first require further consideration and testing by Government.*

### Better Use of Existing Assets

Ref	Solution Description	Status	Purpose and Background
23	Preserve critical land around the Port precinct.	Early consideration	<p>This measure would mark out a sufficient land buffer around the Port, and put in place appropriate planning controls on residential development in these areas, as well as strict monitoring and adherence to these. The aim is to prevent urban encroachment on key infrastructure assets in the corridor that might obstruct their future optimal development.</p> <p>While the Port is currently a State Significant Zone, there has been examples of residential and sensitive use development near to the Port, which would threaten more productive use of the Port in the medium to long term.</p>
24	Remove or Phase out Cashback Scheme	Proposed	<p>This could help to address growing congestion on the M5. This issue is likely to be very sensitive with the community.</p> <p>Alternative options include retaining cash back only for the local community or at certain times of day, eg outside of peak hours.</p>
25	Freight peak hour pricing	Early consideration	<p>This would seek to spread freight related traffic out beyond the peaks, with more truck freight travelling at night and on weekends. It would address growing road congestion and coinciding demand by different road users in the Precinct. This approach was advocated by IPART in 2008.</p>
26	Consider controls on freight line or yard at Port Botany to reduce train shunting around the Port		<p>There are various measures being proposed to standardize freight rail delivery and relieve congestion at Port Botany by reducing the need to breaking up trains at Port Botany. These proposals include:</p> <ul style="list-style-type: none"> <li>- Development of a port shuttle with standard unit (shorter) trains.</li> <li>- Requirement of dedicated loads into Port, for proceeding by a single stevedore.</li> <li>- Service level contracts for all components of the logistics chain, to provide commercial drivers for each component.</li> <li>- MoU on Port operations with stevedores (being considered by ARTC).</li> </ul> <p>These would involve upfront costs to implement, including to rolling stock, but may be considered in the medium term. Importantly, delay and congestion caused by train shunting will worsen with the Port Botany expansion project, as the third terminal begins to dilute train loads further.</p>
27	Introduce congestion pricing options	Early consideration	<p>Congestion pricing can address road congestion and reduce coinciding demand for road infrastructure in the Precinct. It can also promote more efficient use of the road network, and provide revenue to reinvest in infrastructure elsewhere.</p> <p>Heavy vehicle congestion pricing alone as is being developed by COAG may be insufficient, as it does not target discretionary vehicle use. Public and industry acceptance can be a challenge, although congestion pricing can gain acceptance after implementation. A pilot could be developed as has been done in the USA. Options could include:</p> <ul style="list-style-type: none"> <li>- Tolling/congestion pricing on the M5 East. (+\$120m p.a. revenues - Interlink, M5 West concession holder, entitled to compensation for foregone revenues on M5 West that result)</li> <li>- Congestion based tolling on the M5 West (budget neutral - renegotiation of M5 concession with Interlink required)</li> <li>- Cordon pricing at the Airport (this would impose a fee/tax for entry into a restricted area, as a demand management strategy to relieve traffic congestion within that area.</li> </ul>

## Unlock Capacity at 'Pinch Points'

Ref	Solution Description	Status	Purpose and Background
28	Progress planning approval to increase permitted throughput at Port Botany.	Under consideration	<p>Sydney Ports argues Port Botany will be capable of handling 7m TEU pa once the Port Botany Expansion Project is opened in 2012. Port Botany is restricted to 3.2m TEU pa at present.</p> <p>Raising the planning limit is likely to require a clear ports policy for NSW, aligned with a plan for how growth in freight can be accommodated on landside infrastructure.</p>
29	Commuter Car Park & Interchange Program	Under construction & in planning/ development	<p>The Commuter Car Park and Interchange program addresses low levels of public transport use by encouraging discretionary road users onto public transport by providing parking facilities.</p> <p>Construction is underway on a range of commuter car parks and interchange projects which are all located within the Precinct, including Blacktown Commuter Car Park; Macarthur Commuter Car Park - Stage 2; Mount Druitt Commuter Car Park; and Kingswood - Upgrade of Transport Interchange Facilities and Commuter Car Park.</p> <p>A number of other projects are in the planning and design stage, including Cabramatta Commuter Car Park; Fairfield Transport Interchange Upgrade; and Granville - Transport Interchange Upgrade.</p>
30	Permit 4.6 m vehicles to use Qantas Drive	Proposed	<p>Currently, General Access Heavy Vehicles and B-Doubles can use Qantas Drive but 4.6m high trucks cannot.</p> <p>Removing this requirement would improve road freight traffic flow, but may interfere with International Treaty obligations. This measure would require the agreement of the Federal Government and Sydney Airport Corporation.</p>
31	Remove bus depot at the Port and utilize for Port traffic	Proposed	<p>Removing the depot would help ensure a dedicated port zone, clarify the purpose of surrounding land, and reduce non-port traffic. Further work would be required to assess the site's best use. Options include: a heavy vehicle turnaround area, warehousing (pack/unpack), road carriers operation, empty container parks to support the forecasted trade growth.</p> <p>This would require a suitable site nearby to be identified and relocating the bus depot.</p> <p>Key benefits of this site include that it is large and secure, its strategic position, hardstand amenities are already in place, and this would reduce bus traffic in the immediate Port vicinity (currently not a significant problem, but could be an issue in the future).</p>

## Raise Productivity

Ref	Solution Description	Status	Purpose and Background
32	Use existing airport siding to transport air freight by rail	Proposed - for further investigation	<p>Currently all air freight is moved by road. This project would use an existing siding at the Sydney Airport precinct to transport air freight to remote intermodal terminals. Wagons could be left in the siding then picked up by the next train passing. This would reduce some truck movements in the airport itself and in the surrounding area. Currently, the siding is largely unused and may require some upgrading.</p>
33	Introduce full electronic tolling on M5	Under consideration	<p>Addresses problem of current and growing road congestion</p> <p>Potential to improve traffic flow and therefore capacity.</p>
34	Develop a buffer zone policy for the Metropolitan Freight Network.	Proposed	<p>While the Port is a State significant zone, there are no buffer provisions along key freight rail and road routes such as Foreshore Road and the rail corridor. Increased buffers can at times conflict with urban planning objectives to encourage densification along public transport corridors. However, as the supply chain moves towards 24/7 operations, adequate buffer zones will be required to help ensure efficient and extended use of freight infrastructure assets.</p>



35	Standardise Sydney Councils' night time delivery standards	Proposed	Measures should be undertaken to standardize Council approaches to freight movement and operations, to support the move towards 24/7 supply chain operations. Currently, different Sydney local councils have different delivery restrictions on hours of freight operations and opening times. Attempts to move to 24/7 operations will need local council endorsement & consistency.
36	Customer survey on public transport services in Precinct	Early consideration	Undertake a customer-focused study of travel routes/times to the airport, looking at number of connections, and customer choices, to better target public transport provision. This would interface with work already underway in TfNSW Customer Division.
37	Standardise all rail data and rail supply chain information flow to improve transparency and performance data	Early consideration	A key input into a more coordinated and efficient supply chain is a reliable data picture of its performance, to drive transparency and improve its reliability and competitiveness over time.  One option would be to regulate the supply of rail data from stevedores and rail operators to support a more transparent view of the port rail supply chain.
38	Rest areas and truck driver amenity enhancements	Early consideration	Amenity improvements to road infrastructure in the Precinct can promote road safety as truck volumes and congestion increase. Also will assist with managing Port-related layover issues on Foreshore Drive and Botany Road. May require work to resolve land acquisition & planning issues.

## Transformational investment

Ref	Solution Description	Status	Purpose and Background
39	Preserve the rail corridor for the Eastern Creek Terminal.	Early consideration	The proposed Eastern Creek Terminal would serve a very large catchment - Western Sydney. Its proposed annual capacity is 1 million TEU. The provision of an intermodal terminal at Eastern Creek, in addition to current terminals and those planned for Moorebank and Enfield, would be transformational. Several studies have been done, but no corridor identified.  Steps taken in the short to medium term to reserve the site and preserve the corridor to the Main Western Rail Line and the Metropolitan Freight Network (/Southern Sydney Freight Line) will enable the site to be developed at an appropriate time in the future at a lower cost.
40	Resolve potential issues between Moorebank and SIMTA projects, to allow both projects to proceed at the optimum scale and pace	Ongoing	Promotes more efficient and competitive freight rail capacity development.  Development of rail haulage at Port Botany will depend on sufficient capacity. Enfield will be the first significant expansion in terminal capacity. However, it will be necessary to continue to expand intermodal terminal capacity in order to enable more freight to move by rail. The current issues between Moorebank and SIMTA have the potential to delay some of this capacity development coming online.
41	M5 West Widening	Under negotiation with Interlink	This project will increase capacity on the M5 - a particularly congested corridor. The proposed widening of the M5 South West Motorway provides for three lanes in each direction between King Georges Road, Beverly Hills and Camden Valley Way, Prestons.

## Longer Term Solutions

*These measures are options that could be considered in the longer term, or those which would require more than five years to implement.*

### Better Use of Existing Assets

Ref	Solution description	Status	Purpose and Background
42	Long Term High Productivity Vehicle Strategy for the Port and Precinct	Proposed	<p>Long term, a clear strategy for heavy vehicle use in the Precinct would ensure appropriate access and would enable a transparent way to manage road congestion and community concern.</p> <p>The strategy would need to consider ways to improved road freight productivity, factor in road maintenance costs and safety considerations, and urban amenity issues.</p> <p>The aim of the Strategy would be to more encourage more efficient vehicle and freight movements in the Port area.</p>
43	Develop a network of airports and underutilised airport assets (eg Bankstown, Canberra and Newcastle) to take pressure off KSA.	Proposed	<p>Long term, this is one possible approach to expanding aviation capacity as passenger numbers increase. This is subject to the findings of the Joint Study on Sydney's Aviation Capacity.</p> <p>The proposal was recommended by the Australian Airports Association. See <a href="http://www.airports.asn.au/wp-content/uploads/2011/08/AAA_Sydney-Aviation-Capacity-Study.pdf">www.airports.asn.au/wp-content/uploads/2011/08/AAA_Sydney-Aviation-Capacity-Study.pdf</a></p>
44	Develop a state network of ports and regional ports to relieve pressure on Port Botany.	Proposed	<p>Long term, additional capacity could be developed at other ports in New South Wales, or interstate. However, this would involve additional costs to those port assets, and also to landside infrastructure. This may not be efficient for most containers arriving at Port Botany, which are bound for the Sydney Metropolitan region.</p>

### Unlock Capacity at 'Pinch Points'

Ref	Solution description	Status	Purpose and Background
45	<p>Establish a Precinct wide Road Investment Program</p> <p>Refer Appendix B for full list</p>	Proposed	<p>A program would addresses current and growing road congestion in the corridor, and would integrate planned minor road works with large scale road projects to maximize investments.</p> <p>This would enable the joined up development of the Precinct's road network, and could stage RMS projects identified in Appendix B that are not required in the immediate term. The whole package is a significant funding task and proper testing is required to understand which deliver highest economic benefits.</p>
46	Develop rail connection options for air freight received at Sydney Airport	Proposed	<p>Long term, as air freight volumes double, rail freight transport may need to be developed from the Precinct.</p>

## Raise Productivity

Ref	Solution description	Status	Purpose and Background
47	Implement airport-specific rolling stock	Proposed	<p>Addresses problem of inadequate public transport services</p> <p>With the introduction of a new timetable following the completion of the Kingsgrove to Revesby quadruplication, services to the airport may be able to be constrained to operate between Revesby and the city, then continuing west or terminating at Macdonaldtown. At this stage, it may be possible to introduce a new configuration of rolling stock internal to permit facilities for travellers to and from the airport to be better accommodated. Easy options include luggage racks in the vestibules; more difficult options include wider doorways.</p> <p>Providing better facilities for travellers conversely reduces amenity to commuters. This issue may be alleviated if service frequency is high enough.</p>
48	Implement a smart transport infrastructure program for the Precinct	Proposed	This would look to deploy smart technologies to better utilize existing infrastructure networks, building on the first stage of work done through the Managed Motorways program. Smart infrastructure can improve congestion and traffic flow on motorways, and manage demand in real time.
49	Extend distribution centre opening hours	Proposed	<p>Addresses problem of current and growing road congestion &amp; unreliable and uncompetitive rail freight -</p> <p>Will require consultation with Councils, community and evidence that demand justifies the change ( Logistics Supply chain)</p>

## Transformational Investment

Ref	Solution Description	Status	Purpose and Background
50	Moorebank Intermodal Terminal	Feasibility stage	<p>Addresses problem of unreliable and uncompetitive rail freight</p> <p>The proposed Moorebank IMT has the potential to offer very significant benefits in moving toward the target to double the proportion of container freight movements by rail through NSW Ports. The project potentially competes with the SIMTA proposal, below.</p>
51	Develop the Eastern Creek Intermodal Terminal and Western Sydney Freight Line	Proposed	This would require substantial investment in connecting rail infrastructure, as well as immediate corridor preservation (see medium term solutions).
52	SIMTA Moorebank Intermodal Terminal	Preliminary Environmental Assessment Stage	SIMTA's proposal for a Moorebank IMT focuses on servicing the Port Botany container task. It has the potential to support the targeted doubling in rail modal share through NSW Ports. The proposal potentially competes with the Federal Moorebank proposal, above.
53	North Sydney Freight Line	Proposed	The North Sydney Freight Access project is focused primarily on interstate rail freight services and not on rail services to Port Botany. It would likely create extra capacity for passenger services. Some feasibility and preparatory work is underway. \$840M of federal money is allocated to the project.
54	Capacity enhancement to Southern Sydney Freight Line	Proposed	<p>The SSFL construction will duplicate the freight line south of Port Botany (see above), with a capacity of 24 trains per direction per day, or more with shorter IMEX trains.</p> <p>With interstate trains and combined throughput from Moorebank and SIMTA of 500,000 TEU (one quarter of intended overall capacity), this demand would already exceed the initial capacity of the SSFL and require capacity enhancement. Additional crossing loops between Moorebank and Sefton Park Junction, and intermediate signals between crossing loops,</p>

			could be considered in the long term.
55	M4 Extension M4 Extension with Port Botany connection F3-Sydney Orbital F6 Corridor	Proposed	There are several large and unfunded road proposals which aim to address current and growing road congestion in the long term, with large scale potential increases in road capacity and connectivity for both heavy and light vehicles. These would reduce congestion and complete the Sydney Orbital network.
56	M5 Duplication	Early development	This would significantly reduce congestion around the Precinct and facilitate traffic flows on the M5, with partial separation of heavy vehicle flows.
57	Comprehensive road pricing solution for the Sydney network	Proposed	<p>Long term, a comprehensive road pricing solution would reduce congestion, help ensure efficient use of the road network, and encourage public transport use. It would also potentially provide a revenue stream for government to invest in critical infrastructure or to complete the Sydney orbital network.</p> <p>Various options could be considered including the sale of the network to a private operator, subject to agreement on service standards and obligations.</p> <p>Public sensitivity involved. May require trial projects prior to implementation.</p>

## Appendix B RMS corridor capital works proposals

#	Projects For Priority Consideration	Purpose / RMS Comment	Timeframe
1.	Grade Separation at Qantas Drive/Joyce Drive/O'Riordan Street/Reginald Ansett Drive near the Domestic Terminal (could be grade separated right turn or grade separate through movements) *;	Improves access and reduces congestion around Domestic Terminal	Medium
2.	Widen O'Riordan Street at Mascot from Robey Street to Bourke Road;	Diverts traffic from Domestic Terminal and reduces congestion.	Medium
3.	General Holmes Drive Level Crossing replacement (do not close the level crossing without providing a replacement link or enhancing existing links);	Much preparatory work has been done, should continue development.	Medium
4.	Convert Bourke Road and O'Riordan Street to one-way roads from Gardeners Road to Green Square. This creates one-way pairs;	Increases capacity on a major route north of the Airport.	Short
5.	Widen Bourke Road from Coward Street to Gardeners Road at Mascot to allow its use by all vehicles;	Complements #4 above	Short
6.	Widen Marsh Street at Arncliffe from M5 East to the Bridge over the Cooks River (required for Cooks Cove development) **;	improves access to and reduces congestion around International Terminal;	Medium
7.	Improve Wickham Street/West Botany Street/Marsh Street intersection at Arncliffe;	Complements #6 above	Medium
8.	Provide ramps between Gardeners Road and Southern Cross Drive at Kensington;	Should be considered as part of truck route planning.	Medium
9.	Widen Foreshore Road to 6 lanes (and/or provide parking bays);	Improvements should be considered early.	Short

#	Projects For Consideration	Purpose / RMS Comment	Timeframe
10.	Widen Mill Pond Drive and improve intersection of General Holmes Drive/Mill Pond Road (right turns);		Medium
11.	Provide a direct connection between Southern Cross Drive and Foreshore Road (to avoid traffic having to pass through several intersections);		Medium
12.	Extend Campbell Road east across Alexandra Canal to Bourke Road **;	Should be considered in motorway scoping	Medium
13.	Provide a new road from Princes Highway near Holbeach Avenue, Tempe to Euston Road, St Peters (generally in the freeway corridor) **;	Should be considered in motorway scoping	Medium
14.	Widen Canal Road and bridge over Alexandra Canal to 6 lanes *;	Should be considered in motorway scoping	Medium
15.	Widen Airport Drive/Qantas Drive to 6 lanes *;	Should be considered in motorway scoping	Medium
16.	Allow 4.6 metre high vehicles to use Airport Drive/Qantas Drive.	May affect International Treaty re Obstacle Limitation Surface	Medium
17.	Widening Joyce Drive	Should be considered in motorway scoping	Medium

\* May be required with M4 Extension

\*\* May be required with M5 East Duplication

#### Notes:

- Projects not individually prioritised.
- 'Medium term' works indicates planning/approval of the project can be commenced immediately, but that commencement of construction would require 2-3 years.

## Appendix C References

ABS (2011), *Information Paper: Experimental Statistics on International Shipping Container Movements 2009-10*, 5368.0.55.018.

ACCC (2011), *Container Stevedoring Monitoring Report no.13*, Commonwealth of Australia, October 2011

The Allen Consulting Group (2009), *Options for improving the integration of road governance in Australia*, Report to Infrastructure Australia August 2009

The Allen Consulting Group (2010), *Road Access Improvement Regime: Issues Paper*, Report to Infrastructure Australia, September 2010

ARUP (2003), *Port of Botany Expansion - EIS Advice*, Report to the Sydney Ports Corporation, April 2003

AusLink (2007), *Sydney Urban Corridor Strategy*, Commonwealth of Australia, August 2007

Australian Government (2008), *Nation Building: Rail, Road, Education & Research and Business*, Commonwealth of Australia December 2008

Australian Government (2009), *Nation Building for the Future*, Commonwealth of Australia May 2009

Australian Government (2011), *Nation Building Economic Stimulus Plan*, <http://www.economicstimulusplan.gov.au>

Cambridge Systematics (2010), *Separation of Vehicles - CMV-Only Lanes*, Report for the Transportation Research Board, National Academy of Sciences 2010

Eddington, R. (2006), *The Case for Action: Sir Rod Eddington's Advice to Government*, UK Government.

Freight Infrastructure Advisory Board (2005), *Railing Port Botany's Containers: Proposals to Ease Pressure on Sydney's Roads*, NSW Department of Planning, July 2005

Gilfillan (2011), *The future of Sydney's Ports - a 30 year horizon*, Presentation for Sydney Ports Corporation, August 2011

Gunn, S. (2011), *"Congestion versus Landside Reform at Port Botany"*, presentation to the Sydney Ports Corporation, 13 May 2011

Gunn, S & Noon, M (2011), *Port Botany Supply Chain Efficiency*, Sydney Ports Corporation.

Infrastructure Australia (2010), *National Ports Strategy Paper*, Commonwealth of Australia December 2010

Infrastructure Australia (2010), *National Ports Background Paper*, Commonwealth of Australia December 2010

Infrastructure Australia (2011), *National land freight strategy discussion paper*, Commonwealth of Australia February 2011

Infrastructure Partnerships Australia (2010), *Submission: M5 Corridor Upgrade*, March 2010

IPART (2008), *Reforming Port Botany's links with Inland Transport – Final Report*, March 2008

Juturna Consulting (2010), *National Freight Strategy: Roads: 2010-206*, A discussion paper for Infrastructure Australia, June 2010

Juturna Consulting (2011), *COAG Road Freight Incremental Pricing Trials*, Report prepared for Infrastructure Australia, August 2011

Lubulwa, G, Malarz, A & Wang, SP (2011), *An investigation of Best Practice Landside Efficiency at Australian Container Ports*, Australasian Transport Research Forum 2011 Proceedings, BITRE, Canberra.

Maunsell (2002), *Traffic and Landside Transport Study for Proposed Port Botany Expansion*, November 2002.

McKinnon A.C. and Piecyk M. I. (2009) *Logistics 2050: Moving Freight by Road in a very Low Carbon World*.

NSW Department of Infrastructure, Planning and Natural Resources (2009), *Determination of a development application for State significant and designated development under section 80 of the environmental planning and assessment ACT, 1979*, The NSW Department of Planning, November 2003

NSW Treasury (2009), "Budget Paper No. 4: Infrastructure Statement", *NSW 2009-10 Budget*, June 2009

NSW Treasury (2006), *State Infrastructure Strategy: NSW 2006-07 to 2015-16*, NSW Government, 2011

PriceWaterhouseCoopers (2009), *Meeting the 2050 Freight Challenge*, Report to Infrastructure Partnerships Australia, June 2009

Productivity Commission (2011), Draft report on *Economic Regulation of Airports in Australia*, Commonwealth of Australia, August 2011

QR National (2007), *Response to the Review of the Interface between the Land Transport Industries and the Stevedores at Port Botany*, June 2007

Road and Traffic Authority (various), *AADT and Sydney Traffic Volumes*, available online: [http://www.rta.nsw.gov.au/trafficinformation/downloads/aadtdata\\_dl1.html](http://www.rta.nsw.gov.au/trafficinformation/downloads/aadtdata_dl1.html)

Road and Traffic Authority (2005), *Botany Road, Botany: New traffic arrangements for heavy vehicles*, brochure available online: [www.rta.nsw.gov.au/trafficinformation/downloads/2005\\_06\\_botany\\_hvroute.pdf](http://www.rta.nsw.gov.au/trafficinformation/downloads/2005_06_botany_hvroute.pdf)

Road and Traffic Authority (2009), "M5 Transport Corridor Study: Preliminary overview report", *M5 Transport Corridor feasibility study*, November 2009

Road and Traffic Authority (2010), *M5 West Widening Project - Traffic and Transport Report*, September 2010

Road and Traffic Authority (2011), *Key Roads Performance Report*, NSW Government, September 2011

Road and Traffic Authority (2011), "Submissions and Preferred Project Report", *M5 West Widening: moving goods, people and the economy*, NSW Government, May 2011

Road and Traffic Authority (periodic), *Traffic Volume Maps for Infrastructure SEPP*, available online: [http://www.rta.nsw.gov.au/publicationsstatisticsforms/downloads/traffic\\_volume\\_maps/traffic\\_vol\\_maps\\_dl1.html](http://www.rta.nsw.gov.au/publicationsstatisticsforms/downloads/traffic_volume_maps/traffic_vol_maps_dl1.html)

SGS Economics & Planning (2009), *Botany Bay Planning Strategy 2031*, Report to the City of Botany Bay, March 2009

Sydney Airport Corporation (2006), *Sydney Airport Ground Travel Plan*, available online: [http://www.sydneyairport.com.au/corporate/community-environment-and-planning/~/\\_media/Files/Corporate/GrndTrnsprtTravelPlan/Travelplan.ashx](http://www.sydneyairport.com.au/corporate/community-environment-and-planning/~/_media/Files/Corporate/GrndTrnsprtTravelPlan/Travelplan.ashx)

Sydney Airport Corporation (2009), *Sydney Airport Master Plan 2009*, July 2009

URS (2008), *The Economic Impact of Growth at Sydney Airport*, report prepared for Sydney Airport Corporation.

Sydney Ports Corporation (2008), *Port Freight Logistics Plan: A framework to improve road and rail performance at Port Botany*, June 2008

Sydney Ports Corporation (2010), *Trade Report 2009-10*, December 2010

WilburSmith Associates et. al. (2010), *Phase 1 Final Report: The Business Case for Dedicated Truck Lanes*, prepared for the Missouri, Illinois and Ohio Departments of Transportation and the US Federal Highway Administration, June 2010

Xu, M, Milthorpe, F., & Tsang, K. (2011), *Detailed Analysis of the Travel Patterns of Rail Users in Sydney*, Bureau of Transport Statistics, ATRF Proceedings, Sydney

Xu, B., and Milthorpe, F. (2010), *Analysis of Journey to Work Patterns in Sydney*, Bureau of Transport Statistics, ATRF Proceedings, Sydney



Ernst & Young

Assurance | Tax | Transactions | Advisory

**About Ernst & Young**

Ernst & Young is a global leader in assurance, tax, transaction and advisory services. Worldwide, our 152,000 people are united by our shared values and an unwavering commitment to quality. We make a difference by helping our people, our clients and our wider communities achieve their potential.

Ernst & Young refers to the global organization of member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit [www.ey.com](http://www.ey.com).

© 2012 Ernst & Young, Australia.  
All Rights Reserved.

Ernst & Young is a registered trademark. Our report may be relied upon by Infrastructure NSW for the purposes only pursuant to the terms of our engagement letter dated 3 November 2011. We disclaim all responsibility to any other party for any loss or liability that the other party may suffer or incur arising from or relating to or in any way connected with the contents of our report, the provision of our report to other parties or the reliance upon our report by any other party.

Liability limited by a scheme approved under Professional Standards Legislation.