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**Sydney's road network:
plans and prospects**
Briefing Paper No 8/2015
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Sydney's road network:
plans and prospects

by

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SUMMARY

This paper outlines the recent capital programs and targeted road strategies implemented by the NSW Government to address congestion on the Sydney roads network.

As a preface to that discussion, the paper provides a brief overview of Sydney's road network, as well as an outline of the administrative and funding arrangements related to NSW roads more generally.

Profile of the Sydney roads network

Sydney's road network, which comprises an extensive network of tolled motorways, main connecting roads and local roads, is a critical part of the city's broader transport network, directly supporting around 75% of the 17.6 million trips made every weekday.

Private vehicle usage across the network has increased in recent years and the car remains the dominant transport option for Sydney residents – accounting for 69% of all trips across all purposes in 2012-13.

The city's road network also serves a critical economic function, supporting around 278,000 heavy freight vehicle trips and 1.2 million light commercial vehicle trips each day in 2011.

Many key road corridors including the M2, M4 and M5 are all operating at capacity during the morning peak. Other key bottlenecks – such as Victoria Road, Spit Bridge and the Harbour Bridge – are also at capacity.

BITRE estimated that Sydney's annual congestion costs were around \$5 billion in 2005 – equivalent to \$1,100 per Sydneysider – and are forecast to increase to nearly \$8 billion per year by 2020.

With forecasts indicating that private and commercial use of the road network will continue to grow for the foreseeable future, there is likely to be increasing strain on an already congested network without additional capacity being added.

Classification and administration of NSW roads

Commonwealth, State and local governments have varying degrees of responsibility regarding the Sydney roads network, the extent of which is dependent on the road classification.

Generally speaking though, the Commonwealth Government's primary role is funding. The State Government is primarily responsible for funding, prioritising and carrying out capital and maintenance works on **State roads**. Local councils are primarily responsible for funding, prioritising and carrying out works on **regional and local roads**.

Roads and Maritime Services is the principal NSW Government agency

responsible for managing the roads network. The Minister for Roads, Maritime and Freight is ultimately responsible for the administration of individual Acts related to the NSW roads network.

NSW roads funding

The State Government pays for State roads, while local councils pay for regional and local roads. The way in which these funds are sourced is complex with State and Commonwealth government funding flowing across the three levels of classified roads.

Roads and Maritime Services spent \$5.5 billion to maintain, upgrade and operate the NSW roads and traffic network in 2014-15; this funding is not channelled solely to State roads and is also distributed to local councils to administer, maintain and upgrade regional and local roads.

Commonwealth Government funding is provided to the NSW Government under the [Nation Building Program \(National Land Transport\) Act 2009](#) for a [sub set of State Roads](#) in [Sydney](#) and more broadly in [New South Wales](#) that are part of the [National Land Transport Network](#).

The Commonwealth Government has a long standing role in providing road funds to councils predominantly through [Financial Assistance Grants](#) and the [Roads to Recovery Program](#).

NSW roads policy framework

The principal NSW Government policy document is [NSW 2021](#). Under this, separate sectoral plans, including the [State Infrastructure Strategy](#), guide land use and development, infrastructure and transport. The [Long Term Transport Master Plan](#) is the overarching plan for transport and roads.

The [State Infrastructure Strategy Update 2014](#) was prepared by Infrastructure NSW at the direction of the NSW Government to guide how proceeds from the [Rebuilding NSW](#) initiative could be spent.

The Government fully adopted the recommendations proposed by Infrastructure NSW in the updated State Infrastructure Strategy.

Sydney road management strategies

From an infrastructure standpoint, congestion occurs for two core reasons. Either there is insufficient capacity in the existing network and/or the roads network is managed inefficiently. Solutions to these problems can be either large scale capital infrastructure projects or smaller scale, targeted investments that can “make much better use of existing roads and resolve localised congestion problems that impair broader network and economic outcomes.”

The smaller scale road programs currently in place or in the planning phase as implemented by the NSW Government in Sydney are listed below:

- [Pinch Point Program](#)

- [Sydney Clearways Strategy](#)
- [M4 Smart Motorway System](#)
- [Gateway to the South](#)
- Upgrading Sydney Coordinated Adaptive Traffic System

Sydney road infrastructure projects

The **WestConnex** project, which involves the expansion of capacity along the M4 and M5 corridors, is the foremost NSW Government project currently underway in Sydney. A number of other projects are either underway or are in the viability assessment phase of planning, including:

- **NorthConnex** - the construction and operation of a tolled motorway linking the M1 Pacific Motorway at Wahroonga to the Hills M2 Motorway at West Pennant Hills.
- **Western Harbour Tunnel** - would provide a tunnel from WestConnex across Sydney Harbour to North Sydney, creating another bypass of Sydney's CBD and easing demands on the Sydney Harbour Bridge, Eastern Distributor and other approaches to the city.
- **Western Sydney Infrastructure Plan** - a ten-year road investment program of \$3.6 billion for Western Sydney.

Ultimately, the aim of these and other larger infrastructure projects is to enhance capacity and connectivity within and adjacent to the Sydney orbital road network.

1. INTRODUCTION

The Sydney roads network was first laid out in the [1951 County of Cumberland Plan](#).¹ Since then it has evolved considerably, shaped by the various policy measures implemented in response to the sprawling and expanding population base in Sydney. The most notable policy response was the 1987 *Roads 2000 Plan* which mapped the development of an orbital road corridor for Sydney.²

Despite these and other more recent policy responses, demand for the limited road space on the Sydney network has hit saturation. As identified in the [NSW Long Term Transport Master Plan](#), “the M2, M4 and M5 are all operating at capacity during the morning peak. Other key bottlenecks – such as Victoria Road, Spit Bridge and the Harbour Bridge – are also at capacity.”³

Policy responses to roads congestion are contentious, multi-faceted and can target either supply or demand side improvements.⁴ For example, enabling a shift from private vehicles to public transport is a policy response aimed at reducing demand on the roads network. However, even with such a transport mode shift, forecasts from the Bureau of Transport Statistics indicate that private motor vehicle usage will continue to be the dominant transport option for the foreseeable future in Sydney.

The network and public transport policy assumptions that feed into these forecasts are of course the subject of political debate. It should be emphasised that, while this is fully acknowledged, it is beyond the scope of this paper to examine those assumptions and to present a critical commentary on them.

Based on Bureau of Transport Statistics forecasts, the NSW Coalition Government's preferred response to congestion, initially outlined in the *2012 State Infrastructure Strategy*, is targeted primarily toward supply-side road network improvements. Additional supply-side measures, outlined in the *State Infrastructure Strategy Update*, will be funded by the partial lease of NSW electricity networks.

From this supply-side perspective, restoring Sydney's mobility presents “two seemingly simple, yet interlinked options”⁵: making better use of existing road space (Chapter 6) and the construction of additional capacity (Chapter 7). This paper outlines, with respect to these two options, the recent capital programs

¹ Infrastructure Partnerships Australia, [Urban Transport Challenge: Driving Reform on Sydney's Roads](#), December 2009

² A fundamental aspect of the plan was the creation of a circular ring of motorways, the Orbital Network, bisected by an east-west corridor.

³ NSW Government, [NSW Long Term Transport Master Plan](#), 2012, p.101

⁴ While recognising the role of demand-side measures in improving roads congestion, it is beyond the scope of this paper to assess the relative effectiveness of these measures with respect to prospective supply-side road improvements to the Sydney roads network.

⁵ Infrastructure Partnerships Australia, [Urban Transport Challenge: Driving Reform on Sydney's Roads](#), December 2009, p.1

and targeted road strategies implemented by the NSW Government to address congestion on the Sydney roads network.

As a preface to this discussion, this paper provides a brief overview of Sydney's road network, as well as an outline of the administrative and funding arrangements related to NSW roads more generally.

2. PROFILE OF THE SYDNEY ROAD NETWORK

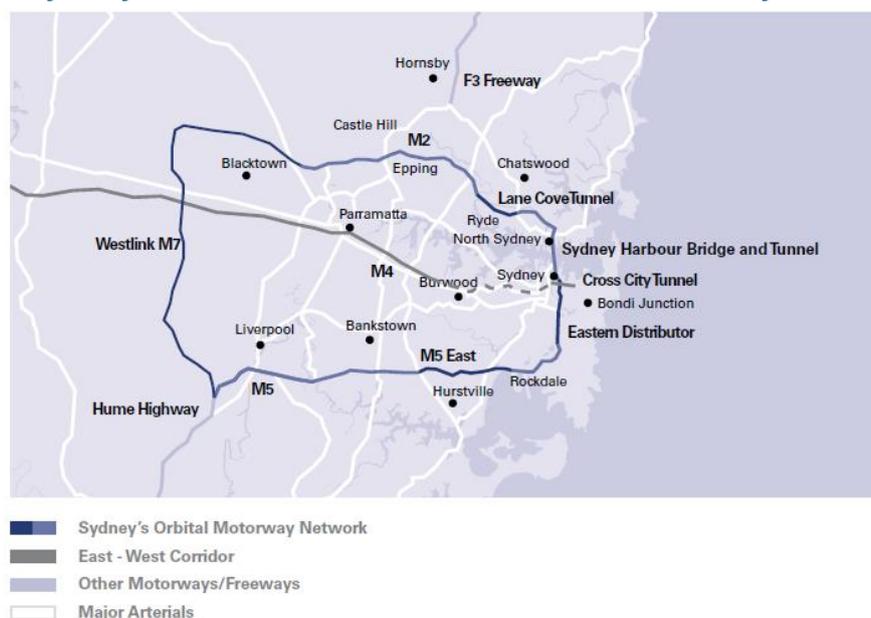
[Sydney's road network](#),⁶ which comprises an extensive network of tolled motorways, main connecting roads and local roads, is a critical part of the city's broader transport network, directly supporting around 75% of the 17.6 million trips made every weekday.⁷

Private and commercial vehicle usage across the network has increased in recent years. With forecasts indicating that use of the road network will continue to grow over the next decade or so, without additional capacity there is likely to be increasing strain on an already congested network.

2.1 Sydney motorway network

The Sydney motorway network is the principle high capacity urban corridor within metropolitan Sydney. The orbital network is the centrepiece of the motorway network (Figure 1) and is complemented by the M4 Motorway (the key artery serving the east-west spine between Penrith and Strathfield) and the M5/F5 (connecting Liverpool to the south western suburbs and Canberra). North of Hornsby, the F3 is the strategic link to the Central Coast, Hunter and beyond. Collectively, the network constitutes more than 160 kilometres of motorways and freeways, including nine tolled roads.⁸

Figure 1: Sydney Orbital and East-West Corridor Motorways Network⁹



⁶ 2,800 km of carriageway; 7000 lane km; more than 800 bridges.

⁷ Bureau of Transport Statistics, [Household Travel Survey Report: Sydney 2012-13](#), November 2014; includes vehicle and other modes of public transport supported by the roads network.

⁸ Brewer, J, and Camilleri, N., [Sydney's Growth Engines: Driving Sydney's Road Network Needs](#), 2009, p.7

⁹ Infrastructure Partnerships Australia, [Urban Transport Challenge: Driving Reform on Sydney's Roads](#), December 2009, Figure 2, p.5

The Sydney motorway network has been funded through public and private sector investment. The Sydney Harbour Bridge and untolled sections of the network are publicly owned and operated, with the remainder developed on Crown land by the private sector through Public Private Partnerships.¹⁰

The constituent motorways of the Sydney Orbital network		
Road	Owner/Concessionaire	Toll
Sydney Harbour Bridge	NSW Government	Yes
Sydney Harbour Tunnel	Private Sector (Sydney Harbour Tunnel Company)	Yes
Cahill Expressway	NSW Government	No
The Eastern Distributor	Private Sector (Airport Motorway Ltd)	Yes
Southern Cross Drive	NSW Government	No
General Holmes Drive	NSW Government	No
M5 East Tunnel	NSW Government	No
M5 South-Western Motorway	Private Sector (Interlink Roads)	Yes
Westlink M7	Private Sector (Westlink M7)	Yes
Hills M2	Private Sector (Hills M2 Motorway)	Yes
Lane Cove Tunnel	Private Sector (Connector Motorways)	Yes
Warringah Freeway	NSW Government	No
Gore Hill Freeway	NSW Government	No
Falcon Street Gateway	Private Sector (Connector Motorways)	Yes
Constituent motorways and roads of the Sydney East-West Corridor		
New South Head Road	NSW Government	No
Cross City Tunnel	Private Sector (CCT Motorway Group)	Yes
The Western Distributor	NSW Government	No
Victoria Road	NSW Government	No
City West Link	NSW Government	No
Wattle Street	NSW Government	No
Parramatta Road	NSW Government	No
M4 – Western Motorway	Private Sector (Statewide Roads)	Yes
F4 – Western Motorway	NSW Government	No

Source: Infrastructure Partnerships Australia

2.2 Private vehicle usage across the Sydney road network¹¹

Analysis of Sydney residents' travel mode choices using the [Household Travel Survey Report: Sydney 2012-13](#) reveals that the car remains the dominant transport option for Sydney residents – accounting for 69% of all trips across all purposes in 2012-13. In that period, 12.1 million trips were made by private vehicle on an average weekday in Sydney, either as a driver (8.3 million) or a passenger (3.8 million). This is a 5% increase in the number of trips taken a decade earlier.

However, there has also been a notable increase in public transport use, with

¹⁰ For further discussion of the role of PPPs in the development of the Sydney Motorway Network, see: Infrastructure Partnerships Australia, [Urban Transport Challenge: Driving Reform on Sydney's Roads](#), December 2009, Section 2.1.4, p.7

¹¹ The statistics presented in this chapter of the paper are sourced primarily from the [Household Travel Survey Report: Sydney 2012-13](#) – other sources are acknowledged where appropriate.

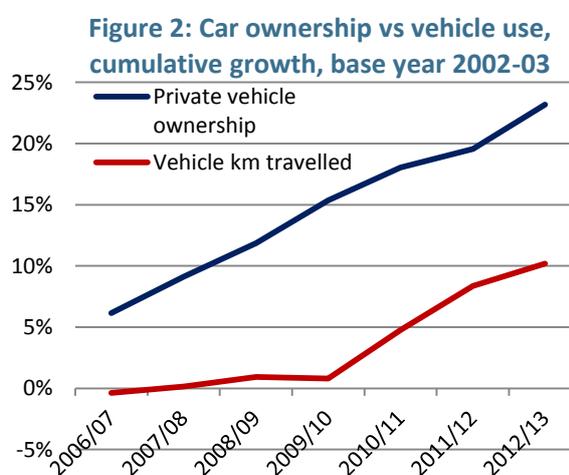
total public transport trips increasing by 21% in the decade to 2012-13; by far exceeding the growth in car trips.

Vehicle ownership in Sydney has grown by 23% in the decade to 2012-13 which was almost double that of population growth (13%). The number of households in Sydney with multiple vehicles has also increased significantly over the decade to 2012-13 (see Table below).

Households in Sydney, by number of vehicles ('000)						
Household vehicles	2002-03	2010-11	2011-12	2012-13	Annual %	Decade %
None	219	202	191	184	-3.7%	-16.0%
One	649	649	674	671	-0.4%	3.4%
Two	478	570	574	594	3.5%	24.3%
Three or more	171	228	229	239	4.4%	39.8%
<i>Source: Household Travel Survey</i>						

As shown in the figure adjacent, growth in vehicle ownership has not translated to a commensurate increase in vehicle travel in Sydney. Vehicle kilometres travelled increased by only 10% over the decade to 2012-13. This indicates that while people own more vehicles, they do not necessarily drive more.

Regions in the outer suburbs of Sydney have higher average levels of car use and dependency than residents in inner Sydney, with a higher number of vehicles per household, and with higher average vehicle kilometres travelled per person (Table below). As described in the [NSW Long Term Transport Master Plan](#):¹²



There are historical reasons for this trend, including a post-war trend towards dispersed, low density development in some areas, which can make public transport service provision difficult and costly to provide. In recent times, ease of access [to public transport] can still be hindered in areas of Greater Sydney by [a lack of supporting] local infrastructure...

¹² NSW Government, [NSW Long Term Transport Master Plan](#), December 2012, p.177

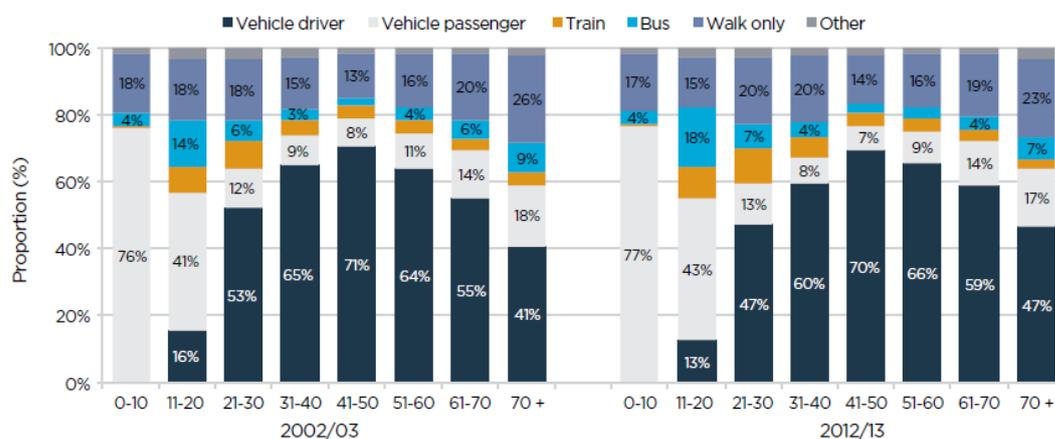
Summary of vehicle use across Sydney LGA areas, weekdays							
	Botany Bay	Liverpool	Campbelltown	Parramatta	Penrith	Inner Syd	Eastern Suburbs
% of trips as the vehicle driver	64%	79%	79%	71%	82%	40%	58%
Vehicles per household	1.3	1.8	1.6	1.4	1.9	1	1.2
Vehicle kms per person	12.9	22.5	23.4	16.7	29.8	9.3	11.8

Source: NSW Transport Master Plan

In the decade to 2012-13, public transport and walking modes increased amongst younger age groups (below 30 years), while people over 60 increasingly relied on using their car (Figure 3). According to the Bureau of Transport Statistics:¹³

The growing representation of the younger age groups among public transport users may be related to their increased education participation and comparatively low access to vehicles. However, car remained the primary travel mode across all age groups and this applies to passengers and drivers.

Figure 3: Mode share of trips by age group, 2002-03 and 2012-13¹⁴



On weekdays, the most critical period for the Sydney roads network is the morning peak around 8:30am. There are two further afternoon peaks, around 3:30pm and 5:30pm (Figure 4).¹⁵

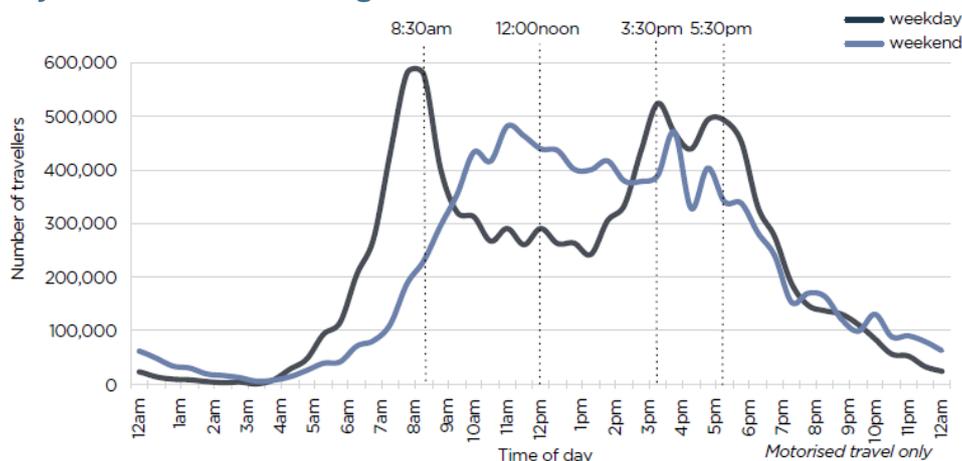
On some parts of the network, motorists now experience similar levels of congestion on Saturdays to those occurring during the weekday peak periods. Weekend travel does not have the same peak-patterns as weekday travel, but tends to be more evenly spread throughout the day with two small peaks at around 11:00am and 4:00pm. Travel generally increases during late mornings and remains at this level most of the day.

¹³ Bureau of Transport Statistics, [Household Travel Survey Report: Sydney 2012-13](#), 2014, p.11

¹⁴ Ibid, p.11

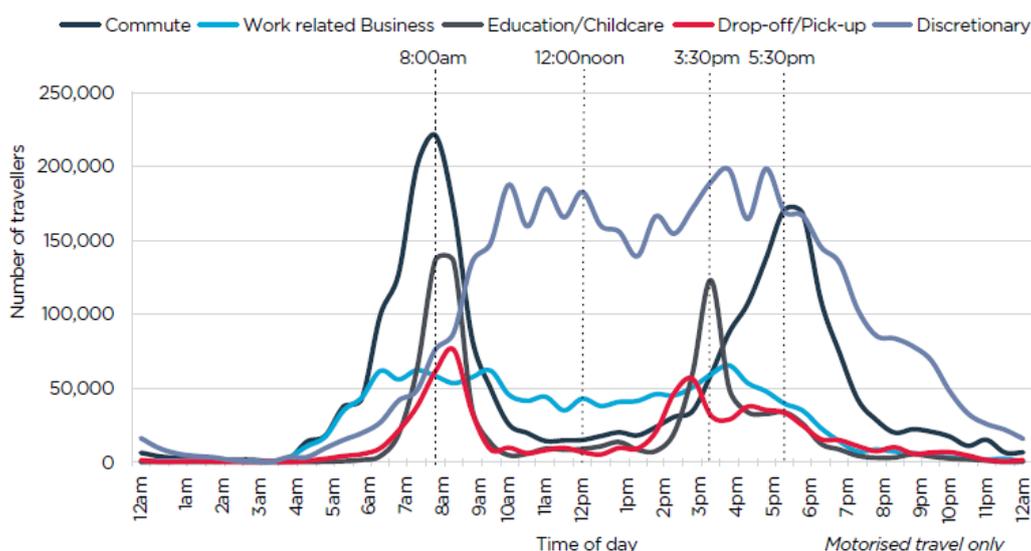
¹⁵ Ibid, p.12

Figure 4: Persons travelling on motorised modes by time of day, average weekday and weekend during 2012/13¹⁶



The morning and afternoon weekday peaks in traffic predictably occur when people travel to and from work, take their children to and from school, transport freight and make deliveries to homes and businesses (Figure 5).

Figure 5: Persons travelling on motorised modes for selected purposes by time of day, average weekday in 2012-13¹⁷



Looking ahead, private vehicle use of the Sydney roads network is forecast to increase. The Bureau of Transport Statistics published travel forecasts from 2011 to 2046 produced by the Sydney Strategic Travel Model. Key findings from the publication as related to road use in the greater metropolitan area of Sydney are as follows:¹⁸

- Car driver and car passenger journeys are forecast to grow annually by

¹⁶ Bureau of Transport Statistics, [Household Travel Survey Report: Sydney 2012-13](#), 2014, p.12

¹⁷ Ibid

¹⁸ Bureau of Transport Statistics, [Travel Forecasts 2011-2046](#), March 2014

1.2% and 0.9% respectively;

- Vehicle kilometres travelled is expected to increase annually by 1% between 2011 and 2046; and
- Car driver journeys during the two-hour morning peak will increase from 1.9 million in 2011 to 2.8 million in 2046, equivalent to an annual increase of 1.2%.

2.3 Freight and commercial vehicle usage of the Sydney road network

As well as being a major freight gateway via Port Botany, Sydney is located at the centre of interstate freight activity, strategically located between South-East Queensland, Canberra and Melbourne. Additionally, the relative lack of freight rail infrastructure within and through the metropolitan Sydney area means that the vast majority of freight journeys are by road.

The city's road network consequently serves a critical economic function, supporting around 278,000 heavy freight vehicle trips and 1.2 million light commercial vehicle trips each day in 2011.¹⁹ The Port Botany container trade alone produces around 3,900 truck movements daily.²⁰

Ports and surrounding areas as well as industrial parks are among those that generate the highest volumes of heavy truck movements in Sydney.²¹ Light commercial vehicle movements tend to occur around commercial centres and are more spread out than heavy vehicle trips. There are high concentrations of light commercial vehicle trips in Inner-Sydney, Warringah, Ryde, Parramatta and Blacktown South-East.

To see a more complete spatial distribution of heavy and light commercial vehicle movement in the Sydney region, see Bureau of Transport Statistics paper [Freight Movement in Sydney](#).

As outlined in the [NSW Freight and Ports Strategy](#), most road freight movements on the Sydney network take place during daylight hours on weekdays. This means that "demand for network capacity peaks when passenger and freight demand coincide."²² By comparing the time of day profile for Port Botany to the time of day pattern for all motorised trips in Sydney, it is possible to see that this occurs during the morning and early evening peaks periods (Figure 6).

¹⁹ NSW Government, [NSW Long Term Transport Master Plan](#), December 2012, p.281

²⁰ Infrastructure NSW, [State Infrastructure Strategy 2012-2032](#), 2012, Chapter 9, p.120

²¹ Bureau of Transport Statistics, [Freight Movement in Sydney](#), July 2010

²² NSW Government, [NSW Freight and Ports Strategy](#), November 2013, p.61

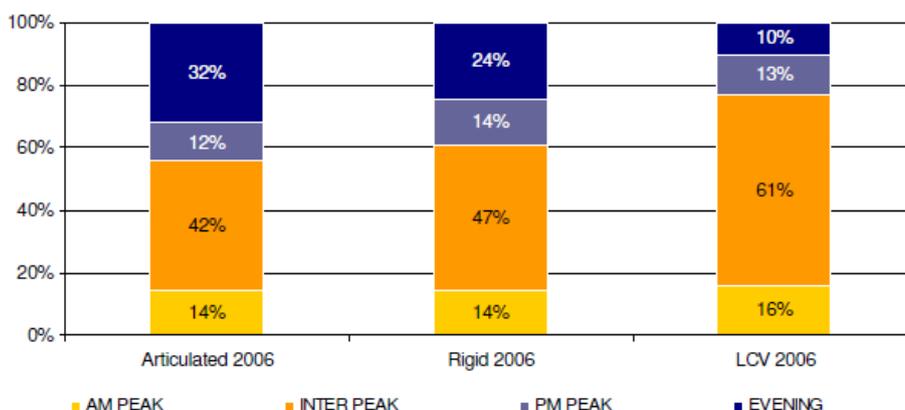
Figure 6: Time of day profile for truck trips to Port Botany, compared to all motorised trips in Sydney, 2011



According to data from the Bureau of Transport Statistics, the majority of articulated truck movements in Sydney specifically occur in the inter-peak (42%) and evening period (32%) (Figure 7).²³ The proportion of evening trips is highest for this vehicle type compared to rigid trucks and light commercial vehicles.

More rigid truck trips occur in the inter-peak period (47%) and less in the evening (24%) compared to articulated vehicles. By comparison, more light commercial vehicle trips are undertaken during the day in the inter peak (61%) and AM peak periods (16%).²⁴

Figure 7: Freight trips in Sydney by time of day and vehicle type, 2006²⁵



As acknowledged in the *NSW Freight and Ports Strategy*, “even the busiest parts of the network display latent capacity in off-peak periods, such as late

²³ AM Peak = 7am-9am, Inter-Peak = 9am-3pm, PM Peak = 3pm-6pm, Evening = 6pm-7am.

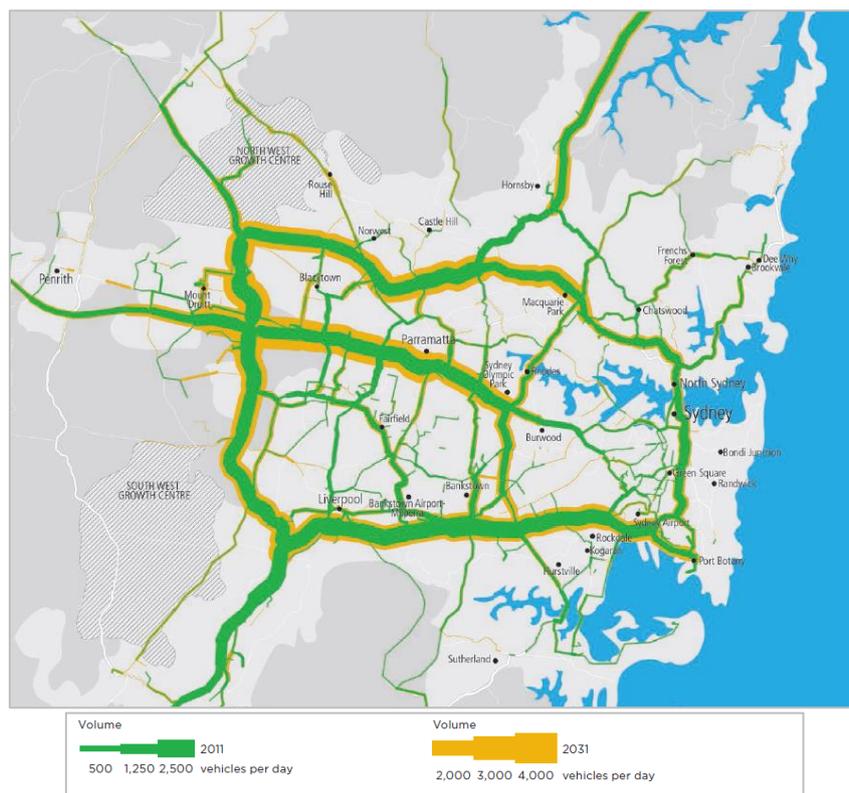
²⁴ Bureau of Transport Statistics, [Freight Movement in Sydney](#), July 2010, p.10

²⁵ Bureau of Transport Statistics, [Freight Movement in Sydney](#), July 2010, Figure 9, p.10

evenings, early mornings, nights and weekends.” Shifting this freight demand for the network from peak to off-peak periods has consequently been identified as a strategy to reduce freight congestion on the Sydney roads network. As is discussed in more detail within the *Strategy*, there are a number of planning and commercial considerations around such a proposition.²⁶

Looking ahead, the number of daily heavy freight vehicle trips in Sydney is forecast to increase by 56% to 433,000 trips in 2031. The number of light commercial vehicle trips in Sydney is forecast to increase by 25% to 1.3 million trips in 2031.²⁷ Figure 8 illustrates the forecast growth in the daily number of heavy freight vehicle trips within Sydney between 2011 and 2031 and the critical role the motorway network serves as part of the freight network in Sydney.

Figure 8: Heavy vehicle movements in Sydney, 2011 and 2031²⁸



Based on the latest forecasts by the Bureau of Transport Statistics, ‘Blacktown South-West, Fairfield-West, Penrith-East, Liverpool-East and Blacktown South-East are the areas which will experience the highest growth in heavy vehicle trips.’²⁹

²⁶ See Action 1B of the [NSW Freight and Ports Strategy](#) for complete discussion of this issue.

²⁷ Infrastructure NSW, [State Infrastructure Strategy 2012-2032](#), 2012, Chapter 9, p.125

²⁸ NSW Government, [NSW Long Term Transport Master Plan](#), 2012, p.282

²⁹ Bureau of Transport Statistics, [Freight Movement in Sydney](#), July 2010, p.2

The Port Botany area will continue to be a focal point for much of this freight traffic in the Sydney network. To and from Port Botany, over 1.7 million twenty-foot equivalent units (TEUs) were transported annually on the road network in 2011-12. As noted in the *NSW Long Term Transport Master Plan*, “with no change to the current road mode share, this task is set to increase to over 2.7 million TEUs by 2017-18.” Even if a significant mode shift to rail can be achieved, “the road task to and from Port Botany will increase to over 2.3 million TEU per annum.”³⁰

While there is a clear objective to shift the mode-share of freight from road to rail, as outlined in the *2012 State Infrastructure Strategy*, realistically the roads network in Sydney will continue to provide the key supply chain link for intra and intercity freight movements:³¹

There has been a strong emphasis on increasing the proportion of container freight that is moved by rail in recent years. However, even under optimistic projections of modal shift to rail, road will remain the dominant mode for Port Botany freight traffic, and the majority of freight growth over the next 20 years will be conveyed by road.

2.4 Costs of congestion on Sydney road network

Sydney's population growth has resulted in considerable demand growth for Sydney's roads network, both from private and commercial vehicles. The result is that Sydney's roads are some of the most congested in Australia and even rank relatively poorly on a global scale; equating to the 6th most congested city in the Americas and the 12th most congested in Europe.³²

As identified in the *NSW Long Term Transport Master Plan*, “the M2, M4 and M5 are all operating at capacity during the morning peak. Other key bottlenecks – such as Victoria Road, Spit Bridge and the Harbour Bridge – are also at capacity.”³³

While congestion occurs mainly during morning and evening peak, for roads such as the M4, M5 and Eastern Distributor it is no longer a peak-only phenomenon, but is sustained for much of the day. The table adjacent shows the periods of congestion currently experienced on some major corridors during a 24-hour weekday period.

Periods of congestion	
Motorway	Hours of congestion
Sydney Harbour Tunnel	8.6
M2	9.9
M5	10
M4	13
M5 East	13.3
Eastern Distributor	13.5
<i>Source: State Infrastructure Strategy 2012</i>	

Many arterial roads on the Sydney road network have average travel speeds of less than 30 km/h in the morning (Figure 9).

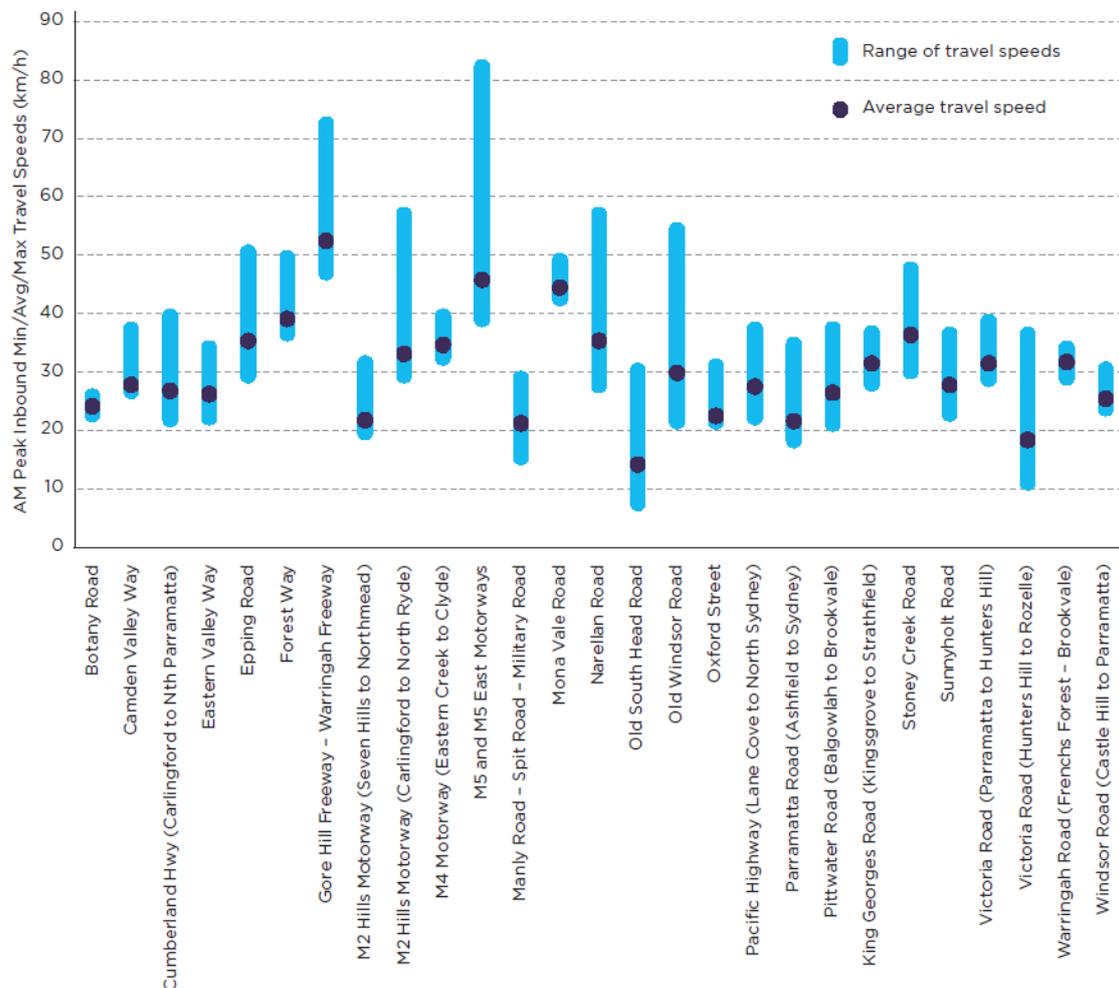
³⁰ NSW Government, [NSW Long Term Transport Master Plan](#), 2012, p.281

³¹ Infrastructure NSW, [State Infrastructure Strategy 2012-2032](#), 2012, Chapter 9, p.120

³² Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.47

³³ NSW Government, [NSW Long Term Transport Master Plan](#), 2012, p.101

Figure 9: Minimum, average and maximum AM peak travel speeds on key roads in Sydney³⁴



Speeds on the motorway network are also low in places (Figure 10), with the M4 and M5 motorways experiencing travel speeds below 40 km/h and 50 km/h in some locations in the morning peak.³⁵ As recognised in the *NSW Long Term Transport Master Plan*:³⁶

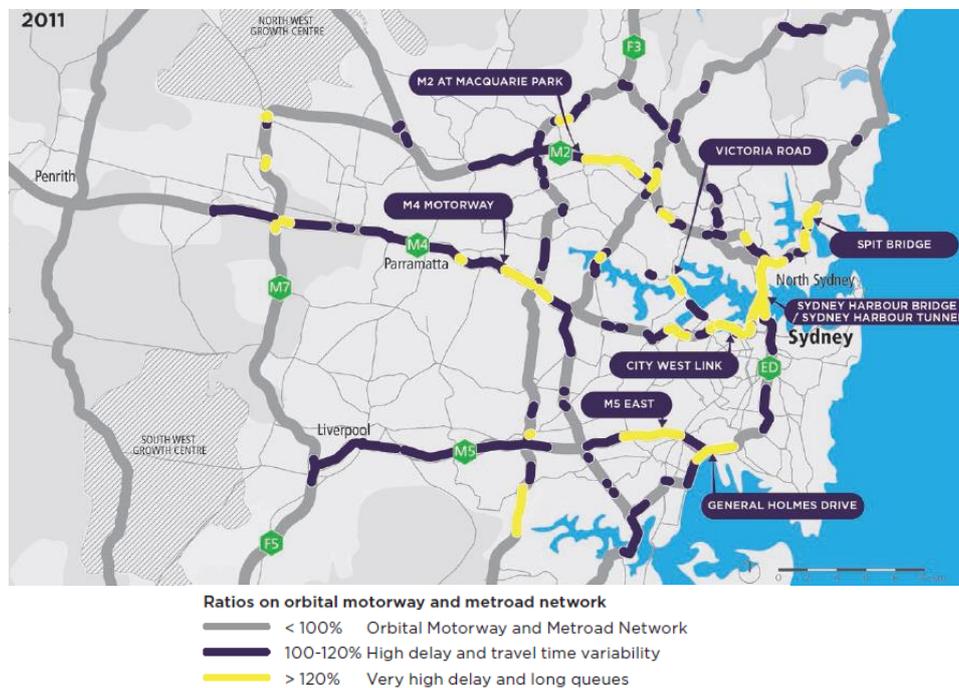
Missing sections in the motorway network cause traffic congestion. These gaps include the M4 not connecting to the Port and Airport; the F6 (M1) not providing access to the motorway network from the South; and the F3 (M1) and M2 not connecting with each other. The gaps mean arterial routes are at capacity during the morning peak period.

³⁴ ³⁴ NSW Government, [NSW Long Term Transport Master Plan](#), 2012, p.101

³⁵ NSW Government, [NSW Long Term Transport Master Plan](#), December 2012, p.101

³⁶ *Ibid*, p.104

Figure 10: Road network performance (represented by volume-capacity ratio), AM peak, 2011³⁷



Speeds on key motorway networks do not appear to be improving. As observed by [HoustonKemp](#) using Roads and Maritime Services [performance data](#).³⁸

...year-on-year comparisons of morning peak average speeds across the key roads network have worsened for every month for the period September to February during 2014/15 compared to the equivalent months in 2013/14. The average decline in average speed was approximately 1.1%.

The Bureau of Infrastructure, Transport and Regional Economics (BITRE), undertook a major study of the costs of congestion on Australia's capital cities in 2007. BITRE identified four key costs of congestion.³⁹

- **Extra Travel Time:** travel time above that for a vehicle travelling under less congested conditions;
- **Extra Travel Time Variability:** where congestion can result in trip times becoming less certain, meaning commuters must allow a greater amount of travel time than the average journey time;
- **Increased Vehicle Operating Costs:** through higher rates of fuel consumption and greater engine wear. An RACQ field test report showed a 30% increase in fuel consumption between free-flow versus stop-start conditions and through

³⁷ NSW Government, [NSW Long Term Transport Master Plan](#), December 2012, p.103

³⁸ HoustonKemp, [Improving the Performance of Sydney's Road Network](#), February 2015, p.3

³⁹ Bureau of Transport and Regional Economics, [Estimating urban traffic and congestion cost trends for Australian cities](#), 2007, Working Paper 71, p.9-10

greater wear on vehicles. Another study, conducted by Integrated Management Information Systems on Melbourne’s Eastlink, showed costs could be as high as 40%;

- **Poorer Air Quality:** vehicles operating in congested conditions emit higher rates of noxious pollutants than under more free flowing conditions, leading to higher health and environmental costs.

As estimated by the Centre for International Economics⁴⁰, indirect costs of congestion represent 8 to 12% of total transport costs incurred by Sydney businesses. In a separate study, BITRE⁴¹ estimated that Sydney’s annual congestion costs were around \$5 billion in 2005 – equivalent to \$1,100 per Sydneysider – and are forecast to increase to nearly \$8 billion per year by 2020.

Costs of congestion on Sydneysiders (\$b)			
Type of costs	% of total	Cost in 2005	Cost in 2020
Private time costs - losses from trip delay and travel time variability	36.5	1.28	2.9
Business time costs – trip delay plus variability	38.5	1.35	3.0
Vehicle operating costs – including fuel and maintenance	13	0.46	1.0
Air pollution damage – including CO2 emissions	12	0.42	0.9
Sydney total	100	3.5	7.8

Source: Bureau of Infrastructure, Transport and Regional Economics

In a more recent and separate study by ACIL Allen Consulting, the costs of road congestion were estimated at \$5.6 billion in 2011 for the Sydney-Newcastle-Wollongong area. By 2031, these congestion costs were forecast to increase to \$14.8 billion (in 2011 dollars).⁴²

Congestion on Sydney’s streets is not new – and is unlikely to ever be eliminated. While in theory there is an “efficient” level of congestion⁴³, as Infrastructure NSW noted in the State Infrastructure Strategy Update “it is clear there is a strong argument for initiatives to mitigate congestion in the Sydney context.”⁴⁴

Even with the significant investment and high levels of patronage growth forecast for Sydney’s public transport network, 72% of 27.5 million journeys in 2031 are forecast to be made on the road network each weekday by vehicle. This equates to an additional 4.3 million new trips per day.⁴⁵

⁴⁰ Centre for International Economics, [Business Costs of Traffic Congestion](#), August 2006

⁴¹ Bureau of Transport and Regional Economics, [Estimating urban traffic and congestion cost trends for Australian cities](#), 2007, Working Paper 71, p.xv

⁴² Infrastructure Australia, [Australian Infrastructure Audit Report](#), 2015, Volume 1, p.32; The ACIL Allen methodology does not account for new investments in infrastructure between 2015 and 2031, apart from infrastructure which is already under construction, or for which a firm funding commitment has been made.

⁴³ Where the costs of tolerating congestion are outweighed by the costs of addressing it.

⁴⁴ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.46

⁴⁵ Bureau of Transport Statistics, Household Travel Survey: Sydney Strategic Travel Model,

Without action by 2031, the six most constrained corridors will be dealing with increased demand and much higher road congestion than at present, leading to increased peak travel times (Figure 11). This is outlined in the *NSW Long Term Transport Master Plan*.⁴⁶

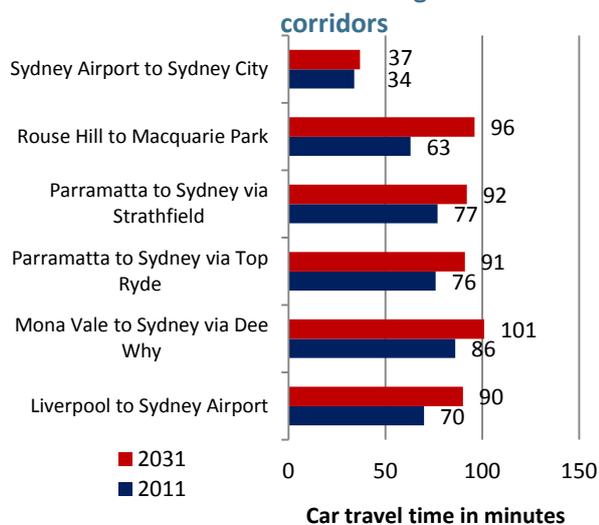
...by 2031, peak travel times by road are forecast to increase by an average of 15 minutes between Parramatta and the CBD and by 33 minutes between Rouse Hill and Macquarie Park in the morning peak period.

Without action, many of the medium constrained corridors will also be performing very poorly by 2031. In particular, the forecast growth in the South West and North West will put increasing pressure on the existing road network.

The *NSW Long Term Transport Master Plan* also acknowledges that as “cross-town travel increases, congestion is likely to spread further from the CBD, with areas between 20 kilometres and 50 kilometres from the CBD forecast to experience higher reductions in average travel speeds than areas less than 20 kilometres from the CBD.”⁴⁷

From this standpoint, it is acknowledged by Infrastructure NSW that there is ‘no viable alternative to the road network [out to 2032] for the vast majority of journeys in Sydney.’⁴⁸

Figure 11: Anticipated change in travel time across the most congested road corridors



2013

⁴⁶ NSW Government, [NSW Long Term Transport Master Plan](#), December 2012, p.83

⁴⁷ Ibid, p.118

⁴⁸ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.46

3. CLASSIFICATION AND ADMINISTRATION OF NSW ROADS⁴⁹

Commonwealth, State and local governments have varying degrees of administrative oversight of the Sydney roads network, the extent of which is dependent on the road classification (Chapter 3.1). Generally speaking though, the Commonwealth Government's primary role is funding (Chapter 4). In addition to funding, State and local governments manage the roads network through the provision of roads infrastructure, maintenance and other related roads services.

3.1 Classification of NSW roads

Roads are classified by the State Government in order to allocate funding and management responsibility between State and local government authorities.

At present, NSW has two different systems for classifying roads. The first is the *legal system* of classified roads, which is defined under the [Roads Act 1993](#) and provides for roads to be classified as Freeways, Controlled Access Roads, Tollways, State Highways, Main Roads, Secondary Roads, Tourist Roads, Transitways and State Works.⁵⁰

To simplify the administration of the various legally recognised classes of roads, the NSW road network is administered under three *administrative classifications* – State roads, regional roads and local roads.

State roads⁵¹ are the major arterial links throughout NSW and within major urban areas.⁵² The State Government funds, prioritises and carries out capital and maintenance works on State Roads. Under Section 7(4) of the [Roads Act 1993](#), however, councils are the owners and roads authority for State roads in their localities, other than Freeways.

Regional roads comprise the secondary road network which, together with State roads, provide for travel between smaller towns and districts and perform a sub-arterial function within major urban centres. Regional roads are wholly owned by and are the responsibility of local council to fund, determine priorities and carry out works.⁵³ However, in recognition of their importance as part of the State economy, regional roads are eligible to receive financial assistance from

⁴⁹ While this paper seeks only to assess key roads policies and projects as related to the Sydney roads network, the administrative and funding arrangements are broadly the same across NSW and do not vary by locality. As such, the discussion in this chapter and the proceeding chapter of the paper will be framed in the NSW context.

⁵⁰ The schedule of roads classified under parts of the *Roads Act 1993* and of State and Regional Roads is available on the RMS [website](#).

⁵¹ Roads and Maritime Services [documents](#) State Roads or the roads classified under sections 46, 47, 50 or 51 of the *Roads Act 1993* that have a Legal Class of Highway, Main Road, Secondary Road or Tourist Road.

⁵² Roads and Maritime Services, [NSW Road Management Arrangements](#), December 2008

⁵³ Roads and Maritime Services, [Regional roads funding assistance to Local Government](#), September 2013, Information Fact Sheet 1

the State Government (Chapter 4.2).

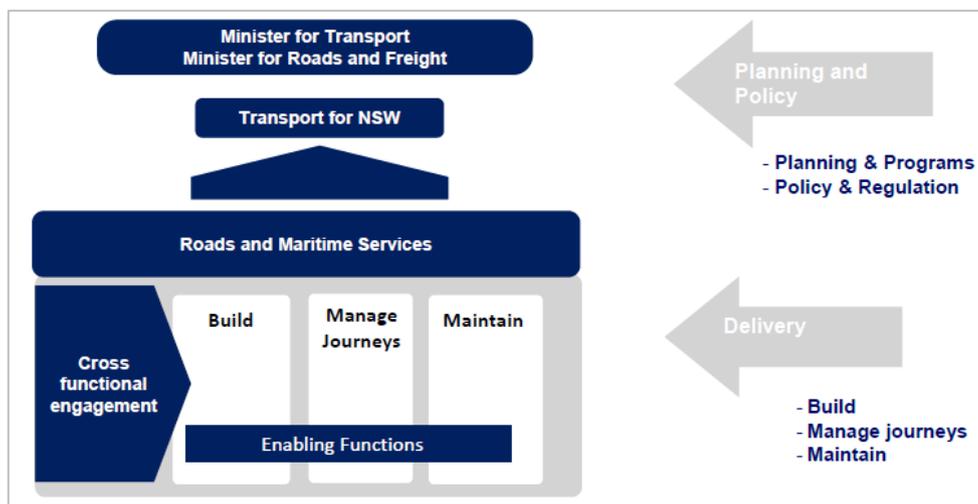
Local roads are those not classified under the [Roads Act 1993](#) and also include some classified roads that only provide for local access and communication. These roads are the responsibility of local government authorities with only limited funding assistance from the State Government.

3.2 NSW Government Roads Administration

The Minister for Roads, Maritime and Freight is ultimately responsible for the administration of individual Acts related to the NSW roads network. The Acts, Regulations and Orders administered by the Minister are listed on the Transport for NSW [website](#).

Roads and Maritime Services (RMS), which was established on 1 November 2011, brought together the former Roads and Traffic Authority and NSW Maritime Authority. It is the principal NSW Government agency responsible for managing the roads network – which includes “providing capacity and maintenance solutions for road infrastructure.”⁵⁴

Figure 12: Levels of NSW Government roads administration⁵⁵



RMS is part of Transport for NSW, which was formally established on 1 November 2011. It is the lead agency in the Transport cluster and is responsible for co-ordination, funding allocation, policy and planning, and other delivery functions for transport in NSW.

The Secretary of Transport for NSW is empowered to issue directions to transport agencies for accounting and administrative purposes, including Roads and Maritime Services, under the [Transport Administration Act 1988](#).⁵⁶

⁵⁴ Roads and Maritime Services, [What we do](#), accessed 1 June 2015

⁵⁵ Roads and Maritime Services, [Presentation to Local Government NSW Annual Conference](#), October 2014

⁵⁶ NSW Auditor General, [NSW Auditor-General's Report to Parliament](#), 2014, Volume 7, p.36-37

4. NSW ROADS FUNDING⁵⁷

The State Government pays for State roads, while local councils pay for regional and local roads. The way in which these funds are sourced is complex with State and Commonwealth government funding flowing across the three levels of road classification.

4.1 State road funding

RMS is responsible for managing State Roads, with the distribution of State and Commonwealth government funding one of its primary administrative roles.

RMS spent around \$5.5 billion to maintain, upgrade and operate the NSW roads and maritime network in 2014-15.⁵⁸ The vast majority of this was spent on the roads network. The [Roads and Maritime Services Delivery Plan](#) outlines the specific areas of expenditure for 2014-15.

As illustrated in the figure adjacent, funding was sourced through a combination of motor vehicle taxes, RMS revenue, as well as State and Commonwealth consolidated funding.

It is important to note, however, that RMS funding is not channelled solely to State roads and is also distributed to local councils to administer, maintain and upgrade regional and local roads (See Chapter 4.2).

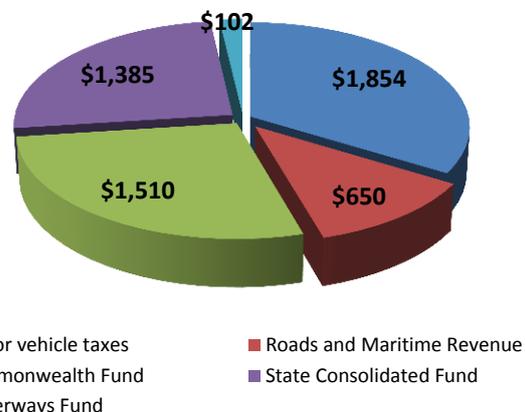
Commonwealth Government funding is provided under the [Nation Building Program \(National Land Transport\) Act 2009](#) for a sub set of State Roads in Sydney and more broadly in New South Wales that are part of the National Land Transport Network.

4.2 Regional road funding

Regional roads are the responsibility of councils to fund and are capitalised as a council asset. In recognition of their importance to the State's economy, the State Government, through RMS, provides funding to local councils to support maintenance and repairs on regional roads across NSW.

The two main sources of State Government funding for regional roads are the

Figure 13: Roads and Maritime Funding (\$m), 2014-15, \$5.5bn



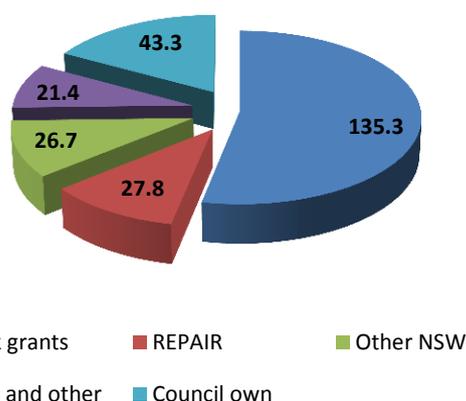
⁵⁷ The complex nature of roads funding means that it is difficult to obtain precise estimates of levels of funding by road classification.

⁵⁸ Roads and Maritime Services, [Roads and Maritime Services Delivery Plan](#), 2014-15

Regional Roads Block Grant and REPAIR (Repair and Improvement of Regional Roads) programs. In the year ended 30 June 2014, \$231 million was distributed by RMS on block grants and other maintenance grants to councils for regional and local roads.⁵⁹

The Block Grant and REPAIR Programs are only intended to be a contribution to councils toward the upkeep of regional roads.⁶⁰ In addition to funds from the State Government, councils have access to other funds to spend on regional roads, including their own revenue streams (via rates and developer contributions) and Commonwealth Government assistance (via financial assistance grants and the Roads to Recovery Program – see Chapter 4.3).

Figure 14: Council expenditure on regional roads by source, 2011-12 (\$m)



The latest available data shows that in 2011–12, councils spent \$254.5 million on regional roads, with a total NSW Government contribution of \$189.8 million. This meant the NSW Government contributed around 75% of total council expenditure on regional roads.

An additional \$21.4 million came from Commonwealth and other sources; leaving councils' direct contribution at \$43.3 million or 17% of the total spend.⁶¹

4.2.1 Regional Roads Block Grant Program

The [Regional Road Block Grant Program](#) is an RMS administered program which provides funding to local councils for the management and maintenance of regional roads.

The Block Grant program has an identified funding pool, CPI adjusted annually, with every council entitled to an annual block grant. \$144.8 million was allocated to NSW local councils during the 2013-14 financial year under the Program.⁶²

To receive Block Grant funds, councils enter into a [Block Grant Agreement](#) with RMS each year. As described by RMS, this agreement:⁶³

⁵⁹ Roads and Maritime Services, [Annual Report 2013-14](#), 2014

⁶⁰ NSW Auditor-General, [Regional Road funding – Block Grant and REPAIR programs](#), May 2014, p.12

⁶¹ Ibid

⁶² Roads and Maritime Services, [Annual Report 2013-14](#), p.41

⁶³ Roads and Maritime Services, [The Regional Road Block Grant Program](#), September 2013

...recognises councils as the road authority with responsibility for Regional Roads and acknowledges the capacity and accountability of councils to make appropriate road management decisions.

The annual Block Grant to councils is determined by a long-standing formula agreed with local government and is differentiated between rural and Sydney councils.⁶⁴

The Block Grant is paid quarterly, subject to a council's execution of the Block Grant Agreement. Scheduled [Block Grant allocations for the 2014-15 financial year](#) are disclosed through the RMS.

4.2.2 REPAIR Program

The [REPAIR Program](#) provides additional funds to assist councils in carrying out larger rehabilitation and development works on regional roads. As described by RMS, the aim of the program is to:⁶⁵

...minimise the long term maintenance costs commensurate with road function and usage, and where benefits of such projects exceed the cost.

Under the REPAIR Program, councils can apply for a 50% contribution from the State Government for specific works. Selection criteria are determined by the [Regional Consultative Committee](#), which also prioritises projects. The REPAIR funding for each region is allocated on the same funding split as the Regional Roads Block Grant Program.

The State Government determines the level of funding available through the REPAIR program each year. The total allocation for this program for 2013–14 was \$29 million, with \$25 million shared between the five rural RMS regions, and \$4 million to the Sydney RMS region.⁶⁶

4.3 Local roads funding

Councils are responsible for funding and carrying out works on local roads. The State Government provides only limited assistance under special programs and a number of smaller grants covering installation and maintenance of traffic management devices – including the [Local Government Road Safety Program](#) and [Traffic Route Lighting Subsidy Scheme](#).

When the Government declares a natural disaster in a council area, RMS also administers [funding assistance](#) for the restoration of road and bridge infrastructure damaged as a direct result of a declared natural disaster event. RMS delivered \$156.4 million worth of work in 2013-14 to address the effects of

⁶⁴ See Roads and Maritime Services Regional Road Block Grant Program [fact sheet](#) for complete details.

⁶⁵ Roads and Maritime Services, [Regional Roads REPAIR Program](#), accessed 2 June 2015

⁶⁶ Roads and Maritime Services, [The Regional Road Block Grant Program](#), September 2013

previous natural disasters in NSW.

The Commonwealth Government has a long standing role in providing road funds to councils. [Financial Assistance Grants](#) are provided under the [Local Government \(Financial Assistance\) Act 1995](#) and consist of two components which are untied in the hands of local government, allowing councils to spend the grants according to local priorities:⁶⁷

1. a *general purpose component* which is distributed between the States and Territories according to population (i.e. on a per capita basis), and
2. an *identified local road component* which is distributed between the States and Territories according to fixed historical shares.

Commonwealth funding is also provided under the [Roads to Recovery Program](#) (legislated by the [Nation Building Program \(National Land Transport\) Act 2009](#)) for the maintenance of local road assets. Direct funding to local councils is distributed according to a formula based on population and road length set by the Local Government Grants Commissions in each State and the Northern Territory.⁶⁸ Councils have discretion to use these Commonwealth funds for works on any category of road.⁶⁹

Commonwealth Government assistance is also provided through the [Black Spots Program](#) which provides funding for the improvement of safety at locations with a high incidence of motor vehicle accidents.⁷⁰ Funding is available for all roads including local roads. The proportion spent on local roads depends on the projects submitted and as a result varies between jurisdictions and years. The Commonwealth Government has committed \$500 million to the Black Spot Program from 2014-15 to 2018-19.⁷¹

⁶⁷ Department of Infrastructure and Regional Development, [Financial Assistance Grants to Local Government](#), accessed 10 June 2015

⁶⁸ Department of Infrastructure and Regional Development, [Funding for Local Roads](#), May 2014

⁶⁹ List of council allocations for the 2014-15 to 2018-19 period are available through the [Department of Infrastructure and Regional Development](#).

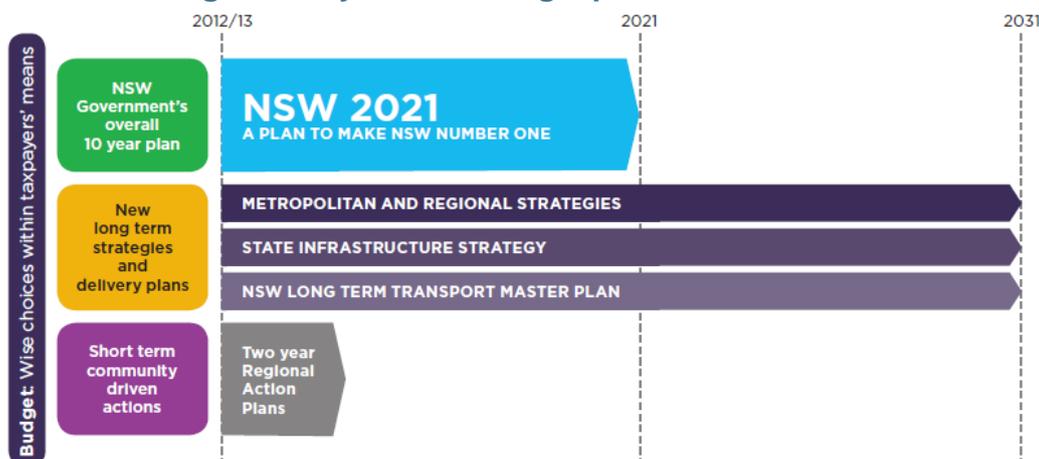
⁷⁰ National Commission of Audit, [Commonwealth funding to State and local governments for infrastructure](#), March 2014

⁷¹ Department of Infrastructure and Regional Development, [Black spot programme](#), accessed 12 June 2015

5. NSW ROADS POLICY FRAMEWORK

The principal NSW Government policy document is [NSW 2021](#). Under this, separate sectoral plans, including the *State Infrastructure Strategy*, guide land use and development, infrastructure and transport.

Figure 15: Linkages in key NSW strategic plans⁷²



5.1 NSW 2021

[NSW 2021](#) was published in September 2011 and is the NSW Government’s 10–year strategic plan to guide policy and budget decision making across the various Government portfolios. Goals 7, 10 and 19 relate directly to the enhancement of the State’s road network.

Goal 7 of the report is to “Reduce Travel Times” with specific targets of:⁷³

- Improving the efficiency of the road network during peak times on Sydney’s road corridors
- Minimising public transport waiting times for customers

Goal 10 of the report is to “Improve Road Safety” with the specific target of “reducing fatalities to 4.3 per 100,000 population by 2016.”

Goal 19 of the report is to “Invest in Critical Infrastructure” with specific targets of:⁷⁴

- increasing expenditure on critical NSW infrastructure
- improving the quality of urban and rural State roads

The latest progress against each of these goals is outlined in [NSW 2021 Performance Report 2014-15](#). Specific road related projects which stemmed

⁷² NSW Government, [NSW Long Term Transport Master Plan](#), December 2012

⁷³ NSW Government, [NSW 2021](#), September 2011, p.18

⁷⁴ Ibid, p.38

from this and other such strategic planning documents are discussed in further detail in Chapters 6 and 7.

5.2 First Things First: The State Infrastructure Strategy 2012-2032

The [State Infrastructure Strategy](#) was developed in September 2012 by [Infrastructure NSW](#).⁷⁵ It built on the NSW Government's public commitments at the time and outlined a forward program of more than 70 urban and regional infrastructure projects and reforms to take priority out to 2032.

The SIS in turn drives the immediate priorities set out in the five year, funded, *State Infrastructure Plan* (Chapter 3 of the [NSW Budget Infrastructure Statement](#)).

As part of the SIS, Infrastructure NSW considered, in detail, the rationale for urban road investment in light of arguments that “new roads do not solve congestion, discourage public transport use, or are environmentally unsustainable.”⁷⁶ The principle argument of Infrastructure NSW for further roads investment was that:⁷⁷

...further investment in the [Sydney roads network] is required to maintain existing levels of mobility across the network, with targeted opportunities to reduce congestion in some locations.

Given that “the overwhelming majority of Sydney's journeys are dispersed in nature” the report noted that public transport will not be able to entirely replace the roads network and that the car will remain the “dominant” mode of transport.⁷⁸

The SIS identified the M4 and M5 corridors as the priority areas of investment because of their importance to the freight and business transport task. The WestConnex project (Chapter 7.1) was subsequently proposed by Infrastructure NSW in response to these priorities.⁷⁹ Other key recommendations from the SIS, as related to the Sydney roads network, included:

- the F3-M2 link should be the next priority following completion of the M4 and M5 upgrades (Chapter 7.2 - NorthConnex);
- urban renewal – in particular, the transformation of Parramatta Road – should be placed at the heart of the WestConnex scheme from the beginning;
- development should begin on the F6 extension and proposed North-

⁷⁵ It was established under the Infrastructure NSW Act 2011 and is governed by a board of senior leaders from the public and private sectors.

⁷⁶ Infrastructure NSW, [State Infrastructure Strategy 2012-2032](#), 2012, Section 6, Urban Roads, p.80

⁷⁷ Ibid, p.81

⁷⁸ Ibid, p.81

⁷⁹ See Section 6.6 of the [State Infrastructure Strategy 2012-2032](#)

South links west of Sydney's CBD beyond year 10 of the strategy;

- identification and preservation of a corridor for the Outer Western Sydney Orbital; and
- the roll-out of the Managed Motorways program, subject to successful trial on the M4.

5.3 NSW Long Term Transport Master Plan

The [NSW Long Term Transport Master Plan](#) provides the overall framework for how the NSW transport system will develop over the next 20 years and “supports the NSW 2021 strategies...”⁸⁰ The Master Plan, which includes 220 short, medium and long term actions to be delivered:⁸¹

...is not intended to be a detailed step by step plan for all transport initiatives. Rather, it is an overarching framework that guides subsequent and more detailed transport plans, policy decisions, reforms and funding decisions.

With respect to roads investment, the priority projects in the Transport Master Plan are broadly in line with those identified in the *State Infrastructure Strategy*; though the Master Plan identified “two Western Sydney road packages, with bus priority infrastructure, to optimise the North West Rail Link and improve access for growing communities in the South West and around Werrington.”⁸²

The complete list of projects identified is presented in Chapter 9.6 of the Master Plan. The [2013](#) and [2014](#) Annual Updates provide detailed discussion around the progression of key projects and priorities out of the Long Term Master Plan.

5.4 2014 State Infrastructure Strategy Update

The [State Infrastructure Strategy Update 2014](#) was prepared by Infrastructure NSW at the direction of the NSW Government to guide how proceeds from the [Rebuilding NSW](#) initiative could be spent. With respect to the Rebuilding NSW fund, the following recommendations were made by Infrastructure NSW for roads projects:

- \$300 million for the Urban Roads Pinch Points Program;
- \$100 million for the Expanded Clearways Program;
- \$400 million for Smart Motorways investments on the M4, the Warringah Freeway and Southern Cross Drive-General Holmes Drive;
- \$200 million to upgrade the Sydney Coordinated Adaptive Traffic System and the Transport Management Centre; and
- \$300 million for a Sydney-Illawarra Pinch Points program to improve access to Sydney from the Illawarra by unblocking critical constraints on

⁸⁰ NSW Government, [Delivering the NSW Long Term Master Plan: First Annual Update](#), 2013

⁸¹ NSW Government, [NSW Long Term Transport Master Plan](#), December 2012, p.9

⁸² *Ibid*, p.353

Sydney's southern road corridors.

Infrastructure NSW also recommended that the WestConnex Delivery Authority develop final business cases for the Northern and Southern Extensions to WestConnex (Chapter 7.1), and Western Harbour Tunnel (Chapter 7.3) – both by the end of 2015, with a view to their procurement and delivery as toll roads. Infrastructure NSW also recommended:⁸³

- further review and development of Beaches Link, with a view to a potential investment being made over a 10 to 20 year timeframe (Chapter 7.5); and
- complete corridor identification work for the Outer Sydney Orbital and Bells Line of Road – Castlereagh Connection by mid-2015 (Chapter 7.6).

5.5 Rebuilding NSW

On 10 June 2014, the NSW Government announced *Rebuilding NSW*⁸⁴, a plan to invest \$20 billion in infrastructure, funded from the partial lease of NSW electricity networks. The Government fully adopted the recommendations proposed by Infrastructure NSW in the State Infrastructure Strategy Update. The major Sydney roads projects funded through the Rebuilding NSW funds are presented in the table below and are discussed in further detail in the proceeding Chapters of this paper.

Investment in urban roads from Rebuilding NSW		
Project	Reservation (\$m)	Funding from
WestConnex northern and southern extensions; Western Harbour Tunnel	\$1,100	2015-16
Pinch Points & Clearways	\$400	2015-16
Smart Motorways	\$400	2015-16
Gateway to the South	\$300	2015-16
Traffic Management Upgrades	\$200	2015-16
Subtotal	\$2,400m	

Source: Rebuilding NSW, State Infrastructure Strategy

5.6 NSW Freight and Ports Strategy

The *NSW Freight and Ports Strategy* supplements the *NSW Long Term Transport Master Plan*, outlining a number targeted actions and strategies for the NSW freight network in order to ensure “capacity and performance can meet demand”.⁸⁵

The NSW Freight and Ports Strategy is structured into three “Strategic Action

⁸³ Infrastructure NSW, *State Infrastructure Strategy Update*, 2014, Chapter 3, p.54

⁸⁴ It was established under the *Restart NSW Fund Act 2011*.

⁸⁵ NSW Government, *NSW Freight and Ports Strategy*, November 2013, p.1

Programs” that target specific network efficiency, capacity and sustainability challenges associated with the forecast doubling of the NSW freight task by 2031.

The Strategy, under Action 2B, supported the key capacity enhancements (including NorthConnex and WestConnex) identified in previous NSW Government policy documents in order to address “gaps in Sydney’s motorway network”.⁸⁶

The *NSW Freight and Ports Strategy* identified a multitude of other measures beyond these capacity enhancements that could enable improved freight efficiency across the Sydney and broader NSW network.

Many of these measures revolve around managing the distribution and quantity of freight demand on the roads network – including shifting freight movements, where possible, from road to rail; and shifting more freight movements to off-peak periods.

While this paper is focussed primarily on the NSW Government’s preferred supply-side road network improvements, these freight demand strategies need to be considered in the broader context of congestion management on the Sydney roads network.

⁸⁶ NSW Government, [NSW Freight and Ports Strategy](#), November 2013, p.104

6. SYDNEY ROAD MANAGEMENT STRATEGIES

Chronic roads congestion occurs for two core reasons – either there is insufficient capacity in the existing network and/or the roads network is managed inefficiently. Infrastructure solutions to these problems can be either large scale capital projects or smaller scale, targeted investments that can “make much better use of existing roads and resolve localised congestion problems that impair broader network and economic outcomes.”⁸⁷

This chapter of the paper outlines the smaller scale road programs currently in place or in the planning phase by the NSW Government in Sydney, with the subsequent chapter outlining the larger scale capital projects.

6.1 Pinch Point Program

Pinch points are defined as “traffic congestion points, intersections or short lengths of roads at which a traffic bottleneck exists.”⁸⁸ Pinch points can cause a build-up of traffic and travel delays on the wider Sydney roads network, increasing travel time and reducing reliability.

The RMS [Pinch Point Program](#) was established to “relieve traffic congestion and improve network efficiency by targeting such peak hour traffic hotspots.”⁸⁹ This specifically involves improvements to intersection design, turning lane approaches, lane width and bus priority treatments. As outlined in the [2015-16 Infrastructure Statement](#).⁹⁰

To date, \$215 million of Restart NSW expenditure commitments have been allocated for the Pinch Points program, with \$130 million for the Easing Sydney's Congestion program and \$85 million for the Regional Freight Pinch Point and Safety program. In addition, a total of \$300 million has been reserved for future projects from the Rebuilding NSW initiative for the Urban Roads Pinch Points program. Of this amount, \$276.5 million was reserved for Sydney, with \$23.5 million for the Hunter.

Transport for NSW estimates “that every dollar invested from its first Pinch Point program produced \$6 worth of travel time savings.”⁹¹

Detailed Rebuilding NSW Funding Reservations toward pinch point programs are listed in Chapter 3.5 of the [2015-16 Infrastructure Statement](#).

⁸⁷ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.46

⁸⁸ Roads and Maritime Services, [Pinch point program](#), accessed 12 June 2015

⁸⁹ Ibid

⁹⁰ NSW Treasury, [Budget Paper No.2](#), 2015-16, Infrastructure Statement, p.2-4

⁹¹ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.48

6.2 Sydney Clearways Strategy

A clearway is defined as “a traffic management restriction placed on the kerbside lane of a strategically important state road. The restriction prevents stopping and parking during peak periods in one or both directions so that the entire road corridor is available during the heaviest periods of traffic congestion.”⁹² To ensure traffic flow is not disrupted, any vehicle found stationary or parked at the kerbside on a road which is a clearway during the hours of operation may be towed away.

Clearways have been in place for several decades in Sydney. They form part of a number of measures aimed at improving travel flows on arterial roads, including no stopping, bus lanes and transit lanes.

On 1 December 2013, the Minister for Roads and Ports Duncan Gay announced the [Sydney Clearways Strategy](#), which outlined how the Government would improve roads efficiency by introducing new or extended clearways on roads that “do not perform to the community’s expectations.” As outlined in the Strategy.⁹³

...the key challenge with a clearways program is to balance the competing needs of local businesses, with those of the broader community using the road network for their daily commute in a car or bus, or for carrying freight.

The Strategy therefore sets out criteria “for identifying potential clearways, a process for engaging with local stakeholders and for providing alternative parking to minimise impacts on local businesses and residents.”⁹⁴ A clearway is considered for a major state road if it meets the following criteria:⁹⁵

- Directional traffic flows exceed 800 vehicles per hour per lane;
- Travel speeds are 30km/h or below during peak periods;
- The road is a strategic bus or freight transport corridor for moving people and goods; and
- Alternative public parking close to local businesses can be found, taking into account the quantity and usage of parking removed to extend or introduce a new clearway.

⁹² NSW Government, [Sydney Clearways Strategy](#), December 2013

⁹³ Roads and Maritime Services, [Sydney Clearways Strategy](#), December 2013, p.14

⁹⁴ Roads and Maritime Services, [Sydney Clearways Strategy](#), accessed 29 May 2015

⁹⁵ Roads and Maritime Services, [Sydney Clearways Strategy](#), December 2013, p.9

Five priority clearway projects identified in the Clearways Strategy		
Road	Location	Proposed clearway extensions
Victoria Road	From Iron Cove Bridge to The Crescent, Rozelle	Weekends – daytime (revised from previous proposal)
Lane Cove Road	From North Ryde to Macquarie Park	Weekdays and weekends – daytime
Mona Vale Road	From Pacific Highway, West Pymble to St Ives	Weekdays – am and pm peaks Weekends – daytime
King Georges Road	From the South West Motorway (M5) to Hume Highway, Greenacre	Weekdays and weekends – daytime
Princes Highway	From President Avenue, Kirrawee to King Georges Road, Blakehurst	Weekdays – am and pm

Source: Sydney Clearways Strategy

6.3 M4 Smart Motorway System

The NSW Government is proposing to introduce intelligent roads technology, known as a “Smart Motorway System”, to the M4 Motorway between Pitt Street, Mays Hill and Lapstone.

Smart Motorways use complementary technologies to monitor traffic conditions, manage congestion and respond to incidents in real-time. Key technical features of the prospective M4 Smart motorway system are outlined on the RMS [website](#).

The M4 Smart Motorway investment is costed at just over \$400 million and is projected to deliver a \$5.4 billion benefit, suggesting an indicative benefit cost ratio of 13:1.⁹⁶

The proposed concept design and Review of Environmental Factors for the M4 Smart Motorway were displayed for community comment from 12 March to 10 April 2015. Construction of the M4 Smart Motorway is expected to start in 2017 and be completed within three years.

6.4 Gateway to the South

As part of the State Infrastructure Strategy, the NSW Government committed \$300 million from the Rebuilding NSW fund to creating a [Gateway to the South](#) by addressing pinch points across the A1, A3 and A6 corridors. The \$300 million will be allocated across 10 years and [includes](#):⁹⁷

- \$45 million to fix pinch point at key intersections commencing 2015/16;
- \$240 million to fix pinch points along key corridors commencing 2016/17;
- \$15 million will be invested in bus infrastructure improvements commencing in 2015/16.

⁹⁶ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.49

⁹⁷ NSW Government, [Busting congestion: \\$300 million to create a gateway to the south](#), February 2015

To help address congestion issues between the Illawarra and Sydney, the Government has also commissioned scoping studies for larger scale investment options on the F6 and A6 corridors (Chapter 7.7).⁹⁸

6.5 Upgrading Sydney Coordinated Adaptive Traffic System

RMS operates the Sydney Coordinated Adaptive Traffic System (SCATS), a traffic management system that seeks to optimise road utilisation – for example, by adjusting traffic light changes to accommodate demand patterns. Infrastructure NSW recommended updating SCATS in the *State Infrastructure Strategy Update* to “best international practice” to further improve Sydney’s traffic management capabilities.

It also recommended the replacement of the [Transport Management Centre’s](#) existing road network management system “to improve the Centre’s capability to integrate and respond to network information and reduce delays to motorists.”⁹⁹

The NSW Government committed \$200 million from the Rebuilding NSW fund to Traffic Management Upgrades (including SCATS), with funding to commence from 2015-16.¹⁰⁰

⁹⁸ NSW Government, [Busting congestion: \\$300 million to create a gateway to the south](#), February 2015

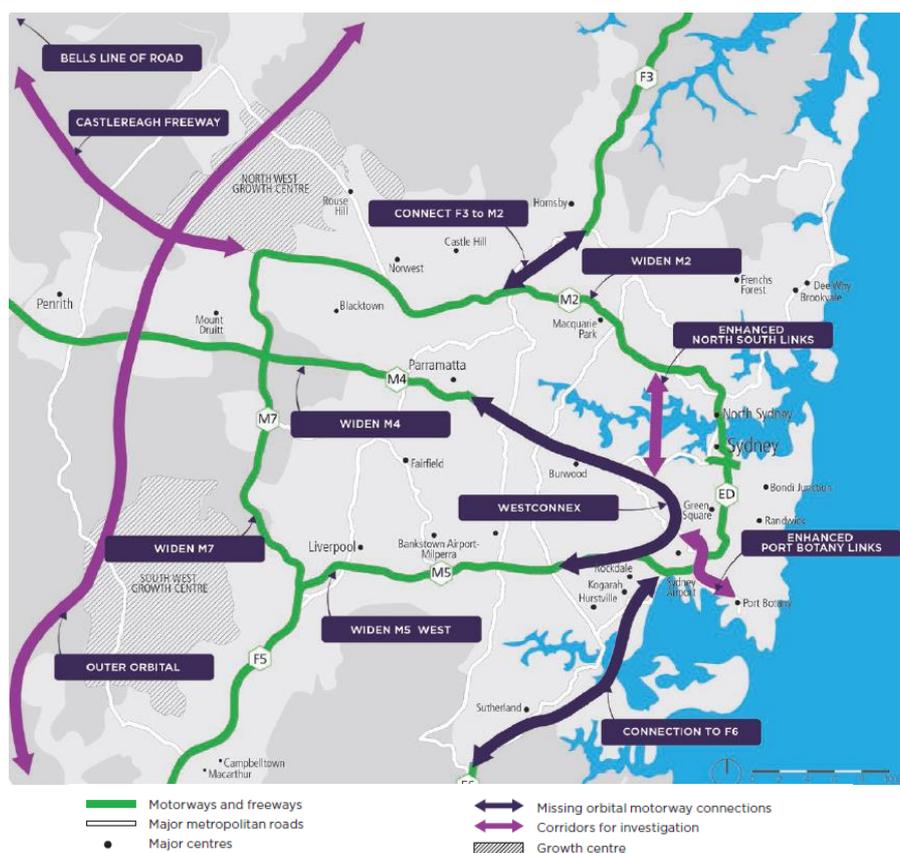
⁹⁹ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.50

¹⁰⁰ NSW Government, [Rebuilding NSW – State Infrastructure Strategy Update](#), February 2015

7. SYDNEY ROADS INFRASTRUCTURE PROJECTS

This chapter outlines the larger scale road programs currently underway or in the planning phase in Sydney. The WestConnex project, which involves the expansion of capacity along the M4 and M5 corridors, is the foremost project currently underway in Sydney (Figure 16).

Figure 16: Transport Master Plan: vision for Sydney's motorway networks¹⁰¹



A number of other projects are either underway or are in the viability assessment phase of planning. Ultimately, the aim of these larger infrastructure projects is to enhance capacity and connectivity within and adjacent to the Sydney orbital road network.

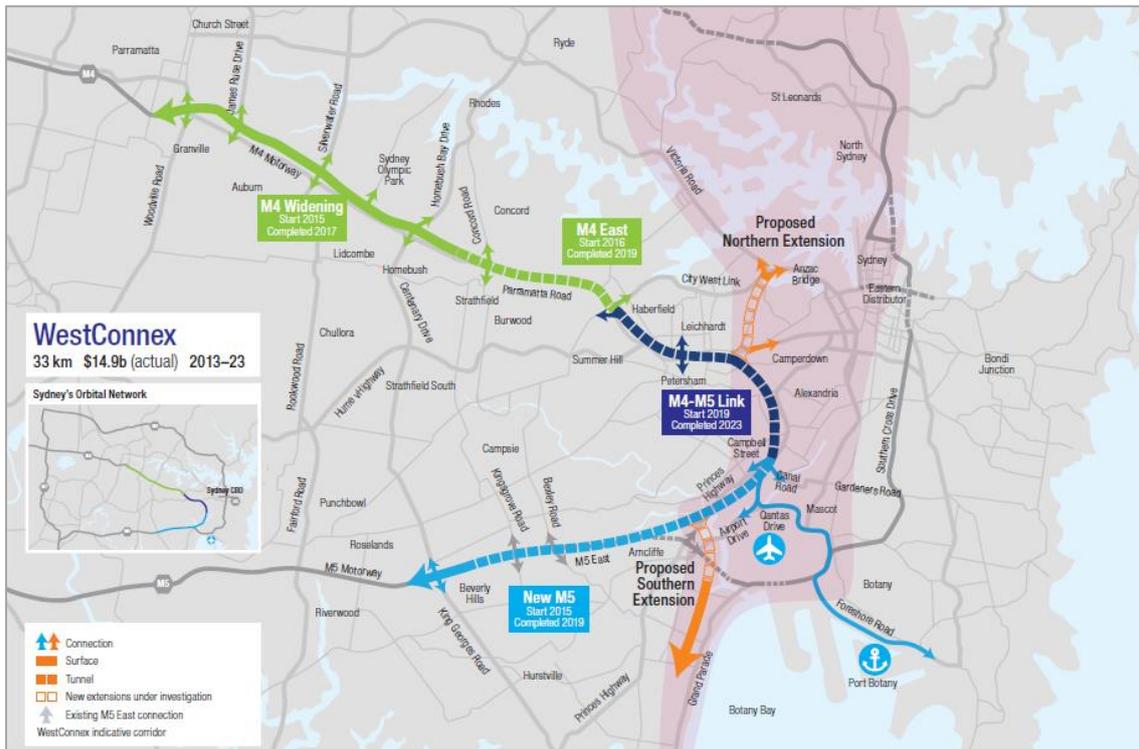
7.1 WestConnex

The WestConnex project involves 33 kilometres of upgraded and new motorways linking the M4 and M5 corridors and providing connections to the Sydney CBD and Airport/Port Precinct (Figure 17). The WestConnex project comprises three stages: the M4 Widening and M4 East Tunnel, the New M5 and the M4-M5 link.¹⁰²

¹⁰¹ NSW Government, [NSW Long Term Transport Master Plan](#), 2012, p.140

¹⁰² NSW Auditor-General, [Westconnex: Assurance to the Government](#), December 2014, p.7

Figure 17: Westconnex project proposal, including extensions¹⁰³



WestConnex will involve a distance-based tolling system similar to the M7. There will be a minimum toll; allowing tolls to be capped at around 16km. Cars will pay less than trucks, reflecting the greater wear and tear trucks have on the motorway, which is consistent with M2 and M5 tolling.

The WestConnex concept was first developed by Infrastructure NSW as part of the [State Infrastructure Strategy 2012](#) which identified the expansion and extension of the M4 corridor and expansion of M5 East as the two highest priorities for enhancing Sydney's motorway network. A formal [concept paper](#) was prepared in October 2012 and coincided with the release of the *State Infrastructure Strategy*.

In October 2013 the Government established the [WestConnex Delivery Authority](#) to lead the delivery of the project. In June 2014, the Government requested that the WestConnex Delivery Authority assess the viability of northern and southern extensions to the scheme. Infrastructure NSW recommended in its *State Infrastructure Strategy Update* that the WestConnex Delivery Authority develop final business cases for the extensions by the end of 2015.¹⁰⁴

These proposed extensions aim to offer a western bypass of Sydney's CBD – alleviating pressure on the existing north-south corridor of Sydney's orbital network and reducing journey times from the city's south. Over the longer term,

¹⁰³ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.51

¹⁰⁴ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.52

through the Western Harbour Tunnel project (Chapter 7.3), the proposed northern extension to WestConnex would connect to a third harbour road crossing.¹⁰⁵

In August 2014 the Sydney Motorway Corporation was set up separately to the WestConnex Delivery Authority to organise the financing of WestConnex. However, as reported in the [Sydney Morning Herald](#), both organisations are now being merged due to “governance issues”. The WDA released a statement regarding these changes:¹⁰⁶

...the NSW Government has taken the opportunity to evolve the early governance model created to deliver the WestConnex. This has resulted in the transfer of the project delivery functions...to the Sydney Motorway Corporation.

Government funding comprises \$1.8 billion from Restart NSW toward WestConnex, \$928 million from the Consolidated Fund and \$1.5 billion in grant funding from the Commonwealth Government.¹⁰⁷ The Commonwealth Government has also agreed to provide a separate \$2.0 billion concessional loan to accelerate the delivery of Stage 2 (M5 East tunnels).¹⁰⁸ As outlined in the NSW Auditor-General [report](#):¹⁰⁹

The balance of the funding for the scheme will come from private sector debt and equity capital raised against tolls on completed stages of the Project, with the recycling of Government capital invested in the individual stages of WestConnex once traffic volumes are established.

Infrastructure NSW estimated the Westconnex project costs at \$14.9 billion in the *State Infrastructure Strategy Update*. This includes an additional \$1.8 billion for the northern and southern extensions. Construction commenced in March 2015, with completion of all stages of WestConnex expected in 2023.

As outlined in the NSW Budget 2015-16, with approved scope changes and increases in land acquisition costs, the estimated nominal outturn cost for the WestConnex project is \$15.4 billion.¹¹⁰

WestConnex has faced significant criticism regarding its claimed benefits, value for money and ability to adequately address Sydney's future transportation issues. While it is beyond the scope of this paper to comprehensively assess proposed costs and benefits from the WestConnex project, it is important to note that the City of Sydney Council strongly opposed WestConnex. A Council-commissioned review by [SGS Economics and Planning](#) made a number of key

¹⁰⁵ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.51

¹⁰⁶ Sydney Morning Herald, [WestConnex governance shake-up as Parramatta Road tunnel nears](#), 3 June 2015

¹⁰⁷ NSW Treasury, [Budget Paper No.2](#), 2015-16, Infrastructure Statement, Chapter 1.4, p.1-4

¹⁰⁸ Ibid

¹⁰⁹ NSW Auditor-General, [Westconnex: Assurance to the Government](#), December 2014, p.8

¹¹⁰ NSW Treasury, [Budget Paper No.2](#), 2015-16, Infrastructure Statement, Chapter 1.4, p.A-13

findings:¹¹¹

- It is highly unlikely that traffic demand will make the tolls roads financially viable;
- Claimed travel time savings are not plausible until all proposed road sections are completed;
- There is no guarantee that WestConnex will remove traffic from local roads; and
- There are significant concerns about the project assessment process.

The NSW Auditor General also raised a number of governance and project assessment issues in the December 2014 [performance audit](#) of WestConnex.

7.2 NorthConnex

The NSW Government and the M7 Westlink Shareholders (Transurban, Canadian Pension Plan and Queensland Investment Corporation) will construct and operate a tolled motorway, called NorthConnex, linking the M1 Pacific Motorway at Wahroonga to the Hills M2 Motorway at West Pennant Hills.¹¹² The project will provide a continuous motorway between the Central Coast and Western and South-Western Sydney.

NorthConnex will [comprise](#) twin motorway tunnels around 9 km in length, wide enough for three lanes but initially marked for two in each direction and an increased height clearance of 5.3 metres. An additional lane will be constructed for the M2 westbound between Pennant Hills Road and Windsor Road to facilitate safe merging from the tunnel onto the M2 Motorway.¹¹³

Figure 18: NorthConnex project proposal



The \$3.0 billion project consists of a construction budget of \$2.65 billion in

¹¹¹ SGS Economics and Planning, [Strategic Review of the WestConnex Proposal](#), February 2015

¹¹² NorthConnex, [Project overview](#), accessed 9 June 2014

¹¹³ NSW Treasury, [Budget Paper No.4](#), 2014-15, Infrastructure Statement, Chapter 1, p.1-8

addition to land and project delivery costs. It will be funded by:¹¹⁴

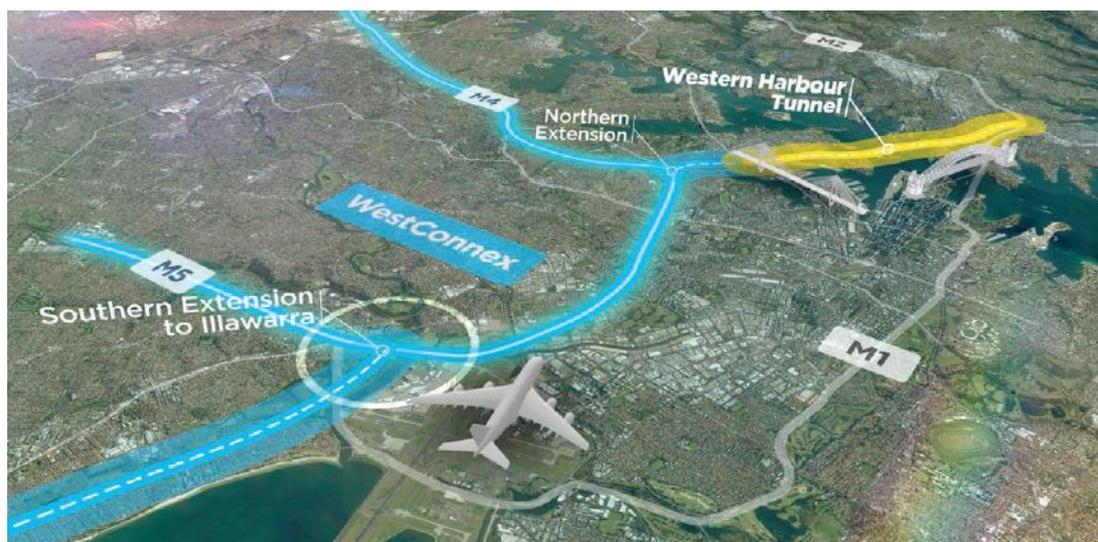
- tolls on the new NorthConnex tunnel;
- M7 concession changes, including increasing the truck toll and extending the concession term;
- \$405 million contribution from the Commonwealth Government; and
- \$502 million State Government contribution (including \$410 million from Restart NSW¹¹⁵).

Following a comprehensive Environmental Impact Statement and extensive community consultation, construction commenced in February 2015, with completion expected by late 2019.

7.3 Western Harbour Tunnel

By 2031 travel demand on the existing Harbour crossings and Anzac Bridge will significantly exceed capacity in peak periods.¹¹⁶ A third road crossing of Sydney Harbour, in the form of a Western Harbour Tunnel, is under investigation as part of the NSW Government's motorway planning program.

Figure 19: Proposed Western Harbour Tunnel and its motorway connections¹¹⁷



The Western Harbour Tunnel would provide a tunnel from WestConnex across Sydney Harbour to North Sydney, creating another bypass of Sydney's CBD and easing demands on the Sydney Harbour Bridge, Eastern Distributor and other approaches to the city.¹¹⁸ Traffic modelling indicates that around 13% of

¹¹⁴ NorthConnex, [Project overview](#), accessed 9 June 2014

¹¹⁵ NSW Treasury, [Budget Paper No. 2](#), 2015-16, Infrastructure Statement, p.2-4

¹¹⁶ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.53

¹¹⁷ NSW Government, [Western Harbour Tunnel](#), 2014

¹¹⁸ Ibid

demand – or almost 2,000 vehicles per hour – would divert to the new tunnel during the morning peak.¹¹⁹

The southern portal at Rozelle would connect with the WestConnex northern extension and the northern portal would be in the corridor between the Gore Hill and Warringah Freeways. The Western Harbour Tunnel's indicative cost is estimated at up to \$4.5 billion. As with the existing Harbour crossings, the Western Harbour Tunnel is expected to be a tolled motorway.¹²⁰

According to the *2015-16 Infrastructure Statement*, \$3.4 million has been spent in planning for the Western Harbour Tunnel, with an additional \$14 million allocated for planning in 2015-16.¹²¹

7.4 Western Sydney Infrastructure Plan

In May 2014, the Commonwealth Government, in partnership with the NSW Government¹²², [announced](#) a ten-year road investment program of \$3.6 billion for Western Sydney.¹²³ This program includes (Figure 20):

- [upgrade of the Northern Road](#) to a minimum of four lanes from Narellan to the M4 Motorway;
- construction of a [new four-lane motorway between the M7 Motorway and the Northern Road](#);
- [upgrade of Bringelly Road](#) to a minimum of four lanes from Camden Valley Way to the Northern Road;
- improved interchanges connecting the Northern Road and the new motorway with arterial roads; and
- a \$200 million local roads package.

All projects under the [local roads package](#) will be in close proximity to the Western Sydney Airport at Badgerys Creek and the Western Sydney Employment Area bounded by the M4, M7, the Hume Motorway and just west of the airport site. The average project cost is expected to be between \$5 and \$10 million.

As documented in the [January to March 2015 Report Card](#), construction has commenced, with project completion anticipated for 2024.¹²⁴

¹¹⁹ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.53

¹²⁰ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.53

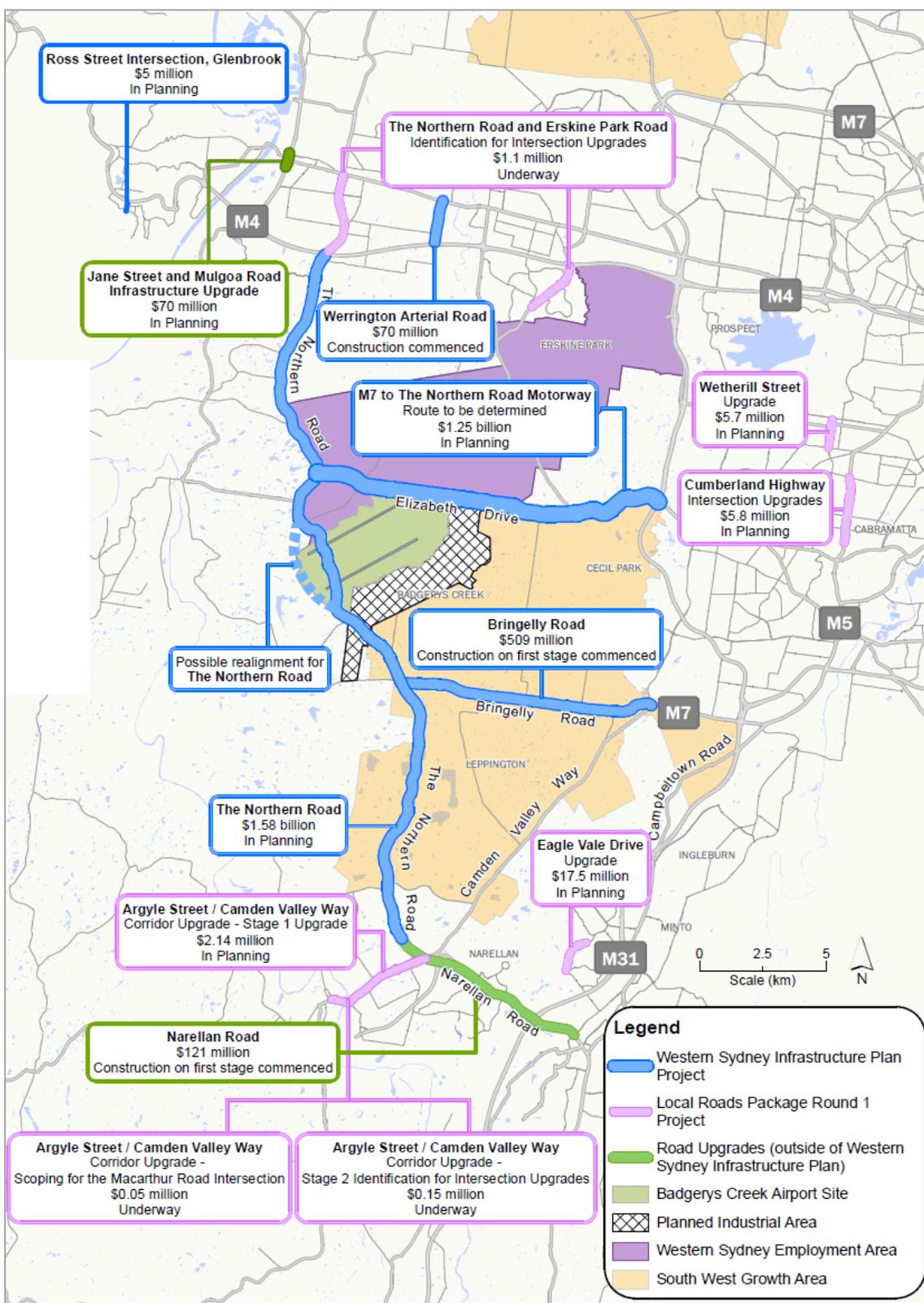
¹²¹ NSW Treasury, [Budget Paper No. 2](#), 2015-16, Infrastructure Statement, p.5-58

¹²² The NSW Government announced additional support of \$103.3 million in the 2015-16 Budget. Total spend for 2016-16 will be \$167 million – see Budget Paper No. 2.

¹²³ Department of Infrastructure and Regional Development, [Local Roads Package Implementation Plan](#), 5 June 2014; The Commonwealth Government will fund \$2.9 billion while the NSW Government will provide around \$700 million.

¹²⁴ Commonwealth Budget, [Building Australia's Infrastructure](#), May 2014, p.13

Figure 20: Western Sydney Infrastructure Plan projects¹²⁵



¹²⁵ Department of Infrastructure and Regional Development, [Western Sydney Airport: community update Autumn 2015](#),

7.5 Beaches Link toll road

A \$5 million feasibility study into a Spit Tunnel, as well as a northern beaches rapid transit bus plan, was allocated as part of the 2014-15 NSW State Budget.¹²⁶ A potential Beaches Link toll road would provide a direct connection from Seaforth to the Warringah Freeway corridor. Details of the proposal were outlined in the *State Infrastructure Strategy Update*.¹²⁷

Beaches Link would likely use a tunnel connection for its full length, although the option of a combined tunnel and bridge over Middle Harbour is also under consideration.

The project is estimated to significantly alleviate congestion on one of the slowest corridors of Sydney's road network – potentially reducing morning peak traffic movements from the Spit Bridge by around 30% and improving the local amenity of Military and Spit Roads.

Pre-feasibility work undertaken to date suggests the Beaches Link would cost between \$2.4 billion and \$3.1 billion (2014 dollars).¹²⁸ Projected toll revenues are unlikely to fully offset the cost.

Infrastructure NSW considered that the Western Harbour Tunnel represents a “higher medium term priority” than the Beaches Link.¹²⁹

7.6 Outer Sydney Orbital & Bells Line of Road Corridor Preservation

As defined by [Transport for NSW](#) “corridor preservation is a process to identify and preserve an area of land for future transport use. A preserved corridor provides certainty for communities, businesses and land owners and reduces the cost of providing infrastructure in the long term.”

Transport for NSW is [investigating](#) a suitable corridor for the Outer Sydney Orbital to provide a north-south connection for a future motorway, freight rail and where practical a passenger rail line (Figure 21).¹³⁰

Transport for NSW is also [investigating](#) a suitable corridor for the Bells Line of Road – Castlereagh Connection to provide an alternative route across the Blue Mountains. The investigation would identify a suitable corridor connecting the Bells Line of Road east of Kurrajong Heights with the Sydney motorway network.

¹²⁶ NSW Treasury, [Budget Paper No.4 - Infrastructure Statement](#), 2014-15, p.2-9

¹²⁷ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.53

¹²⁸ Ibid

¹²⁹ Ibid, p.54

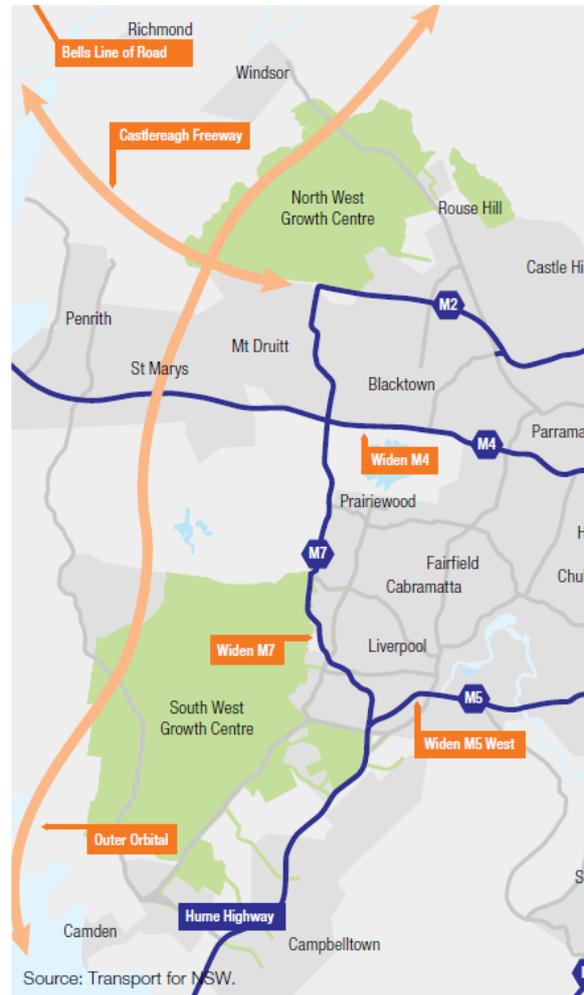
¹³⁰ Transport for NSW, [Outer Sydney Orbital Corridor Preservation Study](#), accessed 15 June 2015

As acknowledged by Transport for NSW, “these transport corridors will need to accommodate road and rail design requirements, which may require certain width, incline and enough room to create interchanges with existing roads, motorways, freight lines and passenger lines. Allowance also needs to be provided for earthwork, utility services and maintenance access.”¹³¹ For example:

- A freight line and motorway combined for Outer Sydney Orbital would need a 140m wide corridor.
- A passenger line would need a 60m wide corridor.
- A combined corridor for all three will be around 200m.
- The Bells Line of Road - Castlereagh Connection would need a 70m corridor.

Community consultation is currently underway as part of the investigation process, with a final corridor commitment to be made by Government in late 2016.

Figure 21: Proposed outer Sydney orbital corridor



According to the *2015-16 Infrastructure Statement*, \$4.6 million has been spent in planning for the Outer Sydney Orbital Corridor, with an additional \$7.52 million allocated for planning in 2015-16.¹³² \$2 million has been spent in planning for the Bells Line of Road Corridor, with an additional \$3.6 million allocated for planning in 2015-16.

7.7 F6 Extension

The Government is currently investigating investment into a potential F6 motorway (between Loftus and St Peters) through an \$11 million Southern Sydney Access Study.¹³³

¹³¹ Transport for NSW, [Outer Sydney Orbital and Bells Line of Road - Castlereagh Connection](#), access 15 June 2015

¹³² NSW Treasury, [Budget Paper No. 2, 2015-16, Infrastructure Statement](#), p.5-58

¹³³ Transport for NSW, [Biggest roads, maritime and freight budget in NSW history: a record \\$5.5 billion](#), accessed 15 June 2015

Infrastructure NSW recognised “the benefits that would come from improving intra-urban and inter-urban journeys along Sydney’s southern road corridors.” However, initial findings suggested that “substantial upgrades to these corridors are likely to be very expensive.” For example, the F6 corridor faces significant topographical constraints.¹³⁴ The Study is yet to be completed.

8. CONCLUSION

Sydney’s rapidly growing and sprawling population base has meant that demand for the limited space on the Sydney road network has hit saturation on a number of major corridors.

While a shift in mode share from vehicles to public transport is one response to reducing demand on the roads network – forecasts indicate that the roads network, through private motor vehicle usage, will continue to be the dominant transport option for the foreseeable future in Sydney.

For this reason, the latest round of policy responses from the NSW Government has been targeted toward enhancing the supply-side of the roads network.

Less capital intensive road management strategies, including the pinch points program and Sydney clearways strategy, aim to improve the efficiency of existing roads by resolving localised congestion problems.

The focal point of roads spending from the NSW Government has been through the implementation of the WestConnex scheme which will involve 33 kilometres of upgraded and new motorways linking the M4 and M5 corridors. In addition to the NorthConnex and prospective Western Harbour Tunnel projects, the aim of such projects is to improve the connectivity and capacity of the Sydney motorway network, thereby relieving congestion.

It is important to note that this paper has only outlined, in detail, NSW Government roads policy and spending measures. As discussed earlier, the administration and management of the Sydney roads network is multi-faceted, involving varying degrees of participation across all levels of government. Consequently, these NSW Government policy measures need to be considered in the context of other local and Commonwealth Government roads policies.

¹³⁴ Infrastructure NSW, [State Infrastructure Strategy Update](#), 2014, Chapter 3, p.54