

asongroup



Transport Assessment

Planning Proposal

2013-2113 The Northern Road & 1-29 Bradley Street, Glenmore Park

14/09/2023

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Glossary

Acronym	Description
CC	Construction Certificate
Council	Penrith City Council
DA	Development Application
DCP	Development Control Plan
DPE	Department of Planning and Environment
GFA	Gross Floor Area
LEP	Local Environmental Plan
LGA	Local Government Area
MOD	Section 4.55 Modification (also referred as a S4.55)
RMS Guide	Transport for NSW (formerly Roads and Traffic Authority), Guide to Traffic Generating Developments, 2002
S4.55	Section 4.55 Modification (also referenced as MOD)
S96	Section 96 Modification (former process terminology for an S4.55)
TDT 2013/04a	TfNSW Technical Direction, Guide to Traffic Generating Developments – Updated traffic surveys, August 2013
TfNSW	Transport for New South Wales
TA	Transport Assessment
TIA	Transport Impact Assessment
veh/hr	Vehicle movements (or trips) per hour (1 vehicle in & out = 2 movements)

1 Executive Summary

The Planning Proposal (PP) seeks to rezone a 47.95-hectare (ha) parcel of land bounded by the recently upgraded The Northern Road to the east, Glenmore Parkway to the north, Bradley Street to the south and the existing Glenmore Park neighbourhood to the west. The precinct is within the Penrith Local Government Area (LGA) and the land subject to this PP is described as **Glenmore Park East**.

The precinct is located 10km to the north of the new 24-hour Western Sydney International Airport and 5km south of the Penrith CBD and is centrally located within the Western Parkland City. The precinct is surrounded by the existing stages of the Glenmore Park Estate (stages 1-3), Penrith Golf Course to the north, the state led Orchard Hills master planned precinct to the east and the Defence Establishment Orchard Hills to the southeast. The precinct is approximately 1km south of the M4 freeway and approximately 5km west of the new Orchard Hills Metro Station which is currently under construction.

Glenmore Park East will contribute to the long-term housing targets of Penrith and the broader Western Parkland City and will contribute to increased housing supply in the short to medium term which is a key priority of the Premier and the NSW Government. The precinct has also been identified as being 'urban capable' and the proponent (Nergyl Developments Pty Ltd) is responding to this capability and government priority through the provision of much needed diversity in housing in the Glenmore Park area and to support future local employment within the Western Parkland City, tapping into the new opportunities that will emerge through the delivery of the Western Sydney Aerotropolis. In doing so, the precinct will achieve its vision of *live, work, play*.

The proponent applied to the Department of Planning and Environment in January 2023 for the PP to be considered under the pilot State Assessed Planning Proposal (SAPP) program. From more than 100 applications across NSW, DPE selected this precinct as one of five (5) to be assessed through the SAPP pilot program. In being selected for this pilot program, DPE was satisfied that the proposal:

- demonstrated public benefit through housing supply and alignment with state policies and land use strategies
- contributed to affordable and social housing outcomes
- offered a pathway to the delivery of housing in the short term
- has adequate infrastructure available or that funding is committed for critical infrastructure

Whilst there has been differing views over the last 20 years about how the precinct should be developed, the growth and evolution of the Western Parkland City confirms that the precinct is a logical urban inclusion in the Penrith Local Environmental Plan 2010 (PLEP 2010) whilst being a contemporary gateway to the Penrith LGA.

2 Introduction

2.1 Overview

Nergyl Developments Pty Ltd engaged Ason Group to provide all necessary transport related and to prepare a Transport Assessment (TA) to support the Glenmore Park East Planning Proposal (the Proposal) to facilitate a diverse mixed-use precinct located at 2013-2113 The Northern Road & 1-29 Bradley Street, Glenmore Park.

2.2 Site Location

With reference to **Figure 1**, the Site is at 2013-2113 The Northern Road & 1-29 Bradley Street, Glenmore Park. It is within Penrith City Council Local Government Area (LGA) and subject to Penrith City Council guidelines.

The location is key and is well positioned to act as the connection between the semi-rural lands to the south and the intended future residential and commercial development within Orchard Hills to the east. The Northern Road has undergone significant recent upgrades with four traffic lanes in each direction (including dedicated bus lanes) separated by a wide central median ensuring ample future capacity to accommodate expansion of land use intensity and to facilitate property access through key signalised intersections.

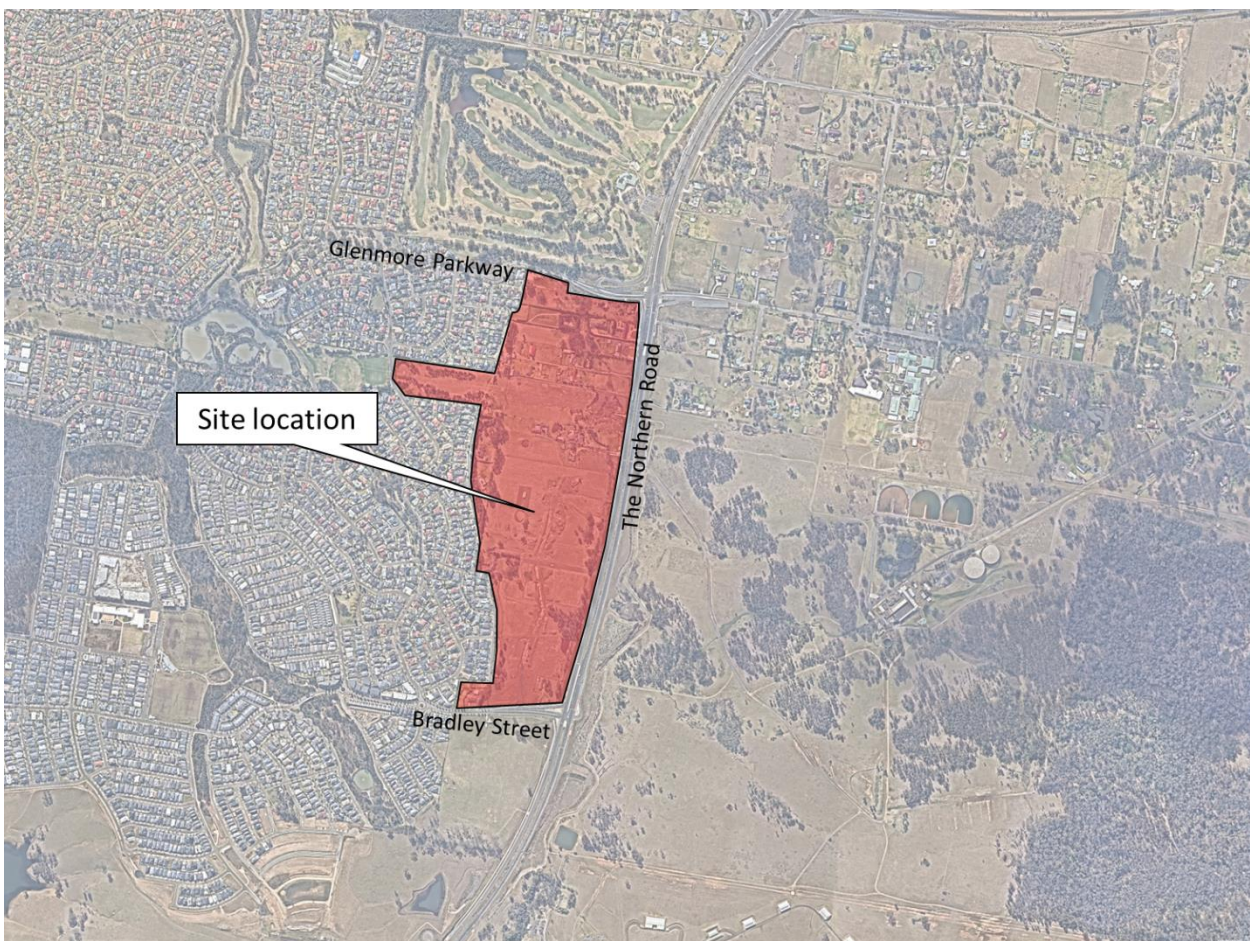


Figure 1: Site Location

2.3 Objectives

This document has been prepared to provide a detailed assessment of the traffic and transport impacts associated with the proposed Site on the surrounding road network and to help guide the overarching approach to transport to facilitate incorporation into the surrounding area whilst recognising recent infrastructure changes and intended future planning with respect to land use planning, density and access to public and active transport.

2.4 Key References

In preparing this TA, Ason Group has referenced key planning documents and transport standards and guidelines, including but not limited to:

- *Future Transport Strategy 2056*¹, *Transport for NSW*
- *Greater Sydney Region Plan*²: *A Metropolis of Three Cities 2018*, *Greater Sydney Commission*
- *Western City District Plan 2018*³, *Greater Sydney Commission*
- *Making the Western Parkland City*⁴: *Initial Place-based Infrastructure Compact (PIC) Area, Draft PIC Report*
- *Western Sydney City Deal*⁵
- *Penrith Development Control Plan (DCP) 2014*
- *Penrith Local Environmental Plan (LEP) 2013*
- *Roads and Maritime Services Guide to Traffic Generating Developments (RMS Guide) 2002*
- *Roads and Maritime Services Guide to Traffic Generating Developments Updated Traffic Surveys (RMS Guide Update) 2013*

¹ media.opengov.nsw.gov.au/pairtreeroot/

² gsc-public-1.s3.amazonaws.com/s3fs-public/greater-sydney-region-plan-0318.pdf

³ greatercities.au/strategic-planning/city-plans/western

⁴ greatercities.au/sites/default/files/2023-07/draft_pic_report_-_making_the_western_parkland_city_november2020.pdf

⁵ infrastructure.gov.au/sites/default/files/migrated/cities/city-deals/western-sydney/

3 Strategic Context

3.1 Introduction

Reference has been made to the State, regional and local planning documents which are considered relevant to the context of the Site. With significant infrastructure work in planning, under construction or recently completed across western Sydney, understanding the scope and location of such works is key to recognising how they relate to the site to ensure the intent of and benefits from are recognised.

The key reference documents and policies are discussed in the following sections.

3.2 NSW State Strategies

3.2.1 Future Transport Strategy

Future Transport Strategy is an overarching strategy which replaces the *Future Transport 2056: Shaping the Future* published in 2018. It provides a 40-year strategy for how transport will be planned, amended and forecasted within New South Wales (NSW), encompassing both regional and metropolitan, for expected 12 million residents within the state. Building upon the foundation laid by 2012 Long Term Transport Master Plan, Future Transport 2056 aligns with the vision of three cities metropolis.

Future Transport 2056 derives its foundation from two essential documents, the Greater Sydney Services and Infrastructure Plan and the Regional NSW Services and Infrastructure Plan. These documents serve as guiding principles and blueprints for the development of transportation and infrastructure in their respective regions.

Looking specifically at metropolitan areas, Future Transport 2056 along with its associated plans, envisions the creation of a '30-minute city'. This ambitious concept aims to ensure that jobs and essential services are conveniently reachable within a 30-minute travel time for Greater Sydney residents. To achieve this, strategic transport corridors have been delineated to facilitate the movement of people and goods between metropolitan areas and strategic centres, clusters and their surroundings.

Furthermore, the Movement and Place framework takes centre stage in this endeavour emphasizing its crucial role in enhancing the overall quality of life, productivity and sustainability of the region. This strategy is supported by a suite of plans to achieve a state-wide transport system and suggests that it is essential to encourage people to use active and public transport through the following methods:

- Expanding public transport networks.
- Integrating walking and cycling networks.

3.2.2 Greater Sydney Regional Plan 2018

The *Greater Sydney Region Plan: A Metropolis of Three Cities – connecting people* (2018) has been produced by the Greater Sydney Commission (GSC) with its key purpose being to:

“...rebalance growth and deliver its benefits more equally and equitably to residents across Greater Sydney. The plan aligns land use, transport and infrastructure planning to reshape greater Sydney as three unique cities”.

Based on a vision of three connected cities – the Eastern Harbour City, the Central River City, and the Western Parklands City – the Region Plan is structured around strategies for infrastructure, collaboration,

liveability, productivity, sustainability, and implementation across Greater Sydney. **Figure 2** identifies the key strategies to achieve the outcomes for the Western Parkland City, where the Site is located.

The Region Plan was prepared concurrently with the Future Transport Strategy 2056 and the State Infrastructure Strategy to ensure the alignment of land use, transport, and infrastructure outcomes for Greater Sydney. It seeks to encourage residential development in close proximity to employment areas to deliver a series of 30-minute cities, providing better access to jobs, schools, and health within 30 minutes of people’s homes.

Objective 14 of the Region Plan focuses on “a well-connected city” with a focus on “integrated land use and transport”. The Plan talks to delivering more efficient supply chains and reducing business costs by co-locating activities in metropolitan, strategic, and local centres. There is also focus on productivity, reducing the time people spend travelling, increasing access to jobs and business’ access to workers.

Further, Objective 16 places emphasis on “freight and logistics network are competitive and efficient”. The Plan notes that Greater Sydney’s freight task is forecast to almost double in the next 40 years, placing increased importance on 24/7 supply chain operations.

The Site is ideally located to align with the aims of the Region Plan as it is located in between two major sub-regions of Western Park land City, Greater Penrith and Western Sydney Airport. The Site’s location in relation to these sub regions result in faster service times to customers, reduction in vehicle kilometres and travel time, and increased accessibility for employees to travel to/ from the Site via non-private car mode share – naturally promoting active and public transport.

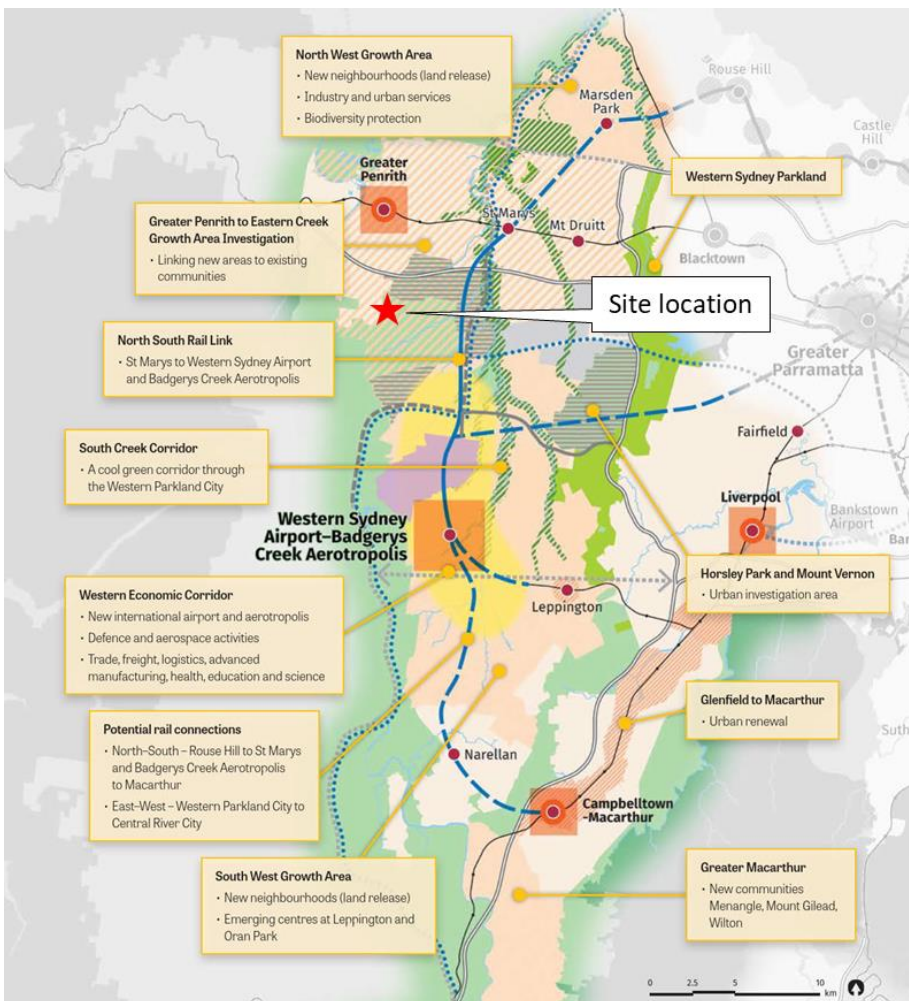


Figure 2: Western Parkland City – Key Strategies (Source: [Greater Sydney Region Plan 2018](#))

3.2.3 Western City District Plan (March 2018) – Greater Sydney Commission

The district is designed to support Greater Sydney’s 40-year vision, offering a comprehensive framework for regional and local planning aimed at achieving desired outcomes across economic, social, and environmental dimensions. This framework also empowers local councils to align their strategic planning with the overarching goals outlined in the Western Sydney district plan.

Glenmore Park is located within the jurisdiction of Penrith City Council and is an integral part of the Greater Penrith to Eastern Creek Growth Area, as illustrated in **Figure 3**. Penrith City Council has set an ambitious housing supply target of 6,600 units for the five-year period spanning 2016 to 2021. Glenmore Park East aligns not only with this housing supply target but also broader economic and social objectives, such as enhancing liveability, productivity and sustainability within the local context.

Overall, the planning intent for Glenmore Park East integrates well with the planning priorities as defined by the Western City District Plan.

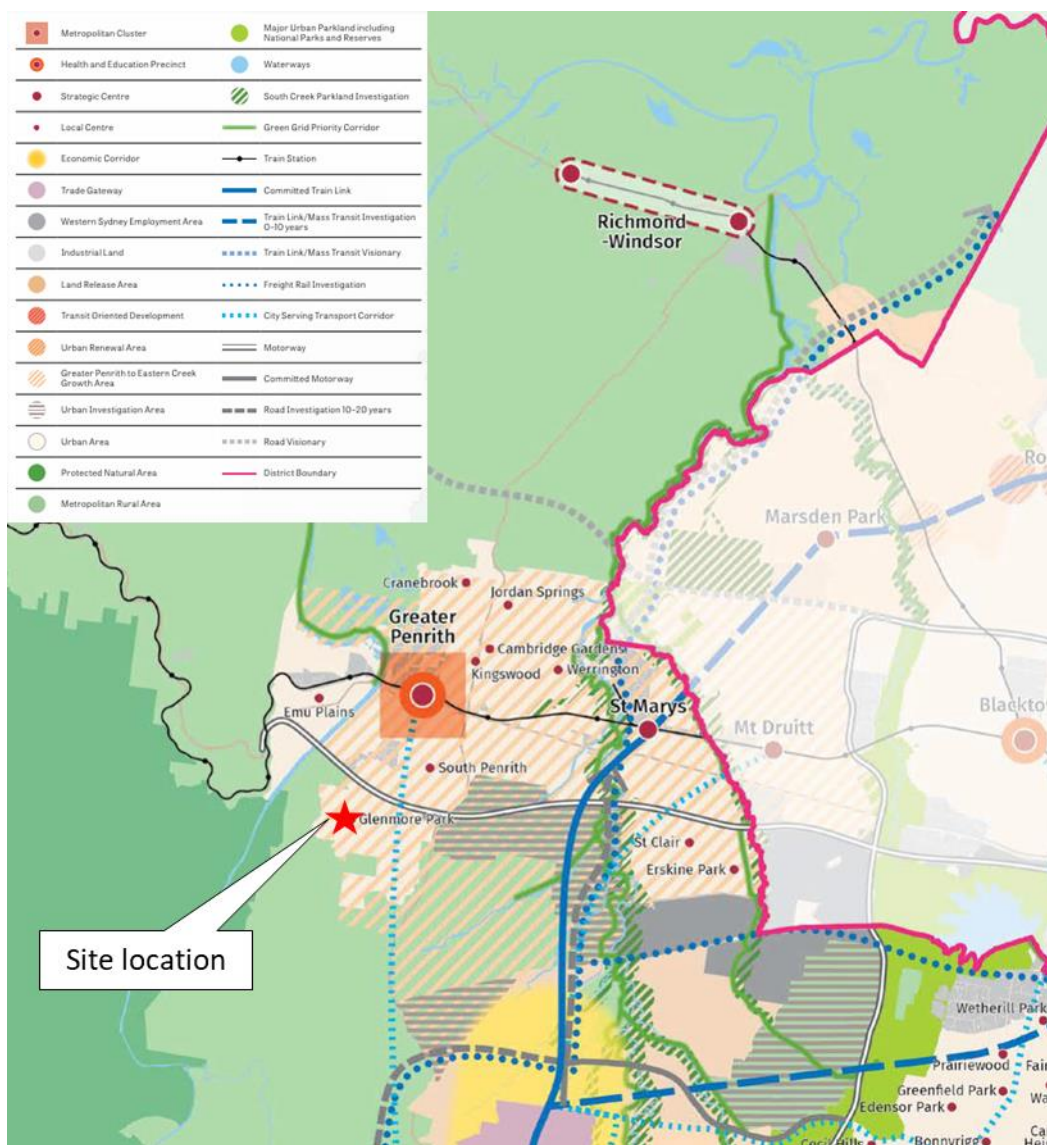


Figure 3: Western City District Plan (March 2018) (Source: [Western City District Plan \(March 2018\)](#))

3.2.4 Ministerial Direction 3.4 Integrating Land Use and Transport

The aim of this directive is to ensure that urban design and its associated land use planning are executed in a manner that delivers comprehensive solutions for the community. This entails not only considering environmental and sustainability factors, but also prioritizing improved transportation options and accessibility to essential amenities like housing, employment, entertainment, and other critical factors. The guidelines provided by TfNSW and the Department of Planning, Industry, and Environment (DPIE) in their document 'Integrating Land Use and Transport' establish the framework for project planning across all levels, with the objective of enhancing transportation choices for various types of developments at a more granular level.

The Glenmore Park location primarily falls within an area where car is a major mode of travel. However, due to the planned Sydney Metro corridor extending from St Marys to the Western Sydney Aerotropolis, the construction of The Northern Road with a dedicated bus lane and an off-road shared path, along with the future M12, has expanded the range of transportation choices. The expansion means that residents will have access to direct or interconnected modes of transportation. Additionally, careful consideration has been given to the design of local access roads within the development to offer integrated transportation solution for residents. The Site's proximity to all these transportation facilities is shown in **Figure 4**.

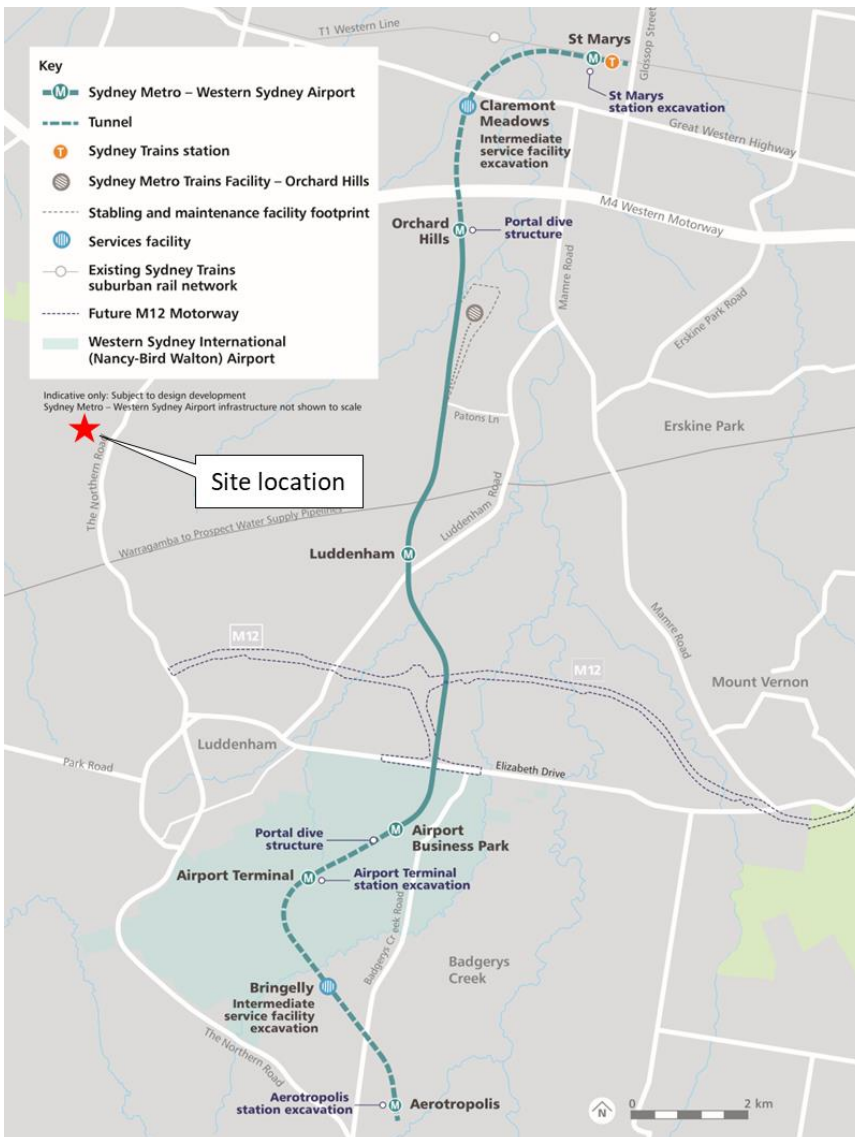


Figure 4: Project Overview Sydney Metro- Western Sydney Airport (Source: [Sydney Metro Project Alignment](#))

3.2.5 Western Sydney City Deal

The Western Sydney City Deal is set to provide rapid bus services connecting metropolitan centres of Penrith, Liverpool and Campbelltown to the Western Sydney International (Nancy-Bird Walton) Airport, anticipated to open in 2026, as well as Western Sydney Aerotropolis. The context of the Rapid Bus services to the site is shown in Figure 4 above.

In early 2020, a strategic business case was completed, recommending the need for detailed planning and a final business case to facilitate the implementation of the three rapid bus routes specified in the City Deal Commitment. Additionally, it proposed an exploration of two additional rapid bus routes, catering to Parramatta and Blacktown, to support the growth of the Western Parkland City.

Detailed planning efforts commenced in mid-2020 which entailed extensive engagement with key stakeholders to solidify the projects vision, objectives, and planning assumptions. By the end of 2020, design guidelines and foundational engineering and transport modelling investigations had been concluded.

The comprehensive planning phase, intended to confirm the service specifications, fleet requirements and infrastructure needs for the rapid bus routes, was scheduled to conclude in 2021. Evaluation of preferred bus route operations was also finalised during this period. Presently, the finalisation of detailed planning for the rapid bus services is in progress, as it feeds into the formulation of final business case. This will serve as the basis for investment decisions by the NSW Government in 2022, making the next step towards implementation and delivery.

Figure 6 shows western Sydney infrastructure planning, including the intended alignment of rapid bus routes linking the key centres. It is planned to run along The Northern Road past Glenmore Park East and connect Penrith CBD with the Aerotropolis and Liverpool. Future planning includes links further south to Macarthur. Such fast and efficient bus connections are key to connecting western Sydney centres and in combination with Metro services, will better connect many centres and residential precincts to key existing and future commercial zones.

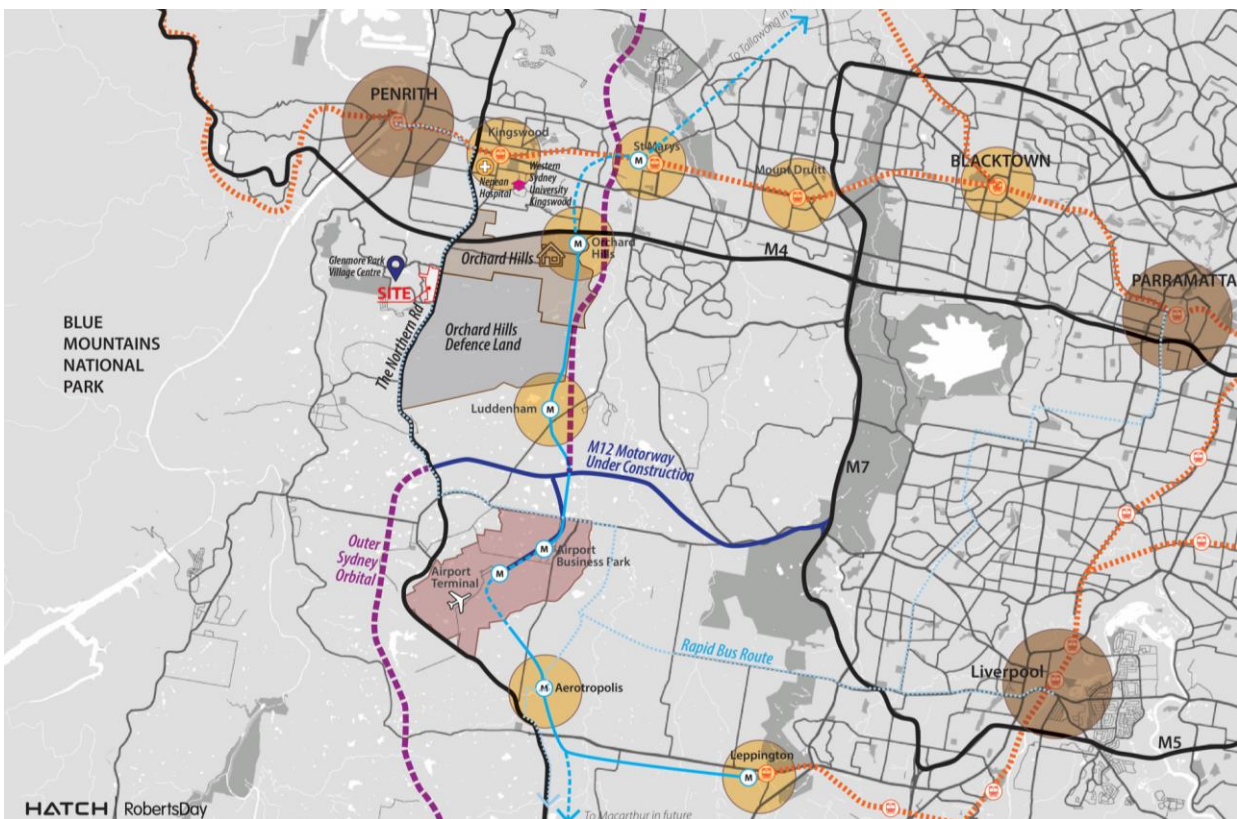


Figure 5: Western Sydney planned transport infrastructure and key centres (Source Hatch Roberts Day)

3.2.6 Western Sydney Place-based Infrastructure Compact (PIC)

The Western Sydney PIC makes up vital component of the broader Western City Deal, a collaborative commitment involving all three levels of government to establish the Western Parkland City-a vibrant and appealing place to reside. The commencement of the initial phase of the PIC program is centred on a substantial area compassing nearly 36,000 hectares within the Western Parkland City, as illustrated in **Figure 6**.

The implementation of the place-based model serves the overarching objectives of Greater Sydney's development. This approach prioritizes the equitable distribution of employment opportunities throughout the Western Parkland City, with strategic investments in various projects, including significant public transportation initiatives, housing expansion, the establishment of business centres, and the creation of other attractive amenities. Over the past 15 years, several hundred hectares of land within the initial PIC zone have undergone rezoning to align with this forward-looking vision.

The proposed site in Glenmore Park is located within the South Penrith and Glenmore Park Precinct, which places primary emphasis on the release of new land for residential purposes as well as the development of healthcare and educational facilities, along with innovation hubs.

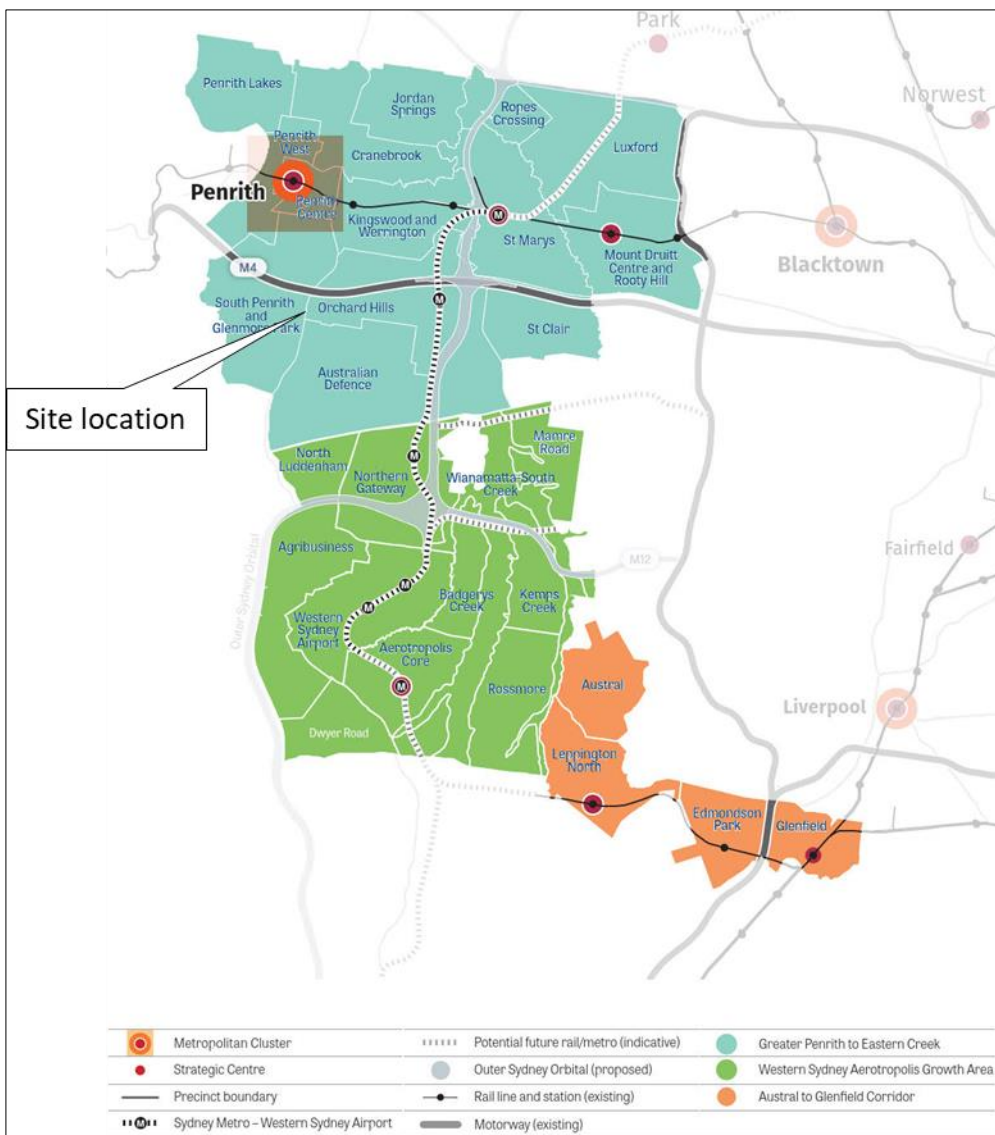


Figure 6: Site location in relation of Initial PIC Area (Source: [Western Sydney Place Based Infrastructure Compact \(PIC\) Report 2020](#))

4 Existing Conditions

4.1 Existing Site Traffic Generation

The Site is occupied by a range of rural residential dwellings with access primarily via the upgraded The Northern Road northern carriageway. There are 15 existing driveway crossovers that have been upgraded as part of these infrastructure works with each limited to left turns. In combination, the site could be expected to generate 15 to 20 vehicle trips in any peak hour based on the TfNSW Guide rates for residential dwellings.

Overall though, the traffic anticipated to be generated by the proposal is considered to be new traffic with existing trips not considered.

4.2 Road Network

4.2.1 Road Hierarchy

The road hierarchy surrounding the Site is presented in **Table 1**.

TABLE 1: ROAD HIERARCHY

Road Name	Road Classification	Speed Limit
The Northern Road	Arterial	80 km/h transitions to 70 km/h along the eastern boundary
Glenmore Parkway	Collector	50 km/h
Wentworth Road	Collector	70 km/h
Bradley Street	Collector	50 km/h

4.3 Public Transport

4.3.1 Bus Services

TfNSW Guidelines state that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes' walk) of a bus stop. Accordingly, the Site is serviced by one bus stop adjacent to the site in The Northern Road as shown in **Figure 8**. This stop is within walkable accessibility by bus services operating along The Northern Road.

Details of each service this stop is presented in **Table 2**. The table provides details around the route number, route description and service frequencies during the morning, evening and off-peak periods.

TABLE 2: EXISTING BUS SERVICES

Route No.	Route	Route Description	Average Service Frequency
789	Luddenham to Penrith	Penrith Station, Luddenham, Mulgoa, Glenmore Park, South Penrith, Kingswood and Penrith.	2 services per day (one each in AM and PM peaks)

4.3.2 Train Services

TfNSW Guidelines state that train services influence the travel mode choice of areas within 800 metres (approximately 10-minute walk) of a train station. In this regard, it is evident that the Site lacks walking accessibility to train services with the closest railway station being Penrith Station approximately 5.5 km to the north.

However, Bus Route 789 which has stops conveniently located adjacent to the Site along The Northern Road providing a public transport connection to Penrith Railway Station. A bus journey to / from this stop to the station takes approximately 15 minutes.

There are four train route which services Penrith Railway Station being the T1 – City to Emu Plains or Richmond line, BMT – Central to Bathurst, 427 – Central to Dubbo and 445 – Central to Broken Hill. T1 and BMT train services from the Penrith Railway Station have a frequency of 10 to 15 minutes during the peak hours and 15 to 20 minutes during the off-peak hours while 427 and 445 train lines provides one service per day.

4.3.3 Existing Pedestrian Accessibility

The Site currently has pedestrian access and shared path along The Northern Road, Glenmore Parkway and Bradley Street. These shared paths provide safe access to public transport and to the Site with the recent The Northern Road upgrades accounting for improvements in such facilities.

4.3.4 Existing Cycle Routes

The area within the locality of the Site is well serviced with cycle routes including both on-road and off-road infrastructure. Notable cycle routes include the route along the Northern Road to the east of the Site and Glenmore Parkway along North of the Site. Other notable on-road cycle routes are those to the south of the Site along Bradley Street.

The existing The Northern Road shared path along the site frontage is shown in **Figure 7** with the overarching bus and cycle networks shown in **Figure 8** and **Figure 9** respectively.



Figure 7: The Northern Road (looking south) shared path

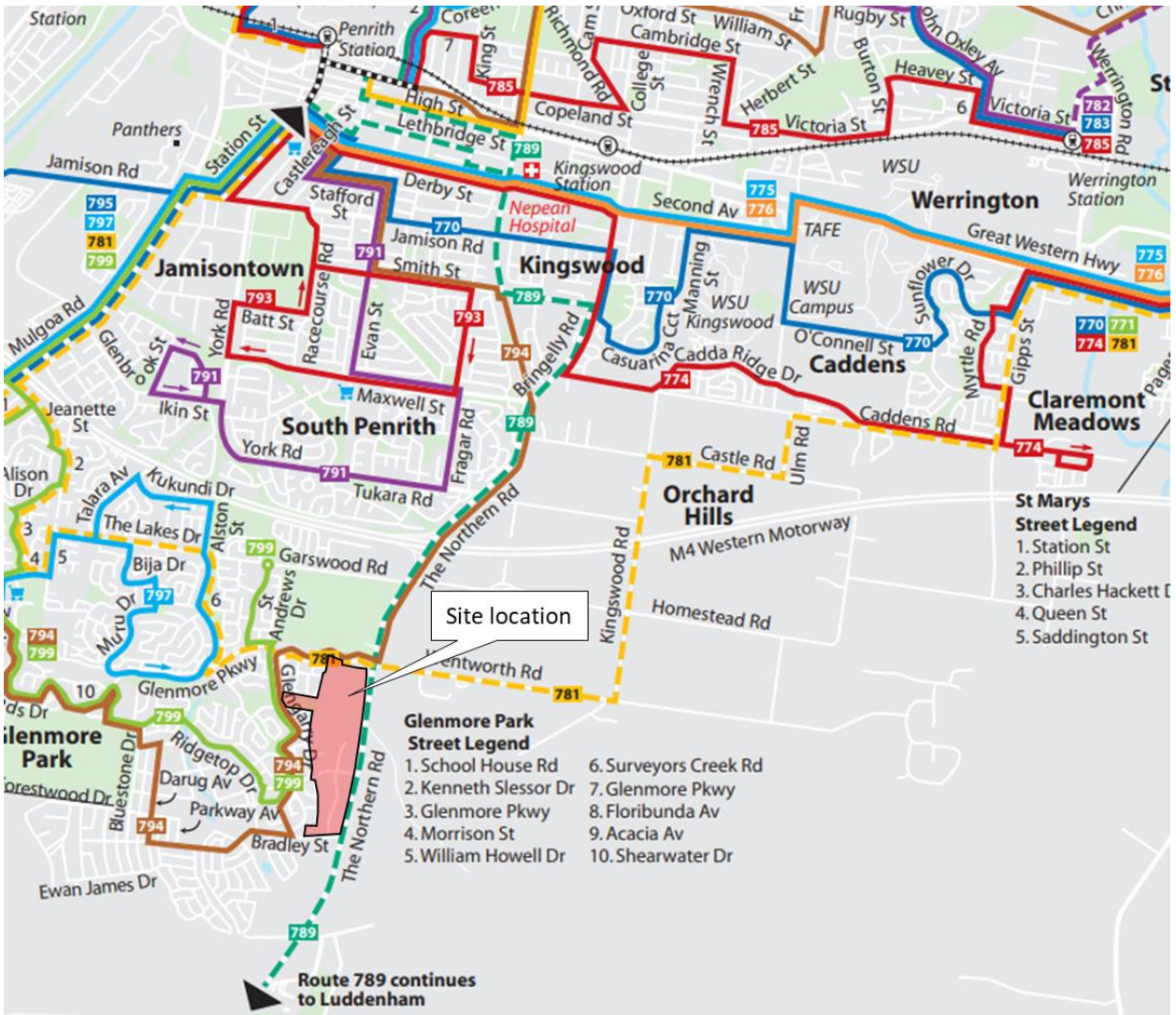


Figure 8: Existing Bus Services

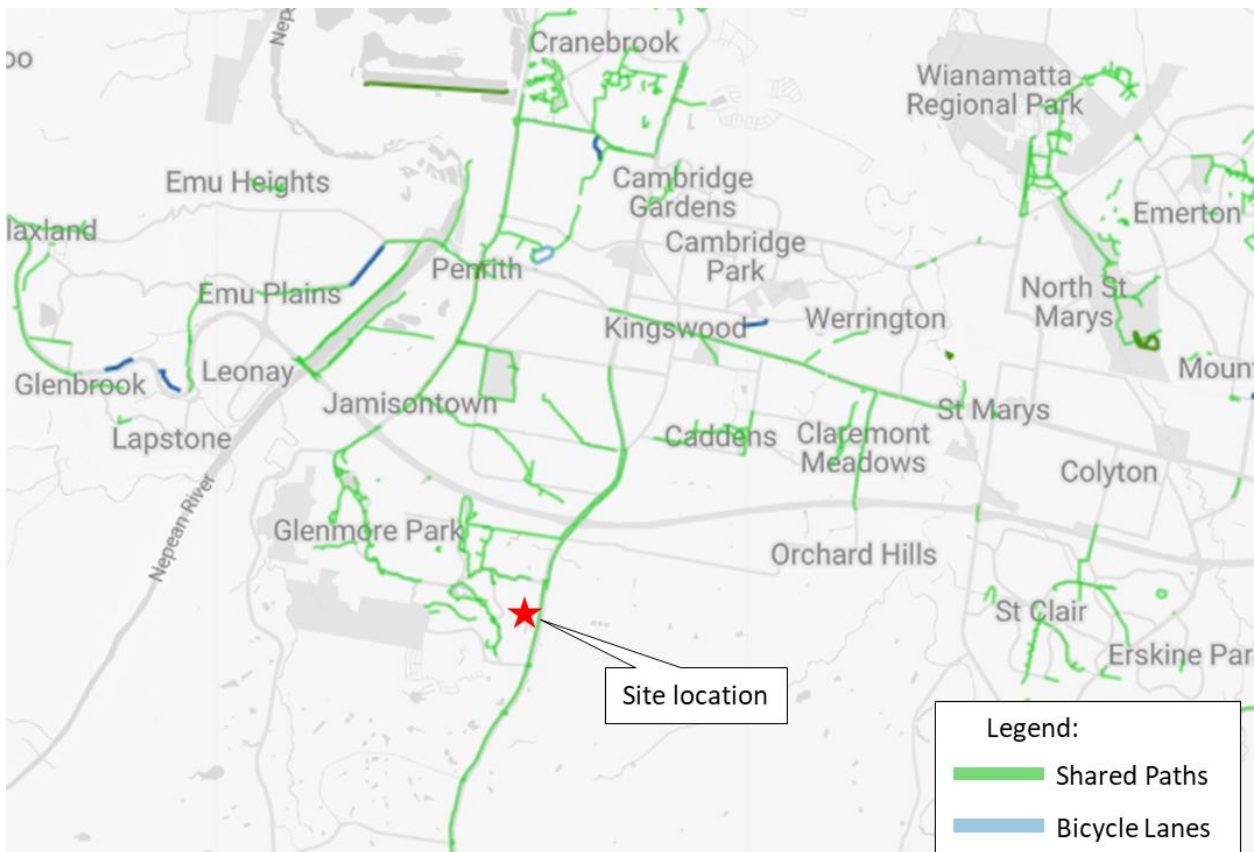


Figure 9: Existing Bicycle Facilities (Source: [Cycleway Finder](#))

4.4 Existing Traffic Volumes

Traffic surveys across a 12-hour period were completed in late August 2023 to establish the baseline traffic flows on the surrounding road network at the following signalised intersections:

- The Northern Road/ Glenmore Parkway/ Wentworth Road
- The Northern Road with Bradley Street.

Additional surveys were completed on both Glenmore Parkway at the reconfigured Penrith Golf Club access road and on Bradley Street at the Glengary Drive roundabout. These check counts ensured a robust approach and has facilitated accuracy and modelling outputs to accurately reflect existing conditions traffic in and around the site. The signalised intersections have consistent peak hours, being 7:45am to 8:45am and 4:00pm to 5:00pm.

4.5 Existing Intersection Performance

A base line traffic modelling has been undertaken to assess the existing intersection conditions. The following two intersections have been assessed.

SCATS data has been provided by TfNSW to ensure consistency with traffic signal phasing and timing, with the traffic survey data adopted for the traffic volumes through the intersections.

The intersection analysis includes a SIDRA Network model to ensure all surrounding intersections are incorporated and queuing through the key road corridors accounted for. In this regard, both signalised intersections along The Northern Road are operating well with minor queuing and delays for most

approaches. The northern approach to turn right into Glenmore Parkway does show some delay on account of the signal timing favouring The Northern Road traffic however queues clear on each cycle and the intersection is operating at an overall LOS C in the network model. This shows appropriate operation and is consistent with site observations during the respective peak hours. The intersection of The Northern Road at Bradley Street is operating well at an overall LOS B with no queuing or delay for any approach.

Overall, the current surrounding road network, while carrying relatively high traffic volumes along The Northern Road in particular, has spare capacity for all movements at the key study intersections, with the additional through traffic lanes (and dedicated bus lane) offering spare capacity well into the future.

5 Future Context

As part of Western Sydney Infrastructure Plan (WSIP) for which the NSW Government established a vision to provide improved road network connections to transform the economy and liveability of the Western Sydney Area by providing safer and more efficient roads.

The WSIP included the following upgrades and projects:

- The Werrington Arterial Road which provides access between M4 motorway, and the Great Western Highway.
- The Bringelly Road upgrade is a 10-kilometre road upgrade which is set to be delivered in two stages. Stage 1 upgrade will involve 5.7-kilometre road upgrade between Camden Valley Way, Leppington and King Street, Rossmore. Stage 2 will oversee an upgrade of 4.3-kilometre road upgrade between King Street, Rossmore and The Northern Road, Bringelly.
- The Northern Road upgrade accounts for the upgrade of 35 kilometres of the Northern Road section between Old Northern Road, Narellan and Jamison Road, South Penrith. This was delivered in six stages.
 - Stage 1 consisted of 3.3 kilometres road section between The Old Northern Road, Narellan and Peter Brock Drive, Oran Park.
 - Stage 2 consisted of 11.3 kilometres of road section between Peter Brock Drive, Oran Park and Mersey Road, Bringelly.
 - Stage 3 covered 4.5 kilometres of road section from Mersey Road, Bringelly to Eaton Road, Luddenham, 4.5 Kilometres of road from Eaton Road, Luddenham to Littlefields Road.
 - Luddenham was upgraded within Stage 4.
 - Littlefields Road, Luddenham to Glenmore Parkway, Glenmore Park was upgraded within Stage 5.
 - Glenmore Parkway, Glenmore to Jamison Road, South Penrith was upgraded as Stage 6.

The details of the upgrade are discussed in Section 5.1.

- The new M12 Motorway will establish connection between Western Sydney Airport at Badgerys Creek with Sydney's motorway network.
- The Glenbrook Intersection upgrade will provide better safety and access at the intersection of Ross Street and the Great Western Highway, Glenbrook.

5.1 Completed Works

As it relates to the Site the following upgrade works have been completed:

- The Northern Road has been upgraded to provide four traffic lanes in each direction (including the dedicated bus lanes) separated by a central median at the northern extent, narrowing to two traffic lanes with a central median for the remainder. Additional capacity is provided by way of dedicated turning lanes at signalised intersections.
- Thirteen signalised intersections have been provided, five of which are new intersections.
- Duplication bridges over Narellan Creek and Thompson Creek have been provided.
- Provision of three metres wide off-road shared pedestrian/ cyclist path has been made.
- Designated turning lanes and bicycle and pedestrian crossing provisions at traffic signals.

5.2 Proposed Works

The access strategy for both vehicles and cyclists/ pedestrians is key to the development of the precinct. Facilitating the efficient and convenient movement of traffic on arrival and departure is critical, along with connections with The Northern Road to ensure unnecessary movements are not forced and to minimise impacts on the key intersections at Bradley Street and Glenmore Parkway/ Wentworth Road. In this regard, the Proposal includes provision of two new roundabout controlled intersections on Glenmore Parkway to the north and Bradley Street to the south. The roundabouts ensure efficient operation well into the future while also recognising the need to minimise impacts on through traffic unrelated to the site.

Both roundabouts aim to maximise the separation from both The Northern Road and other local roads/ priority-controlled intersections. On Glenmore Parkway, this The roundabout intersection in Glenmore Parkway is designed as a three-leg roundabout and to be approximately 300m from the existing intersection of The Northern Road with Glenmore Parkway and Wentworth Road. The design summary of the roundabout has been tabulated in the table below:

TABLE 3: DESIGN SUMMARY TWO LANE ROUNDABOUT (GLENMORE PARKWAY)

Direction of Travel	Number of Lanes	Lane Type	Short Lane Length (m)	Lane width (m)	Number of Circulating Lanes	Diameter of Roundabout (m)
East Approach	2	1 Full Length and 1 Short Lane	60	3.5 each	2	20
East Exit		Full Length Lane	-	4.5 each		
West Approach		1 Full Length and 1 Short Lanes	80	3.5 each		
West Exit			60			
South Approach (Site Access)			100	1		
South Exit (Site Access)	1	Full Length Lane	-	3.5		

However, given the road width constraints along Glenmore Parkway, for sensitivity purposes, the suitability of one lane roundabout intersection has also been tested along Glenmore Parkway. With the same lane widths and roundabout diameter maintained, the spatial efficiencies relate to the single lane rather than dual lane layout. **Figure 10** and **Figure 11** show the layout of the potential roundabout on Glenmore Parkway under both scenarios.

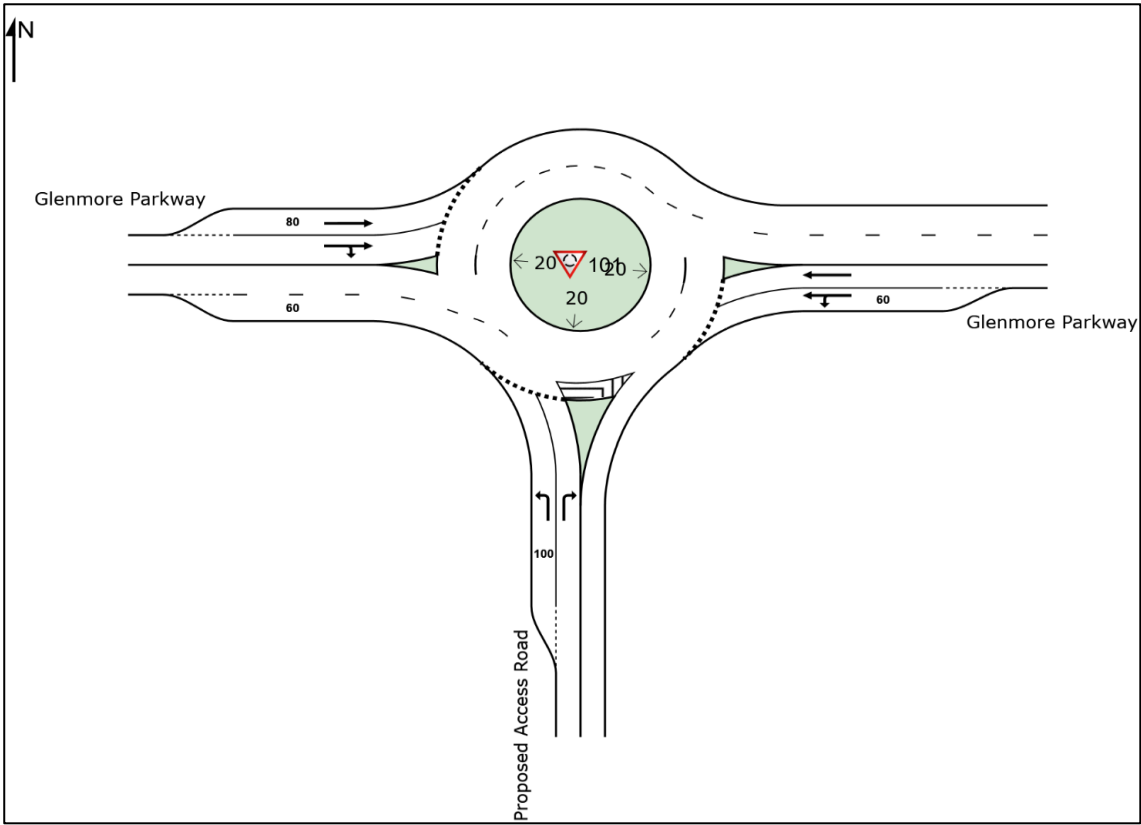


Figure 10: Glenmore Parkway two-lane Roundabout Layout

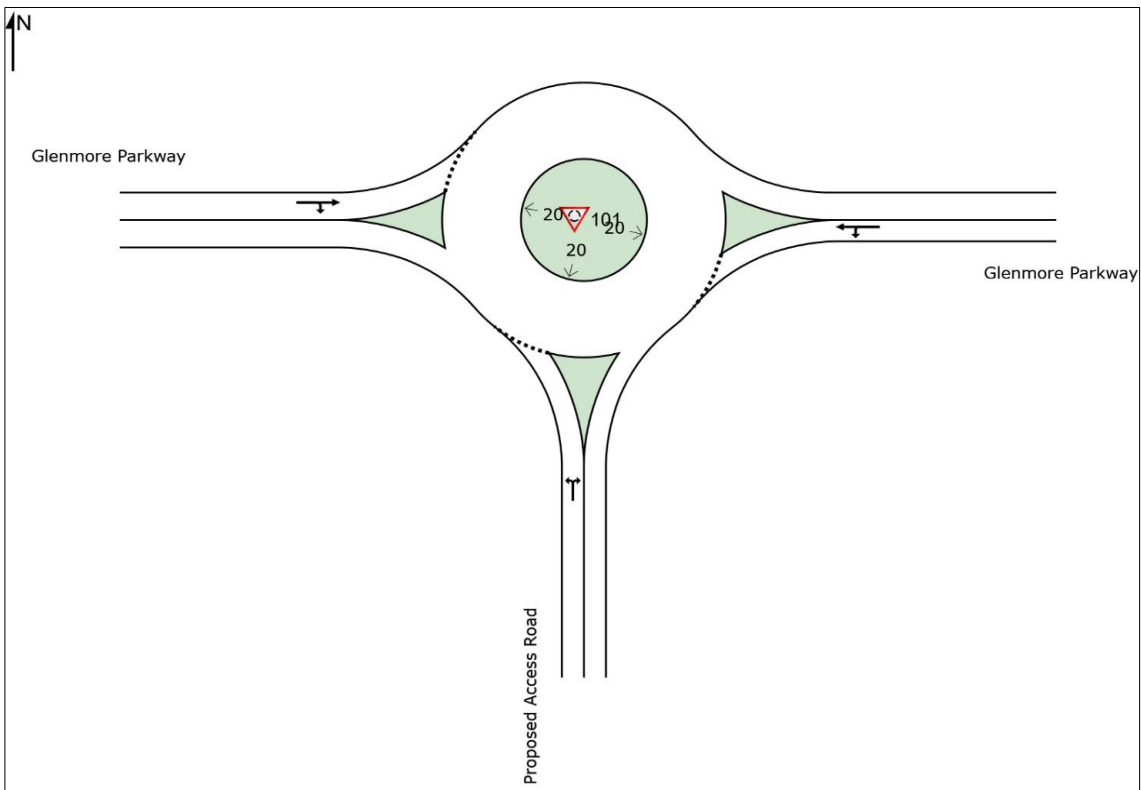


Figure 11: Glenmore Parkway single lane Roundabout Layout

The roundabout intersection in Bradley is designed as a three-leg roundabout and to be approximately 100m from the existing intersection of The Northern Road with Bradley Street. The design summary of the roundabout has been tabulated in the table below:

TABLE 4: DESIGN SUMMARY (BRADLEY STREET)

Direction of Travel	Number of Lanes	Lane Type	Short Lane Length (m)	Lane width (m)	Number of Circulating Lanes	Diameter of Roundabout (m)
East Approach	2	Full Length Lanes	-	3.5 each	1	20
East Exit			-	4.5 each		
West Approach		1 Full Length Lane and 1 Short Lane	97	3.5	2	
West Exit			80			
North Approach (Site Access)	100	1				
North Exit (Site Access)	1	Full Length Lane	-	1		

Figure 12 shows the layout of the proposed roundabout intersection along Bradley Street.

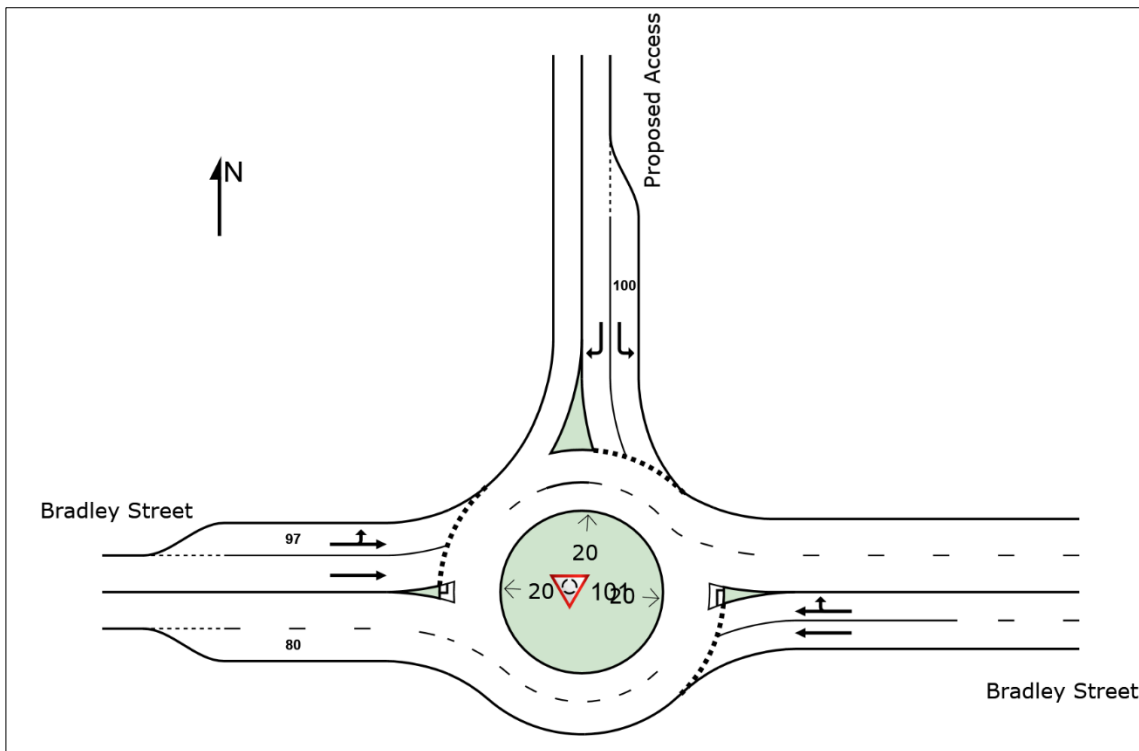


Figure 12: Proposed Roundabout Intersection at Bradley Street

6 Planning Proposal

6.1 Overview

The precinct is currently zoned C4 Environmental Living (44.93 hectares), R2 Low Density Residential (225 square meters), SP2 Infrastructure (113 square meters) and RE1 Public Recreation (2.98 hectares) under the PLEP 2010. Land within the precinct is currently utilised for rural residential lifestyle properties, with part of the precinct having been approved for a 17-lot rural residential subdivision in 2005.

The proposed Master Plan provides for approximately 1,710 new homes, offering a diverse range of housing options to meet the needs of a changing community. These new homes include approximately 242 traditional detached homes (with an average site area of 320 square meters), 182 smaller attached terraces (with an average site area of 240 square meters), and 1,286 (1, 2 and 3 bedroom) apartments (with an average size of 90 square meters). The proposal also commits to providing a minimum of 5% affordable housing on the site, in collaboration with a Community Housing Provider, surpassing Penrith City Council's target of 3% affordable housing applied in other locations.

Furthermore, the proposed Master Plan accommodates a range of non-residential uses in the precinct, including mixed-use retail spaces, childcare facilities, medical services, food and beverage establishments, a fresh food market, specialty shops, restaurants and cafes, entertainment venues, offices, and a hotel for short-term accommodation supporting visitors and the requirements of nearby defence industry partners. This diverse range of services and amenities aims to meet the needs of both residents and visitors to the precinct.

The precinct will also feature 14.425ha of public open space (including bushland and riparian corridors), 1.02ha of communal open space and 2.935ha of avoided land which is to be partly utilised for flooding, drainage and landscape purposes. In all, these areas total 18.38ha which represents more than 38.3% of the site. The location of parks and open space areas has been thoughtfully chosen to enhance the existing natural landscape, such as hilltops and creek lines, and to preserve significant bushland areas, providing the highest level of amenity for future residents. Additionally, the precinct proposes significant open space embellishments including a commitment to the provision of a public swimming pool, two (2) public tennis courts and high-end play facilities.

The precinct is connected through a series of pathways and cycleways with the integration of public transport at its core, reducing the reliance on private cars and promoting sustainable transportation options. This focus on urban sustainability is not limited to transport alone and will be a core consideration for buildings within the precinct.

Having regard to the proposed Master Plan detailed above, the planning proposal seeks to change the areas zoned C4 Environmental Living and SP2 Infrastructure to a combination of the following zones:

- R2 – Low Density Residential
- R3 – Medium Density Residential
- MU1 – Mixed Use
- E1 – Local Centre
- SP2 - Infrastructure
- RE1 – Public Recreation
- C2 – Environmental Conservation.

The planning proposal also proposes the introduction of various controls and provisions, including minimum lot sizes, building height restrictions, consideration of scenic and landscape values, maximum lot yield,

additional permitted uses, urban release area designation, and flexible boundaries between certain zones, to ensure that the statutory framework is in place to deliver the proposed Master Plan.

6.2 Land Uses and Yields

An overview of the proposed high-level land use yields that make up the planning proposal are defined below:

- Residential:
 - 242 low density dwellings (traditional and cottage lots)
 - 182 medium density dwellings (terraces)
 - 1,286 high density units
- Commercial/ retail
 - 15,800m² GFA of commercial floor space
 - For the purposes of this assessment, this GFA includes post office, real estate, bank, hair, childcare, medical centre and hotel land uses (final yields yet to be determined).
 - 13,650m² GFA of retail floor space
 - For the purposes of this assessment, this GFA includes food and beverage, fresh food, specialities, restaurants, outdoor dining, café, entertainments and event space/ pub land uses (final yields yet to be determined).
- Vehicular access
 - Access road to Glenmore Parkway via a proposed roundabout.
 - Access road to Bradley Street via a proposed roundabout.
 - Access road to The Northern Road restricted to Left in left out (LILO) only.
- Associated car parking provision.

The planning proposal layout plan has been prepared and included in **Figure 13**. It shows the various land uses across the precinct, building extents, open space and internal roads (and connections with external roads).

6.3 Intended Precinct Access Strategy

It is important for the precinct to allow for appropriate permeability and connection with the surrounding residential areas in Glenmore Park while not encouraging opportunity for through vehicles to use as a short-cut. The access strategy defines a logical internal road set-out consistent with broader and historical planning principles and would aid the equitable spread of traffic volumes across the precinct. This would ensure that each key access location can accommodate the estimated traffic volumes and no one location is reliant on carrying the bulk of site generated traffic.

The internal roads would be delivered to accommodate safe, convenient and efficient travel to and from the major roads across the broader network. Most traffic would arrive and depart via The Northern Road and M4 Western Motorway, with the distribution also informed by the TfNSW Strategic Traffic Forecasting Model (STFM) and in consultation with TfNSW.

The access strategy focuses on primary connections with Glenmore Parkway and Bradley Street, with secondary access points to The Northern Road and to the local roads to the west. The primary access points on both Glenmore Parkway and Bradley Street are proposed via either single or dual lane roundabouts with all movements permitted. This would mitigate the extent of traffic impacts on The Northern Road

intersections, with ample capacity accommodated as part of recent upgrades, both in terms of intersection capacity and mid-block capacities. It is also noted that the STFM and previous TfNSW modelling accounted for future traffic growth and volumes out to a 2041 design year and hence, the corridor is well planned with future capacity to accommodate various development and change in land use. Other road infrastructure projects, including the M12 (currently under construction) and planned Outer Sydney Orbital would also likely redirect traffic across western Sydney.

The planning proposal includes a light vehicle LILO access on The Northern Road, mid-block between Bradley Street and Glenmore Parkway. While it is recognised that direct local road access via a classified road is not typically granted by TfNSW, there are several obvious benefits to both the surrounding road network and stakeholders should such an access strategy be supported. The proposed LILO would:

- better facilitate some manageable use of other access roads other than the two key connections to the north and south
- allow for a passing trade element and better activate the neighbourhood centre
- avoid unnecessary circulation of local and collector roads by visitors to the precinct
- ensure convenient and direct access to those that need it most
- be co-located with future rapid bus services without materially affecting bus movements.

It would further improve travel time efficiencies and reduce the (albeit manageable) impact on The Northern Road signalised intersections. Provision of a left turn slip lane would also ensure any such concerns with the crossover of the dedicated northbound bus lane on The Northern Road can be appropriately managed, with extensive sightlines and ample mid-block capacity ensuring safety can be maintained.

To ensure that the key precinct access intersections can operate satisfactorily well in the future, traffic surveys have been completed to understand existing traffic conditions, with SIDRA intersection analysis undertaken to determine the traffic impact of the planning proposal. The survey results are presented in **Section 4.5** and the SIDRA results detailed in **Section 0**.

Most internal roads are dimensioned to facilitate on-street kerbside parking for a range of visitors and residents alike. This is common in residential and mixed-use precincts and can further activate the public domain for a variety of benefits. Parking would be for light vehicles, with designated areas, if required for bus/ coach parking should any land uses necessitate such access needs. Bus stops would be provided along the Collector Road, with stops at around 400m intervals, in accordance with planning controls. The precinct could give rise to new or redirected local bus routes, with increasing demand and travel mode share to form part of future assessments.

Active and public transport connections have been a key consideration of the planning proposal, including a meaningful connection with potential future Bus Rapid Transit stop to be integrated into the northbound dedicated bus lane on The Northern Road. Such bus infrastructure facilities could form part of future agreement/ contributions with a range of benefits for future residents and workers in the immediate and broader vicinity and on both sides of The Northern Road. Grade separated crossings, likely best in the form of a pedestrian bridge) would also be a positive outcome in the future, should demand on both sides necessitate.

Early stakeholder engagement has been key, with meetings held with TfNSW to communicate the access strategy in particular. This has included discussion on direct classified road access and if granted, would be represent an exemption to standard TfNSW land use planning practice. TfNSW is open to considering the preferred access strategy noting that the completed traffic assessment is similarly conservative and does not rely on such connections.

The planning proposal layout and defined access points are shown in **Figure 13**.

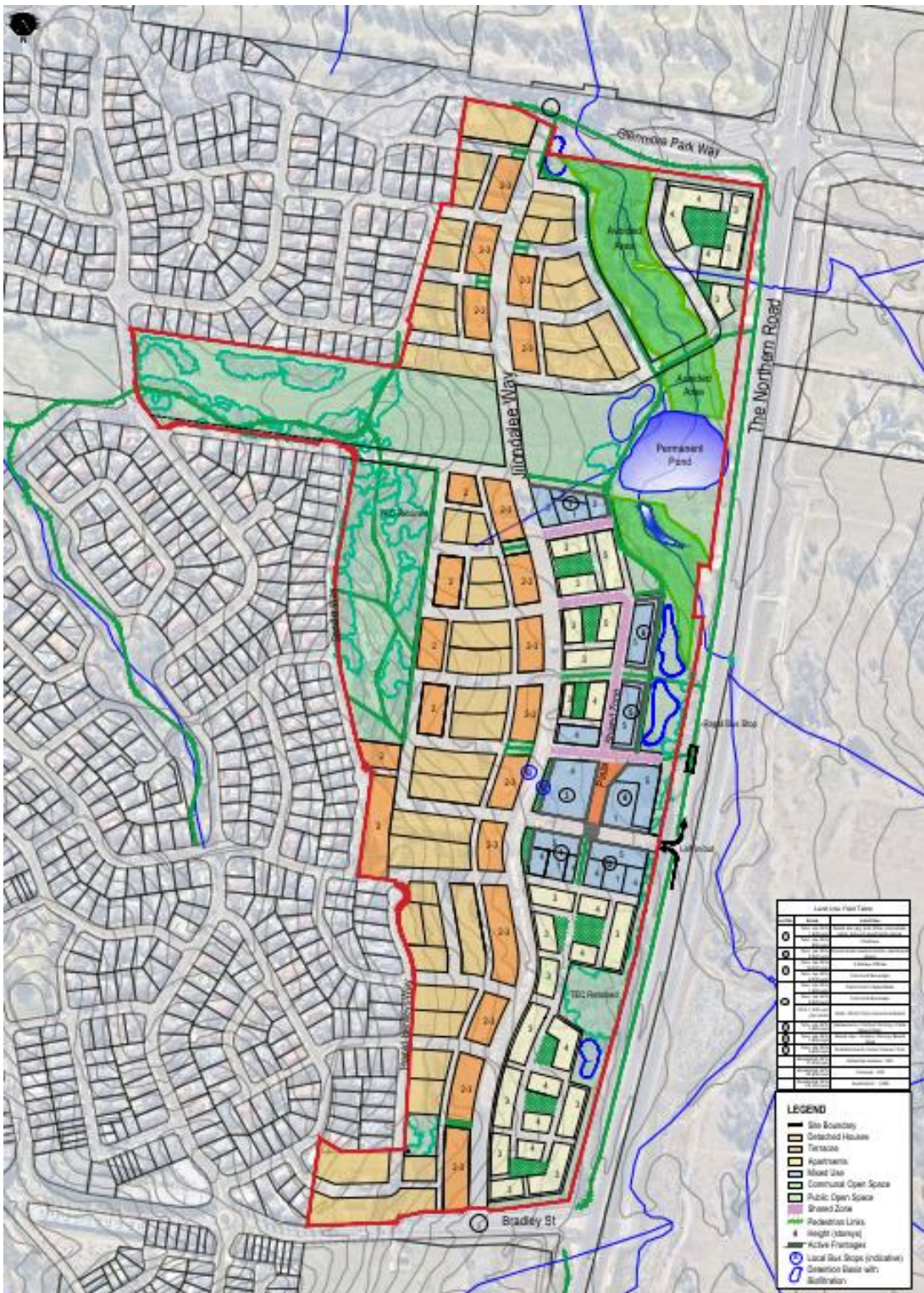


Figure 13: Planning Proposal (source: Hatch Roberts Day)

6.4 Internal Streets

The internal streets within the precinct shall be designed in accordance with the Western Sydney Street Design Guidelines, as prepared by ASPECT Studios for the Western Sydney Planning Partnership (WSPP). The WSPP is a collaboration between Council's and state authorities and formed with the following intention:

'The aim of the Planning Partnership is to facilitate the transformation of Western Sydney, as well as delivering more efficient and higher quality outcomes for local communities.'

The current members of the WSPP include:

- Blacktown City Council
- Blue Mountains City Council
- Camden Council
- Campbelltown City Council
- Fairfield City Council
- Hawkesbury City Council
- Liverpool City Council
- Penrith City Council
- Wollondilly Shire Council
- NSW Department of Planning & Environment
- Greater Cities Commission
- Transport for NSW
- Sydney Water.

The internal road network shall be designed to provide distinction between road hierarchies and inform vehicle and pedestrian movement through precinct, whilst minimising the impact to local Glenmore Park residents.

The internal streets will be designed in accordance with the Western Sydney Street Design Guidelines, with the typical road hierarchies described below:

- **High Street** – High streets are designed for commercial centres to provide high quality pedestrian facilities for public use in retail / commercial areas. This includes footpaths designed to accommodate large pedestrian volumes, generous verge space and street planting. It is intended for high streets to accommodate public transport (such as bus routes) and to be a low-speed vehicle environment.
- **Local Collector** – Local collectors are responsible for access to residential developments within the precinct and will connect to higher order roads, being Bradley Street and Glenmore Parkway. Local collectors will provide high quality facilities for active transport (walking and cycling) whilst also accommodating waste vehicles and bus routes.
- **Local Street** – Local streets are low speed streets and are designed to accommodate minimal traffic volumes. Local streets will form the primary access points to residential developments and will provide active transport infrastructure (footpaths and potentially cycling facilities).
- **Residential Laneway** – Residential laneways provide rear access to dwellings and are designed to be very slow speed environments which can accommodate low traffic volumes. Residential laneways will also provide pedestrian and cyclist access to dwellings and will provide planting, seating and lighting.

The typical street cross-sections, sourced from the Western Sydney Street Design Guidelines, are shown in **Figure 14 to Figure 17**. These cross-sections have been accommodated in the planning proposal.

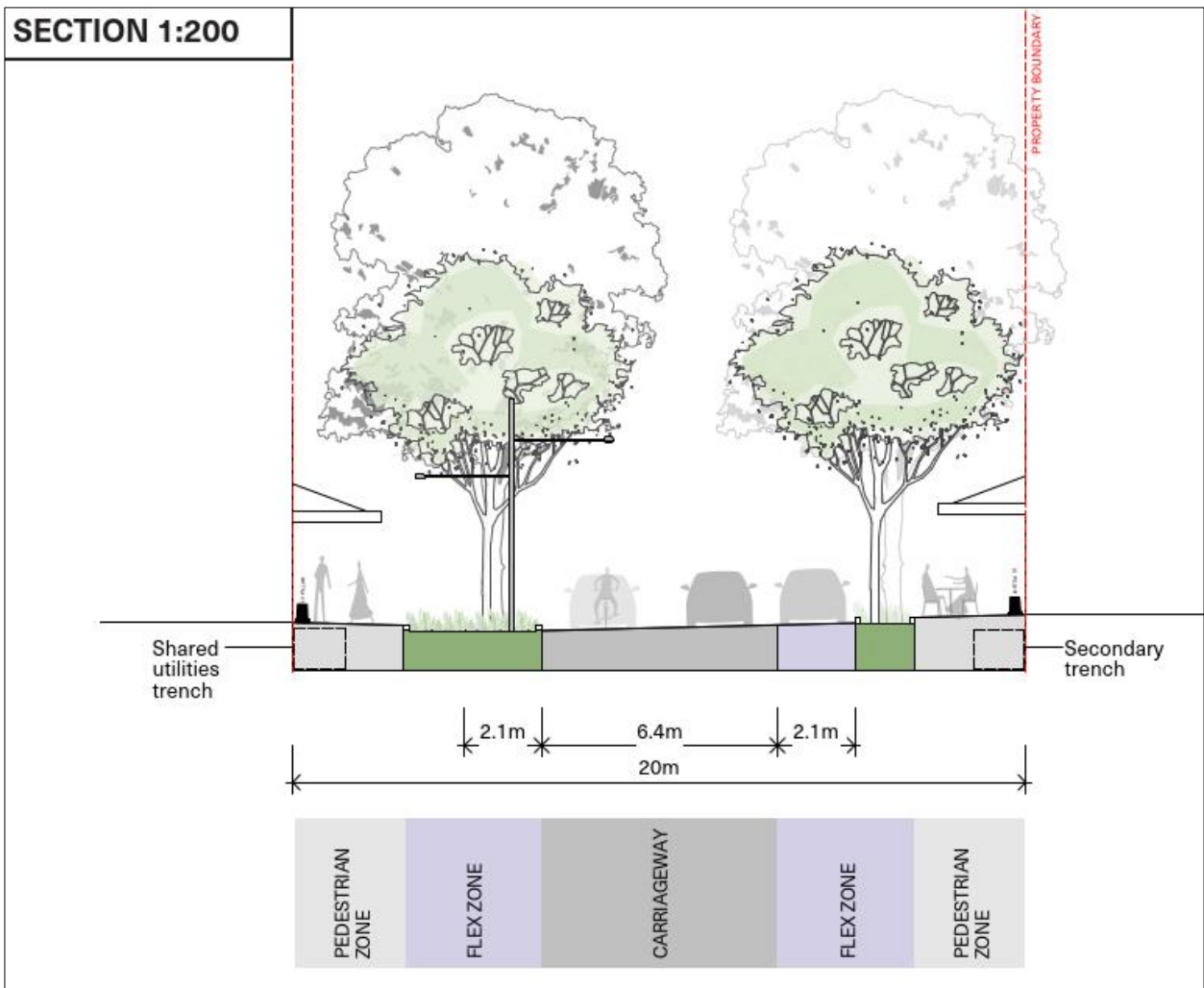


Figure 14: High Street Typical Cross Section

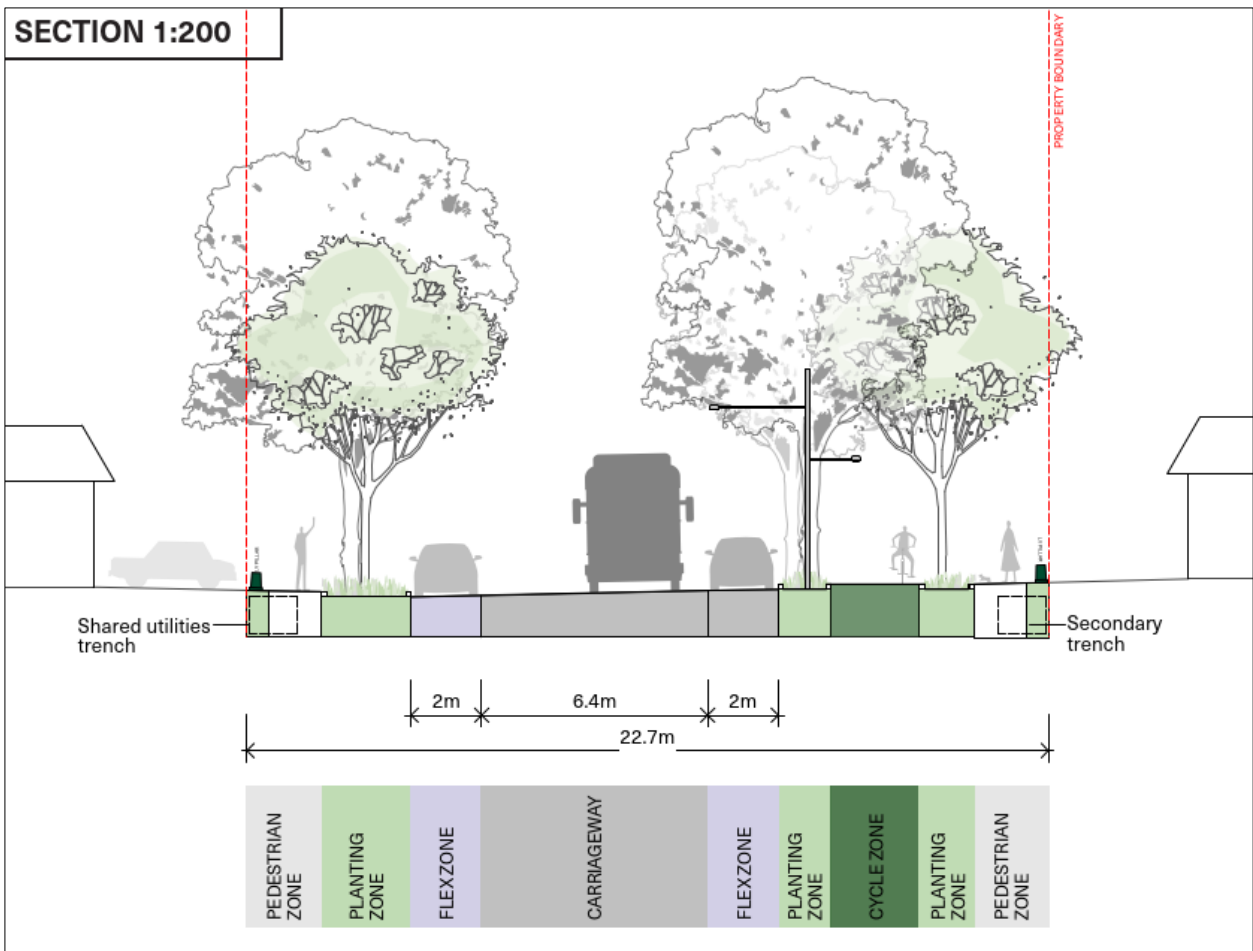


Figure 15: Local Collector Typical Cross Section

SECTION 1:200

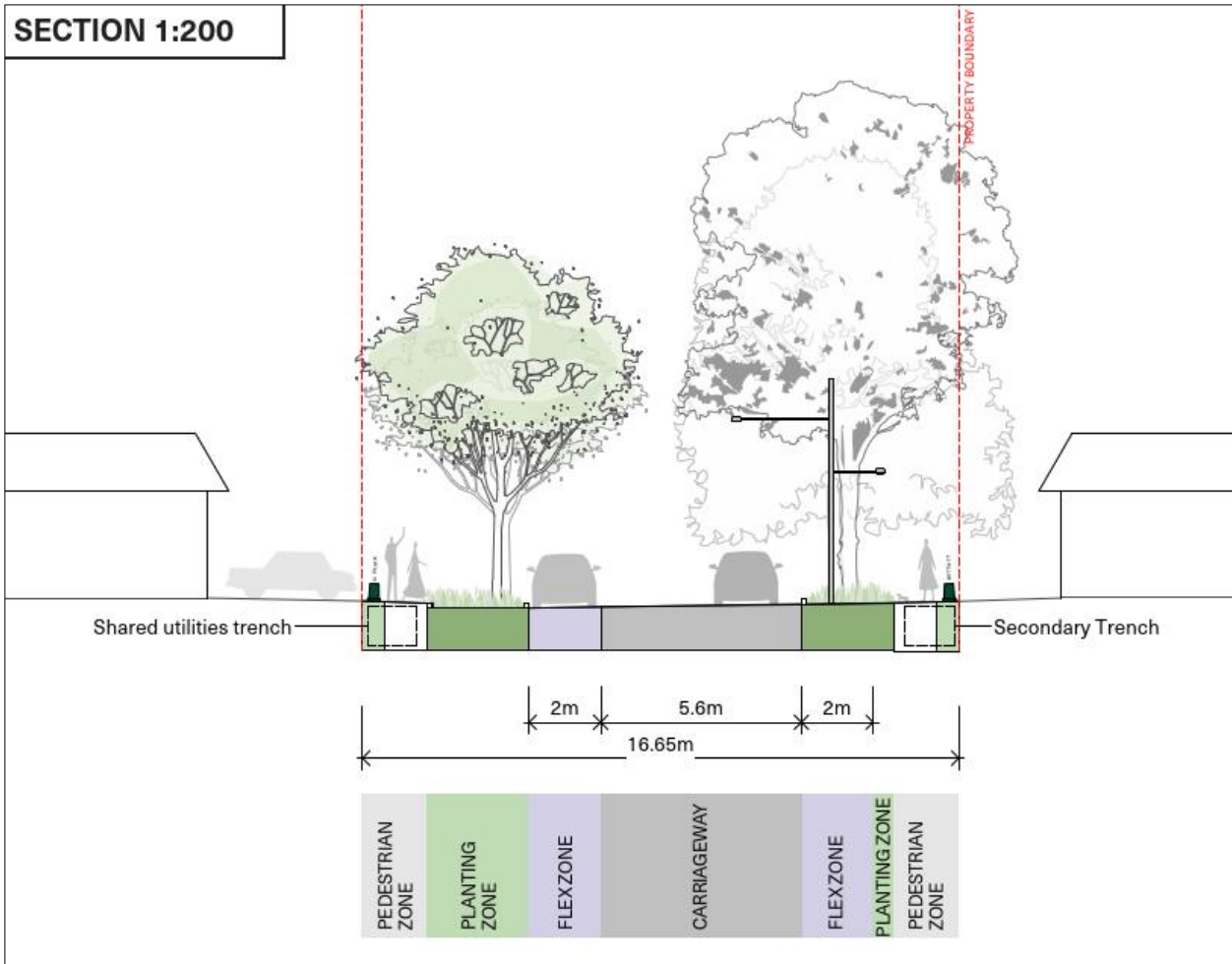


Figure 16: Local Street Typical Cross Section

SECTION 1:200

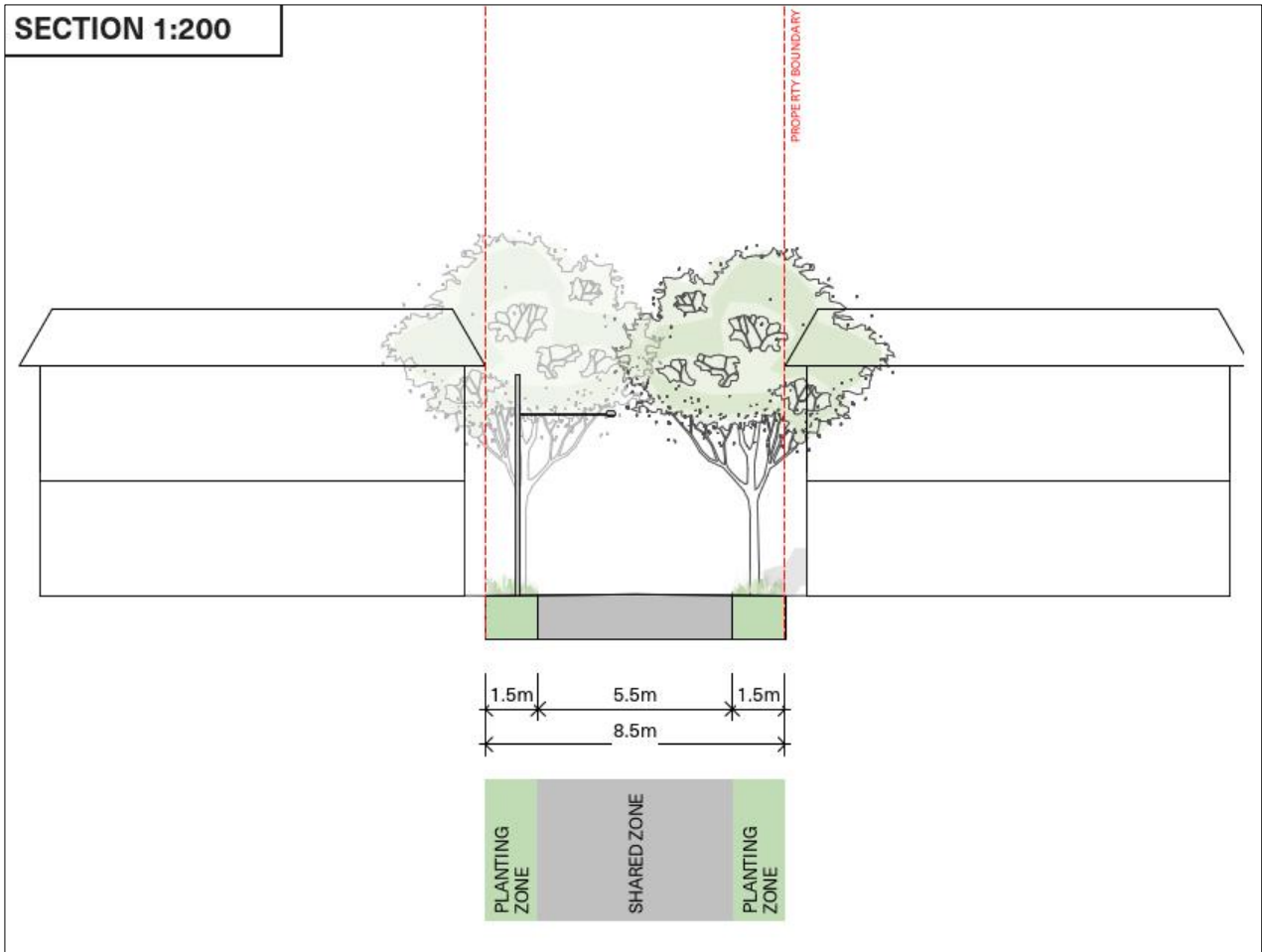


Figure 17: Residential Laneway Typical Cross Section

7 Parking Requirements

7.1 Car Parking

7.1.1 Car Parking Rates

The car parking rates for the precincts will adopt the rates stipulated in Table C10.2 of Penrith DCP which are outlined below:

- Low density residential (Dwelling House)
 - 2 spaces per dwelling
- Medium density residential (Multi Dwelling House)
 - 1 car space per 1 bedroom
 - 1.5 car spaces per 2 bedrooms or part thereof
 - 2 car spaces per 3 bedroom or more bedrooms
- High density residential (Residential Flat Buildings)
 - 1 space per 1 or 2 bedrooms
 - 2 spaces per 3 bedroom or more bedrooms
 - 1 visitor space per dwellings, or part thereof
- Commercial (Business and office premises)
 - 1 space per 40m² GFA
- Retail (Retail Premises)
 - 1 space per 30m² GFA.

7.1.2 Car Parking Requirements

It should be noted that the unit breakdowns for the medium and high density residential developments have yet to be finalised. As such, the following assumptions have been adopted for the purpose of this assessment:

- Medium density residential
 - 20% of units will be 1 bedroom
 - 55% of units will be 2 bedrooms
 - 25% of units will be 3 bedrooms or more.
- High density residential
 - 20% of units will be 1 bedroom
 - 55% of units will be 2 bedrooms
 - 25% of units will be 3 bedrooms or more.

Accordingly, the required parking spaces for the development is presented in **Table 5**.

TABLE 5: PROPOSED TRAFFIC GENERATION

Land Use	Yield	Parking Rate	Parking Requirement
Low density residential	242 dwellings	2 spaces per dwelling	484
Medium density residential			
1 bedroom	36 dwellings	1 space per dwelling	36
2 bedroom	100 dwellings	1.5 spaces per dwelling	150
3 & 3+ bedroom	46 dwellings	2 spaces per dwelling	92
Sub-total			278
High density residential			
1 bedroom	257 units	1 space per apartment	257
2 bedroom	707 units		707
3 / 3+ bedroom	322 units	2 spaces per apartment	644
Visitor	1286 units	1 space per 5 dwellings	258
Sub-total			1,866
Commercial	15,800m ²	1 space per 40m ² GFA	395
Retail	13,650m ²	1 space per 30m ² GFA	455
Total			3,478 spaces

Based on the above, the planning proposal would need to provide up to 3,480 parking spaces within the precinct. This includes 484 spaces for the detached housing all of which are typically provided as part of the dwelling itself (or in the driveway), 278 spaces for the medium density dwellings and up to 1,866 for the higher density dwellings. These would be provided within the footprint of each building and likely in the form of basement parking.

The non-residential land uses theoretically generate the need for up to 850 spaces across the noting that demand profiles, the availability of on-street parking on select roads and a range of complimentary uses, and residents living within an easy walk would contribute to reducing the extent of non-residential parking. Such detailed assessments would be completed as part of any such future DA's.

7.1.3 Accessible Parking

Regarding accessible parking, Penrith DCP stipulates that:

“Accessible car spaces should be in accordance with the Access to Premises Standards, Building Code of Australia and AS2890.”

The precinct will provide accessible parking in accordance with Section D4D6 of the National Construction Code (NCC) Building Code of Australia (BCA) Volume One, 2022 with the number of accessible spaces to be determined upon finalisation of the parking provision within each stage of development as part of future DAs.

7.2 Bicycle Parking

In accordance with Penrith DCP, bicycle parking is required to be provided per the following:

“Bicycle parking in accordance with the suggested bicycle parking provision rates for different land use types in the document ‘Planning Guidelines for Walking and Cycling’ (NSW Government 2004). Bicycle parking spaces should comply with AS2890.3:1993 Bicycle Parking Facilities.”

Accordingly, bicycle parking will be provided to be compliant with Table 1 of the Planning Guidelines for Walking and Cycling’ (NSW Government 2004) and the locker, show and change room provisions will be compliant with Table 3 of the Planning Guidelines for Walking and Cycling’ (NSW Government 2004).

A detailed bicycle parking provision assessment will be completed as part of any future DAs at such time when the requisite details are known, including staff numbers, time of day demand and visitor profiles understood in the context of the precinct and delivery strategy. It is important that bicycle parking provision recognise the end user and hence, the User Class security necessary, whether it be for staff use which may also require end of trip facilities (such as shower and change rooms) or resident/ visitor use.

7.3 Service Vehicles

Provision of service vehicle facilities as part of each land use, namely the higher density apartment buildings and the commercial land uses similarly need to be considered. The low and medium density housing would be designed to accommodate waste vehicle collection from the kerb with standard 240 litre bins allowing for standard collection arrangements by Council’s waste truck. The road typologies and cross-sections allow for such activity.

The higher density apartments would need to provide appropriate on-site loading areas for waste collection and delivery purposes. Depending on the delivery strategy and staging, consolidated loading docks can ensure efficient use and access by service vehicles and reduction in driveway crossovers to maintain pedestrian amenity and deliver quality public domain space. Provision of service vehicle facilities and back of house areas would be detailed as part of future DAs and in consultation with Council.

All service vehicles would need to enter and exit each site and/ or basement in a forward direction with appropriate sightlines in accordance with relevant Australian Standards (AS2890 series). Headroom clearances can be confirmed noting that Council’s 10-11m long waste truck is likely to be the largest design vehicle, with travel and operational headroom clearances likely to be between four and 4.5m.

8 Traffic Assessment

8.1 Trip Rates

8.1.1 Residential Land Uses

The trip rates for the low-density residential dwellings have been adopted from the TDT 2013/04a, which stipulates 0.99 trips per dwelling in the weekday AM peak and 0.95 trips per dwelling in the PM peak.

The medium density residential trip rates have been sourced from the RMS Guide, being **0.5 trips per dwelling**.

For high density residential land uses, the trip rates can be varied and needs to consider a range of factors including site location, access to existing and future high-frequency public transport services and overarching demographics (including car ownership rates and travel mode share). For example, the Box Hill and Box Hill Industrial Precincts Transport and Access Study (GHD, 2011) adopted an overall trip rate of 0.24 trips per dwelling.

In also recognising Council's preference to remain conservative with respect to such trip rates, this assessment has adopted a conservatively high trip rate of **0.3 trips per dwelling**.

8.1.2 Commercial

The trip rates for the commercial component have been adopted from the trip rates of 'office blocks' as per the TDT 2013/04a. The below rates are broadly accepted as representative of commercial land uses and allows for the delivery of a range of like land uses thus avoiding the need for more defined breakdown and/or detailed assessment. For the purposes of this planning proposal, the adopted rates are as follows:

- AM Peak – 1.6 trips per 100m² gross floor area
- PM Peak – 1.2 trips per 100m² gross floor area.

8.1.3 Retail

The RMS Guide and TDT 2013/04a do not provide traffic generation rates for standalone retail developments that are not otherwise defined as a 'shopping centre'. In recognising the neighbourhood town centre objective and the likely future delivery of a range of food and beverage and general small retail shops for convenience and to serve both local/ regional users and residents in the precinct, the trip rates for 'Speciality Shops and Secondary retail' within retail shopping centres have been adopted for the purposes of this assessment.

This too is considered conservative and allows for flexibility as part of the staged delivery of non-residential land uses. In this regard, the traffic generation rate of 56 trips per 1,000m² gross leasable floor area has been adopted during the weekday PM peak hour. This rate has been halved (to 28 trips per 100m² GLFA during the AM peak to account for lower trade and recognises that several retail outlets would not be open.

8.2 Traffic Generation

On the basis of the above adopted traffic generation rates, **Table 6** summarises the likely and forecast peak hour traffic generation possible as part of delivering the planning proposal. This is considered a theoretical maximum and does not account for linked trips, passing trade and complementary land uses. In

combination, the quantity of vehicle trips could be reduced by up to 20 per cent to account for such efficiencies, with such details to be included as part of any future DAs.

TABLE 6: ESTIMATED MAXIMUM TRAFFIC GENERATION				
Land Use	Peak Period	Yield	Trip Generation Rate	Estimated Vehicle Trips
Low density residential	AM	242 dwellings	0.99 trips per dwelling	240
	PM		0.95 trips per dwelling	230
Medium density residential	AM	182 dwellings	0.5 trips per dwelling	91
	PM			91
High density residential	AM	1286 units	0.3 trips per dwelling	386
	PM			386
Commercial	AM	15800m ²	1.6 trips per 100m ²	253
	PM		1.2 trips per 100m ²	190
Retail	AM	13650m ²	28 trips per 1000m ²	383
	PM		56 trips per 1000m ²	765
Estimated Maximum Total Trips				1353 AM, 1662 PM

Overall, the planning proposal could generate up to 1,350 vehicle trips in the weekday AM peak and 1,660 trips in the PM peak.

As outlined in Section 6.2, the commercial and retail GFA includes low traffic generating land uses such as post office, real estate, bank, hair and medical centre. When combined with higher generating land uses such as restaurants, outdoor dining, café, entertainment and event venue/ pub, the adopted rates are appropriate. Most of the commercial land uses would also not tend to generate peak activity during the road network peak hours and hence would represent less of an impact when detailed trip rates, distribution and assignment are assessed as part of future DAs.

Nonetheless, these land uses have been included in the commercial and retail land use calculations and therefore the calculated traffic generation is likely to be notably greater than the likely traffic generated by the precinct. This forms a conservative assessment for the purpose of SIDRA modelling, to ensure a robust assessment of the Proposal with regard to potential or likely future traffic impacts.

8.3 Traffic Distribution

Future SIDRA Network modelling has been completed to better understand the likely or anticipated theoretical maximum traffic impacts on the surrounding road network. This includes the roundabout access points to connect with both Glenmore Parkway and Bradley Street and in-turn, impacts on the existing upgraded signalised intersections along The Northern Road.

To do this, the directional split of traffic both spatially (which roads do they use on approach and departure) and proportionately (differential split on arrival and departures depending on the individual land use) has been completed and defined in the following sections.

8.3.1 Directional Split

Noting that the traffic generation above represents two-way movements (or trips), and based on patterns of other similar developments, the directional splits of inbound and outbound traffic have been adopted for the purposes of estimating the likely future traffic impacts.

For residential land uses, it is broadly accepted that there is an 80:20 split in arrivals and departures during the respective peak periods. This is reflected by vehicles exiting in the AM and returning in the PM. As such and 80:20 outbound: inbound split has been applied during the weekday AM peak, reversed in the PM peak.

For the non-residential land uses, the reverse has been applied during the road network peak periods. While this strictly does apply to the commercial land uses, retail uses tend to have a more even 50:50 split between arrivals and departures, thus recognising the shorter-stay nature of such land uses. In any event, the approach is again conservative and reflects a 'worst-case' scenario which again, can be further defined as part of future DAs to ensure consistency and accuracy.

8.3.2 Directional Distribution

The following assumptions for directional distribution have been determined by considering the surrounding road network and location of commuter 'destinations' (i.e., commercial hubs, industrial estates, business precincts, etc.):

- The Northern Road (northern leg)
 - 40% of all traffic
 - 80% of these vehicles will use the roundabout at Glenmore Parkway
 - 20% of these vehicles will use the roundabout at Bradley Street
- The Northern Road (southern leg)
 - 35% of all traffic
 - 20% of these vehicles will use the roundabout at Glenmore Parkway
 - 80% of these vehicles will use the roundabout at Bradley Street
- Glenmore Parkway
 - 10% of all traffic
- Bradley Street
 - 10% of all traffic
- Saddler Way
 - 5% of all traffic.

8.4 Future Traffic Flows

Having regard for the adopted traffic rates and arrival and departure splits, and accounting for the configuration of the road network, the resulting projected cumulative traffic volumes on the surrounding road network is shown below.

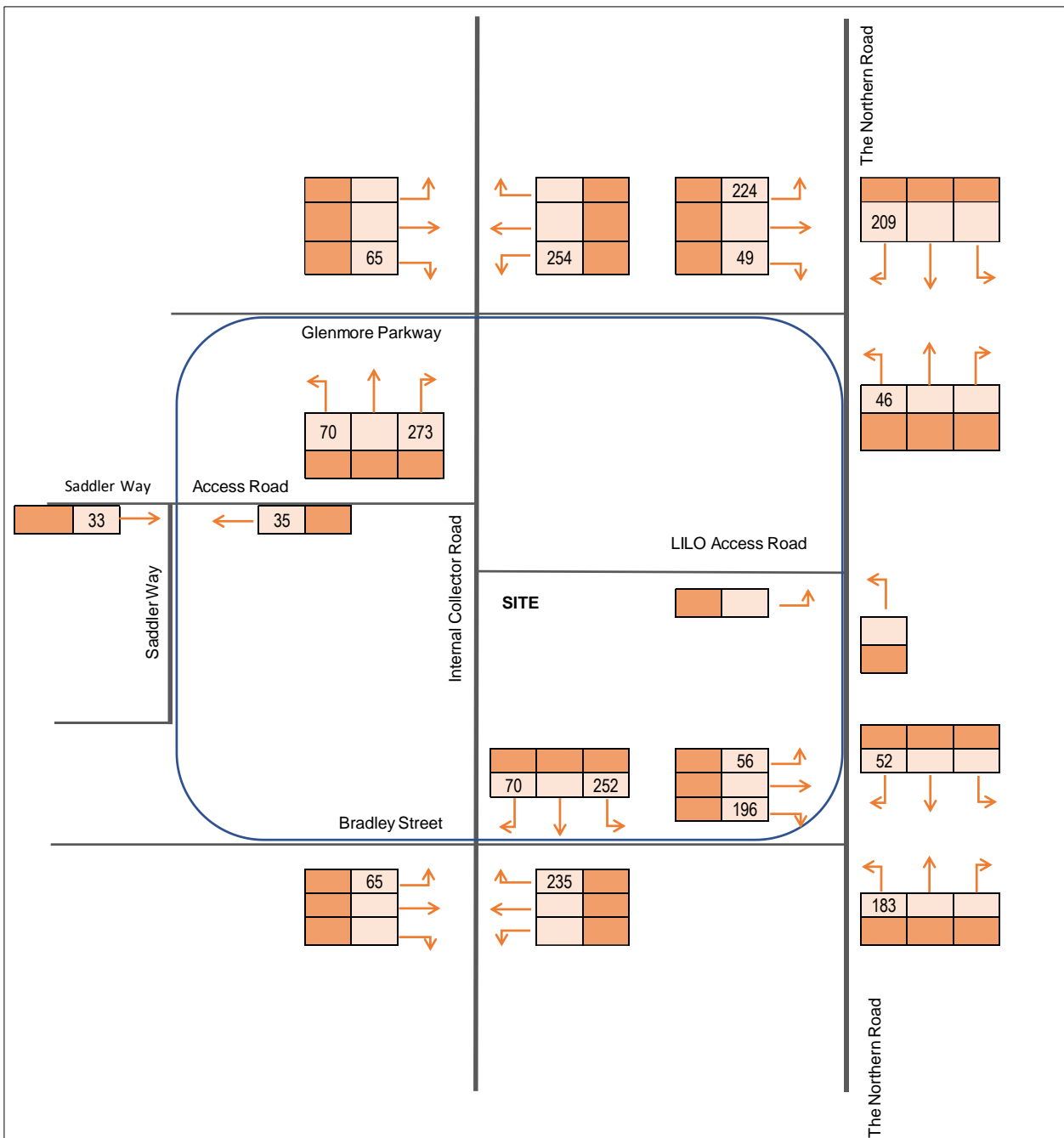


Figure 18: Weekday AM Peak Hour Cumulative Traffic Generation

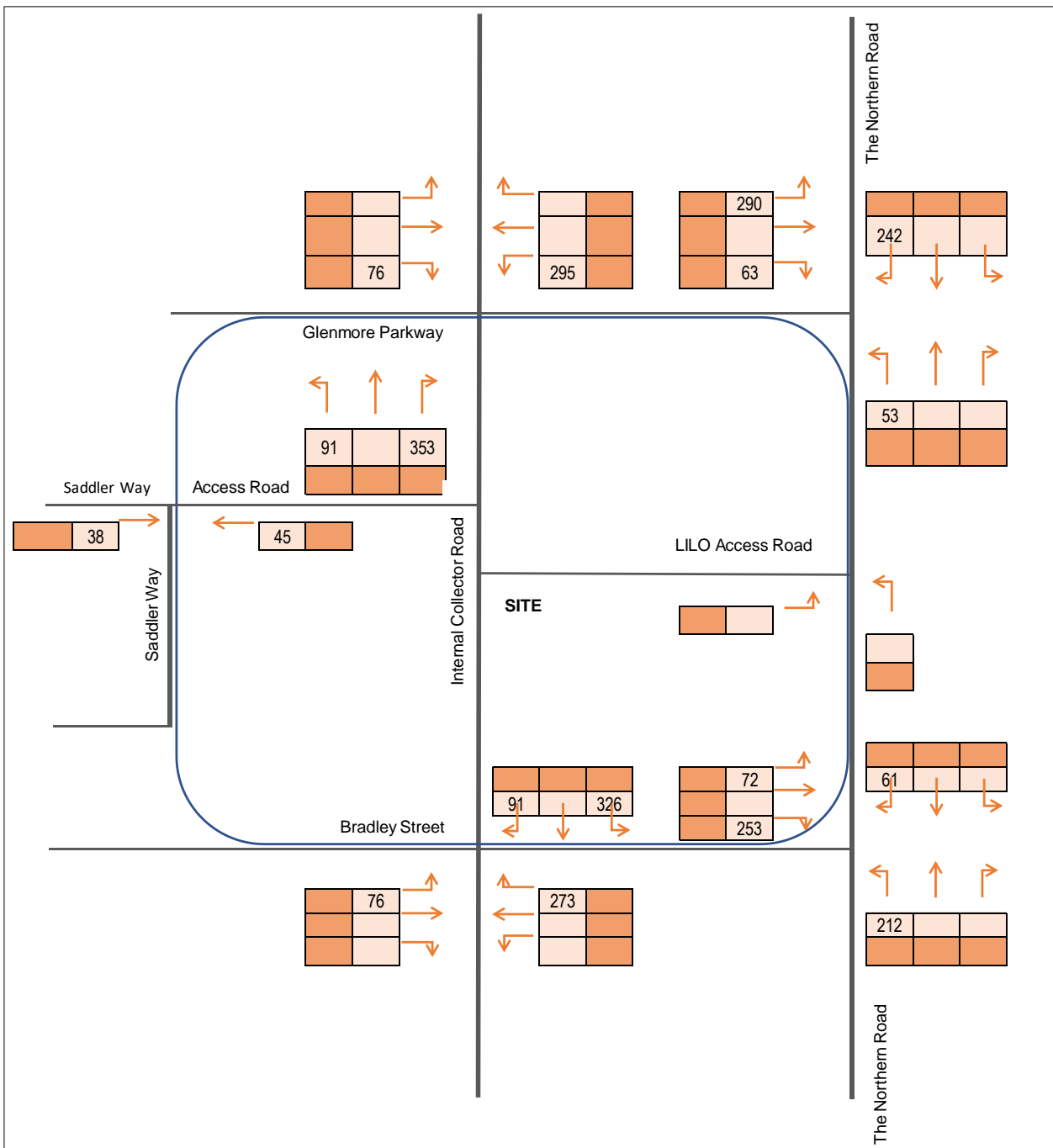


Figure 19: Weekday PM Peak Hour Cumulative Traffic Generation

8.5 Traffic Impacts

With consideration to the forecast traffic generation and distributions, the future operation of the local road network has been modelled to test the future intersection performances.

8.5.1 Future Intersection Performance (in isolation)

The existing intersections have been modelled following the distribution and assignment of the estimated traffic generated by the planning proposal. The Northern Road/ Glenmore Parkway/ Wentworth Road signalised intersection has been modelled both as an isolated intersection and in a basic network with an

overall LOS C (some approaches show minor delay) in the respective peak hours. The Northern Road/Bradley Street intersection is operating well at LOS C for both peaks. Overall, it is evident that the intersections will operate well with the planning proposal traffic volumes added. Additional modelling would be completed as part of future DAs to ensure consistency with TfNSW planning and future growth estimates.

The proposed roundabouts on Glenmore Parkway and Bradley Street would operate well at LOS A with minimal queuing and delay for any approach. The alignment of Glenmore Parkway and connection with the proposed internal Collector Road will require further analysis to confirm configuration and capacity however it is noted that the initial modelling indicates that a dual lane roundabout (for the east and west approaches) is necessary to maintain satisfactory intersection operation.

8.5.2 Future Intersection Performance (in network)

The proposed roundabout intersections along Glenmore Parkway and Bradley Street as discussed in section 5.2 have been modelled in a network with their adjacent existing intersections with The Northern Road as shown in Figure 20 and Figure 21. The results of the network analysis showed that both networks will operate at LOS C during both AM and PM peak hours and with good capacity to accommodate additional traffic if required.

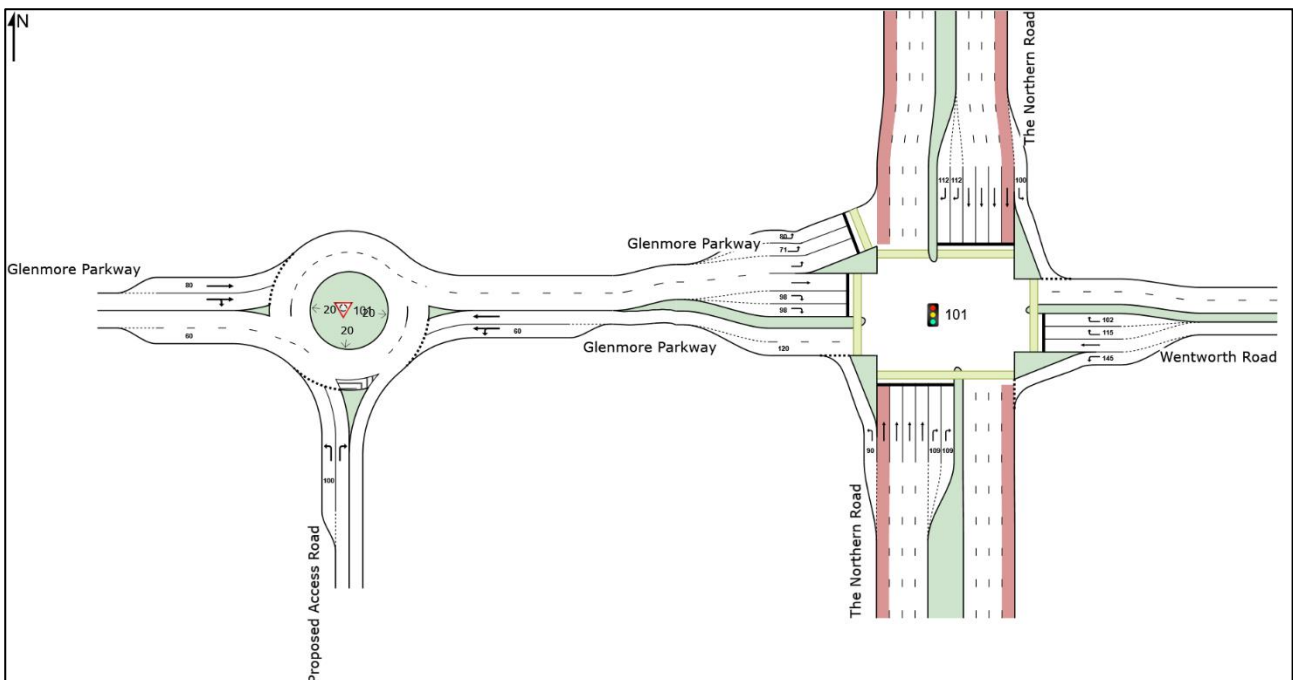


Figure 20: Glenmore Parkway Network Layout

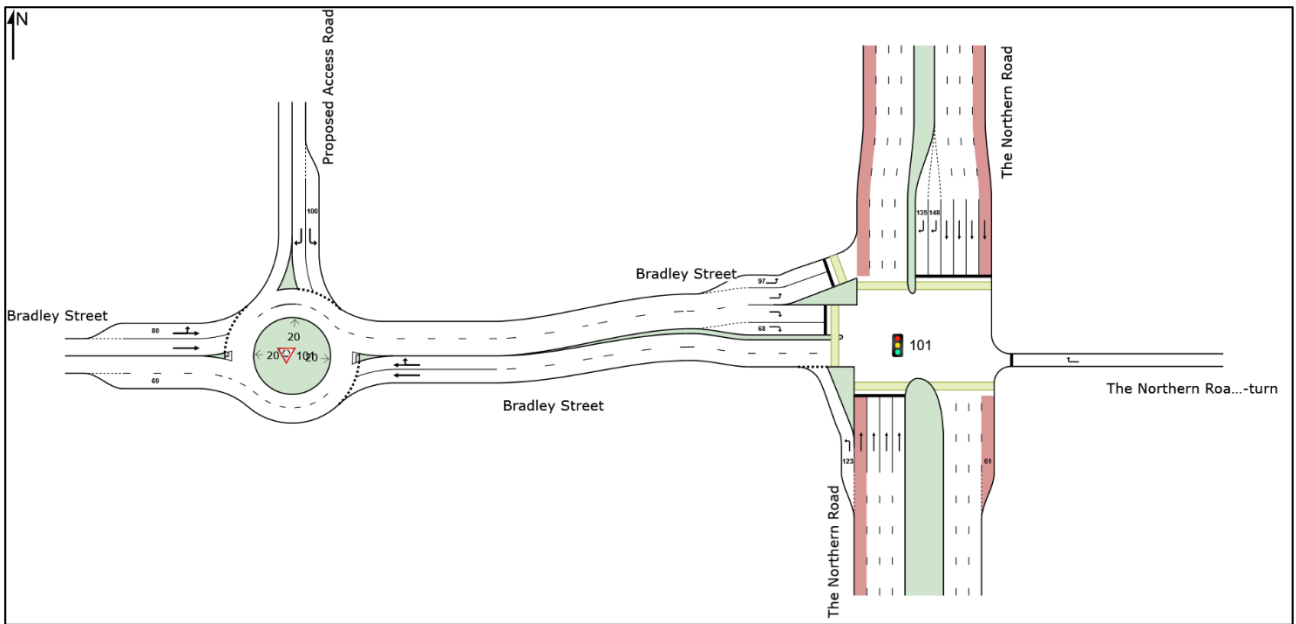


Figure 21: Bradley Street Network Layout

A single lane roundabout intersection in Glenmore Parkway has also been tested in the network. Figure 22 below shows the layout of the one-lane roundabout in a network.

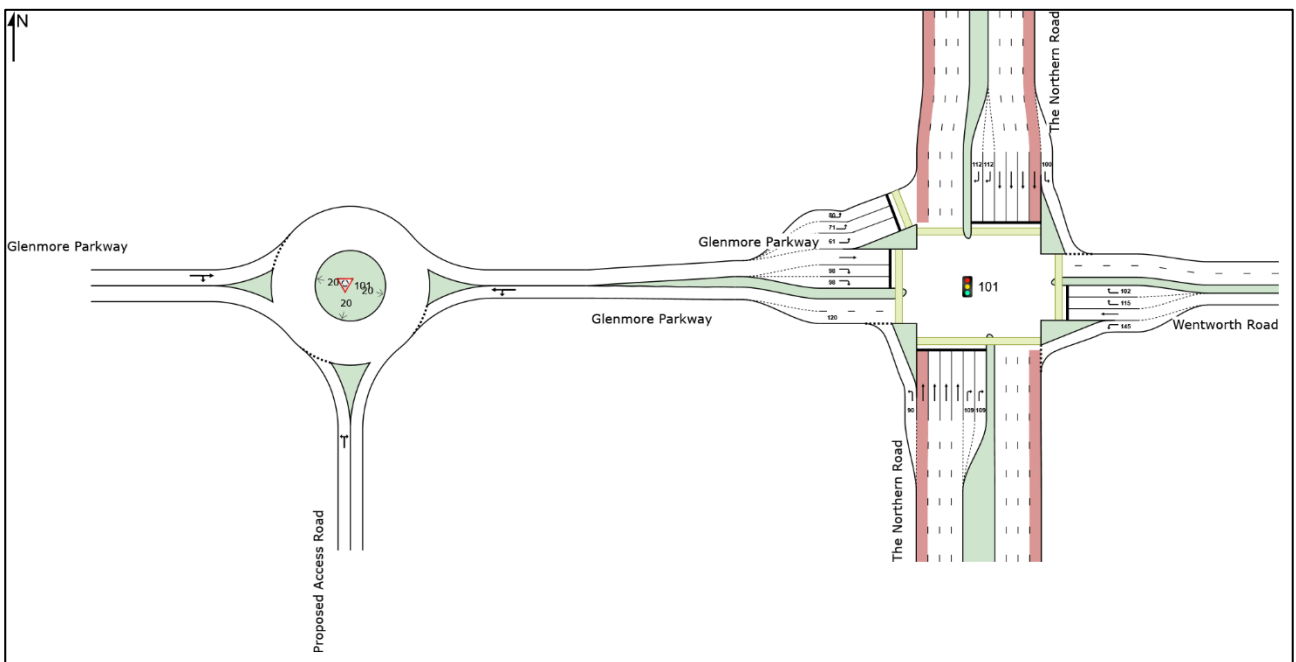


Figure 22: Glenmore Parkway Network with One-lane Roundabout

The results of the network analysis shows that the network can still achieve LOS C despite being reduced to a one lane roundabout. However, based on performance of the roundabout in isolation and on the grounds of future long-term operation, a double lane roundabout is preferable along Glenmore Parkway. Therefore, with amendments to Glenmore Parkway, it would be possible to facilitate this roundabout.

Accordingly, the precinct is not expected to have any material impact onto the road network and as such is supportable on traffic and transportation impact assessment grounds.

9 Design Commentary

9.1 Relevant Design Standards

The Site access, car park and loading arrangements for the various land uses that make up the planning proposal will be designed to comply with the following relevant Australian Standards:

- Australian Standard 2890.1:2004 Parking Facilities – Off Street Car Parking (AS2890.1:2004).
- Australian Standard 2890.2:2018 Parking Facilities – Off Street Commercial Vehicle Facilities (AS2890.2:2018).
- Australian Standard 2890.3:2015 Parking Facilities – Bicycle Parking (AS2890.3:2015).
- Australian Standard 2890.6:2022 Parking Facilities – Off Street Parking for People with Disabilities (AS2890.6:2022).

Future DAs would define design details with vehicle swept paths and detailed assessment to confirm site access arrangements, staged delivery intent, pedestrian amenity and appropriate on-site basement car park layouts and service vehicle access and loading dock arrangements. All vehicles would enter and exit each site in a forward direction while observing any such access denied locations along the internal roads. This includes along the main north: south collector road at the northern and southern ends. Sight lines on entry to and from any development site would need to consider available sightlines to ensure safety is maintained.

9.2 Site Access

The north: south Collector Road that is to provide for most vehicular traffic arriving and departing via the proposed Glenmore Parkway and Bradley Street roundabouts has been designed accommodate a 12.5m Heavy Rigid Vehicle (HRV) design vehicle. The roundabouts themselves have incorporated the necessary spatial design to facilitate access by these vehicles, with the check vehicle being the 20m semi-trailer, per Austroads and Australian Standards requirements. HRVs also readily cover all waste vehicles. The road cross-sections and lane widths also ensure appropriate allocation of road space to ensure ready access by all design (and design check) vehicles.

The potential LILO on The Northern Road has been designed for all passenger vehicles up to a 99th percentile vehicle with the check design allowing for small (or medium) rigid vehicles. A left turn slip lane together with moderate overall use on account of a distinct absence of through traffic routes through the precinct would not materially affect northbound traffic on The Northern Road. Sightlines in this location are extensive and exceed all requirements and when coupled with the infrequent use of the dedicated kerbside bus lane (and future rapid bus), would be manageable from both a TfNSW perspective and benefit the precinct more broadly by facilitating the logical movement of all vehicles on arrival and departure.

All future car parking and loading areas will also be designed in accordance with the relevant Australian Standards.

10 Summary and Conclusions

10.1 Key Findings

The key findings of this Transport Assessment are:

- The application refers to the planning proposal for the proposed mixed-use precinct in 2013-2113 The Northern Road and 1-29 Bradley Street in Glenmore Park.
- The precinct is proposed to comprise the following key land uses:
 - Residential:
 - 242 low density dwellings (traditional and cottage lots)
 - 182 medium density dwellings (terraces)
 - 1,286 high density residential apartments.
 - Commercial/ retail
 - 15,800m² GFA of commercial floor space (GFA includes post office, real estate, bank, hair, childcare, medical centre and hotel land uses with final yields yet to be determined).
 - 13,650m² GFA of retail floor space (GFA includes food and beverage, fresh food, specialties, restaurants, outdoor dining, café, entertainments, event space/ pub land uses with final yields yet to be determined).
- Current traffic volumes and intersection operation has been assessed to ensure a robust approach to ensure that the applied, conservatively high traffic generation can be accommodated under any scenarios. Overall, the key study intersections, particularly those along The Northern Road are operating well with spare capacity to accommodate future background growth and the anticipated traffic associated with the planning proposal.
- The proposal considers the importance of a well-considered access strategy with reliance on the arterial and collector roads in the immediate vicinity. With two new roundabouts providing good amenity for full turning movements for arriving and departing vehicles, both Glenmore Parkway and Bradley Street would carry most site generated traffic. facilitate the Site access.
- Planning also includes a direct connection with The Northern Road along the eastern boundary to improve efficiency and limit unnecessary movement on other local roads, both surrounding the precinct and internal to the precinct. The internal roads would be delivered to accommodate safe, convenient and efficient travel to and from the key roads across the broader network.
- Most internal roads are dimensioned to facilitate on-street kerbside parking to activate the neighbourhood centre and residential streets generally. Bus stops would be provided along the Collector Road, with stops at around 400m intervals, in accordance with planning controls.
- Initial application of Council DCP parking rates results in the need for up to about 3,480 parking spaces spread across the various land uses. Many of these would be accommodated within basement car parks for the commercial and higher density apartment sites, or in garages as part of the lower density dwellings. Further assessment would be completed as part of future Development Applications as part of a staged delivery.
- Traffic generation estimates have been completed based on the applicable Transport for NSW guidelines. They are considered theoretical maximums and do not account for efficiencies associated with linked trips, passing trade and complementary land uses common in such precincts. Overall, the planning proposal could generate up to 1,350 vehicle trips in the weekday AM peak and 1,660 trips in the PM peak.
- The projected cumulative traffic volumes have been estimated having regard for the adopted traffic rates and arrival and departure splits, and accounting for the configuration and capacity of the surrounding road network.

- The existing intersections have been modelled following the distribution and assignment of the estimated traffic generated by the planning proposal. The key signalised intersections on The Northern Road at Glenmore Parkway and Bradley Street would operate satisfactorily (LOS C) with manageable delays and queuing on all approaches. Additional modelling would be completed as part of future DAs to ensure consistency with TfNSW planning and future growth estimates.
- The proposed roundabouts would operate well (LOS A) in both peaks with minimal queuing and delay. Each roundabout would require a dual lane layout for the east and west approaches to ensure appropriate operation.
- Provision of service vehicle facilities as part of each land use, namely the higher density apartment buildings and the commercial land uses will be considered as part of future DAs. The low and medium density housing would be designed to accommodate kerb side waste collection by Council's waste truck.
- The planning proposal is considered appropriate on a range of transport related aspects, with a conservatively high assessment of traffic impacts able to be accommodated on the surrounding road network. The internal layout and road configuration has considered a range of user groups with the road cross-sections appropriate and hierarchy appropriate for the anticipated traffic. The roundabouts will accommodate full turning movements with the access strategy aiming to ensure efficiency, minimise potential impacts on intersections and the surrounding community while delivering a diverse precinct in a key location.