

# Transport and Accessibility Impact Assessment



## **Hawkesbury Centre of Excellence**

State Significant Development No. 15001460

Prepared for School Infrastructure NSW c/o NBRS Architecture
Revision 4.1
06 August 2021

## **Executive Summary**

This Transport and Accessibility Impact Assessment (TAIA) assesses the traffic and transport impacts and design elements of the proposed Hawkesbury Centre of Excellence (CoE) located within the Western Sydney University (WSU) campus in Richmond. The CoE is expected to provide capacity for up to 450 people on-site, comprising a mixture of school staff and students, on-site accommodations, and educational program and occasional school-related events visitors.

The overall transport strategy for the proposed development is as follows:

#### **Pedestrians**

Minimal demand expected; provide connectivity to bus services and to local network

#### **Cvclists**

Minimal demand expected; provide on-site storage

#### **Public transport**

Strong demand expected by bus and rail; bus connectivity to train stations required due to long walking distance

#### Freight & deliveries

Agricultural vehicles accommodated within the site for specialty purposes

#### Kiss & ride

Minimal demand expected; on-site provision for car and bus access to be operated at separate times

#### Car parking

Reasonable demand expected; on-site provision within the CoE for general usage, and shared parking with WSU for peak usage

This overall strategy has been proposed to, and discussed with, both Council and Transport for NSW (TfNSW) during ongoing liaison through a Transport Working Group (TWG) for the project. The TWG has met a number of times since March 2021, and the project has refined the transport strategy during that period in response to feedback received.

Due to the unique nature of the CoE, comprising a specialist non-catchment school and serving external visitors from Sydney and NSW schools, pedestrian and cyclist mode share is anticipated to be low. Nevertheless, new pedestrian facilities are proposed within the WSU campus to provide access to the external road network, and new facilities to cross Londonderry Road to northbound bus services and the Hobartville area via a signalised pedestrian crossing at Londonderry Road. On-site bicycle storage would be provided in accordance with the NSW Department of Education's Educational Facilities Standards & Guidelines (EFSG).

Public transport accessibility will be improved through construction of new formalised bus bays on Londonderry Road, as bus services from this interchange to Richmond and Penrith train stations forms a key part of the transport strategy for the site. It has been discussed and agreed with TfNSW during the TWG process that the provision of additional services for the CoE appears feasible for regularly scheduled services, subject to enrolment numbers and scheduling times being confirmed. Future consultation will be required with TfNSW during the life of the project once enrolment grows and demand can be demonstrated.

An on-site vehicle area is provided which will cater for kiss & ride during school peak periods and will be sized to cater for private bus/coach services to the site for program and occasional school-related events visitors (outside peak times). Due to the nature of the non-catchment school, it is not expected that kiss & ride would be the most appealing mode of transport for most users, however the capacity is provided for.

Finally, car parking is considered the lowest priority mode, which is in accordance with state government policy such as the Road User Space Allocation Policy (TfNSW, January 2021) and other guidelines. By considering the combination of train (with connecting bus) and bus/coach services, a low car parking demand is expected for students and program visitors, however it is anticipated that car will be a highly used mode for school staff and for occasional school-related events visitors. Typical daily car parking demands are accommodated within the CoE car park. Peak demands such as occasional school-related events would be met by utilizing available parking within the WSU campus, which is shown to have good current availability and would occur during offpeak times for the University.

To safely accommodate the additional transport demands to the site particularly pedestrian movements, a concept design is proposed at the intersection of Vines Drive and Londonderry Road. The concept design includes a signalised pedestrian crossing on Londonderry Road, and new bus stops on Londonderry Road south of Vines Drive.

It is anticipated that the signalised pedestrian crossing would function as an interim road work only, however has considered all future demands of the Centre of Excellence. TfNSW presented the proposed preferred corridor and concept design for Richmond Bridge duplication project which includes a new road parallel to Southee Road and an upgraded intersection at Londonderry Road with traffic lights improving access to Western Sydney University. Given that the intersection upgrade is unlikely to begin until at least 2024 with completion in around 2026/27, the proposed signalised pedestrian crossing as interim development was introduced to serve the school operation in its opening years. During the detailed design phase, there may be opportunities to refine the design of the proposed works and create efficiencies between the short-term and longer-term projects. Additionally, it is noted that Council and TfNSW had previously recommended a realignment of Vines Drive to meet Southee Road, however given that the future TfNSW now proposes to provide major upgrades to the intersection on the current Vines Drive alignment, this concept has not been investigated further.

Following approval of this SSD project, it is anticipated that a Construction Traffic Management Plan and School Transport Plan would be fully developed prior to construction and operation of the CoE respectively. Preliminary versions of these documents have been provided as part of this TAIA. The final documents and other detailed design elements can be finalised as a condition of development consent.

The proposed development is deemed suitable on consideration of the traffic and transport elements of the site and its surrounds, and the transport strategy proposed for its management.

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## **Revision Register**

| Rev | Date       | Remarks                | Prepared By                       | Reviewed By | Approved By    |
|-----|------------|------------------------|-----------------------------------|-------------|----------------|
| 0   | 09/04/2021 | Draft for comment      | N. Borja                          | M. Babbage  | -              |
| 1   | 28/04/2021 | Issue for SSDA         | N. Borja                          | M. Babbage  | P. Yannoulatos |
| 2   | 03/06/2021 | Revised issue for SSDA | N. Borja                          | M. Babbage  | P. Yannoulatos |
| 3   | 20/07/2021 | Revised issue for SSDA | N. Borja /<br>M. Ghanbarikarekani | M. Babbage  | P. Yannoulatos |
| 4   | 03/08/2021 | Revised issue for SSDA | N. Borja /<br>M. Ghanbarikarekani | M. Babbage  | P. Yannoulatos |
| 4.1 | 06/08/2021 | Revised issue for SSDA | N. Borja /<br>M. Ghanbarikarekani | M. Babbage  | P. Yannoulatos |

### **Document Control**

| Internal reference | 211091  |
|--------------------|---|
| File path          | P:\2021\2110\211091\Reports\TTW\Traffic\210806 CoE Transport and Accessibility Impact Assessment Rev 4.1.docx |

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## 1 Introduction

## 1.1 Background

School Infrastructure NSW (SINSW) is proposing to construct an agricultural Centre of Excellence with the existing Hawkesbury campus of Western Sydney University (WSU) in Richmond. The development proposes to cater for regular students from Richmond Agricultural College, daily visitors on agricultural programs from other NSW schools, on-site accommodation for visiting students and teaching professionals, and event and occasional school-related events facilities.

Taylor Thomson Whitting (TTW) has been engaged by NBRS Architecture to provide traffic engineering consultancy services for the proposed Hawkesbury Centre of Excellence development. This transport and accessibility impact assessment (TAIA) has been prepared in support of a state significant development application (SSD-15001460) for the proposal and in response to the Secretary's Environmental Assessment Requirements (SEARs) for the site, which have been detailed in Section 1.5 of this report.

## 1.2 Scope

This TAIA has been developed to assess and address the traffic and transport impacts of the proposed development. This report covers the following areas:

- Site access
- Car parking
- Public and active transport
- Pick-up and drop-off
- · Service vehicles and loading
- Traffic generation
- Travel mode analysis

A School Transport Plan has been prepared and included as part of this document. These plans are considered preliminary in nature for the purposes of the SSDA and would be finalised post-approval as a condition of consent (or consolidated in the School Transport Plan).

#### 1.3 Guidelines and References

This report has been prepared in the context of and with knowledge of a variety of relevant documents, standards, and guidelines:

- Australian Standards, including but not limited to:
  - AS2890 Parking facilities
- Austroads Guidelines, including but not limited to:
  - o Guide to Road Design
  - Guide to Road Safety
  - Guide to Traffic Management
- RMS Guides to Traffic Generating Developments, including:
  - Roads and Maritime Service Trip Generating Surveys Schools Analysis Report (GTA, 25 August 2014)
- Road User Space Allocation Policy (TfNSW, January 2021)

Additional documentation reviewed from relevant local jurisdictions includes:

- Hawkesbury Development Control Plan 2002 (DCP 2002)
- Hawkesbury Local Environmental Plan 2012 (LEP 2012)
- Educational Facilities Standards & Guidelines (EFSG)

#### 1.4 Consultation

This report has been prepared following consultation between the design team and relevant stakeholders, including the Transport Working Group which was assembled for the project. This group included project team

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and client representatives, Hawkesbury City Council (Council) and Transport for NSW (TfNSW) as relevant. Consultation events and outcomes occurred as follows:

#### • 16 March 2021

- The meeting included representatives from Council and TfNSW.
- The project was introduced to the Transport Working Group, and the overall strategic concept transport options.
- Key feedback included queries about the site operation, student transport strategy, and discussions of proposed traffic studies.
- The project team noted that the Richmond Bridge duplication project was awaiting finalisation of a Preferred Option Report due in "early 2021", noting that one of the corridor options was along Londonderry Road outside the WSU site. TfNSW advised that this was still under investigation with no preferred option.

#### • 13 April 2021

- The meeting included representatives from Council and TfNSW.
- o Detailed information was provided outlining the operational modes for the site.
- A revised transport strategy was presented and discussed. A concept proposal for a left-out restriction at Vines Drive was presented and discussed, and further detail was requested.
   Operation of public and/or school bus services was discussed, and overall seemed to be a workable solution.
- Key feedback included data requirements for provision of bus services (enrolment and scheduling), clarification of public bus servicing requirements (e.g. road width), and closing out of most travel mode strategies (private bus, car, kiss & ride, pedestrians, and cyclists).

## 26 April 2021

- Formal written advice was received from Council.
- The primary advice was in relation to Southee Road and Vines Drive, expressing concern on a right-turn ban from Southee Road and recommending a realignment of Vines Drive to meet Southee Road.
- Additional comments were provided relating to school operations, WSU enrolment levels and associated traffic/parking demands, and traffic study details.

## • 27 April 2021

- The meeting included representatives from Council and TfNSW.
- A response to Council's overall comments from 26 April was provided, with additional response information to be provided directly or in this EIS. A response to Council's specific comments on the Vines Drive realignment was provided, noting that the proposed design response addresses each of Council's comments.
- A developed concept design for the Vines Drive left-out intersection (including dedicated right-turn lane and bus bays) was presented and discussed. It was clarified that no right-turn ban at Southee Road is proposed.
- Key feedback included a request for more detailed design drawings and recommending that a Road Safety Audit be undertaken. Council reiterated their recommendation that a realignment of Vines Drive would be preferred. We maintain that all concerns are addressed by the EIS concept proposal.

#### • 17 June 2021

- The meeting included representatives from Council and TfNSW.
- TfNSW introduced and presented their preferred corridor and concept design for Richmond Bridge duplication project which had been recently announced.
- TfNSW advised that the intersection upgrades for Londonderry Road / Vines Drive are currently planned for 2026. The project team noted that the opening date of the Centre of Excellence is the start of 2023.

#### • 24 June 2021

- The meeting included representatives from Council and TfNSW.
- TfNSW noted that the SSDA application would need to propose an interim design for the intersection, as funding for the bridge duplication alignment/design is not yet available. Timeline of the projects also does not align.
- The project team noted that due to the scale of the two projects, the SSDA would provide traffic modelling for the development (and a reasonable forecast timeline) only and would not undertake modelling for the bridge duplication project changes.

#### • 8 July 2021

- The meeting included representatives from TfNSW.
- The project team presented a concept proposal for a signalised T-intersection at Vines Drive.
   TfNSW noted that the approval and construction process for traffic signals may take up to 18 months.
- The meeting attendees discussed that there may be further consultation and discussion around project timelines, staging, cost sharing, and reduction of abortive works.

#### 27 July 2021

- The meeting included representatives from Council and TfNSW.
- A revised transport strategy was presented and discussed. A concept proposal was presented and discussed. The concept proposal includes maintaining the existing Londonderry Road – Vines Drive giveway intersection, a signalised pedestrian crossing at Londonderry Road south of Vines Drive.
- TfNSW advised that due to the nature of the road corridor, a raised zebra crossing would be unlikely to be feasible / acceptable in this

Full details and minutes of the relevant agency consultation is attached in Appendix A of this document.

## 1.5 Response to SEARs

Under application number SSD 15001460 we have been provided with Secretary's Environmental Assessment Requirements (SEARs). These requirements were issued on the 19 March 2021 following consultation with the relevant agencies. The key issues relevant to a Transport and Accessibility Impact Assessment include those shown in Table 1.1 and have been addressed in various sections of this report as referenced.

Table 1.1: Response to SEARs

|   | Table 1.1. Response to SEARS  |  |  |  |  |
|---|---|--|--|--|--|
|   | Key items   | Comments and references  |  |  |  |
| 4   | Transport and Accessibility Include a transport and accessibility impact assessment, which includes, but not limited to the following:  |  |  |  |  |
| 4.1   | Analysis of the existing (and proposed/ future) transport net   | work, including:   |  |  |  |
|   | Road hierarchy.   | Section 2.2 – Road Network                                     |  |  |  |
|   | Pedestrian, cycle and public transport infrastructure.  | Section 2.3 – Public Transport Section 2.4 – Active Transport  |  |  |  |
|   | Details of current daily and peak hour vehicle<br>movements based on traffic surveys and / or existing<br>traffic studies relevant to the locality  | Section 2.7 – Network Performance                              |  |  |  |
|   | <ul> <li>Existing transport operation for 1hr before and after<br/>(existing or proposed) bell times such as span of<br/>service, frequency for public transport and school<br/>buses, pedestrian phasing for signals.</li> </ul> | Section 2.3 - Public Transport                                 |  |  |  |
|   | <ul> <li>Existing performance levels of nearby intersection<br/>utilising appropriate traffic modelling methods (such as<br/>SIDRA network modelling).</li> </ul>   | Section 2.8 – Intersection Analysis                            |  |  |  |
| 4.2 Details of the proposed development, including: |   |  |  |  |  |
|   | A map of the proposed access which identifies public roads, bus routes, footpaths and cycleways.  | Section 3.1 – Overall Works<br>Section 3.2 – Transport Context |  |  |  |

|     | Key items  | Comments and references                                       |
|-----|--|---|
|     | Pedestrian site access and vehicular access arrangements, including for service and emergency vehicles and loading/unloading, including swept path analysis (complying with Australian Standards) demonstrating the largest design vehicle entering and leaving the site and moving in each direction through intersections along the proposed transport routes. | Section 3.4 – Site Access                                     |
|     | Car parking, bicycle parking and end-of-trip facilities  | Section 3.8 – Car Parking<br>Section 4.6 - Cyclist Facilities |
|     | <ul> <li>Bicycle parking and end-of-trip facilities, including<br/>number of spaces and compliance with the appropriate<br/>codes and standards.</li> </ul>  | Section 4.6 – Cyclist Facilities                              |
|     | Drop-off /pick-zone(s) and bus bay(s)  | Section 3.7 – Pick-up and Drop-off<br>Section 3.6 – Bus Zones |
|     | Pedestrian or road infrastructure improvements or safety measures.   | Section 3.9 – Infrastructure and Safety<br>Improvements       |
| 4.3 | Analysis of the impacts due to the operation of the proposed   | l development, including:                                     |
|     | <ul> <li>Proposed model split for all users of the development<br/>including vehicle, pedestrian, cyclist, public transport<br/>and other sustainable travel modes.</li> </ul>   | Section 4.1 – Travel Mode                                     |
|     | <ul> <li>Where necessary, the need/associated funding for<br/>upgrading or road improvement works (such as the<br/>alignment of the Londonderry Road and Southee<br/>Road/Vines drive intersection) at nearby intersections<br/>to ensure traffic safety.</li> </ul>   | Section 3.9 – Infrastructure and Safety<br>Improvements       |
|     | <ul> <li>examination and modelling (but not limited to) of the following intersections:         <ul> <li>Londonderry Road at Vines Drive and Southee Road.</li> <li>Lennox and Paget Street.</li> <li>Blacktown Road at Bourke Street and Campus Drive</li> </ul> </li> </ul>  | Section 4.3 - Future Traffic Condition                        |
|     | Estimated total daily and peak hour vehicular trip generation.   | Section 3.2 – School Operation                                |
|     | <ul> <li>A clear explanation and justification of the:</li> <li>✓ Assumed growth rate applied.</li> <li>✓ Volume and distribution of proposed trips to be generated.</li> </ul>  | Section 4.1 – Travel Mode<br>Section 4.2 – Trip Distribution  |
| 4.4 | Type and frequency of vehicles accessing the site.   |   |
|     | Details of performance of nearby intersections with the additional traffic generated by the development by the development both at the commencement of operation and in a 10-year time period (using SIDRA network modelling).   | Section 4.3 – Future Traffic Condition                        |
|     | <ul> <li>Cumulative traffic impacts from any surrounding approved development(s).</li> </ul>   | Section 6.2.4 – Cumulative Impacts                            |

|     | Key items   | Comments and references   |  |  |  |
|-----|---|---|--|--|--|
|     | Adequacy of pedestrian, bicycle and public transport infrastructure to accommodate the development.   | Section 4.4 – Public Transport Section 4.5 – Pedestrian Infrastructure Section 4.6 – Cyclist Infrastructure Section 4.9 – Bus Zones |  |  |  |
|     | <ul> <li>Adequacy of car and motorcycle parking and bicycle<br/>parking provisions for the site and the wider Western<br/>Sydney University campus when assessed against the<br/>relevant car / bicycle parking codes and standards.</li> </ul> | Section 4.6 – Cyclist Infrastructure<br>Section 0 – Car Parking   |  |  |  |
|     | <ul> <li>Adequacy of the drop-off / pick-up zone(s) and bus<br/>bays(s), including assessment of any related queuing<br/>during peak-hour access.</li> </ul>  | Section 4.8 – Pick-up and Drop-off  |  |  |  |
|     | <ul> <li>Adequacy of the existing / proposed pedestrial<br/>infrastructure to enable convenient and safe access to<br/>and from the site for all users.</li> </ul>  |   |  |  |  |
| 4.5 | Measures to ameliorate any adverse traffic and transport in the above analysis, including:  | npacts due to the development based on  |  |  |  |
|     | Travel demand management programs to increase<br>sustainable transport (such as a Green Travel Plan /<br>School Plan)   | Section 5 – School Transport Plan   |  |  |  |
|     | Arrangements for the Travel Coordinator roles.  | Section 5 – School Transport Plan   |  |  |  |
|     | <ul> <li>Governance arrangements or relationships with state<br/>and local government transport providers to update<br/>roads safety.</li> </ul>  |   |  |  |  |
|     | <ul> <li>Infrastructure improvements, including details of timing<br/>and method of delivery.</li> </ul>  | Section 3.9 – Infrastructure and Safety<br>Improvements   |  |  |  |
| 4.6 | A preliminary school transport plan detailing an operational traffic and access management plan for the site, pedestrian entries, the drop-off / pick-up zone(s) and bus bay(s).  |   |  |  |  |
|     |   | Section 5 – School Transport Plan   |  |  |  |
| 4.7 | Analysis of the impacts of the traffic generation during construction of the proposed development, including:   |   |  |  |  |
|     | Construction vehicle routes, types and volumes.   | Section 6.2.2 – Truck Routes  |  |  |  |
|     | Construction program (duration and milestones).   | Section 6 – Construction Program  |  |  |  |
|     | <ul> <li>On-site car parking and access arrangements for<br/>construction, emergency and construction worker<br/>vehicle.</li> </ul>  | Section 6.1.1 – Access Arrangements<br>Section 6.1.2 – Worker Parking   |  |  |  |
|     | Cumulative impacts associated with other construction activities in the locality (if any).  | Section 6.2.4 – Cumulative Impacts  |  |  |  |
|     | <ul> <li>Road safety at identified intersections near the site due<br/>to conflicts between construction vehicles and existing<br/>traffic in the locality.</li> </ul>  | Section 6.3 – Road Safety   |  |  |  |

|     | Key items   | Comments and references  |  |
|-----|---|--|--|
|     | Measures to mitigation impacts, including to ensure the safety of pedestrian and cyclist during construction.   | Section 6.3 – Road Safety  |  |
| 4.8 | 8 A preliminary Construction Traffic and Pedestrian Management Plan.  |  |  |
|     |   | Section 6 – Construction Traffic and<br>Pedestrian Management Plan   |  |
| 6.7 | Relevant Policies and Guidelines:   | Section 1.3 – Design Guidelines  |  |
|     | <ul> <li>Guide to Traffic Generating Developments (Roads and Maritimes Services, 2002)</li> <li>EIS Guidelines – Road and Related Facilities (Department of Urban Affairs and Planning (DUAP), 1996)</li> <li>Cycling Aspects of Austroads Guides</li> <li>NSW Planning Guidelines for Walking and Cycling (Department of infrastructure, planning and Natural Resources (DIPNR), 2004)</li> <li>Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (Austroads, 2020)</li> <li>Australian Standard 2890.3 Parking facilities, Part 3: Bicycle Parking (AS 2890.3).</li> </ul> | This transport and accessibility impact assessment has been prepared in the context of the relevant planning policies as listed. |  |

## **2 Existing Transport Network**

#### 2.1 The Site

Hawkesbury Centre of Excellence is located Part Lot 2 DP1051798, Vines Drive Richmond within the Hawkesbury campus of Western Sydney University (WSU) at 2 College Street, Richmond, leased to Department of Education (DoE) on a long-term basis. The site is situated within Hawkesbury City Council.

The site is mainly an undeveloped site. Directly to the northeast of the site is the P47 car park, an at-grade asphalt car park with capacity for around 142 vehicles. The microbiology building is also located immediately north of the car park. The campus provides courses in environmental health, forensic science, nursing, medical science, natural science (environmental, agricultural, horticultural), and secondary school science teaching.

Figure 2.1 shows the site location and environs.



Figure 2.1: Site location

#### 2.1.1 **Site Location**

The location of the site within the local road network is shown in Figure 2.2.



Figure 2.2: Local road network

Image source: Nearmap (dated January 2021)

## 2.1.2 Site Access

There are currently no formalised vehicular access points to the site development area as it is a greenfield site.

The development site has frontage to Vines Drive and Maintenance Lane which are owned and maintained WSU roads. Vines Drive allows for two-way traffic and has a 5.8-metre wide road carriageway and a footpath on the opposite side of the road. Maintenance Lane has a 5-metre carriageway and has no footpaths. Parking is not permitted on Vines Drive due to its narrow width.

More broadly, the WSU campus can be accessed via three access points into the Campus from the public road network as shown in Figure 2.2;

- Vines Drive at Londonderry Drive
- College Drive at Bourke Street
- Campus Drive at Blacktown Road

#### 2.1.3 Land Use

The land is zoned under SP1 Special Activities zoning (Education, Agriculture, Research Station) and is currently used for educational agricultural purposes under the provisions of Hawkesbury LEP 2012. Figure 2.3 illustrates the various land use zones in the surrounding area, as specified in the LEP.



Figure 2.3: Land use map

Image source: Hawkesbury LEP 2012

### 2.2 Road Network

The location of the site within the immediate surrounding road network is shown in Figure 2.4. This map includes details about the types of controls at the relevant intersections.



Figure 2.4: Nearby intersection controls
Image source: Nearmap (dated January 2021)

#### 2.2.1 Internal Road Network

#### Vines Drive

Vines Drive is an owned and maintained WSU road in the north of the site, which provides a single travel lane in each direction, with a general speed limit of 40 km/hr, and no parking on both sides of the road as shown in Figure 2.5.



Figure 2.5: Vines Drive

## Campus Drive

Campus Drive in the east of the site serves as entrance point for emergency services and provides a single travel lane in each direction, with a general speed limit of 40 km/hr.

#### Maintenance Lane

Maintenance Lane provides a single travel lane in each direction.

#### College Drive

College Drive in the northwest of the site serves as entrance point via Bourke Street and provides a single travel lane in each direction, with a general speed limit of 40 km/hr.

### 2.2.2 State Road Network

The site is located close to the NSW state road network. Blacktown Road is approximately 1.8 kilometres and Londonderry Road approximately 650 metres from the site. Blacktown Road provide access to the M7 Motorway (via Richmond Road) at Dean Park.

Figure 2.6 illustrates the state roads in vicinity of the site.

While the lease boundary for the Centre of Excellence site sits fully within the WSU campus and has no public road frontages, the WSU campus itself has frontages and access to both Londonderry Road and Blacktown Road on the state road network.

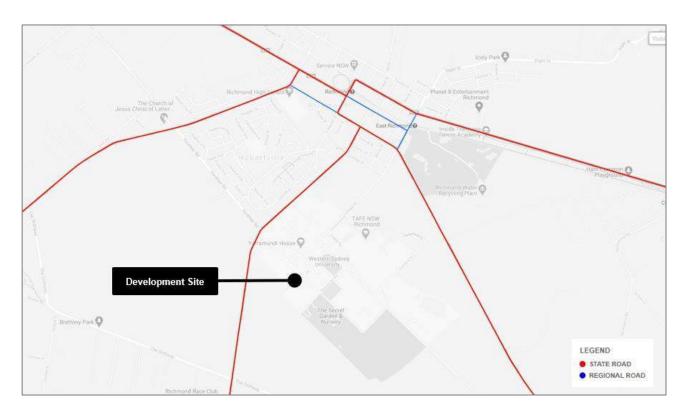


Figure 2.6: State Roads in Vicinity of the Site Image source: Transport for NSW

## Londonderry Road

Londonderry Road runs along the western boundary of the WSU Campus. There are single travel lanes in each direction, with a general speed limit of 60 km/hr. In addition, there is a shoulder lane on each direction. The nearest bus stop is approximately 625 metres from the School located along Londonderry Road as shown in Figure 2.7



Figure 2.7: Londonderry Road

#### Blacktown Road

Blacktown Road is a state road with a single travel lane in each direction. It has a sign-posted speed limit of 80km/hr.

## 2.3 Public Transport

## 2.3.1 Public Buses

Public transport available within the vicinity of the site is primarily bus services. Public bus services operate along Londonderry Road and Blacktown Road. Bus route 677 services Londonderry Road at a bus stop around 600 metres from the site, while route 675 services College Street around 1.4 kilometres from the site. All bus services in the area are operated by Busways and have a low daily frequency. The availability of local bus services is shown in Figure 2.8 below.

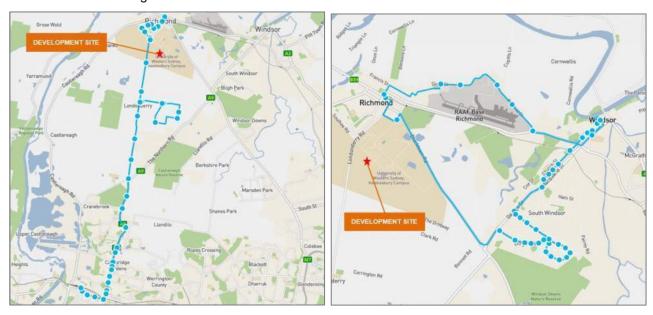


Figure 2.8: Public bus routes
Image source: Transport for NSW
Table 2.1: Public bus frequencies

Data source: Sydney Buses

|       | Destinations                                      | Bus Stop Location                                     | Daily Services         |                         |   |
|-------|---|---|------------------------|-------------------------|---|
| Route |   |   | 8:00am -<br>9:00am     | 3:00pm -<br>4:00pm      | Available Trip<br>before and after<br>peaks |
| 677   | Penrith to Richmond via Londonderry               | Londonderry Road<br>opposite Vines<br>Drive, Richmond | 1 service<br>(8:48 am) | No service<br>available | 7:41 am<br>9:47 am<br>1:47 pm<br>4:09 pm    |
| 677   | Richmond to Penrith via Londonderry               | Londonderry Road<br>and Vines Drive,<br>Richmond      | 1 service<br>(8:15 am) | No service<br>available | 7:24 am<br>10:10 am<br>2:10 pm<br>4:10 pm   |
| 675c  | Windsor to Richmond via<br>RAAF Base & Bligh Park | Bourke Street<br>opposite Teviot<br>Street            | 1 service<br>(8:43 am) | 1 service<br>(3:43 pm)  | 7:53 am<br>9:13 am                          |

#### **2.3.2 Trains**

The nearest train stations to the site are East Richmond (2.0km) and Richmond (2.5km). Walking distances are approximately 24 minutes and 30 minutes, respectively. Route 677 connects Richmond Station to Londonderry Road and could be used as a transfer to the site.

There are no major plans published for additional transport infrastructure in the area.

Train services are shown in Figure 2.9.



Figure 2.9: Sydney Trains network connections

#### 2.3.3 School Buses

No existing school bus routes operate within the University campus. *Busways* operates school services to several local schools in the area, including Richmond High School, Richmond North Public School and Richmond Public School. In addition to servicing residential areas, these services typically provide a connection between each school and local amenities such as Richmond Station.

#### 2.3.4 WSU Shuttle Buses

Western Sydney University shuttle buses travel to and from campus via Richmond Market Place and East Richmond railway station as shown in Figure 2.10. The shuttle stops at Richmond Marketplace and East Richmond Station and within the campus at Fairy Circle, Residential College, The Stables, and the Library as shown in Figure 2.11.

Services have an average frequency of 30 minutes with operating hours as follows:

Bus 1: 7:00am to 10:40pm weekdays
Bus 2 (morning): 7:50am to 11:10am weekdays
Bus 2 (afternoon): 2:10pm to 6:10pm weekdays

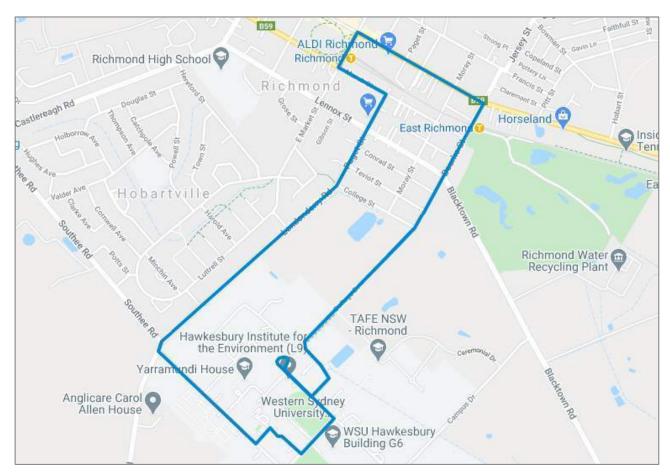


Figure 2.10: WSU shuttle bus route

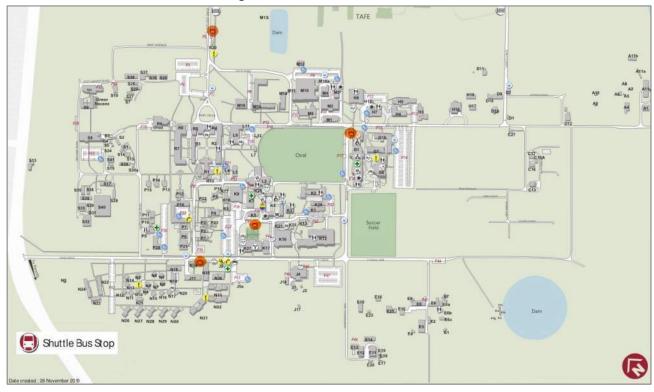


Figure 2.11: WSU shuttle bus stops

## 2.4 Active Transport

#### 2.4.1 Pedestrian Infrastructure

A map of the existing pedestrian infrastructure in the local area can be seen in Figure 2.12.

There are limited pedestrian footpaths available outside the Western Sydney University. It is noted within the Western Sydney University has fair internal footpaths available for pedestrians. Footpaths are not provided on either side of Londonderry Drive and Southee Road. These roads are a component in a likely used pedestrian route to the school for students and staff wishing to walk to the school from the west.

The map also indicates the zebra crossings locations in the area. There is a zebra crossing on the east and west side of the school, and a raised zebra crossing to the north-west.



Figure 2.12: Pedestrian Infrastructure within Local Road Network

## 2.4.2 Cyclist Infrastructure

Figure 2.13 shows the local cycling routes near the site. There is generally good provision of cyclist connections in the region, with a marked on-street bike lane in each direction on Blacktown Road outside the WSU campus site.



Figure 2.13: Cycling Map in the Local Road Network Data source: Cycleway Finder (dated December 2019)

### 2.5 Car Parking

The entire Western Sydney University campus is a restricted parking area. Parking on-campus requires a valid parking permit, with a number of different permits available for staff and students. The campus contains up to 53 labelled parking areas, however only 38 of these are considered open parking areas (when excluding individual driveways and loading zones). These comprise the following:

- 31 general vehicle parking areas containing a total of 1,516 parking spaces
  - Includes a variety of permit areas and accessible parking
- 5 motorbike parking areas containing a total of 34 motorbike parking spaces
- 2 police parking areas containing a total of 46 parking spaces
  - Associated with the NSW Police Leadership Centre

#### 2.5.1 P47 Car Park

For the purposes of this transport impact assessment, particular consideration is given to the P47 car park, which is adjacent to the site. As discussed with WSU, P47 car park may cater for some parking demand in occasional high-occupancy usage of the proposed Centre of Excellence (see Section 4). The capacity of this car park is around 142 spaces.

Site observation indicated that users parking at P47 were generally attending either of two adjacent buildings (J4 Microbiology or K12 Chemistry and Biochemistry).

An analysis of available Nearmap imagery has been undertaken to review historical demand for parking in the P47 car park. Analysis was also separately considered for weekdays within school and university teaching periods, to exclude any periods of low demand. Average weekday vehicle demand across the data was 27 vehicles, with an availability of 115 spaces. Table 2.2 details the full set of data analysed.

The historical data is generally consistent with data recorded on-site, with average peak occupancy of 33 vehicles in the P47 car park during site surveys.

Table 2.2: Historical occupancy data at P47 car park

Source: Nearmap imagery

| Date                        | Occupied | Vacancy |
|-----------------------------|----------|---------|
| Thursday, 25 March 2021     | 7        | 135     |
| Tuesday, 12 January 2021    | 7        | 135     |
| Thursday, 3 September 2020  | 5        | 137     |
| Friday, 3 July 2020         | 1        | 141     |
| Friday, 3 April 2020        | 1        | 141     |
| Tuesday, 17 December 2019   | 5        | 137     |
| Sunday, 20 October 2019     | 2        | 140     |
| Saturday, 20 July 2019      | 2        | 140     |
| Saturday, 6 April 2019      | 2        | 140     |
| Saturday, 8 December 2018   | 2        | 140     |
| Monday, 10 September 2018   | 11       | 131     |
| Monday, 30 July 2018        | 16       | 126     |
| Sunday, 6 May 2018          | 2        | 140     |
| Sunday, 1 April 2018        | 2        | 140     |
| Saturday, 20 January 2018   | 2        | 140     |
| Friday, 22 September 2017   | 19       | 123     |
| Sunday, 9 July 2017         | 2        | 140     |
| Sunday, 6 November 2016     | 2        | 140     |
| Sunday, 2 October 2016      | 2        | 140     |
| Monday, 18 July 2016        | 43       | 99      |
| Friday, 6 May 2016          | 36       | 106     |
| Wednesday, 24 February 2016 | 107      | 35      |
| Sunday, 6 December 2015     | 2        | 140     |
| Tuesday, 30 December 2014   | 2        | 140     |
| Monday, 1 September 2014    | 16       | 126     |
| Tuesday, 17 June 2014       | 7        | 135     |

| Monday, 6 January 2014     | 8     | 134    |
|----------------------------|-------|--------|
| Thursday, 19 December 2013 | 21    | 121    |
| Sunday, 22 September 2013  | 1     | 141    |
| Friday, 16 August 2013     | 44    | 98     |
| Friday, 9 August 2013      | 32    | 110    |
| Wednesday, 3 July 2013     | 5     | 137    |
| Saturday, 18 May 2013      | 2     | 140    |
| Tuesday, 23 April 2013     | 22    | 120    |
| Thursday, 7 February 2013  | 18    | 124    |
| Tuesday, 18 December 2012  | 4     | 138    |
| Wednesday, 24 October 2012 | 57    | 85     |
| Saturday, 13 October 2012  | 14    | 128    |
| Monday, 24 September 2012  | 16    | 126    |
| Saturday, 8 September 2012 | 2     | 140    |
| Sunday, 26 August 2012     | 0     | 142    |
| Thursday, 2 August 2012    | 20    | 122    |
| Wednesday, 9 May 2012      | 69    | 73     |
| Thursday, 23 February 2012 | 9     | 133    |
| Monday, 16 May 2011        | 69    | 73     |
| Tuesday, 21 September 2010 | 14    | 128    |
| Friday, 6 August 2010      | 44    | 98     |
| Thursday, 13 May 2010      | 60    | 82     |
| Wednesday, 14 April 2010   | 61    | 81     |
| Monday, 15 March 2010      | 49    | 93     |
| Weekday average occupancy  | 26.62 | 115.38 |
| Weekday minimum occupancy  | 1     | 35     |
| Weekday median occupancy   | 17    | 125    |
| Weekday maximum occupancy  | 107   | 141    |

In addition to the overall historical occupancy data at the P47 car park, Figure 2.14 compares weekend and weekday occupancy at the car park.

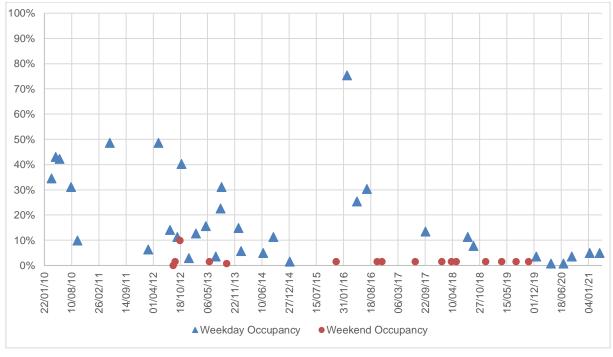


Figure 2.14: P47 parking occupancy result

As illustrated in Figure 2.14, weekday occupancy is consistently higher than weekend occupancy, as expected. Weekend usage is generally observed to be for storage of WSU campus shuttle buses only. Average usage of the P47 car park peaks at typically 30-50%, with a single observed maximum occupancy of around 75%. The usage from around 2014 onwards generally shows a reduction relative to earlier years. Additionally, the recent occupancy trend shows lower usage compared to the overall campus occupancy assessed in the 2017 site-wide detailed survey (refer Section 2.5.2).

## 2.5.2 Overall Campus Parking

A detailed parking occupancy study of the entire campus was undertaken on Thursday 5<sup>th</sup> and Tuesday 10<sup>th</sup> October, 2017. All 38 distinct parking zones were observed each hour to record the vehicle occupancy at the time. The two data sets show a high level of consistency, with total vehicle demand across the day being within 1.0% difference (i.e. 6,561 vs. 6,628 total vehicles recorded).

The peak vehicle demands occurred at 11am on the Thursday, and 12pm on the Tuesday. For the purposes of this assessment, the peak occupancy recorded at either 11am or 12pm on either the Thursday or Tuesday is considered. Note that this does not necessarily record the highest overall occupancy in each zone, but provides a conservative total more than 15% higher than any individual hourly occupancy<sup>1</sup>.

When considering the peak occupancy across data sets, a total of 1,044 vehicles are located on the campus (general vehicle parking only, excludes police and motorbike), from a capacity of 1,516 spaces. 472 parking spaces are therefore vacant across the campus and total occupancy is calculated at 69%. Peak occupancy of the P47 car park was 46 vehicles during the survey peak periods (11am and 12pm), from a capacity of 142 spaces.

Figure 2.15 illustrates the number and distribution of these available spaces and demonstrates the walking distance from the P47 car park to main areas of vacancy across the campus.

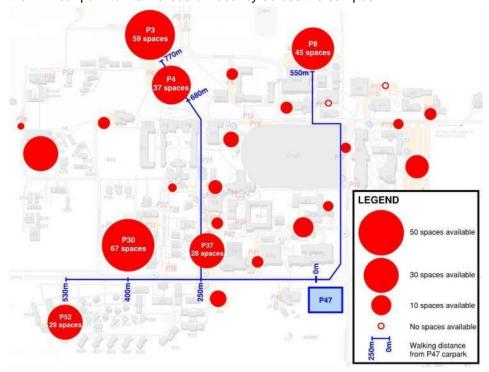


Figure 2.15: Campus parking availability at peak occupancy
Background image source: WSU Hawkesbury campus parking map (dated 4<sup>th</sup> May 2016)

Note that this does not consider the distribution of certain parking permit restrictions across the campus, which may result in differing availability of parking.

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<sup>&</sup>lt;sup>1</sup> Highest vehicle occupancy recorded was 896 vehicles at 11am on Thursday 5<sup>th</sup> October. Sum of peak 11am/12pm values gives total of 1,044 vehicles, or a 17% over-estimate. Higher values for individual zones may have occurred at a different time of day.

## 2.5.3 On-Street Parking

On-street parking in the vicinity of the WSU Campus is generally unrestricted. Figure 2.16 shows the parking restrictions surrounding the site.

No parking is permitted on Vines Drive or along most of the roads within the WSU campus.



Figure 2.16: On-street parking restrictions

#### 2.6 Travel Mode

The findings presented in this section are the result of an online travel survey designed by TTW that was distributed to students and staff at <u>Richmond High School</u>. While the activities of the proposed Centre of Excellence will be significantly different to the existing high school, the statistics from this survey are nevertheless informative for assessing the future school population and current travel habits in the local area.

## 2.6.1 Richmond High School Transport Use

Online travel questionnaires have been issued for staff and students to accurately determine existing transport usage.

A summary of staff responses indicated the following:

- Staff travel is almost exclusively by single-occupancy car, with a 98% mode share.
- The peak travel period for staff is more condensed in the morning than the afternoon, with 60% of morning movements and 33% of afternoon movements occurring in the busiest 30-minute periods.
- Common themes in responses include:
  - o A lack of bus services or challenges with low frequency services,
  - Safety concerns being a deterrent for cycling, and
  - Common reasons for car usage include travel time, convenience, and travel for errands or activities before and after school.

This School Transport Plan aims to address known concerns and proposes actions which are targeted to the site and its users.

Table 2.3 provides the detailed travel mode results of the online survey. The survey requested separate information on morning and afternoon travel, however results across the two periods did not differ by significant amounts. Morning and afternoon results were identical for staff. For students, the afternoon period is more likely than the mornings to show a walk-only result, with reductions across other modes.

As multiple mode responses are permitted in the online survey (to provide better information on mixed or combination transport usage), a hierarchy method has been applied to distil this to a single mode per respondent. The hierarchy has been applied as per the Australian Bureau of Statistics (ABS) Mode of Travel to Work 15-mode classification (MTW15P). The single mode is taken as whichever of the multiple modes is highest on the following list:

- Train
- 2. Bus
- 3. Ferry
- 4. Tram
- 5. Taxi
- 6. Car, as driver
- 7. Car, as passenger
- 8. Truck
- 9. Motorbike/scooter
- 10. Bicycle
- 11. Other Mode
- 12. Walked only
- 13. Worked at home
- 14. Did not go to work
- 15. Mode not stated

Table 2.3: Transport targets - base case

Note: Staff and student volumes based on total capacity of school.

|               | Staff mode share |      | Student mode share |      |  |
|---------------|------------------|------|--------------------|------|--|
| Travel mode   | АМ               | РМ   | АМ                 | PM   |  |
| Train         | 0%               | 0%   | 3%                 | 3%   |  |
| Bus           | 0%               | 0%   | 34%                | 32%  |  |
| Car driver    | 98%              | 98%  | 14%                | 12%  |  |
| Car passenger | 0%               | 0%   | 33%                | 32%  |  |
| Bicycle       | 0%               | 0%   | 1%                 | 1%   |  |
| Walk          | 2%               | 2%   | 15%                | 21%  |  |
| Total         | 100%             | 100% | 100%               | 100% |  |

## 2.6.2 Journey to Work Data

As an additional point of reference, 2016 Journey to Work (JTW) data<sup>2</sup> provides an estimate of employee travel modes into and out of the local areas defined by Statistical Area Level 2 (SA2) zones. The site is located within SA2 zone 'Richmond – Clarendon' (refer to Figure 2.17).

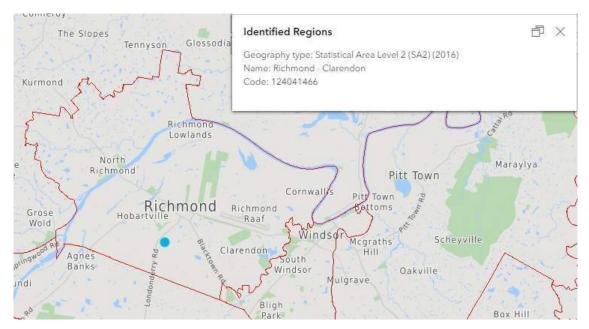


Figure 2.17: SA2 zone extents

Source: ABS

<sup>&</sup>lt;sup>2</sup> Bureau of Transport Statistics public dataset derived from 2016 Census of Population and Housing

An assessment of travel mode share (from ABS Census TableBuilder data set 'MTW15P Method of Travel to Work') is shown in Table 2.4 below. MTW15P categorisation of travel modes (as listed in the left column) is used for a clearer and simpler assessment of 15 key travel modes through allocation a primary mode when multiple modes have been used in one trip.

A summary of key mode categories is also provided in Table 2.5.

Table 2.4: Journey to Work Data

| Table 2.4. Goarney to Work Bata |  |   |  |
|---------------------------------|--|---|--|
|                                 | Mode share (%)                             |   |  |
| Travel mode (MTW15P)            | Place of Work (persons working in SA2 one) | Usual Residence (persons<br>living in SA2 zone) |  |
| Train                           | 2%   | 7%  |  |
| Bus                             | 1%   | 1%  |  |
| Ferry                           | 0%   | 0%  |  |
| Taxi                            | 0%   | 0%  |  |
| Tram                            | 0%   | 0%  |  |
| Car as driver                   | 85%  | 79%   |  |
| Car as passenger                | 6%   | 5%  |  |
| Truck                           | 1%   | 2%  |  |
| Motorbike                       | 1%   | 1%  |  |
| Bicycle                         | 1%   | 1%  |  |
| Other mode                      | 1%   | 4%  |  |
| Walked only                     | 4%   | 1%  |  |
| Total <sup>3</sup>              | 100%                                       | 100%  |  |

**Table 2.5: Journey to Work Summary** 

|   | Mode share (%)                                |  |
|---|---|--|
| Mode summary                                  | Place of Work (persons<br>working in SA2 one) | Usual Residence (persons living in SA2 zone) |
| Private vehicle (car, taxi, truck, motorbike) | 92%   | 87%  |
| Public transport (train, bus, ferry)          | 2%  | 8%   |
| Active transport (bicycle, walking)           | 5%  | 5%   |
| Total⁴  | 99%   | 99%  |

For further analysis of the school development, the most relevant data is the Place of Work (POW) data, which represents mode of travel for persons accessing the local area (rather than leaving to other areas). References to Journey to Work data in the remainder of this report are in reference to the POW data, rather than Usual Residence (UR).

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<sup>&</sup>lt;sup>3</sup> Mode share table excludes responses for "worked at home", "did not go to work", and "mode not stated".

<sup>&</sup>lt;sup>4</sup> Mode summary table excludes "other mode" as unidentified data.

#### 2.7 Network Performance

#### 2.7.1 Data Collection

To determine the existing traffic generation of the site and surrounding traffic conditions, intersection movement counts, and mid-block tube counts were completed at various location in the vicinity of site. Analysis and modelling have been undertaken with these results to assess the existing traffic conditions in the surrounding area.

Mid-block traffic counts were completed at:

- Vines Drive
- Londonderry Road

Intersection traffic counts were completed at the following intersections:

- Londonderry Road Southee Road
- Londonderry Road Vines Drive
- Lennox Street Paget Street
- Lennox Street Bourke Street Blacktown Road
- Blacktown Road Campus Drive

The location of intersection surveys and mid-block tube counts are shown in Figure 2.18.

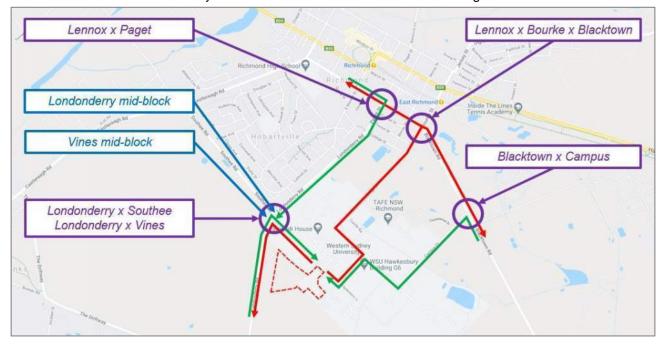


Figure 2.18: Location of traffic data collection

#### 2.7.2 Mid-block Traffic Volumes Summaries

For seven days between Thursday 4<sup>th</sup> to 10<sup>th</sup> May 2021, a 24-hour mid-block tube count was installed to collect traffic volume data on Vines Drive (east of Londonderry Road) and Londonderry Road (north of Southee Road). Counts were undertaken during the NSW school term and during semester time for Western Sydney University, to record background traffic during typical times of school operation. Recorded data is attached in **Appendix C** of this report.

The recorded traffic counts demonstrated that traffic flows were reasonably consistent throughout the day. Figure 2.19 demonstrates the behaviour of traffic flows across each weekday, with minimal daily variation from the average. It is noted that a large volume of traffic accessed the site on the Monday evening, resulting in total daily traffic 36% higher than average. Traffic on Friday was generally lower than the remainder of the week, 30% below average. Volumes on weekends were very low as is expected for a university campus.

The tube count data shows an even distribution between eastbound and westbound traffic, indicating that traffic largely enters and exits the site via the same route. In general, Vines Drive carries traffic volumes well within capacity for a two-way two-lane road.

A full summary of daily traffic volumes and vehicle speeds is provided in Figure 2.19 and Figure 2.20.

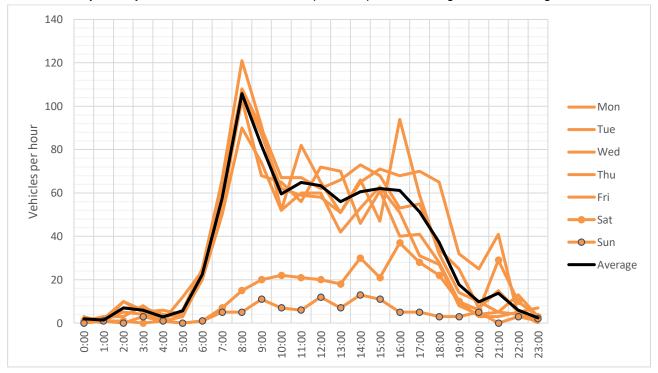


Figure 2.19: Seven-day traffic volumes on Vines Drive

Data source: Traffic counts undertaken Tuesday 4<sup>th</sup> May – 10<sup>th</sup> May 2021

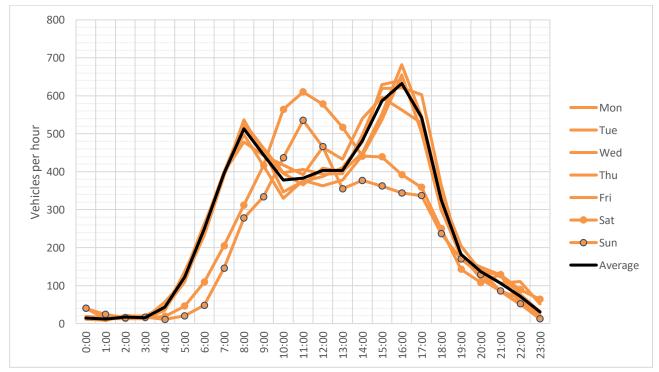


Figure 2.20: Seven-day traffic volumes on Londonderry Road

Data source: Traffic counts undertaken Tuesday 4th May – 10th May 2021

#### 2.7.3 Intersection Traffic Movements

Intersection traffic counts recording vehicle volumes, turning manoeuvres, and pedestrian movements, were undertaken on Thursday 6<sup>th</sup> May from 6:00am to 10:00 am and 2:00pm to 6:00pm. Recorded data is attached in **Appendix C** of this report.

SIDRA intersection modelling has been completed for the selected intersections under existing conditions and is attached in **Appendix D** of this report. All existing intersections operate at a good Level of Service, with a detailed comparison provided in Section 4.3 with regards to pre- and post-development conditions.

Given that traffic flow is generally consistent on a daily basis (as discussed above), it is expected that these modelling results are a good representation of background traffic behaviour.

Peak hour traffic volumes on the nominated study intersections are summarised in Figure 2.21 and Figure 2.22, with full survey results included in **Appendix C**.



Figure 2.21: Trip Volume Summaries during AM peak (08:15am - 09:15am)

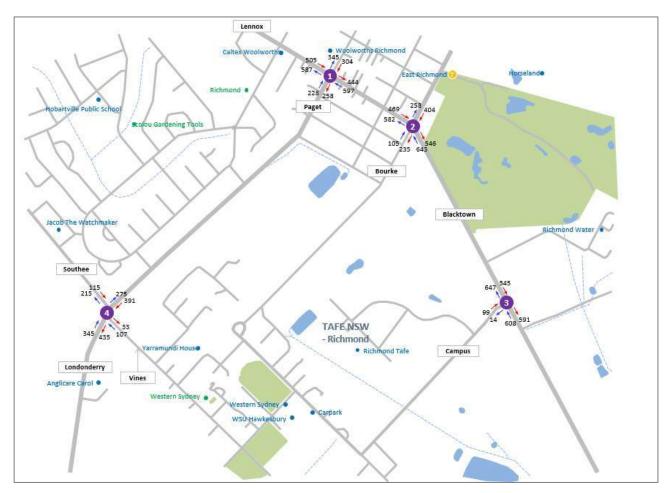


Figure 2.22: Trip Volume Summaries during PM peak (03:45pm - 04:45pm)

## 2.8 Intersection Analysis

### 2.8.1 Intersection Modelling

SIDRA intersection modelling has been completed for the selected study intersections under existing conditions. Table 2.6 shows a summary of the existing operation of the intersection, with full results presented in **Appendix D**.

Table 2.6: Summary of Existing Conditions Intersection Modelling

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|                                  | 2021 - Existing Operation Without Development |       |                     |     |
|----------------------------------|---|-------|---------------------|-----|
| Intersection / Peak              | Average<br>Delay                              | DoS   | 95% Queue<br>Length | LOS |
|                                  | (sec)   |       | (m)                 |     |
| Londonderry Rd / Vines Dr (AM)   | 11.8  | 0.071 | 1.8                 | Α   |
| Londonderry Rd / Vines Dr (PM)   | 10.7  | 0.161 | 4.1                 | A   |
| Londonderry Rd / Southee Rd (AM) | 9.2   | 0.301 | 8.8                 | Α   |
| Londonderry Rd / Southee Rd (PM) | 10.1  | 0.179 | 4.4                 | Α   |
| Lennox St / Paget St (AM)        | 11  | 0.604 | 33.2                | Α   |
| Lennox St / Paget St (PM)        | 11.9  | 0.709 | 44.8                | Α   |

|                               | 2021 - Existing Operation Without Development |       |                     |     |  |
|-------------------------------|---|-------|---------------------|-----|--|
| Intersection / Peak           | Average<br>Delay                              | DoS   | 95% Queue<br>Length | LOS |  |
|                               | (sec)   |       | (m)                 |     |  |
| Blacktown Rd / Bourke St (AM) | 18  | 0.443 | 74.3                | В   |  |
| Blacktown Rd / Bourke St (PM) | 21.2  | 0.594 | 103.9               | В   |  |
| Campus Dr / Blacktown Rd (AM) | 34.5  | 0.119 | 2.6                 | С   |  |
| Campus Dr / Blacktown Rd (PM) | 33.1  | 0.359 | 9.7                 | С   |  |

#### 2.8.2 Intersection Performance

Based on the results outlined in Table 2.6, the nominated study intersections operate at a satisfactorily level of service during both the AM and PM peak conditions. All intersections show a Degree of Saturation (DoS) well below the typical accepted limit of 0.85, with a maximum of 0.709.

# 2.9 Crash History

Transport for NSW provides a history of recorded crash data for the period between 2015 and 2019. This data is reviewed to better understand the existing levels of safe road operation at and around the site, and the potential implications of any increases to traffic volumes.

Figure 2.23 presents the crash and casualty statistics map from TfNSW.

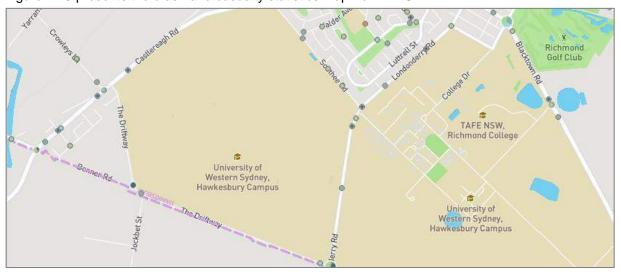


Figure 2.23: Crash and Casualty Statistics

Image Source: https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats

The data shows some serious and moderate injury incidents at surrounding streets. Non-casualty to serious injury incidents were recorded at the Londonderry Road and Blacktown Road.

Traffic impacts in this area should be carefully considered and treated for future developments.

# 2.10 External Projects

# 2.10.1 Richmond Bridge Duplication Project

Transport for NSW is planning to build a bridge over the Hawkesbury River between The Richmond and North Richmond area and upgrade major intersections with aim to increase capacity over the Hawkesbury River,

reduce congestion between centres, improve travel times and improve connectivity for public and active transport. The overall Richmond Bridge Duplication Preferred option works are shown in Figure 2.24.

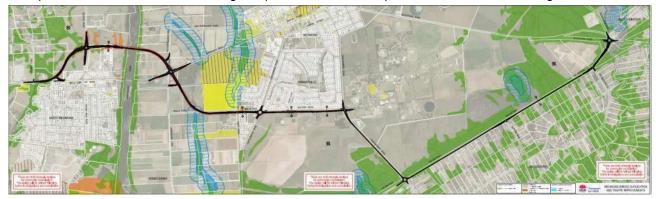


Figure 2.24: Richmond Bridge Duplication Preferred Option Plan Map

Image Source: <a href="https://roads-waterways.transport.nsw.gov.au/projects/01documents/richmond-area-projects/richmond-bridge-preferred-option-plan-map.pdf">https://roads-waterways.transport.nsw.gov.au/projects/01documents/richmond-area-projects/richmond-area-projects/richmond-bridge-preferred-option-plan-map.pdf</a>

The preferred option includes an upgrade of Londonderry Road-Vines Drive-Southee Road intersection to signalised intersection with a new road parallel to Southee Road between Castlereagh Road and Londonderry Road to separate local and through traffic as shown in Figure 2.25. The intersection upgrade is included in Stage 2 of the project that is expected to be completed in year 2026/2027.



Figure 2.25: Proposed new Southee Road – Vines Drive – Londonderry Road Intersection

Image Source: https://roads-waterways.transport.nsw.gov.au/projects/01documents/richmond-area-projects/richmond-

bridge-preferred-option-plan-map.pdf

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# 3 Proposed Development

#### 3.1 Overall Works

The Hawkesbury Centre of Excellence is proposed with capacity for 380 students. The proposed development for the School are:

- Three academic blocks (Block B, C and D).
- Short-term accommodation with capacity for 62 patrons (Block F).
- Dining hall, recreation space and canteen (Block E).
- Administrative building (Block A).
- Support facilities for management and maintenance of site.
- External works to accommodate circulation and covered walkways between buildings.
- Pedestrian walkways.
- Student and staff amenities.
- Covered Outdoor Learning Areas.
- Staff car parking area and mini-bus drop off and pick up area.
- Short-term accommodation car parking area.
- Green House
- Various agricultural plots and associated agricultural workshop.
- Provision of waste facility area.
- Installation of all essential services including stormwater management devices where required.

The proposed site plan is illustrated in Figure 3.1.

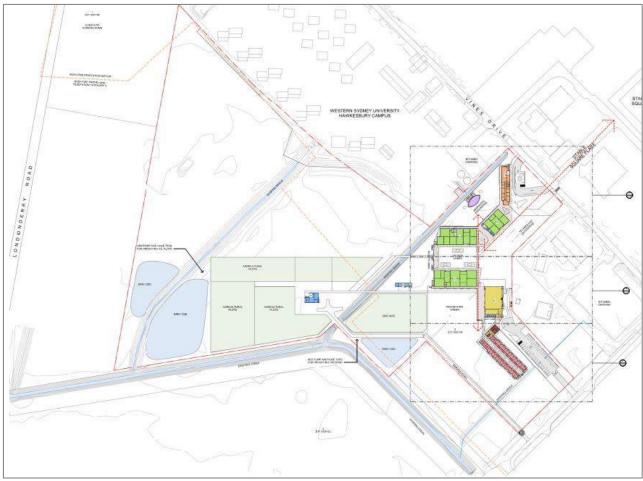


Figure 3.1: Proposed site plan Source: NBRS Architecture

# 3.2 School Operation

The School is expected to operate with the following activities:

#### General daily activity

- Richmond Agricultural College (7-12) 540 students, 60% of time at CoE (remaining 40% of time at Richmond High School)
- o 325 students per day, plus 20 staff

## Additional activity

- Agricultural programs for NSW schools (K-12)
- o 100 program visitors per day (including staff)

#### On-site accommodation

- o 62 beds for visiting students and teaching professionals
- o Would be part of the 100 program visitors no additional demand

# Peak activity

Event/ occasional school-related events facilities for up to 150 pax

Figure 3.2 shows the operational mode of the school.

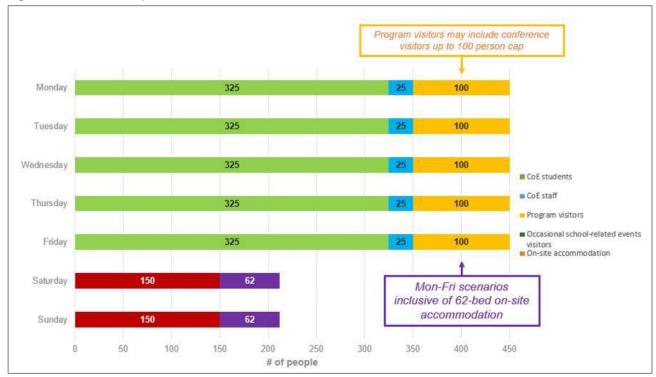


Figure 3.2: Operational Mode

# 3.3 Transport Context

Pedestrian footpaths, raised and zebra crossings are prevalent within the university and adjacent streets, but missing footpaths on Londonderry Road are of note. There is an existing cycle lane along the length of Blacktown Road. Transport context within the vicinity is shown in Figure 3.3.



Figure 3.3: Transport Context

#### 3.4 Site Access

#### 3.4.1 Car Park Access

There will be vehicle access points on Vines Drive and along Maintenance Lane, to the drop-off and pick up area and main car park, respectively.

#### 3.4.2 Pedestrian Access

The School site is to be connected to the external network via a pedestrian entry from Vines Drive. A footpath is provided on the opposite side of Vines Drive and a new footpath is proposed to link from the bus drop off along Londonderry Road to the School entrance.

# 3.4.3 Emergency Vehicle Access

Emergency vehicles (e.g. police, ambulance, fire) access will remain in same location via the access along Vines Drive or via the Maintenance Lane. Emergency protocols for the school would include on-site staff assisting with emergency access. Any vehicle impeding the emergency vehicle access should be cleared, and any planned vehicle movements should be suspended.

# 3.4.4 Service and Loading Vehicle Access

A new service driveway is to be constructed along the southern boundary of the site connecting to Maintenance Lane.

The swept paths at the service facility are attached at **Appendix B**.



Figure 3.4: Proposed Loading Zone

# 3.5 Active Transport Facilities

New pedestrian facilities are proposed within the WSU campus to provide access to the external road network, and new facilities to cross Londonderry Road to northbound bus services and the Hobartville area. On-site bicycle storage would be provided in accordance with the NSW Department of Education's Educational Facilities Standards & Guidelines (EFSG).

It is recommended that the School to provide 1 unisex shower with change room (separate to accessible bathrooms) plus lockers for staff.

#### 3.6 Bus Zones

Public transport accessibility will be improved through construction of new formalised bus bays on Londonderry Road, as bus services from this interchange to Richmond and Penrith train stations forms a key part of the transport strategy for the site.

The Londonderry Road bus bay will operate as the primary bus stop servicing the school. Both publicly operated school bus and public bus services will be using the bus bay. This bay has capacity for up to 2 northbound and 2 southbound buses at one time.

# 3.7 Pick-up and Drop-off (Kiss & Ride)

The proposed drop-off and pick-up area at the school provides approximately 45 metres or 7 vehicles of straight kerbside space, accessed from Vines Drive and located outside Block A. The entry is located east of the exit, such that vehicles movements to and from Londonderry Road would not overlap.

The adequacy of the proposed kiss & ride area is assessed in Section 4.8.

Drop-off and pick-up of students should not occur along Vines Drive as the road width does not sufficiently provide for parking lanes.

#### 3.8 Car Parking

The main car park off Maintenance Lane is proposed with a capacity of 34 parking spaces including 1 accessible parking space. Additionally, 5 visitor parking spaces including 1 accessible parking space are provided outside the main administration block, with access from Vines Drive. Total on-site provision is therefore 39 parking spaces.

The usage and adequacy of the on-site car parking is further detailed in Section 4.7.

# 3.9 Infrastructure and Safety Improvements

The existing Vines Drive – Londonderry Road intersection is to be maintained as a giveway intersection. However, a signalised pedestrian crossing along Londonderry Road south of Vines Drive is proposed to accommodate the pedestrian demand. The proposed pedestrian crossing includes footpaths into the WSU campus for pedestrian connectivity. Long bus bays are proposed in each direction of Londonderry Road near Vines Drive which will serve the Centre of Excellence and will continue to serve the university.

The proposed Vines Drive – Londonderry Road intersection concept is illustrated in Figure 3.5.

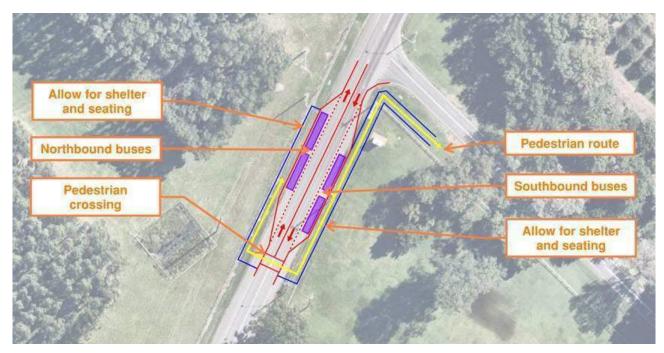


Figure 3.5: Proposed Londonderry Road – Vines Drive Note: concept design only; subject to detailed design

This concept design has been presented as a potential alternative to the preferred solution, which would be the implementation of TfNSW's concept design for Southee Road and Vines Drive. TfNSW has advised that the works under the current preferred corridor option would not be completed until 2026/27, which is in Stage 2 of a two-stage project. It would be the project team's preference that the preferred future intersection (or part of it, in a staged solution) be brought forward into Stage 1 of the project such that it would be ready for opening of the Centre of Excellence. It is recommended that consultation continue following the approval of the Centre of Excellence development to assess the viability of any staged solutions.

The adequacy of the proposed signalised pedestrian crossing against Transport for NSW volume warrants is described further in Section 4.5.1.

# 4 Operational Impacts

#### 4.1 Travel Mode

This section contains details about the school's demand for each travel mode including private vehicle, public transport and active transport. This section analyses the current mode share statistics of Centre of Excellence in reference to the recent travel mode survey results and the JTW Mode Share data. This section should be read in conjunction with the preliminary School Transport Plan in Section 5 which analyses mode share demand in consideration of future targets, rather than the current requirements. The Plan contains strategies and management techniques to reduce dependency on private vehicle use and increase public and active transport use.

The current travel demands of Hawkesbury Centre of Excellence are summarised in Table 4.1 and Table 4.2 below. Across the varying operational modes and expected school activities, travel mode also varies.

| Travel Mode                         | Richmond Ag<br>College Staff | Richmond Ag<br>College Students | Program Visitors | Occasional school-<br>related events<br>visitors |
|-------------------------------------|------------------------------|---------------------------------|------------------|--|
| Train                               | 5%                           | 60%                             | 25%              | 10%  |
| Connecting Bus                      | 5%                           | 60%                             | 25%              | 10%  |
| Bus (public)                        | •                            | -                               | - 75%            |  |
| Bus (private)                       | 5%                           | 30%                             | -                | -  |
| Car driver Inc. truck and motorbike | 80%                          | 4%                              | 0%               | 80%  |
| Car Passenger                       | 8%                           | 4%                              | 0%               | 0%   |
| Bicycle                             | 0%                           | 0%                              | 0%               | 0%   |
| Walk only                           | 0%                           | 0%                              | 0%               | 0%   |
| Total                               | 100%                         | 100%                            | 100%             | 100%   |

<sup>\*</sup> Highest mode share for each operation

Table 4.2 Travel mode expectations (numbers)

| Travel Mode                            | Richmond Ag<br>College Staff | Richmond Ag<br>College Students | Program Visitors | Occasional school-<br>related events<br>visitors |
|--|------------------------------|---------------------------------|------------------|--|
| Train                                  | 1                            | 195                             | 25               | 30   |
| Connecting Bus                         | 1                            | 195                             | 25               | 30   |
| Bus (public)                           | 1                            | 98                              | -                | -  |
| Bus (private)                          | -                            | -                               | 75               | 0  |
| Car driver<br>Inc. truck and motorbike | 20                           | 13                              | 0                | 120  |
| Car Passenger                          | 2                            | 13                              | 0                | 0  |
| Bicycle                                | 0                            | 0                               | 0                | 0  |
| Walk only                              | 1                            | 7                               | 0                | 0  |
| Total                                  | 25                           | 325                             | 100              | 150  |

<sup>\*</sup> Highest mode share for each operation

# 4.1.1 Background Traffic and Traffic Growth

To provide an accurate understanding of the future traffic conditions, modelling has been undertaken for the year 2031 assuming 10 years of traffic growth beyond the current 2021 conditions. Forecasts beyond this date are unlikely to provide accurate information due to uncertainties in the future transport scenario of the area that includes long-term transport and road network changes and changing behaviour of school users.

Background traffic growth across the forecast period has been assumed at 1.0% per annum. While this is a typical growth factor used where historical data is unavailable, it is also highly representative of the population growth in the local area. Between 2006 and 2016, the population in the Richmond-Windsor SA3 statistical area grew from 35,366 to 38,163, an annual growth of 0.76%. Population in the greater Outer West and Blue Mountains SA2 statistical area grew from 285,376 to 318,255, an annual growth of 1.10%.

# 4.2 Trip Distribution

SIDRA intersection modelling has been completed for the selected intersections for projected future conditions due to background growth and is attached in **Appendix C** of this report. See Section 4.6.5 for a full comparison of pre- and post-development operations.

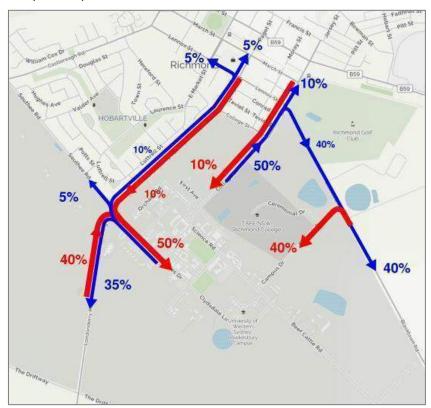


Figure 4.1: Development trip distribution

#### 4.3 Future Traffic Condition

An assessment of the impacts that the anticipated development traffic would have on the surrounding road network can be made by comparing intersections prior to and following the development of the site in 10-year time period. Assessment of existing conditions (without the development) was addressed in Section 2.8.

## 4.3.1 Future Conditions

The transport strategy for this site requires a large number of pedestrians to be able to safely cross Londonderry Road. Therefore, the proposed strategy of a signalised pedestrian crossing has been put forward

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(assuming that the TfNSW major works project cannot be constructed to a timeline matching the Centre of Excellence).

Figure 4.2 shows the layout of the giveway intersections of Londonderry Road and Vines Drive and Londonderry Road and Southee Road, and the proposed signalised pedestrian crossing.

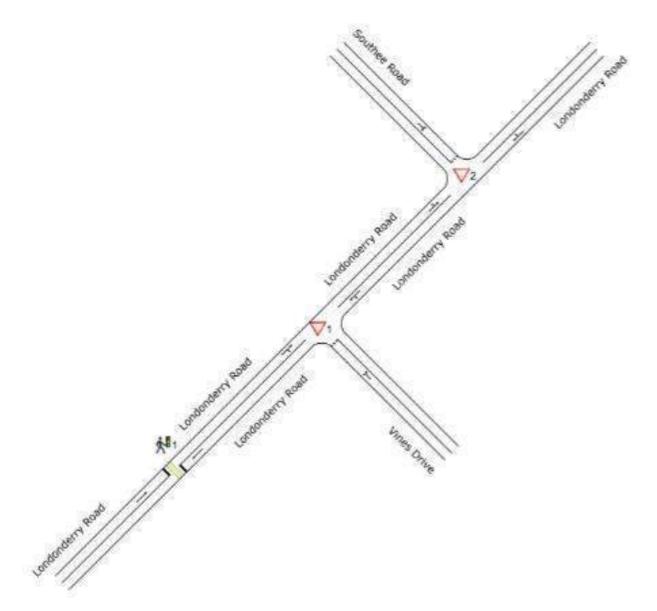


Figure 4.2: Layout of the intersections of Londonderry Road with Vines Drive and Southee Road

It also has been proposed to install signalised pedestrian crossings at the south of Vines Drive because of the high number of pedestrians crossing the intersection. Therefore, any potential risks of pedestrians' accident getting off/on buses that stop at bus stops located at Londonderry Road (one at Vines Drive and one opposite Vines Drive), would be solved.

The performance of nearby intersections with existing background traffic without and with the development traffic generated has been assessed using SIDRA.

The results shown in Table 4.4 and Table 4.6 provide the modelling outcomes under various forecast conditions. These results consider the intersection of Londonderry Road-Vines Drive with the proposed signalised pedestrian crossing arrangement. Table 4.3 and Table 4.5 demonstrate the performance of the proposed intersection under existing traffic volume conditions, i.e. with no additional development traffic, for the purposes of establishing a clear baseline.

Table 4.3: Summary of modelling results for 2021 without development

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|   | 2021 - Intersection Operation Without Development |       |                            |     |  |
|---|---|-------|----------------------------|-----|--|
| Intersection / Peak                           | Average<br>Delay (sec)                            | DoS   | 95% Queue<br>Length<br>(m) | LOS |  |
| Pedestrian Crossing at Londonderry Rd (AM)    | 7.9   | 0.574 | 44.9                       | Α   |  |
| Pedestrian Crossing at<br>Londonderry Rd (PM) | 8.2   | 0.563 | 41.9                       | Α   |  |
| Londonderry Rd / Vines Dr (AM)                | 10.8  | 0.064 | 1.7                        | Α   |  |
| Londonderry Rd / Vines Dr (PM)                | 10.1  | 0.191 | 4                          | Α   |  |
| Londonderry Rd / Southee Rd (AM)              | 9.2   | 0.301 | 8.8                        | Α   |  |
| Londonderry Rd / Southee Rd (PM)              | 10.1  | 0.179 | 4.4                        | Α   |  |
| Lennox St / Paget St (AM)                     | 11  | 0.604 | 33.2                       | Α   |  |
| Lennox St / Paget St (PM)                     | 11.9  | 0.709 | 44.8                       | Α   |  |
| Blacktown Rd / Bourke St (AM)                 | 18  | 0.443 | 74.3                       | В   |  |
| Blacktown Rd / Bourke St (PM)                 | 21.2  | 0.594 | 103.9                      | В   |  |
| Campus Dr / Blacktown Rd (AM)                 | 34.5  | 0.119 | 2.6                        | С   |  |
| Campus Dr / Blacktown Rd (PM)                 | 33.1  | 0.359 | 9.7                        | С   |  |

Table 4.4: Summary of modelling results for 2021 with development

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|   | 2021 - Intersection Operation with Development |       |                            |     |  |
|---|--|-------|----------------------------|-----|--|
| Intersection / Peak                           | Average<br>Delay (sec)                         | DoS   | 95% Queue<br>Length<br>(m) | LOS |  |
| Pedestrian Crossing at<br>Londonderry Rd (AM) | 8  | 0.590 | 46.6                       | Α   |  |
| Pedestrian Crossing at<br>Londonderry Rd (PM) | 8.2  | 0.579 | 43.4                       | Α   |  |
| Londonderry Rd / Vines Dr (AM)                | 9.7  | 0.064 | 1.5                        | Α   |  |
| Londonderry Rd / Vines Dr (PM)                | 9.7  | 0.218 | 4.2                        | Α   |  |
| Londonderry Rd / Southee Rd (AM)              | 9.3  | 0.303 | 8.9                        | Α   |  |
| Londonderry Rd / Southee Rd (PM)              | 10   | 0.180 | 4.4                        | Α   |  |
| Lennox St / Paget St (AM)                     | 11   | 0.606 | 33.2                       | Α   |  |
| Lennox St / Paget St (PM)                     | 11.9   | 0.709 | 44.8                       | Α   |  |
| Blacktown Rd / Bourke St (AM)                 | 18.4   | 0.444 | 76.5                       | В   |  |
| Blacktown Rd / Bourke St (PM)                 | 21.1   | 0.58  | 103.9                      | В   |  |
| Campus Dr / Blacktown Rd (AM)                 | 35.1   | 0.121 | 2.6                        | С   |  |
| Campus Dr / Blacktown Rd (PM)                 | 34.1   | 0.368 | 10                         | С   |  |

Table 4.5: Summary of modelling results for 2031 without development

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|  | 2031 - Inte            | rsection Oper | ation without Devel        | opment |
|--|------------------------|---------------|----------------------------|--------|
| Intersection / Peak                        | Average<br>Delay (sec) | DoS           | 95% Queue<br>Length<br>(m) | LOS    |
| Pedestrian Crossing at Londonderry Rd (AM) | 7.9                    | 0.613         | 51.4                       | Α      |
| Pedestrian Crossing at Londonderry Rd (PM) | 8.2                    | 0.598         | 47.6                       | Α      |
| Londonderry Rd / Vines Dr (AM)             | 12                     | 0.080         | 2.1                        | Α      |
| Londonderry Rd / Vines Dr (PM)             | 11.3                   | 0.261         | 5.1                        | Α      |
| Londonderry Rd / Southee Rd (AM)           | 10.2                   | 0.357         | 11.3                       | Α      |
| Londonderry Rd / Southee Rd (PM)           | 10.9                   | 0.216         | 5.3                        | Α      |
| Lennox St / Paget St (AM)                  | 10.3                   | 0.677         | 31.7                       | Α      |
| Lennox St / Paget St (PM)                  | 12.7                   | 0.795         | 51.7                       | Α      |
| Blacktown Rd / Bourke St (AM)              | 18.2                   | 0.916         | 83.5                       | В      |
| Blacktown Rd / Bourke St (PM)              | 17.8                   | 0.888         | 81.4                       | В      |
| Campus Dr / Blacktown Rd (AM)              | 40.2                   | 0.15          | 3.2                        | С      |
| Campus Dr / Blacktown Rd (PM)              | 42.3                   | 0.461         | 14.2                       | С      |

Table 4.6: Summary of modelling results for 2031 with development

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|   | 2031 - Intersection Operation with Development |       |                            |     |  |
|---|--|-------|----------------------------|-----|--|
| Intersection / Peak                           | Average<br>Delay (sec)                         | DoS   | 95% Queue<br>Length<br>(m) | LOS |  |
| Pedestrian Crossing at<br>Londonderry Rd (AM) | 8  | 0.628 | 53.2                       | Α   |  |
| Pedestrian Crossing at Londonderry Rd (PM)    | 8  | 0.591 | 49                         | Α   |  |
| Londonderry Rd / Vines Dr (AM)                | 12.1   | 0.090 | 2.3                        | Α   |  |
| Londonderry Rd / Vines Dr (PM)                | 11.7   | 0.309 | 6                          | Α   |  |
| Londonderry Rd / Southee Rd (AM)              | 10.3   | 0.359 | 11.4                       | Α   |  |
| Londonderry Rd / Southee Rd (PM)              | 11   | 0.223 | 5.4                        | Α   |  |
| Lennox St / Paget St (AM)                     | 11.4   | 0.678 | 39.3                       | Α   |  |
| Lennox St / Paget St (PM)                     | 13.2   | 0.796 | 56.7                       | Α   |  |
| Blacktown Rd / Bourke St (AM)                 | 18.9   | 0.51  | 89.7                       | В   |  |
| Blacktown Rd / Bourke St (PM)                 | 22   | 0.705 | 122                        | В   |  |
| Campus Dr / Blacktown Rd (AM)                 | 44.8   | 0.171 | 3.6                        | D   |  |
| Campus Dr / Blacktown Rd (PM)                 | 48.7   | 0.511 | 16.3                       | D   |  |

The performance of the corridor studied corridor at Londonderry Road is acceptable with regards to the average delay, LOS and degree of saturation of the modelled junctions including the pedestrian crossing, Vines Drive/Londonderry Road and Southee Road/Londonderry Road.

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It is noted that a change of Level of Service occurs at the intersection of Campus Drive and Blacktown Road for vehicles turning right out of Campus Drive in 2031 scenario. The change of average delay from 40.2 seconds to 44.8 seconds during AM peak and from 42.3 seconds to 48.7 seconds occur due to background traffic growth.

For the purposes of comparison, the results shown in Table 4.7 - Table 4.9 are the scenarios with Londonderry Road-Vines Drive as the <u>existing</u> giveway intersection without and with development traffic.

Table 4.7: Summary of modelling results for 2021 with development on existing layout

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|                                  | 2021 - Existing Operation With Development |       |                     |     |  |
|----------------------------------|--|-------|---------------------|-----|--|
| Intersection / Peak              | Average<br>Delay (sec)                     | DoS   | 95% Queue<br>Length | LOS |  |
|                                  | Delay (Sec)                                |       | (m)                 |     |  |
| Londonderry Rd / Vines Dr (AM)   | 10.4                                       | 0.07  | 1.6                 | Α   |  |
| Londonderry Rd / Vines Dr (PM)   | 10.2                                       | 0.174 | 4.3                 | Α   |  |
| Londonderry Rd / Southee Rd (AM) | 9.3  | 0.303 | 8.9                 | Α   |  |
| Londonderry Rd / Southee Rd (PM) | 10   | 0.18  | 4.4                 | Α   |  |

Table 4.8: Summary of modelling results for 2031 without development on existing layout

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|                                  | 2031 - Existing Operation Without Development |       |                     |     |  |
|----------------------------------|---|-------|---------------------|-----|--|
| Intersection / Peak              | Average<br>Delay (sec)                        | DoS   | 95% Queue<br>Length | LOS |  |
|                                  | 20.49 (000)                                   |       | (m)                 |     |  |
| Londonderry Rd / Vines Dr (AM)   | 13.3  | 0.091 | 2.3                 | Α   |  |
| Londonderry Rd / Vines Dr (PM)   | 11.8  | 0.197 | 5                   | Α   |  |
| Londonderry Rd / Southee Rd (AM) | 10.2  | 0.357 | 11.3                | Α   |  |
| Londonderry Rd / Southee Rd (PM) | 10.9  | 0.216 | 5.3                 | A   |  |

Table 4.9: Summary of modelling results for 2031 with development on existing layout

Data for signalised intersections is intersection total Data for unsignalised intersections is manoeuvre with worst delay

|                                  | 2031 - Existing Operation With Development |       |                       |     |  |
|----------------------------------|--|-------|-----------------------|-----|--|
| Intersection / Peak              | Average<br>Delay (sec)                     | DoS   | 95% Queue<br>Length L | LOS |  |
|                                  | Delay (Sec)                                |       | (m)                   |     |  |
| Londonderry Rd / Vines Dr (AM)   | 13.5                                       | 0.102 | 2.5                   | Α   |  |
| Londonderry Rd / Vines Dr (PM)   | 12   | 0.22  | 5.7                   | Α   |  |
| Londonderry Rd / Southee Rd (AM) | 10.3                                       | 0.359 | 11.4                  | Α   |  |
| Londonderry Rd / Southee Rd (PM) | 11   | 0.218 | 5.4                   | Α   |  |

#### 4.3.2 Forecast Traffic Volumes

As per the Transport for NSW warrants for signalised pedestrian crossings (refer Guide to Traffic Signal Design, Section 2 - Warrants), the minimum requirement for a mid-block signalised crossing are:

- 600 vehicles per hour
- 250 pedestrians per hour

The forecast two-way traffic volumes along Londonderry Road are 753 vehicles per hour and 780 vehicles per hour in 2021 during AM and PM peak, and 832 vehicle per hour and 862 vehicles per hour in 2031 in AM and PM Peak, meeting the minimum requirements of the warrants.

# 4.4 Public Transport

#### 4.4.1 Bus

The travel survey produced the results shown in Table 4.10 projecting a bus demand of 98 students.

Table 4.10: Bus demand forecasts

| User Type | % of Total School using Bus | Number of Users |
|-----------|-----------------------------|-----------------|
| Students  | 30%                         | 98              |
| Staff     | 5%                          | 1               |

Further details regarding the operation and adequacy of the local bus infrastructure is located in Section 4.9.

#### 4.4.2 Train

Table 4.11 summarises the current and forecasted number of students and staff using train services according to the travel survey.

Table 4.11: Train demand forecasts

| User Type | % of Total School using Train connect via bus | Number of Users |
|-----------|---|-----------------|
| Students  | 60%   | 195             |
| Staff     | 5%  | 1               |

# 4.5 Pedestrians

The current and forecasted numbers of pedestrians walking to the school are summarised in Table 4.12. The pedestrian facilities at and around the site including footpaths, pedestrian crossings and access gates, need to support a future demand of students and staff.

**Table 4.12: Pedestrian Demand** 

| Travel Mode                     | Richmond Ag College<br>Staff | Richmond Ag College<br>Students | Program<br>Visitors | Occasional<br>school-related<br>events<br>visitors |
|---------------------------------|------------------------------|---------------------------------|---------------------|--|
| Train<br>(connecting by<br>bus) | 1                            | 195                             | 25                  | 30   |
| Walk only                       | 1                            | 7                               | 0                   | 0  |
| Bus only                        | 1                            | 98                              | 0                   | 0  |

| Total 3 300 25 30 |
|-------------------|
|-------------------|

The provision of pedestrian footpaths on the local road network and appropriately placed zebra crossings support a high mode share. The school has five entry points, including two along the main site frontage. These entrances provide access in the northern, southern and western regions of the site. These facilities support the forecast walking demand of 300 students and staff and are expected to sustain the increase in pedestrian numbers as the school grows.

## 4.5.1 Pedestrian Crossing Warrants

As per the Transport for NSW warrants for signalised pedestrian crossings (refer Guide to Traffic Signal Design, Section 2 - Warrants), the minimum requirement for a mid-block signalised crossing are:

- 600 vehicles per hour
- 250 pedestrians per hour

However, with the crossing is expected to be primarily used by children, the warrant could be reduced to:

- pedestrian flow exceeds 50 pedestrians per hour
- vehicular flow exceeds 600 vehicles per hour in each direction

The forecast pedestrian crossing volumes at this crossing location are approximately 150 pedestrians per hour, comprising half of the total number of students using bus services (assuming a 50/50 north/south split). This meets the warrant requirement of 50 pedestrians per hour.

# 4.6 Cyclists

According to the JTW and Richmond High School mode share data, 1% of students and 0% of workers are estimated to ride a bicycle to the school. However, the travel mode survey revealed that not one student or staff member utilised this travel mode. This is not considered an accurate representation of the future demand and bicycle facilities are still to be included in the design.

The Hawkesbury Centre of Excellence is classified under Stream 3. On-site bicycle storage would be provided in accordance with the NSW Department of Education's Educational Facilities Standards & Guidelines (EFSG) as shown in Table 4.13.

**Streams** 1 2 3 5 6 7 9 12 **Bicvcle** 24 30 36 42 48 54 66 84 **Enclosure** 

Table 4.13: Bicycle Parking Requirements in EFSG

# 4.7 Car Parking

# 4.7.1 Rates and Requirements

Hawkesbury Council's DCP requires that parking be required generally in accordance with the following rates for schools and educational establishments as detailed in Table 4.14.

**DCP Rates** Land Use **Parking Demand Operations** Schools and Educational 1 space for each staff, staff members 25 parking spaces Establishment (including farm, admin plus and teaching plus up to 5 itinerant staff between campuses) for Space delivery vehicles and buses, plus 1 space per 5 seats or 1 150 seats - Dining / 30 parking spaces space per 7m2 of floor School Event Hall area in assembly hall, whichever is greater, plus 1 space per 3 year 12 55 year 12 students 18 parking spaces students. **TOTAL** 73 parking spaces

Table 4.14: DCP parking calculations

# 4.7.2 Car Parking Provision

It is proposed to provide a total of 39 parking spaces on the site, which is less than the DCP parking calculation. It should be noted that for the operation of the School, the Dining / School Event Hall would either be used by students and staff already on the site (thereby creating zero demand), or would be used for occasional school-related events and event functions outside school times at which point the shared usage of WSU parking would apply. Therefore, if this category is removed from the DCP calculations, the resulting calculation would be 43 spaces. The proposed provision is therefore only marginally below the suggested DCP provision.

As noted in Section 4.1, it is estimated that approximately 20 staff members and 13-15 students are expected to drive to the site. These volumes, plus some allowance for visitor parking, would be accommodated within the Centre of Excellence car park. Overflow parking for peak usage periods (e.g. occasional school-related events) would be on arrangement with WSU, in available parking areas such as the adjacent P47 car park.

Overall, the strategy for provision of parking is consistent with the transport strategy of the development as proposed to the Transport Working Group and achieves the sustainable transport goals of the project and of state planning policies more broadly.

#### 4.7.3 Design Compliance

Car parking will be designed to be compliant with the latest Australian Standard AS2890.1. The car park is generally classified as a Class 2 car park (to cater for visitors and occasional users), comprising 2.5m wide spaces and 5.8m wide parking aisles.

The existing P47 car park, which will act as an overflow car park in high-usage scenarios, would be maintained in its existing condition and layout.

# 4.7.4 Accessible Parking

The Building Code of Australia (BCA) defines accessible parking requirements as a portion of total capacity depending on the land use. To cater for the school development, accessible parking is to be provided at a conservative rate of 1 space for every 100 car parking spaces or part thereof (1%). The development is required to provide a minimum of 1 accessible parking space.

The proposed design provides 2 accessible spaces, located at the parking area adjacent to Block A and in the staff car park, complying with the BCA.

# 4.8 Pick-up and Drop-off (Kiss & Ride)

The most significant impacts at any school usually occur around school start and finish times, particularly during the afternoon pick-up period as families arrive in advance and queue to collect their children. All activity typically clears in a period of 15-20 minutes. Morning drop-off is less impacting to traffic, as activity is spread over a longer time (45-60 minutes) and does not require vehicles to queue and wait.

The functional capacity of the kiss & ride zone is assessed as follows:

Total capacity: 7 vehicles (as detailed in Section 3.7)

Peak period: 15 minutes (PM)
Vehicle turnover time: 90 seconds
Vehicle cycles: 10 per peak period

Vehicle flow capacity: 70 vehicles per peak period

This capacity will be sufficient to cater for the forecast usage levels. It is also noted that the morning peak period is twice as long (allowing double the potential flow, or accommodating longer turnover times), and that kiss & ride demand is generally lower in the afternoon than the morning (resulting in lower total demands).

#### 4.9 Bus Zones

The Londonderry Road bus bay will operate as the primary bus stop servicing the school. Both publicly operated school bus and public bus services will be using the bus bay. This bay has capacity for up to 2 northbound and 2 southbound buses at one time.

The overall estimated demand for bus movements, including bus connections to and from Richmond and Penrith train stations, is approximately 300 persons, which is the equivalent to approximately 6 buses. Therefore, the Londonderry Road bus bays would have sufficient capacity to cater for these buses in 2 cycles or less.

# 5 School Transport Plan

A School Transport Plan (STP) is a way to sustainably manage the transport needs of staff, students, volunteers and visitors to a development. The aim of the Plan is to reduce the environmental impact of travel to and from the site and to provide a clear plan of management for vehicle and pedestrian movements within and around the site.

This Plan contains travel plan objectives for the development, the proposed design features that contribute to meeting these objectives, and management strategies intended to fulfil the outlined objectives.

This preliminary School Transport Plan has been prepared to support the development and future operation of the school, and to satisfy conditions of the SEARs issued by the Department of Planning, requiring the provision of a School Transport Plan and strategies to improve infrastructure. This document is preliminary in nature and is intended to be dynamic and respond to the future operation of the site. It is anticipated that this preliminary STP will be developed into a more comprehensive and final STP prior to commencement of operations of the new development. This document may also form a reference point for further development of new operational plans in the future.

The Plan provides a review of existing facilities and travel habits and offers estimations and targets for future sustainable travel use. Details of the site's sustainable travel objectives are outlines in this section and includes specific programs, design features and actions proposed to help achieve these goals.

# 5.1 Transport Goals

## 5.1.1 Vision and Objectives

The vision and objectives of the preliminary School Transport Plan for the Centre of Excellence are:

- To proactively identify and meet school travel demand safely, efficiently and sustainably
- To deliver transport infrastructure to meet school travel demand
- To decongest the road networks around the school
- To empower children and young people to be safe road and transport users now and into the future

# 5.1.2 Mode Share Target

The mode share targets for the site are outlined in Table 5.1.

Table 5.1 Travel mode targets

| Table 6.1 Travel mode targets             |                              |                                    |                     |   |
|---|------------------------------|------------------------------------|---------------------|---|
| Travel Mode                               | Richmond Ag<br>College Staff | Richmond Ag<br>College<br>Students | Program<br>Visitors | Occasional<br>school-related<br>events Visitors |
| Train                                     | 5%                           | 60%                                | 25%                 | 10%   |
| Bus (public)                              | -                            | -                                  | 75%                 | 10%   |
| Bus (private)                             | 5%                           | 30%                                | -                   | -   |
| Car driver<br>Inc. truck and<br>motorbike | 80%                          | 4%                                 | 0%                  | 80%   |
| Car Passenger                             | 8%                           | 4%                                 | 0%                  | 0%  |
| Bicycle                                   | 0%                           | 0%                                 | 0%                  | 0%  |
| Walk only                                 | 0%                           | 0%                                 | 0%                  | 0%  |
| Total                                     | 100%                         | 100%                               | 100%                | 100%  |

#### 5.2 Policies and Procedures

The transport policies and procedures to be implemented for the Centre of Excellence are:

- Prioritise multi-model transport access
- Access policies for car parking on the CoE and WSU car parks
- Information campaigns to staff, students, and visitors
- Group travel to be coordinated by schools, utilising dedicated transport

# 5.3 School Transport Operations

# 5.3.1 Site Transport Access

An overview of transport access to the site is illustrated in Figure 5.1.



Figure 5.1: Site transport access

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# 5.3.2 Day-to-day Operations

## **Emergency Vehicles**

Emergency vehicles are the highest priority vehicle types requiring access to the school. Vines Drive and Maintenance Lane are both nominated emergency vehicle access points, meaning emergency vehicles share access with private vehicles, service and delivery vehicles. Though the CoE and the WSU campus are generally a low speed environment, high speed emergency movements may be required. Emergency vehicle access to the agricultural facilities shall be made available at all times.

#### **Active Transport**

Active transport modes include walking and cycling and other non-motorised means of transport. For the purposes of this Plan, active transport also considers pedestrian movements to and from vehicles parked within car parks, vehicles at the pick-up and drop-off area, and Londonderry Road bus stops. These movements result in some level of conflict and crossover and therefore require safe management. For this reason, active transport is a higher priority mode than all other non-emergency movements.

The main pedestrian facility requiring management includes the pedestrian movement across Londonderry Road to northbound buses (from Penrith and/or to Richmond). The management of this crossing point should be prioritised in consultation with Council and Transport for NSW (as a classified state road). This may include stationing a staff member or Travel Coordinator to ensure student safety.

#### **Public Transport**

The travel demands for students and staff travelling to the site via bus are expected to be a high portion of total demand, comprising both bus-only travel and bus connection to local train stations. This will increase as the school population increases.

The Londonderry Road bus bay will operate as the primary bus stop servicing the school. Both publicly operated school bus and public bus services will be using the bus bay. This bay has capacity for up to 2 northbound and 2 southbound buses at one time, and careful organisation is important for the smooth operation of this facility. Suggestions for bus bay management techniques are provided in Table 5.2.

Description

Allocate zones along the bus bay for different bus numbers so that students can easily locate the appropriate bus. Students would wait in this zone until the bus arrives.

Organise students into queues according to their desired bus number within the school site. This allows for students to be removed from the main roadway to encourage student safety. A staff member would then lead the queue of students to the relevant bus at the appropriate time.

**Table 5.2: Bus Bay Management Options** 

The low frequency of the public bus services may discourage staff and students from using public transport, and more regular services or dedicated school services may be required. The increased demand for public transport may influence the service provider to create additional services. Travellers are more likely to utilise the bus system if services are frequent and reliable with short waiting times. This is a long-term action that the organisation should explore with the relevant service operator (Busways) if deemed appropriate. This scheme has been explored with Transport for NSW during preparation of the EIS.

#### Pick-up and Drop-off

Pick-up and drop-off facilities are expected to attract low volumes of private vehicles due to the location and operations of the site and lack of a school catchment. These demands will occur for short periods of time in the morning and afternoon. It is anticipated that minimal congestion should occur, however should be safely managed. If left unattended, this may present a potential risk to pedestrian and vehicle driver safety.

Activities relating to pick-up and drop-off can produce significant safety concerns and impacts on the local traffic condition. Accordingly, PUDO zones require deliberate management to ensure user safety and maintain an acceptable traffic flow. Table 5.3 outlines a technique that may be implemented.

Table 5.3: Recommended PUDO Zone Management Techniques

| Technique                     | Description   |
|-------------------------------|---|
| Staff to be stationed in zone | <ul> <li>Stationing a staff member in the PUDO zone is likely to encourage sensible user behaviours. Any unsafe student behaviour or reckless driver behaviour can be reported to the school principal for further investigation.</li> <li>Staff members can assist drivers in locating spare parking spaces</li> <li>Staff members can encourage drivers to pull up to the space furthest along the zone to maximise capacity.</li> <li>If applicable, a staff member may be stationed at any nearby pedestrian crossing/s to assist with conserving traffic flows and keeping students safe.</li> </ul> |

The on-site pick-up and drop-off zone would also facilitate private coach movements for program visitors and potential occasional school-related events groups. These groups will need to be coordinated outside morning and afternoon school peak times, to avoid conflict or overlap with cars using the same space. Buses may temporarily block parts of the visitor car park when dropping off or picking up and should move on promptly to other storage locations (or not arrive significantly ahead of schedule) if a particular vehicle is expected to cause blockages.

# **Car Parking**

Travel by car for the purposes of car parking is considered a low-priority transport mode. While the demand volumes for car parking are anticipated to be high for this site location, the safety and sustainability of private vehicle travel result in this being a low priority mode. Nevertheless, to ensure operation of the site it is critical to manage the car parking in an efficient way, for example to allow staff to access the facility in a timely manner.

The provided off-street staff car park is only accessible via the Maintenance Lane. The parking can be accessed from this point via the parking aisles as seen in Figure 5.2.



Figure 5.2: Car Parking Access

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This car park is for the exclusive use of staff members, and the Maintenance Lane access is to be closed to the public, including parents and carers wishing to pick-up or drop-off students. One suggestion to regulate the car park use is to install boom gates at the entrance. This method requires staff to have a parking pass in order to gain access to the car park.

Overflow parking for peak usage periods (e.g. occasional school-related events) would be on arrangement with WSU, in available parking areas such as the adjacent P47 car park.

# Service and Loading

Service and loading functions are a key component of the operation of the school. However, given the importance of other travel mode types, particularly the risk of other movements becoming unsafe or congested, service vehicles are considered the lowest priority transport type for the school site. Heavy rigid vehicles are the largest expected vehicle used for agricultural purposes, while medium rigid vehicles are expected for services or deliveries. Waste collection occurs southeast and is available via the Maintenance Lane vehicle access.

Delivery and service vehicles will enter the site in a forward direction via the Maintenance Lane access. On completion of unloading or servicing activities, the truck should exit the site from the same access in a forward motion. The final arrangements for internal movement of delivery and service vehicles will be finalised in the detailed design stage.

All delivery and service trucks are advised to be fitted with reversing alarms and cameras to assist truck drivers in performing reverse manoeuvres and avoiding any conflict with other vehicles and pedestrians. Given that deliveries are generally occurring outside of school hours, there is a minimal chance for any such conflict to occur. However, some agricultural deliveries may be required to occur during school hours or may form part of the agricultural curriculum. In any case, as a minimum safety requirement delivery and service vehicles should be fitted with the above recommended safety features.

Wherever practical, all deliveries should be scheduled at least 15 minutes apart to avoid any conflicts and allow a buffer for unexpected delays. Additionally, deliveries are recommended to be scheduled outside of school hours either before 8:00am or after 3:20pm. Other considerations for the scheduling of deliveries include:

- Personnel to be available to marshal vehicles through the site for access to the main loading areas (to manage conflict and movements through pedestrian areas)
- Nominated external personnel (if available) to be recorded and provided with induction information if necessary
- Relevant staff in departments or classrooms adjacent to loading areas to be advised of any scheduled activities which may be noisy or disruptive to classes.
- Once deliveries are completed, a record of deliveries is to be kept, to assist with future planning or any incidents which may occur.
- Vehicle size to be determined, and necessary traffic control measures to be considered if necessary and planned for within the scheduling system.
- Vehicle requirements (e.g. reversing alarms) are to be made clear to construction or delivery contractors.

#### 5.3.3 Event Transport Operations

Occasional school-related events and visitor events on the site will be managed on a specific arrangement.

The primary travel mode for general program visitors will be via private coach, to be organised by individual schools as required. The on-site drop-off and pick-up area will be used for this function and is to be coordinated outside morning and afternoon peak school periods.

Occasional school-related events are generally expected to occur on weekends, when public transport availability is reduced, and private car mode share is therefore expected to be high. On-site parking within the University campus will be made available on arrangement between the School and the University.

# 5.3.4 Transport Programs

## Ride 2 School Day and Health Events

Various organisations and groups develop programs and events to encourage active transport. For example, Bicycle Network coordinates a Ride2Work and Ride2School Day each year. These events provide a good opportunity for organisations to encourage staff and students to participate in cycling. Additionally, these initiatives create awareness and are useful for influencing the school community's travel behaviours. The school should investigate avenues to promote this event and encourage staff participation. An additional suggestion is to introduce incentives such as competitions or rewards.

Bicycle training workshops can also be a component of these programs to enable users to become familiar with bicycle maintenance, recommended cycling routes and general bicycle and road safety. Rideability is an example of a cycling education service that delivers workshops in schools with an emphasis on road safety and cycling skills.

Other health events encouraging active transport include Bike Week, Walk Safely to School Day and Health and Wellness Fairs. These initiatives expose staff and students to the many benefits of choosing active transport.

Annually hosting these events provides the community with a continual reminder and is therefore more likely to influence their behaviour.

# Carpooling / Liftango

A strategy to encourage staff to carpool involves a pairing system that notifies staff members of other staff who live in nearby areas or along their travel route. Initiating this system might involve a meeting to provide an opportunity for staff members to discuss carpooling options, including coordination of staff by region or place of residence.

Off-the-shelf alternatives such as the Liftango app may also be an option for staff to utilise.

# **Priority Parking**

Staff committed to carpooling should be allocated priority parking spaces in a desirable area of the staff car park. Having a designated parking space ensures that users will be able to park on-site. This may act as an incentive for others to investigate carpooling opportunities. Priority spaces could also come with other benefits such as a prime location with good accessibility as a further encouragement.

#### 5.4 Communications Plan

Safe and efficient management of the site will require all users to have a thorough understanding of operations and their responsibilities. Two key parts of this will be staff communications and student/parent communications. Communication strategies may include:

- Staff reminders / staff intranet information
- All regular contractors and delivery personnel to be advised of management strategies and requirements
- Staff road safety training seminars
- Student and parent newsletters
- Transport details on school website
- Direct advice to students/parents as required (e.g. responding to unsafe activities during pick-up times)
- Classroom education or extra-curricular transport safety activities (e.g. Safer Drivers courses), particularly for new drivers

# 5.4.1 Channels

# **New Starter Kits**

To ensure new travellers have information regarding all their travel options, a Transport Access Guide should be provided. This brochure can easily be included as part of an induction or orientation package. This is especially important for travellers new to the area and who may be completely unfamiliar with the transport options.

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#### **Periodic Reminders**

One method to enable periodic information sharing is to include a sustainable travel section within a school newsletter. The content may include details about new travel initiatives, mode share progress updates, upcoming events or changes, as well as reminding travellers about the importance of sustainable travel. It should also allow for feedback or questions regarding any travel-related concerns.

#### **School Website**

The school website is to be utilised to provide up-to-date transport information, and to provide a central source of information for students and parents. External visitors would also have access to the website.

## 5.4.2 Messages

Key points of information and typical messages to the school community could include:

- Public transport recommendations (such as preferred bus/train arrival times for best connections)
- Site access recommendations (such as the preferred exit route to College Street to avoid delays at Campus Drive)
- Opal card reminders (to ensure students are tapping on and off even if public transport is free under the SSTS)

# 5.4.3 Transport Access Guide

The aim of a Transport Access Guide is to present staff and students with information about the available safe and sustainable transport options in the local area. This action involves presenting this information in a simple and understandable manner through an educational brochure. Staff and students are more likely to change their travel behaviour after being made aware of the public and active transport options and how to safely and easily utilise these alternatives.

Recommendations for the brochure content includes bus and train routes and how to access these from the site. It should also include information about end-of-trip facilities and safe routes to surrounding neighbourhoods for staff and students able to participate in active transport.

Transport Access Guides can be distributed to staff, students and parents and can be developed in-house or by an external consultant. The brochure should also be accessible online through the school's website for visitors and ease of access.

A Transport Access Guide template is provided in Figure 5.3 and Figure 5.4. This guide gives the type of content and advice to include in a Transport Access Guide for an educational development.



Figure 5.3: Travel Access Guide public transport template
Source: School Infrastructure NSW



Figure 5.4: Travel Access Guide active transport template Source: School Infrastructure NSW

# 5.5 Data Collection and Monitoring

#### 5.5.1 Data Collection

## **Transport Data Collection**

Data collection is required for the ongoing management and reviewing of this Plan. These investigations are intended to evaluate whether a particular operation or system is still successfully functioning and meeting demands. Table 5.4 contains suggestions for the data collection context and the types of data to be collected.

**Table 5.4: Data Collection Summary** 

| Context               | Data to be collected   |
|-----------------------|--|
| Buses                 | <ul> <li>Number of public bus users (morning, afternoon and overall)</li> <li>Number of school bus users (morning, afternoon and overall)</li> <li>Number of school vs non-school users at nearby bus stops</li> <li>Observational assessments (e.g. queuing, safety concerns)</li> </ul>  |
| PUDO Zone             | <ul> <li>Number of users (morning, afternoon and overall)</li> <li>Set down times</li> <li>Arrival and departure times</li> <li>Number of students exiting/entering vehicles</li> <li>Number of any non-formal pick-up and drop-off occurrences as well as the time and location</li> <li>Observational assessments (e.g. queuing, illegal stopping, safety concerns)</li> </ul> |
| Car Parking           | <ul> <li>Number of daily vacant and occupied spaces</li> <li>Number of passengers per vehicle</li> <li>Arrival and departure times</li> </ul>  |
| Pedestrian Facilities | <ul> <li>Number of pedestrians entering through gates</li> <li>Arrival and departure times through school gates</li> <li>Number of pedestrians using pedestrian crossings</li> <li>Number of pedestrians jaywalking as well as the time and location</li> </ul>  |
| Cyclist Facilities    | <ul> <li>Number of daily vacant and occupied bicycle parking spaces</li> <li>Number of cyclists entering through each site access point</li> <li>Number of end-of-trip facility users</li> </ul>   |

# **Incident Recording System**

It is recommended that the school should keep and maintain an on-site traffic incident record. This record would contain a description of the incident, including contact details and what actions were taken by the school in response to the incident. It is advised that records of incidents be kept for an extended period of time following the incident occurrence.

The school should be able to provide the traffic incident register to relevant authorities on request.

#### **Complaints Management**

It is recommended that the school should keep and maintain a record of all complaints made in relation to any transport or access issues in a complaint register. Suggestions for what the record may include are:

- The date and time of the complaint
- The method by which the complaint was made (e.g. phone or email)
- · Any personal details provided by the complainant
- The nature of the complaint
- Any action taken by the school in relation to the complaint including any follow-up communication

It is advised that records of the complaint be kept for an extended period of time after the complaint was made. The school should be able to provide a copy of the complaints register to relevant authorities on request.

# 5.5.2 Program Evaluation

Once the School Transport Plan is finalised, it is to be maintained by the school and shall be distributed to all the concerned logistic personnel and managers. The school is also responsible for distributing appropriate information to staff and contractors as necessary. A copy of the STP is always to be held on-site and available for review.

This STP should be reviewed regularly and updated as required. It is recommended that an initial review should take place following six months of operation. This review should include detailed observations of the transport operations of the site and adjustments to procedures where necessary.

Following this initial review, a review every two years would likely be an appropriate schedule. To ensure that the ongoing review of this STP is carried out as expected, responsibility for this task should be allocated to the Travel Coordinator or a specific alternative staff member.

#### **Reporting Findings** 5.5.3

The School Travel Plan and other associated documentation including the Transport Access Guide should be regularly reviewed and updated as required. It is recommended that an annual review would be an appropriate schedule. The review should include an updated travel mode survey, consultation with staff, students and visitors, and adjustments to initiatives and targets.

Sample evaluations and outputs to stakeholders may include:

| School data  | School Infrastructure<br>NSW   | Students / parents | State / local government  |
|--|--|--------------------|---|
| <ul> <li>Annual update to dashboard</li> <li>Compare results</li> <li>Document progress or deficiencies during delivery</li> <li>Results to communicate</li> <li>Analyse policies, infrastructure, or programs to revisit</li> </ul> | <ul> <li>Annual update to dashboard</li> <li>Compare results</li> <li>Document progress or deficiencies during delivery</li> <li>Results to communicate</li> <li>Analyse policies, infrastructure, or programs to revisit</li> </ul> | Issue report       | <ul> <li>Issue verification</li> <li>Issue resolution</li> <li>Review school and public transport network and services</li> </ul> |

#### 5.6 **Governance Framework**

#### **Travel Coordinator Roles and Responsibilities** 5.6.1

Transport programs must be implemented to achieve travel behaviour change. The school principal and teachers are not travel coordinators, so a dedicated role is required to implement and manage these programs.

The dedicated Travel Coordinator shall:

- Liaise with the School Principal as the nominated transport representative for the school
- Liaise with other internal stakeholders (see below)
- Coordinate communications and publications to staff and students as required
- Directly oversee implementation of transport programs where relevant
- Consult and engage external parties to implement transport programs where relevant
- Liaise with the Contractor prior to the construction phase to review and approve proposed construction traffic and access methodologies
- Liaise with the Contractor during the construction phase to maintain safe operations at and around the site

A dedicated Travel Coordinator is generally required for the duration of construction and the first year post-occupancy. This role is funded by the project during delivery.

After this period, subsequent arrangements for this role are under discussions between School Infrastructure, the Department of Education, and Transport for NSW.

#### 5.6.2 Internal School Stakeholders

The list of internal stakeholders to be consulted by the Travel Coordinator includes:

- School Principal
- Other school Executive Staff as relevant
- Road Safety Education Officer
- Asset Management
- Grounds Management
- WHS Representative
- P&C

#### 5.6.3 State and Local Government Stakeholders

The list of external stakeholders to be consulted by the Travel Coordinator includes:

- Hawkesbury City Council
- Transport for NSW
- Busways

In the event of external consultation being required, various state and local stakeholders have provided a nominated contact person, either for addressing concerns and comments or for providing alternative best contacts for a specific issue.

The nominated point of contact at **Hawkesbury City Council** is as follows:

- Name:
  - To be advised by Council for inclusion in post-approval documentation.
- Role:
  - o TBC
- Phone:
  - o TBC
- Email:
  - o TBC

The nominated point of contact at **Transport for NSW** is as follows:

- Name:
  - o To be advised by TfNSW for inclusion in post-approval documentation.
- Role:
  - o TBC
- Phone:
  - o TBC
- Email:
  - o TBC

The nominated point of contact at **Busways** is as follows:

- Name:
  - To be advised by Busways for inclusion in post-approval documentation.
- Role:
  - o TBC
- Phone:
  - o TBC
- Email:
  - o TBC

# 6 Preliminary Construction Traffic and Pedestrian Management Plan

This preliminary Construction Traffic and Pedestrian Management Plan (CTPMP) addresses the proposed construction of the Hawkesbury Centre of Excellence development. It discusses the management of construction vehicles and activities, and an investigation of the local traffic and safety conditions throughout the construction process. A draft CTPMP is required in accordance with the SEARs for this development.

A detailed CTPMP will be prepared by the builder with consideration of all final design selections. This preliminary CTPMP is intended to provide a framework within which a future CTPMP can be developed and implemented, and to demonstrate the potential operation of the construction site.

A CTPMP is developed to satisfy the duties of various work health and safety legislation, regulations and codes of practice including those from SafeWork NSW. Traffic Guidance Scheme (TGS) will also need to be developed in association with a final CTPMP for the future site to demonstrate the traffic control procedures to be implemented. These must be developed in accordance with Transport for NSW and the relevant Australian Standards.

In addition to a detailed CTPMP, the builder shall be responsible for acquiring the necessary certificates, licences, consents, permits, and approvals relevant to the construction on this site.

# 6.1 Construction Operations

## 6.1.1 Access Arrangements

#### **Access Point**

The majority of works will occur adjacent to Vines Drive, providing good construction access to the site as shown in Figure 2.1.

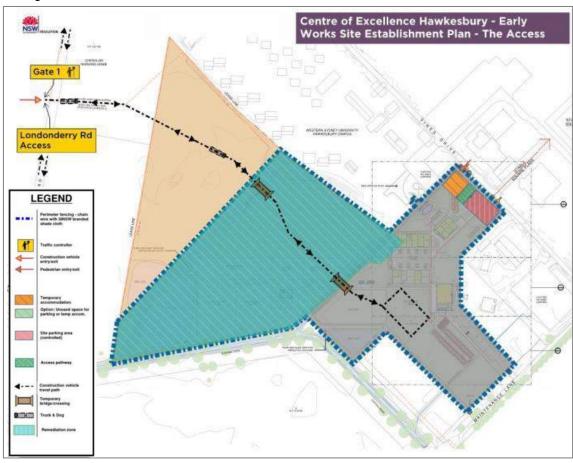


Figure 6.1: Preliminary Site Access Plan

Source: Construction Management Plan Version 3 by Richard Crookes Construction, 19th July 2021

#### **Construction Vehicle Access**

The large amount of undeveloped area within the site provides adequate space for vehicles to load and unload within the worksite.

Turning path analysis are provided and are shown in Appendix B.

#### **Emergency Vehicle Access**

Emergency vehicles will be able to enter from the existing emergency vehicle access point at the Londonderry Road and access each part of the site uninhibited. They will be able to access neighbouring properties and pass by the site without any issues.

# 6.1.2 Worker Parking

The provision of on-site parking for construction workers is expected to be available due to the large site area. This parking can be repositioned depending on the construction activities during any given phase. The parking zone will be placed so that there is no disruption to construction vehicle movements or construction activities. The P47 car park area may be nominated to provide parking for construction workers to avoid any impacts to the broader university campus. The car parking for workers is subject to the final Construction Traffic and Pedestrian Management Plan and future discussions with WSU.

Site sheds and material storage areas are expected to be located within the site.

A detailed Construction Management Plan and Construction Traffic Management Plan shall be developed including the requirements and impacts to parking.

# 6.1.3 Construction Program

Table 6.1 indicates a preliminary phasing outline of each construction stage including estimated vehicle types and volumes, as well as the approximate number of daily workers. These estimations are based on previous projects but are subject to change following the appointment of a contractor.

The data in the table below is to be updated by the builder once appointed and currently represents estimates only.

Vehicles per **Estimated** Workers per Stage Largest Vehicle Duration Day Day Site Establishment 1 month 10 Substructure 2 months Heavy Rigid Vehicle 8 45 Structure 2 months Heavy Rigid Vehicle 30 80 Semi-trailer 2 Roofing & Façade 4 months Heavy Rigid Vehicle 2 95 Finishes & Services 7 months Heavy Rigid Vehicle 2 130 2 Landscaping & Completion 4 months Heavy Rigid Vehicle 80 Works Complete 2 months 60

Table 6.1: Example of Construction Phasing<sup>5</sup>

The hours of operation for construction activities are to be determined by the Council and will contain similar work hours to the following:

Monday to Friday
 Saturday
 Sunday and public holidays
 7am to 5pm
 8am to 1pm
 None

\_

<sup>&</sup>lt;sup>5</sup> Construction Phasing example from Smalls Road Public School Construction Traffic and Pedestrian Management Sub-Plan Report, 4 December 2018

# 6.2 Construction Traffic Management

# 6.2.1 Vehicle Management

Vehicle movements will occur within the prescribed working hours. Delivery and removal trucks are to have a staggered arrival schedule and occur outside general peak hours as well as school peak hours where possible. Avoiding peak hours allows for minimal queueing of construction vehicles on the local roadway and prevents congestion in the neighbouring areas. Any vehicles arriving after the worksite has reached maximum capacity will be expected to reschedule their delivery and depart, although it is anticipated that enough queueing space will be available.

Careful management of heavy construction vehicles exiting the site will ensure traffic safety. The relatively low traffic volumes on Londonderry Road means vehicles are expected to use suitable traffic gaps to exit.

To successfully coordinate and execute these processes, communication between all delivery depots and waste management centres will be maintained.

#### 6.2.2 Construction Vehicle Routes

It is proposed that construction vehicle access to the site take place via Londonderry Road. Construction vehicles will access via Londonderry Road, which is assumed to be modified prior to commencement of works to cater for appropriate heavy vehicle traffic. Given the extensive space available within the construction site, it is anticipated that all vehicles will be able to manoeuvre on-site, entering and exiting in a forward direction and returning along the approach route.

To minimise the disruption to the university operation and users, travel within other parts of the campus shall be restricted only where appropriate.

Recommended regional access routes are described below and illustrated in Figure 6.2.

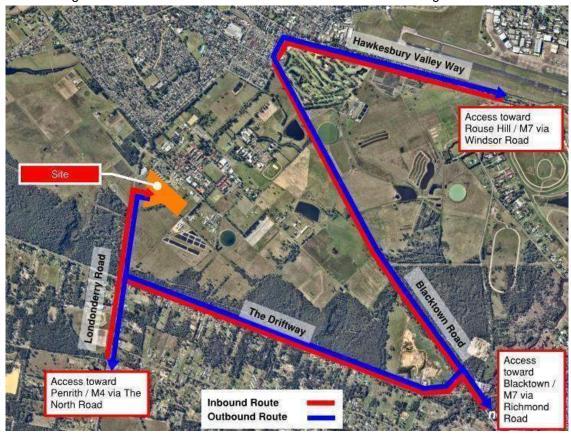


Figure 6.2: Recommended construction vehicle routes

Northeast (note: unsuitable for largest vehicles due to route through Richmond town centre)

- Approach via Hawkesbury Valley Way; then
- Turn left onto Bourke Street:
- Turn left onto Blacktown Road: then
- Exit right onto The Driftway; then
- Turn right onto Londonderry Road; then
- Turn left into Londonderry Road and towards onto the site.
- Return via the same route.

#### **Southeast**

- Approach via Richmond Road; then
- Continue onto Blacktown Road; then
- Turn left onto The Driftway; then
- Turn right onto Londonderry Road; then
- Turn right into Londonderry Road and towards onto the site.
- Return via the same route.

#### South

- Approach via The Northern Road; then
- Continue onto Londonderry Road; then
- Turn right into Londonderry Road and towards onto the site.
- · Return via the same route.

## 6.2.3 Public Transport Impacts

No public transport impacts are expected as the construction will occur within the site. Traffic impacts from the construction works are expected to be limited to the truck routes detailed in this report. These routes are likely to experience only minor impacts due to the presence of additional truck movements. These truck movements are not expected to cause delays on local roads, or create flow-on impacts to other streets.

There shall be no changes to local public transport routes and services as a result of the construction. Access to all adjoining properties both internal and external to the university campus will be maintained throughout the works.

Manoeuvring of heavy vehicles exiting the site is to be managed carefully such that traffic safety is maintained. Due to the relatively quiet nature of the roads surrounding the site, it is expected that vehicles exiting the site will be able to use suitable gaps in traffic (excepting some delays for right-turns out of the Blacktown Road access).

Light vehicle traffic volumes (from construction workers and minor deliveries / equipment) will be less than the operational volumes of the school and shall therefore not cause excessive impacts to the local road network.

#### 6.2.4 Cumulative Impacts

Council has indicated there are no planned works for the local roads or nearby developments. Further details about nearby construction works will be confirmed in a final CTPMP.

# 6.3 Road Safety

#### 6.3.1 Construction Vehicle Access Points

Access to the construction site is situated along Vines Road and Maintenance Lane.

# 6.3.2 Construction Vehicle Routes and Intersections

There are several intersections within the recommended vehicle routes, and possible safety impacts for all road users need to be assessed. Notable intersections near the site have been summarised according to their type in Table 6.2.

**Table 6.2: Intersection Summary** 

| Type of Intersection        | Relevant Intersection/s                        |  |
|-----------------------------|--|--|
| Signalised                  | Windsor Street / Bourke Street                 |  |
|                             | Blacktown Road / Bourke Street / Lennox Street |  |
| Unsignalised T-intersection | Londonderry Road / Vines Drive                 |  |
|                             | Londonderry Road / Southee Road                |  |
|                             | Blacktown Road / Campus Drive                  |  |

Signalised intersections have minimal safety concerns as vehicles, cyclists and pedestrians are adequately controlled.

The unsignalised T-intersections contain turning lane for vehicles and the ample sight distances for safe traffic environment.

# 6.3.3 Construction Traffic Management

All the loading/unloading activities will occur and will be accommodated within the site compound. An on-street works zone is not likely to be required for such activities.

Traffic controllers will be implemented at the site entries as required to ensure safe and efficient movement of vehicles, pedestrians and the safety of workers within site.

All deliveries are to be made within the approved work hours. Truck movements to and from the site will be scheduled outside of network peak hours to reduce impacts to the local road network.

During days of high estimated vehicle movements, communication between the site, concrete batching plant and/or vehicles will be maintained to stagger the arrival of vehicles, for them to be accommodated within the worksite and to minimise traffic disruptions.

This will not impact the surrounding roads as activities will be managed within the site boundary with trucks entering and exiting in forward direction.

A Traffic Control Plan showing appropriate warning signages addressing all the construction stages shall be provided.

#### 6.3.4 Construction Workers Parking

The provision of on-site parking for construction workers is to be available due to the large site area. This parking can be repositioned depending on the construction activities during any given phase. The parking zone will be placed so that there is no disruption to construction vehicle movements or construction activities. The use of P47 car park for workers is subject to WSU approval.

Workers car park will be detailed in the final CTMP.

# 6.3.5 Pedestrians and Cyclists

During school peak hours, significant pedestrian and cyclists activity is expected as students and staff arrive and depart from the site. As discussed, construction vehicle movements will be scheduled outside of school peak hours to ensure pedestrian safety. There is currently no pedestrian footpath provided along the site frontage at Vines Drive. A footpath is provided along the opposite (northern) side of the road. A number of crossing facilities are located along the road to provide access to specific areas and buildings. Pedestrians will be prohibited from entering or passing through specific areas of the site during construction, enforced by fencing around the perimeter. Signage should be fitted to communicate to students and staff alternate access points and routes within the site. Any changes to external pedestrian routes should also be communicated with signage and detours clearly marked.

# 6.3.6 Cyclists

No cycle lane is available along Vines Drive or Londonderry Road, and minimal impacts to cyclists are expected as a result of construction.

#### 6.3.7 Communication of Works

Prior to any site works taking place, notification of commencement of the works shall be distributed to the neighbourhood. Notification is to include information or comment. Community notifications will be undertaken as per the Construction Management Plan prepared by the RCC.

Traffic control advance-warning signage in accordance with TfNSW guidelines and Australian Standards is to be in place to notify motorists of roadwork and when traffic controllers are present. Sign size is to be size "A" and is to be monitored throughout the works to ensure they are clearly visible.

As part of the site induction procedures, all contractors will be made aware of this Construction Traffic Management Plan, the relevant Traffic Control Plans, and their responsibility to adhere to these plans.

#### 6.3.8 Public Infrastructure

On infrequent occasions when particularly large vehicles are required to access the site, some mounting or crossing of public kerbs and medians may be necessary. The builder shall repair any damage to this infrastructure if large vehicles are required to mount the devices. Any other road markings damaged as a result of vehicles associated with the construction shall be repaired as a responsibility of the builder.

# 7 Conclusion

# 7.1 Transport Strategy

The overall transport strategy for the proposed development is as follows:

- Pedestrians
  - Minimal demand expected; provide connectivity to bus services and to local network
- Cyclists
  - Minimal demand expected; provide on-site storage
- Public transport
  - Strong demand expected by bus and rail; bus connectivity to train stations required due to long walking distance
- Freight & deliveries
  - o Agricultural vehicles accommodated within the site for specialty purposes
- Kiss & ride
  - Minimal demand expected; on-site provision for car and bus access to be operated at separate times
- Car parking
  - Reasonable demand expected; on-site provision within the CoE for general usage, and shared parking with WSU for peak usage

This overall strategy has been proposed to, and discussed with, both Council and Transport for NSW (TfNSW) during ongoing liaison through a Transport Working Group (TWG) for the project. The TWG has met a number of times since March 2021, and the project has refined the transport strategy during that period in response to feedback received.

To safely accommodate the additional transport demands to the site particularly pedestrian movements, a concept design is proposed at the intersection of Vines Drive and Londonderry Road. The concept design includes a signalised pedestrian crossing on Londonderry Road, and new bus stops on Londonderry Road south of Vines Drive.

It is recommended that the preferred solution for this intersection would be to undertake staged works as part of the TfNSW Richmond Bridge duplication project, however we currently understand that the timeline of that project would not suit the requirements of the CoE, and therefore this interim or alternative solution is provided.

A preliminary School Transport Plan has been prepared which addresses the sustainable management of operational transport demands, and discusses different management options to ensure the success of the future operation of the CoE. A preliminary Construction Traffic and Pedestrian Management Plan has also been developed to assess any traffic impacts expected to occur during construction works.

# 7.2 Findings

This TAIA has analysed the proposed development and its transport strategy and found the following:

- Forecast pedestrian and vehicle volumes can be accommodated within the proposed concept design
  for a signalised pedestrian crossing at Londonderry Road south of Vines Drive. The proposed concept
  works would be sufficient as a permanent solution (based on traffic modelling results), however would
  be preferable as an interim solution to be replaced by the TfNSW major works in the area.
- Forecast additional vehicle traffic volumes are low and can be comfortably accommodated in the local and state road network while sustaining good levels of intersection performance.
- Northbound (from Penrith to Richmond) and southbound (from Richmond to Penrith) bus services will be critical for moving people to the respective train stations, for connecting access to Greater Sydney (an expected part of the site operations).
- The proposed car parking provision is considered suitable, accommodating general daily demands within the Centre of Excellence site and accommodating peak demands within the University car park (which has availability and would be used off-peak).

The proposed development is deemed suitable on consideration of the traffic and transport elements of the site and its surrounds, and the transport strategy proposed for its management. Only minor items are required to be resolved during further design (see below).

#### 7.3 Next Steps

Following the approval of this SSDA, the expected future works would include:

- Detailed design and Local Traffic Committee approval of the signalised pedestrian crossing at Londonderry Road south of Vines Drive proposal, including pedestrian crossing measures and bus bays
- Ongoing consultation with Transport for NSW to target the preferred intersection option at Vines Drive
- Ongoing consultation with Transport for NSW to determine and implement additional bus services to the site
- Further development of the School Transport Plan and Construction Traffic and Pedestrian Management Plan (subject to the relevant conditions of consent)

#### **Appendix A – Agency Consultation**





### Centre of Excellence – Transport Working Group Meeting #1

| Meeting Details | Meeting Details   |  |  |  |  |
|-----------------|---|--|--|--|--|
| Project         | Centre of Excellence in Agriculture Education – SSD – 15001460 – Centre of Excellence (CoE)   |  |  |  |  |
| Date            | 16 March 2021   |  |  |  |  |
| Location        | Skype for Business  |  |  |  |  |
| Attendees       | SINSW – Matthew Metlege, Rebecca Lehman CIPL – Lizza Young, John Stalley, Maddy Stenniken TTW – Michael Babbage, Paul Yannoulatos, Nathaniel Borja RCC – Tom Hemmett, Kim Pappas TfNSW – John Broady, Billy Yung, Felix Liu, Malgy Coman, Hawkesbury CC – Andrew Johnston, Colleen Haron, Christopher Amit, |  |  |  |  |
| Apologies       | Jack Bruderlin (JB)-SI NSW, Pahee Rathan (PR)-Transport   |  |  |  |  |

|   | ichael Babbage pro MB gave and between the save and distances, pro- Bridge duplic community of the comment o    | k of bus services; low frequency b<br>ety concerns for cycling   | Working Group #1 meeting. submission and differences site location, services travel external projects – Richmond ject, local roads and                                  | Note   |           |
|---|--|--|---|--------|-----------|
|   | - MB gave and between the between the MB gave and distances, public between the community of the community of the comment of t | overview of the previous SEARs at two projects. overview of the Site Plan, project ublic bus routes, bicycle network, cation, Hawkesbury Liveability professional program. By for staff and students by staff results received thus far. It is received: It is received: It is the provious SEARS of the Site Plan, project of the SEARS o | submission and differences site location, services travel external projects – Richmond iject, local roads and   | Note   |           |
|   | o Lor o Hig o No o Litt. o Opportunitie o Pot o Loc o Ter o Duc c Overall tran Policy where are in the lo  | ential shared transport with Richmal and regional upgrades including rain suitable for walking, cycling al transport demands with school as sport hierarchy in line with TfNSW expedestrians and cyclist are the tower end of the hierarchy.  The previous SSD Hurlstone Agricul   | ty campus ucture (and usage) limited planned improvements and HS g town centre and university improvements Road User Space Allocation ap priorities. While private cars |        |           |
|   | Old Scheme New Scheme  |  |   |        |           |
|   | ctudont ( 'ongoity   | 1,500 students inc boarding<br>110 staff   | 380 students (nil boarding) 18 staff  | SI NSW | 22 Mar'21 |
| C | Student Capacity Staff Capacity  | I IU Stall   | TBC   |        |           |



|    | Task  |   |  | Responsible   | Date |
|----|---|---|--|---------------|------|
|    | Buses   | 5 buses/coaches   | TBC  | SI NSW        |      |
|    | Boarding Accom  | 300 students incl   | 60 beds (inclusive)  |               |      |
|    | more than 380, inclu  | ery on the total number of students<br>ding day trippers. SI to revert and<br>itional information with respect to t   | respond  |               |      |
|    | Anticipated SEARs in  | nclusions   |  |               |      |
| 2. | <ul><li>Green trave</li><li>Operational</li><li>Construction</li></ul>                          | nd Accessibility impact Assessment plan / School Transport Plan (prestraffic and access management plan (prelimination) advise if additional reports are requality.   | eliminary)<br>lan (preliminary)<br>nary)   | Transport NSW |      |
|    | Proposed Traffic Stu  | dy areas, requesting Transport an   | d Council  |               |      |
| 3. | ○ Lor<br>○ Lor<br>○ Ler<br>○ Ler<br>■ Travel Surve<br>understandi                               |   | ktown Road  Anticipated to validate current ving and parking   | TTW<br>Note   |      |
| 4. | (CoE).  The CoE is day excursion of the colliers and the colliers and the colliers responsible. | expected to cater more than the 3cons.  TTW is still investigating the Tranfor transport of students to the Colond High School (RHS) as there a tive studies in the CoE.  Transport's raised questions if Colonded that CoE is to accommoda se model conducted where the cas for agricultural and science specials. | 80 students from the Day-to-<br>sport servicing strategy.<br>E may be picking up students<br>re 380 students who will be<br>DE has future expansion plans.<br>te 380 students based on the<br>lculated maximum demand is |               |      |

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|    | Task  | Responsible | Date |
|----|---|-------------|------|
| 5. | commitment for future expansion of CoE. TTW added that future expansion will be subjected to different DA.  Collier confirms that the CoE is a 99 year lease.  Questions for Council  TTW queried Council about Stage 2 funding list for pedestrian and cyclist path upgrade or shared paths that may benefit the school and the residents in the area. Council responded that Council has 10-year projected program where projects will come from but can't say where the stage is at. Council (AJ) noted that coordination of Stage 2 projects could be looked into.  Council (AJ) requested the addition of Campus Drive – Blacktown Road intersection to the proposed traffic study scope   | TTW         |      |
| 6. | <ul> <li>TfNSW queried the traffic distribution where traffic is expected to and from RHS. TTW replied that there are expected transport demand from different directions, but this is still unresolved at this stage. TfNSW (MC) noted that agreement/endorsement of the proposed traffic modelling scope may need to wait until a preliminary transport and access strategy is further developed.</li> <li>TTW raised if there is a master plan for future bus transport service expansion. TfNSW (JB) responded that there are no plans that he is aware of.</li> <li>Collier asked TfNSW if bus services can be provided or service improvement since there is a lack of public bus transport and development of CoE will increase the demand in the area. TfNSW (JB) responded that it is understood that CoE is a low volume students and are anticipated to come from different locations every day. SINSW / TTW to provide further information in future.</li> <li>TTW queried the status of the Preferred Option Report for the Richmond Bridge Duplication. TfNSW (FL) noted this is still under investigation with no preference.</li> </ul> |             |      |

The above represents the authors understanding of issues and conclusions reached. Any errors or omissions brought to the attention of CIPM in writing will be addressed, and the record revised.

Closure sequence for minute author.

- a) Most current minute is to be maintained until closure of item/issue.
- b) Closed meeting minute is to be formatted as strikethrough
- c) Next meeting, closed minute can be dropped off completely.

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### Centre of Excellence – Transport Working Group Meeting #2

| Meeting Details | Meeting Details  |  |  |  |  |
|-----------------|--|--|--|--|--|
| Project         | Centre of Excellence in Agriculture Education – SSD – 15001460 – Centre of Excellence (CoE)  |  |  |  |  |
| Date            | 13 April 2021  |  |  |  |  |
| Location        | Microsoft Teams  |  |  |  |  |
| Attendees       | SINSW – Matthew Metlege (MM), Jack Bruderlin (JBr) CIPL – Lizza Young (LY), Maddy Stenniken, Jacob Ainsworth TTW – Michael Babbage (MB), Paul Yannoulatos, Nathaniel Borja TfNSW – John Broady (JB), Mark Ozinga (MO), Malgy Coman (MC), Hawkesbury CC – Andrew Johnston (AJ), Colleen Haron (CH) NBRS – Stephanie Ferguson, Ewan Saunders |  |  |  |  |
| Apologies       | Rebecca Lehman, SI NSW, Pahee Rathan (PR), Felix Liu -TfNSW, John Stalley (CIPL),  |  |  |  |  |

|    | Task  | Responsible | Date |
|----|---|-------------|------|
| 1. | <ul> <li>TTW Overview</li> <li>MB gave brief overview of project site and scope, travel hierarchy addressed in accordance with TfNSW Road User Space Allocation Policy.</li> <li>EIS lodgement expected to be May 2021</li> </ul>   |             |      |
| 2. | <ul> <li>Operational Modes</li> <li>MB presented slides outlining operational hours of school and volume of people moving through during the week.</li> <li>325 students per day plus 25 staff, split 60-40% between CoE and Richmond Ag college.</li> <li>School programs and excursions, 100 visitors per day</li> <li>Conference facilities 150 people</li> <li>On site accommodation 62 beds.</li> <li>Typical Monday – Friday school day 325 students plus 25 staff, has capacity for additional 100 program or conference visitors, up to the site capacity of 450 people.</li> <li>Saturday/Sunday conference facilities operate, onsite accommodation may also occupied at the same time.</li> <li>(MM) noted that visitors over 100 would be planned events (up to 150 conference attendees), and the site total may exceed this as the 62-bed accommodation might also be in use</li> <li>MO (Mark Ozinga), raised question about school enrolments, important to understand modes and how catchments (walking, cycling, buses) will be addressed, LY clarified the enrolments would build up increase over 5-year period.</li> <li>JB, raised how students will move between schools.</li> </ul> | Note        |      |
| 3. | Travel mode expectations  - MB outlined travel modes will vary greatly, most staff will drive, most students would use public transport, don't expect many students will be in walking or cycling catchment as closest homes are 10min walk away.   |             |      |



|    | Task   |  | Responsible | Date |
|----|--------|--|-------------|------|
|    | -      | Public and private bus services private buses will bring program visitors (direct transfer from their school)  John Broady (JB), suggested program visitors coming by train and connecting bus, would need to arrive at the same time as other students, as to avoid using another charter bus.  Malgy Coman (MC), are Richmond Ag Colllege students 60% travel coming to base school or CoE? MB outlined it would be students traveling directly to CoE.  MM advised the school does have a mini bus at present, message is being relayed by principal that students make their own way to the school if they need to be there. |             |      |
|    | Public | transport Strategy.  | Note        |      |
| 4  | _      | Existing bus routes on Londonderry road connects the two stations.   |             |      |
| 4. | -      | TfNSW advised that regularly scheduled buses from station should be not too much of a problem, requested enrolment and timing details to assist with planning and budgeting  |             |      |
|    |        | Public Transport works,  |             |      |
|    | -      | Seek, increase of route 677 to and from Richmond and Penrith Station   |             |      |
|    | -      | Seek additional use of route 5037 (to Windsor high school)   | Note        |      |
|    | -      | JB, student numbers and bell times bring concerns about arrival times of buses, 195 students would require 4 busses (approx \$500k/bus),   |             |      |
|    | -      | JB suggested the need to stagger arrival of students so we can use one or two busses that do multiple trips.   |             |      |
|    | -      | LY offered bus services could be progressively added in line with student enrolments pending demand  |             |      |
| 5. | -      | MB outlined we would not know the location of students and their way of getting to school until enrolments have firmed up  |             |      |
|    | -      | SI NSW to provide high level guidance where the potential enrolments would be coming from (if possible)  |             |      |
|    | -      | JB noted that regularly scheduled school buses from the station should not be too much of a problem and requested student numbers and arrival/departure times for investigation and justification of future services. Early warning from SINSW assists with the planning and budgeting of services.  |             |      |
|    | -      | MC advised weekend train services (for conference visitors) are limited and car usage is likely higher.  |             |      |
| 6. | -      | Private bus strategy To be organised by individual schools as required   | Note        |      |
|    | -      | No further comment from TfNSW and Council  |             |      |

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|     | Task   |  | Responsible | Date |
|-----|--------|--|-------------|------|
|     |        | Car parking  |             |      |
| 7.  | -      | Onsite car park of staff 34 spaces   |             |      |
| /.  | -      | Visitor and accessibility outside admin building, also where pickup and drop off would be.   |             |      |
|     | -      | No further comment from TfNSW and Council  |             |      |
|     |        | Kiss and Drop  |             |      |
| 8.  | -      | Low demand for kiss and Drop, however onsite facility will be available. No further comment from TfNSW and Council   |             |      |
|     |        | Minimal pedestrian usage   | Note        |      |
| 9.  | -      | Minimal local pedestrians expected, footpaths south side of Vines drive to be extended.  |             |      |
|     | -      | No further comment from TfNSW and Council  |             |      |
|     |        | Cyclist  |             |      |
| 10. | -<br>- | Non catchment school, therefore nominal bike storage No further comment from TfNSW and Council   |             |      |
|     |        | Traffic Works Strategy   |             |      |
|     |        |  |             |      |
|     | -      | Vines drive to be left-out only, but right and left in retained.   |             |      |
|     | -      | Potential right-out ban at Southee Road could be incorporated subject to Council and TfNSW inputs.   |             |      |
|     | -      | Median islands to accommodate pedestrian movements.  |             |      |
| 11. |        | Pedestrian refuge  Right turn entry lane   |             |      |
|     | -      | AJ - Council previously provided advice with preference to Southee and Vines realignment but could look at the proposed left-out concept. Council noted that they could look at the proposed left-out restrictions at Vines/Londonderry (despite it not being their preferred solution)  LY advised that as tenant on WSU land, it has no authority to offer this as a solution. Project team see more complications with the realignment strategy due to use of WSU land. |             |      |

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| Task |   | Responsible | Date                         |
|------|---|-------------|------------------------------|
| Task | MB noted that the expected travel activity due to the size of the development would be low. We are proposing an approach which addresses the safety concerns and is commensurate with the size of the proposed development. Based on low volumes, the proposed is an appropriate scale of mitigation.  JB – aligning intersection, futureproofs the road. John noted it would limit road and if a future bus needed to turn right.  MB noted a previous restriction was Transport NSW wasn't looking to put public buses through Vines Drive.  JB noted all required is 3.2-3.5 width – 6.5m road is sufficient. Current 5.8m  MB requested TfNSW opinion thoughts on Vines. Bus 2.5+400mm, 2.9/bus. JB noted public buses wouldn't go down current road width.  MB noted internal restrictions need to be tabled with the university.  TTW Team to be given contact details of appropriate TfNSW team (Network and Safety) to discuss School Zone requirements  Council and Transport NSW to finalise and confirm traffic count location, to | Responsible | Date  13 <sup>th</sup> April |

The above represents the authors understanding of issues and conclusions reached. Any errors or omissions brought to the attention of CIPM in writing will be addressed, and the record revised.

Closure sequence for minute author.

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Your Ref: SSD-15001460

26 April 2021

Ms L Young Colliers International Level 30, Grosvenor Place, 225 George Street SYDNEY NSW 2000

Email: Lizza.Young@colliers.com

Dear Madam,

Re: Hawkesbury Centre of Excellence – Transport Working Group (SSD-15001460)
Property: 2 College Street RICHMOND NSW (Lot 2 DP 1051798)

Reference is made to the Minutes prepared for the Transport Working Group Meeting held on 13 April 2021 for the proposed Hawkesbury Centre of Excellence at 2 College Street, Richmond. Upon review of the supplied Minutes and Traffic Works Strategy, Council provides the following comments with respect to traffic and transportation strategies:

The relationship between the Centre of Excellence, Richmond Agricultural College and Richmond High School requires clarification. Section 2 of the Minutes suggests that there will be 325 students split between the Centre of Excellence and Richmond Agricultural College and that the student numbers will be split 60-40 between the two schools. It is understood that students of Richmond Agricultural College will attend both the Centre of Excellence and Richmond High School, and that both agricultural specialist and selective streams will be provided by Richmond Agricultural College.

Student and transportation data was not included in the supplied Minutes however given that a component of the Richmond Agricultural College students will be local it is considered that safe pedestrian and cyclist connectivity between the Centre of Excellence, public transport network and local residential areas is important.

Any Traffic Study should clearly address pedestrian and cyclist connectivity. Such a study must include information addressing the following:

- a) The expected number of students and staff at the proposed facility which will be catching public transport, walking and cycling. It must define how travel from the bus stops or train stations to the Centre of Excellence will be undertaken. It is expected that empirical data (pedestrian counts) from a similar development would be used to inform any assumptions made.
- b) An assessment of the current local pedestrian and cycle infrastructure.
- c) Undertakings to construct/upgrade any pedestrian and cycle infrastructure that is required to provide safe connectivity to public transport and local pedestrian routes.
- 2. With respect to the Traffic Works Strategy, the roadworks highlighted in the Minutes may necessitate a ban on right turns from Southee Road. Council are not supportive of a ban on right turns from Southee Road on the following grounds:

Interpreter Service available, call 131 450 131 450 コオリケー 131 450 で現代口譯服務 , 請撥 131 450 Hemm servizz tal-interpretu, čempel 131 450



- Southee Road is the main link between Londonderry Road and Castlereagh Road, both being arterial roads;
- There is no other convenient route in the vicinity to use in its stead to access Londonderry Road to travel in the Penrith direction;
- This will result in an unacceptable impact on residents in the vicinity, university users and the community as a whole; and
- There are other options/works that can be considered/carried out to improve the usability and safety of the Londonderry Road/Southee Road/Vines Drive intersections and environs.
- 3. Council maintains its position that a modification of the intersections of Londonderry Road/Southee Road and Londonderry Road/Vines Drive to realign these intersections is needed. Such a modification would redirect Vines Drive to line up with Southee Road, and include an intersection treatment such as a roundabout. It is considered that the intersection works are still warranted for the following reasons:
  - Council does not support restrictions to right hand turns from Southee Road (as discussed above).
  - Londonderry Road is a classified road.
  - Southee Road provides a busy link between Londonderry Road and Castlereagh Road. Castlereagh Road is also a classified road.
  - Londonderry Road construction, in the vicinity, is akin to many local rural roads in respect to a narrow road pavement width, no slip lanes, no kerb and guttering and degraded road pavement edges.
  - Frequent queuing (at peak times) is experienced on Londonderry Road when waiting for vehicles to make right hand turns into Southee Road or Vines Drive, and when turning right from Southee Road onto Londonderry Road;
  - The proposed development will result in increased bus movements within the area of these intersections;
  - The proposed development will result in increased truck movements within the area of these intersections;
  - The proposed development will result in an increase in the number of inexperienced drivers accessing the site at these intersections; and
  - It will ensure the longevity of road functionality and safety in the locality.
- 4. The traffic counts being undertaken will show existing numbers of vehicles, and in respect to traffic entering and leaving the university will only reflect the current use of the university and not the optimum use of the university. It is acknowledged that student numbers have declined over recent years (i.e. details provided for the previous proposal identified that university student numbers had decreased from 6,000 to 2,000 over the past decade) however student numbers could easily increase in the future. Therefore it is considered reasonable that a higher occupancy rate for the university be determined and reflected in any Traffic Study.
- 5. Likewise, whilst the carparking capacity of the university may not currently be fully utilised due to lower student numbers, this may change in the future. Development Applications approved for the university site have determined car parking requirements to cater for the various uses, and these spaces are needed to cater for those uses regardless of reduced numbers. As such it is not considered appropriate for the Centre of Excellence to use university car parking as this may cause problems in the future.
  - Adequate carparking to cater for the school and ancillary uses is to be provided adjacent to the school and the proposed number of spaces is to be justified.
- 6. Vines Drive and other roads within the university site are private roads and it should be clarified as to whether public buses will enter the site.



- 7. It is unclear where bus stops will be provided along Londonderry Road. The bus stops may be used by younger students so their location and connections to the Centre of Excellence need to be considered in terms of safety.
- 8. It is anticipated that the primary mode of transport for Conference attendees will be private vehicles.
- 9. Traffic Studies at intersections should also consider:
  - a) Exiting the university site at Campus Drive and Blacktown Road. The previous study carried out for the proposed Hurlstone Agricultural High School (SSD 17\_8614) identified that this intersection had a level of service of 'F' when exiting from Campus Drive onto Blacktown Road. The safety of this intersection needs to be addressed.
  - b) The presentation highlighted egress from the university at College Street. The use of this exit will require a rat run through the university and it is unclear if this would be encouraged by the university.

Should you wish to discuss this matter further please give me a call on (02) 4560 4549.

Yours faithfully

Andrew Johnston | Senior Town Planner | Hawkesbury City Council (20) 4560 4549 | (02) 4587 7740 | (1) www.hawkesbury.nsw.gov.au





#### Centre of Excellence - Transport Working Group Meeting #3

| Meeting Details | Meeting Details   |  |  |  |
|-----------------|---|--|--|--|
| Project         | Centre of Excellence in Agriculture Education – SSD – 15001460 – Centre of Excellence (CoE)   |  |  |  |
| Date            | 27 April 2021   |  |  |  |
| Location        | Microsoft Teams   |  |  |  |
| Attendees       | SINSW – Matthew Metlege (MM), Rebecca Lehman (RL) CIPL – Lizza Young (LY), Maddy Stenniken (MS), Jacob Ainsworth (JA) TTW – Michael Babbage (MB), Paul Yannoulatos (PY), Nathanial Borja (NB) TfNSW – John Broady (JB), Felix Liu (FL), Hawkesbury CC – Andrew Johnston (AJ), Colleen Haron (CH) NBRS – Stephanie Ferguson (SF), Ewan Saunders (ES) |  |  |  |
| Apologies       | SINSW –Jack Bruderlin (JB) TfNSW - Malgy Coleman (MC), Billy Yung (BY), Pahee Rathan (PR), Mark Ozinga (MO) Hawkesbury CC - Christopher Amit (CA), Andrew Johnston (AJ) RCC – Tom Hemmett (TH), Kim Pappas (KP), Darren Vozzo (DV)  |  |  |  |

|    | Task   | Responsible | Date |
|----|--|-------------|------|
| 1. | TTW Overview  TTW (MB) presented a recap of the site location in relation to the surrounding Richmond area, and the site layout within the WSU campus.  EIS lodgement expected May 2021.   |             |      |
| 2. | <ul> <li>Previous Outcomes</li> <li>TTW (MB) detailed the outcomes of the previous Transport Working Group meeting (13 April 2021) and recent actions to present to this meeting. Traffic counts are due to occur next week (3 May) after the WSU mid-term break. EIS lodgement is due for May 2021.</li> </ul>  | Note        |      |
| 3. | Transport Hierarchy  TTW (MB) revisited the transport hierarchy being considered for the site which is in accordance with the NSW Road User Space Allocation Policy. General strategy for most travel modes was considered acceptable at the previous meeting, subject to some key items such as numbers and times for bus services, safe pedestrian movements across Londonderry Road, and an agreed treatment of the Vines Drive intersection. | TTW         |      |
| 4. | Ouncil Advice  TTW (MB) noted that advice had been received from Council the previous afternoon (26 April 2021) and provided responses to each item. More detailed responses will be provided directly and/or in the EIS documentation.  TTW (MB) also clarified that the concept design is proposing to retain the right turn out of Southee Road, rather than remove it which was Council's  | Note        |      |



|    | Task   | Responsible | Date |
|----|--|-------------|------|
|    | understanding. The previous concept scheme noted this as an option for consideration only and does not need to be progressed.  |             |      |
|    | Vines Drive / Londonderry Road  - TTW (MB) explained that a key element of Council's advice was in relation to Council's suggested realignment of Vines Drive and Southee Road. Responses to each of Council's specific comments were given. More detailed responses will be provided directly and/or in the EIS documentation.  | Note        |      |
|    | <ul> <li>TTW (MB) presented the developed concept proposal, now including bus<br/>bays in both directions, footpaths and pedestrian connections, and<br/>consideration of options for pedestrian movements across Londonderry Road.</li> </ul>   | Note        |      |
|    | Pedestrian options: 1. Refuge only 2. Children's crossing 3. Raised zebra crossing 4. Signalised pedestrian crossin  Allow for shelter and seating  Median island  Left turn exit only  Right turn entry lane - length TBC  Existing fence to be modified  Allow for shelter and seating   |             |      |
| 5. | <ul> <li>Council (AJ) noted that there is a lot going on with the proposal and that<br/>there is a difference of opinion. Council maintains their position in<br/>recommending that Vines Drive should be realigned to Southee Road.</li> </ul>  | Note        |      |
|    | Council (CH) queried whether WSU supports the scheme, as it would<br>change their operations and re-route traffic on internal roads which may<br>not be up to standard. Colliers (LY) explained that consultation is<br>underway, and that the proposals are subject to commercial implications,<br>and assuming that internal items are resolved with WSU that the project<br>team is seeking feedback from Council and TfNSW on the current<br>proposal. | Note        |      |
|    | <ul> <li>Council (AJ) queried the distance between intersections and whether the concept would comply with relevant standards. The concept would need a Road Safety Audit (RSA) as part of the application. Council believes there is a better option available and that the presented concept has not changed this position.</li> </ul>   | Note        |      |
|    | <ul> <li>TTW (MB) noted to Council that the detailed design requirements are<br/>acknowledged and that safety items would be resolved during design<br/>development, but at the highest level this discussion is seeking to resolve<br/>whether the right-turn ban proposal would in principle address Council's<br/>concerns.</li> </ul>  | Note        |      |
|    | <ul> <li>The project team is of the position that a realignment is not warranted by<br/>the scale of the proposal, and that the right-turn ban is an alternative<br/>scheme which addresses all of Council's concerns. Council (AJ)<br/>suggested that the project team should look at the realignment.</li> </ul>   | Note        |      |

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|    | Task      |   | Responsible | Date    |
|----|-----------|---|-------------|---------|
|    | 0         | TfNSW (FL) advised that comments from TfNSW would need to come from the Network & Safety team (no attendees at this meeting), information and requests can be sent via Felix Liu.   | TfNSW       | 7/05/21 |
|    | 0         | TfNSW (FL) queried where right-turn traffic would go, and if this traffic would attempt to break the rules, and therefore if a median island should be provided. TTW (MB) noted that this could be considered in the design development. TfNSW (FL) also noted that the design would be subject to a Road Safety Audit, indicating items such as sight distance to the refuge island on the bend of Londonderry Road.                                       | Note        |         |
|    | 0         | TfNSW (FL) queried whether the right-turn lane is sufficient based on traffic modelling results. TTW (MB) noted that the concept plan is indicative only and the right-turn lane would be designed to accommodate the necessary queue lengths.  | TTW         |         |
|    | 0         | TfNSW (JB) noted that the layout in terms of buses look fairly good, but that if the pedestrian crossing point were to move e.g. south from the current concept, the bus stops should also move accordingly, to maintain best pedestrian desire lines. TTW (MB) agreed that pedestrian desire lines will be critical to avoiding illegal/unsafe crossings.  | Note        |         |
|    | 0         | SINSW (RL) queried whether the eastern leg at Vines Drive would need to accommodate north-south pedestrian movements, or if these occur elsewhere. TTW (MB) noted that pedestrian zebra crossings are provided further east within the WSU campus and those are the intended crossing points.   | Note        |         |
|    | Londond   | erry Road pedestrian options  |             |         |
|    | 0         | TTW (MB) presented a high-level overview of different pedestrian control options and the relevant TfNSW warrants and requirements.  | Note        |         |
| 6. | 0         | TfNSW (FL) noted that a Children's Crossing option would require referral to the Network & Safety team for further comment. For signals, has the project considered discounted warrants? TfNSW (FL) also noted that all legs of a signalised intersection should be provided with pedestrian crossings i.e. Vines Drive. TTW (MB) clarified that the option would not be a signalised intersection but a mid-block pedestrian crossing on Londonderry Road. | Note        |         |
|    | 0         | Council (AJ) had no comments on the pedestrian crossing options.  | Note        |         |
| 7. | Traffic S | tudy Scope  |             |         |
|    | 0         | TTW (MB) presented the proposed scope of traffic counts and modelling which has been previously provided to Council and TfNSW and is awaiting TfNSW endorsement. Due to absences at the meeting this will be finalised offline. Counts are due to occur starting 3 May 2021.  | Note        |         |
| 8. | EIS supp  | orting documentation  |             |         |
|    | 0         | TTW (MB) requested input on any additional documentation required for the EIS lodgement. Council (AJ) suggested that a Road Safety Audit and  | Note        |         |

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|    | Task  | Responsible | Date |
|----|---|-------------|------|
|    | detailed plans for the intersection proposal should be provided. TfNSW (FL) had no further requirements.  |             |      |
| 9. | Ocuncil (AJ) noted that pedestrian links to the local area (Hobartville, Richmond, train stations) should be considered. TTW (MB) advised that Council's relevant comment in recent advice had been noted and this will be documented in the EIS. | Note        |      |

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Closure sequence for minute author.

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### Centre of Excellence - Transport Working Group Meeting #4

| Meeting Details          | Meeting Details  |  |  |
|--------------------------|--|--|--|
| Project                  | Project Centre of Excellence Hawksbury - Transport Working Group Meeting #4  |  |  |
| <b>Date</b> 17 June 2021 |  |  |  |
| Location Microsoft Teams |  |  |  |
| Attendees                | SINSW – Matthew Metlege (MM), Rebecca Lehman (RL) CIPL – Lizza Young (LY), Jacob Ainsworth (JA) TTW – Michael Babbage (MB), Nathaniel Borja (NB) TfNSW – John Broady (JB), Felix Liu (FL). Hawkesbury CC – Andrew Johnston (AJ), Colleen Haron (CH) NBRS – Ewan Saunders (ES), Macella Salzmann (MSz), Stephanie Ferguson (SF) |  |  |
| Apologies                | TfNSW - Malgy Coman (MC), Billy Yung (BY), Pahee Rathan (PR), Mark Ozinga (MO) Hawkesbury CC - Christopher Amit (CA) RCC - Tom Hemmett (TH) CPL - Maddy Stenniken (MS) TTW - Paul Yannoulatos (PY)   |  |  |

|    | Task  | Responsible          | Date |
|----|---|----------------------|------|
| 1. | TTW Overview  | Note                 |      |
|    | - TTW gave overview of both CoE and RHS site localities.  | Note                 |      |
| 2. | Recent announcements / outcomes   |                      |      |
|    | <ul> <li>Previous outcomes reviewed.</li> <li>Announcement of preferred corridor and concept design for Richmond bridge duplication project, despite the previous 3 transport working groups, this is the first time the project team have been made aware of project progress since the strategic project was raised at the first Transport Working Group.</li> <li>In conjunction with CoE, TTW have been preparing RHS traffic and travel</li> </ul> | Note<br>Note<br>Note |      |
| 3. | plan. Outstanding   |                      |      |
|    | - Traffic outcome is critical for SSDA lodgement.   | Note                 |      |
| 4. | Richmond High School  |                      |      |
|    | - MB confirmed preferred points of contact for TfNSW, Council, and Busways.   | Note                 |      |



|    | Task   |         | Date  |
|----|--|---------|-------|
|    |  |         |       |
|    | Bridge Duplication project - Bridge duplication proposal will impact both CoE / RHS traffic strategy.  | Note    |       |
|    | - MB outlined project team's intent to understand impact on Londonderry Road / Vines Drive intersection.   | Note    |       |
|    | - TfNSW (FL) confirmed Londonderry / Vines Drive intersection will be upgraded in stage 2 of the bridge duplication project. Currently planned for 2026.   | Note    |       |
|    | - The level of detail the project team is seeking is currently unknown by TfNSW  | Note    |       |
| 5. | - TfNSW (FL) will follow up post meeting for detailed material of proposed upgrades and issued to TTW (MB) and CPL (LY) by next week.  | TfNSW   | 21/06 |
|    | - HCC are unaware of any further detail on the bridge duplication scope beyond current public documents.   | Note    |       |
|    | - (FL) queried project time frame, LY advised school is to be operational by term 1 2023.  | Note    |       |
|    | <ul> <li>FL to confirm contact within TfNSW for the Richmond Bridge Duplication project.</li> <li>LY stressed importance of facilitating a meeting urgently to understand the scope &amp; programme of works.</li> </ul>   | Note    |       |
|    | - HCC noted that the Richmond Bridge project team is accepting feedback until 5 July 2021 and recommended that the CoE/RHS team provide feedback through that channel.   | TTW/CPL |       |
|    | Questions and Comments   |         |       |
| 6. | <ul> <li>JB suggested a bus strategy could be to create a U-turn bay in Vines Drive near<br/>Londonderry Rd and buses could all divert in to avoid students crossing<br/>Londonderry Rd. MB reiterated pedestrians crossing Londonderry road would<br/>still need to be accounted for but that an option like this could be considered.</li> </ul> | Note    |       |

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#### Centre of Excellence – Transport Working Group Meeting #5

| Meeting Details | Meeting Details   |  |  |
|-----------------|---|--|--|
| Project         | Centre of Excellence Hawksbury - Transport Working Group Meeting #5   |  |  |
| Date            | 24 June 2021  |  |  |
| Location        | Microsoft Teams   |  |  |
| Attendees       | SINSW – Matthew Metlege (MM), Rebecca Lehman (RL), Tim O'Sullivan, Angelina Kochergin (AK), Sasha Kovacina (SK).  CIPL – Lizza Young (LY), Jacob Ainsworth (JA), Maddy Stenniken (MS).  TTW – Michael Babbage (MB), Nathaniel Borja (NB)  TfNSW – John Broady (JB), Felix Liu (FL), Timothy Webster (TW).  Hawkesbury CC – Andrew Johnston (AJ), Colleen Haron (CH).  RPS – Rob Dwyer (RD). |  |  |
| Apologies       | TfNSW - Malgy Coman (MC).   |  |  |

| Task |  | Responsible | Date  |
|------|--|-------------|-------|
| 1.   | Bridge Duplication   |             |       |
|      | <ul> <li>TfNSW (TW) noted the Southee Rd / Londonderry Rd intersection proposal<br/>is still preliminary and not a confirmed preferred option.</li> </ul>  | Note        |       |
|      | <ul> <li>TfNSW (TW) gave overview of proposed intersection upgrades and road<br/>realignments. Bus bays are provided in their scope. This is still a strategic<br/>preliminary design, pedestrian safety to be worked through.</li> </ul>                            | Note        |       |
|      | <ul> <li>TfNSW (TW) noted these upgrades will be completed in stage 2 of the<br/>bridge duplication project, likely be completed circa 2026/2027.</li> </ul>   | Note        |       |
|      | <ul> <li>It was noted that WSU have provided principal support for this project's<br/>alignment option. Joe Lantz to be point of contact for WSU.</li> </ul>   | Note        |       |
|      | <ul> <li>TfNSW (TW) noted, currently funding for Richmond Bridge duplication<br/>construction is not available yet. As such, the applicant should propose the<br/>interim design for the intersection upgrade to facilitate the proposed<br/>development.</li> </ul> | Note        |       |
| 2.   | SSDA Lodgement   |             |       |
|      | <ul> <li>The project team (LY) noted we are ready of SSD lodgement, but it will be a<br/>number of months before TfNSW finalise this as the preferred option. The<br/>detail we require for lodgement is currently not resolved.</li> </ul>                          | Note        |       |
|      | <ul> <li>TTW (MB) noted as traffic volumes for broader bridge duplication project are<br/>still unknown, our impact on traffic volumes are negligible. Traffic modelling<br/>for the bridge duplication project will not be undertaken by this team.</li> </ul>      | Note        |       |
|      | <ul> <li>An interim design is necessary for SSD lodgement, so when funding<br/>becomes available program can proceed. Further discussion with TfNSW<br/>required on how interim proposal is to be delivered.</li> </ul>  | CPL         | 08/07 |
|      | <ul> <li>Further traffic modelling for our interim proposal is required.</li> <li>Existing Layout and demand.</li> <li>Interim layout and future demand.</li> </ul>  | TTW         | 08/07 |
|      | <ul> <li>Concept design plan, swept path diagram and civil design plan to be<br/>submitted to TfNSW review.</li> </ul>   | CPL         | 08/07 |

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#### Centre of Excellence – TfNSW Consultation

| Meeting Details   | Meeting Details  |  |  |
|---|--|--|--|
| Project Centre of Excellence Hawksbury - Transport Working Group Meeting #6 |  |  |  |
| <b>Date</b> 29 June 2021  |  |  |  |
| Location  | Microsoft Teams  |  |  |
| Attendees   | SINSW – Matthew Metlege (MM), Rebecca Lehman (RL), Tim O'Sullivan (TOs), Angelina Kochergin (AK), Sasha Kovacina (SK), Jennifer Barclay (JBa).  CIPL – Lizza Young (LY), Jacob Ainsworth (JA), Maddy Stenniken (MS), John Stalley (JSt).  TTW – Michael Babbage (MB), Nathaniel Borja (NB), Paul Yannoulatos (PY).  TfNSW – Felix Liu (FL), Timothy Webster (TW), Laura Van putten (LV), Christo Opperman (CO)  WSU – Michaela Briggs (MBs), Craig Smith (CS), |  |  |
| Apologies   | WSU – Joseph Lantz (JL). CPL – John Staley (JS)  |  |  |

|    | Task   |           | Date |
|----|--|-----------|------|
| 1. | Overview   |           |      |
|    | TfNSW (TW) gave high level review of Richmond bridge duplication project. Post the consultation period, it is intended for this to be the preferred option. Confirmation expected late 2021.                         | Note      |      |
|    | TfNSW (TW) noted stage 1 to begin mid next year (2022), stage 2 (remainder of project) likely to begin 2024.   | Note      |      |
|    | TfNSW (TW) noted traffic volumes would not increase until completion for stage 2.  | Note      |      |
|    | TfNSW (TW) noted \$500m has been committed to the project (\$400m federal funding, \$100m state)   |           |      |
| 2. | Commentary   |           |      |
|    | CPL (LY) noted the project team's interest for the interim works to be the most optimal use of time and money. There is to be minimal abortive work.   | Note      |      |
|    | SINSW (TOs) made the suggestion to expedite this intersection as a stage 1A of the bridge upgrade project.   | Note      |      |
|    | CPL (LY) reiterated, the project team's position to submit SSDA as soon as traffic strategy is finalised. School needs to be operational by term 1 2023.   | Note      |      |
| 3. | Proposal   |           |      |
|    | TTW (PY) noted intention to develop interim proposal that will be operational term 1 2023, TTW have proposal in mind. In the scope of the broader bridge project, our development's traffic impact is insignificant. | Note      |      |
|    | TTW (MB) presented interim concept proposal for Vines Drive T intersection. And noted this proposal is the minimal work we can do.   | Note      |      |
|    | Project team to assess with council what the minimal work we can do to make school operational.  | CPL / TTW | -    |
|    | Cost is estimated between 800k - \$1.3m, TfNSW (TW) suggested cost sharing opportunity.  | Note      |      |
|    | TfNSW (LV) noted the construct of traffic signals takes around 18 months.  | Note      |      |



| Task   | Responsible | Date  |
|--|-------------|-------|
| CPL (LY) to direct traffic response and coordinate transport meeting – to assess options with TfNSW. | CPL         | 16/07 |

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#### Centre of Excellence – Transport Working Group #5

| Meeting Details        |   |
|------------------------|---|
| Project                | Centre of Excellence Hawksbury - Transport Working Group Meeting #5   |
| Date                   | 27 July 2021  |
| Location               | Microsoft Teams   |
| Attendees              | CPL – Lizza Young (LY), Jacob Ainsworth (JA), John Stalley (JSt), Maddy Stenniken (MS)  RCC – Amy Warton (AW), Tom Hemmett (TH)  RPS – Rob Dwyer (RD), Christine Bower (CB)  WSU – Michaela Briggs (MBs), Craig Smith (CS), Joseph Lantz (JL)  TfNSW – Felix Liu (FL), John Broady (JB), Laura Van Putten (LV), Malgy Coman (MC), Timothy Webster (TW)  HCC – Andrew Johnston (AJ),  SINSW – Matthew Metlege (MM), Rebecca Lehman (RL)  TTW – Michael Babbage (MB), Nathaniel Borja (NB), Paul Yannoulatos (PY)  RCC - Tom Hemmett (TH) |
| Apologies/Distribution | SINSW –Rebecca Lehman (RL), Tim O'Sullivan (TOs), Angelina Kochergin (AK), Sasha Kovacina (SK),  TfNSW –Christo Opperman (CO)  RCC – Amy Warton (AW), David Moffat (DM)  HCC – Christopher Amit (CA)  |

|     | Task   | Responsible | Date |
|-----|--|-------------|------|
| 1.  | Overview   |             |      |
| 1.1 | MB outlined previous meetings outcome: - Last transport working group - TfNSW bridge meeting - Recent changes  | Note        |      |
| 2.  | Concept Design   |             |      |
| 2.1 | New concept design was presented: Safe ferrying of pedestrians from northbound buses across Southee road. 150 pedestrian movements per busy time, 700 vehicle movements per hour. MB presented overlay of proposed concept with TfNSW's bridge duplication project. Highlighting interface between the two strategies. | Note        |      |
| 2.2 | Allow for sheller and seating  Northbound buses  Pedestrian crossing  Allow for sheller and seating  Allow for sheller and seating   |             |      |



|     | Task  | Responsible          | Date     |
|-----|---|----------------------|----------|
|     | TfNSW Overlay Adjustment  |                      |          |
| 2.3 | Allow for shelter und seating  Northbound buses  Pedestrian route  Southbound buses  Allow for shelter and seating  |                      |          |
| 3.  | Comments and Queries  |                      |          |
| 3.1 | Bus Route Query - TfNSW (JB) outlined from a bus planning perspective, preference for there to be a bus turning bay on Vines Drive. 8km bus turning movement not preferred.  Comment - CPL (LY) and SINSW (MM) noted use of Vines Drive is a commercial risk for SINSW. SINSW (MM) confirmed this would be consulted with WSU further in parallel to the lodgement of currrent Concept in TIA.  | Note                 |          |
| 3.2 | Pavement Query - TfNSW (TW) queried pavement design. Design should be aligned to meet TfNSW standards to remove abortive works. CPL to organise pavement consultation during design development phase. Comment - TfNSW (TW) happy to facilitate coordination.   | TfNSW / CPL /<br>TTW |          |
| 3.3 | Pedestrian Crossing TfNSW (FL) could not comment on pedestrian crossing at this time. Further internal consultation required to discuss concerns. Review of TIA will assist in identifying existing concerns.  CPL (LY) noted EIS is to be lodged in the next couple of weeks i.e. Early Aug'21 TTW (MB) noted TIA will incorporate the latest concept strategy. TIA to be issued to TfNSW (FL) in parallel for review and comment. Review comments to be dealt with in the 'Response to Submissions' within the SSD process. | TfNSW                |          |
| 3.4 | Bus Bays on Main Road TfNSW (LVP) requested concept design to be issued and queried a solution to take children off the main road. CPL (LY) noted this had been considered in previous investigations.  | Note                 |          |
| 3.5 | Copy of Presentation  HCC (AJ) requested copy of presentation, return comments to be returned within the week.  | TTW                  | 4 Aug'21 |
| 3.6 | CPL (LY) confirmed presentation will be circulated. <u>Programme</u> HCC (AJ) queried TfNSW early works, TfNSW (TW) noted project completion 2024  – 2026. Consideration of pedestrian paths were also queried.   | Note                 |          |
| 3.7 | Consideration of 40km/hr zone TTW (MB) suggested 40km/h zone to be implemented.  TfNSW (LVP) noted school zones are generally not supported when school isn't visible. Also difficult to remove once implemented. TfNSW (TW) also unsupportive of school zone in bridge duplication context.  | Note                 |          |

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|     | Task  | Responsible | Date |
|-----|---|-------------|------|
| 3.8 | TfNSW requested a review of site lines as part of concept submission.   | Note        |      |
| 4.  | Other Matters – Early Works   |             |      |
| 4.1 | Remediation on Site: CPL (LY) noted the project team is investigating early works i.e. remediation works, RPS (RD) noted category 2 works don't require consent. More information to be issued to HCC for review.   | Note        |      |
| 4.2 | Temporary Construction Access Road: CPL (LY) advise that there may be a need for to a Temporary Rd access off from Londonderry Rd and queried if this can be included under Exempt Development.  TfNSW (MC) advised that Section 138 will need to be lodged via HCC Council. Council to issue a referral to TfNSW for approval.  TfNSW (LVP) advised that TfNSW will need to be satisfied that there are no other viable means of access other than Londonderry Rd. | Note        |      |

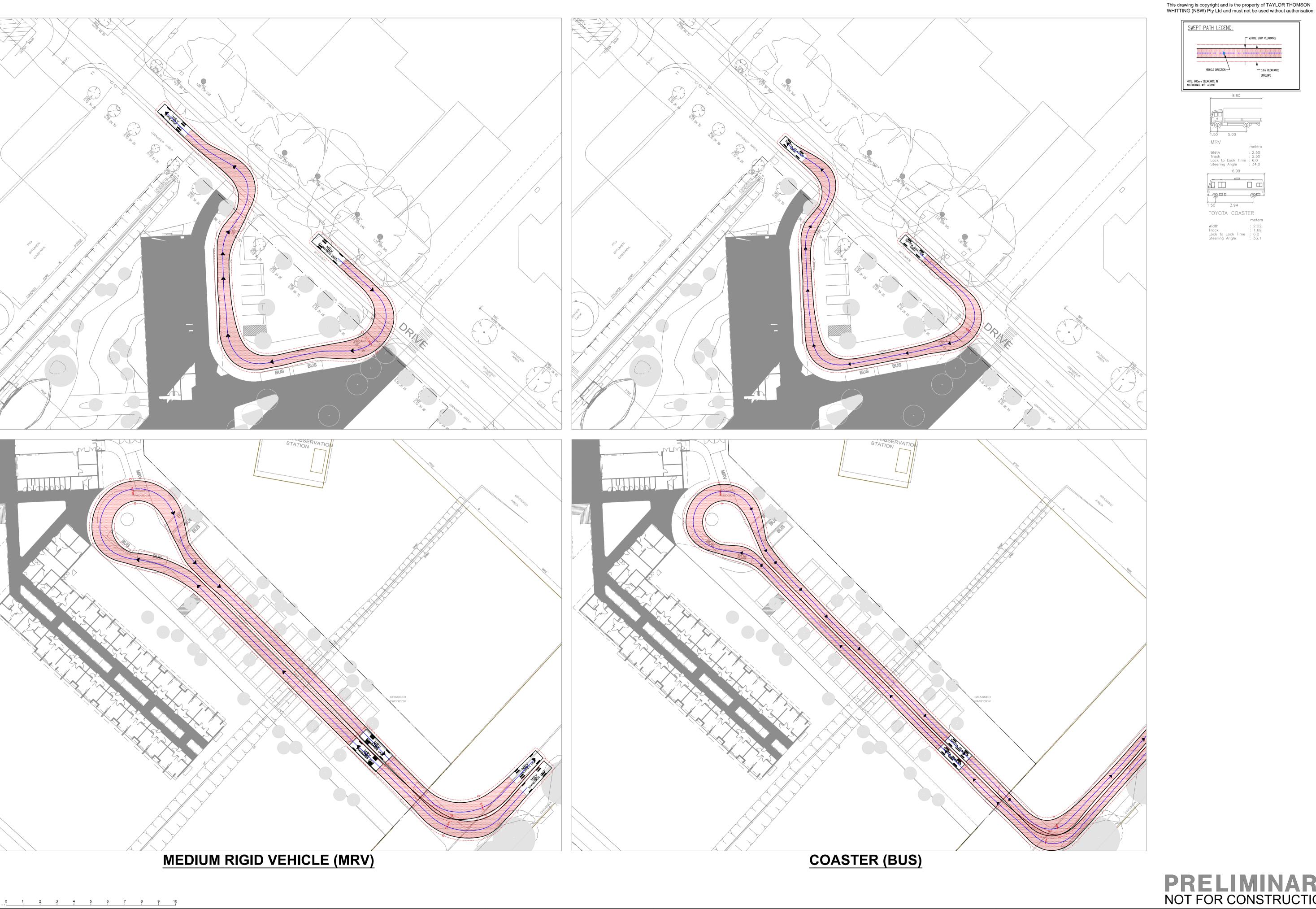
The above represents the authors understanding of issues and conclusions reached. Any errors or omissions brought to the attention of CIPM in writing will be addressed, and the record revised.

Closure sequence for minute author.

- a) Most current minute is to be maintained until closure of item/issue.
- b) Closed meeting minute is to be formatted as strikethrough
- c) Next meeting, closed minute can be dropped off completely.

NSW Department of Education www.dec.nsw.gov.au

#### **Appendix B - Swept Path Analysis**



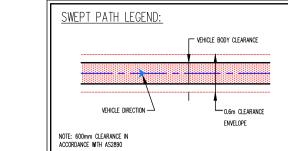
Tel +61 2 9922 2344 | architects@nbrsarchitecture.com

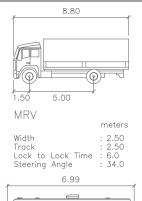
P1 PRELIMINARY

Rev Description

Eng Draft Date Rev Description

Eng Draft Date Rev Description





## PRELIMINARY NOT FOR CONSTRUCTION

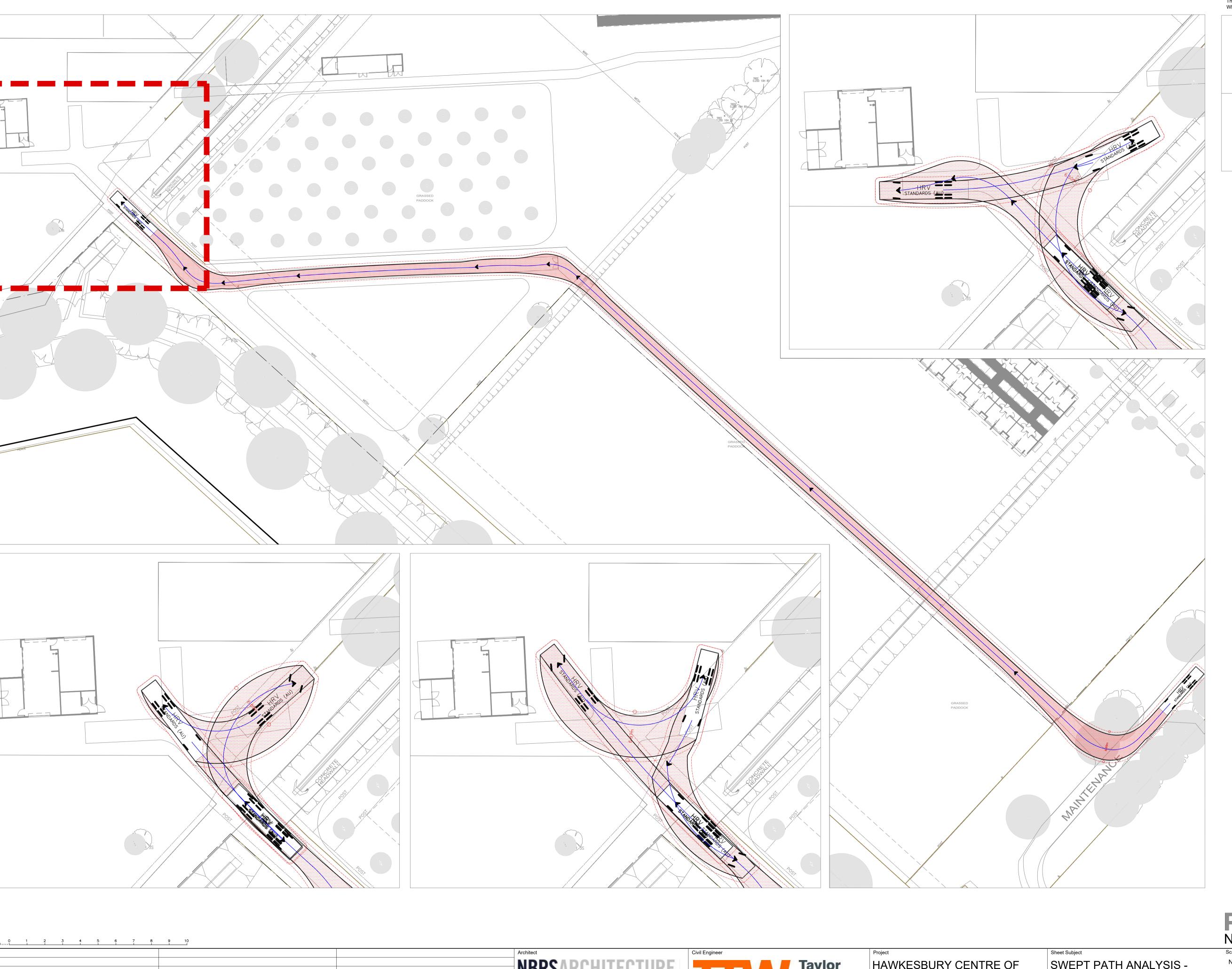
SWEPT PATH ANALYSIS MEDIUM RIGID VEHICLE AND COASTER BUS

Taylor
Thomson
Whitting
HAWKESBURY CENTRE OF
EXCELLENCE

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Plot File Created: Mar 11, 2021 - 3:55pm

211091 SK01



Tel +61 2 9922 2344 | architects@nbrsarchitecture.com

http://nbrsarchitecture.com/

Eng Draft Date

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

P1 PRELIMINARY

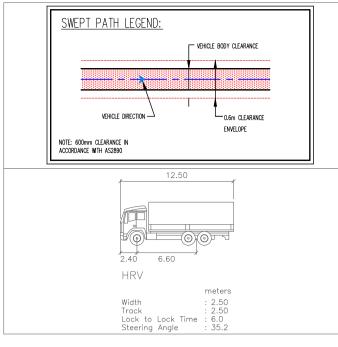
Rev Description

NB NB 11.03.21

Eng Draft Date Rev Description

Eng Draft Date Rev Description

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PRELIMINARY NOT FOR CONSTRUCTION

Taylor
Thomson
Whitting

HAWKESBURY CENTRE OF
EXCELLENCE

HEAVY RIGID VEHICLE (HRV)

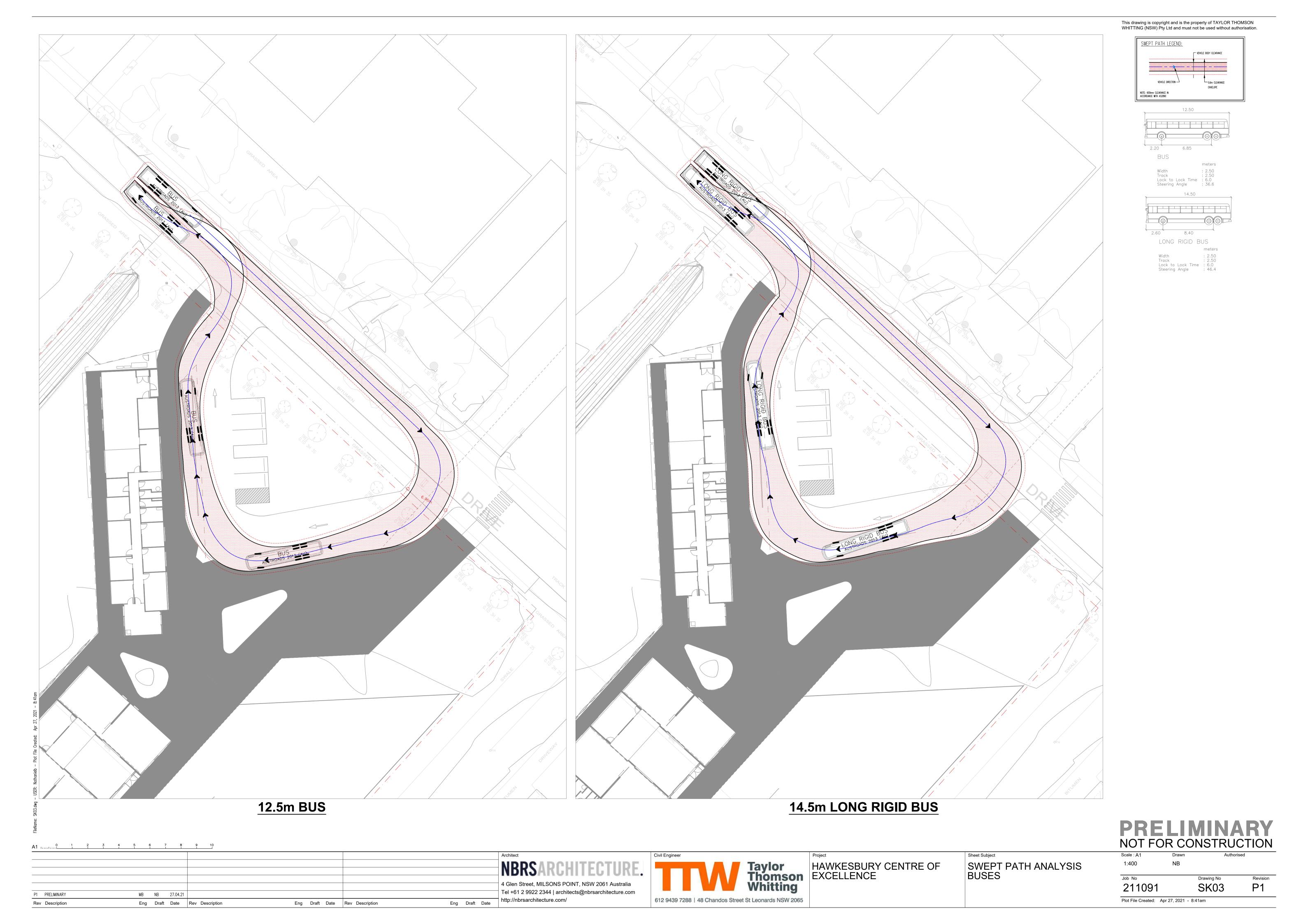
Scale : A1 Drawn Authorised

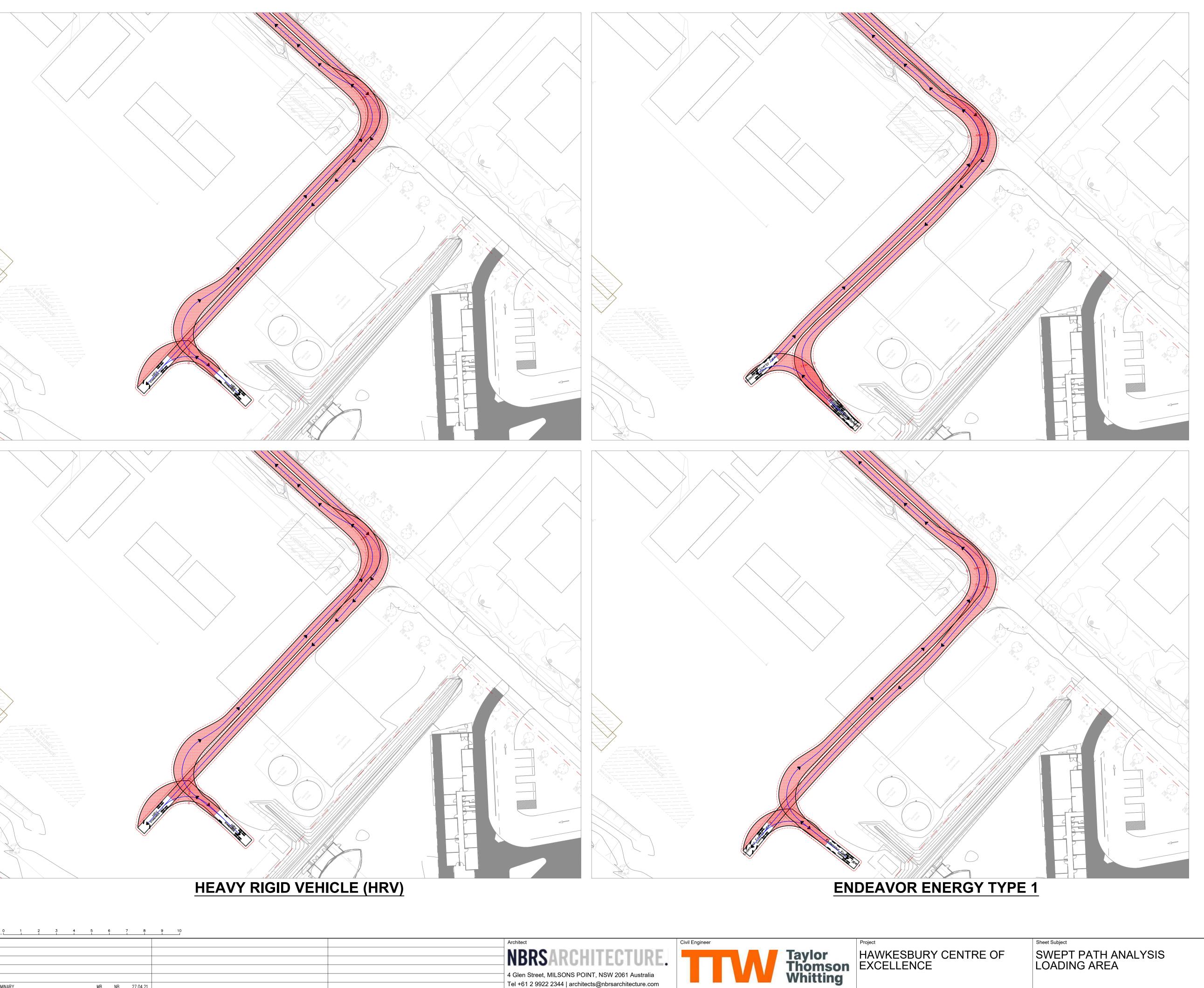
/SIS - NTS NB

 Job No
 Drawing No
 Revision

 211091
 SK01
 P1

 Plot File Created:
 Mar 11, 2021 - 4:20pm





Tel +61 2 9922 2344 | architects@nbrsarchitecture.com

Eng Draft Date

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

P1 PRELIMINARY

Rev Description

MB NB 27.04.21

Eng Draft Date Rev Description

Eng Draft Date Rev Description

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SWEPT PATH LEGEND:

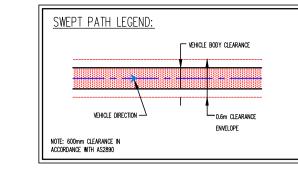
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Track : 2.50
Lock to Lock Time : 6.0
Steering Angle : 28.0

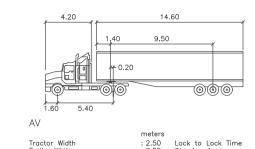
# PRELIMINARY NOT FOR CONSTRUCTION

Plot File Created: Apr 27, 2021 - 8:41am

1:500

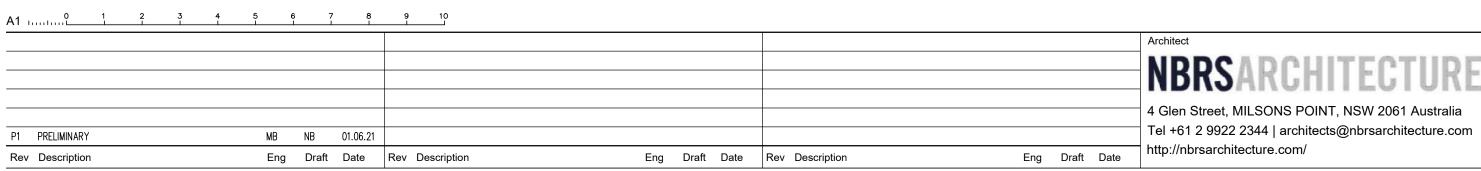
211091 SK04





meters
ctor Width : 2.50 Lock to Lock Time
ler Width : 2.50 Steering Angle
ctor Track : 2.50 Articulating Angle
ller Track : 2.50

### SEMI-TRAILER TRUCK (AV) ON-SITE CIRCULATION





Taylor
Thomson
Whitting

HAWKESBURY CENTRE OF
EXCELLENCE

SWEPT PATH ANALYSIS

NOT FOR CONSTRUCTION

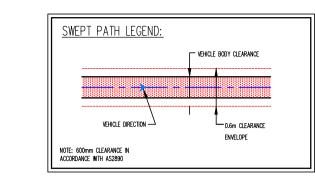
Scale : A1 Drawn Authorised

1:1000 NB

 Job No
 Drawing No
 Revision

 211091
 SK08
 P1

 Plot File Created: Jul 20, 2021 - 4:27pm





## HEAVY RIGID VEHICLE (HRV) ON-SITE CIRCULATION



Taylor
Thomson
Whitting

HAWKESBURY CENTRE OF
EXCELLENCE

SWEPT PATH ANALYSIS

NOT FOR CONSTRUCTION

Scale : A1 Drawn Authorised

1:1000 NB

 Job No
 Drawing No
 Revision

 211091
 SK09
 P1

 Plot File Created:
 Jul 20, 2021 - 4:24pm

#### **Appendix C – Traffic Counts**

Job No AUNSW680

Client 0

Site Londonderry Road
Location north of Southee Road

Site No 1

Start Date 4-May-21

**Description** Volume Summary

**Direction** Combined



| Hour     | Mon    | Tue   | Wed   | Thu   | Fri   | Sat   | Sun   |       |       |
|----------|--------|-------|-------|-------|-------|-------|-------|-------|-------|
| Starting | 10-May | 4-May | 5-May | 6-May | 7-May | 8-May | 9-May | W'Day | 7 Day |
| AM Peak  | 524    | 498   | 529   | 537   | 478   | 610   | 535   | Ave   | Ave   |
| PM Peak  | 641    | 655   | 621   | 682   | 596   | 578   | 466   | 6492  | 6166  |
| 0:00     | 12     | 11    | 15    | 15    | 19    | 40    | 40    | 14    | 22    |
| 1:00     | 14     | 9     | 12    | 8     | 16    | 13    | 24    | 12    | 14    |
| 2:00     | 13     | 19    | 15    | 22    | 17    | 13    | 15    | 17    | 16    |
| 3:00     | 13     | 20    | 14    | 15    | 14    | 15    | 17    | 15    | 15    |
| 4:00     | 57     | 45    | 35    | 36    | 41    | 19    | 11    | 43    | 35    |
| 5:00     | 115    | 131   | 137   | 118   | 110   | 46    | 20    | 122   | 97    |
| 6:00     | 257    | 262   | 247   | 232   | 247   | 109   | 48    | 249   | 200   |
| 7:00     | 400    | 392   | 398   | 389   | 399   | 205   | 146   | 396   | 333   |
| 8:00     | 524    | 498   | 529   | 537   | 478   | 312   | 278   | 513   | 451   |
| 9:00     | 458    | 416   | 462   | 446   | 443   | 416   | 334   | 445   | 425   |
| 10:00    | 347    | 330   | 397   | 396   | 418   | 564   | 437   | 378   | 413   |
| 11:00    | 375    | 377   | 406   | 365   | 392   | 610   | 535   | 383   | 437   |
| 12:00    | 387    | 363   | 394   | 409   | 464   | 578   | 466   | 403   | 437   |
| 13:00    | 411    | 378   | 395   | 401   | 433   | 517   | 355   | 404   | 413   |
| 14:00    | 478    | 443   | 497   | 450   | 540   | 441   | 377   | 482   | 461   |
| 15:00    | 629    | 537   | 619   | 552   | 596   | 439   | 362   | 587   | 533   |
| 16:00    | 641    | 655   | 621   | 682   | 563   | 392   | 344   | 632   | 557   |
| 17:00    | 538    | 503   | 603   | 545   | 528   | 359   | 337   | 543   | 488   |
| 18:00    | 299    | 302   | 366   | 339   | 325   | 250   | 237   | 326   | 303   |
| 19:00    | 183    | 176   | 173   | 205   | 174   | 143   | 170   | 182   | 175   |
| 20:00    | 117    | 140   | 149   | 137   | 143   | 108   | 129   | 137   | 132   |
| 21:00    | 85     | 85    | 128   | 129   | 106   | 129   | 86    | 107   | 107   |
| 22:00    | 67     | 50    | 53    | 77    | 111   | 89    | 52    | 72    | 71    |
| 23:00    | 18     | 29    | 23    | 31    | 52    | 64    | 12    | 31    | 33    |
| Total    | 6438   | 6171  | 6688  | 6536  | 6629  | 5871  | 4832  | 6492  | 6166  |
|          |        |       |       |       |       |       |       |       |       |
| 7-19     | 5487   | 5194  | 5687  | 5511  | 5579  | 5083  | 4208  | 5492  | 5250  |

| 7-19 | 5487 | 5194 | 5687 | 5511 | 5579 | 5083 | 4208 | 5492 | 5250 |
|------|------|------|------|------|------|------|------|------|------|
| 6-22 | 6129 | 5857 | 6384 | 6214 | 6249 | 5572 | 4641 | 6167 | 5864 |
| 6-24 | 6214 | 5936 | 6460 | 6322 | 6412 | 5725 | 4705 | 6269 | 5968 |
| 0-24 | 6438 | 6171 | 6688 | 6536 | 6629 | 5871 | 4832 | 6492 | 6166 |

Job No AUNSW680

Client 0

Site Vines Drive

**Location** east of Londonderry Road

Site No 2

Start Date 4-May-21

**Description** Volume Summary

**Direction** Combined



| Hour     | Mon    | Tue   | Wed   | Thu   | Fri   | Sat    | Sun   |       |       |
|----------|--------|-------|-------|-------|-------|--------|-------|-------|-------|
| Starting | 10-May | 4-May | 5-May | 6-May | 7-May | 8-May  | 9-May | W'Day | 7 Day |
| AM Peak  | 90     | 121   | 107   | 108   | 103   | 22     | 11    | Ave   | Ave   |
| PM Peak  | 63     | 94    | 71    | 73    | 72    | 37     | 13    | 858   | 675   |
| 0:00     | 2      | 1     | 2     | 3     | 2     | 1      | 0     | 2     | 2     |
| 1:00     | 2      | 3     | 2     | 0     | 0     | 1      | 1     | 1     | 1     |
| 2:00     | 10     | 3     | 5     | 10    | 7     | 1      | 0     | 7     | 5     |
| 3:00     | 5      | 8     | 4     | 6     | 7     | 0      | 3     | 6     | 5     |
| 4:00     | 6      | 2     | 1     | 1     | 4     | 1      | 1     | 3     | 2     |
| 5:00     | 4      | 6     | 12    | 3     | 3     | 0      | 0     | 6     | 4     |
| 6:00     | 20     | 25    | 24    | 22    | 21    | 1      | 1     | 22    | 16    |
| 7:00     | 50     | 66    | 64    | 52    | 55    | 7      | 5     | 57    | 43    |
| 8:00     | 90     | 121   | 107   | 108   | 103   | 103 15 |       | 106   | 78    |
| 9:00     | 74     | 91    | 87    | 90    | 68    | 20     | 11    | 82    | 63    |
| 10:00    | 52     | 52    | 62    | 67    | 65    | 22     | 7     | 60    | 47    |
| 11:00    | 60     | 82    | 59    | 67    | 56    | 21     | 6     | 65    | 50    |
| 12:00    | 60     | 65    | 58    | 62    | 72    | 20     | 12    | 63    | 50    |
| 13:00    | 42     | 51    | 51    | 66    | 70    | 18     | 7     | 56    | 44    |
| 14:00    | 53     | 66    | 65    | 73    | 46    | 30 13  |       | 61    | 49    |
| 15:00    | 63     | 47    | 71    | 68    | 61    | 21     | 11    | 62    | 49    |
| 16:00    | 51     | 94    | 68    | 53    | 40    | 37     | 5     | 61    | 50    |
| 17:00    | 31     | 59    | 70    | 55    | 41    | 28     | 5     | 51    | 41    |
| 18:00    | 27     | 32    | 65    | 34    | 28    | 22     | 3     | 37    | 30    |
| 19:00    | 8      | 14    | 32    | 25    | 10    | 10     | 3     | 18    | 15    |
| 20:00    | 4      | 10    | 25    | 7     | 3     | 6      | 5     | 10    | 9     |
| 21:00    | 5      | 5     | 41    | 15    | 3     | 29     | 0     | 14    | 14    |
| 22:00    | 13     | 4     | 3     | 5     | 5     | 10     | 3     | 6     | 6     |
| 23:00    | 3      | 1     | 1     | 0     | 7     | 3      | 2     | 2     | 2     |
| Total    | 735    | 908   | 979   | 892   | 777   | 324    | 109   | 858   | 675   |
|          |        |       |       |       |       |        |       |       |       |
| 7-19     | 653    | 826   | 827   | 795   | 705   | 261    | 90    | 761   | 594   |
| 6-22     | 690    | 880   | 949   | 864   | 742   | 307    | 99    | 825   | 647   |

Job No. : AUNSW680

Client : Taylor Thomson Whitting (NSW) Pty Ltd

**Suburb** : WSU Richmond

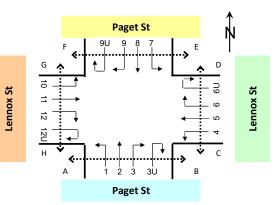
**Location** : 1. Lennox St / Paget St

Day/Date : Thu, 6th May 2021

Weather : Fine

**Description** : Classified Intersection Count

: Peak Hour Summary



| Ар          | proa | ch     |         | Pag      | et St |        |         | Lenn     | ox St |        |         | Page     | et St |        |         | Lenn     | ox St |         | Total |
|-------------|------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|---------|-------|
| Time Period |      | Lights | Heavies | Cyclists | Total | Grand 1 |       |
| 8:15        | to   | 9:15   | 259     | 16       | 0     | 275    | 455     | 29       | 0     | 484    | 142     | 3        | 0     | 145    | 533     | 32       | 0     | 565     | 1,469 |
| 15:45       | to   | 16:45  | 216     | 12       | 0     | 228    | 579     | 18       | 0     | 597    | 296     | 8        | 0     | 304    | 478     | 27       | 0     | 505     | 1,634 |

| Appr        | Approach Paget St |       |        |         |          |       | Lenn   | ox St   |          |       | Page   | et St   |          |       | Lenn   | ox St   |          | otal  |             |
|-------------|-------------------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|-------------|
| Time Period |                   | iod   | Lights | Heavies | Cyclists | Total | Grand Total |
| 6:00 to     | :0                | 7:00  | 102    | 10      | 0        | 112   | 181    | 22      | 0        | 203   | 44     | 1       | 0        | 45    | 432    | 33      | 0        | 465   | 825         |
| 6:15 to     | 0                 | 7:15  | 115    | 12      | 0        | 127   | 208    | 29      | 0        | 237   | 55     | 1       | 0        | 56    | 454    | 27      | 0        | 481   | 901         |
| 6:30 to     | :0                | 7:30  | 119    | 14      | 0        | 133   | 222    | 26      | 0        | 248   | 65     | 1       | 0        | 66    | 506    | 18      | 0        | 524   | 971         |
| 6:45 to     | 0                 | 7:45  | 127    | 14      | 0        | 141   | 243    | 30      | 0        | 273   | 78     | 2       | 0        | 80    | 553    | 23      | 0        | 576   | 1,070       |
| 7:00 to     | :0                | 8:00  | 153    | 13      | 0        | 166   | 270    | 29      | 0        | 299   | 96     | 4       | 0        | 100   | 564    | 24      | 0        | 588   | 1,153       |
| 7:15 to     | 0                 | 8:15  | 173    | 11      | 0        | 184   | 326    | 22      | 0        | 348   | 106    | 7       | 0        | 113   | 574    | 26      | 0        | 600   | 1,245       |
| 7:30 to     | :0                | 8:30  | 218    | 10      | 0        | 228   | 378    | 22      | 0        | 400   | 110    | 7       | 0        | 117   | 578    | 31      | 0        | 609   | 1,354       |
| 7:45 to     | :0                | 8:45  | 234    | 10      | 0        | 244   | 425    | 22      | 0        | 447   | 121    | 8       | 0        | 129   | 559    | 29      | 0        | 588   | 1,408       |
| 8:00 to     | :0                | 9:00  | 244    | 14      | 0        | 258   | 458    | 26      | 0        | 484   | 122    | 6       | 0        | 128   | 554    | 34      | 0        | 588   | 1,458       |
| 8:15 to     | :0                | 9:15  | 259    | 16      | 0        | 275   | 455    | 29      | 0        | 484   | 142    | 3       | 0        | 145   | 533    | 32      | 0        | 565   | 1,469       |
| 8:30 to     | :0                | 9:30  | 227    | 17      | 0        | 244   | 429    | 29      | 0        | 458   | 159    | 4       | 0        | 163   | 494    | 30      | 0        | 524   | 1,389       |
| 8:45 to     | 0                 | 9:45  | 217    | 18      | 0        | 235   | 389    | 25      | 0        | 414   | 168    | 3       | 0        | 171   | 468    | 34      | 0        | 502   | 1,322       |
| 9:00 to     | :0                | 10:00 | 205    | 13      | 0        | 218   | 367    | 19      | 0        | 386   | 174    | 2       | 0        | 176   | 423    | 31      | 0        | 454   | 1,234       |
| AM T        | Гota              | ıls   | 704    | 50      | 0        | 754   | 1,276  | 96      | 0        | 1,372 | 436    | 13      | 0        | 449   | 1,973  | 122     | 0        | 2,095 | 4,670       |
| 14:00 to    | :0                | 15:00 | 154    | 13      | 2        | 169   | 461    | 18      | 0        | 479   | 243    | 6       | 0        | 249   | 465    | 21      | 0        | 486   | 1,383       |
| 14:15 to    | :0                | 15:15 | 172    | 12      | 2        | 186   | 485    | 15      | 0        | 500   | 246    | 4       | 0        | 250   | 479    | 24      | 0        | 503   | 1,439       |
| 14:30 to    | 0                 | 15:30 | 178    | 14      | 1        | 193   | 503    | 21      | 0        | 524   | 229    | 3       | 0        | 232   | 487    | 22      | 0        | 509   | 1,458       |
| 14:45 to    | 0                 | 15:45 | 187    | 12      | 0        | 199   | 506    | 21      | 0        | 527   | 225    | 2       | 0        | 227   | 477    | 15      | 1        | 493   | 1,446       |
| 15:00 to    | 0                 | 16:00 | 210    | 11      | 0        | 221   | 520    | 19      | 0        | 539   | 223    | 2       | 0        | 225   | 457    | 22      | 1        | 480   | 1,465       |
| 15:15 to    | 0                 | 16:15 | 213    | 13      | 0        | 226   | 553    | 20      | 0        | 573   | 238    | 6       | 0        | 244   | 446    | 21      | 1        | 468   | 1,511       |
| 15:30 to    | :0                | 16:30 | 211    | 13      | 0        | 224   | 578    | 17      | 0        | 595   | 267    | 7       | 0        | 274   | 440    | 24      | 1        | 465   | 1,558       |
| 15:45 to    | 0                 | 16:45 | 216    | 12      | 0        | 228   | 579    | 18      | 0        | 597   | 296    | 8       | 0        | 304   | 478    | 27      | 0        | 505   | 1,634       |
| 16:00 to    | :0                | 17:00 | 203    | 10      | 0        | 213   | 572    | 18      | 0        | 590   | 318    | 7       | 0        | 325   | 476    | 21      | 0        | 497   | 1,625       |
| 16:15 to    | 0                 | 17:15 | 182    | 11      | 0        | 193   | 555    | 16      | 0        | 571   | 338    | 3       | 0        | 341   | 493    | 18      | 0        | 511   | 1,616       |
| 16:30 to    | 0                 | 17:30 | 183    | 10      | 0        | 193   | 552    | 15      | 0        | 567   | 331    | 2       | 0        | 333   | 489    | 13      | 0        | 502   | 1,595       |
| 16:45 to    | 0                 | 17:45 | 177    | 10      | 0        | 187   | 543    | 15      | 0        | 558   | 315    | 3       | 0        | 318   | 448    | 10      | 0        | 458   | 1,521       |
| 17:00 to    | :0                | 18:00 | 178    | 8       | 0        | 186   | 530    | 15      | 0        | 545   | 310    | 4       | 0        | 314   | 418    | 7       | 0        | 425   | 1,470       |
| PM T        | ota               | ıls   | 745    | 42      | 2        | 789   | 2,083  | 70      | 0        | 2,153 | 1,094  | 19      | 0        | 1,113 | 1,816  | 71      | 1        | 1,888 | 5,943       |

Job No. : AUNSW680

Client : Taylor Thomson Whitting (NSW) Pty Ltd

**Suburb** : WSU Richmond

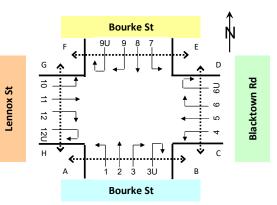
Location : 2. Lennox St / Bourke St / Blacktown Rd

Day/Date : Thu, 6th May 2021

Weather : Fine

**Description** : Classified Intersection Count

: Peak Hour Summary



| Δ     | ppro | oac  | :h    |        | Bour    | ke St    |       |        | Blackto | own Rd   |       |        | Bour    | ke St    |       |        | Lenn    | ox St    |       | otal    |
|-------|------|------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|---------|
| Tir   | ne P | Peri | od    | Lights | Heavies | Cyclists | Total | Grand 1 |
| 8:15  | to   | 0    | 9:15  | 139    | 3       | 0        | 142   | 550    | 38      | 0        | 588   | 268    | 11      | 0        | 279   | 531    | 29      | 0        | 560   | 1,569   |
| 15:45 | to   | 0    | 16:45 | 103    | 2       | 0        | 105   | 623    | 20      | 0        | 643   | 396    | 7       | 1        | 404   | 444    | 25      | 0        | 469   | 1,621   |

| Ар    | proa   | ıch   |        | Bour    | ke St    |       |        | Blackto | own Rd   |       |        | Bour    | ke St    |       |        | Lenn    | ox St    |       | otal        |
|-------|--------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|-------------|
| Tim   | e Pei  | riod  | Lights | Heavies | Cyclists | Total | Grand Total |
| 6:00  | to     | 7:00  | 103    | 0       | 0        | 103   | 229    | 22      | 0        | 251   | 91     | 6       | 0        | 97    | 468    | 41      | 0        | 509   | 960         |
| 6:15  | to     | 7:15  | 103    | 0       | 0        | 103   | 254    | 30      | 0        | 284   | 113    | 5       | 0        | 118   | 507    | 34      | 0        | 541   | 1,046       |
| 6:30  | to     | 7:30  | 124    | 0       | 0        | 124   | 265    | 30      | 0        | 295   | 118    | 7       | 0        | 125   | 563    | 31      | 0        | 594   | 1,138       |
| 6:45  | to     | 7:45  | 127    | 0       | 0        | 127   | 263    | 35      | 0        | 298   | 135    | 4       | 0        | 139   | 587    | 33      | 0        | 620   | 1,184       |
| 7:00  | to     | 8:00  | 133    | 3       | 0        | 136   | 311    | 35      | 0        | 346   | 162    | 5       | 0        | 167   | 630    | 32      | 0        | 662   | 1,311       |
| 7:15  | to     | 8:15  | 136    | 4       | 0        | 140   | 368    | 30      | 0        | 398   | 174    | 6       | 0        | 180   | 623    | 28      | 0        | 651   | 1,369       |
| 7:30  | to     | 8:30  | 126    | 5       | 0        | 131   | 422    | 31      | 0        | 453   | 224    | 6       | 0        | 230   | 621    | 27      | 0        | 648   | 1,462       |
| 7:45  | to     | 8:45  | 135    | 6       | 0        | 141   | 506    | 30      | 0        | 536   | 250    | 11      | 0        | 261   | 599    | 23      | 0        | 622   | 1,560       |
| 8:00  | to     | 9:00  | 140    | 4       | 0        | 144   | 526    | 36      | 0        | 562   | 248    | 12      | 0        | 260   | 565    | 29      | 0        | 594   | 1,560       |
| 8:15  | to     | 9:15  | 139    | 3       | 0        | 142   | 550    | 38      | 0        | 588   | 268    | 11      | 0        | 279   | 531    | 29      | 0        | 560   | 1,569       |
| 8:30  | to     | 9:30  | 133    | 2       | 0        | 135   | 527    | 35      | 0        | 562   | 237    | 14      | 0        | 251   | 495    | 28      | 0        | 523   | 1,471       |
| 8:45  | to     | 9:45  | 103    | 1       | 0        | 104   | 468    | 34      | 0        | 502   | 214    | 14      | 0        | 228   | 467    | 32      | 0        | 499   | 1,333       |
| 9:00  | to     | 10:00 | 71     | 0       | 0        | 71    | 460    | 24      | 0        | 484   | 195    | 18      | 0        | 213   | 434    | 29      | 0        | 463   | 1,231       |
| ΑN    | /I Tot | als   | 447    | 7       | 0        | 454   | 1,526  | 117     | 0        | 1,643 | 696    | 41      | 0        | 737   | 2,097  | 131     | 0        | 2,228 | 5,062       |
| 14:00 | to     | 15:00 | 93     | 3       | 1        | 97    | 504    | 23      | 0        | 527   | 243    | 13      | 0        | 256   | 467    | 24      | 0        | 491   | 1,371       |
| 14:15 | to     | 15:15 | 107    | 2       | 1        | 110   | 561    | 20      | 0        | 581   | 251    | 9       | 0        | 260   | 473    | 27      | 0        | 500   | 1,451       |
| 14:30 | to     | 15:30 | 106    | 2       | 1        | 109   | 601    | 28      | 0        | 629   | 303    | 9       | 0        | 312   | 454    | 24      | 0        | 478   | 1,528       |
| 14:45 | to     | 15:45 | 100    | 1       | 1        | 102   | 607    | 28      | 0        | 635   | 314    | 8       | 0        | 322   | 440    | 16      | 0        | 456   | 1,515       |
| 15:00 | to     | 16:00 | 90     | 0       | 0        | 90    | 616    | 26      | 0        | 642   | 332    | 6       | 1        | 339   | 418    | 19      | 0        | 437   | 1,508       |
| 15:15 | to     | 16:15 | 92     | 1       | 0        | 93    | 608    | 26      | 0        | 634   | 368    | 8       | 1        | 377   | 412    | 19      | 0        | 431   | 1,535       |
| 15:30 | to     | 16:30 | 104    | 1       | 0        | 105   | 618    | 21      | 0        | 639   | 365    | 8       | 1        | 374   | 418    | 23      | 0        | 441   | 1,559       |
| 15:45 | to     | 16:45 | 103    | 2       | 0        | 105   | 623    | 20      | 0        | 643   | 396    | 7       | 1        | 404   | 444    | 25      | 0        | 469   | 1,621       |
| 16:00 | to     | 17:00 | 91     | 2       | 0        | 93    | 616    | 18      | 0        | 634   | 393    | 8       | 0        | 401   | 448    | 20      | 0        | 468   | 1,596       |
| 16:15 | to     | 17:15 | 88     | 2       | 0        | 90    | 585    | 17      | 0        | 602   | 378    | 6       | 0        | 384   | 471    | 17      | 0        | 488   | 1,564       |
| 16:30 | to     | 17:30 | 81     | 2       | 0        | 83    | 575    | 18      | 0        | 593   | 383    | 5       | 0        | 388   | 471    | 13      | 0        | 484   | 1,548       |
| 16:45 | to     | 17:45 | 85     | 2       | 0        | 87    | 554    | 20      | 0        | 574   | 324    | 5       | 0        | 329   | 427    | 11      | 0        | 438   | 1,428       |
| 17:00 | to     | 18:00 | 86     | 2       | 0        | 88    | 530    | 17      | 0        | 547   | 294    | 5       | 0        | 299   | 420    | 10      | 0        | 430   | 1,364       |
| PIV   | 1 Tot  | als   | 360    | 7       | 1        | 368   | 2,266  | 84      | 0        | 2,350 | 1,262  | 32      | 1        | 1,295 | 1,753  | 73      | 0        | 1,826 | 5,839       |

Job No. : AUNSW680

Client : Taylor Thomson Whitting (NSW) Pty Ltd

**Suburb** : WSU Richmond

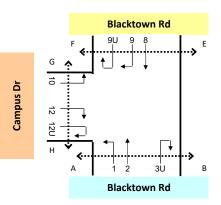
Location : 3. Blacktown Rd / Campus Dr

Day/Date : Thu, 6th May 2021

Weather : Fine

**Description** : Classified Intersection Count

: Peak Hour Summary



| ٩ţ   | proa | ach   |      | Blackto | wn Rd  |     |      | Blackto | own Rd |     |      | Camp  | us Dr  |     |
|------|------|-------|------|---------|--------|-----|------|---------|--------|-----|------|-------|--------|-----|
|      | _    |       | ghts | avies   | clists | tal | ghts | ≥       | clists | tal | ghts | avies | clists |     |
| e Pe | 9    | riod  | Ligh | Fe      | Š      | 10t | Ligh | , E     | Š      | 70t | Ligh | Не    | Š      | Tot |
| t    | 0    | 9:00  | 623  | 38      | 0      | 661 | 587  | 7 33    | 0      | 620 | 21   | 1     | 0      | 22  |
| 5    | to   | 16:45 | 590  | 18      | 0      | 608 | 524  | 4 21    | 0      | 545 | 99   | 0     | 0      | 99  |

| Арр   | roa  | ch    |        | Blackto | own Rd   |       |
|-------|------|-------|--------|---------|----------|-------|
| Time  | Per  | iod   | Lights | Heavies | Cyclists | Total |
| 6:00  | to   | 7:00  | 238    | 24      | 0        | 262   |
| 6:15  | to   | 7:15  | 276    | 28      | 0        | 304   |
| 6:30  | to   | 7:30  | 306    | 27      | 0        | 333   |
| 6:45  | to   | 7:45  | 333    | 30      | 0        | 363   |
| 7:00  | to   | 8:00  | 405    | 30      | 0        | 435   |
| 7:15  | to   | 8:15  | 472    | 27      | 0        | 499   |
| 7:30  | to   | 8:30  | 529    | 28      | 0        | 557   |
| 7:45  | to   | 8:45  | 592    | 32      | 0        | 624   |
| 8:00  | to   | 9:00  | 623    | 38      | 0        | 661   |
| 8:15  | to   | 9:15  | 634    | 42      | 0        | 676   |
| 8:30  | to   | 9:30  | 602    | 39      | 0        | 641   |
| 8:45  | to   | 9:45  | 537    | 35      | 0        | 572   |
| 9:00  | to   | 10:00 | 501    | 24      | 0        | 525   |
| AM    | Tota | als   | 1,767  | 116     | 0        | 1,883 |
| 14:00 | to   | 15:00 | 511    | 25      | 0        | 536   |
| 14:15 | to   | 15:15 | 564    | 19      | 0        | 583   |
| 14:30 | to   | 15:30 | 594    | 28      | 0        | 622   |
| 14:45 | to   | 15:45 | 598    | 31      | 0        | 629   |
| 15:00 | to   | 16:00 | 589    | 23      | 0        | 612   |
| 15:15 | to   | 16:15 | 578    | 28      | 0        | 606   |
| 15:30 | to   | 16:30 | 587    | 23      | 0        | 610   |
| 15:45 | to   | 16:45 | 590    | 18      | 0        | 608   |
| 16:00 | to   | 17:00 | 592    | 19      | 0        | 611   |
| 16:15 | to   | 17:15 | 560    | 18      | 0        | 578   |
| 16:30 | to   | 17:30 | 553    | 17      | 0        | 570   |
| 16:45 | to   | 17:45 | 525    | 18      | 0        | 543   |
| 17:00 | to   | 18:00 | 513    | 15      | 0        | 528   |
| 17.00 |      |       |        |         |          |       |

Job No. : AUNSW680

Client : Taylor Thomson Whitting (NSW) Pty Ltd

**Suburb** : WSU Richmond

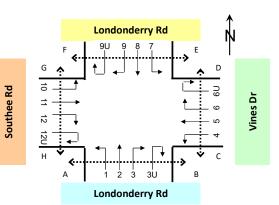
**Location** : 4. Londonderry Rd / Southee Rd / Vines Dr

Day/Date : Thu, 6th May 2021

Weather : Fine

**Description** : Classified Intersection Count

: Peak Hour Summary



| Α     | ppro | oach  |     |        | London  | derry Rd |       |        | Vine    | es Dr    |       |        | London  | derry Rd |       |        | South   | ee Rd    |       | otal    |
|-------|------|-------|-----|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|---------|
| Tir   | ne P | eriod |     | Lights | Heavies | Cyclists | Total | Grand T |
| 8:15  | to   | 9::   | 15  | 456    | 8       | 0        | 464   | 32     | 5       | 0        | 37    | 202    | 9       | 0        | 211   | 212    | 4       | 0        | 216   | 928     |
| 16:15 | to   | 17:   | :15 | 331    | 8       | 0        | 339   | 108    | 4       | 0        | 112   | 395    | 6       | 0        | 401   | 120    | 4       | 0        | 124   | 976     |

| Ар    | proa   | ch    |        | London  | derry Rd |       |        | Vine    | s Dr     |       |        | London  | derry Rd |       |        | South   | iee Rd   |       | otal        |
|-------|--------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|--------|---------|----------|-------|-------------|
| Tim   | e Per  | riod  | Lights | Heavies | Cyclists | Total | Grand Total |
| 6:00  | to     | 7:00  | 170    | 10      | 0        | 180   | 8      | 0       | 0        | 8     | 85     | 3       | 0        | 88    | 141    | 8       | 0        | 149   | 425         |
| 6:15  | to     | 7:15  | 198    | 9       | 0        | 207   | 9      | 1       | 0        | 10    | 101    | 5       | 0        | 106   | 168    | 5       | 0        | 173   | 496         |
| 6:30  | to     | 7:30  | 197    | 10      | 0        | 207   | 10     | 1       | 0        | 11    | 117    | 6       | 0        | 123   | 179    | 4       | 0        | 183   | 524         |
| 6:45  | to     | 7:45  | 215    | 9       | 0        | 224   | 12     | 3       | 0        | 15    | 141    | 8       | 0        | 149   | 175    | 4       | 0        | 179   | 567         |
| 7:00  | to     | 8:00  | 260    | 7       | 0        | 267   | 15     | 4       | 0        | 19    | 152    | 8       | 0        | 160   | 191    | 6       | 0        | 197   | 643         |
| 7:15  | to     | 8:15  | 303    | 7       | 0        | 310   | 16     | 4       | 0        | 20    | 157    | 8       | 1        | 166   | 202    | 7       | 0        | 209   | 705         |
| 7:30  | to     | 8:30  | 361    | 6       | 0        | 367   | 19     | 5       | 0        | 24    | 170    | 8       | 1        | 179   | 222    | 7       | 0        | 229   | 799         |
| 7:45  | to     | 8:45  | 428    | 6       | 0        | 434   | 19     | 4       | 0        | 23    | 170    | 8       | 1        | 179   | 241    | 7       | 0        | 248   | 884         |
| 8:00  | to     | 9:00  | 457    | 9       | 0        | 466   | 23     | 4       | 0        | 27    | 177    | 8       | 1        | 186   | 231    | 4       | 0        | 235   | 914         |
| 8:15  | to     | 9:15  | 456    | 8       | 0        | 464   | 32     | 5       | 0        | 37    | 202    | 9       | 0        | 211   | 212    | 4       | 0        | 216   | 928         |
| 8:30  | to     | 9:30  | 427    | 9       | 0        | 436   | 32     | 6       | 0        | 38    | 198    | 8       | 0        | 206   | 184    | 4       | 0        | 188   | 868         |
| 8:45  | to     | 9:45  | 352    | 9       | 0        | 361   | 33     | 6       | 0        | 39    | 192    | 8       | 0        | 200   | 151    | 4       | 0        | 155   | 755         |
| 9:00  | to     | 10:00 | 293    | 7       | 0        | 300   | 31     | 6       | 0        | 37    | 186    | 7       | 0        | 193   | 128    | 3       | 0        | 131   | 661         |
| AN    | 1 Tot  | als   | 1,180  | 33      | 0        | 1,213 | 77     | 14      | 0        | 91    | 600    | 26      | 1        | 627   | 691    | 21      | 0        | 712   | 2,643       |
| 14:00 | to     | 15:00 | 243    | 9       | 3        | 255   | 63     | 8       | 1        | 72    | 254    | 5       | 2        | 261   | 108    | 5       | 0        | 113   | 701         |
| 14:15 | to     | 15:15 | 288    | 9       | 2        | 299   | 60     | 4       | 0        | 64    | 260    | 7       | 3        | 270   | 123    | 4       | 0        | 127   | 760         |
| 14:30 | to     | 15:30 | 313    | 10      | 1        | 324   | 81     | 5       | 0        | 86    | 255    | 8       | 1        | 264   | 131    | 3       | 0        | 134   | 808         |
| 14:45 | to     | 15:45 | 315    | 8       | 0        | 323   | 99     | 5       | 0        | 104   | 273    | 8       | 1        | 282   | 138    | 3       | 0        | 141   | 850         |
| 15:00 | to     | 16:00 | 338    | 11      | 0        | 349   | 104    | 4       | 0        | 108   | 264    | 8       | 1        | 273   | 138    | 1       | 0        | 139   | 869         |
| 15:15 | to     | 16:15 | 340    | 12      | 1        | 353   | 114    | 6       | 0        | 120   | 302    | 9       | 0        | 311   | 110    | 1       | 0        | 111   | 895         |
| 15:30 | to     | 16:30 | 322    | 13      | 1        | 336   | 104    | 5       | 0        | 109   | 335    | 10      | 0        | 345   | 116    | 1       | 0        | 117   | 907         |
| 15:45 | to     | 16:45 | 333    | 11      | 1        | 345   | 102    | 5       | 0        | 107   | 380    | 11      | 0        | 391   | 113    | 2       | 0        | 115   | 958         |
| 16:00 | to     | 17:00 | 335    | 7       | 1        | 343   | 96     | 5       | 0        | 101   | 401    | 10      | 0        | 411   | 107    | 5       | 0        | 112   | 967         |
| 16:15 | to     | 17:15 | 331    | 8       | 0        | 339   | 108    | 4       | 0        | 112   | 395    | 6       | 0        | 401   | 120    | 4       | 0        | 124   | 976         |
| 16:30 | to     | 17:30 | 343    | 6       | 0        | 349   | 106    | 6       | 0        | 112   | 393    | 2       | 0        | 395   | 115    | 4       | 0        | 119   | 975         |
| 16:45 | to     | 17:45 | 336    | 9       | 0        | 345   | 97     | 6       | 0        | 103   | 342    | 1       | 0        | 343   | 109    | 5       | 0        | 114   | 905         |
| 17:00 | to     | 18:00 | 310    | 9       | 0        | 319   | 102    | 6       | 0        | 108   | 303    | 2       | 0        | 305   | 100    | 2       | 0        | 102   | 834         |
| PIV   | 1 Tota | als   | 1,226  | 36      | 4        | 1,266 | 365    | 23      | 1        | 389   | 1,222  | 25      | 3        | 1,250 | 453    | 13      | 0        | 466   | 3,371       |

# **Appendix D – Intersection Modelling Results**

**V** Site: 1 [Londonderry x Vines 2021 AM WOD (Site Folder: 2021 Without Development - Ped Crs)]

■■ Network: N101 [2021 - AM - WOD - N1 (Network Folder: 2021 WOD - Ped Crs)]

Londonderry Road x Vines Drive

2021: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo       | rmano                           | е           |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|-------------|---------------------------------|-------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |             | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>IHV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: V | /ines Driv                       | /e          |                                 |             |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>23  | L2<br>R2 | 12<br>27                         | 0.0<br>19.2 | 12<br>27                        | 0.0<br>19.2 | 0.064<br>0.064      | 6.5<br>10.8           | LOS A<br>LOS A      | 0.2<br>0.2 | 1.7<br>1.7                   | 0.50<br>0.50 | 0.73<br>0.73                | 0.50<br>0.50       | 46.0<br>46.0           |
| Appro     | oach     | 39                               | 13.5        | 39                              | 13.5        | 0.064               | 9.5                   | LOS A               | 0.2        | 1.7                          | 0.50         | 0.73                        | 0.50               | 46.0                   |
| North     | East: L  | ondonde                          | rry Roa     | ıd                              |             |                     |                       |                     |            |                              |              |                             |                    |                        |
| 24        | L2       | 105                              | 2.0         | 105                             | 2.0         | 0.211               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 25        | T1       | 293                              | 3.6         | 293                             | 3.6         | 0.211               | 0.0                   | LOSA                | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 43.4                   |
| Appro     | oacn     | 398                              | 3.2         | 398                             | 3.2         | 0.211               | 0.7                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 53.4                   |
| South     | nWest: I | Londonde                         | erry Ro     | ad                              |             |                     |                       |                     |            |                              |              |                             |                    |                        |
| 31        | T1       | 401                              | 2.1         | 401                             | 2.1         | 0.282               | 0.6                   | LOS A               | 0.8        | 5.6                          | 0.19         | 0.11                        | 0.19               | 38.2                   |
| 32        | R2       | 87                               | 0.0         | 87                              | 0.0         | 0.282               | 4.9                   | LOS A               | 0.8        | 5.6                          | 0.19         | 0.11                        | 0.19               | 53.8                   |
| Appro     | oach     | 488                              | 1.7         | 488                             | 1.7         | 0.282               | 1.4                   | NA                  | 0.8        | 5.6                          | 0.19         | 0.11                        | 0.19               | 48.7                   |
| All Ve    | ehicles  | 925                              | 2.8         | 925                             | 2.8         | 0.282               | 1.4                   | NA                  | 0.8        | 5.6                          | 0.12         | 0.15                        | 0.12               | 50.3                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Tuesday, 3 August 2021 2:15:43 PM Project: P:\2021\2110\211091\Reports\TTW\Traffic\Modelling\211091 Hawkesbury CoE - Rev2.sip9

**V** Site: 2 [Londonderry x Southee 2021 AM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD - N1 (Network Folder: 2021 WOD - Ped Crs)]

Londonderry Road x Southee Road

2021: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo  | vement                  | Perfo     | rmanc                  | e         |              |       |                     |              |                        |              |                             |                    |                |
|-----------|---------|-------------------------|-----------|------------------------|-----------|--------------|-------|---------------------|--------------|------------------------|--------------|-----------------------------|--------------------|----------------|
| Mov<br>ID | Turn    | DEMA<br>FLO\<br>[ Total | WS<br>HV] | ARRI<br>FLO<br>[ Total | WS<br>HV] | Deg.<br>Satn | Delay | Level of<br>Service | QU<br>[ Veh. | ACK OF<br>EUE<br>Dist] | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed |
|           |         | veh/h                   | %         | veh/h                  | %         | v/c          | sec   |                     | veh          | m                      |              |                             |                    | km/h           |
| North     | East: L | ondonde                 | rry Roa   | ıd                     |           |              |       |                     |              |                        |              |                             |                    |                |
| 25        | T1      | 206                     | 4.1       | 206                    | 4.1       | 0.123        | 0.2   | LOS A               | 0.2          | 1.2                    | 0.09         | 0.04                        | 0.09               | 56.9           |
| 26        | R2      | 16                      | 6.7       | 16                     | 6.7       | 0.123        | 7.5   | LOS A               | 0.2          | 1.2                    | 0.09         | 0.04                        | 0.09               | 55.6           |
| Appro     | oach    | 222                     | 4.3       | 222                    | 4.3       | 0.123        | 0.7   | NA                  | 0.2          | 1.2                    | 0.09         | 0.04                        | 0.09               | 56.7           |
| North     | West:   | Southee F               | Road      |                        |           |              |       |                     |              |                        |              |                             |                    |                |
| 27        | L2      | 38                      | 5.6       | 38                     | 5.6       | 0.301        | 7.3   | LOS A               | 1.2          | 8.8                    | 0.53         | 0.81                        | 0.60               | 47.8           |
| 29        | R2      | 189                     | 1.1       | 189                    | 1.1       | 0.301        | 9.2   | LOS A               | 1.2          | 8.8                    | 0.53         | 0.81                        | 0.60               | 46.5           |
| Appro     | oach    | 227                     | 1.9       | 227                    | 1.9       | 0.301        | 8.9   | LOS A               | 1.2          | 8.8                    | 0.53         | 0.81                        | 0.60               | 46.8           |
| South     | nWest:  | Londonde                | erry Ro   | ad                     |           |              |       |                     |              |                        |              |                             |                    |                |
| 30        | L2      | 111                     | 1.9       | 111                    | 1.9       | 0.227        | 2.7   | LOS A               | 0.0          | 0.0                    | 0.00         | 0.14                        | 0.00               | 55.5           |
| 31        | T1      | 318                     | 3.6       | 318                    | 3.6       | 0.227        | 0.0   | LOS A               | 0.0          | 0.0                    | 0.00         | 0.14                        | 0.00               | 57.4           |
| Appro     | oach    | 428                     | 3.2       | 428                    | 3.2       | 0.227        | 0.7   | NA                  | 0.0          | 0.0                    | 0.00         | 0.14                        | 0.00               | 56.6           |
| All Ve    | ehicles | 878                     | 3.1       | 878                    | 3.1       | 0.301        | 2.8   | NA                  | 1.2          | 8.8                    | 0.16         | 0.29                        | 0.18               | 52.5           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - AM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD - N1 (Network Folder: 2021 WOD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmanc                            | e:        |                     |     |                     |                                |      |              |                             |                     |                        |
|-----------|----------|----------------------------------|---------|----------------------------------|-----------|---------------------|-----|---------------------|--------------------------------|------|--------------|-----------------------------|---------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | Aver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ad                               |           |                     |     |                     |                                |      |              |                             |                     |                        |
| 8         | T1       | 304                              | 3.5     | 304                              | 3.5       | 0.362               | 7.3 | LOS A               | 3.5                            | 25.1 | 0.69         | 0.58                        | 0.69                | 48.9                   |
| Appro     | oach     | 304                              | 3.5     | 304                              | 3.5       | 0.362               | 7.3 | LOS A               | 3.5                            | 25.1 | 0.69         | 0.58                        | 0.69                | 48.9                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                               |           |                     |     |                     |                                |      |              |                             |                     |                        |
| 1         | T1       | 488                              | 1.7     | 488                              | 1.7       | <b>*</b> 0.574      | 8.3 | LOS A               | 6.3                            | 44.9 | 0.78         | 0.67                        | 0.78                | 47.2                   |
| Appro     | oach     | 488                              | 1.7     | 488                              | 1.7       | 0.574               | 8.3 | LOS A               | 6.3                            | 44.9 | 0.78         | 0.67                        | 0.78                | 47.2                   |
| All Ve    | ehicles  | 793                              | 2.4     | 793                              | 2.4       | 0.574               | 7.9 | LOSA                | 6.3                            | 44.9 | 0.75         | 0.64                        | 0.75                | 47.9                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mov  | vement  | Perforr | nance   |         |        |          |      |        |        |       |
|-----------------|---------|---------|---------|---------|--------|----------|------|--------|--------|-------|
| Mov             | Dem.    | Aver.   |         | AVERAGE |        | Prop. Et |      | Travel | Travel | Aver. |
| ID Crossing     | Flow    | Delay   | Service | QUE     |        | Que      | Stop | Time   | Dist.  | Speed |
|                 | 1.0     |         |         | [ Ped   | Dist ] |          | Rate |        |        | ,     |
|                 | ped/h   | sec     |         | ped     | m      |          |      | sec    | m      | m/sec |
| SouthWest: Lond | onderry | Road    |         |         |        |          |      |        |        |       |
| P1 Full         | 158     | 11.6    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.1  | 208.6  | 1.21  |
| All Pedestrians | 158     | 11.6    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.1  | 208.6  | 1.21  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 1 [Londonderry x Vines 2021 PM WOD (Site Folder: 2021 ■ Network: N101 [2021 - PM -Without Development - Ped Crs)]

WOD - N1 (Network Folder: 2021 WOD - Ped Crs)]

Londonderry Road x Vines Drive

2021: Existing Conditions - Without Development

PM Peak: 15:45-14:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | е         |                     |                       |                     |     |                               |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|-----|-------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>IEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: \ | /ines Driv                       |         | VCII/II                         | /0        | V/C                 | 360                   |                     | Ven | - '''                         |              |                             |                    | KIII/II                |
| 21        | L2       | 53                               | 0.0     | 53                              | 0.0       | 0.191               | 7.1                   | LOS A               | 0.5 | 4.0                           | 0.51         | 0.75                        | 0.51               | 46.8                   |
| 23        | R2       | 60                               | 8.8     | 60                              | 8.8       | 0.191               | 10.1                  | LOS A               | 0.5 | 4.0                           | 0.51         | 0.75                        | 0.51               | 46.8                   |
| Appro     | oach     | 113                              | 4.7     | 113                             | 4.7       | 0.191               | 8.7                   | LOS A               | 0.5 | 4.0                           | 0.51         | 0.75                        | 0.51               | 46.8                   |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |     |                               |              |                             |                    |                        |
| 24        | L2       | 31                               | 0.0     | 31                              | 0.0       | 0.345               | 2.7                   | LOS A               | 0.0 | 0.0                           | 0.00         | 0.04                        | 0.00               | 56.4                   |
| 25        | T1       | 405                              | 3.1     | 405                             | 3.1       | 0.345               | 0.0                   | LOS A               | 0.0 | 0.0                           | 0.00         | 0.04                        | 0.00               | 54.0                   |
| Appro     | oach     | 436                              | 2.9     | 436                             | 2.9       | 0.345               | 0.2                   | NA                  | 0.0 | 0.0                           | 0.00         | 0.04                        | 0.00               | 55.3                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |     |                               |              |                             |                    |                        |
| 31        | T1       | 358                              | 3.2     | 358                             | 3.2       | 0.191               | 0.0                   | LOS A               | 0.0 | 0.3                           | 0.01         | 0.01                        | 0.01               | 57.7                   |
| 32        | R2       | 4                                | 0.0     | 4                               | 0.0       | 0.191               | 4.9                   | LOS A               | 0.0 | 0.3                           | 0.01         | 0.01                        | 0.01               | 55.7                   |
| Appro     | oach     | 362                              | 3.2     | 362                             | 3.2       | 0.191               | 0.1                   | NA                  | 0.0 | 0.3                           | 0.01         | 0.01                        | 0.01               | 57.4                   |
| All Ve    | ehicles  | 911                              | 3.2     | 911                             | 3.2       | 0.345               | 1.2                   | NA                  | 0.5 | 4.0                           | 0.07         | 0.11                        | 0.07               | 50.5                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**V** Site: 2 [Londonderry x Southee 2021 PM WOD (Site Folder: 2021 Without Development - Ped Crs)]

■■ Network: N101 [2021 - PM - WOD - N1 (Network Folder: 2021 WOD - Ped Crs)]

Londonderry Road x Southee Road

2017: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmanc                           | :e        |                     |                       |                     |      |                               |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|------|-------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |      | ACK OF<br>IEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          |         |                                 | /0        | V/C                 | 366                   |                     | VEII | '''                           |              |                             |                    | KIII/II                |
| 25        | T1       | 345                              | 3.0     | 345                             | 3.0       | 0.239               | 0.6                   | LOS A               | 0.7  | 4.9                           | 0.21         | 0.11                        | 0.21               | 53.4                   |
| 26        | R2       | 66                               | 1.6     | 66                              | 1.6       | 0.239               | 7.5                   | LOS A               | 0.7  | 4.9                           | 0.21         | 0.11                        | 0.21               | 54.7                   |
| Appro     | oach     | 412                              | 2.8     | 412                             | 2.8       | 0.239               | 1.7                   | NA                  | 0.7  | 4.9                           | 0.21         | 0.11                        | 0.21               | 53.9                   |
| North     | West: 9  | Southee F                        | Road    |                                 |           |                     |                       |                     |      |                               |              |                             |                    |                        |
| 27        | L2       | 31                               | 0.0     | 31                              | 0.0       | 0.179               | 6.5                   | LOS A               | 0.6  | 4.4                           | 0.49         | 0.75                        | 0.49               | 48.4                   |
| 29        | R2       | 91                               | 2.3     | 91                              | 2.3       | 0.179               | 10.0                  | LOS A               | 0.6  | 4.4                           | 0.49         | 0.75                        | 0.49               | 46.3                   |
| Appro     | oach     | 121                              | 1.7     | 121                             | 1.7       | 0.179               | 9.1                   | LOS A               | 0.6  | 4.4                           | 0.49         | 0.75                        | 0.49               | 47.0                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |      |                               |              |                             |                    |                        |
| 30        | L2       | 160                              | 4.6     | 160                             | 4.6       | 0.224               | 2.7                   | LOS A               | 0.0  | 0.0                           | 0.00         | 0.21                        | 0.00               | 54.8                   |
| 31        | T1       | 258                              | 3.7     | 258                             | 3.7       | 0.224               | 0.0                   | LOS A               | 0.0  | 0.0                           | 0.00         | 0.21                        | 0.00               | 56.3                   |
| Appro     | oach     | 418                              | 4.0     | 418                             | 4.0       | 0.224               | 1.0                   | NA                  | 0.0  | 0.0                           | 0.00         | 0.21                        | 0.00               | 55.5                   |
| All Ve    | hicles   | 951                              | 3.2     | 951                             | 3.2       | 0.239               | 2.3                   | NA                  | 0.7  | 4.9                           | 0.15         | 0.23                        | 0.15               | 53.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - PM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD - N1 (Network Folder: 2021 WOD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehic     | cle Mo  | vement                           | Perfo   | rmano                            | e         |                     |                       |                     |                                |      |              |                             |                    |                        |
|-----------|---------|----------------------------------|---------|----------------------------------|-----------|---------------------|-----------------------|---------------------|--------------------------------|------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn    | DEMA<br>FLOV<br>[ Total<br>veh/h |         | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L | ondonde                          | rry Roa | ad                               |           |                     |                       |                     |                                |      |              |                             |                    |                        |
| 8         | T1      | 458                              | 2.8     | 458                              | 2.8       | <b>*</b> 0.563      | 8.4                   | LOS A               | 5.8                            | 41.9 | 0.79         | 0.68                        | 0.79               | 47.6                   |
| Appro     | ach     | 458                              | 2.8     | 458                              | 2.8       | 0.563               | 8.4                   | LOS A               | 5.8                            | 41.9 | 0.79         | 0.68                        | 0.79               | 47.6                   |
| South     | West:   | Londonde                         | erry Ro | ad                               |           |                     |                       |                     |                                |      |              |                             |                    |                        |
| 1         | T1      | 362                              | 3.2     | 362                              | 3.2       | 0.447               | 7.9                   | LOS A               | 4.3                            | 31.1 | 0.74         | 0.62                        | 0.74               | 47.7                   |
| Appro     | ach     | 362                              | 3.2     | 362                              | 3.2       | 0.447               | 7.9                   | LOS A               | 4.3                            | 31.1 | 0.74         | 0.62                        | 0.74               | 47.7                   |
| All Ve    | hicles  | 820                              | 3.0     | 820                              | 3.0       | 0.563               | 8.2                   | LOSA                | 5.8                            | 41.9 | 0.77         | 0.65                        | 0.77               | 47.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mov         | vement  | Perforr | nance    |         |         |          |         |        |        |       |
|------------------------|---------|---------|----------|---------|---------|----------|---------|--------|--------|-------|
| Mov                    | Dem.    | Aver.   | Level of | AVERAGE | BACK OF | Prop. Et | fective | Travel | Travel | Aver. |
| <sub>ID</sub> Crossing | Flow    | Delay   | Service  | QUE     | EUE     | Que      | Stop    | Time   | Dist.  | Speed |
|                        |         |         |          | [Ped    | Dist ]  |          | Rate    |        |        |       |
|                        | ped/h   | sec     |          | ped     | m       |          |         | sec    | m      | m/sec |
| SouthWest: Lond        | onderry | Road    |          |         |         |          |         |        |        |       |
| P1 Full                | 158     | 11.1    | LOS B    | 0.1     | 0.1     | 0.82     | 0.82    | 171.6  | 208.6  | 1.22  |
| All Pedestrians        | 158     | 11.1    | LOS B    | 0.1     | 0.1     | 0.82     | 0.82    | 171.6  | 208.6  | 1.22  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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**V** Site: 1 [Londonderry x Vines 2021 AM WD (Site Folder: 2021 With Development - Ped Crs)]

■■ Network: N101 [2021 - AM - WD - N1 (Network Folder: 2021

WD - Ped Crs)]

Londonderry Road x Vines Drive 2021: Future Growth + School AM Peak: 8:15-9:15 Site Category: With Development

Give-Way (Two-Way)

| Vehi             | cle Mo           | vement                           | Perfo             | rmano                           | ce                |                         |                       |                      |                                |                   |                      |                            |                      |                        |
|------------------|------------------|----------------------------------|-------------------|---------------------------------|-------------------|-------------------------|-----------------------|----------------------|--------------------------------|-------------------|----------------------|----------------------------|----------------------|------------------------|
| Mov<br>ID        | Turn             | DEMA<br>FLO\<br>[ Total<br>veh/h |                   | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>IHV]        | Deg.<br>Satn<br>v/c     | Aver.<br>Delay<br>sec | Level of<br>Service  | 95% BA<br>QUE<br>[ Veh.<br>veh |                   | Prop.<br>Que         | EffectiveA<br>Stop<br>Rate | ver. No.<br>Cycles   | Aver.<br>Speed<br>km/h |
| Sout             | hEast: V         | /ines Driv                       | ⁄e                |                                 |                   |                         |                       |                      |                                |                   |                      |                            |                      |                        |
| 21<br>23         | L2<br>R2         | 17<br>29                         | 0.0               | 17<br>29                        | 0.0               | 0.064<br>0.064          | 6.5<br>9.7            | LOS A<br>LOS A       | 0.2<br>0.2                     | 1.5<br>1.5        | 0.47<br>0.47         | 0.71<br>0.71               | 0.47<br>0.47         | 46.9<br>46.9           |
| Appr             | oach             | 46                               | 0.0               | 46                              | 0.0               | 0.064                   | 8.6                   | LOSA                 | 0.2                            | 1.5               | 0.47                 | 0.71                       | 0.47                 | 46.9                   |
| North            | nEast: L         | ondonde                          | rry Roa           | ad                              |                   |                         |                       |                      |                                |                   |                      |                            |                      |                        |
| 24<br>25<br>Appr | L2<br>T1<br>oach | 108<br>293<br>401                | 1.9<br>3.6<br>3.1 | 108<br>293<br>401               | 1.9<br>3.6<br>3.1 | 0.213<br>0.213<br>0.213 | 2.7<br>0.0<br>0.7     | LOS A<br>LOS A<br>NA | 0.0<br>0.0<br>0.0              | 0.0<br>0.0<br>0.0 | 0.00<br>0.00<br>0.00 | 0.15<br>0.15<br>0.15       | 0.00<br>0.00<br>0.00 | 55.5<br>43.2<br>53.4   |
|                  |                  | Londonde                         |                   |                                 |                   |                         |                       |                      |                                |                   |                      |                            |                      |                        |
| 31<br>32         | T1<br>R2         | 401<br>101                       | 2.1<br>0.0        | 401<br>101                      | 2.1<br>0.0        | 0.294<br>0.294          | 0.7<br>4.9            | LOS A<br>LOS A       | 0.9<br>0.9                     | 6.5<br>6.5        | 0.21<br>0.21         | 0.12<br>0.12               | 0.21<br>0.21         | 36.5<br>53.5           |
| Appr             | oach             | 502                              | 1.7               | 502                             | 1.7               | 0.294                   | 1.5                   | NA                   | 0.9                            | 6.5               | 0.21                 | 0.12                       | 0.21                 | 48.4                   |
| All V            | ehicles          | 949                              | 2.2               | 949                             | 2.2               | 0.294                   | 1.5                   | NA                   | 0.9                            | 6.5               | 0.13                 | 0.16                       | 0.13                 | 50.1                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2021 AM WD (Site Folder: 2021 With Development - Ped Crs)]

■■ Network: N101 [2021 - AM - WD - N1 (Network Folder: 2021 WD - Ped Crs)]

Londonderry Road x Southee Road 2021: Future Growth + School AM Peak: 8:15-9:15 Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | :e        |                     |                       |                     |     |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|-----|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | nEast: L | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 25        | T1       | 209                              | 4.0     | 209                             | 4.0       | 0.125               | 0.2                   | LOS A               | 0.2 | 1.2                          | 0.09         | 0.04                        | 0.09               | 57.0                   |
| 26        | R2       | 16                               | 6.7     | 16                              | 6.7       | 0.125               | 7.5                   | LOS A               | 0.2 | 1.2                          | 0.09         | 0.04                        | 0.09               | 55.6                   |
| Appro     | oach     | 225                              | 4.2     | 225                             | 4.2       | 0.125               | 0.7                   | NA                  | 0.2 | 1.2                          | 0.09         | 0.04                        | 0.09               | 56.7                   |
| North     | nWest: 9 | Southee F                        | Road    |                                 |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 27        | L2       | 38                               | 5.6     | 38                              | 5.6       | 0.303               | 7.3                   | LOS A               | 1.2 | 8.9                          | 0.53         | 0.82                        | 0.60               | 47.8                   |
| 29        | R2       | 189                              | 1.1     | 189                             | 1.1       | 0.303               | 9.3                   | LOS A               | 1.2 | 8.9                          | 0.53         | 0.82                        | 0.60               | 46.5                   |
| Appro     | oach     | 227                              | 1.9     | 227                             | 1.9       | 0.303               | 9.0                   | LOS A               | 1.2 | 8.9                          | 0.53         | 0.82                        | 0.60               | 46.7                   |
| South     | hWest: I | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 30        | L2       | 112                              | 1.9     | 112                             | 1.9       | 0.229               | 2.7                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 31        | T1       | 320                              | 3.6     | 320                             | 3.6       | 0.229               | 0.0                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 57.4                   |
| Appro     | oach     | 432                              | 3.2     | 432                             | 3.2       | 0.229               | 0.7                   | NA                  | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 56.6                   |
| All Ve    | ehicles  | 884                              | 3.1     | 884                             | 3.1       | 0.303               | 2.8                   | NA                  | 1.2 | 8.9                          | 0.16         | 0.29                        | 0.18               | 52.5                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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★ Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - AM WD (Site Folder: 2021 With Development - Ped Crs)]

**■■** Network: N101 [2021 - AM -WD - N1 (Network Folder: 2021

WD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmanc                            | e:        |                     |     |                     |                                |      |              |                             |                     |                        |
|-----------|----------|----------------------------------|---------|----------------------------------|-----------|---------------------|-----|---------------------|--------------------------------|------|--------------|-----------------------------|---------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | Aver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ad                               |           |                     |     |                     |                                |      |              |                             |                     |                        |
| 8         | T1       | 309                              | 3.4     | 309                              | 3.4       | 0.368               | 7.4 | LOS A               | 3.6                            | 25.6 | 0.69         | 0.58                        | 0.69                | 48.9                   |
| Appro     | oach     | 309                              | 3.4     | 309                              | 3.4       | 0.368               | 7.4 | LOS A               | 3.6                            | 25.6 | 0.69         | 0.58                        | 0.69                | 48.9                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                               |           |                     |     |                     |                                |      |              |                             |                     |                        |
| 1         | T1       | 502                              | 1.7     | 502                              | 1.7       | <b>*</b> 0.590      | 8.4 | LOS A               | 6.6                            | 46.6 | 0.79         | 0.68                        | 0.79                | 47.1                   |
| Appro     | oach     | 502                              | 1.7     | 502                              | 1.7       | 0.590               | 8.4 | LOS A               | 6.6                            | 46.6 | 0.79         | 0.68                        | 0.79                | 47.1                   |
| All Ve    | ehicles  | 812                              | 2.3     | 812                              | 2.3       | 0.590               | 8.0 | LOSA                | 6.6                            | 46.6 | 0.75         | 0.64                        | 0.75                | 47.8                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mo      | vement       | Perforr        | nance               |                |             |                |                  |                |                 |                |
|--------------------|--------------|----------------|---------------------|----------------|-------------|----------------|------------------|----------------|-----------------|----------------|
| Mov<br>ID Crossing | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE |             | Prop. E<br>Que | ffective<br>Stop | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|                    | ped/h        | sec            |                     | [ Ped<br>ped   | Dist ]<br>m |                | Rate             | sec            | m               | m/sec          |
| SouthWest: Lond    | donderry     | Road           |                     |                |             |                |                  |                |                 |                |
| P1 Full            | 158          | 11.6           | LOS B               | 0.1            | 0.1         | 0.83           | 0.83             | 172.1          | 208.6           | 1.21           |
| All Pedestrians    | 158          | 11.6           | LOS B               | 0.1            | 0.1         | 0.83           | 0.83             | 172.1          | 208.6           | 1.21           |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 1 [Londonderry x Vines 2021 PM WD (Site Folder: 2021 With Development - Ped Crs)]

■■ Network: N101 [2021 - PM - WD - N1 (Network Folder: 2021 WD - Ped Crs)]

Londonderry Road x Vines Drive 2021: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                          | Perfo   | rmano                           | :e        |                     |                       |                     |     |                              |              |                            |                    |                        |
|-----------|----------|---------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|-----|------------------------------|--------------|----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | EffectiveA<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: ∖ | ines Driv                       | ⁄e      |                                 |           |                     |                       |                     |     |                              |              |                            |                    |                        |
| 21        | L2       | 65                              | 0.0     | 65                              | 0.0       | 0.218               | 7.2                   | LOSA                | 0.6 | 4.2                          | 0.51         | 0.75                       | 0.51               | 47.1                   |
| 23        | R2       | 65                              | 0.0     | 65                              | 0.0       | 0.218               | 9.7                   | LOS A               | 0.6 | 4.2                          | 0.51         | 0.75                       | 0.51               | 47.1                   |
| Appro     | oach     | 131                             | 0.0     | 131                             | 0.0       | 0.218               | 8.4                   | LOS A               | 0.6 | 4.2                          | 0.51         | 0.75                       | 0.51               | 47.1                   |
| North     | East: L  | ondonde                         | rry Roa | ad                              |           |                     |                       |                     |     |                              |              |                            |                    |                        |
| 24        | L2       | 33                              | 0.0     | 33                              | 0.0       | 0.364               | 2.7                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.04                       | 0.00               | 56.3                   |
| 25        | T1       | 405                             | 3.1     | 405                             | 3.1       | 0.364               | 0.0                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.04                       | 0.00               | 53.6                   |
| Appro     | oach     | 438                             | 2.9     | 438                             | 2.9       | 0.364               | 0.2                   | NA                  | 0.0 | 0.0                          | 0.00         | 0.04                       | 0.00               | 55.2                   |
| South     | nWest: I | ondonde                         | erry Ro | ad                              |           |                     |                       |                     |     |                              |              |                            |                    |                        |
| 31        | T1       | 358                             | 3.2     | 358                             | 3.2       | 0.197               | 0.1                   | LOS A               | 0.1 | 0.7                          | 0.03         | 0.02                       | 0.03               | 54.6                   |
| 32        | R2       | 11                              | 0.0     | 11                              | 0.0       | 0.197               | 5.0                   | LOS A               | 0.1 | 0.7                          | 0.03         | 0.02                       | 0.03               | 55.5                   |
| Appro     | oach     | 368                             | 3.1     | 368                             | 3.1       | 0.197               | 0.2                   | NA                  | 0.1 | 0.7                          | 0.03         | 0.02                       | 0.03               | 54.8                   |
| All Ve    | ehicles  | 937                             | 2.6     | 937                             | 2.6       | 0.364               | 1.4                   | NA                  | 0.6 | 4.2                          | 0.08         | 0.13                       | 0.08               | 50.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2021 PM WD (Site Folder: 2021 With Development - Ped Crs)]

■■ Network: N101 [2021 - PM - WD - N1 (Network Folder: 2021 WD - Ped Crs)]

Londonderry Road x Southee Road 2021: Future Growth + School PM Peak: 15:45-14:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi        | cle Mc     | vement                           | Perfo      | rmanc                          | :e         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-------------|------------|----------------------------------|------------|--------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID   | Turn       | DEMA<br>FLO\<br>[ Total<br>veh/h |            | ARRI<br>FLO<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North       | East: L    | ondonde                          | rry Roa    | ıd                             |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 25<br>26    | T1<br>R2   | 347<br>66                        | 3.0<br>1.6 | 347<br>66                      | 3.0<br>1.6 | 0.240<br>0.240      | 0.6<br>7.6            | LOS A<br>LOS A      | 0.7<br>0.7 | 5.0<br>5.0                   | 0.21<br>0.21 | 0.11<br>0.11                | 0.21<br>0.21       | 53.4<br>54.7           |
| Appro       | oach       | 414                              | 2.8        | 414                            | 2.8        | 0.240               | 1.7                   | NA                  | 0.7        | 5.0                          | 0.21         | 0.11                        | 0.21               | 53.9                   |
| North       | West:      | Southee F                        | Road       |                                |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 27          | L2         | 31                               | 0.0        | 31                             | 0.0        | 0.180               | 6.5                   | LOSA                | 0.6        | 4.4                          | 0.49         | 0.75                        | 0.49               | 48.3                   |
| 29<br>Appro | R2<br>pach | 91<br>121                        | 1.7        | 91<br>121                      | 1.7        | 0.180<br>0.180      | 9.1                   | LOS A               | 0.6        | 4.4                          | 0.49         | 0.75<br>0.75                | 0.49               | 46.3                   |
| South       | nWest:     | Londonde                         | erry Ro    | ad                             |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30          | L2         | 162                              | 4.5        | 162                            | 4.5        | 0.227               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 54.8                   |
| 31          | T1         | 261                              | 3.6        | 261                            | 3.6        | 0.227               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 56.3                   |
| Appro       | oach       | 423                              | 4.0        | 423                            | 4.0        | 0.227               | 1.0                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 55.5                   |
| All Ve      | hicles     | 958                              | 3.2        | 958                            | 3.2        | 0.240               | 2.3                   | NA                  | 0.7        | 5.0                          | 0.15         | 0.23                        | 0.15               | 53.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - PM WD (Site Folder: 2021 With Development - Ped Crs)] WD -

■■ Network: N101 [2021 - PM - WD - N1 (Network Folder: 2021 WD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | :e        |                     |     |                     |                                |      |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----|---------------------|--------------------------------|------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ıd                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 8         | T1       | 471                              | 2.7     | 471                             | 2.7       | <b>*</b> 0.579      | 8.5 | LOS A               | 6.1                            | 43.4 | 0.80         | 0.69                        | 0.80               | 47.5                   |
| Appro     | oach     | 471                              | 2.7     | 471                             | 2.7       | 0.579               | 8.5 | LOS A               | 6.1                            | 43.4 | 0.80         | 0.69                        | 0.80               | 47.5                   |
| South     | nWest: L | ondond                           | erry Ro | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 1         | T1       | 368                              | 3.1     | 368                             | 3.1       | 0.454               | 7.9 | LOS A               | 4.4                            | 31.8 | 0.74         | 0.63                        | 0.74               | 47.7                   |
| Appro     | oach     | 368                              | 3.1     | 368                             | 3.1       | 0.454               | 7.9 | LOS A               | 4.4                            | 31.8 | 0.74         | 0.63                        | 0.74               | 47.7                   |
| All Ve    | hicles   | 839                              | 2.9     | 839                             | 2.9       | 0.579               | 8.2 | LOSA                | 6.1                            | 43.4 | 0.77         | 0.66                        | 0.77               | 47.6                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mo   | vement   | Perforr | nance    |         |         |          |         |        |        |       |
|-----------------|----------|---------|----------|---------|---------|----------|---------|--------|--------|-------|
| Mov             | Dem.     | Aver.   | Level of | AVERAGE | BACK OF | Prop. Et | fective | Travel | Travel | Aver. |
| ID Crossing     | Flow     | Delay   | Service  | QUE     | EUE     | Que      | Stop    | Time   | Dist.  | Speed |
|                 |          |         |          | [ Ped   | Dist]   |          | Rate    |        |        |       |
|                 | ped/h    | sec     |          | ped     | m       |          |         | sec    | m      | m/sec |
| SouthWest: Lond | londerry | Road    |          |         |         |          |         |        |        |       |
| P1 Full         | 158      | 11.1    | LOS B    | 0.1     | 0.1     | 0.82     | 0.82    | 171.6  | 208.6  | 1.22  |
| All Pedestrians | 158      | 11.1    | LOS B    | 0.1     | 0.1     | 0.82     | 0.82    | 171.6  | 208.6  | 1.22  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Site: 3 [Paget x Lennox 2021 AM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD (Network Folder: 2021 WOD - Ped Crs)]

**■**■ Network: N101 [2021 - AM -

Paget Street x Lennox Street

2021: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

| Vehi      | cle Mo   | vement           | Perfo     | rmanc            | e   |                |                |                     |               |             |              |                     |                    |                |
|-----------|----------|------------------|-----------|------------------|-----|----------------|----------------|---------------------|---------------|-------------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\     | NS        | ARRI<br>FLO'     | WS  | Deg.<br>Satn   | Aver.<br>Delay | Level of<br>Service | 95% BA<br>Que | EUE         | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
|           |          | [ Total<br>veh/h | HV ]<br>% | [ Total<br>veh/h |     | v/c            | sec            |                     | [ Veh.<br>veh | Dist ]<br>m |              | Rate                |                    | km/h           |
| Sout      | h: Page  | t Street         |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 1         | L2       | 84               | 5.0       | 84               | 5.0 | 0.235          | 18.0           | LOS B               | 1.1           | 8.2         | 0.87         | 0.74                | 0.87               | 41.9           |
| 2         | T1       | 165              | 5.7       | 165              | 5.7 | <b>*</b> 0.602 | 13.4           | LOS A               | 3.1           | 22.9        | 0.96         | 0.82                | 1.07               | 44.6           |
| 3         | R2       | 40               | 7.9       | 40               | 7.9 | 0.602          | 19.1           | LOS B               | 3.1           | 22.9        | 0.96         | 0.82                | 1.07               | 40.9           |
| Appr      | oach     | 289              | 5.8       | 289              | 5.8 | 0.602          | 15.5           | LOS B               | 3.1           | 22.9        | 0.93         | 0.80                | 1.02               | 43.3           |
| East      | Lennox   | Street           |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 4         | L2       | 14               | 0.0       | 14               | 0.0 | 0.223          | 12.4           | LOS A               | 1.7           | 12.4        | 0.69         | 0.57                | 0.69               | 51.7           |
| 5         | T1       | 400              | 7.1       | 400              | 7.1 | 0.604          | 8.5            | LOS A               | 4.5           | 33.2        | 0.80         | 0.70                | 0.83               | 48.5           |
| 6         | R2       | 96               | 2.2       | 96               | 2.2 | <b>*</b> 0.604 | 14.9           | LOS B               | 4.5           | 33.2        | 0.86         | 0.78                | 0.92               | 44.1           |
| Appr      | oach     | 509              | 6.0       | 509              | 6.0 | 0.604          | 9.8            | LOS A               | 4.5           | 33.2        | 0.81         | 0.71                | 0.85               | 47.8           |
| North     | n: Paget | Street           |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 7         | L2       | 38               | 0.0       | 38               | 0.0 | 0.102          | 16.4           | LOS B               | 0.5           | 3.4         | 0.85         | 0.70                | 0.85               | 23.5           |
| 8         | T1       | 89               | 1.2       | 89               | 1.2 | 0.346          | 12.2           | LOS A               | 1.6           | 11.4        | 0.90         | 0.72                | 0.90               | 39.6           |
| 9         | R2       | 25               | 8.3       | 25               | 8.3 | 0.346          | 16.9           | LOS B               | 1.6           | 11.4        | 0.90         | 0.72                | 0.90               | 34.7           |
| Appr      | oach     | 153              | 2.1       | 153              | 2.1 | 0.346          | 14.0           | LOS A               | 1.6           | 11.4        | 0.89         | 0.71                | 0.89               | 36.6           |
| West      | : Lenno  | x Street         |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 10        | L2       | 84               | 1.3       | 84               | 1.3 | 0.431          | 13.4           | LOS A               | 3.6           | 26.2        | 0.77         | 0.68                | 0.77               | 42.8           |
| 11        | T1       | 466              | 6.3       | 466              | 6.3 | 0.431          | 7.7            | LOS A               | 3.6           | 26.2        | 0.77         | 0.67                | 0.77               | 38.9           |
| 12        | R2       | 44               | 7.1       | 44               | 7.1 | 0.431          | 13.1           | LOS A               | 3.1           | 22.8        | 0.77         | 0.66                | 0.77               | 48.9           |
| Appr      | oach     | 595              | 5.7       | 595              | 5.7 | 0.431          | 8.9            | LOS A               | 3.6           | 26.2        | 0.77         | 0.67                | 0.77               | 41.1           |
| All V     | ehicles  | 1546             | 5.4       | 1546             | 5.4 | 0.604          | 11.0           | LOSA                | 4.5           | 33.2        | 0.82         | 0.71                | 0.85               | 43.6           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pedestrian N       | /lovement    | Perforr        | nance               |                         |     |                |                          |                |                 |                |
|--------------------|--------------|----------------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID Crossing | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|                    | ped/h        | sec            |                     | ped                     | m - |                |                          | sec            | m               | m/sec          |
| South: Paget S     | Street       |                |                     |                         |     |                |                          |                |                 |                |
| P1 Full            | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| East: Lennox S     | Street       |                |                     |                         |     |                |                          |                |                 |                |
| P2 Full            | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| North: Paget S     | Street       |                |                     |                         |     |                |                          |                |                 |                |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

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Project: P:\2021\2110\211091\Reports\TTW\Traffic\Modelling\211091 Hawkesbury CoE - Rev2.sip9

Site: 4 [Blacktown x Bourke 2021 AM WOD (Site Folder: 2021 Wod (Network: N101 [2021 - AM - Wod (Network Folder: 2021 WOD - Ped Crs)] WOD - Ped Crs)] ■■ Network: N101 [2021 - AM - Wod (Network Folder: 2021 WOD - Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street 2021: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

| Vehic     | cle Mo   | vement                           | Perfo | rmano                           | :e        |                     |                       |                     |                                |      |              |                             |                    |                        |
|-----------|----------|----------------------------------|-------|---------------------------------|-----------|---------------------|-----------------------|---------------------|--------------------------------|------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |       | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | ı: Bourk | ce Street                        |       |                                 |           |                     |                       |                     |                                |      |              |                             |                    |                        |
| 1         | L2       | 1                                | 0.0   | 1                               | 0.0       | 0.076               | 29.5                  | LOS C               | 1.2                            | 8.3  | 0.77         | 0.58                        | 0.77               | 24.4                   |
| 2         | T1       | 132                              | 1.6   | 132                             | 1.6       | 0.234               | 24.3                  | LOS B               | 3.4                            | 23.9 | 0.80         | 0.64                        | 0.80               | 33.3                   |
| 3b        | R3       | 17                               | 6.3   | 17                              | 6.3       | 0.234               | 31.0                  | LOS C               | 3.4                            | 23.9 | 0.81         | 0.67                        | 0.81               | 23.1                   |
| Appro     | oach     | 149                              | 2.1   | 149                             | 2.1       | 0.234               | 25.1                  | LOS B               | 3.4                            | 23.9 | 0.80         | 0.65                        | 0.80               | 32.4                   |
| South     | nEast: E | Blacktown                        | Road  |                                 |           |                     |                       |                     |                                |      |              |                             |                    |                        |
| 21b       | L3       | 17                               | 12.5  | 17                              | 12.5      | 0.157               | 15.3                  | LOS B               | 2.9                            | 21.7 | 0.49         | 0.67                        | 0.49               | 44.3                   |
| 21a       | L1       | 464                              | 7.3   | 464                             | 7.3       | 0.434               | 14.5                  | LOS A               | 10.1                           | 74.3 | 0.57         | 0.72                        | 0.57               | 41.0                   |
| 23a       | R1       | 138                              | 3.1   | 138                             | 3.1       | * 0.434             | 14.9                  | LOS B               | 10.1                           | 74.3 | 0.61         | 0.74                        | 0.61               | 43.8                   |
| Appro     | oach     | 619                              | 6.5   | 619                             | 6.5       | 0.434               | 14.6                  | LOS B               | 10.1                           | 74.3 | 0.58         | 0.72                        | 0.58               | 41.9                   |
| North     | : Bourk  | e Street                         |       |                                 |           |                     |                       |                     |                                |      |              |                             |                    |                        |
| 7a        | L1       | 120                              | 2.6   | 120                             | 2.6       | 0.232               | 30.0                  | LOS C               | 3.7                            | 26.3 | 0.81         | 0.76                        | 0.81               | 21.0                   |
| 8         | T1       | 112                              | 4.7   | 112                             | 4.7       | 0.443               | 26.2                  | LOS B               | 5.7                            | 41.5 | 0.86         | 0.74                        | 0.86               | 31.4                   |
| 9         | R2       | 62                               | 5.1   | 62                              | 5.1       | * 0.443             | 31.8                  | LOS C               | 5.7                            | 41.5 | 0.86         | 0.74                        | 0.86               | 21.7                   |
| Appro     | oach     | 294                              | 3.9   | 294                             | 3.9       | 0.443               | 28.9                  | LOS C               | 5.7                            | 41.5 | 0.84         | 0.75                        | 0.84               | 25.8                   |
| West:     | Lenno    | x Street                         |       |                                 |           |                     |                       |                     |                                |      |              |                             |                    |                        |
| 10        | L2       | 119                              | 2.7   | 119                             | 2.7       | 0.168               | 14.5                  | LOS B               | 3.2                            | 23.2 | 0.50         | 0.69                        | 0.50               | 43.1                   |
| 12a       | R1       | 466                              | 5.9   | 466                             | 5.9       | 0.426               | 14.2                  | LOS A               | 8.8                            | 64.6 | 0.58         | 0.70                        | 0.58               | 38.5                   |
| 12        | R2       | 4                                | 0.0   | 4                               | 0.0       | 0.426               | 15.5                  | LOS B               | 8.8                            | 64.6 | 0.59         | 0.70                        | 0.59               | 43.0                   |
| Appro     | oach     | 589                              | 5.2   | 589                             | 5.2       | 0.426               | 14.2                  | LOS A               | 8.8                            | 64.6 | 0.56         | 0.70                        | 0.56               | 39.8                   |
| All Ve    | hicles   | 1652                             | 5.2   | 1652                            | 5.2       | 0.443               | 18.0                  | LOS B               | 10.1                           | 74.3 | 0.64         | 0.71                        | 0.64               | 37.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pedestrian Mo      | vement   | Perforr | nance               |                         |     |                |                          |                |                 |                |
|--------------------|----------|---------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID Crossing |          |         | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|                    | ped/h    | sec     |                     | ped                     | m   |                |                          | sec            | m               | m/sec          |
| South: Bourke S    | treet    |         |                     |                         |     |                |                          |                |                 |                |
| P1 Full            | 53       | 12.1    | LOS B               | 0.1                     | 0.1 | 0.55           | 0.55                     | 39.2           | 35.2            | 0.90           |
| SouthEast: Blac    | ktown Ro | ad      |                     |                         |     |                |                          |                |                 |                |
| P5 Full            | 53       | 29.0    | LOS C               | 0.1                     | 0.1 | 0.85           | 0.85                     | 56.0           | 35.2            | 0.63           |
| North: Bourke S    | treet    |         |                     |                         |     |                |                          |                |                 |                |

| P3 Full           | 53  | 12.1 | LOS B | 0.1 | 0.1 | 0.55 | 0.55 | 39.2 | 35.2 | 0.90 |
|-------------------|-----|------|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |      |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 29.0 | LOS C | 0.1 | 0.1 | 0.85 | 0.85 | 56.0 | 35.2 | 0.63 |
| All Pedestrians   | 211 | 20.5 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 | 47.6 | 35.2 | 0.74 |

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**▽** Site: 5 [Blacktown x Campus 2021 AM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD (Network Folder: 2021 WOD - Ped Crs)]

**■■** Network: N101 [2021 - AM -

Blacktown Road x Campus Drive

2021: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo      | rmanc                           | :e         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: B | lacktown                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>22  | L2<br>T1 | 93<br>619                        | 2.3<br>6.8 | 93<br>619                       | 2.3<br>6.8 | 0.051<br>0.331      | 7.0<br>0.1            | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.0                   | 0.00         | 0.63<br>0.00                | 0.00               | 64.6<br>79.8           |
| Appro     | oach     | 712                              | 6.2        | 712                             | 6.2        | 0.331               | 1.0                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.08                        | 0.00               | 75.7                   |
| North     | West: E  | Blacktowr                        | n Road     |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 28        | T1       | 557                              | 5.1        | 557                             | 5.1        | 0.297               | 0.1                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.00                        | 0.00               | 79.8                   |
| 29        | R2       | 49                               | 2.1        | 49                              | 2.1        | 0.083               | 11.5                  | LOS A               | 0.3        | 2.0                          | 0.60         | 0.84                        | 0.60               | 54.7                   |
| Appro     | oach     | 606                              | 4.9        | 606                             | 4.9        | 0.297               | 1.0                   | NA                  | 0.3        | 2.0                          | 0.05         | 0.07                        | 0.05               | 76.9                   |
| South     | nWest: ( | Campus I                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30        | L2       | 7                                | 0.0        | 7                               | 0.0        | 0.119               | 6.9                   | LOS A               | 0.4        | 2.6                          | 0.00         | 0.58                        | 0.00               | 33.7                   |
| 32        | R2       | 15                               | 7.1        | 15                              | 7.1        | 0.119               | 34.5                  | LOS C               | 0.4        | 2.6                          | 0.00         | 0.58                        | 0.00               | 44.0                   |
| Appro     | oach     | 22                               | 4.8        | 22                              | 4.8        | 0.119               | 25.3                  | LOS B               | 0.4        | 2.6                          | 0.00         | 0.58                        | 0.00               | 41.5                   |
| All Ve    | hicles   | 1340                             | 5.6        | 1340                            | 5.6        | 0.331               | 1.4                   | NA                  | 0.4        | 2.6                          | 0.02         | 0.08                        | 0.02               | 75.3                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 3 [Paget x Lennox 2021 PM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD (Network Folder: 2021 WOD - Ped Crs)]

**■** Network: N101 [2021 - PM -

Paget Street x Lennox Street

2021: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

| Vehi      | cle Mo   | vement           | Perfo     | rmano            | :e  |                |                |                     |               |             |              |                     |                    |                |
|-----------|----------|------------------|-----------|------------------|-----|----------------|----------------|---------------------|---------------|-------------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\     |           | ARRI<br>FLO      |     | Deg.<br>Satn   | Aver.<br>Delay | Level of<br>Service | 95% BA<br>QUE |             | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
|           |          | [ Total<br>veh/h | HV ]<br>% | [ Total<br>veh/h |     | v/c            | sec            |                     | [ Veh.<br>veh | Dist ]<br>m |              | Rate                |                    | km/h           |
| South     | n: Paget | Street           |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 1         | L2       | 64               | 6.6       | 64               | 6.6 | 0.181          | 18.1           | LOS B               | 8.0           | 6.3         | 0.86         | 0.73                | 0.86               | 41.9           |
| 2         | T1       | 159              | 4.6       | 159              | 4.6 | 0.504          | 12.7           | LOS A               | 2.5           | 18.4        | 0.93         | 0.75                | 0.94               | 45.6           |
| 3         | R2       | 17               | 6.3       | 17               | 6.3 | 0.504          | 18.3           | LOS B               | 2.5           | 18.4        | 0.93         | 0.75                | 0.94               | 42.1           |
| Appr      | oach     | 240              | 5.3       | 240              | 5.3 | 0.504          | 14.5           | LOS B               | 2.5           | 18.4        | 0.91         | 0.75                | 0.92               | 44.3           |
| East:     | Lennox   | Street           |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 4         | L2       | 23               | 4.5       | 23               | 4.5 | 0.262          | 12.8           | LOS A               | 2.0           | 14.7        | 0.71         | 0.60                | 0.71               | 51.3           |
| 5         | T1       | 500              | 3.4       | 500              | 3.4 | 0.709          | 9.4            | LOS A               | 6.3           | 44.8        | 0.83         | 0.77                | 0.94               | 47.8           |
| 6         | R2       | 105              | 1.0       | 105              | 1.0 | <b>*</b> 0.709 | 15.9           | LOS B               | 6.3           | 44.8        | 0.89         | 0.87                | 1.07               | 43.5           |
| Appr      | oach     | 628              | 3.0       | 628              | 3.0 | 0.709          | 10.6           | LOS A               | 6.3           | 44.8        | 0.83         | 0.78                | 0.96               | 47.2           |
| North     | ı: Paget | Street           |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 7         | L2       | 89               | 1.2       | 89               | 1.2 | 0.243          | 16.7           | LOS B               | 1.2           | 8.5         | 0.88         | 0.74                | 0.88               | 23.1           |
| 8         | T1       | 177              | 3.6       | 177              | 3.6 | <b>*</b> 0.701 | 14.7           | LOS B               | 3.7           | 26.7        | 0.98         | 0.91                | 1.25               | 38.1           |
| 9         | R2       | 54               | 2.0       | 54               | 2.0 | 0.701          | 19.2           | LOS B               | 3.7           | 26.7        | 0.98         | 0.91                | 1.25               | 33.0           |
| Appr      | oach     | 320              | 2.6       | 320              | 2.6 | 0.701          | 16.0           | LOS B               | 3.7           | 26.7        | 0.95         | 0.86                | 1.14               | 34.9           |
| West      | : Lenno  | x Street         |           |                  |     |                |                |                     |               |             |              |                     |                    |                |
| 10        | L2       | 99               | 0.0       | 99               | 0.0 | 0.414          | 13.4           | LOS A               | 3.4           | 24.9        | 0.76         | 0.68                | 0.76               | 42.6           |
| 11        | T1       | 361              | 6.7       | 361              | 6.7 | 0.414          | 7.9            | LOS A               | 3.4           | 24.9        | 0.77         | 0.69                | 0.77               | 37.6           |
| 12        | R2       | 72               | 5.9       | 72               | 5.9 | 0.414          | 13.8           | LOS A               | 2.6           | 19.3        | 0.79         | 0.69                | 0.79               | 47.6           |
| Appr      | oach     | 532              | 5.3       | 532              | 5.3 | 0.414          | 9.7            | LOS A               | 3.4           | 24.9        | 0.77         | 0.69                | 0.77               | 41.1           |
| All Ve    | ehicles  | 1720             | 4.0       | 1720             | 4.0 | 0.709          | 11.9           | LOSA                | 6.3           | 44.8        | 0.85         | 0.76                | 0.93               | 42.8           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pedestrian Mo      | Pedestrian Movement Performance |     |                     |                         |                |                |                          |                |                 |                |  |  |  |  |  |
|--------------------|---------------------------------|-----|---------------------|-------------------------|----------------|----------------|--------------------------|----------------|-----------------|----------------|--|--|--|--|--|
| Mov<br>ID Crossing | ssing Flow Delay Service        |     | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |                | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |  |  |  |  |  |
|                    | ped/h                           | sec |                     | ped                     | m <sup>*</sup> |                |                          | sec            | m               | m/sec          |  |  |  |  |  |
| South: Paget St    | reet                            |     |                     |                         |                |                |                          |                |                 |                |  |  |  |  |  |
| P1 Full            | 53                              | 9.6 | LOS A               | 0.0                     | 0.0            | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |  |  |  |  |  |
| East: Lennox St    | treet                           |     |                     |                         |                |                |                          |                |                 |                |  |  |  |  |  |
| P2 Full            | 53                              | 9.6 | LOS A               | 0.0                     | 0.0            | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |  |  |  |  |  |
| North: Paget St    | reet                            |     |                     |                         |                |                |                          |                |                 |                |  |  |  |  |  |

| P3 Full           | 53  | 9.6 | LOSA  | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOS A | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA  | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

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Site: 4 [Blacktown x Bourke 2021 PM WOD (Site Folder: 2021 Without Development - Ped Crs)] WOD (Network: N101 [2021 - PM - WOD (Network Folder: 2021 WOD - Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street

2021: Existing Conditions PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

| Vehi              | cle Mo         | vement                           | Perfo              | rmano                           | e                  |                           |                       |                     |                     |                              |                      |                             |                      |                        |
|-------------------|----------------|----------------------------------|--------------------|---------------------------------|--------------------|---------------------------|-----------------------|---------------------|---------------------|------------------------------|----------------------|-----------------------------|----------------------|------------------------|
| Mov<br>ID         | Turn           | DEMA<br>FLOV<br>[ Total<br>veh/h |                    | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV]          | Deg.<br>Satn<br>v/c       | Aver.<br>Delay<br>sec | Level of<br>Service |                     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que         | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles   | Aver.<br>Speed<br>km/h |
| South             | n: Bourk       | e Street                         |                    |                                 |                    |                           |                       |                     |                     |                              |                      |                             |                      |                        |
| 1 2               | L2<br>T1       | 5<br>81                          | 0.0                | 5<br>81                         | 0.0                | 0.049<br>0.150            | 22.9<br>19.2          | LOS B<br>LOS B      | 0.9<br>2.1          | 6.2<br>14.8                  | 0.65<br>0.71         | 0.52<br>0.59                | 0.65<br>0.71         | 29.0<br>36.1           |
| 3b<br>Appro       | R3<br>pach     | 24<br>111                        | 1.9                | 24<br>111                       | 8.7<br>1.9         | 0.150<br>0.150            | 27.3                  | LOS B               | 2.1                 | 14.8<br>14.8                 | 0.74                 | 0.64<br>0.60                | 0.74                 | 33.8                   |
| South             | nEast: E       | Blacktown                        | Road               |                                 |                    |                           |                       |                     |                     |                              |                      |                             |                      |                        |
| 21b<br>21a<br>23a | L3<br>L1<br>R1 | 40<br>515<br>122                 | 5.3<br>3.1<br>2.6  | 40<br>515<br>122                | 5.3<br>3.1<br>2.6  | 0.210<br>0.580<br>* 0.580 | 20.6<br>20.9<br>21.6  | LOS B<br>LOS B      | 4.0<br>14.5<br>14.5 | 29.1<br>103.9<br>103.9       | 0.63<br>0.75<br>0.79 | 0.72<br>0.78<br>0.80        | 0.63<br>0.75<br>0.79 | 41.4<br>35.9<br>39.6   |
| Appro             |                | 677                              | 3.1                | 677                             | 3.1                | 0.580                     | 21.0                  | LOS B               | 14.5                | 103.9                        | 0.75                 | 0.78                        | 0.75                 | 37.1                   |
| North             | : Bourk        | e Street                         |                    |                                 |                    |                           |                       |                     |                     |                              |                      |                             |                      |                        |
| 7a<br>8<br>9      | L1<br>T1<br>R2 | 128<br>203<br>93                 | 0.8<br>1.6<br>3.4  | 128<br>203<br>93                | 0.8<br>1.6<br>3.4  | 0.174<br>0.594<br>* 0.594 | 22.7<br>22.4<br>28.0  | LOS B<br>LOS B      | 3.3<br>9.2<br>9.2   | 23.2<br>65.9<br>65.9         | 0.69<br>0.84<br>0.84 | 0.73<br>0.74<br>0.74        | 0.69<br>0.84<br>0.84 | 25.0<br>33.7<br>23.9   |
| Appro             | oach           | 424                              | 1.7                | 424                             | 1.7                | 0.594                     | 23.7                  | LOS B               | 9.2                 | 65.9                         | 0.79                 | 0.74                        | 0.79                 | 29.7                   |
| West              | : Lenno        | x Street                         |                    |                                 |                    |                           |                       |                     |                     |                              |                      |                             |                      |                        |
| 10<br>12a<br>12   | L2<br>R1<br>R2 | 68<br>422<br>3                   | 7.7<br>4.5<br>66.7 | 68<br>422<br>3                  | 7.7<br>4.5<br>66.7 | 0.175<br>0.444<br>0.444   | 19.4<br>19.4<br>21.6  | LOS B<br>LOS B      | 3.3<br>9.0<br>9.0   | 24.6<br>65.5<br>65.5         | 0.62<br>0.69<br>0.71 | 0.70<br>0.73<br>0.74        | 0.62<br>0.69<br>0.71 | 39.3<br>34.0<br>33.7   |
| Appro             | ehicles        | 494<br>1705                      | 5.3                | 494<br>1705                     | 5.3                | 0.444                     | 19.4                  | LOS B               | 9.0                 | 65.5<br>103.9                | 0.68                 | 0.73                        | 0.68                 | 35.0<br>34.6           |
| All VE            | HILIES         | 1703                             | 3.3                | 1705                            | 5.5                | 0.554                     | 21.2                  | LUGB                | 14.5                | 103.9                        | 0.74                 | 0.73                        | 0.74                 | 34.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pedestrian Mo      | vement       | Perforr        | nance               |   |                |                |                          |                |                 |                |
|--------------------|--------------|----------------|---------------------|---|----------------|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID Crossing | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE BACK O<br>QUEUE<br>[ Ped Dist ] |                | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|                    | ped/h        | sec            |                     | ped                                     | m <sup>'</sup> |                |                          | sec            | m               | m/sec          |
| South: Bourke St   | treet        |                |                     |   |                |                |                          |                |                 |                |
| P1 Full            | 53           | 17.6           | LOS B               | 0.1                                     | 0.1            | 0.66           | 0.66                     | 44.7           | 35.2            | 0.79           |
| SouthEast: Black   | town Ro      | ad             |                     |   |                |                |                          |                |                 |                |
| P5 Full            | 53           | 21.8           | LOS C               | 0.1                                     | 0.1            | 0.74           | 0.74                     | 48.9           | 35.2            | 0.72           |
| North: Bourke St   | reet         |                |                     |   |                |                |                          |                |                 |                |

| P3 Full           | 53  | 17.6 | LOS B | 0.1 | 0.1 | 0.66 | 0.66 | 44.7 | 35.2 | 0.79 |
|-------------------|-----|------|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |      |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 21.8 | LOS C | 0.1 | 0.1 | 0.74 | 0.74 | 48.9 | 35.2 | 0.72 |
| All Pedestrians   | 211 | 19.7 | LOS B | 0.1 | 0.1 | 0.70 | 0.70 | 46.8 | 35.2 | 0.75 |

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**▽** Site: 5 [Blacktown x Campus 2021 PM WOD (Site Folder: 2021 Without Development - Ped Crs)]

WOD (Network Folder: 2021 WOD - Ped Crs)]

**■** Network: N101 [2021 - PM -

Blacktown Road x Campus Drive

2021: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi  | cle Mo   | vement                           | Perfo      | rmano                          | e          |                     |                       |                     |            |                              |              |                             |                    |                        |
|---|----------|----------------------------------|------------|--------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID   | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South   | nEast: E | Blacktown                        | Road       |                                |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21 22   | L2<br>T1 | 8<br>632                         | 0.0<br>3.0 | 8<br>632                       | 0.0<br>3.0 | 0.005               | 6.9<br>0.1            | LOS A               | 0.0        | 0.0                          | 0.00         | 0.63                        | 0.00               | 65.4<br>79.8           |
| Approach         640         3.0         640         3.0         0.330         0.2         NA         0.0           NorthWest:         Blacktown Road |          |                                  |            |                                |            |                     |                       |                     |            | 0.0                          | 0.00         | 0.01                        | 0.00               | 79.3                   |
| 28<br>29  | T1<br>R2 | 567<br>6                         | 3.9<br>0.0 | 567<br>6                       | 3.9<br>0.0 | 0.298<br>0.009      | 0.1<br>10.4           | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.2                   | 0.00<br>0.54 | 0.00<br>0.70                | 0.00<br>0.54       | 79.8<br>55.7           |
| Appro   | oach     | 574                              | 3.9        | 574                            | 3.9        | 0.298               | 0.2                   | NA                  | 0.0        | 0.2                          | 0.01         | 0.01                        | 0.01               | 79.4                   |
| South   | nWest: ( | Campus I                         | Road       |                                |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30  | L2       | 49                               | 0.0        | 49                             | 0.0        | 0.359               | 9.9                   | LOS A               | 1.4        | 9.7                          | 0.00         | 0.58                        | 0.00               | 35.9                   |
| 32  | R2       | 55                               | 0.0        | 55                             | 0.0        | 0.359               | 33.1                  | LOS C               | 1.4        | 9.7                          | 0.00         | 0.58                        | 0.00               | 47.1                   |
| Appro   | oach     | 104                              | 0.0        | 104                            | 0.0        | 0.359               | 22.1                  | LOS B               | 1.4        | 9.7                          | 0.00         | 0.58                        | 0.00               | 42.9                   |
| All Ve  | ehicles  | 1318                             | 3.1        | 1318                           | 3.1        | 0.359               | 1.9                   | NA                  | 1.4        | 9.7                          | 0.00         | 0.05                        | 0.00               | 74.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 3 [Paget x Lennox 2021 AM WD (Site Folder: 2021 With Development - Ped Crs)] ■■ Network: N101 [2021 - AM - WD (Network Folder: 2021 WD -

Ped Crs)]

Paget Street x Lennox Street 2021: Future Growth + School

AM Peak: 8:15-9:15

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

| Vehi  | cle Mo   | vement          | Perfo     | rmanc         | :e  |                |       |          |              |               |       |              |        |       |
|-------|----------|-----------------|-----------|---------------|-----|----------------|-------|----------|--------------|---------------|-------|--------------|--------|-------|
| Mov   | Turn     | DEM/            |           | ARRI          |     | Deg.           |       | Level of |              | ACK OF        | Prop. | EffectiveA   |        | Aver. |
| ID    |          | FLO\<br>[ Total | ws<br>HV1 | FLO'<br>Total |     | Satn           | Delay | Service  | QUI<br>[Veh. | EUE<br>Dist ] | Que   | Stop<br>Rate | Cycles | Speed |
|       |          | veh/h           | %         | veh/h         |     | v/c            | sec   |          | veh          | m m           |       | Nate         |        | km/h  |
| Sout  | h: Page  | t Street        |           |               |     |                |       |          |              |               |       |              |        |       |
| 1     | L2       | 85              | 4.9       | 85            | 4.9 | 0.238          | 18.0  | LOS B    | 1.1          | 8.3           | 0.88  | 0.74         | 0.88   | 41.9  |
| 2     | T1       | 166             | 5.7       | 166           | 5.7 | * 0.606        | 13.5  | LOS A    | 3.1          | 23.0          | 0.96  | 0.82         | 1.08   | 44.5  |
| 3     | R2       | 40              | 7.9       | 40            | 7.9 | 0.606          | 19.1  | LOS B    | 3.1          | 23.0          | 0.96  | 0.82         | 1.08   | 40.9  |
| Appr  | oach     | 292             | 5.8       | 292           | 5.8 | 0.606          | 15.6  | LOS B    | 3.1          | 23.0          | 0.93  | 0.80         | 1.02   | 43.3  |
| East  | Lenno    | x Street        |           |               |     |                |       |          |              |               |       |              |        |       |
| 4     | L2       | 14              | 0.0       | 14            | 0.0 | 0.223          | 12.4  | LOS A    | 1.7          | 12.4          | 0.69  | 0.57         | 0.69   | 51.7  |
| 5     | T1       | 400             | 7.1       | 400           | 7.1 | 0.604          | 8.5   | LOS A    | 4.5          | 33.2          | 0.80  | 0.70         | 0.83   | 48.5  |
| 6     | R2       | 96              | 2.2       | 96            | 2.2 | <b>*</b> 0.604 | 14.9  | LOS B    | 4.5          | 33.2          | 0.86  | 0.78         | 0.92   | 44.1  |
| Appr  | oach     | 509             | 6.0       | 509           | 6.0 | 0.604          | 9.8   | LOS A    | 4.5          | 33.2          | 0.81  | 0.71         | 0.85   | 47.8  |
| North | n: Paget | Street          |           |               |     |                |       |          |              |               |       |              |        |       |
| 7     | L2       | 38              | 0.0       | 38            | 0.0 | 0.102          | 16.4  | LOS B    | 0.5          | 3.4           | 0.85  | 0.70         | 0.85   | 23.5  |
| 8     | T1       | 92              | 1.1       | 92            | 1.1 | 0.352          | 12.2  | LOS A    | 1.6          | 11.6          | 0.90  | 0.72         | 0.90   | 39.7  |
| 9     | R2       | 25              | 8.3       | 25            | 8.3 | 0.352          | 16.9  | LOS B    | 1.6          | 11.6          | 0.90  | 0.72         | 0.90   | 34.8  |
| Appr  | oach     | 155             | 2.0       | 155           | 2.0 | 0.352          | 14.0  | LOS A    | 1.6          | 11.6          | 0.89  | 0.71         | 0.89   | 36.7  |
| West  | : Lenno  | x Street        |           |               |     |                |       |          |              |               |       |              |        |       |
| 10    | L2       | 84              | 1.3       | 84            | 1.3 | 0.434          | 13.4  | LOS A    | 3.6          | 26.4          | 0.77  | 0.68         | 0.77   | 42.8  |
| 11    | T1       | 466             | 6.3       | 466           | 6.3 | 0.434          | 7.7   | LOS A    | 3.6          | 26.4          | 0.77  | 0.67         | 0.77   | 38.9  |
| 12    | R2       | 46              | 6.8       | 46            | 6.8 | 0.434          | 13.1  | LOS A    | 3.1          | 22.9          | 0.77  | 0.67         | 0.77   | 48.8  |
| Appr  | oach     | 597             | 5.6       | 597           | 5.6 | 0.434          | 9.0   | LOS A    | 3.6          | 26.4          | 0.77  | 0.67         | 0.77   | 41.1  |
| All V | ehicles  | 1553            | 5.4       | 1553          | 5.4 | 0.606          | 11.0  | LOSA     | 4.5          | 33.2          | 0.82  | 0.71         | 0.85   | 43.6  |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pec | destrian Mov   | /ement | Perforn | nance    |                     |                |         |              |        |        |       |
|-----|----------------|--------|---------|----------|---------------------|----------------|---------|--------------|--------|--------|-------|
| Mov | /<br>Crossing  | Dem.   | Aver.   | Level of | AVERAGE             |                | Prop. E |              | Travel | Travel | Aver. |
| ID  | Crossing       | Flow   | Delay   | Service  | QUEUE<br>[Ped Dist] |                | Que     | Stop<br>Rate | Time   | DIST.  | Speed |
|     |                | ped/h  | sec     |          | ped                 | m <sup>1</sup> |         |              | sec    | m      | m/sec |
| Sou | th: Paget Stre | et     |         |          |                     |                |         |              |        |        |       |
| P1  | Full           | 53     | 9.6     | LOS A    | 0.0                 | 0.0            | 0.80    | 0.80         | 36.7   | 35.2   | 0.96  |
| Eas | t: Lennox Stre | eet    |         |          |                     |                |         |              |        |        |       |
| P2  | Full           | 53     | 9.6     | LOS A    | 0.0                 | 0.0            | 0.80    | 0.80         | 36.7   | 35.2   | 0.96  |
| Nor | th: Paget Stre | et     |         |          |                     |                |         |              |        |        |       |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

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Site: 4 [Blacktown x Bourke 2021 AM WD (Site Folder: 2021 With Development - Ped Crs)]

WD (Network Folder: 2021 WD -

Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street

2021: Future Growth + School

AM Peak: 8:15-9:15

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

| Vehi   | cle Mo   | vement         | Perfo     | rmano        | e    |                |       |          |               |        |       |              |        |       |
|--------|----------|----------------|-----------|--------------|------|----------------|-------|----------|---------------|--------|-------|--------------|--------|-------|
| Mov    | Turn     | DEMA           |           | ARRI         |      | Deg.           |       | Level of | 95% BA        |        | Prop. | EffectiveA   |        | Aver. |
| ID     |          | FLO\<br>[Total | WS<br>HV1 | FLO<br>Total |      | Satn           | Delay | Service  | QUE<br>[ Veh. | Dist ] | Que   | Stop<br>Rate | Cycles | Speed |
|        |          | veh/h          | %         | veh/h        |      | v/c            | sec   |          | veh           | m m    |       | Nate         |        | km/h  |
| South  | n: Bourk | e Street       |           |              |      |                |       |          |               |        |       |              |        |       |
| 1      | L2       | 1              | 0.0       | 1            | 0.0  | 0.080          | 28.7  | LOS C    | 1.3           | 9.0    | 0.76  | 0.58         | 0.76   | 24.9  |
| 2      | T1       | 134            | 1.6       | 134          | 1.6  | 0.245          | 24.1  | LOS B    | 3.5           | 25.0   | 0.80  | 0.65         | 0.80   | 33.3  |
| 3b     | R3       | 23             | 4.5       | 23           | 4.5  | 0.245          | 31.0  | LOS C    | 3.5           | 25.0   | 0.82  | 0.68         | 0.82   | 22.9  |
| Appro  | oach     | 158            | 2.0       | 158          | 2.0  | 0.245          | 25.1  | LOS B    | 3.5           | 25.0   | 0.80  | 0.65         | 0.80   | 32.1  |
| South  | nEast: E | Blacktown      | Road      |              |      |                |       |          |               |        |       |              |        |       |
| 21b    | L3       | 17             | 12.5      | 17           | 12.5 | 0.160          | 15.8  | LOS B    | 3.0           | 22.3   | 0.51  | 0.68         | 0.51   | 44.0  |
| 21a    | L1       | 464            | 7.3       | 464          | 7.3  | 0.444          | 15.1  | LOS B    | 10.4          | 76.5   | 0.59  | 0.72         | 0.59   | 40.5  |
| 23a    | R1       | 138            | 3.1       | 138          | 3.1  | <b>*</b> 0.444 | 15.5  | LOS B    | 10.4          | 76.5   | 0.63  | 0.75         | 0.63   | 43.3  |
| Appro  | oach     | 619            | 6.5       | 619          | 6.5  | 0.444          | 15.2  | LOS B    | 10.4          | 76.5   | 0.60  | 0.73         | 0.60   | 41.4  |
| North  | : Bourk  | e Street       |           |              |      |                |       |          |               |        |       |              |        |       |
| 7a     | L1       | 120            | 2.6       | 120          | 2.6  | 0.222          | 29.2  | LOS C    | 3.6           | 25.8   | 0.80  | 0.75         | 0.80   | 21.4  |
| 8      | T1       | 115            | 4.6       | 115          | 4.6  | 0.442          | 26.1  | LOS B    | 5.8           | 42.1   | 0.86  | 0.74         | 0.86   | 31.5  |
| 9      | R2       | 62             | 5.1       | 62           | 5.1  | <b>*</b> 0.442 | 31.7  | LOS C    | 5.8           | 42.1   | 0.86  | 0.74         | 0.86   | 21.8  |
| Appro  | oach     | 297            | 3.9       | 297          | 3.9  | 0.442          | 28.5  | LOS C    | 5.8           | 42.1   | 0.84  | 0.74         | 0.84   | 26.1  |
| West   | : Lenno  | x Street       |           |              |      |                |       |          |               |        |       |              |        |       |
| 10     | L2       | 119            | 2.7       | 119          | 2.7  | 0.173          | 15.0  | LOS B    | 3.3           | 24.1   | 0.51  | 0.69         | 0.51   | 42.7  |
| 12a    | R1       | 466            | 5.9       | 466          | 5.9  | 0.438          | 14.8  | LOS B    | 9.0           | 66.3   | 0.59  | 0.71         | 0.59   | 38.0  |
| 12     | R2       | 4              | 0.0       | 4            | 0.0  | 0.438          | 16.1  | LOS B    | 9.0           | 66.3   | 0.60  | 0.71         | 0.60   | 42.6  |
| Appro  | oach     | 589            | 5.2       | 589          | 5.2  | 0.438          | 14.8  | LOS B    | 9.0           | 66.3   | 0.58  | 0.70         | 0.58   | 39.2  |
| All Ve | hicles   | 1663           | 5.1       | 1663         | 5.1  | 0.444          | 18.4  | LOS B    | 10.4          | 76.5   | 0.65  | 0.71         | 0.65   | 36.9  |
|        |          |                |           |              |      |                |       |          |               |        |       |              |        |       |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Ped       | lestrian Mov   | vement       | Perforn        | nance               |  |     |                |                          |                |                 |                |
|-----------|----------------|--------------|----------------|---------------------|--|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID | Crossing       | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE BACK OF<br>QUEUE<br>[ Ped Dist ] |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|           |                | ped/h        | sec            |                     | ped                                      | m - |                |                          | sec            | m               | m/sec          |
| Sou       | th: Bourke Sti | reet         |                |                     |  |     |                |                          |                |                 |                |
| P1        | Full           | 53           | 12.7           | LOS B               | 0.1                                      | 0.1 | 0.56           | 0.56                     | 39.8           | 35.2            | 0.89           |
| Sou       | thEast: Black  | town Ro      | ad             |                     |  |     |                |                          |                |                 |                |
| P5        | Full           | 53           | 28.1           | LOS C               | 0.1                                      | 0.1 | 0.84           | 0.84                     | 55.2           | 35.2            | 0.64           |
| Nort      | th: Bourke Str | eet          |                |                     |  |     |                |                          |                |                 |                |

| P3 Full           | 53  | 12.7 | LOS B | 0.1 | 0.1 | 0.56 | 0.56 | 39.8 | 35.2 | 0.89 |
|-------------------|-----|------|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |      |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 28.1 | LOS C | 0.1 | 0.1 | 0.84 | 0.84 | 55.2 | 35.2 | 0.64 |
| All Pedestrians   | 211 | 20.4 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 | 47.5 | 35.2 | 0.74 |

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**V** Site: 5 [Blacktown x Campus 2021 AM WD (Site Folder: 2021 With Development - Ped Crs)]

WD (Network: N101 [2021 - AM - WD (Network Folder: 2021 WD -

Ped Crs)]

Blacktown Road x Campus Drive 2021: Future Growth + School AM Peak: 8:15-9:15 Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo  | vement                           | Perfo      | rmano                           | :e         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|---|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn  | DEMA<br>FLO\<br>[ Total<br>veh/h |            | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | hEast: E  | Blacktown                        | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>22  | L2<br>T1  | 106<br>619                       | 2.0<br>6.8 | 106<br>619                      | 2.0<br>6.8 | 0.058<br>0.331      | 6.8<br>0.1            | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.0                   | 0.00         | 0.62<br>0.00                | 0.00               | 62.9<br>79.8           |
|           | Approach 725 6.1 725 6.1 0.331 1.1 NA 0.0 0.0 0.00 0.09 0.00 7  NorthWest: Blacktown Road |                                  |            |                                 |            |                     |                       |                     |            |                              |              | 74.7                        |                    |                        |
| 28<br>29  | T1<br>R2  | 563<br>49                        | 5.0<br>2.1 | 563<br>49                       | 5.0<br>2.1 | 0.300<br>0.085      | 0.1<br>11.7           | LOS A<br>LOS A      | 0.0<br>0.3 | 0.0<br>2.0                   | 0.00<br>0.61 | 0.00<br>0.85                | 0.00<br>0.61       | 79.5<br>54.6           |
| Appr      | oach  | 613                              | 4.8        | 613                             | 4.8        | 0.300               | 1.0                   | NA                  | 0.3        | 2.0                          | 0.05         | 0.07                        | 0.05               | 76.6                   |
| South     | hWest: (  | Campus                           | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30        | L2  | 7                                | 0.0        | 7                               | 0.0        | 0.121               | 6.9                   | LOS A               | 0.4        | 2.6                          | 0.00         | 0.58                        | 0.00               | 33.5                   |
| 32        | R2  | 15                               | 7.1        | 15                              | 7.1        | 0.121               | 35.1                  | LOS C               | 0.4        | 2.6                          | 0.00         | 0.58                        | 0.00               | 43.8                   |
| Appr      | oach  | 22                               | 4.8        | 22                              | 4.8        | 0.121               | 25.7                  | LOS B               | 0.4        | 2.6                          | 0.00         | 0.58                        | 0.00               | 41.2                   |
| All Ve    | ehicles   | 1360                             | 5.5        | 1360                            | 5.5        | 0.331               | 1.4                   | NA                  | 0.4        | 2.6                          | 0.02         | 0.09                        | 0.02               | 74.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 3 [Paget x Lennox 2021 PM WD (Site Folder: 2021 With **■** Network: N101 [2021 - PM -Development - Ped Crs)] WD (Network Folder: 2021 WD -Ped Crs)]

Paget Street x Lennox Street 2021: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

| Vehi      | cle Mo   | vement       | Perfo | rmano       | :e  |                |                |                     |               |        |              |                     |                    |                |
|-----------|----------|--------------|-------|-------------|-----|----------------|----------------|---------------------|---------------|--------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\ |       | ARRI<br>FLO |     | Deg.<br>Satn   | Aver.<br>Delav | Level of<br>Service | 95% BA<br>QUE |        | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
|           |          | [ Total      | HV]   | [ Total     |     | Calli          | Delay          | OCIVICE             | [ Veh.        | Dist ] | Que          | Rate                | Cycles             | Орсси          |
|           |          | veh/h        | %     | veh/h       | %   | v/c            | sec            |                     | veh           | m      |              |                     |                    | km/h           |
| Sout      | n: Paget | Street       |       |             |     |                |                |                     |               |        |              |                     |                    |                |
| 1         | L2       | 66           | 6.3   | 66          | 6.3 | 0.187          | 18.1           | LOS B               | 0.9           | 6.5    | 0.86         | 0.73                | 0.86               | 41.9           |
| 2         | T1       | 161          | 4.6   | 161         | 4.6 | 0.510          | 12.7           | LOS A               | 2.6           | 18.7   | 0.93         | 0.76                | 0.95               | 45.6           |
| 3         | R2       | 17           | 6.3   | 17          | 6.3 | 0.510          | 18.3           | LOS B               | 2.6           | 18.7   | 0.93         | 0.76                | 0.95               | 42.0           |
| Appr      | oach     | 244          | 5.2   | 244         | 5.2 | 0.510          | 14.6           | LOS B               | 2.6           | 18.7   | 0.92         | 0.75                | 0.93               | 44.2           |
| East:     | Lennox   | Street       |       |             |     |                |                |                     |               |        |              |                     |                    |                |
| 4         | L2       | 23           | 4.5   | 23          | 4.5 | 0.262          | 12.8           | LOS A               | 2.0           | 14.7   | 0.71         | 0.60                | 0.71               | 51.3           |
| 5         | T1       | 500          | 3.4   | 500         | 3.4 | 0.709          | 9.4            | LOS A               | 6.3           | 44.8   | 0.83         | 0.77                | 0.94               | 47.8           |
| 6         | R2       | 105          | 1.0   | 105         | 1.0 | <b>*</b> 0.709 | 15.9           | LOS B               | 6.3           | 44.8   | 0.89         | 0.87                | 1.07               | 43.5           |
| Appr      | oach     | 628          | 3.0   | 628         | 3.0 | 0.709          | 10.6           | LOS A               | 6.3           | 44.8   | 0.83         | 0.78                | 0.96               | 47.2           |
| North     | n: Paget | Street       |       |             |     |                |                |                     |               |        |              |                     |                    |                |
| 7         | L2       | 89           | 1.2   | 89          | 1.2 | 0.243          | 16.7           | LOS B               | 1.2           | 8.5    | 0.88         | 0.74                | 0.88               | 23.1           |
| 8         | T1       | 178          | 3.6   | 178         | 3.6 | <b>*</b> 0.705 | 14.7           | LOS B               | 3.7           | 26.9   | 0.98         | 0.92                | 1.26               | 38.1           |
| 9         | R2       | 54           | 2.0   | 54          | 2.0 | 0.705          | 19.3           | LOS B               | 3.7           | 26.9   | 0.98         | 0.92                | 1.26               | 33.0           |
| Appr      | oach     | 321          | 2.6   | 321         | 2.6 | 0.705          | 16.0           | LOS B               | 3.7           | 26.9   | 0.95         | 0.87                | 1.15               | 34.9           |
| West      | : Lenno  | x Street     |       |             |     |                |                |                     |               |        |              |                     |                    |                |
| 10        | L2       | 99           | 0.0   | 99          | 0.0 | 0.415          | 13.4           | LOS A               | 3.4           | 25.0   | 0.76         | 0.68                | 0.76               | 42.6           |
| 11        | T1       | 361          | 6.7   | 361         | 6.7 | 0.415          | 7.9            | LOS A               | 3.4           | 25.0   | 0.77         | 0.69                | 0.77               | 37.6           |
| 12        | R2       | 73           | 5.8   | 73          | 5.8 | 0.415          | 13.8           | LOS A               | 2.6           | 19.3   | 0.79         | 0.69                | 0.79               | 47.5           |
| Appr      | oach     | 533          | 5.3   | 533         | 5.3 | 0.415          | 9.7            | LOS A               | 3.4           | 25.0   | 0.77         | 0.69                | 0.77               | 41.1           |
| All Ve    | ehicles  | 1726         | 4.0   | 1726        | 4.0 | 0.709          | 11.9           | LOSA                | 6.3           | 44.8   | 0.85         | 0.76                | 0.93               | 42.8           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pec | destrian Mov   | /ement | Perforn | nance    |                     |                |         |              |        |        |       |
|-----|----------------|--------|---------|----------|---------------------|----------------|---------|--------------|--------|--------|-------|
| Mov | /<br>Crossing  | Dem.   | Aver.   | Level of | AVERAGE             |                | Prop. E |              | Travel | Travel | Aver. |
| ID  | Crossing       | Flow   | Delay   | Service  | QUEUE<br>[Ped Dist] |                | Que     | Stop<br>Rate | Time   | DIST.  | Speed |
|     |                | ped/h  | sec     |          | ped                 | m <sup>1</sup> |         |              | sec    | m      | m/sec |
| Sou | th: Paget Stre | et     |         |          |                     |                |         |              |        |        |       |
| P1  | Full           | 53     | 9.6     | LOS A    | 0.0                 | 0.0            | 0.80    | 0.80         | 36.7   | 35.2   | 0.96  |
| Eas | t: Lennox Stre | eet    |         |          |                     |                |         |              |        |        |       |
| P2  | Full           | 53     | 9.6     | LOS A    | 0.0                 | 0.0            | 0.80    | 0.80         | 36.7   | 35.2   | 0.96  |
| Nor | th: Paget Stre | et     |         |          |                     |                |         |              |        |        |       |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

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Site: 4 [Blacktown x Bourke 2021 PM WD (Site Folder: 2021 **■** Network: N101 [2021 - PM -With Development - Ped Crs)]

WD (Network Folder: 2021 WD -

Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street

2021: Future Growth + School

PM Peak: 15:45-14:45

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

| Vehi      | cle Mo   | vement           | Perfo     | rmano         | е    |                |                |                     |               |             |              |                     |                    |                |
|-----------|----------|------------------|-----------|---------------|------|----------------|----------------|---------------------|---------------|-------------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV     | NS        | ARR<br>FLO    | WS   | Deg.<br>Satn   | Aver.<br>Delay | Level of<br>Service | 95% BA<br>Que | EUE         | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
|           |          | [ Total<br>veh/h | HV ]<br>% | [ Total veh/h |      | v/c            | sec            |                     | [ Veh.<br>veh | Dist ]<br>m |              | Rate                |                    | km/h           |
| South     | ı: Bourk | ce Street        |           |               |      |                |                |                     |               |             |              |                     |                    |                |
| 1         | L2       | 5                | 0.0       | 5             | 0.0  | 0.116          | 23.4           | LOS B               | 2.2           | 15.3        | 0.67         | 0.54                | 0.67               | 28.9           |
| 2         | T1       | 84               | 0.0       | 84            | 0.0  | 0.116          | 17.0           | LOS B               | 2.2           | 15.3        | 0.68         | 0.55                | 0.68               | 38.4           |
| 3b        | R3       | 38               | 5.6       | 38            | 5.6  | 0.116          | 28.8           | LOS C               | 1.2           | 8.5         | 0.76         | 0.73                | 0.76               | 21.7           |
| Appro     | oach     | 127              | 1.7       | 127           | 1.7  | 0.116          | 20.8           | LOS B               | 2.2           | 15.3        | 0.70         | 0.60                | 0.70               | 33.4           |
| South     | East: E  | Blacktown        | Road      |               |      |                |                |                     |               |             |              |                     |                    |                |
| 21b       | L3       | 40               | 5.3       | 40            | 5.3  | 0.210          | 20.6           | LOS B               | 4.0           | 29.1        | 0.63         | 0.72                | 0.63               | 41.4           |
| 21a       | L1       | 515              | 3.1       | 515           | 3.1  | 0.580          | 20.9           | LOS B               | 14.5          | 103.9       | 0.75         | 0.78                | 0.75               | 35.9           |
| 23a       | R1       | 122              | 2.6       | 122           | 2.6  | <b>*</b> 0.580 | 21.6           | LOS B               | 14.5          | 103.9       | 0.79         | 0.80                | 0.79               | 39.6           |
| Appro     | oach     | 677              | 3.1       | 677           | 3.1  | 0.580          | 21.0           | LOS B               | 14.5          | 103.9       | 0.75         | 0.78                | 0.75               | 37.1           |
| North     | : Bourk  | e Street         |           |               |      |                |                |                     |               |             |              |                     |                    |                |
| 7a        | L1       | 128              | 8.0       | 128           | 8.0  | 0.174          | 22.7           | LOS B               | 3.3           | 23.2        | 0.69         | 0.73                | 0.69               | 25.0           |
| 8         | T1       | 205              | 1.5       | 205           | 1.5  | 0.575          | 21.6           | LOS B               | 9.1           | 65.2        | 0.83         | 0.74                | 0.83               | 34.3           |
| 9         | R2       | 93               | 3.4       | 93            | 3.4  | * 0.575        | 27.2           | LOS B               | 9.1           | 65.2        | 0.83         | 0.74                | 0.83               | 24.4           |
| Appro     | oach     | 426              | 1.7       | 426           | 1.7  | 0.575          | 23.1           | LOS B               | 9.1           | 65.2        | 0.79         | 0.73                | 0.79               | 30.1           |
| West      | Lenno    | x Street         |           |               |      |                |                |                     |               |             |              |                     |                    |                |
| 10        | L2       | 68               | 7.7       | 68            | 7.7  | 0.175          | 19.1           | LOS B               | 3.3           | 24.6        | 0.62         | 0.70                | 0.62               | 39.3           |
| 12a       | R1       | 422              | 4.5       | 422           | 4.5  | 0.444          | 19.4           | LOS B               | 9.0           | 65.5        | 0.69         | 0.73                | 0.69               | 34.0           |
| 12        | R2       | 3                | 66.7      | 3             | 66.7 | 0.444          | 21.6           | LOS B               | 9.0           | 65.5        | 0.71         | 0.74                | 0.71               | 33.7           |
| Appro     | oach     | 494              | 5.3       | 494           | 5.3  | 0.444          | 19.4           | LOS B               | 9.0           | 65.5        | 0.68         | 0.73                | 0.68               | 35.0           |
| All Ve    | hicles   | 1724             | 3.3       | 1724          | 3.3  | 0.580          | 21.1           | LOS B               | 14.5          | 103.9       | 0.73         | 0.74                | 0.73               | 34.7           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

| Pedestrian Movement Performance |              |                |                     |                         |     |                |                          |                |                 |                |  |  |  |  |
|---------------------------------|--------------|----------------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|--|--|--|--|
| Mov<br>ID Crossing              | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |  |  |  |  |
|                                 | ped/h        | sec            |                     | ped                     | m - |                |                          | sec            | m               | m/sec          |  |  |  |  |
| South: Bourke Street            |              |                |                     |                         |     |                |                          |                |                 |                |  |  |  |  |
| P1 Full                         | 53           | 17.6           | LOS B               | 0.1                     | 0.1 | 0.66           | 0.66                     | 44.7           | 35.2            | 0.79           |  |  |  |  |
| SouthEast: Black                | town Ro      | ad             |                     |                         |     |                |                          |                |                 |                |  |  |  |  |
| P5 Full                         | 53           | 21.8           | LOS C               | 0.1                     | 0.1 | 0.74           | 0.74                     | 48.9           | 35.2            | 0.72           |  |  |  |  |
| North: Bourke St                | reet         |                |                     |                         |     |                |                          |                |                 |                |  |  |  |  |

| P3 Full             | 53  | 17.6 | LOS B | 0.1 | 0.1 | 0.66 | 0.66 | 44.7 | 35.2 | 0.79 |
|---------------------|-----|------|-------|-----|-----|------|------|------|------|------|
| West: Lennox Street |     |      |       |     |     |      |      |      |      |      |
| P4 Full             | 53  | 21.8 | LOS C | 0.1 | 0.1 | 0.74 | 0.74 | 48.9 | 35.2 | 0.72 |
| All Pedestrians     | 211 | 19.7 | LOS B | 0.1 | 0.1 | 0.70 | 0.70 | 46.8 | 35.2 | 0.75 |

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V Site: 5 [Blacktown x Campus 2021 PM WD (Site Folder: 2021 With Development - Ped Crs)]

■■ Network: N101 [2021 - PM - WD (Network Folder: 2021 WD -

Ped Crs)]

Blacktown Road x Campus Drive 2021: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Give-Way (Two-Way)

| Vehicle Movement Performance |          |                                  |            |                                 |            |                     |                       |                     |            |                               |              |                             |                    |                        |
|------------------------------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|-------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>IEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| SouthEast: Blacktown Road    |          |                                  |            |                                 |            |                     |                       |                     |            |                               |              |                             |                    |                        |
| 21<br>22                     | L2<br>T1 | 15<br>632                        | 0.0<br>3.0 | 15<br>632                       | 0.0<br>3.0 | 0.008<br>0.330      | 6.4<br>0.1            | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.0                    | 0.00<br>0.00 | 0.61<br>0.00                | 0.00               | 59.7<br>79.8           |
| Appro                        | oach     | 646                              | 2.9        | 646                             | 2.9        | 0.330               | 0.2                   | NA                  | 0.0        | 0.0                           | 0.00         | 0.01                        | 0.00               | 78.6                   |
| NorthWest: Blacktown Road    |          |                                  |            |                                 |            |                     |                       |                     |            |                               |              |                             |                    |                        |
| 28                           | T1       | 581                              | 3.8        | 581                             | 3.8        | 0.305               | 0.1                   | LOSA                | 0.0        | 0.0                           | 0.00         | 0.00                        | 0.00               | 79.2                   |
| 29                           | R2       | 6                                | 0.0        | 6                               | 0.0        | 0.010               | 10.4                  | LOS A               | 0.0        | 0.2                           | 0.54         | 0.70                        | 0.54               | 55.7                   |
| Appro                        | oach     | 587                              | 3.8        | 587                             | 3.8        | 0.305               | 0.2                   | NA                  | 0.0        | 0.2                           | 0.01         | 0.01                        | 0.01               | 78.8                   |
| SouthWest: Campus Road       |          |                                  |            |                                 |            |                     |                       |                     |            |                               |              |                             |                    |                        |
| 30                           | L2       | 49                               | 0.0        | 49                              | 0.0        | 0.368               | 10.2                  | LOS A               | 1.4        | 10.0                          | 0.00         | 0.58                        | 0.00               | 35.4                   |
| 32                           | R2       | 55                               | 0.0        | 55                              | 0.0        | 0.368               | 34.1                  | LOS C               | 1.4        | 10.0                          | 0.00         | 0.58                        | 0.00               | 46.7                   |
| Appro                        | oach     | 104                              | 0.0        | 104                             | 0.0        | 0.368               | 22.8                  | LOS B               | 1.4        | 10.0                          | 0.00         | 0.58                        | 0.00               | 42.4                   |
| All Ve                       | ehicles  | 1338                             | 3.1        | 1338                            | 3.1        | 0.368               | 2.0                   | NA                  | 1.4        | 10.0                          | 0.00         | 0.06                        | 0.00               | 73.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**V** Site: 1 [Londonderry x Vines 2031 AM WOD (Site Folder: 2031 Without Development - Ped Crs)]

■■ Network: N101 [2031 - AM - WOD - N1 (Network Folder: 2031 WOD - Ped Crs)]

Londonderry Road x Vines Drive

2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | :e        |                     |                       |                     |     |                                |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|-----|--------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | BACK OF<br>JEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| Sout      | hEast: V | ines Driv                        | ⁄e      |                                 |           |                     |                       |                     |     |                                |              |                             |                    |                        |
| 21        | L2       | 13                               | 0.0     | 13                              | 0.0       | 0.080               | 6.6                   | LOS A               | 0.3 | 2.1                            | 0.53         | 0.75                        | 0.53               | 45.0                   |
| 23        | R2       | 31                               | 20.7    | 31                              | 20.7      | 0.080               | 12.0                  | LOS A               | 0.3 | 2.1                            | 0.53         | 0.75                        | 0.53               | 45.0                   |
| Appr      | oach     | 43                               | 14.6    | 43                              | 14.6      | 0.080               | 10.4                  | LOS A               | 0.3 | 2.1                            | 0.53         | 0.75                        | 0.53               | 45.0                   |
| North     | nEast: L | ondonde                          | rry Roa | ıd                              |           |                     |                       |                     |     |                                |              |                             |                    |                        |
| 24        | L2       | 116                              | 1.8     | 116                             | 1.8       | 0.233               | 2.7                   | LOS A               | 0.0 | 0.0                            | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 25        | T1       | 323                              | 3.6     | 323                             | 3.6       | 0.233               | 0.0                   | LOS A               | 0.0 | 0.0                            | 0.00         | 0.14                        | 0.00               | 43.4                   |
| Appr      | oach     | 439                              | 3.1     | 439                             | 3.1       | 0.233               | 0.7                   | NA                  | 0.0 | 0.0                            | 0.00         | 0.14                        | 0.00               | 53.4                   |
| Sout      | hWest: I | ondond                           | erry Ro | ad                              |           |                     |                       |                     |     |                                |              |                             |                    |                        |
| 31        | T1       | 443                              | 2.1     | 443                             | 2.1       | 0.316               | 0.7                   | LOS A               | 1.0 | 7.1                            | 0.21         | 0.11                        | 0.22               | 36.3                   |
| 32        | R2       | 97                               | 0.0     | 97                              | 0.0       | 0.316               | 5.3                   | LOS A               | 1.0 | 7.1                            | 0.21         | 0.11                        | 0.22               | 53.5                   |
| Appr      | oach     | 540                              | 1.8     | 540                             | 1.8       | 0.316               | 1.6                   | NA                  | 1.0 | 7.1                            | 0.21         | 0.11                        | 0.22               | 47.7                   |
| All V     | ehicles  | 1022                             | 2.9     | 1022                            | 2.9       | 0.316               | 1.6                   | NA                  | 1.0 | 7.1                            | 0.14         | 0.15                        | 0.14               | 49.6                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**V** Site: 2 [Londonderry x Southee 2031 AM WOD (Site Folder: 2031 Without Development - Ped Crs)]

■■ Network: N101 [2031 - AM - WOD - N1 (Network Folder: 2031 WOD - Ped Crs)]

Londonderry Road x Southee Road

2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo  | vement                           | Perfo   | rmanc                           | :e        |                     |                       |                     |      |                              |              |                             |                    |                        |
|-----------|---------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn    | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |      | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L | ondonde                          |         |                                 | 70        | V/C                 | 300                   |                     | VCII | '''                          |              |                             |                    | KIII/II                |
| 25        | T1      | 228                              | 4.1     | 228                             | 4.1       | 0.137               | 0.3                   | LOS A               | 0.2  | 1.4                          | 0.10         | 0.04                        | 0.10               | 56.9                   |
| 26        | R2      | 17                               | 6.3     | 17                              | 6.3       | 0.137               | 7.8                   | LOS A               | 0.2  | 1.4                          | 0.10         | 0.04                        | 0.10               | 55.6                   |
| Appro     | oach    | 245                              | 4.3     | 245                             | 4.3       | 0.137               | 8.0                   | NA                  | 0.2  | 1.4                          | 0.10         | 0.04                        | 0.10               | 56.7                   |
| North     | West: 9 | Southee F                        | Road    |                                 |           |                     |                       |                     |      |                              |              |                             |                    |                        |
| 27        | L2      | 42                               | 5.0     | 42                              | 5.0       | 0.357               | 7.8                   | LOS A               | 1.6  | 11.3                         | 0.57         | 0.86                        | 0.71               | 47.2                   |
| 29        | R2      | 209                              | 1.0     | 209                             | 1.0       | 0.357               | 10.2                  | LOS A               | 1.6  | 11.3                         | 0.57         | 0.86                        | 0.71               | 45.5                   |
| Appro     | oach    | 252                              | 1.7     | 252                             | 1.7       | 0.357               | 9.8                   | LOS A               | 1.6  | 11.3                         | 0.57         | 0.86                        | 0.71               | 45.9                   |
| South     | nWest:  | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |      |                              |              |                             |                    |                        |
| 30        | L2      | 122                              | 1.7     | 122                             | 1.7       | 0.251               | 2.7                   | LOS A               | 0.0  | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 31        | T1      | 351                              | 3.6     | 351                             | 3.6       | 0.251               | 0.0                   | LOS A               | 0.0  | 0.0                          | 0.00         | 0.14                        | 0.00               | 57.3                   |
| Appro     | oach    | 473                              | 3.1     | 473                             | 3.1       | 0.251               | 0.7                   | NA                  | 0.0  | 0.0                          | 0.00         | 0.14                        | 0.00               | 56.6                   |
| All Ve    | hicles  | 969                              | 3.0     | 969                             | 3.0       | 0.357               | 3.1                   | NA                  | 1.6  | 11.3                         | 0.17         | 0.30                        | 0.21               | 52.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - AM WOD (Site Folder: 2031 Without Development - Ped Crs)]

■■ Network: N101 [2031 - AM - WOD - N1 (Network Folder: 2031 WOD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | е         |                     |     |                     |                                |      |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----|---------------------|--------------------------------|------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 8         | T1       | 336                              | 3.4     | 336                             | 3.4       | 0.385               | 7.3 | LOS A               | 3.9                            | 28.2 | 0.68         | 0.58                        | 0.68               | 49.0                   |
| Appro     | oach     | 336                              | 3.4     | 336                             | 3.4       | 0.385               | 7.3 | LOS A               | 3.9                            | 28.2 | 0.68         | 0.58                        | 0.68               | 49.0                   |
| South     | nWest: L | ondond                           | erry Ro | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 1         | T1       | 540                              | 1.8     | 540                             | 1.8       | <b>*</b> 0.613      | 8.4 | LOS A               | 7.2                            | 51.4 | 0.79         | 0.69                        | 0.79               | 47.1                   |
| Appro     | oach     | 540                              | 1.8     | 540                             | 1.8       | 0.613               | 8.4 | LOS A               | 7.2                            | 51.4 | 0.79         | 0.69                        | 0.79               | 47.1                   |
| All Ve    | hicles   | 876                              | 2.4     | 876                             | 2.4       | 0.613               | 7.9 | LOS A               | 7.2                            | 51.4 | 0.75         | 0.64                        | 0.75               | 47.9                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mov         | vement  | Perforr | nance    |         |         |          |          |        |        |       |
|------------------------|---------|---------|----------|---------|---------|----------|----------|--------|--------|-------|
| Mov _                  | Dem.    | Aver.   | Level of | AVERAGE | BACK OF | Prop. Et | ffective | Travel | Travel | Aver. |
| <sub>ID</sub> Crossing | Flow    | Delay   | Service  | QUE     | EUE     | Que      | Stop     | Time   | Dist.  | Speed |
|                        |         |         |          | [Ped    | Dist ]  |          | Rate     |        |        |       |
|                        | ped/h   | sec     |          | ped     | m       |          |          | sec    | m      | m/sec |
| SouthWest: Lond        | onderry | Road    |          |         |         |          |          |        |        |       |
| P1 Full                | 158     | 12.1    | LOS B    | 0.1     | 0.1     | 0.83     | 0.83     | 172.6  | 208.6  | 1.21  |
| All Pedestrians        | 158     | 12.1    | LOS B    | 0.1     | 0.1     | 0.83     | 0.83     | 172.6  | 208.6  | 1.21  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 1 [Londonderry x Vines 2031 PM WOD (Site Folder: 2031 WOD - N1 (Network: N101 [2031 - PM - WOD - N1 (Network Folder: 2031 WOD - Ped Crs)]

Londonderry Road x Vines Drive

2031: Existing Conditions - Without Development

PM Peak: 15:45-14:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo             | rmanc                            | e                 |                         |                       |                     |                   |                              |                      |                             |                      |                        |
|-----------|----------|----------------------------------|-------------------|----------------------------------|-------------------|-------------------------|-----------------------|---------------------|-------------------|------------------------------|----------------------|-----------------------------|----------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |                   | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV]         | Deg.<br>Satn<br>v/c     | Aver.<br>Delay<br>sec | Level of<br>Service |                   | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que         | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles   | Aver.<br>Speed<br>km/h |
| South     | nEast: V | 'ines Driv                       | ⁄e                |                                  |                   |                         |                       |                     |                   |                              |                      |                             |                      |                        |
| 21<br>23  | L2<br>R2 | 58<br>66<br>124                  | 0.0<br>9.5<br>5.1 | 58<br>66<br>124                  | 0.0<br>9.5<br>5.1 | 0.261<br>0.261<br>0.261 | 7.6<br>11.3<br>9.6    | LOS A<br>LOS A      | 0.7<br>0.7<br>0.7 | 5.1<br>5.1<br>5.1            | 0.55<br>0.55<br>0.55 | 0.79<br>0.79<br>0.79        | 0.59<br>0.59<br>0.59 | 45.8<br>45.8<br>45.8   |
|           | ıEast: L | ondonde                          | rry Roa           | ad                               |                   |                         |                       |                     |                   |                              |                      |                             |                      |                        |
| 24<br>25  | L2<br>T1 | 34<br>447                        | 0.0<br>3.1        | 34<br>447                        | 0.0<br>3.1        | 0.463<br>0.463          | 2.7<br>0.0            | LOS A<br>LOS A      | 0.0<br>0.0        | 0.0<br>0.0                   | 0.00                 | 0.04<br>0.04                | 0.00                 | 56.2<br>53.7           |
| Appro     |          | 481                              | 2.8               | 481                              | 2.8               | 0.463                   | 0.2                   | NA                  | 0.0               | 0.0                          | 0.00                 | 0.04                        | 0.00                 | 55.1                   |
| South     | nWest: L | _ondonde                         | erry Ro           | ad                               |                   |                         |                       |                     |                   |                              |                      |                             |                      |                        |
| 31        | T1       | 397                              | 3.2               | 397                              | 3.2               | 0.212                   | 0.0                   | LOS A               | 0.0               | 0.3                          | 0.01                 | 0.01                        | 0.01                 | 57.6                   |
| 32        | R2       | 4                                | 0.0               | 4                                | 0.0               | 0.212                   | 5.3                   | LOS A               | 0.0               | 0.3                          | 0.01                 | 0.01                        | 0.01                 | 55.7                   |
| Appro     | oach     | 401                              | 3.1               | 401                              | 3.1               | 0.212                   | 0.1                   | NA                  | 0.0               | 0.3                          | 0.01                 | 0.01                        | 0.01                 | 57.4                   |
| All Ve    | ehicles  | 1006                             | 3.2               | 1006                             | 3.2               | 0.463                   | 1.3                   | NA                  | 0.7               | 5.1                          | 0.07                 | 0.12                        | 0.08                 | 49.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**V** Site: 2 [Londonderry x Southee 2031 PM WOD (Site Folder: 2031 Without Development - Ped Crs)]

■■ Network: N101 [2031 - PM - WOD - N1 (Network Folder: 2031 WOD - Ped Crs)]

Londonderry Road x Southee Road

2031: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mc   | vement                  | Perfo     | rmanc                   | e         |              |       |                     |              |                         |              |                             |                    |                |
|-----------|----------|-------------------------|-----------|-------------------------|-----------|--------------|-------|---------------------|--------------|-------------------------|--------------|-----------------------------|--------------------|----------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total | WS<br>HV] | ARRI<br>FLO'<br>[ Total | WS<br>HV] | Deg.<br>Satn | Delay | Level of<br>Service | QU<br>[ Veh. | ACK OF<br>EUE<br>Dist ] | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed |
|           |          | veh/h                   | %         | veh/h                   | %         | v/c          | sec   |                     | veh          | m                       |              |                             |                    | km/h           |
| North     | ıEast: L | ondonde                 | rry Roa   | ad                      |           |              |       |                     |              |                         |              |                             |                    |                |
| 25        | T1       | 381                     | 3.0       | 381                     | 3.0       | 0.266        | 0.7   | LOS A               | 8.0          | 5.9                     | 0.23         | 0.11                        | 0.23               | 53.1           |
| 26        | R2       | 73                      | 1.4       | 73                      | 1.4       | 0.266        | 7.9   | LOS A               | 8.0          | 5.9                     | 0.23         | 0.11                        | 0.23               | 54.7           |
| Appro     | oach     | 454                     | 2.8       | 454                     | 2.8       | 0.266        | 1.8   | NA                  | 0.8          | 5.9                     | 0.23         | 0.11                        | 0.23               | 53.7           |
| North     | West:    | Southee F               | Road      |                         |           |              |       |                     |              |                         |              |                             |                    |                |
| 27        | L2       | 34                      | 0.0       | 34                      | 0.0       | 0.216        | 6.6   | LOS A               | 0.7          | 5.3                     | 0.53         | 0.77                        | 0.54               | 47.8           |
| 29        | R2       | 100                     | 2.1       | 100                     | 2.1       | 0.216        | 10.9  | LOS A               | 0.7          | 5.3                     | 0.53         | 0.77                        | 0.54               | 45.5           |
| Appro     | oach     | 134                     | 1.6       | 134                     | 1.6       | 0.216        | 9.8   | LOS A               | 0.7          | 5.3                     | 0.53         | 0.77                        | 0.54               | 46.2           |
| South     | nWest:   | Londonde                | erry Ro   | ad                      |           |              |       |                     |              |                         |              |                             |                    |                |
| 30        | L2       | 177                     | 4.8       | 177                     | 4.8       | 0.248        | 2.7   | LOS A               | 0.0          | 0.0                     | 0.00         | 0.21                        | 0.00               | 54.8           |
| 31        | T1       | 285                     | 3.7       | 285                     | 3.7       | 0.248        | 0.0   | LOS A               | 0.0          | 0.0                     | 0.00         | 0.21                        | 0.00               | 56.3           |
| Appro     | oach     | 462                     | 4.1       | 462                     | 4.1       | 0.248        | 1.0   | NA                  | 0.0          | 0.0                     | 0.00         | 0.21                        | 0.00               | 55.4           |
| All Ve    | ehicles  | 1049                    | 3.2       | 1049                    | 3.2       | 0.266        | 2.5   | NA                  | 0.8          | 5.9                     | 0.17         | 0.24                        | 0.17               | 52.7           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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★ Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - PM WOD (Site Folder: 2031 Without Development - Ped Crs)]

**■** Network: N101 [2031 - PM -WOD - N1 (Network Folder: 2031 WOD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmanc                            | e:        |                     |     |                     |     |                              |              |                             |                     |                        |
|-----------|----------|----------------------------------|---------|----------------------------------|-----------|---------------------|-----|---------------------|-----|------------------------------|--------------|-----------------------------|---------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service |     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | Aver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ad                               |           |                     |     |                     |     |                              |              |                             |                     |                        |
| 8         | T1       | 505                              | 2.7     | 505                              | 2.7       | * 0.598             | 8.4 | LOS A               | 6.6 | 47.6                         | 0.79         | 0.69                        | 0.79                | 47.6                   |
| Appro     | oach     | 505                              | 2.7     | 505                              | 2.7       | 0.598               | 8.4 | LOS A               | 6.6 | 47.6                         | 0.79         | 0.69                        | 0.79                | 47.6                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                               |           |                     |     |                     |     |                              |              |                             |                     |                        |
| 1         | T1       | 401                              | 3.1     | 401                              | 3.1       | 0.476               | 7.8 | LOS A               | 4.9 | 35.2                         | 0.74         | 0.63                        | 0.74                | 47.8                   |
| Appro     | oach     | 401                              | 3.1     | 401                              | 3.1       | 0.476               | 7.8 | LOS A               | 4.9 | 35.2                         | 0.74         | 0.63                        | 0.74                | 47.8                   |
| All Ve    | ehicles  | 906                              | 2.9     | 906                              | 2.9       | 0.598               | 8.2 | LOSA                | 6.6 | 47.6                         | 0.77         | 0.66                        | 0.77                | 47.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mov  | vement  | Perforr | nance   |         |        |          |      |        |        |       |
|-----------------|---------|---------|---------|---------|--------|----------|------|--------|--------|-------|
| Mov             | Dem.    | Aver.   |         | AVERAGE |        | Prop. Et |      | Travel | Travel | Aver. |
| ID Crossing     | Flow    | Delay   | Service | QUE     |        | Que      | Stop | Time   | Dist.  | Speed |
|                 | 1.0     |         |         | [ Ped   | Dist ] |          | Rate |        |        | ,     |
|                 | ped/h   | sec     |         | ped     | m      |          |      | sec    | m      | m/sec |
| SouthWest: Lond | onderry | Road    |         |         |        |          |      |        |        |       |
| P1 Full         | 158     | 11.6    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.1  | 208.6  | 1.21  |
| All Pedestrians | 158     | 11.6    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.1  | 208.6  | 1.21  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 1 [Londonderry x Vines 2031 AM WD (Site Folder: 2031 With Development - Ped Crs)]

■■ Network: N101 [2031 - AM - WD - N1 (Network Folder: 2031 WD - Ped Crs)]

Londonderry Road x Vines Drive 2031: Future Growth + School AM Peak: 8:15-9:15

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | е         |                     |                       |                     |     |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|-----|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: V | 'ines Driv                       | ⁄e      |                                 |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 21        | L2       | 18                               | 0.0     | 18                              | 0.0       | 0.090               | 6.7                   | LOS A               | 0.3 | 2.3                          | 0.52         | 0.74                        | 0.52               | 45.2                   |
| 23        | R2       | 33                               | 19.4    | 33                              | 19.4      | 0.090               | 12.1                  | LOS A               | 0.3 | 2.3                          | 0.52         | 0.74                        | 0.52               | 45.2                   |
| Appro     | oach     | 51                               | 12.5    | 51                              | 12.5      | 0.090               | 10.2                  | LOS A               | 0.3 | 2.3                          | 0.52         | 0.74                        | 0.52               | 45.2                   |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 24        | L2       | 119                              | 1.8     | 119                             | 1.8       | 0.236               | 2.7                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.15                        | 0.00               | 55.5                   |
| 25        | T1       | 323                              | 3.6     | 323                             | 3.6       | 0.236               | 0.0                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.15                        | 0.00               | 43.2                   |
| Appro     | oach     | 442                              | 3.1     | 442                             | 3.1       | 0.236               | 0.7                   | NA                  | 0.0 | 0.0                          | 0.00         | 0.15                        | 0.00               | 53.4                   |
| South     | nWest: I | ondond                           | erry Ro | ad                              |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 31        | T1       | 443                              | 2.1     | 443                             | 2.1       | 0.328               | 0.9                   | LOS A               | 1.2 | 8.3                          | 0.24         | 0.13                        | 0.26               | 34.5                   |
| 32        | R2       | 111                              | 0.0     | 111                             | 0.0       | 0.328               | 5.4                   | LOS A               | 1.2 | 8.3                          | 0.24         | 0.13                        | 0.26               | 53.2                   |
| Appro     | oach     | 554                              | 1.7     | 554                             | 1.7       | 0.328               | 1.8                   | NA                  | 1.2 | 8.3                          | 0.24         | 0.13                        | 0.26               | 47.3                   |
| All Ve    | hicles   | 1046                             | 2.8     | 1046                            | 2.8       | 0.328               | 1.7                   | NA                  | 1.2 | 8.3                          | 0.15         | 0.17                        | 0.16               | 49.3                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2031 AM WD (Site Folder: 2031 With Development - Ped Crs)]

■■ Network: N101 [2031 - AM - WD - N1 (Network Folder: 2031 WD - Ped Crs)]

Londonderry Road x Southee Road 2031: Future Growth + School AM Peak: 8:15-9:15 Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                          | :e        |                     |                       |                     |     |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|--------------------------------|-----------|---------------------|-----------------------|---------------------|-----|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ıd                             |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 25        | T1       | 232                              | 4.1     | 232                            | 4.1       | 0.138               | 0.3                   | LOS A               | 0.2 | 1.4                          | 0.10         | 0.04                        | 0.10               | 56.9                   |
| 26        | R2       | 17                               | 6.3     | 17                             | 6.3       | 0.138               | 7.8                   | LOS A               | 0.2 | 1.4                          | 0.10         | 0.04                        | 0.10               | 55.6                   |
| Appro     | oach     | 248                              | 4.2     | 248                            | 4.2       | 0.138               | 8.0                   | NA                  | 0.2 | 1.4                          | 0.10         | 0.04                        | 0.10               | 56.7                   |
| North     | West: S  | Southee F                        | Road    |                                |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 27        | L2       | 42                               | 5.0     | 42                             | 5.0       | 0.359               | 7.8                   | LOS A               | 1.6 | 11.4                         | 0.57         | 0.86                        | 0.72               | 47.1                   |
| 29        | R2       | 209                              | 1.0     | 209                            | 1.0       | 0.359               | 10.3                  | LOS A               | 1.6 | 11.4                         | 0.57         | 0.86                        | 0.72               | 45.4                   |
| Appro     | oach     | 252                              | 1.7     | 252                            | 1.7       | 0.359               | 9.9                   | LOS A               | 1.6 | 11.4                         | 0.57         | 0.86                        | 0.72               | 45.8                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                             |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 30        | L2       | 123                              | 1.7     | 123                            | 1.7       | 0.252               | 2.7                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 31        | T1       | 353                              | 3.6     | 353                            | 3.6       | 0.252               | 0.0                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 57.3                   |
| Appro     | oach     | 476                              | 3.1     | 476                            | 3.1       | 0.252               | 0.7                   | NA                  | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 56.6                   |
| All Ve    | hicles   | 976                              | 3.0     | 976                            | 3.0       | 0.359               | 3.1                   | NA                  | 1.6 | 11.4                         | 0.17         | 0.30                        | 0.21               | 52.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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★ Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - AM WD (Site Folder: 2031 With Development - Ped Crs)]

**■■** Network: N101 [2031 - AM -WD - N1 (Network Folder: 2031 WD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | e:        |                     |     |                     |                                |      |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----|---------------------|--------------------------------|------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 8         | T1       | 341                              | 3.4     | 341                             | 3.4       | 0.391               | 7.3 | LOS A               | 4.0                            | 28.7 | 0.69         | 0.58                        | 0.69               | 49.0                   |
| Appro     | oach     | 341                              | 3.4     | 341                             | 3.4       | 0.391               | 7.3 | LOS A               | 4.0                            | 28.7 | 0.69         | 0.58                        | 0.69               | 49.0                   |
| South     | nWest: L | ondond                           | erry Ro | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 1         | T1       | 554                              | 1.7     | 554                             | 1.7       | <b>*</b> 0.628      | 8.4 | LOS A               | 7.5                            | 53.2 | 0.80         | 0.69                        | 0.80               | 47.0                   |
| Appro     | oach     | 554                              | 1.7     | 554                             | 1.7       | 0.628               | 8.4 | LOS A               | 7.5                            | 53.2 | 0.80         | 0.69                        | 0.80               | 47.0                   |
| All Ve    | ehicles  | 895                              | 2.4     | 895                             | 2.4       | 0.628               | 8.0 | LOSA                | 7.5                            | 53.2 | 0.75         | 0.65                        | 0.75               | 47.8                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mov  | vement  | Perforr | nance   |         |        |          |      |        |        |       |
|-----------------|---------|---------|---------|---------|--------|----------|------|--------|--------|-------|
| Mov             | Dem.    | Aver.   |         | AVERAGE |        | Prop. Et |      | Travel | Travel | Aver. |
| ID Crossing     | Flow    | Delay   | Service | QUE     |        | Que      | Stop | Time   | Dist.  | Speed |
|                 | 1.0     |         |         | [ Ped   | Dist ] |          | Rate |        |        | ,     |
|                 | ped/h   | sec     |         | ped     | m      |          |      | sec    | m      | m/sec |
| SouthWest: Lond | onderry | Road    |         |         |        |          |      |        |        |       |
| P1 Full         | 158     | 12.1    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.6  | 208.6  | 1.21  |
| All Pedestrians | 158     | 12.1    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.6  | 208.6  | 1.21  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 1 [Londonderry x Vines 2031 PM WD (Site Folder: 2031 With Development - Ped Crs)]

WD - N1 (Network Folder: 2031

WD - Ped Crs)]

Londonderry Road x Vines Drive 2031: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo      | rmanc                            | :e        |                     |                       |                     |            |                               |              |                             |                    |                        |
|-----------|----------|----------------------------------|------------|----------------------------------|-----------|---------------------|-----------------------|---------------------|------------|-------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>JEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: \ | /ines Driv                       | ⁄e         |                                  |           |                     |                       |                     |            |                               |              |                             |                    |                        |
| 21<br>23  | L2<br>R2 | 71<br>72                         | 0.0<br>8.8 | 71<br>72                         | 0.0       | 0.309<br>0.309      | 7.9<br>11.7           | LOS A<br>LOS A      | 0.8<br>0.8 | 6.0<br>6.0                    | 0.55<br>0.55 | 0.81<br>0.81                | 0.63<br>0.63       | 45.6<br>45.6           |
| Appro     | oach     | 142                              | 4.4        | 142                              | 4.4       | 0.309               | 9.8                   | LOS A               | 8.0        | 6.0                           | 0.55         | 0.81                        | 0.63               | 45.6                   |
| North     | East: L  | ondonde                          | rry Roa    | ıd                               |           |                     |                       |                     |            |                               |              |                             |                    |                        |
| 24        | L2       | 36                               | 0.0        | 36                               | 0.0       | 0.253               | 2.7                   | LOS A               | 0.0        | 0.0                           | 0.00         | 0.04                        | 0.00               | 56.5                   |
| 25        | T1       | 447                              | 3.1        | 447                              | 3.1       | 0.253               | 0.0                   | LOS A               | 0.0        | 0.0                           | 0.00         | 0.04                        | 0.00               | 53.8                   |
| Appro     | oach     | 483                              | 2.8        | 483                              | 2.8       | 0.253               | 0.2                   | NA                  | 0.0        | 0.0                           | 0.00         | 0.04                        | 0.00               | 55.4                   |
| South     | nWest:   | Londonde                         | erry Ro    | ad                               |           |                     |                       |                     |            |                               |              |                             |                    |                        |
| 31        | T1       | 395                              | 3.2        | 395                              | 3.2       | 0.216               | 0.1                   | LOS A               | 0.1        | 8.0                           | 0.03         | 0.01                        | 0.03               | 54.4                   |
| 32        | R2       | 11                               | 0.0        | 11                               | 0.0       | 0.216               | 5.3                   | LOS A               | 0.1        | 8.0                           | 0.03         | 0.01                        | 0.03               | 55.5                   |
| Appro     | oach     | 405                              | 3.1        | 405                              | 3.1       | 0.216               | 0.2                   | NA                  | 0.1        | 0.8                           | 0.03         | 0.01                        | 0.03               | 54.7                   |
| All Ve    | ehicles  | 1031                             | 3.2        | 1031                             | 3.2       | 0.309               | 1.5                   | NA                  | 0.8        | 6.0                           | 0.09         | 0.14                        | 0.10               | 49.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2031 PM WD (Site Folder: 2031 With Development - Ped Crs)]

■■ Network: N101 [2031 - PM - WD - N1 (Network Folder: 2031 WD - Ped Crs)]

Londonderry Road x Southee Road 2031: Future Growth + School PM Peak: 15:45-14:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo      | rmanc                           | :e         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa    | ıd                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 25<br>26  | T1<br>R2 | 383<br>73                        | 3.0<br>1.4 | 383<br>73                       | 3.0<br>1.4 | 0.275<br>0.275      | 0.7<br>8.0            | LOS A<br>LOS A      | 0.8<br>0.8 | 5.9<br>5.9                   | 0.23<br>0.23 | 0.11<br>0.11                | 0.23<br>0.23       | 53.1<br>54.6           |
| Appro     | oach     | 456                              | 2.8        | 456                             | 2.8        | 0.275               | 1.8                   | NA                  | 0.8        | 5.9                          | 0.23         | 0.11                        | 0.23               | 53.7                   |
| North     | West: S  | Southee F                        | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 27        | L2       | 34                               | 0.0        | 34                              | 0.0        | 0.223               | 6.7                   | LOS A               | 8.0        | 5.4                          | 0.53         | 0.78                        | 0.55               | 47.7                   |
| 29        | R2       | 100                              | 2.1        | 100                             | 2.1        | 0.223               | 11.0                  | LOS A               | 8.0        | 5.4                          | 0.53         | 0.78                        | 0.55               | 45.4                   |
| Appro     | oach     | 134                              | 1.6        | 134                             | 1.6        | 0.223               | 9.9                   | LOS A               | 0.8        | 5.4                          | 0.53         | 0.78                        | 0.55               | 46.1                   |
| South     | nWest:   | Londonde                         | erry Ro    | ad                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30        | L2       | 179                              | 4.7        | 179                             | 4.7        | 0.251               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 54.8                   |
| 31        | T1       | 288                              | 3.6        | 288                             | 3.6        | 0.251               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 56.3                   |
| Appro     | oach     | 467                              | 4.1        | 467                             | 4.1        | 0.251               | 1.0                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 55.4                   |
| All Ve    | ehicles  | 1057                             | 3.2        | 1057                            | 3.2        | 0.275               | 2.5                   | NA                  | 0.8        | 5.9                          | 0.17         | 0.24                        | 0.17               | 52.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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★ Site: 1 [Pedestrian Crossing (Signals) Two-Way L NSW - PM WD (Site Folder: 2031 With Development - Ped Crs)]

**■** Network: N101 [2031 - PM -WD - N1 (Network Folder: 2031 WD - Ped Crs)]

Signalised pedestrian crossing across one-way road

Site Category: (None)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | e:        |                     |     |                     |                                |      |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----|---------------------|--------------------------------|------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c |     | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |      | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 8         | T1       | 518                              | 2.6     | 518                             | 2.6       | <b>*</b> 0.591      | 8.2 | LOS A               | 6.8                            | 49.0 | 0.78         | 0.68                        | 0.78               | 47.8                   |
| Appro     | oach     | 518                              | 2.6     | 518                             | 2.6       | 0.591               | 8.2 | LOS A               | 6.8                            | 49.0 | 0.78         | 0.68                        | 0.78               | 47.8                   |
| South     | nWest: L | ondond                           | erry Ro | ad                              |           |                     |     |                     |                                |      |              |                             |                    |                        |
| 1         | T1       | 405                              | 3.1     | 405                             | 3.1       | 0.464               | 7.6 | LOS A               | 5.0                            | 35.6 | 0.72         | 0.61                        | 0.72               | 48.1                   |
| Appro     | oach     | 405                              | 3.1     | 405                             | 3.1       | 0.464               | 7.6 | LOS A               | 5.0                            | 35.6 | 0.72         | 0.61                        | 0.72               | 48.1                   |
| All Ve    | hicles   | 923                              | 2.9     | 923                             | 2.9       | 0.591               | 8.0 | LOS A               | 6.8                            | 49.0 | 0.75         | 0.65                        | 0.75               | 47.9                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Mov  | vement  | Perforr | nance   |         |        |          |      |        |        |       |
|-----------------|---------|---------|---------|---------|--------|----------|------|--------|--------|-------|
| Mov             | Dem.    | Aver.   |         | AVERAGE |        | Prop. Et |      | Travel | Travel | Aver. |
| ID Crossing     | Flow    | Delay   | Service | QUE     |        | Que      | Stop | Time   | Dist.  | Speed |
|                 | 1.0     |         |         | [ Ped   | Dist ] |          | Rate |        |        | ,     |
|                 | ped/h   | sec     |         | ped     | m      |          |      | sec    | m      | m/sec |
| SouthWest: Lond | onderry | Road    |         |         |        |          |      |        |        |       |
| P1 Full         | 158     | 12.1    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.6  | 208.6  | 1.21  |
| All Pedestrians | 158     | 12.1    | LOS B   | 0.1     | 0.1    | 0.83     | 0.83 | 172.6  | 208.6  | 1.21  |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Site: 3 [Paget x Lennox 2031 AM WOD (Site Folder: 2031 Without Development - Ped Crs)]

WOD (Network Folder: 2031 WOD - Ped Crs)]

**■■** Network: N101 [2031 - AM -

Paget Street x Lennox Street

2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 30 seconds (Network Practical Cycle Time)

| Vehi   | cle Mo   | vement         | Perfo     | rmano        | :e  |                |       |          |               |        |       |              |        |       |
|--------|----------|----------------|-----------|--------------|-----|----------------|-------|----------|---------------|--------|-------|--------------|--------|-------|
| Mov    | Turn     | DEMA           |           | ARRI         |     | Deg.           |       | Level of | 95% BA        |        | Prop. | EffectiveA   |        | Aver. |
| ID     |          | FLO\<br>[Total | WS<br>HV1 | FLO<br>Total |     | Satn           | Delay | Service  | QUE<br>[ Veh. | Dist ] | Que   | Stop<br>Rate | Cycles | Speed |
|        |          | veh/h          | %         | veh/h        |     | v/c            | sec   |          | veh           | m      |       | 1 1010       |        | km/h  |
| South  | h: Paget | t Street       |           |              |     |                |       |          |               |        |       |              |        |       |
| 1      | L2       | 93             | 4.5       | 93           | 4.5 | 0.257          | 18.1  | LOS B    | 1.2           | 9.1    | 0.88  | 0.75         | 0.88   | 41.9  |
| 2      | T1       | 182            | 5.2       | 182          | 5.2 | * 0.666        | 14.1  | LOS A    | 3.6           | 26.0   | 0.97  | 0.87         | 1.17   | 44.0  |
| 3      | R2       | 44             | 7.1       | 44           | 7.1 | 0.666          | 19.7  | LOS B    | 3.6           | 26.0   | 0.97  | 0.87         | 1.17   | 40.3  |
| Appr   | oach     | 319            | 5.3       | 319          | 5.3 | 0.666          | 16.0  | LOS B    | 3.6           | 26.0   | 0.94  | 0.83         | 1.09   | 42.9  |
| East:  | Lennox   | Street         |           |              |     |                |       |          |               |        |       |              |        |       |
| 4      | L2       | 15             | 0.0       | 15           | 0.0 | 0.250          | 9.1   | LOS A    | 1.0           | 7.6    | 0.38  | 0.34         | 0.38   | 54.5  |
| 5      | T1       | 442            | 6.4       | 442          | 6.4 | 0.677          | 5.7   | LOS A    | 4.3           | 31.7   | 0.60  | 0.56         | 0.65   | 51.4  |
| 6      | R2       | 106            | 2.0       | 106          | 2.0 | <b>*</b> 0.677 | 12.4  | LOS A    | 4.3           | 31.7   | 0.74  | 0.71         | 0.82   | 46.5  |
| Appr   | oach     | 563            | 5.4       | 563          | 5.4 | 0.677          | 7.1   | LOS A    | 4.3           | 31.7   | 0.62  | 0.59         | 0.67   | 50.6  |
| North  | n: Paget | Street         |           |              |     |                |       |          |               |        |       |              |        |       |
| 7      | L2       | 42             | 0.0       | 42           | 0.0 | 0.113          | 16.6  | LOS B    | 0.5           | 3.8    | 0.85  | 0.70         | 0.85   | 23.5  |
| 8      | T1       | 99             | 1.1       | 99           | 1.1 | 0.390          | 12.4  | LOS A    | 1.8           | 12.8   | 0.91  | 0.73         | 0.91   | 39.5  |
| 9      | R2       | 28             | 7.4       | 28           | 7.4 | 0.390          | 17.0  | LOS B    | 1.8           | 12.8   | 0.91  | 0.73         | 0.91   | 34.6  |
| Appr   | oach     | 169            | 1.9       | 169          | 1.9 | 0.390          | 14.2  | LOS A    | 1.8           | 12.8   | 0.89  | 0.72         | 0.89   | 36.5  |
| West   | :: Lenno | x Street       |           |              |     |                |       |          |               |        |       |              |        |       |
| 10     | L2       | 93             | 1.1       | 93           | 1.1 | 0.474          | 13.7  | LOS A    | 4.1           | 29.5   | 0.78  | 0.70         | 0.78   | 42.7  |
| 11     | T1       | 515            | 5.7       | 515          | 5.7 | 0.474          | 7.9   | LOS A    | 4.1           | 29.5   | 0.78  | 0.69         | 0.78   | 38.7  |
| 12     | R2       | 48             | 6.5       | 48           | 6.5 | 0.474          | 13.3  | LOS A    | 3.5           | 25.6   | 0.78  | 0.68         | 0.78   | 48.8  |
| Appr   | oach     | 656            | 5.1       | 656          | 5.1 | 0.474          | 9.1   | LOS A    | 4.1           | 29.5   | 0.78  | 0.69         | 0.78   | 40.9  |
| All Ve | ehicles  | 1707           | 4.9       | 1707         | 4.9 | 0.677          | 10.3  | LOSA     | 4.3           | 31.7   | 0.77  | 0.69         | 0.81   | 44.4  |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian N       | /lovement    | Perforr        | nance               |                         |     |                |                          |                |                 |                |
|--------------------|--------------|----------------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID Crossing | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|                    | ped/h        | sec            |                     | ped                     | m - |                |                          | sec            | m               | m/sec          |
| South: Paget S     | Street       |                |                     |                         |     |                |                          |                |                 |                |
| P1 Full            | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| East: Lennox S     | Street       |                |                     |                         |     |                |                          |                |                 |                |
| P2 Full            | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| North: Paget S     | Street       |                |                     |                         |     |                |                          |                |                 |                |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Site: 4 [Blacktown x Bourke 2031 AM WOD (Site Folder: 2031 Without Development - Ped Crs)] WOD (Network: N101 [2031 - AM - WOD (Network Folder: 2031 WOD - Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street 2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 30 seconds (Network Practical Cycle Time)

| Vehic  | cle Mo  | vement         | Perfo     | rmano        | :e   |                |       |          |               |               |       |              |        |       |
|--------|---------|----------------|-----------|--------------|------|----------------|-------|----------|---------------|---------------|-------|--------------|--------|-------|
| Mov    | Turn    | DEMA           |           | ARRI         |      | Deg.           |       | Level of | 95% BA        |               | Prop. | EffectiveA   |        | Aver. |
| ID     |         | FLO\<br>[Total | ws<br>HV1 | FLO<br>Total |      | Satn           | Delay | Service  | QUE<br>[ Veh. | :UE<br>Dist ] | Que   | Stop<br>Rate | Cycles | Speed |
|        |         | veh/h          | пv ј<br>% | veh/h        |      | v/c            | sec   |          | veh           | m m           |       | Nate         |        | km/h  |
| South  | : Bourk | e Street       |           |              |      |                |       |          |               |               |       |              |        |       |
| 1      | L2      | 1              | 0.0       | 1            | 0.0  | <b>*</b> 0.114 | 16.9  | LOS B    | 0.6           | 3.9           | 0.82  | 0.61         | 0.82   | 36.1  |
| 2      | T1      | 145            | 1.4       | 145          | 1.4  | 0.351          | 11.8  | LOS A    | 1.7           | 11.9          | 0.88  | 0.68         | 0.88   | 42.9  |
| 3b     | R3      | 19             | 5.6       | 19           | 5.6  | 0.351          | 18.6  | LOS B    | 1.7           | 11.9          | 0.90  | 0.72         | 0.90   | 32.9  |
| Appro  | ach     | 165            | 1.9       | 165          | 1.9  | 0.351          | 12.6  | LOS A    | 1.7           | 11.9          | 0.88  | 0.69         | 0.88   | 42.0  |
| South  | East: E | Blacktown      | Road      |              |      |                |       |          |               |               |       |              |        |       |
| 21b    | L3      | 19             | 11.1      | 19           | 11.1 | 0.331          | 16.2  | LOS B    | 2.2           | 16.0          | 0.82  | 0.75         | 0.82   | 43.8  |
| 21a    | L1      | 513            | 6.6       | 513          | 6.6  | 0.916          | 24.1  | LOS B    | 11.4          | 83.5          | 0.94  | 1.11         | 1.58   | 33.9  |
| 23a    | R1      | 153            | 2.8       | 153          | 2.8  | <b>*</b> 0.916 | 28.3  | LOS B    | 11.4          | 83.5          | 1.00  | 1.27         | 1.92   | 36.1  |
| Appro  | ach     | 684            | 5.8       | 684          | 5.8  | 0.916          | 24.8  | LOS B    | 11.4          | 83.5          | 0.95  | 1.14         | 1.63   | 34.8  |
| North  | Bourk   | e Street       |           |              |      |                |       |          |               |               |       |              |        |       |
| 7a     | L1      | 133            | 2.4       | 133          | 2.4  | 0.353          | 17.8  | LOS B    | 1.8           | 13.0          | 0.90  | 0.76         | 0.90   | 29.0  |
| 8      | T1      | 123            | 4.3       | 123          | 4.3  | 0.588          | 13.4  | LOS A    | 2.9           | 21.0          | 0.95  | 0.82         | 1.06   | 40.1  |
| 9      | R2      | 68             | 4.6       | 68           | 4.6  | 0.588          | 19.0  | LOS B    | 2.9           | 21.0          | 0.95  | 0.82         | 1.06   | 30.6  |
| Appro  | ach     | 324            | 3.6       | 324          | 3.6  | 0.588          | 16.4  | LOS B    | 2.9           | 21.0          | 0.93  | 0.79         | 0.99   | 34.5  |
| West:  | Lenno   | x Street       |           |              |      |                |       |          |               |               |       |              |        |       |
| 10     | L2      | 132            | 2.4       | 132          | 2.4  | 0.250          | 13.5  | LOS A    | 2.2           | 15.5          | 0.81  | 0.76         | 0.81   | 43.9  |
| 12a    | R1      | 515            | 5.3       | 515          | 5.3  | 0.633          | 13.6  | LOS A    | 6.4           | 47.1          | 0.91  | 0.84         | 0.95   | 39.1  |
| 12     | R2      | 4              | 0.0       | 4            | 0.0  | 0.633          | 14.9  | LOS B    | 6.4           | 47.1          | 0.93  | 0.85         | 0.97   | 43.5  |
| Appro  | ach     | 651            | 4.7       | 651          | 4.7  | 0.633          | 13.6  | LOS A    | 6.4           | 47.1          | 0.89  | 0.82         | 0.92   | 40.4  |
| All Ve | hicles  | 1824           | 4.7       | 1824         | 4.7  | 0.916          | 18.2  | LOS B    | 11.4          | 83.5          | 0.92  | 0.92         | 1.20   | 37.1  |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pec       | lestrian Mov   | vement       | Perforn        | nance               |                         |     |                |                          |                |                 |                |
|-----------|----------------|--------------|----------------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID | Crossing       | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|           |                | ped/h        | sec            |                     | ped                     | m - |                |                          | sec            | m               | m/sec          |
| Sou       | th: Bourke Sti | reet         |                |                     |                         |     |                |                          |                |                 |                |
| P1        | Full           | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| Sou       | thEast: Black  | town Ro      | ad             |                     |                         |     |                |                          |                |                 |                |
| P5        | Full           | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| Nor       | th: Bourke Str | eet          |                |                     |                         |     |                |                          |                |                 |                |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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**▽** Site: 5 [Blacktown x Campus 2031 AM WOD (Site Folder: 2031 Without Development - Ped Crs)]

WOD (Network Folder: 2031 WOD - Ped Crs)]

**■■** Network: N101 [2031 - AM -

Blacktown Road x Campus Drive

2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo      | rmanc                           | e:         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: B | lacktown                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>22  | L2<br>T1 | 102<br>684                       | 2.1<br>6.2 | 102<br>684                      | 2.1<br>6.2 | 0.056<br>0.365      | 7.0<br>0.1            | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.0                   | 0.00<br>0.00 | 0.63<br>0.00                | 0.00               | 64.7<br>79.7           |
| Appro     | oach     | 786                              | 5.6        | 786                             | 5.6        | 0.365               | 1.0                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.08                        | 0.00               | 75.7                   |
| North     | West: E  | Blacktowr                        | n Road     |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 28        | T1       | 615                              | 4.6        | 615                             | 4.6        | 0.327               | 0.1                   | LOSA                | 0.0        | 0.0                          | 0.00         | 0.00                        | 0.00               | 79.8                   |
| 29        | R2       | 55                               | 1.9        | 55                              | 1.9        | 0.104               | 12.5                  | LOS A               | 0.3        | 2.2                          | 0.66         | 0.88                        | 0.66               | 53.9                   |
| Appro     | oach     | 669                              | 4.4        | 669                             | 4.4        | 0.327               | 1.1                   | NA                  | 0.3        | 2.2                          | 0.05         | 0.07                        | 0.05               | 76.7                   |
| South     | nWest: ( | Campus I                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30        | L2       | 8                                | 0.0        | 8                               | 0.0        | 0.150               | 7.1                   | LOS A               | 0.4        | 3.2                          | 0.00         | 0.58                        | 0.00               | 31.9                   |
| 32        | R2       | 16                               | 6.7        | 16                              | 6.7        | 0.150               | 40.2                  | LOS C               | 0.4        | 3.2                          | 0.00         | 0.58                        | 0.00               | 42.4                   |
| Appro     | oach     | 24                               | 4.3        | 24                              | 4.3        | 0.150               | 28.7                  | LOS C               | 0.4        | 3.2                          | 0.00         | 0.58                        | 0.00               | 39.6                   |
| All Ve    | ehicles  | 1480                             | 5.0        | 1480                            | 5.0        | 0.365               | 1.5                   | NA                  | 0.4        | 3.2                          | 0.02         | 0.09                        | 0.02               | 75.1                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 3 [Paget x Lennox 2031 PM WOD (Site Folder: 2031 Without Development - Ped Crs)]

WOD (Network Folder: 2031

**■■** Network: N101 [2031 - PM -

WOD - Ped Crs)]

Paget Street x Lennox Street

2031: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 30 seconds (Network Practical Cycle Time)

| Vehi  | icle Mo  | vement         | Perfo     | rmano         | :e  |                |       |          |               |        |       |              |        |       |
|-------|----------|----------------|-----------|---------------|-----|----------------|-------|----------|---------------|--------|-------|--------------|--------|-------|
| Mov   | Turn     | DEMA           |           | ARRI          |     | Deg.           |       | Level of | 95% BA        |        | Prop. | EffectiveA   |        | Aver. |
| ID    |          | FLO\<br>[Total | ws<br>HV1 | FLO'<br>Total |     | Satn           | Delay | Service  | QUE<br>[ Veh. | Dist ] | Que   | Stop<br>Rate | Cycles | Speed |
|       |          | veh/h          | %         | veh/h         |     | v/c            | sec   |          | veh           | m      |       | . 15.15      |        | km/h  |
| Sout  | h: Paget | Street         |           |               |     |                |       |          |               |        |       |              |        |       |
| 1     | L2       | 71             | 6.0       | 71            | 6.0 | 0.198          | 18.2  | LOS B    | 0.9           | 6.9    | 0.87  | 0.73         | 0.87   | 41.9  |
| 2     | T1       | 176            | 4.2       | 176           | 4.2 | 0.559          | 13.1  | LOS A    | 2.9           | 20.9   | 0.95  | 0.79         | 1.01   | 45.3  |
| 3     | R2       | 19             | 5.6       | 19            | 5.6 | 0.559          | 18.7  | LOS B    | 2.9           | 20.9   | 0.95  | 0.79         | 1.01   | 41.7  |
| Appr  | oach     | 265            | 4.8       | 265           | 4.8 | 0.559          | 14.8  | LOS B    | 2.9           | 20.9   | 0.92  | 0.77         | 0.97   | 44.1  |
| East  | : Lennox | Street         |           |               |     |                |       |          |               |        |       |              |        |       |
| 4     | L2       | 25             | 4.9       | 25            | 4.9 | 0.293          | 11.6  | LOS A    | 1.7           | 12.5   | 0.53  | 0.47         | 0.53   | 52.3  |
| 5     | T1       | 553            | 3.0       | 553           | 3.0 | 0.795          | 10.2  | LOS A    | 7.2           | 51.7   | 0.77  | 0.75         | 0.94   | 47.1  |
| 6     | R2       | 116            | 0.9       | 116           | 0.9 | <b>*</b> 0.795 | 17.8  | LOS B    | 7.2           | 51.7   | 0.90  | 0.91         | 1.17   | 41.9  |
| Appr  | oach     | 694            | 2.8       | 694           | 2.8 | 0.795          | 11.5  | LOS A    | 7.2           | 51.7   | 0.78  | 0.77         | 0.96   | 46.5  |
| North | n: Paget | Street         |           |               |     |                |       |          |               |        |       |              |        |       |
| 7     | L2       | 99             | 1.1       | 99            | 1.1 | 0.268          | 16.8  | LOS B    | 1.3           | 9.4    | 0.88  | 0.74         | 0.88   | 23.1  |
| 8     | T1       | 196            | 3.2       | 196           | 3.2 | <b>*</b> 0.786 | 16.5  | LOS B    | 4.4           | 31.7   | 1.00  | 1.01         | 1.47   | 37.0  |
| 9     | R2       | 59             | 1.8       | 59            | 1.8 | 0.786          | 21.0  | LOS B    | 4.4           | 31.7   | 1.00  | 1.01         | 1.47   | 31.8  |
| Appr  | oach     | 354            | 2.4       | 354           | 2.4 | 0.786          | 17.3  | LOS B    | 4.4           | 31.7   | 0.97  | 0.94         | 1.30   | 34.0  |
| West  | t: Lenno | x Street       |           |               |     |                |       |          |               |        |       |              |        |       |
| 10    | L2       | 109            | 0.0       | 109           | 0.0 | 0.469          | 13.6  | LOS A    | 4.0           | 29.0   | 0.78  | 0.70         | 0.78   | 42.5  |
| 11    | T1       | 399            | 6.1       | 399           | 6.1 | 0.469          | 8.4   | LOS A    | 4.0           | 29.0   | 0.80  | 0.71         | 0.80   | 36.9  |
| 12    | R2       | 79             | 5.3       | 79            | 5.3 | 0.469          | 14.8  | LOS B    | 3.0           | 21.7   | 0.83  | 0.72         | 0.83   | 46.7  |
| Appr  | oach     | 587            | 4.8       | 587           | 4.8 | 0.469          | 10.2  | LOS A    | 4.0           | 29.0   | 0.80  | 0.71         | 0.80   | 40.5  |
| All V | ehicles  | 1900           | 3.6       | 1900          | 3.6 | 0.795          | 12.7  | LOSA     | 7.2           | 51.7   | 0.84  | 0.78         | 0.98   | 42.1  |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |        |     |                     |                         |     |                |                          |                |                 |                |  |  |  |
|---------------------------------|--------|-----|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|--|--|--|
| Mov<br>ID Crossing              |        |     | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |  |  |  |
|                                 | ped/h  | sec |                     | ped                     | m - |                |                          | sec            | m               | m/sec          |  |  |  |
| South: Paget S                  |        |     |                     |                         |     |                |                          |                |                 |                |  |  |  |
| P1 Full                         | 53     | 9.6 | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |  |  |  |
| East: Lennox S                  | Street |     |                     |                         |     |                |                          |                |                 |                |  |  |  |
| P2 Full                         | 53     | 9.6 | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |  |  |  |
| North: Paget S                  | Street |     |                     |                         |     |                |                          |                |                 |                |  |  |  |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Site: 4 [Blacktown x Bourke 2031 PM WOD (Site Folder: 2031 Without Development - Ped Crs)] WOD (Network: N101 [2031 - PM - WOD (Network Folder: 2031 WOD - Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street

2031: Existing Conditions PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 30 seconds (Network Practical Cycle Time)

| Vehic     | cle Mo   | vement                           | Perfo | rmano                           | е          |                     |      |                     |                                |       |              |                             |                    |                        |
|-----------|----------|----------------------------------|-------|---------------------------------|------------|---------------------|------|---------------------|--------------------------------|-------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |       | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>IHV] | Deg.<br>Satn<br>v/c |      | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |       | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | n: Bourl | ke Street                        | /0    | VEII/II                         | /0         | V/C                 | 360  |                     | Veri                           | - ''' |              |                             |                    | KIII/II                |
| 1         | L2       | 6                                | 0.0   | 6                               | 0.0        | 0.070               | 16.0 | LOS B               | 0.4                            | 2.9   | 0.77         | 0.59                        | 0.77               | 36.5                   |
| 2         | T1       | 89                               | 0.0   | 89                              | 0.0        | 0.214               | 10.4 | LOS A               | 1.1                            | 7.8   | 0.82         | 0.65                        | 0.82               | 43.4                   |
| 3b        | R3       | 26                               | 8.0   | 26                              | 8.0        | 0.214               | 17.2 | LOS B               | 1.1                            | 7.8   | 0.84         | 0.68                        | 0.84               | 33.6                   |
| Appro     | oach     | 122                              | 1.7   | 122                             | 1.7        | 0.214               | 12.1 | LOS A               | 1.1                            | 7.8   | 0.82         | 0.65                        | 0.82               | 41.6                   |
| South     | East: E  | Blacktown                        | Road  |                                 |            |                     |      |                     |                                |       |              |                             |                    |                        |
| 21b       | L3       | 44                               | 4.8   | 44                              | 4.8        | 0.321               | 15.4 | LOS B               | 2.2                            | 16.0  | 0.79         | 0.75                        | 0.79               | 45.0                   |
| 21a       | L1       | 568                              | 2.8   | 568                             | 2.8        | 0.888               | 21.5 | LOS B               | 11.4                           | 81.4  | 0.94         | 1.07                        | 1.45               | 35.5                   |
| 23a       | R1       | 135                              | 2.3   | 135                             | 2.3        | * 0.888             | 24.3 | LOS B               | 11.4                           | 81.4  | 1.00         | 1.18                        | 1.68               | 38.1                   |
| Appro     | oach     | 747                              | 2.8   | 747                             | 2.8        | 0.888               | 21.7 | LOS B               | 11.4                           | 81.4  | 0.94         | 1.07                        | 1.45               | 36.7                   |
| North     | : Bourk  | e Street                         |       |                                 |            |                     |      |                     |                                |       |              |                             |                    |                        |
| 7a        | L1       | 142                              | 0.7   | 142                             | 0.7        | 0.280               | 15.6 | LOS B               | 1.8                            | 12.4  | 0.83         | 0.75                        | 0.83               | 31.0                   |
| 8         | T1       | 225                              | 1.4   | 225                             | 1.4        | 0.747               | 14.0 | LOS A               | 5.3                            | 37.8  | 0.97         | 0.94                        | 1.27               | 39.8                   |
| 9         | R2       | 102                              | 3.1   | 102                             | 3.1        | <b>*</b> 0.747      | 19.6 | LOS B               | 5.3                            | 37.8  | 0.97         | 0.94                        | 1.27               | 30.2                   |
| Appro     | oach     | 469                              | 1.6   | 469                             | 1.6        | 0.747               | 15.7 | LOS B               | 5.3                            | 37.8  | 0.93         | 0.88                        | 1.14               | 36.0                   |
| West      | Lenno    | x Street                         |       |                                 |            |                     |      |                     |                                |       |              |                             |                    |                        |
| 10        | L2       | 76                               | 6.9   | 76                              | 6.9        | 0.252               | 15.6 | LOS B               | 2.0                            | 15.0  | 0.91         | 0.78                        | 0.91               | 42.0                   |
| 12a       | R1       | 466                              | 4.1   | 466                             | 4.1        | 0.637               | 15.7 | LOS B               | 5.9                            | 42.7  | 0.97         | 0.85                        | 1.02               | 37.1                   |
| 12        | R2       | 3                                | 66.7  | 3                               | 66.7       | 0.637               | 18.0 | LOS B               | 5.9                            | 42.7  | 0.99         | 0.87                        | 1.05               | 35.5                   |
| Appro     | oach     | 545                              | 4.8   | 545                             | 4.8        | 0.637               | 15.7 | LOS B               | 5.9                            | 42.7  | 0.97         | 0.84                        | 1.01               | 38.0                   |
| All Ve    | hicles   | 1884                             | 3.0   | 1884                            | 3.0        | 0.888               | 17.8 | LOS B               | 11.4                           | 81.4  | 0.94         | 0.93                        | 1.21               | 37.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestria   | n Movement       | t Perform | nance               |                         |     |                |                          |                |                 |                |
|-------------|------------------|-----------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov         | Crossing Flow De |           | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|             | ped/h            | sec       |                     | ped                     | m   |                |                          | sec            | m               | m/sec          |
| South: Bou  | rke Street       |           |                     |                         |     |                |                          |                |                 |                |
| P1 Full     | 53               | 9.6       | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| SouthEast:  | Blacktown Ro     | oad       |                     |                         |     |                |                          |                |                 |                |
| P5 Full     | 53               | 9.6       | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| North: Bour | ke Street        |           |                     |                         |     |                |                          |                |                 |                |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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**▽** Site: 5 [Blacktown x Campus 2031 PM WOD (Site Folder: 2031 Without Development - Ped Crs)]

WOD - Ped Crs)]

**■** Network: N101 [2031 - PM -

WOD (Network Folder: 2031

Blacktown Road x Campus Drive

2031: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo      | rmanc                           | e:         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: B | lacktown                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>22  | L2<br>T1 | 9<br>698                         | 0.0<br>2.7 | 9<br>698                        | 0.0<br>2.7 | 0.005<br>0.364      | 6.9<br>0.1            | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.0                   | 0.00         | 0.63<br>0.00                | 0.00               | 65.4<br>79.7           |
| Appro     | oach     | 707                              | 2.7        | 707                             | 2.7        | 0.364               | 0.2                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.01                        | 0.00               | 79.3                   |
| North     | West: E  | Blacktowr                        | n Road     |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 28<br>29  | T1<br>R2 | 626<br>7                         | 3.5<br>0.0 | 626<br>7                        | 3.5<br>0.0 | 0.329<br>0.012      | 0.1<br>11.1           | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.2                   | 0.00<br>0.59 | 0.00<br>0.74                | 0.00<br>0.59       | 79.8<br>55.1           |
| Appro     |          | 634                              | 3.5        | 634                             | 3.5        | 0.329               | 0.2                   | NA                  | 0.0        | 0.2                          | 0.01         | 0.74                        | 0.01               | 79.3                   |
| South     | nWest: ( | Campus I                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30        | L2       | 55                               | 0.0        | 55                              | 0.0        | 0.461               | 14.0                  | LOS A               | 2.0        | 14.2                         | 0.00         | 0.58                        | 0.00               | 31.9                   |
| 32        | R2       | 60                               | 0.0        | 60                              | 0.0        | 0.461               | 42.3                  | LOS C               | 2.0        | 14.2                         | 0.00         | 0.58                        | 0.00               | 43.4                   |
| Appro     | oach     | 115                              | 0.0        | 115                             | 0.0        | 0.461               | 28.8                  | LOS C               | 2.0        | 14.2                         | 0.00         | 0.58                        | 0.00               | 39.0                   |
| All Ve    | hicles   | 1456                             | 2.8        | 1456                            | 2.8        | 0.461               | 2.4                   | NA                  | 2.0        | 14.2                         | 0.00         | 0.05                        | 0.00               | 73.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Organisation: TAYLOR THOMSON WHITTING (TTW) PTY LTD | Licence: NETWORK / 1PC | Processed: Monday, 19 July 2021 4:46:28 PM Project: P:\2021\2110\211091\Reports\TTW\Traffic\Modelling\211091 Hawkesbury CoE - Rev2.sip9

Site: 3 [Paget x Lennox 2031 AM WD (Site Folder: 2031 With Development - Ped Crs)] ■■ Network: N101 [2031 - AM - WD (Network Folder: 2031 WD -

Ped Crs)]

Paget Street x Lennox Street 2031: Future Growth + School

AM Peak: 8:15-9:15

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

| Vehicle Movement Performance  Mov Turn DEMAND ARRIVAL Deg. Aver. Level of 95% BACK OF Prop. Effective Aver. No. Aver. |          |              |     |             |     |                |                |                     |               |        |              |                     |                    |                |
|---|----------|--------------|-----|-------------|-----|----------------|----------------|---------------------|---------------|--------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID   | Turn     | DEMA<br>FLO\ |     | ARRI<br>FLO |     | Deg.<br>Satn   | Aver.<br>Delav | Level of<br>Service | 95% BA<br>QUE |        | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
| טו  |          | [ Total      | HV] | [ Total     |     | Jalii          | Delay          | Service             | [ Veh.        | Dist ] | Que          | Rate                | Cycles             | Speed          |
|   |          | veh/h        | %   | veh/h       | %   | v/c            | sec            |                     | veh           | m -    |              |                     |                    | km/h           |
| South   | n: Paget | Street       |     |             |     |                |                |                     |               |        |              |                     |                    |                |
| 1   | L2       | 94           | 4.5 | 94          | 4.5 | 0.260          | 18.1           | LOS B               | 1.3           | 9.2    | 0.88         | 0.75                | 88.0               | 41.9           |
| 2   | T1       | 183          | 5.2 | 183         | 5.2 | <b>*</b> 0.670 | 14.2           | LOS A               | 3.6           | 26.2   | 0.97         | 0.87                | 1.18               | 44.0           |
| 3   | R2       | 44           | 7.1 | 44          | 7.1 | 0.670          | 19.8           | LOS B               | 3.6           | 26.2   | 0.97         | 0.87                | 1.18               | 40.2           |
| Appr  | oach     | 321          | 5.2 | 321         | 5.2 | 0.670          | 16.1           | LOS B               | 3.6           | 26.2   | 0.95         | 0.83                | 1.09               | 42.9           |
| East:   | Lennox   | Street       |     |             |     |                |                |                     |               |        |              |                     |                    |                |
| 4   | L2       | 15           | 0.0 | 15          | 0.0 | 0.250          | 12.5           | LOS A               | 1.9           | 14.1   | 0.70         | 0.58                | 0.70               | 51.6           |
| 5   | T1       | 442          | 6.4 | 442         | 6.4 | 0.678          | 9.3            | LOS A               | 5.4           | 39.3   | 0.82         | 0.75                | 0.91               | 47.8           |
| 6   | R2       | 106          | 2.0 | 106         | 2.0 | <b>*</b> 0.678 | 16.0           | LOS B               | 5.4           | 39.3   | 0.89         | 0.85                | 1.04               | 43.1           |
| Appr  | oach     | 563          | 5.4 | 563         | 5.4 | 0.678          | 10.6           | LOS A               | 5.4           | 39.3   | 0.83         | 0.76                | 0.93               | 47.1           |
| North   | n: Paget | Street       |     |             |     |                |                |                     |               |        |              |                     |                    |                |
| 7   | L2       | 42           | 0.0 | 42          | 0.0 | 0.114          | 16.6           | LOS B               | 0.5           | 3.8    | 0.85         | 0.70                | 0.85               | 23.5           |
| 8   | T1       | 101          | 1.0 | 101         | 1.0 | 0.395          | 12.4           | LOS A               | 1.8           | 12.9   | 0.91         | 0.73                | 0.91               | 39.6           |
| 9   | R2       | 28           | 7.4 | 28          | 7.4 | 0.395          | 17.0           | LOS B               | 1.8           | 12.9   | 0.91         | 0.73                | 0.91               | 34.7           |
| Appr  | oach     | 172          | 1.8 | 172         | 1.8 | 0.395          | 14.2           | LOS A               | 1.8           | 12.9   | 0.89         | 0.72                | 0.89               | 36.6           |
| West  | : Lenno  | x Street     |     |             |     |                |                |                     |               |        |              |                     |                    |                |
| 10  | L2       | 93           | 1.1 | 93          | 1.1 | 0.480          | 13.7           | LOS A               | 4.1           | 29.9   | 0.79         | 0.70                | 0.79               | 42.7           |
| 11  | T1       | 515          | 5.7 | 515         | 5.7 | 0.480          | 8.0            | LOS A               | 4.1           | 29.9   | 0.79         | 0.69                | 0.79               | 38.6           |
| 12  | R2       | 51           | 6.3 | 51          | 6.3 | 0.480          | 13.3           | LOS A               | 3.5           | 25.5   | 0.79         | 0.68                | 0.79               | 48.7           |
| Appr  | oach     | 658          | 5.1 | 658         | 5.1 | 0.480          | 9.2            | LOS A               | 4.1           | 29.9   | 0.79         | 0.69                | 0.79               | 40.9           |
| All Ve  | ehicles  | 1714         | 4.9 | 1714        | 4.9 | 0.678          | 11.4           | LOSA                | 5.4           | 39.3   | 0.84         | 0.74                | 0.90               | 43.2           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Pedestrian Movement Performance |              |                |                     |  |     |                             |                          |                |                 |                |  |  |  |
|---------------------------------|--------------|----------------|---------------------|--|-----|-----------------------------|--------------------------|----------------|-----------------|----------------|--|--|--|
| Mov<br><sub>ID</sub> Crossing   | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE BACK OF<br>QUEUE<br>[ Ped Dist ] |     | Prop. E <sup>.</sup><br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |  |  |  |
|                                 | ped/h        | sec            |                     | ped                                      | m ¹ |                             |                          | sec            | m               | m/sec          |  |  |  |
| South: Paget Stre               | eet          |                |                     |  |     |                             |                          |                |                 |                |  |  |  |
| P1 Full                         | 53           | 9.6            | LOS A               | 0.0                                      | 0.0 | 0.80                        | 0.80                     | 36.7           | 35.2            | 0.96           |  |  |  |
| East: Lennox Str                | eet          |                |                     |  |     |                             |                          |                |                 |                |  |  |  |
| P2 Full                         | 53           | 9.6            | LOS A               | 0.0                                      | 0.0 | 0.80                        | 0.80                     | 36.7           | 35.2            | 0.96           |  |  |  |
| North: Paget Stre               | eet          |                |                     |  |     |                             |                          |                |                 |                |  |  |  |

| P3 Full           | 53  | 9.6 | LOSA  | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOS A | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA  | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Site: 4 [Blacktown x Bourke 2031 AM WD (Site Folder: 2031 With Development - Ped Crs)]

**■■** Network: N101 [2031 - AM -WD (Network Folder: 2031 WD -

Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street

2031: Future Growth + School

AM Peak: 8:15-9:15

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

| Vehi      | cle Mo                    | vement           | Perfo     | rmanc            | e    |                |                |                     |               |             |              |                     |                    |                |
|-----------|---------------------------|------------------|-----------|------------------|------|----------------|----------------|---------------------|---------------|-------------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID | Turn                      | DEMA<br>FLOV     | NS        | ARRI<br>FLO'     |      | Deg.<br>Satn   | Aver.<br>Delay | Level of<br>Service | 95% BA<br>QUE |             | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
|           |                           | [ Total<br>veh/h | HV ]<br>% | [ Total<br>veh/h |      | v/c            | sec            |                     | [ Veh.<br>veh | Dist ]<br>m |              | Rate                |                    | km/h           |
| South     | n: Bourk                  | ke Street        |           |                  |      |                |                |                     |               |             |              |                     |                    |                |
| 1         | L2                        | 1                | 0.0       | 1                | 0.0  | 0.085          | 28.1           | LOS B               | 1.4           | 9.8         | 0.75         | 0.57                | 0.75               | 25.4           |
| 2         | T1                        | 147              | 1.4       | 147              | 1.4  | 0.260          | 23.4           | LOS B               | 3.8           | 27.1        | 0.79         | 0.65                | 0.79               | 33.7           |
| 3b        | R3                        | 25               | 4.2       | 25               | 4.2  | 0.260          | 30.4           | LOS C               | 3.8           | 27.1        | 0.81         | 0.68                | 0.81               | 23.3           |
| Appro     | oach                      | 174              | 1.8       | 174              | 1.8  | 0.260          | 24.5           | LOS B               | 3.8           | 27.1        | 0.79         | 0.65                | 0.79               | 32.5           |
| South     | SouthEast: Blacktown Road |                  |           |                  |      |                |                |                     |               |             |              |                     |                    |                |
| 21b       | L3                        | 19               | 11.1      | 19               | 11.1 | 0.181          | 16.4           | LOS B               | 3.4           | 25.5        | 0.53         | 0.69                | 0.53               | 43.7           |
| 21a       | L1                        | 513              | 6.6       | 513              | 6.6  | 0.500          | 16.0           | LOS B               | 12.2          | 89.7        | 0.62         | 0.74                | 0.62               | 39.7           |
| 23a       | R1                        | 153              | 2.8       | 153              | 2.8  | 0.500          | 16.6           | LOS B               | 12.2          | 89.7        | 0.67         | 0.76                | 0.67               | 42.6           |
| Appro     | oach                      | 684              | 5.8       | 684              | 5.8  | 0.500          | 16.2           | LOS B               | 12.2          | 89.7        | 0.63         | 0.74                | 0.63               | 40.7           |
| North     | : Bourk                   | e Street         |           |                  |      |                |                |                     |               |             |              |                     |                    |                |
| 7a        | L1                        | 133              | 2.4       | 133              | 2.4  | 0.235          | 28.6           | LOS C               | 3.9           | 28.1        | 0.79         | 0.76                | 0.79               | 21.7           |
| 8         | T1                        | 126              | 4.2       | 126              | 4.2  | 0.490          | 25.6           | LOS B               | 6.3           | 46.0        | 0.86         | 0.74                | 0.86               | 31.8           |
| 9         | R2                        | 68               | 4.6       | 68               | 4.6  | * 0.490        | 31.2           | LOS C               | 6.3           | 46.0        | 0.86         | 0.74                | 0.86               | 22.0           |
| Appro     | oach                      | 327              | 3.5       | 327              | 3.5  | 0.490          | 28.0           | LOS B               | 6.3           | 46.0        | 0.83         | 0.75                | 0.83               | 26.4           |
| West      | : Lenno                   | x Street         |           |                  |      |                |                |                     |               |             |              |                     |                    |                |
| 10        | L2                        | 132              | 2.4       | 132              | 2.4  | 0.202          | 15.8           | LOS B               | 4.0           | 28.7        | 0.54         | 0.70                | 0.54               | 42.2           |
| 12a       | R1                        | 515              | 5.3       | 515              | 5.3  | <b>*</b> 0.510 | 15.6           | LOS B               | 10.3          | 75.7        | 0.62         | 0.72                | 0.62               | 37.2           |
| 12        | R2                        | 4                | 0.0       | 4                | 0.0  | 0.510          | 17.0           | LOS B               | 10.3          | 75.7        | 0.64         | 0.72                | 0.64               | 41.9           |
| Appro     | oach                      | 651              | 4.7       | 651              | 4.7  | 0.510          | 15.7           | LOS B               | 10.3          | 75.7        | 0.61         | 0.72                | 0.61               | 38.5           |
| All Ve    | hicles                    | 1836             | 4.6       | 1836             | 4.6  | 0.510          | 18.9           | LOS B               | 12.2          | 89.7        | 0.67         | 0.73                | 0.67               | 36.5           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Ped   | Pedestrian Movement Performance |              |                |                     |                         |              |                |                          |                |      |                         |  |  |  |
|---|---------------------------------|--------------|----------------|---------------------|-------------------------|--------------|----------------|--------------------------|----------------|------|-------------------------|--|--|--|
| Mo\<br>ID                                       |                                 | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped | EUE<br>Dist] | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time |      | Aver.<br>Speed<br>m/sec |  |  |  |
| ped/h sec ped m sec m r<br>South: Bourke Street |                                 |              |                |                     |                         |              |                |                          |                |      | III/SEC                 |  |  |  |
| P1  | Full                            | 53           | 13.3           | LOS B               | 0.1                     | 0.1          | 0.58           | 0.58                     | 40.3           | 35.2 | 0.87                    |  |  |  |
| Sou   | thEast: Black                   | town Ro      | ad             |                     |                         |              |                |                          |                |      |                         |  |  |  |
| P5  | Full                            | 53           | 27.3           | LOS C               | 0.1                     | 0.1          | 0.83           | 0.83                     | 54.4           | 35.2 | 0.65                    |  |  |  |
| Nor   | th: Bourke Str                  | eet          |                |                     |                         |              |                |                          |                |      |                         |  |  |  |

| P3 Full           | 53  | 13.3 | LOS B | 0.1 | 0.1 | 0.58 | 0.58 | 40.3 | 35.2 | 0.87 |
|-------------------|-----|------|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |      |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 27.3 | LOS C | 0.1 | 0.1 | 0.83 | 0.83 | 54.4 | 35.2 | 0.65 |
| All Pedestrians   | 211 | 20.3 | LOS C | 0.1 | 0.1 | 0.70 | 0.70 | 47.3 | 35.2 | 0.74 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 5 [Blacktown x Campus 2031 AM WD (Site Folder: 2031 With Development - Ped Crs)]

■■ Network: N101 [2031 - AM - WD (Network Folder: 2031 WD - Ped Crs)]

Blacktown Road x Campus Drive 2031: Future Growth + School AM Peak: 8:15-9:15

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo      | rmanc                           | :e         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: B | lacktown                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>22  | L2<br>T1 | 116<br>684                       | 1.8<br>6.2 | 116<br>684                      | 1.8<br>6.2 | 0.063<br>0.365      | 6.8<br>0.1            | LOS A<br>LOS A      | 0.0<br>0.0 | 0.0<br>0.0                   | 0.00<br>0.00 | 0.62<br>0.00                | 0.00               | 63.1<br>79.7           |
| Appro     | oach     | 800                              | 5.5        | 800                             | 5.5        | 0.365               | 1.1                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.09                        | 0.00               | 74.8                   |
| North     | West: E  | Blacktowr                        | n Road     |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 28        | T1       | 621                              | 4.6        | 621                             | 4.6        | 0.331               | 0.1                   | LOSA                | 0.0        | 0.0                          | 0.00         | 0.00                        | 0.00               | 79.5                   |
| 29        | R2       | 55                               | 1.9        | 55                              | 1.9        | 0.106               | 12.7                  | LOS A               | 0.3        | 2.4                          | 0.66         | 0.88                        | 0.66               | 53.8                   |
| Appro     | oach     | 676                              | 4.4        | 676                             | 4.4        | 0.331               | 1.1                   | NA                  | 0.3        | 2.4                          | 0.05         | 0.07                        | 0.05               | 76.5                   |
| South     | nWest: ( | Campus I                         | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30        | L2       | 8                                | 0.0        | 8                               | 0.0        | 0.171               | 7.1                   | LOS A               | 0.5        | 3.6                          | 0.00         | 0.58                        | 0.00               | 30.3                   |
| 32        | R2       | 16                               | 6.7        | 16                              | 6.7        | 0.171               | 44.8                  | LOS D               | 0.5        | 3.6                          | 0.00         | 0.58                        | 0.00               | 41.0                   |
| Appro     | oach     | 24                               | 4.3        | 24                              | 4.3        | 0.171               | 31.7                  | LOS C               | 0.5        | 3.6                          | 0.00         | 0.58                        | 0.00               | 38.1                   |
| All Ve    | hicles   | 1500                             | 5.0        | 1500                            | 5.0        | 0.365               | 1.6                   | NA                  | 0.5        | 3.6                          | 0.02         | 0.09                        | 0.02               | 74.5                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Site: 3 [Paget x Lennox 2031 PM WD (Site Folder: 2031 With Development - Ped Crs)] 

■■ Network: N101 [2031 - PM - WD (Network Folder: 2031 WD - Ped Crs)]

Paget Street x Lennox Street 2031: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

| Vehi                    | cle Mo         | vement                              | Perfo   | rmano                                      | е   |   |  |   |   |   |  |  |  |  |
|-------------------------|----------------|-------------------------------------|---|--|---|---|--|---|---|---|--|--|--|--|
| Mov<br>ID               | Turn           | DEMA<br>FLOV<br>[Total<br>veh/h     |   | ARRI<br>FLO<br>[ Total<br>veh/h            | WS<br>HV]                                     | Deg.<br>Satn<br>v/c   | Aver.<br>Delay<br>sec                                | Level of<br>Service                       |   | ACK OF<br>EUE<br>Dist ]<br>m                        | Prop.<br>Que                                 | Effective A<br>Stop<br>Rate                  | ver. No.<br>Cycles                                   | Aver.<br>Speed<br>km/h                               |
| South                   | n: Paget       | t Street                            |   |  |   |   |  |   |   |   |  |  |  |  |
| 1 2 3                   | L2<br>T1<br>R2 | 73<br>177<br>19                     | 5.8<br>4.2<br>5.6                             | 73<br>177<br>19                            | 5.8<br>4.2<br>5.6                             | 0.204<br>0.562<br>0.562   | 18.2<br>13.1<br>18.7                                 | LOS B<br>LOS A<br>LOS B                   | 1.0<br>2.9<br>2.9                             | 7.1<br>21.0<br>21.0                                 | 0.87<br>0.95<br>0.95                         | 0.73<br>0.79<br>0.79                         | 0.87<br>1.01<br>1.01                                 | 41.9<br>45.3<br>41.7                                 |
| Appro                   | oach<br>Lennox | 268<br>Street                       | 4.7   | 268  | 4.7   | 0.562   | 14.9   | LOS B                                     | 2.9   | 21.0  | 0.93   | 0.78   | 0.98   | 44.0   |
| 4<br>5<br>6<br>Appro    | L2<br>T1<br>R2 | 25<br>553<br>116<br>694             | 4.2<br>3.0<br>0.9<br>2.7<br>1.1<br>3.2<br>1.8 | 25<br>553<br>116<br>694<br>99<br>196<br>59 | 4.2<br>3.0<br>0.9<br>2.7<br>1.1<br>3.2<br>1.8 | 0.293<br>0.796<br>* 0.796<br>0.796<br>0.268<br>* 0.786<br>0.786 | 13.0<br>11.6<br>19.2<br>12.9<br>16.8<br>16.5<br>21.1 | LOS A LOS B LOS A LOS B LOS B LOS B LOS B | 2.3<br>7.9<br>7.9<br>7.9<br>1.3<br>4.4<br>4.4 | 16.7<br>56.7<br>56.7<br>56.7<br>9.4<br>31.8<br>31.8 | 0.72<br>0.87<br>0.95<br>0.88<br>0.88<br>1.00 | 0.61<br>0.85<br>0.99<br>0.87<br>0.74<br>1.01 | 0.72<br>1.10<br>1.31<br>1.12<br>0.88<br>1.47<br>1.47 | 51.2<br>45.8<br>40.8<br>45.2<br>23.1<br>37.1<br>31.8 |
| Appro                   | oach           | 354                                 | 2.4   | 354  | 2.4   | 0.786   | 17.3   | LOS B                                     | 4.4   | 31.8  | 0.97   | 0.94   | 1.30   | 34.1   |
| 10<br>11<br>12<br>Appro | L2<br>T1<br>R2 | x Street<br>109<br>399<br>80<br>588 | 0.0<br>6.1<br>5.3<br>4.8                      | 109<br>399<br>80<br>588                    | 0.0<br>6.1<br>5.3<br>4.8                      | 0.473<br>0.473<br>0.473<br>0.473                                | 13.6<br>8.4<br>14.8<br>10.3                          | LOS A<br>LOS B<br>LOS A                   | 4.0<br>4.0<br>2.9<br>4.0                      | 29.3<br>29.3<br>21.6<br>29.3                        | 0.78<br>0.80<br>0.84<br>0.80                 | 0.70<br>0.71<br>0.73<br>0.71                 | 0.78<br>0.80<br>0.84<br>0.80                         | 42.5<br>36.9<br>46.7<br>40.5                         |
| All Ve                  | hicles         | 1904                                | 3.6   | 1904                                       |   | 0.796   | 13.2   | LOSA                                      | 7.9   | 56.7  | 0.88   | 0.82   | 1.04   | 41.6   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| Ped       | destrian Mov   | /ement       | Perforr        | nance               |                         |     |                |                          |                |                 |                |
|-----------|----------------|--------------|----------------|---------------------|-------------------------|-----|----------------|--------------------------|----------------|-----------------|----------------|
| Mov<br>ID | /<br>Crossing  | Dem.<br>Flow | Aver.<br>Delay | Level of<br>Service | AVERAGE<br>QUE<br>[ Ped |     | Prop. E<br>Que | ffective<br>Stop<br>Rate | Travel<br>Time | Travel<br>Dist. | Aver.<br>Speed |
|           |                | ped/h        | sec            |                     | ped                     | m ¯ |                |                          | sec            | m               | m/sec          |
| Sou       | th: Paget Stre | et           |                |                     |                         |     |                |                          |                |                 |                |
| P1        | Full           | 53           | 9.6            | LOSA                | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| Eas       | t: Lennox Stre | et           |                |                     |                         |     |                |                          |                |                 |                |
| P2        | Full           | 53           | 9.6            | LOS A               | 0.0                     | 0.0 | 0.80           | 0.80                     | 36.7           | 35.2            | 0.96           |
| Nor       | th: Paget Stre | et           |                |                     |                         |     |                |                          |                |                 |                |

| P3 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
|-------------------|-----|-----|------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |     |      |     |     |      |      |      |      |      |
| P4 Full           | 53  | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |
| All Pedestrians   | 211 | 9.6 | LOSA | 0.0 | 0.0 | 0.80 | 0.80 | 36.7 | 35.2 | 0.96 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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Project: P:\2021\2110\211091\Reports\TTW\Traffic\Modelling\211091 Hawkesbury CoE - Rev2.sip9

Site: 4 [Blacktown x Bourke 2031 PM WD (Site Folder: 2031 With Development - Ped Crs)]

WD (Network Folder: 2031 WD -

Ped Crs)]

Blacktown Road x Bourke Street x Lennox Street

2031: Future Growth + School

PM Peak: 15:45-14:45

Site Category: With Development

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

| Vehi      | cle Mo   | vement           | Perfo     | rmano         | е    |                |                |                     |               |             |              |                     |                    |                |
|-----------|----------|------------------|-----------|---------------|------|----------------|----------------|---------------------|---------------|-------------|--------------|---------------------|--------------------|----------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV     | NS        | ARR<br>FLO    | WS   | Deg.<br>Satn   | Aver.<br>Delay | Level of<br>Service | 95% BA<br>Que | EUE         | Prop.<br>Que | Effective A<br>Stop | ver. No.<br>Cycles | Aver.<br>Speed |
|           |          | [ Total<br>veh/h | HV ]<br>% | [ Total veh/h |      | v/c            | sec            |                     | [ Veh.<br>veh | Dist ]<br>m |              | Rate                |                    | km/h           |
| South     | ı: Bourk | ce Street        |           |               |      |                |                |                     |               |             |              |                     |                    |                |
| 1         | L2       | 6                | 0.0       | 6             | 0.0  | 0.122          | 22.3           | LOS B               | 2.3           | 16.4        | 0.65         | 0.53                | 0.65               | 30.1           |
| 2         | T1       | 93               | 0.0       | 93            | 0.0  | 0.122          | 15.6           | LOS B               | 2.3           | 16.4        | 0.65         | 0.53                | 0.65               | 39.5           |
| 3b        | R3       | 41               | 5.1       | 41            | 5.1  | 0.122          | 28.1           | LOS B               | 1.2           | 8.8         | 0.75         | 0.73                | 0.75               | 21.9           |
| Appro     | oach     | 140              | 1.5       | 140           | 1.5  | 0.122          | 19.6           | LOS B               | 2.3           | 16.4        | 0.68         | 0.59                | 0.68               | 34.2           |
| South     | East: E  | Blacktown        | Road      |               |      |                |                |                     |               |             |              |                     |                    |                |
| 21b       | L3       | 44               | 4.8       | 44            | 4.8  | 0.255          | 22.3           | LOS B               | 5.0           | 35.7        | 0.67         | 0.74                | 0.67               | 40.5           |
| 21a       | L1       | 568              | 2.8       | 568           | 2.8  | 0.705          | 23.0           | LOS B               | 17.0          | 122.0       | 0.80         | 0.80                | 0.80               | 34.5           |
| 23a       | R1       | 135              | 2.3       | 135           | 2.3  | <b>*</b> 0.705 | 23.9           | LOS B               | 17.0          | 122.0       | 0.85         | 0.83                | 0.85               | 38.3           |
| Appro     | oach     | 747              | 2.8       | 747           | 2.8  | 0.705          | 23.1           | LOS B               | 17.0          | 122.0       | 0.80         | 0.81                | 0.80               | 35.8           |
| North     | : Bourk  | e Street         |           |               |      |                |                |                     |               |             |              |                     |                    |                |
| 7a        | L1       | 142              | 0.7       | 142           | 0.7  | 0.181          | 21.6           | LOS B               | 3.5           | 24.8        | 0.67         | 0.73                | 0.67               | 25.8           |
| 8         | T1       | 227              | 1.4       | 227           | 1.4  | 0.607          | 20.4           | LOS B               | 9.9           | 70.7        | 0.81         | 0.73                | 0.81               | 35.0           |
| 9         | R2       | 102              | 3.1       | 102           | 3.1  | <b>*</b> 0.607 | 25.9           | LOS B               | 9.9           | 70.7        | 0.81         | 0.73                | 0.81               | 25.2           |
| Appro     | oach     | 472              | 1.6       | 472           | 1.6  | 0.607          | 21.9           | LOS B               | 9.9           | 70.7        | 0.77         | 0.73                | 0.77               | 31.0           |
| West      | Lenno    | x Street         |           |               |      |                |                |                     |               |             |              |                     |                    |                |
| 10        | L2       | 76               | 6.9       | 76            | 6.9  | 0.212          | 20.6           | LOS B               | 4.1           | 29.8        | 0.66         | 0.72                | 0.66               | 38.4           |
| 12a       | R1       | 466              | 4.1       | 466           | 4.1  | 0.535          | 21.2           | LOS B               | 10.4          | 75.9        | 0.73         | 0.75                | 0.73               | 32.8           |
| 12        | R2       | 3                | 66.7      | 3             | 66.7 | 0.535          | 23.5           | LOS B               | 10.4          | 75.9        | 0.75         | 0.76                | 0.75               | 32.9           |
| Appro     | oach     | 545              | 4.8       | 545           | 4.8  | 0.535          | 21.1           | LOS B               | 10.4          | 75.9        | 0.72         | 0.75                | 0.72               | 33.8           |
| All Ve    | hicles   | 1904             | 3.0       | 1904          | 3.0  | 0.705          | 22.0           | LOS B               | 17.0          | 122.0       | 0.76         | 0.76                | 0.76               | 34.1           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

\* Critical Movement (Signal Timing)

| _   |                |         |         |          |              |               |         |              |        |        |       |
|-----|----------------|---------|---------|----------|--------------|---------------|---------|--------------|--------|--------|-------|
| Ped | destrian Mov   | vement  | Perforr | nance    |              |               |         |              |        |        |       |
| Moι |                | Dem.    | Aver.   | Level of | AVERAGE      |               | Prop. E |              | Travel | Travel | Aver. |
| ID  | Crossing       | Flow    | Delay   | Service  | QUE<br>[ Ped | EUE<br>Dist ] | Que     | Stop<br>Rate | Time   | Dist.  | Speed |
|     |                | ped/h   | sec     |          | ped          | m Î           |         |              | sec    | m      | m/sec |
| Sou | ıth: Bourke St | reet    |         |          |              |               |         |              |        |        |       |
| P1  | Full           | 53      | 18.9    | LOS B    | 0.1          | 0.1           | 0.69    | 0.69         | 46.0   | 35.2   | 0.76  |
| Sou | ıthEast: Black | town Ro | ad      |          |              |               |         |              |        |        |       |
| P5  | Full           | 53      | 20.4    | LOS C    | 0.1          | 0.1           | 0.71    | 0.71         | 47.4   | 35.2   | 0.74  |
| Nor | th: Bourke Str | eet     |         |          |              |               |         |              |        |        |       |

| P3 Full           | 53  | 18.9 | LOS B | 0.1 | 0.1 | 0.69 | 0.69 | 46.0 | 35.2 | 0.76 |
|-------------------|-----|------|-------|-----|-----|------|------|------|------|------|
| West: Lennox Stre | eet |      |       |     |     |      |      |      |      |      |
| P4 Full           | 53  | 20.4 | LOS C | 0.1 | 0.1 | 0.71 | 0.71 | 47.4 | 35.2 | 0.74 |
| All Pedestrians   | 211 | 19.6 | LOS B | 0.1 | 0.1 | 0.70 | 0.70 | 46.7 | 35.2 | 0.75 |

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay) Pedestrian movement LOS values are based on average delay per pedestrian movement. Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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V Site: 5 [Blacktown x Campus 2031 PM WD (Site Folder: 2031 With Development - Ped Crs)]

■■ Network: N101 [2031 - PM - WD (Network Folder: 2031 WD -

Ped Crs)]

Blacktown Road x Campus Drive 2031: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo | rmanc                            | :e        |                     |                       |                     |     |                          |              |                             |                    |                        |
|-----------|----------|----------------------------------|-------|----------------------------------|-----------|---------------------|-----------------------|---------------------|-----|--------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |       | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>JEUE<br>Dist ] | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: E | Blacktown                        |       | ven/m                            | 70        | V/C                 | <u> </u>              |                     | ven | m                        |              |                             |                    | KIII/II                |
| 21        | L2       | 16                               | 0.0   | 16                               | 0.0       | 0.009               | 6.4                   | LOS A               | 0.0 | 0.0                      | 0.00         | 0.61                        | 0.00               | 60.1                   |
| 22        | T1       | 698                              | 2.7   | 698                              | 2.7       | 0.364               | 0.1                   | LOS A               | 0.0 | 0.0                      | 0.00         | 0.00                        | 0.00               | 79.7                   |
| Appro     | oach     | 714                              | 2.7   | 714                              | 2.7       | 0.364               | 0.2                   | NA                  | 0.0 | 0.0                      | 0.00         | 0.01                        | 0.00               | 78.6                   |
| North     | West: E  | Blacktowr                        | Road  |                                  |           |                     |                       |                     |     |                          |              |                             |                    |                        |
| 28        | T1       | 641                              | 3.4   | 641                              | 3.4       | 0.336               | 0.1                   | LOS A               | 0.0 | 0.0                      | 0.00         | 0.00                        | 0.00               | 79.2                   |
| 29        | R2       | 7                                | 0.0   | 7                                | 0.0       | 0.012               | 11.1                  | LOS A               | 0.0 | 0.3                      | 0.59         | 0.74                        | 0.59               | 55.1                   |
| Appro     | oach     | 648                              | 3.4   | 648                              | 3.4       | 0.336               | 0.2                   | NA                  | 0.0 | 0.3                      | 0.01         | 0.01                        | 0.01               | 78.8                   |
| South     | nWest: ( | Campus                           | Road  |                                  |           |                     |                       |                     |     |                          |              |                             |                    |                        |
| 30        | L2       | 55                               | 0.0   | 55                               | 0.0       | 0.511               | 16.9                  | LOS B               | 2.3 | 16.3                     | 0.00         | 0.58                        | 0.00               | 29.5                   |
| 32        | R2       | 60                               | 0.0   | 60                               | 0.0       | 0.511               | 48.7                  | LOS D               | 2.3 | 16.3                     | 0.00         | 0.58                        | 0.00               | 41.1                   |
| Appro     | oach     | 115                              | 0.0   | 115                              | 0.0       | 0.511               | 33.5                  | LOS C               | 2.3 | 16.3                     | 0.00         | 0.58                        | 0.00               | 36.6                   |
| All Ve    | hicles   | 1477                             | 2.8   | 1477                             | 2.8       | 0.511               | 2.8                   | NA                  | 2.3 | 16.3                     | 0.00         | 0.06                        | 0.00               | 72.1                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 1 [Londonderry x Vines 2021 AM WD (Site Folder: 2021 With Development)]

■■ Network: N101 [2021 - AM - WD - N1 (Network Folder: 2021

WD)]

Londonderry Road x Vines Drive 2021: Future Growth + School AM Peak: 8:15-9:15

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | :e        |                     |                       |                     |                                |            |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|--------------------------------|------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service | 95% BA<br>QUE<br>[ Veh.<br>veh |            | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: ∖ | /ines Driv                       | e e     |                                 |           |                     |                       |                     |                                |            |              |                             |                    |                        |
| 21<br>23  | L2<br>R2 | 17<br>29                         | 0.0     | 17<br>29                        | 0.0       | 0.070               | 6.5<br>10.4           | LOS A               | 0.2                            | 1.6<br>1.6 | 0.47         | 0.72                        | 0.47               | 51.0<br>46.4           |
| Appro     |          | 46                               | 0.0     | 46                              | 0.0       | 0.070               | 9.0                   | LOSA                | 0.2                            | 1.6        | 0.47         | 0.72                        | 0.47               | 48.7                   |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |                                |            |              |                             |                    |                        |
| 24        | L2       | 108                              | 1.9     | 108                             | 1.9       | 0.213               | 2.7                   | LOS A               | 0.0                            | 0.0        | 0.00         | 0.15                        | 0.00               | 55.5                   |
| 25        | T1       | 293                              | 3.6     | 293                             | 3.6       | 0.213               | 0.0                   | LOS A               | 0.0                            | 0.0        | 0.00         | 0.15                        | 0.00               | 58.5                   |
| Appro     | oach     | 401                              | 3.1     | 401                             | 3.1       | 0.213               | 0.7                   | NA                  | 0.0                            | 0.0        | 0.00         | 0.15                        | 0.00               | 57.7                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |                                |            |              |                             |                    |                        |
| 31        | T1       | 401                              | 2.1     | 401                             | 2.1       | 0.294               | 0.7                   | LOS A               | 1.0                            | 7.4        | 0.26         | 0.14                        | 0.26               | 55.9                   |
| 32        | R2       | 101                              | 0.0     | 101                             | 0.0       | 0.294               | 7.5                   | LOS A               | 1.0                            | 7.4        | 0.26         | 0.14                        | 0.26               | 55.7                   |
| Appro     | oach     | 502                              | 1.7     | 502                             | 1.7       | 0.294               | 2.1                   | NA                  | 1.0                            | 7.4        | 0.26         | 0.14                        | 0.26               | 55.8                   |
| All Ve    | hicles   | 949                              | 2.2     | 949                             | 2.2       | 0.294               | 1.8                   | NA                  | 1.0                            | 7.4        | 0.16         | 0.17                        | 0.16               | 56.1                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2021 AM WD (Site Folder: 2021 With Development)]

■■ Network: N101 [2021 - AM - WD - N1 (Network Folder: 2021

WD)]

Londonderry Road x Southee Road 2021: Future Growth + School AM Peak: 8:15-9:15

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo  | vement                           | Perfo   | rmano                           | :e        |                     |                       |                     |     |                              |              |                             |                    |                        |
|-----------|---------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|-----|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn    | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North     | East: L | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 25        | T1      | 209                              | 4.0     | 209                             | 4.0       | 0.125               | 0.2                   | LOS A               | 0.2 | 1.2                          | 0.09         | 0.04                        | 0.09               | 57.0                   |
| 26        | R2      | 16                               | 6.7     | 16                              | 6.7       | 0.125               | 7.5                   | LOS A               | 0.2 | 1.2                          | 0.09         | 0.04                        | 0.09               | 55.6                   |
| Appro     | oach    | 225                              | 4.2     | 225                             | 4.2       | 0.125               | 0.7                   | NA                  | 0.2 | 1.2                          | 0.09         | 0.04                        | 0.09               | 56.7                   |
| North     | West: 9 | Southee F                        | Road    |                                 |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 27        | L2      | 38                               | 5.6     | 38                              | 5.6       | 0.303               | 7.3                   | LOS A               | 1.2 | 8.9                          | 0.53         | 0.82                        | 0.60               | 47.8                   |
| 29        | R2      | 189                              | 1.1     | 189                             | 1.1       | 0.303               | 9.3                   | LOS A               | 1.2 | 8.9                          | 0.53         | 0.82                        | 0.60               | 46.5                   |
| Appro     | oach    | 227                              | 1.9     | 227                             | 1.9       | 0.303               | 9.0                   | LOS A               | 1.2 | 8.9                          | 0.53         | 0.82                        | 0.60               | 46.7                   |
| South     | nWest:  | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |     |                              |              |                             |                    |                        |
| 30        | L2      | 112                              | 1.9     | 112                             | 1.9       | 0.229               | 2.7                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 31        | T1      | 320                              | 3.6     | 320                             | 3.6       | 0.229               | 0.0                   | LOS A               | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 57.4                   |
| Appro     | oach    | 432                              | 3.2     | 432                             | 3.2       | 0.229               | 0.7                   | NA                  | 0.0 | 0.0                          | 0.00         | 0.14                        | 0.00               | 56.6                   |
| All Ve    | ehicles | 884                              | 3.1     | 884                             | 3.1       | 0.303               | 2.8                   | NA                  | 1.2 | 8.9                          | 0.16         | 0.29                        | 0.18               | 52.5                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 1 [Londonderry x Vines 2021 PM WD (Site Folder: 2021 With Development)]

WD - N1 (Network Folder: 2021 WD)]

**■** Network: N101 [2021 - PM -

Londonderry Road x Vines Drive 2021: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi      | cle Mo   | vement                           | Perfo   | rmano                           | :e        |                     |                       |                     |            |                              |              |                             |                    |                        |
|-----------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | nEast: V | /ines Driv                       | e e     |                                 |           |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>23  | L2<br>R2 | 65<br>65                         | 0.0     | 65<br>65                        | 0.0       | 0.174<br>0.174      | 7.2<br>10.2           | LOS A<br>LOS A      | 0.6<br>0.6 | 4.3<br>4.3                   | 0.51<br>0.51 | 0.75<br>0.75                | 0.51<br>0.51       | 51.3<br>46.8           |
| Appro     | oach     | 131                              | 0.0     | 131                             | 0.0       | 0.174               | 8.7                   | LOS A               | 0.6        | 4.3                          | 0.51         | 0.75                        | 0.51               | 49.7                   |
| North     | East: L  | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |            |                              |              |                             |                    |                        |
| 24        | L2       | 33                               | 0.0     | 33                              | 0.0       | 0.230               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.04                        | 0.00               | 56.5                   |
| 25        | T1       | 405                              | 3.1     | 405                             | 3.1       | 0.230               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.04                        | 0.00               | 59.5                   |
| Appro     | oach     | 438                              | 2.9     | 438                             | 2.9       | 0.230               | 0.2                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.04                        | 0.00               | 59.3                   |
| South     | nWest: I | Londonde                         | erry Ro | ad                              |           |                     |                       |                     |            |                              |              |                             |                    |                        |
| 31        | T1       | 358                              | 3.2     | 358                             | 3.2       | 0.197               | 0.1                   | LOS A               | 0.1        | 8.0                          | 0.04         | 0.02                        | 0.04               | 59.3                   |
| 32        | R2       | 11                               | 0.0     | 11                              | 0.0       | 0.197               | 7.5                   | LOS A               | 0.1        | 0.8                          | 0.04         | 0.02                        | 0.04               | 57.4                   |
| Appro     | oach     | 368                              | 3.1     | 368                             | 3.1       | 0.197               | 0.3                   | NA                  | 0.1        | 0.8                          | 0.04         | 0.02                        | 0.04               | 59.2                   |
| All Ve    | ehicles  | 937                              | 2.6     | 937                             | 2.6       | 0.230               | 1.4                   | NA                  | 0.6        | 4.3                          | 0.09         | 0.13                        | 0.09               | 57.2                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2021 PM WD (Site Folder: 2021 With Development)]

■■ Network: N101 [2021 - PM - WD - N1 (Network Folder: 2021

WD)]

Londonderry Road x Southee Road 2021: Future Growth + School PM Peak: 15:45-14:45

Site Category: With Development

Give-Way (Two-Way)

| Vehi        | cle Mo     | vement                           | Perfo      | rmanc                           | :e         |                     |                       |                     |            |                              |              |                             |                    |                        |
|-------------|------------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID   | Turn       | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North       | East: L    | ondonde                          | rry Roa    | ad                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 25<br>26    | T1<br>R2   | 347<br>66                        | 3.0<br>1.6 | 347<br>66                       | 3.0<br>1.6 | 0.240<br>0.240      | 0.6<br>7.6            | LOS A<br>LOS A      | 0.7<br>0.7 | 5.0<br>5.0                   | 0.21<br>0.21 | 0.11<br>0.11                | 0.21<br>0.21       | 53.4<br>54.7           |
| Appro       | oach       | 414                              | 2.8        | 414                             | 2.8        | 0.240               | 1.7                   | NA                  | 0.7        | 5.0                          | 0.21         | 0.11                        | 0.21               | 53.9                   |
| North       | West: 9    | Southee F                        | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 27          | L2         | 31                               | 0.0        | 31                              | 0.0        | 0.180               | 6.5                   | LOS A               | 0.6        | 4.4                          | 0.49         | 0.75                        | 0.49               | 48.3                   |
| 29<br>Appro | R2<br>pach | 91<br>121                        | 1.7        | 91<br>121                       | 1.7        | 0.180<br>0.180      | 9.1                   | LOS A               | 0.6        | 4.4                          | 0.49         | 0.75<br>0.75                | 0.49               | 46.9                   |
| South       | nWest: I   | Londonde                         | erry Ro    | ad                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30          | L2         | 162                              | 4.5        | 162                             | 4.5        | 0.227               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 54.8                   |
| 31          | T1         | 261                              | 3.6        | 261                             | 3.6        | 0.227               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 56.3                   |
| Appro       | oach       | 423                              | 4.0        | 423                             | 4.0        | 0.227               | 1.0                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 55.5                   |
| All Ve      | hicles     | 958                              | 3.2        | 958                             | 3.2        | 0.240               | 2.3                   | NA                  | 0.7        | 5.0                          | 0.15         | 0.23                        | 0.15               | 53.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 1 [Londonderry x Vines 2031 AM WOD (Site Folder: 2031 Without Development)]

■■ Network: N101 [2031 - AM - WOD - N1 (Network Folder: 2031 WOD)]

Londonderry Road x Vines Drive

2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi      | Vehicle Movement Performance |                                  |         |                                |           |                     |                       |                     |     |                                |              |                             |                    |                        |
|-----------|------------------------------|----------------------------------|---------|--------------------------------|-----------|---------------------|-----------------------|---------------------|-----|--------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID | Turn                         | DEMA<br>FLO\<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |     | BACK OF<br>JEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South     | hEast: V                     | ines Driv                        | /e      |                                |           |                     |                       |                     |     |                                |              |                             |                    |                        |
| 21        | L2                           | 13                               | 0.0     | 13                             | 0.0       | 0.091               | 6.6                   | LOS A               | 0.3 | 2.3                            | 0.57         | 0.77                        | 0.57               | 49.5                   |
| 23        | R2                           | 31                               | 20.7    | 31                             | 20.7      | 0.091               | 13.3                  | LOS A               | 0.3 | 2.3                            | 0.57         | 0.77                        | 0.57               | 44.0                   |
| Appr      | oach                         | 43                               | 14.6    | 43                             | 14.6      | 0.091               | 11.3                  | LOS A               | 0.3 | 2.3                            | 0.57         | 0.77                        | 0.57               | 46.3                   |
| North     | nEast: L                     | ondonde                          | rry Roa | ıd                             |           |                     |                       |                     |     |                                |              |                             |                    |                        |
| 24        | L2                           | 116                              | 1.8     | 116                            | 1.8       | 0.233               | 2.7                   | LOS A               | 0.0 | 0.0                            | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 25        | T1                           | 323                              | 3.6     | 323                            | 3.6       | 0.233               | 0.0                   | LOS A               | 0.0 | 0.0                            | 0.00         | 0.14                        | 0.00               | 58.6                   |
| Appr      | oach                         | 439                              | 3.1     | 439                            | 3.1       | 0.233               | 0.7                   | NA                  | 0.0 | 0.0                            | 0.00         | 0.14                        | 0.00               | 57.7                   |
| South     | hWest: I                     | Londonde                         | erry Ro | ad                             |           |                     |                       |                     |     |                                |              |                             |                    |                        |
| 31        | T1                           | 443                              | 2.1     | 443                            | 2.1       | 0.316               | 8.0                   | LOS A               | 1.1 | 8.1                            | 0.26         | 0.12                        | 0.27               | 56.1                   |
| 32        | R2                           | 97                               | 0.0     | 97                             | 0.0       | 0.316               | 7.9                   | LOS A               | 1.1 | 8.1                            | 0.26         | 0.12                        | 0.27               | 55.8                   |
| Appr      | oach                         | 540                              | 1.8     | 540                            | 1.8       | 0.316               | 2.0                   | NA                  | 1.1 | 8.1                            | 0.26         | 0.12                        | 0.27               | 56.0                   |
| All Ve    | ehicles                      | 1022                             | 2.9     | 1022                           | 2.9       | 0.316               | 1.9                   | NA                  | 1.1 | 8.1                            | 0.16         | 0.16                        | 0.17               | 56.1                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**▽** Site: 2 [Londonderry x Southee 2031 AM WOD (Site Folder: 2031 Without Development)]

■■ Network: N101 [2031 - AM - WOD - N1 (Network Folder: 2031 WOD)]

Londonderry Road x Southee Road

2031: Existing Conditions - Without Development

AM Peak: 8:15-9:15

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehicle Movement Performance |          |                                  |            |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
|------------------------------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North                        | East: L  | ondonde                          | rry Roa    | ıd                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 25<br>26                     | T1<br>R2 | 228<br>17                        | 4.1<br>6.3 | 228<br>17                       | 4.1<br>6.3 | 0.137<br>0.137      | 0.3<br>7.8            | LOS A<br>LOS A      | 0.2<br>0.2 | 1.4<br>1.4                   | 0.10<br>0.10 | 0.04<br>0.04                | 0.10<br>0.10       | 56.9<br>55.6           |
| Appro                        |          | 245                              | 4.3        | 245                             | 4.3        | 0.137               | 0.8                   | NA                  | 0.2        | 1.4                          | 0.10         | 0.04                        | 0.10               | 56.7                   |
| North                        | West:    | Southee F                        | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 27                           | L2       | 42                               | 5.0        | 42                              | 5.0        | 0.357               | 7.8                   | LOS A               | 1.6        | 11.3                         | 0.57         | 0.86                        | 0.71               | 47.2                   |
| 29                           | R2       | 209                              | 1.0        | 209                             | 1.0        | 0.357               | 10.2                  | LOS A               | 1.6        | 11.3                         | 0.57         | 0.86                        | 0.71               | 45.5                   |
| Appro                        | oach     | 252                              | 1.7        | 252                             | 1.7        | 0.357               | 9.8                   | LOS A               | 1.6        | 11.3                         | 0.57         | 0.86                        | 0.71               | 45.9                   |
| South                        | nWest:   | Londonde                         | erry Ro    | ad                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30                           | L2       | 122                              | 1.7        | 122                             | 1.7        | 0.251               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 31                           | T1       | 351                              | 3.6        | 351                             | 3.6        | 0.251               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 57.3                   |
| Appro                        | oach     | 473                              | 3.1        | 473                             | 3.1        | 0.251               | 0.7                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 56.6                   |
| All Ve                       | hicles   | 969                              | 3.0        | 969                             | 3.0        | 0.357               | 3.1                   | NA                  | 1.6        | 11.3                         | 0.17         | 0.30                        | 0.21               | 52.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 1 [Londonderry x Vines 2031 PM WOD (Site Folder: 2031 ■ Network: N101 [2031 - PM -Without Development)] WOD - N1 (Network Folder: 2031 WOD)]

Londonderry Road x Vines Drive

2031: Existing Conditions - Without Development

PM Peak: 15:45-14:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehicle Movement Performance |          |                                  |            |                                  |            |                     |                       |                     |            |                               |              |                             |                    |                        |
|------------------------------|----------|----------------------------------|------------|----------------------------------|------------|---------------------|-----------------------|---------------------|------------|-------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[ Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>IEUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South                        | nEast: \ | /ines Driv                       | ⁄e         |                                  |            |                     |                       |                     |            |                               |              |                             |                    |                        |
| 21<br>23                     | L2<br>R2 | 58<br>66                         | 0.0<br>9.5 | 58<br>66                         | 0.0<br>9.5 | 0.197<br>0.197      | 7.4<br>11.8           | LOS A<br>LOS A      | 0.7<br>0.7 | 5.0<br>5.0                    | 0.55<br>0.55 | 0.78<br>0.78                | 0.55<br>0.55       | 50.5<br>45.6           |
| Appro                        | oach     | 124                              | 5.1        | 124                              | 5.1        | 0.197               | 9.8                   | LOS A               | 0.7        | 5.0                           | 0.55         | 0.78                        | 0.55               | 48.6                   |
| North                        | East: L  | ondonde                          | rry Roa    | ıd                               |            |                     |                       |                     |            |                               |              |                             |                    |                        |
| 24                           | L2       | 34                               | 0.0        | 34                               | 0.0        | 0.252               | 2.7                   | LOS A               | 0.0        | 0.0                           | 0.00         | 0.04                        | 0.00               | 56.5                   |
| 25                           | T1       | 447                              | 3.1        | 447                              | 3.1        | 0.252               | 0.0                   | LOS A               | 0.0        | 0.0                           | 0.00         | 0.04                        | 0.00               | 59.5                   |
| Appro                        | oach     | 481                              | 2.8        | 481                              | 2.8        | 0.252               | 0.2                   | NA                  | 0.0        | 0.0                           | 0.00         | 0.04                        | 0.00               | 59.3                   |
| South                        | nWest:   | Londonde                         | erry Ro    | ad                               |            |                     |                       |                     |            |                               |              |                             |                    |                        |
| 31                           | T1       | 397                              | 3.2        | 397                              | 3.2        | 0.212               | 0.0                   | LOS A               | 0.1        | 0.4                           | 0.02         | 0.01                        | 0.02               | 59.7                   |
| 32                           | R2       | 4                                | 0.0        | 4                                | 0.0        | 0.212               | 7.9                   | LOS A               | 0.1        | 0.4                           | 0.02         | 0.01                        | 0.02               | 57.6                   |
| Appro                        | oach     | 401                              | 3.1        | 401                              | 3.1        | 0.212               | 0.1                   | NA                  | 0.1        | 0.4                           | 0.02         | 0.01                        | 0.02               | 59.7                   |
| All Ve                       | ehicles  | 1006                             | 3.2        | 1006                             | 3.2        | 0.252               | 1.3                   | NA                  | 0.7        | 5.0                           | 0.07         | 0.12                        | 0.07               | 57.3                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**V** Site: 2 [Londonderry x Southee 2031 PM WOD (Site Folder: 2031 Without Development)]

■■ Network: N101 [2031 - PM - WOD - N1 (Network Folder: 2031 WOD)]

Londonderry Road x Southee Road

2031: Existing Conditions - Without Development

PM Peak: 15:45-16:45

Site Category: Existing Scenario - Without Development

Give-Way (Two-Way)

| Vehi                    | cle Mo               | vement                 | Perfo     | rmanc                   | е         |              |       |                     |               |                         |              |                             |                    |                |
|-------------------------|----------------------|------------------------|-----------|-------------------------|-----------|--------------|-------|---------------------|---------------|-------------------------|--------------|-----------------------------|--------------------|----------------|
| Mov<br>ID               | Turn                 | DEMA<br>FLO\<br>[Total | WS<br>HV] | ARRI<br>FLO\<br>[ Total | WS<br>HV] | Deg.<br>Satn | Delay | Level of<br>Service | QUI<br>[ Veh. | ACK OF<br>EUE<br>Dist ] | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed |
| North                   | nFast <sup>.</sup> I | veh/h<br>ondonde       | rry Roa   | veh/h                   | %         | v/c          | sec   |                     | veh           | m                       |              |                             |                    | km/h           |
|                         |                      |                        | •         |                         |           | 0.000        |       |                     | 2.0           |                         | 0.00         | 0.44                        | 0.00               | <b>50.</b> 4   |
| 25                      | T1                   | 381                    | 3.0       | 381                     | 3.0       | 0.266        | 0.7   | LOS A               | 8.0           | 5.9                     | 0.23         | 0.11                        | 0.23               | 53.1           |
| 26                      | R2                   | 73                     | 1.4       | 73                      | 1.4       | 0.266        | 7.9   | LOS A               | 0.8           | 5.9                     | 0.23         | 0.11                        | 0.23               | 54.7           |
| Appro                   | oach                 | 454                    | 2.8       | 454                     | 2.8       | 0.266        | 1.8   | NA                  | 8.0           | 5.9                     | 0.23         | 0.11                        | 0.23               | 53.7           |
| NorthWest: Southee Road |                      |                        |           |                         |           |              |       |                     |               |                         |              |                             |                    |                |
| 27                      | L2                   | 34                     | 0.0       | 34                      | 0.0       | 0.216        | 6.6   | LOS A               | 0.7           | 5.3                     | 0.53         | 0.77                        | 0.54               | 47.8           |
| 29                      | R2                   | 100                    | 2.1       | 100                     | 2.1       | 0.216        | 10.9  | LOS A               | 0.7           | 5.3                     | 0.53         | 0.77                        | 0.54               | 45.5           |
| Appro                   | oach                 | 134                    | 1.6       | 134                     | 1.6       | 0.216        | 9.8   | LOS A               | 0.7           | 5.3                     | 0.53         | 0.77                        | 0.54               | 46.2           |
| South                   | hWest: I             | Londonde               | erry Ro   | ad                      |           |              |       |                     |               |                         |              |                             |                    |                |
| 30                      | L2                   | 177                    | 4.8       | 177                     | 4.8       | 0.248        | 2.7   | LOS A               | 0.0           | 0.0                     | 0.00         | 0.21                        | 0.00               | 54.8           |
| 31                      | T1                   | 285                    | 3.7       | 285                     | 3.7       | 0.248        | 0.0   | LOS A               | 0.0           | 0.0                     | 0.00         | 0.21                        | 0.00               | 56.3           |
| Appro                   | oach                 | 462                    | 4.1       | 462                     | 4.1       | 0.248        | 1.0   | NA                  | 0.0           | 0.0                     | 0.00         | 0.21                        | 0.00               | 55.4           |
| All Ve                  | ehicles              | 1049                   | 3.2       | 1049                    | 3.2       | 0.266        | 2.5   | NA                  | 8.0           | 5.9                     | 0.17         | 0.24                        | 0.17               | 52.7           |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 1 [Londonderry x Vines 2031 AM WD (Site Folder: 2031 With Development)]

■■ Network: N101 [2031 - AM - WD - N1 (Network Folder: 2031

WD)]

Londonderry Road x Vines Drive 2031: Future Growth + School AM Peak: 8:15-9:15

Site Category: With Development

Give-Way (Two-Way)

| Vehicle Movement Performance |                        |                                  |             |                                |             |                     |                       |                     |            |                              |              |                             |                    |                        |
|------------------------------|------------------------|----------------------------------|-------------|--------------------------------|-------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn                   | DEMA<br>FLO\<br>[ Total<br>veh/h |             | ARRI<br>FLO<br>[Total<br>veh/h | WS<br>HV]   | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South                        | SouthEast: Vines Drive |                                  |             |                                |             |                     |                       |                     |            |                              |              |                             |                    |                        |
| 21<br>23                     | L2<br>R2               | 18<br>33                         | 0.0<br>19.4 | 18<br>33                       | 0.0<br>19.4 | 0.102<br>0.102      | 6.7<br>13.5           | LOS A<br>LOS A      | 0.3<br>0.3 | 2.5<br>2.5                   | 0.55<br>0.55 | 0.75<br>0.75                | 0.55<br>0.55       | 49.7<br>44.3           |
| Appro                        | oach                   | 51                               | 12.5        | 51                             | 12.5        | 0.102               | 11.0                  | LOS A               | 0.3        | 2.5                          | 0.55         | 0.75                        | 0.55               | 47.0                   |
| North                        | East: L                | ondonde                          | rry Roa     | ıd                             |             |                     |                       |                     |            |                              |              |                             |                    |                        |
| 24                           | L2                     | 119                              | 1.8         | 119                            | 1.8         | 0.234               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.15                        | 0.00               | 55.5                   |
| 25                           | T1                     | 323                              | 3.6         | 323                            | 3.6         | 0.234               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.15                        | 0.00               | 58.5                   |
| Appro                        | oach                   | 442                              | 3.1         | 442                            | 3.1         | 0.234               | 0.7                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.15                        | 0.00               | 57.7                   |
| South                        | nWest: I               | Londonde                         | erry Ro     | ad                             |             |                     |                       |                     |            |                              |              |                             |                    |                        |
| 31                           | T1                     | 443                              | 2.1         | 443                            | 2.1         | 0.328               | 0.9                   | LOS A               | 1.3        | 9.5                          | 0.29         | 0.14                        | 0.31               | 55.7                   |
| 32                           | R2                     | 111                              | 0.0         | 111                            | 0.0         | 0.328               | 7.9                   | LOS A               | 1.3        | 9.5                          | 0.29         | 0.14                        | 0.31               | 55.6                   |
| Appro                        | oach                   | 554                              | 1.7         | 554                            | 1.7         | 0.328               | 2.3                   | NA                  | 1.3        | 9.5                          | 0.29         | 0.14                        | 0.31               | 55.7                   |
| All Ve                       | hicles                 | 1046                             | 2.8         | 1046                           | 2.8         | 0.328               | 2.1                   | NA                  | 1.3        | 9.5                          | 0.18         | 0.17                        | 0.19               | 55.8                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2031 AM WD (Site Folder: 2031 With Development)]

■■ Network: N101 [2031 - AM - WD - N1 (Network Folder: 2031

WD)]

Londonderry Road x Southee Road 2031: Future Growth + School AM Peak: 8:15-9:15

Site Category: With Development

Give-Way (Two-Way)

| Vehicle Movement Performance |          |                                  |            |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
|------------------------------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |            | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North                        | East: L  | ondonde                          | rry Roa    | ıd                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 25<br>26                     | T1<br>R2 | 232<br>17                        | 4.1<br>6.3 | 232<br>17                       | 4.1<br>6.3 | 0.138<br>0.138      | 0.3<br>7.8            | LOS A<br>LOS A      | 0.2<br>0.2 | 1.4<br>1.4                   | 0.10<br>0.10 | 0.04<br>0.04                | 0.10<br>0.10       | 56.9<br>55.6           |
| Appro                        | oach     | 248                              | 4.2        | 248                             | 4.2        | 0.138               | 0.8                   | NA                  | 0.2        | 1.4                          | 0.10         | 0.04                        | 0.10               | 56.7                   |
| North                        | West:    | Southee F                        | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 27                           | L2       | 42                               | 5.0        | 42                              | 5.0        | 0.359               | 7.8                   | LOSA                | 1.6        | 11.4                         | 0.57         | 0.86                        | 0.72               | 47.1                   |
| 29                           | R2       | 209                              | 1.0        | 209                             | 1.0        | 0.359               | 10.3                  | LOS A               | 1.6        | 11.4                         | 0.57         | 0.86                        | 0.72               | 45.4                   |
| Appro                        | oach     | 252                              | 1.7        | 252                             | 1.7        | 0.359               | 9.9                   | LOS A               | 1.6        | 11.4                         | 0.57         | 0.86                        | 0.72               | 45.8                   |
| South                        | nWest:   | Londonde                         | erry Ro    | ad                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30                           | L2       | 123                              | 1.7        | 123                             | 1.7        | 0.252               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 55.5                   |
| 31                           | T1       | 353                              | 3.6        | 353                             | 3.6        | 0.252               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 57.3                   |
| Appro                        | oach     | 476                              | 3.1        | 476                             | 3.1        | 0.252               | 0.7                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.14                        | 0.00               | 56.6                   |
| All Ve                       | hicles   | 976                              | 3.0        | 976                             | 3.0        | 0.359               | 3.1                   | NA                  | 1.6        | 11.4                         | 0.17         | 0.30                        | 0.21               | 52.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 1 [Londonderry x Vines 2031 PM WD (Site Folder: 2031 With Development)]

■■ Network: N101 [2031 - PM - WD - N1 (Network Folder: 2031

WD)]

Londonderry Road x Vines Drive 2031: Future Growth + School PM Peak: 15:45-16:45

Site Category: With Development

Give-Way (Two-Way)

| Vehicle Movement Performance |          |                                  |         |                                 |           |                     |                       |                     |      |                              |              |                             |                    |                        |
|------------------------------|----------|----------------------------------|---------|---------------------------------|-----------|---------------------|-----------------------|---------------------|------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn     | DEMA<br>FLOV<br>[ Total<br>veh/h |         | ARRI<br>FLO<br>[ Total<br>veh/h | WS<br>HV] | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |      | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| South                        | nEast: V | ines Driv                        |         | VOII/II                         | 70        | V/ 0                |                       |                     | VOII |                              |              |                             |                    | NIII/II                |
| 21                           | L2       | 71                               | 0.0     | 71                              | 0.0       | 0.220               | 7.4                   | LOS A               | 0.8  | 5.7                          | 0.56         | 0.78                        | 0.56               | 50.5                   |
| 23                           | R2       | 72                               | 8.8     | 72                              | 8.8       | 0.220               | 12.0                  | LOS A               | 8.0  | 5.7                          | 0.56         | 0.78                        | 0.56               | 45.7                   |
| Appro                        | oach     | 142                              | 4.4     | 142                             | 4.4       | 0.220               | 9.7                   | LOS A               | 0.8  | 5.7                          | 0.56         | 0.78                        | 0.56               | 48.8                   |
| North                        | East: L  | ondonde                          | rry Roa | ad                              |           |                     |                       |                     |      |                              |              |                             |                    |                        |
| 24                           | L2       | 36                               | 0.0     | 36                              | 0.0       | 0.253               | 2.7                   | LOS A               | 0.0  | 0.0                          | 0.00         | 0.04                        | 0.00               | 56.5                   |
| 25                           | T1       | 447                              | 3.1     | 447                             | 3.1       | 0.253               | 0.0                   | LOS A               | 0.0  | 0.0                          | 0.00         | 0.04                        | 0.00               | 59.5                   |
| Appro                        | oach     | 483                              | 2.8     | 483                             | 2.8       | 0.253               | 0.2                   | NA                  | 0.0  | 0.0                          | 0.00         | 0.04                        | 0.00               | 59.2                   |
| South                        | nWest: I | ondonde                          | erry Ro | ad                              |           |                     |                       |                     |      |                              |              |                             |                    |                        |
| 31                           | T1       | 395                              | 3.2     | 395                             | 3.2       | 0.216               | 0.1                   | LOS A               | 0.1  | 0.9                          | 0.04         | 0.02                        | 0.04               | 59.4                   |
| 32                           | R2       | 11                               | 0.0     | 11                              | 0.0       | 0.216               | 7.9                   | LOS A               | 0.1  | 0.9                          | 0.04         | 0.02                        | 0.04               | 57.4                   |
| Appro                        | oach     | 405                              | 3.1     | 405                             | 3.1       | 0.216               | 0.3                   | NA                  | 0.1  | 0.9                          | 0.04         | 0.02                        | 0.04               | 59.3                   |
| All Ve                       | ehicles  | 1031                             | 3.2     | 1031                            | 3.2       | 0.253               | 1.6                   | NA                  | 0.8  | 5.7                          | 0.09         | 0.13                        | 0.09               | 57.0                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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V Site: 2 [Londonderry x Southee 2031 PM WD (Site Folder: 2031 With Development)]

■■ Network: N101 [2031 - PM - WD - N1 (Network Folder: 2031

WD)]

Londonderry Road x Southee Road 2031: Future Growth + School PM Peak: 15:45-14:45

Site Category: With Development

Give-Way (Two-Way)

| Vehicle Movement Performance |          |                                  |            |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
|------------------------------|----------|----------------------------------|------------|---------------------------------|------------|---------------------|-----------------------|---------------------|------------|------------------------------|--------------|-----------------------------|--------------------|------------------------|
| Mov<br>ID                    | Turn     | DEMA<br>FLO\<br>[ Total<br>veh/h |            | ARRI<br>FLO'<br>[Total<br>veh/h | WS<br>HV]  | Deg.<br>Satn<br>v/c | Aver.<br>Delay<br>sec | Level of<br>Service |            | ACK OF<br>EUE<br>Dist ]<br>m | Prop.<br>Que | Effective A<br>Stop<br>Rate | ver. No.<br>Cycles | Aver.<br>Speed<br>km/h |
| North                        | East: L  | ondonde                          | rry Roa    | ıd                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 25<br>26                     | T1<br>R2 | 383<br>73                        | 3.0<br>1.4 | 383<br>73                       | 3.0<br>1.4 | 0.268<br>0.268      | 0.7<br>8.0            | LOS A<br>LOS A      | 0.8<br>0.8 | 5.9<br>5.9                   | 0.23<br>0.23 | 0.11<br>0.11                | 0.23<br>0.23       | 53.1<br>54.6           |
| Appro                        | oach     | 456                              | 2.8        | 456                             | 2.8        | 0.268               | 1.8                   | NA                  | 0.8        | 5.9                          | 0.23         | 0.11                        | 0.23               | 53.7                   |
| North                        | West: S  | Southee F                        | Road       |                                 |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 27                           | L2       | 34                               | 0.0        | 34                              | 0.0        | 0.218               | 6.6                   | LOSA                | 0.8        | 5.4                          | 0.53         | 0.78                        | 0.54               | 47.7                   |
| 29                           | R2       | 100                              | 2.1        | 100                             | 2.1        | 0.218               | 11.0                  | LOS A               | 8.0        | 5.4                          | 0.53         | 0.78                        | 0.54               | 45.4                   |
| Appro                        | oach     | 134                              | 1.6        | 134                             | 1.6        | 0.218               | 9.9                   | LOS A               | 0.8        | 5.4                          | 0.53         | 0.78                        | 0.54               | 46.1                   |
| South                        | nWest:   | Londonde                         | erry Ro    | ad                              |            |                     |                       |                     |            |                              |              |                             |                    |                        |
| 30                           | L2       | 179                              | 4.7        | 179                             | 4.7        | 0.251               | 2.7                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 54.8                   |
| 31                           | T1       | 288                              | 3.6        | 288                             | 3.6        | 0.251               | 0.0                   | LOS A               | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 56.3                   |
| Appro                        | oach     | 467                              | 4.1        | 467                             | 4.1        | 0.251               | 1.0                   | NA                  | 0.0        | 0.0                          | 0.00         | 0.21                        | 0.00               | 55.4                   |
| All Ve                       | ehicles  | 1057                             | 3.2        | 1057                            | 3.2        | 0.268               | 2.5                   | NA                  | 8.0        | 5.9                          | 0.17         | 0.24                        | 0.17               | 52.7                   |

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab). Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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