NEW PARRAMATTA RD

Parramatta Road Corridor Urban Transformation Strategy

Precinct Transport Report

REFERENCE REPORT

NOVEMBER 2016

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NSW GOVERNMENT

UrbanGrowth NSW

Contents

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1. Introduction

1.1 Overview

Sydney is one of the most liveable cities in the world, boasting a strong economy, skilled labour force, beautiful natural environment and good lifestyle. A sign of its prosperity is that the city is growing. With a current population of about 4.3 million people, Sydney's population will increase by 1.6 million people over the next 20 years[1]. The city will need to provide more diverse and affordable housing, a broader range of job opportunities and easier ways for people and goods to move around. As the city grows, existing urban areas will need to be renewed to provide a sustainable way to meet increasing demand for housing, transport and services, and maintain international competitiveness.

The Parramatta Road Corridor (the Corridor) is identified in A Plan for Growing Sydney as an urban renewal corridor that will be the focus for increased housing, economic activity and social infrastructure. The Corridor will be transformed over the next 30 years through implementation of the Parramatta Road Urban Transformation Strategy. In 2050, the Corridor will have an estimated 56,000 additional residents, approximately 27,000 new homes and 50,000 new jobs.

Realising the Corridor's full potential is important to the future productivity and liveability of metropolitan Sydney. It also presents an opportunity to optimise sustainability performance.

> ***"The construction of WestConnex will allow for significant improvements to local amenity by reducing through-traffic on surface roads, and allowing for enhanced north-south local connectivity. The Government will investigate the feasibility of light rail along Parramatta Road for the length of the corridor.***
>
> ***"The corridor will be a focus for increased housing, economic activity and social infrastructure, especially around centres with good public transport access and amenity. An Urban Renewal Strategy is being prepared to guide development in selected precincts in the Parramatta Road Corridor and to bring new life to local communities. Burwood, Sydney Olympic Park and Rhodes will continue to be a particular focus for employment."***
>
> *A Plan for Growing Sydney*

1.2 Purpose of Report

This Report is one of a suite of technical documents prepared for UrbanGrowth NSW as part of the Parramatta Road Corridor Urban Transformation Program. It should be read in conjunction with, the following documents:

- Parramatta Road Corridor Urban Transformation Strategy
- Parramatta Road Corridor Implementation Plan 2016 - 2023
- Parramatta Road Corridor Infrastructure Schedule
- Parramatta Road Corridor Urban Amenity Improvement Program
- Parramatta Road Corridor Planning and Design Guidelines
- Sydney CBD to Parramatta Strategic Transport Plan (prepared by TfNSW)

[1] A Plan for Growing Sydney

- Supporting specialist reports:
  - Parramatta Road Corridor Fine Grain Study
  - Parramatta Road Corridor Social Sustainability Report (Volumes 1 and 2)
  - Parramatta Road Corridor Sustainability Implementation Plan and Report
  - Parramatta Road Corridor Economic Analysis Report.

This Precinct Transport Report has been informed by Transport for NSW's (TfNSW) *Sydney CBD to Parramatta Strategic Transport Plan* (September, 2015) and UrbanGrowth NSW's Strategy to establish a high level strategic framework and an indicative plan to guide development of the Precincts to achieve sustainable, targeted, social and economic outcomes for all stakeholders for each of the eight Precincts along the Corridor.

This Report presents the following for each Precinct:

- an assessment of existing land use, traffic and transport conditions
- a review of the likely future character of the Precinct
- recommendations for future improvements for the Precinct.

The key tasks undertaken to prepare this Report have included:

- consideration of feedback received from stakeholders during public display of the Draft Parramatta Road Urban Transformation Strategy, exhibited from September to December 2015
- an assessment of existing travel patterns and behaviour in the Precincts
- the development of a strategic road hierarchy based on TfNSW's Strategic Transport Plan and the 'movement' and 'place' planning approach
- identification of principles to inform the development of transport improvements
- identification of transport improvements that align with the strategic framework and principles outlined in Section 2 (Planning Approach).

It is important to emphasise that the Strategy itself does not rezone land or alter development controls in the Corridor. Rather, it provides a framework for priority precinct, council-led, and/or proponent rezoning applications.

Future statutory planning processes will test and refine urban development and appropriate densities along the Corridor. Rezoning proposals will need to evaluate, in detail, the performance of the existing and proposed road, public transport, walking and cycling networks, to ensure the future land uses are adequately catered for. This Report therefore represents only the commencement of initial investigations into the traffic and transport movements that will be required to support urban transformation in the Corridor over the short, medium and long term. More detailed transport network assessments beyond the work presented in this Report will be required to confirm the extent and density of urban development as part of future rezoning or development proposals. This will need to include contextual and contemporaneous traffic modelling and analysis that assesses the specific proposal being contemplated.

1.3 Parramatta Road Urban Transformation Program

The Parramatta Road Urban Transformation Program (PRUTP) is the integrated, cross-agency project established by the NSW Government in 2013 to explore, capture and deliver on opportunities for urban

transformation along the Corridor, resulting in part from the WestConnex Motorway, and in line with A Plan for Growing Sydney.

The PRUTP incorporates three key deliverables:

- an Urban Transformation Strategy for the future growth and development of the Parramatta Road Corridor - set out in the document known as the Parramatta Road Urban Transformation Strategy
- a transport infrastructure program for the Corridor – set out in the document known as the Sydney CBD to Parramatta Strategic Transport Plan
- a $198 million program of local urban amenity improvement works to deliver tangible public domain improvements to the Corridor aligned with its staged redevelopment – set out in the document known as the Parramatta Road Urban Amenity Improvement Plan.

The PRUTP has been led by UrbanGrowth NSW, the NSW Government's urban transformation delivery organisation. In developing the Strategy, UrbanGrowth NSW has worked closely with TfNSW, Roads and Maritime Services, Sydney Motorways Corporation, the Greater Sydney Commission (GSC), the Department of Planning and Environment (DPE), the Department of Education (DoE), Sydney Local Health Districts and the seven councils along the Corridor.

The GSC has been charged with preparing the District Plans for each of Sydney's six districts. The District Plans will identify the basis for strategic planning in each district, having regard to economic, social and environmental matters, and set out the actions required for achieving those planning priorities.

The Corridor is located in the Central and Central West districts. The long-term delivery of the Strategy will be taken over by the GSC and will inform the relevant District Plans.

1.4 The Parramatta Road Corridor Urban Transformation Strategy

The Strategy articulates the long term growth vision for the Corridor. The purpose of the Strategy is to facilitate the coordinated transformation of Parramatta Road and its adjoining lands by integrating land use and built form with transport initiatives and public domain improvements. This integrated approach recognises the importance of the Corridor as a single strategic entity, by combining the benefits of applying a subregional response to 'big picture' issues with the depth of local knowledge required to plan for existing and future communities.

More specifically, the Strategy contains:

- a long-term vision for the transformation of the Parramatta Road Corridor
- an Integrated Land Use and Transport Concept Plan that includes land use and development intensity, public transport and walking and cycling initiatives, green space and links, and key infrastructure focused in eight growth Precincts
- guiding principles for land use, transport, development and public domain, which will apply to all land within the Corridor
- Precinct Plans and associated building envelopes for each Precinct, providing more detailed principles and targets for growth and development, and actions for implementation.

The vision for the Parramatta Road Corridor is:

a balanced, high quality multi-use corridor with improved amenity, better transport choices, more job opportunities and an increased quantity and diversity of housing.

The Strategy identifies seven principles to meet this vision:

- plan for a diversity of housing types to accommodate a wide range of community needs, including affordable housing, family housing, student housing and seniors housing
- plan for and position the Corridor to attract new business and to support existing business to create a diversity of jobs and promote jobs closer to homes
- reshape and better connect places and associated movement networks to better serve customers and encourage sustainable travel
- promote quality places and built form outcomes to transform the Corridor over time
- embellish existing open spaces and provide new active and passive open spaces to support the recreational needs of the community and to encourage healthy and active lifestyles
- create liveable local Precincts along the Corridor that are sustainable, resilient and which make Sydney a better place
- deliver, drive and facilitate action.

The full urban transformation of Parramatta Road to 2050 will deliver far-reaching benefits for Sydney including:

- a targeted 27,000 homes, well-located to transport and services, with a diverse mix of housing types and choices, including affordable homes
- $31 billion in economic benefits to the State, arising from new residential development
- a productive business environment, to support viable and prosperous businesses, and a variety of employment opportunities that will deliver 50,000 new jobs
- more efficient and reliable public transport, providing both east-west and north-south connections, and
- eight well-serviced and well-connected Precincts, each with diverse spaces, places and links for people to live in, work in, visit, connect with and enjoy.

The Strategy will be implemented in two stages, 2016 – 2023 and post-2023. Land use change prior to 2023 will be guided by the *Parramatta Road Corridor Implementation Plan 2016 -2023* and will be accommodated with planned improvements to Western Line rail frequencies and a rapid bus solution from Burwood to Sydney. Investment such as longer term light rail or heavy rail solutions, currently being investigated, would be required to support the land use change beyond 2023. The short term staged approach will allow for the land use change to move in sync with the available transport capacity, whilst ensuring the scale, timing, and staging of longer term land use changes respond to Government transport investment.

Improvements to the road network will also be required. These will need to be developed using detailed traffic modelling in consultation with the RMS and TfNSW.

1.5 The Sydney CBD to Parramatta Strategic Transport Plan

TfNSW's Sydney CBD to Parramatta Strategic Transport Plan (Strategic Transport Plan) sets the strategic context for current plans, proposals and interventions in the Sydney CBD to Parramatta Corridor. It is an integrated transport and land use plan that considers a holistic view of growth and renewal in the Corridor, as well as metropolitan, regional and local influences on future transport, housing and employment.

The Strategic Transport Plan establishes the objectives for the Corridor, which are to:

- make it easier to move to, through and within the Corridor
- support walking and/or cycling for local trips, buses and/or light rail for intermediate trips, rail and/or car for regional trips
- realise and support urban transformation and transit-oriented development
- facilitate additional east-west and north-south movements
- enhance existing or create new desirable and affordable mixed use environments
- optimise the Corridor's inherent social, economic and environmental resources, including freight-generating precincts
- utilise excess road and rail capacity and non-infrastructure initiatives and optimise public investments in transport
- contribute to regional resilience and sustainable communities.

In addition, it identifies future transport requirements and appropriate interventions at the regional, intermediate and local levels to guide future investment and to meet changing demands. Accordingly, the Strategic Transport Plan has informed the Strategy.

1.6 The Urban Amenity Improvement Program

The Urban Amenity Improvement Program (UAIP) is a $198 million initiative to stimulate the transformation of the Corridor.

The UAIP identifies early local amenity improvement works to help realise the vision for the Parramatta Road Corridor. The UAIP recognises that the Precincts and existing communities along the Corridor must respond to population growth and change. It also recognises that some existing infrastructure is ageing or unable to respond to the needs of communities as they grow and change. Local amenity infrastructure is therefore required to be delivered quickly to achieve positive social and economic outcomes.

UrbanGrowth NSW has prepared the UAIP together with the councils along the Corridor. Further information relating to the UAIP Program is provided in the Parramatta Road Corridor Urban Amenity Improvement Program (September, 2015).

1.7 The Parramatta Road Corridor

For the purposes of the Strategy, the Corridor and its components are referred to in different ways, for various components and stages of work due to the nature of the required inputs and key deliverables of the Strategy.

The **Study Area** covers the seven Local Government Areas (LGAs) that the Corridor spans and includes the geographical area between Parramatta CBD in the west and Sydney CBD in the east, and the Parramatta River in the north to the Western Rail Line in the south.

The **Parramatta Road Corridor** is the continuous length of Parramatta Road, and includes land with direct frontage to Parramatta Road, as well as the eight Precincts.

Change and growth along the Corridor is focused in eight **Precincts** which have been chosen for their ability to support growth, and their access to public transport, services and jobs. The Precincts boundaries have

been informed by a range of factors including natural features or barriers, built form or land use change, and subdivision patterns. In some cases, the Precincts straddle LGA boundaries.

Frame Areas are portions of the Corridor located between the identified Precincts with direct frontage to Parramatta Road, and typically include the first strip of lots or land to the first street/laneway running parallel to the north or south of Parramatta Road. The Frame Areas are important links that may have some change at a lower intensity than that anticipated in the Precincts. The transformation should not be seen as the redevelopment of Precincts alone, but rather the combined renewal of Precincts and Frame Areas that will collectively deliver a transformational effect along the Corridor.

Figure 1 identifies the extent of the Study Area, Corridor, Precincts and Frame Areas. Figure 1 also illustrates the extent of the Transport Study Area used by Transport NSW for the purposes of the Strategic Transport Plan (which is a wider catchment than the Study Area used for the draft Strategy). It should be noted that the 'Transport Corridor' is a separately defined term for the purposes of the Strategic Transport Plan.

Table 1 identifies the LGAs that the Precincts are located within.

Table 1 Parramatta Road Corridor Precincts By Local Government Area

PRECINCT	LOCAL GOVERNMENT AREA
Granville	City of Parramatta
	Cumberland Council
Auburn	Cumberland Council
Homebush	Strathfield Municipal Council
	City of Canada Bay Council
Burwood-Concord	Burwood Council
	City of Canada Bay Council
Kings Bay	Burwood Council
	City of Canada Bay Council
	Inner West Council
Taverners Hill	Inner West Council
Leichhardt	Inner West Council
Camperdown	City of Sydney
	Inner West Council

Local Councils in the Parramatta Road Corridor

The Parramatta Road Urban Transformation Program is an integrated, cross-agency project established by the NSW Government in 2013. The Program explores, captures and facilitates opportunities for urban transformation along the Parramatta Road Corridor – a 20 km stretch that spans multiple jurisdictions.

When first established, the Corridor covered ten local government areas. During the course of the Parramatta Road Urban Transformation Program, new councils have been created and at the time of Strategy's publication, there are seven local government areas in the Corridor and additional merger proposals are being considered.

The Parramatta Road Urban Transformation Strategy and Implementation Tool Kit has been prepared in collaboration with all councils in place along the Corridor over the last three years. The technical supporting documents that have informed the Strategy and the Implementation Tool Kit also acknowledge past and present councils. Former councils are referenced for the purposes of citing local plans and policies that were, and continue to be, in place whilst the Strategy and Implementation Tool Kit was being prepared.

The NSW Government is continuing to work with all councils and will work with administrators where they have been appointed.

1.8 Community Consultation

Community engagement to prepare the Strategy began in 2013. The draft Strategy and its supporting technical studies were released in September 2015 for consultation until December 2015. The people who live, work and visit the Corridor come from a range of socio-economic groups, all age groups, and from culturally and linguistically diverse backgrounds. A range of activities and different information and feedback channels were used to cater to the different needs and preferences of these groups. In total, more than 3,700 responses to the draft Strategy were received through submissions and surveys.

While feedback varied from Precinct to Precinct, there was broad consensus from councils and communities that:

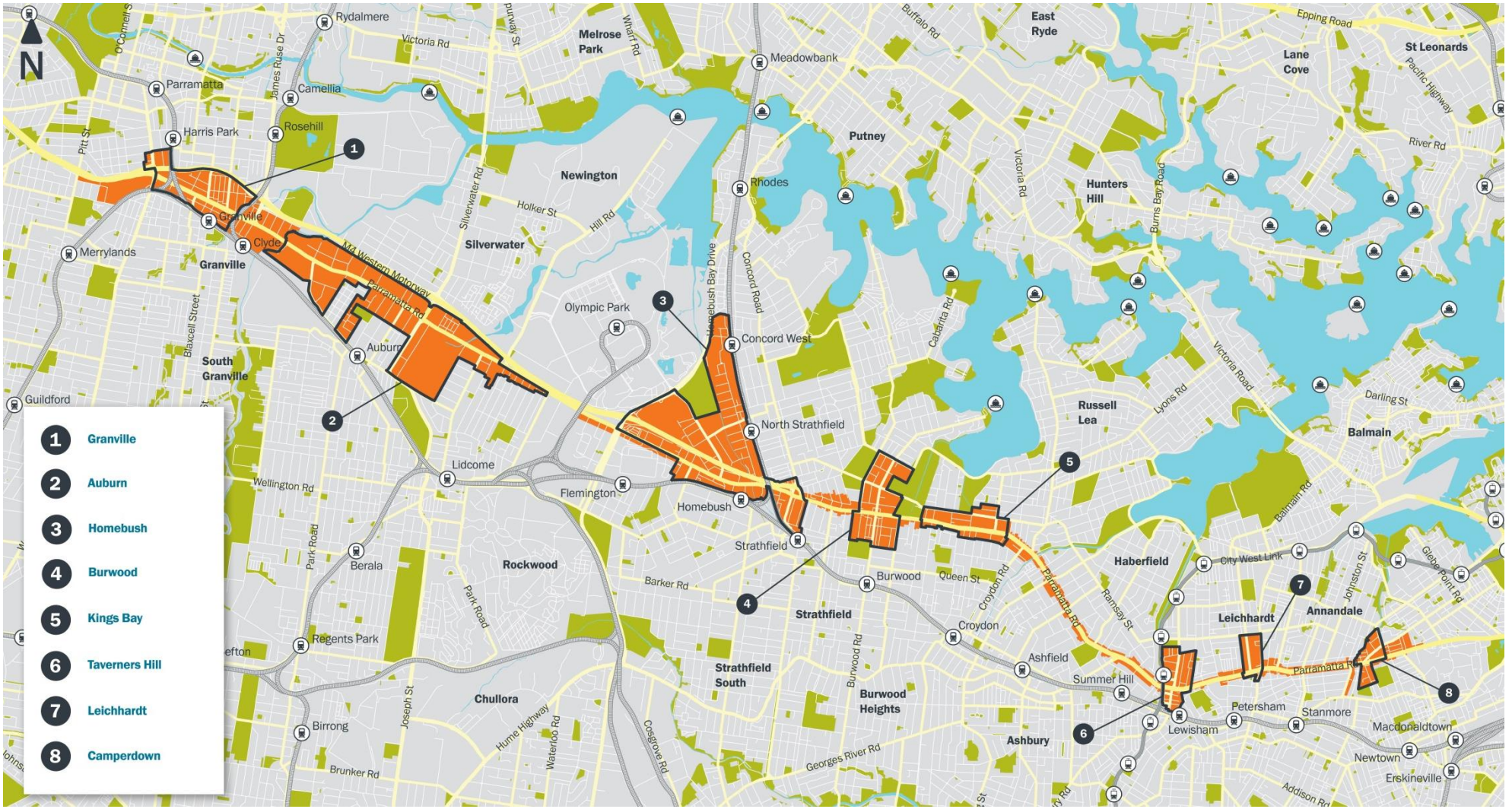
- development needs to be sensitive to local character
- population growth needs to be supported by public transport, social infrastructure, open space and amenity improvements.

Key feedback themes included traffic, walking and cycling, parking, property impacts, and the consultation program itself. Most comments were on the themes of development (land uses, heights, density), character and amenity, public transport, traffic, social infrastructure and open space.

Overall, comments on the draft Strategy were fairly evenly split between those who thought the draft Strategy was 'really good' and those who thought it 'could be further improved'.

The feedback received was analysed and used to inform the final Strategy.

Figure 1 – Parramatta Road Corridor



1.9 The Catalyst - WestConnex

The strategic importance of Parramatta Road to the structure and function of the city is clear. It represents the spine of the city, connecting the two main economic hubs of Sydney CBD in the east and the Parramatta CBD in the west. However, traffic congestion and associated poor amenity have placed the road under increasing pressure to the point where its many other attributes, including its role as a high street or focus for shopping and trade, have been significantly eroded. This is evidenced by declining economic vitality of traditional strips of shops, high commercial vacancy levels and an overall degradation of the street environment quality over time. From a planning perspective, multiple jurisdictions and levels of government mean that planning decisions are not easily coordinated. Planning controls are inconsistent and restrict how the land can be used, diminishing incentives for improvements.

The WestConnex Motorway represents the opportunity to deliver the largest integrated transport and urban renewal project in Australia – a 33km motorway and a 20km urban renewal corridor. It will change traffic volumes, divert some traffic and, in particular, provide an alternative route for trucks and heavy vehicles. This will free up road space for better public transport, while also encouraging walking and cycling. Better transport options and improved urban amenity will enable urban transformation that can optimise the Corridor's well-established retail and service centres and help to provide significant volumes of diverse, well-located housing and jobs.

2. Planning Approach

2.1 Consultation Outcomes and Planning Principles

The approach taken for the transport planning of the Corridor builds on the vision and principles articulated in the Strategic Transport Plan which outlines the framework for planning at the Corridor level, and the consultation outcomes from the exhibition of the draft Strategy in late 2015. The Precinct transport planning sits a layer below the Strategic Transport Plan and the transport planning principles are finer grained to take account of more detailed local transport needs and the interaction with existing and future land use. Some of the issues that have been identified at the Precinct level include:

- congestion: congestion is present throughout the majority of each weekday and during peak periods on weekends.

  Related Consultation Outcome: 31% of people think that what the Corridor needs most is 'Less Traffic'.

- public transport deficiencies: the lack of dedicated bus priority lanes west of Leichhardt impacts travel reliability. In addition, bus network congestion also potentially contributes to low bus occupancy/usage rates.

  Related Consultation Outcome: 24% of people think that what the Corridor needs most is 'Better Public Transport'.

- limited north-south connections: Parramatta Road, Parramatta River, the Western Railway Line, and the Bankstown Line impede north-south connectivity for all transport modes.

  Related Consultation Outcome: 10% of comments made in surveys and submissions raised concern that the projected population growth would compound existing traffic congestion and further impede north-south movements.

- impediments to development: Parramatta Road is a hostile environment and has poor amenity; the quality of neighbourhoods and businesses fronting Parramatta Road are in a state of decline.

  Related Consultation Outcome: 12% of people think that what the Corridor needs most is 'Better Environment for Businesses'.

- physical constraints: heritage listed buildings, subdivision patterns, land ownership and existing building lines are potential constraints to urban transformation.

  Related Consultation Outcome: 97% of people agreed that the Corridor needs to be revitalised.

- street network permeability: the existing street network includes long blocks and indirect walking and cycling paths resulting in long walk and cycle times for trips and encouraging car use.

  Related Consultation Outcome: 19% of people think that what the Corridor needs most is 'More Appealing Streets'.

The Precinct transport planning principles that have been adopted are provided below. These respond to the identified issues, whilst also facilitating future development and aiming to create a liveable urban environment (these are not in order of priority):

- improve north-south connectivity across Parramatta Road for all road users.
- improve street network permeability across the Corridor, particularly for pedestrians and cyclists.
- improve the quality of public transport, walking and cycling networks, access and connectivity to and within Precincts and Frame Areas.
- support an improved urban environment with areas designated for greater levels of street activity.

- facilitate local access needs for new development to support the needs of residents and businesses.
- encourage travel behaviour change to discourage car use and support more sustainable travel choices.

2.2 Integrated Transport and Land Use Planning

The Strategic Transport Plan includes an analysis of current demands within the Parramatta Road Corridor which indicates that overall mobility can be enhanced through actions that promote sustainable travel choices as part of a transport mix that includes private car use:

- an increasing proportion of local trips of up to 2km can be made on foot or by bicycle
- intermediate trips of up to 10km will continue to make up the majority of travel within the Corridor and, with the support of appropriate land use changes, represent a key growth market for higher-capacity and more efficient public transport services, including service improvements delivered in advance of significant new infrastructure investment
- longer-distance regional trips through the Corridor can be made by train and WestConnex.

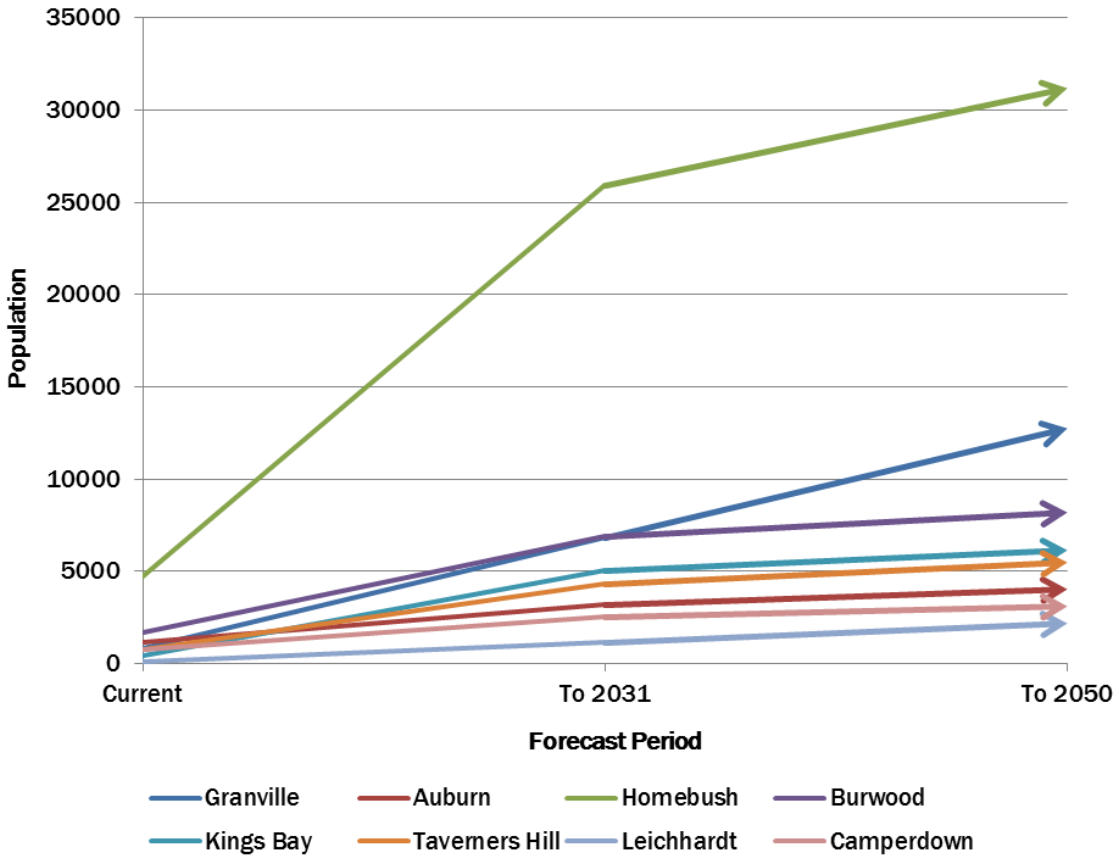
Figure 2 shows an indicative trend of growth within the Precincts based on the current population projections in the Strategy. The implications of population growth for the transport task along the Corridor will depend on where people choose to live, where employment growth occurs and where other activities are concentrated. A transport network can both respond to these land use patterns as well as influence them. Integrated and coordinated planning of the transport network is complex but necessary for the Corridor's long-term sustainability.

A connected Parramatta Road Corridor public transport network – comprising train, light rail, bus and ferry links in a single system, accessed by walking or by bicycle – provides options to travel to many destinations easily. Easy interchange between modes and services is critical, requiring attractive service frequencies, a supportive ticketing system and simple transfer arrangements.

The heavy rail network will continue to play an intermediate role in the Parramatta Road Corridor, as well as a more dominant regional role. Further investigations are required as to whether a higher-capacity heavy rail solution could be warranted in the future. This will involve analysis to compare the benefits provided by improvements to the existing North Shore, Northern and Western lines with the benefits delivered by a different form of transport. This analysis would need to take account of wider rail network requirements for the Sydney metropolitan area.

In addition to improvements and enhancements to the public transport and walking and cycling networks, the road impacts of future development will need to be minimised through appropriate mitigation measures. It is recognised that even with public transport and walking and cycling investments, future land use changes and long term growth may result in more congestion. Future development will need to be assessed to determine the capacity of the road network to accommodate land use change and traffic movements, whilst balancing the role and function of Parramatta Road as one of Sydney's major arterial roads.

Figure 2 – Precinct population comparison projection

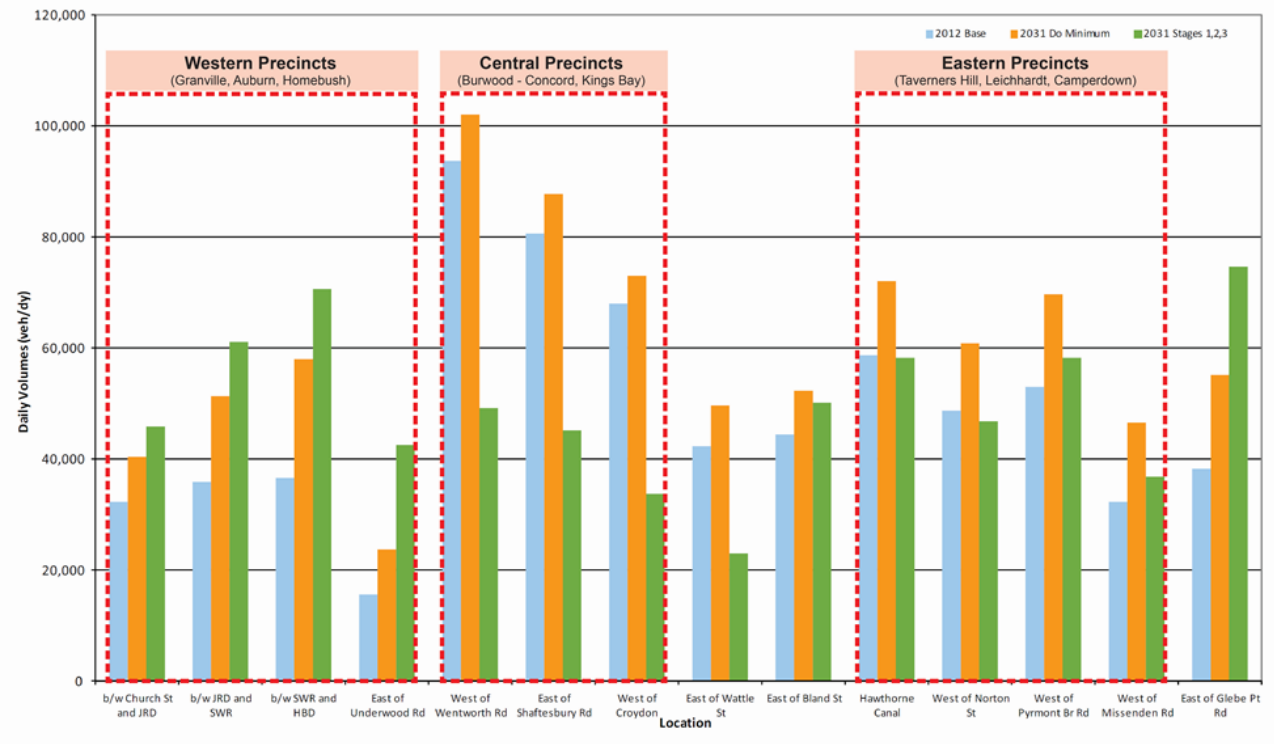


2.3 The Influence of WestConnex along Parramatta Road

As described in Section 1.9 WestConnex is the catalyst for change in the Corridor. The opportunities created by WestConnex will vary along the Corridor as some sections are forecast to see significant reductions in traffic; some will see minor traffic reductions, and others may see traffic increases. Figure 3 shows forecast traffic volume differences between the base (2015), 2031 Do Minimum (No WestConnex) and in 2031 with WestConnex. This demonstrates the influence of WestConnex along the Corridor. The results generally show:

- Western Precincts (Granville, Auburn, and Homebush): Traffic reductions are likely to be limited as this section of Parramatta Road is already paralleled by the M4 Motorway. The reintroduction of the toll on the M4 is likely to see some traffic divert back to Parramatta Road. The function of Parramatta Road will still largely be focused on movement.
- Central Precincts (Burwood and Kings Bay): The M4 East will provide a bypass of this section and there is forecast to be a significant reduction in traffic volumes as a result. This provides opportunities for a more vibrant street function along Parramatta Road
- Eastern Precincts (Taverners Hill, Leichhardt, and Camperdown): The completion of the M4-M5 Link is forecast to provide some traffic relief for this section. The majority of this section already suits a more Vibrant street function in terms of the scale, density and mix of land use. The opportunity WestConnex provides is to activate this vibrancy by supporting the land use with a street that is easier to cross and more pleasant to be around.

Figure 3 – Forecast traffic volume differences along Parramatta Road, 2015 base, 2031 without WestConnex and 2031 with WestConnex (source: WestConnex Updated Strategic Business Case - Technical Paper 1)



2.4 Approach to Precinct Transport Planning

The Strategy and this Report have been informed by the Strategic Transport Plan, and a range of other work streams and activities, each of which is described below. As land use change occurs in the Corridor and planning proposals are prepared, Precinct based transport planning will need to continue to develop these considerations and actions.

Application of the Street Function (Movement and Place) Framework

In order to achieve good transport and land use outcomes, it is necessary to set a strategic framework to ensure any subsequent proposals are consistent with the future role and function of a particular street. This framework is a vital first step in transport planning at the Precinct level and is heavily influenced by the land use plans. In turn, the framework informs the land use and can create opportunities or constraints for the type of land use that can occur along a particular street.

The framework defines the future function of the street network on the basis of land use and transport objectives and desired outcomes for each Precinct and Frame Area. The roads within and around Precincts and Frame Areas provide two primary functions for transport customers:

- movement: the ability to travel between places
- place: the ability to access origins and destinations of travel.

An understanding of the two functions of a street are vital when the two functions are competing, such as through increased movement requirements or improved place amenity. The movement and place function of a street informs planning for the level of access across each of the transport modes. The street network consists of a mixture of different street function types serving different roles within the transport network, each with their own typical attributes. These are shown below in Table 2.

Figure 4 – Movement and Place Hierarchy and Framework (Transport for NSW 2015)

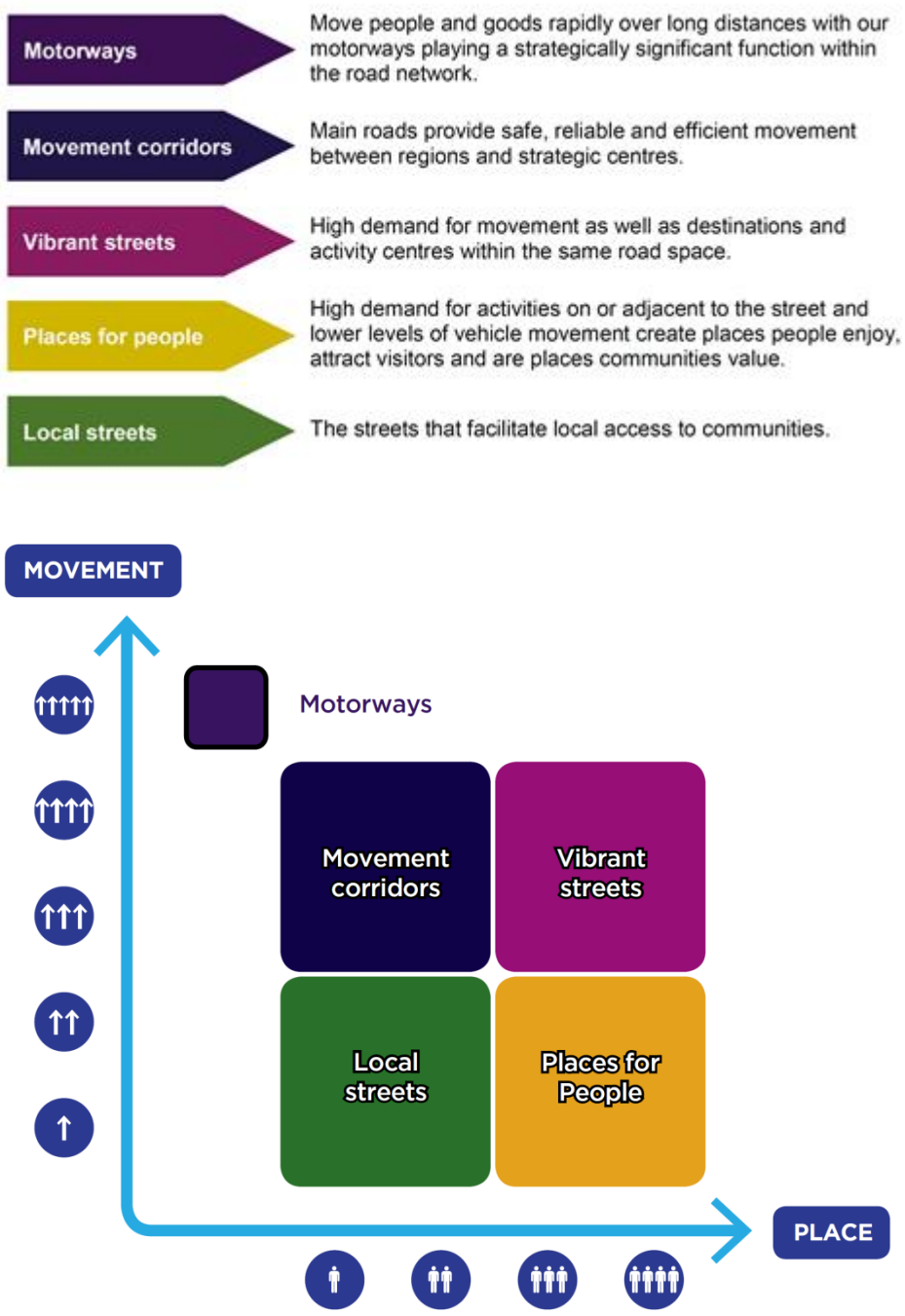


Table 2 Movement and Place Matrix

	Motorways	Movement corridors	Vibrant streets	Places for people	Local streets
	Motorways are strategically significant roads that move people and goods rapidly over long distances.	*Movement corridors are main roads that provide safe, reliable and efficient movement between regions and strategic centres.*	*Vibrant Streets have a high demand for movement as well as destinations and activity centres within the same road space.*	*Places for People are streets with high demand for activities and lower levels of vehicle movement. They create places people enjoy, attract visitors, and are places communities value.*	*Streets that facilitate local access to communities.*
TRIP TYPES	▪ Longer distance trips including freight	▪ Intermediate and longer distance trips including freight	▪ Mix of trip distances and destination trips	▪ Destination trips	▪ Local access trips
TYPICAL SPEED LIMIT	▪ 80 – 110 km/hr	▪ 60-70 km /hr	▪ 50 km/hr	▪ 40 km/hr ▪ ▪ Speed limits may be as low as 10 km/hr in Shared zones	▪ 40-50 km/hr ▪ ▪ Speed limits may be as low as 10 km/hr in Shared zones
INTERSECTION TREATMENTS	▪ Long distances between intersections ▪ Signalised/controlled intersections generally grade separated ▪ Grade separated pedestrian access across	▪ Signals limited to significant connections ▪ Majority of intersections left in/left out only ▪ Signal-controlled pedestrian crossings or grade separated	▪ Signalised or sign posted ▪ Some left in-left out turns ▪ Signal-controlled pedestrian crossings	▪ Significantly traffic calmed through a range of measures (sign posting, roundabouts, built out kerbs, raised thresholds) ▪ Marked pedestrian crossings at intersections, roundabouts	▪ Signal controlled at major cross streets ▪ Marked pedestrian crossings where required ▪
CLEARWAYS/ STOPPING ZONES	▪ 24/7 Clearways ▪ Fulltime No Stopping Zones ▪ Intermittent kerbside shoulders	▪ Clearways during peak hours to facilitate movement of public transport, private vehicles and freight ▪	▪ In some instances, clearways during AM and PM peak to facilitate movement of public transport and private vehicles ▪ No Stopping in select locations (intersection approaches, public transport stops) ▪ Time restricted parking	▪ Very limited No Stopping Zones including to facilitate public transport access	▪ No Stopping Zones by exception

	Motorways	Movement corridors	Vibrant streets	Places for people	Local streets
KERBSIDE PARKING	▪ Emergency zones only	▪ Kerbside parking limited to non-peak times, if provided	▪ Kerbside parking outside peak times and on weekends ▪	▪ Generally fulltime kerbside parking ▪ Loading spaces, where appropriate	▪ Time restricted and unrestricted parking ▪ Loading spaces, where appropriate
PEDESTRIAN ACTIVITY	▪ No footpath ▪ No pedestrian volumes or activity	▪ Footpaths provided ▪ Generally low pedestrian volumes or activity	▪ Generally standard footpath widths with some wider areas at high activity locations ▪ High pedestrian volumes or activity, including outdoor seating	▪ Wide footpath ▪ Very high to significant pedestrian volumes and activity, including outdoor seating	▪ Standard – wide footpath ▪ Shared zones ▪ Good – Very High pedestrian volumes or activity depending on surrounding land uses
CYCLING PROVISION	▪ Fully segregated or allowed within shoulder	▪ Fully segregated, sometimes on a shared path, or allowed on-road depending on whether adjacent path is provided	▪ Generally on-road to allow more space for pedestrian activity on the footpath ▪ Where practicable, segregated path could be provided on-street	▪ Cyclists generally on-street in safe street environment ▪ Stencils where required ▪ Segregated when required	▪ Cyclists generally on-street in safe street environment ▪ Stencils where required ▪ Segregated where required
LAND USE INTERFACE	▪ Grade separated through the Parramatta Road Corridor (viaduct or subterranean) ▪ No direct vehicle access to properties	▪ Mix of uses with non-residential focus ▪ Generally wide lanes/narrow kerbs ▪ Restricted vehicle access to properties to minimise disruption to traffic flows (i.e.: movement prioritised)	▪ Retail and entertainment uses ▪ Standard lanes/varying kerb widths ▪ Limited vehicle access to properties from the street, reducing conflicts with pedestrians (movement or pedestrian priority is peak based)	▪ Mix of residential and active uses (retail, cafes/dining) ▪ Narrow lanes/widened kerbs ▪ Pedestrian and cyclist prioritised ▪ Restricted vehicle access to properties to reduce conflicts with pedestrians (i.e.: pedestrian prioritised)	▪ High degree of residential ▪ Narrow lanes/widened kerbs ▪ High degree of vehicle access servicing individual properties

Three selected case studies are provided below to demonstrate the movement and place concept **in illustrative purposes only**. These three case studies show Parramatta Road, Five Dock, which is categorised as a 'Movement Corridor', Oxford Street, Paddington, which is categorised as 'Vibrant', and Booth Street, Annandale, which is categorised as a 'Place for People'.

Additionally, an example of a 'Motorway' is the current M4 Motorway, and 'Local Streets' are the remainder of largely suburban streets with generally lower traffic volumes. These case studies have been selected to show the balance required between movement and place. The case studies also demonstrate how the function of the street is important to set a framework for how the street is designed, and how land use planning responds to and influences function. **The case studies are not to be used as a matter for consideration during the assessment of any planning proposal.**

Case Study – Parramatta Road, Five Dock - Existing 'Movement Corridor'

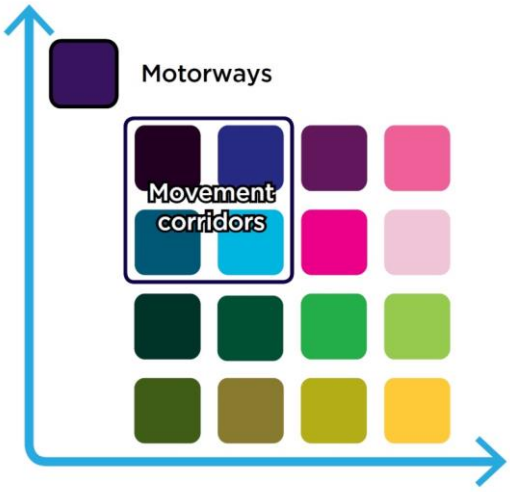
Parramatta Road is a major arterial road connecting Sydney CBD to Parramatta and provides a vital east-west link through Inner Western and Western Sydney.

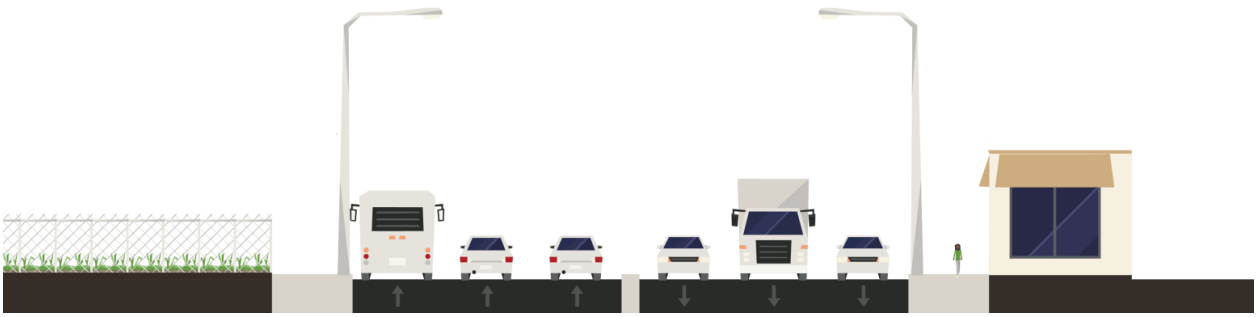
The section of Parramatta Road through Five Dock represents a typical 'Movement Corridor' prioritising the efficient movement of vehicles. Parramatta Road is one of Sydney's busiest urban roads with high demand placed on it for a wide range of travel purposes. Traffic volumes are high on Parramatta Road during much of the day throughout the week and on weekends.

Features which define Parramatta Road as a Movement Corridor include:

- major arterial traffic corridor with high traffic volumes (average 70,000 vehicles daily)
- 60km/h speed limit
- signal-controlled intersections, some with pedestrian crossings, which favour east-west traffic on Parramatta Road over north-south traffic
- clearways during daylight hours and full-time no stopping zones
- no kerbside parking
- very low pedestrian activity volumes and activity on footpaths

In the future, parts of Parramatta Road will remain as a Movement Corridor despite changes to land use and redevelopment occurring.





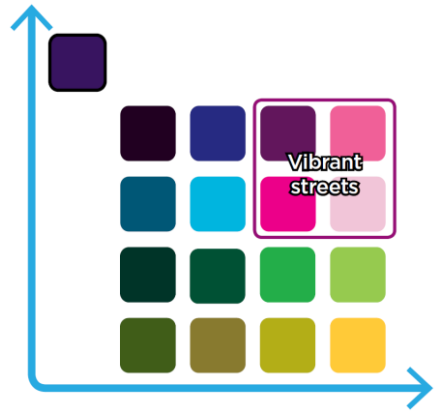
Case Study – Oxford Street, Paddington - Existing 'Vibrant Street'

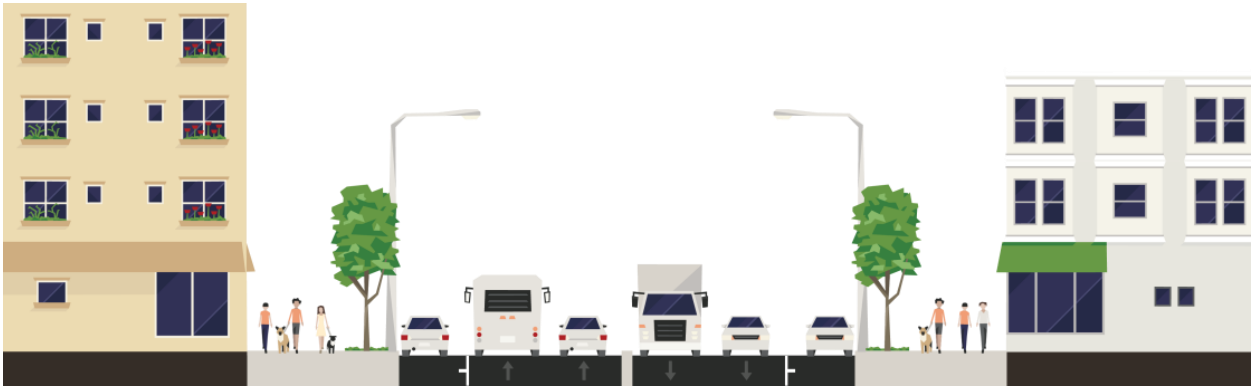
Oxford Street, a major road link connecting the Sydney CBD and Sydney's Eastern Suburbs, passes through several activity centres, each with different land uses and levels of pedestrian activity. Oxford Street through Paddington is a prime example of a 'Vibrant Street', balancing competing demands for movement and place functions along a single road. In this location, it is one of Sydney's most significant high streets for retail and entertainment, as well as a key route for buses and general traffic.

The prioritisation of movement and place functions change during different times of the day. The movement function is more pronounced during morning and evening peak periods with bus lanes operating in the kerbside lanes and higher overall traffic volumes. The place function is prioritised outside of peak periods with kerbside parking and loading that supports retail and commercial functions and provides a buffer between footpaths and traffic lanes. Features which define Oxford Street as a Vibrant Street include:

- key traffic route with moderate traffic volumes (average 40,000 vehicles daily)
- a 50km/h speed limit
- signal-controlled intersections with pedestrian crossings
- kerbside parking outside peak times and on weekends (bus lanes during peak times)
- mix of land uses with active street frontages, comprised of retail shops, restaurants and cafes
- significant pedestrian volumes and activity on footpaths
- lack of vehicle access to properties from the street, reducing conflicts with pedestrians.

Parts of Parramatta Road have the future potential to become a Vibrant Street as changes to land use and new development takes place. Between Taverners Hill and Camperdown, Parramatta Road is envisaged to benefit from reduced traffic volumes, lower speeds and greater levels of on-street parking (in appropriate locations) and footpath activity.





Case Study – Glebe Point Road, Glebe - Existing 'Place for People'

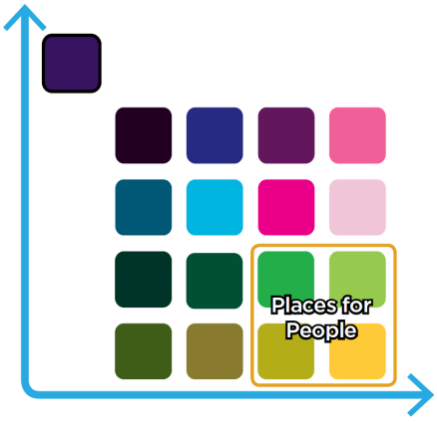
Glebe Point Road provides local access from Broadway through Glebe in Sydney's Inner West, and is the focal point for local business and community activity in Glebe. It is an example of a 'Place for People' with high levels of pedestrian activity and low-moderate volumes of vehicle movement. The street environment has been significantly traffic calmed and people-focussed, including marked pedestrian crossings with built-out kerbs, bicycle stencilling, full-time kerbside parking and loading spaces, and a 40km/h speed limit. All these elements combine to support a mix of retail shops, cafes, restaurants and residential buildings along the street.

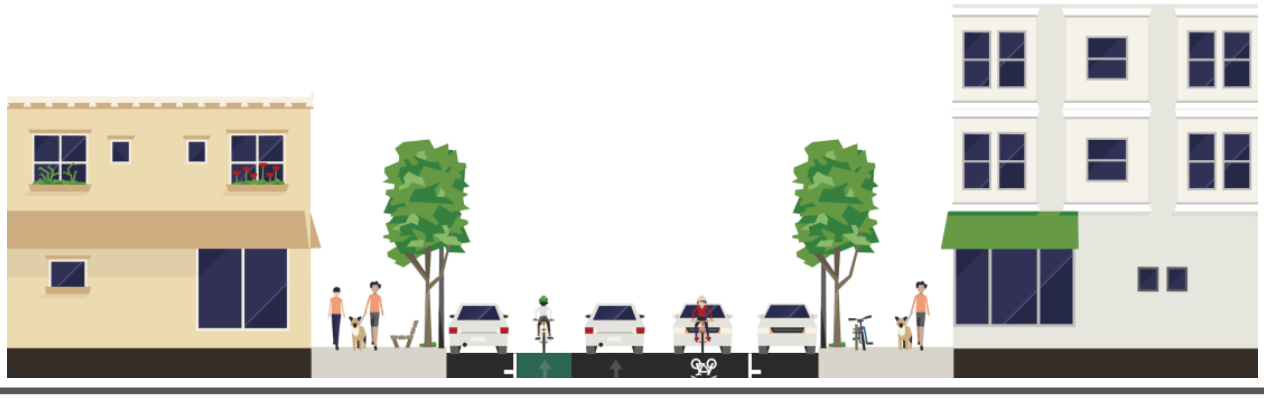
While the place function is prioritised in Glebe Point Road, there is also a key movement function through Glebe. Frequent Route 370, 431 and 433 bus services use the street to provide public transport access to the Sydney CBD and to Rozelle, Leichhardt, Newtown, and the Eastern Suburbs. General traffic uses Glebe Point Road as a key local link connecting with Pyrmont Bridge Road and Broadway and for access to Broadway Shopping Centre.

Features which define Glebe Point Road as a Place for People include:

- local traffic route with moderate traffic volumes
- a 40km/h speed limit
- narrow traffic lanes and widened kerbs
- marked pedestrian crossings and roundabouts at intersections
- full-time kerbside parking
- mix of land uses with active street frontages, comprised of retail shops, restaurants, cafes, and residential buildings
- significant pedestrian volumes and activity on footpaths
- lack of vehicle access to properties from the street, reducing conflicts with pedestrians.

Some streets within the Corridor have the future potential to become Places for People in the future as changes to land use and new development takes place, including Spencer Street, Kings Bay and Cowper Street, Granville (refer to Sections 3 to 10).





Street Network Connections and Intersections

A key principle of the approach to the Precinct Transport Planning set out in subsequent sections is to improve street network permeability. This results in better transport connectivity and has advantages from an urban domain perspective in terms of activating streets and avoiding long block frontages that act as barriers for pedestrians and cyclists. This does not mean that every new connection needs to be open to traffic. Some new connections are quite suitable as through-site pedestrian or bicycle linkages. The approach aims to provide new streets that are open to traffic only where this is desirable for local access and circulation.

A similar approach has been applied to the identification of potential new intersections. New intersections are designed to provide improved local access and north-south connectivity. In some instances a new set of traffic signals is proposed to primarily provide crossing opportunities for pedestrians. In other cases, the signals may be providing a pedestrian crossing opportunity whilst also providing a new right turn capability for local access into a Precinct.

The need for intersection upgrades to provide additional capacity has also been considered. Public transport use, walking and cycling is encouraged rather than providing new capacity for private vehicles. It is recognised that in some instances additional capacity may be required to accommodate growth regardless of the uptake of public and active transport. These proposals are focussed on the areas where the road network is particularly constrained and the growth is significant, e.g. in the Homebush Precinct. The intersection proposals have also been informed by an assessment of 20 year horizon Intersection Level of Service results. More details on the modelling approach are provided in the following section.

Modelling

TfNSW's planning for the Parramatta Road Corridor on-street rapid transit project has been informed by transport modelling. The resultant modelling outputs provides a good starting point to identify potential future intersection 'hotspots' along the Corridor.

Population and Employment Assumptions

Population and employment forecasts are a key input to transport models, providing both the overall level and pattern of demand. The Bureau of Transport Statistics (BTS) at TfNSW is the primary source of population and employment forecasts at the small area (travel zone) level for the Sydney Greater Metropolitan Area (GMA). This area includes the Sydney Greater Capital City Statistical Area, and the Illawarra and Hunter regions. The latest forecasts were released in September 2014 and these are the forecasts that were utilised for the purposes of the Parramatta Road Corridor modelling exercise. These forecasts do not explicitly include the Strategy forecasts, with the exception of the Strathfield Local Government Area (LGA) which includes an allowance for development along the 'Parramatta Road Corridor', (BTS Population Forecasts 2011-2041 September 2041 Release Technical Documentation, TfNSW, 2014) on the basis that at the time of the September 2014 BTS release, the Strategy was not yet endorsed Government policy[2]. As the majority of the LGA forecasts do not explicitly include the Strategy forecasts, these modelling results should be treated as 'indicative only'. Further traffic modelling will be required for each Precinct as part of subsequent planning stages, including assessment of the cumulative impacts of the Strategy including working with TfNSW and the RMS to understand the changing Parramatta Road function and up-to-date opportunities to deliver or complement this. Such assessment will also need to appropriately assess trip generation and travel demands, and identify other road improvements that may be required (separate to Parramatta Road).

[2] The Strategy projects an additional 38,367 residents in the Corridor to 2050 when compared to BTS projections for the same period.

The September 2014 data forecasts an increase in the population of Sydney Greater Metropolitan Area by 1.8 million people over 20 years (from 5.5 million in 2011 to 7.3 million in 2031), which is equivalent to 1.4% growth per annum.

AIMSUN Mesoscopic Model

A mesoscopic traffic model (with microsimulation pockets) was developed explicitly for the Parramatta Road Corridor project. The model is referred to as a 'Meso Model'. The model extent is shown in Figure 5.

Model development included a two-pronged calibration/validation process, firstly to highway demand and travel times, and secondly to bus travel times. The model was independently peer reviewed and deemed 'fit for purpose' for the Burwood to Sydney CBD section of the Parramatta Road corridor.

The initial mesoscopic modelling work to date has indicated a finite limitation on the overall vehicle capacity of the road network. There are few, if any, surface opportunities to increase the total number of vehicles that can move through the system. As a result, there is a need to invest in more efficient modes of transportation to accommodate planned growth along Parramatta Road.

To inform the Precinct transport planning, the Intersection Level of Service (LOS) results from the Parramatta Road Corridor 2021 and 2031 'Reference Case' forecast years have been used. Table 3 outlines the assumptions included within this Reference Case relating to the WestConnex motorway.

Whilst the modelling extent and preliminary results have been provided for context, it is important to highlight that the Mesoscopic Model is a tool that reflects a particular point in time and is underpinned by a set of assumptions to test particular scenarios. Future modelling will be required to support land use change that reflects contemporaneous traffic patterns and movements and adopts appropriate assumptions at the time that a planning proposal is made.

Figure 5 – Parramatta Road Corridor Traffic Modelling Extent (Note: microsimulation pockets highlighted)

Table 3 – Parramatta Road Corridor Modelling Assumptions

FORECAST YEAR	WESTCONNEX STAGES	ROAD NETWORK
2021	Stages 1 & 2	▪ Widening of the M4 motorway between Church Street and Homebush Bay Drive and construction of the M4 East tunnel between Concord Road and Haberfield with new tunnel portals on City West Link (Ramsay Street) and Parramatta Road (Ashfield) ▪ Construction of a new M5 tunnel between St Peters and Beverly Hills (not within the study area, but reflected in the demand forecast)
2031	Stage 3	▪ Extension of the M4 East tunnel to connect to new M5 Tunnel with portals at Rozelle and Camperdown ▪ Construction of a new M5 tunnel between St Peters and Beverly Hills (not within the study area, but reflected in the demand forecast)

Source: *WestConnex Community Update: Extending the M4 – Enabling Tomorrow's Sydney (June 2015)*

Intersection Level of Service

The performance of the road network is largely a function of the operating performance of key intersections, which are critical capacity control points on the road network. The capacity of an urban road network is generally governed by the operation of its intersections. It is therefore appropriate to consider the intersection operation as a measure of the capacity of the road network.

The criteria for evaluating operational performance of intersections are provided by the RTA Guide to Traffic Generating Developments (2002); these criteria are provided in Table 4. The criteria for evaluating the operational performance of intersections are based on the qualitative measure (the Level of Service) which is applied to each band on the basis of average delay. This average vehicle delay is equated to a corresponding Level of Service from A (best) to F (worst). Intersections that perform at a Level of Service D are considered to be operating satisfactorily, while intersections Level of Service E or F are considered to be at or over capacity.

Table 4 – Level of Service Criteria for Intersections[3]

LEVEL OF SERVICE	AVERAGE DELAY PER VEHICLE (SECS/VEH)	TRAFFIC SIGNALS. ROUNDABOUTS	GIVE WAY & STOP SIGNS
A	<14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory
D	43 to 56	Operating near capacity	Near capacity
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control modes	At capacity, requires other control mode
F	>70	Over capacity unstable operation	Over capacity, unstable operation.

Planning for Walking and Cycling

Planning for walking and cycling has been developed using a strategic network approach, based on the identification of key local and regional networks, links, connections and activity areas[4], as well as street functions determined using the movement and place framework. This strategic, network based approach to walking and cycling is focussed on improving connectivity and permeability in existing walking and cycling networks by prioritising and upgrading existing walking and cycling links, and creating new walking and cycling links and connections within and adjacent to each Precinct.

Key differences exist in the roles of the walking and cycling links subsequently proposed. For walking, it is assumed that all streets are provided with a minimum level of walking facilities. Some streets are prioritised as strategic walking links on the basis of high pedestrian activity and connectivity between activity areas, identified as Prioritised Walking Links. These are typically the Vibrant Streets and Places for People identified in each Precinct using the movement and place framework.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

[3] As documented in various local and State government plans and policies that have been prepared in respect of the Corridor

Why build cycling infrastructure?

Providing cycling infrastructure increases perceived safety for people cycling, particularly facilities which separate cyclists from general traffic. Research has found that up to 84% of non-regular cyclists in Sydney would be willing to consider cycling or cycle more if provided with safer cycling infrastructure.

Further research has found that building separated cycling facilities along heavily travelled roads and at intersections is key to encouraging high levels of cycling. A 19% to 34% increase in cycling volumes has been observed in Sydney following the opening of separated cycle facilities on King Street and Kent Street in the Sydney CBD and the Bourke Street cycleway. Similar increases have been observed in Perth following the opening of the East Perth to Maylands Principle Shared Path.

(Source: Inner Sydney Regional Bicycle Network Demand Assessment and Economic Appraisal, *AECOM 2010)*

Parking

Off-Street Parking

Parking was identified in the *PRUTP PRECINX Strategy Report* as a key strategy to drive multiple benefits and outcomes, including:

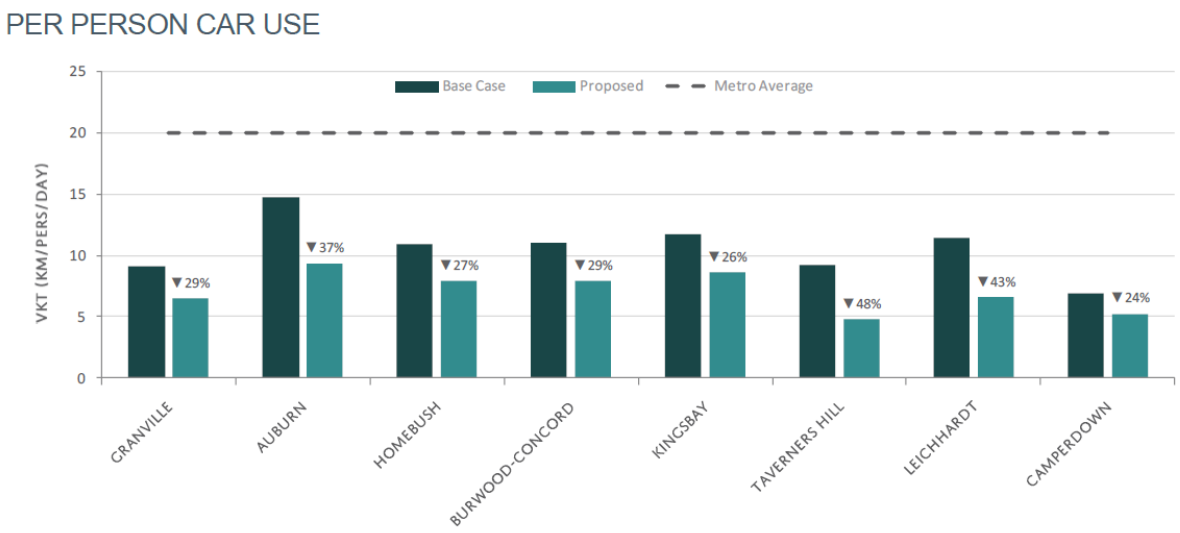
- reduced car dependence, car ownership and household costs
- improved air quality and reduced greenhouse gas emissions
- reduced construction costs and improved development feasibility
- increased housing choice
- improved the business case for private investment in car share
- reduced common area energy demands from underground parking lighting and ventilation, delivering lower electricity costs and strata fees.

Parking across the Corridor will be delivered and designed to transition future communities to low car dependency. The parking approach has been developed in conjunction with principles to encourage active and public transport use and discourage car use. The strategy for parking delivery along the Corridor is proposed using the following hierarchy of principles:

1. minimise parking
2. minimise underground parking
3. unbundle parking from dwelling and building ownership
4. share parking
5. decouple parking.

The implementation of these strategies along Parramatta Road are expected to deliver the multiple benefits outlined above, including a 50% to 75% reduction in car use, compared to the current Sydney Metropolitan Average (Figure 6). This has been determined using a VKT model taking into account car ownership rates, public transport access and proposed land use mix along the Corridor.

Figure 6 – Estimated per person car use under the Base Case and Proposed PRUTP



Note: Percent reductions are shown as a reduction against the Metropolitan Average

Source: *Parramatta Road Corridor Transformation Strategy Sustainability Implementation Plan,* Kinesis 2016

The parking approach is cognisant of the fact that there are eight Precincts over a 20km length Corridor with varying levels of public transport access. In recognition of the Corridor's characteristics, Precincts have been placed into one of three categories for parking. These categories have been informed by mapping of 800 metre walking catchments around existing and proposed rail stations, light rail stops, and Rapid Bus route stops.

A benchmarking exercise was undertaken to validate the categories against existing controls within planning instruments, whilst recognising that more restrictive parking rates may be desirable to meet the project objectives. All parking rates are proposed to be maximum rates consistent with best practice to ensure there is not an oversupply of parking and that developers are not forced to provide additional costly parking that is not required, and which contributes to increased living costs.

Figures 7 and 8 provide a benchmark of several existing parking requirements and guidelines. These examples were identified as potential 'ideal' scenarios for the eastern, central and western sections of the Corridor on the basis that each section exhibits different characteristics in terms of access to transport, current (and accepted) parking rates, and emerging best practices. Generally, the parking rates become more restrictive in areas of the Corridor closer to the Sydney CBD. This is to be expected and is entirely appropriate given the variation in the level of access to services and public transport across the length of the Corridor.

Figure 7 compares benchmark parking rates for residential development used to inform the parking approach.

Figure 7 – Comparison of benchmark parking rates for residential development (spaces per dwelling)

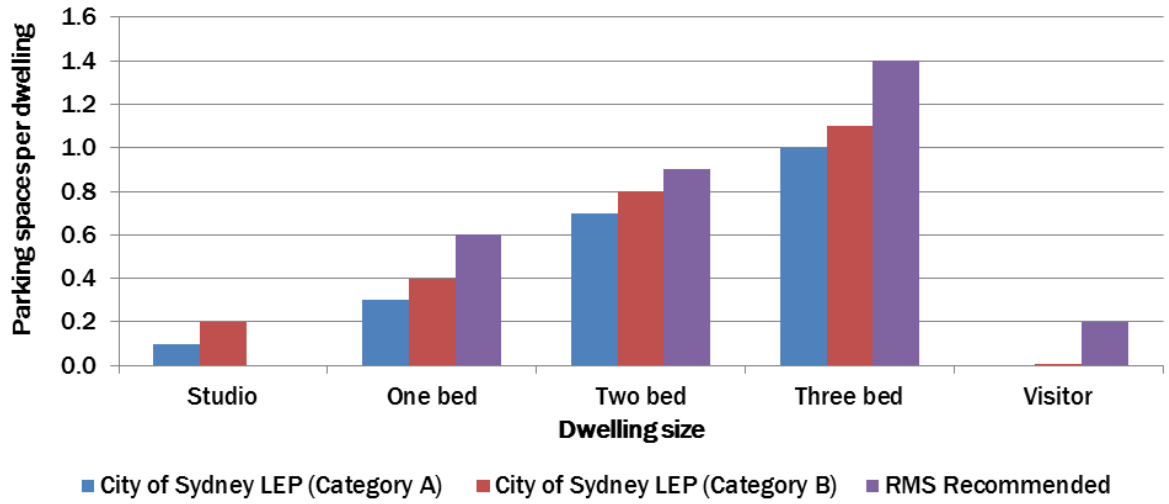
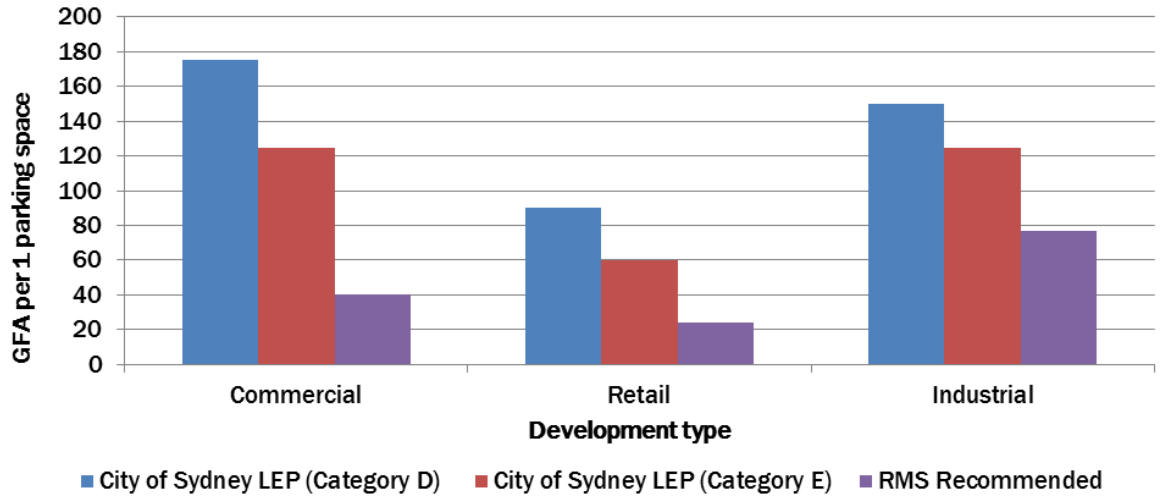


Figure 8 compares benchmark parking rates for non-residential development used to inform the parking approach.

Figure 8 – Comparison of benchmark parking rates for non-residential development (1 space per sqm GFA)



Based on the outlined approach and the benchmarking exercise, localised parking categories were determined for the Precincts that broadly fell into one of three categories. An 800 metre walking catchment was adopted on the basis that it is a readily accepted land use planning assumption that can be comfortably walked in 10-15 minutes.

Category 1 – High Accessibility Locations

- Precincts and Frame Areas to be included within this category include Camperdown, Leichhardt and Taverners Hill.
- All Precincts are within 800m walk access to multiple public transport options, good walking and cycling networks, high quality local services, and within 5 km of the Sydney CBD.
- Parking rates are proposed be the most restrictive. Category A (residential) and D (non-residential) rates within the City of Sydney Local Environment Plan (LEP) 2012 are used as a best practice

benchmark. These rates already apply to Camperdown east of Mallett Street and the characteristics that support these rates (public transport accessibility etc.) are seen as comparative to the three precincts selected for Category 1. The rates proposed for Category 1 are very similar to the benchmark rates with the following differences:

- a more restrictive retail parking rate to encourage public transport use, walking and cycling
- a more generous rate for commercial to account for the significant change from the existing rates in Leichhardt and Marrickville planning controls
- nil parking rates for studio apartments to encourage public transport use, walking and cycling.

Category 2 – Medium Accessibility Locations

- Precincts to be included within this category include Kings Bay, Burwood, Homebush and Granville. Burwood and Kings Bay Frame Areas also fall within this category.
- These Precincts have 800m walking access to good quality public transport which will further improve with investment in Parramatta Road Corridor on-street rapid transit route (for Kings Bay/Burwood) and Parramatta Light Rail (Homebush).
- They also have good access to a strategic centre (Burwood) or CBD (Parramatta) with a variety of local services.
- Parking rates are not as restrictive as Category 1, but still at a level appropriately tailored to encourage public transport use, walking and cycling and discourage car trips.
- Category B (residential) and Category E (non-residential) rates within the City of Sydney Local Environment Plan (LEP) 2012 have been used as the benchmark. The proposed Category 2 rates are slightly more generous than the benchmark to reflect that the precincts and frame areas in question do not have public transport access that is directly comparative to that of the City of Sydney Category B and E areas, although their public transport access is very good and the proposed rates support encouraging the use of public and active transport.

Category 3 – Lower Accessibility Locations

- Auburn Precinct is included in this category, along with the Homebush and Granville Frame Areas.
- Auburn Precinct is likely to need greater commercial and retail parking rates due to bulky goods, large format retail land and employment land uses continuing to be located in the Precinct in the long term which are difficult to access via public transport, walking or cycling.
- The majority of these areas do not fall within the 800m walking catchments of major public transport stops.
- Parking rates will be more restrictive than current controls, but alternative choices to private vehicle use are more limited than other Precincts, in the short to medium term. The selected benchmark is the RTA Guide to Traffic Generating Development (2002). This benchmark has been selected as the rates are seen as within an appropriate range for development that does not have a high level of access to public transport. The proposed Category 3 rates for residential are largely comparative to the benchmark. The proposed rates for non-residential are more restrictive than the benchmark which is largely a reflection of the overly generous nature of the non-residential rates in the benchmark, particularly for retail. Although Category 3 rates relate to the lowest level of public transport access in the Corridor, there is still a need to try and encourage public transport use, as well as walking and cycling connections.

Rates for each category and development type are outlined below in Table 5.

Table 5 – Proposed maximum parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)				OTHER (SPACES GFA)			
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMM.	RETAIL	IND.
1	0	0.3	0.7	1	0	150	100	150
2	0.3	0.5	0.9	1.2	0.1	100	70	120
3	0.6	0.9	1.2	1.5	0.2	70	50	100

Car Sharing

Car sharing rates have been developed using the parking categories outlined above. Car share schemes are generally more successful in higher density areas with limited off-street parking availability and high quality public transport, and this aligns well with the three parking categories. Rates for car sharing spaces in new developments are based on the City of Sydney Development Control Plan (DCP) 2012. A higher rate of provision for car share spaces is proposed for Precincts in Category 1, a moderate rate in Category 2, and a lower rate in Category 3.

Additionally, controls permitting reduced car parking provision where car share spaces are provided is proposed, based on the Leichhardt DCP 2013. Tiered rates would allow car share spaces to be provided in lieu of car parking spaces, determined by the number of car share spaces to be provided. This rate would be highest in Category 1 and gradually stepped down for Categories 2 and 3.

City of Sydney and Leichhardt DCPs have been used in the development of car share rates as these are considered best practice and applicable to the future vision of the Corridor. A more detailed local assessment will be required to validate or refine the proposed rates, as well as detailed investigation of car share rates for non-residential developments.

Rates for each category and development type are outlined in Table 6.

Table 6 – Proposed car share rates by category and development

CATEGORY	RESIDENTIAL CAR SHARE RATE	CAR SHARE RATE TO REDUCE CAR PARKING PROVISION
Category 1	1 per 20 dwellings	1 in lieu of 5 parking spaces
Category 2	1 per 40 dwellings	1 in lieu of 3 parking spaces
Category 3	1 per 60 dwellings	1 in lieu of 1 parking space

Bicycle Parking

The bicycle parking approach has been developed to complement the approach to vehicle parking. A uniform rate has been developed for all Precincts based on Category A rates within the City of Sydney Development Control Plan (DCP) 2012 which are considered best practice in the Sydney context. End-of-trip facilities for non-residential developments and on-street bicycle parking are also included in the bicycle parking approach. As cycling infrastructure is proposed for all Precincts and bicycle usage is encouraged

across the Corridor, one single set of minimum rates is considered appropriate. The proposed rates are outlined below in Table 7. End-of-trip facility rates are outlined in Table 8. Parking spaces should be designed to comply with relevant Australian Standards.

Table 7 – Proposed minimum bicycle parking rates

CATEGORY	RESIDENTIAL		COMMERCIAL		RETAIL		INDUSTRIAL
	RESIDENT	VISITOR	EMPLOYEE	VISITOR	EMPLOYEE	VISITOR	
All Precincts	1 per dwelling	1 per 10 dwellings	1 per 150 m^2	1 per 400 m^2	1 per 250 sqm	2 spaces + 1 per 100 m^2	1 per 10 staff

Table 8 – Proposed end-of-trip facilities for non-residential developments

CATEGORY	PERSONAL LOCKERS	SHOWERS & CHANGE CUBICLES		
		UP TO 10 BICYCLE SPACES	11 – 20+ BICYCLE SPACES	EACH 20 ADDITIONAL BICYCLE SPACES
All Precincts	1 per bicycle space	1 per bicycle space	2 per bicycle space	2

Unbundled Parking

Unbundled parking is parking that is separated from the cost or rent of a dwelling or building. This is not only more equitable, but can also reduce the total amount of parking required for the building. For buildings with unbundled parking, a parking rate reduction of 20% is proposed.

Decoupled Parking

Decoupled parking is parking that is spatially separated from the building to which the parking services. It is also generally unbundled from the sale or rental of an apartment or building.

The benefits of decoupled parking are significant, enabling the Parramatta Road Corridor to transition to a low car dependant future. Decoupled parking has the potential to deliver the significant and mutually reinforcing benefits of parking.

The shift towards lower car ownership rates and emergence of the autonomous vehicle will reduce the need for parking and investment in underground parking. In particular, parking stations/basement parking may lose value as vehicles may no longer need to be parked or housed at origin or destination locations.

To achieve this:

- parking should be spatially decoupled from buildings where possible
- sites should be identified for decoupled parking to reduce the need for on-site, underground parking
- decoupled parking should be built above ground and managed flexibly as the corridor transitions towards low car ownership and use.

For buildings with decoupled, unbundled parking, a parking rate reduction of 40% on maximum parking rates is proposed.

Decoupled parking could be transitioned to other uses when the demand for parking is no longer required, including where new public transport infrastructure is delivered and parking rates for the Precinct are reduced to a more accessible parking classification.

Future Thinking:
Autonomous car and ride sharing, and the role of public and active transport

Car sharing and ride sharing services such as GoGet and Uber have already had an impact on how people travel in cities. Car sharing has typically been most effective in areas where a range of viable transport alternatives are available, mainly public and active transport, and can have a measurable impact on car ownership levels. North American research has found that car sharing can reduce the average number of vehicles per household by half[1]. In Sydney, surveys of GoGet members have found similar results with respondents deferring the purchase of cars since becoming a car share member[2]. To this point in time, ride sharing has emerged more as a competitor to on-demand taxi services with limited effect on private vehicle ownership and use, but this could change.

In the future, autonomous vehicles could provide an opportunity to challenge traditional notions of car ownership and use in cities. A merging of car sharing and ride sharing could occur in the future when autonomous vehicles reach sufficient maturity to be viable alternatives to non-autonomous vehicles in cities. A fleet of autonomous vehicles in this role would be able to perform the roles of both service types, providing on-demand point-to-point transport and removing the need for vehicles to be accessed and returned to the same parking space. This will reduce the number of empty trips and improve the efficiency of parking use, reducing the number of parking spaces needed.

The convenience and efficiency of this model is likely to reduce the need to own a private vehicle. People living in cities who currently own a car mainly for weekend activities such as shopping, leisure and recreation may no longer need their car. Others that currently use their car to travel to work may be happy to use a shared vehicle instead. Of course there will still be many people that either require their own vehicle for work (e.g. certain trades), or who simply value the independence of owning their own car.

Walking, cycling and public transport will be even more vital in such a future. Public transport will continue to be the most efficient way to move large numbers of people, and walking and cycling will be a vital way to help people in our cities move around with the least impact to the environment and their fellow city dwellers, and to keep fit and healthy. Walking in particular always needs to be at the forefront of ensuring cities are planned for people, not vehicles. This will continue to be the case.

The role of walking, cycling and public transport can actually be enhanced under a future with shared autonomous vehicles. In fact, if their role is not enhanced there is a risk that the introduction of autonomous vehicles will lead to a substantial increase in car kilometres travelled as cars travel more frequently and people switch from more sustainable modes[3]. Understanding and clearly articulating the role of autonomous shared vehicles within the transport mix will be the challenge to ensure great urban outcomes for our cities. By challenging the need for private vehicle ownership and improving the efficiency of road and parking use, shared autonomous vehicles could allow urban space to be freed up for uses that better support cities as places for people.

(Sources: [1] Impact of Carsharing on Household Vehicle Holdings, *Martin et al 2010; [2]* Benefit-Cost Analysis of Car Share within the City of Sydney, *SGS Economics & Planning 2012, [3]* Urban Mobility System Upgrade – How shared self-driving cars could change city traffic, *OECD International Transport Forum 2015*)

Public Transport Planning and Assumptions

The approach to public transport planning for the Precincts assumes the implementation of two major pieces of public transport infrastructure that do not currently exist.

Parramatta Light Rail

Parramatta Light Rail will be over 20 kilometres long, providing reliable public transport to link residential, employment, cultural and education precincts.

High frequency services, seven days a week from early in the morning to late night will connect to the wider rail network, bus, ferry, walking and cycling links.

The preferred network will include:

1. a core spine linking Precincts within Greater Parramatta including Westmead health precinct, Parramatta CBD and Camellia
2. the replacement of the existing heavy rail service between Camellia and Carlingford with a more frequent light rail service
3. a light rail service through the Camellia renewal area, Sydney Olympic Park and connecting to Strathfield.

The currently planned route would service the Homebush Precinct and provide an important connection to Parramatta, Olympic Park and Strathfield.

On-street rapid transit for Parramatta Road

The NSW Long Term Transport Master Plan identifies Burwood to Sydney CBD as a strategic corridor for integrated transport and land use planning. Sydney's Bus Future includes Parramatta Road as one of Sydney's key growth corridors to investigate for rapid bus or light rail.

The Government has reinforced this position with a condition of consent for the WestConnex M4 East project requiring 'at least two lanes of Parramatta Road, from Burwood Road to Haberfield, to be solely dedicated for the use of public transport unless an alternative public transport route that provides an improved public transport outcome…is approved.'

TfNSW is committed to delivering an on-street rapid transit system to support the shared vision for the growth of the Parramatta Road Corridor and cater for future demand in the eastern section of the Corridor, and to reinforce higher-order north-south bus routes between major centres such as Macquarie Park, Burwood and Hurstville.

TNSW is investigating a rapid transit solution that has the capacity, integrated with the heavy rail network and Inner West Light Rail services, to accommodate additional demand over the short to medium term. The rapid transit project will service five of the Precincts along the Parramatta Road Corridor (Burwood, Kings Bay, Taverners Hill, Leichhardt and Camperdown). Public transport journeys will become faster and more reliable for customers through the operation of higher-frequency and capacity services, additional on-road transit priority and the provision of high-quality and accessible transit interchanges.

TNSW is currently preparing a medium to long-term transport implementation plan for the Sydney to Parramatta Corridor to drive economic development, support desirable land use change and improve travel options for our customers in the corridor. For the short term, TNSW is investigating bus priority, service frequency and other customer-facing improvements to the existing Burwood to Sydney CBD major bus corridor. The plan will also support the Greater Sydney Commission's district plans.

To ensure the on-street rapid transit service can be delivered, the Parramatta Road Urban Transformation Strategy identifies the proposed future location of transit interchanges (sometimes referred to as 'superstops'. Applications for land use and development proposals will need to consider these locations and consult with TfNSW to ensure that the future land use and mix around these nodes make appropriate provision for future infrastructure requirements. It is important for TfNSW to be involved in any decision-making processes that could impact future traffic conditions and the reliability of public transport services along this strategic corridor, to ensure that the attractiveness of public transport use is maximised.

Future-proofing for on-street rapid transit infrastructure investment is required now to ensure that this provides a major uplift and benefits all travellers within the Corridor over the short, medium and long term.

Further investigation is required to identify potential longer-term public transport solutions that support travel demand along Parramatta Road. The Government is investigating longer-term rail improvements and light rail options to support future population growth and transformation of the area through new housing and job opportunities.

Rail and Bus Planning

Having regard to the Parramatta Light Rail and Parramatta Road Corridor on-street rapid transit projects, there are two main approaches for additionally supporting the Precincts with public transport.

Rapid and Suburban Bus Routes are assumed to be implemented in line with Sydney's Bus Future, with the following potential routes would support renewal of the Corridor:

- Rouse Hill to Hurstville via Parramatta and Bankstown Rapid Route: This would involve improved frequencies and bus priority for the existing M91 bus route connecting to the Granville Precinct.
- Hurstville to Macquarie Park via Burwood Rapid Route: This would involve improved frequencies and bus priority for the existing M41 bus route connecting to the Burwood Precinct.
- Burwood to Chatswood via Drummoyne Suburban Route: This would involve a new bus route with 10 minute frequency in peak periods serving the Burwood and Kings Bay Precincts.
- Any additional bus service changes that may be required to support the Precincts are identified in later sections of this report.

The Granville, Auburn and Homebush Precincts are particularly reliant on rail access to service expected future growth. At a minimum, Granville, Auburn, Homebush, North Strathfield and Concord West stations will maintain existing train frequencies and frequencies are predicted to improve over time with the implementation of the Western Sydney Rail Upgrade Program, and wider metropolitan rail timetable changes.

Travel Demand Management

The parking strategies outlined in previous sections are a form of Travel Demand Management (TDM). There are other TDM measures that can be employed to complement parking strategies, and these can be applied across all Precincts. TDM measures generally aim to achieve changes in travel behaviour to reduce car dependency and increase the share of travel by public transport, pedestrians and cyclists.

As land use change is implemented across the Corridor, travel demand management strategies will play an increasingly important role in how and when the Corridor's road network is utilised by residents, workers, visitors, whilst ensuring that important freight, loading and servicing functions are maintained. There are a range of travel demand management options that may be applicable to the Parramatta Road Corridor and will need to be considered by proponents when preparing planning proposals, as well as councils and State

agencies when determining applications that propose land use change. These range from “hard measures”, such as parking charges and workplace parking levies through to “soft measures” such as car sharing, car clubs, public transport information, tele-working, etc. Each of these are broadly outlined below as a guide only and would need to be considered on merit by individual proposals.

Parking Management and Control

There are a number of ways parking management and control can be used to influence demand:

- parking charges – for all or certain road user categories (i.e. time based pricing, vehicle occupancy pricing)
- reducing or limiting available parking space for all or certain road user categories (i.e. vehicle size parking to encourage the use of smaller and more environmentally friendly vehicles)
- variable parking pricing programs during congested hours of the day
- discount of certain spaces (at priority locations, next to building entrance, etc.) for use by those arriving in multi-occupant vehicles
- loading/servicing – Ensuring that loading activities to support local business are undertaken off-street in shared facilities, or if undertaken on-street, that this occurs in early morning or late night to allow street space to be utilised for other purposes during core hours
- improving enforcement and control of available parking.

Well-planned parking pricing can impact the use of alternative travel modes, in particular where high-quality public transport is available. It can also be relatively quickly implemented and can generate revenue sources that can be used to invest in other demand management measures.

Perth Parking Policy

Developed in the late 1990s, the Perth Parking Policy sets strict maximum parking limits for off-street residential parking in new developments and a parking levy on all non-residential parking spaces in the City of Perth.

Non-residential parking spaces are licenced under the Policy with an annual licence fee payable. Funds raised as a result of the licencing scheme must be used for public and active transport improvements in City of Perth.

The Policy also includes strict legal maximum levels of parking for new non-residential developments, based on ground floor space of developable land, and a three-category on-street parking zone system to control public parking.

A 10% reduction in parking in City of Perth has been observed ten years after the Policy was adopted, together with a 17% drop in car mode share for trips to central Perth and a 27% increase in public transport mode share. Total car travel to and within the CBD has also decreased.

(Source: Parking Pricing Implementation Guidelines*, Victoria Transport Policy Institute 2015)*

Future Thinking: Changing work habits and information technology advances

Technology advances and new, disruptive technologies could have a significant role to play in changing the way people work in the future. Improved data transfer capabilities brought by better internet infrastructure, new developments in technologies such as virtual reality (VR), and ever increasing computing power in devices will have a large impact on how and where work is done.

These information technology advances could increase work flexibility, particularly for 'white collar' office jobs, by improving interactions between employees remotely. An increase in work taking place outside of the traditional office environment could potentially reduce travel demand for commutes and work related travel. This would have a flow on effect on road and public transport networks, potentially reducing pressure on these networks particularly during peak periods.

Flexible Working Hours

Flexible working approaches can include:

- Flex-time: allows employees to arrive and depart to and from work according to their choice within an established boundary set up with the employer.
- Staggered work hours: the employees arrive in different shifts at different times within the work period. Unlike flexible hours, employees in a staggered work schedule may have no ability to choose which shift they work.
- Compressed work week: Employers establish compressed work week programs that offer employees the option to work the same number of work hours in fewer working days in the week.

Workplace and Green Travel Plans

Workplace travel plans and green travel plans are a set of initiatives that are put in place by employers before occupying a new or existing development that encourages staff to choose alternatives to driving to work that are healthier and more sustainable. Workplace travel plans need to be tailored to the specific needs of each particular organisation. Elements of such travel plans can include many of the initiatives mentioned above, as well as information programs for sustainable transport, walking and cycling initiatives (such as Walk to Work Day), proactive cooperation with transport agencies to tailor public transport facilities to the site and employer initiated parking policies that support alternative transport use.

Other Travel Demand Management Options

In addition to parking management control, flexible working hours and Workplace and Green Travel Plans, other potential measures that could be considered are:

- telecommuting: allowing workers to either eliminate a commute trip altogether by working from home or to reduce trip length by working from a satellite office
- teleconferencing: telephone or video meetings between multiple participants may eliminate the need for travel to the place of the meetings
- home shopping: home delivery operations allow shoppers to visit shopping venues without the need for a vehicle to transport packages or bulky items home

- personalised travel plans: personalised travel planning provides tailored information and incentives directly to households with the aim of influencing travel behaviour and reducing car usage
- public transport information: establishing a marketing campaign and developing a strong, overarching, brand image for public transport has the potential to perform a key role in supporting other demand management options and encouraging modal shift from the private car to public transport alternatives. Such a campaign could also be used to encourage travel on public transport outside peak times where additional capacity is available. This approach could be used, for example, on the Inner West rail line stations. A good level of public transport service needs to be in place before the promotion and marketing of a route or service can be considered as an effective tool.

3. Delivering the Strategy

3.1 Delivery and Planning Approach

The Strategy establishes a framework within the NSW urban planning and transport planning systems to guide, coordinate and facilitate the transformation of the Corridor in line with the established vision, principles and strategic actions.

Figure 9 illustrates the role of the Strategy in the context of existing State planning, transport planning and infrastructure planning frameworks.

3.2 Delivery Mechanisms and Next Steps

The Strategy itself does not rezone land or alter development controls in the Corridor. Successful implementation of the Strategy will be implemented in two stages, 2016 – 2023 and post-2023. Land use change prior to 2023 will be guided by the *Parramatta Road Corridor Implementation Plan 2016 -2023* and will be coordinated with the delivery of planned improvements to Western Line rail frequencies and the rapid bus solution from Burwood to Sydney CBD as part of rapid transit investigations (amongst other things).

Beyond 2023, population growth and transformation of the Corridor will need to be supported by longer term rail improvements and light rail options in order to proceed. The Government is currently investigating public transport options which will be required to support the scale, timing, and staging of longer term land use changes. The Greater Sydney Commission has been charged with preparation of the District Plans for each of Sydney's six districts. Each District Plan will be the key strategic planning document for the district. The District Plans will address economic, social and environmental issues, and set out the actions required to achieve planning priorities.

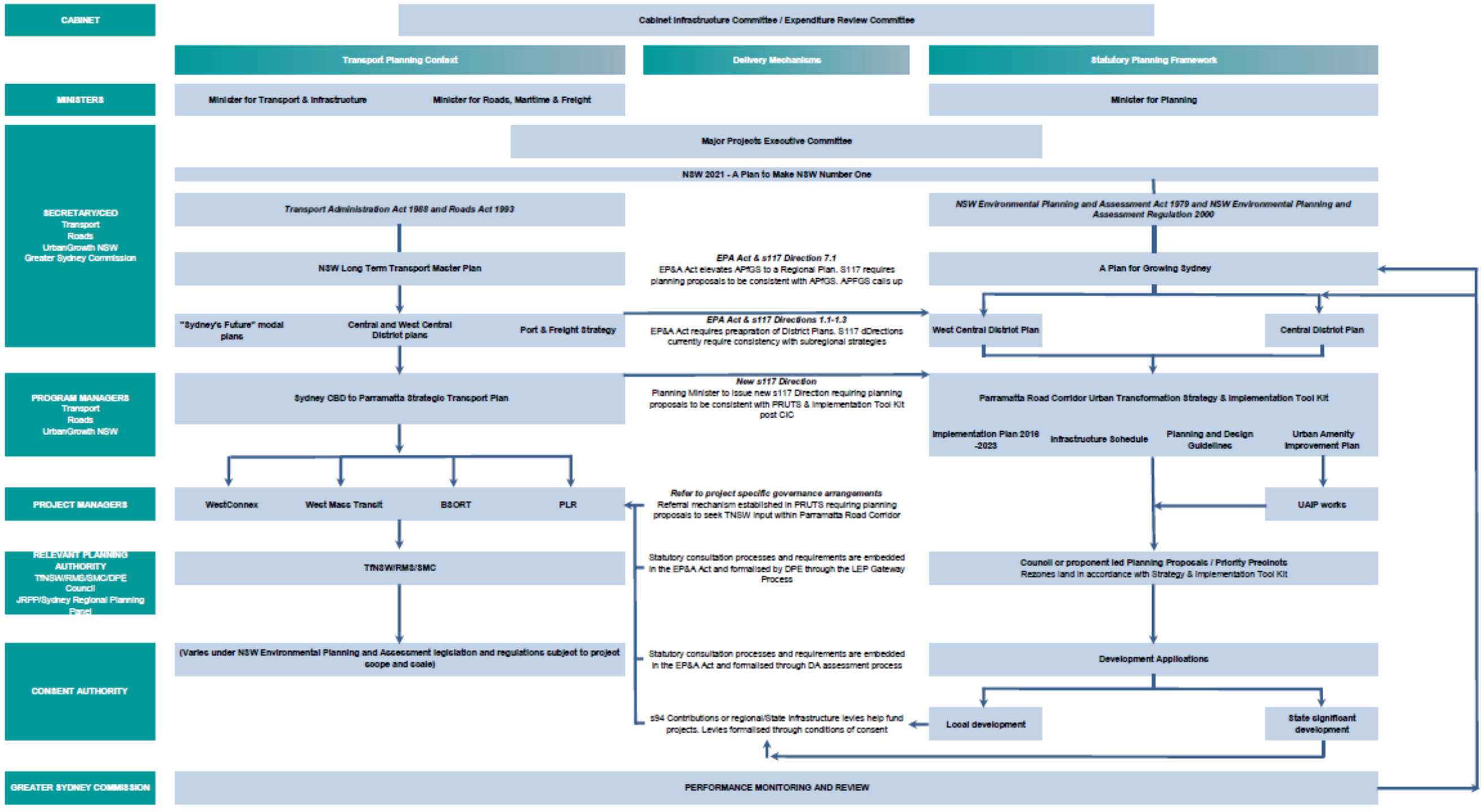
The Strategy will inform the District Plans for both the Central and Central West Districts, where the Corridor is located. The District Plans will then be implemented through activities specified in councils' Local Environmental Plans or the DPE's Priority Precinct program, in coordination with key infrastructure.

The current planning controls such as zoning, height and floor space ratios constrain some of the proposed renewal activities identified in the Strategy, and will need to be revisited.

The Strategy will be implemented through:

- State environmental planning policies for priority Precincts
- planning proposals prepared by landowners or developers
- comprehensive LEP reviews undertaken by councils.

Figure 9 – Role of the Strategy in the context of existing State planning, transport planning and infrastructure planning frameworks



Planning proposals will need to be generally consistent with the Strategy and will need to be supported by appropriate justification. In terms of transport and traffic planning, future proposals will need to:

- demonstrate consistency with the transport principles and Strategic Actions outlined in the Strategy, including any transport targets identified for the relevant Precinct or Frame Area
- outline existing traffic and parking conditions
- assess the traffic generating qualities of the proposal(s)
- consider existing and committed transport provision and its capacity to support the proposal(s)
- identify mitigation measures to address transport impacts of the proposal(s).

Localised and contemporaneous traffic modelling will be encouraged. Future proposals should also demonstrate how relevant stakeholders have been engaged. The transport principles and initiatives contained in this report will also require further detailed investigation and planning, as outlined below.

3.3 Movement and Place and New Streets

The next phase of planning should include street design for the identified 'Places for People', 'Vibrant' Streets, and any new streets. This could include:

- defining the desired speed environment
- identifying appropriate treatments for pedestrian crossings of the main street and connecting side streets
- identifying appropriate treatments for intersections
- defining appropriate footpath widths accounting for 'stay and play' activities, circulation and public domain improvements
- defining appropriate traffic and parking lane widths based on the desired speed environment
- defining appropriate treatments for cyclists
- integrating public transport infrastructure requirements, particularly relating proposed stop locations for the Parramatta Road Corridor on-street rapid transit route and Parramatta Light Rail.

3.4 Regional Public Transport Needs

Further work is required to understand the future public transport needs for the Corridor. These investigations should be carried out considering the broader relationship with the transport network and the cumulative effect of planned growth within the areas between Parramatta and Sydney CBD's. This is consistent with the findings of the Strategic Transport Plan. These investigations would be led by TfNSW and would not be specific to the Parramatta Road transformation precincts. These could include:

- demand modelling using the Sydney Travel Model (STM) or similar to understand the future demand and mode shift needs to support the Precincts, including consideration of the cumulative impact of proposed uplift in the Parramatta to Olympic Park Peninsula
- a more detailed understanding of the opportunities to provide additional rail services on the existing rail network and whether this will be sufficient to support future travel demand
- consideration of alternative approaches where appropriate, including mass transit options and how

this would be integrated with the existing network

- implementing new bus priority measures along Parramatta Road when the first stage of WestConnex (M4 East) is completed in 2019
- delivering the Parramatta Road Corridor on-street rapid transit route when the third stage of WestConnex (M4-M5 Link) is completed in 2023
- amending the State Environmental Planning Policy (Infrastructure) 2007 to identify Parramatta Road between Burwood and the Sydney CBD as a strategic corridor and insert provisions that require planning proposals and development applications along the Corridor to be referred to Transport NSW for comment, particularly at and around future superstop locations.

3.5 Detailed Localised Transport Assessments

This Precinct Transport Report has sought to identify local transport improvements as far as practicable at this stage of assessment. As there are eight precincts, the report is necessarily focused at a Corridor level. More detailed local transport assessments, including an assessment of local public transport and walking and cycling needs, would need to be undertaken at each subsequent planning approval stage and be tailored appropriately to the requirements of that particular approval stage. In particular, the modelling undertaken thus far has not been specifically tailored to the Precinct planning. The intersections identified in this report will need to be validated and appropriate treatments confirmed.

Further local and network-wide traffic modelling of preferred options for each Precinct will be required to determine appropriate mitigation and improvement measures for local and state roads, as well as to provide understanding of likely performance of road based public transport (including bus and light rail). Transport planning and modelling for individual sites or Precincts will need to assess the impacts of cumulative growth in the Corridor associated with the Strategy, understand the changing Parramatta Road function and up-to-date opportunities to deliver or complement this, and to appropriately assess trip generation and travel demands, and identify other road improvements required (separate to Parramatta Road). This process should be undertaken in close consultation with TfNSW, RMS and Councils, including agreeing growth assumptions and assessment years.

3.6 Parking and Car Share

The next phase of planning should focus on validating the proposed off-street parking rates and identifying appropriate locations for de-coupled parking. The validation of the rates could include more detailed local level consideration of the following:

- mapping of the public transport accessibility of the Precincts using the Public Transport Accessibility Level (PTAL) metric
- access to, and quality of, local and regional services
- demographics of the area
- proximity to CBD's and Strategic Centres
- levels of car ownership and uptake of alternative models such as car share schemes.

These points have been considered in the development of the proposed parking rates. A more detailed local assessment will be required to validate or refine the proposed rates, as well as detailed investigation of car share rates for non-residential developments. Consideration should also be given to extending the proposed parking rates to cover the broader Local Government Areas (LGA's) to ensure consistency.

3.7 Walking and Cycling

The next phase of planning should focus on the design for new walking and cycling infrastructure. Over the 30 year life of the Strategy, it is expected that much of the existing walking and cycling infrastructure will require refurbishment, widening and / or new infrastructure which will need to addressed through detailed Precinct planning.

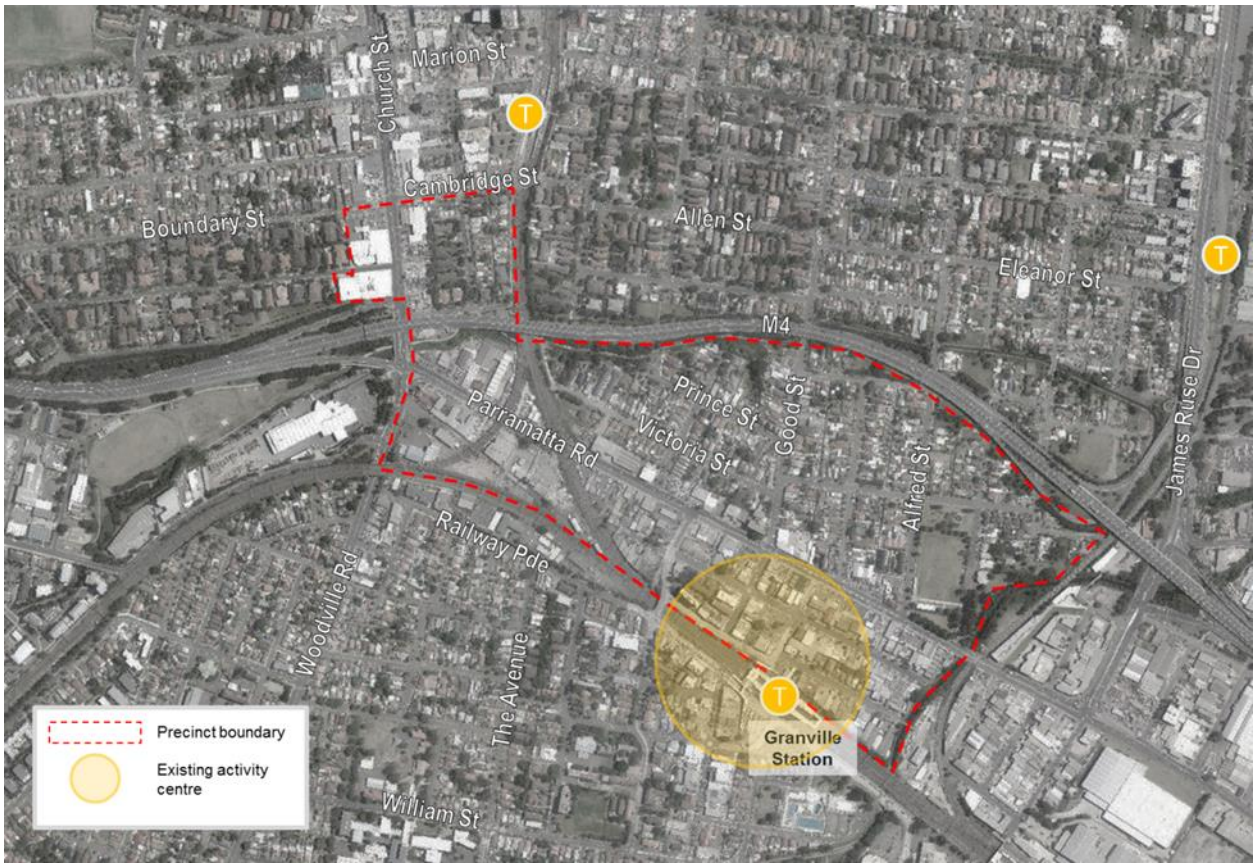
Many of the proposed treatments identified in the *Infrastructure Schedule* and the *Planning and Design Guidelines* are of low complexity and low cost and should proceed as quickly as possible. Segregated cycle paths will take more time to design, including the Gipps Street/Patterson Road/Queens Road regional cycleway which will also need to consider intersection treatments proposed to support the Kings Bay Precincts' local access needs.

4. Granville

4.1 Existing Activity Centre

Granville's existing activity centre is focussed around Granville Station, including areas to the south of the station which are beyond the Precinct boundary. The existing centre is comprised of a range of retail and commercial land uses as well as community facilities.

Figure 10 – Existing activity centre, Granville Precinct



4.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 reveals that a comparable number of residents in the Granville Precinct work in the major centres of the Sydney Inner City, Parramatta and Merrylands - Guildford. Excluding the Sydney Inner City area, travel to work is dominated by car for all other destinations with an overall mode share of 59 per cent. The high level of car dependency within the Precinct is considered to be attributed to the low frequency of bus routes and alternative transport modes servicing these destinations. This indicates that there is a need for improved public transport facilities and connections. It could also be related to the location of employment for many residents which may not be conveniently accessed by public transport.

Table 9 – Workforce travel destinations, Granville Precinct (source: BTS Journey to Work – Travel Zones 1220, 1274)

	WORKFORCE DESTINATIONS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Sydney Inner City**	143	0	31	0	0	174
2	**Parramatta**	30	14	102	22	0	168
3	**Merrylands - Guildford**	9	6	117	12	15	159
4	**Auburn**	18	0	57	0	4	79
5	**Ryde - Hunters Hill**	15	3	36	0	0	54
Other		131	3	301	3	18	456
Total		346	26	644	37	37	1,090
Mode share		32%	2%	59%	3%	3%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

The majority of workers in the Granville Precinct start their travel in the Merrylands-Guildford area. The top five places of residence of people working in the Granville Precinct are to its west. Similar to outbound trips, the majority of inbound trips to Granville are made by car with a mode share of 84 per cent. Only nine per cent of workers travel by train and less than 0.5 per cent of workers travel by bus, indicating that there is a lack of competitiveness of public transport services to private vehicle travel into the Granville Precinct. The high car mode share may also be a reflection of the nature of employment in Granville Precinct primarily outside of the core business hours when public transport is limited.

Table 10 – Employment travel origins, Granville Precinct (source: BTS Journey to Work – Travel Zones 1220, 1274)

	EMPLOYEE ORIGINS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Merrylands - Guildford**	6	3	201	27	10	247
2	**Parramatta**	7	0	99	12	9	127
3	**Fairfield**	8	0	70	3	3	84
4	**Blacktown**	13	0	70	0	0	83
5	**Penrith**	0	0	78	0	0	78
Other		93	3	703	0	38	837
Total		127	6	1221	42	60	1456
Mode share		9%	0%	84%	3%	4%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

Table 11 shows the existing mode share for the Granville Precinct, Parramatta LGA and Holroyd LGA. It is evident that proximity to public transport infrastructure has a clear impact on mode share with the Precinct having both a higher public transport and lower private vehicle mode share compared to the individual LGAs. While train is the preferred travel mode for the Precinct, bus mode share is lower in the Precinct than the LGAs. This may be attributed to commuters taking advantage of the convenient location of Granville Station just south of the Precinct, instead of opting to travel by bus. However, the data also suggests that there may be underlying deficiencies in facilities, routes and frequencies for bus services in the Precinct.

Walking and cycling is slightly lower for the Precinct than the average LGA mode shares, potentially due to pedestrian barriers such as limited crossing opportunities on Parramatta Road and lack of convenient cycling routes. However, it should be noted that the JTW data is based on the primary mode of travel used for each trip, indicating walking and cycling mode shares may be underestimated due to people accessing rail services, for example.

Table 11 – Mode share for Granville Precinct compared to Parramatta LGA and Holroyd LGA (2011)

MODE	EXISTING GRANVILLE PRECINCT MODE SHARE	EXISTING LGA MODE SHARES	
		PARRAMATTA LGA	HOLROYD LGA
Vehicle driver	53%	61%	66%
Vehicle passenger	6%	5%	6%
Train	32%	22%	19%
Bus / Ferry / Tram	2%	5%	3%
Walked only	3%	4%	2%
Other mode	2%	1%	1%
Mode not stated	2%	2%	2%

Source: BTS Journey to Work – Travel Zones

Existing Traffic and Transport Conditions

Existing road network

The existing road network in the Granville Precinct is illustrated in Figure 11, highlighting the key road connections, including the M4 Western Motorway and Parramatta Road.

Traffic volumes

Table 12 highlights the volumes from the permanent Roads and Maritime traffic count station located within the Granville Precinct in 2012. While there is only a single traffic count station present, it is considered an appropriate reference point as it is representative of the scale of traffic volumes on Parramatta Road within the Precinct. Based on the counter, Parramatta Road experiences two-way volumes over 50,000 vehicles per day. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, the section of the Parramatta Road running through Granville Precinct would be classified as a Class 5 Urban road (5U). Characteristics of a

Class 5U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RMS Network and Corridor Planning, 2008).

Figure 11 – Road network and major connections in the vicinity of Granville Precinct

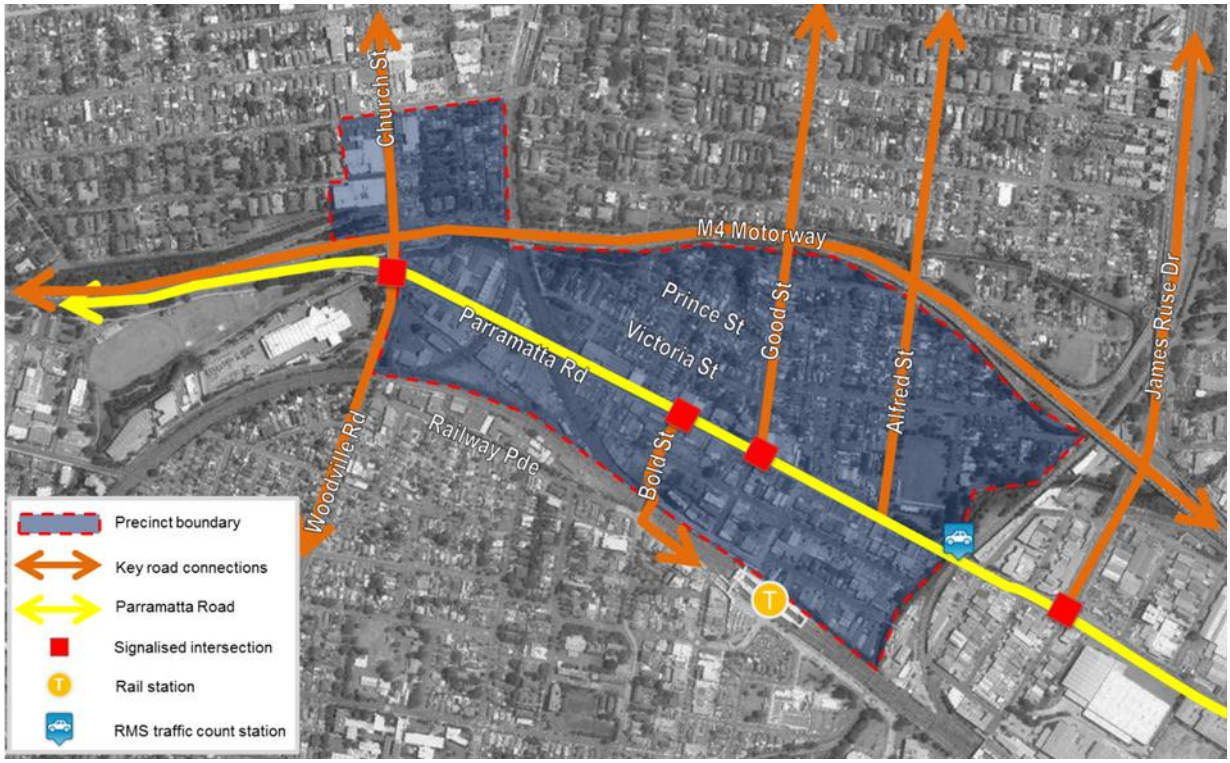


Table 12 – Traffic counting stations near Granville Precinct (source: RMS traffic counts, 2012)

ROAD NAME	STATION DESCRIPTION	WESTBOUND*	EASTBOUND*	TOTAL*
Parramatta Road	Between Alfred and Kemp Streets, Granville	25,800	26,000	51,800

*Weekday counts for 2012

Constraints

The main road network constraints in and around the Precinct are due to a lack of permeability and connectivity due to the barrier of the rail line and a lack of north-south roads crossing Parramatta Road. The pinch-points of the road network include:

- Good Street, James Ruse Drive and Woodville Road along Parramatta Road
- at-grade level rail crossing of T6 Carlingford Line on Parramatta Road
- limited vehicular crossing over the T1 Western Line (currently only at Bold Street)
- limited vehicular connections across the M4 Motorway
- limited vehicular connections across Parramatta Road
- existing and future heavy vehicle movements which use Parramatta Road to connect from the south along Woodville Road / Parramatta Road to access James Ruse Drive and Silverwater.

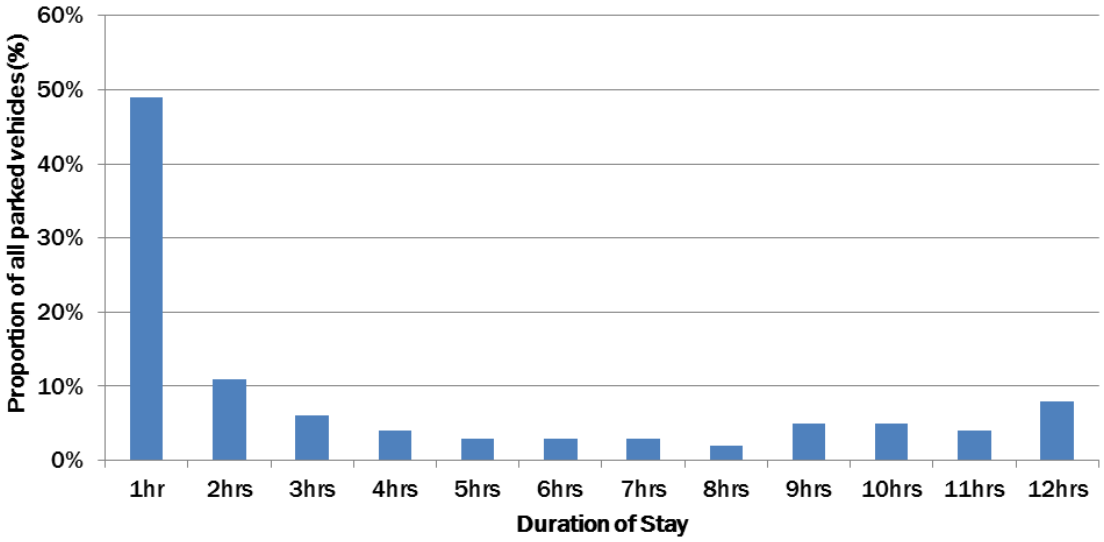
Existing Parking Conditions

Parking conditions across the Granville Precinct are varied. Clearways are in operation along Parramatta Road during weekday peak hours. Time restricted on-street parking is concentrated in the mixed use and local centre areas. Unrestricted on-street parking is more commonly found north of Parramatta Road, throughout the residential areas. On-street parking conditions in key areas of Granville Precinct are:

- Town centre parking around Granville Station and the main street (South Street) with predominantly short stay parking (0.5/1P)
- Residential streets near Granville Station, with a combination of time restricted (2P) with residential permit-excepted and unrestricted parking. Streets further away from the station have no parking restrictions
- 142 commuter parking spaces around Granville Station.

It should be noted that Granville Station is currently listed under the Roads and Maritime *Schedule of Nominated Train Stations.* As a result, on-street parking is controlled by Roads and Maritime within a one kilometre radius of the Station. Surveys of on-street parking supply and demand were undertaken for streets within 800 metres walk of Granville Station. An average occupancy rate of 60% was observed across the study area. Nearly 50% of all vehicles were parked for no longer than 1 hour at a time (Figure 12). This suggests that these on-street spaces are mainly being used for quick trips to access local shops and facilities in the area. A much lower proportion of vehicles were parked for longer periods.

Figure 12 – Duration of stay for on-street parking spaces within 800 metres of Granville Station



Public off-street parking within the Precinct includes a 60-space Council-owned car park provided on Cowper Street between Good Street and Rowell Street. New developments are required to provide off-street parking to service the anticipated demands of the proposed land use.

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of off-street parking rates in the Granville Precinct is presented in

Table 13 – Off-street parking rate summary – Parramatta LGA (source: Parramatta DCP 2011)

and

Table 14 – Off-street parking rate summary – Holroyd LGA (source: Holroyd DCP 2013)

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Table 13 – Off-street parking rate summary – Parramatta LGA (source: Parramatta DCP 2011)

LAND USE	PARKING RATE		
Dwelling	1 space per dwelling <125sqm; 2 spaces per dwelling >125sqm		
Residential flat buildings (within 400m of a railway station)	Studio	0.6 spaces per dwelling	Visitors: 0.25 spaces per dwelling.
	1 bedroom unit	1 space per dwelling	
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	1.2 spaces per dwelling	
Residential flat buildings (NOT within 400m of a railway station)	1 bedroom unit	1 space per dwelling	Visitors: 0.25 spaces per dwelling.
	2 bedroom unit	1.25 space per dwelling	
	3+ bedroom unit	1.5 spaces per dwelling	
Business premises	Min: 1 space per 70sqm of GFA; Max: 1 space per 50sqm of GFA		
Retail	Min: 1 space per 60sqm of GFA; Max: 1 space per 30sqm of GFA		

Table 14 – Off-street parking rate summary – Holroyd LGA (source: Holroyd DCP 2013)

LAND USE	PARKING RATE		
Residential flat buildings	Studio	0.8 to 1 spaces per dwelling	Visitors: 0.2 to 0.5 spaces per dwelling.
	1 bedroom	1 to 1.5 space per dwelling	
	2 bedroom	1.2 to 2 space per dwelling	
	3 bedroom	1.2 to 2 spaces per dwelling	
	4+ bedroom	1.5 to 2 spaces per dwelling	
Business premises	Min: 1 space per 50sqm of GFA; Max: 1 space per 15sqm of GFA		
Retail	Min: 1 space per 50sqm of GFA; Max: 1 space per 15sqm of GFA		

Existing Public Transport Network

Rail services

Granville Station is located on the southern boundary of the Precinct. The station is located close to residential areas, therefore walking and cycling are the most common modes of transport to access the Station. Based on station barrier counts, Granville Station was ranked the 43rd busiest station on the

Sydney Trains network, recording approximately 12,160 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014).

Granville Station is serviced by three lines: the T1 North Shore Line which connects the Precinct to the centres to the north east of the Precinct (e.g. Sydney CBD, Macquarie Park and the North Shore line), the T1 Western Line which connects the Precinct to Inner West areas as far as Emu Plains and the T2 Inner West and South Line which provides a route to both the Sydney CBD and South West Sydney.

The number of services provided at Granville Station during the AM and PM two-hour peak periods is shown in Table 15 **– Rail service frequencies at Granville Station (source: Sydney Trains, 2015)**

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Table 15 – Rail service frequencies at Granville Station (source: Sydney Trains, 2015)

SERVICES	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T1 North Shore Line		
Berowra to City via Gordon, Hornsby to City via Macquarie University	13	14
City to Berowra via Gordon, City to Hornsby via Macquarie University	8	8
T1 Western Line		
Emu Plains to City, Richmond to City	7	8
City to Emu Plains, City to Richmond	14	14
T2 Inner West & South Line		
City to Campbelltown via Granville	8	8
Campbelltown to City via Granville	14	9

Bus services

The Granville Precinct is currently serviced by six main bus routes, providing connections to major centres in South West Sydney, Parramatta, Hurstville and Bankstown.

Table **16 – Bus services in the vicinity of the Granville Precinct (source: Transport NSW – Sydney Buses, 2015)**

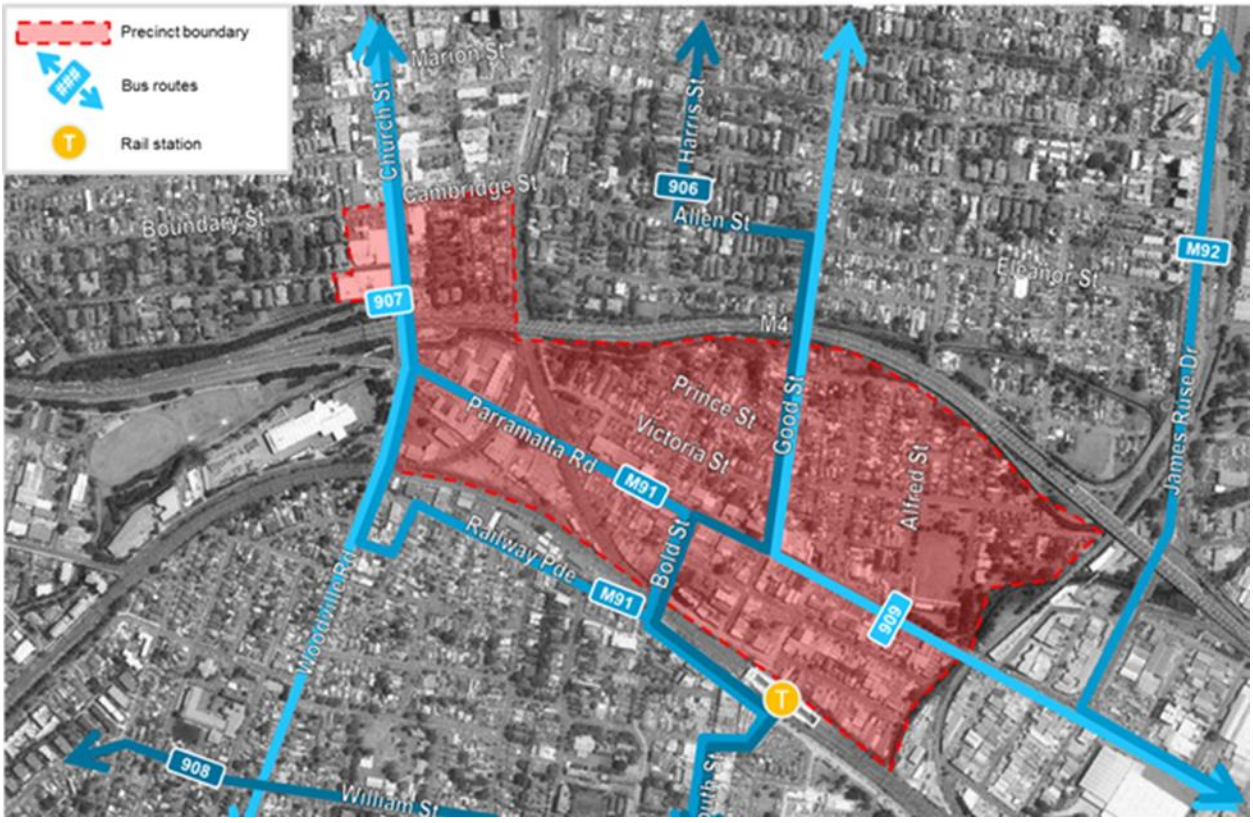
provides the peak hour frequencies for services accessible from the Granville Precinct. The frequencies for routes travelling to / from South West Sydney (such as Fairfield and Merrylands) are much less frequent when compared to other services. This is likely due to the presence of rail connections to this region via Granville Station and the T2 Inner West and South Line.

Table 16 – Bus services in the vicinity of the Granville Precinct (source: Transport NSW – Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
906	Fairfield to Parramatta via Guildford Station and Excelsior Street	30 minutes	60 minutes
907	Bankstown to Parramatta via Yagoona, Bass Hill, Villawood & Guildford	< 20 minutes	< 20 minutes
908	Bankstown to South Granville & Merrylands	60 minutes	60 minutes
909	Bankstown to Auburn & Parramatta	30 minutes	60 minutes
M91	Hurstville to Parramatta via Padstow, Bankstown & Chester Hill	10 minutes	10 minutes
M92	Sutherland to Parramatta via Bangor, Menai, Padstow, Bankstown, Lidcombe, Auburn & Rosehill	15 minutes	10 minutes

Figure 13 presents the bus routes in and around the Granville Precinct. Routes 906, 909 and M91 are all accessible within the Precinct with stops along Parramatta Road. Routes 906 and 909 also have stops along Good Street at the centre of the Granville Precinct residential area. These routes provide connectivity between Parramatta and other centres including Fairfield, Bankstown, Auburn, Hurstville and Sutherland.

Figure 13 – Bus services, Granville Precinct



The Precinct offers extensive connections for pedestrians, with paved footpaths provided on most roads. Accessibility across Parramatta Road is limited due to the presence of only two signalised crossings within 200 metres of each other (at Bold Street and Good Street intersections) across the 1.2 kilometre length of the Precinct. The primary movements within the Precinct can be attributed to pedestrians moving from residential areas in the north of the Precinct, towards the mixed use and public transport facilities near Parramatta Road and Granville Station.

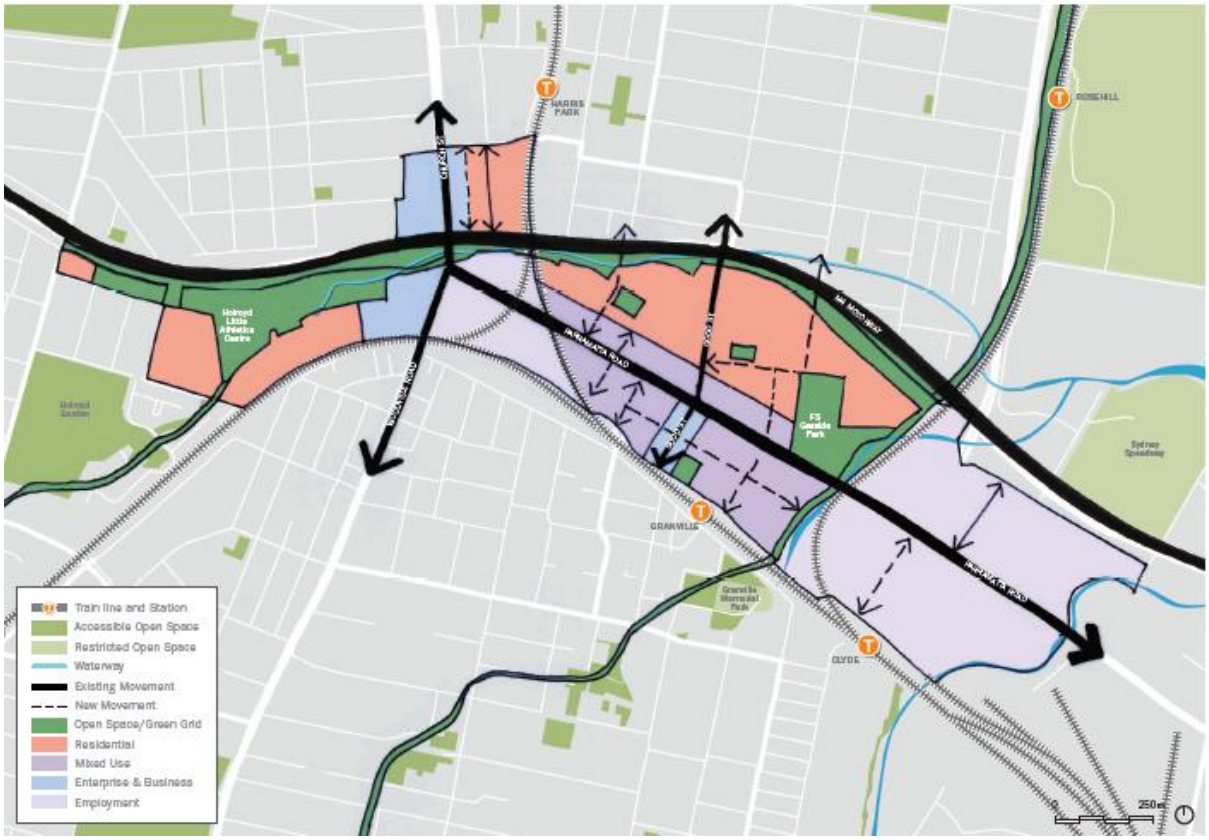
The Granville Precinct contains extensive cycle facilities, including a shared off-road pedestrian and cycle paths along Parramatta Road and the Western Motorway (M4) off-road cycleway. These two cycle routes

A vibrant mixed use town centre with a high quality public domain, open space networks and transport links, with close connections to Sydney's second CBD.

serve as the key east-west cycle connections for the Precinct. North-south cycleways crossing Parramatta Road are limited to one on-road cycleway on Good Street. This connection provides access from areas within the Precinct to Granville Station in the south. Formal bicycle storage facilities are currently provided at Granville Station, but are not present at Harris Park or Rosehill Station, north of the Precinct.

4.3 Future Granville Precinct Character

Figure 14 – Granville Structure Plan



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- mixed use core between Granville Station and Parramatta Road
- non-residential uses fronting Parramatta Road and transitioning to residential towards the north of the Precinct
- expansion of business and commercial uses along the southern end of Church Street
- employment uses and residential uses fronting Holroyd Sports Ground, west of Woodville Road
- industrial uses within the 'Mort Street Y-Link' lands being the land bound by three rail lines and the Clyde employment lands

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- a new urban plaza adjacent to railway station for the community to meet and interact that can be used in a variety of ways and could host small markets, community-based events or provide a passive recreation space
- centre retail and mixed-use activity such as supermarkets, indoor recreation and child care will be centred around Good Street, Cowper Street, and Rowell Street
- create new connections to facilitate access to and around the town centre, existing community facilities and public transport
- recognise Granville as one of Sydney's oldest suburbs by preserving and incorporating heritage elements in the built form and streetscape
- recognise the historical identity of 'Parramatta Junction' and acknowledge/reinforce that it is a junction, both of rail lines and of suburbs/centres, being the southern extent of Parramatta, western extent of Granville, northern/eastern extent of Holroyd/Merrylands.

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance north-south connections to increase accessibility to employment, recreation and cultural opportunities in Parramatta CBD
- create a series of new laneways and through links between Parramatta Road and the railway line to increase the permeability of long blocks.
- enhance pedestrian connectivity and safety across Parramatta Road and over the railway line at Granville Station
- improve walking and cycling connections to regional recreation and open space facilities
- reduce car dependency by lowering parking rates in areas with good access to public transport.

Primary Constraints

- high traffic volumes on the strategic road network

- overcoming access barriers created by major roads and the railway line
- low levels of pedestrian connectivity and permeability, particularly across major road and rail corridors
- existing small lot sizes and land fragmentation may limit potential through-site links
- open space is difficult to access within the Precinct.

4.4 Future Strategic Transport Network

Proposed Street Functions

The majority of streets within the Granville Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Granville Precinct and Frame Area and their categorisation are outlined below.

Movement Corridors

- Parramatta Road – This is the main east-west traffic route and will continue to have a high movement function providing access at either end of the Precinct to Woodville Road and James Ruse Drive, both of which are also Movement Corridors.

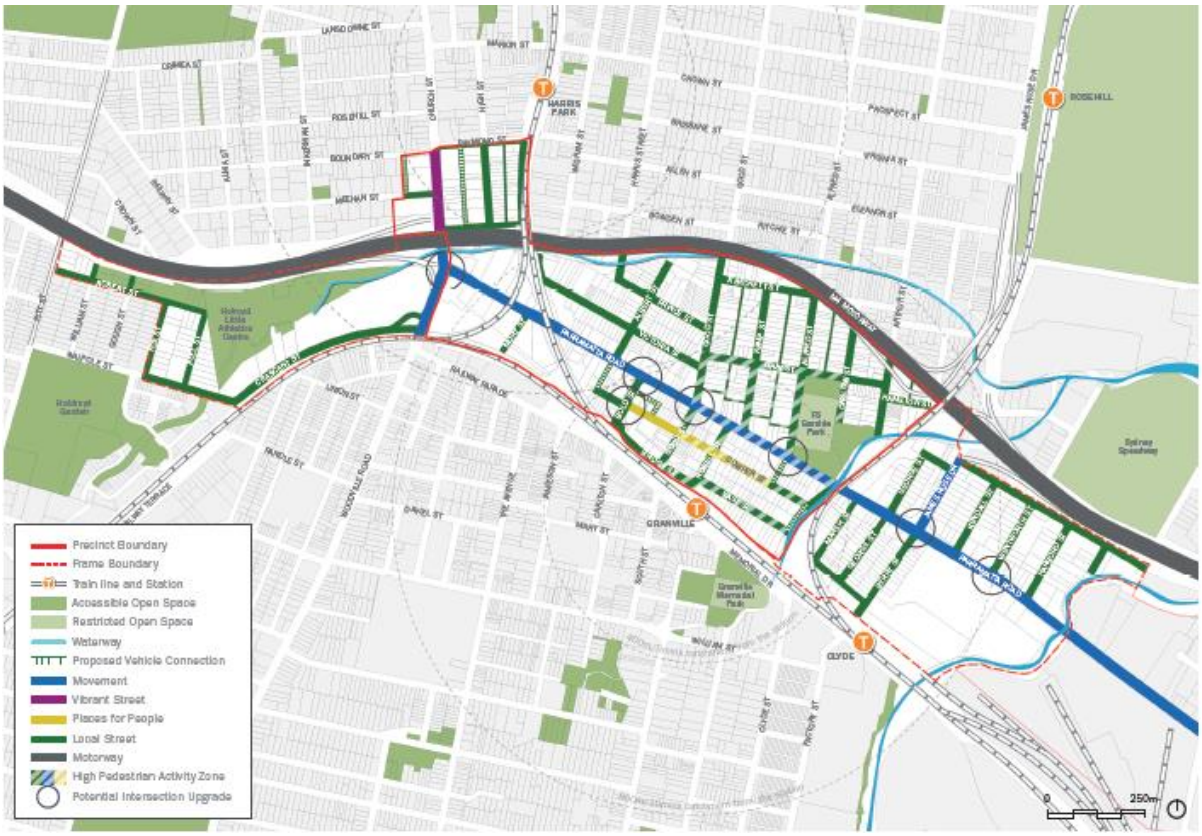
Vibrant Streets

- Church Street (between Rosehill Street and M4 Motorway) – This section of Church Street will be revitalised through the creation of new mixed use development and laneways creating an activated frontage. There will also continue to be a high movement function for traffic accessing Parramatta.

Places for People

- Cowper Street – This will be the main east-west street with an activated frontage and access to the town centre.

Figure 15 – Proposed street functions, Granville Precinct



Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided a preliminary indication of future traffic performance. The model has shown:

- Increased delay at the northern approach of the intersection of Parramatta Road and James Ruse Drive. This is a result of proposed tolling on the M4 Western Motorway; trips that currently travel from James Ruse Drive (north) to the M4 Motorway (west) are likely to avoid the toll by travelling along Parramatta Road instead of using the existing James Ruse Drive westbound on-ramp.
- Moderate delays at the northern approach of the intersection of Parramatta Road and Church Street. This largely reflects the current operation of the intersection.

Figure 16 – Future intersection constraints, Granville Precinct (approaches not to scale)

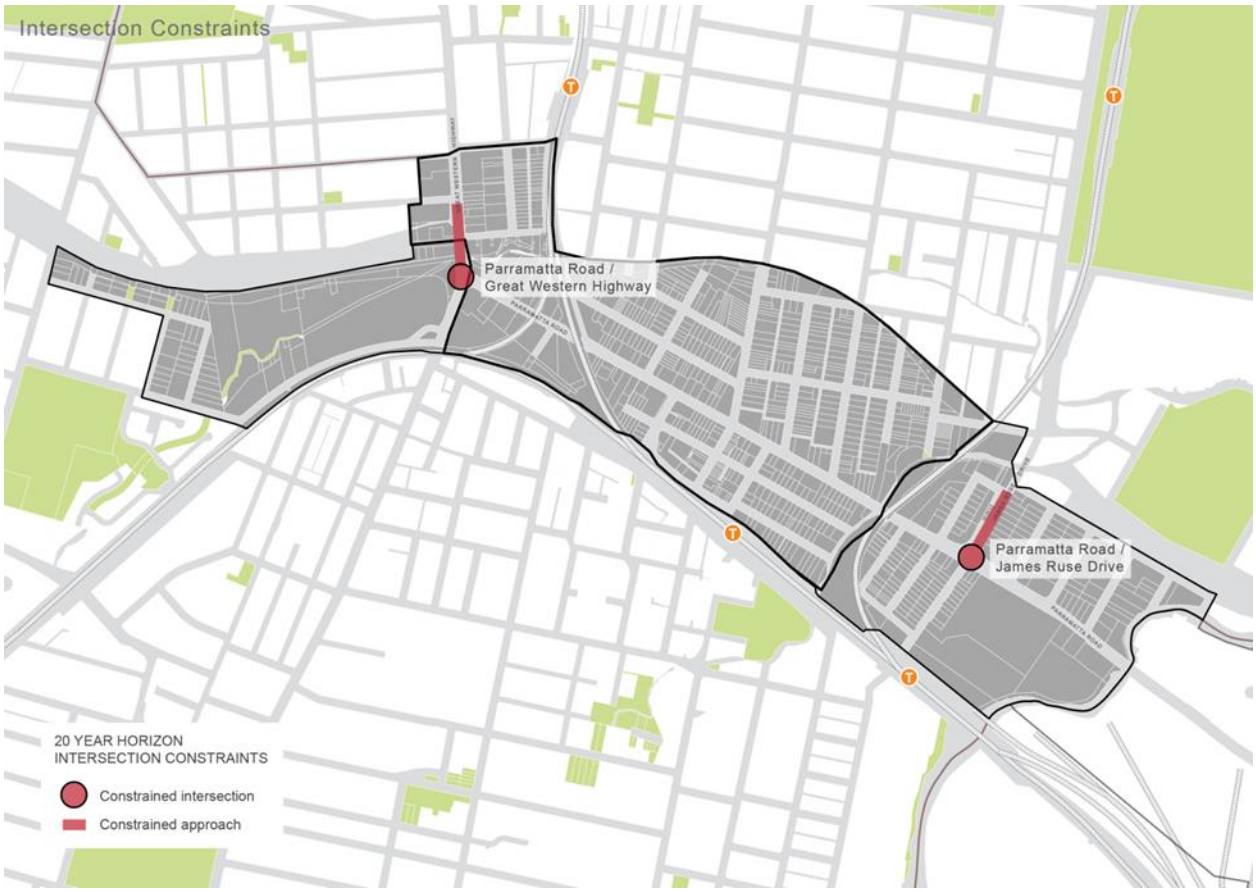


Table 17 – Future intersection performance, Granville Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Woodville Road	C	East	B
		North (left turn lane)	A
		North	D
		South	C
Parramatta Road / Bold Street	C	East	C
		South	C
		West	B
Parramatta Road / James Ruse Drive	C	East	C
		North (left turn lane)	C
		North	F
		West (left turn lane)	A
		West	C

Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades to be delivered as part of any proposed renewal in the Granville Precinct.

The following intersections have been identified that will require investigation and likely upgrades in order to better facilitate future movements in and through Granville Precinct and Frame Area and should be specifically modelled as part of future rezoning proposals. ***The identified upgrades are indicative only and may require alternative solutions.***

- Parramatta Road/Woodville Road – Provision of additional westbound right turn bay to increase capacity and relieve Parramatta Road congestion. This treatment is already planned as part of measures related to WestConnex and could assist in reducing queues and freeing up capacity to allow additional Precinct access and north-south movement.
- M4 Motorway/James Ruse Drive – Consider removing the toll for vehicle trips that currently travel from James Ruse Drive (north) to the M4 Motorway (west) to encourage use of the existing James Ruse Drive westbound on-ramp rather than travelling on Parramatta Road.
- Bold Street/Parramatta Road – Provision of additional eastbound right turn bay on Parramatta Road to improve access into the Precinct.
- Bold Street/Cowper Street - Provision of right turn bay northbound on Bold Street into Cowper Street. This will provide access into the Precinct for trips coming from the southern side of the railway line. Right turns from Bridge and Cowper Street onto Bold Street should not be permitted with access out of the precinct available from Good Street.
- Good Street/Parramatta Road - Allow all turns out of Good Street to improve local access into the Precinct.
- Alfred Street/Parramatta Road - Provide new signals with pedestrian and cycle crossings to improve local walking and cycling access.

Proposed Public Transport Network

In addition to existing and planned public transport in the Granville Precinct, the following opportunities have been identified.

- improve rail frequencies at Granville Station to support growth in the Precinct. Demand modelling will be required to ascertain the exact needs
- investigate provision of a new bus route connecting Parramatta to Burwood via Parramatta Road. This could assist in providing access between the areas of Granville, Auburn and Homebush closer to Parramatta Road than rail stations, and also to/from these areas to the strategic centres of Parramatta and Burwood and to the major interchange at Strathfield Station
- investigate new or improved north-south local bus routes to connect from Granville to existing and future activity generators such as the Camellia priority Precinct and potential interchange connections to Parramatta Light Rail.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed walking and cycling networks.

For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Local Streets as identified using the movement and place framework that connect to major destinations, open space or existing links. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Prince Street to Harris Street.
- Alfred Street
- Full length of Good Street connecting the existing Granville town centre south of the rail line, Bridge Street, crossing Parramatta Road, and northwards to Bowden Street.
- Bridge Street – Rowell Street – East Street and Cowper Street as two key east-west streets in the Precinct.
- Existing links under the M4 Motorway on Harris Street and Good Street.
- Bold Street, Victoria Street, Duke Street and Wigram Street.
- In the longer term, upgrading of the existing link at Granville Railway Station to enhance links to the existing town centre and community facilities south of the railway line.

Desired Through Site Links

- East Street to Parramatta Road.
- Parramatta Road to Prince Street.
- Good Street to Alfred Street.

Proposed Strategic Cycle Links

- Wigram Street between M4 Motorway and Marion Street
- Marion Street between Station Street East and Harris Street
- Crown Street/Prospect Street between Harris Street and Alfred Street
- Alfred Street between M4 Motorway and Prospect Street
- Wentworth Street-Kay Street-Unwin Street to Shirley Street
- Alfred Street between Parramatta Road and M4 Motorway
- Gray Street between Good Street and Alfred Street
- Victoria Street between M4 Motorway and Good Street)including new link adjacent to railway line
- Victoria Street to Parramatta Road adjacent to railway line
- Albert Street between Victoria Street and Parramatta Road
- Cowper Street between Bold Street and Duck Creek

- Alfred Street between Parramatta Road and Cowper Street
- Berry Street between Parramatta Road and Clyde Rail Station
- Memorial Drive between Clyde Rail Station and Mary Street
- Mary Street between Memorial Drive and The Avenue
- Carlton Street between Railway Parade and William Street
- Daniel Street between Woodville Road and The Avenue
- Crescent Street between Woodville Road and Walpole Street

Figure 17 – Proposed active transport, Granville Precinct

Proposed Parking Controls

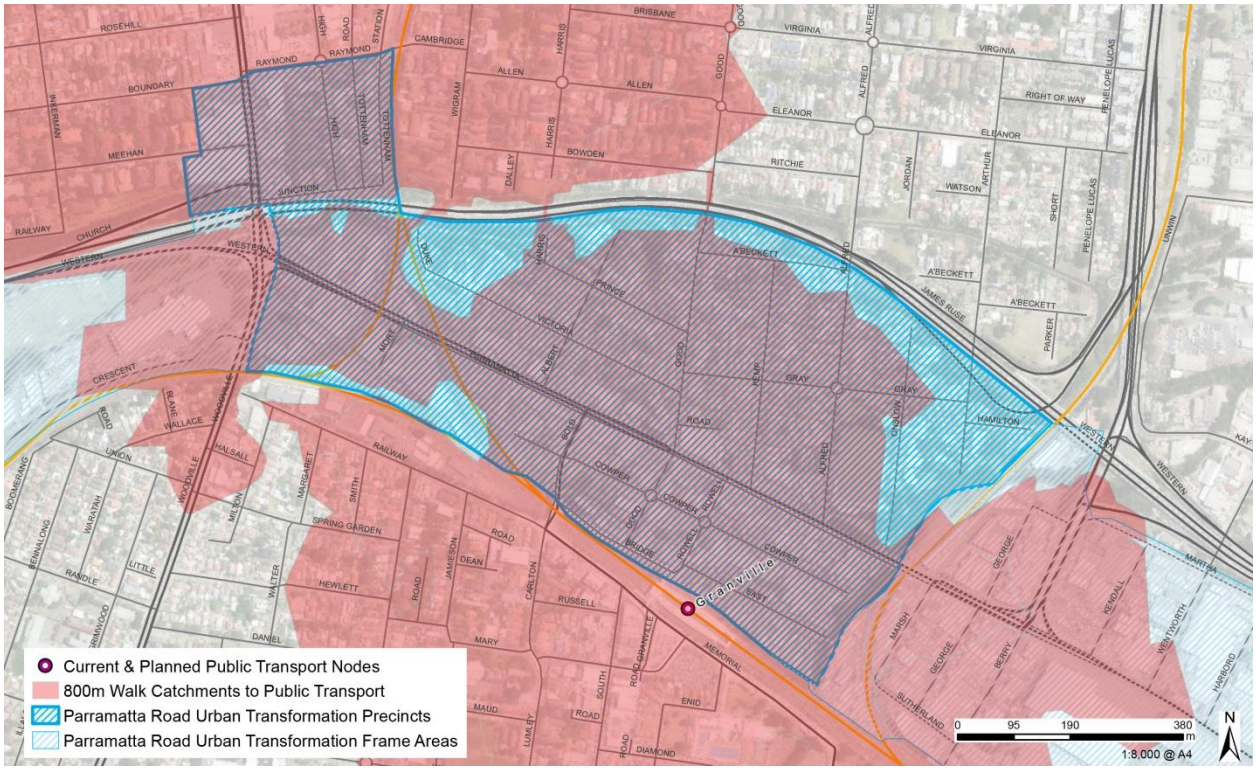
As outlined in Section 2, the Granville Precinct is proposed to fall under the Category 2 maximum parking rates shown in Table 18. Maximum parking rates for the Frame Areas are proposed to fall under Category 3. This is based on the following points:

- most areas of the Precinct have 800m walking access to good quality public transport being train stations or Rapid Bus Route stops (existing M91 Metrobus)
- there is also good access to Parramatta CBD and a variety of local services in Parramatta and Granville
- access to public transport from the Frame Areas is not as good and therefore they are placed in Category 3.

Table 18 – Proposed maximum parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
2 (Granville Precinct)	0.3	0.5	0.9	1.2	0.1	100	70	120
Category 3 (Granville Frame Areas)	0.6	0.9	1.2	1.5	0.2	70	50	100

Figure 18 – 800m walking catchments to public transport, Granville Precinct

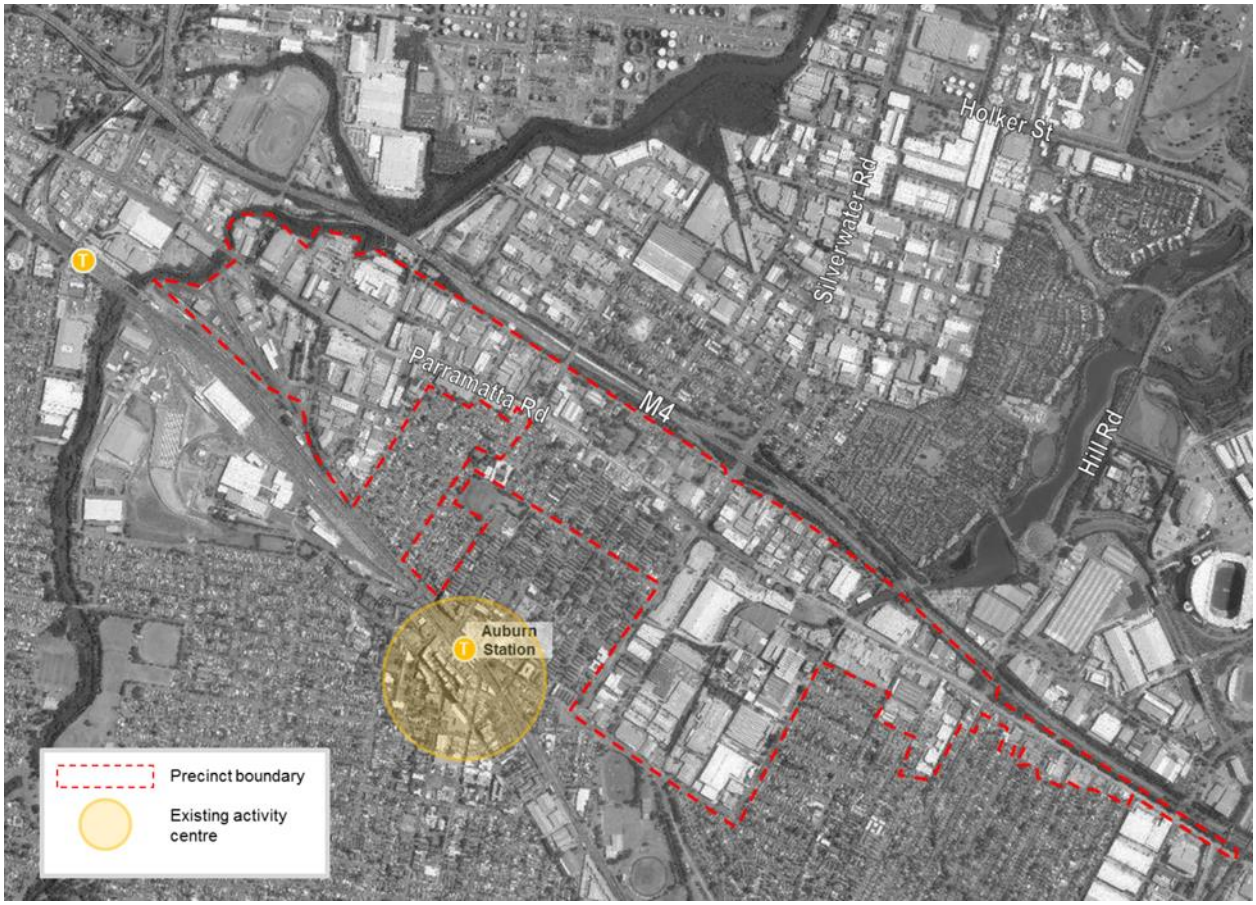


5. Auburn

5.1 Existing Activity Centre

Auburn's existing activity centre is primarily focussed around Auburn Station, located south of the Precinct boundary. The existing centre is comprised of a range of retail and commercial land uses clustered around the station, including a shopping centre, as well as community facilities. Most of the centre's existing shops and facilities are concentrated on the southern side of the rail line.

Figure 19 – Existing activity centre, Auburn Precinct



5.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 reveals that a comparable number of residents in the Auburn Precinct work in the major centres of Auburn (south of the Precinct) and Sydney Inner City. Excluding the Sydney Inner City area, the main mode of transport to work is by car for all other destinations, with an overall mode share of 52 per cent. The high level of car dependency within the Precinct is considered to be attributed to deficiencies in public transport facilities or connections. It could also be related to the location of employment for many residents which may not be conveniently accessed by public transport.

Table 19 – Workforce travel destinations, Auburn Precinct (source: BTS Journey to Work – Travel Zones 1303, 1304)

	WORKFORCE DESTINATIONS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Auburn**	28	7	150	60	33	278
2	**Sydney Inner City**	178	0	35	4	10	228
3	**Parramatta**	27	3	55	0	6	91
4	**Strathfield - Burwood - Ashfield**	26	0	53	0	0	79
5	**Bankstown**	8	3	57	0	3	71
Other		220	5	360	7	32	624
Total		487	18	710	71	84	1371
Mode share		36%	1%	52%	5%	6%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

The majority of workers in the Auburn Precinct start their travel in the Auburn area (south of the Precinct). The top five places of residence of people working in the Precinct are west of Sydney. Similar to outbound trips, the majority of inbound trips to Auburn Precinct are made by car with a mode share of 76 per cent. Only 11 per cent of workers travel by train and one per cent of workers travel by bus. This indicates that public transport, walking and cycling options for travel into the Auburn Precinct are currently less attractive than car.

Table 20 – Employment travel origins, Auburn Precinct (source: BTS Journey to Work – Travel Zones 1303, 1304)

	EMPLOYEE ORIGINS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Auburn**	8	4	92	23	28	155
2	**Merrylands - Guildford**	14	0	42	0	6	62
3	**Bankstown**	0	0	43	3	0	46
4	**Parramatta**	5	3	27	0	3	38
5	**Fairfield**	3	0	26	0	0	29
Other		32	0	214	0	12	258
Total		62	7	443	26	48	586
Mode share		11%	1%	76%	4%	8%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

Table 21 shows the existing mode share for the Auburn Precinct and the Auburn LGA. It is evident that proximity to public transport infrastructure has an impact on mode share with the Precinct having both a higher public transport and lower private vehicle mode share compared to the LGA. It is evident that while train travel is the preferred mode for the Precinct, with a mode share higher than the overall LGA, bus mode share is low and consistent with the LGA at one per cent. This may be attributed to commuters taking advantage of the convenient location of Auburn Station south of the Precinct, instead of opting to travel by bus. However, the data suggests that there may be underlying deficiencies in facilities, routes or frequencies for bus services in the Precinct.

Active forms of transport were slightly higher for the Precinct than the average LGA mode share, potentially due to the level of footpath and crossing provision in the Precinct. However, the mode share for walking and cycling is quite low when compared to private vehicles. It should be noted that the JTW data is based on the primary mode of travel used for each trip, indicating mode shares may be underestimated due to people walking or cycling to their primary mode of rail travel.

Table 21 – Mode share for the Precinct compared to Auburn LGA (2011) (source: BTS Journey to Work – Travel Zones)

MODE	EXISTING AUBURN PRECINCT MODE SHARE	EXISTING LGA MODE SHARE AUBURN LGA
Vehicle driver	46%	57%
Vehicle passenger	6%	6%
Train	36%	29%
Bus / Ferry / Tram	1%	1%
Walked only	5%	3%
Other mode	3%	1%
Mode not stated	3%	3%

Existing Traffic and Transport Conditions

Existing road network

The existing road network in the Auburn Precinct is illustrated in Figure 20, highlighting the key road connections including the Western Motorway (M4), Silverwater Road and Parramatta Road.

Traffic Volumes

Table 22 highlights the volumes experienced on Parramatta Road of over 28,000 vehicles per day. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, the section of the Parramatta Road would be classified as a Class 4 Urban road (4U). Characteristics of a Class 4U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RMS Network and Corridor Planning, 2008).

Figure 20 – Road network and major connections in the vicinity of Auburn Precinct

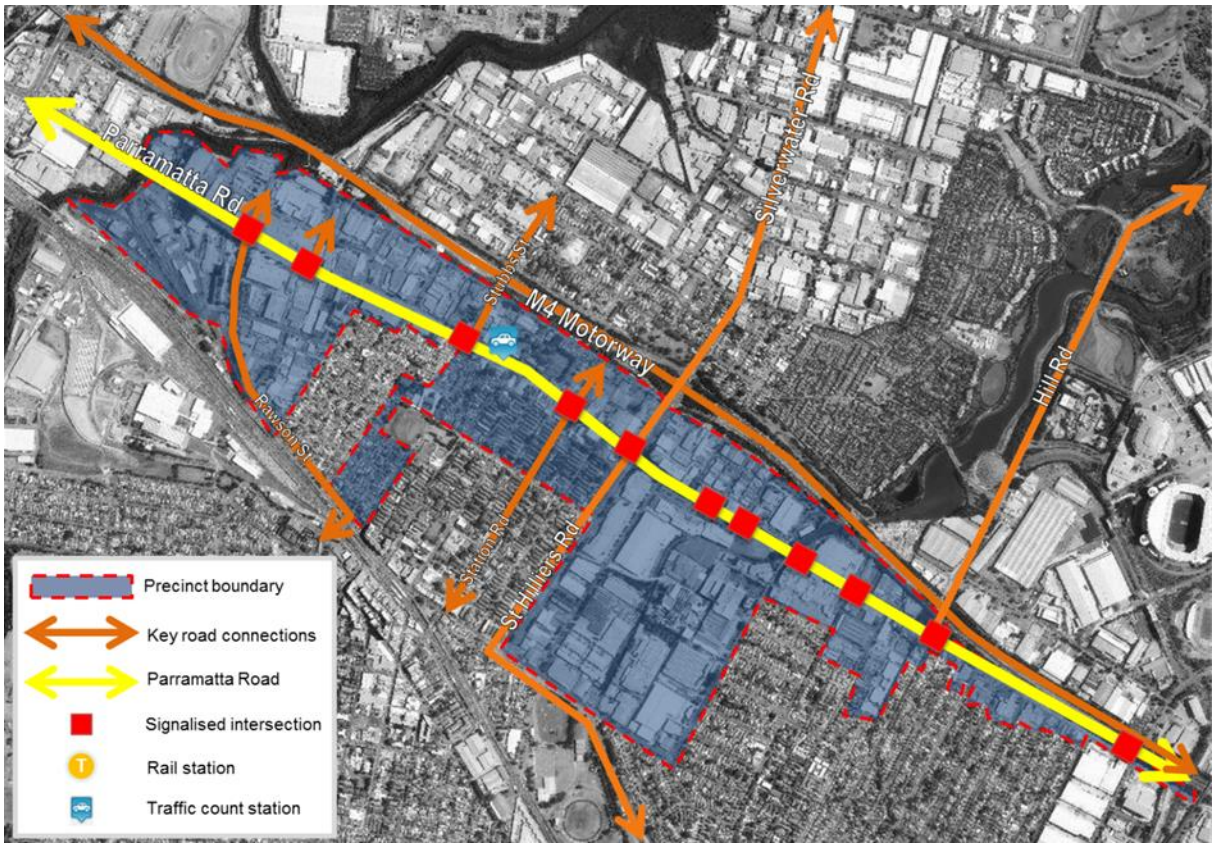


Table 22 – Traffic counting stations near Auburn Precinct (source: RMS, 2011)

ROAD NAME	STATION DESCRIPTION	WESTBOUND	EASTBOUND	TOTAL
Parramatta Road^	West of Macquarie Road, Auburn	-	-	28,000

^2011 AADT counts from Roads and Maritime Services Traffic Corridor Planning for Parramatta Road Corridor - Granville to North Strathfield

Constraints

The main road network constraints in the Precinct are due to a lack of permeability and connectivity due to the barrier of the rail line south of the Precinct and a lack of north-south roads crossing Parramatta Road. The brewery site and larger industrial sites, as well as long north-south streets south of Parramatta Road, also limit permeability across the Precinct in an east-west direction. The key constraints of the road network include:

- limited access to Silverwater Road from Parramatta Road, with access currently via Stubbs Street only
- limited access to the growth areas of Sydney Olympic Park and Wentworth Point, creating pinch points at Hill Road and Birnie Avenue
- Parramatta Road / Silverwater Road congestion which is largely attributed to both roads' arterial function with limited turning movements, the intersection's proximity to the M4 Motorway interchange as well as the intersection of two state roads, is often congested
- conflicts between local traffic and commercial traffic servicing local trades and businesses.

Existing Public Transport Network

Public transport services are based around the Auburn Station, including services connecting the Precinct to centres such as the Sydney CBD, Macquarie Park, Hornsby and Liverpool. There are also four bus services travelling in and around the Precinct. The impact of the nearby train station is evident when comparing the public transport mode shares of the Precinct to the wider LGA.

Rail services

Auburn Station is located approximately 100 metres from the southern boundary of the Precinct, in an area comprised of primarily residential and mixed use land uses. Based on station barrier counts Auburn Station was ranked the 22nd busiest station on the Sydney Trains network recording approximately 21,120 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014).

Auburn Station is serviced by three lines: the T1 North Shore Line which connects the Precinct to the centres to the north east of the Precinct (e.g. Sydney CBD and Rhodes), the T1 Western Line which connects the Precinct to inner west areas as far as Emu Plains and the T2 Inner West and South Line which provides a route to both the Sydney CBD and south-west Sydney.

The number of services provided at Auburn Station during the AM and PM two-hour peak periods is shown in Table 23 – **Rail service frequencies at Auburn Station (source: Sydney Trains, 2015)**

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Table 23 – Rail service frequencies at Auburn Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T1 North Shore Line		
Berowra to City via Gordon, Hornsby to City via Macquarie University	9	8
City to Berowra via Gordon, City to Hornsby via Macquarie University	7	8
T1 Western Line		
Emu Plains to City, Richmond to City	7	8
City to Emu Plains, City to Richmond	9	8
T2 Inner West & South Line		
Campbelltown to City via Granville	14	8
City to Campbelltown via Granville	8	10

Bus services

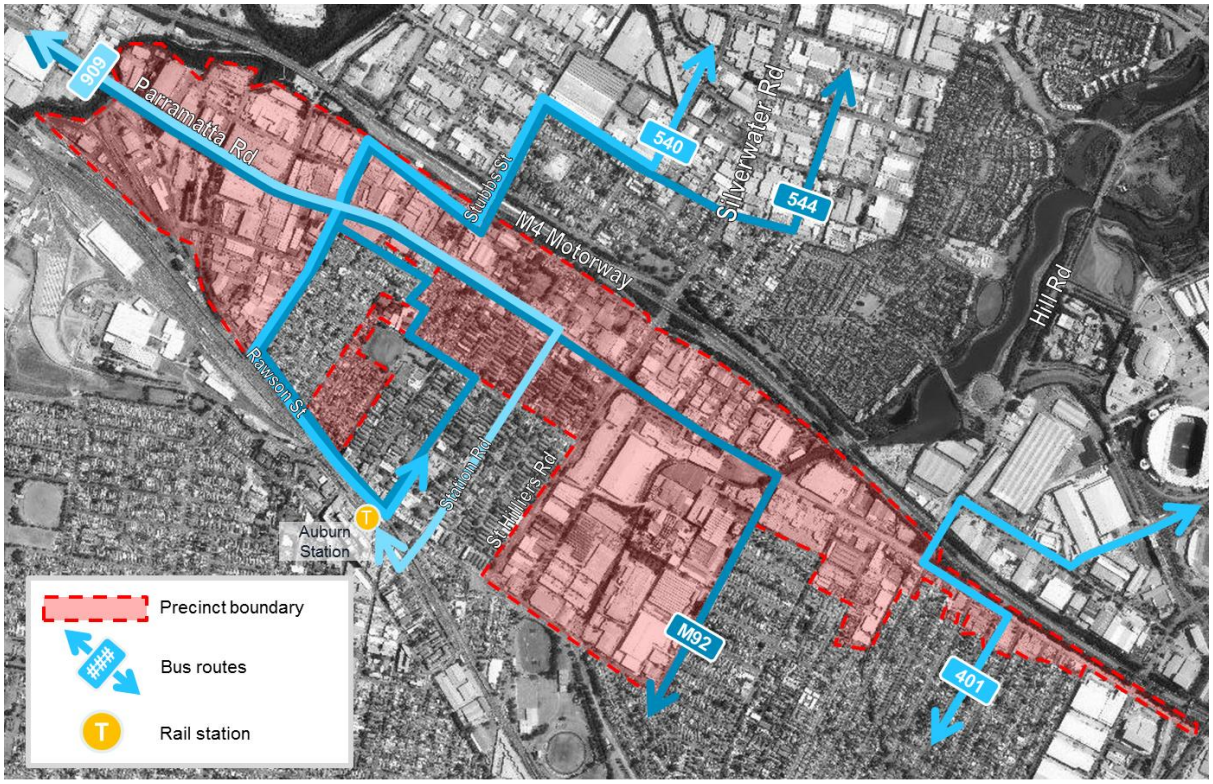
The Auburn Precinct is currently serviced by four bus routes connecting to major centres such as Parramatta, Bankstown, and Macquarie Park. Table 24 provides the peak hour frequencies for services accessible from the Auburn Precinct. It is evident that bus services in Auburn Precinct provide strong connectivity to Parramatta.

Table 24 – Bus services in the vicinity of Auburn Precinct (source: Transport NSW – Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK FREQUENCY (07:00-09:00)	PM WEEKDAY PEAK FREQUENCY (16:00-18:00)
909	Bankstown to Auburn & Parramatta	30 minutes	30 minutes
M92	Sutherland to Parramatta	10 minutes	10 minutes
540, 544	Auburn to Newington and Macquarie Centre	15 minutes	< 30 minutes

Figure 21 presents the bus routes in and around the Auburn Precinct. Bus routes are accessible from stops on key roads in the Precinct including Parramatta Road, Station Road and Northumberland Road.

Figure 21 – Bus services in the vicinity of Auburn Precinct



Existing Parking Conditions

Parking conditions across Auburn Precinct are varied. Clearways are in operation along Parramatta Road during weekday peak hours. Limited on-street parking is permitted along Parramatta Road, near bulky goods retailers during off-peak periods or on weekends. The Precinct provides unrestricted on-street parking on either side of most local roads within the Precinct. Time restricted on-street parking is present along Northumberland Road and Station Road near Auburn Station with time restrictions of 1P and 2P. On-street parking within the Auburn Precinct includes:

- unrestricted parking on most local streets
- 2P parking on Northumberland Road between Rawson Street and Hall Street
- 1P parking on Station Road, closer to its intersection with Rawson Street.

There are no publicly operated off-street parking facilities provided within the Precinct, however a number of privately operated off-street car parks are present. New developments are required to provide off-street parking to service the anticipated demands of proposed land uses.

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of off-street parking rates in the Auburn Precinct based on the Auburn DCP 2013 is presented in Tables 25 and 26.

Table 25 – Off-street parking rate summary outside of 1km of Auburn Station – Auburn LGA (source: Auburn DCP 2013)

LAND USE	PARKING RATE		
Residential flat buildings	1 bedroom unit	1 space per dwelling	Visitors: 0.2 spaces per dwelling.
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	2 spaces per dwelling	
Business premises	2.5 space per 100 sqm of GFA		
Retail	2.5 space per 100 sqm of GFA		

Table 26 – Off-street parking rate summary within 1km of Auburn Station – Auburn LGA (source: Auburn DCP 2013

LAND USE	MINIMUM PARKING RATE		
Residential flat buildings	1 bedroom unit	1 space per dwelling	Visitors: 0.1 to 0.25 spaces per dwelling.
	2 bedroom unit	1.2 to 3 space per dwelling	
	3+ bedroom unit	1.5 to 6 spaces per dwelling	
Business premises	1.7 to 10 spaces per 100 sqm of GFA		
Retail	1.7 to 10 spaces per 100 sqm of GFA		

Existing Walking and Cycling Networks

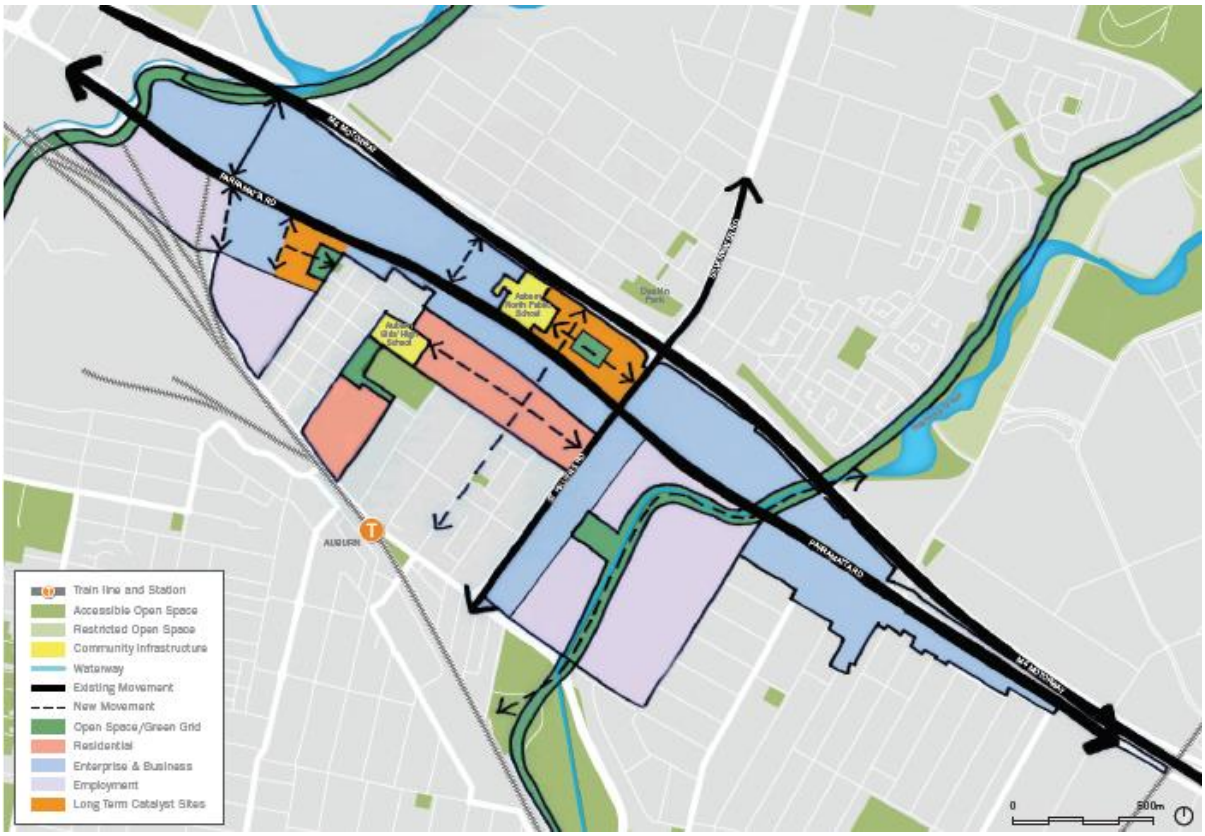
The Precinct offers extensive connections for pedestrians, with paved footpaths provided on either side of most roads and signalised pedestrian crossings are present along several intersections on Parramatta Road. The primary pedestrian movements within the Precinct can be attributed to pedestrians moving from residential areas south of the Precinct, towards retailers, industrial facilities and bus stops near Parramatta Road. There is also significant pedestrian activity across the Precinct associated with access to North Auburn Public School and Auburn Girls High School. Cycle facilities in the Precinct are limited, with minimal east-west routes through the Precinct, which forms a significant constraint to walking and cycling

connectivity. However, off-road cycle links are provided north-east of the Precinct near Sydney Olympic Park and north-west of the Precinct along the M4 Motorway viaduct.

5.3 Future Auburn Precinct Character

An evolving employment corridor with a unified and welcoming streetscape.

Figure 22 – Auburn Structure Plan



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- increase Auburn's role for regional employment and large format retail by retaining and growing jobs that respond to the changing needs of Sydney's economy
- facilitate more efficient and diverse employment uses, including emerging sectors and new innovation industries
- encourage higher density residential uses within reasonable walking catchments of public transport
- new social infrastructure.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- capitalise on existing large lot sizes which can support redevelopment opportunities
- create a unified and inviting streetscape building on existing improvements and with new developments
- create a series of local commercial nodes to support employees
- new and expanded open space
- heritage retention and conservation
- improved building design quality.

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance north-south connections, particularly those that provide links to Auburn Station or across Parramatta Road and / or to the M4 Motorway
- create a series of new laneways and through site links to increase the permeability of long blocks and provide active and inviting streetscapes
- enhance pedestrian connectivity and safety across Parramatta Road
- improve walking and cycling connections to regional recreation and open space facilities
- reduce car dependency by lowering parking rates in areas with good access to public transport.

Primary Constraints

- high traffic volumes on the strategic road network
- overcoming the barrier created by Parramatta Road
- poor pedestrian amenity and low quality streetscapes
- a high proportion of heavy goods vehicles including B-doubles creating additional hazards for other road users, particularly cyclists
- open space is difficult to access within the Precinct
- high vehicle dependency for access to bulky goods and employment services.

5.4 Future Strategic Transport Network

Proposed Street Function

The majority of streets within the Auburn Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Auburn Precinct and their categorisation are outlined below.

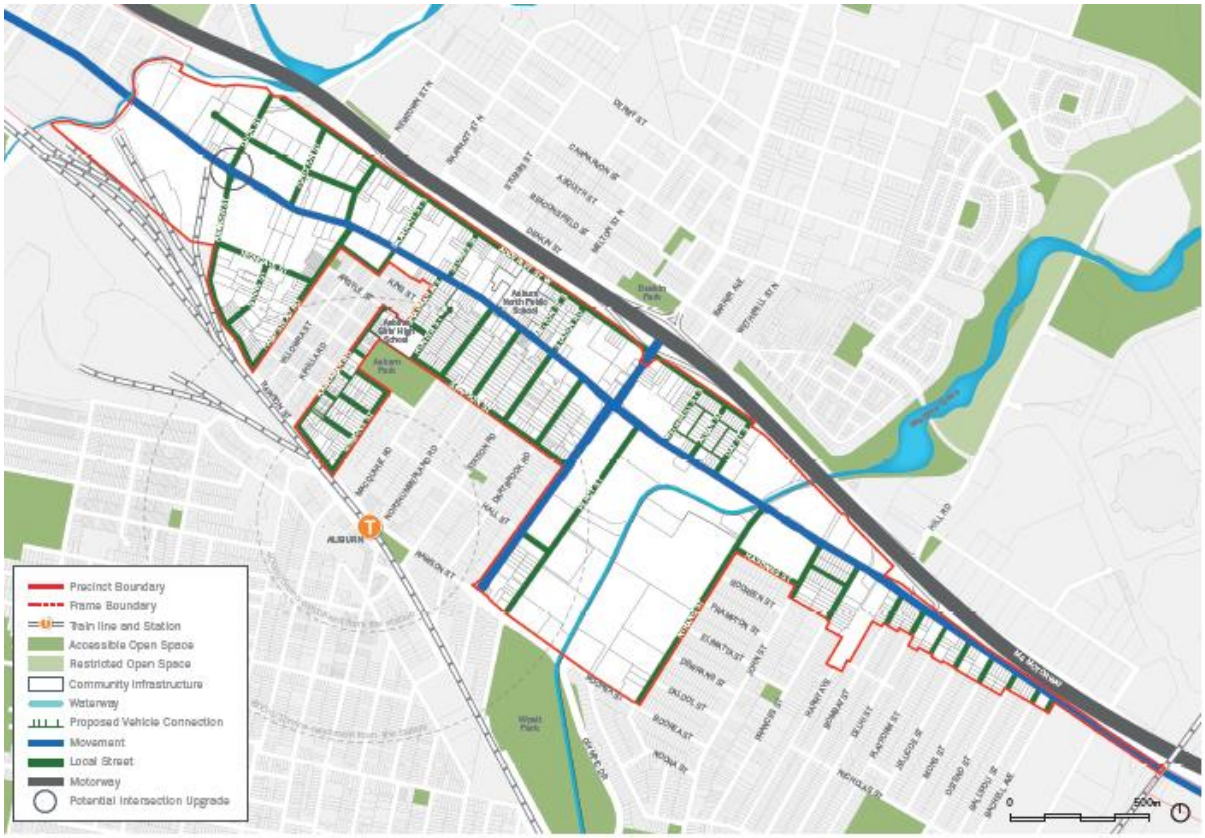
Movement Corridors

Parramatta Road – This is the main east-west traffic route through the Precinct and will continue to have a high movement function providing access to James Ruse Drive in the west and Silverwater Road at the eastern end of the Precinct.

Silverwater Road/St Hilliers Road – Provides the main north-south traffic and freight route through the Precinct connecting to the M4 Motorway and south to Bankstown.

All other streets (existing and proposed) will perform a Local street function.

Figure 23 – Proposed street functions, Auburn Precinct



Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- additional delays at the Parramatta Road/Silverwater Road intersection, due to its proximity to surrounding industrial, warehousing and bulky good retail land use and to the Silverwater Road interchange. This intersection also serves as the primary access to the M4 Motorway from Auburn
- significant delays due to the inefficiency of the split approach phasing arrangement at the intersection of Parramatta Road and Hill Road. This is a consequence of the physical constraints to road width imposed by the existing M4 overpass Hill Road
- significant delays due to the inefficiency of the split approach phasing arrangement at the intersection of Parramatta Road and Rawson Street
- additional trips concentrated at the Parramatta and Silverwater Road intersection, which are generated by forecast development at Wentworth Point and Sydney Olympic Park.

Figure 24 – Future intersection constraints, Auburn Precinct (approaches not to scale)

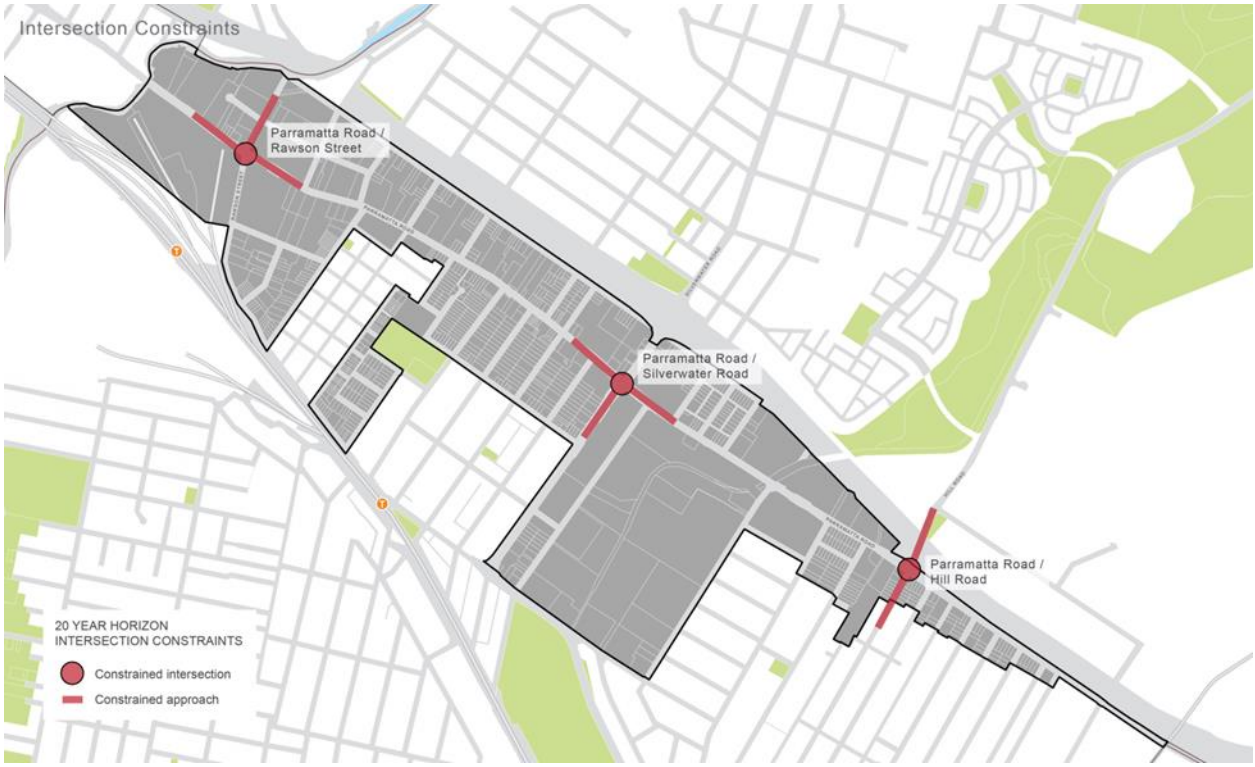


Table 27 – Future intersection performance, Auburn Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Rawson Street	F	East	F
		North	F
		South	C
		West	F
Parramatta Road / Silverwater Road	F	East	F
		North	C
		South	F
		West	F
Parramatta Road / Hill Road	D	East	C
		North	F
		South	F
		West	B

Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Auburn Precinct.

The following intersections have been identified that will require investigation and likely upgrades in order to better facilitate future movements in and through the Precinct and should be specifically modelled as part of future rezoning proposals. ***The identified upgrades are indicative only and may require alternative solutions***.

- Rawson Street/Parramatta Road - Realign southern approach to provide double left turn and allow conventional phase arrangement. Allowing a conventional phase arrangement will assist operation for all intersection approaches.

The constraints identified at other intersections are considered to be primarily related to intersections that are already operating near capacity that are impacted in the future by development planned in Sydney Olympic Park, Carter Street and Wentworth Point; upgrades should be considered in this context.

Proposed Public Transport Network

In addition to existing and planned public transport in the Auburn Precinct, the following opportunities have been identified:

- improve rail frequencies at Auburn Station to support growth in the Precinct. Demand modelling will be required to ascertain the exact needs
- investigate provision of a new bus route connecting Parramatta to Burwood via Parramatta Road to assist access between Granville, Auburn and Homebush and also to/from these areas to the strategic centres of Parramatta and Burwood and to the major interchange at Strathfield Station
- investigate new or improved north-south local bus routes to connect from Auburn to existing and future activity generators such as Newington and potential interchange connections to Parramatta Light Rail.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed walking and cycling networks.

For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on streets designated as Places for People as identified using the movement and place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Station Road and Rawson Street from Hall Street to Auburn Rail Station
- Parramatta Road from Braemar Avenue to Station Street.

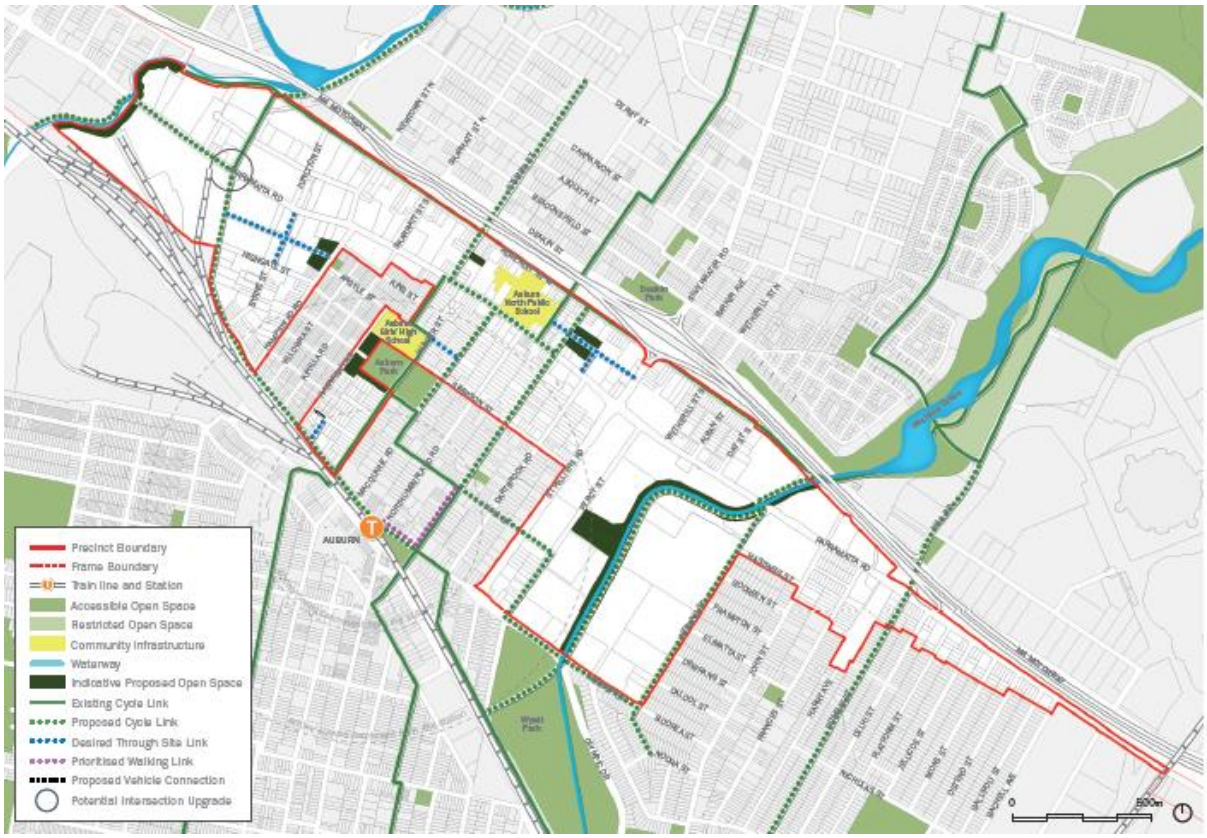
Desired Through Site Links

- Byrne Street to Junction Street
- Rawson Street to Hampstead Street
- Melton Street to Silverwater Road
- Parramatta Road to Adderley Street West
- Argyle Street to Braemar Avenue
- Karrabah Road to Gibbons Street

Proposed Strategic Cycle Links

- Duck River between railway line and Parramatta Road
- Duck River between Junction Street and Carnarvon Street
- Parramatta Road between Duck River and Rawson Street
- Rawson Street between Parramatta Road and Station Road
- Station Road between Adderley Street West and Rawson Street
- Haslam's Creek between M4 Motorway and Church Street through Wyatt Park
- Hill Road between John Ian Wing Parade and Parramatta Road
- Bombay Street between M4 Motorway and Nicholas Street
- Stubbs Street between Parramatta Road and Adderley Street West
- Melton Street M4 cycleway and overpass.

Figure 25 – Proposed active transport, Auburn Precinct



Proposed Parking Controls

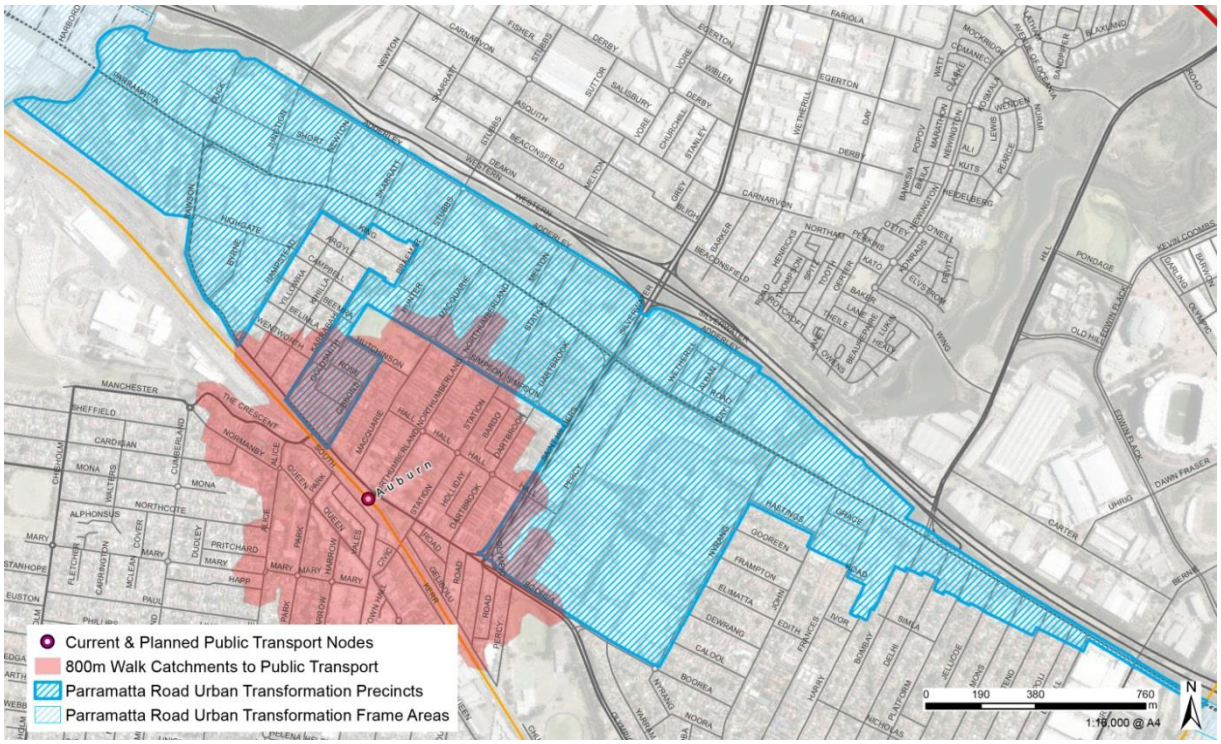
As outlined in Section 2, the Auburn Precinct is proposed to fall under the Category 3 parking rates shown in Table 28. This is based on the following points:

- Most areas of the Precinct fall outside an 800m walking access to good quality public transport being Auburn train station (see Figure 26).

Table 28 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
3 (Auburn Precinct)	0.6	0.9	1.2	1.5	0.2	70	50	100

Figure 26 – 800m walking catchment to public transport, Auburn Precinct

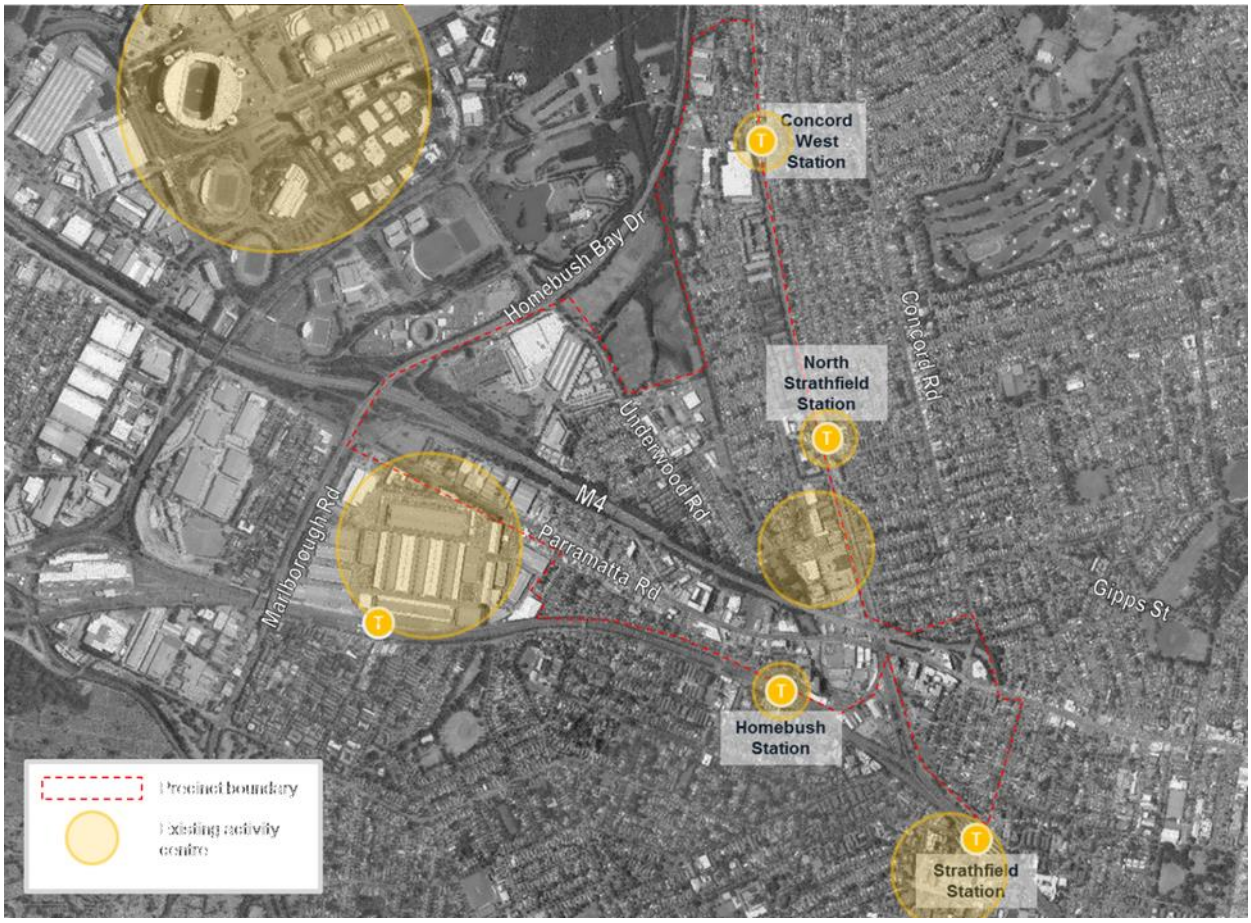


6. Homebush

6.1 Existing Activity Centre

The Homebush Precinct currently has multiple activity centres. A significant concentration of activity is focussed on the Bakehouse Quarter on George Street, North Strathfield, with a range of retail and commercial sites including supermarkets. Smaller activity centres are clustered around Homebush, North Strathfield and Concord West rail stations, comprised of smaller retail and commercial. Outside the Precinct, the activity centre south of Strathfield Station, Sydney Markets and Sydney Olympic Park are all significant existing activity centres.

Figure 27 – Existing activity centres, Homebush Precinct



6.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 reveals that Sydney Inner City (31 per cent) is the single largest workforce destination for residents in the Homebush Precinct. Overall rail mode share is relatively high for work travel at 40%, with a significant proportion of this rail travel to Sydney Inner City where rail is likely the most reliable and convenient access mode available to the Precinct. Car mode share for work travel is relatively modest at 52% and spread amongst the top 5 workforce destinations. Bus, walking and cycling mode shares are low (2-3%), however there are

a number of residents walking to Strathfield – Burwood – Ashfield and Canada Bay for work travel. This could be due to a combination of walking accessibility, traffic congestion and infrequent or unreliable bus services to these locations.

Table 29 – Workforce travel destinations, Homebush Precinct (source: BTS Journey to Work – Travel Zones 717, 719, 720, 958, 961, 963, 969)

WORKFORCE DESTINATIONS		TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Sydney Inner City**	1030	0	299	8	40	1377
2	**Strathfield - Burwood - Ashfield**	72	10	319	60	32	493
3	**Canada Bay**	59	18	244	69	22	412
4	**Auburn**	21	37	185	3	0	246
5	**Ryde - Hunters Hill**	50	3	174	0	9	236
Other		578	13	1099	16	24	1730
Total		1810	81	2320	156	127	4494
Mode share		40%	2%	52%	3%	3%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

The majority of workers in the Homebush Precinct start their travel in the neighbouring areas of Strathfield - Burwood - Ashfield. The next four places of residence for people working in Homebush are Canada Bay, Bankstown, Merrylands - Guildford and Auburn. Unlike work trips from the Precinct, the majority of inbound trips to the Homebush Precinct are made by car with a dominant mode share of 82 per cent. Only 12 per cent of workers travel by train and one per cent of workers travel by bus, indicating that the employment areas may not be directly accessible to the train stations or there is a good supply of off-street and on-street parking available to the employees. The mode share could also be influenced by existing employment use types which may require workers to use a vehicle or may include shift work not suitable to public transport use.

Table 30 – Employment travel origins, Homebush Precinct (source: BTS Journey to Work – Travel Zones 717, 719, 720, 958, 961, 963, 969)

EMPLOYEE ORIGINS		TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Strathfield - Burwood - Ashfield**	104	46	514	84	26	774
2	**Canada Bay**	32	9	461	72	17	591
3	**Bankstown**	10	3	455	0	12	480
4	**Merrylands - Guildford**	41	3	415	0	12	471

5	**Auburn**	81	9	344	11	20	465
Other		899	42	5476	23	172	6612
Total		1167	112	7665	190	259	9393
Mode share		12%	1%	82%	2%	3%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

Table 31 shows the existing mode share for the Homebush Precinct compared to the Strathfield and Canada Bay LGAs. It is evident that proximity to public transport infrastructure has a clear trend on mode share with the Precinct having both a much higher public transport and lower private vehicle mode share when compared against the LGAs. It is evident that while train mode share is substantially higher in the Precinct than at LGA level, bus mode share is lower in the Precinct than in the broader Canada Bay LGA. This may be attributed to commuters taking advantage of the convenient location of the five nearby stations, instead of opting to travel by bus.

Walking and cycling modes are slightly lower in the Precinct than Canada Bay LGA, most likely due to the barriers created by Parramatta Road and the rail lines, as well as the high amenity, facilities and access to cycling infrastructure along the Parramatta River foreshore. However, it should be noted that the JTW data is based on the primary mode of travel used for each trip, indicating mode shares may be underestimated due to people walking or cycling to their primary mode of rail travel.

Table 31 – Mode share for the Homebush Precinct compared to Strathfield LGA and Canada Bay LGA (2011) (source: BTS Journey to Work – Travel Zones)

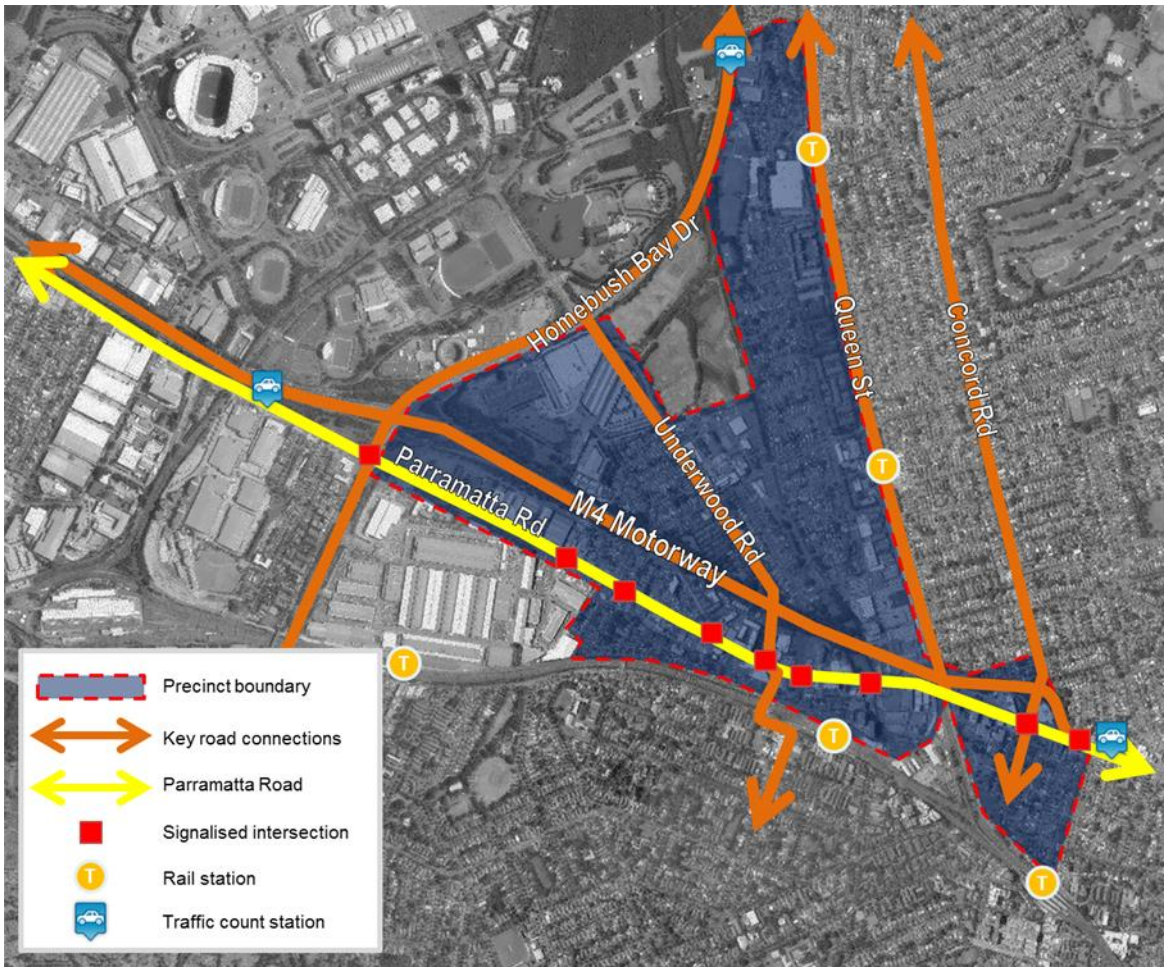
MODE	EXISTING HOMEBUSH PRECINCT MODE SHARE	EXISTING LGA MODE SHARE	
		STRATHFIELD LGA	CANADA BAY LGA
Vehicle driver	48%	54%	62%
Vehicle passenger	4%	5%	4%
Train	40%	33%	14%
Bus / Ferry / Tram	2%	5%	12%
Walked only	3%	3%	3%
Other mode	2%	1%	2%
Mode not stated	1%	2%	1%

Existing Traffic and Transport Conditions

Existing Road Network

The existing road network in the Homebush Precinct is illustrated in Figure 28, highlighting the key roads connections including Parramatta Road, Homebush Bay Drive and Underwood Road.

Figure 28 – Road network and major connections in the vicinity of the Homebush Precinct



Traffic Volumes

Table 32 presents the volumes from Roads and Maritime traffic count stations located on Homebush Bay Drive (2012) and on Parramatta Road (2011). In addition, the *WestConnex M4 East EIS Traffic and Transport Assessment* provided volumes for Parramatta Road at the eastern end of the Precinct obtained from automatic traffic count surveys completed between 2012 and 2014. These three locations are considered to be representative of the scale of traffic volumes travelling through the Precinct.

It is evident that the two way volumes experienced on Parramatta Road (east of the M4 Motorway) and Homebush Bay Drive are over 80,000 vehicles per weekday. According to the Roads and Maritime Road Network Management Hierarchy, based on the description of the road and speed limit, these sections of road would be classified as a Class 6 Urban road (6U). Class 6U roads are principal State Roads and with high traffic volumes, including freight, public transport and commercial vehicle travel. The lower volumes on Parramatta Road west of Telopea indicate that the section would be classified as a lower level Class 4 Urban road (4U), typically considered as important State Roads with moderately high traffic volumes (RMS Network and Corridor Planning, 2008).

Table 32 – Traffic counting stations near the Homebush Precinct

ROAD NAME	STATION DESCRIPTION	WESTBOUND	EASTBOUND	TOTAL
Parramatta Road*	West of Telopea Avenue	-	-	34,000
Parramatta Road^	East of M4 Motorway	49,700	53,500	103,200
Homebush Bay Drive~	Concord West – South of Concord Road, MR200	42,800	42,900	85,700

* RMS Traffic Corridor Planning for Parramatta Road Corridor - Granville to North Strathfield, AADT counts, 2011

^ WDA automatic AADT traffic counts, 2012-14

~RMS weekday traffic counts, 2012

Constraints

The main road network constraints to the Precinct are due to barriers created by the rail line to the south and east of the Precinct. Some of the constraints of the road network include:

- Underwood Road, George Street and along Parramatta Road.
- Pomeroy Street between Wentworth Road and George Street.
- Limited crossing opportunities over both the Western Rail Line and Northern Rail Line.
- Subway Lane underpass crossing rail line has a 3.6 metre height restriction.
- "Arnott's famous Biscuits" overpass has a 4.3 metre height restriction.

Existing Public Transport Network

Public transport services are based around the numerous train stations located on / near the Precinct boundary. These stations provide services to south western and inner western centres of Sydney, as well as major attractors to the north of the Precinct. While there are several rail stations in close proximity to the Homebush Precinct, there are currently only limited bus routes throughout the Precinct. The impact of the cluster of train stations is evident when comparing the public transport mode shares of the Precinct to the wider LGA.

Rail services

The Precinct is bordered by five stations along the T1 Northern Line and the T2 Inner West and South Line: Homebush (T2), Flemington (T2), North Strathfield (T1), Concord West (T1) and Strathfield (T1 & T2).

Strathfield Station is located at the south-east corner of the Precinct, serving as the key interchange point between the T1 and T2 rail lines and providing services for both lines. As a result, Strathfield Station has high patronage, ranked the 9th busiest station on the Sydney Trains network with approximately 40,560 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014). The approximate numbers of suburban rail services stopping at Strathfield Station during peak periods is shown in Table 33. It should be noted that Intercity Trains on the Blue Mountains Line and the Central Coast and Newcastle Line service Strathfield Station, providing links to regional NSW in west and north of Sydney.

Table 33 – Rail service frequencies at Strathfield Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T1 North Shore, Northern & Western Line		
Berowra to City via Gordon, Hornsby to City via Macquarie University	29	28
City to Berowra via Gordon, City to Hornsby via Macquarie University	29	30
Hornsby and Epping to City via Strathfield	18	12
City to Epping and Hornsby via Strathfield	13	16
Emu Plains to City, Richmond to City	28	26
City to Emu Plains, City to Richmond	23	27
T2 Inner West & South Line		
Campbelltown to City via Granville	23	18
City to Campbelltown via Granville	19	18

Homebush Station is located at the southern boundary of the Precinct near largely residential and mixed use land uses. Flemington Station is located approximately 400 metres from the south western boundary of the Precinct located near the Flemington Markets. Both Homebush Station and Flemington Station are serviced by the T2 Inner West and South Line, connecting to the Sydney CBD and South West Centres such as Liverpool and Campbelltown.

Based on station barrier counts, Homebush Station was ranked the 119th busiest station on the Sydney Trains network, recording approximately 1,910 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014).

Barrier counts suggest Flemington Station serviced more commuters, ranked the 84th busiest station on the network, recording approximately 2,930 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014). The approximate number of peak period rail services stopping at Homebush Station and Flemington Station are shown in Table 34.

Table 34 – Rail service frequencies at Homebush Station and Flemington Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T2 Inner West & South Line		
Campbelltown to City via Granville	8	9
City to Campbelltown via Granville	9-10	8-9

Both North Strathfield Station and Concord West Station service the T1 Northern Line and provide a connection to Hornsby to the north and the Sydney CBD to the east. Based on station barrier counts, North Strathfield Station was ranked the 96th busiest station on the Sydney Trains network, recording approximately 2,590 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014). The volumes are at a similar level at Concord West Station, which was ranked the 104th busiest station, recording approximately 2,350 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014). The approximate number of peak period rail services stopping at North Strathfield Station and Concord West Station are shown in Table 35.

Table 35 – Rail service frequencies at North Strathfield Station and Concord West Station

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T1 Northern Line		
Hornsby and Epping to City via Strathfield	8	8
City to Epping and Hornsby via Strathfield	8	8

(source: Sydney Trains, 2015)

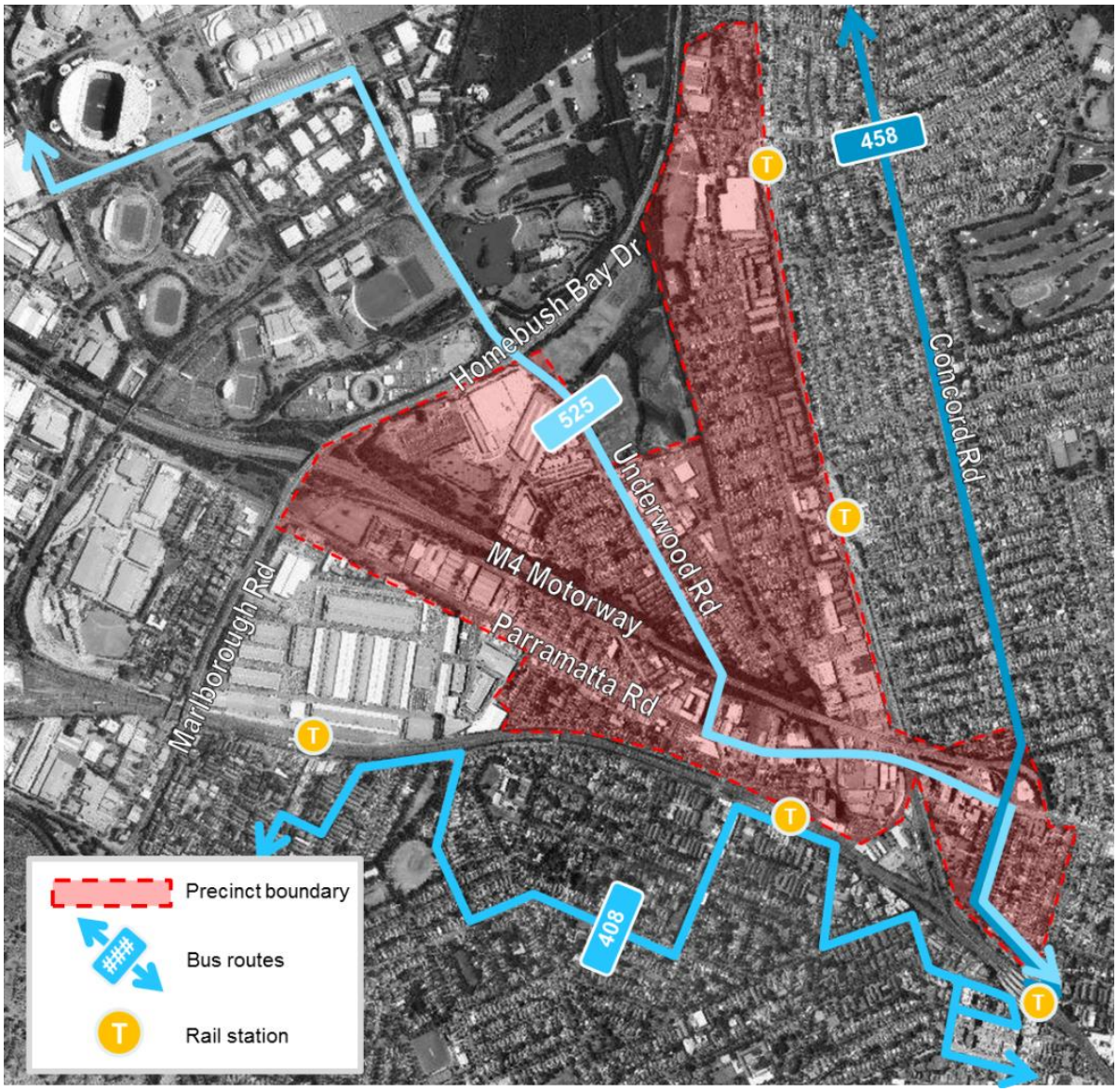
Bus services

There are currently a limited number of bus routes passing through the Precinct. The Precinct is currently serviced by one main bus route, Route 525, providing a connection to major centres including Parramatta and Burwood. Two further bus services, Routes 458 and 408 pass through or across the Precinct, providing connections to Strathfield and Macquarie University. Table 36 gives the peak hour frequencies for services accessibly to residents of the Homebush Precinct. Bus routes in and around the Precinct are illustrated in **Error! Reference source not found.**.

Table 36 – Bus services frequencies for Homebush Precinct (source: Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK FREQUENCY (07:00-09:00)	PM WEEKDAY PEAK FREQUENCY (16:00-18:00)
408	Burwood to Rockwood via Strathfield	Services operate off-peak only	Services operate off-peak only
458	Macquarie University to Burwood	< 30 minutes	< 30 minutes
525	Parramatta to Burwood	< 15 minutes	<30 minutes

Figure 29 – Bus services in the vicinity of the Homebush Precinct

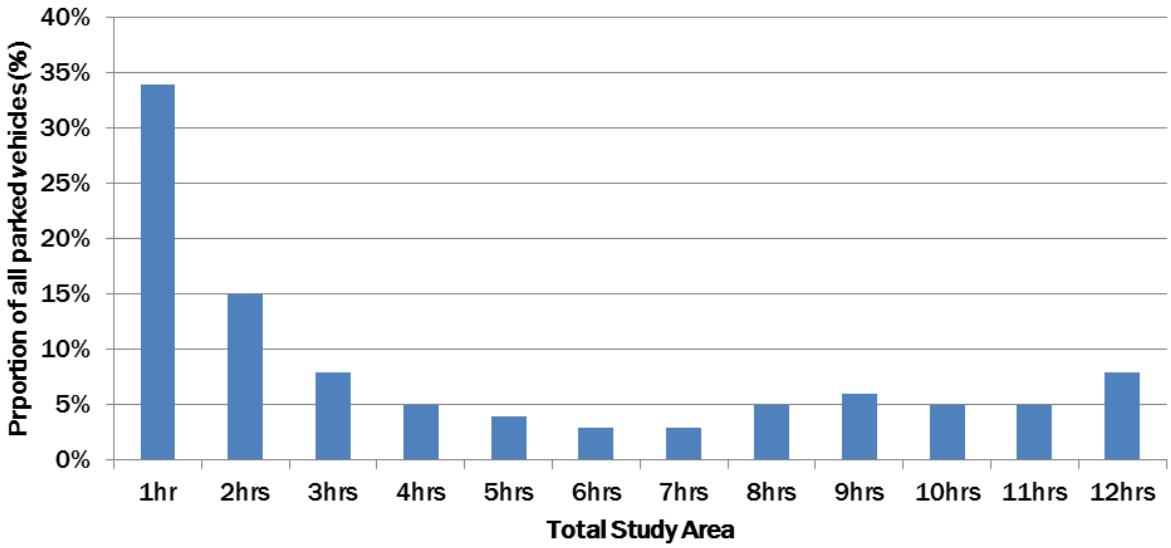


Existing Parking Conditions

The Homebush Precinct contains an extensive local road network with minimal on-street parking restrictions. Most local streets permit unrestricted parking on one or both sides of the road. Clearways are in operation along Parramatta Road between 6am – 7pm weekdays and 8am – 8pm weekends. During off peak, one hour parking is permitted along Parramatta Road within the Precinct. Currently there are no public off-street car parks within the Precinct.

Surveys of on-street parking supply and demand were undertaken for streets within 800 metres walk of major public transport stops. An average occupancy rate of 59% was observed across the study area with a maximum occupancy of 69% observed at any one time. A large proportion of all vehicles were parked for between 1 to 2 hours in duration (Figure 30). This suggests that these on-street spaces were mainly being used to access local shops and facilities in the area surveyed. A much lower proportion of vehicles were parked for longer periods.

Figure 30 – Duration of stay for on-street parking spaces within 800 metres of major public transport stops



Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of private off-street parking rates in the Homebush Precinct for each LGA is provided in Tables 37 and 38.

Table 37 – Off-street parking summary – Strathfield LGA (source: Strathfield DCP 2005 / Parramatta Road Corridor DCP)

LAND USE	PARKING RATE		
Residential flat buildings	Dwelling house	1 to 2 spaces per dwelling	
	1 bedroom unit	1 space per dwelling	Visitors: 0.2 spaces per dwelling.
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	1.5 spaces per dwelling	
Office / Business	Min: 2.5 space per 100 sqm of GFA or 1 space per 100 sqm of GFA along Parramatta Road Corridor.		
Retail premises	Min: 6.2 space per 100 sqm of GFA or 2 space per 100 sqm of GFA along Parramatta Road Corridor.		

Table 38 – Off-street parking rate summary – Canada Bay LGA (source: Canada Bay DCP 2013)

LAND USE	MINIMUM PARKING RATE		
Residential	Detached	1 space per dwelling	
	1 bedroom unit	1 space per dwelling	Visitors: < 5 dwellings, 1 space per dwelling > 5 dwellings 0.5 spaces per dwelling
	2 bedroom unit	1.5 space per dwelling	
	3+ bedroom unit	2 spaces per dwelling	
Office/Business	1 space per 40sqm of GFA.		
Restaurants / cafes	The greater of: 1 space per 6sqm of serviced area or 1 space per 4 seats.		

Existing Walking and Cycling Networks

Paved footpaths are provided on either side of most roads. Signalised crossings on Parramatta Road are provided at several major intersections at regular and frequent intervals except the western end outside the Flemington Markets. However, there are very few crossings of the rail lines, which form a barrier for active transport. Shared off-road pedestrian and cycle paths are provided through and around the Precinct at parks and via the Western Motorway (M4) viaduct. Currently there are no formal cycle links to key stations such as Strathfield, from the core of the Precinct.

6.3 Future Homebush Precinct Character

A major high-density mixed-use precinct strategically located between Sydney's two main CBDs focused on providing employment and housing opportunities supported by an extensive open space network and efficient vehicular, active, and public transport linkages.

Figure 31 – Structure Plan, Homebush Precinct

Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- employment and mixed use focus on both sides of Parramatta Road and through the Bakehouse Quarter
- retention of the existing low density character in North Strathfield and Concord West east of George Street between Allen Street and Conway Avenue
- medium and high density residential development in select locations around key transport nodes
- the need to explore opportunities for a new primary school with co-located community facilities within the Precinct.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- undertake improved public domain opportunities to Station Street and Homebush Station as a key link to public transport
- establish strong activity on Parramatta Road
- break up large blocks with laneways and through site links where possible
- facilitate site amalgamation to provide opportunities for master planned redevelopment that deliver good public open space outcomes and other benefits
- explore adaptive re-use options for several commercial heritage items and the conservation area near the Homebush Station

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance road connections for all modes of transport within the Precinct to increase accessibility of employment, recreation and cultural opportunities currently separated by riparian corridors and road / rail infrastructure
- improve connectivity to the five rail stations bordering the Precinct at Concord West, North Strathfield, Homebush, Flemington and Strathfield
- enhance pedestrian connectivity and safety across Parramatta Road, the M4 Motorway and railway lines whilst improving connections to Sydney Markets and the Bakehouse Quarter
- improve walking and cycling connection/access to regional recreation and open space facilities with a focus on connecting to the existing recreational routes around Olympic Park
- reduce car dependency by lowering parking rates in areas with good access to public transport.

Primary Constraints

- high traffic volumes on the strategic road network
- access barriers for all modes of transport created by major roads, the railway line and riparian corridor
- low pedestrian connectivity and permeability within the Precinct
- high parking demand and levels on on-street parking throughout the Precinct for short bursts
- fragmented and disconnected communities within the Precinct.

6.4 Future Strategic Transport Network

Proposed Street Function

The majority of streets within the Homebush Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Homebush Precinct and their categorisation are outlined below.

Movement Corridors

- Parramatta Road - This is the main east-west traffic route and will continue to have a relatively high movement function providing access through the Precinct. The change of land use will activate frontages and provide opportunities for mixed use development.
- Homebush Bay Drive – will continue to perform a key Movement function.
- Leicester Avenue / Concord Road – these roads provide the primary vehicular access into Strathfield Town Centre and Strathfield Railway Station to the south, and distribute traffic northwards, Accordingly, Leicester Avenue and Concord Road will continue to have a primary Movement function.

Places for People

- George Street – This is the main north-south street with an activated frontage providing access to the Bakehouse Quarter.
- All other streets (existing and proposed) will perform a Local street function.

Figure 32 – Proposed street functions, Homebush Precinct

Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- high delays at the intersection of Homebush Bay Drive and Underwood Road as a result of traffic accessing surrounding developments. Results indicate that the increase in demand cannot be served by the current roundabout. Furthermore, upgrade of the existing intersection is physically constrained by its location under the Homebush Bay Drive overpass

- during the evening and weekend peaks, the performance of this intersection is significantly worse, corresponding to the peak demand for surrounding retail development. Traffic signals have been added to this roundabout which operate during evening and weekend periods to mitigate delays but further capacity is required
- long delays at the intersection of Parramatta Road and Concord Road. This is due to its proximity to the M4 Motorway, physical constraints of surrounding developments and the need to cross under the Main Western Rail Line and the M4 Motorway. Leicester Avenue and Concord Road also serve as primary routes out of Strathfield and North Strathfield respectively
- inefficiency of split approach phasing arrangement at the intersection of Parramatta Road and George Street. This is a consequence of the physical constraints to road width imposed by the existing M4 overpass on George Street.

Table 39 – Future intersection performance, Homebush Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Underwood Road	A	East	A
		North	C
		West	A
Pomeroy Street / Underwood Road	C	East	B
		North	F
		South	D
		West	A
Homebush Bay Drive/Underwood Road	C	East	F
		North	B
		South	B
		South (left turn lane)	A
		West	A
		West (left turn lane)	A
Parramatta Road / George Street	C	East	A
		North	F
		West	B
Pomeroy Street / George Street	B	East	A
		North	C
		South	B
		West	B
Parramatta Road / Concord Road	E	East	E
		North	C
		South	E
		West	F

Sydney Street / Concord Road	A	North	A
		South	A
		West	A
Patterson Street / Concord Road	B	East	C
		North	C
		South	A
Parramatta Road / M4 Western Motorway	C	East	C
		North	B
		West	C
Parramatta Road / Mosely Street	B	East	C
		West	A

Figure 33 – Future intersection constraints, Homebush Precinct (approaches not to scale)

Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Homebush Precinct.

The following intersections have been identified that will require investigation and likely upgrades in order to better facilitate future movements in and through the Precinct and Frame Area and should be

specifically modelled as part of future rezoning proposals. *The identified upgrades are indicative only and may require alternative solutions*.

- George Street/Parramatta Road - Consider extension or duplication of westbound right turn bay and additional capacity on northern approach. New development south of Parramatta Road includes an extension of George Street to create a 4 leg intersection. Performance will also be influenced by new westbound M4 ramp.
- George Street/Pomeroy Street and Underwood Road/Pomeroy Street – Detailed investigation is required at these intersections. Capacity improvement options are limited and may be affected by the preferred Parramatta Light Rail route.
- Cooper Street/Parramatta Road - Provide new signals with pedestrian and cycle crossings to improve local walking and cycling access to Strathfield.
- Derowie Avenue/Parramatta Road - New signals to serve increased traffic from Pomeroy St extension. The extension of Pomeroy St to Parramatta Road has been included to provide improved permeability and local access for the Precinct. This is important given the constrained road network and limited opportunities for access.
- The intersection at Homebush Bay Drive/Underwood Road is a known existing constraint and options to upgrade should be considered in the context of broader growth in the area.

Proposed Public Transport Network

In December 2015, the NSW Premier announced a preferred light rail network that will connect Parramatta CBD to the key hubs of Westmead Hospital, Camellia, Carlingford, Sydney Olympic Park and Strathfield. Parramatta Light Rail will kick-start revitalisation and jobs growth along a corridor more than 20km long, and will be part of an improved transport network serving the Greater Parramatta to Olympic Peninsula Priority Growth Area, which captures the Homebush Precinct.

The spine of the preferred light rail network runs from Westmead to Camellia via Parramatta CBD, before branching to Sydney Olympic Park via Strathfield and to Carlingford replacing the existing heavy rail shuttle. The network will link areas that are being transformed by Government and private investment, including Westmead Health Precinct, Parramatta North renewal area, Camellia, Telopea, Rydalmere, Sydney Olympic Park and the Homebush Precinct.

Parramatta Light Rail will provide a reliable, high frequency public transport service running seven days a week from early in the morning to late at night. Light rail will connect to wider rail and bus networks as well as walking and cycling routes. Modern, comfortable light rail vehicles will provide an attractive transport choice for local residents and the OPAL integrated ticketing system will facilitate seamless end-to-end journeys for customers.

TfNSW is currently working on the scope and definition design of the Parramatta Light Rail project which includes a process to confirm the exact light rail route and stop locations. A business case is also being prepared for the project and consultation with the community will also commence in the near future.

In addition to existing and planned public transport in the Homebush Precinct, the following opportunities have been identified.

- improve rail frequencies at Homebush, North Strathfield and Concord West Stations to support growth in the Precinct. Demand modelling will be required to ascertain the exact needs
- investigate provision of a new bus route connecting Parramatta to Burwood via Parramatta Road. This

could assist in providing access between the areas of Granville, Auburn and Homebush closer to Parramatta Road than rail stations, and also to/from these areas to the strategic centres of Parramatta and Burwood and to the major interchange at Strathfield Station.

Parramatta Light Rail Benefits

- ***Support growth by providing a new east / west link through the Parramatta to Olympic Peninsula Growth Area***
- ***Connect destinations along the corridor and allow people to live closer to new jobs***
- ***Increase travel choice by providing an attractive alternative to the car***
- ***Provide seamless connections to the wider rail and bus networks via new and improved interchanges***
- ***Offer a reliable 'turn up and go' service that runs from early in the morning to late at night***
- ***Use high-quality wayfinding and urban design to ensure stops integrate with walking and cycling routes, including those to nearby ferry services***
- ***Operate the Opal ticketing system so that passengers can transfer easily from light rail to trains, buses and ferries***
- ***Enable the creation of new neighbourhood centres and public space through good urban design at stops and along the route***
- ***Provide smooth, quiet and comfortable journeys in air-conditioned, accessible vehicles.)***

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed walking and cycling networks.

For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Vibrant Streets and Places for People as identified using the movement and place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Concord West Rail Station to Rothwell Avenue eastern extension.
- George Street from Rothwell Avenue to Parramatta Road.
- Parramatta Road from Powell's Creek and Station Street.

Desired Through Site Links

- Loftus Lane to Powell's Creek Reserve
- Station Street to Columbia Lane
- Victoria Avenue to Concord West Rail Station

- Rothwell Avenue eastern extension

Proposed Strategic Cycle Links

- Queen Street - Parramatta Road - Cooper Street between Princess Avenue and Strathfield Rail Station
- Homebush Bay Drive to Mason Park
- Mason Park from Underwood Road to Powell's Creek Reserve
- Embellishments to the Bridge Road cycleway
- New link alongside the western side of Powells Creek, connecting through to George Street and Railway Lane
- New bridge link across the railway corridor from Queen Street, including a connection with the Powells Creek link above, providing access to the Queen Street / Gipps Street regional cycle link.
- New shared path link along Parramatta Road, connecting George Street and the cycleway on the M4 Motorway via new westbound motorway on-ramp at Powells Creek.
- New link on Sydney Street connecting to the eastbound cycleway on the M4 Motorway and Concord Road, providing connectivity with the Queen Street / Gipps Street Regional cycle link.

Figure 34 – Proposed active transport, Homebush Precinct

Proposed Parking Controls

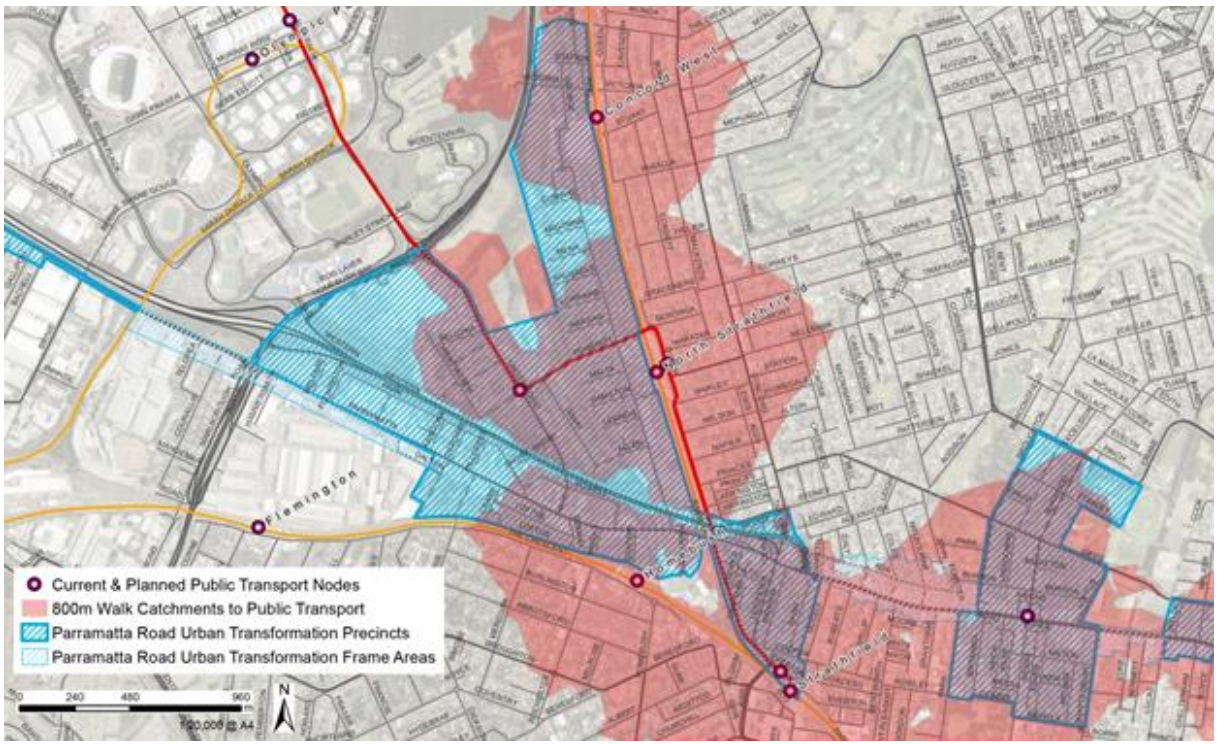
As outlined in Section 2, the Homebush Precinct is proposed to fall under the Category 2 parking rates shown in Table 40. The Frame Areas are proposed to fall under Category 3. This is based on the following points:

- most areas of the Precinct have 800m walking access to good quality public transport either being existing train stations or future light rail stops
- there is also good access to a strategic centre (Burwood) and a variety of local services in Homebush and Burwood
- access to public transport from the Frame Areas is not as high and therefore the Frame Areas are recommended to be in Category 3.

Table 40 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
2 (Homebush Precinct)	0.3	0.5	0.9	1.2	0.1	100	70	120
3 (Homebush Frame Areas)	0.6	0.9	1.2	1.5	0.2	70	50	100

Figure 35 – 800m walking catchments to public transport, Homebush Precinct



7. Burwood - Concord

7.1 Existing Activity Centre

The Burwood – Concord's existing activity centre is focussed to the south of the Precinct along Burwood Road, primarily between Burwood Park and Burwood Station. The centre accommodates a large Westfield shopping centre near Burwood Park, and a smaller shopping plaza south of the station. A wide range of high street retail shops are located along Burwood Road. The centre also includes several commercial office buildings located close to the station.

Figure 36 – Existing activity centre, Burwood – Concord Precinct

7.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 revealed that more residents of the Burwood – Concord Precinct are employed in Sydney Inner City (29 per cent) than any other destination, as shown in Table 41. Public transport, walking and cycling collectively comprise the majority of mode share for work travel for residents in the Precinct (52% combined). Residents travelling to North Sydney - Mosman and Sydney Inner City predominately travel by rail, however private vehicle travel is

the dominant mode for work travel to other workplace destinations. This may be a reflection of the numerous rail and bus connections available to access Sydney Inner City and North Sydney - Mosman, but lack of / infrequent public transport services to other top workforce destinations.

Table 41 – Workforce travel destinations, Burwood – Concord Precinct (source: BTS Journey to Work – Travel Zones)

	WORKFORCE DESTINATIONS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Sydney Inner City**	2,095	185	610	7	102	2,999
2	**Strathfield-Burwood-Ashfield**	187	58	769	479	83	1,576
3	**Canada Bay**	81	83	571	66	30	831
4	**Auburn**	79	41	273	4	14	411
5	**North Sydney-Mosman**	252	9	112	0	9	382
	Other	1,275	155	2,625	18	114	4,187
	Total	3,969	531	4,960	5,74	352	10,386
		38%	5%	48%	6%	3%	100%

^Excludes those who did not go to work or work from home
*Standard Area 3 selected were those that contained sections of the core study area

The majority of workers in the Burwood – Concord Precinct start their travel in the neighbouring areas of Strathfield - Burwood – Ashfield as shown in Table 42. The next four top places of residence for people working in Burwood – Concord are Canada Bay, Canterbury, Bankstown and Auburn. The majority of inbound trips to the Burwood – Concord Precinct are made by car with a dominant mode share of 64 per cent. Approximately 24 per cent of workers travel by train and four per cent of workers travel by bus, a much lower mode share than outbound trips. This indicates the employment areas may not be directly accessible to the train stations and the frequent bus corridors or there is a good supply of off-street and on-street parking available to the employees within the Burwood – Concord Precinct.

Table 42 – Employment travel origins, Burwood – Concord Precinct (source: BTS Journey to Work – Travel Zones)

	EMPLOYEE ORIGINS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Strathfield-Burwood-Ashfield**	348	186	1,723	637	129	3,023
2	**Canada Bay**	87	101	1,040	89	75	1,392
3	**Canterbury**	78	94	629	6	12	819
4	**Bankstown**	91	15	528	3	27	664
5	**Auburn**	220	18	335	3	9	585
	Other	2,681	152	4,942	24	167	7,966

	Total	3,505	566	9,197	762	419	14,449
		24%	4%	64%	5%	3%	100%

^Excludes those who did not go to work or work from home
*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

The existing Journey to Work mode split for the Burwood – Concord Precinct compared to the wider Canada Bay LGA and Burwood LGA are summarised in Table 43. The suburb has historically developed from low to medium density towards increasing high density residential uses. The most popular choice of travel to work is private vehicle travel (48%), followed by public transport (35%) and walk only trips (14%). It is evident that the public transport use mode share is higher and the private vehicle mode share lower within the Burwood – Concord Precinct compared to both Canada Bay LGA and Burwood LGA. However, walk only trips are higher in both wider LGAs. The low walking mode share may be attributed to the strong public transport provision in the Precinct, evidenced by the high bus mode share. It should be noted that the JTW data is based on the primary mode of travel used for each trip, indicating mode shares may be underestimated due to people walking or cycling to their primary mode of rail travel.

Table 43 – Mode share for Burwood – Concord Precinct compared to Canada Bay LGA and Burwood LGA (2011) (source: BTS Journey to Work – Travel Zones)

MODE	EXISTING BURWOOD – CONCORD PRECINCT MODE SHARE	EXISTING LGA MODE SHARES	
		CANADA BAY LGA	BURWOOD LGA
Vehicle driver	44%	62%	59%
Vehicle passenger	4%	4%	5%
Train	38%	14%	23%
Bus	5%	10%	4%
Ferry / Tram	<1%	2%	-
Walked only	<1%	3%	5%
Other mode	1%	2%	1%
Mode not stated	2%	1%	2%

Existing Traffic and Transport Conditions

Existing Road Network

The existing road network in the Burwood – Concord Precinct is illustrated in Figure 37, highlighting the key road connections including Parramatta Road and Burwood Road.

Figure 37 – Road network and major connections in the vicinity of Burwood – Concord Precinct

Traffic Volumes

There are no Roads and Maritime Services traffic count stations located within the Burwood – Concord Precinct, however a counting station is present approximately three kilometres east of the Precinct in Ashfield along Parramatta Road. It is considered that these volumes provide an indication of the scale of traffic passing through the Precinct. Table 44 shows the traffic count station east of the Burwood – Concord Precinct, with volumes just over 57,000 vehicles per day in 2012. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, the section of the Parramatta Road would be classified as a Class 5 Urban road (5U). Characteristics of a Class 5U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RMS Network and Corridor Planning, 2008).

Table 44 – Traffic counting stations near the Burwood – Concord Precinct (source: RMS traffic counts)

ROAD NAME	STATION DESCRIPTION	WESTBOUND*	EASTBOUND*	TOTAL*
Parramatta Road	Ashfield - East Of Dalhousie Street	27,800	29,400	57,200

*Weekday counts for 2012

Constraints

The main road network constraints to the Precinct are caused by limited north-south road connections in the Precinct. Burwood Road is the only strong north-south connection which passes through the existing activity centre. The constraints of the road network include:

- limited north-south connections other than Burwood Road
- limited east-west connections
- historic narrow streets in the Precinct
- high traffic volumes associated with Westfield shopping centre.

Existing Public Transport Network

Public transport services are based around the Parramatta Road strategic bus corridor, with seven bus routes on this corridor within 400 metres of the Precinct and an additional 12 bus routes within 800 metres. Several bus services connect to Burwood Station, located south of the Burwood – Concord Precinct boundary, which provides an attractive public transport option for commuters travelling east towards Sydney CBD or west towards Parramatta.

Rail Services

Burwood Station lies approximately 500 metres south of the Precinct, accessible from Burwood Road. Based on station barrier counts Burwood Station was ranked the 15th busiest station on the Sydney Trains network recording approximately 29,040 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014).

Burwood Station is serviced by the T2 Inner West & South Line and the T1 North Shore, Northern & Western Line. These lines connect the Burwood – Concord Precinct to several centres including the Sydney CBD, Parramatta and Liverpool.

The number of rail services stopping at Burwood Station during peak periods are shown in Table 45.

Table 45 – Rail service frequencies at Burwood Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T1 North Shore, Northern & Western Line		
Berowra to City via Gordon, Hornsby to City via Macquarie University	25	16
City to Berowra via Gordon, City to Hornsby via Macquarie University	16	19
Hornsby and Epping to City via Strathfield	8	8
City to Epping and Hornsby via Strathfield	8	8
Emu Plains to City, Richmond to City	8	11
City to Emu Plains, City to Richmond	17	8
T2 Inner West & South Line		
Campbelltown to City via Granville	8	9
City to Campbelltown via Granville	11	8

Bus Services

The Burwood – Concord Precinct is currently serviced by several main bus routes connecting to the major centres of: Canada Bay, Sydney CBD, Campsie and Ashfield. Bus routes operate along Gipps Street, Parramatta Road, Burwood Road and Crane Street. The Precinct is currently served by the following bus routes (operated by Sydney Buses):

- route 415 (Campsie to Chiswick via Strathfield and Burwood) passes through the Burwood – Concord Precinct along Parramatta Road and into Burwood Road, south of the Precinct
- route 439, L39 (Mortlake to City via Leichhardt) passes through the Burwood – Concord Precinct via Burwood Road, Gipps Street, Crane Street and Burwood Road, into Bayview Road
- route 460 (Five Dock to Concord Hospital) passes along Queens Road, Gipps Street and Broughton Street, into Crane Street
- route 461 (Burwood to Domain via Parramatta Road and City) passes along Parramatta Road
- route 462, 464 and 466 (Ashfield to Mortlake via Burwood) passes along Burwood Road and into Gipps Street.

Figure 38 presents the bus routes in and around the Burwood – Concord Precinct.

Figure 38 – Bus services in the vicinity of the Burwood – Concord Precinct

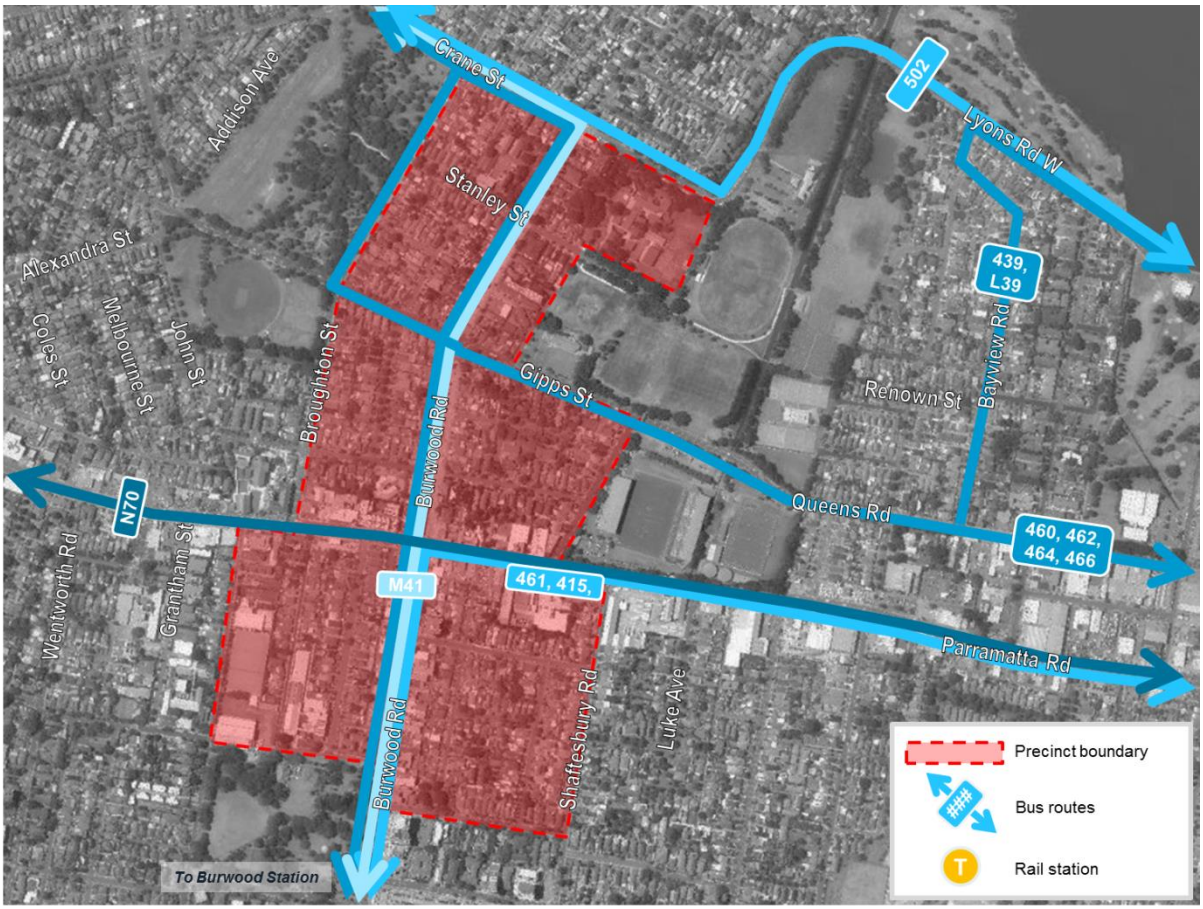


Table 46 provides a summary of peak bus service frequencies for routes operating in the vicinity of the Precinct.

Table 46 – Bus service frequencies for the Burwood – Concord Precinct (source: Transdev and Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
415	Chiswick to Campsie	30 minutes	30 minutes
439, L39	Five Dock and Rozelle to City via Leichhardt	<10 minutes	<10 minutes
461	Burwood to the Domain	<10 minutes	10 minutes
462, 464, 466	Ashfield to Cabarita & Mortlake	<10 minutes	<15 minutes

* Route 460 and N70 have been excluded from the table as they do not provide peak period services. Route 460 operates during weekday off-peak periods only, with six services per day (60 minute frequency). Route N70 provides hourly NightRide (late night) services between midnight to 5am.

Existing Parking Conditions

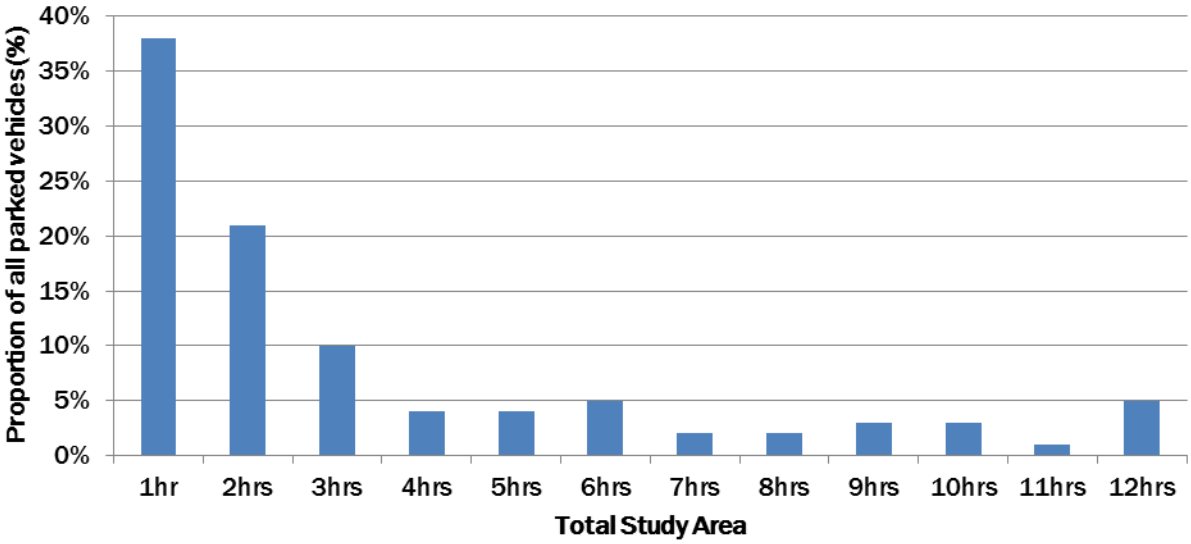
Parking conditions across the Burwood – Concord Precinct are varied. Clearways are in operation along Parramatta Road between 6am – 7pm weekdays and 8am – 8pm weekends. Time restrictions are present throughout the Burwood – Concord Precinct, particularly towards the activity centre at the southern end, near Burwood Station and Town Centre. The presence of mixed use developments particularly along Burwood Road, results in high demand for on-street parking along the road and other nearby streets.

On-street parking within the Burwood – Concord Precinct includes:

- the majority of residential streets south of Parramatta Road have restricted parking (1P/2P) near Burwood Town Centre and Burwood Station south of the Precinct
- short term parking 0.5P – 2P is provided along the Burwood Road, particularly near the mixed use developments
- residential streets north of Parramatta Road are largely unrestricted.

Surveys of on-street parking supply and demand were undertaken for streets within 800 metres walk of Burwood Station. An average occupancy rate of 68% was observed across the study area with a maximum occupancy of 77% observed at any one time. Most vehicles were parked for between 1 and 2 hours, with a lower proportion parked for 3 hours (Figure 38). This suggests that these on-street spaces are mainly being used to access local shops and facilities in the area. A significantly lower proportion of vehicles were parked for longer periods.

Figure 39 – Duration of stay for on-street parking spaces within 800 metres of Burwood Station



Public off-street parking is provided by Burwood Council at the southern boundary of the Precinct, on Meryla Street. The car park is free on Sunday and during off-peak periods Monday to Saturday, with fees applicable during peak periods. New developments are required to provide off-street parking to service the anticipated demands of the proposed land use.

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of off-street parking rates in Burwood – Concord Precinct is provided in Tables 47 and 48.

Table 47 – Off-street parking rate summary – Canada Bay LGA (source: Canada Bay DCP 2013)

<table>
<tr><th>LAND USE</th><th colspan="3">MINIMUM PARKING RATE</th></tr>
<tr><td rowspan="4">Residential</td><td>Detached</td><td colspan="2">1 space per dwelling</td></tr>
<tr><td>1 bedroom unit</td><td>1 space per dwelling</td><td rowspan="3">Visitors:
< 5 dwellings, 1 space per dwelling
> 5 dwellings 0.5 spaces per dwelling</td></tr>
<tr><td>2 bedroom unit</td><td>1.5 space per dwelling</td></tr>
<tr><td>3+ bedroom unit</td><td>2 spaces per dwelling</td></tr>
<tr><td>Office/Business</td><td colspan="3">1 space per 40sqm of GFA.</td></tr>
<tr><td>Restaurants / cafes</td><td colspan="3">The greater of: 1 space per 6sqm of serviced area or 1 space per 4 seats.</td></tr>
</table>

Table 48 – Off-street parking rate summary – Burwood LGA (source: Burwood DCP 2013)

LAND USE	PARKING RATE		
Residential	Studio	0.5 space per dwelling	Visitors: 0.2 spaces per dwelling.
	1 bedroom unit	0.5 space per dwelling	
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	1.2 spaces per dwelling	
Business	1.5 spaces per 100 sqm of GFA		
Retail	1.5 spaces per 100 sqm of GFA		

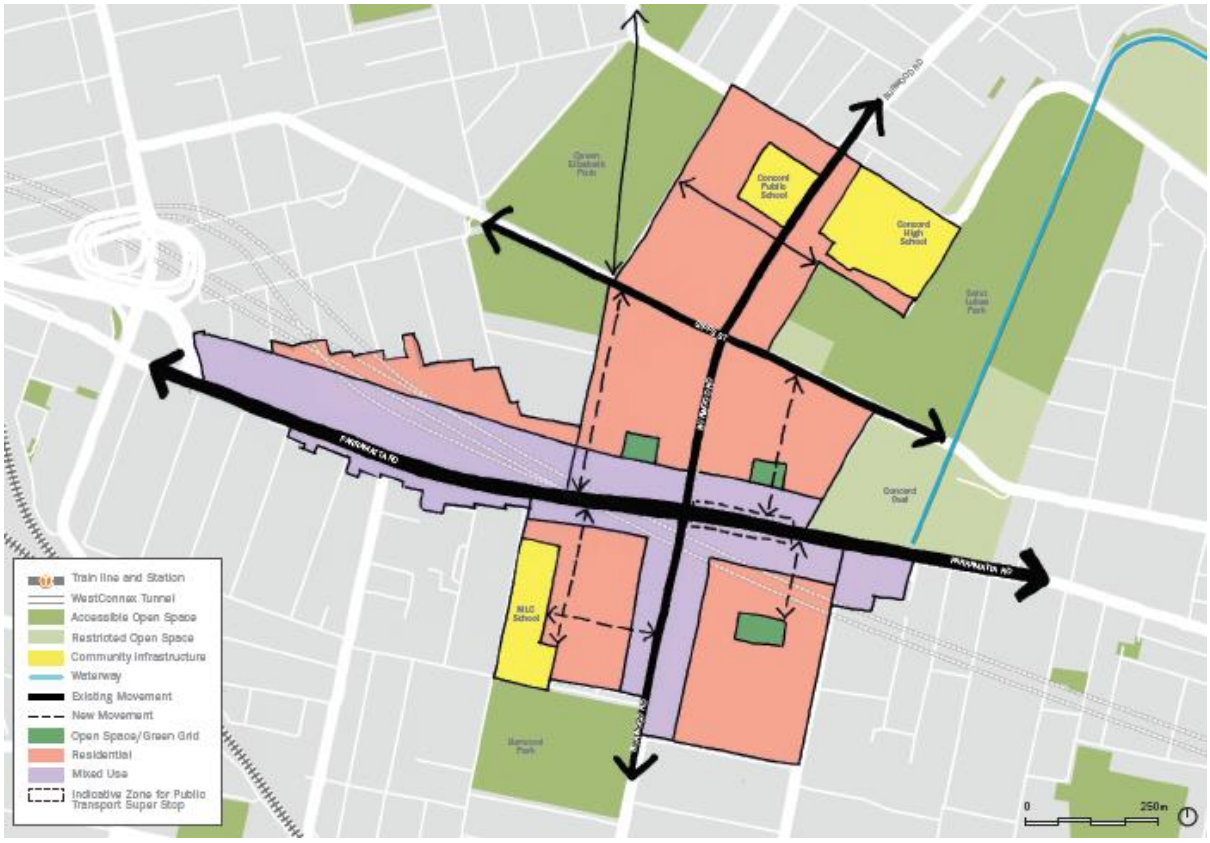
Existing Walking and Cycling Networks

Paved footpaths are provided on either side of roads in the Precinct, and signalised pedestrian crossings are present along several intersections of Parramatta Road. Additionally a shared pedestrian and cyclist bridge is provided at the Broughton Street / Parramatta Road intersection. Cycle facilities are limited, with no formal north-south cycle routes in the Precinct or leading to Burwood Station, which forms a significant constraint to walking and cycling connectivity. Cycling provisions are present as on-road cycle routes only, with the exception of a short shared path along Parramatta Road. East and west of the Precinct boundary, parklands provide off road shared pedestrian and cycle paths. Cycle routes south of Parramatta Road have not been well established, with minimal routes providing access to residential areas in the south.

7.4 Future Burwood – Concord Precinct Character

A commercial gateway to Burwood Town Centre based around an enlivened spine that builds upon existing amenity for new residents.

Figure 40 – Structure plan, Burwood – Concord Precinct



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- facilitate mixed uses on both sides of Parramatta Road and Burwood Road (south) that complement the existing active and vibrant Burwood town centre
- reinforce non-residential uses at the ground and first floors of development along Parramatta Road and Burwood Road
- encourage appropriately scaled residential development across the remainder of the Precinct.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- create a gateway to Burwood town centre at the junction of Parramatta Road and Burwood Road

- appropriately responding to the existing urban grid with a reasonably fine grain of roads, streets and laneways in keeping with the existing urban character
- facilitate amalgamation of certain sites in appropriate locations to create redevelopment opportunities that can deliver additional open space, public domain and other benefits
- reduce onsite residential car parking rates to decrease car dependency and increase public transport patronage
- transition heights in appropriate locations.

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- leverage potential traffic reductions along Parramatta Road (due to WestConnex) to enhance north south connectivity across Parramatta Road for all modes of transport
- increase the priority of Burwood Road (for all modes) at the intersection with Parramatta Road in order to ensure strong connectivity between the Burwood – Concord Precinct and the existing centre / Burwood rail station
- create a series of new laneways and through links within the existing road network grid to increase the permeability of long blocks
- improve walking and cycling connections to regional recreation and open space facilities, particularly via the Patterson / Gipps / Queens Road regional cycle route toward the leisure routes around Canada Bay and further east to Iron Cove
- reduce car dependency by lowering parking rates in areas with good access to public transport and capitalising on the rapid bus network along Parramatta Road
- potential to reduce traffic along Burwood Road by enhancing the route as a bus corridor and encouraging other vehicular traffic to utilise Shaftesbury Road
- improve connectivity to the existing Burwood Town Centre for all modes of travel.

Primary Constraints

- overcoming the north-south barrier to permeability created by Parramatta Road
- the distance between the Burwood rail station and the area to the north of Parramatta Road
- reliance on a small number of key roads for accommodating all modes of transport.

7.5 Future Strategic Transport Network

Proposed Access and Movement Plan

The majority of streets within the Burwood – Concord Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Burwood – Concord Precinct and their categorisation are outlined below.

Movement Corridors

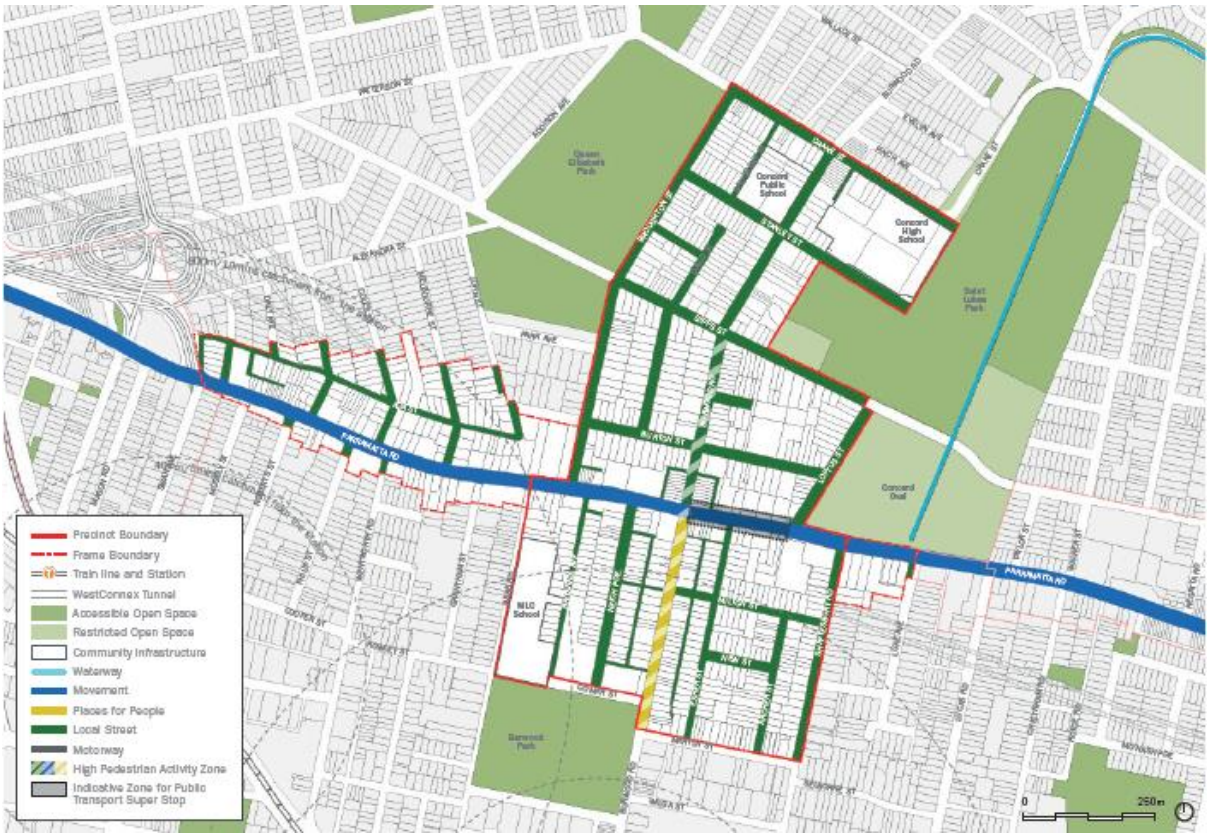
Parramatta Road – Whilst this section of Parramatta Road will continue to have a Movement function as a result of traffic reductions post M4 East completion, there will still be high movement function, particularly as the western extent of the Parramatta Road Corridor on-street rapid transit route will require prioritisation of public transport on the Road. The change of land use will nevertheless create a more activated street frontage.

Places for People

Burwood Road – This will be the main north-south street with an activated frontage providing access to the town centre, station and connecting into any future Rapid Transit stop. It will also form part of the Parramatta Road Corridor on-street rapid transit route.

All other streets (existing and proposed) will perform a Local street function.

Figure 41 – Proposed Movement and Place, Burwood – Concord Precinct



Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- significant delays to the north and south of Parramatta Road on streets that front on to Parramatta Road, including Broughton Street and Burwood Road
- these streets have limited stop-line capacity and low green time as priority is allocated to the through movement on Parramatta Road to maintain east-west coordination
- overall intersection performance remains acceptable.

Figure 42 – Future intersection constraints, Burwood – Concord Precinct (approaches not to scale)

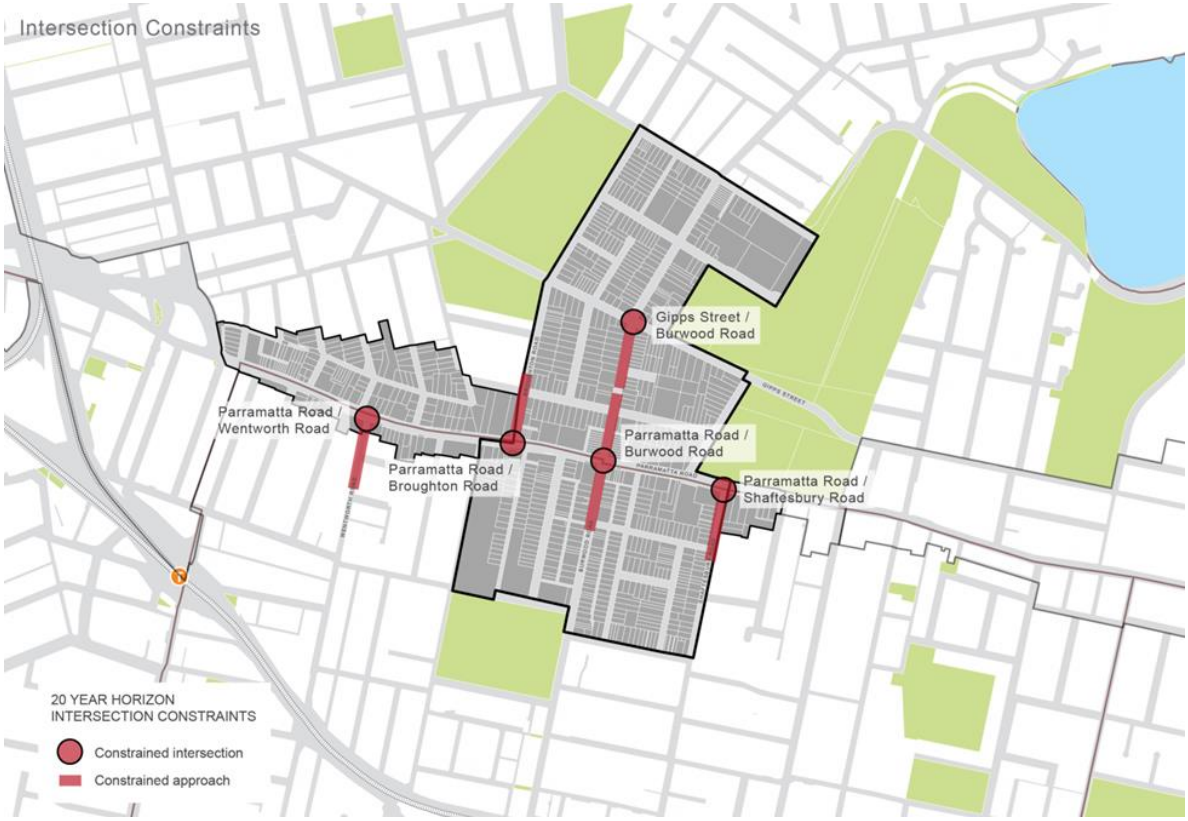


Table 49 – Future intersection performance, Burwood – Concord Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Wentworth Road	B	East	B
		South	D
		West	A
Parramatta Road / Broughton Street	C	East	A
		North	F
		West	A
Parramatta Road / Burwood Road	B	East	A
		North	E
		South	F
		West	A
Gipps Street / Burwood Road	B	East	B
		North	B
		South	E
		West	B
Parramatta Road / Shaftsbury Road	A	East	B
		South	D
		West	A

Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Burwood-Concord Precinct. The following intersections have been identified that will require investigation and likely upgrades in order to better facilitate north-south movements across Parramatta Road for all road users and improve access into the Precinct and should be specifically modelled as part of future rezoning proposals. ***The identified upgrades are indicative only and may require alternative solutions and RMS endorsement.***

All existing signalised intersections in the Precinct – Post implementation of the WestConnex Stage 1B (M4 East) investigate reprioritising intersection signals to allow additional green time for north-south streets.

Proposed Public Transport Network

In addition to existing and planned public transport in the Burwood – Concord Precinct, the following opportunities have been identified:

- improve rail frequencies at Burwood Station to support growth in the Precinct; demand modelling will be required to ascertain the exact needs
- investigate provision of a new bus route connecting Parramatta to Burwood via Parramatta Road to assist in providing access between the areas of Granville, Auburn and Homebush closer to Parramatta Road than rail stations, and also to/from these areas to the strategic centres of Parramatta and Burwood and to the major interchange at Strathfield Station.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed walking and cycling networks.

For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Vibrant Streets and Places for People as identified using the movement and place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

<u>Prioritised Walking Links</u>

- Parramatta Road between Broughton Street and Shaftesbury Road
- Burwood Road between Parramatta Road and Meryla Street

<u>Desired Through Site Links</u>

- Burton Street to Gipps Street
- Parramatta Road to Burton Street
- Parramatta Road to Milton Street
- Park Road to Britannia Avenue

- Britannia Avenue to Neich Parade

Proposed Strategic Cycle Links

- Luke Avenue and Parramatta Road intersection to Burwood Park (via Arthursleigh Street, Shaftesbury Road and Meryla Street
- Queen Elizabeth Park and Burwood Park via Broughton St and Neich Parade
- Park Road between Parramatta Road and Comer Street
- Comer Street between Park Road and Burwood Road
- Concord Oval between Parramatta Road and Gipps Street
- Gipps Street/Patterson Street and Queens Road regional cycleway (upgraded to separated cycleway).

Figure 43 – Proposed active transport, Burwood – Concord Precinct

Proposed Parking Controls

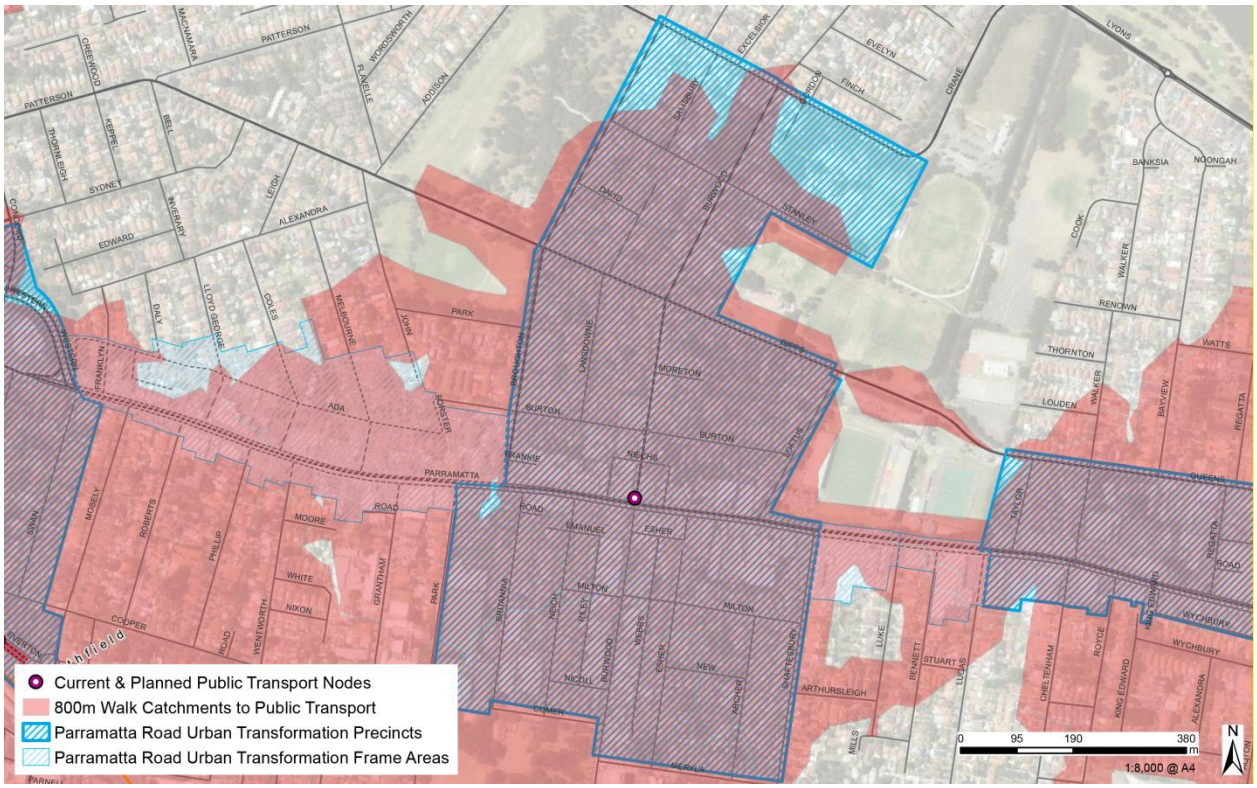
As outlined in Section 2, the Burwood – Concord Precinct is proposed to fall under the Category 2 parking rates shown in Table 50. This is based on the following points:

- most areas of the Precinct have 800m walking access to good quality public transport being train stations or Rapid Bus Route stops
- there is also good access to a strategic centre (Burwood) and a variety of local services in Concord and Burwood

Table 50 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
2 (Burwood – Concord Precinct)	0.3	0.5	0.9	1.2	0.1	100	70	120

Figure 44 – 800m walking catchments to public transport, Burwood – Concord Precinct



8. Kings Bay

8.1 Existing Activity Centre

Kings Bay's existing activity centre is not a traditional hub for retail or commercial, comprised mostly of car dealerships and other assorted retail businesses, as well as a leisure centre and two schools (Rosebank College and Lucas Gardens School). The nearest established activity centres are located at Burwood Road, Burwood and Great North Road, Five Dock.

Figure 45 – Existing activity centre, Kings Bay Precinct

8.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 revealed that more residents of Kings Bay Precinct are employed in Sydney Inner City (29 per cent) than any other destination, as shown in Table 51. A significant number of residents travel by bus to Sydney Inner City, however private vehicle travel remains the dominant mode in all of the top five destinations with an overall mode share of 69 per cent. This is likely to be a result of the lack of convenient public transport options available from the Precinct.

Table 51 – Workforce travel destinations, Kings Bay Precinct (source: BTS Journey to Work – Travel Zones)

WORKFORCE DESTINATIONS		TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL*^
1	**Sydney Inner City**	246	372	437	5	77	1137
2	**Canada Bay**	14	27	406	77	22	546
3	**Strathfield-Burwood-Ashfield**	17	24	323	43	24	431
4	**Ryde - Hunters Hill**	10	9	171	3	6	199
5	**Leichhardt**	0	13	178	0	7	198
Other		152	34	1232	3	54	1475
Total		439	479	2747	131	190	3986
		11%	12%	69%	3%	5%	100%

^Excludes those who did not go to work or work from home
*Standard Area 3 selected were those that contained sections of the core study area

A majority of workers in the Kings Bay Precinct start their travel in the neighbouring areas of Canada Bay and Strathfield - Burwood – Ashfield as shown in Table 52. The top five places of residence for people working in Kings Bay also included Canterbury, Bankstown and Leichhardt. The majority of inbound trips to the Kings Bay Precinct are made by car with a dominant mode share of 80 per cent. Only seven per cent of workers travel by train and five per cent of workers travel by bus, a lower public transport mode share than outbound trips. This indicates that there may be issues with public transport accessibility to employment areas or there is a good supply of off-street and on-street parking available to the employees within the Kings Bay Precinct.

Table 52 – Employment travel origins, Kings Bay Precinct (source: BTS Journey to Work – Travel Zones)

EMPLOYEE ORIGINS		TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL*^
1	**Canada Bay**	10	41	600	112	38	801
2	**Strathfield-Burwood-Ashfield**	38	56	464	49	39	646
3	**Canterbury**	7	22	115	0	6	150
4	**Bankstown**	16	0	120	0	3	139
5	**Leichhardt**	0	6	96	0	6	108
	Other	143	38	1182	0	27	1390
	Total	214	163	2577	161	119	3234
		7%	5%	80%	5%	4%	100%

^Excludes those who did not go to work or work from home
*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

The existing mode split for the Kings Bay Precinct compared to the wider Burwood LGA, Canada Bay LGA and Ashfield LGA is summarised in Table 53. The most popular choice of travel to work is private vehicle travel (69%), followed by public transport (24%) and walk only trips (3%). It is evident that while the public transport mode share is lower in the Precinct than all LGAs, the bus mode share is higher than all LGAs. This suggests that residents are using buses as it is the only available public transport. In addition, the private vehicle mode share was higher than all LGAs, further indicating a lack of public transport infrastructure located within convenient walking distance of Kings Bay Precinct. However, it should be noted that the JTW data is based on the primary mode of travel used for each trip, indicating mode shares may be underestimated due to people walking or cycling to their primary mode of rail travel.

Table 53 – Mode share of Kings Bay Precinct compared to Burwood LGA, Canada Bay LGA and Ashfield LGA (2011) (source: BTS Journey to Work – Travel Zones)

MODE	EXISTING KINGS BAY PRECINCT MODE SHARE	EXISTING LGA MODE SHARES		
		BURWOOD LGA	CANADA BAY LGA	ASHFIELD LGA
Vehicle driver	64%	47%	62%	46%
Vehicle passenger	5%	4%	4%	4%
Train	11%	36%	14%	36%
Bus / Ferry / Tram	13%	4%	12%	6%
Walked only	3%	5%	3%	4%
Other mode	2%	1%	2%	2%
Mode not stated	2%	2%	1%	2%

Existing Traffic and Transport Conditions

Existing Road Network

The existing road network in the Kings Bay Precinct is illustrated in Figure 46, highlighting the key roads connections including Parramatta Road.

Traffic volumes

There are no permanent Roads and Maritime Services traffic count stations located within the Kings Bay Precinct, with the nearest counting station located approximately two kilometres east of the Precinct in Ashfield along Parramatta Road. However, the *WestConnex M4 East EIS Traffic and Transport Assessment* provided volumes for Queens Road at the centre of the Precinct, obtained from automatic traffic count surveys completed between 2012 and 2014. It is considered that the volumes from the two counters provide an indication of the scale of traffic passing through the Precinct.

Figure 46 – Road network and major connections in the vicinity of Kings Bay Precinct

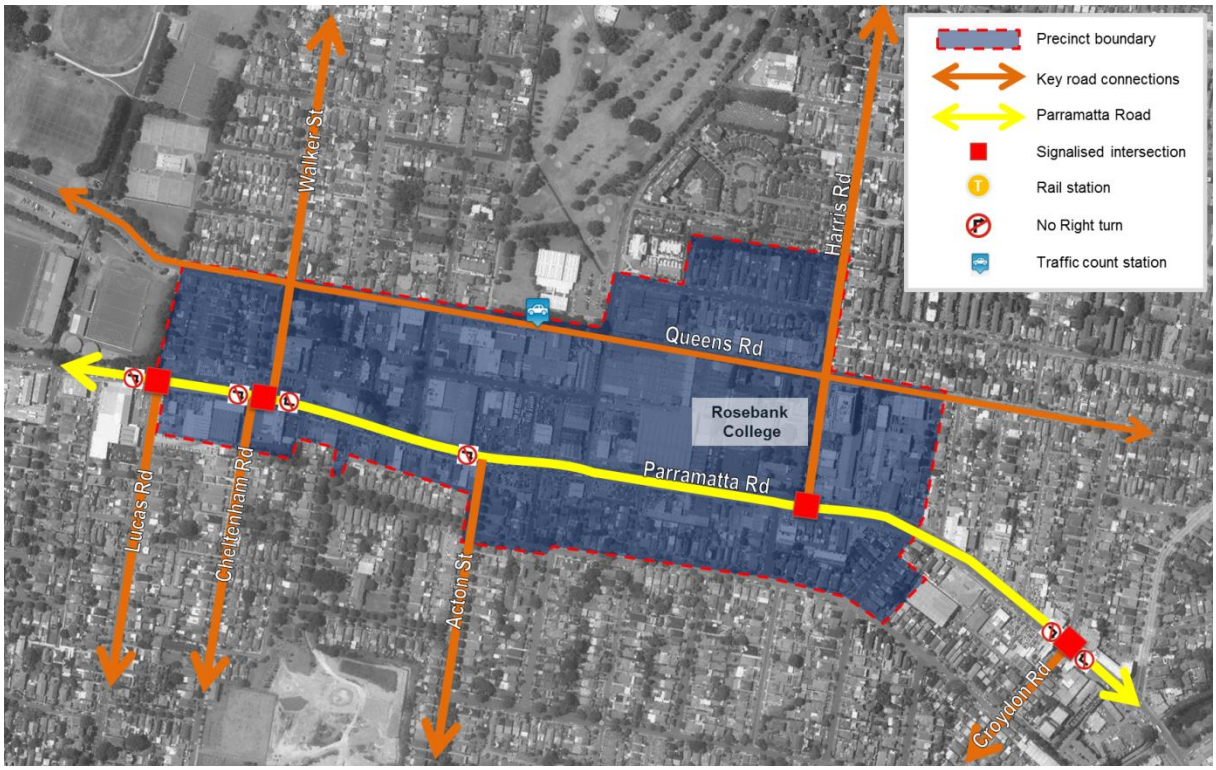


Table 54 shows the volumes per weekday for Parramatta Road east of the Precinct and Queens Road in 2012. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, Parramatta Road would be classified as a Class 5 Urban road (5U). Characteristics of a Class 5U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RMS Network and Corridor Planning, 2008). The lower volumes on Queens Road indicate that it would be classified as a lower level Class 4 Urban road (4U), typically considered as important State Roads with moderately high traffic volumes.

Table 54 – Traffic counting stations near Kings Bay Precinct (source: RMS traffic counts)

ROAD NAME	STATION DESCRIPTION	WESTBOUND*	EASTBOUND*	TOTAL*
Parramatta Road~	Ashfield - East Of Dalhousie Street	27,800	29,400	57,200
Queens Road^	Between William Street and Coonardoo Close	13,600	13,700	27,300

*Weekday counts ~RMS traffic counts, 2012 ^ WDA automatic traffic counts, 2012-14

Constraints

The Precinct contains a number of land uses such as retail zones, community facilities and education facilities, which often generate private vehicle trips. In particular, the dense retail district between Regatta Road and Harris Road causes severe traffic congestion during morning peak hours (i.e. 6am to 9:30am) and school hours. This reflects the lack of permeability for customers and employees accessing the retail district of Kings Bay.

Constraints of the surrounding road network include:

- Harris Road and Regatta Road intersections at Parramatta Road and Queens Road

- vehicular and pedestrian movement conflicts at Regatta Road, William Street, Courland Street, Lavender Street and York Avenue due to the lack of pedestrian crossings
- north-south vehicular connectivity across Parramatta Road.

Existing Public Transport Network

Public transport services in Kings Bay Precinct are based around bus services operating along Parramatta Road, Queens Road and Harris Road. It should be noted that there are no rail stations located within convenient walking distance (800 metres) of the Precinct boundary. However rail services at the nearest stations, Burwood Station and Croydon Station, have been taken into consideration below.

Rail Services

Burwood Station is located approximately 1.1 kilometres south-west of the Precinct boundary and Croydon Station is located approximately 1.2 kilometres south of the Precinct boundary. Based on station barrier counts Burwood Station was ranked the 15th busiest station on the Sydney Trains network recording approximately 29,040 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014). While both Burwood Station and Croydon Station are serviced by the T2 Inner West & South Line; Burwood Station also services the T1 North Shore, Northern & Western Line. These lines connect to several centres including the Sydney CBD, Parramatta and Liverpool.

The number of rail services stopping at Burwood Station and Croydon Station during peak periods are shown in Tables 55 and 56.

Table 55 – Rail service frequencies at Burwood Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T1 North Shore, Northern & Western Line		
Berowra to City via Gordon, Hornsby to City via Macquarie University	25	16
City to Berowra via Gordon, City to Hornsby via Macquarie University	16	19
Hornsby and Epping to City via Strathfield	8	8
City to Epping and Hornsby via Strathfield	8	8
Emu Plains to City, Richmond to City	8	11
City to Emu Plains, City to Richmond	17	8
T2 Inner West & South Line		
Campbelltown to City via Granville	8	9
City to Campbelltown via Granville	11	8

Table 56 – Rail service frequencies at Croydon Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T2 Inner West & South Line		
Campbelltown to City via Granville	9	13
City to Campbelltown via Granville	8	8

Bus Services

The Kings Bay Precinct is currently serviced by several bus routes connecting to major centres including Leichhardt, Strathfield, Sydney CBD, Burwood and Hurstville. Bus routes are accessible within the Precinct along Queens Street, Parramatta Road and Harris Road. The Precinct is currently served by the following bus routes:

- route 439 (Mortlake to City via Leichhardt) passes along Bayview Road and around Canada Bay, providing bus services to the northern and Western districts of Kings Bay Precinct
- route 502 (Drummoyne to City) operates along Harris Street and Garfield Street and runs south of the Great North Road
- route 461 (Chiswick to Campsie via Strathfield and Burwood) operates along Garfield Street, Harris Street and Parramatta Road
- route 415 (City to Parramatta via Burwood) operates along Parramatta Road within the Precinct
- route 490 & 492 (from Drummoyne to Hurstville/Rockdale via Burwood and Kingsgrove) operates along the Great Northern Road and passes along Croydon Road and Church Street.

Error! Reference source not found. presents the bus routes in and around the Kings Bay Precinct.

Figure 47 – Bus services in the vicinity of Kings Bay Precinct

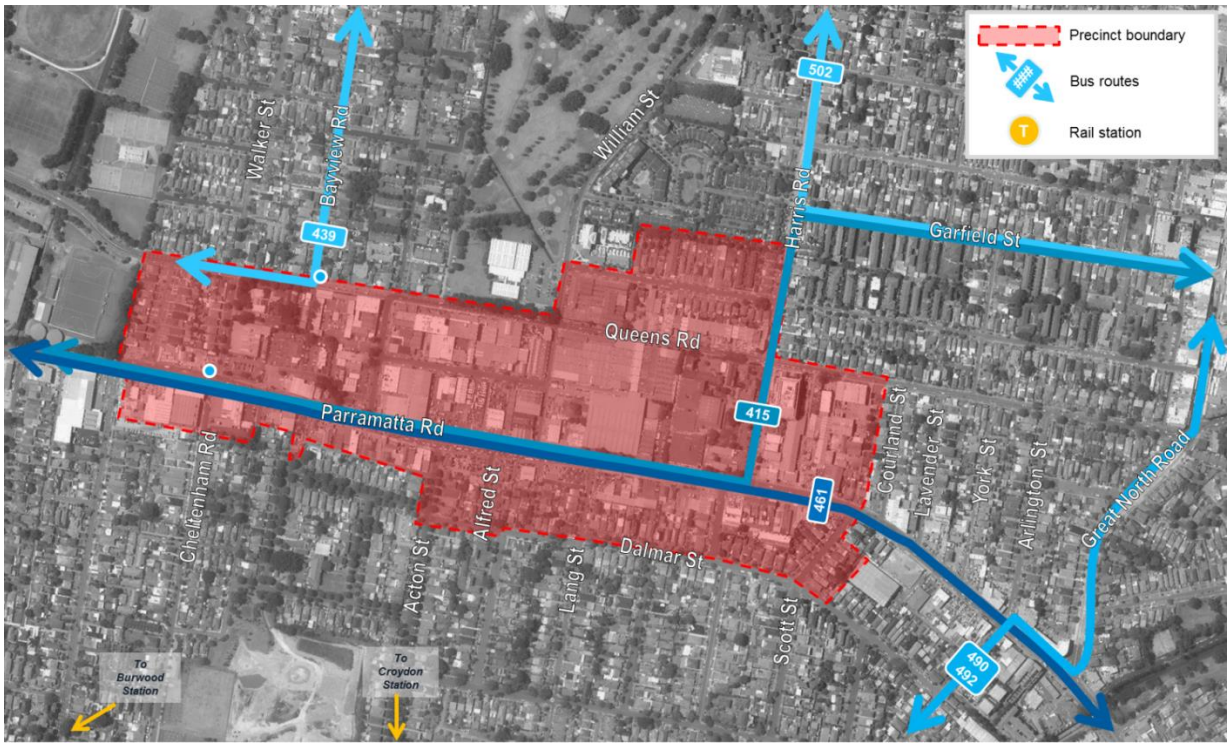


Table 57 provides a summary of peak bus service frequencies for routes operating in and around the Kings Bay Precinct.

Table 57 – Bus service frequencies for Kings Bay Precinct (source: Transdev and Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
439	Mortlake to City via Leichhardt	10 minutes	10 minutes
502	Drummoyne to City	10 minutes	<10 minutes
461	Chiswick to Campsie via Strathfield and Burwood	<15 minutes	15 minutes
415	City to Parramatta via Burwood	10 minutes	5 minutes
490 & 492	Drummoyne to Hurstville and Rockdale via Burwood and Kingsgrove	10 minutes	10 minutes

Existing Parking Conditions

A majority of roads provide unrestricted on-street parking throughout Kings Bay Precinct, including William Street, Regatta Road and Bayview Road. Clearways are in operation along Parramatta Road between 6am – 7pm weekdays and 8am – 8pm weekends.

Approximately 110 public off-street parking spaces are provided by Canada Bay Council at the Five Dock Leisure Centre along the northern boundary of the Precinct. New developments are required to provide off-street parking to service the anticipated demands of the proposed land use.

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of the current off-street parking rates in the Kings Bay Precinct based on the Development Control Plans for each LGA are presented in Tables 58-60

Table 58 – Off-street parking rate summary – Canada Bay LGA (source: Canada Bay DCP 2013)

LAND USE	PARKING RATE (MINIMUM)		
Residential	Detached	1 space per dwelling	
	1 bedroom unit	1 space per dwelling	Visitors: < 5 dwellings, 1 space per dwelling > 5 dwellings 0.5 spaces per dwelling
	2 bedroom unit	1.5 space per dwelling	
	3+ bedroom unit	2 spaces per dwelling	
Office/Business	1 space per 40sqm of GFA.		
Restaurants / cafes	The greater of: 1 space per 6sqm of serviced area or 1 space per 4 seats.		

Table 59 – Off-street parking rate summary – Burwood LGA (source: Burwood DCP 2013)

LAND USE	PARKING RATE (MINIMUM)		
Residential	Studio	0.5 space per dwelling	Visitors: 0.2 spaces per dwelling.
	1 bedroom unit	0.5 space per dwelling	
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	1.2 spaces per dwelling	
Business	1.5 spaces per 100 sqm of GFA		
Retail	1.5 spaces per 100 sqm of GFA		

Table 60 – Off-street parking rate summary – Ashfield LGA (source: Ashfield DCP 2013)

LAND USE	PARKING RATE (MINIMUM)		
Residential	1 bedroom unit	1 space per dwelling	Visitors: 0.2 spaces per dwelling.
	2 bedroom unit	1 space per dwelling, plus 1 space for every five 2-bedroom units	
	3+ bedroom unit	1 spaces per dwelling, plus 1 space for every two 3-bedroom units	
Commercial premises including offices	2.5 spaces per 100 sqm of GFA		
Retail	2.5 spaces per 100 sqm of GFA		

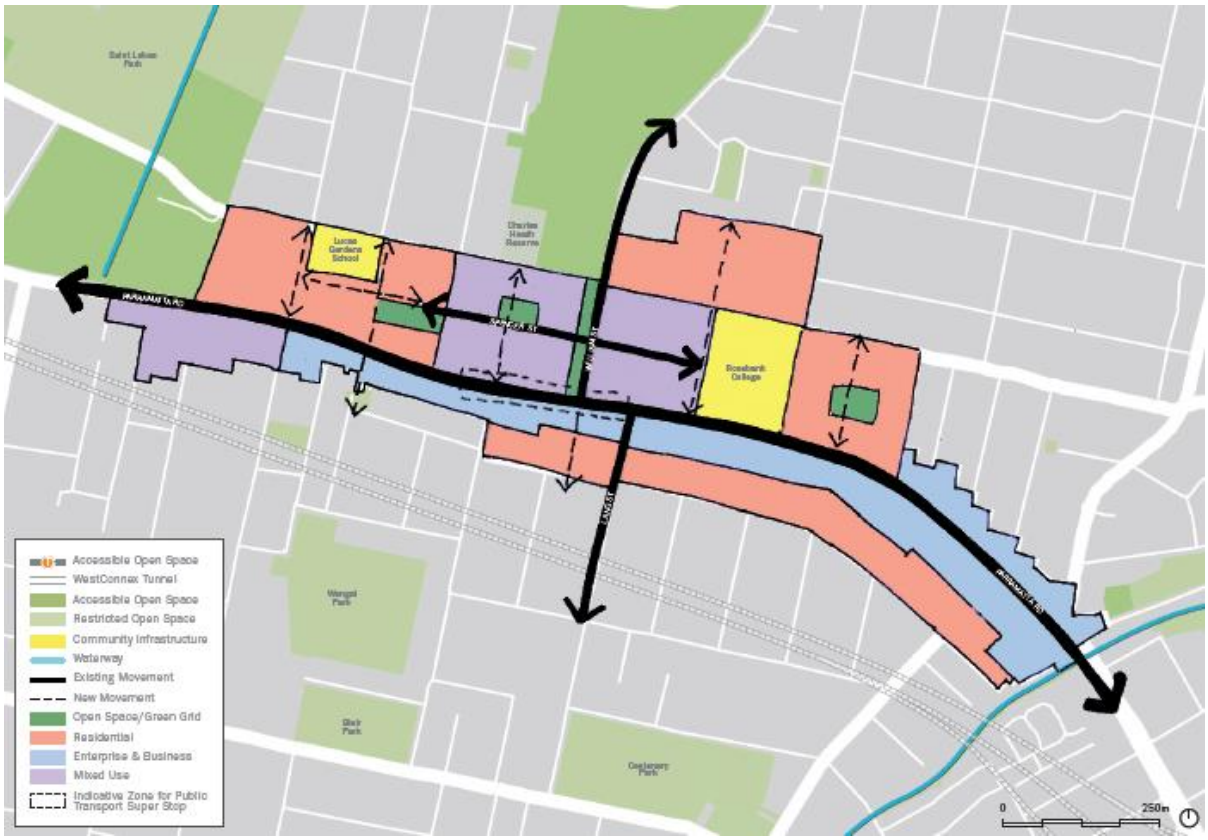
Existing Walking and Cycling Networks

While paved footpaths are provided on either side of a majority of roads in the Precinct, there are limited formal pedestrian crossings of Parramatta Road within the Precinct. The Precinct has well connected cycle facilities, with an on-road cycle route along Queens Road serving as the key east-west walking and cycling link. An on-road cycle route to the east of the Precinct on Croydon Road provides residents with a walking and cycling link to Croydon Station, south of the Precinct. Cycling facilities are present as on-road cycle routes only, with off-road routes present north of the Precinct.

8.3 Future Kings Bay Precinct Character

A new residential urban village with a Parramatta Road address, a fine-grained active street network and strong links to the open space network along Sydney Harbour.

Figure 48 – Structure plan, Kings Bay Precinct



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- facilitate mixed uses on both sides of Parramatta Road between Regatta Road and Scott Street
- develop a new local village around Spencer Street
- encourage medium and high density residential uses north of Parramatta Road with limited appropriately scaled infill residential development south of Parramatta Road.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- create a new fine grain road network and a mixture of uses and activities anchored on the Queens Road, Spencer Street and William Street intersections
- establish a new, high amenity local neighbourhood hub focussed around Spencer Street with high amenity and low traffic

- retain and build on existing lifestyle/recreation businesses in and around the Precinct
- facilitate site amalgamation in appropriate locations to provide opportunities for redevelopment.

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance links to Croydon Station so that it is easier to access rail services with a focus on north south connectivity across Parramatta Road
- enhance access to open space areas to the north with improved active travel infrastructure between Parramatta Road and the foreshore
- introduce a series of new laneways and through links within the existing road network grid to encourage greater land use mix and create a distinct place for residents
- improve walking and cycling connections to regional recreation and open space facilities, particularly via the Patterson / Gipps / Queens Road cycle route toward the leisure routes around Canada Bay
- reduce car dependency by lowering parking rates in areas with good access to public transport and capitalising on the rapid bus network along Parramatta Road.

Primary Constraints

- high traffic volumes along Parramatta Road and surrounding streets
- overcoming the north-south barrier to permeability created by Parramatta Road
- reliance on a small number of key roads for accommodating all modes of transport.

8.4 Future Strategic Transport Network

Proposed Street Functions

The majority of streets within the Kings Bay Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Kings Bay Precinct and their categorisation are outlined below.

Movement Corridors

- Parramatta Road – This is the main east-west traffic route through the Precinct and will continue to have a high movement function providing access at either end of the Precinct to Burwood and Five Dock.

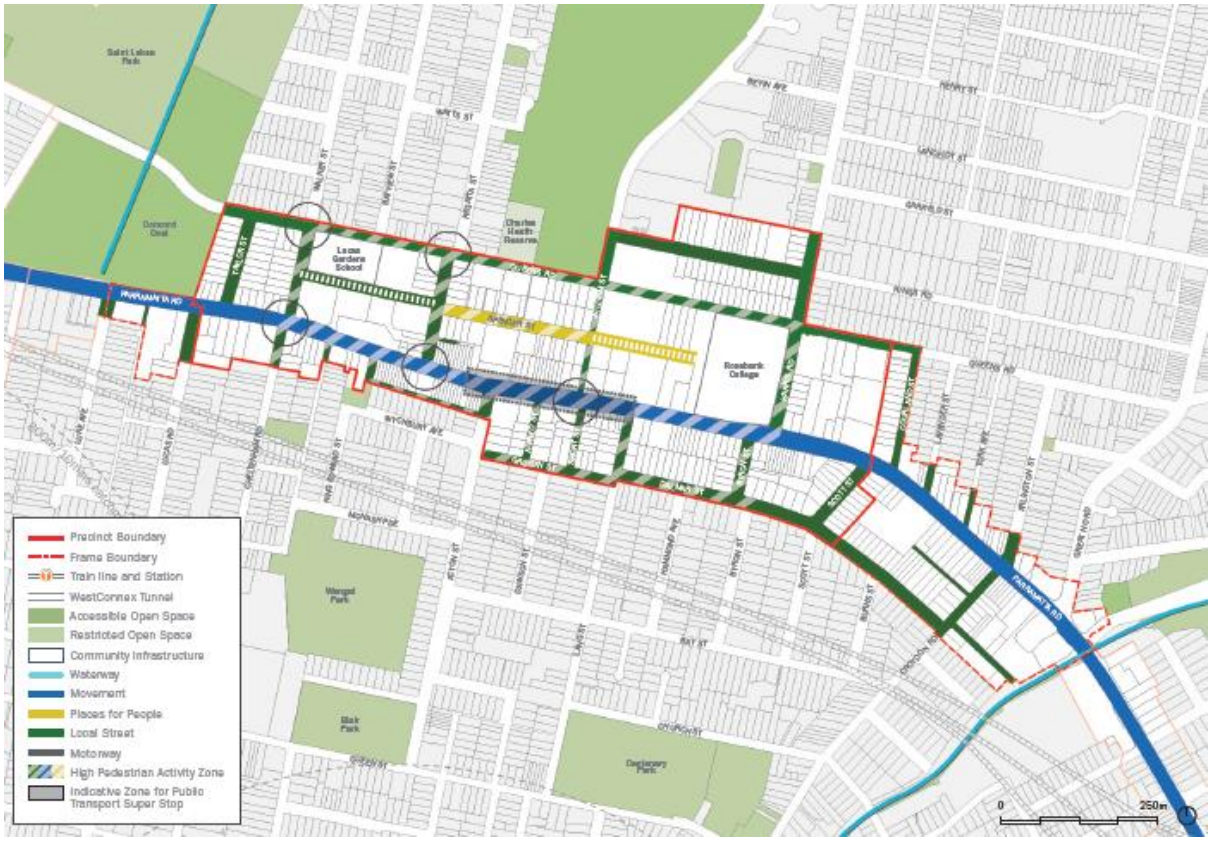
  This section of Parramatta Road will also see a significant reduction in vehicle traffic as a result of WestConnex M4 East.

  Parramatta Road will still have high movements for private vehicles and public transport, but there is an opportunity for higher kerbside activity and activated frontages connecting into any future Rapid Transit stop.

Places for People

- Spencer Street – This will be the main east-west street with an activated frontage providing access to the town centre.
- All other streets (existing and proposed) will perform a Local street function.

Figure 49 – Proposed street functions, Kings Bay Precinct



Future Road Network

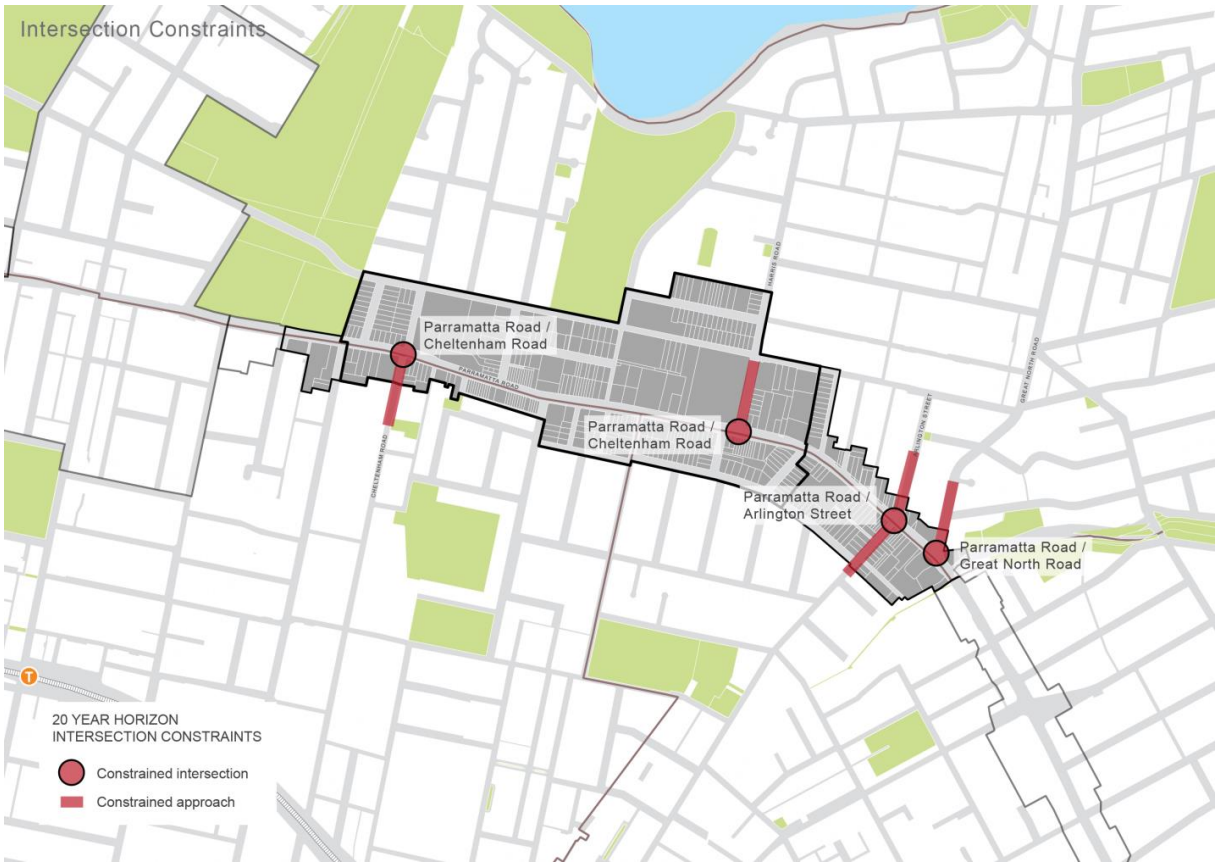
Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- significant delays to the north and south of Parramatta Road on streets that intersect with Parramatta Road, including Cheltenham Road, Harris Road, Arlington Street and Great North Road
- these streets have limited stop-line capacity and low green time; priority is allocated to the through movement on Parramatta Road to maintain east-west coordination
- overall intersection performance remains acceptable.

Table 61 – Future intersection performance, Kings Bay Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Luke Avenue	A	East	A
		West	A
Parramatta Road / Cheltenham Road	A	East	A
		South	E
		West	A
Parramatta Road / Harris Road	C	East	C
		North	E
		West	B
Parramatta Road / Arlington Street	B	East	A
		North	F
		South	D
		West	B
Parramatta Road / Great North Road	B	East	A
		North	E
		West	A

Figure 50 – Future intersection constraints, Kings Bay Precinct (approaches not to scale)



Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Kings Bay Precinct and Frame Area. The following intersections have been identified that will require investigation and likely upgrades in order to better facilitate future movements in and through the Precinct and Frame Area and should be specifically modelled as part of future rezoning proposals. ***The identified upgrades are indicative only and may require alternative solutions***.

- All existing signalised intersections in the Precinct – Post implementation of WestConnex Stage 1B (M4 East) investigate reprioritising intersection signals to allow additional green time for north-south streets.
- Regatta Road/Queens Road - Provide new signals to improve pedestrian access into Precinct.
- Regatta Road/Parramatta Road - Provide new signals to improve pedestrian access across Parramatta Road.
- Walker Street/Parramatta Road - Provide westbound right turn bay into Walker Street for access into the western half of the Precinct.
- Walker Street/Queens Road - Allow eastbound right turn into Walker St for access into the western half of the Precinct.
- William Street/Parramatta Road - New signals to be provided with unrestricted turns out of William Street. Signals to include pedestrian and cycle crossings to improve local walking and cycling access.

Proposed Public Transport Network

In addition to existing and planned public transport in the Kings Bay Precinct, the following opportunities have been identified:

- investigate local bus network needs before and after the implementation of the Parramatta Road Corridor on-street rapid transit route. This could include opportunities for more direct services connecting the Precinct to the Sydney CBD via Lyons Rd (potential upgrade or variation of the existing peak only route 502). Consideration should also be given the role of route 439 and the potential for improved frequencies and/or service span.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed walking and cycling networks. For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Vibrant Streets and Places for People as identified using the movement and place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Parramatta Road between Wychbury Lane and Rosebank College

- William Street between Parramatta Road and Queens Road
- Spencer Street between Walker Street to William Street

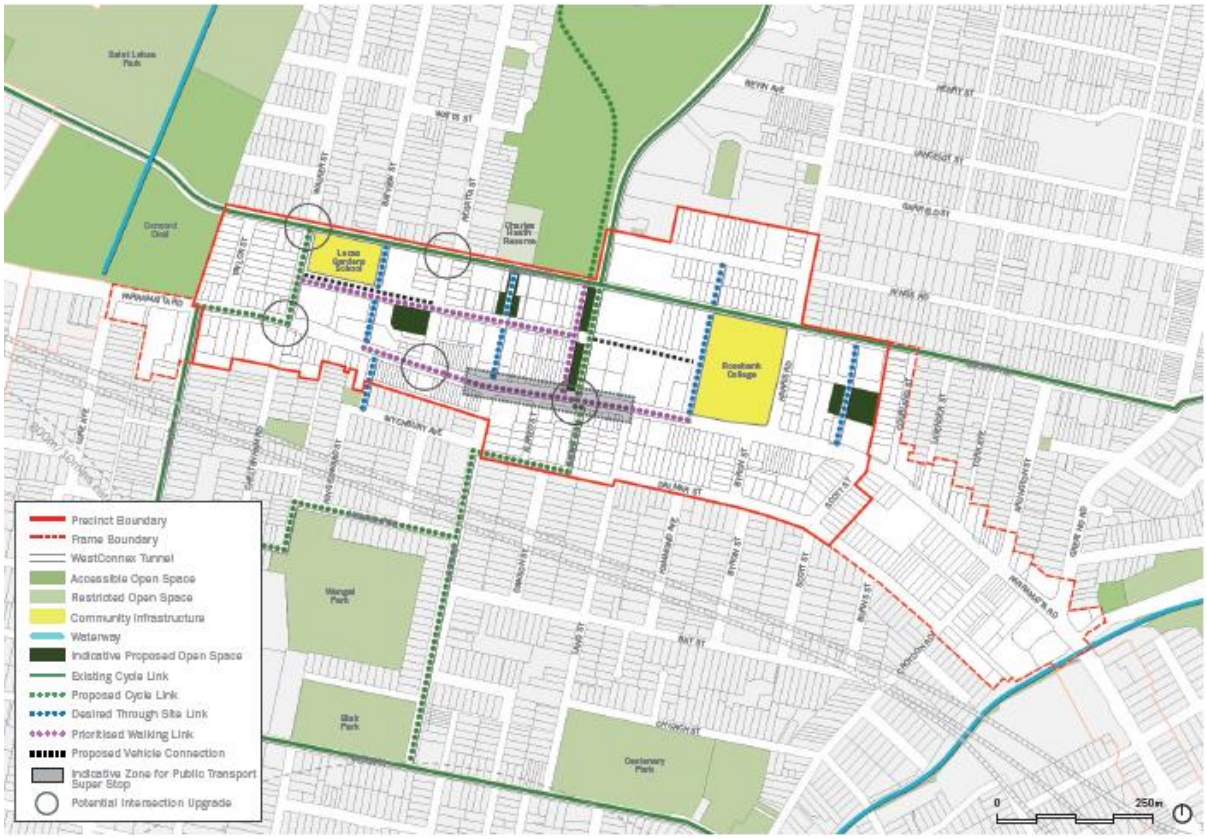
Desired Through Site Links

- Parramatta Road to Queens Road near Bayview Street
- Parramatta Road to Queens Road near Charles Heath Reserve
- Parramatta Road to Queens Road between Harris Road and Courland Street
- Parramatta Road to Kings Road
- Parramatta Road to Wychbury Avenue.

Proposed Strategic Cycle Links

- Parramatta Road between Lucas Road and Walker Street
- Walker Street between Parramatta Road and Queens Road
- William Street between Queens Road and Parramatta Road
- Barnwell Park between Lyons Road West and Queens Road
- Incorporation of Wangal Park into the regional bicycle network
- Regional cycleway along Gipps Street, Patterson Street and Queens Road (upgraded to separated cycleway).

Figure 51 – Proposed active transport, Kings Bay Precinct



Proposed Parking Controls

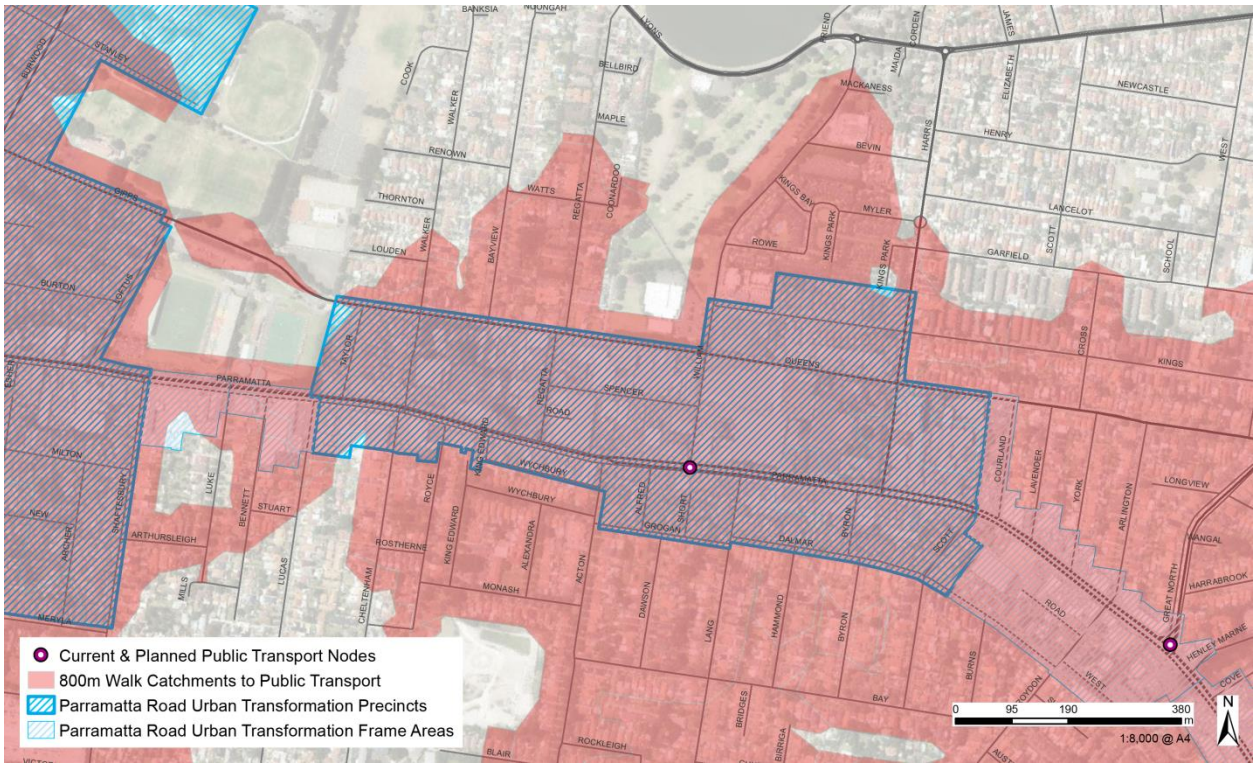
As outlined in Section 2, the Kings Bay Precinct is proposed to fall under the Category 2 parking rates shown in Table 62. This is based on the following points:

- almost the entire Precinct is within an 800m walking catchment to good quality public transport being Rapid Bus Route stops
- there is also good access to a strategic centre (Burwood) and a variety of local services in Five Dock and Burwood.

Table 62 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
2 (Kings Bay Precinct)	0.3	0.5	0.9	1.2	0.1	100	70	120

Figure 52 – 800m walking catchments to public transport, Kings Bay Precinct



9. Taverners Hill

9.1 Existing Activity Centre

Taverners Hill's existing activity centre is located to the north of the Precinct on Marion Street, anchored by the MarketPlace Leichhardt shopping centre which houses two supermarkets and a big box retailer. Marion Street is comprised of a range of retail and commercial shops as well as several restaurants. A mixture of retail and wholesale shops are located along Parramatta Road through the Precinct.

Figure 53 – Existing activity centre, Taverners Hill Precinct

9.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 reveals that more residents of the Taverners Hill Precinct are employed in the Sydney Inner City (46 per cent) than any other destination, with approximately 59 per cent of residents travelling to Sydney Inner City by either train or bus. Despite this, private vehicle travel comprises the highest overall mode share for residents within the Precinct accounting for 53 per cent of trips. This may be attributed to a lack of direct or convenient public transport connections to other metropolitan locations from Taverners Hill.

Table 63 summarises the JTW workforce travel destination data for the Taverners Hill Precinct.

Table 63 – Workforce travel destinations, Taverners Hill Precinct (source: BTS Journey to Work – Travel Zones 821, 939)

	WORKFORCE DESTINATIONS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Sydney Inner City**	326	364	361	22	96	1169
2	**Leichhardt**	4	19	143	51	20	237
3	**Strathfield – Burwood - Ashfield**	29	0	93	16	12	150
4	**North Sydney - Mosman**	50	3	57	0	9	119
5	**Ryde – Hunters Hill**	13	3	79	0	6	101
	Other	96	22	616	24	17	775
	Total	518	411	1349	102	171	2551
		20%	16%	53%	4%	6%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

In terms of people employed in the Precinct, the largest single employee origin location is Strathfield – Burwood – Ashfield accounting for approximately 15 per cent of all origins. The highest mode share for inbound trips were made by private vehicle (75 per cent). Public transport accounted for 17 per cent of trips to the Precinct, suggesting that the location of employment in the Precinct may not be conveniently accessible by public transport.

Table 64 summarises the JTW employment travel origin data for the Taverners Hill Precinct.

Table 64 – Employment travel origins, Taverners Hill Precinct (source: BTS Journey to Work – Travel Zones 821, 939)

	EMPLOYEE ORIGINS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL^*
1	**Strathfield - Burwood - Ashfield**	27	32	295	31	22	407
2	**Leichhardt**	6	22	161	73	20	282
3	**Canterbury**	3	13	167	0	6	189
4	**Canada Bay**	9	14	153	3	6	185
5	**Sydney Inner City**	31	28	90	6	9	164
	Other	208	37	1115	25	37	1422
	Total	284	146	1981	138	100	2649
		11%	6%	75%	5%	4%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

Table 65 shows the existing mode share for the Taverners Hill Precinct compared to the wider Leichhardt LGA and Marrickville LGA. The data shows the Precinct has a similar mode split to Marrickville LGA. Travel by private vehicle has the highest mode share for all three areas (43-50%), with public transport mode share following in the 20-30% range. It is evident that the chosen form of public transport to travel by was dependent on the service provided. The Leichhardt LGA is serviced by the Parramatta Road and Victoria Street bus corridors, resulting in a high proportion of bus trips. Marrickville LGA is served by two train lines and has a higher proportion of train travel.

Table 65 – Mode share for Taverners Hill Precinct compared to Leichhardt LGA and Marrickville LGA (2011) (source: BTS Journey to Work – Travel Zones)

MODE	EXISTING TAVERNERS HILL PRECINCT MODE SHARE	EXISTING LGA MODE SHARE	
		LEICHHARDT LGA	MARRICKVILLE LGA
Vehicle driver	49%	50%	43%
Vehicle passenger	4%	4%	4%
Train	20%	5%	30%
Bus / Ferry / Tram	16%	29%	11%
Walked only	4%	6%	6%
Other mode	6%	5%	5%
Mode not stated	1%	1%	1%

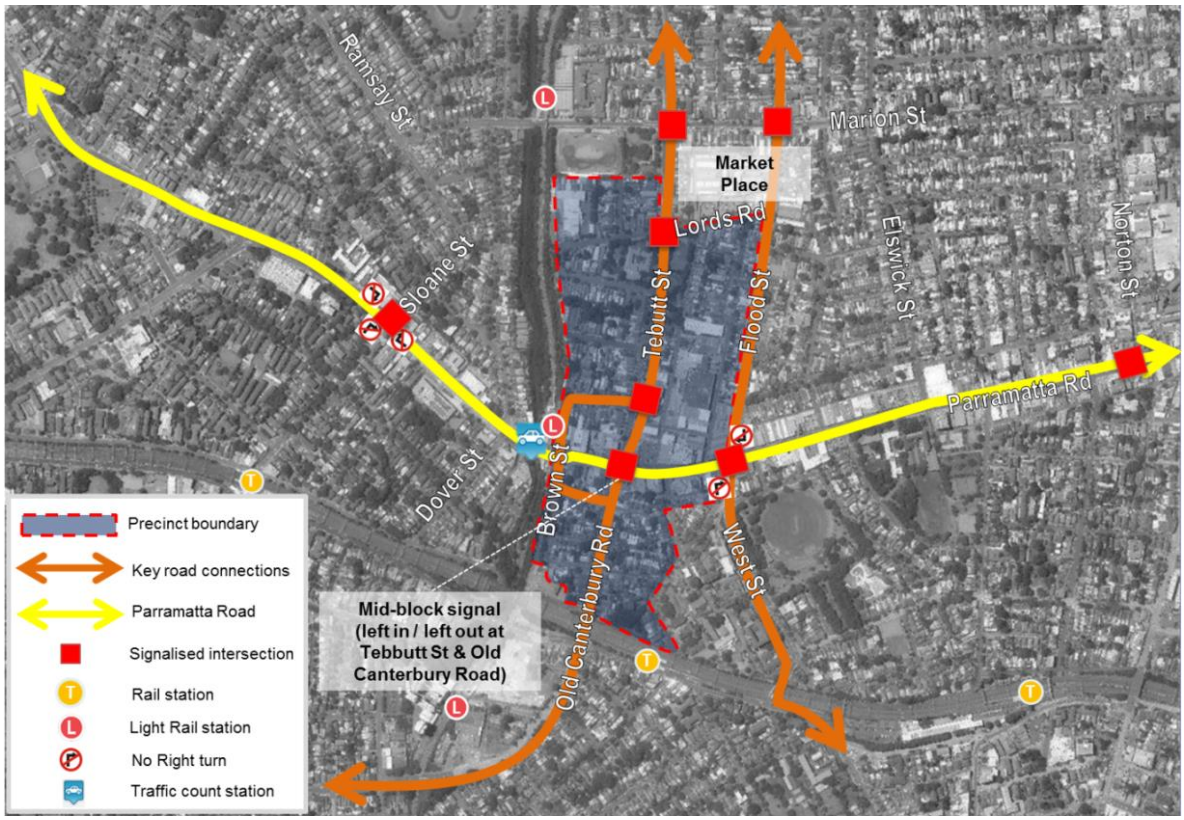
It should be noted that the extension of the Light Rail network to Dulwich Hill is not reflected in the 2011 JTW data, with the extension opening in 2014.

Existing Traffic and Transport Conditions

Existing Road Network

The existing road network in the Taverners Hill Precinct is illustrated in **Error! Reference source not found.**, ighlighting the key roads connections including Parramatta Road, Old Canterbury Road and Tebbutt Street.

Figure 54 – Road network and major connections in the vicinity of Taverners Hill Precinct



Traffic Volumes

There are no Roads and Maritime Services traffic count stations located within the Taverners Hill Precinct, however a counting station is present west of the Precinct along Parramatta Road at the Light Rail Line. It is considered that these volumes would provide an indication of the scale of traffic passing through the Precinct. Table 66 highlights a single traffic count station west of the Taverners Hill Precinct, with volumes over 60,000 vehicles per day in 2012. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, the section of the Parramatta Road would be classified as a Class 5 Urban road (5U). Characteristics of a Class 5U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RTA Network and Corridor Planning, 2008).

Table 66 – Traffic counting stations near Taverners Hill Precinct (source: RMS traffic counts)

ROAD NAME	STATION DESCRIPTION	WESTBOUND*	EASTBOUND*	TOTAL*
Parramatta Road	Leichhardt – At Light Rail Line	31,700	33,000	64,700

*Weekday counts for 2012

Constraints

The key constraints of the road network within the Taverners Hill Precinct include:

- Tebbutt Street, Old Canterbury Road, Flood Street and along Parramatta Road

- limited crossing opportunities of the T1 Western Line
- limited access to Lewisham Station via Thomas Street
- limited crossing of the light rail line at Marion Street
- lack of secondary east-west connections in the Precinct.

Existing Public Transport Network

Public transport services are based around Lewisham Station, Taverners Hill Light Rail stop and Marion Light Rail stop, all of which are in close proximity to the Precinct. Bus services are also provided along Parramatta Road, Marion Street and the southern side of Lewisham Station. Bus services along Parramatta Road provide connections to major centres including Burwood / Strathfield to the west and the Sydney / CBD to the east. Bus services along Marion Street provide connections to other centres such as Five Dock and Mortlake.

Rail Services

Lewisham Station lies on the southern boundary of the Precinct, accessible from Thomas Street. Based on station barrier counts Lewisham Station was ranked the 102nd busiest station on the Sydney Trains network recording approximately 4,780 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014).

Lewisham Station is serviced by the T2 Inner West & South Line. These lines connect the Taverners Hill Precinct to several major centres including the Sydney CBD, Parramatta and Liverpool.

The number of rail services stopping at Lewisham Station during peak periods is shown in Table 67.

Table 67 – Rail service frequencies at Lewisham Station (source: Sydney Trains, 2015.)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T2 Inner West & South Line		
Campbelltown to City via Granville	8	8
City to Campbelltown via Granville	8	8

The Taverners Hill Light Rail stop is located on the western boundary of the Precinct, providing connections to light rail services between Central Station and Dulwich Hill. The Inner West Light Rail extension from Lilyfield to Dulwich Hill opened in March 2014.

The number of light rail services stopping at Taverners Hill Light Rail Station during the peak periods is shown in Table 68.

Table 68 – Light Rail service frequencies at Taverners Hill Light Rail Station (source: Transport NSW, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
Zone 2 Pyrmont Bay to Dulwich Hill		
Pyrmont Bay to Dulwich Hill	12	12
Dulwich Hill to Pyrmont Bay	12	12

Bus Services

The Taverners Hill Precinct is currently serviced by several bus routes connecting to the major centres of Burwood, Strathfield, Campsie and the Sydney CBD. Bus routes are accessible along Parramatta Road, Marion Street and Railway Terrace with bus stops located just outside the Precinct, however one bus stop is located on Parramatta Road (near Carrington Street). The Precinct is currently served by the following bus routes:

- route 370 (Leichhardt to Coogee via UNSW) operates along Marion Street starting and terminating at Market Place
- route 413 (Campsie to City via Ashbury) travels along Railway Terrace and West Street south of the Precinct
- route 436 (Chiswick to City via Leichhardt), 438 (Abbotsford to City via Leichhardt) and 439 (Mortdale to City via Leichhardt) travels along Marion Street north of the Precinct
- route 461 (Burwood to City), 480 (Strathfield to City via Ashfield) and 483 (Strathfield to City via South Strathfield / Ashfield) passes through the Precinct along Parramatta Road.

Figure 55 presents the bus routes in and around the Taverners Hill Precinct.

Figure 55 – Bus services in the vicinity of Taverners Hill Precinct

Table 69 provides a summary of peak bus service frequencies for routes operating in and around the Taverners Hill Precinct.

Table 69 – Bus service frequencies for the Taverners Hill Precinct (source: Transdev and Sydney Buses, 2015)

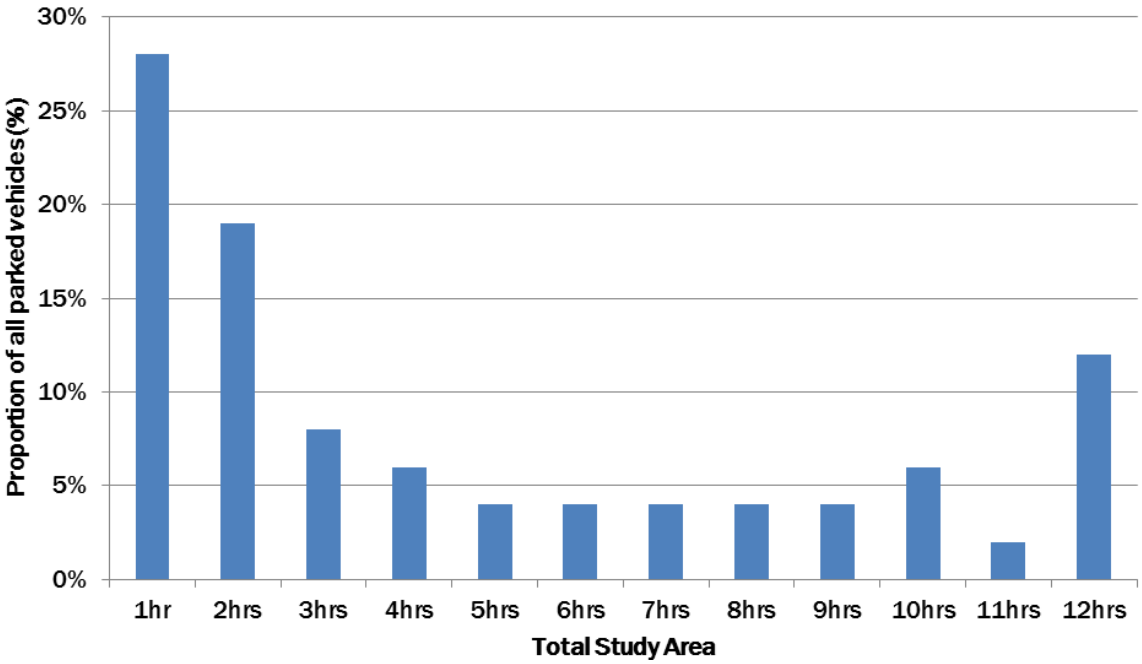
ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
370	Leichhardt to Coogee	10 – 30 minutes	10 – 15 minutes
413	Campsie to City via Ashbury	10 – 30 minutes	15 – 30 minutes
436, 438, L38, 439, L39	Five Dock to City via Leichhardt	10 – 15 minutes	10 – 30 minutes
461, 480, 483	Strathfield & Burwood to City via Domain	15 – 30 minutes	15 – 30 minutes

Existing Parking Conditions

The majority of roads provide unrestricted on-street parking throughout Taverners Hill Precinct, including Tebbutt Street and Flood Street. Clearways are in operation along Parramatta Road between 6am – 10am and 3pm – 7pm during weekdays.

Surveys of on-street parking supply and demand were undertaken for streets within 800 metres walk of major public transport stops. An average occupancy rate of 51% was observed across the study area with a maximum occupancy of 62% observed at any one time. A large proportion of all vehicles were parked for between 1 to 2 hours in duration (Figure 56). This suggests that many of these on-street spaces were being used to access local shops, businesses and facilities in the area surveyed. A moderate proportion of vehicles were observed parked for 12 hours, which is likely to be residents' vehicles parked on-street due to lack of off-street parking.

Figure 56 – Duration of stay for on-street parking spaces within 800 metres of major public transport stops



Currently there are no off-street council or commuter car parks provided within a convenient distance of the Precinct. Private parking is provided at various activity centres throughout the Precinct such as MarketPlace Leichhardt. New developments are required to provide off-street parking to service the anticipated demands of the proposed land use.

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of off-street parking rates in Leichhardt LGA is provided in Table70. The portion of the Precinct within Marrickville LGA is under Parking Area 1 and Area 2, a summary of parking rates is provided in Table 71.

Table 70 – Off-street parking rate summary – Leichhardt LGA (source: Leichhardt DCP 2013)

LAND USE	PARKING RATE		
Residential	Studio	0 to 0.5 spaces per dwelling	Visitors: 0.09 to 0.125 spaces per dwelling.
	1 bedroom unit	0.333 to 0.5 spaces per dwelling	
	2 bedroom unit	0.5 to 1 space per dwelling	
	3+ bedroom unit	1 to 1.2 spaces per dwelling	
Office premises	Min: 1 space per 100 sqm of GFA; Max: 1 space per 80 sqm of GFA		
Business premises	Min: 1 space per 100 sqm of GFA; Max: 1 space per 60 sqm of GFA		
Bulky goods	Min: 1 space per 125 sqm of GFA; Max: 1 space per 100 sqm of GFA		
Restaurants or cafes	Min: 1 space per 80 sqm of GFA; Max: 1 space per 50 sqm of GFA		

Table 71 – Off-street parking rate summary – Marrickville LGA (source: Marrickville DCP 2011)

LAND USE	PARKING RATE		
Residential flats - 7 or more units (Area 1 and 2)	Studio	1 space per dwelling;	Visitors: 0.25 spaces per resident space.
	1 bedroom unit	1 space per dwelling;	
	2 bedroom unit	1 space per dwelling;	
	3+ bedroom unit	1 space per dwelling;	
Business, retail and shops (Area 1)	Up to 500sqm	1 per 100sqm GFA	
	500 - 750sqm	5 + 1 per 65sqm GFA over 500sqm GFA	
	750 – 1,000sqm	9 + 1 per 45sqm GFA over 750sqm GFA	
	Over 1,000sqm	15 + 1 per 35sqm GFA over 1,000sqm GFA	
Business, retail and shops (Area 2)	Up to 500sqm	1 per 80sqm GFA	
	500 - 750sqm	7 + 1 per 45sqm GFA over 500sqm GFA	
	750 – 1,000sqm	12 + 1 per 35sqm GFA over 750sqm GFA	
	Over 1,000sqm	20 + 1 per 30sqm GFA over 1,000sqm GFA	

Existing Walking and Cycling Networks

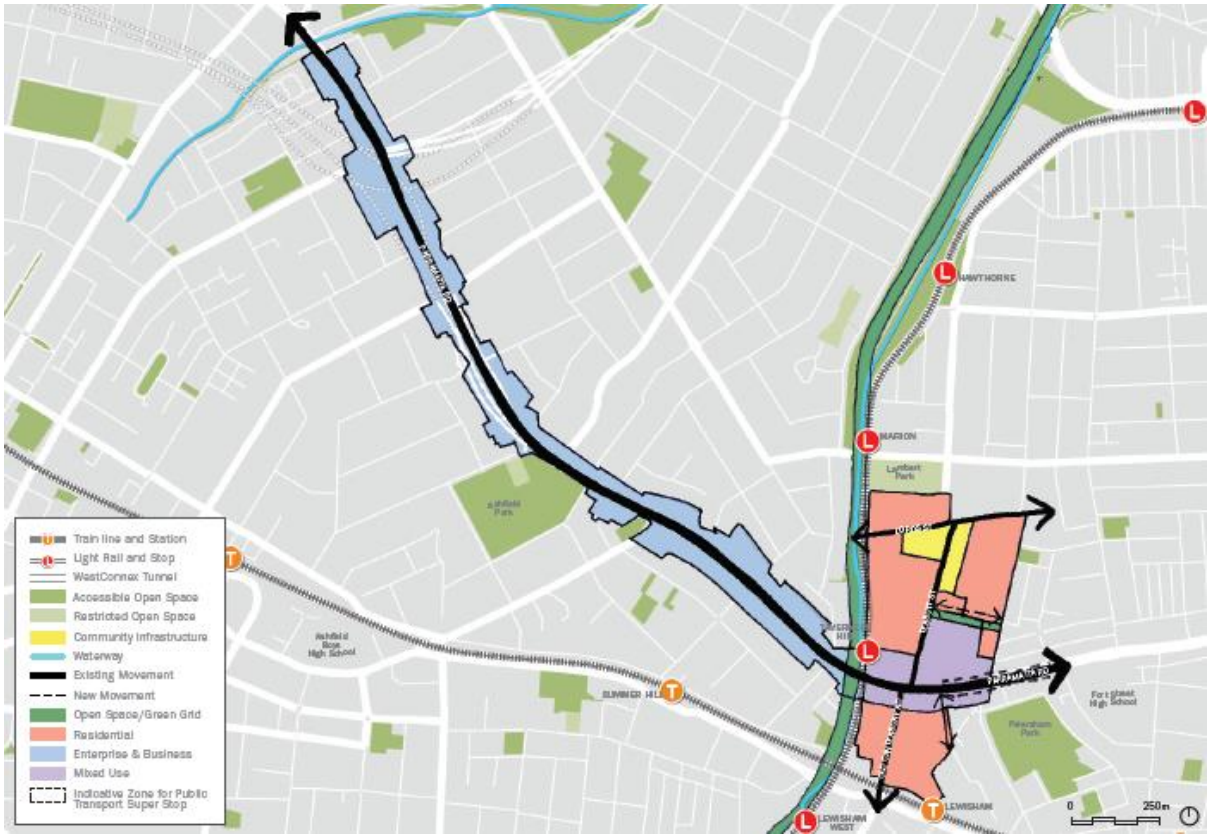
Paved footpaths are provided on either side of a majority of roads and signalised pedestrian crossings are present at intersections along Parramatta Road. A mid-block signalised crossing is provided within the Precinct on Parramatta Road near Tebbutt Street and Old Canterbury Road. A pedestrian bridge is located approximately 400 metres east of the Precinct, integrated with the Taverners Hill Light Rail stop. Cycle

facilities surrounding the Precinct are extensive providing links to a number of interchanges including Lewisham Station and Taverners Hill Light Rail stop and on the GreenWay / along Hawthorne Canal. While cycling facilities within the Precinct are present as on-road cycle routes only, the GreenWay is an off-road shared path present just outside the western Precinct boundary.

9.3 Future Taverners Hill Precinct Character

An urban village with strong green, water and active transport links via the adjoining GreenWay; a traffic calmed road network; a revitalised neighbourhood centre around a pedestrianised Parramatta Road intersection; and enhanced accessibility to nearby multiple public transport modes and high amenity neighbourhood parks, squares and leafy streets just off Parramatta Road.

Figure 57 – Structure plan, Taverners Hill Precinct



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- maintain an employment focus on both sides of Parramatta Road, Tebbutt Street, Upward Street and George Street
- retention of the existing low density character across the remainder of the Precinct
- encourage appropriately scaled infill residential development in select locations to attract and retain people in the core of the Precinct.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- establish a new high amenity local neighbourhood centre along Tebbutt Street/Upward Street that benefits from the Kolotex/Labelcraft site redevelopment
- create an activity node around the Taverners Hill Light Rail Stop
- create a new link between Upward Street and George Street.

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance links to both light and heavy rail stations with a focus on north south connectivity across Parramatta Road and a defined route for pedestrians to move between the station locations and through rail underpasses
- enhance access to open space areas to the north with active travel infrastructure between the Taverners Hill Precinct and the GreenWay as well as Leichhardt (Norton Street) in the east
- reduce the impact of the barriers provided by rail lines and Parramatta Road by enhancing connections across these constraints for all modes of transport
- introduce new north-south aligned laneways south of Parramatta Road and additional east-west aligned laneways to the north of Parramatta Road to enhance permeability for all modes of travel, provide activate streetscapes and link new developments to public transport infrastructure
- focus on Taverners Hill as a transit oriented development with dense residential land use, active streetscapes and low parking rates across the Precinct in order to capitalise on the existing rail service provision and the rapid bus network along Parramatta Road.

Primary Constraints

- high traffic volumes along Parramatta Road
- overcoming the barriers to permeability created by Parramatta Road and rail lines
- the existing road network is constrained by the rail lines and underpasses, with few options for traffic distribution within the Precinct and restricted access to Parramatta Road
- the high cost of reconfiguring the road network and existing impermeable street infrastructure
- low levels of connectivity to adjacent neighbourhoods for non-car modes of travel.

9.4 Future Strategic Transport Network

Proposed Street Functions

The majority of streets within the Taverners Hill Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Taverners Hill Precinct and their categorisation are outlined below.

Movement Corridors

Parramatta Road (from Iron Cove Creek to the light rail crossing) – This is the main east-west traffic route and will continue to have a high movement function, particularly given the WestConnex entry/exit portal at Wattle Street.

Vibrant Streets

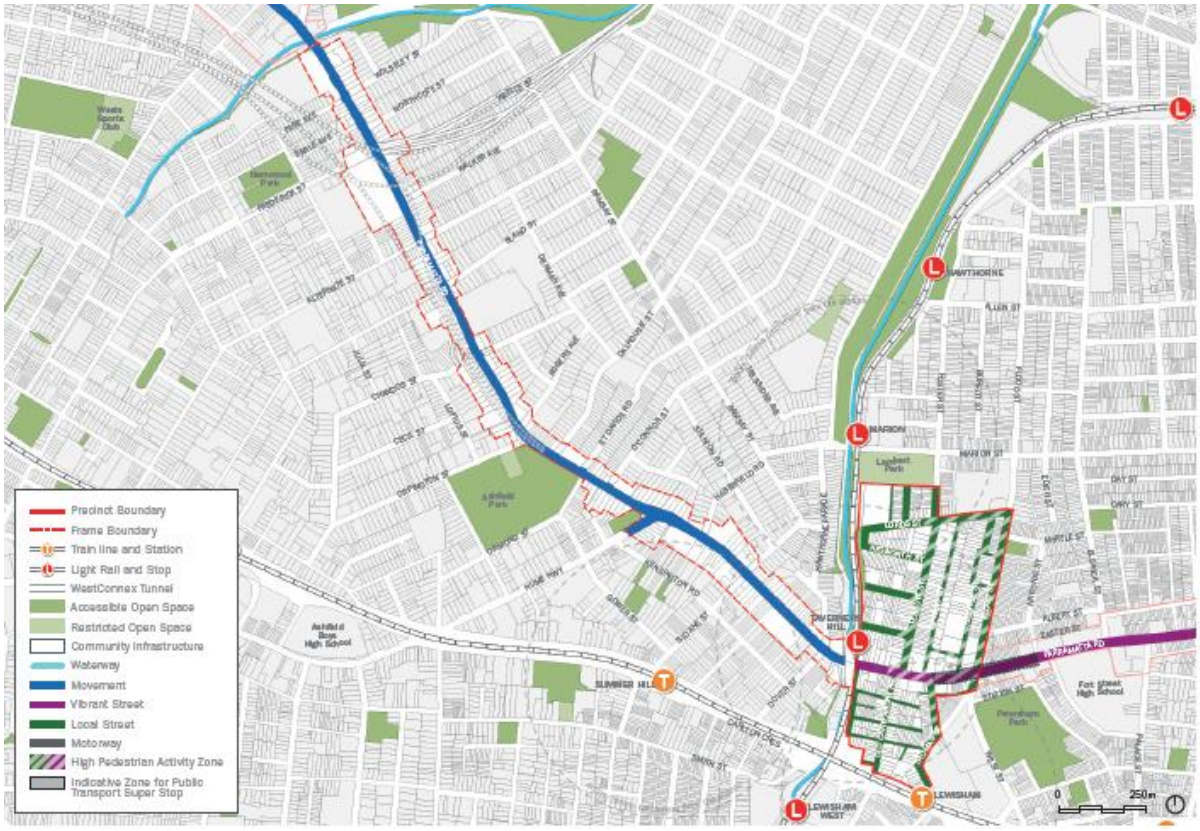
Parramatta Road (from light rail crossing to Flood Street) – This is the main east-west traffic route through the Precinct and will continue to have a high movement function providing access at either end of the Precinct to Burwood and Leichhardt.

This section of Parramatta Road will also see a reduction in vehicle traffic as a result of WestConnex M4-M5 Link. This, along with the transformed land use and better north-south connectivity, provides an ideal environment for a Vibrant Street.

Parramatta Road will still have high movements for private vehicles and public transport, but there is an opportunity for higher kerbside activity and activated frontages.

All other streets will perform a Local street function.

Figure 58 – Proposed street functions, Taverners Hill Precinct



Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- significant delays to the north and south of Parramatta Road on streets that intersect with Parramatta Road, including Sloane Street and Flood Street
- these streets have limited stop-line capacity and low green time; priority is allocated to the through movement on Parramatta Road to maintain east-west coordination
- overall intersection performance remains acceptable.

Figure 59 – Future intersection constraints, Taverners Hill Precinct (approaches not to scale)

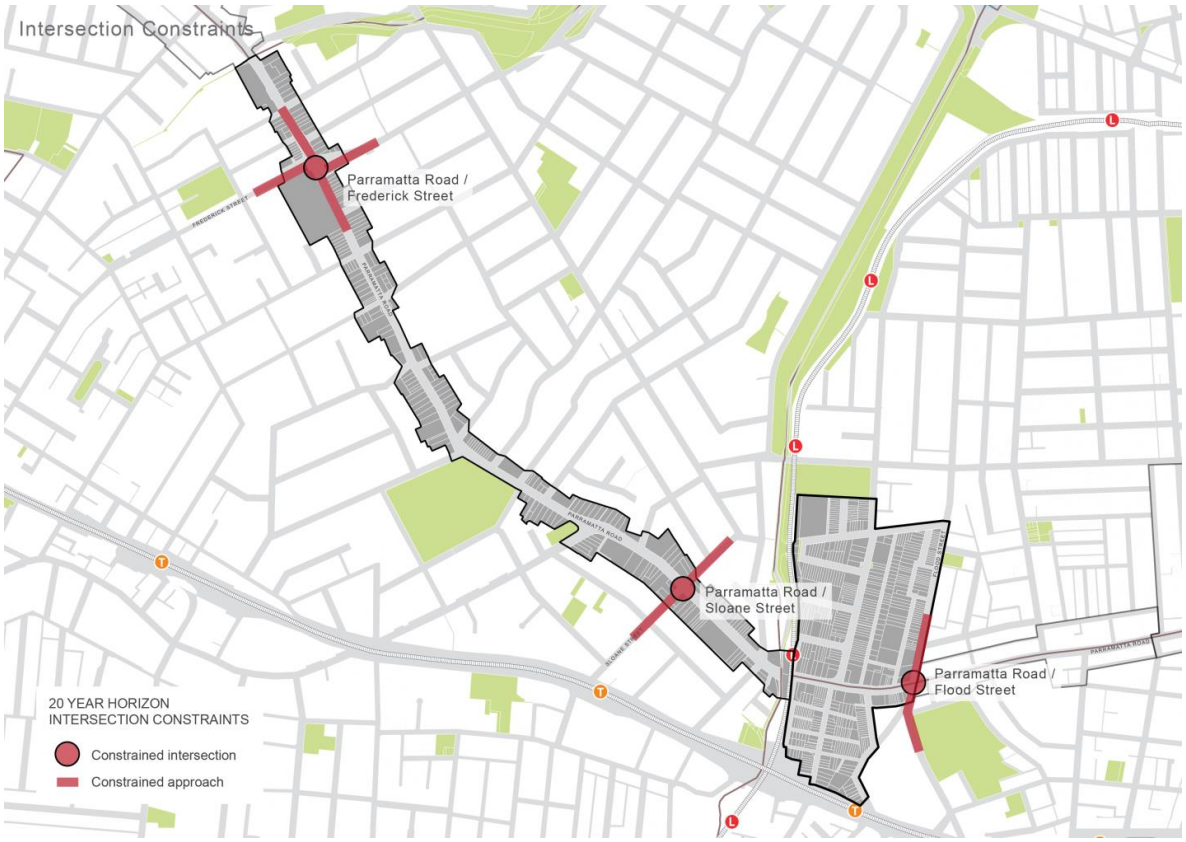


Table 72 – Future intersection performance, Taverners Hill Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Liverpool Road	C	East	B
		South	D
		South (left turn lane)	D
		West	D
Parramatta Road / Sloane Street	B	East	A
		North	F
		South	F
		West	B
Parramatta Road / Tebbutt Street	A	East	A
		North	B
		South	A
		West	B
Parramatta Road / Flood Street	C	East	B
		North	F
		South	D
		West	A

Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Taverners Hill Precinct.

The Flood Street/Parramatta Road intersection has been identified as a potential focus for facilitating better north-south movements across Parramatta Road for all road users, as well as improving access into the Precinct. The opportunity exists to investigate reprioritisation of the signals to allow additional green time post implementation of WestConnex Stage 3 (M4-M5 Link). Future rezoning proposals should model the impacts of future development on the Flood Street/Parramatta Road intersection in this context, in addition to any other intersections likely to be impacted.

Proposed public transport network

In addition to existing and planned public transport in the Taverners Hill Precinct, the following opportunities have been identified:

- investigate improved frequencies at Lewisham rail station and Taverners Hill Light Rail stop to support growth in the Precinct.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed active transport network.

For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Vibrant Streets and Places for People as identified using the movement and

place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Lords Road between light rail line and Flood Street
- Tebbutt Street between Parramatta Road and Lords Road
- Parramatta Road between Tebbutt Street and Carrington Street
- Carrington Street.

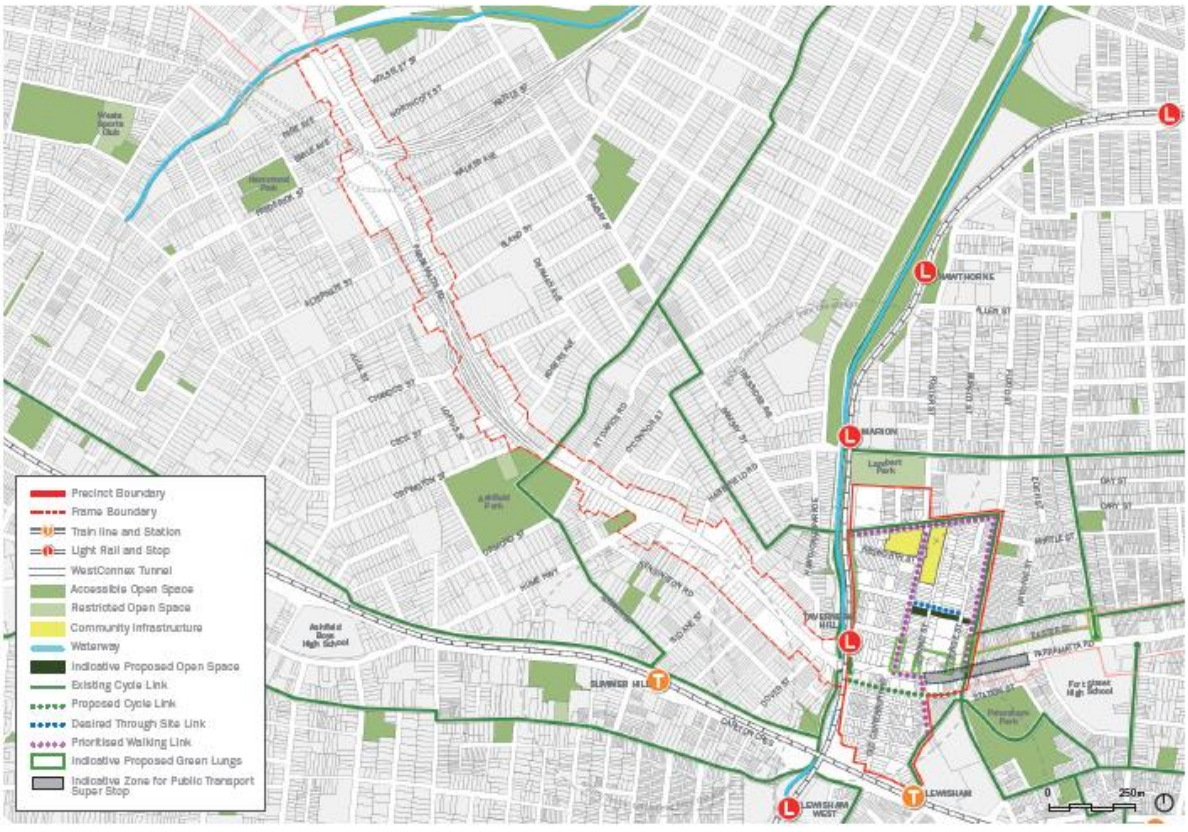
Desired Through Site Links

- Between Tebbutt Street and Flood Street

Proposed Strategic Cycle Links

- new east-west link on Nestor Lane, connecting with a new link between Carrington Street, Old Canterbury Road and Brown Street (overpass). Greenway connection under Parramatta Road.
- Greenway connection under Longport Street.

Figure 60 – Proposed active transport, Taverners Hill Precinct



Proposed Parking Controls

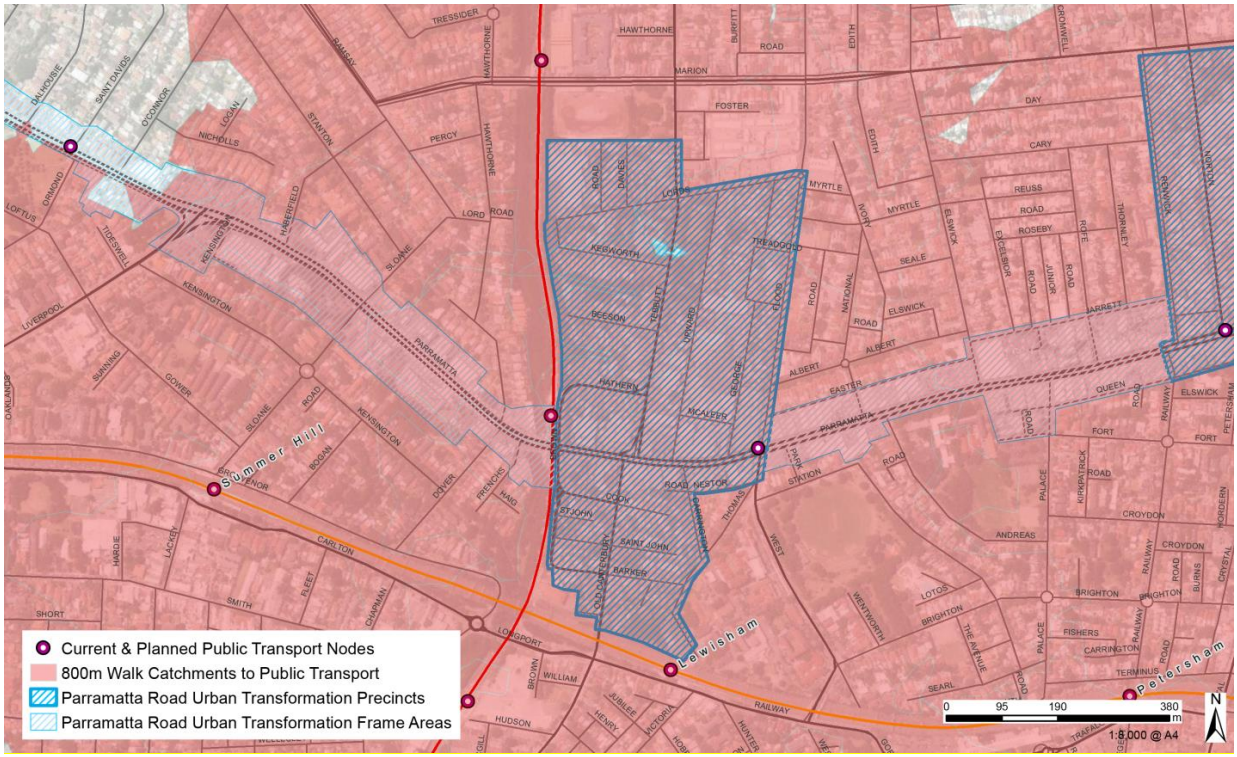
As outlined in Section 2, the Taverners Hill Precinct is proposed to fall under the Category 1 parking rates shown in Table 73. This is based on the following points:

- all of the Precinct falls within an 800m walking catchment of good quality public transport being train stations and/or Rapid Bus Route stops
- there is also good access to the Sydney CBD, a strategic centre (Burwood) and a variety of local services in Leichhardt, Summer Hill, and Lewisham.

Table 73 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
1	0	0.3	0.7	1	0	150	100	150

Figure 61 – 800m walking catchments to public transport, Taverners Hill Precinct



10. Leichhardt

10.1 Existing Activity Centre

Leichhardt's existing activity centre is focussed on Norton Street, running north from Parramatta Road through the Precinct. The centre includes Norton Plaza shopping centre, a cinema complex, a significant number of street level retail and commercial businesses, a range of restaurants and cafes and the Forum between Norton Street and Balmain Road. Leichhardt Town Hall is located immediately north of Marion Street, the Precinct's northern boundary.

Figure 62 – Existing activity centre, Leichhardt Precinct

10.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 reveals that more residents of the Leichhardt Precinct are employed in the Sydney Inner City (48 per cent) than any other area, with 61 per cent travelling by public transport. Public transport trips comprise 48 per cent of all work trips for residents in the Precinct, with buses recording 30 per cent and train recording 8 per cent. Private vehicle mode share is marginally lower at 47%. Walking and cycling modes comprise 15% mode

share combined, which could be due to the proximity of the top two workforce destinations and the fine grain street network in and around the Precinct.

Table 74 summarises the JTW workforce travel destination data for the Leichhardt Precinct.

Table 74 – Workforce travel destinations, Leichhardt Precinct (source: BTS Journey to Work – Travel Zones 819)

	WORKFORCE DESTINATIONS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL
1	**Sydney Inner City**	34	350	167	21	53	625
2	**Leichhardt**	0	6	62	82	6	156
3	**North Sydney - Mosman**	22	6	34	0	3	65
4	**Strathfield – Burwood - Ashfield**	0	11	40	6	0	57
5	**Ryde – Hunters Hill**	4	6	41	0	3	54
	Other	45	18	276	7	12	358
	Total	105	397	620	116	77	1,315
		8%	30%	47%	9%	6%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

In terms of people employed within the area, the JTW data shows that employed people working in the area are dispersed throughout Sydney. The Strathfield – Burwood – Ashfield area recorded the highest number of employed people who work within the Precinct at 15 per cent. Private vehicle is the dominant mode for travel to the Precinct at 67 per cent, possibly indicating that employment in the Precinct is not conveniently accessible by public transport from some of the top employment origins. Half of all employees travelling from Leichhardt walk to work in the Precinct.

Table 75 summarises the JTW employment travel origin data for the Leichhardt Precinct. It should be noted that the southern section of the Precinct is within Travel Zone 317 and has not been included due to the small portion of the Precinct within the Travel zone.

Table 75 – Employment travel origins, Leichhardt Precinct (source: BTS Journey to Work – Travel Zones 819)

	EMPLOYEE ORIGINS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL
1	**Strathfield – Burwood - Ashfield**	10	50	168	8	12	248
2	**Leichhardt**	4	23	63	103	6	199
3	**Canada Bay**	3	16	117	0	6	142
4	**Canterbury**	3	15	90	0	3	111
5	**Marrickville - Sydenham - Petersham**	6	9	42	43	6	106
	Other	101	80	613	4	23	821
	Total	127	193	1093	158	56	1,627
		8%	12%	67%	10%	3%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

The existing mode split for the Leichhardt Precinct compared to the Leichhardt LGA is summarised in Table 76. Private vehicle travel comprises 47% of all travel, followed by public transport (39%) and walk only trips (9%). The mode share for the Precinct is similar to the Leichhardt LGA, with a slightly lower private vehicle mode share. The data shows that buses are the dominant mode of public transport given the significant number of bus routes serving the area. The data also shows a higher proportion of people travelling by train than Leichhardt LGA.

Table 76 – Mode share of the Leichhardt Precinct compared to Leichhardt LGA (2011) (source: BTS Journey to Work – Travel Zones)

MODE	EXISTING LEICHHARDT PRECINCT MODE SHARE	EXISTING LGA MODE SHARES LEICHHARDT LGA
Vehicle driver	44%	50%
Vehicle passenger	3%	4%
Train	8%	5%
Bus / Ferry / Tram	31%	29%
Walked only	9%	6%
Other mode	4%	5%
Mode not stated	1%	1%

Existing Traffic and Transport Conditions

Existing Road Network

The existing road network in the Leichhardt Precinct is illustrated in Figure 63, highlighting the key road connections including Parramatta Road, Norton Street, Balmain Road and Crystal Street.

Figure 63 – Road network and major connections in the vicinity of Leichhardt Precinct

Traffic Volumes

There are no Roads and Maritime Services traffic count stations located within the Leichhardt Precinct; however two relevant traffic count stations are located east and west of Leichhardt Precinct, along Parramatta Road. Their locations and volume of traffic are summarised in Table 77. Both of the stations recorded volumes over 60,000 vehicles per weekday in 2012. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, the section of the Parramatta Road would be classified as a Class 5 Urban road (5U). Characteristics of a Class 5U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RMS Network and Corridor Planning, 2008).

Table 77 – Traffic counting stations near Leichhardt Precinct (source: RMS traffic counts)

ROAD NAME	STATION DESCRIPTION	WESTBOUND*	EASTBOUND*	TOTAL*
Parramatta Road	Leichhardt – At Goods Railway Line	31,700	33,000	64,700
Parramatta Road	Camperdown – East of Cardigan Street	31,800	31,500	63,300

*Weekday counts for 2012

Constraints

The Precinct is currently a local centre with mixed use and retail areas along Parramatta Road and Norton Street, with education facilities to the north which generates a number of private vehicles trips. The Norton Street, Balmain Road/ Crystal Street intersections with Parramatta Road in particular is an area of high vehicular and pedestrian activity. Crystal Street is also the nearest connection to the south of Parramatta Road providing links to Petersham and Stanmore.

Constraints of the surrounding road network include:

- Norton Street and Balmain Road / Crystal Street intersections at Parramatta Road
- limited vehicular crossings over the rail corridor to the south
- vehicular and pedestrian movement conflicts on Norton Street.

Existing Public Transport Network

Public transport services for the Precinct are based around bus services along Parramatta Road and Norton Street. Petersham Station and Stanmore Station are within 0.7 kilometres and 1 kilometre respectively of the southern Precinct boundary.

Rail Services

Petersham Station is located approximately 0.7 kilometres south of the Precinct boundary and Stanmore Station is located approximately 1 kilometre south of the Precinct boundary. Petersham Station and Stanmore Station each recorded approximately 7,000 entry and exit passenger movements during a typical weekday in 2014 (BTS Station Barrier Counts 2004-2014). Petersham Station and Stanmore Station are serviced by the T2 Inner West & South Line.

The number of rail services stopping at Petersham Station and Stanmore Station during the AM and PM peak periods is shown in Table 78.

Table 78 – Rail service frequencies at Petersham and Stanmore Stations (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T2 Inner West & South Line		
Campbelltown to City via Granville	8	8
City to Campbelltown via Granville	8-12*	8

*During the AM Weekday Peak Petersham receives four addition services compared to Lewisham

Bus Services

The Leichhardt Precinct is primarily serviced by a number of bus routes connecting the Precinct to major centres including the Sydney CBD, Campsie, Rozelle, Five Dock, Burwood, Strathfield and Ashfield. Bus routes are accessible from Parramatta Road, Norton Street, Marion Street and Crystal Street as shown in **Error! Reference source not found.**. The Precinct is currently served by the following bus routes:

- route 370 (Leichhardt to Coogee) travels along Marion Street and Balmain Road
- route 413 (Campsie to City via Ashbury) passes through the Precinct travelling along Parramatta Road providing connections to Lewisham Station
- route 436, 438, 439 and 440 (Five Dock and Rozelle to City via Leichhardt) passes through the Precinct along Norton Street and Parramatta Road
- route 444 and 445 (Campsie to Balmain East) travels through the Precinct from Crystal Street to Norton Street providing connections to Petersham Station
- routes 461, 480 and 483 (Strathfield and Burwood to City – Domain) passes through the Precinct along Parramatta Road.

Table 79 provides a summary of peak bus service frequencies for routes operating in the vicinity of the Precinct.

Table 79 – Bus service frequencies for Leichhardt Precinct (source: Transdev and Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
370	Leichhardt to Coogee	< 30 minutes	< 15 minutes
413	Campsie to City via Ashbury	< 30 minutes	< 30 minutes
436, 438, 439, 440, L38 & L39	Five Dock and Rozelle to City via Leichhardt	<10 minutes	< 10 minutes
444 and 445	Campsie to Balmain East	< 20 minutes	< 15 minutes
461, 480 & 483	Burwood Strathfield to the Domain	< 10 minutes	< 10 minutes

Figure 64 – Bus services in Leichhardt Precinct

Existing Parking Conditions

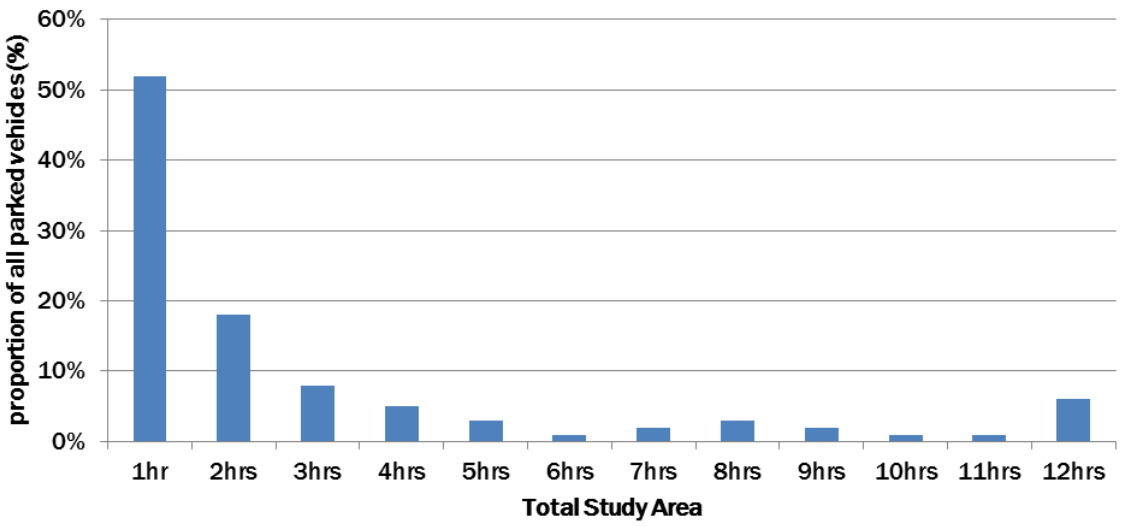
Parking controls within the Leichhardt Precinct are varied with no unrestricted parking offered. Bus lanes and clearways operate along Parramatta Road between 6am – 10am and 3pm – 7pm during weekdays with no parking permitted at all other times of the day. Time-restricted parking and parking permits apply within and surrounding the Precinct.

Time restrictions are in place for on-street parking within the Precinct, which includes:

- 2P and 4P parking restrictions on Norton Street and Marion Street
- 2P parking restrictions on Renwick Street
- 1/2P and 1P parking restrictions on Balmain Road
- 1P parking restrictions on Queen Street
- 2P parking restrictions on Elswick Street.

Surveys of on-street parking supply and demand were undertaken for streets within 800 metres walk of major public transport stops. An average occupancy rate of 68% was observed across the study area with a maximum occupancy of 75% observed at any one time. Vehicles parked for 1 hour or less comprised the largest proportion of all parked vehicles, with a lower proportion parked for 2 hours and very few parked for 3 hours or longer (Figure 65). This suggests that these on-street spaces were mainly being used to access local shops and facilities in the area surveyed.

Figure 65 – Duration of stay for on-street parking spaces within 800 metres of major public transport stops



The Leichhardt Precinct provides parking permits for residents and local businesses for streets within the Leichhardt LGA These parking permits provide the necessary parking controls within the Precinct to manage the availability of on-street parking. Holders of the permits are able to park without restrictions in the appropriate parking facilities, which mostly encompass on-street parking.

Currently there are several council operated off-street car parks provided within a convenient distance of the Precinct, including:

- 10 spaces in the Council Carpark in Renwick Street (30 minutes)
- 87 spaces (and 4 disabled parking spaces) in the Council Carpark in Norton Street (30 minutes)
- 61 spaces (and 1 disabled parking space) in the Council Carpark in Hay St, Leichhardt (30 minutes).

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

New developments are required to provide off-street parking to service the anticipated demands of the proposed land use. A summary of off-street parking rates in Leichhardt LGA is provided in

Table **80 – Off-street parking rate summary – Leichhardt LGA (source: Leichhardt DCP 2013)**

. The portion of the Precinct within Marrickville LGA is under Parking Area 2, a summary of parking rates is provided in Table 80.

Table 80 – Off-street parking rate summary – Leichhardt LGA (source: Leichhardt DCP 2013)

LAND USE	PARKING RATE		
Residential	Studio	0 to 0.5 spaces per dwelling	Visitors: 0.09 to 0.125 spaces per dwelling.
	1 bedroom unit	0.333 to 0.5 spaces per dwelling	
	2 bedroom unit	0.5 to 1 space per dwelling	
	3+ bedroom unit	1 to 1.2 spaces per dwelling	
Office premises	Min: 1 space per 100 sqm of GFA; Max: 1 space per 80 sqm of GFA		
Business premises	Min: 1 space per 100 sqm of GFA; Max: 1 space per 60 sqm of GFA		
Bulky goods	Min: 1 space per 125 sqm of GFA; Max: 1 space per 100 sqm of GFA		
Restaurants or cafes	Min: 1 space per 80 sqm of GFA; Max: 1 space per 50 sqm of GFA		

Table 81 – Off-street parking rate summary – Marrickville LGA (source: Marrickville DCP 2011)

LAND USE	PARKING RATE		
Residential flats - 7 or more units (Area 2)	Studio	1 space per dwelling	Visitors: 0.25 spaces per resident space.
	1 bedroom unit	1 space per dwelling	
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	1 space per dwelling	
Business, retail and shops (Area 2)	Up to 500m2	1 per 80sqm GFA	
	500 - 750m2	7 + 1 per 45sqm GFA over 500sqm GFA	
	750 – 1,000m2	12 + 1 per 35sqm GFA over 750sqm GFA	
	Over 1,000m2	20 + 1 per 30sqm GFA over 1,000sqm GFA	

Existing Walking and Cycling Networks

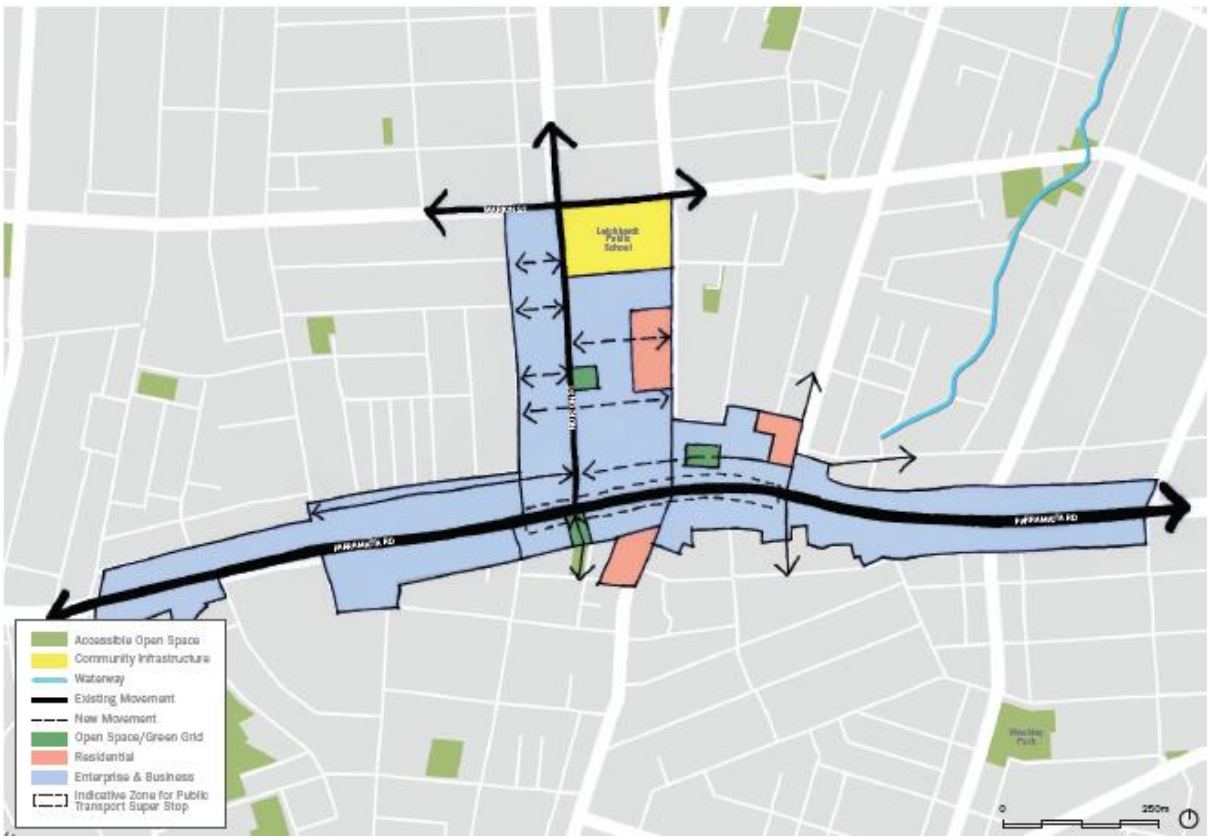
Paved footpaths are provided on either side of the roads in the Precinct with pedestrian crossings at signalised intersections. However, due to the congested nature of Parramatta Road, the intersections with Norton Street and Crystal Street do not provide a pedestrian crossing on the eastern approach. A pedestrian bridge is provided near the Fort Street High School at Elswick Street, approximately 350 metres west of the Precinct to facilitate the safe crossing of Parramatta Road.

The Precinct is well connected to the existing cycle network with links along Norton Street, Balmain Road and Marion Street. The cycle network mainly comprises of on-road cycleways. There are limited opportunities for cyclists to safely cross Parramatta Road which presents a constraint to links to train stations to the south.

10.3 Future Leichhardt Precinct Character

A vibrant mixed-use entertainment precinct that is a destination for wider Sydney, with retail and residential opportunities creating a rejuvenated and active Norton Street and Parramatta Road.

Figure 66 – Structure plan, Leichhardt Precinct



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- create a truly mixed use Precinct focused around Norton Street
- encourage appropriately scaled infill residential development to attract and retain people in the core of the Precinct.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- capitalise on new transport connections to rebadge and create a new Norton Street identity
- provide a 'Gateway' anchor to Norton Street at Parramatta Road that is mirrored at Marion Street
- identify short to medium term opportunities for new public domain and spaces
- enhance side streets including Thornley Street, Hey Street, Charles Street and Railway Street as public spaces

- improve the amenity and pedestrian priority on Parramatta Road through traffic light phasing, reduced speed limits, increased crossing points, enhanced footpath design, and tree planting in side streets).

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance links to Petersham Station with a focus on north-south connectivity across Parramatta Road and along Railway Street
- provide new areas of public open space within the Precinct
- improve connectivity to the existing active travel network with emphasis on a north-south connection between Petersham Station to connect better to existing leisure routes and the rail station to the Leichhardt Precinct
- introduce new and extend existing east-west aligned laneways (including Dot Lane) to enhance permeability for all modes of travel, provide activate streetscapes and link new developments to public transport infrastructure
- reduce parking rates across the Precinct to capitalise on the strong bus service provision on Norton Street and the rapid bus network along Parramatta Road.

Primary Constraints

- high traffic volumes along Parramatta Road
- barriers to permeability and space limitations created by Parramatta Road
- a lack of public open space within the vicinity of the Precinct
- the distance between Petersham Station and residents located in the northern part of the Precinct
- low levels of connectivity to adjacent neighbourhoods for non-car modes of travel.

10.4 Future Transport Provision of Leichhardt Precinct

Proposed Access and Movement Plan

The majority of streets within the Leichhardt Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Leichhardt Precinct and their categorisation are outlined below.

Movement Corridors

- Crystal Street – Provides a north-south bypass of Leichhardt Town Centre whilst also providing access to town centre parking and a connection to the City West Link in the north and Petersham, Marrickville and Stanmore in the south.
- Johnston Street – provides a north-south connection to the City West Link and Anzac Bridge.

Vibrant Streets

- Parramatta Road – This is the main east-west traffic route through the Precinct and will continue to have a high movement function providing access at either end of the Precinct to Burwood and the Sydney CBD.

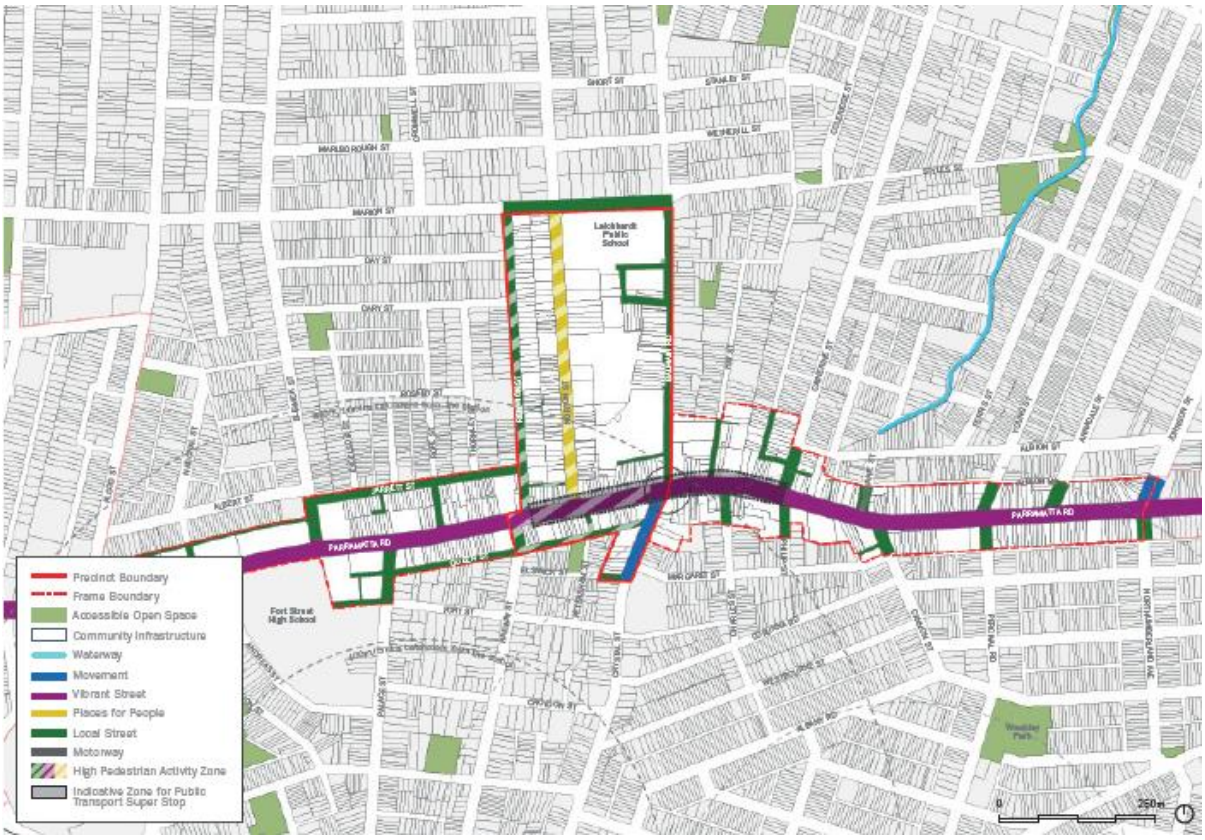
  This section of Parramatta Road will also see a reduction in vehicle traffic as a result of WestConnex. This, along with the transformed land use and better north-south connectivity, provides an ideal environment for a Vibrant Street.

  Parramatta Road will still have high movements for private vehicles and public transport, but there is an opportunity for higher kerbside activity and activated frontages along with connections into a future Rapid Transit stop.

Places for People

- Norton Street – This is the main north-south street with an activate frontage providing access to the town centre.
- All other streets will perform a Local street function.

Figure 67 – Proposed Movement and Place, Leichhardt Precinct



Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- significant delays to the north and south of Parramatta Road on streets that intersect with Parramatta Road, including Crystal Street, Catherine Street and Young Street
- these streets have limited stop-line capacity and low green time; priority is allocated to the through

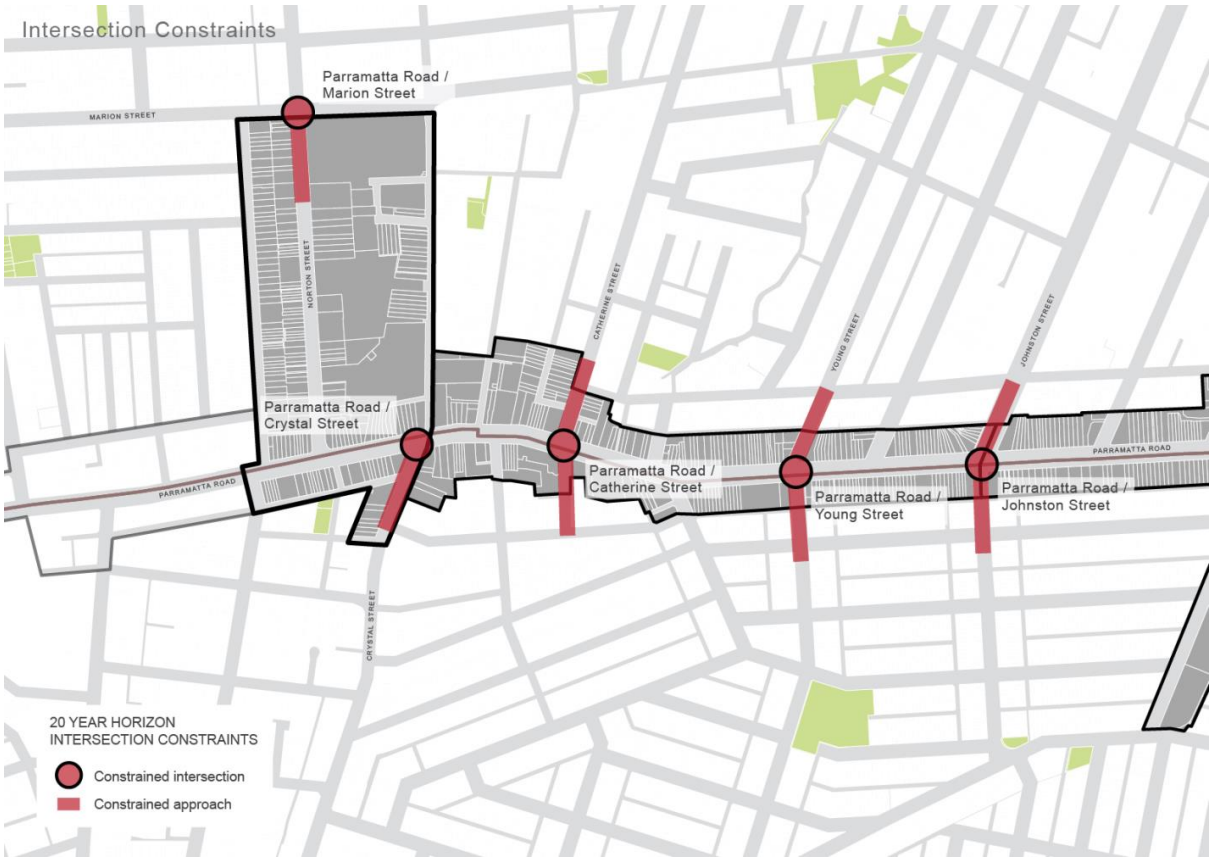
movement on Parramatta Road to maintain east-west coordination

- overall intersection performance remains acceptable.

Table 82 – Future intersection performance, Leichhardt Precinct

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Norton Street	B	East	B
		North	B
		West	A
Marion Street / Norton Street	C	East	A
		North	B
		South	E
		West	B
Parramatta Road / Crystal Street	D	East	C
		South	F
		West	C
Parramatta Road /Catherine Street	B	East	A
		North	F
		South	D
		West	A
Parramatta Road / Young Street	B	East	A
		North	E
		South	F
		West	B
Parramatta Road /Johnston Street	C	East	B
		North	D
		South	D
		West	C

Figure 68 – Future intersection constraints, Leichhardt Precinct



Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Leichhardt Precinct and Frame Area.

The following Intersections have been identified that will require investigation and likely upgrades or modifications in order to better facilitate future movements in and through the Precinct and Frame Area and should be specifically modelled as part of future rezoning proposals. ***The identified upgrades are indicative only and may require alternative solutions***.

- Balmain Road/Parramatta Road – Upgrade intersection to improve pedestrian crossing opportunities.
- Crystal Street/Parramatta Road and Norton Street/Parramatta Road – Right turns from Parramatta Road will require more green time to improve access into the Precinct. These are the only right turn opportunities for several kilometres.

Proposed Public Transport Network

No further changes have been identified in addition to existing and planned public transport in the Leichhardt Precinct. The Parramatta Road Corridor on-street rapid transit project will be the major public transport initiative that will support the Precinct in the future.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed active transport network. For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Vibrant Streets and Places for People as identified using the movement and place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Norton Street from Parramatta Road to Marion Street.
- Parramatta Road between Renwick Street and Catherine Street.

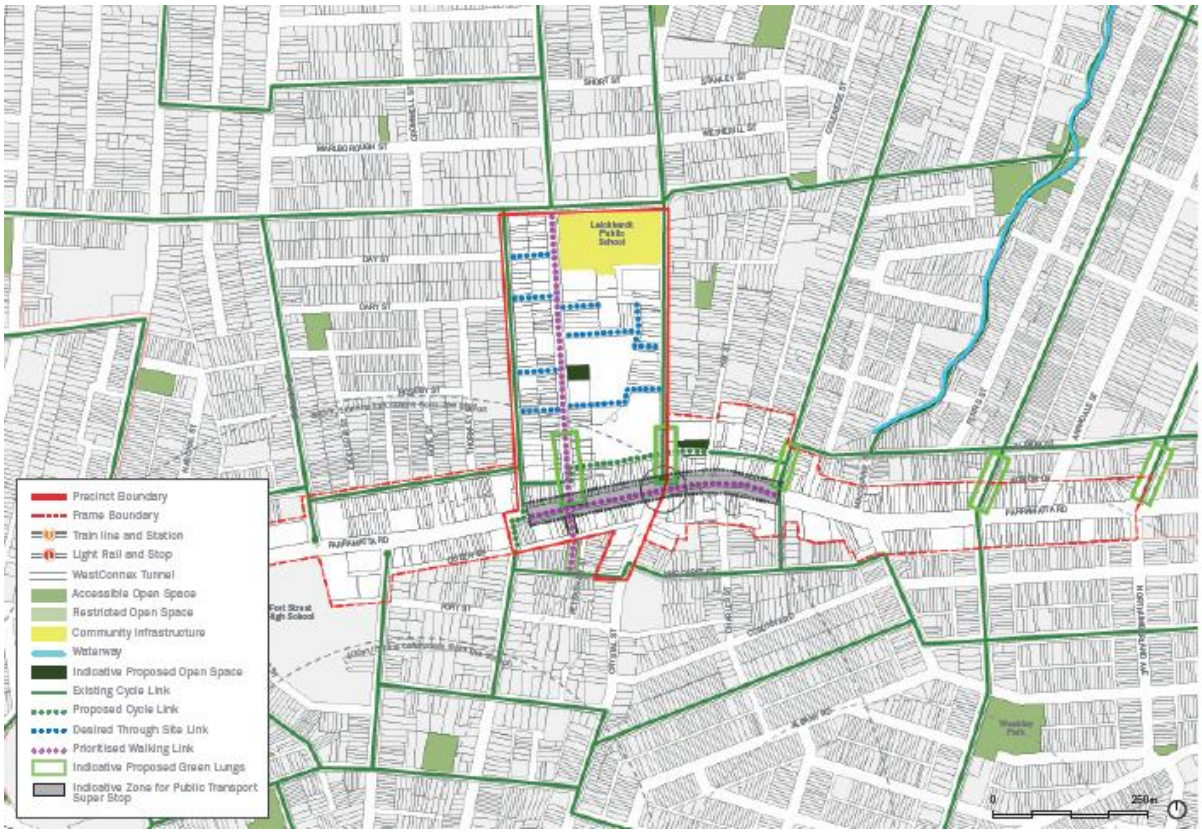
Desired Through Site Links

- Renwick Street to Balmain Road.

Proposed Strategic Cycle Links

- reinforcement of existing north-south links on Renwick Street, Parramatta Road and Railway Street, including upgraded crossing of Parramatta Road
- Dot Lane connecting Renwick Street and Albion Street, connecting existing east-west links north of Parramatta Road.

Figure 69 – Proposed active transport, Leichhardt Precinct



Proposed Parking Controls

As outlined in Section 2, the Leichhardt Precinct is proposed to be subject to Category 1 parking rates shown in Table 83 – **Proposed parking rates by category and development**

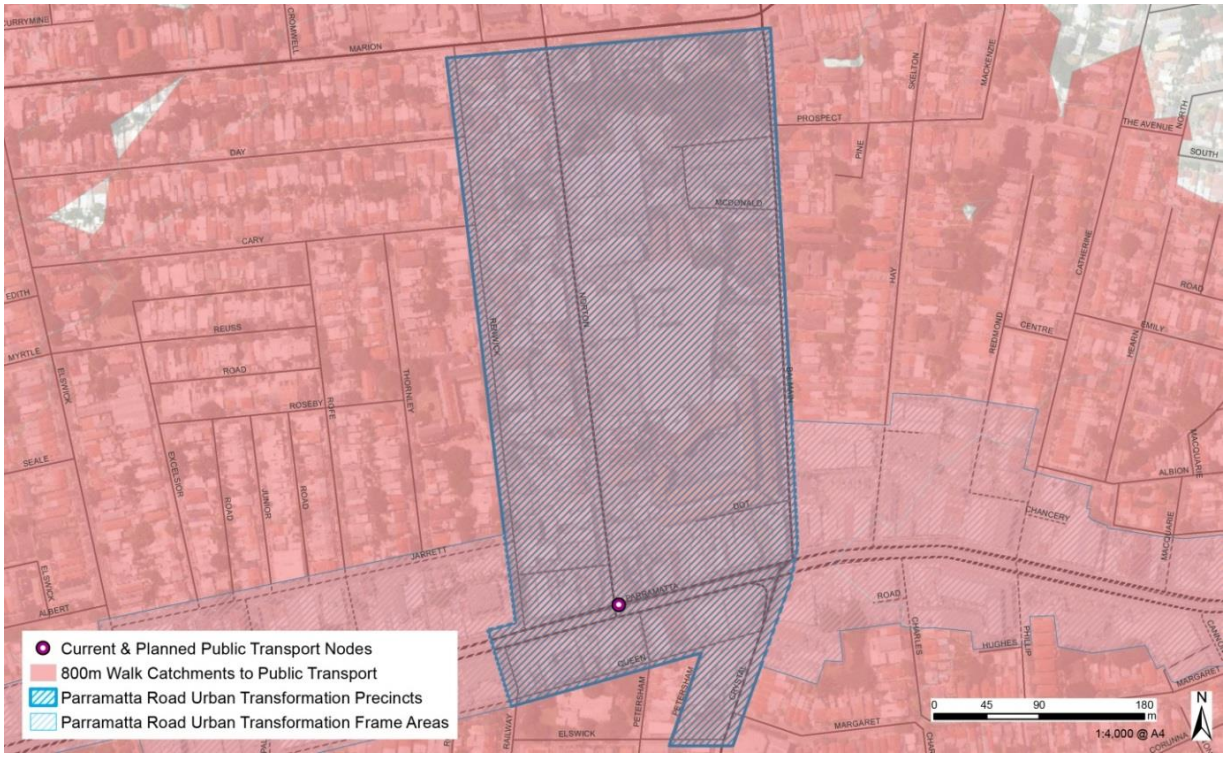
. This is based on the following points:

- all of the Precinct falls within an 800m walking catchment of good quality public transport being Rapid Bus Route stops
- there is also good access to the Sydney CBD, a strategic centre (Burwood) and a variety of local services in Leichhardt, Stanmore, Petersham and Annandale.

Table 83 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
1	0	0.3	0.7	1	0	150	100	150

Figure 70 – 800m walking catchments to public transport, Leichhardt Precinct

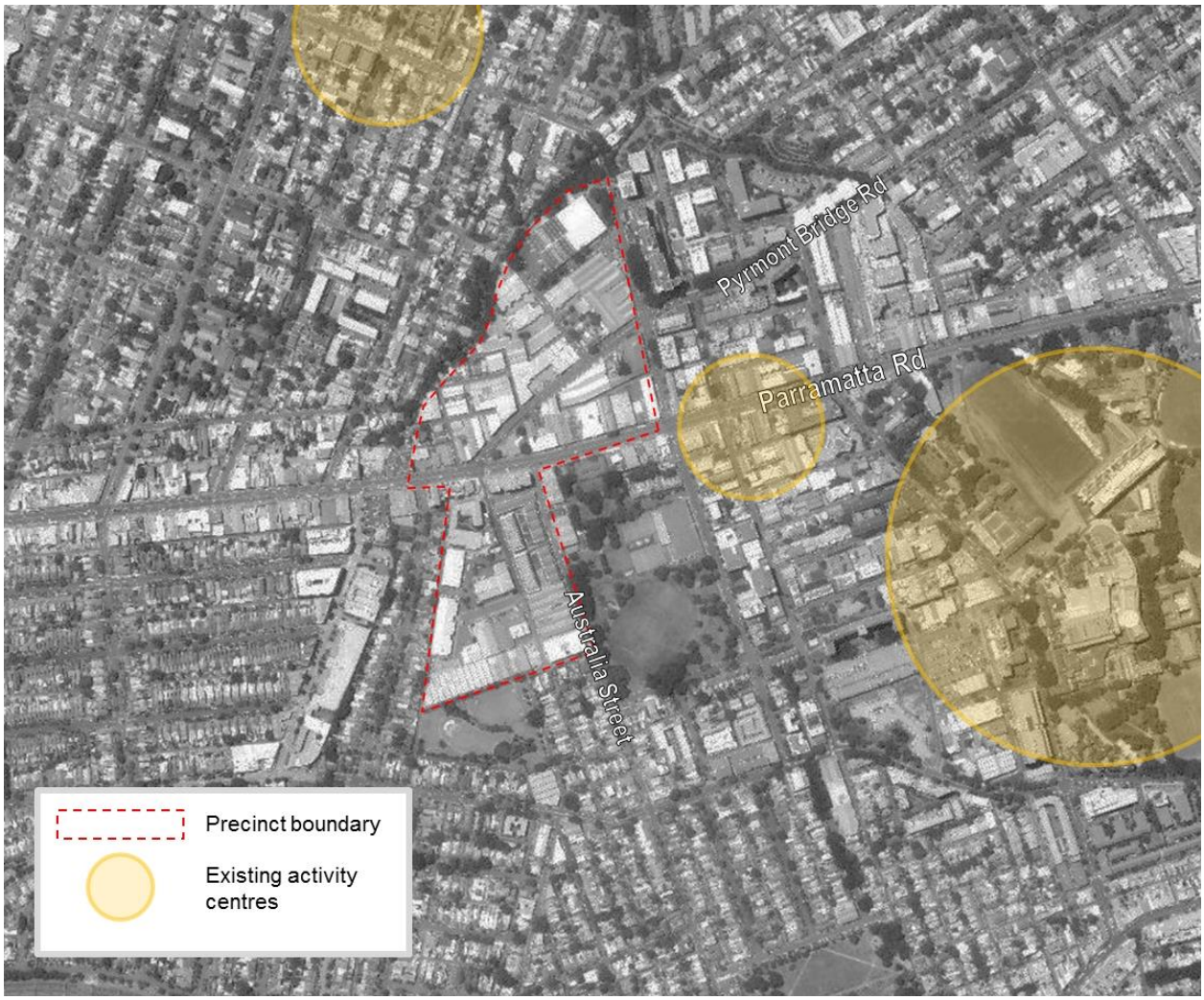


11. Camperdown

11.1 Existing Activity Centre

Camperdown Precinct's existing activity centre is located on Parramatta Road to the immediate east of Mallet Street. The centre is a relatively small mix of retail shops and commercial premises, supported by other activity centres such as Booth Street, Annandale, Royal Prince Alfred Hospital and Sydney University.

Figure 71 – Existing activity centre, Camperdown Precinct



11.2 Existing Travel Patterns and Mode Share

Existing Travel Patterns

A review of the Bureau of Transport Statistics (BTS) Journey to Work (JTW) data from 2011 revealed that more residents of Camperdown Precinct are employed in Sydney Inner City (53 per cent) than any other destination, as shown in Table 84. Public and active transport modes dominate travel to Sydney Inner City due to its proximity to the Precinct and significant provision of bus services to Sydney CBD. There is still a significant level of private vehicle travel for work trips with a 47% mode share. Walking and cycling for work

travel is a relatively high 18% combined, possibly due to the proximity of employment and fine grained street network in the Precinct.

Table 84 – Workforce travel destinations, Camperdown Precinct (source: BTS Journey to Work – Travel Zones 237, 820)

	WORKFORCE DESTINATIONS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL*^
1	**Sydney Inner City**	52	518	318	147	121	1156
2	**Leichhardt**	0	25	102	49	13	189
3	**North Sydney – Mosman**	32	10	47	0	9	98
4	**Chatswood – Lane Cove**	16	3	64	0	3	86
5	**Ryde – Hunters Hill**	6	9	62	0	3	80
	Other	53	52	448	15	20	588
	Total	159	617	1041	211	169	2197
		7%	28%	47%	10%	8%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

The JTW data shows that employed people working in the area reside in a diverse range of locations throughout Sydney. Leichhardt was the top area employees in the Precinct originated from with 14 per cent of trips to the area. Private vehicle is the dominant mode of travel to the Precinct at 70 per cent. Only 7 per cent of workers travel by bus and 11 per cent of workers travel by train. This indicates that there may be issues with public transport accessibility to the employment areas or an over-supply of off-street parking in these employment areas.

Table 85 summarises the JTW employment travel origin data for the Camperdown Precinct.

Table 85 – Employment travel origins, Camperdown Precinct (source: BTS Journey to Work – Travel Zones 237, 820)

	EMPLOYEE ORIGINS	TRAIN	BUS	CAR	WALKED ONLY	OTHER	TOTAL*^
1	**Leichhardt**	0	13	125	41	18	197
2	**Sydney Inner City**	6	20	84	50	18	178
3	**Strathfield – Burwood – Ashfield**	14	28	95	0	7	144
4	**Marrickville – Sydenham – Petersham**	8	3	38	23	7	79
5	**Canada Bay**	0	6	69	0	3	78

	Other	124	24	593	7	18	766
	Total	152	94	1004	121	71	1442
		11%	7%	70%	8%	5%	100%

^Excludes those who did not go to work or work from home

*Standard Area 3 selected were those that contained sections of the core study area

Existing Mode Share

The existing mode share for the Camperdown Precinct compared to the Leichhardt LGA and Marrickville LGA is summarised in Table 86. Private vehicle travel comprises the highest single mode share (47 per cent), followed by public transport (36 per cent) and walk only trips (10 per cent). Public transport, walking and cycling collectively represent a significant mode share for travel in the Precinct and in the Leichhardt and Marrickville LGAs. The data shows the Precinct and Leichhardt LGA have similar mode splits for bus and train where buses are the main choice in terms of public transport given the significant number of bus routes serving the Precinct and Leichhardt LGA. The data also shows a higher proportion of people walking to work compared to both LGAs.

Table 86 –Camperdown Precinct mode share compared to Leichhardt and Marrickville LGA (2011) (source: BTS Journey to Work – Travel Zones)

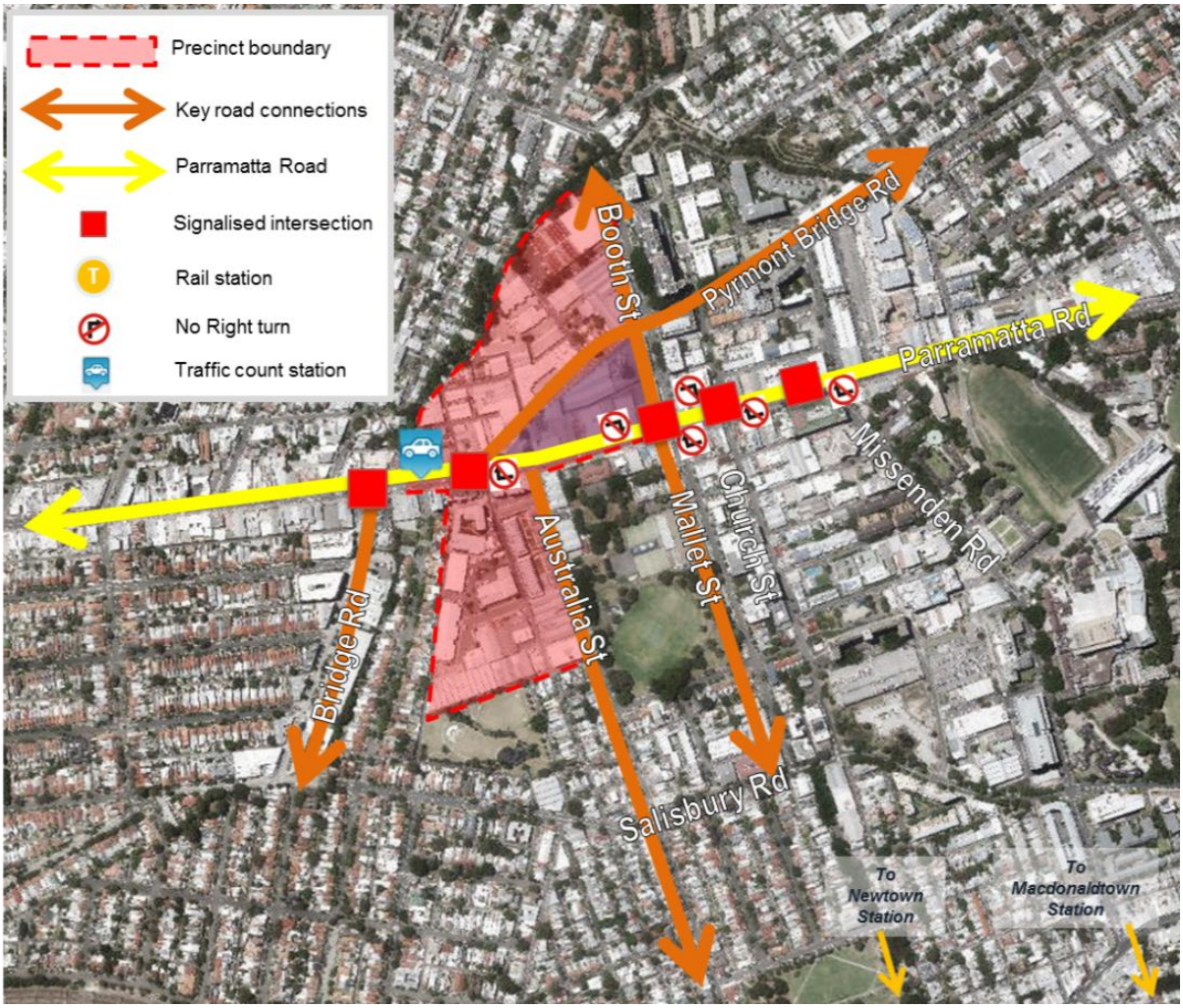
MODE	EXISTING LEICHHARDT PRECINCT MODE SHARE	EXISTING LGA MODE SHARES	
		LEICHHARDT LGA	MARRICKVILLE LGA
Vehicle driver	43%	50%	43%
Vehicle passenger	4%	4%	4%
Train	7%	5%	30%
Bus / Ferry / Tram	29%	29%	11%
Walked only	10%	6%	6%
Other mode	6%	5%	5%
Mode not stated	1%	1%	1%

Existing Traffic and Transport Conditions

Existing Road Network

The existing road network in the Camperdown Precinct is illustrated in **Error! Reference source not found.**, ighlighting the key road connectors within the Precinct including Parramatta Road, Pyrmont Bridge Road and Booth Street.

Figure 72 – Road network and major connections in Camperdown Precinct



Traffic Volumes

There is one Roads and Maritime Services traffic count station located within the Camperdown Precinct on Parramatta Road – east of Cardigan Street. Table 87 highlights the traffic count station, with volumes over 60,000 vehicles per day in 2012. According to the Roads and Maritime Road Network Management Hierarchy, based on the given description of the road and speed limit, the section of the Parramatta Road would be classified as a Class 5 Urban road (5U). Characteristics of a Class 5U road involve moderately high traffic volumes, including freight, public transport and commercial vehicle travel (RMS Network and Corridor Planning, 2008).

Table 87 – Traffic counting stations near Camperdown Precinct (source: RMS traffic counts)

ROAD NAME	STATION DESCRIPTION	WESTBOUND*	EASTBOUND*	TOTAL*
Parramatta Road	Camperdown – East of Cardigan Street	31,800	31,500	63,300

*Weekday counts for 2012

Constraints

Pinch-points of the surrounding road network include:

- narrow roads and laneways with limited north-south movements between both sides of Parramatta Road
- limited capacity along Pyrmont Bridge Road to cater for increasing traffic demands
- limited right turn opportunities along Parramatta Road in both directions, due to right turn restrictions including:
- vehicles travelling eastbound banned from turning right (south) into Mallet Street
- vehicles travelling westbound banned from turning right (north) into Mallet Street
- vehicles travelling westbound banned from turning right (north) into Church Street.

Existing Public Transport Network

Public transport services for the Precinct are based around services along Parramatta Road and Booth Street. It should be noted that there are no rail stations located within convenient walking distance (800 metres) of the Precinct boundary. The nearest station is Newtown Station located approximately 1.3 kilometres south.

Rail Services

Based on station barrier counts Newtown Station was ranked the 37th busiest station on the Sydney Trains network recording approximately 13,660 entry and exit passenger movements during a typical weekday in 2013 (BTS Train Statistics 2014). Newtown Station is serviced by the T2 Inner West & South Line providing connectivity to the Sydney Trains network.

The number of rail services stopping at Newtown Station during the AM and PM peak periods is shown in Table 88

Table 88 – Rail service frequencies at Newtown Station (source: Sydney Trains, 2015)

KEY DESTINATION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
T2 Inner West & South Line		
Campbelltown to City via Granville	14	9
City to Campbelltown via Granville	14	11

Bus Services

Camperdown Precinct is currently serviced by a number of bus routes connecting the Precinct to major centres including the Sydney CBD, Burwood and Strathfield. Bus routes are accessible from Parramatta Road and Booth Street as shown in Figure 73. The Precinct is currently served by the following bus routes (operated by Sydney Buses):

- route 412 (Campsie to City) travels along Salisbury Road which is approximately 200 m south of the southern portion of the Precinct

- route 413 (Campsie to City via Ashbury) passes through the Precinct travelling along Parramatta Road
- route 436, 438, 439, 440 and respective limited stop services (Five Dock and Rozelle to City via Leichhardt) pass through the Precinct along Parramatta Road
- route 461, 480 and 483 (Strathfield and Burwood to City – Domain) pass through the Precinct along Parramatta Road
- M10 (Maroubra to Leichhardt), a high frequency and high capacity bus, operates along Parramatta Road.

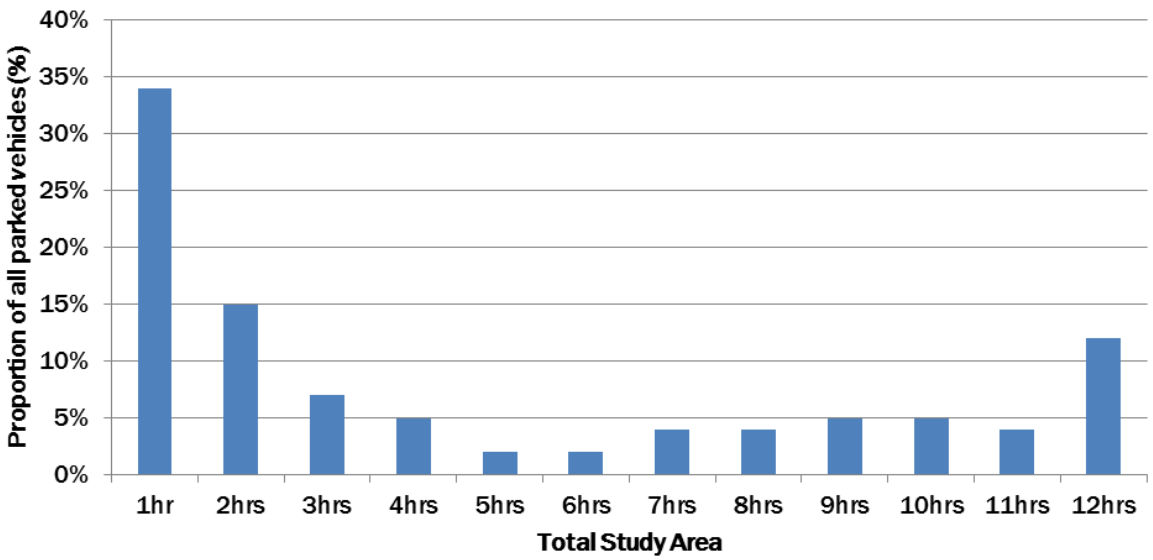
Figure 73 – Bus services in the vicinity of Camperdown Precinct

Table 89 provides a summary of peak bus service frequencies for routes operating in the vicinity of the Precinct.

Table 89 – Bus service frequencies for Camperdown Precinct (source: Sydney Buses, 2015)

ROUTE NO.	DESCRIPTION	AM WEEKDAY PEAK (07:00-09:00)	PM WEEKDAY PEAK (16:00-18:00)
412	Campsie to City	Under 15 minutes between buses	Under 20 minutes between buses
413	Campsie to City via Ashbury	Under 15 minutes between buses	Under 25 minutes between buses
436, 438,439, 440, L38 & L39	Five Dock & Rozelle to City via Leichhardt	Under 10 minutes between buses	Under 10 minutes between buses
461,480 & 483	Strathfield & Burwood to City via the Domain	Under 10 minutes between buses	10 minutes between buses
470	Lilyfield to City	Under 5 minutes between buses	Under 10 minutes between buses

Figure 74 – Duration of stay for on-street parking spaces within 800 metres of major public transport stops



Currently there are no council or commuter off-street car parks provided within a convenient distance of the Precinct. New developments are required to provide off-street parking to service the anticipated demands of the proposed land use.

Existing parking rates are provided for planning controls covering the LGA level. It is recognised that in some council areas there are also existing parking rates contained within site specific planning controls. For the purposes of providing an overview of the existing parking rates, LGA level controls have only been provided in this report.

A summary of off-street parking rates in Camperdown is provided in Table 90. The portion of the Precinct within Marrickville is under Parking Area 2, a summary of parking rates is provided in Table 91.

Table 90 – Off-street parking rate summary – Leichardt LGA (source: Leichhardt DCP 2013)

LAND USE	PARKING RATE		
Residential	Studio	0 to 0.5 spaces per dwelling	Visitors: 0.09 to 0.125 spaces per dwelling.
	1 bedroom unit	0.333 to 0.5 spaces per dwelling	
	2 bedroom unit	0.5 to 1 space per dwelling	
	3+ bedroom unit	1 to 1.2 spaces per dwelling	
Office premises	Min: 1 space per 100 sqm of GFA; Max: 1 space per 80 sqm of GFA		
Business premises	Min: 1 space per 100 sqm of GFA; Max: 1 space per 60 sqm of GFA		
Bulky goods	Min: 1 space per 125 sqm of GFA; Max: 1 space per 100 sqm of GFA		
Restaurants or cafes	Min: 1 space per 80 sqm of GFA; Max: 1 space per 50 sqm of GFA		

Table 91 – Off-street parking rate summary – Marrickville LGA (source: Marrickville DCP 2011)

LAND USE	PARKING RATE		
Residential flats - 7 or more units (Area 2)	Studio	1 space per dwelling	Visitors: 0.25 spaces per resident space.
	1 bedroom unit	1 space per dwelling	
	2 bedroom unit	1 space per dwelling	
	3+ bedroom unit	1 space per dwelling	
Business, retail and shops (Area 2)	Up to 500m2	1 per 80sqm GFA	
	500 - 750m2	7 + 1 per 45sqm GFA over 500sqm GFA	
	750 – 1,000m2	12 + 1 per 35sqm GFA over 750sqm GFA	
	Over 1,000m2	20 + 1 per 30sqm GFA over 1,000sqm GFA	

Existing Walking and Cycling Networks

Paved footpaths are provided on either side of the roads in the Precinct with the exception of laneways. Pedestrian crossings are provided on most of the approaches at signalised intersections. No pedestrian crossing is provided on the eastern approach of the intersection of Parramatta Road / Mallet Street / Booth Street and on the western approach of Parramatta Road / Pyrmont Bridge Road.

Cycle routes within the Precinct are currently limited however the Precinct is surrounded by a number of cycle routes. The majority of the cycle routes are on-road cycleways providing links to number of key areas such as the University of Sydney.

Existing Parking Conditions

Parking controls implemented within the Camperdown Precinct are varied. Bus lanes operate along Parramatta Road between 6am – 10am and 3pm – 7pm during weekdays which otherwise is restricted to

1P parking between 10am – 3pm during weekdays and 8:30am – 12:30pm on Saturdays. Pyrmont Bridge Road has clearway restrictions between 6am – 10am and 3pm – 7pm during weekdays.

On-street parking within the Camperdown Precinct includes:

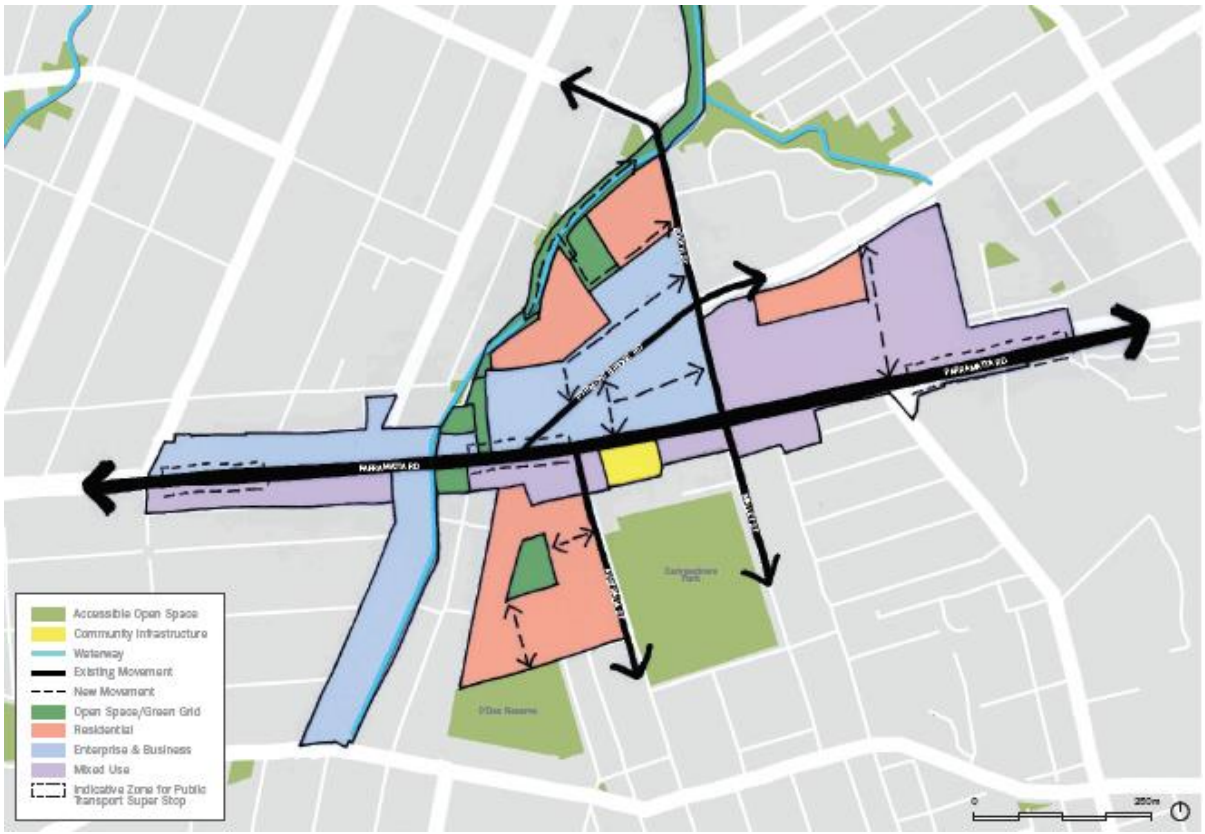
- unrestricted parking along residential streets within the southern section of the Precinct
- 2P restrictions along Mathieson Street, Cahill Street (west of Mathieson Street), Water Street
- unrestricted parking along Chester Street, Guihen Street and Booth Street.

Surveys of on-street parking supply and demand were undertaken for streets within 800 metres walk of major public transport stops. An average occupancy rate of 59% was observed across the study area with a maximum occupancy of 64% observed at any one time. A large proportion of all vehicles were parked for between 1 to 2 hours in duration (**Error! Reference source not found.**). This suggests that many of these n-street spaces were being used to access local shops, businesses and facilities in the area surveyed. A much lower proportion of vehicles were parked for longer periods. Vehicles observed parked for 12 hours are likely to be residents' vehicles parked on-street due to lack of off-street parking available.

11.3 Future Camperdown Precinct Character

An attractive highly urbanised precinct with high-quality amenity for housing and workplaces, well connected to the surrounding city and parklands, and focused on a busy and active local centre.

Figure 2 – Structure plan, Camperdown Precinct



Land Uses

The following important land use directions were identified for the Precinct through the consultation process and supporting technical studies:

- prioritise Camperdown Precinct for biotechnology and employment uses that support the growth of the nearby institutions
- reinforce the Layton Street cluster of shops and services as a local centre expanding westwards to Bignell Lane
- focus residential development on students, key worker and affordable housing.

Place Making

The following important place making opportunities were identified for the Precinct through the consultation process and supporting technical studies:

- adapt, retain and celebrate the existing industrial heritage character
- develop Bignell Lane as a lively, fine-grained mixed use area with entertainment and other day/night 'social' uses
- reinforce and provide new opportunities for fine grain through the Hordern Place Industrial Area
- create a greener, friendlier and safer Cardigan Lane as an enhanced north-south walking and cycling spine
- create active streets that connect residents and workers to small, diverse, and highly connected local and regional open spaces.

Opportunities and Constraints

Through the development of the Precinct Plans, a 'Strengths, Weaknesses, Opportunities and Threats' (SWOT) analysis has been undertaken to guide the scale and form of development.

Significant Opportunities

- enhance links to the University of Sydney, Royal Prince Alfred Hospital, Annandale and Newtown
- enhance connectivity to areas of public open space with a focus on Camperdown Park and O'Dea Reserve
- enhance the existing cycle network with improvements to existing infrastructure including connectivity to Johnstons Creek
- reduce the impact of the barriers provided by Parramatta Road and Pyrmont Bridge Road by enhancing connections across these constraints for all modes of transport
- utilise and activate existing laneways to enhance permeability for all modes of travel, provide activate streetscapes (including an enhanced retail centre) and link new developments to public transport infrastructure.
- reduce parking rates across the Precinct to capitalise on the rapid bus network along Parramatta Road.

Primary Constraints

- high traffic volumes along Parramatta Road
- barriers to permeability and space limitations created by Parramatta Road, including the lack of north-south connections across Parramatta Road
- the amenity of the existing streetscape and commercial property frontages
- the distance between the Precinct and Newtown Station
- high demand for on-street parking.

11.4 Future Transport Provision of Camperdown Precinct

Proposed Street Functions

The majority of streets within the Camperdown Precinct are categorised as Local Streets. These streets are focused on facilitating local access and do not have a high movement or place function. The main streets in the Camperdown Precinct and their categorisation are outlined below.

Vibrant Streets

- Parramatta Road – This is the main east-west traffic route through the Precinct and will continue to have a high movement function providing access at either end of the Precinct to Leichhardt and the Sydney CBD.

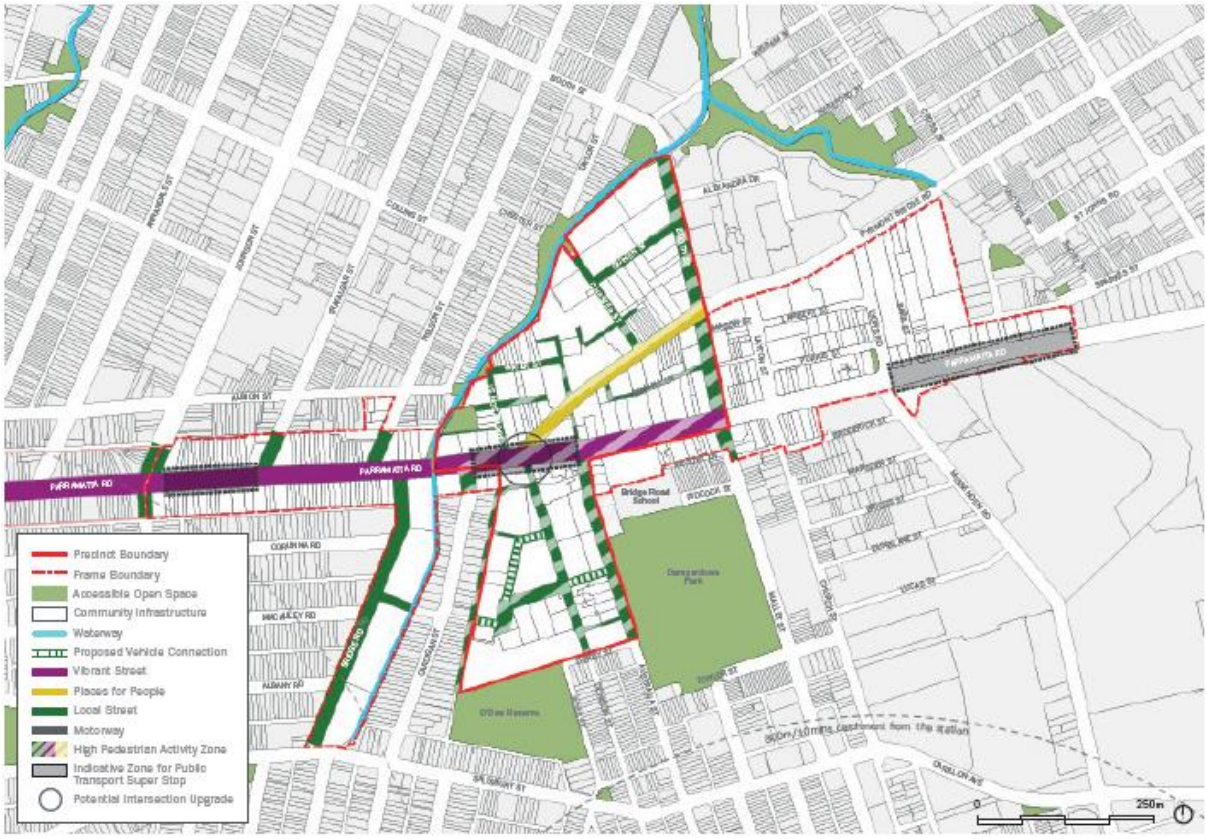
  This section of Parramatta Road will also see a reduction in vehicle traffic as a result of WestConnex. This, along with the transformed land use and better north-south connectivity, provides an ideal environment for a Vibrant Street.

  Parramatta Road will still have high movements for private vehicles and public transport, but there is an opportunity for higher kerbside activity and activated frontages along with connections into a future Rapid Transit stop.

Places for People

- Pyrmont Bridge Road (west of Booth St) – This section has a lower movement function and provides an opportunity for an activated frontage as a Vibrant Street connecting south of Parramatta Road and north into Booth Street.
- All other streets (existing and proposed) will perform a Local street function.

Figure 76 – Proposed street functions, Camperdown Precinct



Future Road Network

Analysis of the Parramatta Road Corridor traffic model has provided an indication of future traffic performance. The model shows:

- significant delays to the north and south of Parramatta Road on streets that front on to Parramatta Road, including Bridge Road and Pyrmont Bridge Road
- these streets have limited stop-line capacity and low green time; priority is allocated to the through movement on Parramatta Road to maintain east-west coordination
- overall intersection performance remains acceptable.

Figure 77 – Future intersection constraints, Camperdown Precinct

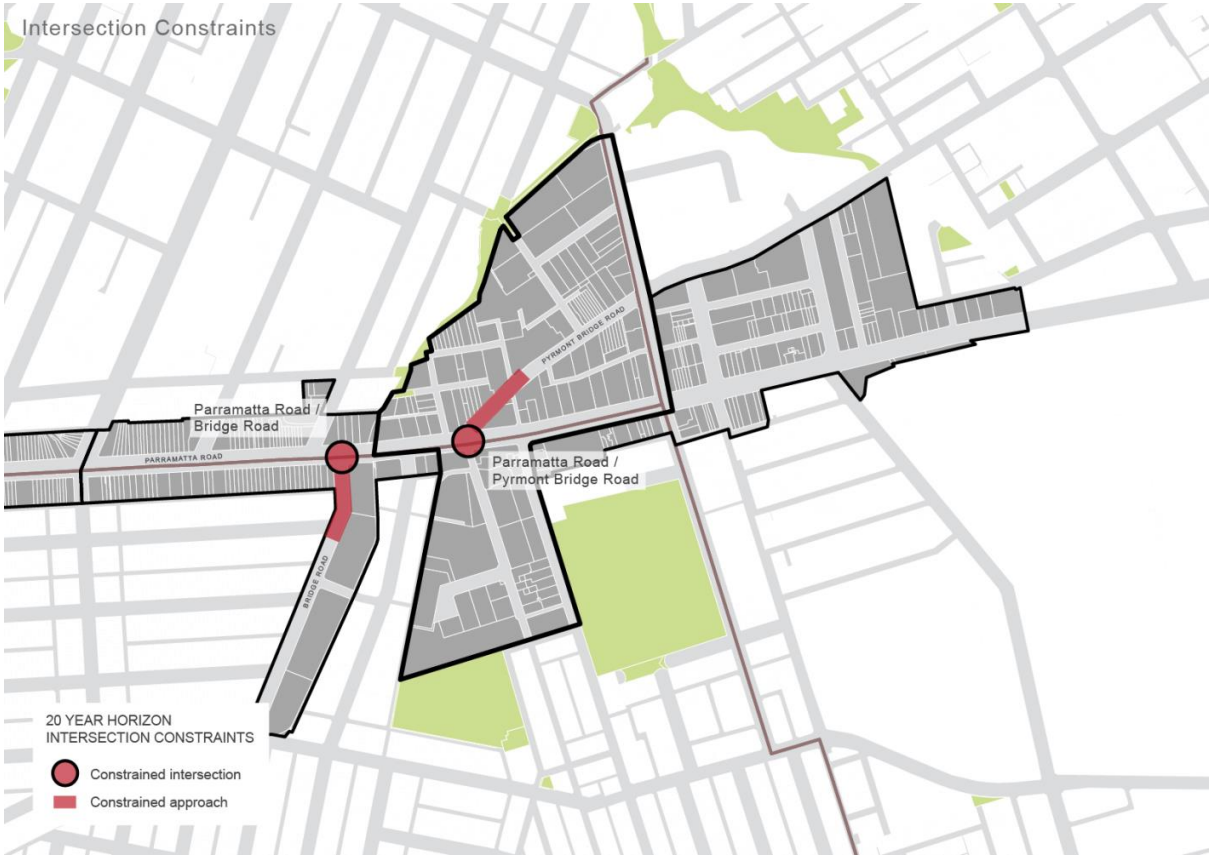


Table 92 – Future intersection performance, Camperdown Precinct)

INTERSECTION NAME	OVERALL LOS	APPROACH LEG	LOS
Parramatta Road / Bridge Road	C	East	C
		South	E
		West	C
Parramatta Road / Pyrmont Bridge Road	B	East	A
		North	E
		West	B
Parramatta Road / Mallet Street	A	East	A
		North	A
		South	C
		West	A
Parramatta Road / Layton Street	A	East	A
		North	A
		South	B
		West	A
Parramatta Road / Missenden Road	A	East	B
		North	A
		South	B
		West	A

Prior to any rezoning commencing, a Precinct wide traffic study and supporting modelling will be required to be completed which considers the proposed land uses and densities, as well as future WestConnex conditions, and identifies the necessary road improvements and upgrades that will be required to be delivered as part of any proposed renewal in the Camperdown Precinct.

The Pyrmont Bridge Road/Parramatta Road intersection has been identified as an intersection that will require investigation and likely upgrade to improve pedestrian crossing opportunities by providing a pedestrian crossing on the western approach. The intersection is also a focus for facilitating better north-south movements across Parramatta Road for all road users, as well as improving access into the Precinct. The opportunity exists to investigate reprioritisation of the signals to allow additional green time post implementation of WestConnex Stage 3 (M4-M5 Link). The intersection (as well as others) should be specifically modelled as part of future rezoning proposals. ***Signal repriorisation is a suggestion only and requires RMS endorsement.***

Proposed Public Transport Network

No further changes have been identified in addition to existing and planned public transport in the Camperdown Precinct. It is expected that any changes in the area will be driven by the Parramatta Road Corridor on-street rapid transit project.

Proposed Walking and Cycling Networks

New and upgraded walking and cycling links have been developed as part of the proposed active transport network.

For walking, key streets are prioritised as strategic walking links where high pedestrian activity is located. These are mostly located on Vibrant Streets and Places for People as identified using the movement and place framework. Additional new links are also proposed to improve permeability and connectivity in the Precinct.

For cycling, greater focus is placed on prioritising strategic links based on connectivity with regional cycling links. New or upgraded cycling links provide and improve this connectivity and close missing gaps in the network.

Prioritised Walking Links

- Johnstons Creek to Pyrmont Bridge Road along Chester Street
- Water Street to Booth Street along Gehrig Lane
- Parramatta Road to Pyrmont Bridge Road along Bignell Lane
- Denison Street to Australia Street
- Parramatta Road between Johnstons Creek and Mallet Street
- Mallett Street between Guihen Street and Fowler Street
- Pyrmont Bridge Road between Parramatta Road and Booth Street
- Australia Street between Water Street and Derby Street

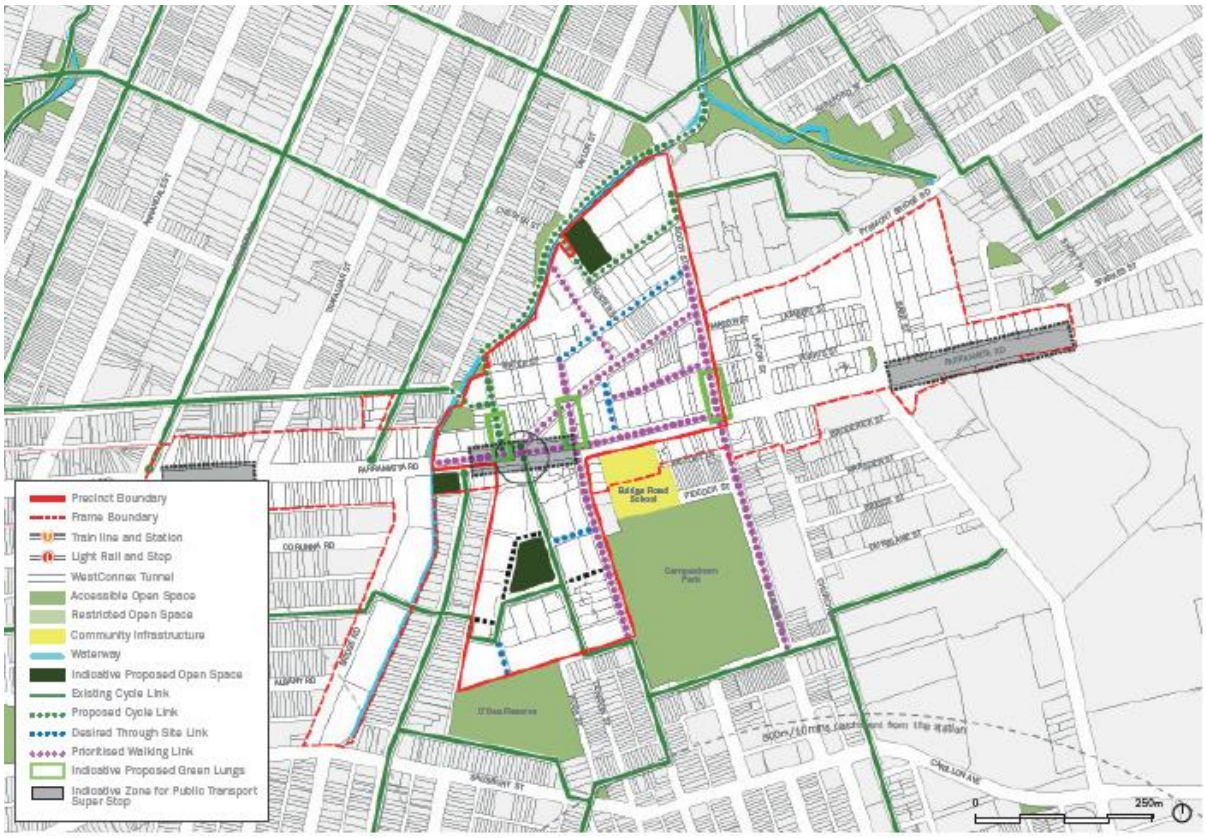
Desired Through Site Links

- Bignell Lane extension

Proposed Strategic Cycle Links

- Pyrmont Bridge Road between Parramatta Road and Mallett Street / Booth Street
- Johnstons Creek from Booth Street to Parramatta Road
- Johnstons Creek from Wigram Street to Parramatta Road along Mathieson Street
- Guihen Street between Johnston's Creek and Booth Street
- Lyons Road between Pyrmont Bridge Road and Parramatta Road
- Missenden Road between Parramatta Road and King Street
- Albion Street to Cahill Street

Figure 78 – Proposed active transport, Camperdown Precinct



Proposed Parking Controls

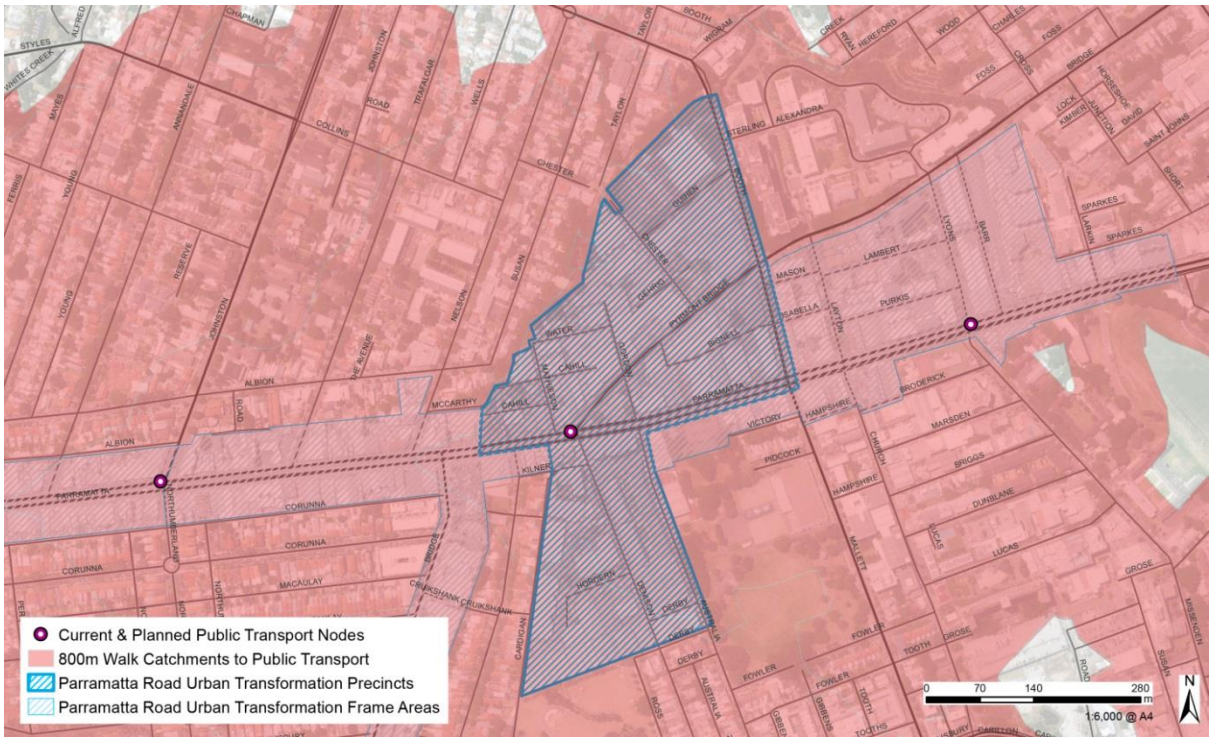
As outlined in Section 2, the Camperdown Precinct is proposed to fall under the Category 1 maximum parking rates shown in Table 93. This is based on the following points:

- all of the Precinct falls within an 800m walking catchment of good quality public transport being Rapid Bus Route stops
- there is also good access to the Sydney CBD, and a variety of local services in Leichhardt, Stanmore, Glebe and Annandale.

Table 93 – Proposed parking rates by category and development

CATEGORY	RESIDENTIAL (SPACES PER DWELLING)					OTHER (SPACES GFA)		
	STUDIO	1 BED	2 BED	3 BED	VISITOR	COMMERCIAL	RETAIL	INDUSTRIAL
1	0	0.3	0.7	1	0	150	100	150

Figure 78 – 800m walking catchments to public transport, Camperdown Precinct

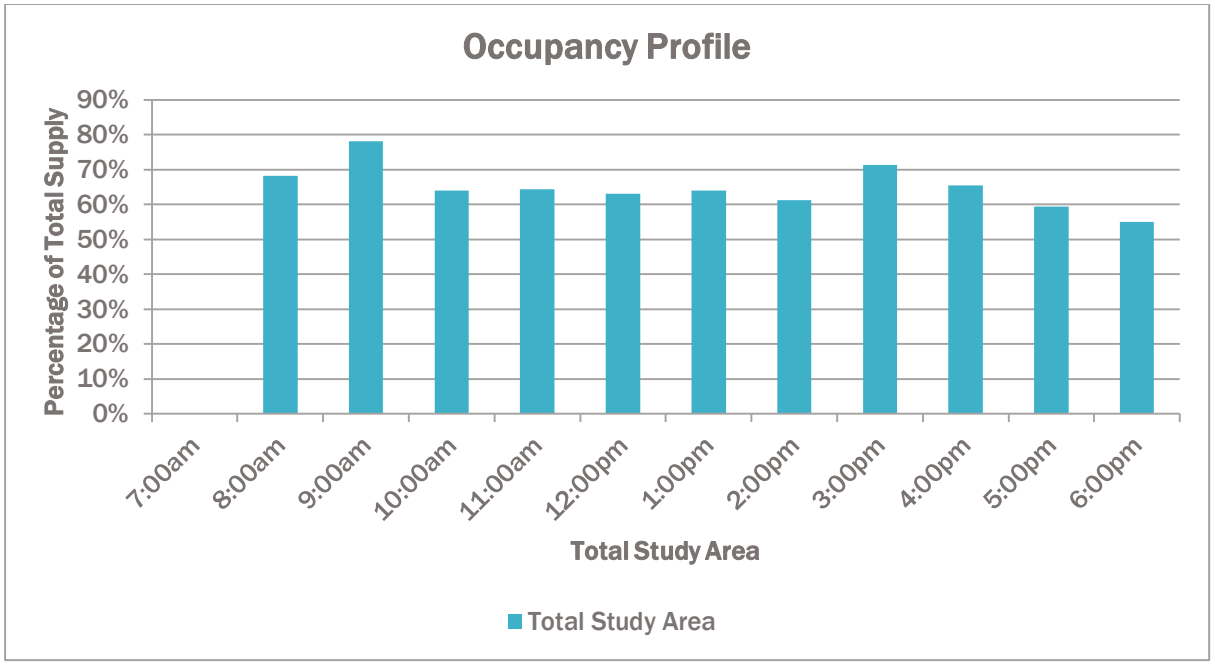


12. Appendices

Appendix A: Car Parking Survey Summaries

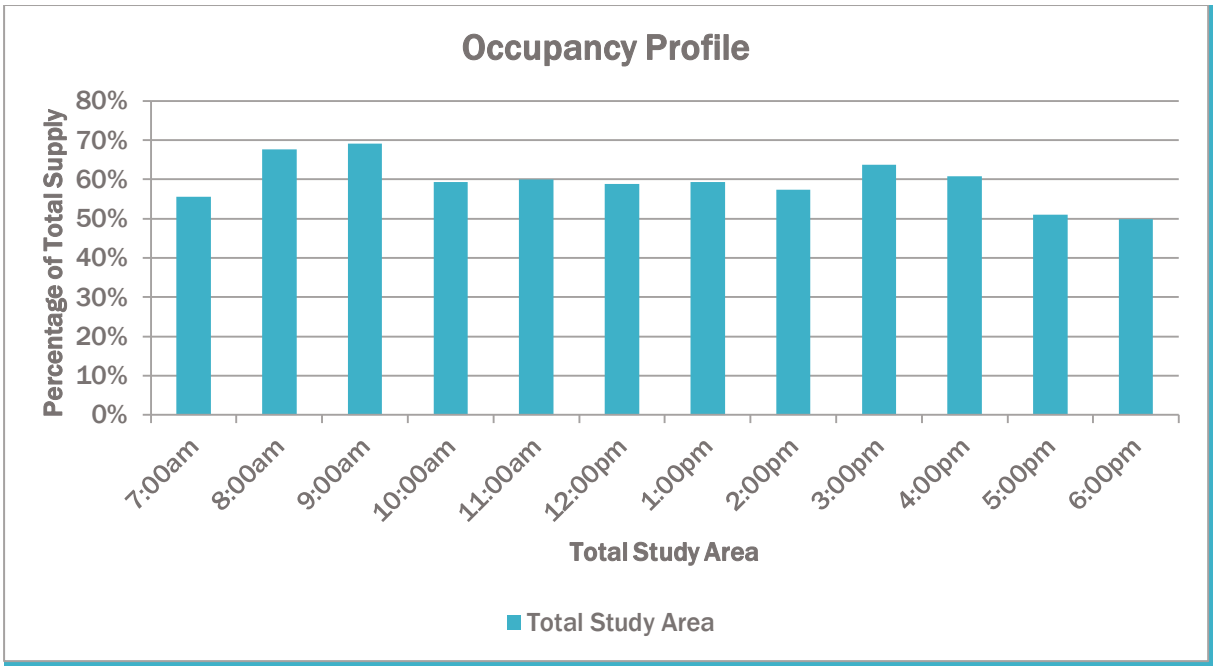
Granville

Zone Group Id	Location	Max Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Memorial Drive	88	89%	98%	273	720	206
B	Railway Parade	14	53%	86%	74	180	72
C	Cowper Street	87	70%	78%	202	720	230
D	Rowell Street	17	68%	94%	127	600	65
E	East Street	53	71%	89%	362	720	75
F	Bridge Street	30	65%	87%	117	720	126
G	Good Street	42	56%	88%	132	720	86
H	Parramatta Road	96	0%	0%	0	0	0
I	Albert Street	19	72%	95%	351	720	28
J	Victoria Street	30	66%	77%	333	720	43
K	Kemp Street	46	49%	59%	375	720	43
L	Gray Street	50	69%	82%	345	720	72
M	Alfred Street	61	67%	77%	364	720	82
TOTAL STUDY AREA		**633**	**60%**	**78%**	**235**	**720**	**1128**



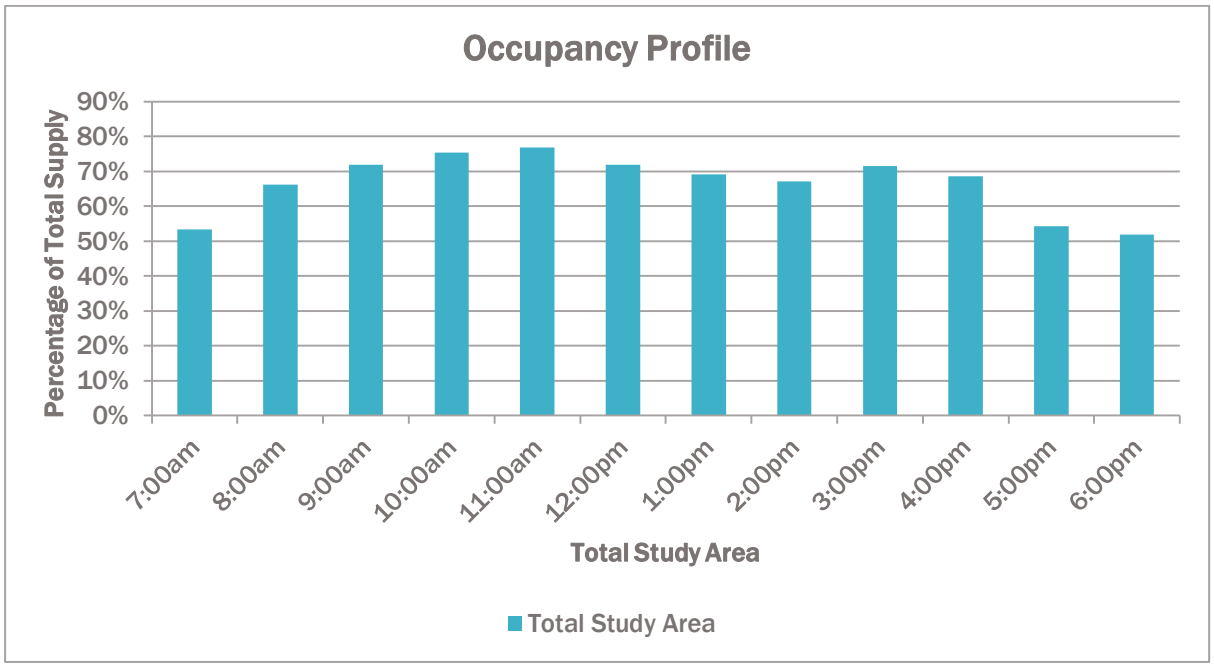
Homebush

Zone Group Id	Location	Max Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Parramatta Road	253	5%	7%	128	480	39
B	Loftus Cres	119	61%	77%	356	720	147
C	Loftus Lane	15	58%	73%	367	720	17
D	Station Street	44	64%	86%	177	720	115
E	The Crescent	69	56%	65%	140	720	200
F	Knight Street	13	72%	88%	214	720	25
G	Crane Street	25	80%	96%	233	720	62
H	George Street	302	67%	75%	257	720	557
I	Allen Street	23	75%	87%	266	660	47
J	Lemnos Street	32	89%	97%	263	720	80
K	Hamilton Street	37	87%	95%	342	720	68
L	Malta Street	48	75%	88%	478	720	54
M	Ismay Avenue	86	69%	80%	324	720	132
N	Pomeroy Street	62	52%	60%	371	720	55
O	Underwood Road	103	45%	53%	189	660	176
P	Powell Street	70	73%	87%	312	720	119
Q	Queen Street (S)	126	67%	79%	329	720	186
R	Queen Street (N)	104	72%	88%	313	720	167
S	Warsaw Street	45	39%	49%	398	720	32
T	Lorraine Street	42	18%	29%	291	720	19
U	Conway Avenue	24	30%	38%	268	720	19
V	Rothwell Avenue	43	54%	70%	299	720	56
W	Station Avenue	11	68%	82%	360	720	15
X	King Street	44	68%	77%	446	720	48
Y	Victoria Avenue	45	71%	77%	386	720	60
Z	Hamilton St E	25	62%	82%	128	720	82
TOTAL STUDY AREA		**1797**	**59%**	**69%**	**274**	**720**	**2577**



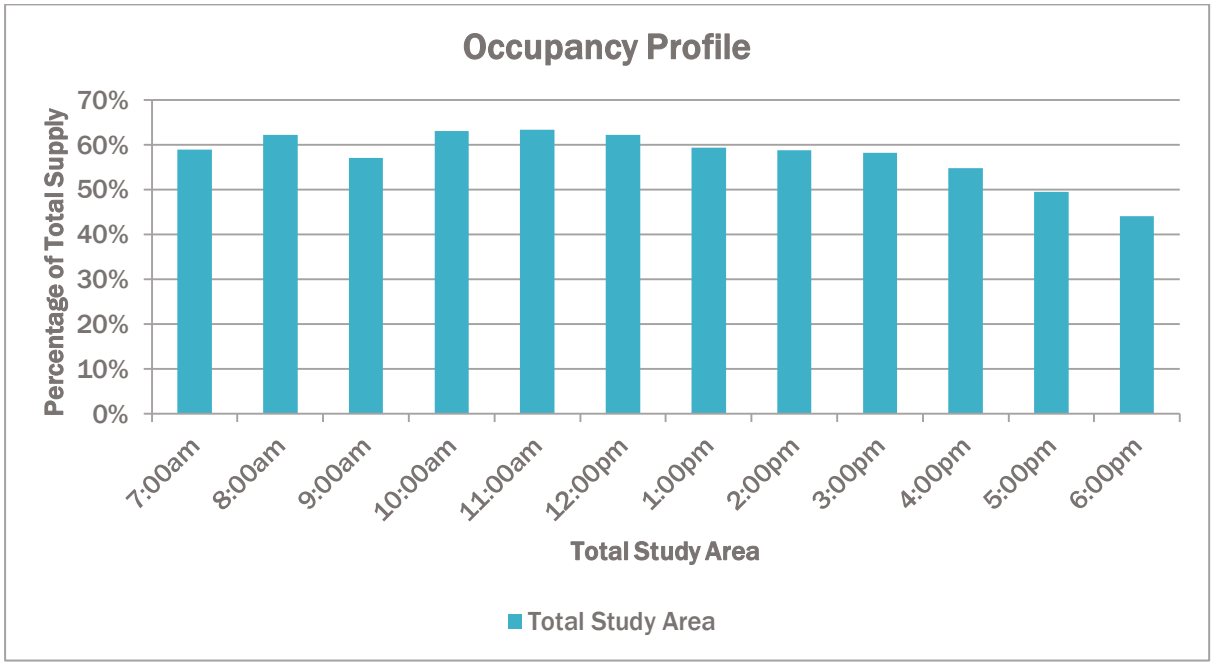
Burwood

Zone Group Id	Location	Max Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Burwood Road	132	50%	63%	119	720	353
B	Burton Street	79	89%	97%	313	720	162
C	Moreton Street	14	71%	86%	300	720	24
D	Lansdowne Street	44	71%	91%	253	720	89
E	Loftus Street	21	86%	95%	350	720	37
F	Neich Parade	74	77%	89%	234	720	176
G	Emanuel Lane	4	98%	100%	403	720	7
H	Esher Street	56	54%	64%	222	720	99
I	Webbs Lane	0	0%	0%	180	180	1
J	Milton Street	42	50%	74%	145	660	104
K	Parramatta Road	0	0%	0%	0	0	0
TOTAL STUDY AREA		**466**	**68%**	**77%**	**206**	**720**	**1052**



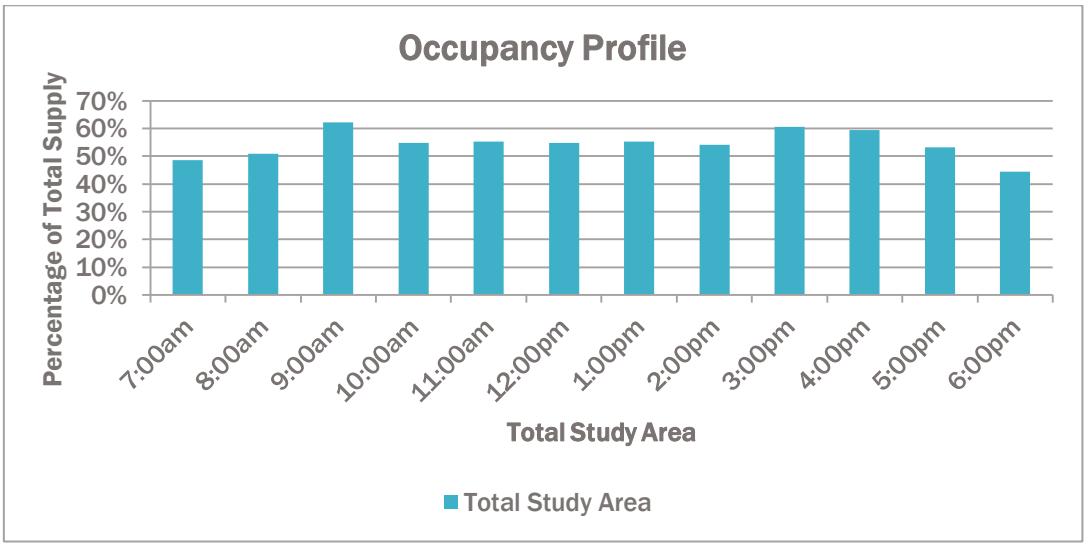
Kings Bay

Zone Group Id	Location	Max Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Harris Road	16	76%	100%	182	600	38
B	Queens Road	58	45%	73%	242	600	66
C	William Street	4	100%	100%	360	660	8
D	Spencer Street	51	89%	98%	370	720	88
E	Regatta Road	28	89%	96%	464	720	38
F	Unnamed laneway	5	0%	0%	0	0	0
G	Byron Street	17	85%	94%	208	720	50
H	Lang Street	70	47%	56%	271	720	87
I	Alfred Street	9	60%	78%	217	600	18
J	Short Street	15	43%	53%	360	720	13
K	Dalmar Street	41	53%	63%	257	720	61
L	Grogan Street	49	53%	63%	367	720	51
M	Dawson Street	53	36%	49%	262	720	53
N	Action Street	46	53%	59%	249	720	70
O	Wychbury Lane	5	80%	80%	360	720	8
P	King Edward Street	7	88%	100%	634	720	7
Q	Parramatta Road	0	0%	0%	0	0	0
TOTAL STUDY AREA		474	59%	63%	292	720	656



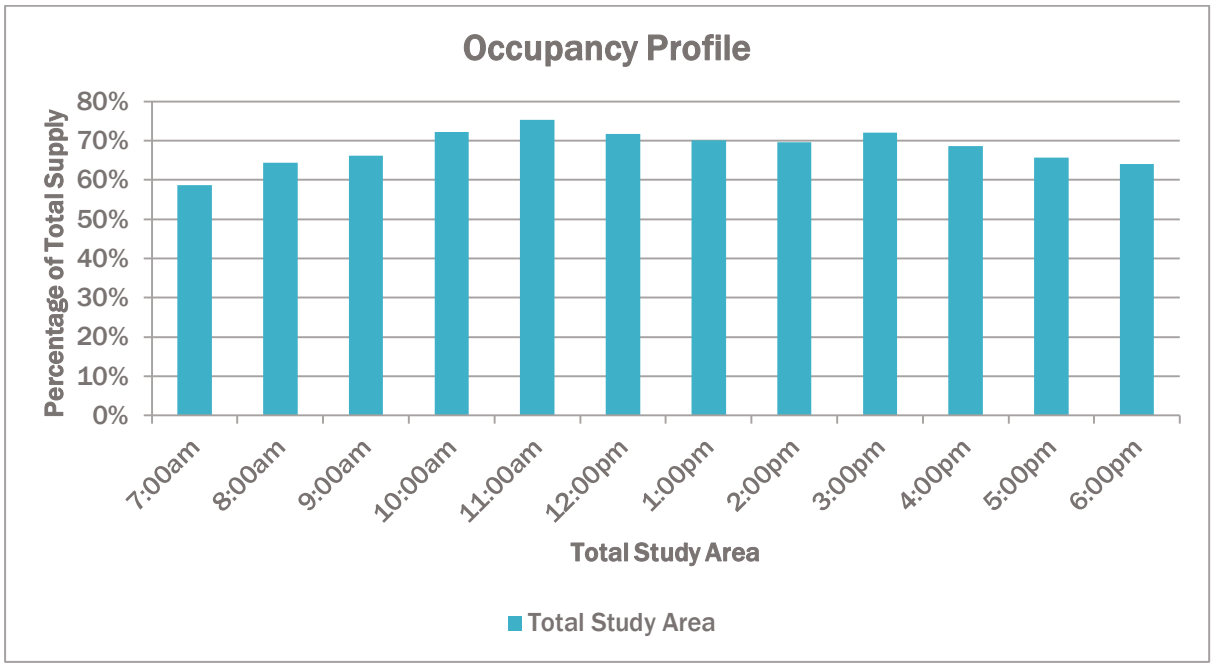
Taverners Hill

Zone Group Id	Location	Max Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Foster street	25	69%	89%	324	720	37
B	Lords Road	75	53%	63%	178	720	159
C	Davies Street	34	80%	100%	240	720	82
D	Davies Ln	6	58%	67%	504	720	5
E	Tebbutt Street	91	58%	76%	324	720	108
F	Beeson Street	32	60%	75%	259	720	53
G	Hathern Street	20	82%	100%	415	720	26
H	Cook Street	20	47%	60%	295	720	23
I	Brown Street	36	9%	14%	351	540	7
J	St John Ln	54	5%	6%	320	720	6
K	St John Street	47	45%	53%	367	720	41
L	Baker Street	21	74%	86%	234	720	48
M	Baker Lane	11	10%	18%	390	720	2
N	Old Canterbury Road	34	56%	71%	274	720	39
O	Upward Street	49	53%	63%	265	720	71
P	McAleer Street	9	58%	67%	344	720	11
Q	George Street	47	58%	64%	289	720	68
R	Treadgold Street (N)	6	49%	67%	191	480	11
S	Treadgold Street (S)	1	83%	100%	300	540	2
T	National Street	63	84%	92%	333	720	114
U	Albert Street	26	89%	96%	437	720	38
V	Easter Street	21	40%	48%	253	600	24
W	Andreas Street	16	29%	38%	305	720	11
X	Thomas Street	90	67%	81%	308	720	140
Y	West Street	76	72%	97%	279	720	116
Z	Railway Terrace	7	86%	86%	617	720	7
AA	Flood Street	102	83%	91%	322	720	189
AB	Station Street	48	78%	96%	279	720	97
AC	Nestor Lane	22	40%	50%	450	720	14
AD	Carrington Street	29	72%	90%	280	720	54
AE	Park Street	11	81%	100%	306	720	21
AF	Albert Lane	22	15%	23%	343	600	7
AG	Myrtle Lane	26	3%	8%	150	300	4
AH	Kegworth Street	62	49%	73%	201	720	111
AI	Parramatta Road	142	4%	6%	130	240	12
AJ	National Ln	12	8%	8%	660	660	1
TOTAL STUDY AREA		**1362**	**51%**	**62%**	**286**	**720**	**1759**



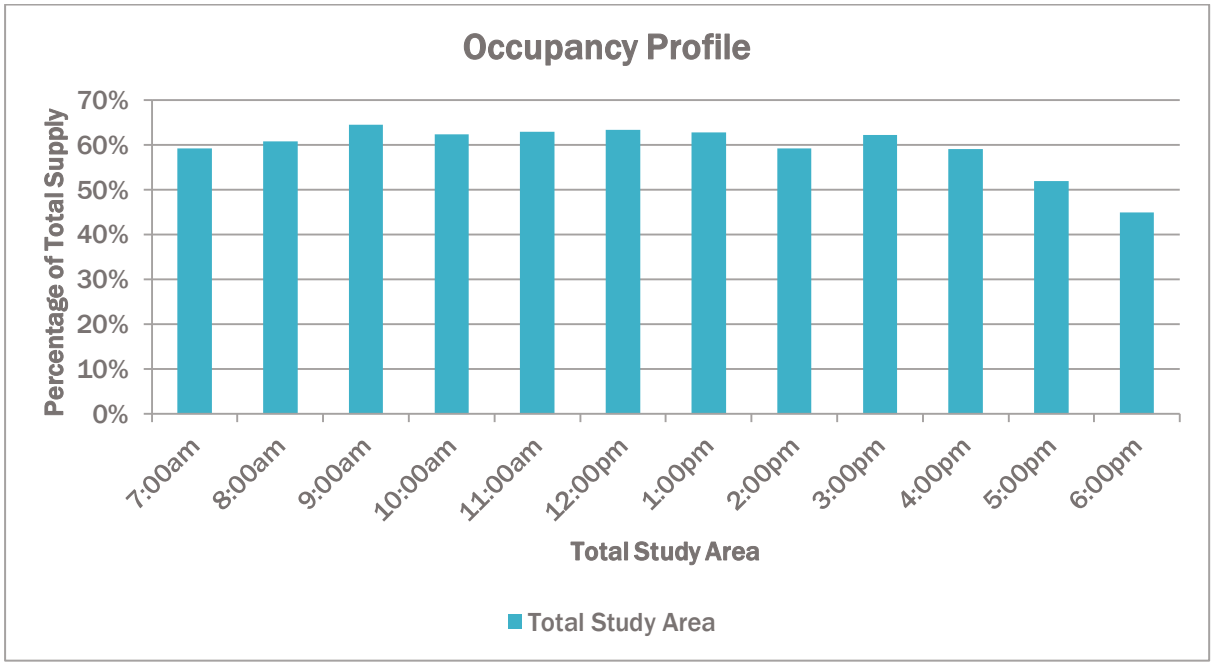
Leichhardt

Zone Group Id	Location	Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Margaret Street	20	77%	85%	326	720	34
B	Margaret Street	20	78%	90%	254	720	44
C	Charles Street	5	47%	80%	140	300	12
D	Charles Street	7	64%	86%	171	660	19
E	Charles Street	14	59%	71%	198	720	30
F	Elswick Street	6	74%	100%	199	720	16
G	Elswick Street	13	81%	92%	162	540	47
H	Railway Street	6	100%	100%	720	720	6
I	Railway Street	2	42%	100%	100	180	6
J	Railway Street	0	0%	0%	0	0	0
K	Railway Street	2	67%	100%	64	120	15
L	Rofe Street	6	83%	100%	277	720	13
M	Rofe Street	9	60%	89%	170	720	23
N	Jarrett Street	6	88%	100%	222	540	17
O	Thornley Street	14	88%	100%	202	720	44
P	Thornley Street	18	71%	89%	168	660	55
Q	Jarrett Street	19	84%	89%	167	720	69
R	Petersham Street	3	86%	100%	274	600	7
S	Petersham Street	10	93%	100%	420	720	16
T	Renwick Street	2	63%	100%	82	240	11
U	Renwick Street	43	73%	79%	398	720	57
V	Renwick Street	6	63%	83%	338	720	8
W	Renwick Street	7	82%	86%	518	720	8
X	Renwick Street	60	71%	80%	158	720	194
Y	Renwick Street	5	47%	100%	87	240	18
Z	Jarrett Street	6	82%	100%	236	660	15
AA	Jarrett Street	7	90%	100%	253	720	18
AB	Balmain Street	6	25%	50%	135	300	8
AC	Mcdonald Street	14	64%	79%	259	720	25
AD	Mcdonald Street	9	56%	78%	305	720	12
AE	Mcdonald Street	5	31%	80%	300	720	9
AF	Marion Street	15	30%	100%	66	180	50
AG	Marion Street	3	72%	100%	405	540	4
AH	Parramatta road	16	0%	0%	86	300	14
AI	Paramatta Road	8	13%	63%	90	240	8
AJ	Hay Street	10	78%	100%	424	720	14
AK	Parramatta Road	0	20%	60%	97	240	13
AL	Marion Street	4	58%	100%	168	360	10
AM	Marion Street	5	72%	100%	176	600	15
AN	Marion Street	4	12%	50%	75	120	4
AO	Norton Sreet	0	0%	25%	60	60	1
AP	Norton Street	30	76%	87%	80	480	207
AQ	Palace street	4	77%	100%	117	240	19
AR	Palace street	2	71%	100%	113	240	9
AS	Queen Street	4	90%	100%	161	540	16
AT	Queem Street	14	79%	100%	181	720	44
AU	Queen Street	6	72%	100%	136	540	23
AV	Queen Street	15	70%	93%	154	720	49
AW	Crystal Street	0	0%	0%	0	0	0
AX	Crystal Street	7	36%	71%	90	240	10
AY	Parrametta Road	5	3%	20%	60	60	2
AZ	Parramatta road	6	1%	17%	60	60	1
BA	Parramatta Road	17	15%	47%	64	120	28
BB	Norton Street	18	79%	94%	78	480	133
BC	Balmain Road	43	74%	86%	211	720	95
BD	McDonalds St 99	7	69%	71%	348	720	10
TOTAL STUDY AREA		**569**	**68%**	**75%**	**171**	**720**	**1635**


Occupancy Profile
Percentage of Total Supply
80%
70%
60%
50%
40%
30%
20%
10%
0%
7:00am
8:00am
9:00am
10:00am
11:00am
12:00pm
1:00pm
2:00pm
3:00pm
4:00pm
5:00pm
6:00pm
Total Study Area
Total Study Area

Camperdown

Zone Group Id	Location	Supply	Average Occupancy (%)	Maximum Occupancy (%)	Average Duration of Stay (minutes)	Maximum Duration of Stay (minutes)	Total Users (Vehicles)
A	Pyrmont Bridge Road	83	22%	30%	130	300	42
B	Mallett Street	23	89%	94%	281	720	48
C	Booth Street	49	98%	100%	509	720	58
D	Guihen Street	38	92%	97%	485	720	51
E	Gehrig Lane	5	32%	60%	285	660	4
F	Chester Street	39	86%	97%	384	720	63
G	Bignell Lane	15	13%	100%	570	600	2
H	Nelson Steet	34	81%	91%	220	720	90
I	McCarthy Lane	14	31%	94%	495	720	8
J	Gordon Street	7	85%	100%	258	720	13
K	Water Street	11	62%	82%	234	720	21
L	Mathieson Street	10	93%	100%	392	720	17
M	Cahill Lane	15	7%	7%	720	720	1
N	Cahill Street	24	73%	88%	317	720	40
O	Parramatta Road	198	8%	18%	84	300	117
P	Bridge Road	68	66%	88%	215	660	133
Q	Cruikshank Street (W)	7	74%	100%	531	600	7
R	Cruikshank Street (E)	7	87%	100%	365	720	12
S	Cardigan Street	115	76%	81%	290	720	216
T	Cardigan Lane	26	3%	94%	163	480	14
U	Kilner Lane	17	35%	53%	284	720	15
V	Salisbury Lane	11	79%	100%	380	720	6
W	Denison Street	58	81%	97%	336	720	101
X	Australia Street	67	97%	100%	324	720	144
Y	Hordern Place	6	53%	67%	190	600	12
Z	Derby Street	14	90%	100%	336	720	27
TOTAL STUDY AREA		**886**	**59%**	**64%**	**286**	**720**	**1262**



For further information:

1300 730 627

info@newparramattard.com.au

urbangrowth.nsw.gov.au