

# 9. Transport

The recommendations in the 2018 SIS for the transport sector need to be read in the context of *Future Transport 2056* and the *Greater Sydney Region Plan*. Both documents have been key inputs to this strategy. Infrastructure NSW supports the land use directions set out in the *Greater Sydney Region Plan* and, in this chapter, seeks to assess the relative priority of the major investments within *Future Transport 2056*. It does so by considering both the guiding vision in the *Greater Sydney Region Plan* and its own strategic directions set out in Chapters 2 to 7.

**STRATEGIC OBJECTIVE** Ensure the transport system creates opportunities for people and businesses to access the services and support they need

## SNAPSHOT

- From providing access to essential services in the bush, connecting valuable goods and services to markets and moving millions of people each day across our cities and regions, transport is an integral part of our lives and is crucial to helping NSW function.
- Unprecedented levels of investment are being made in the State's transport network, but more targeted investment will be needed, and more efficient use made of existing transport assets, to cater for growing personal, business and freight transport needs over the next 20 to 40 years.
- Infrastructure NSW's recommendations acknowledge the directions set by *Future Transport 2056* and the *Greater Sydney Region Plan*, and are generally supportive of the investments and approaches proposed by these plans.
- In regional NSW, Infrastructure NSW endorses Transport for NSW's vision for a 'hub and spoke' transport network model that improves connectivity to strategic centres from surrounding communities and improves access to key markets and international gateways. In the regions, reducing road trauma and protecting transport assets from natural disasters and extreme weather must be a priority.
- In Greater Sydney, catering for the extra 1.7 million people that will live there by 2036 will require better integration of land use with transport, managing travel demand, making better use of scarce road space (including delivering bus priority and bus rapid transit infrastructure on major road projects and to connect strategic centres), continuing to improve and extend the city's rail network, upgrading major public transport interchanges and modernising the city's motorway network.
- With the freight task in NSW over the next 20 years growing from 443 Mt to 569 Mt per year, strategically important ports, airports, industrial lands, freight precincts and key corridors must be protected from incompatible uses to ensure the efficient movement of freight in Sydney and NSW, now and into the future.

RESPONSE	Summary of key recommendations
<b>Integrate transport with land use</b>	<ul style="list-style-type: none"> <li>• Support the development of a three-city metropolis for Greater Sydney by investing in transport infrastructure that provides high frequency and high-volume access to, and connectivity between, each of the three cities, while enhancing local amenity.</li> <li>• Invest in transport infrastructure that is integrated with land use to create opportunities for agglomeration and enhance productivity, liveability and accessibility, in support of the policy goal of a '30-minute city'.</li> <li>• Support the development of regional hubs by enhancing their accessibility and connectivity via major north-south and east west links.</li> </ul>
<b>Manage travel demand</b>	<ul style="list-style-type: none"> <li>• Encourage travel patterns that are tailored to the capacity of the network and help to manage congestion with mobility pricing reform and demand management initiatives.</li> </ul>
<b>Unlock capacity in existing assets</b>	<ul style="list-style-type: none"> <li>• Re-allocate road space in key commuter corridors to give priority to the most productive and sustainable transport modes, improve the integration of services across modes, remove network bottlenecks and upgrade operational systems and infrastructure.</li> <li>• Overcome local constraints on the regional road and rail networks that limit the use of high productivity freight vehicles and rail freight.</li> </ul>
<b>Continue to invest in new network links</b>	<ul style="list-style-type: none"> <li>• Further develop the Sydney rail network with new rail links and system-wide upgrades. Develop extensive on-road rapid transit networks and active transport links to support the mass transit system and link key centres across Greater Sydney. Plan and deliver critical links in the motorway network that will serve Sydney well into the future.</li> <li>• In the Western Sydney Parkland City, give priority for the next 20 years to establishing a high quality, on-road rapid transit system and planning and preserving future infrastructure corridors. Commence investment in rail-based mass transit as a staged investment from 2036 onwards, unless co-investment from the Commonwealth Government and the private sector enables it to proceed earlier.</li> <li>• Complete missing links in the regional network, creating travel time savings and safety benefits that increase productivity.</li> </ul>
<b>Capitalise on new technology</b>	<ul style="list-style-type: none"> <li>• Equip the transport system for emerging technology with investments in connectivity and digital infrastructure, and establish regulatory and governance settings that will encourage innovation and ensure the benefits of new technology can be fully realised.</li> </ul>
<b>Improve regional and metropolitan freight productivity</b>	<ul style="list-style-type: none"> <li>• Develop and protect freight and service networks by improving road and rail access for goods and services to local, national and global markets, leverage the Commonwealth's Inland Rail investment and address existing inefficiencies and pinch points.</li> <li>• Improve the resilience of the system to reflect its critical operational role, including during periods of acute and sustained shock.</li> </ul>

## 9.1 Recent progress

The recommendations for transport investment in the *State Infrastructure Strategy 2012* and *State Infrastructure Strategy Update 2014* are being progressively implemented by the NSW Government, which has invested nearly \$60 billion in transport infrastructure since 2012.

The *State Infrastructure Strategy Update 2014* recommended delivering 16 major transport passenger and freight projects and programs across the state. Four years into implementation, Infrastructure NSW finds these projects are now progressing through planning and delivery. Significant milestones include:

- **Sydney Metro City & South West:** the NSW Government has committed \$7 billion from Restart NSW to this project, accelerating its delivery by five to seven years. Planning approvals for Metro City from Chatswood to Sydenham were obtained in January 2017, with early works already underway. The planning approval process for Metro South West has started and, subject to approval, construction work will commence in early 2018.
- **Parramatta Light Rail:** currently in its planning and development stage. Stage 1 is fully funded and construction is expected to begin in late 2018, to be completed by 2023.

- **WestConnex:** the centrepiece of the *State Infrastructure Strategy 2012*. In 2017, the first stage of the M4 upgrade was opened, as was the King Georges Road / M5 interchange. Delivery of Stages 1 and 2 are well progressed, with planning well underway for Stage 3.
- **M4 Smart Motorway:** using intelligent technology to improve the safety, reliability and efficiency of the M4 Motorway. Construction of Stage 1 has begun and is scheduled to be completed by 2019.
- **Fixing Country Rail Program:** a \$400 million program to fund rail infrastructure enhancements that eliminate connectivity constraints and reduce the costs of moving freight on the regional rail network. A pilot, run in 2016, allocated \$14 million in funding to six projects across NSW. The total reservation of \$150 million for the first round of the program is expected to be fully allocated to projects by early 2018.
- **Bridges for the Bush Program:** announced in 2012 and extended in 2014, the program improves road freight productivity by replacing or upgrading bridges across NSW. Seven bridges have been completed and planning or delivery of works at other key locations in regional NSW is underway.
- **Fixing Country Roads Program:** providing targeted funding to local councils to repair and upgrade regional NSW roads. As at the end of 2017 a total of 210 projects valued at \$319 million have received \$195 million in Restart NSW funds.

## 9.2 Challenges and opportunities

NSW is in the midst of an unprecedented infrastructure investment boom, with \$41 billion to be spent on transport alone over the next four years. This transformative investment will bolster NSW's rich stock of transport infrastructure assets, and help to address the following key challenges and opportunities over the coming decades:

- **Addressing capacity constraints:** NSW's road, public transport and freight networks are affected by system-wide and interdependent capacity constraints, particularly on radial routes into and out of major centres.
- **Improving productivity:** Across the road, rail and freight networks, local pinch points, bottlenecks, missing links and inefficient management of freight movements hamper productivity.
- **Shaping our regions and cities:** The transport network plays an important role in shaping our regions and cities by establishing the mass movement patterns that create the structure of cities.
- **Improving road safety:** With 380 fatalities and a further 12,000 serious injuries in NSW in 2016,<sup>173</sup> road trauma is the largest contributor to transport-related social and economic costs in Australia.<sup>174</sup>
- **Addressing socio-economic disadvantage:** Parts of Sydney and regional NSW have relatively poor accessibility to services, jobs and

<sup>173</sup> Transport for NSW 2017a, p. 4

<sup>174</sup> Bureau of Infrastructure, Transport and Regional Economics (BITRE) 2014, p. 1

opportunities and higher levels of disadvantage than the rest of NSW.

- **Catering for demographic changes:** An ageing population means that travel needs will change. There is also evidence of a gradual reduction in average car travel per capita since 2004.<sup>175</sup>
- **Embracing technological changes:** The rapid emergence of new technology can improve personal mobility, as well as freight supply chains, by making journeys safer, more efficient and more productive.
- **Resilience and climate change:** Reducing greenhouse gas emissions from the transport sector and adaptation to climate change are crucial to meeting Australia's commitments to the *Paris Agreement* and the NSW Government's target of net zero emissions by 2050 as part of the *NSW Climate Change Policy Framework*.
- **Leveraging health benefits:** A well-designed transport system can reduce health system costs by increasing walking and cycling.<sup>176</sup>

## 9.3 Response

### 9.3.1 Regional NSW

NSW is blessed with diverse regions, each with unique capabilities, resources and cultural heritage. The Department of Planning and Environment's *Regional Plans*, Transport for NSW's *Future Transport 2056* and the 2018 SIS recognise that each region has its own infrastructure and service needs and seek to acknowledge that diversity. Infrastructure NSW

recommends investments in the transport sector in regional NSW that:

- support Transport for NSW's vision for a 'hub and spoke' regional transport network model that improves connectivity to global gateways and strategic centres from surrounding communities, capitalising on their role as hubs for services and employment
- support regional development with reliable and efficient access to key markets, including improved access to international gateways and the National Land Transport Network
- support sustainable jobs growth in traditional and emerging industries by facilitating access between and within regional centres
- reduce the levels of accident trauma on the regional transport network
- protect regional communities and physical infrastructure from the impacts of extreme weather and mitigate climate change.

#### Hub and spoke model of regional service delivery

Transport in regional NSW is transitioning to a 'hub and spoke' model: a transport service and network model that recognises the importance of regional strategic centres in the provision of essential services and jobs (refer to Chapter 8.3). This is characterised by links that radiate to connect to surrounding towns and communities (spokes) from strategic centres and cities (hubs).

The NSW and Commonwealth Governments have invested substantial funds in north-south routes that comprise the National Land Transport Network, such as the Hume and Pacific Highways, and the NSW Government is leading major improvement programs on the Princes and the Newell Highways. The final sections of the Pacific Highway are being upgraded to dual carriageway, although two significant pinch points at Coffs Harbour and Hexham/Heatherbrae remain and should be addressed as a priority in partnership with the Commonwealth Government. As the north-south routes are completed, east-west connectivity on corridors such as the Barrier, Bruxner, Great Western, Kings, Oxley and Snowy Mountains Highways will become even more important as (see Figure 32 showing annual regional road freight movements). Roads and Maritime Services is undertaking a progressive corridor planning program to identify ways of overcoming physical challenges and network restrictions such as:

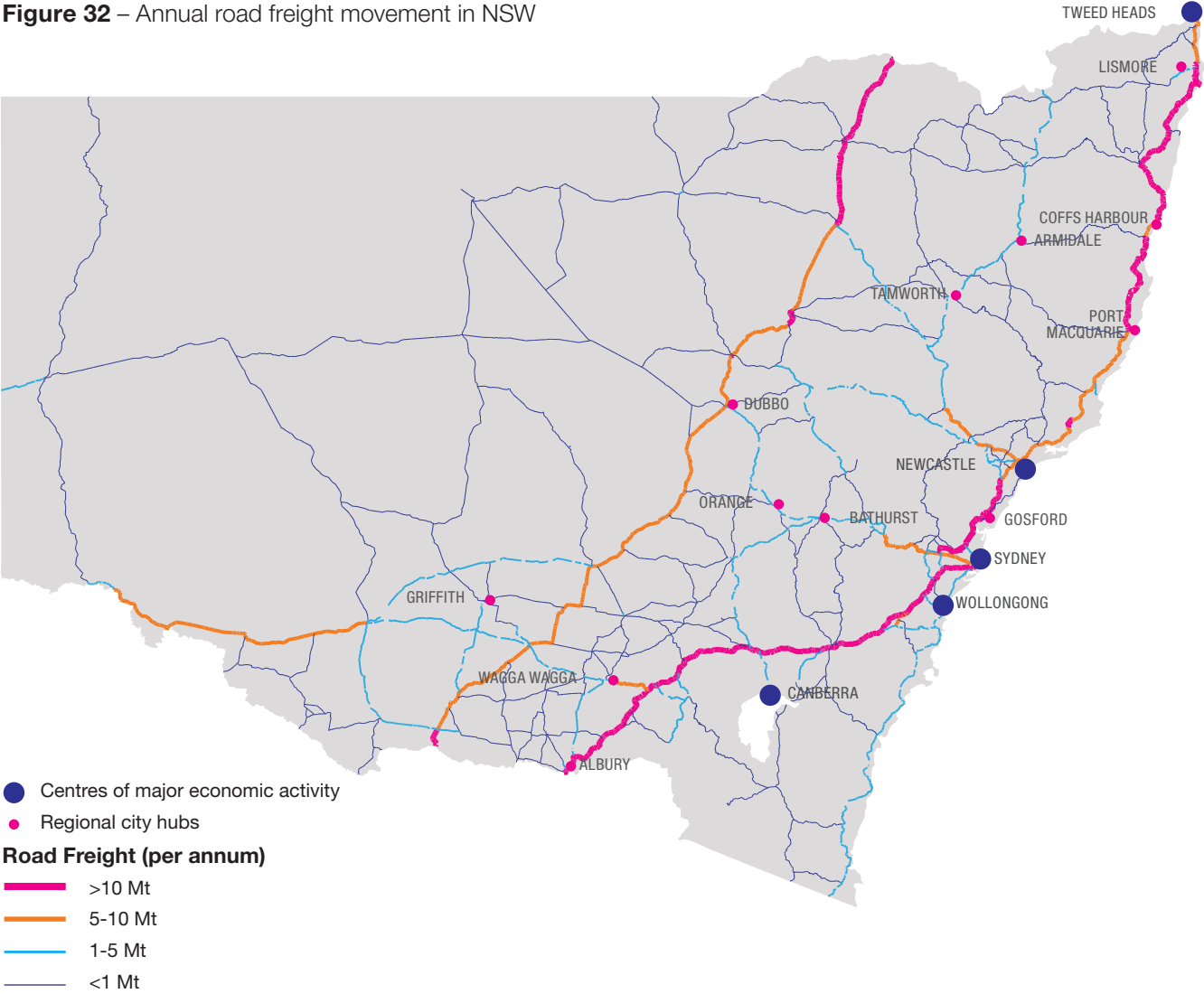
- a lack of overtaking lanes, which increases travel times and the risk of crashes
- restricted access for High Productivity Freight Vehicles due to road design constraints
- recurring road and rail closures in flood-prone areas
- a shortfall of facilities to manage driver fatigue for heavy vehicle operators
- rail level crossings without boom gates that increase the safety risk for road and rail users
- narrow bridges, road shoulders and clear zones that increase the risk of vehicle crashes.

<sup>175</sup> Bureau of Infrastructure 2012, p. 71

<sup>176</sup> Reiner et al 2013

Aviation also has a role to play in the ‘hub and spoke’ model. Global gateways at Sydney Airport, Newcastle and Canberra, as well as regional aviation hubs, can be made more productive prior to the development of Western Sydney Airport with more effective regulation, accommodating day-return trips and better integrating landside transport connections.

Figure 32 – Annual road freight movement in NSW



Source: Transport for NSW 2017

### Embedding safety and resilience

Regional NSW is significantly over-represented in the NSW road toll. The combination of high private vehicle use, long distances to travel and the condition of some physical infrastructure increases exposure to risk and contributes to the road toll. Despite being home to just over 20 per cent of the NSW population, country areas represent two thirds of all fatalities and one third of serious injuries.<sup>177</sup> Infrastructure investments are a critical part of the Safe System approach in Transport for NSW's *Road Safety Plan 2021*. Bringing higher volume routes up to four- and five-star standard creates safer roads that – together with safer speed limits, safer vehicles with new technology and changes in driver behaviour and enforcement that create safer users – will help to reduce the regional road toll and move NSW closer the 'Towards Zero' road toll target.

Inland and remote areas are already prone to extreme weather conditions and natural hazards, including floods, droughts and fires. These conditions will be exacerbated by a changing climate. Regional NSW's transport infrastructure needs to be able to better withstand extreme weather conditions and natural disasters and provide reliable emergency evacuation routes for people living in vulnerable areas.

Infrastructure NSW recognises the importance of investing in safe and resilient infrastructure (refer to Chapter 5) and recommends that considerations of safety and network resilience be factored into all of NSW's future transport investments and policies.

As Corridor Strategies are completed, these will provide a framework to guide subsequent investment

decisions in regional Rebuild NSW programs, including the *Regional Road Freight Corridor Fund*, *Fixing Country Roads* and *Bridges for the Bush* programs. Consequently, these strategies should recognise the strategic importance of east-west connectivity, the high standards of safety required to move closer to the 'Towards Zero' target and the role these play in increasing the resilience of regional NSW.

### Recommendation 40

Infrastructure NSW recommends that the Corridor Strategies and guidelines for submissions to the *Regional Road Freight Corridor Fund*, *Fixing Country Roads* and *Bridges for the Bush* programs adopt an increased focus on achieving goals related to road safety and network resilience.

### Improving regional productivity

Despite the NSW and Commonwealth Governments' investments to increase regional freight capacity, including the main north-south routes and the future Inland Rail project, freight productivity will continue to be hampered by local constraints (such as the physical challenges outlined above). In addition, network restrictions on key corridors (particularly in an east-west direction), as well as 'last-mile' challenges and access restrictions on local roads, compounded by fragmented road ownership across state and local governments, remain barriers to regional freight productivity.

Existing funding mechanisms, which are a mix of Commonwealth, state and local funding sources, tend to entrench underinvestment in the road network, with road managers unable to recover the full costs

for repairing and maintaining roads. Revenue-raising mechanisms such as fuel excise and vehicle registration fees are mismatched to road use and the wear and tear it brings with it. The proposed National Heavy Vehicle Pricing and Investment Reform would establish equitable 'user pays' arrangements and help set prices that reflect the long-run cost of road provision.

### Recommendation 41

Infrastructure NSW recommends that the NSW Government continue the *Regional Road Freight Corridor Fund* for a further 10 years once the current Rebuilding NSW reservation is exhausted around 2025 to overcome physical challenges and network restrictions. Investment should target freight productivity upgrades on key east-west routes linking the National Land Transport Network via a 'top down' strategic approach, supported by completed Corridor Strategies and business cases.

### Recommendation 42

Infrastructure NSW recommends that the NSW Government continue the *Fixing Country Roads and Bridges for the Bush* programs for a further 10 years once the current Rebuilding NSW reservation is exhausted around 2025 to overcome physical challenges and network restrictions. Investment should occur via a 'top down' strategic approach to target safety and productivity upgrades to the road network to unlock High Productivity Freight Vehicle network capacity.

<sup>177</sup> Transport for NSW 2017a, p. 11

## Regional freight markets in NSW

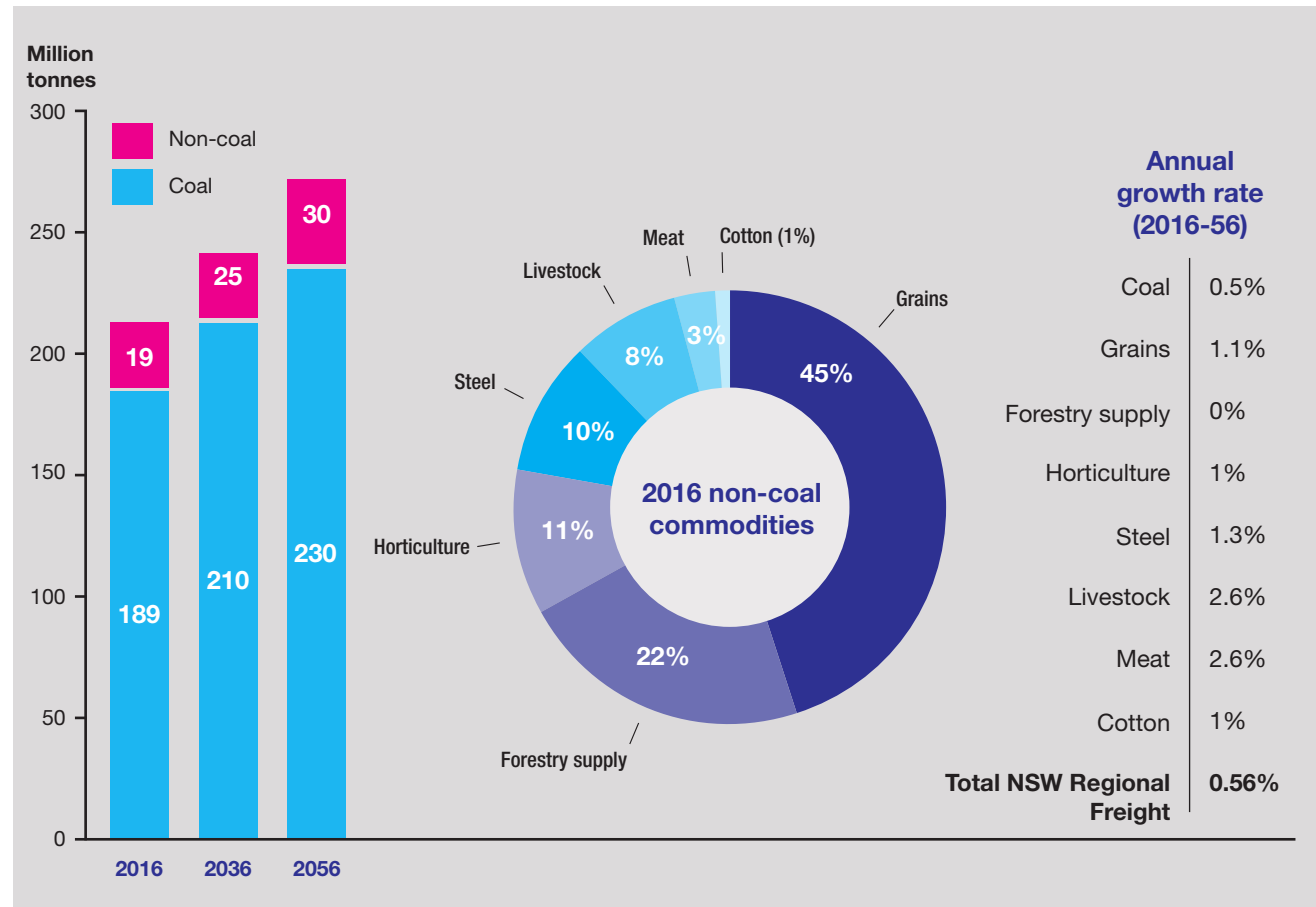
The total regional NSW freight task is forecast to grow from 208 Mt in 2016 to 235 Mt by 2036 and 260 Mt by 2056 – a 25 per cent increase.

The freight sector is dominated by the movement of coal destined for export markets via rail through the Hunter to the Port of Newcastle and from the Central West to Newcastle and through the Illawarra to Port Kembla. The demand for coal in 2016 was approximately 189 Mt. Even with a changing international energy market, it is expected to grow to 230 Mt by 2056, an increase of 21 per cent.

Demand for other freight sectors is generally correlated with population and economic growth. Food and agricultural products destined for local and overseas consumption represent the next largest components of the freight market in NSW. Where economies of scale occur and rail access exists, freight flows are aggregated and moved to capital cities via rail for export or consumption. Road freight remains important for the transport of these commodities, particularly for shorter journeys and for access to railheads.

Imported goods and general freight are de-containerised in capital cities and distributed to the regions primarily via road. These movements represent the quickest growing segment of the freight market, being more closely linked to consumer demand. While road freight will continue to play a crucial role in the freight task, it is notable that both the NSW Government and Commonwealth Government are aiming to increase the proportion of freight moved by rail.

Figure 33 – Composition of regional NSW freight task



Source: Transport Performance and Analytics 2017

### Leverage Inland Rail and resolve local access constraints

The NSW Government is working with the Commonwealth Government to develop the Inland Rail project, which provides an opportunity to reshape the regional freight rail network and the economic geography of the regions it serves. A key focus for NSW is to ensure that Inland Rail supports the State's primary industries by optimising the movement of freight in regional NSW to ports and gateways, regardless of whether those gateways are in NSW, Victoria or Queensland. Inland Rail seeks to deliver efficient links to these gateways and develop economically sustainable freight hubs – operated by the private sector – at appropriate locations along the route.

Key parts of the broader rail network beyond the mainline tracks suffer from significant constraints, including low axle weight capacity, low track speeds and insufficient siding lengths. While addressing these issues has been a focus of previous State Infrastructure Strategies, many constraints remain, impairing productivity and resulting in freight inefficiencies and/or goods being transferred to road transport.

To get the best value, investments to upgrade the regional rail freight network should be underpinned by a high-level network strategy that reflects the Commonwealth Government's proposed *National Freight and Supply Chain Strategy* and leverages the development of Inland Rail.

## Recommendation 43

Infrastructure NSW recommends that the NSW Government continue the *Fixing Country Rail* program for a further 10 years once the Rebuilding NSW reservation is exhausted around 2025 to overcome local rail system constraints. Investment should occur via a 'top down' strategic approach underpinned by a high-level network strategy.

### 9.3.2 Central Coast and Illawarra-Shoalhaven

Infrastructure NSW recognises the need to invest in the Central Coast and Illawarra-Shoalhaven as stand-alone, self-contained administrative and business centres, and to support the increasingly important connectivity between the Illawarra-Shoalhaven and south-western Sydney. Infrastructure NSW supports the Department of Planning and Environment's Regional Plans for the Central Coast and Illawarra-Shoalhaven and the vision of *Future Transport 2056* that recommend investments in the transport sector to:

- provide for improved connectivity between the Illawarra-Shoalhaven and south-western Sydney, and between Sydney, the Central Coast and Newcastle
- support population growth and changing demographics in the Central Coast and Illawarra-Shoalhaven, as the total population of these areas grow to over one million people
- support self-sustaining local employment in traditional and emerging industries (health, education) through an integrated, connected public transport network

- support import/export industries with connections between international gateways and the National Land Transport Network and recognise the increasing importance of Port Kembla.

### Improving connectivity to south-western Sydney

Over the next 40 years, the Illawarra-Shoalhaven will become more closely integrated with the economy of Greater Sydney. Major economic growth opportunities stem from the region's proximity to the growth areas of south-western Sydney, the Illawarra's port and logistics infrastructure and its education, health and innovation facilities. Reliable access between the Illawarra-Shoalhaven, the Greater Sydney Region, the Hume Motorway and the broader National Land Transport Network is crucial to realising these opportunities. This means addressing congestion in and around Wollongong and the Illawarra Escarpment, as well as resolving conflicts between passenger and freight train movements on the rail network.

Picton Road provides the main vehicle and freight access from the Illawarra-Shoalhaven to the M31 Hume Motorway, the Greater Macarthur Growth Area in the Western Parkland City and beyond. To achieve the road's full potential, further safety and design improvements will be needed, building on the success of the \$53 million Picton Road upgrade program (2009-2013) and the \$2.5 million Hume Highway and Picton Road interchange safety improvements (2016).

Road links into and out of the Illawarra are challenged by steep grades and tight turns on the Illawarra escarpment, which create safety, noise and access problems. Roads and Maritime Services is planning an upgrade to the M1 Princes Motorway between Picton Road and Bulli Tops



and an upgrade to the M1 Princes Motorway / Mount Ousley interchange. When completed, these projects will improve safety, capacity and efficiency for the 44,000 vehicles that use these routes each day.

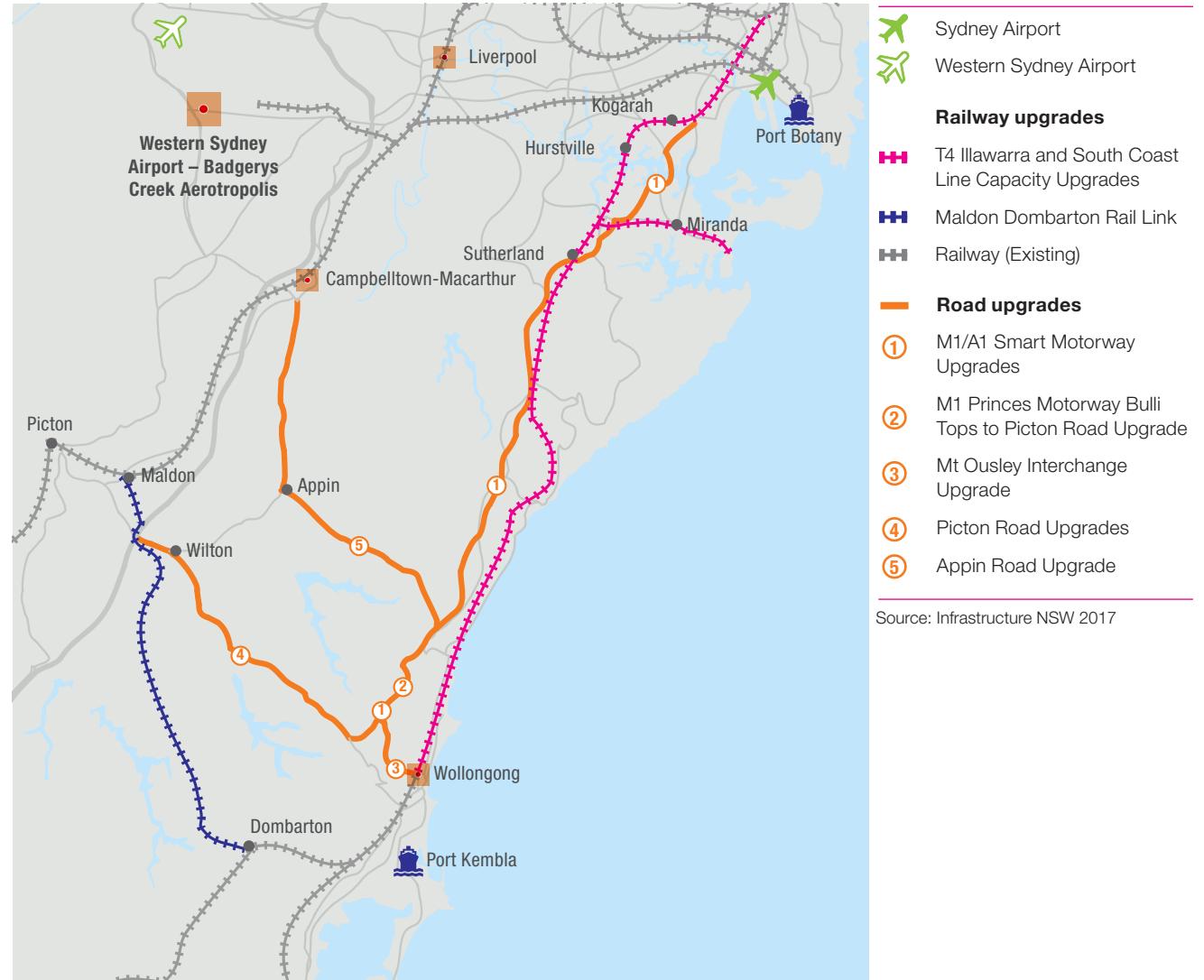
In addition, the NSW Government has committed to upgrading the Princes Highway at Albion Park Rail and the section between Berry to Bombaderry. This investment will improve access between the Shoalhaven and Wollongong and Sydney.

### Recommendation 44

Infrastructure NSW recommends that the NSW Government improve strategic connectivity between the Illawarra-Shoalhaven and the Western Parkland City by investing, subject to business cases, in the following projects over the next five to 10 years:

- upgrades to road access into the Illawarra via the M1 Princes Motorway, including the Mount Ousley interchange and M1 Princes Motorway between Bulli Tops and Mount Ousley
- freight and safety upgrades to Picton Road in recognition of its role as the primary connector between the M31 Hume Motorway and the M1 Princes Motorway.

Figure 34 – Road and rail network upgrades to support the Illawarra-Shoalhaven



As demand for passenger travel between Sydney and the Illawarra-Shoalhaven grows, competition between passenger and freight movements on the T4 Illawarra and South Coast line will intensify. Forecasts suggest that, by around 2030, freight movements will be displaced entirely from the rail network between Sydney and the Illawarra-Shoalhaven to make way for passenger services. It is strategically critical to maintain long-term rail freight connectivity between Sydney and the Illawarra-Shoalhaven. When Port Botany reaches capacity, Port Kembla will need to support servicing the containerised freight needs of Greater Sydney.

Building on recommendations from the *State Infrastructure Strategy Update 2014*, Infrastructure NSW considers that the Maldon-Dombarton rail link is the most appropriate rail freight connection between Sydney and Port Kembla, although it is unlikely to be needed until 2030. This link will connect Port Kembla to intermodal facilities in the Western Parkland City via the Southern Sydney Freight Line and future Western Sydney Freight Line, as well as improving travel times and reliability for the 60-65 per cent of freight that currently enters or leaves Port Kembla by rail.

While the need for this investment is some time in the future, Transport for NSW should be prepared for its eventuality. Infrastructure NSW suggests that in the next five to 10 years, Transport for NSW should prepare an updated business case for the project that incorporates updated land use, transport and freight forecasts that reflect planned growth in the Western

Parkland City and passenger rail demands on the T4 Illawarra and South Coast line. Overall strategic investment for the region is shown in Figure 34.

### Alternatives to fast rail

*Future Transport 2056* envisages that track straightening and new fleet will improve the rail connection between the Sydney CBD, the Illawarra-Shoalhaven and the Central Coast and Newcastle. However, significant improvements in passenger rail travel time between the Sydney CBD, the Illawarra-Shoalhaven and the Central Coast and Newcastle are difficult to achieve given the region's challenging terrain, such as steep gorges, river crossings and geotechnical conditions affected by mining activity. Studies into improving travel times between Sydney CBD and Wollongong and Sydney CBD and Newcastle have consistently found that only very modest improvements are likely to be feasible without immense cost.

Around 17,000 workers, or 14 per cent of the Illawarra-Shoalhaven workforce, commute to Sydney, most of them living north of Wollongong. Over time, the proportion of people living in the Illawarra who work locally will increase, but the connection to Sydney will remain important as the number working in Greater Sydney will also grow.<sup>178</sup>

### Illawarra-Shoalhaven workforce commute to Sydney



Source: Transport for NSW 2017

Passenger rail capacity constraints to and from the Illawarra-Shoalhaven can be overcome with progressive investment in the SmartRail program (refer to section 9.3.3) and, in the long term, by the diversion of freight services from the T4 Illawarra Line. However, as the Western Parkland City takes shape, and its economic connection to the Illawarra-Shoalhaven grows, the case for a direct passenger rail connection between western Sydney and the Illawarra may become stronger. Such an investment is unlikely to be feasible within the timeframe of the 2018 SIS, but should be canvassed as part of the business case for the Maldon-Dombarton freight line.

The M1 Princes Motorway is the major road connecting Sydney and the Illawarra-Shoalhaven. Traffic incidents and congestion on the route can significantly affect travel times, and these challenges are expected to worsen over time. Smart motorway technology can smooth traffic flows and control entry

178 Transport for NSW 2016a, p. 58

and exit points, help to manage congestion and decrease the impact of incidents, as well as equipping motorways to harness the productivity benefits of advanced vehicle technologies. Smart motorways have proven to be a very worthwhile investment both in Australia and overseas; they have similar potential to improve operations on the corridor between Sydney and the Illawarra-Shoalhaven.

In the Central Coast, 22 per cent, or 22,000 people, commute to Sydney every day and six per cent, or 6,000, commute to the Hunter region.<sup>179</sup> In the long term, large numbers of commuters will continue to travel from the Central Coast to Sydney and the Hunter.

**Central Coast workforce commute to Sydney and the Hunter**



Source: Transport for NSW 2017

Like the Illawarra-Shoalhaven, options for materially improving capacity and travel times on the rail network between the Central Coast and Sydney are unlikely to be economically feasible, even in the long term.

Road access between the Central Coast, Sydney and Newcastle is provided primarily by the M1 Pacific Motorway. As with road connectivity between Sydney and the Illawarra, reliance on one primary link means traffic incidents and congestion can significantly affect travel times. Smart motorways also have similar potential to improve operation on the corridor between Sydney, the Central Coast and Newcastle.

**Recommendation 45**

Infrastructure NSW recommends that Transport for NSW develop business cases by the end of 2020 for the deployment of Smart motorway technology along the M1 Princes Motorway between Sydney and Wollongong and the M1 Pacific Motorway between Sydney and Newcastle to help manage congestion, improve network resilience and capitalise on future vehicle technologies.

**9.3.3 Greater Sydney**

The 2018 SIS supports the guiding principle of the '30-minute' city vision and the metropolis of three cities that underpins the *Greater Sydney Region Plan* and *Future Transport 2056*.

By 2036, 6.4 million people will live in Greater Sydney, 1.7 million more people than today, resulting in an estimated increase of 6.2 million journeys each day: up from 16 million now to over 22 million. These daily journeys will generate strong additional demand on

important links into and out of the Eastern Harbour and Central River cities, as well as strong growth in the northern and southern parts of the Western Parkland City.

*Future Transport 2056* recognises that catering for this additional demand and maintaining and expanding the '30-minute' catchments within each of Sydney's three cities will require a mobility system that improves people's access to jobs and services without compromising the liveability and amenity of Sydney's suburbs and centres. Infrastructure NSW supports this strategic direction.

Recommendations for Greater Sydney as a whole are presented in this section. Further recommendations for each of the three cities are set out in sections 9.3.4 to 9.3.6.

The NSW Government is investing across Greater Sydney in transformational mass transit projects like Sydney Metro and Sydney Light Rail, as well as in major motorways like WestConnex and NorthConnex, which will improve travel times and increase network capacity. Major investments like these have established the backbone of the citywide transport system and will continue to be critically important in increasing the '30-minute' catchments of each city.

However, even with this investment, Transport for NSW has forecast that rising congestion on parts of the road network and crowding on sections of the rail network will increase travel times and affect the reliability of the system. These trends will impair the productivity of the city, with congestion alone expected to cost over

<sup>179</sup> Transport for NSW 2016b, p. 59

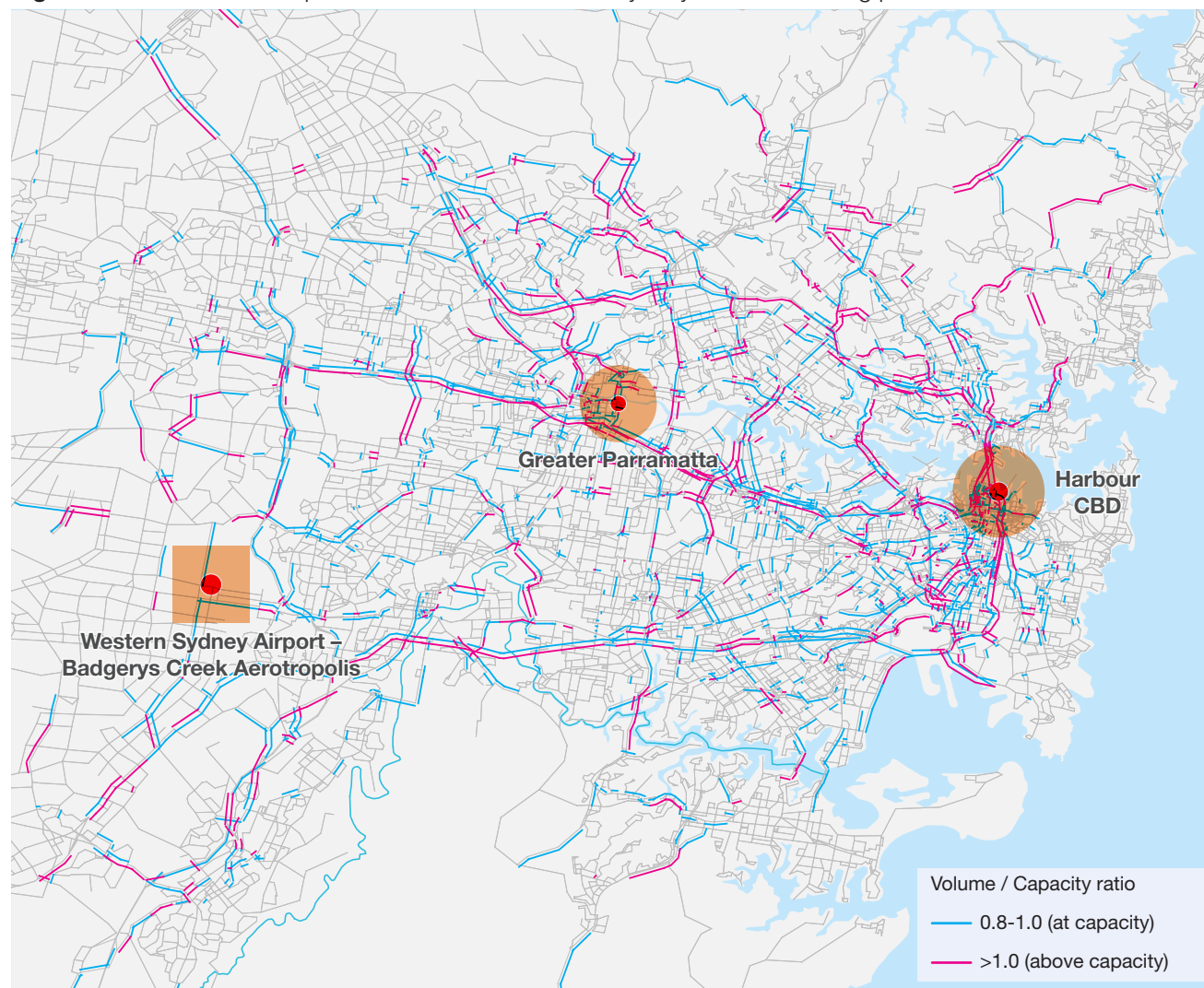
\$12 billion per annum by 2030.<sup>180</sup> If current levels of private vehicle use persist, they will reduce the ‘30-minute’ catchments across the city.

As shown in Figure 35, major road links in all three cities will experience severe congestion, with an extra 500,000 car trips during each morning peak.

To respond to this, like *Future Transport 2056*, the 2018 SIS recommends a response that will shift demand towards more efficient modes of transport, reduce, re-time or re-route movements and unlock the capacity of current assets by modernising systems and addressing bottlenecks. Both strategies seek to identify transport investments that will support the land use directions in the *Greater Sydney Region Plan*. In this context, Infrastructure NSW recommends investments in the transport sector for Greater Sydney that:

- support and shape the structure of Greater Sydney with major transport infrastructure
- preserve the high levels of amenity that contribute to Sydney’s existing competitive advantages
- sustainably manage transport demand by integrating land use with transport
- efficiently move people across an integrated, connected network by using mass movement corridors to their highest potential, improving local accessibility, facilitating ease of interchange and enhancing public and private supply of services

**Figure 35** – Road network performance across Greater Sydney in 2036 morning peak



Source: Transport for NSW 2017

180 Bureau of Infrastructure, Transport and Regional Economics (BITRE) 2015, p. 1

- reduce the incidence of accident trauma on the metropolitan transport network
- mitigate emissions and adapt to the impacts of climate change.

**Demand management**

Congestion brings with it considerable social and economic costs, including increased travel times, lost productivity, health impacts from stress and increased air pollution, and increased vehicle operating costs. These affect Sydney’s economic productivity and liveability.

Analysis of global cities (refer to Figure 36) suggests that cities with higher congestion levels than Sydney have a materially lower quality of life. Sydney may have reached a point of inflection, beyond which further increases in congestion may significantly reduce its high quality of life and global competitiveness.<sup>181</sup>

In addition, reducing congestion will reduce emissions in line with Australia’s commitments to the *Paris Agreement* and NSW’s Net Zero Emissions objective. In NSW, the transport sector contributes 20 per cent of all greenhouse gas emissions, with road based transport – cars, commercial vehicles and buses – contributing over 85 per cent, as shown in Figure 37. Further details on the transition toward electric vehicles and charging infrastructure are outlined in Chapter 10.

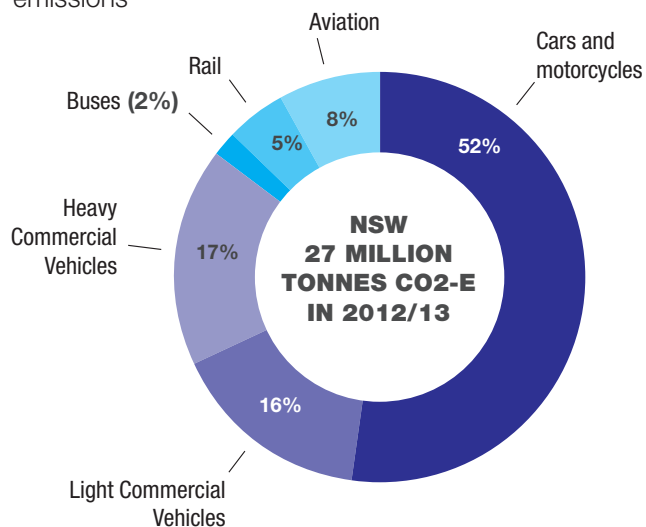
**Figure 36 – City congestion and quality of living rankings**



Source: Austroads 2016, *Congestion and Reliability Review*

181 Austroads 2016, p. 42

**Figure 37** – NSW transport related greenhouse gas emissions



Source: Centre for Transport, Energy and Environment and Pekol Traffic and Transport 2015, *NSW Transport Facts*

As new major links like WestConnex, NorthConnex and the planned Western Harbour Tunnel are established, the necessary functional links that have been missing from the urban motorway network will be completed, particularly in the eastern and central regions of metropolitan Sydney. However, over the term of this strategy, further investment in expanding the road network in established parts of Sydney will become harder to justify given:

- the high cost of major road projects
- the decreasing amount of land available to accommodate new roads
- the negative impacts of traffic on the amenity of neighbourhoods.

## Integrated system-wide pricing

While transport is crucial to economic prosperity and the quality of people's lives, it comes with a cost. Part of this cost is recovered from users through public transport fares, fuel excise, vehicle registration fees and tolls.

In addition, transport activities impose societal costs from congestion, crowding, air pollution and noise, which impact people's quality of life, health and productivity. These costs are not reflected in the prices road users pay and are ultimately borne by others and society in general. This results in an inefficient transport system as the choices made by drivers, passengers and freight operators regarding when to travel and their mode, route and vehicle type do not consider the external costs they cause.

The introduction of a system-wide user pricing system for the Sydney metropolitan area and for heavy vehicles across NSW would represent a means to more fairly recover costs to provide mobility, relieve congestion, improve road safety and reduce other costs to society.

Pricing reform in the transport sector has been considered by governments for at least two decades, albeit with little change in institutional arrangements – as found by the 2015 Harper Competition Review. In response to this review, the reform process was refreshed as Heavy Vehicle Road Reform in 2015, with heavy vehicle user pricing at its core, and has since been endorsed by the Commonwealth, state, territory and local governments.

In December 2016, as part of the *Intergovernmental Agreement on Competition and Productivity Enhancing Reforms*, state and territory governments (including NSW) and the Commonwealth Government committed to accelerate the Heavy Vehicle Road Reform, including identifying steps to introduce pricing regulation by 2017-18 and developing cost-reflective road pricing for all users.

In 2017, the Commonwealth Government (in response to Infrastructure Australia's recommendation to introduce road pricing for all vehicles within 10 years) commissioned a study to investigate its costs and benefits for the community, noting that its introduction would hinge on a positive net benefit.

Current reform discussions are focused on providing a direct link between users and the cost of transport provision. Infrastructure NSW supports this approach.

Reform of road user charging has proven very challenging for governments, not just in NSW but globally. However, the advent of electric and autonomous vehicles will inevitably transform people's use of the road network and will require changes to funding and charging arrangements. In anticipation of these developments, Infrastructure NSW considers it would be prudent for the NSW Government to begin to assess the options for reform of road user charging.

It will become increasingly important to ensure that the use of scarce road space is optimised. Pricing can play a role, with economic modelling undertaken as part of the 2018 SIS suggesting that it leads to fairer charging for users of the system, decongestion of the network and overall economic benefits. Any reforms to road user charging will require careful consideration given current community sentiment on the issue.

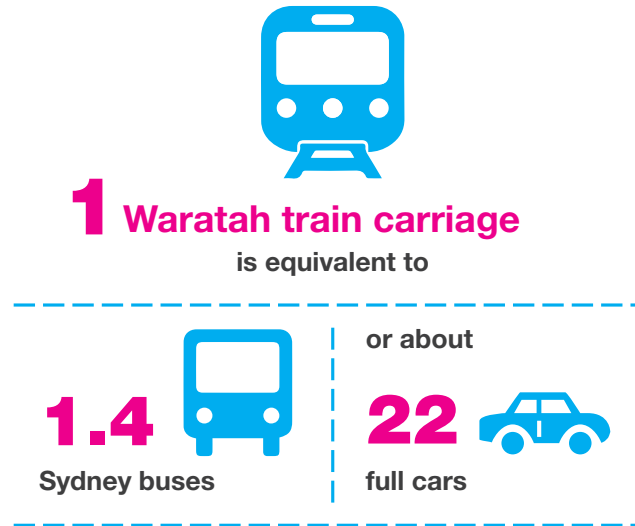
### Recommendation 46

Infrastructure NSW recommends that it partner with NSW Government agencies to develop a 'road map' by the end of 2020 that examines the merits of, and outlines a pathway to, an integrated, system-wide user pricing regime across the Sydney metropolitan road and transport network that contemplates the impacts of electric and autonomous vehicle technology.

### Using the road network more efficiently

As Sydney's population grows, competition for scarce road space between users, modes and sectors will increase. A more efficient way of moving increasing numbers of people and goods on existing, constrained networks will need to be found. Particularly in the commuter segment of the travel market, private vehicle traffic with low vehicle occupancy rates is far less efficient at moving people than public transport.

### Relative efficiency of transport modes



Source: Transport for NSW 2017

The NSW Government has provided record funding to upgrade and extend Sydney's road and public transport networks over the next decade. This means that parts of Sydney, including the Eastern Harbour City, will maintain a very high standard of amenity and public transport accessibility and connectivity. These parts of the city should play a key role in accommodating population and jobs growth.

Population growth will complement the already high density, mixed use areas in the Eastern Harbour City and strengthen established patterns of high volume, concentrated flows of people and goods throughout the day, not just in peak times.

However, as indicated in Figure 35, even with the major investments committed or underway, unless private

vehicle use can be reduced, population growth will result in severe congestion on a majority of roads in the Eastern Harbour City by 2036.

To protect the amenity that Sydneysiders prize so highly, available road space will need to be used more efficiently. Reallocating road space in key corridors to more efficient and sustainable modes is critical – modes such as light rail, buses and active transport that will maintain high patronage levels throughout the day.

### Recommendation 47

Infrastructure NSW recommends that Transport for NSW develop a program to reallocate and prioritise road space for on-road rapid transport links for buses and high-efficiency vehicles on major routes into the Sydney CBD as major projects like WestConnex, Sydney Metro and SmartRail are completed progressively over the next five to 10 years.

In the Western Parkland City, the NSW and Commonwealth Governments have co-invested in the Western Sydney Infrastructure Plan, which provides key road infrastructure to support the early development of the city. This program aims to improve connectivity between the main centres of Greater Penrith, Liverpool, Campbelltown and the Western Sydney Airport, and complements other major infrastructure like the Liverpool and North West T-Ways, as well as major arterial roads linking growth areas.

While rail networks will be important over the long term, the arterial road network provides an opportunity

to introduce a high quality rapid bus network to serve the airport and the metropolitan centres of Liverpool, Penrith and Campbelltown as the Western Parkland City takes shape.

Establishing this network should leverage investment in the Western Sydney Infrastructure Plan by reallocating road space, extend the Liverpool T-Way to Western Sydney Airport and include the necessary bus priority infrastructure and complementary supporting infrastructure to provide high user amenity and accessibility (such as stops, shelters and weather protection, and signage).

### Recommendation 48

Infrastructure NSW recommends that Transport for NSW develop business cases by the end of 2019 for the progressive delivery of a bus rapid transit network connecting the centres of Liverpool, Campbelltown, Greater Penrith, Blacktown and Western Sydney Airport over the next 10 years.

Notwithstanding the Government's major investment in public transport, the road network will continue to be crucial to the movement of people and goods. Pinch points, bottlenecks and reliability problems on the existing road network were highlighted in the *State Infrastructure Strategy Update 2014*, with recommendations for investment in targeted upgrades as part of the Easing Sydney's Congestion program. Projects implemented as part of this program, such as the Pinch Points Program and upgrades to Sydney Coordinated Adaptive Traffic System, have consistently demonstrated large benefits relative to their costs.

Further targeted investments to remove pinch points, improve public transport priority and upgrade traffic management systems should remain a priority.

### Recommendation 49

Infrastructure NSW recommends that the NSW Government continue the *Easing Sydney's Congestion* program over the next 10 years with further progressive investment in targeted, small scale, high impact network management programs (such as pinch points, clearways and bus priority programs) and Co-operative Intelligent Transport Systems (such as upgrades to the Sydney Coordinated Adaptive Traffic System and Transport Management Centre).

Walking and cycling provide people with flexible point-to-point mobility for short trips and make neighbourhoods more liveable by reducing noise and pollution from through-traffic. They can easily coexist with public open spaces where people like to relax. Walking and cycling trips help to reduce ill-health and health-related expenditure, and ensuring they are safe and protected from traffic is proven to increase their use.

Within high density areas, such as major retail districts and employment centres, walking is by far the most efficient means to travel, given the relatively short distances involved and volumes of traffic on the road network. Ninety per cent of trips in Sydney's CBD are made on foot<sup>182</sup> and the introduction of Sydney Light Rail and the pedestrianisation of George Street will transform walking in the CBD. However, pedestrians

<sup>182</sup> Transport for NSW 2013, p. 10

in other parts of the CBD face high levels of crowding and long wait times at intersections. Improvements targeted at reducing wait times, widening kerbside areas and increasing accessibility would have a significantly positive impact on productivity and amenity.

Walking and cycling should be encouraged in the established Eastern Harbour and Central River cities, and integrated into planning for the new growth areas in the Western Parkland City.

### Recommendation 50

Infrastructure NSW recommends that by the end of 2018, Transport for NSW develop business cases on a city-by-city basis for an annual program of investment in a network of protected cycleways linking major strategic centres across the three cities. This should be delivered in partnership with local government and be integrated with the Greater Sydney Commission Green Grid.

### Recommendation 51

Infrastructure NSW recommends that Transport for NSW, in partnership with local government, develop a 10-year rolling program that prioritises active transport at high volume and high profile locations in the Sydney CBD and other strategic centres.



### Greater Sydney rail strategy

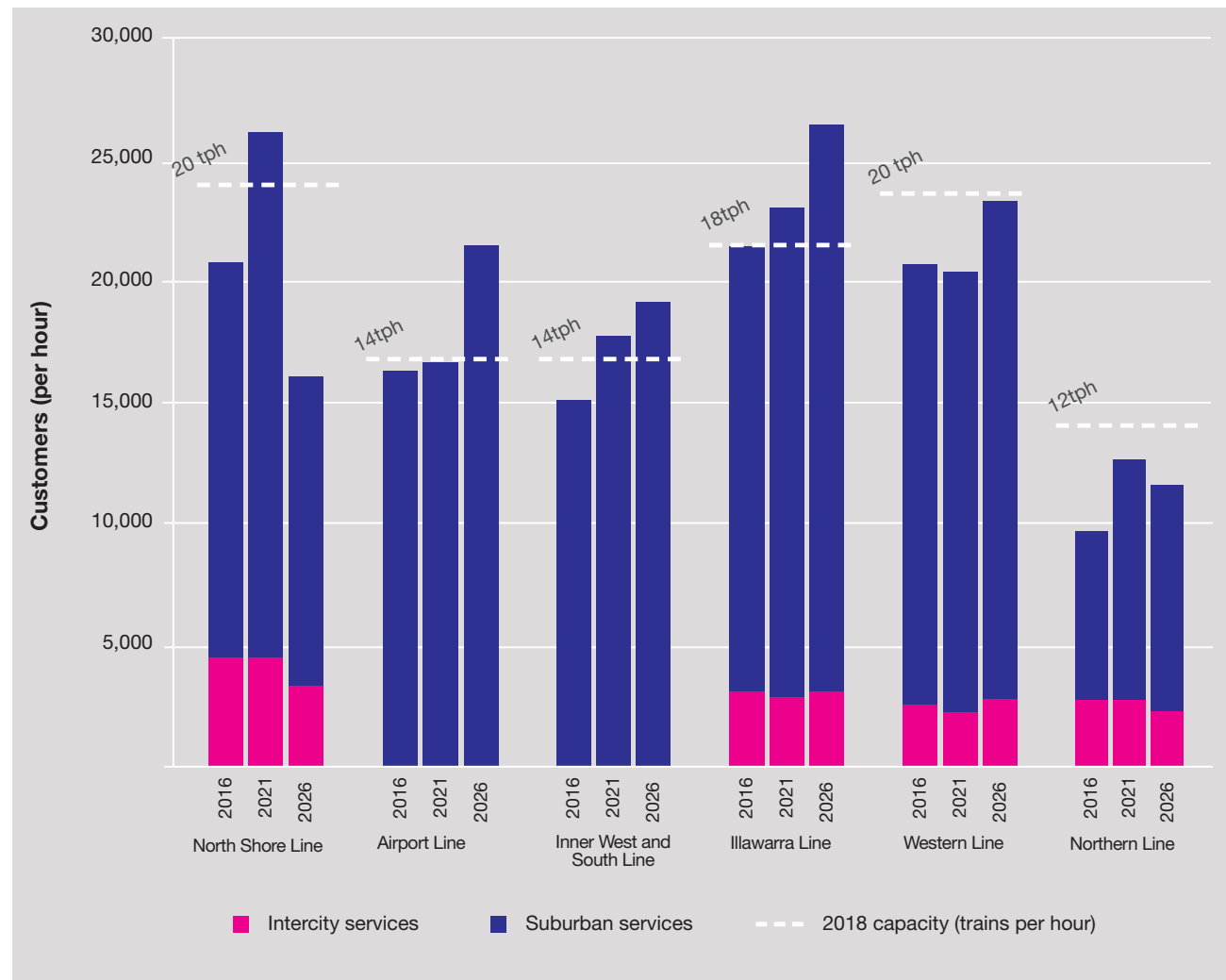
*Future Transport 2056* acknowledges the rail network will play a pivotal role in realising the vision of a three-city metropolis with connected housing, jobs and services outlined in the *Greater Sydney Region Plan*. To achieve this, the Greater Sydney rail network will need to transition from its predominantly radial pattern and focus on the Eastern Harbour City to service an interconnected system of cities and centres with accessible 30-minute catchments.

Rail trips are expected to more than double over the next 20 years, growing from 386 million trips per year in 2016 to 817 million by 2036 and to over 1.1 billion by 2056. As shown in Figure 38, without further investment in parts of the network as Sydney grows, beyond 2021, the main routes into the Eastern Harbour City and the Central River City will suffer from levels of crowding that will impair the performance of the system.

To address these pressures, in the near term, Transport for NSW has developed the SmartRail program, a series of network-wide investments that will deliver additional capacity, reduce the complexity of rail operations and better connect the network. SmartRail will transform the rail network by utilising world-class technology to enable automated high-capacity turn-up-and-go services. The first three stages should be delivered over the next 10 years, with targeted investments to remove bottlenecks, automate train control, improve signalling systems and capitalise on the benefits of new rolling stock and infrastructure.

Stage 1 would deliver extra capacity across the network by upgrading rail infrastructure to unlock capacity in central Sydney. It includes the development

**Figure 38** – Rail network demand and capacity on key lines to 2026



Source: Transport for NSW 2017

of new automated systems to cost-effectively improve train control. Stage 1 would deliver capacity upgrades on the T4 Eastern Suburbs and Illawarra line and the T8 Airport line.

Stage 2 would continue to upgrade the T4 Eastern Suburbs and Illawarra line and improve the T8 Airport line, providing an uplift of capacity, as well as delivering further upgrades in central Sydney to provide a network-wide benefit. Stages 1 and 2 include the deployment of new suburban trains and coincide with the introduction of the New Intercity Fleet, further improving services across the network.

Stage 3 would complete the reconfiguration of the network in central Sydney, deploying automation and providing the transformative programs needed to separate inner urban and intercity services on the T1 Western and Northern line and the T4 Eastern Suburbs and Illawarra line.

These investments would deliver significant customer benefits by transforming the network into a more efficient and reliable rail system that allows more trains to run per hour in peak times and helps separate longer distance intercity, suburban and freight services from suburban operations. SmartRail will allow the independent operation of rail lines across the system, improving the capacity, frequency and reliability of the network and permitting the conversion of lines to provide high-frequency all-day services in the future, with the T4 Illawarra Line as the top priority for transformation.

While SmartRail will benefit the entire network, the most constrained parts of Sydney's heavy rail system

will realise the most significant benefit of the initial stages, particularly services in the south of Sydney on the T4 Illawarra Line and the T8 Airport Line.

The State Infrastructure Strategy Update 2014 allocated \$1 billion towards the More Trains More Services program, and SmartRail should continue to be a priority for funding to ensure that existing rail assets are used to their full potential.

## Recommendation 52

Infrastructure NSW recommends that Transport for NSW complete business cases for Stage 1 and Stage 2 of the SmartRail program by the end of 2018 and 2019 respectively to enable progressive delivery of this program as a priority to provide capacity needed beyond 2021.

Sydney Metro is at the heart of the Government's agenda for the rail system. New links being procured and built, including Sydney Metro North West and Sydney Metro City & South West, will increase coverage of 30-minute rail catchments across Sydney and provide high frequency connections between the three cities.

Beyond these new links, Transport for NSW has identified further extensions to the rail network to relieve capacity pressures, increase 30-minute catchments and facilitate the evolution from a predominantly radial to an interconnected network that is no longer reliant on travel through Sydney CBD to access other parts of the city.

With the SmartRail program addressing capacity constraints in the south of Sydney, Transport for NSW's top priority for a new rail link is the Sydney Metro West project, which will connect the Eastern Harbour City to the Central River City and double capacity between Parramatta and the Eastern City's CBD. The business case for this project is in development and – assuming that the project proves to be affordable in the near and medium term – it could be delivered by around 2027.

Other network extensions will become important in the longer term. Transport for NSW has identified potential new links that radiate from Parramatta, establishing it as the centre of the long-term rail network and reinforcing its role as the second city in the Greater Sydney metropolis.

New links from Parramatta to Kogarah, Parramatta to Epping and Parramatta to Norwest, and an extension of Sydney Metro South West to Liverpool, would considerably increase the catchment that can easily access the Central River City. A link between Kogarah and Parramatta would mean that an extra 324,000 people would be able to access the Parramatta CBD within 30 minutes by public transport. A link from Epping would increase this catchment by an extra 276,000 people, and a link from Norwest would contribute an additional 264,000 people.<sup>183</sup> Focusing these new links on Parramatta significantly strengthens the network overall – providing direct connections between strategic centres without having to travel via the Sydney CBD.

<sup>183</sup> Transport for NSW 2017b

The development of a sustainable and compact urban form in the Western Parkland City will ultimately require the provision of mass public transport services. Transport for NSW has identified the backbone of this network, involving a new north-south link between the North West Growth Area, T1 Western Line and the new Western Sydney Airport that will ultimately continue south to Campbelltown and beyond, as well as new links to Parramatta, and to Leppington.

As these projects are developed, it is crucial that they contribute to achieving higher population densities, integrating land use with transport. Combining new or updated stations with pedestrian-friendly environments, public spaces, on-road rapid transit networks and active transport will help to reduce traffic congestion.

Early investment in the north-south corridor through Western Sydney Airport to Campbelltown has the potential to shape development in a way that favours mixed use, high density patterns and supports employment precincts around the new airport. However, the significant cost of this link means that without co-investment from the Commonwealth Government and the private sector, the NSW Government will need to weigh its relative priority against more pressing needs, especially those in the Central River City as outlined above.

Infrastructure NSW considers that the Sydney Metro West project should be the priority for rail network extensions, followed by the new links necessary to service the Central River City. Beyond this, rail connections to the Western Parkland City, integrated with land use, via the Western Sydney Airport should

only be a priority once they are justified by patronage at the airport having reached a critical mass. This is unlikely to be the case before 2036, unless investment from the Commonwealth Government and the private sector significantly offsets the contribution of the NSW Government.

### Recommendation 53

Infrastructure NSW recommends that Transport for NSW complete the Sydney Metro West business case before the end of 2018 and continue to progress corridor planning and protection activities for future links in the Central River City and Western Parkland City.

As the rail network is augmented and upgraded, the role of interchanges will become paramount as users switch between services to get to their destinations. Given their size and location, major transport interchanges have place-making functions that go beyond enabling a smooth interchange between services. Integrating a mix of uses (including high density residential uses) with interchanges will create vibrant places where people live and shop, local businesses prosper and people want to spend time.

Transport for NSW has identified Central station, Redfern, Circular Quay, and other locations in the Metropolitan Interchange Program as priorities in the existing network for upgrades. In addition, as major transport projects like the Metro and light rail networks are delivered, new interchanges will be established.

Opportunities to partner with the private sector to integrate land use with transport, and help fund

development, should be pursued for both existing and new interchanges.

### Recommendation 54

Infrastructure NSW recommends that by the end of 2018, Transport for NSW complete business cases and planning for the upgrade of major public transport interchanges at Central, Redfern and Circular Quay, and develop a program for the progressive upgrade of other major interchanges across Greater Sydney.

#### Greater Sydney's strategic road network

*Future Transport 2056* sets out a long-term vision in which Sydney's motorway network evolves to connect important economic precincts and gateways such as Western Sydney Airport and to capitalise on advanced vehicle technology. Infrastructure NSW supports the vision of *Future Transport 2056* for smart, digitally connected and efficient motorways that service the city's key economic assets and enable the mass movement of people and goods without compromising Sydney's prized amenity.

The NSW Government's investment in WestConnex and NorthConnex, combined with existing links such as the M2, M7 and the M31 in the Central River and Western Parkland cities, establishes the backbone for vehicular movement into and around Sydney. When complete, this network will provide much-needed connectivity between the three cities of Sydney, the main economic precincts of Sydney's service-based economy in the Global Economic Corridor, international gateways (such as the port and airports)

and important freight and logistics precincts (such as Moorebank Intermodal Terminal).

### *Modernising the motorway network*

Investment into Sydney's motorway network will serve generations to come, not least because advanced technology has the potential to improve the capacity and efficiency of the network by allowing traffic to flow more smoothly with fewer disruptive incidents and less congestion. Sydney's motorway network needs to be ready to take advantage of these technology-driven opportunities, using Co-operative Intelligent Transport Systems (C-ITS) that will enable Vehicle to Infrastructure communication (V2X) within regulatory settings that will foster the introduction of high-efficiency Connected and Autonomous Vehicles (CAVs) to the network.

Recent investment in Smart motorway technology is a good starting point, as is the upgrade of the Sydney Coordinated Adaptive Traffic System – a traffic signalling detection, analysis and signalling system developed by Roads and Maritime Services that is used in over 150 cities around the world. These investments have consistently demonstrated high returns relative to their costs and will significantly improve the capacity, reliability and safety of the network, potentially deferring the need for further investment in motorway widening and freeing up funds for other uses.

Rolling out Smart motorway technology across the network will ensure that existing assets are operating to their full potential and the benefits of new motorway investments are maximised. The network wide roll-out of Smart motorway technology should be staged

to complement the opening of NorthConnex and WestConnex to leverage the benefits of these links, and ultimately be in place prior to the opening of the Western Harbour Tunnel.

## Recommendation 55

Infrastructure NSW recommends that Transport for NSW develop business cases to complete the deployment of Smart motorway technology and digital infrastructure across the network in time for the expected opening of the Western Harbour Tunnel.

Future Transport 2056 envisages further extensions to the strategic road and motorway network through projects such as the Western Harbour Tunnel, Beaches Link, the F6 Extension, new motorways to connect the Western Parkland City into the Sydney motorway network and longer-term connections such as a new Central River City motorway linking the M2 and M5, as well as the full development of the Outer Sydney Orbital.

These projects will provide crucial functions for the strategic road network such as improving its resilience, extending the network to major growth areas and connecting key freight precincts.

### *Sydney's inner urban motorway network*

With the completion of WestConnex Stage 3: M4-M5 Link and the Western Harbour Tunnel, a western bypass of the CBD will be created. This completed bypass will establish an inner urban motorway network enclosed by the M1, the M2, the M5 and the M7 and connected by cross-town routes via the

M4, WestConnex, Western Harbour Tunnel and the Cross City Tunnel, as shown in Figure 39. Future Transport 2056 estimates that gains from advanced vehicle technology could significantly improve freeway capacity as CAVs are taken up. An integrated, cross-town, inner urban motorway network that is free of 'missing links' will serve Sydney well into the future.

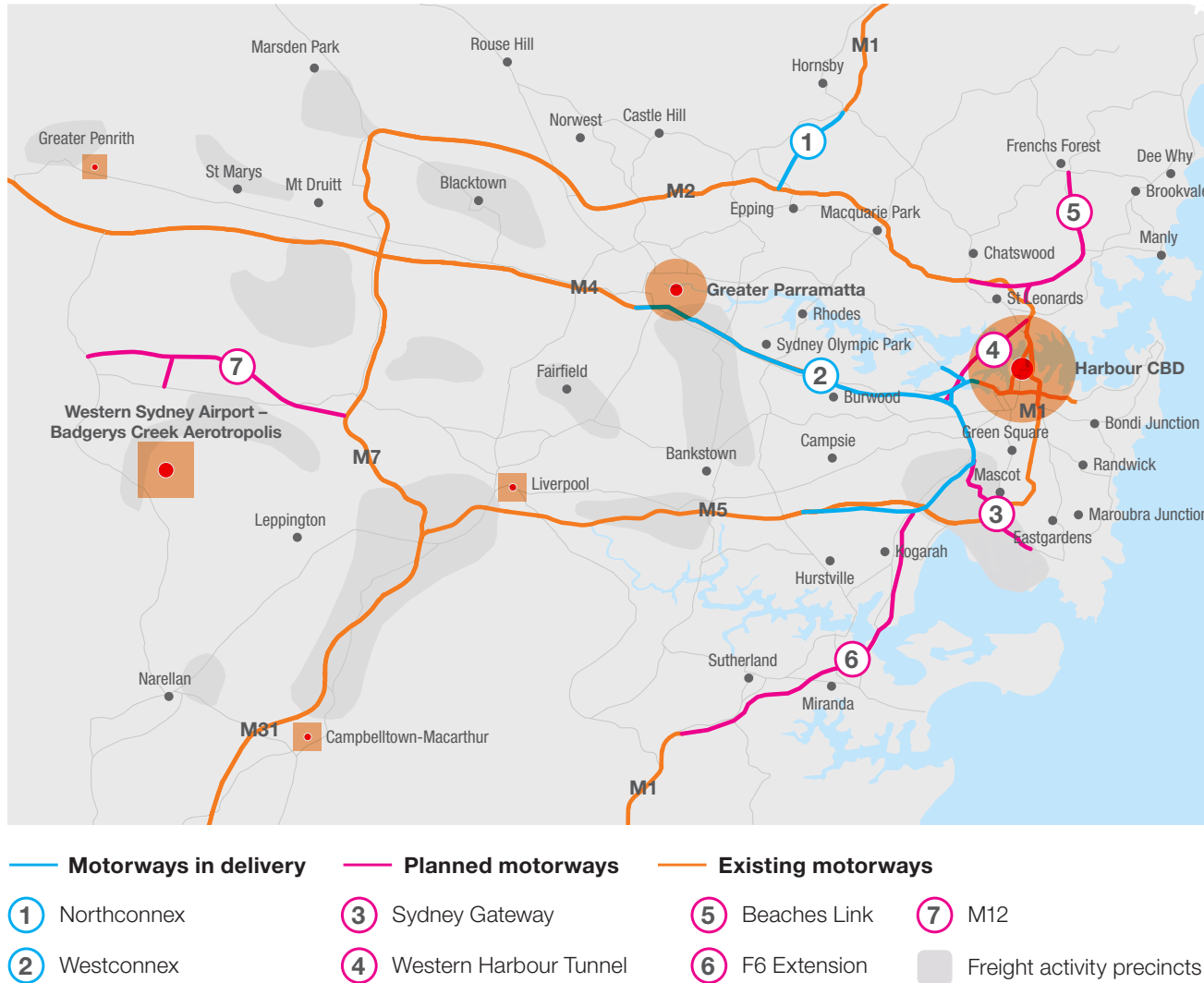
Infrastructure NSW recognises that the Western Harbour Tunnel will considerably strengthen the capacity and resilience of the Sydney motorway network. Crucially, the western bypass of the CBD provides the opportunity to remove through traffic from sensitive residential and commercial precincts, improving public amenity and enabling the allocation of more surface road space to public transport, walking and cycling.

It is important to complete the business case for Western Harbour Tunnel as a priority, enabling the NSW Government to take an investment decision on this critical project.

## Recommendation 56

Infrastructure NSW recommends that subject to completion of the business case in 2018, the NSW Government invest in the Western Harbour Tunnel to complete a Western CBD Bypass and inner urban motorway network.

Figure 39 – Sydney motorway network



Source: Infrastructure NSW 2017

*Connecting key economic precincts*

Sydney Gateway will provide a valuable connection between WestConnex and the key international gateways of Sydney Airport and Port Botany. Planning for this link has consistently demonstrated that it returns a high benefit relative to its cost, commensurate with the high value of the productive traffic that is expected to use it. At this stage, the link remains only partially funded. Infrastructure NSW recommends that, subject to a business case, the NSW Government and Commonwealth Government partner to prioritise its delivery.

By 2036, the Western Parkland City will have grown by an additional 500,000 people to over 1.4 million people. Developing a strategic road network that can cater for the mass movement of people and valuable freight is crucial to support connectivity to Western Sydney Airport and the surrounding employment lands. Infrastructure NSW recommends that Transport for NSW continue to develop its plans for the Western Sydney Airport motorway in partnership with the Commonwealth Government, enabling the link to be available at the time of the airport opening in the mid 2020's.

As the Western Parkland City evolves, the Outer Sydney Orbital will provide an important long-term north-south link that connects the Illawarra-Shoalhaven and the National Land Transport Network to the Western Parkland City and the south via the M31.

## Recommendation 57

Infrastructure NSW recommends that Transport for NSW complete the business case for the Western Sydney Airport motorway for delivery in time for opening of the Western Sydney Airport. Corridor planning and protection for future strategic road links in the Western Parkland City and to the Illawarra-Shoalhaven should continue to be progressed.

### Potential future network expansions

In the Central River City, consistent with *Future Transport 2056*, Infrastructure NSW recommends upgrades to the strategic road network that connects Parramatta to surrounding strategic centres. Along with investments in WestConnex and Smart motorway technology on the M4, these upgrades will reinforce Parramatta's position at the geographic centre of the inner urban motorway and establish a strategic road network to service the Central River City well into the future, at least until a Central City motorway is needed – beyond 20 years from now.

In other parts of Sydney, *Future Transport 2056* envisages the delivery of new motorway projects in the near term. In the South District in the Eastern Harbour City, the F6 Extension has been identified as a priority. The South District has a mature road network that is the target of a \$300 million investment from the Pinch Points program and a well-developed mass transit network, with the T8 Airport and South Line and T4 Illawarra Line set to realise significant improvements from the SmartRail program and a new rail link between Parramatta and Kogarah in the longer term.

The F6 Extension would provide a link between the M1 Princes Motorway and the Sydney motorway network near Sydney Airport. The project is currently in the planning phase, with Stage 1 (providing a link between the New M5 and President Avenue at Kogarah) identified as the initial priority. Any decision to invest in Stage 1 should be made subject to a completed business case demonstrating a positive economic return from the investment.

In a similar vein, *Future Transport 2056* considers Beaches Link as a near-term priority for the Sydney motorway network. This project would primarily benefit the eastern parts of the lower North Shore and the Northern Beaches, providing an alternative to the Military Road / Spit Road corridor and bypass the Spit Bridge, which still opens.

Both of these projects provide connections to areas that were expanded over the last four decades and significant congestion has built up over this time.

Infrastructure NSW considers that the F6 Extension and Beaches Link both need to be weighed carefully against other potential government sector investments. In a constrained fiscal environment, a near term decision to invest in these new motorway connections serving the Eastern Harbour City may mean deferral of projects elsewhere in Greater Sydney which may have greater city-shaping impacts. Infrastructure NSW supports an increased focus on public transport (such as the Northern Beaches B-Line and SmartRail), demand management and continued investment in pinch points to ensure fast and reliable access in these locations over the next 20 years.

### Metropolitan freight

Strong growth in the Greater Sydney freight task is expected, from 235 Mt in 2016 to 334 Mt in 2036 and 462 Mt in 2056, and is being driven by increased population and related construction and consumption.<sup>184</sup> Freight movements in Sydney are dominated by manufacturing production, construction materials and wholesale retail, representing over 80 per cent of the freight task.

Investment that increases the proportion of freight moved by rail will help to mitigate the wider impacts of this task. Metropolitan roads will continue to be the dominant carrier in the Sydney network, largely due to the typically short distances involved in most freight trips, which mean they are generally not contestable by rail.

### Bulk handling network

New commercial and residential development will require an ongoing supply of building materials. Inbound flows of raw materials (such as bitumen, aggregates and sand) and outbound flows associated with cement and concrete and waste products are generated from the building process. In 2016, Greater Sydney consumed approximately 41 Mt of construction material, which translates to more than 5,500 truck trips per day on the network.<sup>185</sup>

To ensure there is an efficient bulk-handling network to support the Eastern Harbour City, it will be important to maintain Glebe Island as a working port for at least the next 20 years, while recognising that it needs to be better integrated with existing and planned urban

<sup>184</sup> Transport for NSW 2017c, p. 5  
<sup>185</sup> Ibid.

development. Glebe Island allows for the efficient transport of the construction materials needed to support the growth of the Eastern Harbour City, with fewer noise, air pollution and safety impacts than freight vehicles.

### Recommendation 58

Infrastructure NSW recommends that Transport for NSW lead the development of a bulk materials transport and handling plan for Greater Sydney by the end of 2019 to support the construction and waste management sectors.

#### *Integrate land use and freight planning*

As Sydney grows, competition for valuable land will intensify. Pressure to accommodate population growth may have unintended consequences for the operation of freight infrastructure, including impacts on the efficiency of supply chains.

To address these issues, the NSW Government introduced the *Three Ports State Environmental Planning Policy (SEPP)* in 2014. This policy created consistent planning controls across Port Botany, Port Kembla and the Port of Newcastle, protecting these vital assets from incompatible land uses and establishing appropriate zoning of land and waterways to accommodate port uses.

The most common planning instrument used when providing public infrastructure is the 2007 *Infrastructure SEPP*, which outlines provisions for development around key infrastructure assets such as roads, railways, and utilities. In 2016, the Department of Planning and Environment commenced a review of this policy.

Even with this legislative protection, planned residential and commercial developments are at risk of encroaching on key corridors and precincts, increasing conflicts between heavy vehicle traffic and people's legitimate desire to live in a safe and quiet neighbourhood. The result is lost economic opportunities and, often, higher costs for freight operators which could get factored into the price of goods for end-users.

The 2018 SIS, *Greater Sydney Region Plan and Future Transport 2056* identify the strategically important freight, port and airport precincts, and key freight connections needed for the next 40 forty years. The NSW Government now needs to update the relevant planning instruments to minimise the negative impacts of freight movements and related activities, while ensuring there is limited encroachment of urban development on these movements, activities and connections. These instruments should:

- preserve strategically important clusters of industrial land in proximity to international gateways and freight-related infrastructure (such as intermodal terminals, major roads and freight rail lines)
- identify, protect and preserve the existing and future freight-related road, rail and pipeline infrastructure. This includes identifying compatible and incompatible land uses in proximity to freight-related infrastructure
- restrict the expansion of permitted uses on industrial lands around international gateways and freight-related infrastructure to avoid displacing traditional industrial developments (that is, reducing pressure on the affordability of industrial lands for 'lower value' industrial uses)

- prohibit incompatible development along key access roads so that they can be used for truck routes to transport freight, including dangerous goods.

### Recommendation 59

Infrastructure NSW recommends that the Department of Planning and Environment update the relevant State Environmental Planning Policies by the end of 2019 to further protect strategically important ports, airports, industrial lands, freight precincts and key corridors from incompatible uses to ensure the efficient movement of freight in Sydney and NSW, now and into the future.

#### *Freight precincts*

Airfreight is only a small part of the overall freight task, comprising approximately 0.5 Mt in 2016, but its value is significant. In 2015-16, NSW received \$38 billion in imports by air and exported \$12 billion worth of goods. The value of goods moved by airfreight through Sydney Airport is the same as almost the entire agricultural production of Australia.<sup>186</sup>

Throughput at Port Botany has historically grown by more than six per cent a year, with periodic slowdowns due to droughts or unfavourable global economic conditions. Growth over the last five years has been slower, at only three to four per cent a year. The dynamics of the port are driven by imports (which comprise about two thirds of movements at the port), with exports dominated by the evacuation of empty containers to Asia. The limits of Port Botany's operating capacity are likely to be reached before 2046.

<sup>186</sup> Transport for NSW 2017d

Once the Sydney Gateway, Port Botany Rail Duplication and road pinch point works to improve freight flows in the Port Botany and Sydney Airport precinct are completed, the city's major road and rail networks will efficiently connect Sydney's eastern international gateways to strategic centres via WestConnex and the Port Botany line. These major infrastructure upgrades need to be complemented by efficient vehicle access to Port Botany via Botany Road, Foreshore Road and General Holmes Drive. Despite their national significance, these works remain only partially funded. This needs to be rectified as a matter of urgency, with funding support from the Commonwealth Government.

Western Sydney has ready access to the National Land Transport Network and emerging global gateways, but strong growth in freight movements in western Sydney over the next 20 years will expose capacity constraints on existing networks. To address congestion issues on key arterial roads and enable the efficient distribution of containers to and from Port Botany, rail will need to play a much greater role via dedicated lines linked to a network of intermodal terminals across Sydney.

The Moorebank Intermodal Terminal, Port Botany Rail Duplication and policy reforms including the Port Botany Landside Improvement Strategy (which enhances the efficient coordination of road and rail freight in and out of Port Botany) are the highest priority investments necessary to achieve a target of carrying 40 per cent of containerised traffic on rail to and from Port Botany. Within the next 40 years, developments around Western Sydney Airport and the

creation of additional intermodal terminals will require a Western Sydney Freight Line, complementing other long-term investments in freight networks such as the Outer Sydney Orbital.

A reliable road network will be needed to give trucks efficient access to the Moorebank Intermodal Terminal. To achieve this, Transport for NSW has developed the Moorebank Intermodal Terminal Road Access Strategy. The first stage recommends that the M5 be upgraded to eliminate the existing bottleneck between Moorebank Avenue and the Hume Highway and to extend Cambridge Avenue to provide an alternative road access to the terminal.

## Recommendation 60

Infrastructure NSW recommends that Transport for NSW finalise business cases by the end of 2018 to enable the NSW Government to partner with the Commonwealth Government to fund investment in Sydney Gateway, Port Botany Rail Duplication and Foreshore Road/Botany Road, as well as the Moorebank Intermodal Terminal Road Access Strategy, to remove bottlenecks on connections to and from Sydney Airport and Port Botany and to capitalise on development of the Moorebank Intermodal Terminal.

### 9.3.4 Sydney's Eastern Harbour City

The Eastern Harbour City will remain the main engine for the NSW economy. It is Sydney's link into globally connected finance, services, education and innovation networks and the primary international gateway for

people, goods and services into and out of Australia. The Eastern Harbour City will need to accommodate strong population and job growth, with an additional 600,000 people living within its established suburbs and renewal areas by 2036.

Infrastructure NSW recognises the need to protect and enhance the competitive advantage of the Eastern Harbour City's economy and its world-class amenity. Investment recommendations target productivity, liveability, access and connectivity enhancements that:

- maintain the Eastern Harbour City's position as an established globally competitive finance, services, education, innovation and FinTech hub by assuring efficient and reliable mass movement access to its employment centres
- leverage the Eastern Harbour City's rich endowments in natural and built capital to accommodate population growth and maintain high levels of amenity and liveability by integrating land use with transport
- create vibrant neighbourhoods and improve the public realm, recognising the city- and place-shaping functions of transport investment decisions
- improve connectivity between current and emerging innovation precincts, research institutions and financial and business services at the periphery of the CBD
- maintain the Eastern Harbour City's position as the primary international gateway for people, goods and services by providing efficient and reliable connections to Port Botany and Sydney Airport.



### Maintain mass transit accessibility to the Eastern Harbour City

Now and in the future, the Eastern Harbour City will continue to provide the majority of jobs in Greater Sydney, with an additional 480,000 jobs created by 2036. In the face of this significant future jobs and population growth, travel demand on routes into the CBD is expected to grow strongly.

Without further investment, radial links in the Eastern Harbour City from Sydney Airport, Parramatta and the north, north-western and south-western Sydney access corridors, which already cater for the highest demand during the morning peak period, will suffer from severe crowding and congestion.

The SmartRail program and Sydney Metro City & South West will help alleviate these pressures to some extent. However, in the short to medium term, an augmentation of public transport capacity is needed, particularly in the critical corridor between the Eastern Harbour and Central River cities. Sydney Metro West will provide this capacity boost, doubling mass transit capacity on services in the corridor. Based on Transport for NSW's work to date, and assuming it is affordable, Sydney Metro West could be implemented by around 2027 – mid-way through the timeframe for this 2018 SIS.

Given this long lead time, while Sydney Metro West is being developed and delivered, on-road rapid bus transit that supports the Sydney to Parramatta corridor should be delivered as a priority on Parramatta Road and Victoria Road. High-frequency bus services could provide additional capacity for the 70 per cent of trips made in the corridor that are less than 10 kilometres

in length, and would complement Sydney Metro West when it is developed.

On-road rapid transit schemes could increase inbound bus capacity in the Sydney to Parramatta corridor by nearly eight per cent in the peak hour, moving upwards of 4,200 people per hour per lane – around 2,700 more than a regular traffic lane.

However, high quality on-road public transport will not be feasible if the Government continues to insist on preserving existing levels of road space for general car traffic. With record investment in projects like WestConnex putting large volumes of traffic into tunnels, higher priority should be given to public transport by converting existing traffic lanes to full-time public transport lanes, without the need for significant land acquisition.

### Recommendation 61

Infrastructure NSW recommends that, by the end of 2018, Transport for NSW develop business cases for on-road rapid transit and priority infrastructure that caters for buses and high-efficiency vehicles on Parramatta Road and Victoria Road in support of the Sydney Metro West project.

### Improve connectivity around the Sydney CBD

With current and future investment plans, radial movements into and out of Sydney's CBD will remain well served by public transport and high capacity road links. However, movement in and around the periphery of the CBD is constrained by limits on road capacity and impermeable physical barriers. Better public transport connections would enhance the

vibrant, innovative and highly-productive areas located at the periphery of Sydney's established CBD, such as the health, research and education precincts in Camperdown and Randwick and knowledge and digital-creative start-ups in Pyrmont and Australian Technology Park in Eveleigh, as well as major growth precincts in Green Square, Central to Eveleigh and the Bays Precinct.

*Future Transport 2056* identifies rapid bus links from the Eastern Suburbs to the Inner West that provide this connectivity. These include links from Randwick to Sydney University to the Bays Precinct and from Maroubra Junction to Sydney Airport to Marrickville. Reallocating road space and prioritising movements for these services will enable them to be delivered affordably, earlier and more effectively than otherwise would be the case.

### Recommendation 62

Infrastructure NSW recommends that Transport for NSW develop business cases by the end of 2019 for staged investment in on-road rapid transport links for buses and high efficiency vehicles on key corridors at the periphery of the Harbour CBD over the next five to 10 years.

### 9.3.5 Sydney's Central River City

The Central River City is the geographic centre of Sydney, featuring a diverse economy, recreational facilities and a world-class health and education precinct at Westmead. With Greater Parramatta to the Olympic Peninsula as the focus for development, it will provide a greater choice of housing, major entertainment and cultural facilities, and green spaces within enriched waterways and restored landscapes. To support this transformation, the Central River City needs further investment to deepen and increase its access to labour markets and enhance its function and attractiveness as a place of business and economic activity. Infrastructure NSW recommends investments that:

- support the aspiration for the Central River City to become a stronger and better connected liveable city and a major centre for knowledge-based employment by improving connectivity between CBD precincts and key economic assets
- cater for significant population growth in the Central River City, with priority investment in Greater Parramatta to the Olympic Peninsula that integrates land use and transport planning
- establish the Central River City as the centre of the Greater Sydney high-order transport network with improved mass transit connectivity to the Eastern Harbour City and Western Parklands City
- encourage economic development and jobs growth in Greater Parramatta and other centres by creating agglomeration opportunities through increasing accessibility and permeability to and from major centres and skilled labour markets

- reduce social exclusion and disadvantage through improved access to services and opportunities.

#### Enhance radial links to the Central River City

To support the creation the Central River City, it's economic and social catchment needs to grow, with additional transport network capacity and improved radial connectivity to Greater Parramatta. Ultimately, the Central River City should become the centre of Greater Sydney's high-order transport network by capitalising on its geographic location at the heart of the city.

Infrastructure NSW supports the staged investment approach outlined in *Future Transport 2056* – an approach that will better connect Parramatta to the Eastern Harbour City and Western Parklands City and enable economic development and jobs growth. Transport investment should target agglomeration opportunities by increasing connectivity to the major centres and labour markets of Blacktown, Norwest, Epping, Macquarie Park, Sydney Olympic Park and Bankstown that are located in a radial pattern around Parramatta, as shown in Figure 40.

Parts of the Central River City south and south-west of Parramatta, are among the most disadvantaged areas in Sydney. While the causes of this disadvantage are complex, overcoming the social exclusion that results should be a key driver of investment choices: a high level of accessibility by public transport can help to address this issue.

Programs like SmartRail and extensions to the rail network will improve mass transit connectivity to the Central River City, but rail-based investments have long lead times and are costly. In the interim, investment should focus on small-scale measures to improve existing infrastructure networks and services. Bus rapid transit lines in the Central River City currently provide good connectivity between Greater Parramatta and the strategic centres of Liverpool, Rouse Hill, Blacktown and Norwest. In the short term, the priority should be to improve the two existing T-Ways with enhanced signal priority, capacity and connectivity by integrating these separate systems.

### Recommendation 63

Infrastructure NSW recommends that Transport for NSW develop a business case by the end of 2019 to augment the capacity and productivity of the Liverpool to Parramatta and North West T-Ways with additional services, enhanced signal priority and a Wentworthville T-Way-to-T-Way connection to link the two separate lines.

Figure 40 – Strategic transport connections for the Central River City



Major north-south road traffic flows in the Central River City radiate from the centre of Greater Parramatta, channelling traffic through the Greater Parramatta CBD, reducing its amenity and creating localised congestion. An outer ring road that creates a bypass around Parramatta via the A28/A40 corridor, together with traffic calming measures within this ring road, would protect Parramatta’s CBD and residential areas from traffic intrusion, improve amenity and provide better north-south connectivity.

### Recommendation 64

Infrastructure NSW recommends that Transport for NSW develop a business case by the end of 2019 to establish an outer Parramatta ring road bypass to protect the Parramatta CBD from traffic intrusion.

Similarly, the existing north-south arterial roads between the M2 and the M5 that access Greater Parramatta, such as the A3, A6, A28 and A40 corridors, will need to cater for the additional demand that will accompany population growth. Investing in technology to better monitor traffic conditions, manage congestion, prioritise high- efficiency vehicles and respond to incidents in real time will improve reliability on the key arterial roads on this corridor.

Source: Transport for NSW 2017

## Recommendation 65

Infrastructure NSW recommends that Transport for NSW develop business cases by the end of 2019 for the progressive upgrade of key north-south arterials between the M2 and the M5 to Smart road facilities to improve connectivity, safety and reliability.

On-road rapid transit that connects strategic centres such as Bankstown, Hurstville, Kogarah, Epping and Macquarie Park to Greater Parramatta should be a short- to medium-term priority, ahead of any investment in rail-based mass transit. Reallocating road space and prioritising access for on-road rapid transit will be crucial to achieve this affordably and to present a credible, competitive alternative to private vehicle trips on key corridors. Investments in bus services should be considered in the context of long-term planning for mass transit to and from Parramatta to ensure they play a supporting role for mass transit when it becomes feasible.

## Recommendation 66

Infrastructure NSW recommends that Transport for NSW develop business cases by the end of 2019 for investment in on-road rapid transit links for buses and high efficiency vehicles between Greater Parramatta and surrounding strategic centres such as Bankstown, Hurstville, Kogarah and Macquarie Park.

Transport for NSW has proposed Stage 2 of the Parramatta Light Rail project. This is intended to link Stage 1 of Parramatta Light Rail near Rydalmere to Sydney Olympic Park, crossing the Parramatta River via a new bridge at Wentworth Point. Improving connectivity to Sydney Olympic Park and the Wentworth Point peninsula will increase accessibility and help to cater for growth. The relative merit of Stage 2 as an investment priority should be considered once the business case is complete and the route, benefits and costs are clear.

The business case should examine the optimal route for the project, how it will integrate with planned on-road rapid transit on Victoria Road, the potential for extensions to Strathfield and/or Burwood and how it might integrate with the Sydney Metro West project.

## Recommendation 67

Infrastructure NSW recommends that Transport for NSW develop the business case for Stage 2 of Parramatta Light Rail project by the end of 2018 to enable the NSW Government to make an informed investment decision on the project.

### Improve connectivity within Greater Parramatta and the Olympic Peninsula

Greater Parramatta to the Olympic Peninsula is the focal point of the Central River City and will change dramatically as current, planned and future transport infrastructure converges in the area. It is critical to develop a strategic picture of how these investments

will interact, be tied together and can be leveraged successfully to integrate health, urban development, education, innovation and cultural precincts across the area.

A Greater Parramatta Access Plan would fulfil this need, identifying ways of integrating the various precincts across the Greater Parramatta to the Olympic Peninsula area by improving their connectivity, calming traffic and enhancing urban amenity. As discussed in Chapter 2, the Greater Sydney Commission's growth infrastructure compact provide a mechanism to link these infrastructure investments to growth thresholds, providing certainty about what infrastructure is needed to support growth and when it will be delivered.

## Recommendation 68

Infrastructure NSW recommends that by the end of 2018, Transport for NSW and the Greater Sydney Commission develop a Greater Parramatta Access Plan leading to a strategic business case for a program of works under the pilot growth infrastructure compact.

### 9.3.6 Sydney's Western Parkland City

The Western Parkland City is Sydney's greatest opportunity to create a new, future-focused, sustainable city that supports the long-term growth of the metropolitan region. Western Sydney Airport will be the catalyst for an emerging business and tourism gateway that will support a strong trade, logistics, advanced manufacturing, health, education and science economy. As this new city develops, better connections will be needed between Liverpool, Campbelltown and Greater Penrith, international education facilities and residential communities.

The timing of the delivery of infrastructure in the Western Parkland City will have a significant influence on achieving the vision for the new city. In particular, it will influence the success of the shift from a suburban to an urban environment, including better support for walkability and public transport viability and investment and business attraction to boost local job opportunities.

The Western Parkland City will need substantial transport investment to overcome a legacy of car dependency, urban sprawl and poor job containment. This legacy has led to long travel times and commute distances with a heavy reliance on private motor vehicles for transport, and an imbalance in high-value jobs between the east and west that means over 300,000 western Sydney residents leave the region each day. The area also has higher levels of social disadvantage, social exclusion and poorer health outcomes than other parts of Greater Sydney.

Recognising the role infrastructure can play in shaping the future city into a sustainable and productive urban

form, Infrastructure NSW recommends investments that:

- create a vibrant, liveable and self-sufficient city from greenfield growth and existing, geographically dispersed centres
- foster the development of Greater Sydney by connecting the Western Parkland City to the Eastern Harbour and Central River cities
- support the development of a strong trade, logistics, advanced manufacturing, health, education and science economy with high quality access to Western Sydney Airport and improved connectivity between existing centres
- accommodate future population growth in Western Sydney within a sustainable, compact urban form
- bolster the resilience of the transport network
- establish the South Creek integrated growth corridor, underpinned by mass transit
- reduce social exclusion and disadvantage with improved access to services and opportunities.

#### Preserve corridors to connect Western Parkland City to Greater Sydney's transport network

By 2036, the Western Parkland City will have grown by an additional 500,000 people to over 1.4 million people. This growth will generate additional transport demand in existing and new areas, leading to congestion on some key arterial roads and crowding on rail corridors. Existing transport links will need to be upgraded and extended to accommodate this extra demand and improve the connectivity of new growth areas to established centres.

Implementing the recommendations in this chapter for Greater Sydney as whole would contribute to establishing a sustainable transport system for the Western Parkland City. In addition, the NSW and Commonwealth Governments are investing \$3.6 billion in the Western Sydney Infrastructure Plan to establish the strategic road network for the area and provide the foundation for on-road public transport (as outlined in previous sections of this chapter). Further investment in road and public transport links will be needed, although the city's future transport, energy, communications, freight and logistics needs have yet to be fully identified.

Despite this uncertainty, the NSW Government should act now to preserve key infrastructure corridors and strategic land uses. Opportunities to rationalise and integrate uses into multi-use corridors should be pursued. Infrastructure requirements and hardship resources should be factored into long-term land use and budget plans.

Recognising the influence of mass transit on urban form and investment attraction, sequencing of development should be used as a tool to better align growth with infrastructure delivery – specifically, the delivery of mass transit infrastructure.

### Recommendation 69

Infrastructure NSW recommends that the NSW Government plan and protect the corridors and precincts necessary for future transport, freight, logistics, energy and communications facilities and infrastructure in the Western Parkland City.

In the next 20 years, investment in public transport in the Western Parkland City should focus on increasing the frequency and coverage of existing bus services, facilitating demand responsive services, using proposed investments in the Western Sydney Infrastructure Plan and other arterial road links for on-road priority services, and planning for and protecting future corridors – in advance of providing staged investment in rail-based mass transit.

While mass transit is not a near-term priority, the first phase should incorporate a connection from the T1 Western Line to Western Sydney Airport and the adjacent new CBD for the Western Parkland City. As this is developed, opportunities to advance the second stage to extend south from Western Sydney Airport to Campbelltown-Macarthur through intergovernmental partnerships should be considered. In the longer term, further development of the mass transit network could explore potential connections from centres including Leppington and Campbelltown-Macarthur and beyond.

Coupling this mass transit spine with land use will be crucial to shaping an urban form that is more sustainable and supports jobs growth in the Western Parkland City.

The scale of investment in this mass transit link is significant, and cannot be justified ahead of new mass transit links in the Central City. It should only be considered as feasible in the next 20 years if

investment from the Commonwealth Government and private sector significantly offsets the contribution of the NSW Government.

### Recommendation 70

Infrastructure NSW recommends the NSW Government partner with the Commonwealth Government to plan the staged investment in mass transit to support the Western Parkland City over the period from 2036 to 2056.

As Western Sydney Airport matures, more rapid connections to the geographic heart of Sydney and its large passenger catchment will be needed. Patronage forecasts suggest that, by around the mid-2030s, a step-change in aviation demand for Western Sydney Airport will occur as Sydney Airport reaches capacity. Without significant co-investment, from the Commonwealth Government or others, it is only at this point that rail connections to the airport should be built.

### Recommendation 71

Infrastructure NSW recommends that investment in rapid, express rail services to Western Sydney Airport be considered only as a long-term proposition when an expected step-change in airport patronage occurs.