

Department of Planning,
Infrastructure and Environment

Macquarie Park Strategic Master Plan

Integrated Transport Plan

ITP

Final | 22 June 2021

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Executive Summary

The purpose of the Integrated Transport Plan is to provide a strategy for transport; aligned with and in support of the collaboratively developed place-based vision and objectives for Macquarie Park:

"For Macquarie Park to be a highly successful place within Sydney's Eastern Harbour City that supports world class business, research and education opportunities, and contributes to Australia's economy."

Strong transport connections are vital for economic and social activity. To achieve this vision, Macquarie Park must be supported with strong local and regional connectivity through:

- *Activating the centre with a new Movement and Place framework,*
- *Encouraging active travel (walking and cycling) and public transport use,*
- *Providing a safe road environment, suitable pathways, and streets that balance movement of people and goods and access with amenity of place,*
- *Enhanced accessibility to/from Macquarie Park within 30 minutes by public transport, seven days a week."*

This vision is supported by a series of objectives that would shape decision-making for transport infrastructure and services. These objectives are:

1. Provide sufficient public transport services into, out of and within Macquarie Park bringing customers where they want to go and when, providing a viable alternative to private vehicles.
2. Contributes to an integrated transport network across transport modes, resulting in an amenable, functional and safe transport system from door-to-door.
3. Enhance walking and cycling opportunities in Macquarie Park through direct and attractive connections, creating a permeable network.
4. Provide sustainable access to Macquarie Park centres for people and goods while safeguarding liveability and vibrancy of place.
5. Improve public transport access to/from Macquarie Park and other key employment centres at all times of day.
6. Increase trip containment within Macquarie Park.

7. Support cross-regional freight movement along major road corridors.
8. Create an amenable, prioritised and safe pedestrian environment in Macquarie Park.
9. Improve accessibility to fast and frequent public transport services including Metro and the Macquarie Centre bus interchange for all using any sustainable transport mode.
10. Reduce demand for new infrastructure by influencing customers to use Metro and other services and infrastructure with spare capacity.
11. Contribute to net-zero emission by 2050.

There are a number of challenges and opportunities that were identified as part of the overall problem definition in the ITP. These form part of the rationale in the recommended set of initiatives, to achieve the transport vision and objectives set out for Macquarie Park.

Capacity of the road network – Current projections using the Sydney Strategic Travel Model indicate some 387,200 trips to/from Macquarie Park by 2041. Of these trips, 67% are forecasted to use private vehicle; a challenge that must be overcome.

Accessibility across modes – Infrastructure supporting the master plan must address the disparity between the 30-min travel time catchments for public transport and private vehicle.

High parking availability – The master plan provides an opportunity to address this existing issue through site redevelopment, which contributes to the attractiveness of the private vehicle travel, relative to other modes.

Housing and services closer to work – The master plan provides an opportunity to reduce the distance between key places, such as home and work, and allow for walking/cycling to become viable travel choices.

Preserving land for future transport infrastructure – The master plan provides an opportunity to facilitate longer-term Mass Transit connections to/from Macquarie Park, beyond the time horizon of the master plan.

Amenity for active transport – An opportunity is presented to plan for safe and attractive active transport infrastructure, integrated with open space and separated from general vehicle traffic, which will encourage users to adopt active travel. Greater amenity for active travel would be supported by provisions for open space

through the concept of 'Woven Ways' and adjacent uses that activate streets.

Permeability of walking network – The existing subdivisions contribute to increased door-to-door travel times for public and active transport modes. This challenge would need to be overcome by providing a dense network of walking routes via new or upgraded pedestrian-prioritised infrastructure.

Facilitate lower-emissions transport – Both exhaust and noise emissions from transport impact the amenity of the urban environment. The precinct's focus on innovation and technology provides an opportunity to test new transport solutions, such as an accelerated adoption of electric buses and public charging stations to encourage the uptake of electric vehicles.

A total of 52 transport infrastructure and service interventions were shortlisted using high-level MCA against the transport vision and objectives. The initiatives range from local to regional transport infrastructure, and next to committed projects such as bus priority improvements as part of BPIP and Macquarie University Bus Interchange, key initiatives include:

- Implementing the fine-grained street network;
- Mass Transit links between Parramatta and Epping, as well as Macquarie Park to Southeast Sydney;
- Providing more signalized pedestrian crossings across Lane Cove Road and Waterloo Road;
- Complete missing links of the connected metropolitan cycling network ; and
- Strategic bus corridors to Mona Vale, Hurstville, Blacktown and Parramatta.

The recommended next steps would be to further validate the set of relevant transport infrastructure and service initiatives using transport and traffic modelling within a future land use scenario. This would facilitate further refinement of the initiatives.

The initiatives will need to be implemented by both local and state governments using all the available planning and delivery mechanisms. Furthermore, it is critical that appropriate sequencing of redevelopment is considered to align growth with the provision of infrastructure.

1 Introduction

1.1 Background

In November 2018, the NSW Premier requested the Greater Sydney Commission (GSC) to undertake the *Assurance Review of Planning in the Ryde Local Government Area*, with a focus on the Macquarie Park Investigation Area (MPIA) and its broader impact on the Ryde LGA. The Assurance Review was completed in May 2019 and included the following key relevant recommended actions:

Recommended Action 1: “Establish a Ryde Co-ordination Group (RCG), to be chaired by the Greater Sydney Commission’s (Commission) North District Commissioner, to better co-ordinate land-use, infrastructure planning and delivery across the LGA”

Recommended Action 2: “The Department of Planning and Environment (DPE) to complete work on the Macquarie Park Investigation Area and deliver a Master Plan within 12-months of the Government accepting this recommendation”

Recommended Action 6: “The DPE investigate improvements to pedestrian amenity and connectivity, particularly with regard to Waterloo Road, Macquarie Park, as part of its activities at Action 2.”

Recommended Action 7: “The DPE, along with the City of Ryde, investigate opportunities to improve the night-time economy in Macquarie Park as part of its activities at Action 2.”

In October 2019, Arup were commissioned by the Department of Planning, Industry and Environment (DPIE) to work closely with the agency and its key stakeholders, including the GSC, Government Architect NSW (GANSW), City of Ryde Council (Council) and Transport for NSW (TfNSW), to develop a high-level strategic master plan for the MPIA and supporting Integrated Transport Plan (ITP). In execution of Recommended Action 1, an RCG was established and has overseen the development of the strategic master plan.

Arup also engaged the Sydney-based Indigenous strategic consultancy Old Ways, New to bring their cultural, place making and master planning expertise into the project. Arup have integrated their Country Centred Design methodology in the master planning process, to bridge the needs of the industry and of country.

A Strategic Infrastructure and Services Assessment (SISA), led by the GSC, has been undertaken to identify the supporting infrastructure likely required to support the future growth envisioned as part of the MPIA strategic master plan.

The SISA has been developed with input from NSW Government infrastructure and services agencies, as well as input from the City of Ryde Council. This document incorporates the investigations and findings of the SISA and provides recommendations on how the master plan intends to respond.

1.2 Study area

Macquarie Park is located approximately 16 kilometres north-west of Sydney CBD and 14 kilometres north-east of Parramatta CBD. The study area is illustrated in

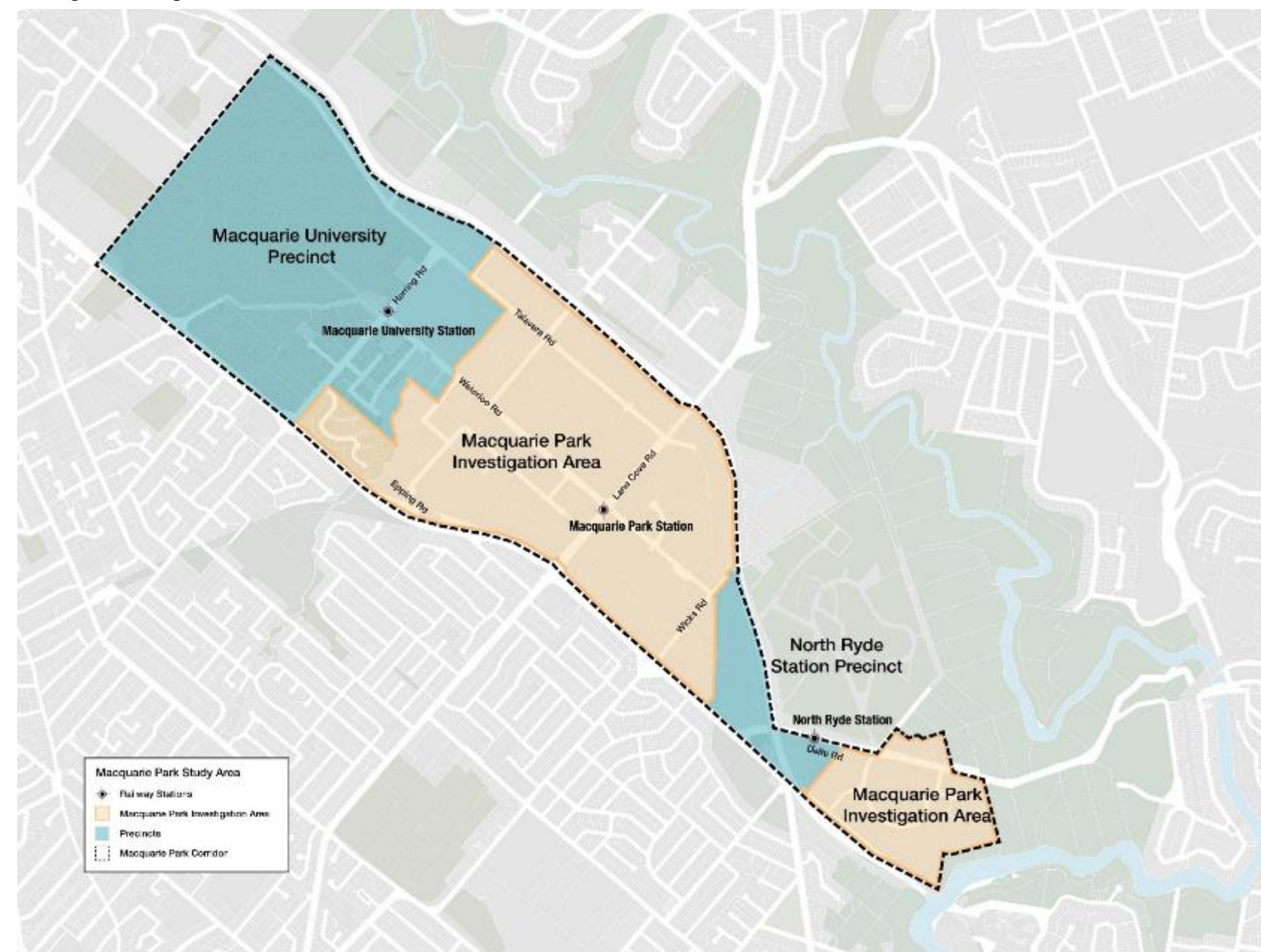


Figure 1 Macquarie Park Investigation Area

Figure 1 and is bound by the M2 Motorway and Delhi Road at the north, Epping Road at the south, Lane Cove National Park at the east and Shrimpton's Creek at the north. The area notably excludes the interfacing North Ryde Precinct and Macquarie University Station Precinct – which were the subject of separate Urban Activation Precinct investigations finalised in 2013 and 2015 respectively.

1.3 Strategic context

The following is a summary of the strategic transport and urban context for Macquarie Park, developed through a review of relevant strategic plans, policies and major projects. This provides the foundations for the development of the transport vision and objectives discussed in Section 2 of this report.

A synopsis is provided of the following plans:

- Greater Sydney Region Plan and supporting North District Plan;
- Future Transport Strategy 2056 and the supporting Greater Sydney Infrastructure and Services Plan; and
- City of Ryde Council's Local Strategic Planning Statement.

Greater Sydney Region Plan

The *Greater Sydney Region Plan: A Metropolis of Three Cities* (GSC, 2018) presents a vision whereby most residents live within 30 minutes of their jobs, education and health facilities, services and great places. It provides ten directions for the metropolis of three cities with a liveability, productivity and sustainability framework for the Eastern Harbour City and North District within which the study area is situated.

Pertinent to this Integrated Transport Plan is the direction of “*A city supported by infrastructure*”, whereby population and employment growth is sequenced with infrastructure provision via a place-based approach.

North District Plan

The *North District Plan* (GSC, 2018) recognises Macquarie Park as a Strategic Centre within Sydney's Eastern Economic Corridor, one of the State's greatest economic assets, with Sydney's largest office floor area outside of the Sydney CBD. It further identifies Macquarie Park as the largest non-CBD office market in Australia, set to become Australia's fourth largest commercial precinct by 2030. In addition to its economic value, the plan also identifies the vibrant centre as a great place that meet the needs of a culturally rich and diverse residential population, and a key health and education precinct containing a university, a hospital and a high-tech industrial employment hub.

The following are the key actions identified for Macquarie Park within the responsibility of NSW government agencies, Greater Sydney Commission and the City of Ryde:

Strengthen Macquarie Park through approaches that:

- enable additional capacity for commercial floor space and maintain a commercial core*
- improve urban amenity as the centre transitions from business park to a vibrant commercial centre, including **reducing the impact of vehicle movements on pedestrian and cyclist accessibility***
- deliver a **finer grain road network to enhance pedestrian connections** and provide new access points*
- promote design excellence in urban design by upgrading public areas*
- deliver an innovation ecosystem in Macquarie Park, capitalising on the relationship with Macquarie University and nearby high-tech and medical corporations*
- improve public transport connections to Parramatta and the District's other strategic centres, including the Northern Beaches Hospital***

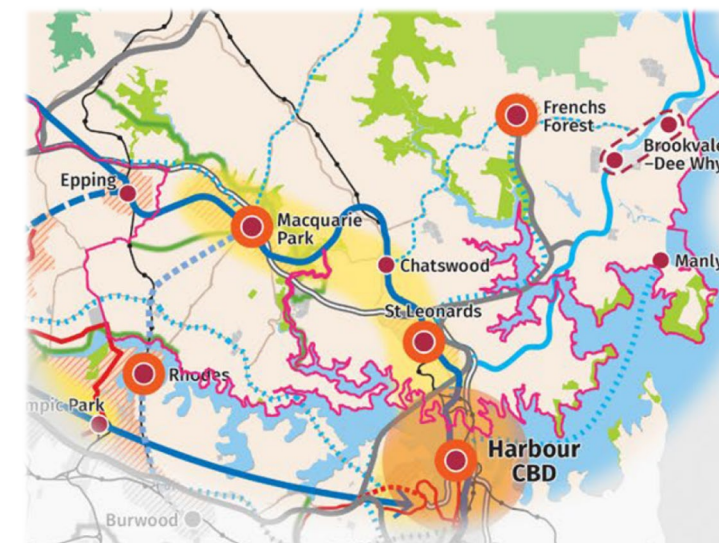


Figure 2 North District structure plan

Future Transport Strategy 2056

Future Transport Strategy 2056 (TfNSW, 2018) presents a vision for transport in NSW built around six customer outcomes for Greater Sydney: customer focussed, successful places, a strong economy, safety and performance, accessible services and sustainable. It establishes a framework to guide investment in transport, including high-level details of both committed initiatives and initiatives for investigation.

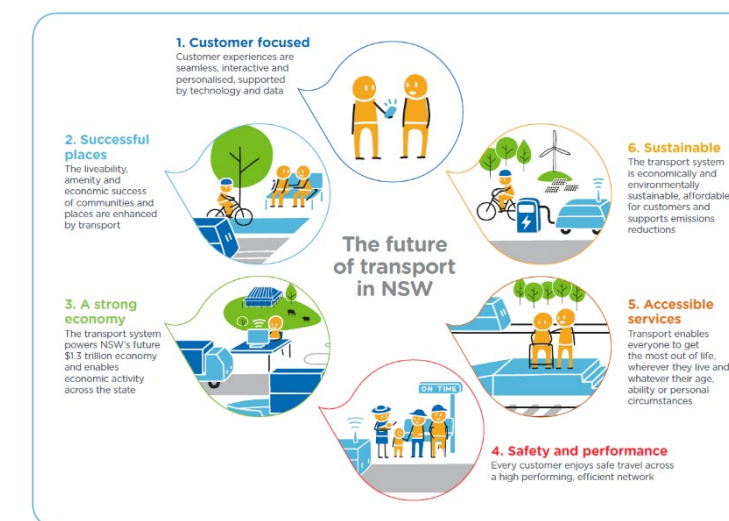


Figure 3 Future Transport's six state-wide desired outcomes

The strategy provides the following strategic directions, applicable to this ITP and the future of Macquarie Park:

- Apply Movement and Place principles to create successful places.
- Deliver complete cycling networks, pedestrian space and interchanges that safely support a wider range of devices.
- Provide safe, quick and convenient public transport services that offer journey times competitive with private cars.
- Plan centres with a greater focus on walking and cycling as well as public transport priority options.
- Prioritise separation of road users to reduce risk.
- Plan and manage transport networks for the best use and optimum movement of people and goods along and across transport corridors and within precincts, whilst creating better places and amenity for communities.
- Reserve corridors for future network development.

Greater Sydney Infrastructure and Services Plan

The Greater Sydney Infrastructure and Services Plan (TfNSW, 2018) underpins the Future Transport Strategy 2056; identifying the policy, service and infrastructure initiatives to achieve the state-wide desired outcomes. The plan highlights both committed initiatives and initiatives for investigation including strategic road, public transport and cycling network initiatives that may impact Macquarie Park.

Relevant to Macquarie Park and having influence on this ITP are some of the following initiatives:

- Bus Priority Program (0-10 committed): This program delivers upgraded and improved bus services across the network, prioritising public transport on roads, reducing travel time, and providing more reliable bus services.
- Macquarie Park interchange and precinct improvements (0-10 committed): A suite of improvements to the Macquarie Park interchange at

Macquarie University station, including road upgrades, bus infrastructure improvements and pedestrian and safety improvements.

- East-west public transport connection from Mona Vale to Macquarie Park (0-10 investigation): Support the efficiency and reliability of passenger journeys west from the Northern Beaches, and improve 30-minute access to key employment centres through rapid, high frequency buses, as opposed to lower frequency suburban services.
- Parramatta to Epping mass transit link (10-20 investigation): This would extend 30-minute access to Macquarie Park to a significant number of suburbs on the transport network.
- Mass transit link Macquarie Park to Southeast Sydney (20+ visionary): This project will be an important link between the North and South Districts for the Eastern Harbour City and Sydney Olympic Park that will transform the metropolitan rail network by facilitating transfers outside of the Sydney CBD, through multiple interchange opportunities with existing east-west rail lines.

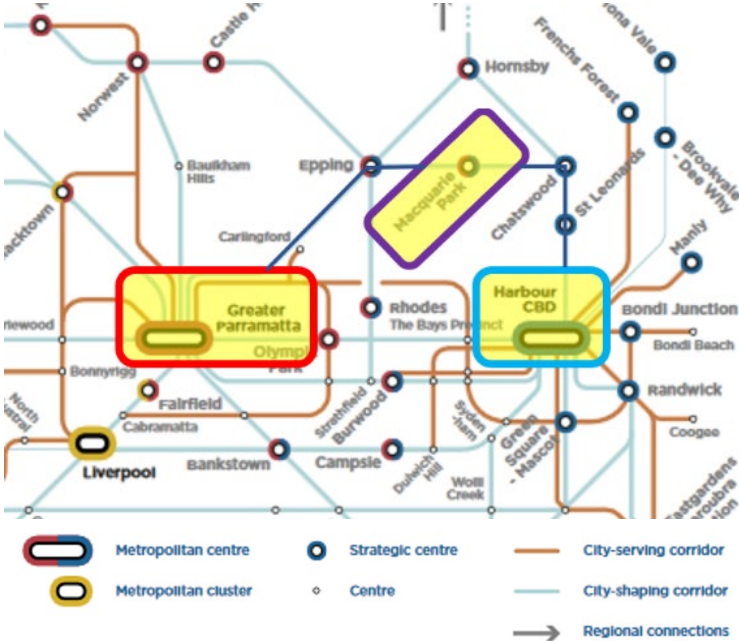


Figure 4 Adjusted from Intermediate Transit Network 2056 (visionary) from Greater Sydney Infrastructure and Services Plan. Macquarie Park (purple outline) is located on the city-shaping corridor between Greater Parramatta (red outline) and the Harbour CBD (blue outline).

Local Strategic Planning Statement

The City of Ryde Council's Local Strategic Planning Statement (LSPS) (City of Ryde, 2019) responds to the Greater Sydney Region Plan and North District Plan, setting out the 20-year vision for the area and guiding Council's more detailed plans, planning controls and policies. It also sets out a vision for transport in Ryde:

Improve transport links between town centres and other destinations – including open space, residential areas, schools and Macquarie University – with a focus on active and public transport.

The statement identifies the pedestrian environment and congestion on the road network, especially into and out of Macquarie Park, as key challenges for the area and sets a number of targets, including a 60/40 public transport/private vehicle journey to work modal split for Macquarie Park, and actions to deliver on the transport vision for the Ryde area. The actions identified cover land use and pedestrian connectivity, parking, cycling infrastructure and programs, safety, public transport, the road network and freight and logistics.

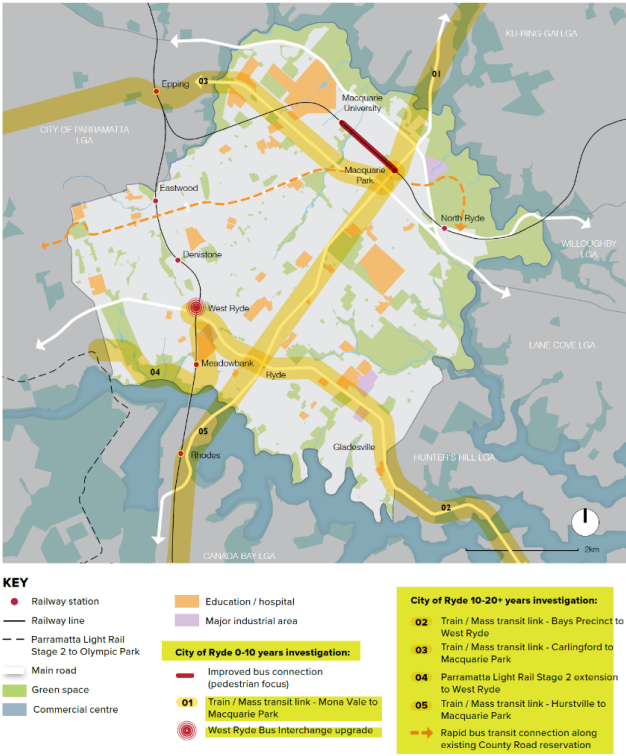


Figure 5 Transport initiatives Structure Plan (City of Ryde, 2019)

Other relevant documents

A brief synopsis of relevance from a variety of other plans, policies and studies is provided in Table 1.

Table 1 Summary of plans and policies

Documents	Relevance
NSW Government	
Road Safety Plan 2021 (TfNSW, 2018)	<ul style="list-style-type: none">Road safety targets set:<ul style="list-style-type: none">2021 - Reduce road fatalities by at least 30% from 2008–2010 levels (State Priority Target)2056 – zero fatalities and serious injuries on our roadsKey focus is established on increasing safety for vulnerable road users by providing pedestrian crossings, refuges and traffic calming devices, as well as expanding 40km/h zones in high pedestrian and local areas.
Herring Road Urban Activation Precinct Planning Report (DPIE, 2014)	<ul style="list-style-type: none">Identifies the vision and principles for the Macquarie University Station PrecinctIdentifies the places and movement networks that the MPIA will need to integrate with in the future near Macquarie University
North Ryde Station Precinct Planning Report (DPIE, 2012)	<ul style="list-style-type: none">Identifies the vision and principles for the North Ryde Station PrecinctIdentifies the places and movement networks that the MPIA will need to integrate with in the future at North Ryde
Local Government	
Macquarie Park Baseline Movement Economy Report (Space Syntax, 2009)	<ul style="list-style-type: none">Establishes the importance of refined pedestrian infrastructure to improve Macquarie Park’s economic and social sustainability across the whole siteTwo potential urban villages: Shrimpton’s Creek to Macquarie Shopping Centre and DCP park Waterloo Road to Lane Cove RoadWaterloo Road would become a major pedestrian route between the two villages
Macquarie Park Pedestrian Access and Mobility Plan (Arup, 2013)	<ul style="list-style-type: none">Shrimpton Creek is a high priority active routeRecommendations include: Investigation of crossing opportunities, major new developments to provide for pedestrian access, street light audit to check brightness levels, encouraging walking

	through education on the benefits, periodic review of the PAMP by Council
The State of Transport in Macquarie Park (Arup, 2015)	<ul style="list-style-type: none">Identified constraints include: road congestion resulting in slow travel times and poor reliability for private vehicle and public transport, barriers to walking and cycling access including intersection delays and incomplete footpathsFurther action to include fast-track infrastructure for walking and cycling and the development of a long-term transport strategy
Integrated Transport Study 2016-2031 (Council, 2016)	<p>Key themes for improving traffic and transport to 2031 include:</p> <ul style="list-style-type: none">Upgrade targeted traffic pinch pointsDevelop “fine grained” networks to improve local connectivity for traffic, pedestrians and cyclistsImprove bus access to/from Macquarie Park and plan for the expected significant increase in bus movements
Draft Strategy for Waterloo Road Macquarie Park (Council, 2019)	<ul style="list-style-type: none">Vision: The Linear Park will be a publicly accessible open space, which provides passive recreational opportunities and serves as a green spine through the city centre
Private sector	
Various development proposals	<ul style="list-style-type: none">The area is experiencing significant development interest with a total of 38 development applications across the MPIA and Macquarie University Station Precinct at various stages of approval or delivery identified and mapped as part of the strategic master plan framework – including a strong contingent of residential and commercial floor space along with smaller areas of retail and education / social

1.4 Purpose & structure of report

The strategic master plan is anticipated to catalyse significant growth in jobs, retail and dwellings. This is anticipated to generate a need for Council and the NSW Government to invest in transport infrastructure and services, including the identification of necessary and desirable improvements to enable a safe, efficient and sustainable transport response to growth.

The purpose of this report is to form a transport plan supporting the master plan and infrastructure plan that includes a strategy for transport, aligned with and in support of the place-based vision for Macquarie Park, outlining:

- The preferred configuration of movement and place functions, features and interactions within the precinct
- The transport task generated by the future Macquarie Park, and an understanding of the associated scale and type of transport interventions required to support proposed growth.

Arup and TfNSW have jointly developed this ITP with consultation and collaboration with DPIE, GSC, GANSW and Council.

This study also brings in the findings of the SISA to form the beginning of the response to the transport issues and opportunities facing Macquarie Park, providing a strategic framework and direction.

The SISA ultimately supports the MPIA strategic master plan and it provides a forward program of infrastructure and services over the next 20 years to support growth.

Further development and adjustment of both the strategic master plan and SISA would be undertaken following stakeholder and community consultation.

The structure of this ITP is as follows:

2. Vision & objectives.

Identifies the place-based vision for the future Macquarie Park, the objectives set to realise the vision and the performance measures used to assess whether objectives are being met.

A strategic level understanding of relevant strategic plans, policies and projects is provided as an underlying basis to support the development of the vision and objectives.

3. Existing and future places.

Provides an overview of Macquarie Park’s existing and future planned land use and transport network characteristics.

Details on existing travel patterns and accessibility to jobs and dwellings is provided to understand

travel behaviour and demand. This will provide context on the logic used to identify challenges, opportunities and strategic directions.

4. Challenges and opportunities.

Through data analysis and stakeholder input, the challenges and opportunities are presented through the lens of the vision and objectives.

5. Achieving the vision.

Exploration of options for potential transport initiatives to support the preferred land use scenario and the transport system serving Macquarie Park.

6. Next steps.

This section outlines the implementation plan with a range of actions to achieve the vision and supporting objectives for Macquarie Park.

1.5 Methodology

In parallel with how we plan for our places, in particular how we plan for transport to interact with and enable place, has been changing through the emergence of Future Transport 2056, Better Placed (GANSW, 2017) and developing guidance and investigations since.

1.5.1 Implementing movement and place in NSW

GANSW have issued aspirations for realising better and well-designed built environments. Key to these aspirations is the execution of a vision and validate approach to planning and designing the built environment, using movement and place as a framework within this approach.

The Draft Practitioner's Guide to Movement and Place by the Government Architect New South Wales (2020) explains to practitioners how to apply the approach to projects and plans in six steps, shown in Figure 6.

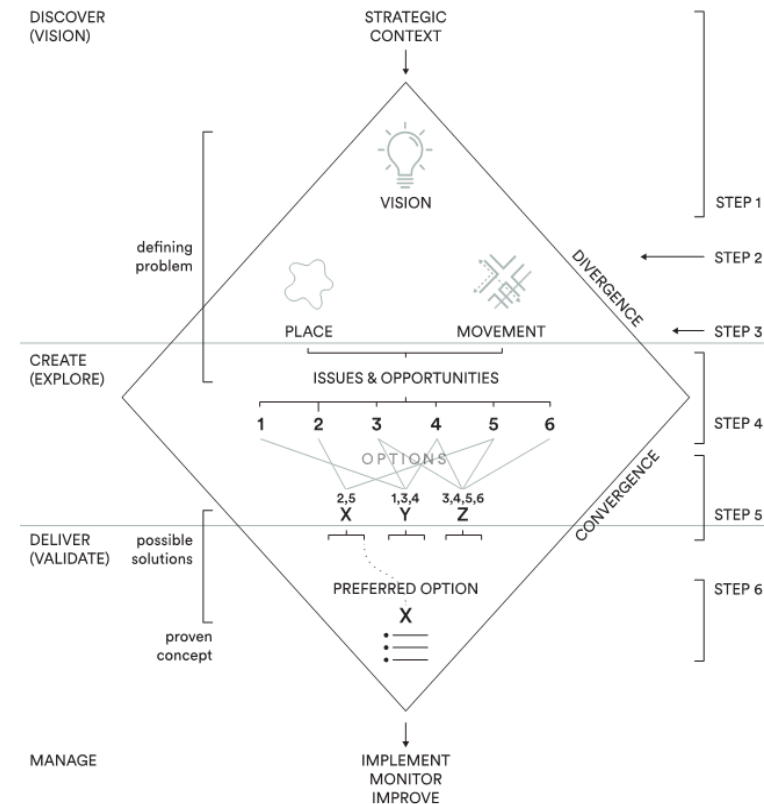


Figure 6 Six stages in the core Movement and Place process (Draft Practitioner's Guide to Movement Place, GANSW, 2020)

As described in the Guide, the process requires collaboration between various levels of Government, interest groups and other stakeholders. Spatial information and existing performance metrics play an important role to achieve mutual understanding of the current functioning and objectives for the study area, after which design-thinking is used to identify a range of planning options.

Macquarie Park, the sixth largest employer in NSW, provides a strong case to serve as a pilot for the Movement and Place framework. It features both a high movement function and a high place function that are in conflict, limiting potential for both. As an example, the high through-movement functions bisecting and bordering Macquarie Park limits public space amenity along the corridors. As Sydney and Macquarie Park are forecasted to grow significantly, the movement and place functions are only expected to intensify in the future.

The growing conflict of movement and place is recognised by local and state government, residents and businesses in Macquarie Park. They share the ambition

for Macquarie Park to become a better place, making a good case to gain experience in using the tool.

1.5.2 Collaborative approach

The collaborative approach taken for development of the master plan has been continued for the ITP to follow the methodology. A range of workshops, stakeholder engagement sessions and informal discussions have taken place with the Council, TfNSW, DPIE, GSC and more. The following key engagement activities have been undertaken:

- SISA Workshop 1: Engagement on the vision, objectives, indicators, the future challenge and the long list of interventions.
- Stakeholder engagement with the TfNSW Road Network Development, Walking and Cycling Strategy and Bus Network Development teams on the long list of interventions.
- SISA Workshop 2: Report back on stakeholder engagement to other stakeholders, presentation on the methodology and results of reducing the long list to the short list.

2 Vision & Objectives

2.1 Transport vision statement

"For Macquarie Park to be a highly successful place within Sydney's Eastern Harbour City that supports world class business, research and education opportunities, and contributes to Australia's economy."

Strong transport connections are vital for economic and social activity. To achieve this vision, Macquarie Park must be supported with strong local and regional connectivity through:

- *Activating the centre with a new Movement and Place framework,*
- *Encouraging active travel (walking and cycling) and public transport use,*
- *Providing a safe road environment, suitable pathways, and streets that balance movement of people and goods and access with amenity of place, and*
- *Enhanced accessibility to/from Macquarie Park within 30 minutes by public transport, seven days a week."*

The above vision statement, and the objectives following, were crafted to guide the strategic planning process. It builds on the comprehensive understanding of the strategic urban, environmental and transport context of Macquarie Park and a collaborative

¹ The vision in the North District Plan includes: *Residents in the North District will have quicker and easier access to a wider range of jobs, housing types and activities.*



engagement process with stakeholders that included relevant parties from each Local and State Government as well as the traditional custodians of the land introduced to the process through our partners Old Ways, New.

The vision aligns with that of the North District Plan (GSC, 2018)¹, which focuses on access to opportunities such as housing, and the Local Strategic Planning Statement, Planning Ryde² (City of Ryde, 2020), which has a vision for a liveable, prosperous and connected city.





The outcome is a statement that lays a strong foundation for transport planning and designing a new Macquarie Park.

2.2 Objectives

To realise the transport vision, the following eleven (11) transport objectives were identified for the Macquarie Park Strategic Master Plan:

Future Transport 2056 Outcome		Macquarie Park Transport Objective
Customer Focused 	1	Provide sufficient public transport services into, out of and within Macquarie Park bringing customers where they want to go and when, providing a viable alternative to private vehicles.
	2	Contributes to an integrated transport network across transport modes, resulting in an amenable, functional and safe transport system from door to door.
Successful Places 	3	Enhance walking and cycling opportunities in Macquarie Park through direct and attractive connections creating a permeable network.

² The vision for Ryde as described in the LSPS reads: *"The City of Ryde will be a liveable, prosperous and connected city that provides for our future needs while protecting nature and our history. As our city with diverse and vibrant centres, our neighbourhoods will reflect and serve our residents and business. Our well-planned*

	4	Provide sustainable access to Macquarie Park centres for people and goods while safeguarding liveability and vibrancy of place.
A Strong Economy 	5	Improve public transport access to/from Macquarie Park and other key employment centres at all times of day.
	6	Increase trip containment within Macquarie Park.
	7	Support cross-regional freight movement along major road corridors.
Safety and Performance 	8	Create an amenable, prioritised and safe pedestrian environment in Macquarie Park.
Accessible Services 	9	Improve accessibility to fast and frequent public transport services including Metro and the Macquarie Centre bus interchange for all using any sustainable transport mode.
Sustainability 	10	Reduce demand for new infrastructure by influencing customers to use Metro and other services and infrastructure with spare capacity.
	11	Contribute to net-zero emission by 2050.

These objectives have been developed having regard for the state-wide customer outcomes within Future Transport 2056 (see Section 1.3). The objectives have influenced the development of the suite of recommendations in the SISA and this ITP on infrastructure, planning and policy initiatives to support growth in Macquarie Park.

places will enhance the health, wellbeing and resilience of our future community. They will also foster innovation, equity, inclusion and resilience."

3 Existing and future places and movement networks

This section will describe existing places and movement networks, currently planned interventions and the conflicts and synergies found when overlaying movement and place.

3.1 Existing place

In the 2016 Greater Sydney Regional Plan: *A metropolis of three cities*, the GSC identified Macquarie Park as a health and education precinct. Macquarie Park is also identified as a key strategic centre, as it already currently is the 6th biggest CBD in Australia and has been identified to deliver on job targets and support the growth of Greater Sydney.

Macquarie Park is an established business cluster in the health, education and technology sectors including Astra Zeneca, Johnson & Johnson, Sony, Optus, and Foxtel. A number of the world’s largest companies, with 12 of the top 100 ASX-listed companies by market capitalisation, have their Australian headquarters within the business park.

Currently, Macquarie Park is largely featured by its commercial land uses, dominant throughout the precinct. Typical built form characteristics include large campus-style plots with large commercial blocks and light industrial units, significant surface-level car parking and a mix of architectural styles.

Macquarie Park is bordered by residential areas south of Epping Road. There is limited access to green space, including access to a small number of high-quality green pockets and Lane Cove National Park which is separated from Macquarie Park by the M2 Motorway. North Ryde Riverside Corporate Park, while part of the study area, is severed from the rest of Macquarie Park by the M2 motorway and Epping Road.

3.2 Existing key places

The Corridor is anchored by Macquarie University which plans to support the area’s expansion with significant commercial growth. As at 2019, there were 40,209 students enrolled with the institution. These enrolments would likely contribute to demand for

residential and/or student accommodation within easy access.

Besides the commercial land uses, Macquarie Park has several large retail clusters which attract customers from outside the precinct. The largest is Macquarie Centre with 350 shops, which is integrated with a local bus interchange and directly next to Macquarie Park Metro Station, followed by The Village in North Ryde. Macquarie University borders the Macquarie Park Investigation Area and features major education facilities in a sparse and green campus setting.

Public parks in Macquarie Park mostly serve residents and workers of the precinct, and include Wilga Park, its green connections to Waterloo Road and Epping Road along Shrimpton’s Creek, Lachlan’s Line Park and Elouera Reserve.

3.3 Future place

Macquarie Park is forecast to grow. Growth Pathway 2: “Diversify” has been identified as the preferred scenario going forward, which features a consolidation of commercial uses supplemented by introduction of new residential areas and supporting infrastructure. See Table 2 for the population, dwelling and employment estimates from 2021 to 2036.

Table 2 Population, dwelling and employment estimates from 2021 to 2036.

Year	2021	2026	2031	2036	Change
People	12,800	21,700	30,400	38,050	+25,250
Dwellings	5,450	9,550	13,750	17,750	+12,300
Jobs	72,850	75,900	79,350	83,500	+10,650

The masterplan, which this document supports, has adopted a place-led approach, which in the context of Macquarie Park will aim to connect with Country and the deep history and culture of Wallumattagal Ngurrangra (places) and Dharug Ngurra (Country). Placemaking principles as described in the Placemaking strategy include the revealing of Country through its creeks, increasing amenity and liveability of public space and stronger connections to Macquarie University.

Over the past 10 years, the proposed diversification of Macquarie Park has already started through the zoning and development of high-density residential dwellings in

the corridor; particularly within the Herring Road and North Ryde Urban Activation Precincts (UAPs).

Other major placemaking processes that are already underway include the Macquarie University Masterplan, which seeks to accommodate a sustainable growth of its student and employment population and the major redevelopment of the Ivanhoe Estate.

Neighbourhoods

Seven neighbourhoods have been defined in the masterplan, each with a distinctive identity, purpose and unique spatial qualities, creating a ‘place of many places’. See Figure 7 and the numbers below for reference. For more information, see the Placemaking Strategy.

- Butbut / Waterloo Park (1): Commercial core set around a new linear park
- Nangamay / North Ryde Riverside (2): Green cluster surrounded by National Park
- Garungul / Wicks Road South (3): Highly connected education and small business cluster
- Badu Nawi / Porters Creek (4): Larger business space around creek-line open spaces
- Ngalawala / North Park (5): Diversity of business space around creek-line open spaces
- Waragal Birrung / Shrimptons Quarter (6) Tech cluster with high quality landscape and accessibility
- Gari Nawi / Macquarie Living Station (7): Dense commercial and social centre

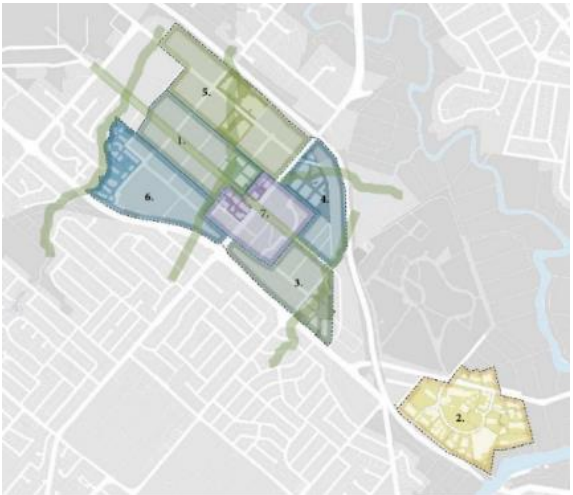


Figure 7 Proposed neighbourhoods of Macquarie Park

3.4 How customers travel to and from Macquarie Park

The previous sections described how Macquarie Park is forecast to grow. To provide insight into what transport response is required to meet the related growth in travel demand, understanding of existing travel behaviour is required.

The high share of commercial land use in Macquarie Park has historically contributed to a tidal pattern of private vehicle trips accessing the precinct in the morning and departing it in the afternoon. A key reason for this is the location of Macquarie Park in relation to the strategic road network, including the M2 Motorway. A second reason is the high availability of private parking provided by commercial land uses, making it more attractive to access employment by car. The high accessibility by private vehicle and low level of public transport service to Sydney's North Shore has made it attractive for residents of the North Shore to access Macquarie Park by car, as shown in Figure 8.

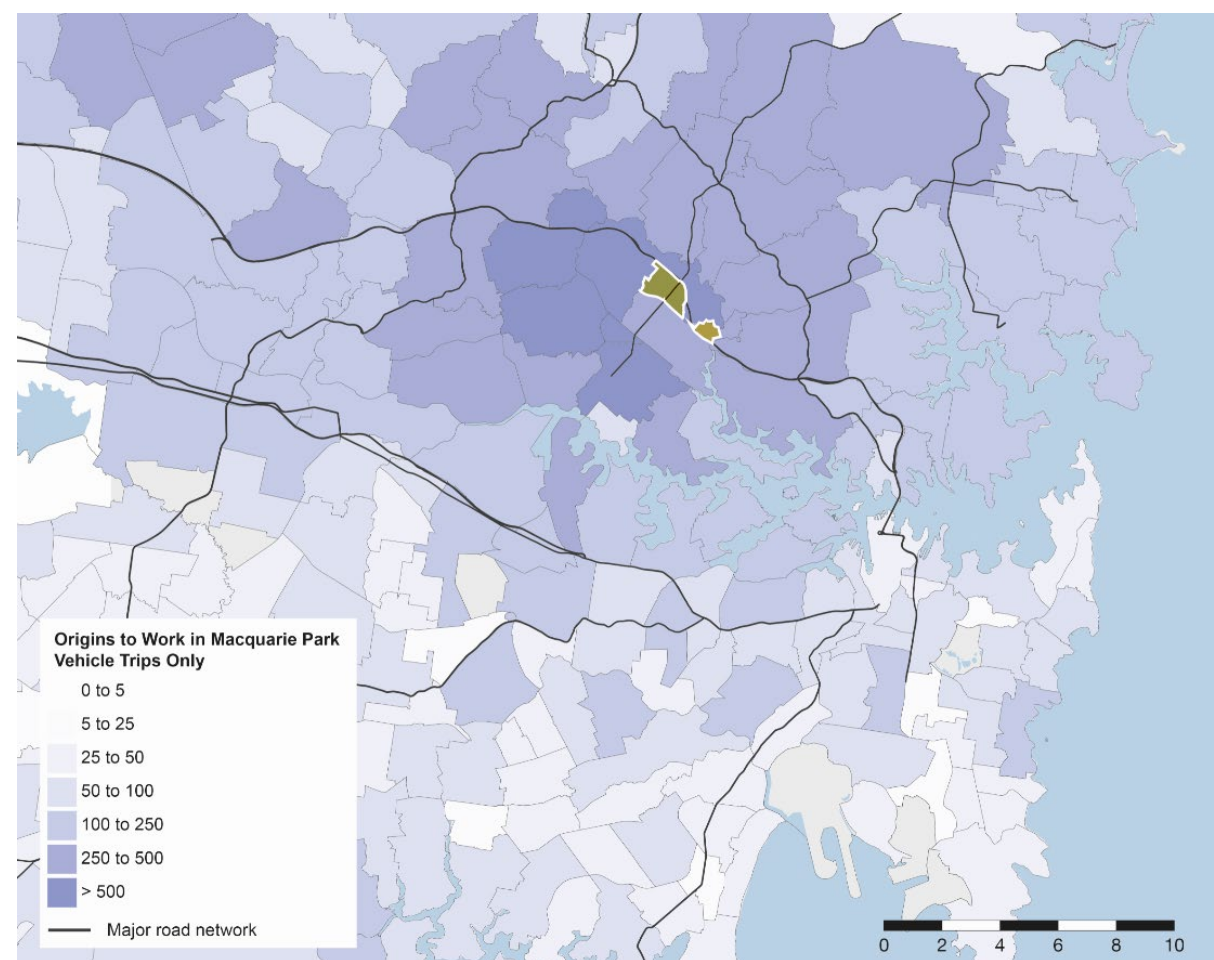


Figure 8 Origins of work trips to Macquarie Park by private vehicle (ABS, 2016)

This has also contributed to the large average distance travelled to Macquarie Park, its location serving the northern part of Greater Sydney. Figure 41 in Appendix C shows that the share of trips between 10 to 30 kilometres is significantly larger than for Greater Sydney.

³ Journey to Work 2011 and 2016 data, Australian Bureau of Statistics

Although travel behaviour to Macquarie Park has been becoming more sustainable since 2011, the transport task is expected to increase for all transport modes. Figure 9 shows that the share of private vehicle trips has dropped to 70% of trips accessing work in 2016³ (from 77% in 2011). At the expense of the car, the share of public transport trips has increased to 26%, likely driven by the opening of the Epping to Chatswood rail link in 2009.

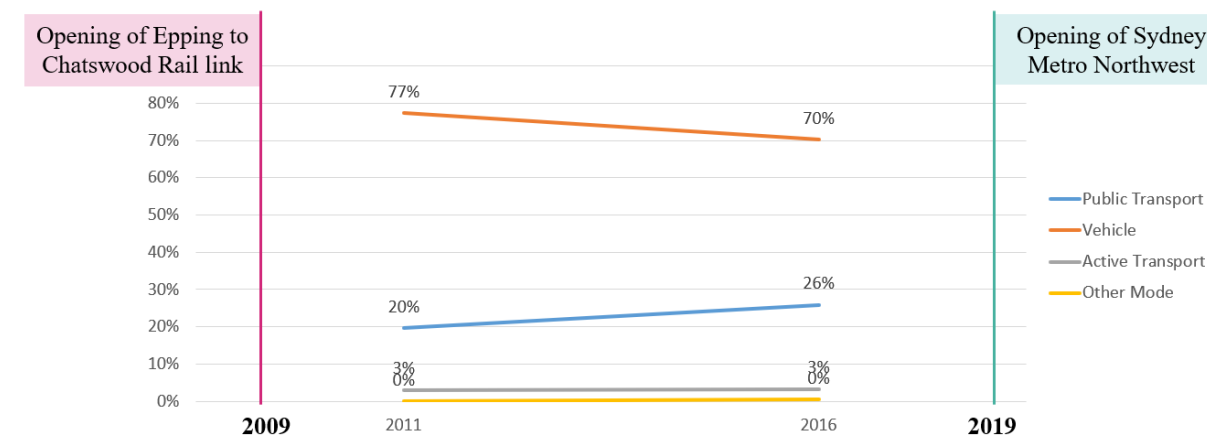


Figure 9 Journey-to-work mode share of trips arriving in Macquarie Park (Census 2016, ABS). Private vehicle mode share has been falling while public transport has been increasing.

Figure 10 shows that the share of trips arriving by private vehicle transport has grown by 12% up to 2016 but that the share of public transport trips has grown by 39%. This shows that, although a travel mode shift has been taking place from private vehicle to public transport, the overall travel task has actually been growing for all transport modes including private vehicle⁴.

As land use in Macquarie Park is forecast to grow and travellers to and from Macquarie Park already experience issues, significant investment in the transport systems is required to improve travel for existing travellers and cater for the additional future trips.

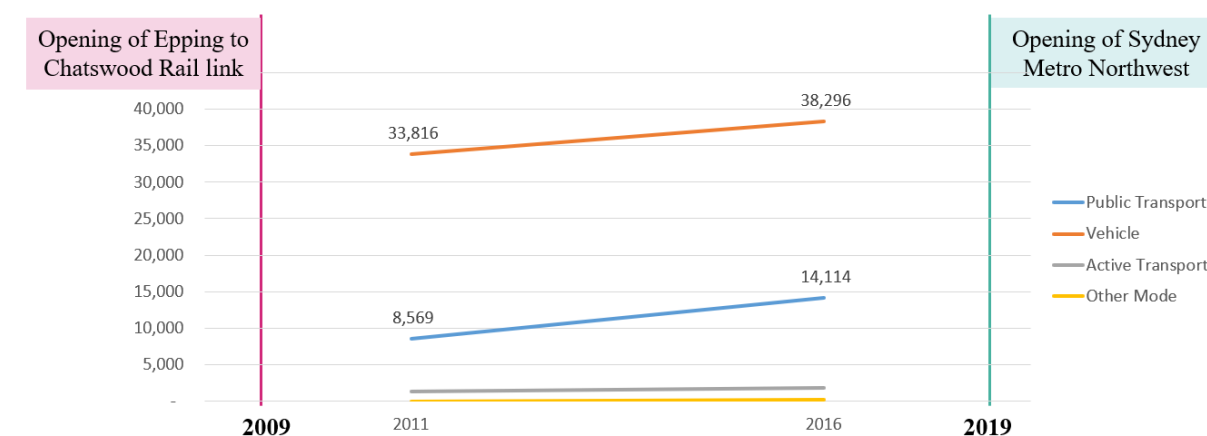


Figure 10 Number of trips to work by mode arriving in Macquarie Park (Census 2016, ABS). The number of trips arriving in Macquarie Park has been growing for all modes, including private vehicle, despite its dropping mode share.

⁴ Education, health, retail and residential functions in Macquarie Park, mostly adjacent to the Investigation Area, generate a more diverse range of trips.

3.5 Existing transport conditions

The transport behaviour described in the previous section is made possible and restricted by the available transport networks for different modes. The remainder of this section will describe how the transport facilities per mode influence existing travel behaviour.

3.5.1 Walking

Amenity

Due to the large share of commercial land use, a large share of current walking trips in Macquarie Park is made by workers accessing employment from bus stops and metro stations, as well as recreational and ancillary trips made on lunch breaks or accessing supporting services. Key generators of walking trips are Macquarie University, Macquarie Shopping Centre, businesses and green spaces such as Shrimpton's Creek and Lane Cove National Park.

Public space in Macquarie Park has limited success in providing an attractive and safe place to walk for a range of reasons described below. This reduces the liveliness of public spaces and could contribute to increased travel by car, especially where there are limited other transport opportunities.

- Public space amenity for pedestrians is limited along the major roads of Epping Road and Lane Cove Road due to high speeds and high traffic volumes particularly during morning and evening peak periods.
- Narrow footpaths restricting pedestrian flow, e.g. along Lane Cove Road between Macquarie Park Station and Epping Road.
- Paths shared with cyclists, e.g. along Waterloo Road, Talavera Road and Wicks Road, creating pedestrian customer comfort issues particularly for the less mobile.
- Limited activated frontages and limited dwelling opportunities. Exceptions include the intersection of Khartoum Rd and Banfield Rd, Eden Park Drive and Optus Drive.
- Limited amount of trees and greenery, e.g. between kerb and footpath, to provide shade and protection from vehicle impact.

Lane Cove National Park features high-amenity green spaces within close proximity to Macquarie Park. However, it is separated from the precinct by the M2 Motorway, limiting current use by Macquarie Park workers and residents. Khartoum Road, currently passing under the M2, presents an opportunity to connect the precinct directly with Lane Cove National Park. Similarly, North Ryde is separated from surrounding green spaces such as Lane Cove River in the north by Delhi Road and Pages Creek in the south by the M2 Motorway. The opportunity exists for North Ryde to connect to these spaces.



Figure 11 Newly delivered Lachlans Line Park



Figure 12 Activation of recreational walking in Lane Cove National Park is a major opportunity



Figure 13 Road environment along Lane Cove Road

Mobility

Pedestrian mobility across Macquarie Park is limited due to various reasons. Figure 14 illustrates the walking catchments departing each of the Metro stations Macquarie Park currently. It shows how access on foot is constrained by major roads. This is due to two reasons:

First, there are limited pedestrian crossings across several roads and streets in the precinct, resulting in a large distance between crossings and limiting opportunity to move freely through Macquarie Park on foot. Key examples include:

- *M2 motorway and Talavera Road* – preventing a potential connection with Lane Cove National Park
- *Waterloo Road* – restricting at-grade access to/from bus services and between neighbourhoods either side of Lane Cove Road
- *Epping Road and Lane Cove Road* – resulting in a high volume of vehicle, pedestrian and bicycle crashes at this intersection as shown in Figure 43 and Figure 44 in Appendix C.

Second, signalised intersections along Lane Cove Road and Epping Road are managed to give priority to vehicle traffic rather than pedestrians, leading to very long crossing times. This is attributed to the high traffic volumes on these roads, especially during morning and evening peak periods.

Additionally, large average block sizes with limited pedestrian through-connectivity limits the opportunity for pedestrians to find direct travel paths through the precinct.

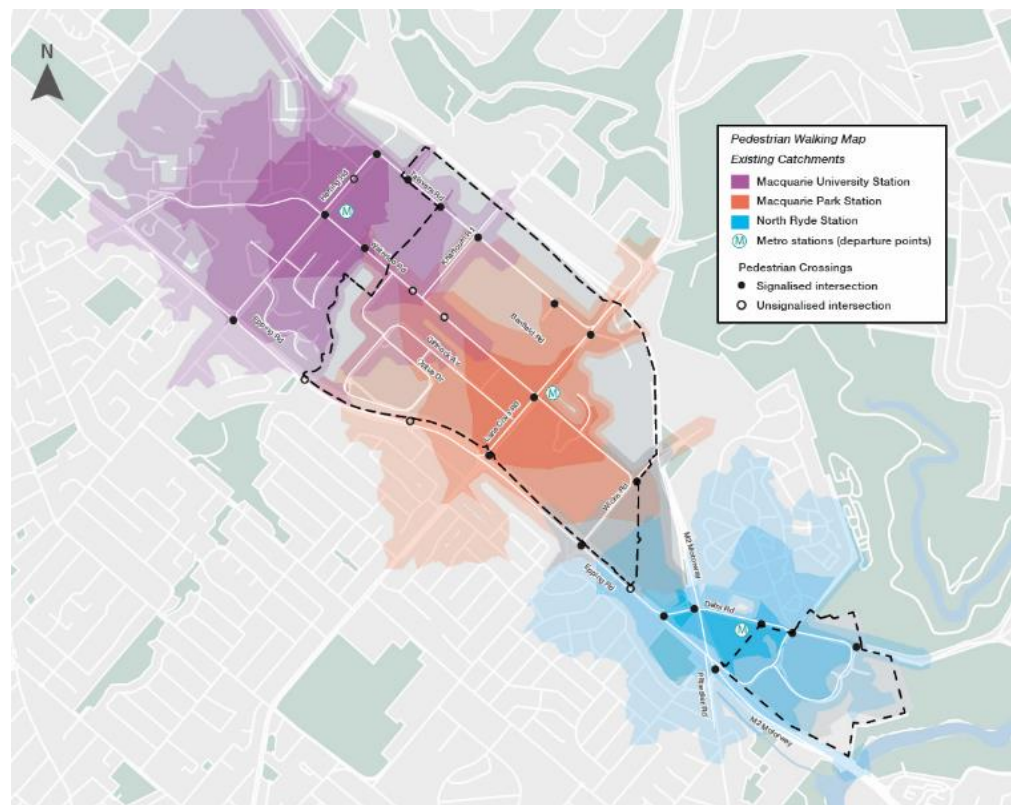


Figure 14 15-min walking catchments departing key locations in Macquarie Park (existing network)

3.5.2 Cycling

The large distances in Macquarie Park and qualities of surrounding green spaces such as Lane Cove National Park create a large opportunity for increasing cycling in, to and from Macquarie Park. This could help reduce or minimize the growth of private vehicles accessing Macquarie Park and improve public space amenity, particularly for trips departing the immediate vicinity of Macquarie Park including Ryde and the Upper North Shore. However, lack of facilities, safety issues and limited crossing opportunities currently reduce potential benefits.

Existing cycling facilities in Macquarie Park only provide limited coverage. Figure 15 shows connectivity is mostly provided in north-west to south-east direction, such as along Waterloo Road and Talavera Road, but there is limited connectivity in south-west to north-east direction, currently including Khartoum Road and Shrimpton's Creek.

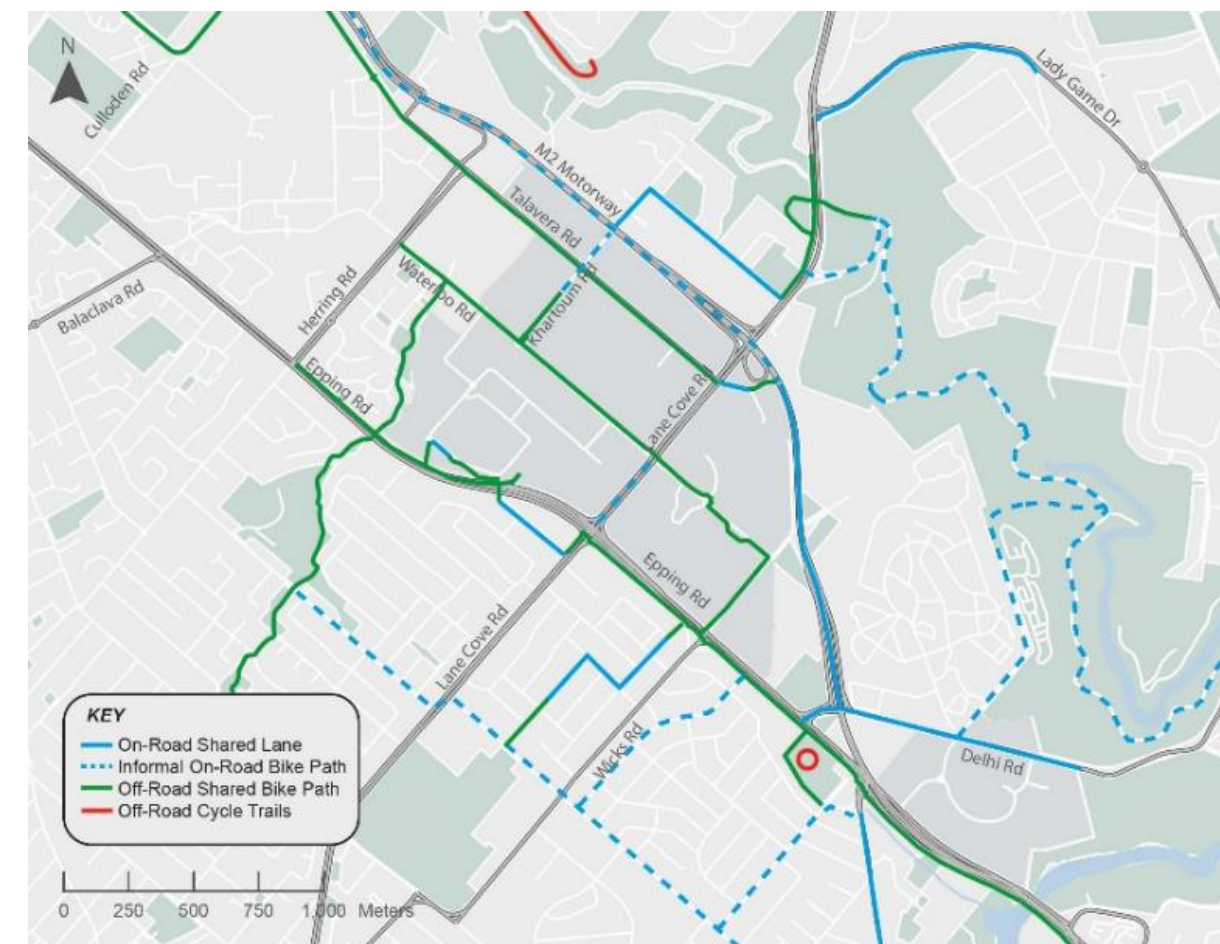


Figure 15 Existing cycle facilities in Macquarie Park

Where no separated facilities are provided, severe safety issues are presented for on-street cyclists, in particular at the intersections of Epping Road and Lane Cove Road, a crash hotspot for pedestrians and cyclists, as well as Epping Road and Lane Cove Road and Waterloo Road.

Finally, the lack of crossing opportunities along the long road segments, as well as slip lanes without crossing opportunities restrict freedom for cyclists to move around the precinct.

3.5.3 Metro

The opening of the Epping to Chatswood rail link in 2009 and the completion of Metro conversion and extension to Tallawong in 2019 have significantly improved the access to and from Macquarie Park by public transport. Both projects extended rail to new suburbs previously unserved by rail, and the Sydney Metro North West significantly increased frequency (every 4 minutes in peak) and amenity of service. Both projects together have made a significant step towards building a more sustainable transport behaviour to and from Macquarie Park. Utilising this service for access to Macquarie Park will continue to be one of the major transport opportunities to support its growth in the future, maximising the transport investment.

Figure 16 shows that current travel demands indicate a high spare capacity within the stations, which along with the high available line capacity, indicate the Metro infrastructure delivered will be able to continue to support significant growth in Macquarie Park.

Despite the high patronage of people arriving in Macquarie Park via Metro, accessibility is limited in connecting people to their final destination. As discussed previously, there are limited pedestrian crossing opportunities due to intersection design including spatial distribution and wait times at intersections. Additionally, stations are deep underground, taking a considerable amount of time to get from ground level to platform (5 minutes or more).

There is opportunity to increase usability of Metro by making it easier for customers to access stations, for example, through providing pedestrian crossings on all approaches at the intersection of Waterloo Road and Lane Cove Road (for Macquarie Park Station). The planned redevelopment of Macquarie Centre includes further integration with Macquarie University Station, which will contribute to its usability.

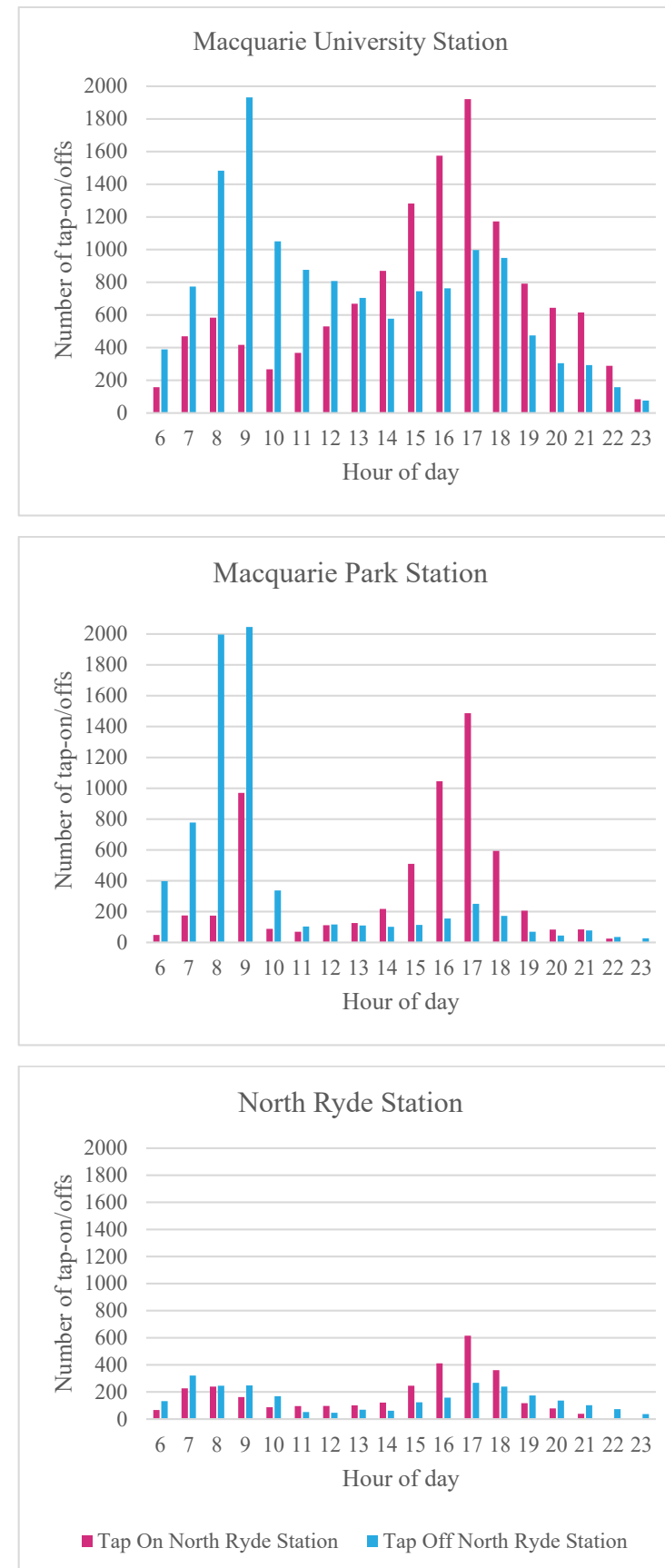


Figure 16 Hourly tap on / offs at stations (TfNSW, 2019)

3.5.4 Bus

The bus network plays a significant role in making Macquarie Park accessible in places where Metro currently does not. The Macquarie University Bus Interchange (MUBI) is the central hub for bus in Macquarie Park and a major regional interchanging location on the North Shore, accommodating bus routes to and from Parramatta, Sydney Olympic Park, Chatswood and North Sydney to Sydney Metro Northwest.

The majority of the current travel task by bus comes from the west and northwest, including the Blacktown area via the M2 Motorway. This has been validated by stakeholders and shown in Figure 17 and Figure 18. Locations of stops with major bus boarding and alighting numbers (see Figure 45 in Appendix C) show bus is used to access Metro services as well as express services towards the Sydney CBD. The bus network has been adjusted at the introduction of Metro to provide an integrated network and facilitate these movements.

Bus transit has the opportunity to accommodate a significant share of the transport task for Macquarie Park and increase its access mode share significantly, particularly to service areas where Metro currently does not go. This includes areas currently serviced by bus, but also includes expansion to the Upper North Shore.

However, the attractiveness of service is significantly reduced due to performance issues. Road segments without bus (only) lanes, suffer similar congestion as private vehicles, resulting in late and unreliable services. Additionally, limited bus priority at intersections such as Lane Cove Road and Waterloo Road restrict throughput by bus, particularly for the Wicks Road South catchment.

As part of the Bus Priority Infrastructure Program (BPIP) Stage 1, bus lanes are provided on Herring Road, which will improve access to MUBI, and bus priority will be increased on the intersection of Lane Cove Road and Waterloo Road. Stage 2, currently uncommitted, would see further provision of bus lanes on Waterloo Road and Lane Cove Road, increasing movement opportunities by bus for customers within Macquarie Park, as well as on Lane Cove Road, improving access to Macquarie Park Station.

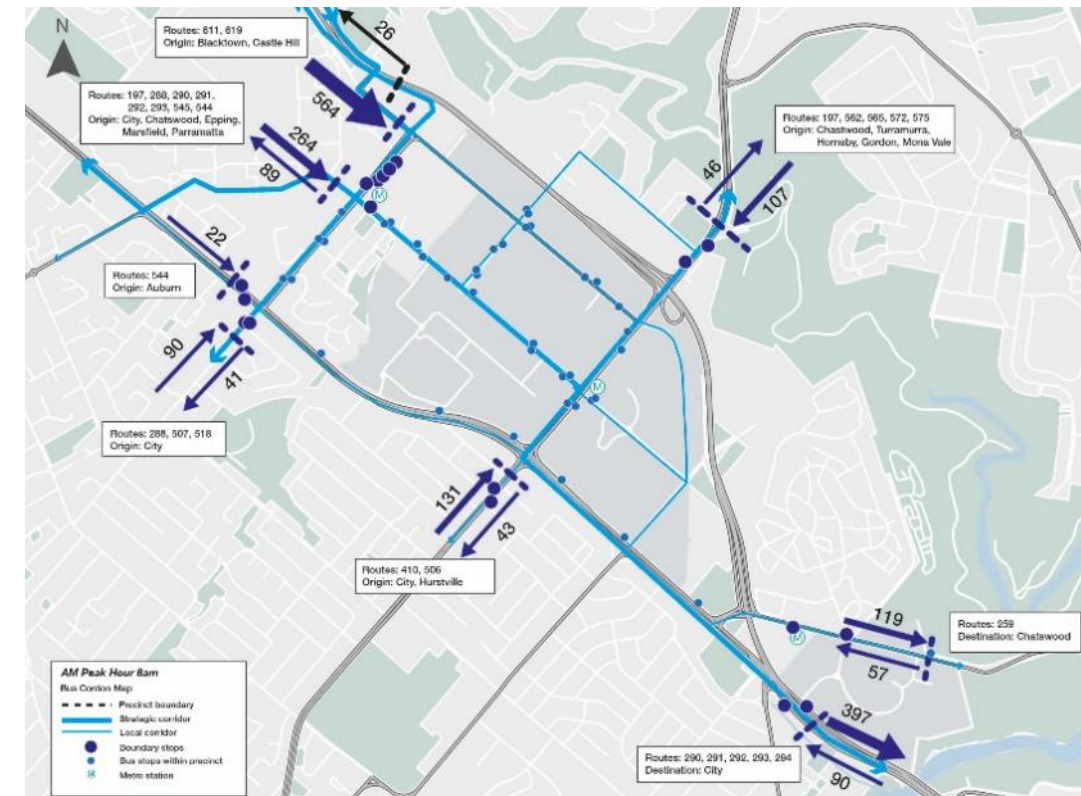


Figure 17 Cordon passenger flows, 2041, AM peak (Sydney Strategic Travel Model)

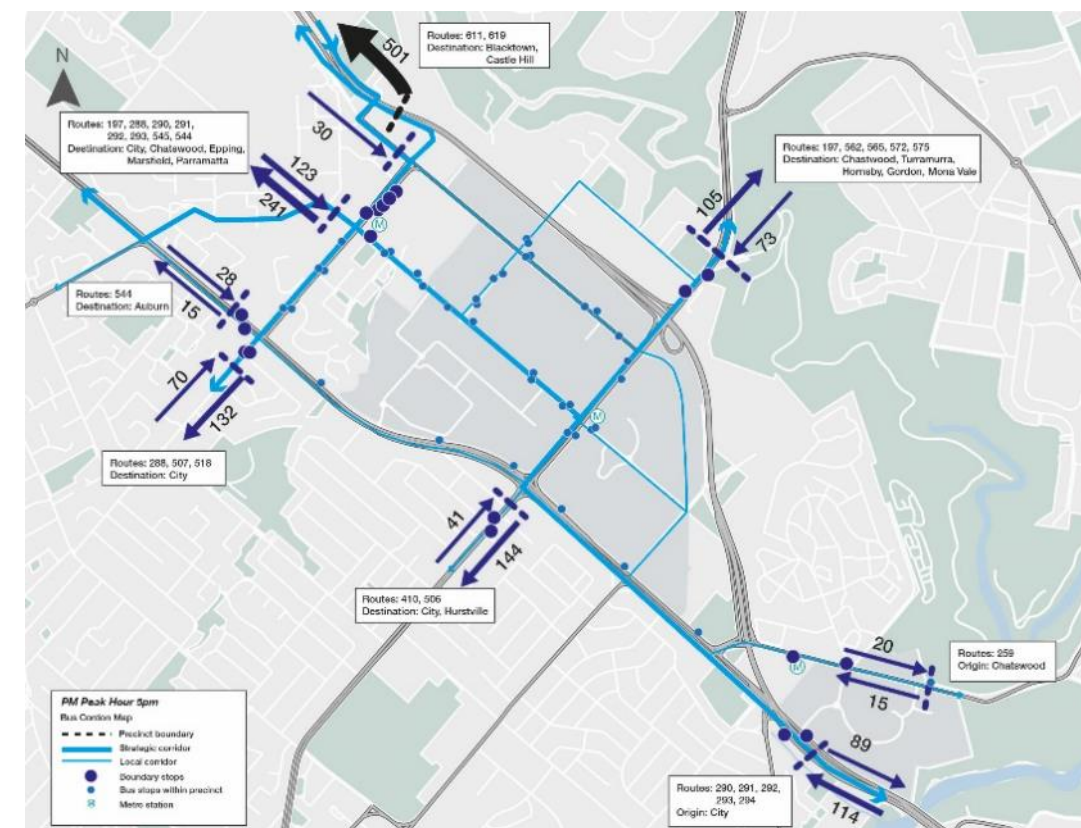


Figure 18 Cordon passenger flows, 2041, PM peak (Sydney Strategic Travel Model)

3.5.5 Private vehicles and freight

Macquarie Park has developed as a business park with a strategic location on the road network. It has become a victim of its own success as the attractiveness of access by car is a barrier on the way towards realizing the envisioned Macquarie Park. The high parking availability in Macquarie Park is a major contributor to high private vehicle use, next to available on-street parking.

Besides private vehicles accessing functions in Macquarie Park, the precinct is also affected by trips going through or past accessing other destinations. Macquarie Park is surrounded and bisected by major roads with significant roles in the wider Sydney road network. Macquarie Park is located at the intersection of two of Sydney's highest function road corridors, being:

- M2 Motorway: providing access to Sydney's motorway network and connectivity to inner Sydney and the north west
- A3 Lane Cove Road / Ryde Road: providing a key north south function across Sydney due to lack of an orbital motorway through Sydney's geographic centre.

The precinct is also served by:

- Epping Road, which provides a partially parallel function to the M2 Motorway and provides connectivity to Epping, Carlingford and areas of Greater Parramatta, and
- Delhi Road, providing access across to Chatswood.

Next to private vehicles, these roads also accommodate an important role for freight. The M2 Motorway and Epping Road are B-double routes in the Sydney network accessing the Sydney CBD, as shown in Figure 19. Travel restrictions for dangerous goods redirect part of freight traffic through local streets including Lane Cove Road, impacting public space amenity for active transport and road performance for private vehicles and freight in Macquarie Park throughout the day.

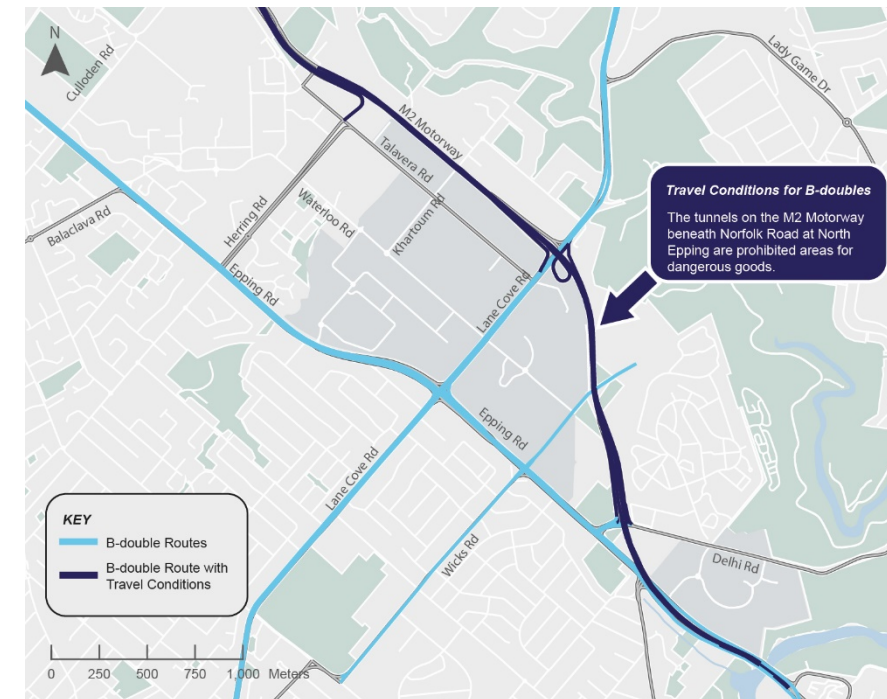


Figure 19 B-Double network around Macquarie Park

The impact of the high number of private vehicles and freight vehicles accessing Macquarie Park or driving through Macquarie Park impact all customers in the precinct, including the vehicles themselves. Roads and intersections operate at or over capacity during AM and PM peaks and throughout the day, creating congestion that impacts travel speed, reliability and overall access for private vehicle users and freight traffic. Issues experienced by customers and identified in the 2016 model in the morning and afternoon peak in Figure 20 include long queues on the M2 and A3 accessing Macquarie Park, slow travel speeds along Lane Cove Road, Waterloo Road east of Lane Cove Road and Wicks Road.



Figure 20 PM peak hour vehicle delays (TfNSW, 2019)

Despite pinch point projects being delivered over the years, congestion issues remain at the intersection of local roads such as Talavera Road and Waterloo Road with the A3 corridor, along with its intersection with Epping Road. Additionally, the works likely have resulted in worsened crossing opportunities and amenities for active transport, as traffic signals have likely been adjusted to increase throughput, reducing green time, as well as local amenity impacts.

Bus services are impacted equally where bus lanes or bus priority is not provided, such as travelling along or turning into Lane Cove Road, impacting the effectiveness of the bus system to access the precinct or travel within it for customers.

3.6 Planned transport interventions

The planned growth of commercial and residential floor space proposed in Growth Pathway 2 will increase the demand for travel to and from Macquarie Park. This means that, even though a transport mode shift has been happening from car to public transport, the future transport task for Macquarie Park is expected to grow for all transport modes, including private vehicles. This will increase the task for the roads serving Macquarie Park, some of which are already operating at or over capacity. This means that 1) private vehicle use will need to be kerbed further and 2) traveling by metro, bus, bicycle, foot will need to increase so that customers can access Macquarie Park sustainably in the future. A range of interventions is already committed to or planned for further investigation, however more interventions will be required to maintain accessibility to and from Macquarie Park.

Metro is expected to remain a key service to access Macquarie Park from the Hills district, the lower North Shore, Eastern Suburbs, Inner and Outer West. As Metro is planned for extension Chatswood to Bankstown under Sydney Metro City to South West, it will become even more attractive for customers to use this service. Access and exit capacity of all stations in Macquarie Park is expected to cater for forecasted growth in the precinct as well as near metro stations.

To counter the reliability and speed issues experienced by buses in Macquarie Park due to private vehicles, bus lanes and priority infrastructure are being introduced as part of the Bus Priority Infrastructure Program (BPIP). Whereas Stage 1 is nearly finished, which includes:

- Stage 1A: Waterloo Road & Lane Cove Road Intersection upgrades, and
- Stage 1B: Upgrades to Herring Road and the intersections with Waterloo Road, Epping Road and Ivanhoe Place,

Stage 2 (uncommitted) will see bus lanes along Waterloo Road. Additionally, the Macquarie University Bus Interchange (MUBI) and the corresponding layover will increase access capacity by both buses as well as amenity for pedestrians to the main bus interchange in the precinct.

The introduction of the Fine Grain Street Network will particularly aid pedestrians and cyclists from moving more freely through Macquarie Park to education and employment and provide opportunity for more activated public spaces for active transport.

The Connected Metropolitan Cycling Network (CMCN), currently uncommitted, would connect Macquarie Park to surrounding centres and destinations by shared and dedicated

cycle infrastructure, making it safer and more attractive to cycle to, from and within Macquarie Park.

Travel to, from and through Macquarie Park by private vehicle is expected to remain prevalent for the foreseeable future and as a response, roads will continue to require investment. As part of the BPIP program, road improvements are currently being made along Herring Road.

3.7 Movement & place

The current functions of roads within the Macquarie Park corridor reflect the current built-form and land uses. As detailed in the Placemaking strategy, the following points highlight the limited sense of place and interaction with the public road realm:

- The prevalent built form is that of a traditional business park; large plots, with large buildings that have large floor plates set back from the boundary. This typology can result in the lack of a ‘clear front door’ for buildings as entrances to these buildings are often away from the street.
- There are places for people to gather around Macquarie Centre and the outdoor dining areas of the cafes and restaurants up and down Macquarie Park, as well as around North Ryde Station. However, the area is lacking in terms of benches and small pocket parks where people can run into a friend and catch-up.
- The majority of night-time activity is limited to visit and shop at Macquarie Centre. While the asset of the shopping centre is a significant one, users of Macquarie Park describe the shopping centre as inward-facing.

Having regard for the above, the existing road environment demonstrate lack of consideration for placemaking aspects with the current functions of Waterloo Road, Herring Road, Talavera Road, Khartoum Road, Epping Road and Lane Cove Road prioritised to serve the movement functions of vehicles, freight, public transport, bicycles and people. The quality of the road environment to serve the different movement types varies, with most of the abovementioned roads designed to prioritise the movement of vehicles.

This is expected to change with the planning intent to deliver increased intensity of uses, activated streets, increased use of public and active transport, new neighbourhoods and additional employment. As such, the vehicle movement functions of the existing roads will need to also accommodate increased people movement and place functions. Figure 22 provides an indication of the intended location for increased activity – forming new places for people to gather and interface with the road environment. These areas primarily surround the current Metro Stations with the intent to maximise the access provided by the recently delivered infrastructure.

As shown in Figure 21, the masterplan intends to maintain the existing movement functions and make provisions for new and enhanced pedestrian movement functions through:

- New pedestrian only links to improve permeability across the large land plots.
- Woven Ways park trails that follow the creek lines.
- Local roads in the fine-grain street network with higher priority for pedestrians.

This would be coupled with a landscape framework that would improve the quality of pedestrian movement across existing routes. The additional people-focused functions (where relevant) would need to be accommodated with additional space, achieved through a mix of private and public means; an opportunity presented through the redevelopment of Macquarie Park per the master plan.

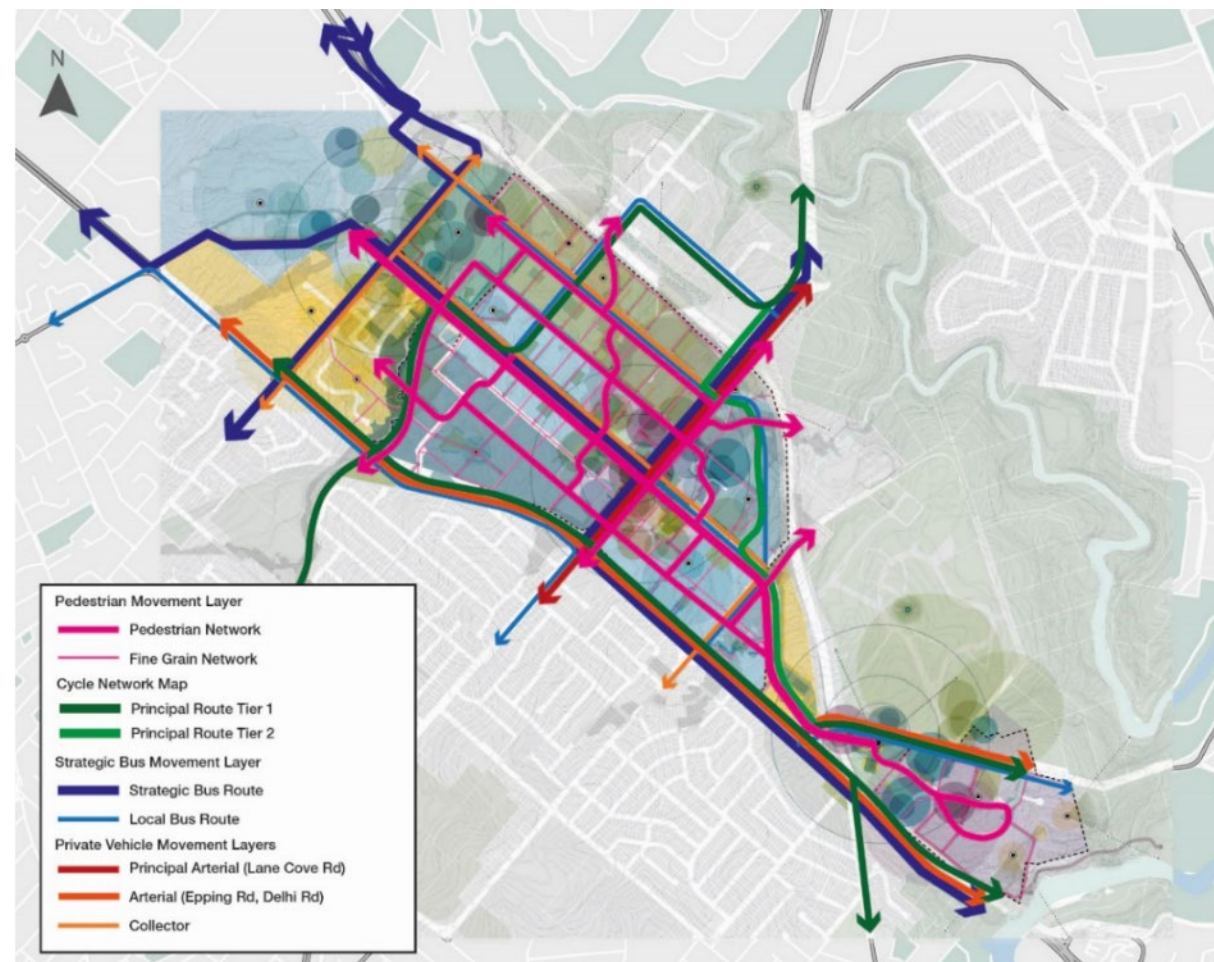


Figure 21 Proposed movement framework

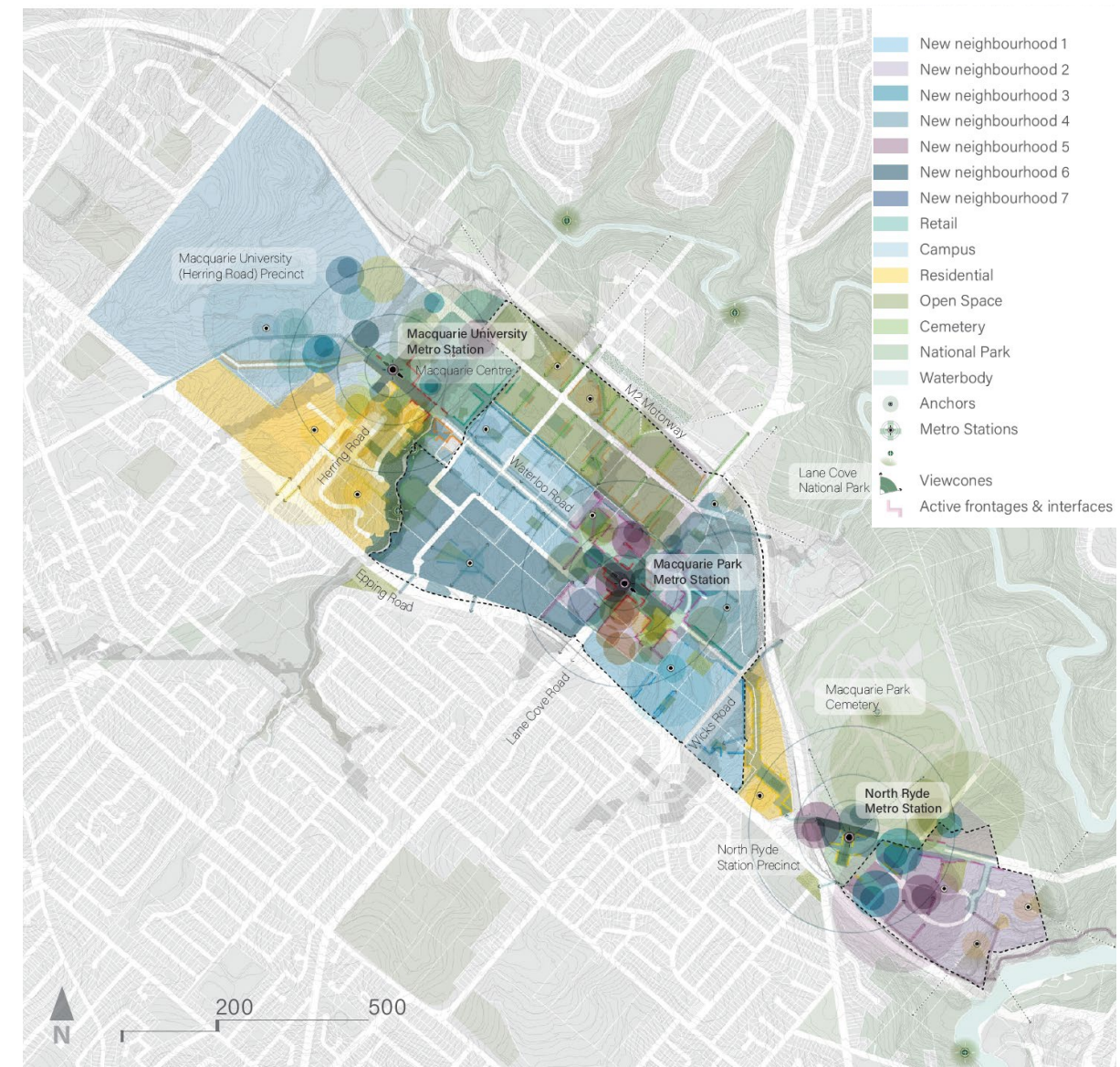


Figure 22 Land use and activity framework. Key places will likely form around the Metro Stations, however will not only be limited to those areas.

4 Challenges and opportunities

4.1 Challenges

4.1.1 Permeability of walking network

Pedestrian mobility across Macquarie Park is limited due to various reasons:

1. Large subdivision blocks with lack of publicly accessible pedestrian connectivity limits opportunities to find direct travel paths through the precinct.
2. There are limited pedestrian crossings across several roads and streets in the precinct, resulting in large distances between crossings and limiting opportunity to move freely through Macquarie Park on foot. Several key examples include:
 - *Talavera Road and M2 motorway* – create barriers for pedestrian pathways to Lane Cove National Park.
 - *Waterloo Road across Lane Cove Road* – restricting at-grade access to/from bus services and between future neighbourhoods either side of Lane Cove Road
 - *Epping Road and Lane Cove Road* – restricting access to/from surrounding suburbs of Marsfield and North Ryde.
 - Intersections along Lane Cove Road, Epping Road and Delhi Road.
3. Long cycle times for pedestrian phases at signalised intersections along Lane Cove Road and Epping Road, leading to very long crossing times. This is attributed to the high traffic volumes on these roads, especially during morning and evening peak periods.

Accessibility analysis, shown in Figure 23, of walking from the Metro stations in Macquarie Park highlights the access challenge by the existing walking network to destinations.

The lack of permeability presents a challenge to respond with enhanced walking and cycling opportunities to improved directness in the network. This would also contribute towards achieving the objective of improving public transport access to/from Macquarie Park by reducing last-mile travel times.

4.1.2 Capacity of the road network

Current projections using the Sydney Strategic Travel Model indicate some 387,200 trips to/from the Macquarie Park corridor by 2041. Of these trips, 67% are forecasted to use private vehicle; a challenge that must be overcome. Lane Cove Road and Epping Road have limited capacity to accommodate additional private vehicle demand attributed to the master plan.

With reference to Figure 24, the regional roads, such as Lane Cove Road and Ryde Road, providing access to the precinct are currently projected to be at or over capacity during the morning peak period; should the master plan be realised. A challenge is presented to manage the current projections and minimise private vehicle traffic growth. A consequential risk of not resolving the issue is the overflow of through traffic through the precinct, including local streets.

There are limitations to further expanding the carriageway of Ryde Road and Lane Cove Road due to the environmental significance of Lane Cove National Park. As such, there may be a need to investigate solutions to increase the productivity of this link in moving people between the Kur-ring-gai, Hornsby and Northern Beaches Council areas.

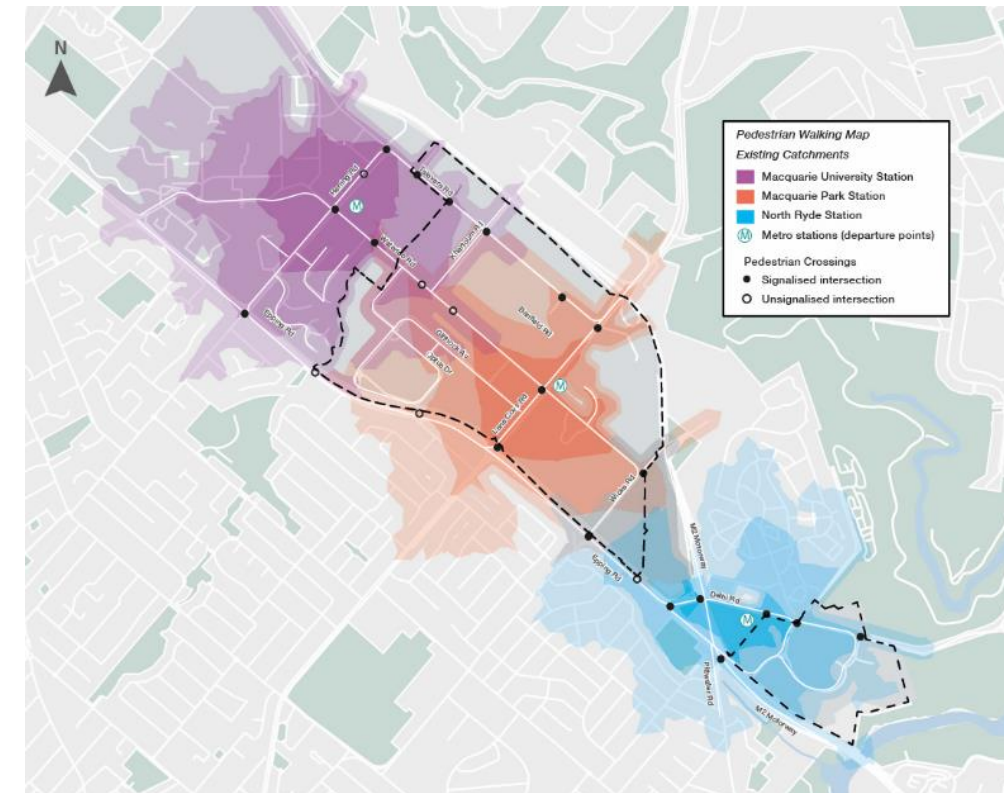


Figure 23 Existing 5 / 10 / 15-minute walking catchments from Metro stations

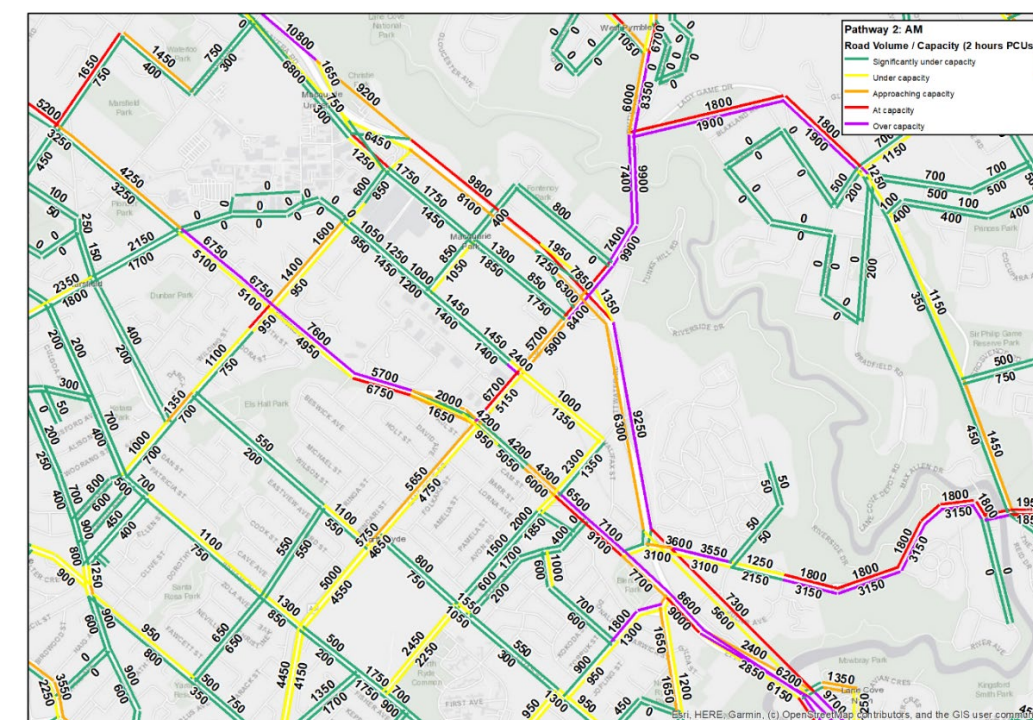


Figure 24 Projected link flows 2041

4.1.3 Accessibility across modes

Using 30-minute accessibility catchments, a comparison between the number of people and jobs that can be accessed to/from Macquarie Park using either public transport or private vehicle is provided in Table 3 below.

Table 3 Comparison of 30-min catchments between private vehicle travel and public transport travel (2041)

30-min accessibility catchment	Public transport	Private vehicle	Ratio (private vehicle / public transport)
Population	208,500	876,300	4.2
Employment	234,300	500,100	2.1

The above demonstrates the challenge in achieving mode shift towards public transport. Approximately four times as many people can reach Macquarie Park within 30-minutes of travel by private vehicle than public transport. Furthermore, a resident living in Macquarie Park has access to twice as many jobs in 30-minutes via private vehicle than public transport. Infrastructure supporting the master plan must address the disparity between the 30-min travel time catchments for public transport and private vehicle, resulting in more people choosing to drive to/from Macquarie Park.

To respond to the challenge, there would be a need to prioritise public transport infrastructure to expand the 30-minute public transport catchment and reduce existing travel times. This would encourage greater mode shift away from private vehicle travel.

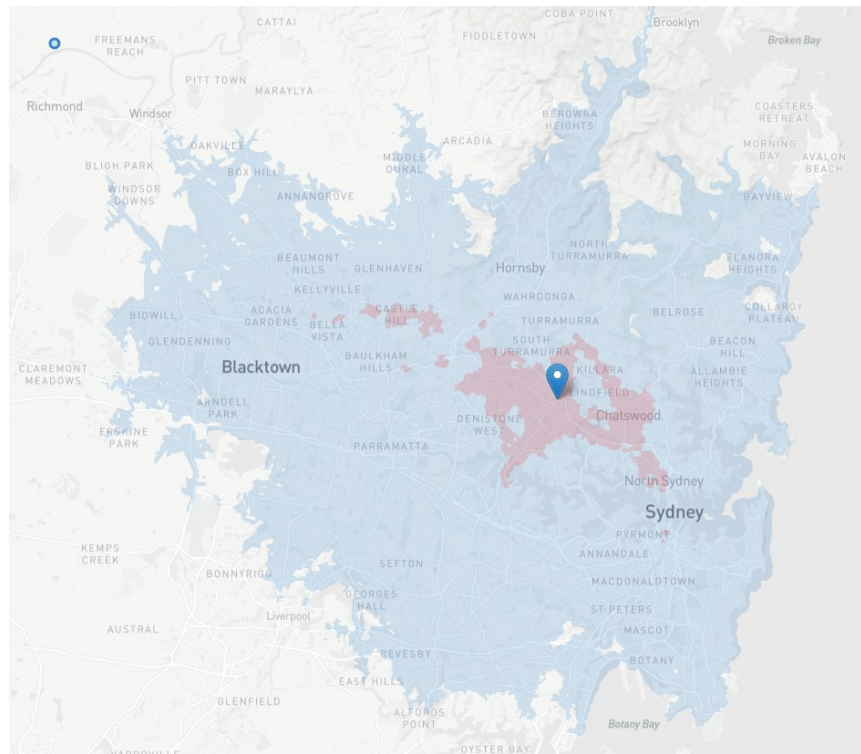


Figure 25 Comparative 30-minute accessibility catchments between private vehicle (blue) and public transport (red), departing Macquarie Park. (Source: Conveyal, using February 2020 networks).

4.2 Opportunities

4.2.1 Re-prioritise parking availability

Figure 26 shows the spatial distribution of parking supply across Macquarie Park, with the densest parking areas located at the Macquarie Centre and the eastern portion of the North Ryde Business Park; areas which generally offer multi-level car parking.

Having consideration for current development design, parking is in close proximity to building entrances, further minimising door-to-door travel times for private vehicle travel. Some existing commercial developments are also designed such that parking is located between the building entrance and access point from the public road. This further disadvantage public and active transport users, increasing travel times to their destination.

The prevalence of convenient, plentiful and low-cost parking (to the user) contributes to the attractiveness of the private vehicle travel, relative to other modes.

The master plan provides an opportunity to address these existing issues through site redevelopment by:

- Reducing the overall quantum of parking relative to the number of employees within developments.
- Reducing the distance between the site access point and building access point.

Furthermore, there is the opportunity to review parking policies and car parking pricing as part of the transition from a campus-style business park to a commercial centre, consisting of a mix of uses in addition to employment.

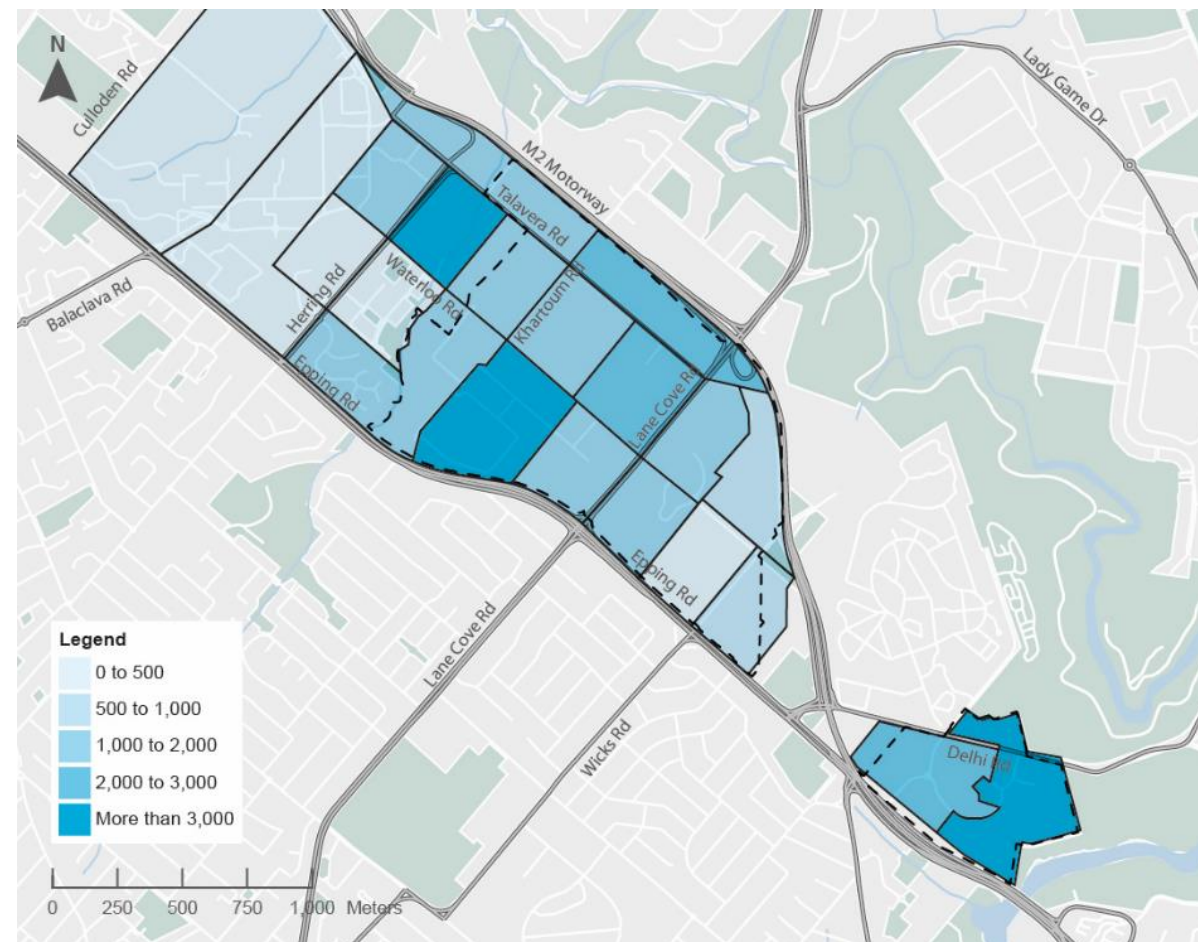


Figure 26 Off-street parking availability in Macquarie Park (City of Ryde, 2011)

4.2.2 Housing and services closer to work

The master plan presents an opportunity to reduce the distance between key places, such as home and work, and allow for walking/cycling to become viable choices of travel.

New social infrastructure and community facilities within all neighbourhoods will facilitate trip containment for the existing and future residential population in the corridor.

Employees have greater choice in choosing to live closer to work, whilst being serviced by existing and new amenity. This amenity will create further activity that could easily be accessed by walking/cycling/public transport before or after work, reducing the intensity of travel that typically occurs in the morning and evening peak periods.

Reducing the spatial distance between employees and their homes would ultimately reduce the median travel distance to/from work for Macquarie Park. The majority (approximately 70%) of employees travel more than 10km from their place of residence to Macquarie Park, as shown in Figure 41 (see Appendix B), contributing to strain on the transport network.

Ultimately, the transport network would benefit from reduced demand per employee for longer commute distances.

4.2.3 Preserving land for transport infrastructure

Current planning, per the Future Transport Strategy 2056, for future transport connections such as the Macquarie Park to Southeast Sydney are expected in the 20+ year timeframe. This is beyond the planning timeframes being considered by the strategic master plan.

The master planning process provides an opportunity to facilitate short and longer-term transport connections to/from Macquarie Park by setting out the required land reservations and zoning controls within the Local Environment Plan or State Environmental Planning Policies. This would subsequently reduce future construction costs, maintain feasibility and enable projects that would improve accessibility to the precinct – particularly public transport infrastructure and services.

4.2.4 Amenity for active transport

The transformation from an inward-focused business park to a multi-functioning commercial centre is an opportunity to plan for:

- A total green experience by completing the urban canopy along major roads and intersections in Macquarie Park, combating the urban heat island effect.
- The utilisation of greenery in the design of the public realm that is multifunctional.
- The re-introduction of native species and encourage the return of biodiversity into Macquarie Park.
- All infrastructure, transport, open space, social and cultural, as part of one network and as an extension of the public realm and safe pathways to schools.

This has the potential to enhance the overall pedestrian experience and amenity of Macquarie Park by improving every aspect of a journey from start to finish; encouraging users to adopt active travel. Figure 27 provides a spatial overview of the proposed landscape framework and its opportunity provided to active transport to improve its quality of movement.



Figure 27 Proposed landscape framework

The strategic master plan also provides an opportunity to re-think the operation of local roads and streets with a greater focus on desirability for pedestrians. This would involve providing new crossing opportunities to overcome internal pedestrian movement barriers within the precinct and reduce delays when crossing.

4.2.5 Facilitate lower-emissions transport

An action from the North District Plan relating to Macquarie Park is to *“improve urban amenity as the centre transitions from business park to a vibrant commercial centre, including reducing the impact of vehicle movements on pedestrian and cyclist accessibility”*. Both exhaust and noise emissions impact the amenity of the urban environment, which are generated by private vehicles, freight vehicles and public buses alike. Furthermore, the narrow provisions for buffer between walking/cycling paths and the vehicle carriageway on roads within and surrounding the precinct exacerbate the amenity impacts of traffic.

The precinct’s focus on innovation and technology provides an opportunity to test new transport solutions, such as an accelerated adoption of electric buses and public charging stations to encourage the uptake of electric vehicles (EVs). The localised noise and emissions impact of EVs are lower than that of conventional combustion vehicles.

Therefore, it would be beneficial to urban amenity if EV technology was widely adopted by public and private users in the precinct. This could be facilitated by the master planning process, which should include provisions for publicly accessible electric vehicle charging stations within developments or within the road reserve.

5 Achieving the Vision

Presented with the existing conditions, the planned land use, the transport vision and objectives and the corresponding challenges and opportunities, a set of initiatives have been developed as part of the SISA deliverable facilitated by the GSC and TfNSW. In developing the set of initiatives, the following overarching methodology was used:

- Development of transport-specific vision and objectives for Macquarie Park.
- Identification of strategic challenges and opportunities facing future transport in the area.
- Development of a longlist of potential transport options in collaboration with a wide range of stakeholders.
- A qualitative Strategic Merit Test (SMT), including Strategic Alignment and feasibility components, of the long list using a high-level MCA.

The following sections provides a description of the initiatives that are recommended to support the master plan and transport vision for the area. These initiatives should be further investigated for:

- Validation to confirm that the recommended initiatives address the vision, objectives and the travel demand needs to accommodate forecasted growth for Macquarie Park, and as required apply further gap analysis to refine recommendations. This would include assessing the cumulative versus individual impact of interventions.
- Grouping and staging of interventions to confirm the ‘packaging’ and temporal staging of initiatives align to customer needs, stakeholder expectation and uptake of growth. This would include further identification of interventions to be brought forward into further planning stages or to catalyse early development.

Further details on these initiatives are provided at Appendix B.

Options and alternatives to achieving the vision

It should be noted that the major public transport initiatives presented in this section addresses the need for increased regional connectivity from Macquarie Park. All of the major projects discussed are currently unfunded and require further detailed investigation before an investment decision can be made. These investigation will include considerations of alternatives (for example frequent buses compared with rapid buses compared with metro compared with technological innovations) to best serve our customers as the vision and objectives could be met through a number of transport infrastructure options. These options would vary based on the intensity of investment deemed suitable at the time.

Notwithstanding, the following major public transport initiatives provided in the following sections are the preferred initiatives to realise the transport vision and objectives of Macquarie Park.

5.1 Walking

The following is the set of walking related initiatives recommended to be investigated to support the master plan:

- Provide more signalised pedestrian / cyclist crossings across Waterloo Rd.
- Provide more signalised pedestrian / cyclist crossings across Talavera Rd.
- Deliver the Fine Grain Street Network – all neighbourhoods.
- Implement lower speed limits – Waterloo Rd, Herring Rd, Khartoum Rd, Wicks Rd.
- Implement lower speed limits – Lane Cove Rd.
- Construction of pedestrian crossings on all legs of intersections at:
 - Lane Cove Rd/Waterloo Rd,
 - Lane Cove Rd/Talavera Rd,
 - Epping Rd/Lane Cove Rd,
 - Epping Rd/Delhi Rd,
 - Talavera Rd/Christie Rd,
 - Talavera Road/Macquarie Park Shopping Centre.
- Provide a pedestrian bridge crossing of:
 - Lane Cove Rd in vicinity of Hyundai Dr,
 - Lane Cove Rd in vicinity of Dirrabari Rd,
 - Lane Cove Rd at Waterloo Rd.
- Waterloo Rd/Macquarie Park Shopping Centre: provide an additional crossing leg to access the centre.
- Waterloo Road: provide new and upgraded paths.
- Provide footpath adjacent to Lane Cove Road from Talavera Rd to Fontenoy Rd.

The combined outcome would realise a walking network shown in Figure 28.

The implementation of a fine grain street network across the precinct forms a core aspect of the future walkability of the precinct. The fine grain street network will introduce smaller block sizes and a permeable pedestrian network, significantly increasing the area reachable on foot, thus increasing the number of opportunities (such as jobs, schools or restaurants) within acceptable walking distance.

Figure 29, Figure 30 and Figure 31 illustrate the increased walking catchment from each Metro station, resulting from the introduction of the fine grain street network.

Departing Macquarie Park Station, the fine grained street network has increased the area accessible on foot. In the existing network, only a narrow portion of Waterloo Road is accessible within 10 minutes walking, however the future network increases the accessibility of this corridor roughly 4-5 times. The majority of Waterloo Rd is accessible within 15

minutes walking as shown in Figure 30. Similarly, the eastern extent accessible within 15-minutes walking from Macquarie University Station has increased across Waterloo Road, Epping Road and connecting regions.

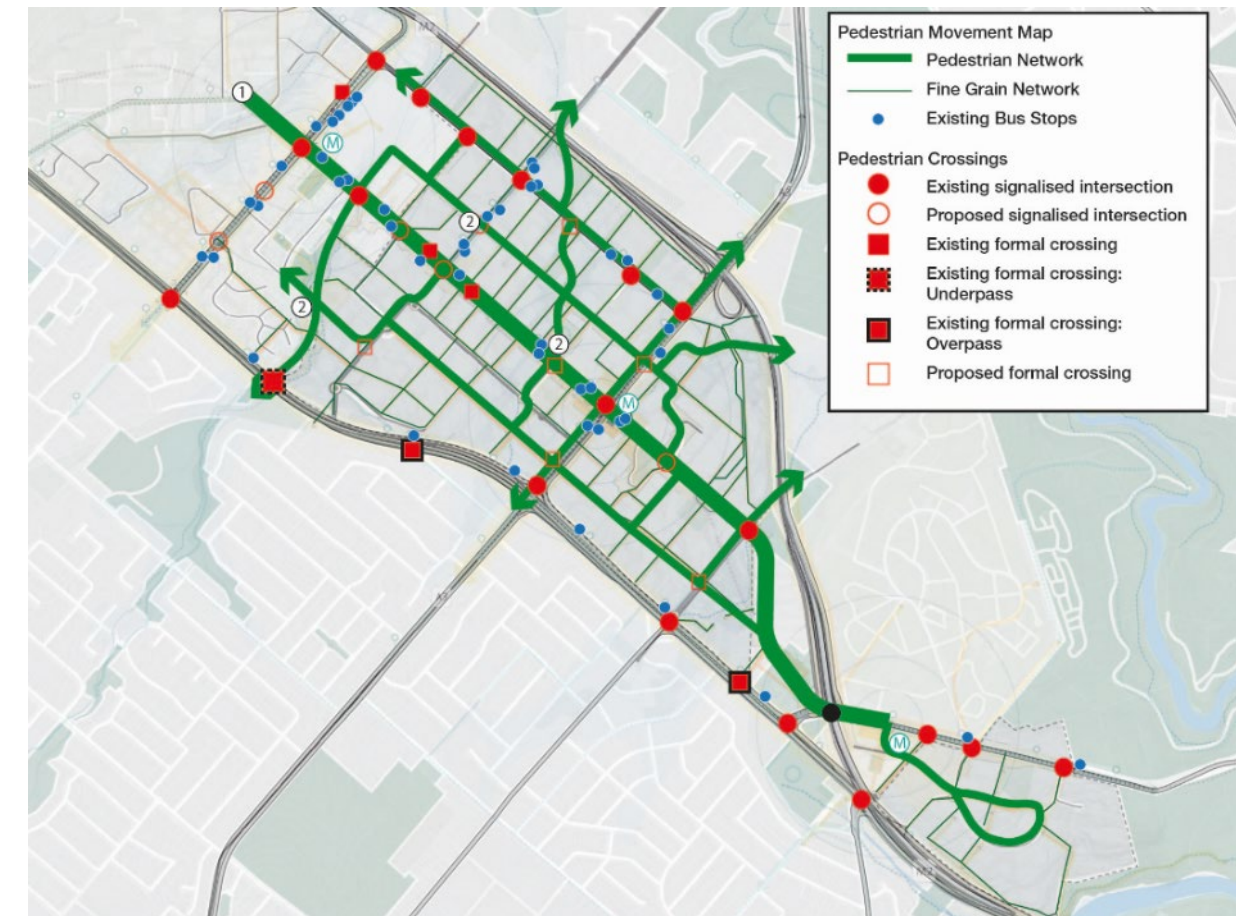


Figure 28 Proposed walking network

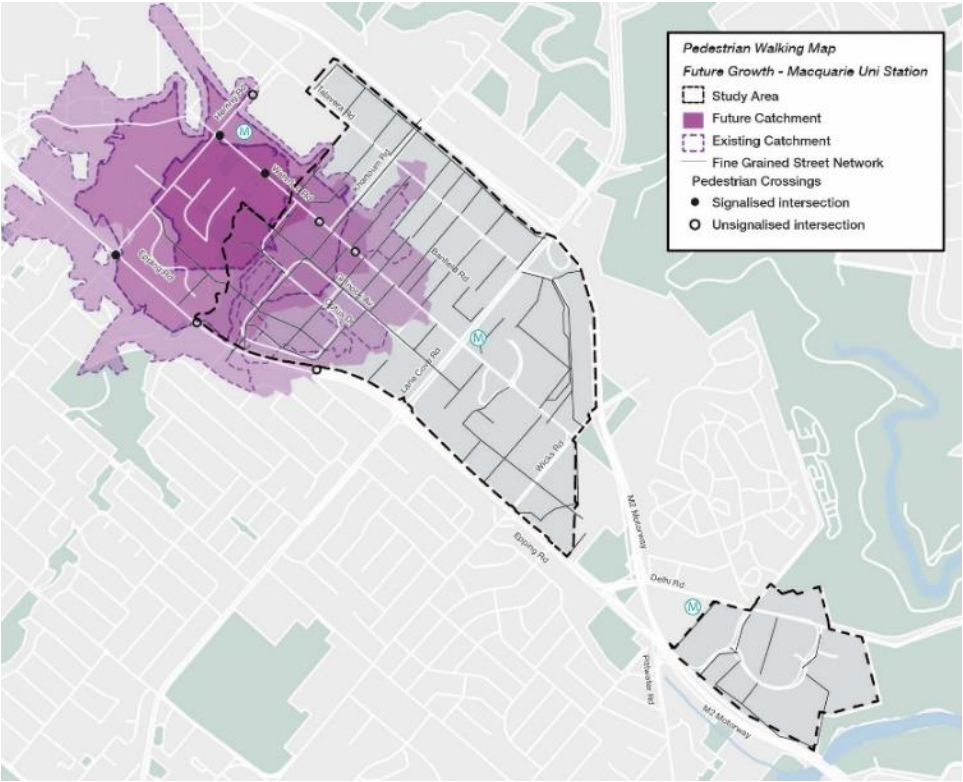


Figure 29 Future network: 5-min, 10-min and 15-min walking catchments from Macquarie University Station.

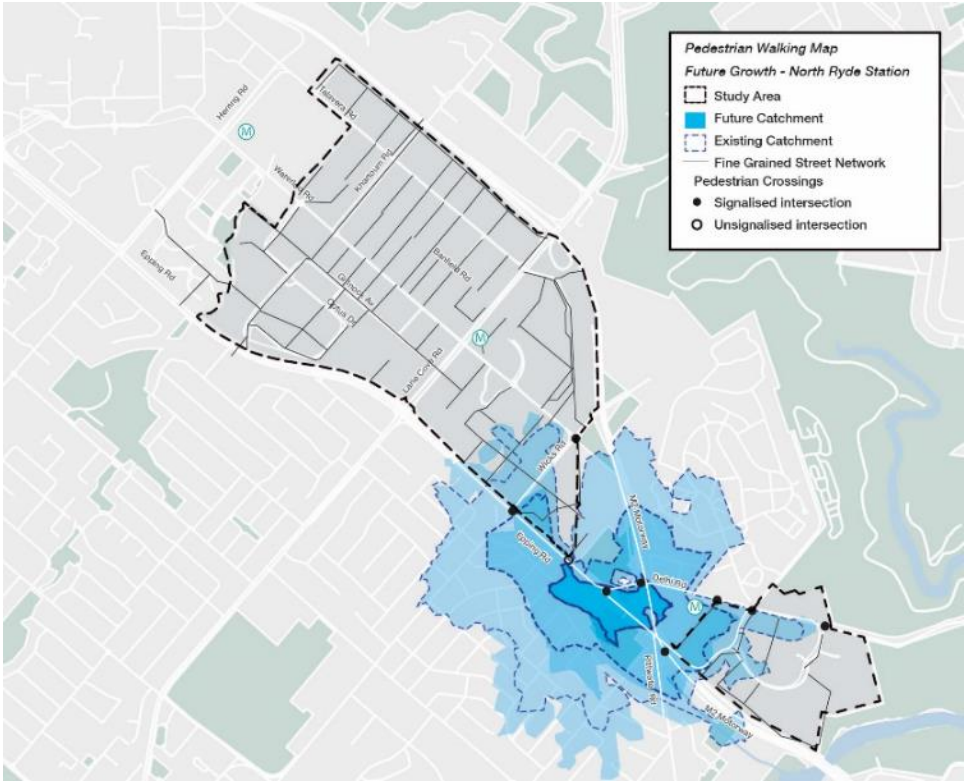


Figure 31 Future network: 5-min, 10-min and 15-min walking catchments from North Ryde Station.

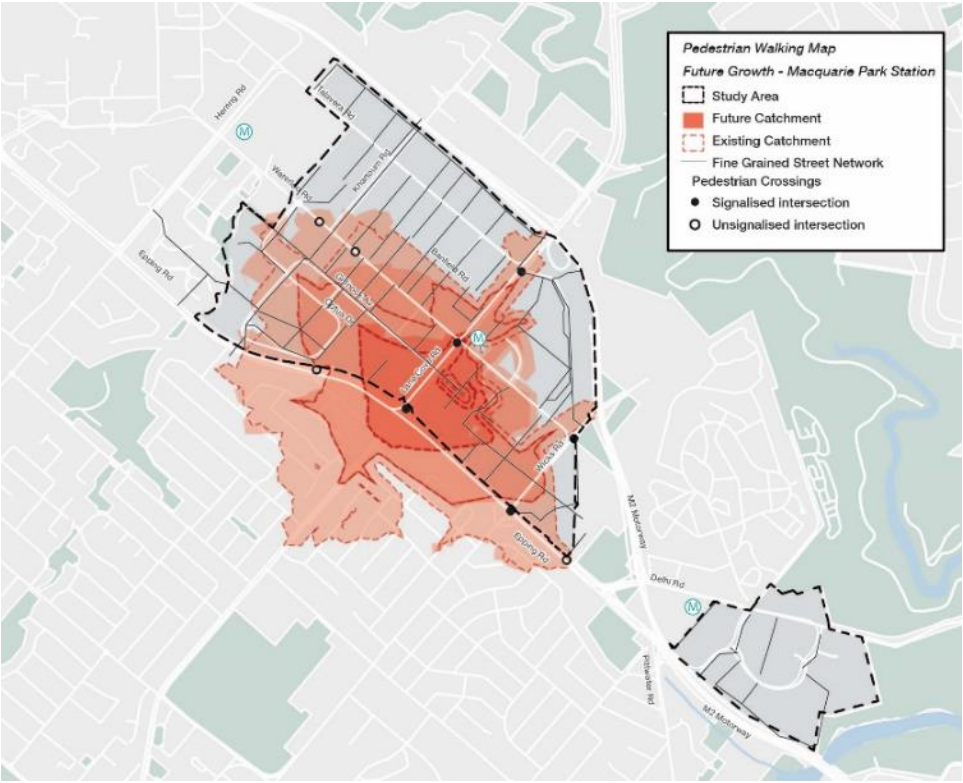


Figure 30 Future network: 5-min, 10-min and 15-min walking catchments from Macquarie Park Station.

5.2 Cycling

The following is the set of cycling related initiatives recommended to be investigated to support the master plan:

- Complete missing links in Macquarie Park's Connected Metropolitan Cycling Network (CMCN).
- Provide a cycling link to Northern Beaches via A3.
- Deliver comprehensive network of dedicated cycle & micro-mobility connections.
- Deliver increased publicly accessible bicycle parking.
- Provide alternative to M2 on-shoulder link as off-road cycleway through precinct.
- Deliver active transport link through Browns Waterhole.
- Deliver south-facing grade separated active transport link into Riverside Business Park.

The combined outcome of delivering these initiatives would realise a cycling network shown in Figure 32.

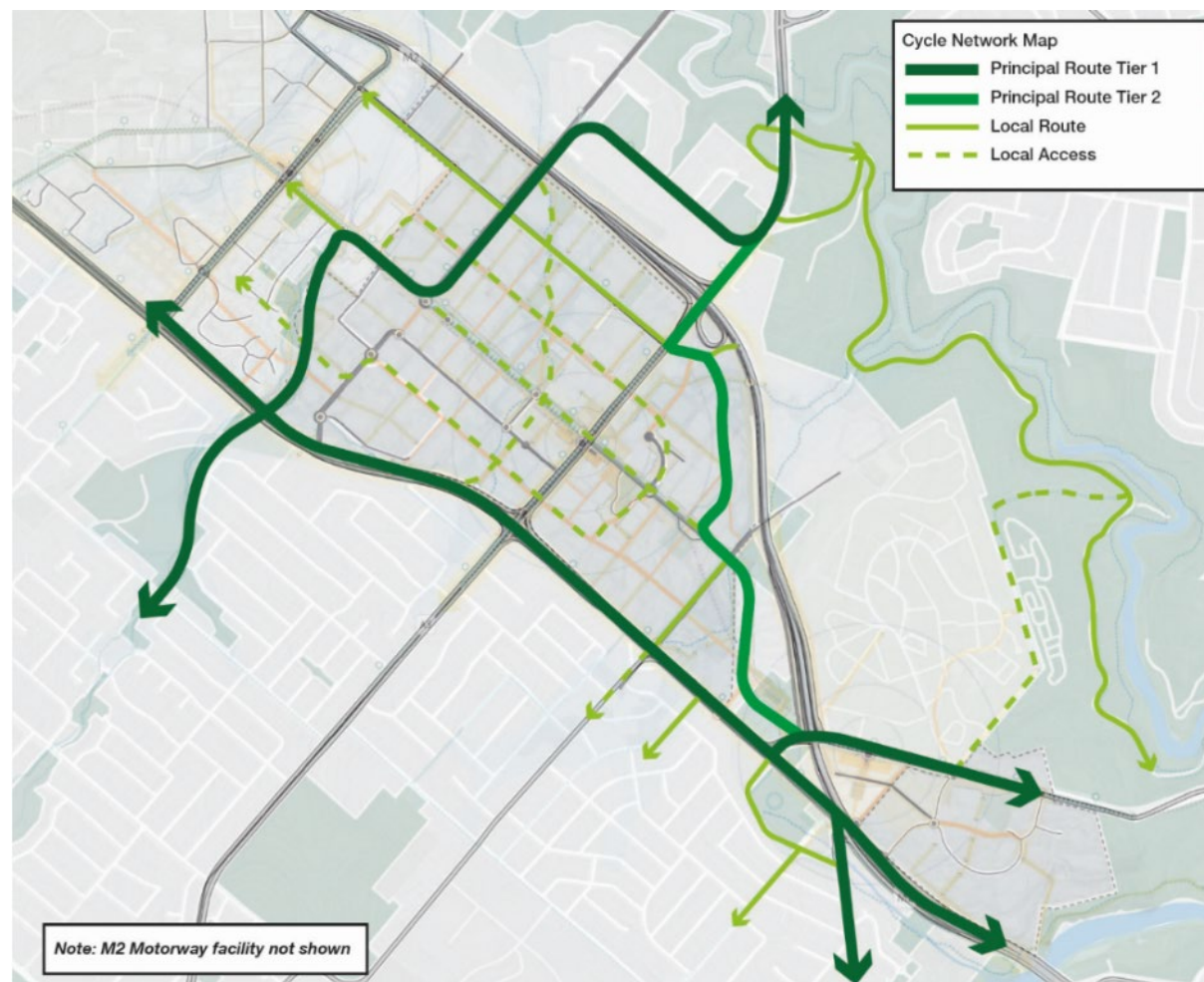


Figure 32 Proposed cycling network

5.3 Bus

The following is the set of bus transit related initiatives recommended to be investigated to support the master plan:

- Deliver Mona Vale to Macquarie Park public transport improvements.
- Deliver Strategic Bus Corridor from Macquarie Park to Parramatta via Eastwood, Rockdale via Rhodes, Blacktown via M2.
- Additional infrastructure to support bus operations.
- Talavera Road: Reallocate road space for other uses.
- Provide new and upgraded bus stops.
- Deliver the Macquarie University Bus Interchange (MUBI).
- Provide new northern and southern bus layovers.
- Deliver BPIP Stage 1 and Stage 2.

The combined outcome of delivering these initiatives would realise a bus transit network shown in Figure 33.

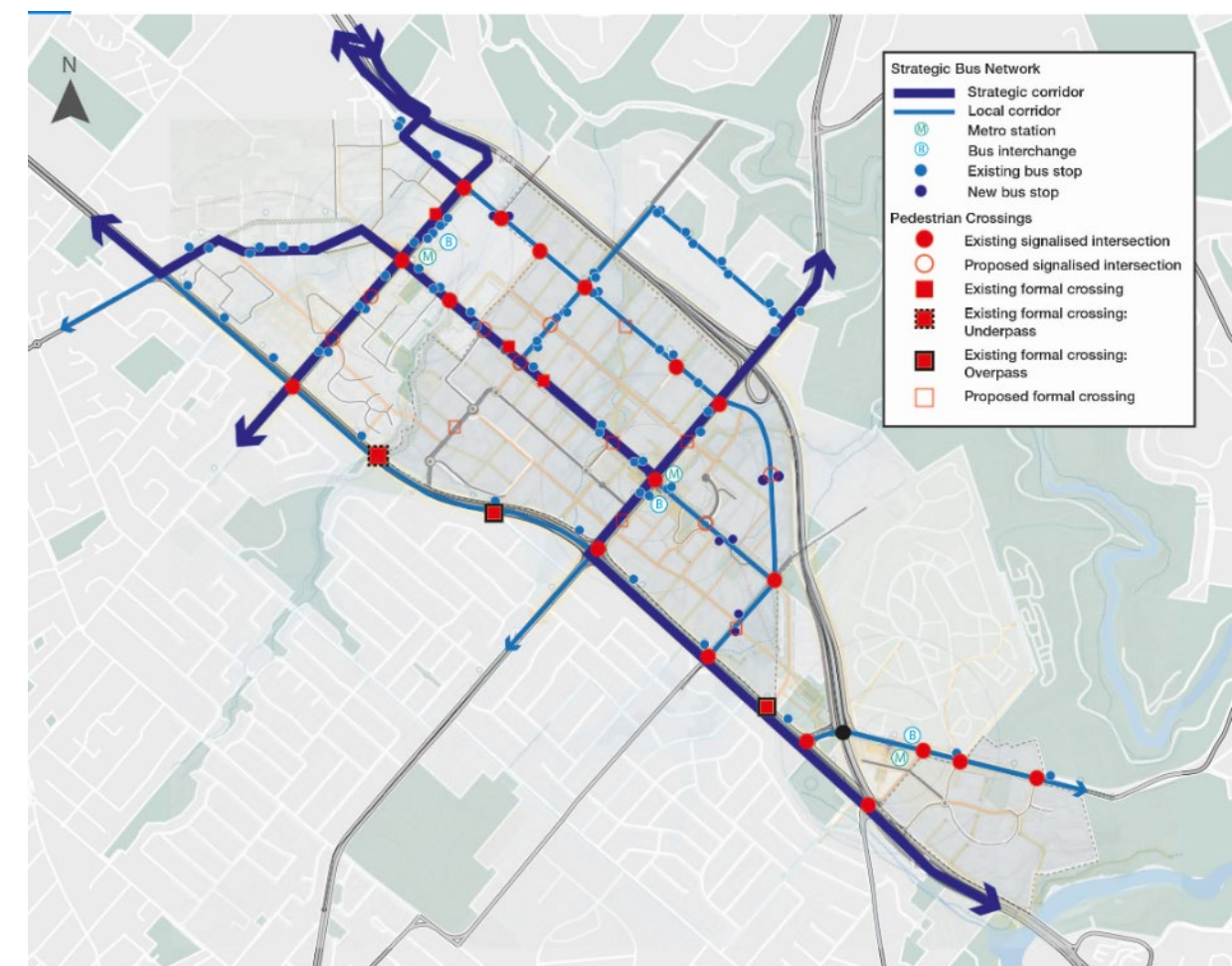


Figure 33 Proposed bus network

5.4 Mass Transit

The following is the set of Mass Transit related initiatives recommended to be investigated to support the master plan:

- Deliver the Parramatta to Epping Mass Transit Link.
- Increase Sydney Metro service frequency.
- Deliver the Macquarie Park to Southeast Sydney Mass Transit Link.

The regional impact of these initiatives to accessibility, beyond the current committed infrastructure pipeline, is demonstrated spatially and analytically in Figure 34 and Figure 35 whereby some 25% more jobs are accessible from Macquarie Park (within 45-min) in the intervention scenario versus the committed scenario.

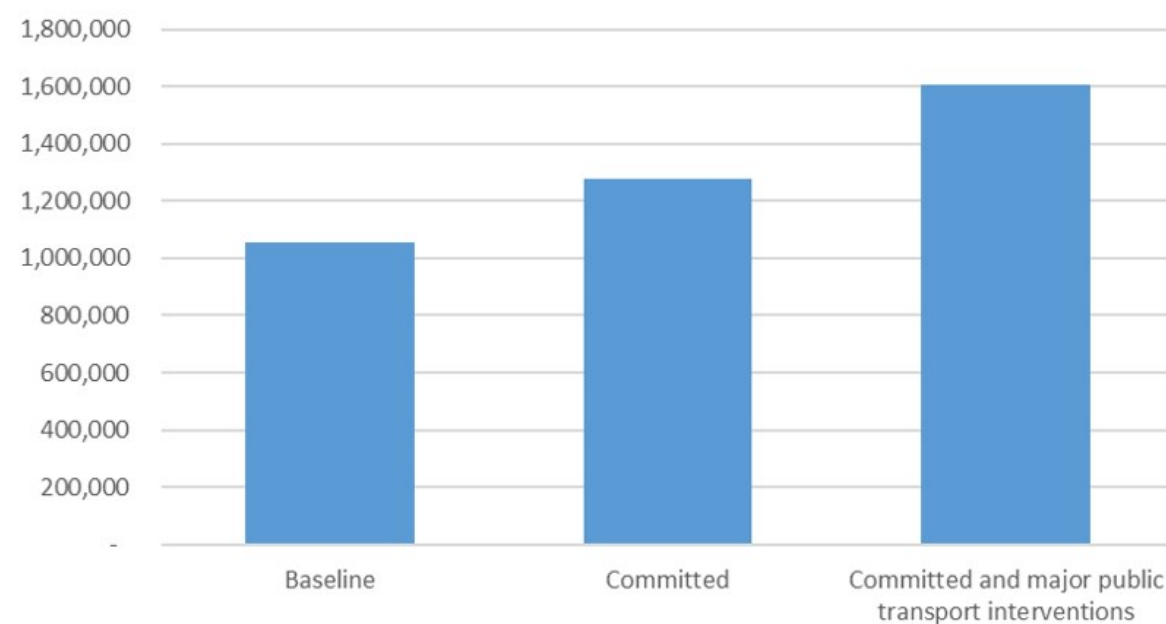


Figure 34 Jobs accessible in Baseline, Committed and Committed & major public transport interventions scenarios. Departing Macquarie Park Station in AM peak, travelling for 45 minutes. (TZP16 v1.51 2036 employment)

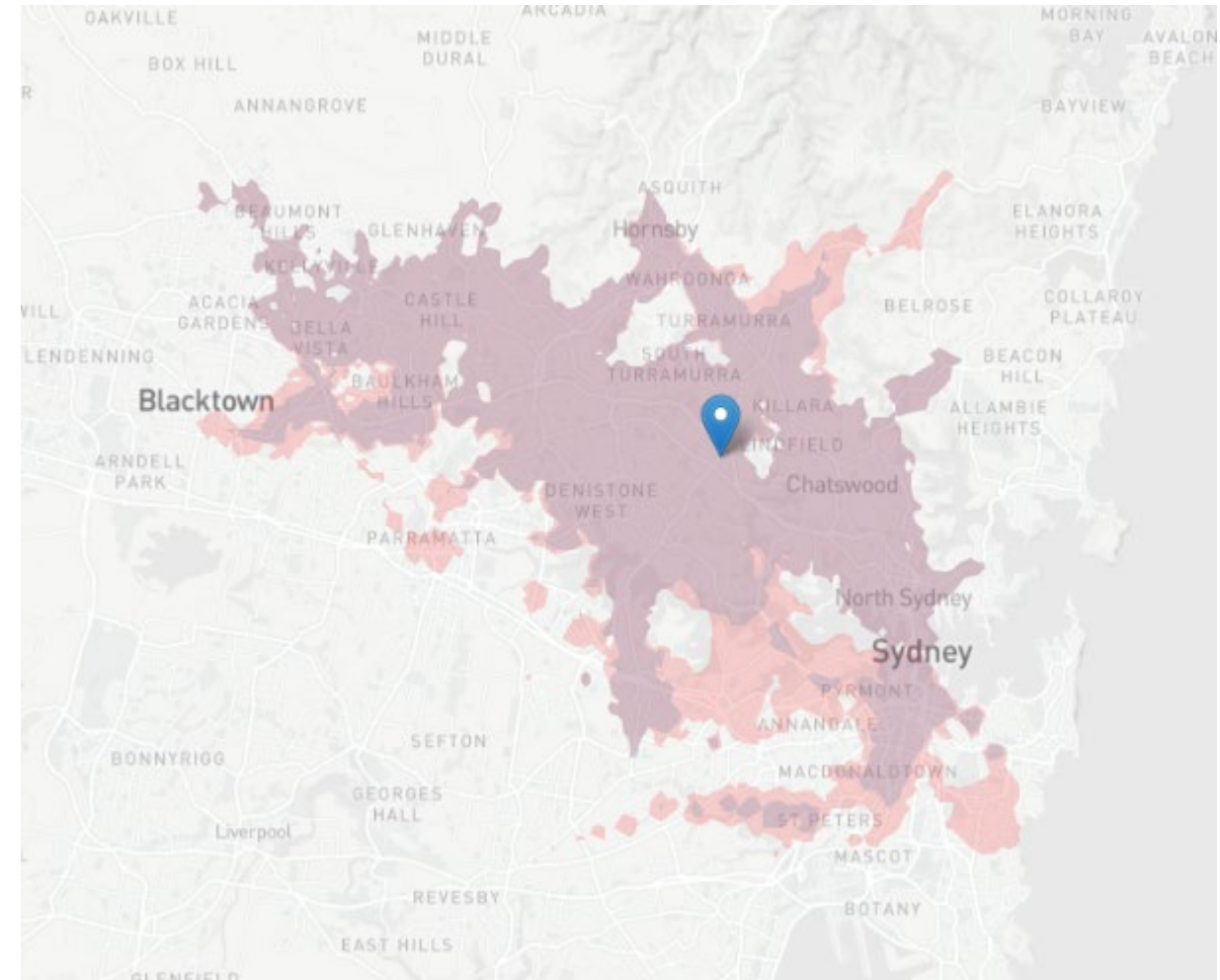


Figure 35 Departing Macquarie Park Station, AM peak, travelling for 45 minutes. Blue area: Existing network and committed rail projects such as Sydney Metro West. Red area: Existing network, committed projects and major public transport interventions.

Private vehicles and local freight

The following is the set of road network initiatives recommended to be investigated to support the master plan. Some of the initiatives raised in Section 5.1 also shape the local road network, such as the fine-grained road network (new site access opportunities) and lower speed limits (negatively impacting vehicle movement – positively impacting pedestrian movement).

- Waterloo Road: Provide intersection improvements Byfield Rd, Khartoum Rd, Thomas Holt Rd.
- Waterloo Road: Provide additional traffic management measures.
- Herring Road intersection improvements.
- Lane Cove Road: Intersection improvement at Waterloo Rd (at grade).
- Lane Cove Road: Intersection improvement at Talavera Rd (at grade).
- Epping Road: Intersection improvement at Wicks Rd (at grade).
- Khartoum Road/Banfield Road intersection improvements.
- Review existing and minimise future off-street parking provision.
- Ensure adequate off-street loading dock capacity in developments and encourage centralised/agglomeration of freight facilities.
- Support reliable travel times for freight vehicles.

The combined outcome of delivering these initiatives would realise a road network shown in Figure 36. Local road functionality is enhanced with improved capacity and opportunities for vehicle access internally, albeit likely at lower speeds as highlighted in Figure 37.

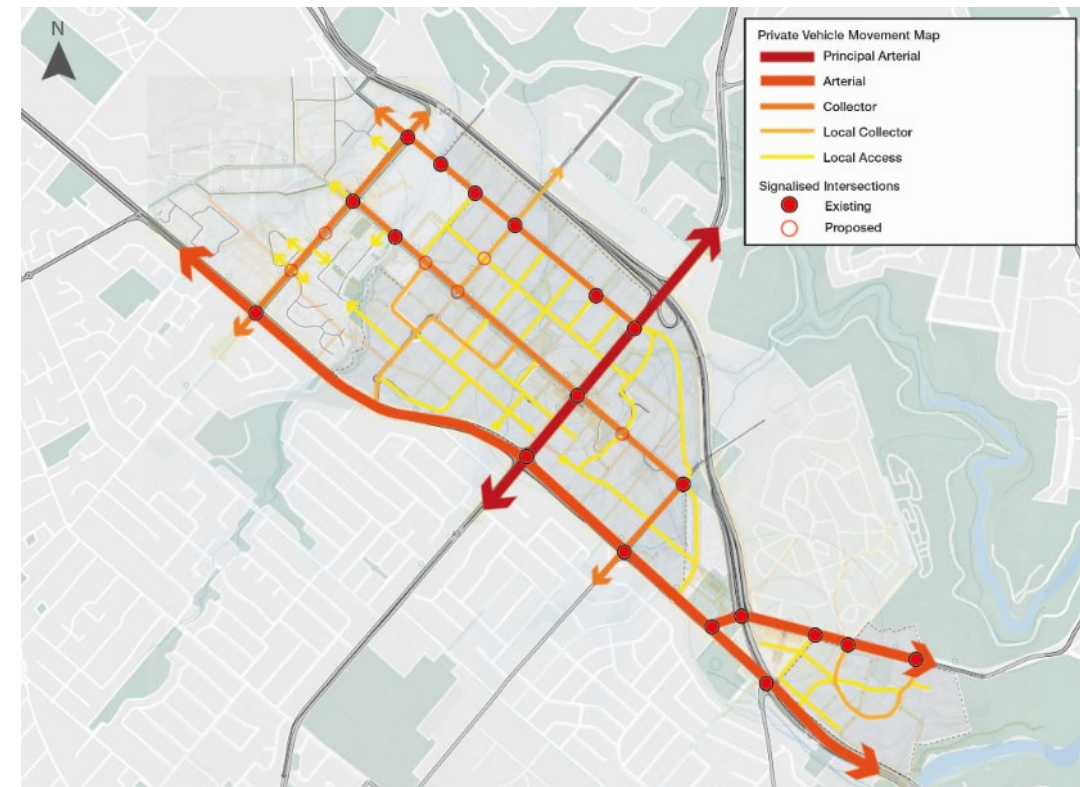


Figure 36 Private vehicle movement map with initiatives.

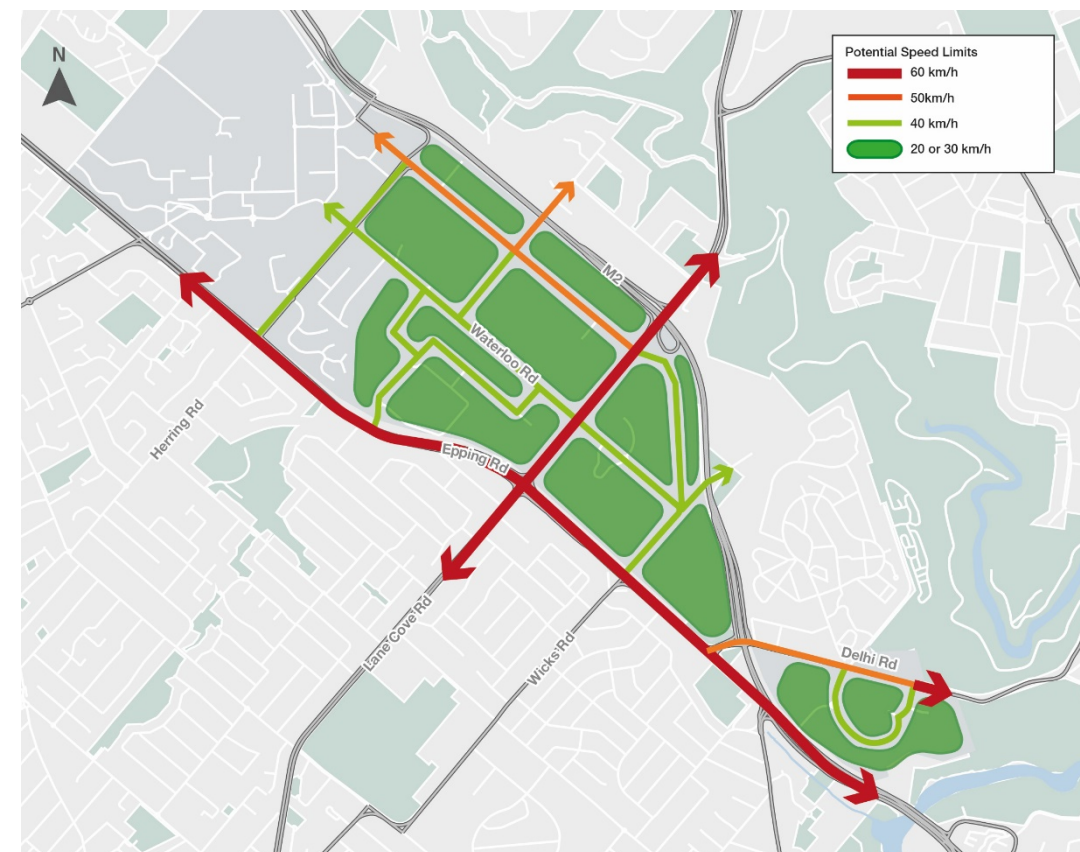


Figure 37 Potential vehicle speed limits.

5.5 Sustainability

The following is the set of sustainability related initiatives recommended to be investigated to support the master plan:

- Introduce electric vehicle charging stations within all 7 neighbourhoods.
- Introduce lower emissions bus fleet.

6 Next steps

Chapter 3 has summarised existing place in Macquarie Park and described how existing transport infrastructure in Macquarie Park has resulted in the high travel mode share by private vehicle, road performance issues, impacts on buses and freight, as well as issues for pedestrians and cyclists related to permeability, amenity and safety issues. Chapter 4 described in more detail what challenges need to be overcome and what opportunities are available to realize the vision for Macquarie Park, and Chapter 5 described what initiatives likely required to achieve the vision.

6.1 Validation and refinement

As the investigation is currently in a strategic stage, the presented transport initiatives are only high-level ideas that will need further refining through detailed investigation. Similarly, further work is required to validate the impacts of the transport initiatives on travel behaviour. A better understanding of the impacts will help further optimize the transport response to Macquarie Park's growing travel task to meet future customer demands. Strategic transport modelling can be helpful to estimate these impacts such as:

- potential transport mode shares of public transport and private vehicle.
- future performance of Macquarie Park road network.
- apportionment of infrastructure investment to growth of Macquarie Park.
- the impact of policy interventions on transport behaviour.
- change in accessibility to jobs.

6.2 Implementation

To deliver the set of initiatives, most of which are not within the current investment pipeline by Council or the NSW Government, the following would need to be considered:

- Identification or creation of governance structures to ensure decision-making is coordinated and considered by the relevant business areas within NSW Government.
- The development of business cases for the larger transport initiatives, such as Mass Transit and major road upgrades. This would confirm the funding allocation decisions are well timed, offer value for money, consider and mitigate risks and are consistent with Government priorities and objectives.
- Implementation of funding mechanisms through the planning system, such as Special Infrastructure Contributions and local contribution plans, to manage the costs of new infrastructure required to respond to growth. This would apportion some of the costs to developers and reduce the burden of capital expenditure on the rest of the NSW population.

Appendix A

Sydney Metro

Sydney Metro Northwest is a rapid mass transit link connecting Tallawong to Chatswood via Castle Hill and Epping and the three stations around which Macquarie Park is centred: Macquarie University, Macquarie Park and North Ryde stations. With an interchange at Epping 6 minutes west, customers can access the T9 Northern Line providing access to the inner west suburbs to the south as well as locations north to Hornsby. Through interchange at Chatswood, customers can access significant portions of the Eastern Economic Corridor to the south include the North Sydney CBD and Sydney CBD, with further interchange required to access areas between Central and Sydney Airport.

As Sydney Metro Northwest will be extended via the city towards Sydney's south west, and Sydney Metro West will be realized to Parramatta, Macquarie Park will be connected to Sydney's first and second CBD via frequent and high-quality public transport services.

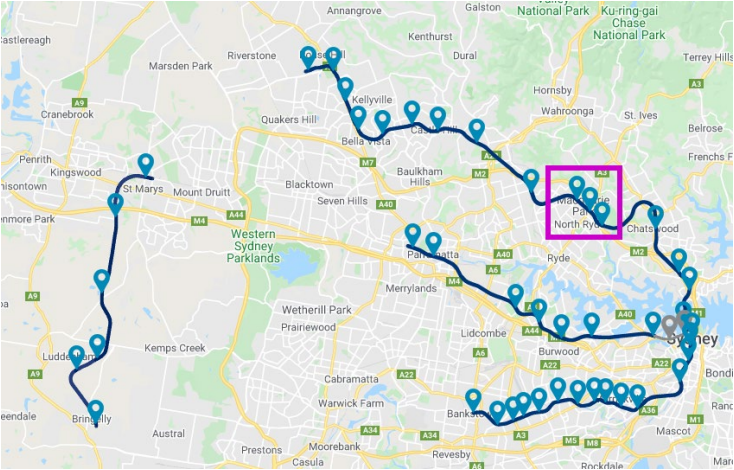


Figure 38 All committed Sydney Metro lines, with Macquarie Park in magenta square.

The metro line currently consists of 6-car trains at 4-minute headway services during peak periods (and 10-minute frequency off-peak) with the capacity to run 8-car trains at 2-minute frequencies, if required; resulting in a total potential line capacity of approximately 46,170 passengers per hour.

Monthly patronage figures for the line since opening and station tap on and tap offs are shown below.

Other key insights:

- Tap on / tap off profiles through the day reflect the land use that surrounds them concentrated and heavily directional peaks at Macquarie Park reflecting the higher density commercial activities, with slightly less pronounced and more balanced flows at each Macquarie University and North Ryde station reflecting a richer mixed balance of uses. For North Ryde demands are lower reflecting the lower intensity of existing uses across the catchment with some new high density residential mixed with the established offices. At Macquarie University the peak is more spread due the presence of retail and university uses in addition to the residential and commercial.
- A comparison of station demands pre vs post Metro indicate modest increases in patronage – a likely outcome of the undeveloped nature of precincts surrounding stations upstream - which will occur in future

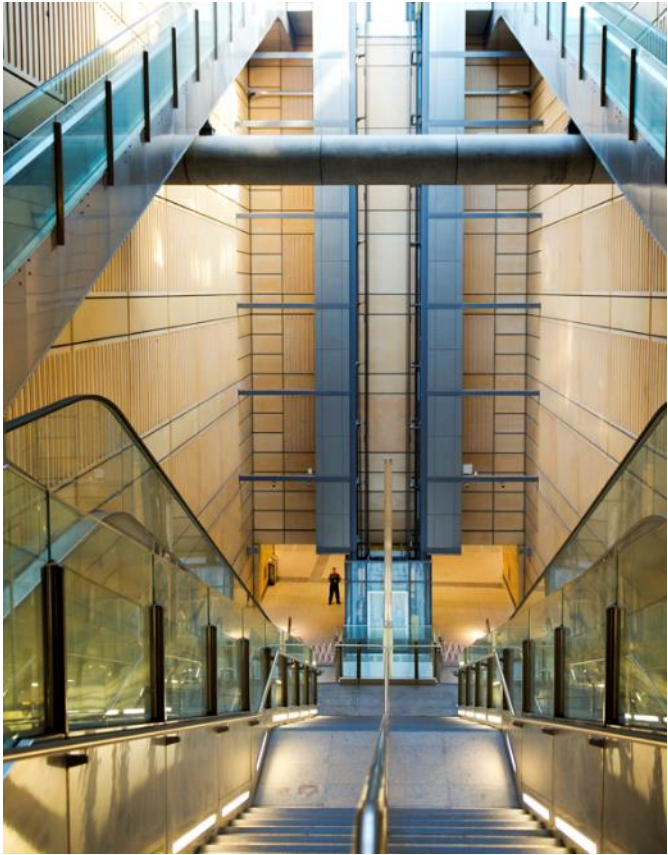


Figure 39 Inside Macquarie Park Station

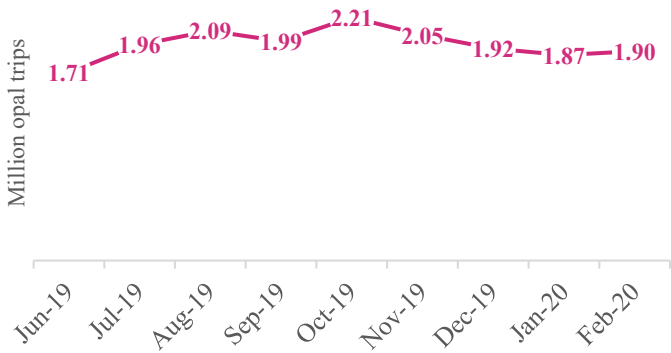


Figure 40 Sydney Metro North West patronage (millions) (TfNSW, 2020)

Appendix B

Initiatives List

B1 List of initiatives for investigation

	Initiative	Description	Responsibility
Walking			
W01	Provide more signalised pedestrian / cyclist crossings across Waterloo Rd	To provide safer and more attractive walking connections, particularly for trips inside the precinct. Results in formal crossings every 200m or less for pedestrians along these corridors.	City of Ryde Council
W02	Provide more signalised pedestrian / cyclist crossings across Talavera Rd	Same as W01.	City of Ryde Council
W03	Deliver the Fine Grain Street Network – all neighbourhoods	A series of 20m and 14.5m streets and 8m pedestrian ways that will enable finer grain movement by pedestrians, cyclists, private vehicles and service vehicles as well as human-scale places. Slow speeds.	City of Ryde Council
W04	Lower speed limits - Waterloo Rd, Herring Rd, Khartoum Rd, Wicks Rd	Reduce speed along middle order network to increase the 40km/h network in high pedestrian activity areas. Depending on the role of private vehicles, active transport and buses on the roads as part of the wider network, as well as pedestrian activity.	City of Ryde Council
W05	Lower speed limits – Lane Cove Rd	Improving safety and amenity, depending on level of pedestrian activity (e.g. Metro stations and key attractors). Will likely need to be undertaken in accordance with emerging new speed zoning guidance.	City of Ryde Council
W06	Pedestrian crossings on all legs of intersections at: -Lane Cove Rd/Waterloo Rd, -Lane Cove Rd/Talavera Rd, -Epping Rd/Lane Cove Rd, -Epping Rd/Delhi Rd -Talavera Rd/Christie Rd -Talavera Road/Macquarie Park Shopping Centre	E.g. at Metro stations to improve station access. Reduce walking travel times.	Transport for NSW
W07	Pedestrian bridge crossing of: - Lane Cove Rd in vicinity of Hyundai Dr, -Lane Cove Rd in vicinity of Dirrabari Rd, -Lane Cove Rd at Waterloo Rd	Focus on appropriate integration with built /natural environment, not isolated structures with difficult accessibility / minimal walkability improvement.	Transport for NSW
W08	Waterloo Rd/Macquarie Park Shopping Centre: Additional crossing leg to access the centre	Reduce walking travel times.	Transport for NSW

	Initiative	Description	Responsibility
W09	Waterloo Road: New and upgraded paths	New paths removed of driveway conflicts (access diverted to fine grain streets).	City of Ryde Council
W10	Provide footpath adjacent to Lane Cove Road from Talavera Rd to Fontenoy Rd.	To improve access north of M2 motorway.	City of Ryde Council
Cycling			
C01	Complete missing links in Macquarie Park's connected metropolitan cycling network.	Improve cycling accessibility within 5km of the precinct.	Transport for NSW
C02	Cycle link to Northern Beaches via A3.	Regional connectivity, improving cycling access to the precinct for employees or visitors from Kur-ring-gai, Northern Beaches LGAs.	Transport for NSW
C03	Deliver comprehensive network of dedicated cycle & micro-mobility connections.	Deliver dedicated bicycle lanes on all new and existing precinct roads and streets. Convert shared paths to dedicated footpaths and separated cycleways where necessary. Provides more comfortable and safer trips for pedestrians and cyclists.	City of Ryde Council
C04	Deliver increased publicly accessible bicycle parking	Should be provided in tandem with improved network infrastructure and off-street supply (end-of-trip facilities in developments). May need to include additional supply at stations.	City of Ryde Council
C05	Provide alternative to M2 on-shoulder link as off-road cycleway through precinct	Notionally along / near Halifax St to Talavera Rd.	City of Ryde Council
C06	Deliver active transport link through Browns Waterhole	From Macquarie University, through Browns Waterhole to South Turramurra.	City of Ryde Council
C07	Deliver south-facing grade separated active transport link into Riverside Business Park	To Pittwater Road corridor, crossing M2 and Epping Road.	City of Ryde Council
Bus Transit			
B01	Deliver Mona Vale to Macquarie Park public transport improvements.	As per FT2056 'for investigation 0-10 years' initiative.	Transport for NSW
B02	Deliver Strategic Bus Corridor from Macquarie Park to Parramatta via Eastwood, Rockdale via Rhodes, Blacktown via M2	Includes associated infrastructure and services for each.	Transport for NSW

	Initiative	Description	Responsibility
B03	Infrastructure to support bus operations.	The increase in services would need to be supported by infrastructure such as layovers and depots. Does not include upgrade including electric bus charging infrastructure.	Transport for NSW
B04	Talavera Road: Reallocation of road space	In addition for intersection improvements at Khartoum Rd, reallocation of road space along the corridor to ensure it can be adapted to its future role with the park, acknowledging stakeholder discussions where the corridor having an increased role for buses and reduced role in on-street parking.	City of Ryde Council
B05	New and upgraded bus stops	Adding 8 bus stop areas to Macquarie Park and upgrading 17 existing bus stops along strategic bus corridors. Increasing access to the bus network in Macquarie Park by providing more bus stops servicing the increased number of homes, businesses, and office locations.	City of Ryde Council
B06	Macquarie University Bus Interchange (MUBI)	Detailed planning currently in progress. Increase the capacity of the bus interchange, improve bus customers' connection to the Macquarie University Metro Station and optimise bus operations, which will reduce travel times and delays for bus customers.	Transport for NSW
B07	Northern bus layover	New layover within Macquarie Park to support bus operations.	Transport for NSW
B08	Southern bus layover	New layover within Macquarie Park to support bus operations.	Transport for NSW
B09	BPIP Stage 1	Herring Rd/Epping Rd intersection, Herring Rd between Epping Rd and Waterloo Rd, Herring Rd/Waterloo Rd intersection, and Waterloo Rd/Lane Cove Rd intersection.	Transport for NSW
B10	BPIP Stage 2	Waterloo Rd between Herring Rd and Lane Cove Rd, Lane Cove Rd southbound between Waterloo Rd and Epping Rd (partial).	Transport for NSW
Mass Transit			
M01	Parramatta to Epping Mass Transit Link	As per FT2056 'for investigation 10-20 years', delivered by 2041 or prior. Potential for staged delivery: bus replaced by rail. Includes land requirements to future proof for later delivery.	Transport for NSW
M02	Increase Sydney Metro service frequency	Initial analysis indicates service capacity in addition to that being delivered as part of Metro City & South West may be required by 2041.	Transport for NSW

	Initiative	Description	Responsibility
M03	Macquarie Park to Southeast Sydney Mass Transit Link	As per FT2056 'visionary 20+ years', delivered by 2041 or prior. Includes land requirements to future proof for later delivery.	Transport for NSW
Private vehicles			
P01	Waterloo Road: Intersection improvements Byfield Rd, Khartoum Rd, Thomas Holt Rd.	Traffic signals to manage turning conflict volumes within the local road network and provide signalised pedestrian crossings.	City of Ryde Council
P02	Waterloo Road: Additional traffic management measures	Additional traffic management options that may shift any through traffic from Waterloo Rd to Talavera Rd.	City of Ryde Council
P03	Herring Road intersection improvements	Replacing the roundabout with traffic signals.	City of Ryde Council
P04	Lane Cove Road: Intersection improvement at Waterloo Rd (at grade)	Improving intersection capacity to mitigate the overall increase in private vehicle movements attributed to growth from the master plan.	Transport for NSW
P05	Lane Cove Road: Intersection improvement at Talavera Rd (at grade)	Same as P04.	Transport for NSW
P06	Epping Road: Intersection improvement at Wicks Rd (at grade)	Same as P04.	Transport for NSW
P07	Khartoum Road/Banfield Road intersection improvements	Traffic signals to manage turning conflict volumes within the local road network.	City of Ryde Council
P08	Review existing and minimise future off-street parking provision	Reduce off-street maximum parking provision policy rates and accelerate removal of existing parking availability (delivered according to old rates) following further improvements in public transport accessibility. Focus on commercial and local-serving uses (small retail etc.) and around public transport nodes.	City of Ryde Council
P09	Ensure adequate off-street loading dock capacity in developments and encourage centralised/agglomeration of freight facilities.	Minimise freight impact to future residential developments and shopping mall by providing adequate and sufficient off-street servicing access capacity, reducing impact on street environment.	Developers
Sustainability			
S01	Introduce electric vehicle charging stations within all 7 neighbourhoods.	Attracting low emission vehicles could improve public space amenity and local air quality.	Transport for NSW

	Initiative	Description	Responsibility
S02	Introduce lower emissions bus fleet.	In line with NSW Government’s aspirational target to transition the entire public bus fleet to zero emissions by 2030, accelerate transition from ICE buses to electric or hydrogen buses servicing Macquarie Park to improve air quality and local emissions.	Transport for NSW

Appendix C

Additional Transport Analysis

Travel behaviour

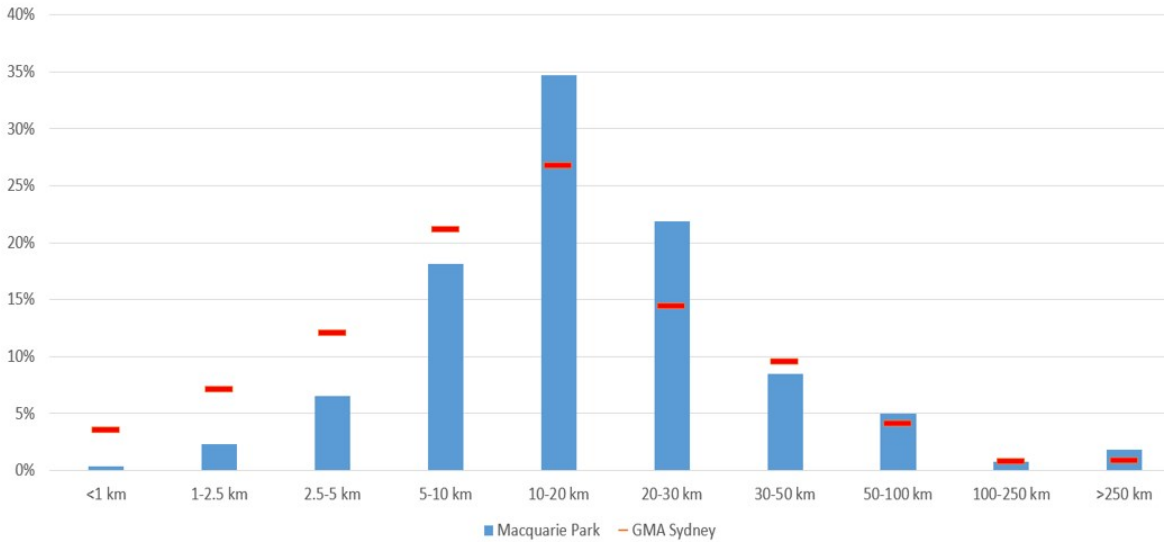


Figure 41 Journey-to-work travel distance of trips arriving in Macquarie Park (ABS, 2016)

Travel distance to work is larger for work in Macquarie Park compared to trips work on average in Greater Sydney.

Walking

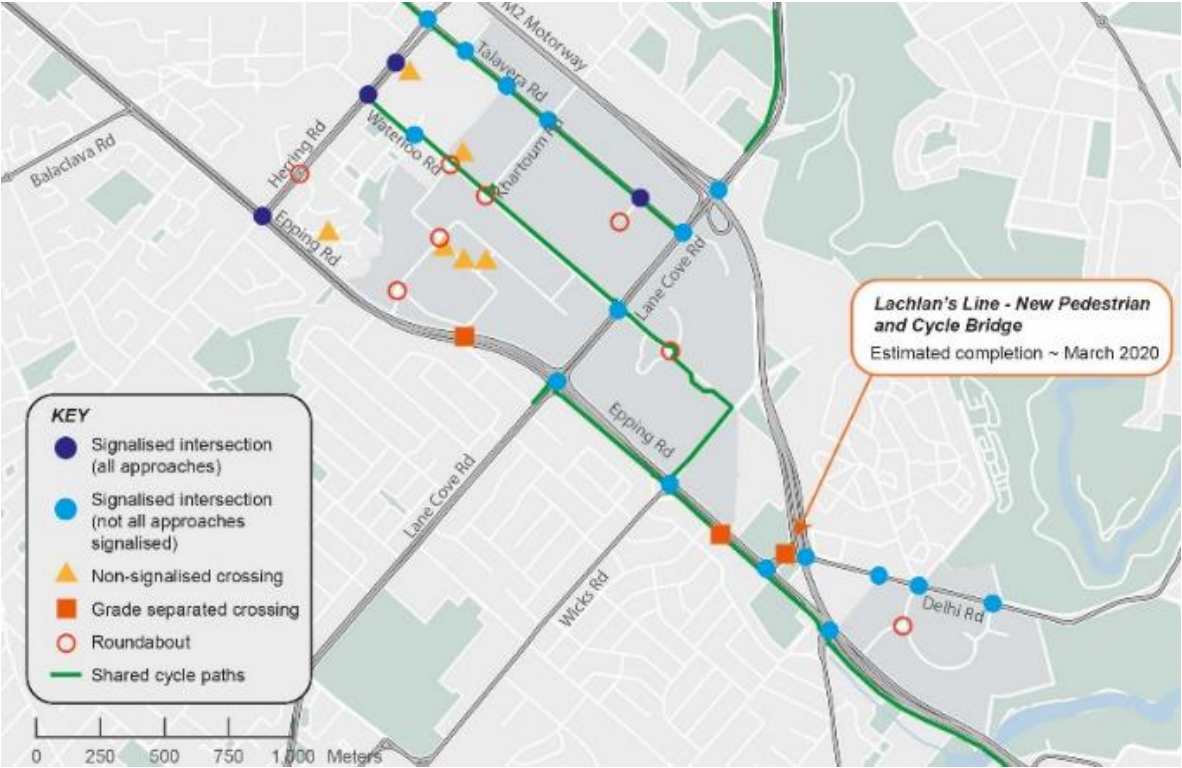


Figure 42 Missing crossings in Macquarie Park.

Several roads in Macquarie Park have large distances between crossings, inhibiting pedestrians from freely moving around. This includes Waterloo Road between Khartoum Road and Lane Cove Road, Talavera Road, Epping Road, Lane Cove Road and Wicks Road.

Cycling

Connectivity and Safety Concerns

There are a series of local routes that connect areas within Macquarie Park. Some examples include off-road shared path facilities along Talavera Road connecting to Lane Cove Road and along Waterloo Road from Herring Road to Lane Cove Road.

The large traffic volumes and high traffic speeds create significant safety issues for on-street cyclists inside Macquarie Park and across busy intersections. Two intersections are particularly problematic.

Epping Road and Lane Cove Road

The Epping Road and Lane Cove Road intersection has attracted the most bicycle and pedestrian crashes in the precinct over the years. Potential factors for this include:

- Discontinuation of the off-road shared path along Epping Road in the northern direction.
- Narrow footpaths lacking delineation for cyclists continuing north along Epping Road in the direction of the precinct.
- Negligible/poor way-finding for cyclists who wish to enter the precinct. This potentially creates confusion for cyclists who may interpret Lane Cove Road as a cycle path to connect to the precinct – undesirable and unsafe.
- Long connection in terms of waiting time and number of crossings for cyclists continuing north along Epping road. This includes:
 - Two slip-lane crossings across the high-speed roads (70km/hr) and;
 - One signalised pedestrian/cyclist crossing.

Lane Cove Road and Waterloo Road

Cyclists connecting to Macquarie Park Station are encouraged to use the off-road shared path facility along Waterloo Road to access the precinct. However, cyclists experience long wait times when connecting to Waterloo Road.

- Cyclists connecting north are subjected to three crossings (2 x slip lane crossings and 1 x signalised across Waterloo Road).
- Cyclists connecting south are subjected to three crossings (3 x signalised crossings from the station bicycle rack facility) due to missing crossing across Lane Cove Road on the southern extent.
- Additionally, the off-road shared path facility is discontinued for cyclists connecting south along Waterloo Road.

Road Safety

The following crash density maps illustrate common areas where crashes occur. Intersections along the Epping Road and Lane Cove Road corridors are highlighted as hotspots due to the high traffic volumes and speeds (70km/hr) along these corridors.

In particular, Figure 44 suggests that the Epping Road and Lane Cove Road junction is a safety concern, as 5 combined pedestrian and cycle crashes occurred here.

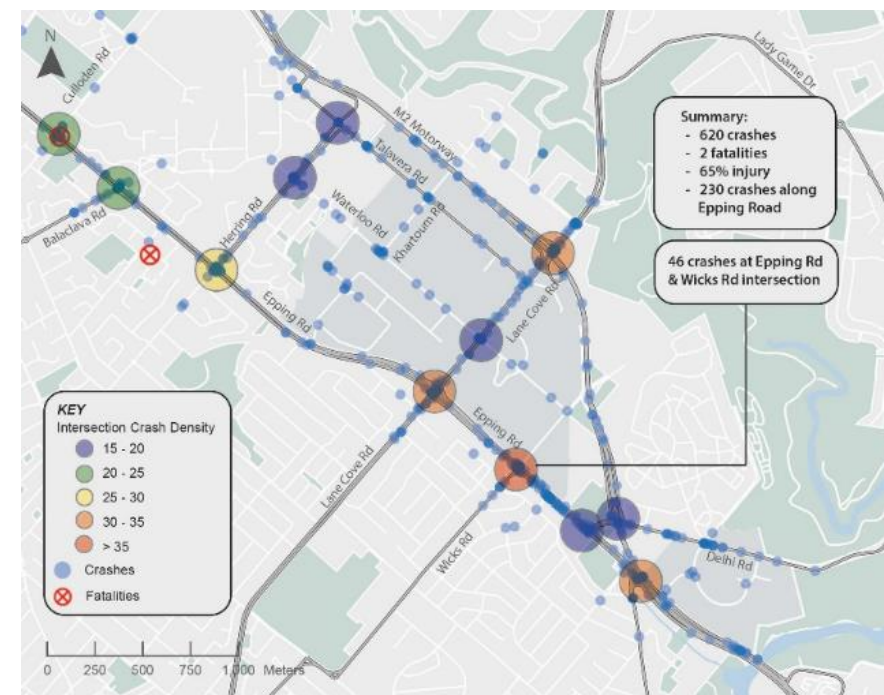


Figure 43 Crash density map (2014-2018).

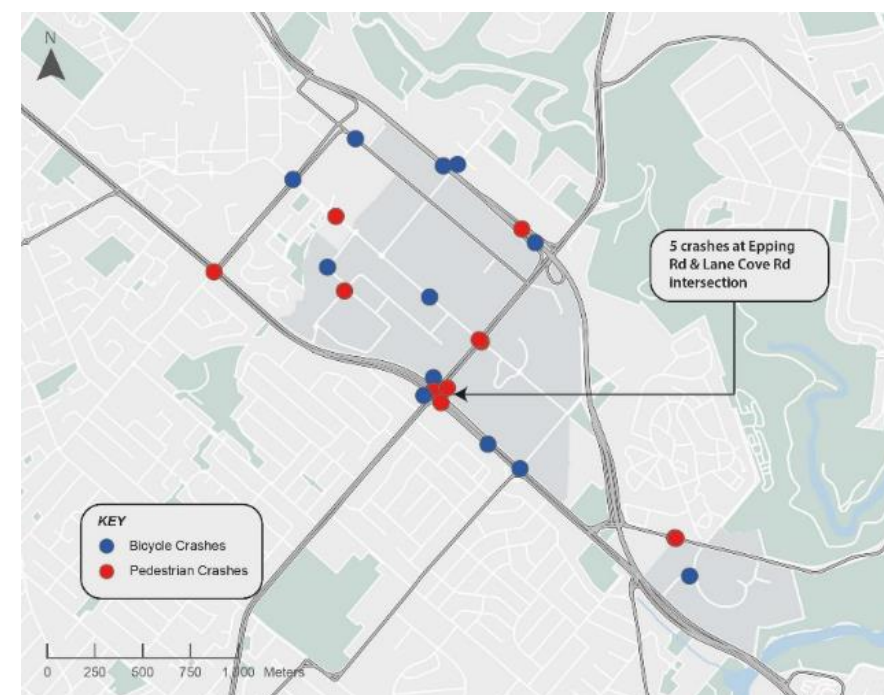


Figure 44 Pedestrian and bicycle related crashes (2014-2018).

Bus

In the morning peak (8-10 AM), Waterloo Road and Lane Cove Road north of Waterloo Road sees a higher share of bus alightings at bus stops. Along Epping Road and Fontenoy Road the share of boardings is higher, reflecting surrounding residential land uses.

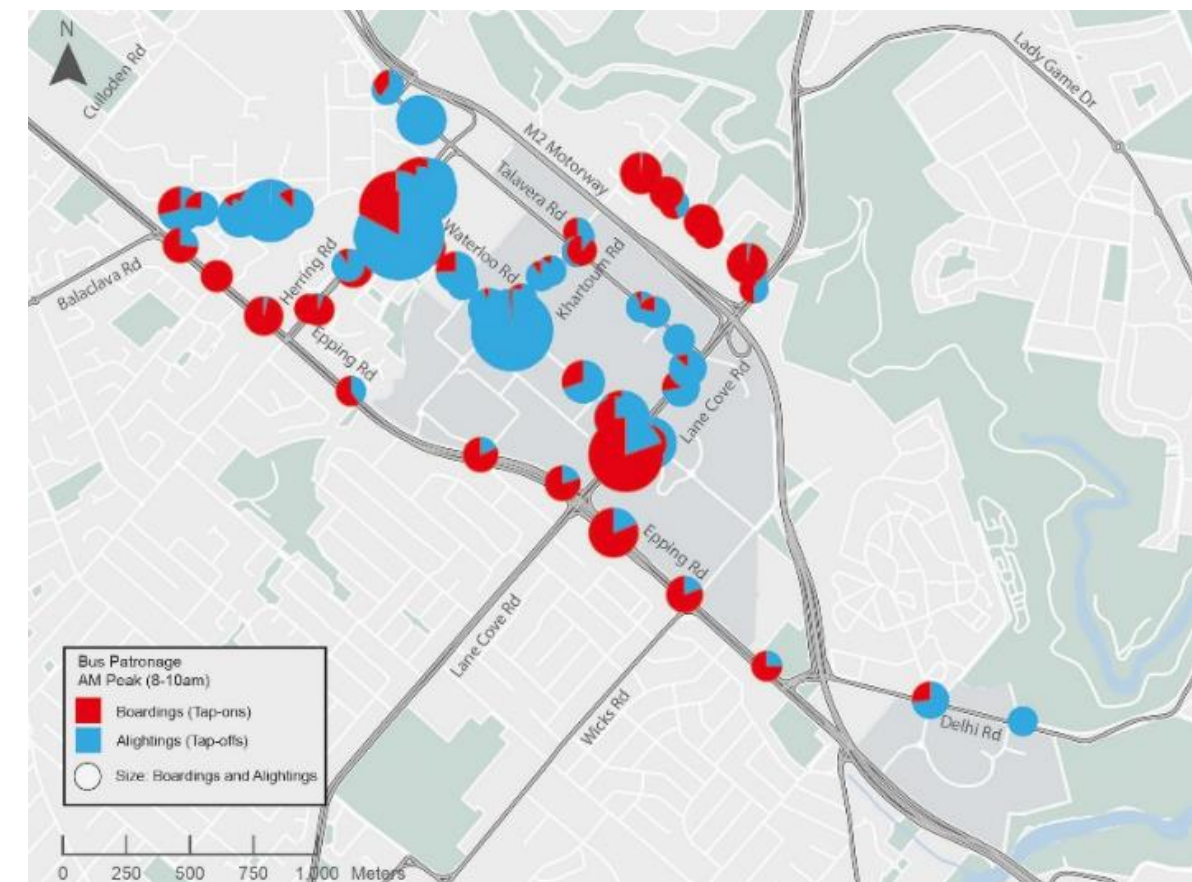


Figure 45 Bus patronage, AM peak

Buses are on average more frequently late in the morning peak than in the afternoon peak. In the morning peak, buses are most typically late on Waterloo Road, Herring Road (near Macquarie University Bus Interchange), Talavera Road, Lane Cove Road and Epping Road. This indicates a low service reliability for customers in these places.

In terms of bus speed, buses are travelling at low speeds in both the morning and afternoon peak particularly on Waterloo Road, crossing or turning into/out of Lane Cove Road and Herring Road, at 8-10 km/h.

See Figure 46, Figure 47 and Figure 48

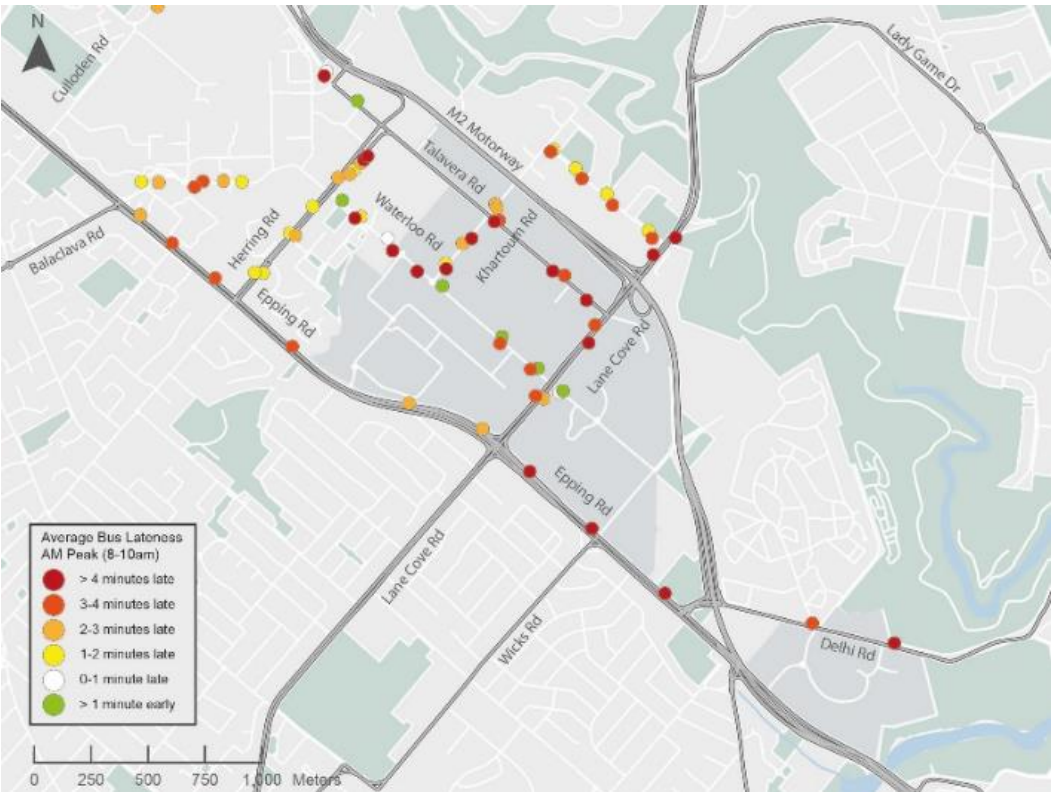


Figure 46 Average bus lateness, AM peak

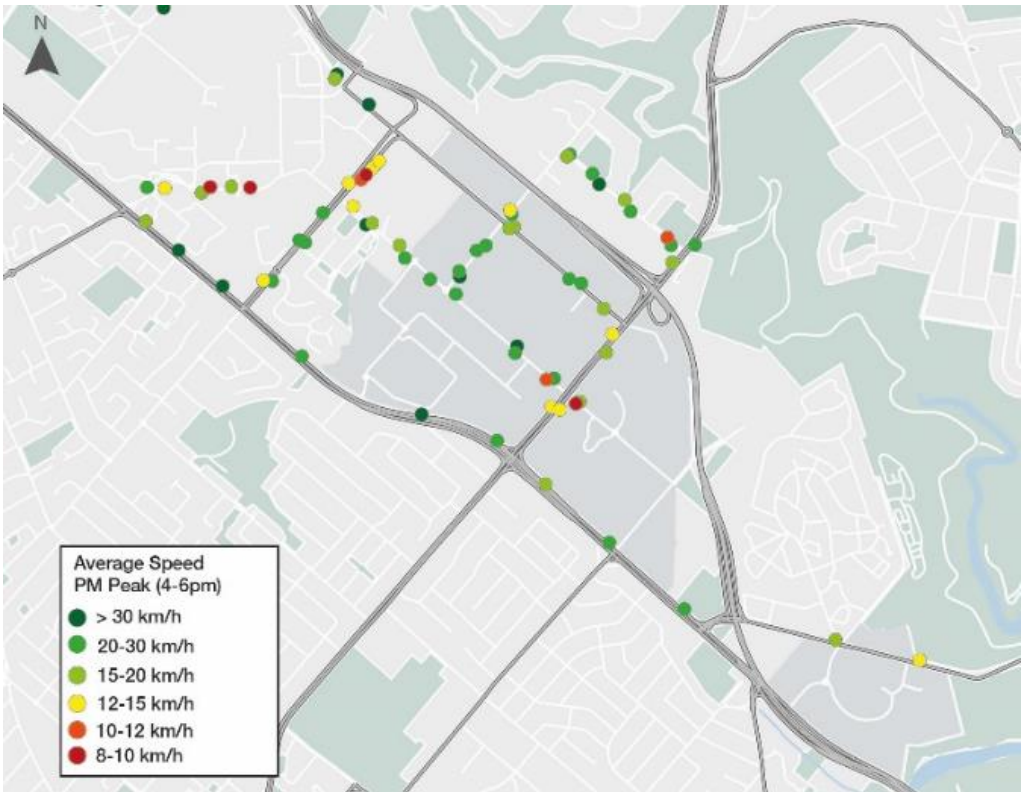


Figure 48 Average bus speed, PM Peak

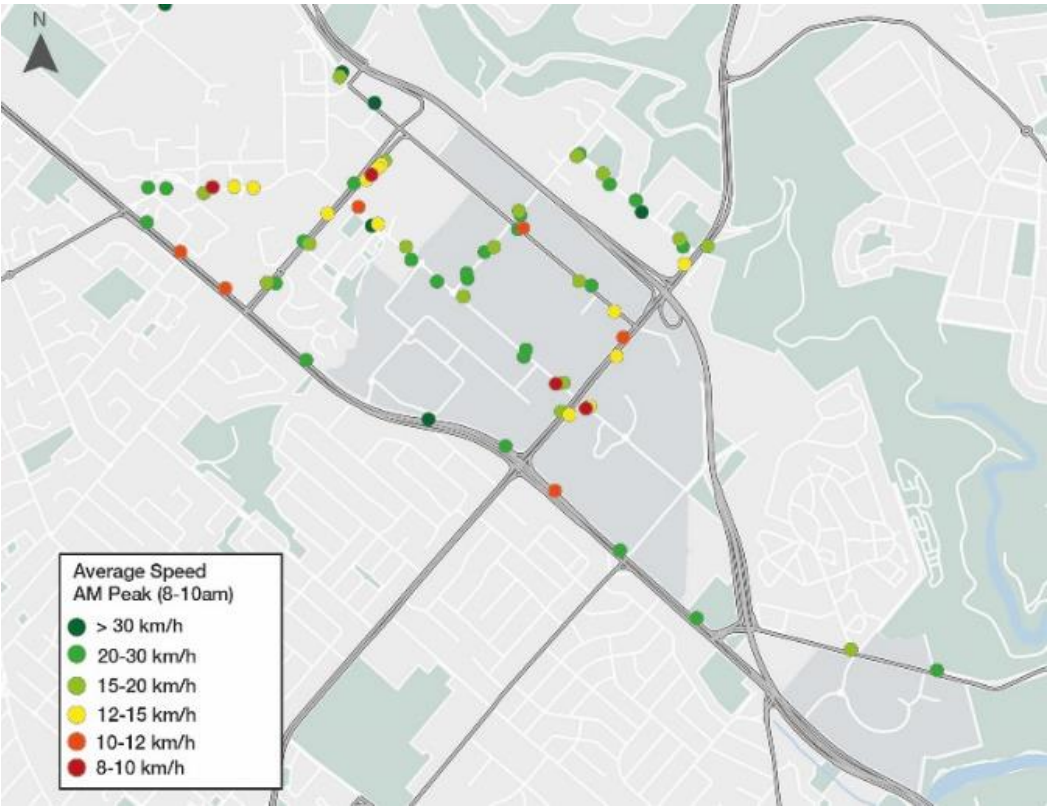


Figure 47 Average bus speed, AM Peak

Accessibility

Figure 49 and Figure 50 compare the reachable area travelling by public transport in a network with committed projects with a network with committed projects and additional initiatives proposed as part of this investigation. They demonstrate:

- Departing Macquarie University Station, the area accessible within 45 minutes increases along the A3 towards Mona Vale, as a product of the rapid bus connection
- Departing Macquarie University Station, the area accessible within 45 minutes increases towards Sydney's Inner West and providing interchange opportunities with Sydney Metro West
- Accessibility benefits departing North Ryde station are limited to access increases to Sydney's Inner West.

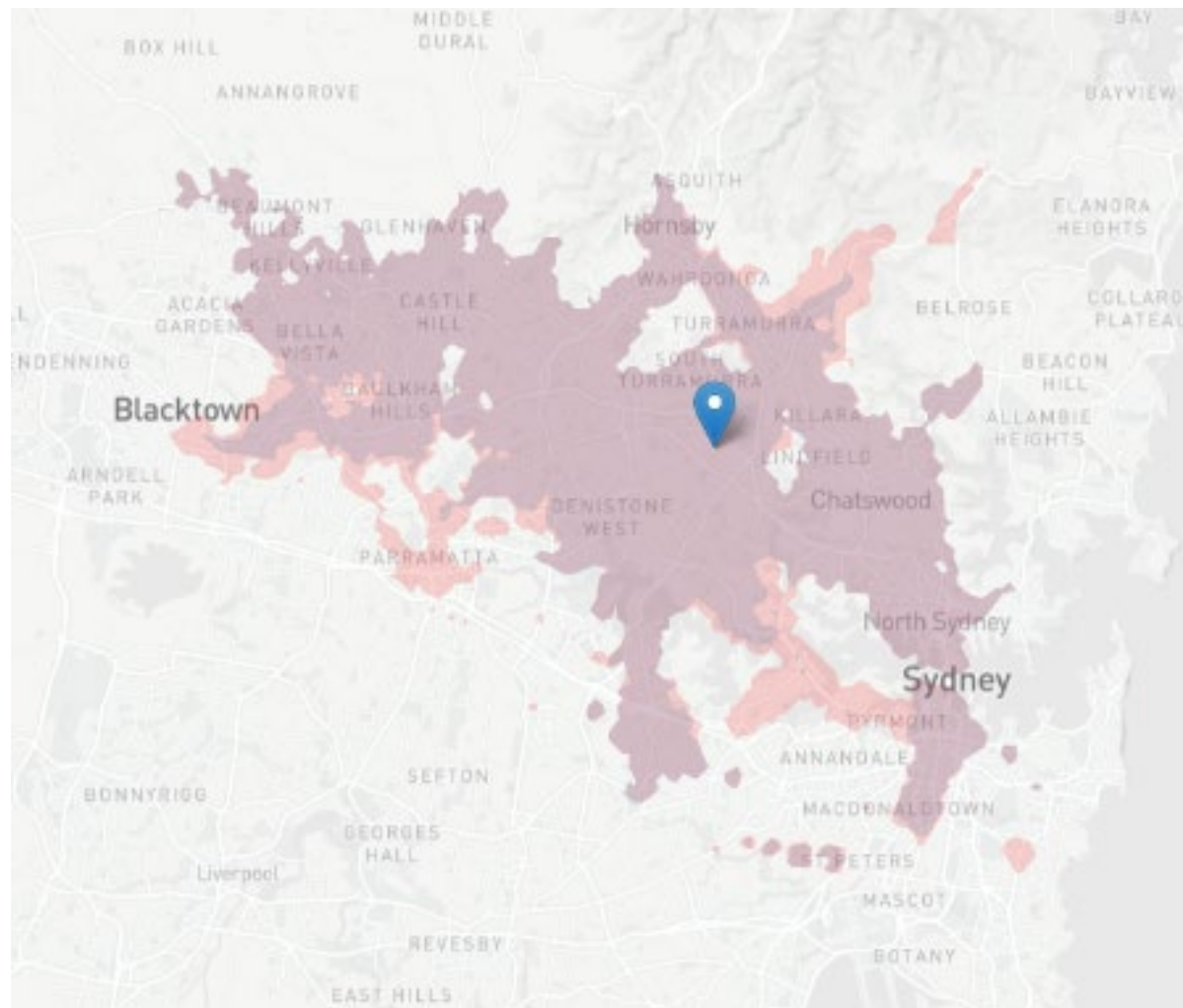


Figure 49 Departing Macquarie University, AM peak. Blue: Committed, Red: Committed & major public transport interventions, travelling for 45 minutes

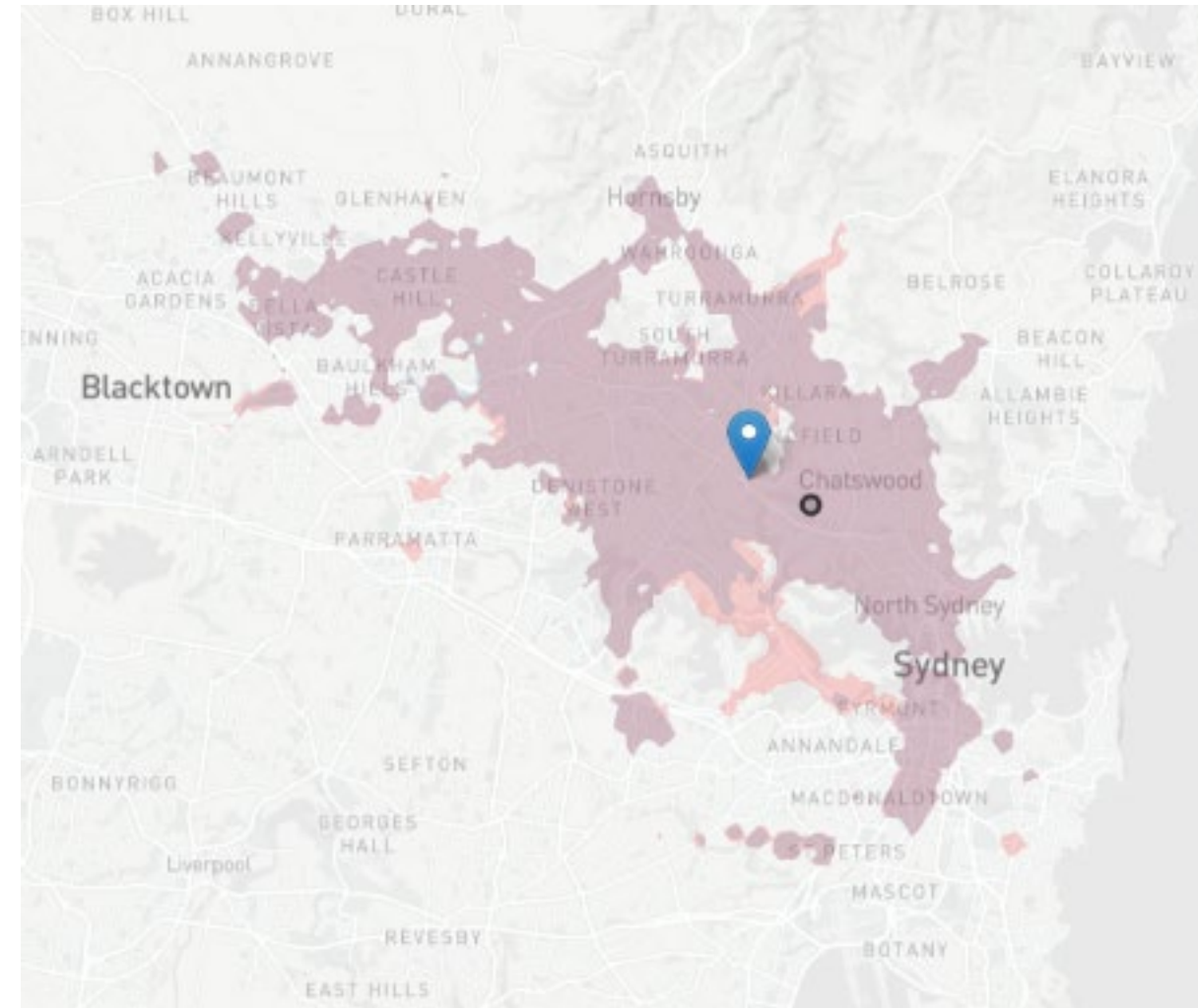


Figure 50 Departing North Ryde Station, AM peak. Blue: Committed, Red: Committed + major public transport interventions, travelling for 45 minutes