Appendix 5 – Preliminary Traffic Assessment

asongroup

Prepared for
PROPERTY NSW

Traffic Impact Assessment

Planning Proposal
26 Kissing Point Road & 266 Victoria Road, Parramatta

Ref: 0277r01v3
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1	21/10/2016	Issue I	T. Lewis	
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3	25/11/2016	Issue III	T. Lehmann	T. Lewis

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1 Executive Summary

This report has been prepared on behalf of Property NSW to support a planning proposal to amend the Parramatta Local Environmental Plan (PLEP) 2011 to allow for the redevelopment of surplus land in North Parramatta to create a new mixed-use precinct.

The objectives of this traffic study are to:

- Undertake preliminary assessment of existing traffic and transport conditions in the locality
- Identify potential impacts of the proposed development
- Where possible, identify indicative mitigating measures to ameliorate the impacts of the development or areas that may require further consideration as part of the subsequent planning proposal studies.

The new precinct will provide a high density residential development with a diverse range of housing, retail and commercial development with the opportunity for research and education related employment in close proximity to existing and planned public transport nodes. The proposal will allow for the provision of up to 3,000 dwellings, with up to 40,000m^2 of retail and commercial floor space.

The proposal will also allow for community facilities, a significant public open space network and a new public domain to meet the needs of the new community.

In this regard, the Proposal is consistent with objectives of Parramatta Council and the Sydney Metropolitan strategy by increasing and accelerating housing supply. The proposal is also consistent with the Greater Sydney Commission's vision for Greater Parramatta and the Olympic Peninsula (GPOP) released in in October 2016. Furthermore, the Proposal satisfies the NSW Government's priorities by:

- The future redevelopment and amalgamation of the Site provides an opportunity for improving local connectivity between the Site and its surrounds.
- The Site is readily accessible to key centres such as the Parramatta CBD, Camellia and Olympic Park by a range of public and active transport modes, including existing and planned pedestrian, cycling networks and the open space networks, thus potentially reducing reliance on the use of private car travel.
- Increased density on the Site optimises the potential value capture of planned public transport infrastructure investment in the area noting the Site's strategic location relative to the proposed Parramatta Light Rail network and potential Bus Rapid Transit route along Victoria Road.

Locating development on public transport corridors is sound transport planning and should arguably supersede other considerations such as congestion for private vehicle use.

1.1 Key Development Assumptions

The planning proposal seeks to amend the PLEP and does not specifically seek development consent for any particular development yield. For the purposes of this study, the indicative development yield outlined in Table 1 has been adopted to determine the likely traffic and transport impacts.

Table 1: Land Use Assumptions

Land Use	No. / Area
Residential	
Residential	2,800 units
Non-Residential	**(40,000m^2)**
Retail – Supermarket	3,000m^2 GFA
Retail – General Specialty	2,000m^2 GFA
Child Care Centre	1,000m^2 GFA (66 children)
Gym	1,500m^2 GFA
Commercial	32,500m^2 GFA

It is emphasised that the above has been adopted for the purposes of this modelling exercise only and is but one of many development scenarios that could be possible following rezoning of the Site. Non-residential uses could have flexible use such as offices, educational or research facilities. This level of detail with regard to specific uses and final yields will be assessed further as part of subsequent development applications following the rezoning of the Site to which this Planning Proposal relates.

The proposed site access strategy is presented in **Figure 1** below.

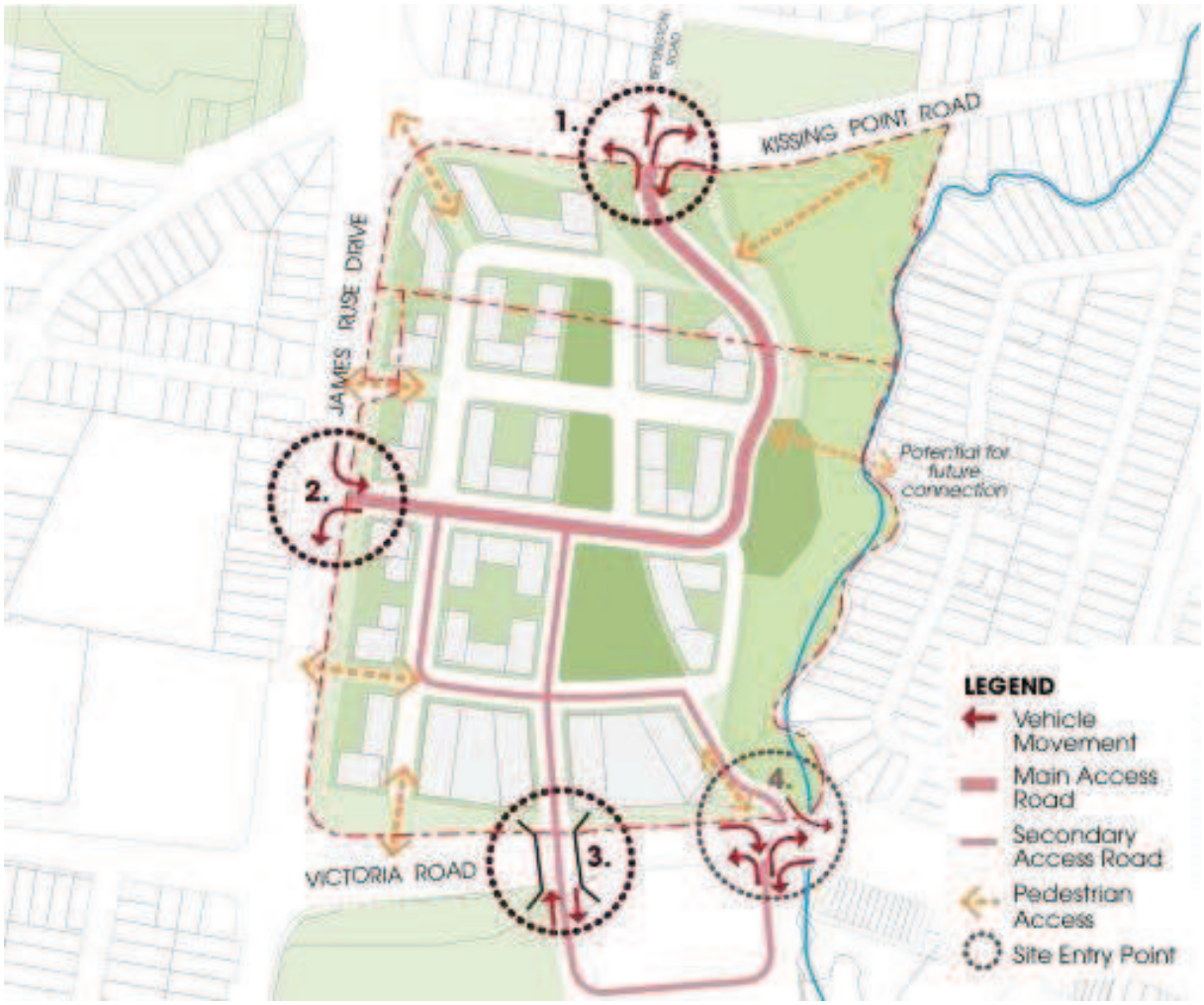


Figure 1: Proposed Site Access Arrangements

1.2 Development Traffic Generation

Traffic generation rates adopted as part of this assessment are consistent with the RMS Guide and the RMS Technical Direction 04a rates for residential and commercial land uses.

Furthermore, the mixed-use redevelopment of the Site, including improved pedestrian and cyclist connections will complement the "place-making" objective of the Parramatta Light Rail project. The future light rail will further improve accessibility and associated activation of the Light Rail corridor, particularly with improved connections direct to the centre of the Parramatta CBD.

Application of the adopted traffic generation rates results in a nominal traffic generation range of approximately 1,200-1,300 vehicles per hour on the external road network during weekday peak periods.

1.3 Road Network Performance

Road network performance has been assessed using SIDRA Network software, with ramp weaving analysis undertaken in accordance with the *Highway Capacity Manual 2010*. Intersections included in this assessment at the request of TfNSW and RMS include:

- Victoria Road / Pennant Street,
- James Ruse Drive / Kissing Point Road / Pennant Street,
- Kissing Point Road / Bettington Road,
- James Ruse Drive / First Street,
- James Ruse Drive / Victoria Road,
- Victoria Road / Railway Street / Bridge Street,
- Victoria Road / Clyde Street, and
- James Ruse Drive / Hassall Street / Grand Avenue.

1.3.1 Existing Network Performance

Currently, the network generally operates within capacity with the following intersections either at or nearing capacity:

- James Ruse Drive / Kissing Point Road / Pennant Street,
- James Ruse Drive / Hassall Street / Grand Avenue; and
- Victoria Road / Railway Street / Bridge Street (due to upstream lane merge on western approach)

1.3.2 Future 2026 Conditions

With additional projected background traffic growth based on RMS growth rates, the following intersections will exceed available capacity by 2026 regardless of whether the subject site is developed:

- James Ruse Drive / Kissing Point Road / Pennant Street,
- James Ruse Drive / Victoria Road,
- Victoria Road / Railway Street / Bridge Street,
- Victoria Road / Clyde Street, and
- James Ruse Drive / Hassall Street / Grand Avenue.

Additional traffic generated by the development, without improvement works, would result in the following additional intersections exceeding capacity:

- Victoria Road / Pennant Street (due to network effects, alleviated by improving the performance of the other key intersections),
- Kissing Point Road / Bettington Road / New Access Road, and
- James Ruse Drive / New Access Road

Notwithstanding, network improvement options (subject to further modelling and detailed design as part of subsequent Planning Proposal assessment) would improve the performance of the network to offset any increased delay (above that of background future conditions) as a result of the development.

Preliminary upgrade works to the following intersections investigated as part of this assessment resulted in improved operation of the network:

- James Ruse Drive / Kissing Point Road / Pennant Street
- Kissing Point Road / Bettington Road / New Access Road
- James Ruse Drive / New Access Road, and
- Victoria Road / Railway Street / Bridge Street.

Details regarding the required upgrade works are outlined further in Section 7.2. These preliminary improvement works were tested and found to generally improve the operation of the overall network. A comparison between modelled intersection performance is provided in **Table 2**.

Table 2: Intersection Performance Comparison

Intersection	Period	Future 2026 Baseline			Future 2026 +Development + Upgrades		
		Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Victoria Road / Pennant Street	AM	0.898	18.7 sec	B	1.000	68.4 sec	E
	PM	0.813	14.8 sec	B	0.865	17.8 sec	B
	SAT	0.741	10.8 sec	A	0.782	11.6 sec	A
James Ruse Drive / Kissing Point Road / Pennant Street	AM	1.080	101.1 sec	F	0.986	65.9 sec	E
	PM	1.207	166.2 sec	F	1.081	82.1 sec	F
	SAT	0.811	19.5 sec	B	0.823	16.4 sec	B
Kissing Point Road / Bettington Road / New Access Road	AM	0.978	56.3 sec	D	1.001	57.6 sec	E
	PM	0.901	28.7 sec	C	0.892	26.3 sec	B
	SAT	0.831	15.4 sec	B	0.750	15.6 sec	B
James Ruse Drive / New Access Road	AM	0.525	18.9 sec	B	0.778	43.2 sec	D
	PM	0.365	12.1 sec	A	0.378	10.8 sec	A
	SAT	0.357	11.9 sec	A	0.423	11.4 sec	A
James Ruse Drive / Victoria Road	AM	0.965	55.4 sec	D	1.289	208.1 sec	F
	PM	0.781	12.8 sec	A	0.858	15.2 sec	B
	SAT	0.675	10.2 sec	A	0.733	10.9 sec	A
Victoria Road / Railway Street / Bridge Street	AM	1.016	55.7 sec	D	1.037	79.6 sec	F
	PM	0.980	36.1 sec	C	1.011	52.6 sec	D
	SAT	0.900	18.9 sec	B	0.910	26.3 sec	B
Victoria Road / Clyde Street	AM	1.205	146.8 sec	F	1.486	274.4 sec	F
	PM	2.385	265.0 sec	F	2.670	434.2 sec	F
	SAT	0.802	14.1 sec	A	0.863	17.9 sec	B
James Ruse Drive / Hassall Street / Grand Avenue	AM	1.244	216.6 sec	F	1.356	287.8 sec	F
	PM	1.148	157.8 sec	F	1.290	230.0 sec	F
	SAT	1.128	155.7 sec	F	1.333	243.4 sec	F

1.3.3 Deferred Matters

Improvement options have not been developed as part of this preliminary analysis for the following intersections originally included within the RMS brief:

- James Ruse Drive / Hassall Street / Grand Avenue
  - It is noted that the subject proposal would contribute only 5% to peak hourly traffic volumes at this intersection which is consistent with typical daily fluctuations.
  - Resolution of delays at this intersection potentially includes grade separation of the intersection, as reflected in Parramatta City Council's Western Sydney Ring Road plans. Grade separation, if that is the outcome, would presumably resolve any additional delays as a result of the subject development.
  - The requirement to resolve any issues at this intersection would fall under the remit of planning for the Camellia Precinct and need not necessarily be considered in the context of this development in isolation.
- James Ruse Drive / Victoria Road
  - Similar to the above, it is noted that the subject proposal would contribute to in the order of 8% of traffic volumes at this intersection which is consistent with typical daily fluctuations.
  - Resolution of delays at this intersection potentially includes grade separation of the intersection, as reflected in Parramatta City Council's Western Sydney Ring Road plans.
  - The requirement to resolve any issues at this intersection would fall under the planning for the James Ruse Drive and Victoria Road Corridors and need not necessarily be considered in the context of this development in isolation.
- Victoria Road / Clyde Street
  - Similar to the above, it is noted that the subject proposal would contribute to in the order of 5% of peak hourly traffic volumes at this intersection which is consistent with typical daily fluctuations.
  - The requirement to resolve any issues at this intersection would fall under planning for the Rydalmere Industrial Precinct, or Victoria Road corridor more generally and need not necessarily be considered in the context of this development in isolation.

Having regard for the above, it is our view that analysis and identification of potential upgrade works to these 3 intersections should not form part of the scope for any subsequent Planning Proposal in relation to the subject Site but be deferred as ongoing operational considerations for Council, RMS

and TfNSW as part of the standard transport corridor planning for the wider sub-region which includes both Victoria Road and James Ruse Drive.

Broad improvements to the sub-regional area, such as the Bus Rapid Transit along the Victoria Road Corridor, are being investigated by Council, RMS and TfNSW. In this regard, these regional studies should include the above intersections in the subsequent investigations. It is these regional studies that would be expected to dictate future road infrastructure upgrades throughout the locality more generally rather than redevelopment of this particular site in isolation.

1.4 WSU Access Considerations

The preferred option for access to / from the Site relies on the use of Western Sydney University (WSU) private roads to the south of Victoria Road consistent with the current traffic arrangement to WSU via Bridge Street on the FACS site and across a one-way overpass over Victoria Road to the campus. The concept plan incorporates improvements to this arrangement while retaining access to WSU. It is noted that the existing bridge between the Site and WSU has a carriageway of 6.1 metres in width and can therefore support two-way vehicle movements of the magnitude envisaged. Consideration is required whether consolidation of the existing raised kerb footpaths provided is desirable to achieve a compliant footpath (or shared path) width using this existing bridge. Upgrades would be needed to ensure that this connection complies with the Disability Discrimination Act (DDA) as required for new works.

- WSU currently enjoys the use of the subject Site for access via one-way (southbound) movements over the Victoria Road overpass. This historical arrangement is particularly beneficial for access to WSU from the north via James Ruse Drive, alleviating the need for these vehicles to undertake potentially unsafe merge movements from the James Ruse Drive / Victoria Street off-ramp to the Victoria Road / Railway Street signalised right turn. The concept plan seeks to retain and formalise this arrangement albeit in a revised form.
- Traffic growth on the surrounding network, including the existing WSU access (Victoria Road / Railway Street intersection), is expected to result in the WSU access exceeding capacity in the future, regardless of whether the subject Site is redeveloped.
- Accordingly, alternate arrangements may be required at some point in the future or access may be restricted to WSU on road safety grounds. This could therefore result in the loss of access to the WSU Parramatta South campus from the north via James Ruse Drive due to the high number of unsafe weaving manoeuvres. As such, consideration should be given to developing a mutually beneficial access strategy which the preferred options seeks to provide. Formalising a solution that is agreeable to both parties will encourage improved safety within the road network and maintain current levels of accessibility to both sites.
- The road connections envisaged by the proposed access strategy provide these alternative routes for convenient access to WSU in the absence of the existing facilities. For example, vehicles travelling southbound on James Ruse Drive could be provided access to WSU via the proposed site access to James Ruse Drive, the internal collector road and existing bridge (operating as two-way) to gain access to the Site.
- A direct two-way connection would reinforce the potential synergies between the Site and the University, particularly future commercial, educational and retail uses.

In the absence of the bridge being able to be relied upon for two-way access to both the WSU and subject Site, alternate access arrangements would need to be investigated further as part of any subsequent development application process prior to any subdivision of the Site.

This may include provision of a high-level off-ramp from the existing Victoria Road overpass of James Ruse Drive. Such an option may require land dedication on the subject Site to shift the exiting (at-grade) off-ramp from James Ruse Drive (southbound) to Victoria Road (eastbound) slightly to the north. This would be to facilitate required structure and to allow sufficient distance until such time that adequate height clearance is achieved for the existing slip lane to pass underneath the new off-ramp. Whilst not the preferred option for a precinct-wide solution, it does present but one alternative for consideration.

Figure 2: Alternate Site Access Strategy

1.5 Further Consultation

Consultation with RMS and TfNSW to date has been productive and it is understood that additional traffic impact assessment will be required prior to any development on the site. The RMS has indicated that those matters may include:

- Preparation of a detailed Traffic Management Plan (TMAP), in accordance with all reasonable requirements from the relevant authorities including Council, RMS and TfNSW. During the preparation of the detailed Planning Proposal, there may be more detailed resolution of plans for the Parramatta Light Rail in the vicinity of the subject Site and the impacts this may have on transport movements through the sub-regional corridor more generally may need to be explored to maximise the development potential of the Site.
- Further detailed modelling to resolve the infrastructure upgrade requirements and work through the feasibility of the indicative upgrade options identified as part of this preliminary assessment.

1.6 Summary

This report has been prepared for consideration by Council for progression to the Gateway process.

A Gateway determination will enable formal consultation with agencies and stakeholders to commence prior to exhibition.

2 Introduction

This report has been prepared on behalf of Property NSW to support a planning proposal to amend the Parramatta Local Environmental Plan (PLEP) 2011 to allow for the redevelopment of surplus land in North Parramatta to create a new mixed-use precinct.

2.1 Overview of Proposal

The new precinct will provide a high density residential development with a diverse range of housing, retail and commercial development with the opportunity for research and education related employment in close proximity to existing and planned public transport nodes. The proposal will allow for the provision of up to 3,000 dwellings, with up to 40,000m^2 of retail and commercial floor space.

The proposal will also allow for community facilities, a significant public open space network and a new public domain to meet the needs of the new community.

2.2 Background

Comprising two adjoining land parcels, as shown in **Figure 3**, the Ageing, Disability and Home Care (ADHC) facility at 266 Victoria Road, North Parramatta and the former Macquarie Boys High School (MBHS) at 26 Kissing Point Road, the Site encompasses approximately 19.4ha in the City of Parramatta LGA. The MBHS was closed by the Department of Education in 2008 and the Site has been vacant since that time. The ADHC facility is still in operation, however, the Site will be vacated by mid-2017.

Property NSW on behalf of Family and Community Services (FACS) and Department of Education (DE) have been charged with responsibility of divesting the Site.

The Site is located north of Rydalmere train station, on the north-eastern corner of James Ruse Drive and Victoria Road intersection, bounded to the north by Kissing Point Road and Vineyard Creek to the east. The Site is a 5-10 minute walk from Rydalmere Train station, with the potential for improvements in connectivity to further enhance accessibility. The Western Sydney University's North Parramatta and Parramatta campuses lie to the west and south of the Site offering the potential for synergies between education, research and employment.

Figure 3: Site Location

The divestment and redevelopment of the Site offers opportunities to:

- Provide a significant urban infill opportunity within the City of Parramatta LGA aligning with the broader Government objectives and the Sydney Metropolitan strategy to increase and accelerate housing supply.
- Optimise the Site's strategic location relative to the proposed Western Sydney Light Rail network in terms of increasing density along public transport corridors.

- Support FACS and DE's commitment to recycling of capital investment in new facilities to meet the needs of the community.
- Reduce liabilities through the disposal of underutilised assets deemed to be surplus to need and unsuitable for the redevelopment for meet the needs of the agencies.

In line with the above and to provide certainty of housing supply to the market, job creation and development of underutilised assets, Property NSW has developed a concept plan to guide the redevelopment of the Site. The concept plan seeks to satisfy the NSW Government's priorities for the precinct:

- Create a sustainable community with access to employment and education opportunities, community facilities and a high quality of life
- Improve connectivity between the Site and its surrounds in terms of transport, pedestrian and cycling networks and the open space network
- Create a high quality public domain that is legible and activates the precinct
- Enhance the riparian corridor along the boundary of the Site with the potential to deliver the missing link in the Vineyard Creek Corridor and to support the development of Sydney's Green Grid

To realise the vision for the Site articulated in the concept plan, an amendment to the Parramatta Local Environmental Plan (PLEP) 2011 is required to rezone the Site from R2 Low Density Residential and SP2 Infrastructure to B4 Mixed Use and RE1 Public Recreation.

2.3 Document References

In the preparation of this report, reference is made to the following documents:

- Parramatta Local Environmental Plan (PLEP),
- NSW Government, *Long Term Transport Master Plan*, December 2012, (LTTMP),
- GHD *Report for High Density Residential Trip Generation Surveys - Survey Data Analysis Report* (GHD Analysis Report),
- GHD *Report for High Density Residential Trip Generation Surveys - Data Report* (GHD Data Report),
- TfNSW *Integrated Public Transport Service Planning Guidelines* (TfNSW Guideline),
- RMS (formerly RTA) *Guide to Traffic Generating Developments* (RMS Guide), and

- RMS Technical Direction 2013/04a – Guide to Traffic Generating Developments; Updated traffic surveys (TDT 2013/04a).

2.4 Report Structure

This report is structured as follows:

- Section 2 provides a summary of the assessment objectives and the proposed development.
- Section 3 describes the Site, its location, local public transport and active transport facilities in the area and summarises the existing traffic conditions in the locality.
- Section 4 discusses public amenities accessibility and future transport infrastructure
- Section 5 outlines the future traffic of the surrounding road network and forecasted intersection performances.
- Section 6 describes the traffic impacts of the proposed development including projected trip generation, forecasted network performance and infrastructure improvement works.
- Section 7 provides a conclusion and summary of the key traffic and transport issues.

3 Assessment Objectives

3.1 Consultation with Authorities

Ason Group has undertaken consultation with the following agencies:

- Transport for NSW (TfNSW) Parramatta Light Rail Team (11 July 2016),
- TfNSW and RMS (1 August 2016)
- Parramatta Council (25 August 2016).

These discussions have defined the study area required to be considered as part of this Pre-Gateway submission. As per discussions with TfNSW and RMS, the following intersections require SIDRA Network analysis as part of this preliminary study:

- Victoria Road / Pennant Street,
- James Ruse Drive / Kissing Point Road / Pennant Street,
- Kissing Point Road / Bettington Road,
- James Ruse Drive / First Street,
- James Ruse Drive / Victoria Road,
- Victoria Road / Railway Street / Bridge Street,
- Victoria Road / Clyde Street, and
- James Ruse Drive / Hassall Street / Grand Avenue.

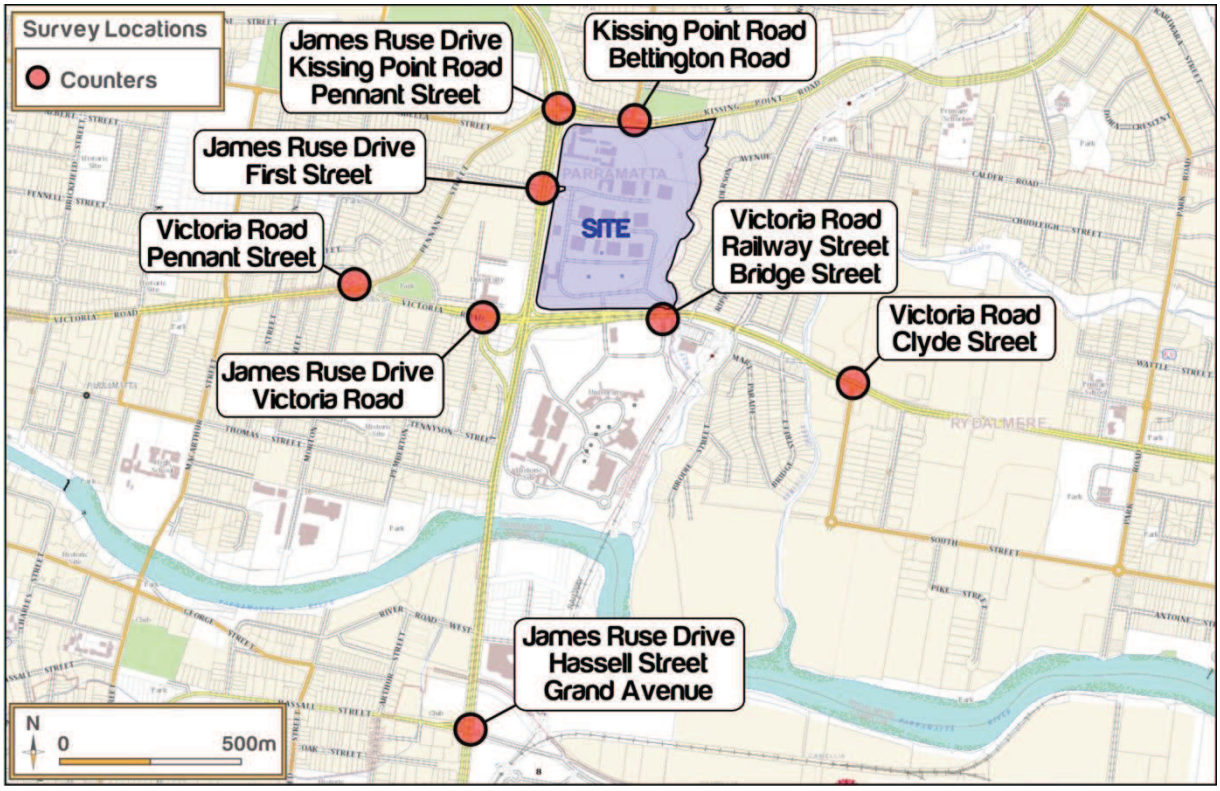


Figure 4: Traffic Survey & Analysis Locations

The operation of the above intersections will be examined during weekday morning (AM), evening (PM) and weekend (Saturday) peak periods. These intersections will then be assessed under the following scenarios:

- Existing traffic,
- Future 2026 (Existing + Background Growth to 2026, and
- Future 2026 + Development.

The scope of modelling required to accompany the final planning proposal submission will be subject to further review and consideration by RMS and TfNSW. There may be an opportunity for this Site to be included within detailed modelling to be undertaken by TfNSW in relation to planning for the Parramatta Light Rail which is expected to be undertaken in the near future.

3.2 Traffic Study Objectives

The objectives of this traffic study are to:

- Undertake preliminary assessment of existing traffic and transport conditions in the locality
- Identify potential impacts of the proposed development
- Where possible, identify indicative mitigating measures to ameliorate the impacts of the development or areas that may require further consideration as part of the subsequent planning proposal studies.

3.3 Land Use Development Assumptions

The planning proposal seeks to amend the PLEP and does not specifically seek development consent for any particular development yield. For the purposes of this study, the indicative development yield outlined in **Table 3** has been adopted to determine the likely traffic and transport impacts.

Table 3: Land Use Assumptions

Land Use	No. / Area
Residential	
Residential	2,800 units
Non-Residential	**(40,000m^2)**
Retail – Supermarket	3,000m^2 GFA
Retail – General Specialty	2,000m^2 GFA
Child Care Centre	1,000m^2 GFA (66 children)
Gym	1,500m^2 GFA
Commercial	32,500m^2 GFA

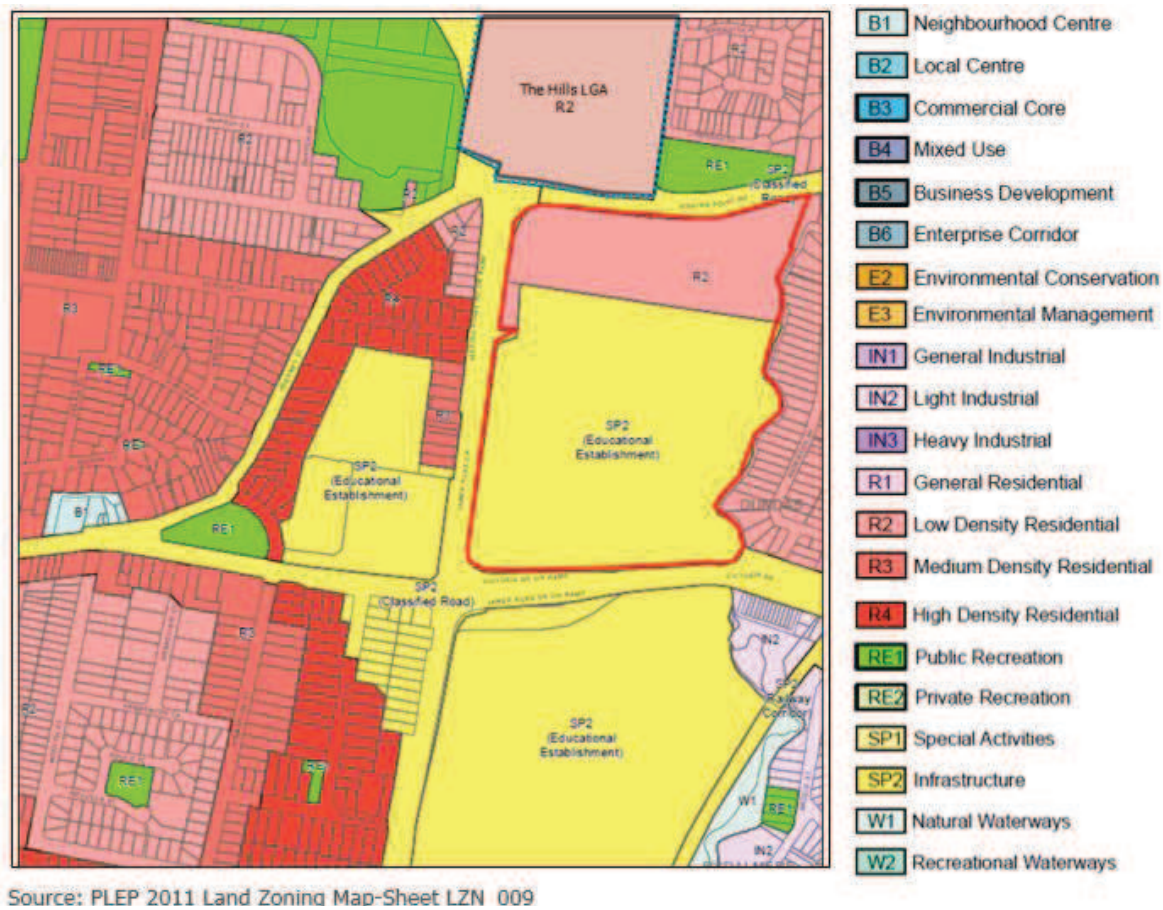
It is emphasised that the above has been adopted for the purposes of this modelling exercise only and is but one of many development scenarios that could be possible following rezoning of the Site. Gateway determination (or subsequent Planning Proposal approval) does not provide approval for any specific development mix or lock a future developer into a particular development outcome. Non-residential uses could have flexible use such as offices, educational or research facilities and this level of detail with regard to specific uses and final yields will be assessed further as part of subsequent master planning and/or development applications following the rezoning of the Site to which this Planning Proposal relates.

4 Existing Traffic and Transport Conditions

4.1 Study Area

The Site is located 2 kilometres northeast of the Parramatta CBD and 18 kilometres northwest of the Sydney CBD. It is bounded by Vineyard Creek to the east, Victoria Road to the south, James Ruse Drive to the west and Kissing Point Road to the north. These roads form key arterial roads within the Parramatta Local Government Area (LGA). The Site is located approximately 450 metres northwest of the Rydalmere Railway Station.

As detailed in Section 1.2, the Site consists of the ADHC facility and the MBHS and is currently zoned R2 – Low Density Residential and SP2 – Infrastructure: Educational Establishment, as shown in **Figure 5**. A Neighbourhood Centre is located approximately 750 metres west of the Site, with the lands to the east of Rydalmere Station forming the Rydalmere Industrial Precinct and zoned IN1 and IN2 accordingly. The Western Sydney University (WSU) Parramatta campus is located to the south and west of the Site.



Source: PLEP 2011 Land Zoning Map-Sheet LZN_009

Figure 5: Existing Zoning Controls

4.2 Road Hierarchy

The road hierarchy in the vicinity of the Site is shown in **Figure 6**, with the following roads considered noteworthy:

- James Ruse Drive – an RMS classified Main Road (MR 309) that generally runs in a north-south direction and forms the western site boundary. It forms grade separated intersections, including on and off-ramps with Kissing Point Road and Victoria Road in the vicinity of the Site. The road has a divided carriageway and is subject to a 70 km/h speed zoning. The road carries approximately 64,000 vehicles per day (vpd) (Station 49.095).
- Victoria Road – an RMS classified Main Road (MR 165) that generally runs in an east-west direction and forms the southern frontage of the Site. The road is subject to a 60 km/h speed limit and generally carries 2 lanes of traffic in either direction within a divided carriageway of approximately 20 metres width. The road carries approximately 59,000 vpd (Station 50.207).
- Kissing Point Road – an RMS classified Main Road (MR574) that generally runs in an east-west direction along the northern frontage of the Site. The road is subject to a 60 km/h speed zoning and generally carries 3 lanes of traffic in either direction within a divided carriageway of approximately 20 metres width. The road carries approximately 34,000 vpd (Station 50.037).
- Pennant Street – an RMS classified Main Road (MR574) that generally runs in a northeast-southwest direction in the vicinity of the Site. The road is subject to a 60 km/h speed limit and generally carries approximately 8,500 vpd (Station 50.389).Bettington Road – a collector road that runs in a north-south direction to the north of the Site, between Pennant Hills Road and Kissing Point Road. The road is subject to a 50 km/h speed zoning and generally carries a single lane of traffic in either direction along an undivided carriageway. There is unrestricted parking permitted on either side of the road.
- First Street – a private road that runs in an east-west direction within the Site. The road is subject to a 15 km/h speed zoning and generally carries a single lane of traffic in either direction. A boom gate is provided at the entry to First Street from James Ruse Drive.
- Railway Street – a local road that runs in a north-south direction in the vicinity of the Site. The road is subject to a 40 km/h speed zoning and generally carries a single lane of traffic in either direction. There are 'No Stopping' zones on either side of the road.
- Bridge Street – a local road that runs in a north-south direction in the Site. The road is subject to a 15 km/h speed zoning and generally carries a single lane of traffic in either direction along an undivided carriageway. There is unrestricted parking permitted during the AM peak period and 'No Parking' restrictions on the northbound lane during the PM peak period on certain sections of the road.

- Clyde Street – a collector road that runs in a north-south direction to the southeast of the Site and serves the Rydalmere Industrial Precinct. The road is subject to a 50 km/h speed zoning and generally carries a single lane of traffic in either direction within an undivided carriageway. Unrestricted parking is permitted during the AM peak period, however 'No Parking' restrictions apply on the northbound approach to its intersection with Victoria Road during the weekday PM peak period.
- Hassall Street – a sub-arterial road that runs in an east-west direction approximately 1.1 kilometres to the south of the site. The road is subject to a 60 km/h speed zoning and generally carries 2 lanes of traffic in either direction with an undivided carriageway. It forms the gateway intersection to the Camelia Precinct via a signalised intersection with James Ruse Drive and Grand Avenue.
- Grand Avenue – a local road that runs in an east-west direction and serves as one of the main access points to the Camelia Precinct. The road is subject to a 60 km/h speed limit and generally carries a single lane of traffic in either direction along an undivided carriageway. Access opportunities to the Camelia Precinct are restricted having regard for the Carlingford rail line, however an overpass bridge is provided on Grand Avenue to provide access to James Ruse Drive.

As such, the Site is conveniently located with respect to the arterial and local road network serving the region. It is therefore able to effectively distribute traffic onto the wider road network, minimising traffic impacts on local roads.

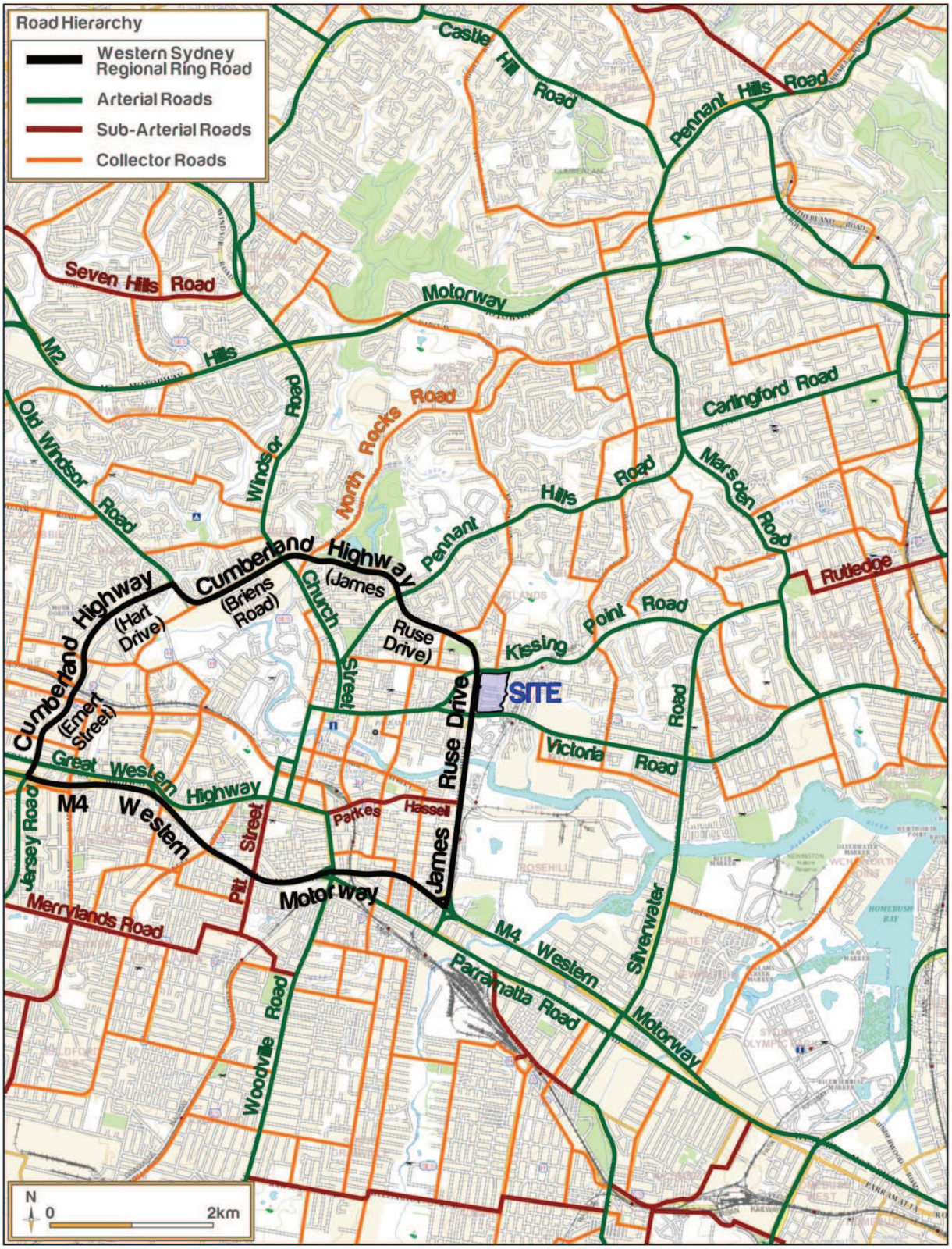


Figure 6: Site Location and Surrounding Road Hierarchy

4.3 Public Transport

The Site lies within close proximity to a range of public transport services, as shown in **Figure 7** and **Figure 8**. A summary of the existing public transport services is discussed further below.

4.3.1 Bus services

With regard to bus travel, the TfNSW Guideline states that bus services influence the travel mode choices of sites within 400 metres (approximately 5 minutes walk) of a bus stop. In this regard, the Site is accessible by a number of bus services operating along Victoria Road and Kissing Point Road. The details of each service that stops within 400 metres of the Site are presented in **Table 4**. The table details each route number, route description and service frequencies during the morning and evening peak periods.

Table 4: Bus Service Frequencies

Route No.	Route	Route Description	Service Operating Hours	Approximate Weekday Service Frequency
520	CBD to Parramatta	CBD, Rozelle, Drummoyne, Ryde, Rydalmere, Parramatta	5.00AM-6.45AM & 8.15PM-3.10AM	AM Peak: No Service PM Peak: No Service Off-Peak: 30 minutes
521	Parramatta to Eastwood	Parramatta, Rydalmere, Dundas, Carlingford, Eastwood	7.30AM-7.00PM	AM Peak: 20 minutes PM Peak: 1 hour Off-Peak: 1 hour
523	Parramatta to West Ryde	Parramatta, Rydalmere, Ermington, Ryde	6.10AM-7.00PM	AM Peak: 20 minutes PM Peak: 30 minutes Off-Peak: 1 hour
524	Parramatta to Ryde via West Ryde	Parramatta Rydalmere, Ermington, Melrose Park, West Ryde, Denistone, Ryde	5.45AM-7.30PM	AM Peak: 30 minutes PM Peak: 30 minutes Off-Peak: 1 hour
525	Parramatta to Burwood via Sydney Olympic Park	Parramatta, Rydalmere, Ermington, Sydney Olympic Park, Strathfield, Burwood	6.10AM-11.00AM	AM Peak: 30 minutes PM Peak: 30 minutes Off-Peak: 30 minutes
545	Parramatta to Chatswood via Eastwood & Macquarie Centre	Parramatta, Rydalmere, Eastwood, Marsfield, Macquarie Park, North Ryde, Chatswood	5.00AM-12.10AM	AM Peak: 10 minutes PM Peak: 10 minutes Off-Peak: 15 minutes
550	Chatswood to Parramatta via Macquarie Park	Chatswood, North Ryde, Macquarie Park, Marsfield, Eastwood, Rydalmere, Parramatta	3.40PM-4.30PM	AM Peak: No Service PM Peak: No Service Off-Peak: 15 hour
M52	Parramatta to CBD	Parramatta, Rydalmere, Ryde, Drummoyne, Rozelle, CBD	4.40AM-10.20PM	AM Peak: 10 minutes PM Peak: 10 minutes Off-Peak: 15 minutes

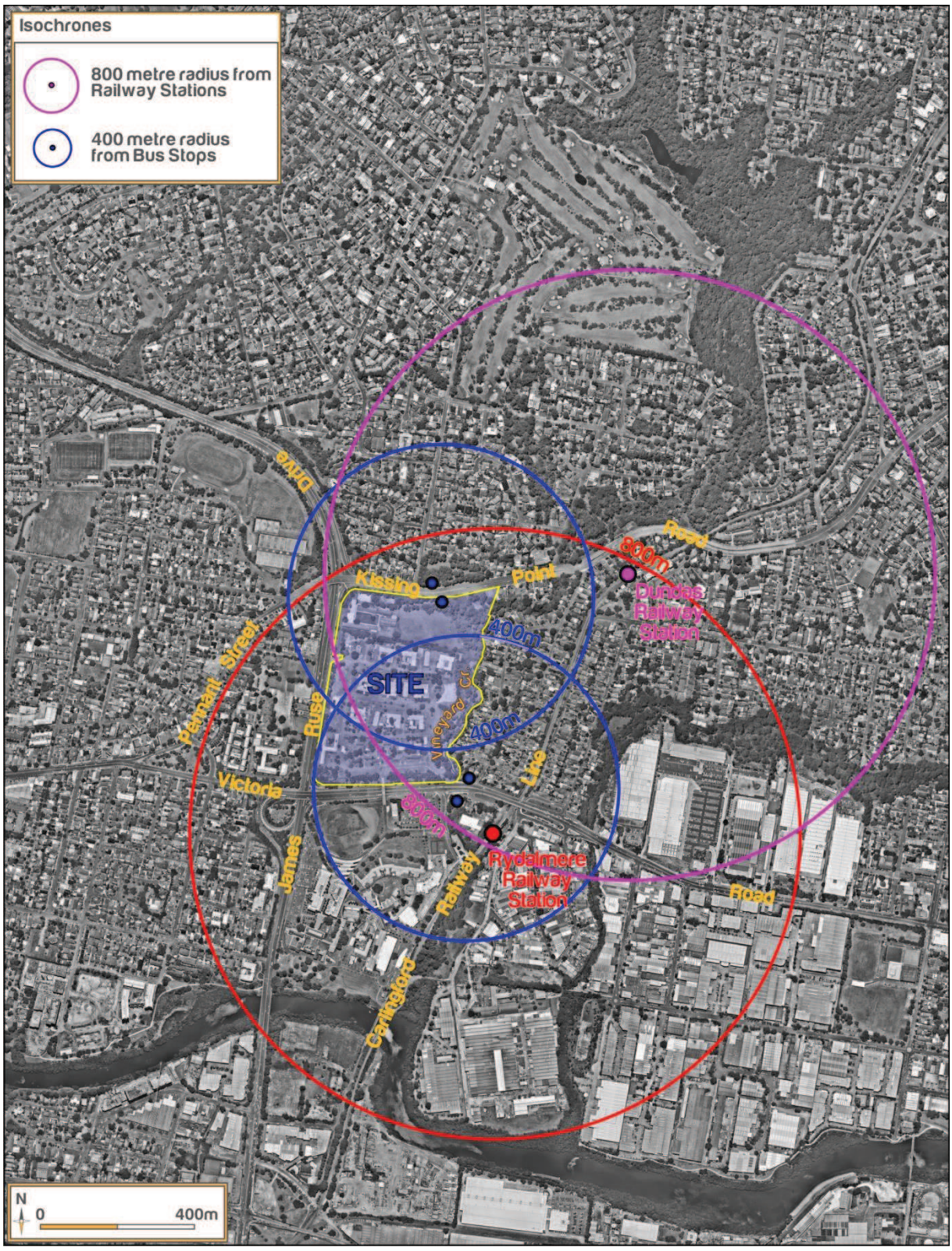


Figure 7: Station and Bus Stop Catchments

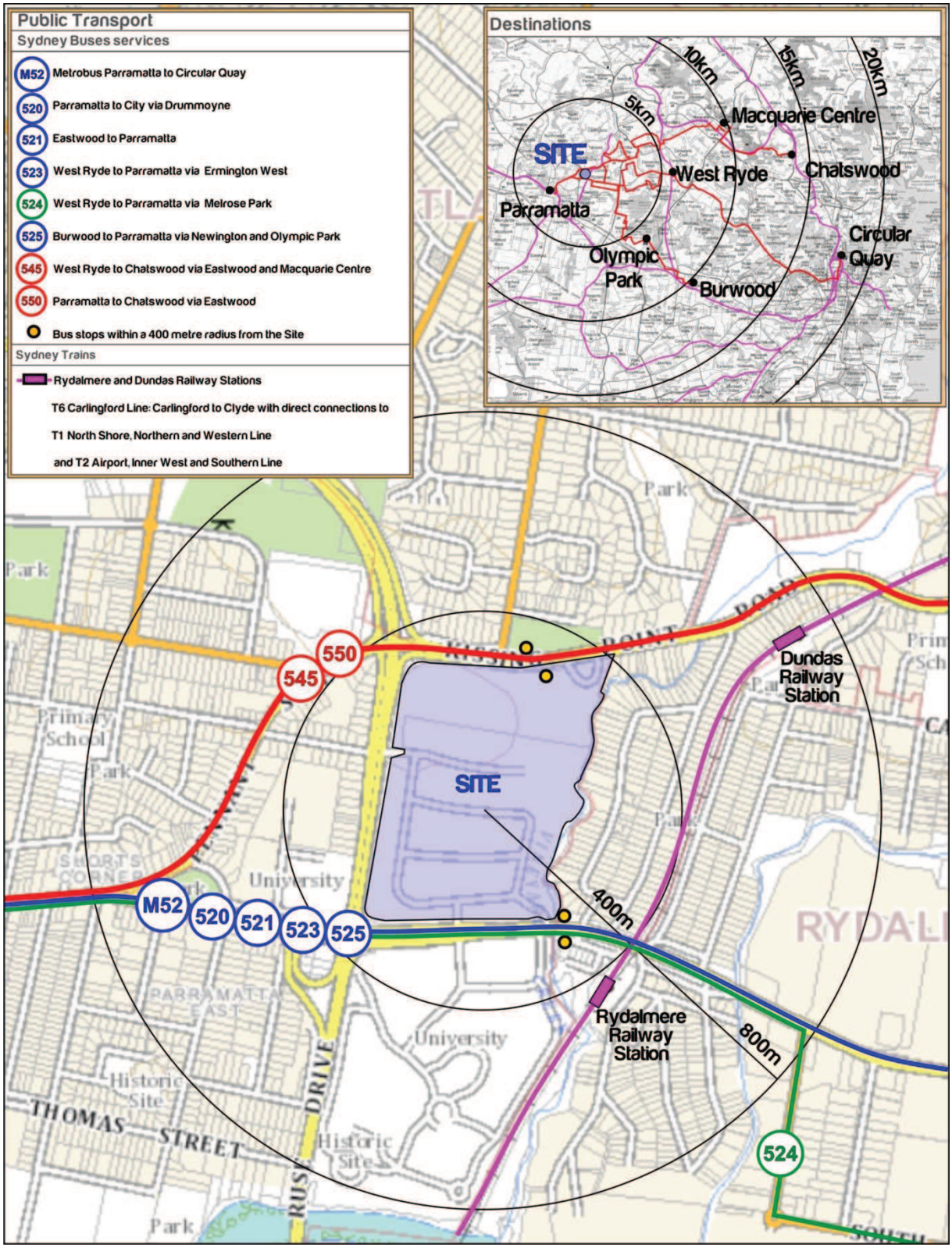


Figure 8: Public Transport Services

4.3.2 Rail services

The TfNSW Guidelines states that train services influence the travel mode choices of areas within 800 metres distance (approximately 10 minutes walk) of a train station. It is therefore noteworthy that the Site is located within 800 metres from both Rydalmere and Dundas train stations, on the T6 Clyde to Carlingford Line. Accordingly, a significant proportion of future commuters travelling from the Site could be expected to use the train services at Rydalmere station.

Rydalmere station provides direct services to Clyde railway station, which provides connections to Intercity train services and other services on the rail network at Redfern and Central stations. **Table 5** summarises the peak hour train frequencies for Rydalmere station.

Table 5: Train Service Frequencies

Peak Period	To Clyde	From Clyde	Total
Morning Peak Hour (7-8AM)	2	2	4
Off Peak Hour	1	1	2
Evening Peak Hour (5-6PM)	2	2	4

In summary, the data indicates that the Site is located within the influence zone of train services and there is a train servicing Rydalmere Railway Station approximately every 30 minutes in the morning and afternoon peak periods and approximately every 1 hour in the off-peak periods.

4.4 Bicycle Networks

The bicycle network in the vicinity of the Site is shown in **Figure 9**. A shared path is provided along Parramatta River foreshore, to south of the Site and on-road bicycle paths along the rail network to the east of the Site. These paths provide access to the wider walking and cycling network, including links to the Parramatta CBD, as demonstrated in **Figure 10**.

4.5 Pedestrian Connectivity

Key pedestrian desire lines in the vicinity of the Site primarily relate to connections to existing public transport infrastructure. In this regard, footpaths are provided on Victoria Road and Kissing Point Road providing connectivity to local bus stops.

Pedestrian access to the existing Rydalmere Station requires pedestrians to cross at the Victoria Road signals to use the footpath on the southern side of Victoria Road to access Brodie Street and enter the

station from its eastern side. This forms a detour to the natural (as the crow flies) desire line and improved connectivity to the Station has been identified as an opportunity to improve local pedestrian connectivity.

Signalised and pedestrian (zebra) crossings are provided at the intersection of James Ruse Drive with Kissing Point Road and Pennant Street which provides connectivity to the recreational areas to the north-west of the Site.Other pedestrian connections are provided by way of the existing bridge between the Site and the WSU Parramatta campus.

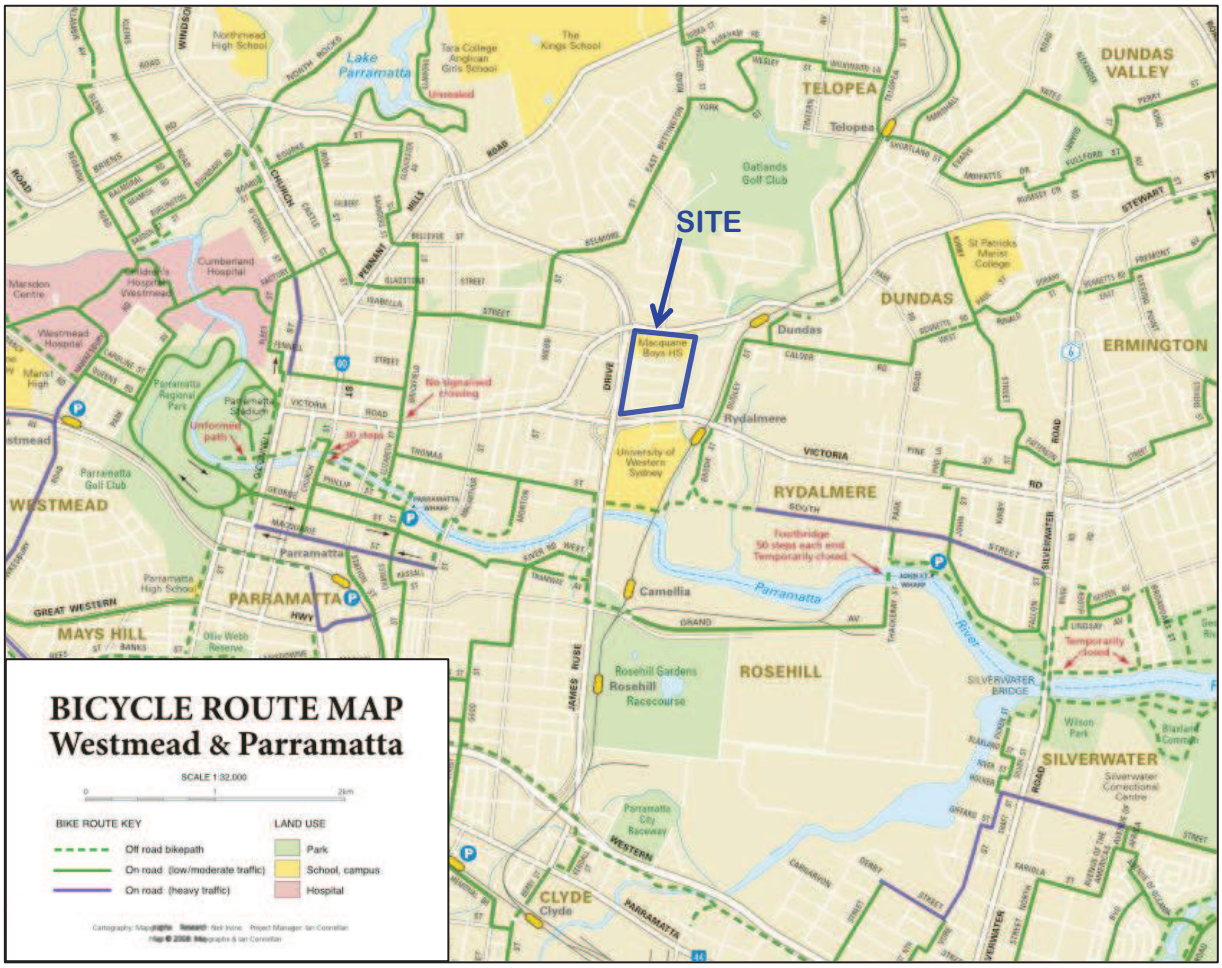


Figure 9: Surrounding Bicycle Paths

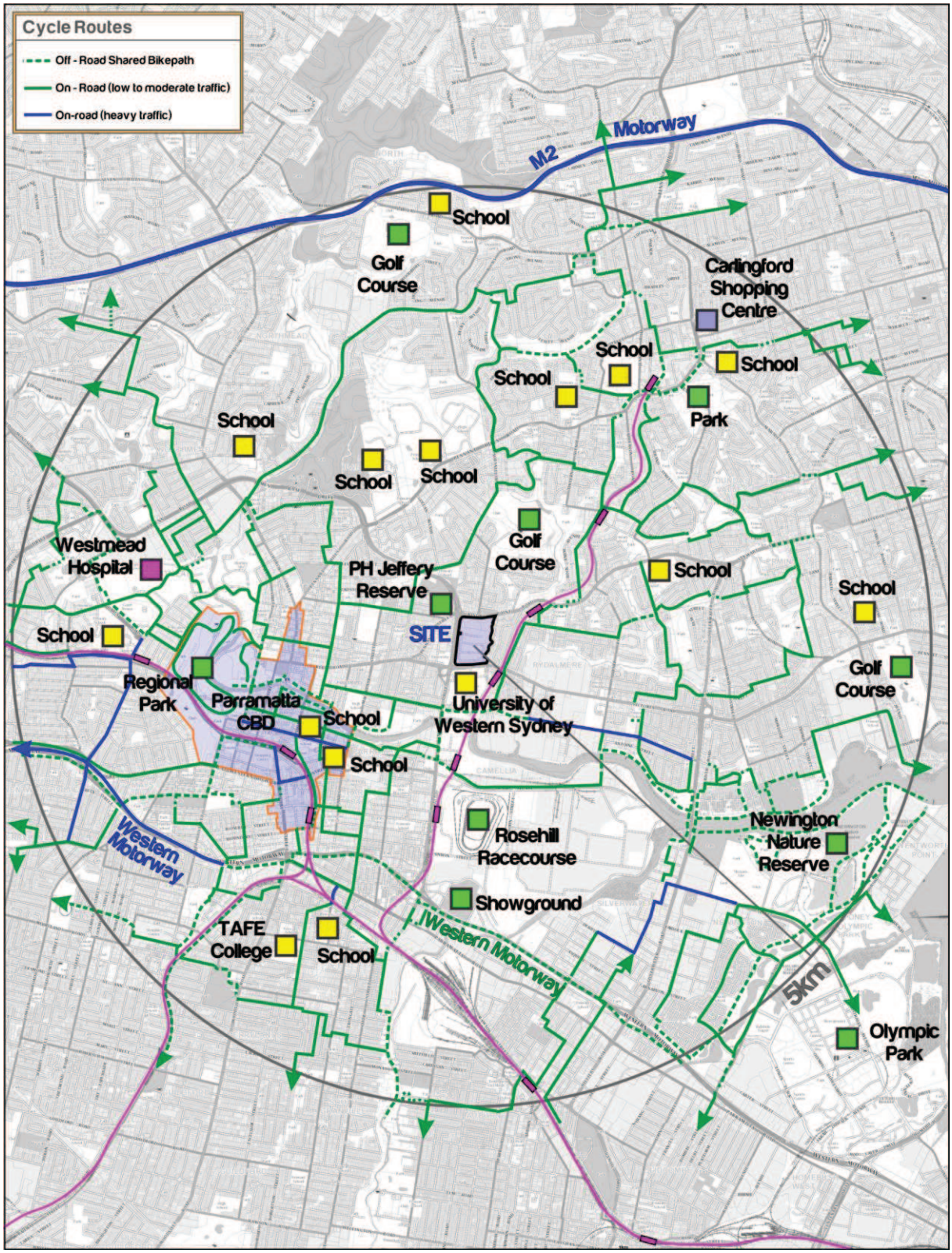
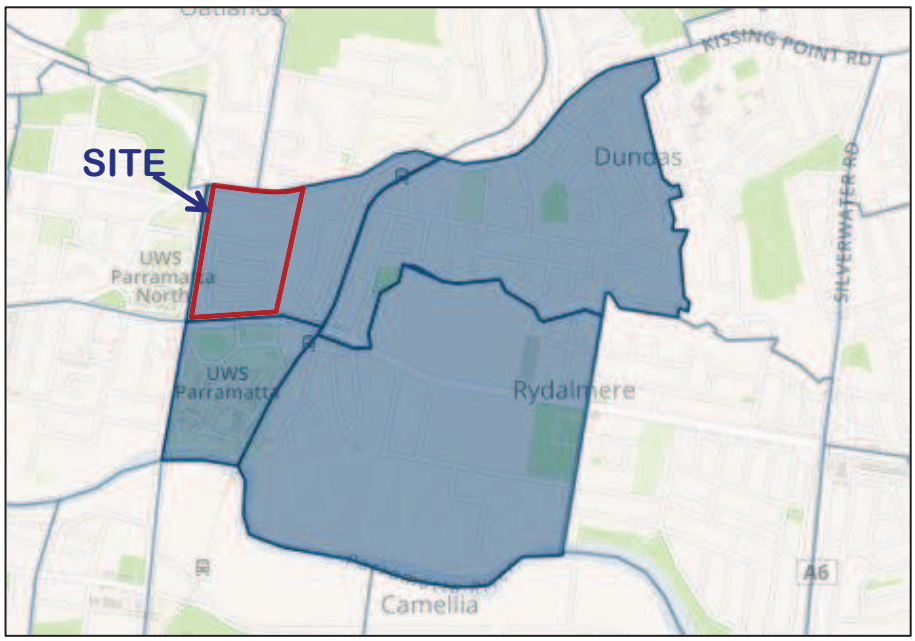


Figure 10: Regional Pedestrian & Cycle Connectivity

4.6 Journey to Work Data Analysis

The existing travel patterns of residents and workers within the surrounding locality was surveyed within the 2011 Census and presented in the Journey to Work (JTW) data provided by the Bureau of Transport Statistics. A summary of key travel modes for both residents and workers within the locality (Travel Zones 1116, 1117, 1119, and 1120– refer **Figure 11**) is presented in **Table 6** below.



Source: NSW Bureau of Transport Statistics, 2011

Figure 11: Journey-to-Work Travel Zones

Table 6: Existing Travel Mode Summary

Travel Mode	Mode Share of Residents	Mode Share of Employees
Vehicle driver	68%	85%
Vehicle passenger	5%	4%
Train	14%	5%
Bus	7%	2%
Walked only	3%	1%
Other mode	2%	1%
Mode not stated	1%	2%

4.7 Existing Traffic Volumes at Key Intersections

Surveys have been undertaken at the key intersections detailed in Section 2.1 In order to determine existing traffic volumes for the morning, evening and weekend peak periods.

The peak hourly volumes surveyed are summarised in the figures below for respective survey periods.

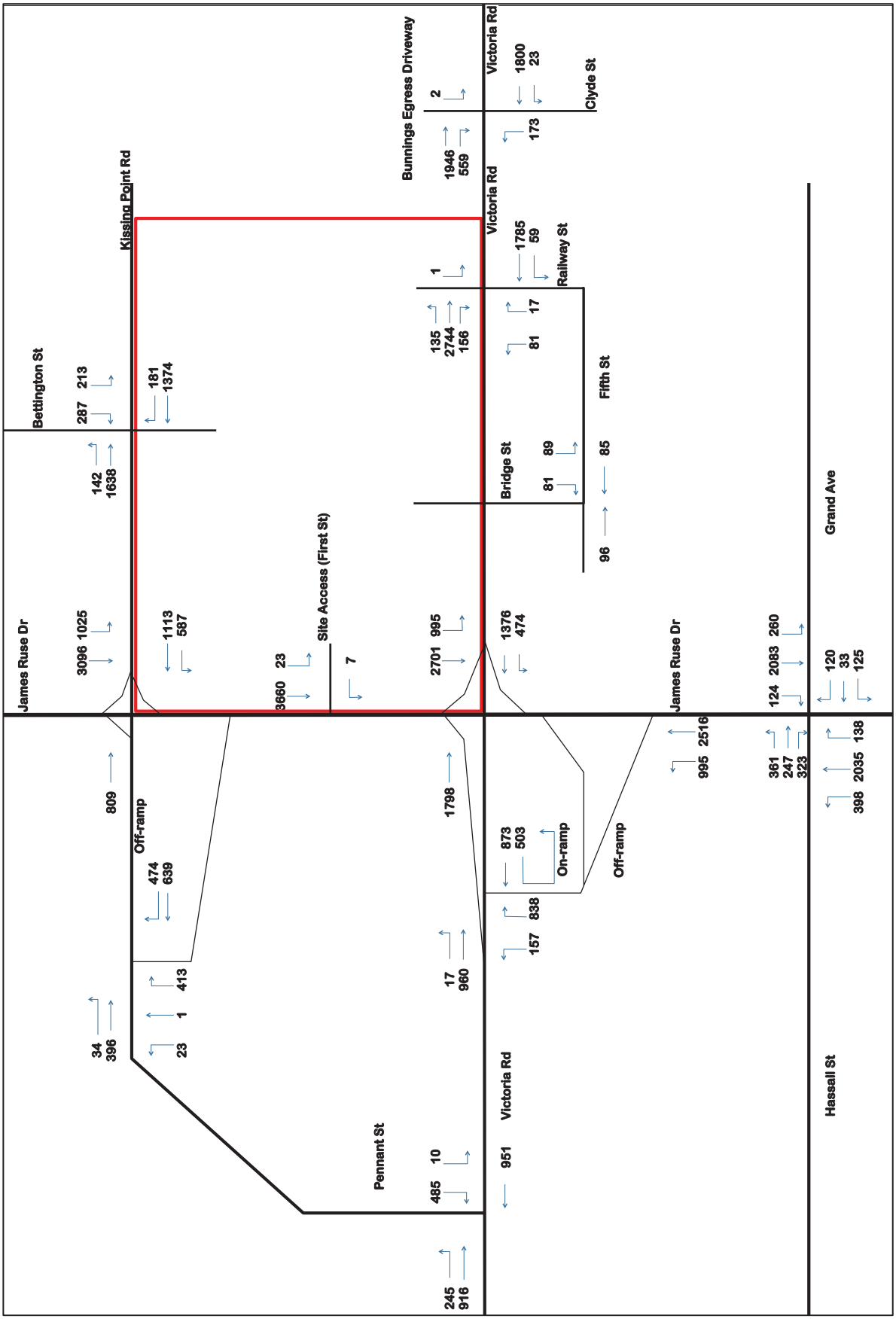


Figure 12: Network Traffic Volumes - Existing (2016) AM Peak

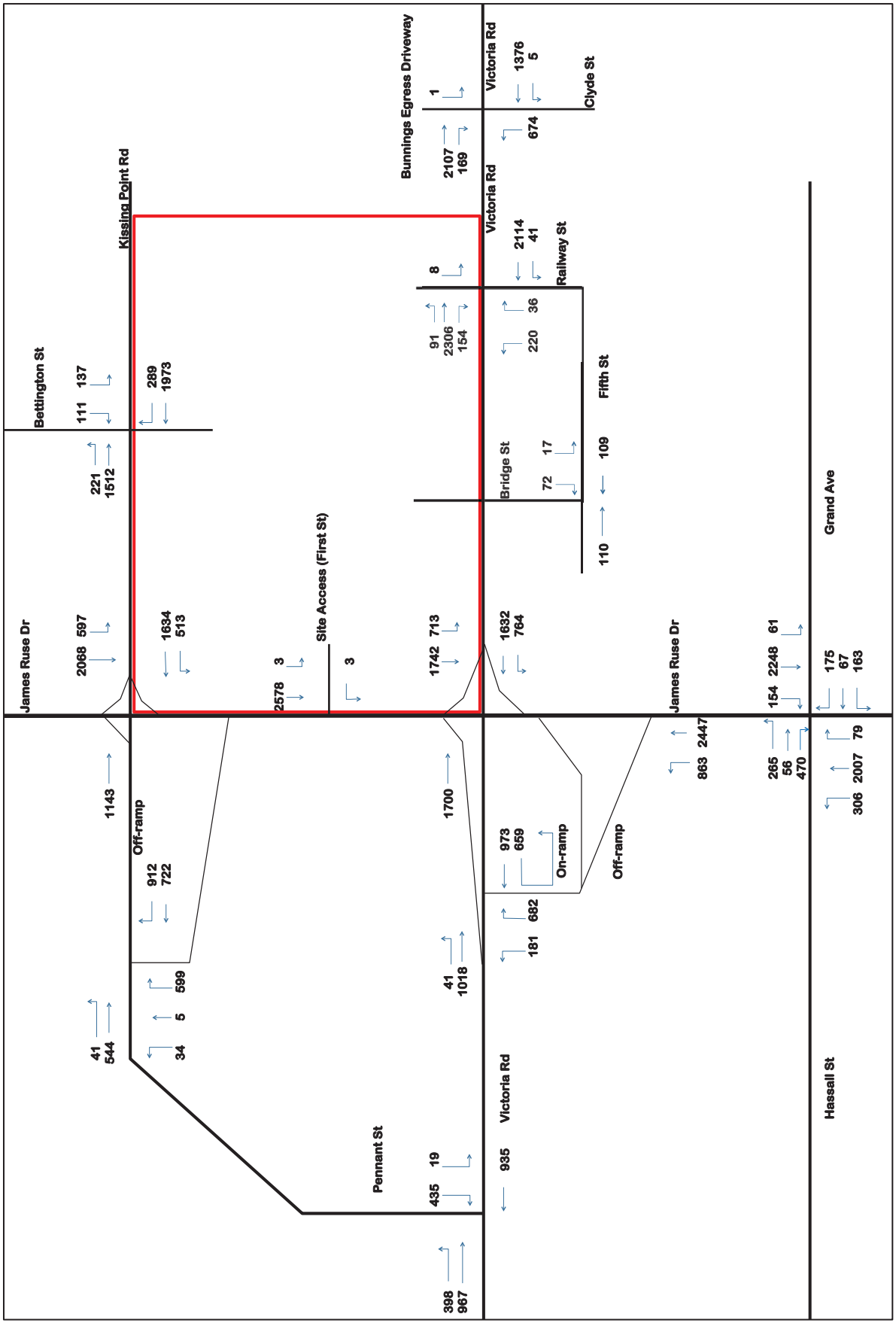


Figure 13: Network Traffic Volumes - Existing (2016) PM Peak

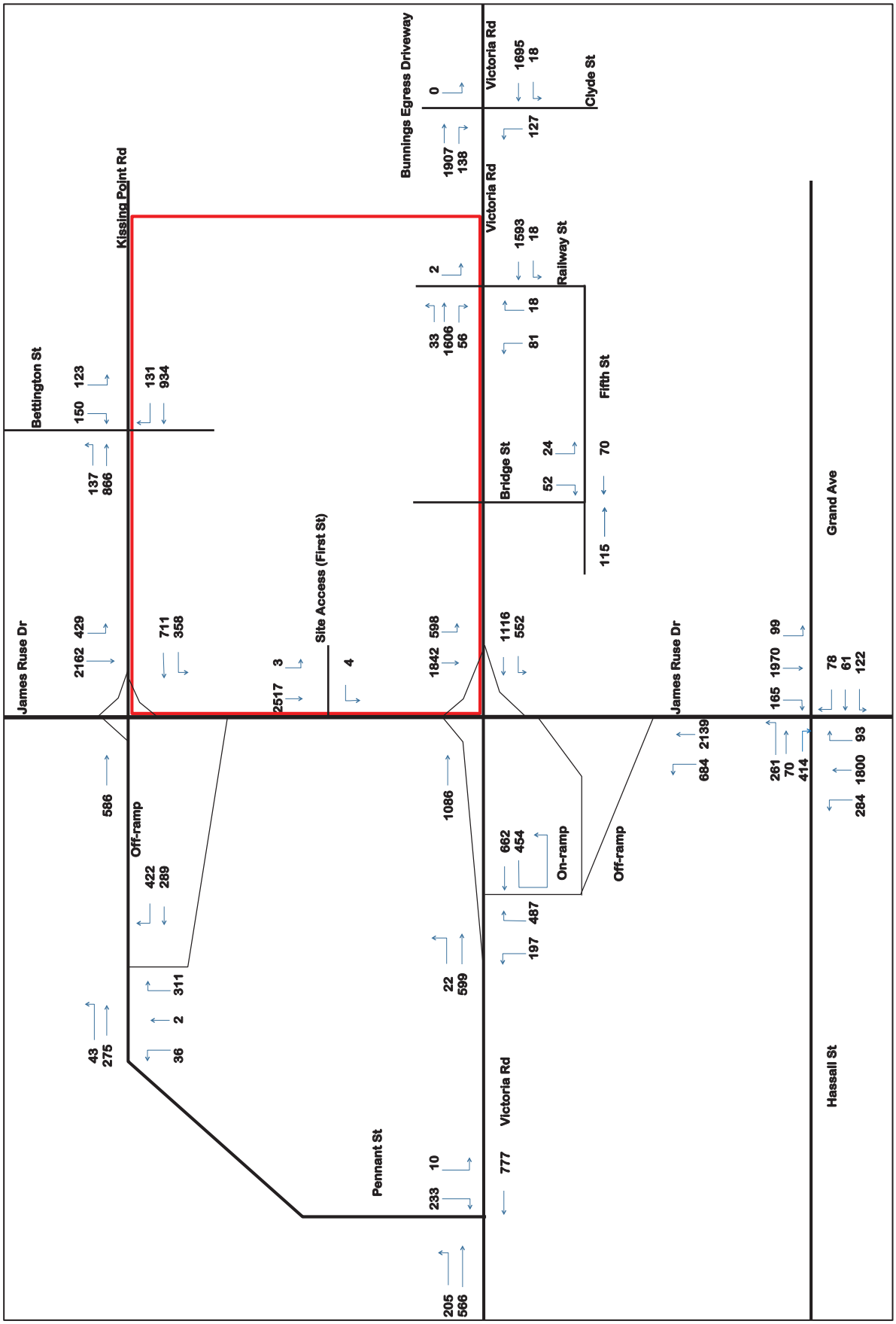


Figure 14: Network Traffic Volumes - Existing (2016) Saturday Peak

4.8 Road Network Performance

The performance of the key intersections has been analysed using the SIDRA Network modelling software. SIDRA modelling outputs a range of performance measures, in particular:

- *Degree of Saturation (DOS)* – The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- *Average Vehicle Delay (AVD)* – Delay represents the difference between interrupted and uninterrupted travel times through an intersection and is measured in seconds per vehicle. Delays include queued vehicles accelerating and decelerating from/to the intersection stop lines, as well as general delays to all vehicles travelling through the intersection. The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.
- *Level of Service (LOS)* – This is a comparative measure that provides an indication of the operating performance, based on AVD. For signalised and roundabout intersections, LOS is based on the average delay to all vehicles, while at priority controlled intersections LOS is based on the worst approach delay.

Table 7 outlines the relevant performance criteria in accordance with the RMS Guide.

Table 7: Intersection Assessment Criteria

Level of Service	Average Delay per Vehicle (sec/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

A summary of the performance of key intersections is shown in **Table 8**.

Table 8: Existing (2016) Intersection Performance

Intersection	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Victoria Road / Pennant Street	AM	0.687	10.4 sec	A
	PM	0.654	9.8 sec	A
	SAT	0.770	10.5 sec	A
James Ruse Drive / Kissing Point Road / Pennant Street	AM	0.805	20.0 sec	B
	PM	0.985	68.7 sec	E
	SAT	0.755	17.5 sec	B
Kissing Point Road / Bettington Road	AM	0.909	22.3 sec	B
	PM	0.871	18.5 sec	B
	SAT	0.741	13.0 sec	A
James Ruse Drive / First Street	AM	0.509	17.9 sec	B
	PM	0.354	11.8 sec	A
	SAT	0.346	11.6 sec	A
James Ruse Drive / Victoria Road	AM	0.923	20.3 sec	B
	PM	0.837	12.5 sec	A
	SAT	0.629	10.1 sec	A
Victoria Road / Railway Street / Bridge Street	AM	0.920	22.9 sec	B
	PM	0.957	26.9 sec	B
	SAT	0.880	15.1 sec	B
Victoria Road / Clyde Street	AM	0.936	34.9 sec	C
	PM	0.893	23.6 sec	B
	SAT	0.862	17.4 sec	B
James Ruse Drive / Hassall Street / Grand Avenue	AM	0.967	54.0 sec	D
	PM	0.951	51.7 sec	D
	SAT	0.903	48.4 sec	D

The results, as shown in the table above, demonstrates that the operation of the intersection of James Ruse Drive, Kissing Point Road and Pennant Street is operating at capacity with Level of Service (LOS) E during the weekday evening peak period. The intersection of James Ruse Drive, Hassall Street and Grand Avenue is operating near capacity (LOS D) during all peak periods.

All other intersections operate with acceptable delays, with a Level of Service C or better during both peak periods. Accordingly, these intersections have spare capacity to accommodate future growth in traffic volumes.

5 Strategic Context

5.1 A Plan for Growing Sydney

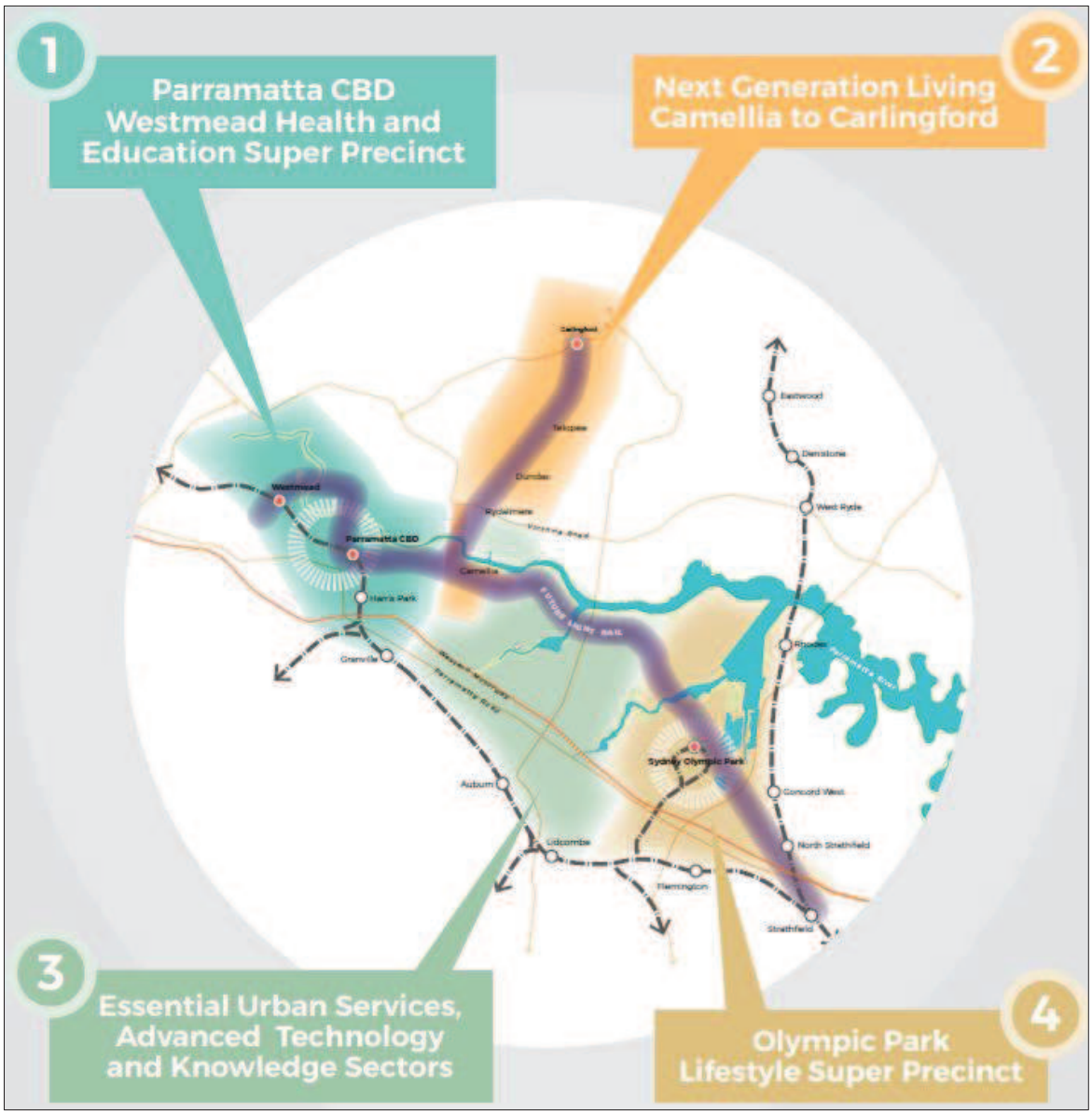
A Plan for Growing Sydney sets a number of NSW Government's goals and outlines specific priorities within the various sub-regions throughout NSW. The Plan seeks to identify suitable locations for new services, homes and employment close to the existing and planned transport infrastructure serving the West Central sub-region. This includes the Carlingford Railway Line which runs to the east of the subject Site. Accordingly, provision of increased residential and employment uses on the Site is considered complimentary to the goals of A Plan for Growing Sydney.

The Plan also seeks to improve transport connections between Greater Parramatta and other centres, starting with Macquarie Park via Carlingford. It prioritises the delivery of light rail services to Parramatta to improve connections between jobs and housing. Parramatta Light Rail is discussed further below.

5.2 GPOP: Greater Parramatta and the Olympic Peninsula

Greater Parramatta and the Olympic Peninsula (GPOP) was identified as a new priority growth area in *A Plan for Growing Sydney*. GPOP is an urban renewal area of 40,000ha in Greater Sydney spanning 13km from Strathfield to Westmead and 7km from Carlingford to Lidcombe and Granville, along the planned Parramatta Light Rail corridor. In October 2016, the Greater Sydney Commission (GSC) launched *GPOP Vision.* In accordance with this document, GPOP will be formed around four distinct quarters:

- **Parramatta CBD and Westmead** Health and Education Super Precinct
- **Next Generation Living** from Camellia to Carlingford
- **Essential Urban Services, Advanced Technology and Knowledge Sectors** in Camellia, Rydalmere, Silverwater and Auburn
- **Olympic Park Lifestyle** Super Precinct



Source: [Greater Sydney Commission, GPOP Vision, 2016]

The subject site is located in the Next Generation Living Precinct, a living, learning and leisure district which will comprise a mix of medium to high-density housing types with nearby education, research, retail, recreation and entertainment facilities providing all the conveniences of inner-city living. The subject site itself is specifically identified as **Smart Living: Rydalmere**:

> *'The 19-hectare site opposite the Western Sydney University's campus at Rydalmere will be redeveloped with a mix of housing types to cater for people seeking an inner-city lifestyle next door to a great university campus. This redevelopment will contain retail and commercial uses — designed to suit businesses seeking to build strong relationships with this world-class institution.'*

5.3 Long Term Transport Master Plan

The Long Term Transport Master Plan (LTTMP) highlights the Parramatta to the Sydney CBD via Ryde as a constrained transport corridor. This corridor is centred on Victoria Road and forecasts suggest that the car travel time will increase to 91 minutes from 76 minutes during peak times under a 'do nothing' scenario. Furthermore, the LTTMP forecasts:

- bus demand will increase by up to 30 percent; and
- traffic growth of approximately 10 percent will be constrained by capacity on the corridor.

As such, the LTTMP identifies the key actions that will improve the operation of the corridor, including:

- the investigation of a Bus Rapid Transit along Victoria Road; and
- the implementation of the northern sector of WestConnex.

The completion of WestConnex is expected to reduce the traffic demand on Victoria Road, which in turn will allow for the opportunity to improve the bus infrastructure. Furthermore, investigation into the implementation of Light Rail as a method of reducing traffic demand is currently underway.

The LTTMP also seeks to promote Sydneysiders to use bicycle as a form of transport, particularly for areas within a 5 kilometre catchment of local centres. In this regard, the subject Site is located within 2.5 kilometres of Parramatta CBD and therefore provides an opportunity to encourage more residents to use bicycles for both commuter and other trip purposes. As detailed in Section 3.4, there are a number of cycleways within the vicinity of the Site. In particular, connections to the Parramatta foreshore cycle path would be particularly desirable. Improved access to this and other cycle routes will allow for increased connectivity to the Parramatta CBD and other local centres, including Carlingford, Westmead and on to Olympic Park. This will reduce the total traffic generation of the development.

The Planning Proposal also proposes improved pedestrian accessibility to Rydalmere train station. This will promote the increased use of the existing rail (or future Light Rail) network and will promote the use of public transport by future residents.

5.4 Parramatta Light Rail

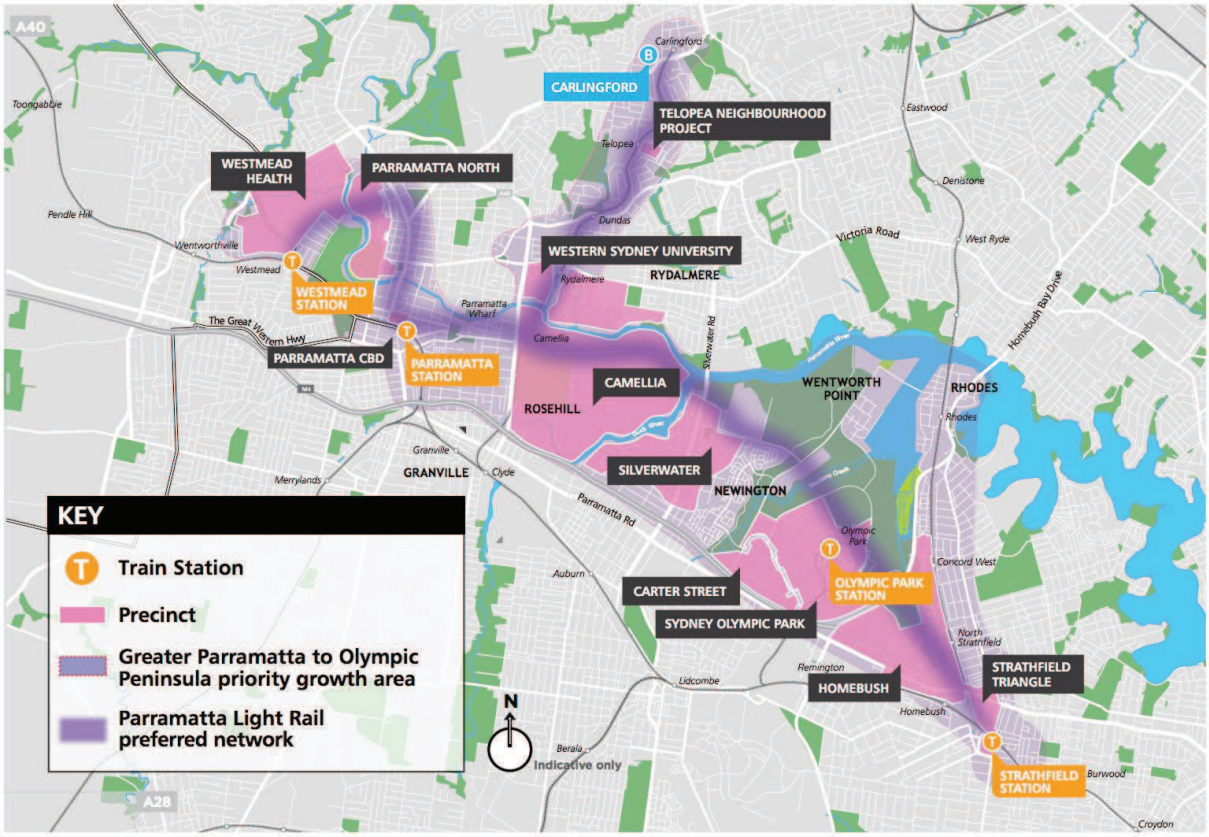
Detailed planning and the business case for the Parramatta Light Rail (PLR) is currently under consideration by TfNSW. However, it is noted that the preferred PLR network currently follows the existing Carlingford Railway Line, particularly in the vicinity of the subject Site, as shown in **Figure 15**. The PLR will provide an increased frequency of services with direct connections to the Parramatta CBD. Accordingly, the Site will provide an opportunity for increased residential density within 30

minutes travel from the Parramatta CBD, thereby supporting increased employment within Greater Parramatta whilst minimising transport loads.

The current planning for the Rydalmere Precinct as part of the PLR investigations outlines that the PLR will "*support future opportunities for residential, commercial and retail land uses in the area between James Ruse Drive, Victoria Road and Kissing Point Road*" (the subject Site).

It is also noted that any new Light Rail station in Rydalmere would be expected to provide dual sided access. In the context of the existing Rydalmere Station location, this would enable more direct access to WSU and the subject Site by eliminating the need to cross the railway line using the Victoria Road bridge. This would increase the accessibility to public transport by reducing the walking distances required to access the current Rydalmere railway station. The wider impacts arising from the Parramatta Light Rail will presumably form part of the Environmental Assessment for the PLR to be prepared at a later date and separate to this planning proposal.

Furthermore, the TfNSW Parramatta Light Rail team has indicated in-principle support for the rezoning with increased density in close proximity supporting the business case for provision of the Light Rail.



Source: Parramatta Light Rail

Figure 15: Parramatta Light Rail - Preferred Network

5.5 Western Sydney Regional Ring Road

The Western Sydney Regional Ring Road concept was developed by Parramatta City Council and seeks to establish a regional arterial road circulating the Parramatta CBD. This is in response to a number of strategic transport corridors radiating from Parramatta and outlines a number of intersection upgrades to facilitate creation of the Ring Road as summarised in Figure 16.

In the vicinity of the Site, it can be seen that the Ring Road identifies upgrade works to the intersections of James Ruse Drive with Kissing Point Road and Victoria Road intersections. Further afield, upgrade works are identified at the intersection of James Ruse Drive with Hassall Street and Grand Avenue.

STAGE 1 HIGH

1	Extend right turn lane from James Ruse Dr to Grand Ave reduces congestion on James Ruse Dr	<$1 m
2	Camellia Link Road (under James Ruse Dr to Unwin St) provides a direct connection to the M4	$5 m
3	Grade separate James Ruse Dr from Grand Ave/Hassall St to remove delay to James Ruse Dr traffic	$60 m
	TOTAL	**$66 m**

STAGE 2 MEDIUM

4	Widen Windsor Rd bridge over Cumberland Hwy	$20 m
5	Increase access to the M4 from Woodville Rd and Church St	$4 m
6	Lower the Cumberland Hwy between Windsor Rd and Redbank Rd	$100 m
	TOTAL	**$124 m**

STAGE 3 LOW

7	New off-ramp from M4 to Great Western Hwy	$20 m
8	Reduce access from Smith St to Cumberland Hwy and new pedestrian bridge	$3 m
9	Grade separate Great Western Hwy/Cumberland Hwy and Cumberland Hwy/M4	$60 m
10	New ramps between James Ruse Dr and Victoria Rd	$40 m
11	New on-ramp from James Ruse Dr to M4	$20 m
12	Improve right turn from Kissing Point Rd to James Ruse Dr	$1 m
13	Improved turning capacity along Cumberland Hwy at Old Windsor Rd/Hart Dr	$4 m
14	Close Wentworth St, new pedestrian bridge & modify Darcy St	$7 m
	TOTAL	**$155 m**
	PROJECT TOTAL	**$345 m**

Source: Parramatta City Council

Figure 16: Western Sydney Regional Ring Road - Proposed Upgrades

6 Traffic Assessment

6.1 Future Baseline

A future baseline traffic scenario has been assessed to provide a 'benchmark' from which to appropriately assess the impacts of the proposal compared to a long term 'do nothing' scenario. For the purposes of this assessment, future conditions relates to a 2026 scenario.

6.1.1 Future Baseline Traffic Volumes

Future traffic volumes have been derived from application of background growth rates, supplied by RMS, to the existing (surveyed) traffic volumes. Annual growth rates vary for individual road sections but are generally within a range of 1-4% per annum (up to a maximum of 5.9% p.a.). Application of these growth rates over the 10-year transport planning horizon therefore results in future traffic volumes increasing anywhere from 10-50% above existing volumes over that period. For example, westbound movements on Victoria Road during the weekday evening peak are forecast to experience growth of some 3.2% p.a. which equates to an increase of 37% above current volumes.

It should be noted that these background growth rates are far in excess of that envisaged under the NSW Long Term Transport Master Plan which states that traffic growth will be constrained (limited) to 10% along the Victoria Road corridor. Nevertheless, these rates have been adopted for the purposes of this study. Future traffic volumes adopted as part of this assessment are summarised for respective peak periods below.

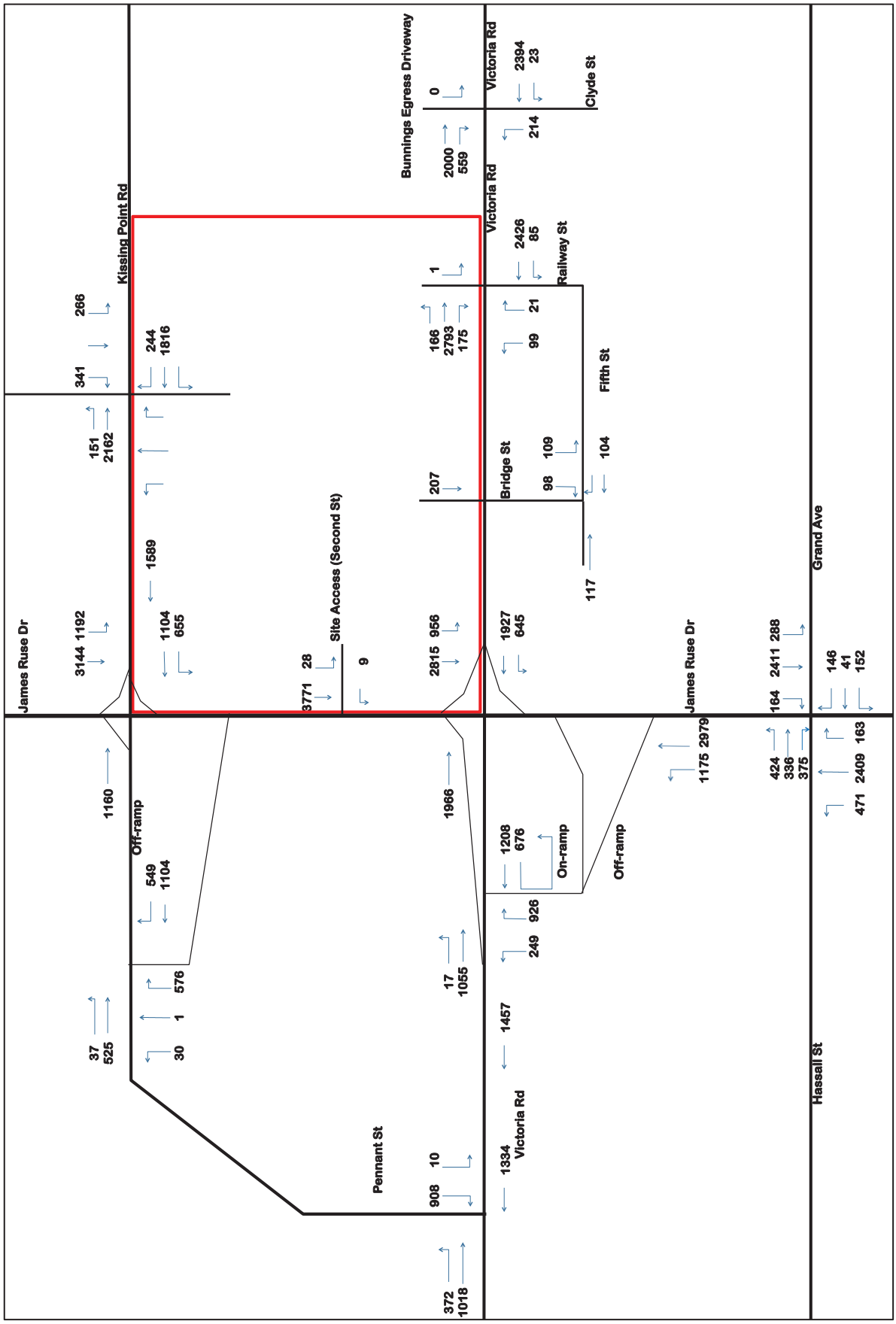


Figure 17: Network Traffic Volumes - Future (2026) AM Peak

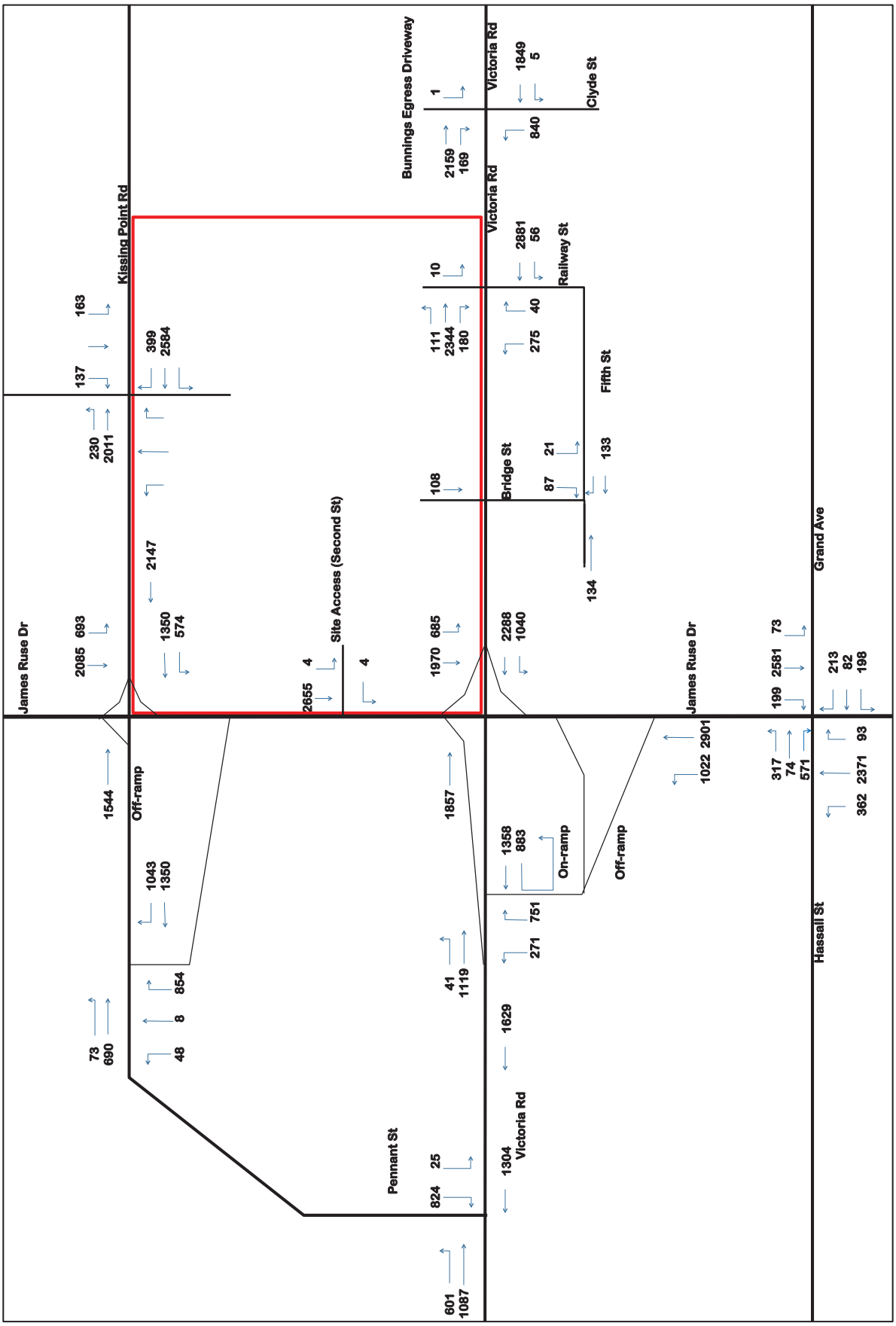


Figure 18: Network Traffic Volumes - Future (2026) PM Peak

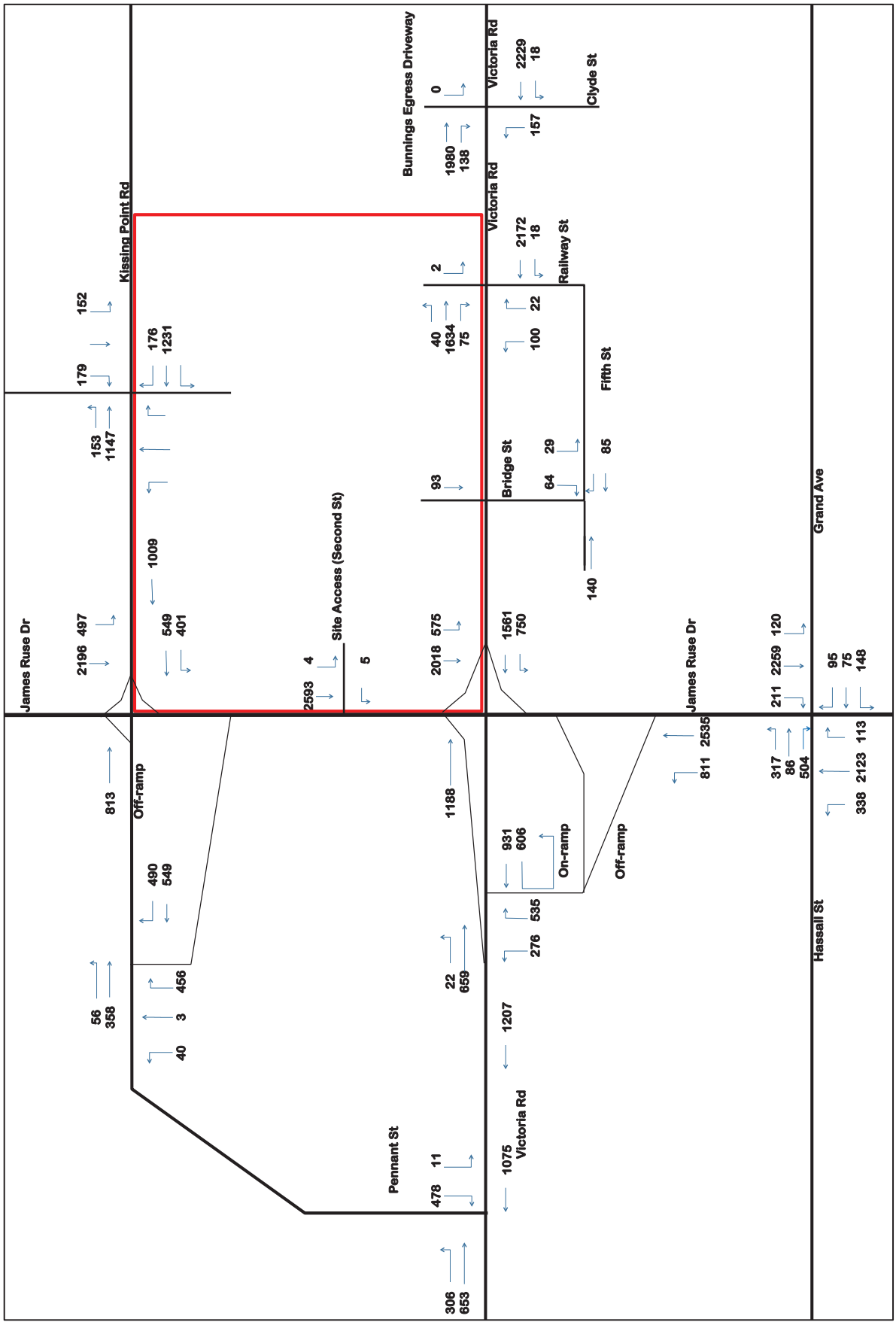


Figure 19: Network Traffic Volumes - Future (2026) Saturday Peak

6.1.2 Future Baseline Network Performance

The results of the SIDRA analysis for the future baseline conditions are summarised in **Table 9**.

Table 9: Future (2026) Baseline Intersection Performance

Intersection	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Victoria Road / Pennant Street	AM	0.898	18.7 sec	B
	PM	0.813	14.8 sec	B
	SAT	0.741	10.8 sec	A
James Ruse Drive / Kissing Point Road / Pennant Street	AM	1.080	101.1 sec	F
	PM	1.207	166.2 sec	F
	SAT	0.811	19.5 sec	B
Kissing Point Road / Bettington Road	AM	0.978	56.3 sec	D
	PM	0.901	28.7 sec	C
	SAT	0.831	15.4 sec	B
James Ruse Drive / First Street	AM	0.525	18.9 sec	B
	PM	0.365	12.1 sec	A
	SAT	0.357	11.9 sec	A
James Ruse Drive / Victoria Road	AM	0.965	55.4 sec	D
	PM	0.781	12.8 sec	A
	SAT	0.675	10.2 sec	A
Victoria Road / Railway Street / Bridge Street	AM	1.016	55.7 sec	D
	PM	0.980	36.1 sec	C
	SAT	0.900	18.9 sec	B
Victoria Road / Clyde Street	AM	1.205	146.8 sec	F
	PM	2.385	265.0 sec	F
	SAT	0.802	14.1 sec	A
James Ruse Drive / Hassall Street / Grand Avenue	AM	1.244	216.6 sec	F
	PM	1.148	157.8 sec	F
	SAT	1.128	155.7 sec	F

The results demonstrates that the following intersections will all exceed nominal capacity with a Level of Service F during weekday peak periods:

- James Ruse Drive / Kissing Point Road / Pennant Street
- Victoria Road / Clyde Street; and
- James Ruse Drive / Hassall Street / Grand Avenue.

It should also be noted that ramp weaving analysis, in accordance the *Highway Capacity Manual 2010* procedures, for the James Ruse Drive off-ramp to Victoria Road site access will also exceed capacity under forecast future traffic volumes.

All other intersections operate with acceptable delays and with a Level of Service D or better during critical weekday peak periods.

7 Traffic Impacts

7.1 Existing + Baseline Growth + Development

7.1.1 Development Traffic Generation

The traffic generation rates adopted in this assessment and provided in **Table 10** are based on the rates published within the RMS *Guide to Traffic Generating Developments* and subsequent updated rates in accordance with Technical Direction 04a (the RMS Guide Update).

A report prepared by GHD outlines the 'Accessibility Scores' of the high-density residential developments that were surveyed to develop the RMS Guide Update rates. This report states "*The Accessibility Score aims to reflect the proximity of a site to public transport facilities and considers the type of public transport, how close it is to the development and the frequency of the service, to arrive at a cumulative score of public transport accessibility*". Using the RMS methodology to determine the Accessibility Score gives the Site a score of 102. The average of the Accessibility Scores of the developments surveyed in the RMS Guide Update was 117.9, with a range from 63.5 to 248. As such, the adoption of the residential trip rates outlined in the RMS Guide Update is considered appropriate, particularly with regard for the preliminary nature of this assessment.

With regard to the retail component of the development, the RMS Guide provides trip rates for the critical evening peak hour only. The RMS Guide does not specify morning peak hour trip rate; therefore, an assumed trip rate equivalent to 30% of the adopted PM peak hour trip rate has been adopted for the purposes of this analysis.

Table 10: Adopted Vehicle Generation Rates

Land Use	AM Peak Hour Rate	PM Peak Hour Rate	SAT Peak Hour Rate
Residential	0.19 veh/hr/unit	0.15 veh/hr/unit	0.18 veh/hr/unit
Retail – Supermarket	4.65 veh/hr/100m^2	15.5 veh/hr/100m^2	14.7 veh/hr/100m^2
Retail – General (Specialty)	1.38 veh/hr/100m^2	4.6 veh/hr/100m^2	10.7 veh/hr/100m^2
Child Care Centre	0.8 veh/hr/child	0.7 veh/hr/child	0 veh/hr/child
Gym	9 veh/hr/100m^2	9 veh/hr/100m^2	9 veh/hr/100m^2
Commercial	1.6 veh/hr/100m^2	1.2 veh/hr/100m^2	0 veh/hr/100m^2

Application of these rates to the subject development would result in a nominal traffic generation of between 1,250 – 1,550 vehicles per hour, as summarised in **Table 11**.

Table 11: Development Traffic Generation (No On-site Containment)

Land Use	AM	IN	OUT	PM	IN	OUT	Sat	IN	OUT
Residential	532	106	426	420	294	126	504	202	302
Retail Supermarket	140	98	42	465	233	232	441	221	220
Retail General	28	20	8	92	46	46	214	107	107
Child Care	53	27	26	46	23	23	0	0	0
Gym	135	68	67	135	68	67	135	68	67
Commercial	520	468	52	390	117	273	0	0	0
TOTAL	1,408	787	621	1,548	781	767	1,294	598	696

However, due to the scale and nature of the development, it is expected that the retail offering, particularly the general retail specialty shops, will largely be ancillary to the residential and commercial components of the development. The RMS Guide advises that a shopping centres of 10,000m^2 or less typically generate 25% of its traffic as linked trips (or 'pass-by' trips). These are trips that are taken as a side-track to another trip, for example, a commuter stopping on the way home from work. With regard to the general retail specialty shops, child care centre, and gym components of the development, it is expected that these are to be local amenities designed to service the residential component of the development. Accordingly, a large proportion of the retail trips generated by the development will be contained within the overall site. As such, this analysis has assumed the following on-site trip containment for respective land-uses:

- Residential: 5%
- Retail – supermarket: 25%
- Retail – general specialty: 50%
- Child Care Centre: 50%
- Gym: 50%
- Commercial: 0%

Having regard for the above, the traffic volumes generated by the development on the external road network will be in the order of that outlined in **Table 12** below.

Table 12: Development Traffic Generation (External)

Land Use	AM	IN	OUT	PM	IN	OUT	Sat	IN	OUT
Residential	505	101	404	399	279	120	479	192	287
Retail Supermarket	105	74	31	349	175	174	331	166	165
Retail General	14	10	4	46	23	23	107	54	53
Child Care	27	14	13	23	12	11	0	0	0
Gym	68	34	34	68	34	34	68	34	34
Commercial	520	468	52	390	117	273	0	0	0
TOTAL	1,239	701	538	1,275	640	635	985	446	539

It can be seen from Table 12 that the development will generate in the order of 1,200 - 1,300 external vehicle trips per hour during the critical weekday morning and evening peak periods. Traffic volumes on weekends will be approximately 985 vehicles per hour.

7.1.2 Traffic Distribution

With regard to the local road network, a number of origin-destination zones have been adopted to account for distribution of traffic onto the wider road network as follows:

- Zone 1 – James Ruse Drive north of the intersection with Kissing Point Road and Pennant Street.
- Zone 2 – Kissing Point Road, east of the intersection with Bettington Road.
- Zone 3 – Victoria Road, east of the intersection with Clyde Street.
- Zone 4 – James Ruse Drive, south of the intersection with Hassall Street and Grand Avenue.
- Zone 5 – Victoria Road, west of the intersection with Pennant Street, southern egress.
- Zone 6 – Pennant Street, via northern access to Kissing Point Road.

The trips have been distributed onto the surrounding road network based generally on the travel patterns evident from the existing traffic flows on the network, combined with a review of Journey to Work census data for residents and workers in the surrounding area. Within the context of the zones outlined above, the trip distributions outlined in **Table 13** have been adopted.

Table 13: Adopted Traffic Distribution

Origin / Destination	Residential		Commercial		Retail	
	IN	OUT	IN	OUT	IN	OUT
Zone 1	15%	10%	20%	15%	20%	15%
Zone 2	15%	20%	10%	15%	20%	15%
Zone 3	25%	35%	10%	15%	25%	20%
Zone 4	35%	25%	50%	40%	15%	15%
Zone 5	10%	10%	10%	10%	20%	20%
Zone 6	Banned	0%	Banned	5%	Banned	15%

Application of the distribution assumptions to the adopted traffic generation results in the following development traffic volumes on the study road network, as presented in below.

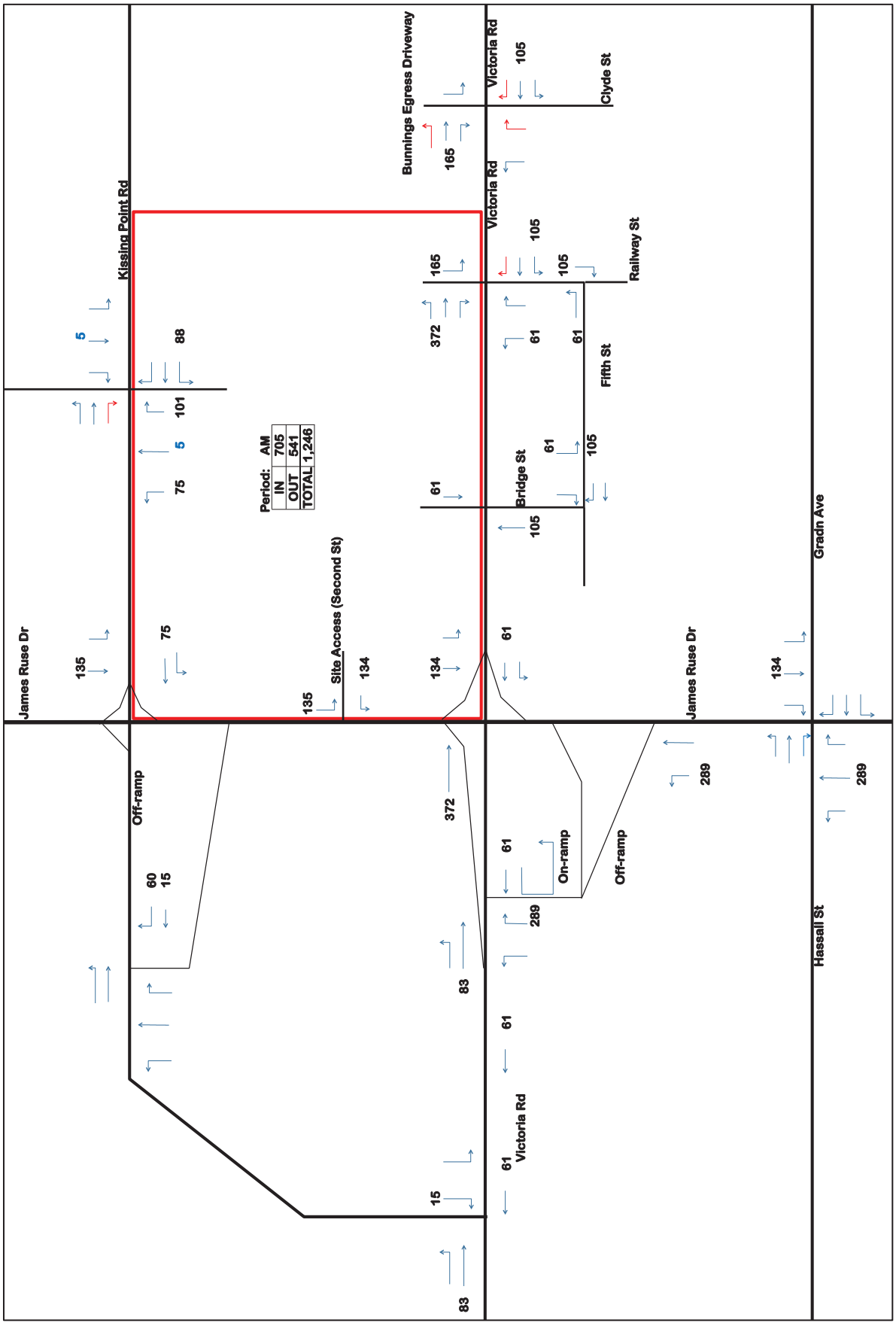


Figure 20: Development Traffic Volumes - AM Peak

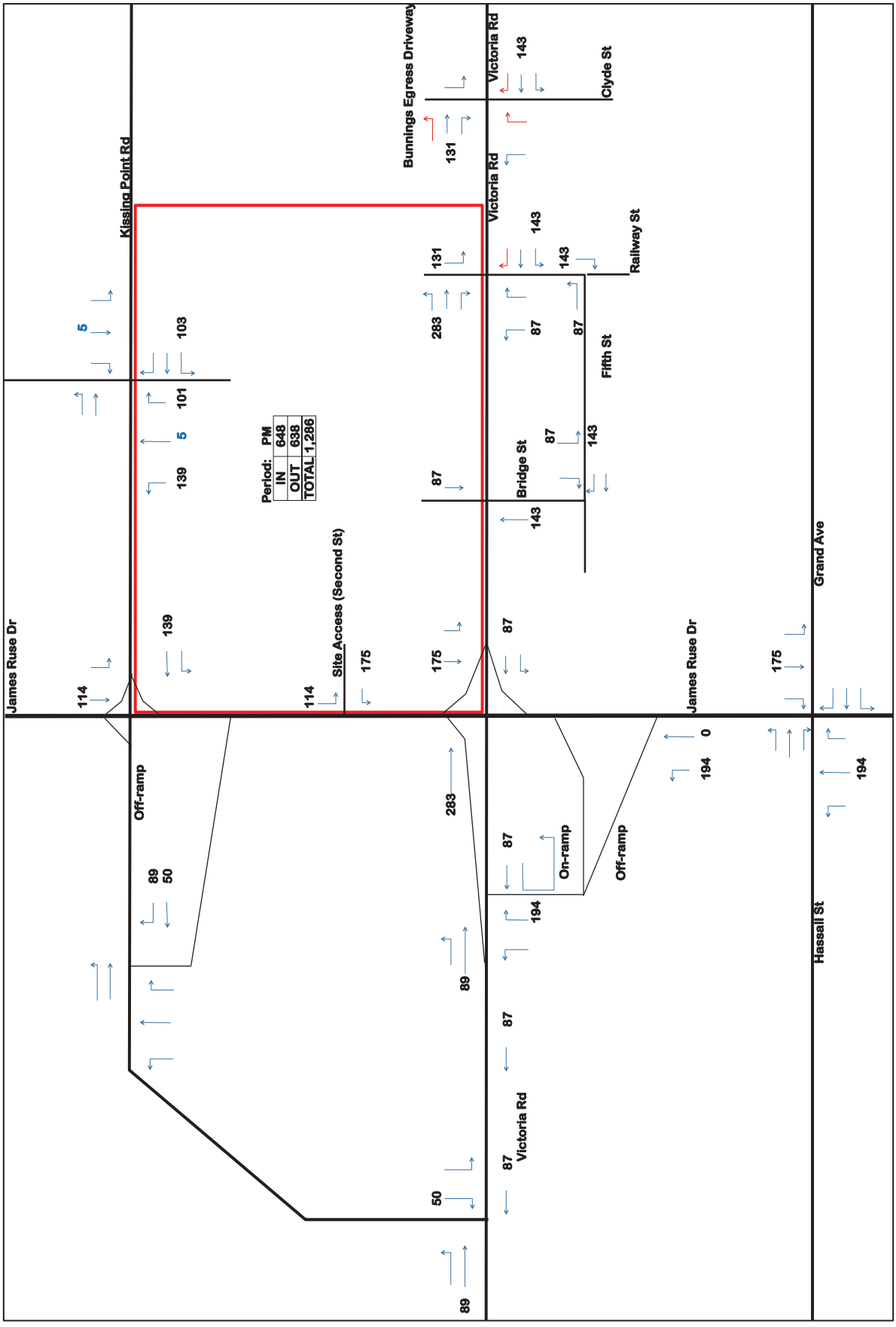


Figure 21: Development Traffic Volumes - PM Peak

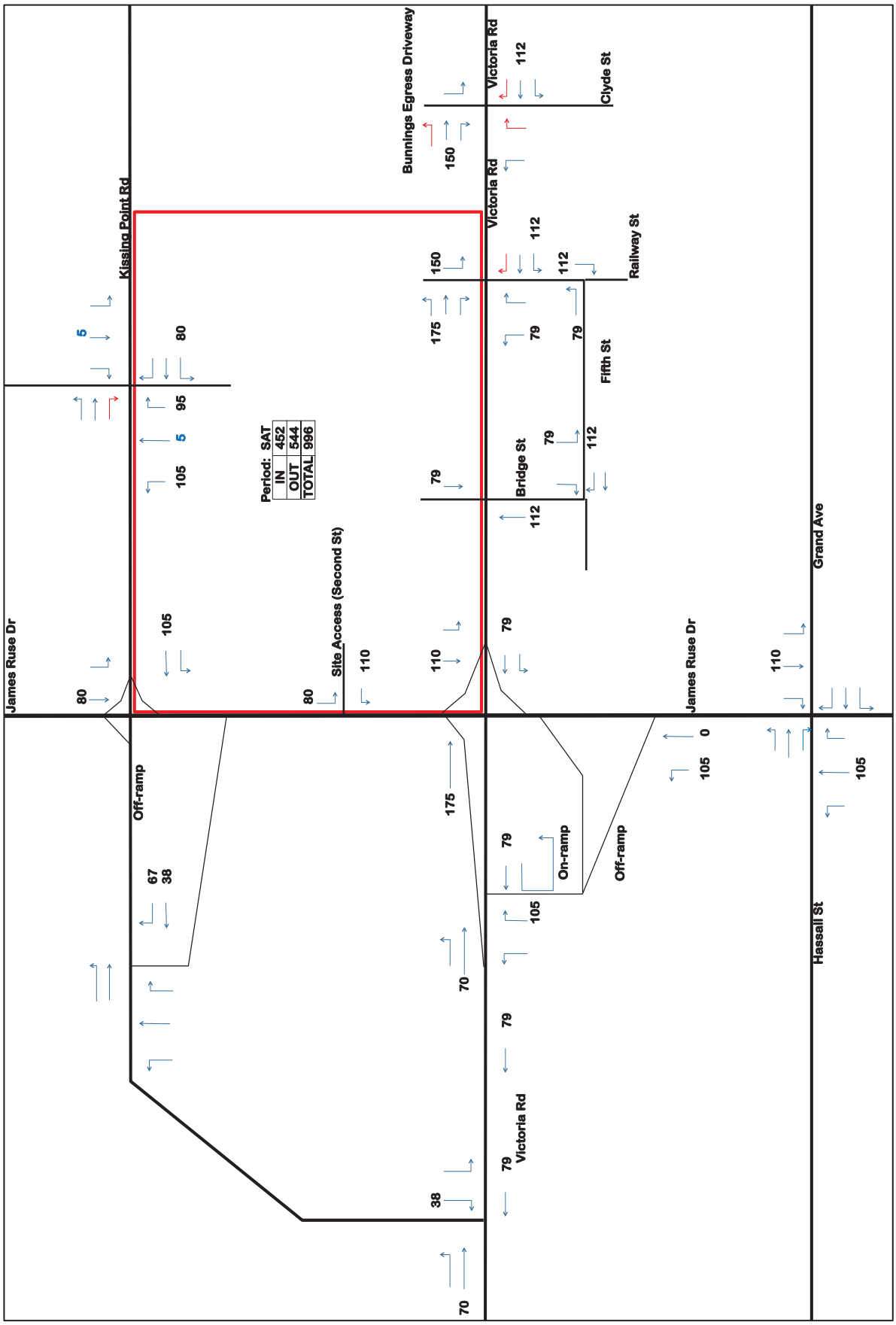


Figure 22: Development Traffic Volumes - Saturday Peak

7.1.3 Existing + Background Growth + Development Modelling Results

The results of the Future Baseline plus Development SIDRA analysis are summarised in **Table 14**.

Table 14: Future 2026 + Development Intersection Performance

Intersection	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Victoria Road / Pennant Street	AM	0.992	64.2 sec	E
	PM	0.857	17.4 sec	B
	SAT	0.786	11.6 sec	A
James Ruse Drive / Kissing Point Road / Pennant Street	AM	1.107	104.8 sec	F
	PM	1.719	457.1 sec	F
	SAT	0.792	20.6 sec	B
Kissing Point Road / Bettington Road / New Access Road	AM	1.399	248.9 sec	F
	PM	1.091	95.4 sec	F
	SAT	0.831	16.7 sec	B
James Ruse Drive / New Access Road	AM	0.903	72.6 sec	F
	PM	0.381	12.8 sec	A
	SAT	0.368	12.0 sec	A
James Ruse Drive / Victoria Road	AM	1.354	223.7 sec	F
	PM	0.843	15.5 sec	B
	SAT	0.733	11.0 sec	A
Victoria Road / Railway Street / Bridge Street	AM	1.010	51.7 sec	D
	PM	0.993	33.3 sec	C
	SAT	0.900	18.4 sec	B
Victoria Road / Clyde Street	AM	1.189	141.6 sec	F
	PM	2.308	244.8 sec	F
	SAT	0.845	14.9 sec	B
James Ruse Drive / Hassall Street / Grand Avenue	AM	1.356	295.8 sec	F
	PM	1.290	233.4 sec	F
	SAT	1.333	243.4 sec	F

The results of the modelling demonstrate that all intersections will reach or exceed capacity in at least one of the peak periods.

As such, some indicative improvement options were investigated at the following intersections to improve overall network performance and improve access to and from the Site:

- James Ruse Drive / Kissing Point Road / Pennant Street.
- Kissing Point Road / Bettington Road / New Access Road.
- James Ruse Drive / New Access Road.
- Victoria Road / Railway Street / Bridge Street.

The extent of upgrade works will be subject to further detailed analysis and the indicative options outlined below are only an example of the type of works that may be required. Consultation with WSU will need to be on-going to ensure that any changes in traffic and intersection treatments are mutually beneficial to both the development site and WSU in the longer term. Identification of a package of measures necessary to support development of the Site will form a key component of any traffic study accompanying a subsequent Planning Proposal submission, following Gateway approval to proceed with further studies.

7.2 Improvement Works

7.2.1 James Ruse Drive / Kissing Point Road / Pennant Street

Figure 23 outlines the upgraded layout of the James Ruse Drive / Kissing Point Road / Pennant Street intersection.

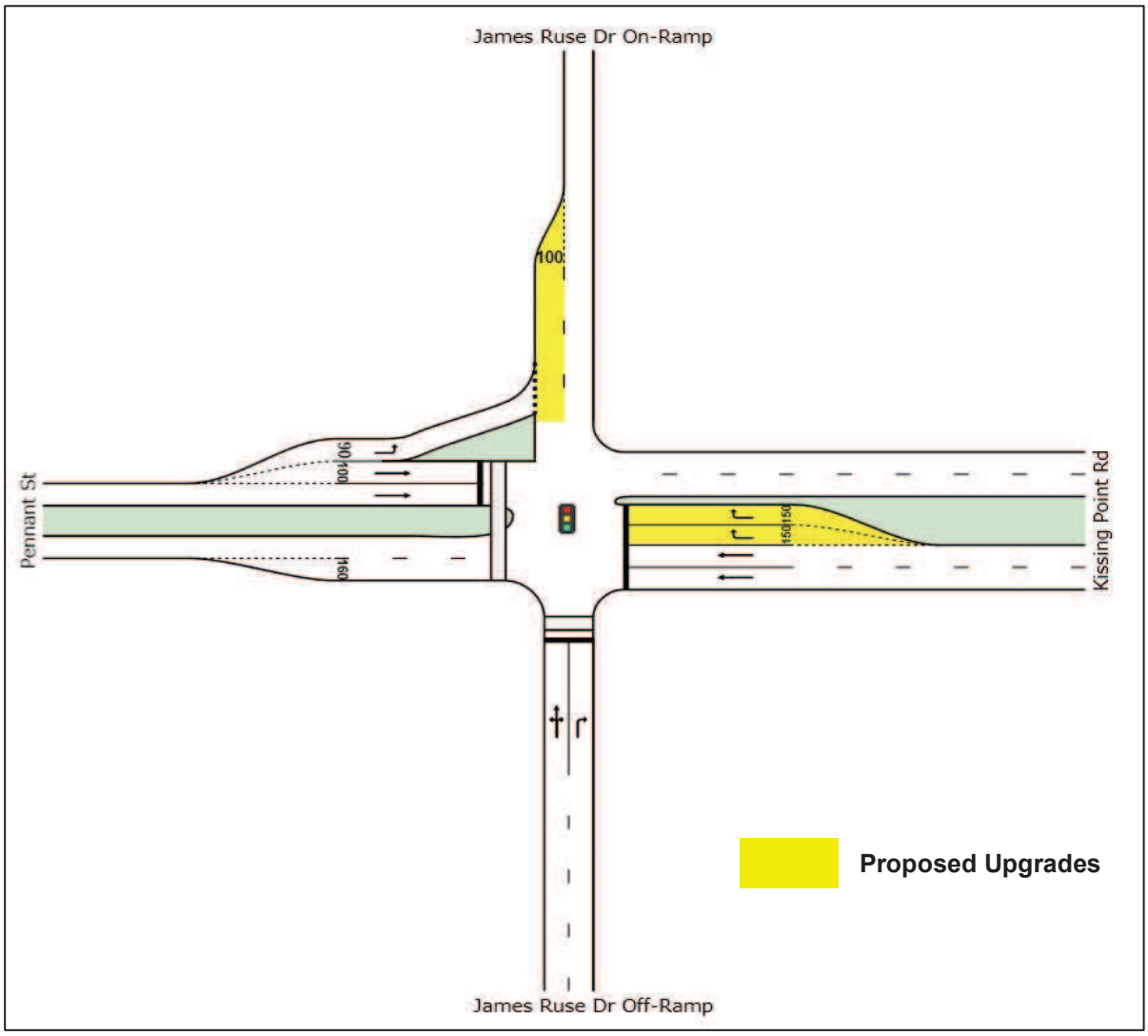


Figure 23: James Ruse Dr / Kissing Point Rd / Pennant St – Indicative Upgrade Layout

The key features of the upgraded intersection are as follows:

- Duplication of the right turn lane on Kissing Point Road (east approach), including extension of the existing right turn bay to 150 metres.
- Additional 100 metre exit lane to the James Ruse Drive On-Ramp (north approach departure) to facilitate the above right turn bay duplication.

7.2.2 Kissing Point Road / Bettington Road / New Site Access Road

The indicative layout of the Kissing Point Road / Bettington Road / New Access Road intersection adopted is presented in **Figure 24**.

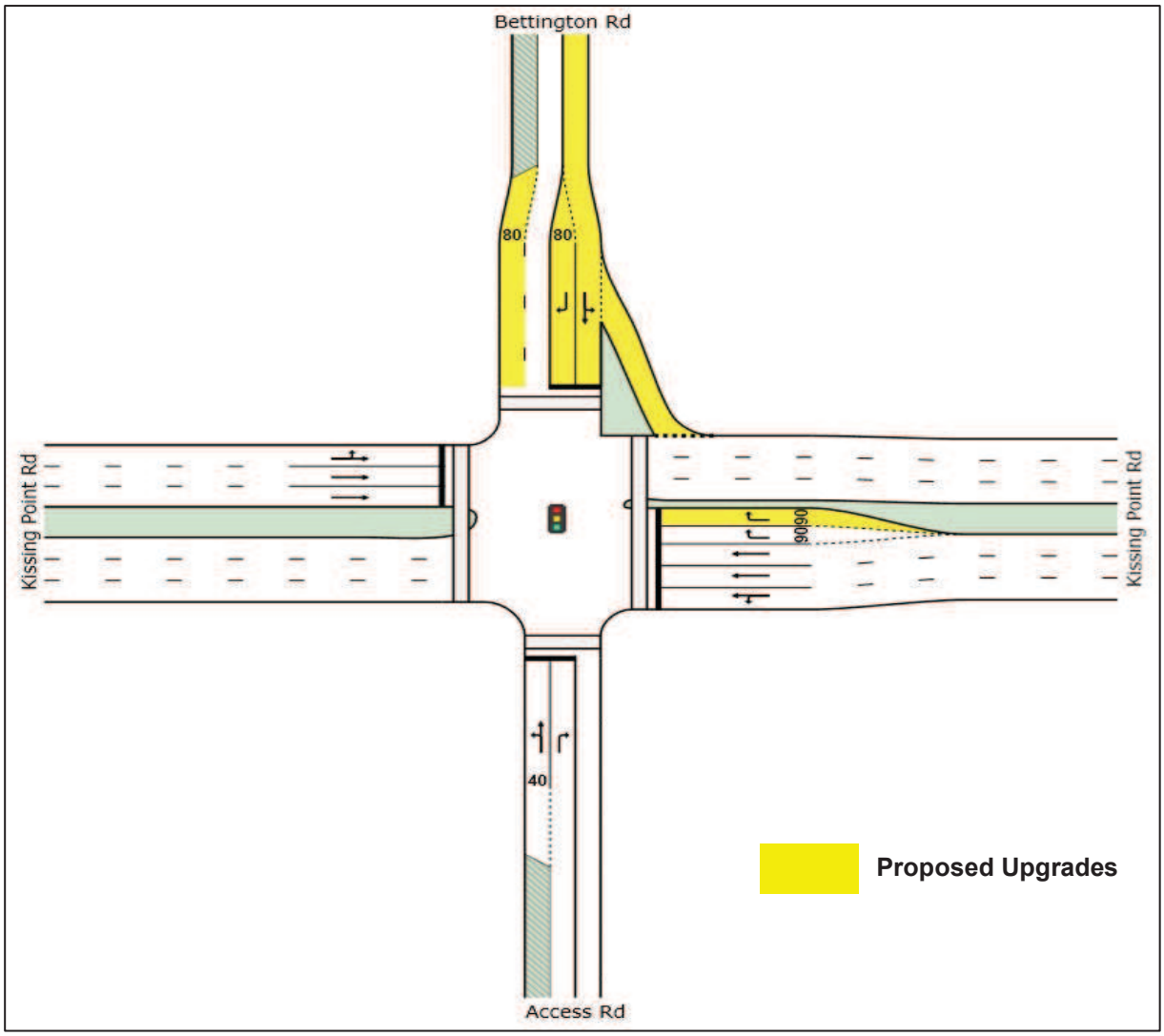


Figure 24: Kissing Point Rd / Bettington Rd / Site Access - Indicative Upgrade Layout

The key features of the upgraded intersection are as follows:

- Duplication of the right turn lane on Kissing Point Road (east approach),
- Additional 80 metre exit lane to the Bettington Road (north approach departure) to facilitate the above right turn bay duplication.
- Extension of dedicated right turn lane on Bettington Road from 60 metres to 80 metres.
- Addition of a left-turn slip lane on Bettington Road (north approach).

7.2.3 Victoria Road / Railway Street / Bridge Street

Figure 25 outlines the upgraded layout of the Kissing Point Road / Bettington Road / Access Road intersection adopted.

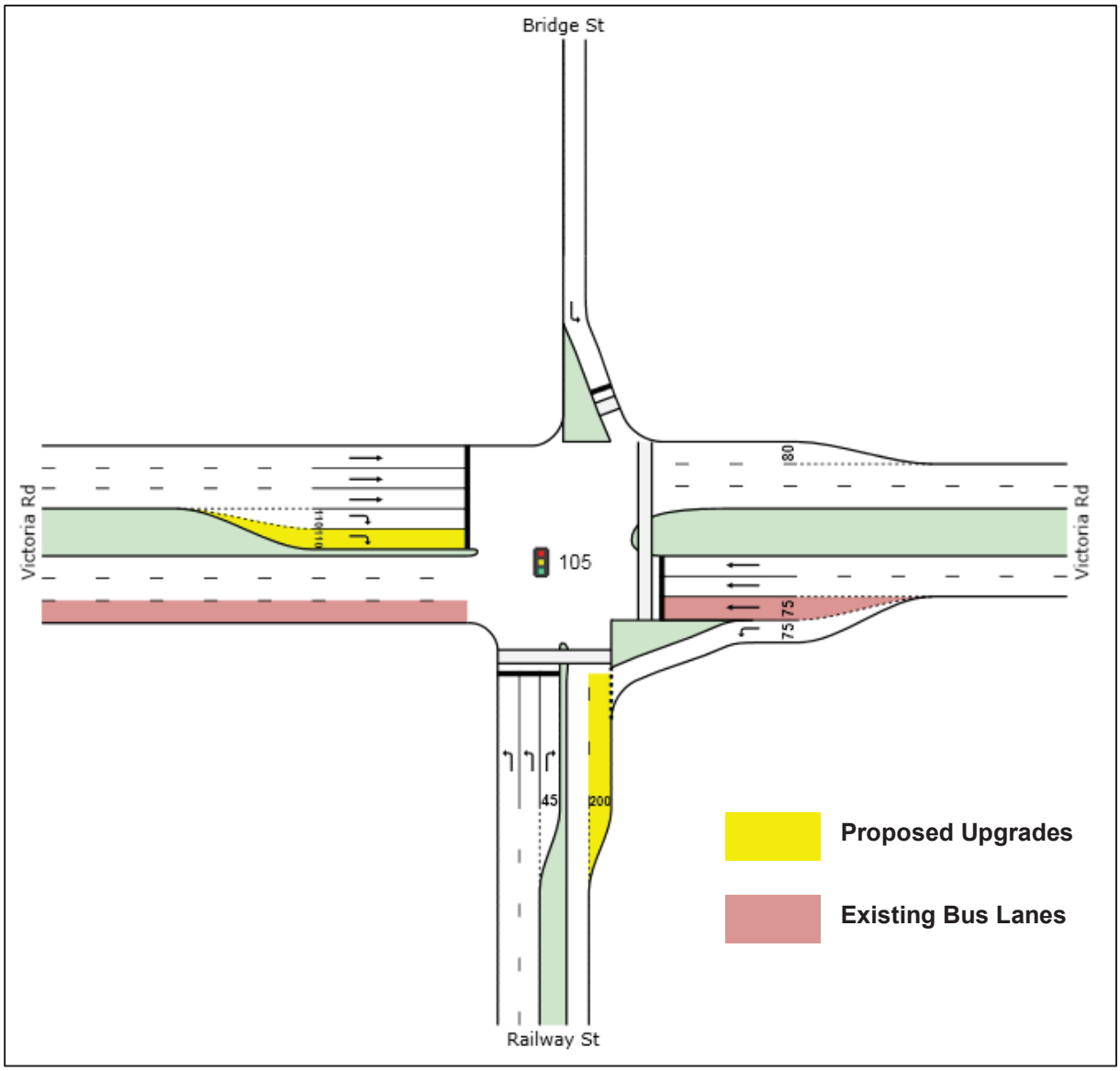


Figure 25: Victoria Rd / Railway St / Bridge St - Indicative Upgrade Layout

The key features of the upgraded intersection are as follows:

- Closure of the left turn entry to the subject Site (Bridge Street for safety reasons associated with the merge from Victoria Road).
- Additional right turn lane on Victoria Road (west approach).
- Extension of the departure lane on Railway Street (south approach) to 200 metres.

- Relocation of signalised pedestrian crossing from the western approach of Victoria Road to align with the eastern side of the Railway Street (south approach).
- Signalisation of the left turn egress from the Site (north approach) to Victoria Road

7.3 Future 2026 + Development + Improvement Works

7.3.1 Modelling Results

The results of the future baseline plus development plus intersection upgrades SIDRA analysis are summarised in **Table 15**.

Table 15: Intersection Performance Summary -Future 2026 + Development + Upgrades

Intersection	Period	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Victoria Road / Pennant Street	AM	1.000	68.4 sec	E
	PM	0.865	17.8 sec	B
	SAT	0.782	11.6 sec	A
James Ruse Drive / Kissing Point Road / Pennant Street	AM	0.986	65.9 sec	E
	PM	1.081	82.1 sec	F
	SAT	0.823	16.4 sec	B
Kissing Point Road / Bettington Road / New Access Road	AM	1.001	57.6 sec	E
	PM	0.892	26.3 sec	B
	SAT	0.750	15.6 sec	B
James Ruse Drive / New Access Road	AM	0.778	43.2 sec	D
	PM	0.378	10.8 sec	A
	SAT	0.423	11.4 sec	A
James Ruse Drive / Victoria Road	AM	1.289	208.1 sec	F
	PM	0.858	15.2 sec	B
	SAT	0.733	10.9 sec	A
Victoria Road / Railway Street / Bridge Street	AM	1.037	79.6 sec	F
	PM	1.011	52.6 sec	D
	SAT	0.910	26.3 sec	B
Victoria Road / Clyde Street	AM	1.486	274.4 sec	F
	PM	2.670	434.2 sec	F
	SAT	0.863	17.9 sec	B
James Ruse Drive / Hassall Street / Grand Avenue	AM	1.356	287.8 sec	F
	PM	1.290	230.0 sec	F
	SAT	1.333	243.4 sec	F

A comparison of the results above and the results of the Future Baseline model is presented in **Table 16**.

Table 16: Intersection Performance Comparison

Intersection	Period	Future Baseline			Future Baseline +Development + Upgrades		
		Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)	Degree of Saturation (DOS)	Average Vehicle Delay (AVD)	Level of Service (LOS)
Victoria Road / Pennant Street	AM	0.898	18.7 sec	B	1.000	68.4 sec	E
	PM	0.813	14.8 sec	B	0.865	17.8 sec	B
	SAT	0.741	10.8 sec	A	0.782	11.6 sec	A
James Ruse Drive / Kissing Point Road / Pennant Street	AM	1.080	101.1 sec	F	0.986	65.9 sec	E
	PM	1.207	166.2 sec	F	1.081	82.1 sec	F
	SAT	0.811	19.5 sec	B	0.823	16.4 sec	B
Kissing Point Road / Bettington Road / New Access Road	AM	0.978	56.3 sec	D	1.001	57.6 sec	E
	PM	0.901	28.7 sec	C	0.892	26.3 sec	B
	SAT	0.831	15.4 sec	B	0.750	15.6 sec	B
James Ruse Drive / New Access Road	AM	0.525	18.9 sec	B	0.778	43.2 sec	D
	PM	0.365	12.1 sec	A	0.378	10.8 sec	A
	SAT	0.357	11.9 sec	A	0.423	11.4 sec	A
James Ruse Drive / Victoria Road	AM	0.965	55.4 sec	D	1.289	208.1 sec	F
	PM	0.781	12.8 sec	A	0.858	15.2 sec	B
	SAT	0.675	10.2 sec	A	0.733	10.9 sec	A
Victoria Road / Railway Street / Bridge Street	AM	1.016	55.7 sec	D	1.037	79.6 sec	F
	PM	0.980	36.1 sec	C	1.011	52.6 sec	D
	SAT	0.900	18.9 sec	B	0.910	26.3 sec	B
Victoria Road / Clyde Street	AM	1.205	146.8 sec	F	1.486	274.4 sec	F
	PM	2.385	265.0 sec	F	2.670	434.2 sec	F
	SAT	0.802	14.1 sec	A	0.863	17.9 sec	B
James Ruse Drive / Hassall Street / Grand Avenue	AM	1.244	216.6 sec	F	1.356	287.8 sec	F
	PM	1.148	157.8 sec	F	1.290	230.0 sec	F
	SAT	1.128	155.7 sec	F	1.333	243.4 sec	F

The improvement works identified will improve the performance of the network in comparison to the future 'do nothing' scenario, with the exception of the following intersections:

- Kissing Point Road / Betting Road / New Access Road level of services reduces from a "D" to an "E". However, the change in average delay is only 1.3 seconds such that the change in performance is considered negligible.

- James Ruse Drive / Hassall Street / Grand Avenue intersection performance is largely going to be governed by changes as a result of the Camellia Precinct redevelopment which is being planned separately. In this regard, it is noted that development traffic associated with the subject Site accounts for 5.8% and 5.5% of the total traffic using the intersection in the morning and evening peak period, respectively. Accordingly, it is expected that any package of upgrades required to that intersection would be identified as part of that urban renewal project and not specifically tied to this planning proposal.
- James Ruse Drive / Victoria Road has been identified for upgrade by The Western Sydney Regional Ring Road concept developed by Parramatta City Council and will require further consideration. Similar to the above, development traffic will represent approximately 8% of the future intersection traffic volumes and, accordingly, identification of necessary improvements to this intersection should reasonably be considered in the context of future capacity planning for the Victoria Road and James Ruse Drive corridors more generally.
- Victoria Road / Clyde Street will require further consideration, particularly in respect to any changes proposed for the Rydalmere Industrial Precinct more generally to which this intersection forms a major gateway. Similar to the above, development traffic will represent approximately 5% of the future intersection traffic volumes and, accordingly, identification of necessary improvements to this intersection should reasonably be considered in the context of future capacity planning for the Victoria Road corridor more generally.

Nevertheless, the improvements works detailed in Section 7.2 are preliminary and further investigation may be required during subsequent Planning Proposal studies and assessment to determine the full scope of the impacts of the development and necessary infrastructure upgrades. In this regard, it is noted that TfNSW and RMS have indicated an Aimsun model will be required to support the Planning Proposal process be undertaken to determine the impacts of the broader area. It is expected that this more detailed modelling would be used to inform any final requirements and/or commitments in relation to infrastructure upgrades necessary.

8 Summary and Conclusion

The key findings of this Traffic Impact Assessment are:

- Ason Group has been commissioned by Property NSW to prepare a 'high-level' Traffic Impact Assessment report to support a Pre-Gateway submission. It encompasses:
  - An assessment of existing traffic and transport conditions in the locality
  - Identification of potential impacts of the proposed development
  - Where possible, identify indicative mitigating measures to ameliorate the impacts of the development or areas that may require further consideration as part of the subsequent planning proposal investigations.
- The proposed amendments to the Parramatta Local Environmental Plan (PLEP) 2011 aim to rezone the Site from R2 Low Density Residential and SP2 Infrastructure to B4 Mixed Use, R4 High Density Residential and RE1 Public Recreation. This will provide a high density residential development with a diverse range of housing, retail and commercial development with the opportunity for research and education related employment.
- In this regard, the Proposal is consistent with objectives of Parramatta Council and the Sydney Metropolitan strategy by increasing and accelerating housing supply. The Proposal supports the "smart living Rydalmere" GPOP vision for the precinct. Furthermore, the Proposal satisfies the NSW Government's priorities by:
  - Redevelopment and amalgamation of the Site provides an opportunity for improving local connectivity between the Site and its surrounds.
  - The Site is readily accessible to key centres such as the Parramatta CBD, Camellia and Olympic Park by a range of public and active transport modes, including existing and planned pedestrian, cycling networks and the open space networks, thus potentially reducing reliance on the use of private car travel.
  - Increased density on the Site optimises the potential value capture of planned public transport infrastructure investment in the area noting the Site's strategic location relative to the proposed Parramatta Light Rail network and potential Bus Rapid Transit route along Victoria Road. Locating development on public transport corridors is sound transport planning and should arguably supersede other considerations such as congestion for private vehicle use.
- Traffic generation rates adopted as part of this assessment are consistent with the RMS Guide and the RMS Guide Update rates for residential and commercial land uses. These rates are

considered acceptable, as the 'public transport accessibility level' of the Site is consistent with that of the sites included in the RMS Technical Direction 04a.

- Furthermore, the mixed-use redevelopment of the Site, including improved pedestrian and cyclist connections will complement the "place-making" objective of the Parramatta Light Rail project. The Parramatta light rail will further improve accessibility and associated activation of the future Light Rail corridor, particularly with improved connections direct to the centre of the Parramatta CBD.
- Application of the adopted traffic generation rates results in a nominal traffic generation range of approximately 1,200-1,300 vehicles per hour.
- The surrounding road network during the morning, evening and weekend peak period has been assessed under an existing, future baseline (background growth only with no development of the Site) and a future baseline plus development.
    - Currently, the network generally operates within capacity with some intersections nearing capacity.
    - Future background traffic growth, even without any development of this Site, is expected to result in the following intersections reaching or exceeding nominal capacity:
        - James Ruse Drive / Kissing Point Road / Pennant Street,
        - James Ruse Drive / Victoria Road,
        - Victoria Road / Railway Street / Bridge Street,
        - Victoria Road / Clyde Street, and
        - James Ruse Drive / Hassall Street / Grand Avenue.
    - The additional traffic generated by the development, without improvement works, would be expected to result in the following additional intersections exceeding capacity:
        - Victoria Road / Pennant Street (due to network effects, alleviated by improving the performance of the other key intersections),
        - Kissing Point Road / Bettington Road / New Access Road, and
        - James Ruse Drive / New Access Road
    - Notwithstanding, network improvement options (subject to further modelling and detailed design as part of subsequent Planning Proposal assessment) would improve the performance of the network to offset any increased delay (above that of background future conditions) as a result of the development.

- Preliminary upgrade works to the following intersections investigated as part of this assessment resulted in improved operation of the network:
    - James Ruse Drive / Kissing Point Road / Pennant Street,
    - Kissing Point Road / Bettington Road / New Access Road,
    - James Ruse Drive / New Access Road, and
    - Victoria Road / Railway Street / Bridge Street.

  These preliminary improvement works were tested and determined to generally improve the operation of the overall network with the exception of the intersections discussed below.

- Improvement options have not been developed as part of this preliminary analysis for the following intersections originally included within the RMS brief:
    - James Ruse Drive / Hassall Street / Grand Avenue
        - It is noted that the subject proposal would contribute only 5% to traffic volumes at this intersection which is consistent with typical daily fluctuations.
        - Resolution of delays at this intersection potentially includes grade separation of the intersection, as reflected in Parramatta City Council's Western Sydney Ring Road plans. Grade separation, if that is the outcome, would presumably resolve any additional delays as a result of the subject development.
        - The requirement to resolve any issues at this intersection would fall under the remit of planning for the Camellia Precinct and need not necessarily be considered in the context of this development in isolation.
    - James Ruse Drive / Victoria Road
        - Similar to the above, it is noted that the subject proposal would contribute to in the order of 8% of traffic volumes at this intersection which is consistent with typical daily fluctuations.
        - Resolution of delays at this intersection potentially includes grade separation of the intersection, as reflected in Parramatta City Council's Western Sydney Ring Road plans.
        - The requirement to resolve any issues at this intersection would fall under the planning for the James Ruse Drive and Victoria Road Corridors and need not necessarily be considered in the context of this development in isolation.

- Victoria Road / Clyde Street
    - Similar to the above, it is noted that the subject proposal would contribute to in the order of 5% of traffic volumes at this intersection which is consistent with typical daily fluctuations.
    - The requirement to resolve any issues at this intersection would fall under planning for the Rydalmere Industrial Precinct, or Victoria Road corridor more generally and need not necessarily be considered in the context of this development in isolation.

Having regard for the above, it is our view that analysis and identification of potential upgrade works to these 3 intersections should not form part of the scope for any subsequent Planning Proposal in relation to the subject Site but be deferred as ongoing operational considerations for Council, RMS and TfNSW as part of the standard corridor planning for the wider sub-region. This would therefore account for other broad picture improvements such as Bus Rapid Transit along the Victoria Road corridor.

- The preferred option for access to/from the site relies on the use of Western Sydney University (WSU) private roads to the south of Victoria Road to gain access to the Site and the ability to rely on this connection is a critical matter for consideration and negotiation between the relevant parties. Notwithstanding, the following is noteworthy:
    - WSU currently enjoys the use of the subject Site for access to its Site via one-way (southbound) movements over the Victoria Road overpass.
    - Future traffic growth on the surrounding network is expected to result in the existing WSU access to Victoria Road to exceed capacity in the future, regardless of whether the subject Site is redeveloped. Accordingly, alternate arrangements will be required at some point in the future. In addition, any development of the subject Site, regardless of the Proposal will have implications for this access arrangement.
    - The proposed road connections and access provide these alternative routes for convenient access to WSU in the absence of the existing facilities. For example, it is expected that access to WSU from James Ruse Drive, via Victoria Road could be removed on safety grounds at some point in the future (due to unsafe ramp merge weaving issues). However, alternate access for vehicles travelling southbound on James Ruse Drive could be provided using the proposed site access to James Ruse Drive, the internal collector road and existing bridge (operating as two-way) to gain access to WSU.
    - A direct two-way connection would reinforce the potential synergies between the Site and the University, particularly future commercial, educational and retail uses.
    - The existing bridge between the Site and WSU has a carriageway of 6.1 metres in width and can therefore support two-way vehicle movements of the magnitude envisaged.

Consideration is required whether consolidation of the existing raised kerb footpaths provided is desirable to achieve a compliant footpath (or shared path) using this existing bridge.

In summary, this report has been prepared for consideration by Council for progression to the Gateway process to further assess the impacts of the development and associated infrastructure upgrade requirements.

Following Gateway determination, the next steps in relation to traffic and transport planning are expected to include:

- Preparation of a detailed Traffic Management Plan (TMAP), in accordance with all reasonable requirements from the relevant authorities including Council, RMS and TfNSW. During the preparation of the detailed Planning Proposal, there may be more detailed resolution of plans for the Parramatta Light Rail in the vicinity of the subject Site and the impacts this may have on transport movements through the sub-regional corridor more generally can be explored to maximise the development potential of the Site.
- Further detailed modelling to resolve the infrastructure upgrade requirements and work through the feasibility of the indicative upgrade options identified as part of this preliminary assessment.

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