Attachment 3: Transport Assessment prepared by ARUP

Meriton Group

112 Talavera Road, Macquarie Park

Transport Assessment

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Job number 252454-00

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SIDRA Assessment

1 Introduction

1.1 Overview

Meriton Group has engaged Arup to provide a transport assessment to support the Planning Proposal of 112 Talavera Road, Macquarie Park. The site is currently known as the Macquarie View Corporate Park, and is located within the northern section of the Macquarie University Station Priority Precinct. The site is approximately 1.95 hectares and currently supports a predominately commercial/ industrial land use.

The development proposal looks to transform the site in phases, into a mixed use development supporting approximately 1,256 apartments and 1,500 sqm of childcare/retail uses.

This report also provides additional information following discussion with Roads and Maritime Services, Ryde Council, Department of Planning and Environment on 8 August 2018. Specific reference is made to Alteration of Gateway Determination dated 27 July 2018 which refers to the Roads and Maritime letter dated October 2017. The key comments to be addressed by the

Conditions	Report reference
"The planning proposal is to be updated to: … (g) include a revised traffic impact assessment that	
i. incorporates Roads and Maritime Services' (RMS) SIDRA modelling advice dated October 2017;	Section 6.4 and Appendix A1
ii. considers the traffic generation implications of reduced parking rates	Sections 5.2.1 and 6.2.2
iii. incorporates future traffic growth. The applicable future growth rates to be modelled for the assessment of future traffic impacts are available from RMS by request; and	Section 2.4 and 0
iv. provides an assessment of entry/exit options of the site, including a demonstration of the impacts of the closure of the left-in access via the M2"	Sections 5.3 and 6.4.3

1.2 Reference documentation

Specific documentations referred to in this report includes:

- Development Control Plan (DCP), City of Ryde, 2014
- Ryde Local Environmental Plan, 2014
- State Environmental Planning Policy No 65 – Design Quality of Residential Apartment Development (SEPP 65)
- Apartment Design Guide, NSW Department of Planning and Environment, 2015
- Guide to Traffic Generating Developments, Road and Maritime Services, 2002
- Herring Road, Macquarie Park Finalisation Report, Department of Planning, 2015

1.3 Report Structure

The scope of this report will outline the following:

- Planning context
- Existing transport conditions
- Proposed development yields
- Vehicle access and parking
- Traffic impact assessment
- Public transport access
- Pedestrian and cycle access

2 Planning Context

2.1 Sydney Metro Northwest

Sydney Metro Northwest represents Stage 1 of the NSW Government's Sydney Metro project. Sydney Metro is a new proposed railway line that will deliver 31 metro stations and more than 65 kilometre of new metro rail (Figure 1).

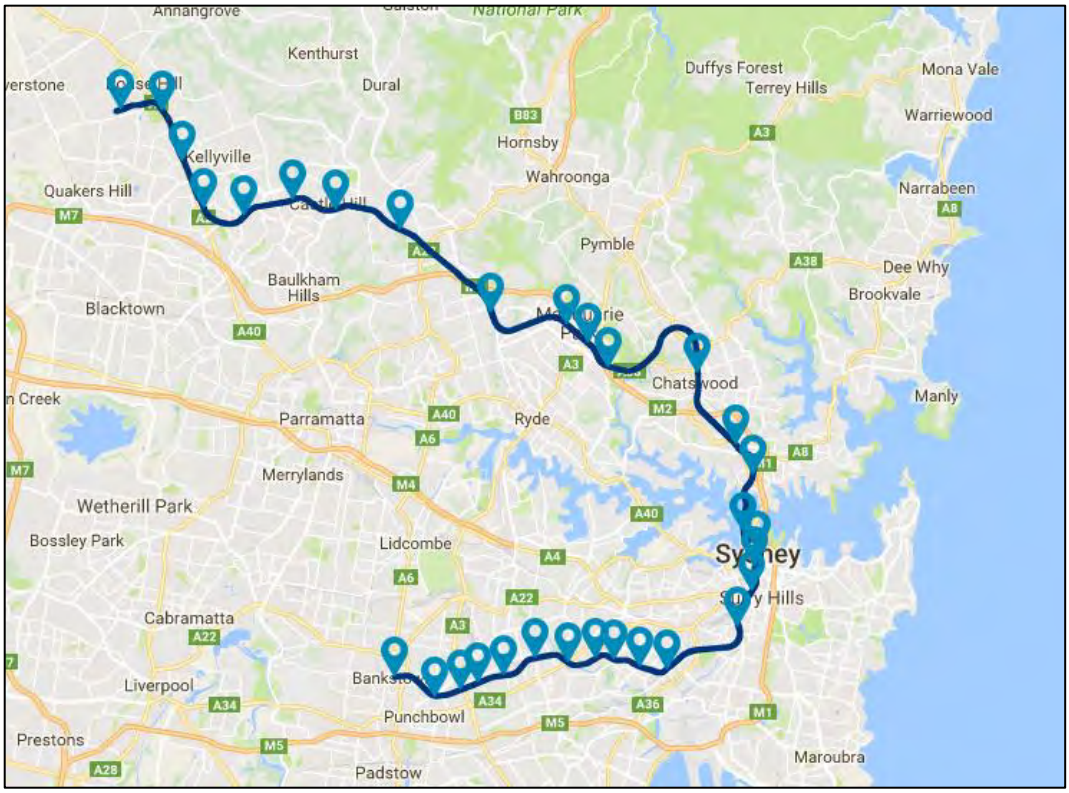


Figure 1: Proposed Sydney Metro alignment

Source: TfNSW (accessed 04/2017) https://www.sydneymetro.info/map/interactive-map

Sydney Metro Northwest will connect Rouse Hill to Chatswood, via Epping. This project proposes to convert the existing Epping to Chatswood railway line to rapid transit standard and extend this line to Cudgegong Road and Rouse Hill. This latter section of railway line was originally referred to as the North West Rail Link. A review of Transport for NSW's Sydney Metro website indicates project completion of Stage 1 is forecast for the first half of 2019, with rail replacement buses between Epping and Chatswood in late 2018.

The Macquarie University Station, which is within 400m of the development site, currently sits along the Epping to Chatswood railway line. It is one of five current railway stations which will be upgraded to metro standards as part of the Sydney Metro project. The number of train services between Epping and Chatswood is anticipated to increase by almost four times during the peak hour to 15 trains an hour in both direction. Direct services to Crows Nest, Barangaroo and Martin Place will also be introduce once Sydney Metro City and Southwest (Stage 2) is finished in 2024.

2.2 Epping and Macquarie Park Urban Renewal Area

The Epping and Macquarie Park Urban Renewal Area is a priority growth area outlined by the NSW government's Department of Planning and Environment (Department). As part of this initiative, the Department has worked with the Ryde Council and other stakeholders to identify opportunities to revitalise the Macquarie University Station (Herring Road) precinct.

The Finalisation Report for this precinct, completed by the department in 2015, focused on the walking catchment around Macquarie University Station and along Herring Road, which are currently zoned mixed use in the City of Ryde's Local Environmental Plan (LEP), 2014.

The report proposes amendments to Ryde's LEP to increase the height and density controls, especially around the station. The precinct will look to deliver up to 5,800 dwellings by 2031.

2.3 Macquarie Park Bus Priority and Capacity Improvements

Transport for NSW (TfNSW) and Roads and Maritime Services (Roads and Maritime) are proposing a range of road and intersection upgrades in Macquarie Park. Given the precinct's growth, these upgrades aim to improve the reliability and efficiency of bus services, while easing congestion and improving traffic flow for all road users in the area.

The proposal is currently out for public comment, with the feedback window closing in May 2017. This proposal would be delivered as part of the Bus Priority Infrastructure Program and will be separated into two stages.

Stage 1

As highlighted in section 2.1, Sydney Metro Northwest will temporarily close in late 2018, with rail replacement buses operating for approximately seven months. During this period the Temporary Transport Plan (TfNSW, 2014) will be implemented. Works on the proposed road and intersection upgrades will commence mid-2017 and once complete will support the running of current and additional rail replacement bus services and improved traffic flow in the area.

Stage 2

Following the completion of the Sydney Metro Northwest, the remainder of the proposed road and intersection upgrades will be carried out. These works will focus on long term improvements and ongoing support for the Parramatta to Macquarie Park and Hurstville to Burwood bus corridors as well as other bus services operating the in the area.

Some of the key proposed upgrades within proximity of 112 Talavera Road are outline in Figure 2.

Figure 2: Key features of the Macquarie Park bus priority and capacity improvements

2.4 Macquarie Park AIMSUN Model Review

It is understood that Transport for NSW and Roads and Maritime have been in discussions with The Department of Planning and Environment in regards to updating the Macquarie Park AIMSUN Model. The DPE letter dated 7 March 2018 noted that the planning proposal be updated to:

"1 (f) demonstrate consistency with the updated Aimsun traffic model for the Macquarie Park Precinct, available at request from RMS"

Arup is aware that the Macquarie Park Aimsun Model (MPAM) was built to understand the traffic and transport implications of the future development uplift in the Macquarie Park corridor. It covers the road network within the North Ryde Station precinct through to Culloden Road north of Macquarie University, and includes major arterial roads such as Lane Cove Road and Epping Road. The base year model considers the movement of approximately 25,000 individual traffic movements during both the AM and PM peak hour.

Arup have previously utilised the MPAM to under the future year traffic conditions in Macquarie Park – up to the year 2031. With the extent of development growth and uplift envisaged by the Transport for NSW owned Strategic Travel Model, the modelling indicated significant capacity constraints throughout the modelled area. Further, there was significant variation in each model run (using random seeds) due to these capacity constraints.

As part of this updated Transport Assessment, Roads and Maritime have provided output flows at the Talavera Road and Herring Road intersection for years 2021 and 2031. These flows have been used as the basis of future year modelling. It is assumed that traffic generation rates utilised in this model are consistent with the typical rates outlined in the Roads and Maritime guides.

3 Existing Context

3.1 Site description

The site subject to the planning proposal is located at 112 Talavera Road, Macquarie Park, approximately 17 km from Sydney CBD. The site is approximately 1.95 hectares in size and is situated within the City of Ryde local government area. The location plan is shown in Figure 3.

The site is bound by the M2 Motorway to the north, Herring Road to the east, Talavera Road to the south and Christie Road to the west. The site currently comprises of the Macquarie View Corporate Park with the Fujitsu Head Office commercial building abutting the site to the west.

Figure 3: Location plan

Background image source: Google Maps, accessed 2017

The site currently consists of an office tower and associated business park/ industrial uses. Existing vehicular access is provided along Talavera Road, Herring Road and Christie Road. The access from Christie Road is shared with a right of way easement with Fujitsu. As per the Ryde's LEP (2014) the development site is zoned B4, mixed use. This is shown in Figure 4.

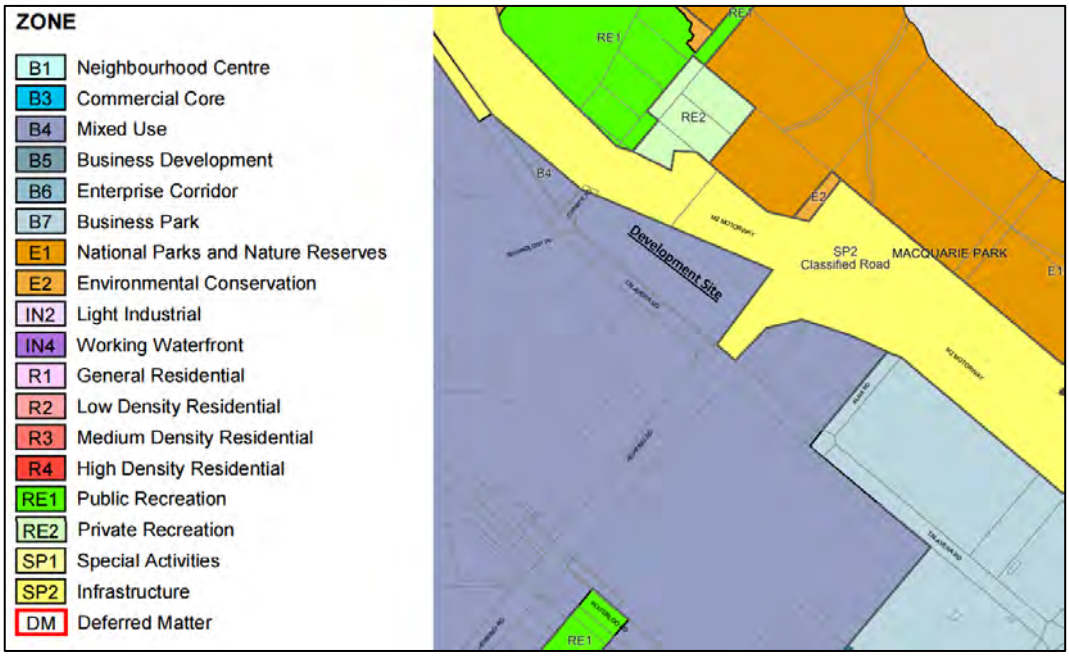


Figure 4: Land use zoning

Source: City of Ryde LEP (2014)

3.2 Road network

The site is bound by the M2 Motorway to the north, the Herring Road M2 on-ramp to the east, Talavera Road to the south and the Fujitsu commercial building to the west.

The M2 Motorway is a toll road that is operated by Transurban. It has a sign posted speed limit of 100km/h. In this vicinity, it operates as a six lane dual carriage way.

Talavera Road is an east-west regional road and generally consists of two lanes in each direction.

Herring Road is a north-south regional road. The section north of Talavera Road forms the on/off ramp to the M2 Motorway.

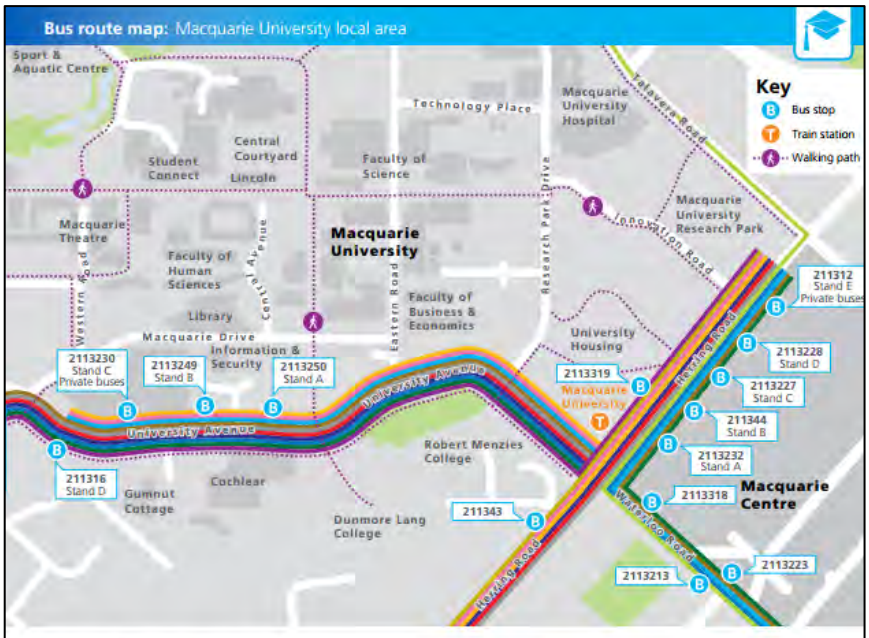
The key intersections surrounding the development site consists of:

- **Herring Road/ Talavera Road/ M2 Ramps:** Pedestrian crossing facilities are provided to all approaches to the intersection expect the eastern leg. A bus priority lane is provided on the western approach along Talavera Road, with the right turn movement from Talavera Road to Herring Road restricted for buses only.
- **Talavera Road/ Christie Road:** This signalised intersection caters for pedestrian crossing facilities on the north and west approaches. The Christie Road approach provides vehicular access to and from the M2 Motorway for traffic travelling eastbound.

3.3 Public transport

The site has good access to public transport and is within walking distance to both rail and bus services. Macquarie University Station is located 400m to the south of the development site and forms part of the Epping to Chatswood line. This station provides services between 5am to 11pm on a topical weekday and 13 train services arrive at the station during peak hours.

Several bus services operate along Talavera Road, fronting the development site. Macquarie University and Macquarie Centre are within close proximity, both of which provide high frequency buses connecting to Parramatta CBD, Sydney City and other major centres. Public transport options for the local area are summarised via Macquarie University's local area map (Figure 5).



Stop	Stand	Routes	Towards
University Avenue			
2113250	Stand A	288 290 291 292 294 506 507 518	City, McMahons Point
2113249	Stand B	M54 140 459 545	Macquarie Park, Manly, Strathfield, Chatswood
211316	Stand D	M54 140 288 290 291 292 544 545 550	Marsfield, Epping, Parramatta, Auburn
Herring Road			
2113232	Stand A	M54 506 507 518 544 545 550	Parramatta, City, Auburn
211344	Stand B	458 459 545	Strathfield, Burwood, Chatswood
2113227	Stand C	M54 140 288 290 291 292 294	Macquarie Park, Manly, McMahons Point, City
2113228	Stand D	140 288 290 291 292 295	Marsfield, Epping, North Epping
211343		288 290 291	Epping
2113319		M41	Marsfield
Waterloo Road			
2113213		292 545 550	Marsfield, Parramatta
2113223		M41 M54 292 294 458 459 506 545	Macquarie Park, Ryde, Rhodes, Burwood, Strathfield, Hurstville, City, Chatswood
2113318		M41	Ryde, Rhodes, Burwood, Hurstville

Figure 5: Local area public transport map

Source: Transport for NSW, September 2016

3.4 Active transport

The pedestrian network in the vicinity of the proposed development is of a reasonable quality with footpaths on both sides of Talavera Road. Good connectivity to nearby attractors such as Macquarie Centre, Macquarie University and Macquarie University Station is provided.

Walking isochrones from the proposed development site are shown in Figure 6, using the Arup developed T3A tool. This tool utilises pedestrian data from Open Street Map, with a walking speed of 5km/h. The isochrones indicate the area which can be reached within a certain walking time.

The assessment indicates that Macquarie Centre and Macquarie University Station are both approximately five minutes walk of the development site, while Macquarie University can be accessed within 15 minutes.

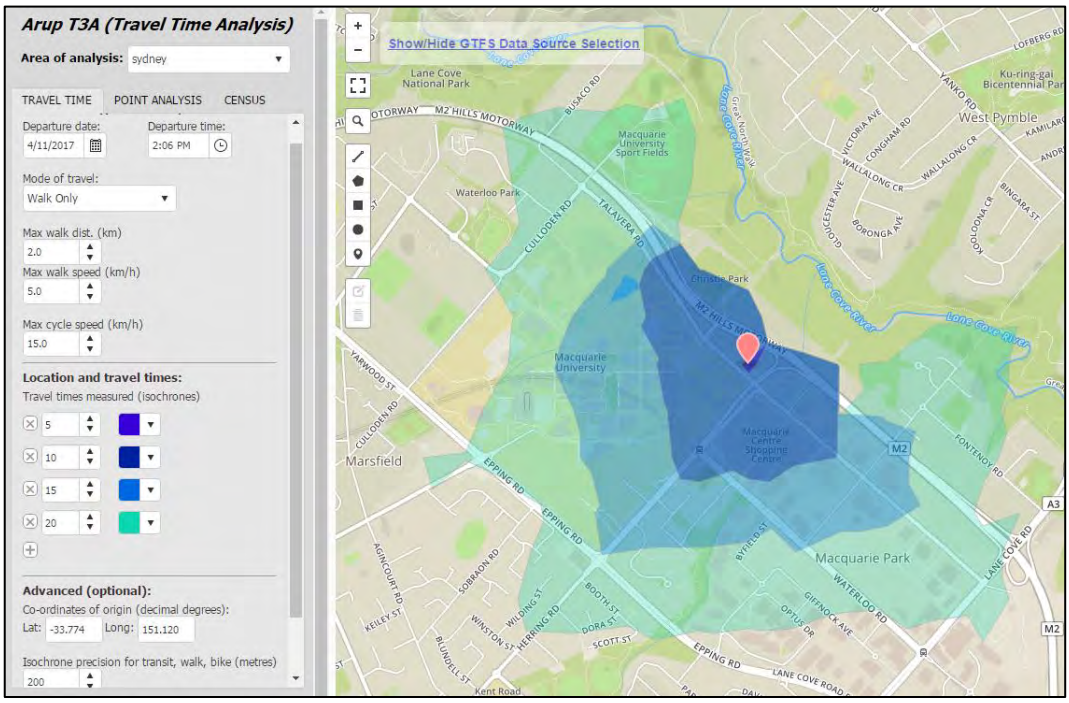


Figure 6: Walking isochrones, Arup T3A

The existing dedicated and low difficulty cycle routes, recommended by the Roads and Maritime Cycleway Finder is shown in Figure 7. Existing cycle routes are relatively well connected with off-road paths located along Talavera Road and Waterloo Road.

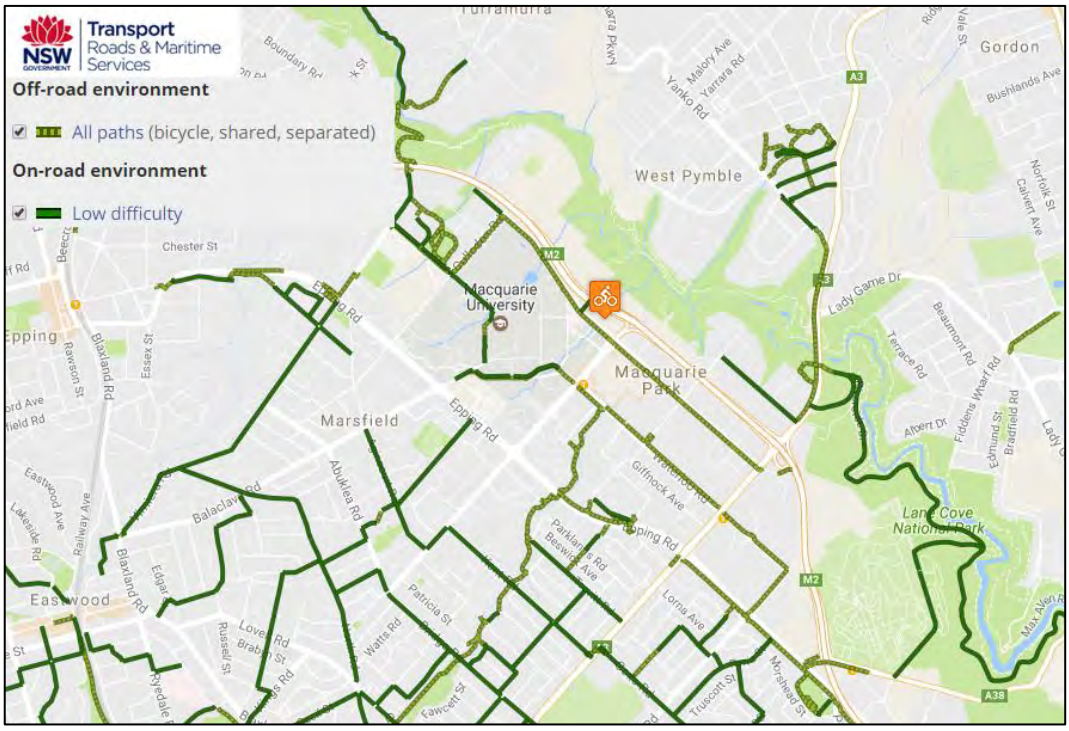


Figure 7: Cycle network map

Source: Roads and Maritime Cycleway Finder

3.5 Travel patterns

Analysis of travel modes of people who live and work in the immediate area has been undertaken. A review of the 2016 Census Travel to Work data was conducted to assess people's method of commute to and from the suburb. This information is collected as part of the Census and it captures commuter travel behaviours for one particular day.

3.5.1 Workers of Macquarie Park

An approximate total of 48,400 people was recorded working in the Macquarie Park area in 2011. The Travel to Work data indicates that the majority of workers in the area use private vehicle as the primary form of commute. Public and active transport make up less than 30% of all respondents in the area. A summary of worker mode share is shown in Table 1.

Table 1: Workers travelling to Macquarie Park

Mode	Trips	Proportion
Public Transport	11,744	24%
Private Vehicle	30,299	63%
Active Transport	1,576	3%
Other Mode	184	0%
Worked at home or Did not go to work	4,251	9%
Mode not stated	340	1%
Not applicable	0	0%
Total	48,394	100%

3.5.2 Residents of Macquarie Park

The Census data indicates there are approximately 18,700 working residents that live in the Macquarie Park area in 2016. Unlike the workers within the area, the data shows that the commuting patterns of residents in Macquarie Park are more balanced. With an approximate 50/50 split of survey respondents indicating private vehicle compared to public and active transport as a method of travel to work as indicated in Table 2. It is important to note this covers areas that do not necessarily have immediate access to the public transport nodes.

Table 2: Residents commuting from Macquarie Park

Mode of travel	Trips	Proportion
Public Transport	3,126	17%
Private Vehicle	4,527	24%
Active Transport	994	5%
Other Mode	36	0%
Worked at home or Did not go to work	1,228	7%
Mode not stated	89	0%
Not applicable	8,736	47%
Total	18,742	100%

3.6 Road safety

Crashes were analysed on the surrounding streets of the site over the most recent five-year period (from July 2011 – June 2016 inclusive). Overall, there were 82 crashes recorded, of which there were no fatalities, 47 injury crashes involving 59 casualties and 35 non-casualty (tow away) crashes. The data also indicates a fairly even distribution of crashes per year as shown in Figure 8 (accounting for the half years for 2011 and 2016).

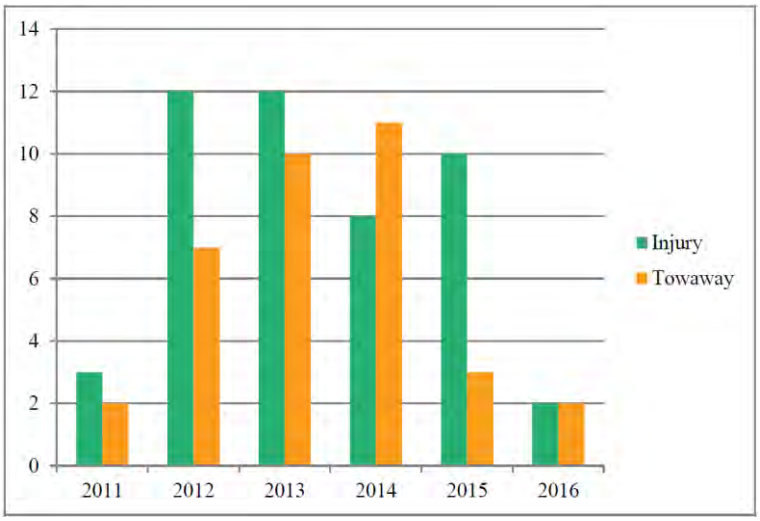


Figure 8: Degree of crashes per year (2011-2016) on surrounding streets

The crash data was classified into the various road user movement (RUM) codes to analyse crash clustering. The majority of crash types were recorded as vehicles from opposing directions, followed by vehicles in the same direction which are common along arterial roads and at intersections (Figure 9).

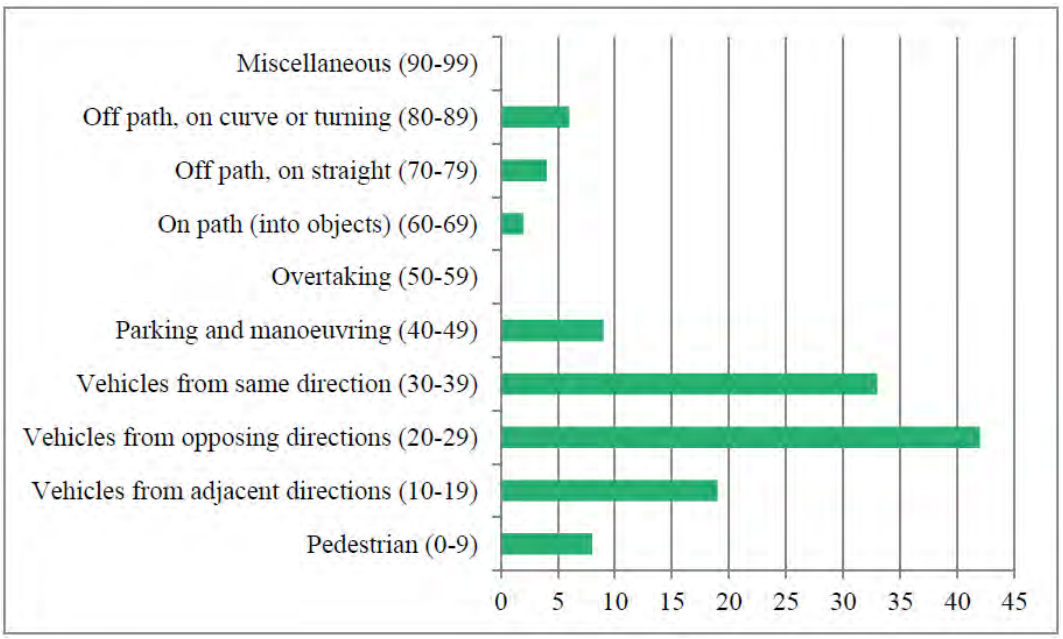


Figure 9: Crash types by road user movement categories

The majority of crashes occurred at intersections and included the lower rum codes. However, there were some crashes recorded midblock on Talavera Road, which included a rear-left, opposing right-thru crash and a rear end due to another crash. The opposing right-thru crash was recorded in 2013 and involved a vehicle turning right into the site access. The other rear-left crash was attributed to the University access opposite the site.

4 Proposed Development

The development proposes approximately 1,256 residential apartments over four buildings. Arup understands that this is approximately 350 apartments in addition to the current planning controls for this site. The proposed development is planned to be constructed in phases. A summary of the residential development yields per building is shown in Table 3

Table 3: Residential yield summary of the proposed development per building

Yield Summary	Building A	Building B	Building C	Building D	Total
One Bedroom	55	194	56	128	433
Two Bedroom	102	240	126	195	663
Three Bedroom	30	59	26	45	160
TOTAL	**187**	**493**	**208**	**368**	**1,256**

Arup understands that up to 25 apartments may be dedicated to Council affordable housing. It should be noted that no affordable housing has been allowed for in this transport assessment.

In addition to the residential component, up to two 600sqm child care centres are proposed to be included (as part of each development phase). Each child care centre is anticipated to cater for 100 children and 20 staff per phase. There is also a small retail component of 300sqm proposed.

A concept site plan is shown in Figure 10 below.

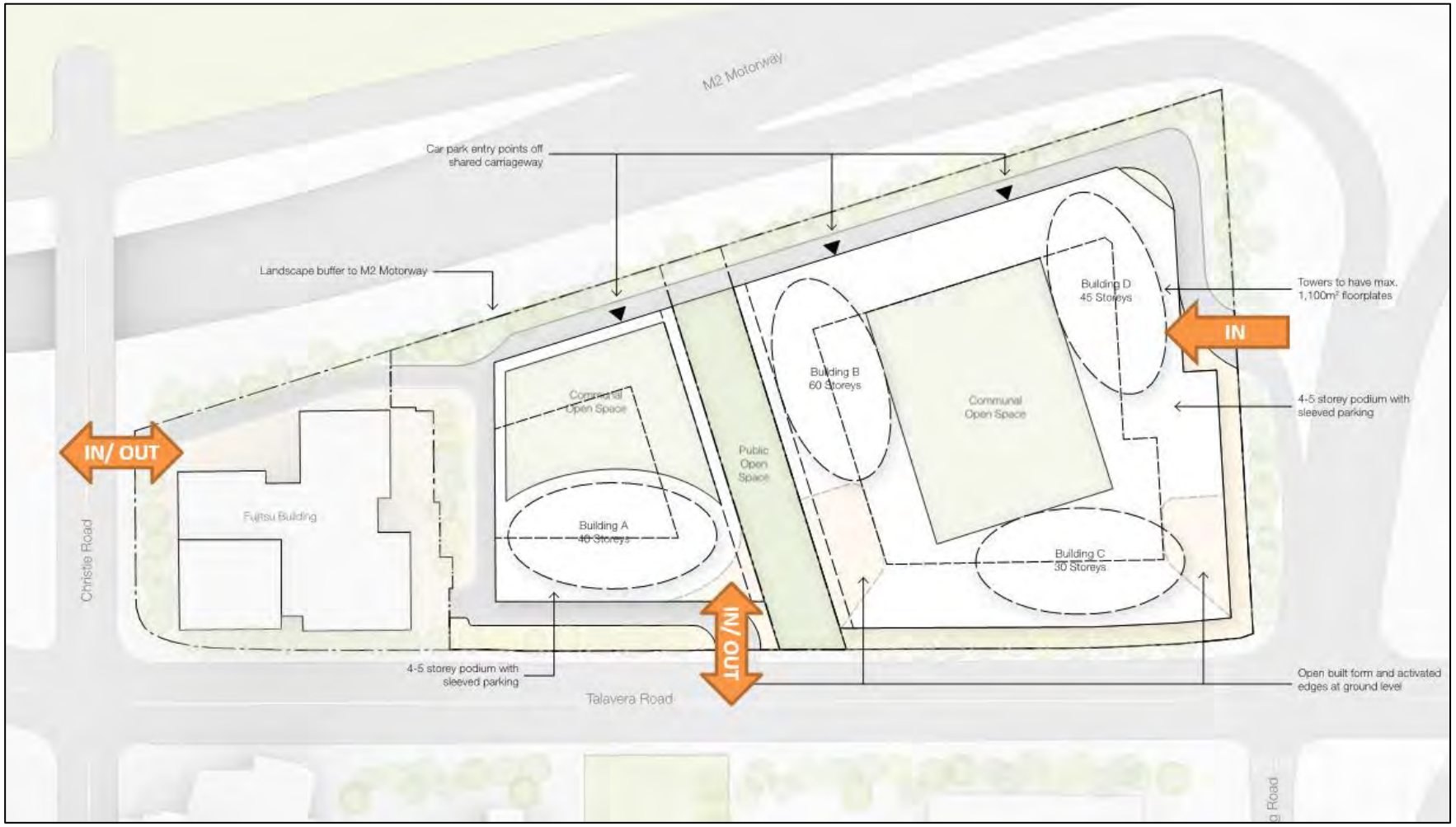


Figure 10 Site concept plan (Source: SJB Architects, May 2017)

5 Parking and Vehicle Access

5.1 Existing parking

A review of the existing parking supply was conducted. The capacity and occupancy during the morning peak of a typical weekday is summarised in Table 4.

Table 4: Existing parking supply and occupancy

Site	Level	Spaces	Occupancy*
Fujitsu Site	Lower level	85	25%
	Middle level	86	50%
	Upper level	72	25%
Development Site	At Grade	187	100%
	Service Bays	8	-
	Upper Basement	60	50%
	Lower Basement	60	50%

* Occupancy was recorded during the morning peak hour of a typical weekday

5.2 Parking requirements

5.2.1 Car parking

A review of the City of Ryde Development Control Plan (DCP) 2014 indicates the following **maximum** residential parking rates for the Macquarie Park Corridor:

- 1 bedroom – 0.6 bays per dwelling
- 2 bedroom – 0.9 bays per dwelling
- 3 bedroom or more – 1.4 bays per dwelling
- Visitor parking – 1 bay per 10 dwellings
- Car Share – 1 bay per 50 required parking spaces

The Apartment Design Guide provides design criteria and general guidance regarding how development proposals can achieve the quality principles identified in the State Environmental Planning Policy No 65 - Design Quality of Residential Apartment Development (SEPP 65). Applying transit oriented development principles, the guide indicates that on-site car parking on a site that is within 800m of a railway station in the Sydney metropolitan area should take the minimum of either the council DCP or Roads and Maritime's Guide to Traffic Generating Developments. In this case, the parking rates outlined the DCP are maximum and the development has considered reducing rates further.

A review of the DCP was also conducted to identify the baseline parking requirements for the proposed child care centres. The rates were as follows:

- 1 space per 8 children – this is to facilitate the drop off and pick up of children
- 1 space per 2 staff – to facilitate parking for employees

The assumptions applied to the calculation of parking requirements are as follows:

- As the child care centres are anticipated to predominately serve the residents on site, it is proposed to share the residential visitor parking with the child care component

The estimated parking potential per building for this development are summarised in Table 5.

Table 5: Summary of potential maximum parking permitted on site

Use types	**Building**				**Total**
	A	**B**	**C**	**D**	
1 bed	33	116	34	77	260
2 bed	92	216	113	176	597
3 bed	42	83	36	63	224
Visitor Parking	19	49	21	37	126
Car Share Parking	4	9	4	7	24*
TOTAL	**190**	**473**	**208**	**360**	**1,232**

* From experience on other residential projects, it is recommended that consultation with car share companies such as Go Get be conducted during subsequent stages of design to achieve a more realistic provision of allocated car share bays.

Traffic generation will be discussed in more detail in the Section 6, however it is important to note that the actual supply of parking will have an influencing factor on traffic generation. Though this statement may seem obvious, current guidance does not correlate these two factors. Arup recently undertook research which considered the influencing factors that contribute to the level of traffic generated by high density residential developments. The research specifically considered how the provision of on-site parking and site location may influence traffic generation rates.

Key findings of the research was that the rate at which parking is provided within residential developments was found to influence the overall level of traffic generated by that development. Further, the consideration of public transport accessibility was found to influence the level of traffic generation. Figure 11 shows the relatively positive correlation between peak hour traffic generation and parking provision.

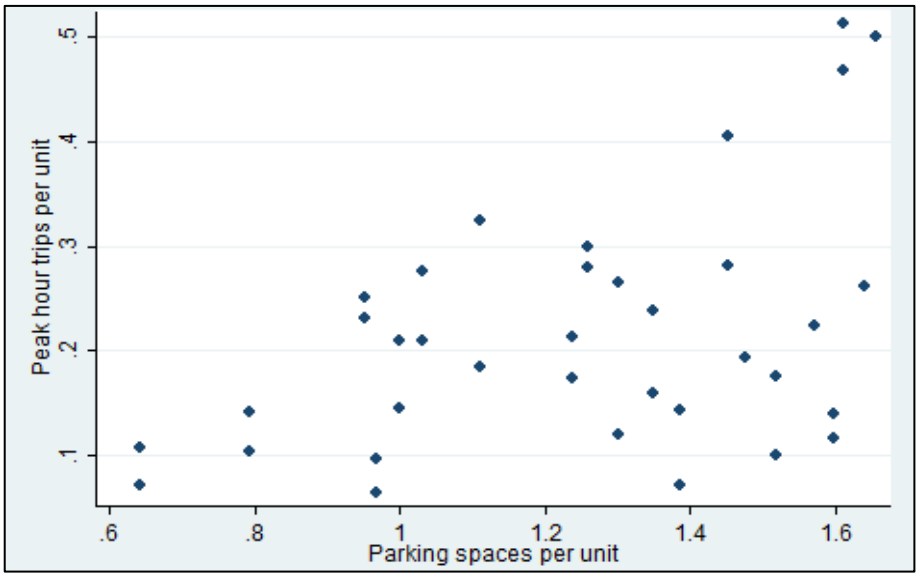


Figure 11: Correlation between peak traffic generation and parking spaces per unit

Given the Macquarie Park Corridor's evolution from business park uses to a specialised employment centre, this development should be cognisant that reduced parking provision will likely lead to lower traffic generation.

In regards to the parking provision, using the RTA parking rates could theoretically reduce car mode share (see Table 5). It is anticipated that a mode shift from 52% to 28% based on the parking provision and trip rates per parking space.

However, to adopt Roads and Maritime objectives of no additional parking/traffic compared to the no uplift (i.e. 879 units) scenario, an alternative parking rate has been developed with lower parking rates that can be supported with the enhanced public transport provisions.

Table 6: Proposed parking rates for the development

Bedrooms	**Assumed Mix**	**RMS parking rates**	**Permitted base scenario**		**Uplift development scenario (PP)**		**Revised parking rates**
			Units	**Parking (RMS rates)**	**Units**	**Parking (RMS rates)**	
1	34%	0.6	303	182	433	259.8	**0.42**
2	53%	0.9	464	418	663	596.7	**0.63**
3	13%	1.4	112	157	160	224	**0.98**
Total		0.860	**879**	756	**1256**	1080.5	**0.602**

5.2.2 Bicycle parking

The City of Ryde's DCP highlights that cycling accounts for approximately 10% of the journey to work in the Ryde local government area and as a result requires bicycle parking to be provided at 10% of the required maximum car spaces. This control looks to provide for the minimum quantum of bicycle parking and to cater for anticipated increases in demand.

Secure bicycle parking should designed in accordance with the requirements of AS2890.3. The required bicycle parking result in a total of 124 bicycle spaces summarised by building below:

- Building A: 19 bicycle spaces
- Building B: 48 bicycle spaces
- Building C: 21 bicycle spaces
- Building D: 36 bicycle spaces

The development proposes to adopt the bicycle parking provision above.

5.3 Vehicle accesses

It is generally recommended that there should be least one access point per 500 car parking spaces on a site as per AS2890. Given that the development will supply a reduced parking provision outlined in Section 5.2.1 (882 spaces), the parking for Fujitsu (243 spaces) should also be taken into account resulting in a total of approximately 1,125 spaces will be provided across the site by the completion of the planning proposal development.

This would imply that conceptually three external access points should be allowed for to serve the anticipated traffic accessing the site. It is recommended to maximise the amount of vehicle storage space between the frontage road and the access gates for all driveways to minimise any impacts on the network traffic. This will still remove up to two existing access points along Talavera Road.

In order to better facilitate access onto the east bound on ramp of the M2 Motorway, it is recommended that a right turn out of the site is maintained at Talavera Road. Keep clear line marking can contribute to improving exiting movement from right turn vehicles at this location. This should be considered given the impacts associated with removing these right turns as previously suggested by the authorities.

5.3.1 M2 On-ramp access

During consultation with Roads and Maritime Services, the proponent has been advised to review access arrangements against the State Environmental Planning Policy (SEPP) Infrastructure 2007 on practicality. The following outlines the wording of the SEPP (in blue) and the proponent's response following:

(2) The consent authority must not grant consent to development on land that has a frontage to a classified road unless it is satisfied that:
(a) where practicable, vehicular access to the land is provided by a road other than the classified road, and –

It is noted that it is not practicable to redirect traffic to make erroneous and unsafe movements that will create additional congestion on the regional road network and reduce safety by encouraging vehicles to make unsafe manoeuvres. Otherwise, the M2 Motorway on-ramp access closure will limit vehicle access to the site by directing vehicles approaching from the east and south, requiring

vehicles to travel up to Research Park Drive roundabout (to perform a U-turn) and then travel back to Talavera Road.

The subject access point currently exists and there is no recorded crash history at the subject access point.

Design/signage adjustments can be made as required by Roads and Maritime. Access control can be granted to Roads and Maritime, the access point has existed for many years without any issues and the proposed development can improve the situation with reduced traffic, this site is very unique and will not set an undesirable precedent.

The impacts of the resulting redistribution of traffic along with potential right turn bans is shown in Figure 12 and further assessed in Section 6.4.3.

Figure 12: Impacts associated with closure of M2 On-ramp access driveway

(b) the safety, efficiency and ongoing operation of the classified road will not be adversely affected by the development as a result of:
(i) the design of the vehicular access to the land, or

The site access has not had known issues in the past and the proponent accepts adjustments of the design to address any concerns as per Roads and Maritime requirements, retaining the access.

(ii) the emission of smoke or dust from the development, or

Zoning is not changing and future uses will not emit smoke or dust.

(iii) the nature, volume or frequency of vehicles using the classified road to gain access to the land, and

The volume of traffic using the access will be reduced from the existing situation and the proponent is happy to accommodate any design changes necessary to retain the access.

The proposed increase in density has not resulted in any additional traffic generation by limiting the parking. This will ensure practical and safe access as well as encouraging more use for the Metro which is due to being operation in 2019.

(c) the development is of a type that is not sensitive to traffic noise or vehicle emissions, or is appropriately located and designed, or includes measures, to ameliorate potential traffic noise or vehicle emissions within the site of the development arising from the adjacent classified road.

The planning proposal allows for a taller, more slender built form which will pull the building away from the M2 Motorway, as well as retaining the perimeter road as a buffer. Appropriate design and acoustic measures will be adopted at the development application (DA) stage. This has already been addressed in the current DA.

5.4 Service vehicles

It is recommended that one service bay is provided for each of the phases of the development given that the Roads and Maritime Guide to Traffic Generating Development (Section 5.4.3) for high density housing states that:

The provision of at least one loading dock for residential use is desirable, although a dock intended for commercial uses may be sufficient.

Where service bays are to be located on the site circulation (private) road, they should be located such that sufficient sightlines to the one-way oncoming traffic is provided. A minimum recommend width of 7m should be provided to allow cars to pass stationary service vehicles.

Swept path analysis using a 12.5m long heavy rigid vehicle (as per AS2890.2) has been conducted to check access around the development site. It is not anticipated that service vehicles will be required to access the car park. This has been used to inform the development of the concept design.

6 Transport Impact Assessment

6.1 Person trip generation

Traffic generation forecasts for high-density residential uses are generally derived from the RMS Guide to Traffic Generating Developments – Updated Traffic Surveys (Roads and Maritime, August 2013), which stipulate that the quantum of traffic generated is based on the number of dwellings contained in the future development. Traffic generation rates are however typically influenced by a number of factors such as bulk and scale of the development, public transport availability, availability and cost of parking, mixed-use and complementary nature of various land use components and peak traffic generation hours.

Taking the proposed yields for the development site, an assessment of the person trip generation for the various modes was conducted. Reviewing data collected by Roads and Maritime (2014) for high density residential flat buildings; a peak hour person trip rate of 0.67 per unit was utilised for this assessment. Applying the residential yields outlined in Section 4, the peak hour people trips for each phase was calculated (Table 7).

Table 7: Forecast peak hour pedestrian trips

Building	Units	Peak Hour People Trips
A	187	125
B	493	329
C	208	139
D	368	245
Total	**1,256**	**838**

The residential land uses, in particular, market housing, are by far the most significant component of the proposed development. Therefore, adopting an appropriate traffic generation rate for this use is critical in determining the traffic impacts and required mitigation measures arising from the proposal. Typically this is done in one of two ways, as outlined below:

6.1.1 Determining vehicle mode share and trip generation

Previously, mode share assumptions which are broadly based on existing travel behaviour from residents of Macquarie Park and Marsfield area were used. This indicates a driver mode share of 52% during the AM peak hour (of those who travelled in Section 3.5.2).

Roads and Maritime surveys of high-density residential developments (as outlined in TDT 2013/04a) have indicated a trip (i.e. all modes) generation rate of 0.67 trips/dwelling as noted above. Applying the 52% vehicle driver mode share to this trip rate gives a traffic generation rate of 0.35 vehicles trips/dwelling.

6.1.2 Surveying a similar site

Given the complexities in forecasting traffic generation rates, it is good practice to survey a site with similar characteristics and features to that of the proposed development. The recently completed development at 120-128 Herring Road, which is opposite the Ivanhoe Estate site, is considered suitable to inform the development of a traffic generation rate.

Arup undertook a survey at this development during the AM and PM peak hours to determine the volume of traffic generated by the site in 2018. This survey recorded all vehicle entries and exits from the basement driveways at the buildings within the development, as shown in Figure 13. The survey results are shown in Table 8.

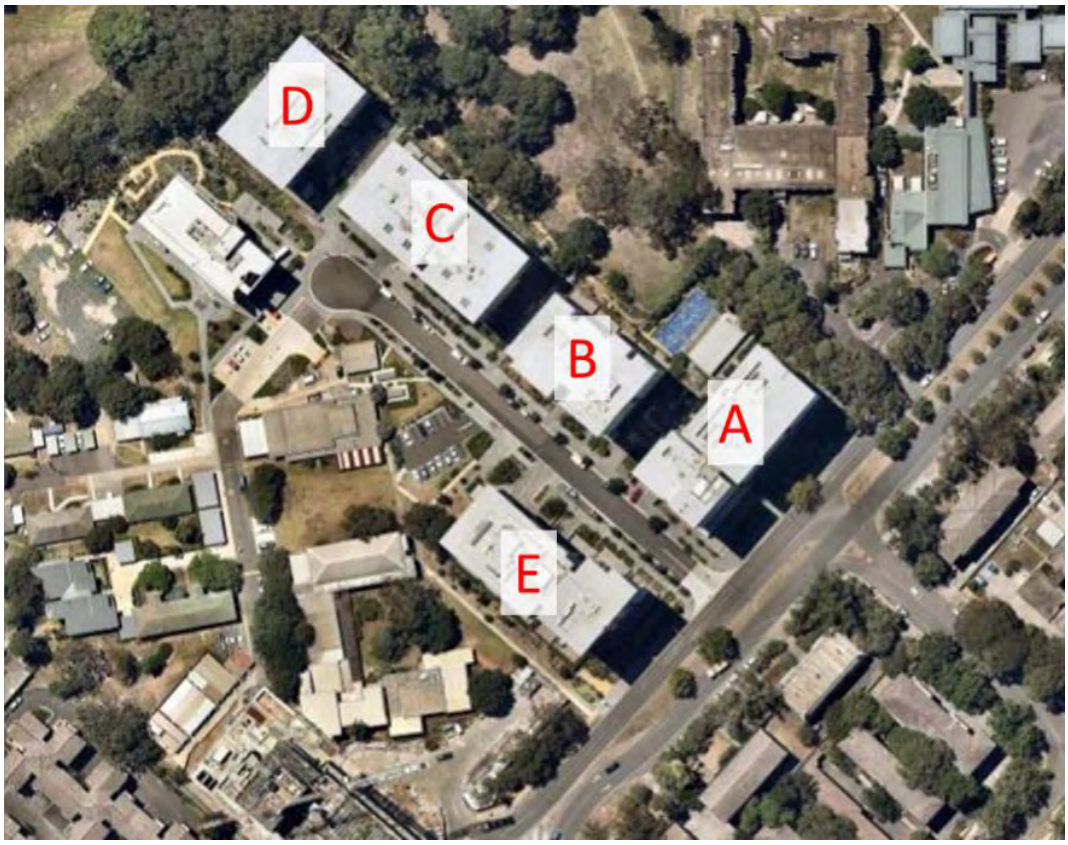


Figure 13: 120-128 Herring Road development

Table 8: Traffic generation for 120-128 Herring Road site

Building	# Units	No. of vehicles		Trip rate	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
A	129	26	19	0.11	0.08
B	117				
C	153	27	27	0.12	0.12
D	71				
E	148	23	18`	0.16	0.12
Average rate				**0.13**	**0.11**

6.1.3 Summary

- By comparing the survey results undertaken by Arup and the mode shares, it is concluded that the standard traffic generation rates for the high-density residential component of the development are appropriate
- The mode share assumptions (including those by public transport) should be adjusted to reflect the adopted traffic generation rate

6.2 Traffic generation

6.2.1 Existing

Traffic surveys were conducted for traffic accessing the development site and the surrounding the road network during the AM and PM peak hours on a typical week day. This is displayed in Figure 14 and Figure 15 below. A summary of the peak hour trips accessing the current site are as shown in Table 9.

Table 9: Summary of baseline traffic generation

Peak Hour	Fujitsu		Development Site (Existing)		Total	
	In	Out	In	Out	In	Out
AM (8am – 9am)	69	1	137	50	206	51
PM (5pm – 6pm)	3	54	58	162	61	216

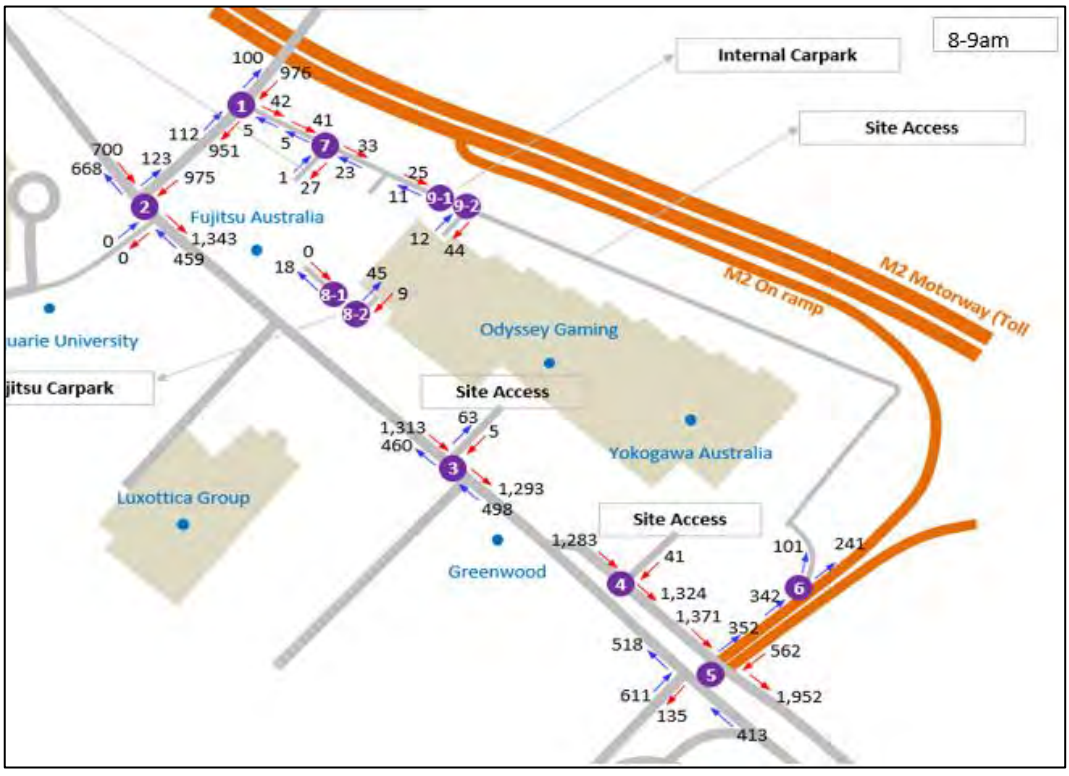


Figure 14: Baseline traffic generation - AM Peak

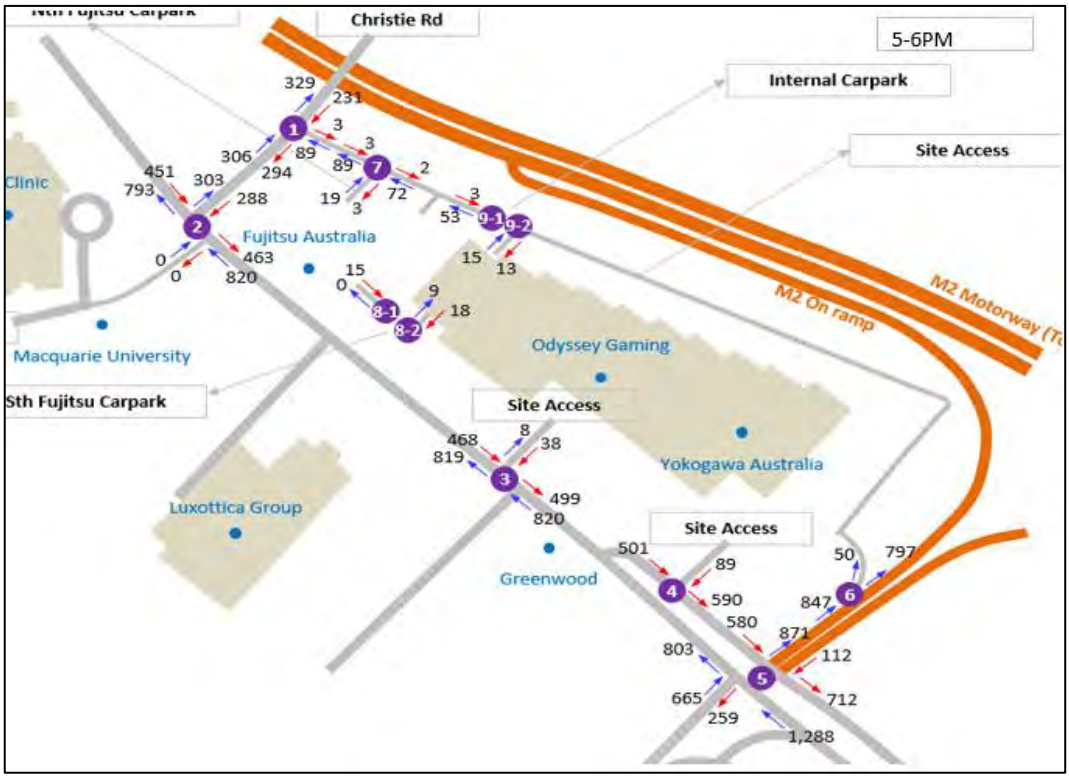


Figure 15: Baseline trip generation - PM Peak

6.2.2 Development

Under the proposed development yields, trip generation was estimated with the following assumptions (Table 11):

- The childcare centres serve mostly residents living on site and a reduced rate of trip generation has been applied.
- Residential trip rates have been based on the standard Roads and Maritime parking rates (based on reduced parking and surrounding development trip rates)

Table 10: Expected development trip generation rates per use

Land Use	AM	PM	Weekend
High density residential	0.15	0.12	0.21
Child Care*	0.6	0.54	-

*Child care trip generation rates reduced by 25% due to containment

The following in/ out proportions for the respective peak hours:

- AM (8:00 – 9:00) – 80% (out), 20% (in)
- PM (17:00 – 18:00) – 20% (out), 80% (in)
- Weekend (and childcare) – 50% (out), 50% (in)

- The Fujitsu site will continue to generate the same amount of traffic as observed in 2016, with negligible traffic on the weekend.

Table 11: Expected development trip generation per building

Building	AM		PM		Weekend	
	In	Out	In	Out	In	Out
A	4	16	13	3	14	14
B	10	39	31	8	34	34
C	4	17	14	3	15	15
D	7	30	24	6	26	26
Childcare	45	45	40	41	0	0
Total	**70**	**147**	**122**	**61**	**89**	**89**

6.2.3 Additional trips relative to existing

Traditionally, traffic generation at high density residential developments is dictated by the number of dwellings proposed. However, considering the reduced parking provision utilised by the development in comparison to the Macquarie Park corridor rates as well as the restrictive nature of on-street parking surrounding the development, traffic generation rates relating to the number of parking bays provided was investigated.

Comparison of the baseline with the development trip generation is shown in Table 12. Overall, the proposed development will generate an increase in traffic to the network relative to the existing land use. However, it should be noted that with the change in land use from commercial to residential, the proportion of trips entering and exiting the site will switch for the respective peak hours. With the adjacent commercial development (Fujitsu) this will have a balancing effect to in/out movements during the respective peak hours.

Table 12: Comparison of trip generation relative to existing (no Fujitsu traffic)

Peak hour	Baseline Traffic	Trip Rate per Car Space*	
		Development Traffic	Relative Difference
AM	187	217	+30
PM	220	183	-37

*Roads and Maritime trip generation rate of 0.15 and 0.12 trips per car space for the AM and PM peaks, respectively.

6.3 Traffic distribution

6.3.1 Existing distribution

Approximately 50% of the current 206 trips into the site are made via the M2 on-ramp entrance to the east of the site. The access point on Talavera Road is used by a further 30% of people entering the site, with the remaining 20% using the Christie Road entrance.

In the afternoon when majority of trips are leaving the site, the most common direction is left turn out of Christie Road (30%) and left out onto Talavera Road (16%). The right-turn movement out of Christie Road, while signed as left-only (facing inside the site), receives over 10% of trips. The right turn onto Talavera Road is difficult due to higher traffic volumes and is used by only 2% of people exiting the site.

(Note there is an additional exit access on Talavera Road which is being removed which accounts for the remaining 89 vehicles or 41% of the total site traffic.)

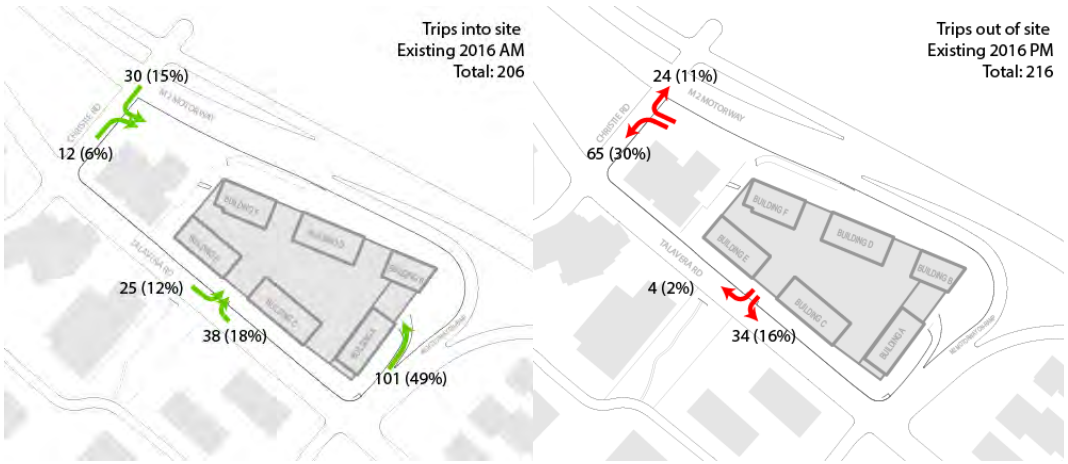


Figure 16: Trips into site in morning peak and out of site in evening, 2016

6.3.2 Potential future distribution

Changing the major land use of the site from commercial space to residential shifts the dominant traffic directions. Residential traffic generates mostly outbound trips in the morning peak and inbound trips in the evening, while commercial space has the opposite pattern. Combining the new residential development with the existing Fujitsu site evens out the traffic distribution so that entries and exits are more balanced than they currently are.

Given the traffic generation estimated in Table 11, future traffic patterns can be estimated by assuming that:

1. Fujitsu access is maintained as-is (entrance off Christie Road and Talavera Road maintained)
2. Access to the site via M2 on-ramp is entry only
3. Entry and exit to/from the site is made via Christie Road and Talavera Road
4. Left turn out of Christie Road only for site traffic.

Note that since the access point on Talavera Road is an entrance for Fujitsu, there are vehicles entering only in the AM peak since in the evening all traffic is leaving Fujitsu.

The future access points have been assumed to ban all right turns, so that traffic movements (including Fujitsu) were required to account for the banned right turns, including:

- Vehicles turning right onto Talavera Road were reallocated to the left turn movement onto Christie Street, to either continue north along Talavera Road or perform a U-Turn at Talavera Road / Research Park Drive;
- Right turning vehicles into the site from Talavera Road were reallocated to the access to the Herring Road on-ramps, with appropriate changes to the turning volumes at Talavera Road / Herring Road.

It has been assumed that the current authority Aimsun traffic modelling has taken these assumptions into account, inclusive of all the background development in the Macquarie Park area and retention of all of the existing access points. It should be noted that Fujitsu is a recently completed office development that is likely to stay in the foreseeable future.

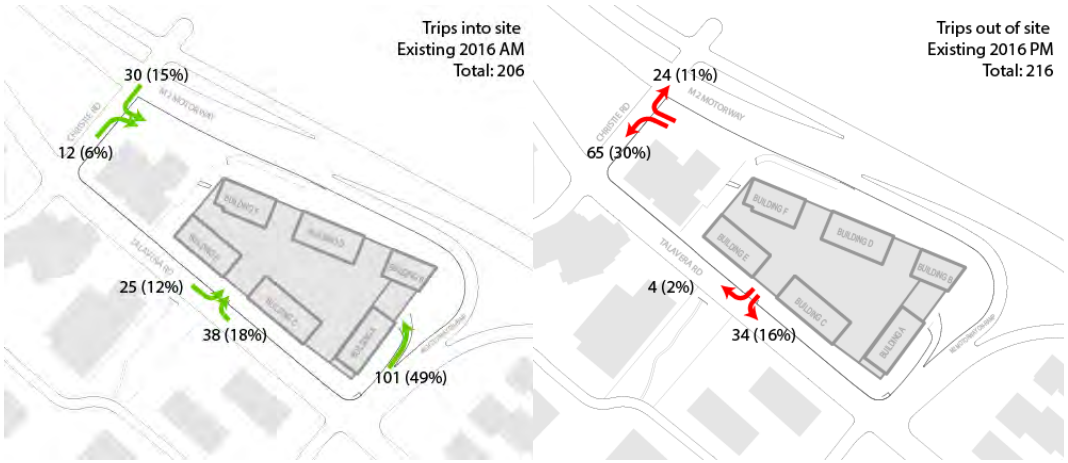


Figure 17: Trips into site in morning peak and out of site in evening, 2016

6.4 Local network performance

The intersections have been assessed using Roads and Maritime approved software SIDRA software (version 8) incorporating the commentary from the October 2017 letter. The intersections have been considered as a network to account for the effect of queuing on the network as a whole.

In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LOS), is based on the average delay per vehicle. LOS ranges from A = very good to F = unsatisfactory. In urban environments, no worse than a LOS of D is often aimed for.

The existing case (2016 volumes) is compared against the 2021 and 2031 future base cases, which is considered to be 2016 volumes with background growth and the development traffic. The 2021 and 2031 models are assumed to allow for the base development traffic (with 879 units on the site) with proposed right turn bans as a result of the previous rezoning submission for the Priority Precinct.

6.4.1 Modelling calibration

Previous models generated had calibrated a coordinated network, which operated much better than the revised isolated network that has been advised by Roads and Maritime. The 2016 models were previously calibrated by observed queue lengths at the intersections during the peak hours both from site visit and video footage, but have subsequently been adjusted as a result of this commentary.

The right turn onto Christie Street from the site was also banned to reflect current signposting at the egress, although it is still possible in the base case, as there were a number of vehicles observed illegally turning right.

A list of the assumptions and associated responses to the Roads and Maritime commentary is provided in Appendix A1.

6.4.2 Road network impacts

The critical intersection in the local network is Talavera Road and Herring Road. This intersection is unable to meet current demand with the revised phasing and non-coordinated nature of the network. This in turn impacts the operation of the Christie Road and Talavera Road intersection.

Changing the travel patterns of the area have been modelled by the 2021 and 2031 Aimsun network outputs provided by Roads and Maritime. This provides a slight improvement initially in 2021, but still results in significant delays.

In the morning, queues build up along Talavera Road, west of Herring Road due to the large volumes of eastbound traffic, as well as Herring Road south of the intersection. These queues therefore impact the Christie Road and Talavera Road intersection operation.

The intersection of Talavera Road and Herring Road is currently operating poorly and able to service the new traffic associated with the development of the study site. The west approach (Talavera Road) has higher delays than the other approaches in all cases since traffic must either give way or is held to allow the respective east-west and north-south pedestrian crossing.

Any slight variations on the sensitive nature of the unstable road network are expected to have significant flow on effects. Therefore, it is considered that the development will maintain the current trip generation associated with the reduced parking rates which have already been tested at a network level.

Results for each the AM peak period and PM peak period are displayed below in Table 13 and Table 14 respectively. Further detailed outputs and commentary are provided in the appendix.

Table 13: Intersection performance for AM peak period

Intersection	Year / Scenario	Degree of saturation	Average delay	Level of service
101 Christie Road / M2 ramps	2016	0.6	18	B
	2021	0.4	19	B
	2031	0.3	21	B
102 Christie Road / Site Access	2016	0.2	19	B
	2021	0.2	16	B
	2031	0.1	14	A
103 Christie Road / Talavera Road	2016	1.0	73	F
	2021	0.9	33	C
	2031	1.0	50	D
104 Site Access / Talavera Road	2016	0.4	52	D
	2021	0.3	67	E
	2031	0.3	62	E
105 Herring Road / Talavera Road	2016	1.0	69	E
	2021	1.0	75	F
	2031	1.1	137	F

Table 14: Intersection performance for PM peak period

Intersection	Year / Scenario	Degree of saturation	Average delay	Level of service
101 Christie Road / M2 ramps	2016	0.3	23	B
	2021	0.4	24	B
	2031	0.4	24	B
102 Christie Road / Site Access	2016	0.1	9	A
	2021	0.1	12	A
	2031	0.2	15	B
103 Christie Road / Talavera Road	2016	0.4	15	B
	2021	0.4	15	B
	2031	0.4	15	A
104 Site Access / Talavera Road	2016	0.2	25	B
	2021	0.2	36	C
	2031	0.4	49	D
105 Herring Road / Talavera Road	2016	0.8	55	D
	2021	0.9	50	D
	2031	1.0	71	F

6.4.3 Impacts of a potential M2 on-ramp access closure

As described in Section 5.3.1, there may be considerable impacts along Talavera Road with a proposed closure of the M2 On-ramp access. Given the proposed right turn bans outlined in Section 6.3.2, access to the site will be severely limited.

The closure of the additional access point will require any traffic from the south of the site (or within the Macquarie Park area) to also utilise the roundabout at Research Park Drive and Talavera Road to perform a U-turn, before re-joining southbound traffic on Talavera Road. The impact will be two-fold as it will also impact existing Fujitsu trips to the site, which is expected to remain in operation into the foreseeable future.

With the right turn bans, some 36% of the site's traffic will be added to the Christie Road and Talavera Road intersection (to account for the two trips through the intersection), with up to 18% performing a U-turn at Research Park Drive to enter the site via Talavera Road. There are similar results in the exit scenario, with some 22% of site traffic requiring to perform this U-turn.

With the removal of the on-ramp access point, the entering site traffic adds an additional 98% of site traffic through the Christie Road and Talavera Road intersection. Some 89% of development traffic will be required therefore to perform a U-turn manoeuvre at the roundabout.

This redistribution was modelled in the 2021 and 2031 scenarios and resulted in further impacts to the Christie Road and Talavera Road intersection, which is at capacity as a result of the network queuing impacts at the Talavera Road and Herring Road intersection. In the year 2031, the intersection fails and results in a level of service of F given the further delays from network queuing effects (see Table 15).

Table 15: Christie Road / Talavera Road impacts with on-ramp closure

Peak scenario	Year / Scenario	Degree of saturation	Average delay	Level of service
AM peak	2021	0.9	42	C
	2031	1.1	71	F
PM peak	2021	0.4	21	B
	2031	0.4	21	B

7 Recommendations and Conclusion

7.1 Public transport

As discussed in preceding sections, the site is currently serviced by a good array of public transport options. Macquarie University Station is located approximately 400m away and multiple bus routes service the area, with bus stops along Talavera Road as well Macquarie Centre and Macquarie University.

The construction of Sydney Metro Northwest, which is scheduled to be completed in late 2018, will boost the capacity of the public transport network with the inclusion of 15 peak hour trains in both directions along the Epping to Chatswood line. This is almost an increase of four times the current train frequencies.

Furthermore, Transport for NSW has plans to inject $60 million worth of bus priority and road infrastructure works in order to improve travel times, upgrade pedestrian safety and increase public transport reliability. This will commence prior to the construction of Sydney Metro Northwest and Stage 1 of the 2 stage programme will be focused on supporting the existing bus services during the construction shut down period of Macquarie University Station.

With current mode share for public transport of residents in Macquarie Park of approximately 30%, it is reasonable to expect this to increase to 40% with the boost in public transport infrastructure. As a result, this development site will likely generate approximately 350 peak hour pedestrian trips onto the public transport network.

7.2 Pedestrian and cycling

Walking and cycling are forecast to account for one in five trips generated by the site, a similar proportion to the current rate of 18%. In the peak hour the site is expected to generate around 200 trips on bike or on foot.

Pedestrian facilities in the area surrounding the site are generally of a reasonable quality, with footpaths of both sides of Talavera Road. Nearby Macquarie Centre, Macquarie University and Macquarie University Station are all well connected to the site and are all within a 15 minute walk of the site.

Cycling connections in the area are reasonable, with the southern footpath along Talavera Road marked as a shared pedestrian/cycle path and a number of smaller roads in the area considered low-difficulty.

7.3 Road network

Given the traffic generated from the proposed development is commensurate with the affects outlined in the previous rezoning work conducted by Department of Planning, it does not significantly impact the performance of the surrounding the road network.

The following improvements may be considered:

- The intersection of Talavera Road and Christie Road currently accommodates a pedestrian crossing on the western approach along Talavera Road. Given the geometry of the intersection and the current signal phasing there is potential to increase the capacity of the intersection if the pedestrian crossing was shifted to the eastern leg. This measure is not required to support this development.
- Coordination of signalised intersections surrounding the site could improve network results which currently indicate poor performance.

7.4 Summary

A transport assessment was conducted to examine the impacts of the proposed development at 112 Talavera Road on the surrounding transport network. The development is anticipated to accommodate approximately 1,256 new dwellings (approximately 350 apartments above the current planning controls) and two child care centres.

The site is serviced by reasonable pedestrian and cyclist connections as well as excellent access to public transport. The introduction of Sydney Metro Northwest will only add to the accessibility of this development to public transport.

Proposed parking for the site is limited by the maximum parking requirements imposed by the City of Ryde's Development Control Plan and the site is proposing to further reduce parking rates to generate no additional traffic than the permitted development scenario of 879 units.

A SIDRA modelling exercise was conducted for the local road network surrounding this development. The analysis showed that the local road network will be operating either at or above capacity for all scenarios. There are considered to be no further implications of this development which has not already been tested using the Macquarie Park AIMSUN Model (MPAM).

In conclusion this assessment, which conservatively assumed the provision of reduced parking rates, indicates that the proposed development will not have a detrimental impact on the local road network. The proposed increase in density on the site can be accommodated with application of the maximum parking rates in the City of Ryde DCP. Through the detail design process, given the site's high level of public transport accessibility due to the proximity to the future Metro station, opportunities for further mode shift may be considered.

Appendix A

SIDRA Assessment

A1 Responses to commentary received by Roads and Maritime (October 2017)

The following commentary is provided in response to issues raised by Roads and Maritime Services in a letter dated October 2017. Arup have reviewed and provided the suggested changes with the exception to the issues outlined below.

A1.1 Christie Rd / Talavera Rd (2_Base) - AM & PM Peak

Lane Geometry

East Approach: Christie Road / Talavera Road intersection east approach distance is around 250m and the short right turn length is 180m as presented in Figure 18. However, the subject site access (intersection no.104) is located between two intersections of Christie Road / Talavera Road and Talavera Road / Herring Road. Therefore, the distances are measured from this point as shown in the below in Figure 18.

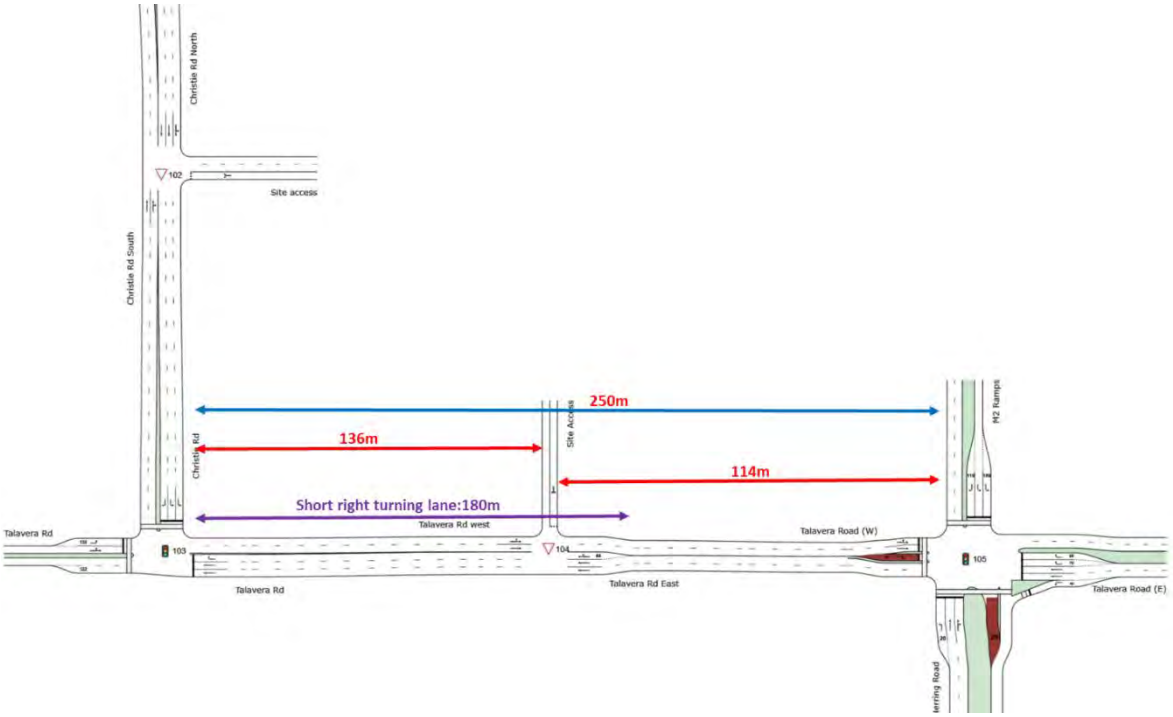


Figure 18: Network Layout and Approaches distances

West Approach: They have been corrected in the updated Sidra models.

North Approach: The two left turning lanes and one right turning lane have been corrected in the updated Sidra models.

Christie Road / Talavera Road intersection north approach distance is around 90m as presented in Figure 19. However, the subject site access (intersection no.102) is located between two intersections of Christie Road / Talavera Road and Christie Rd / M2 on-off ramps. Therefore, the distances are measured from this point as shown in the below Figure.

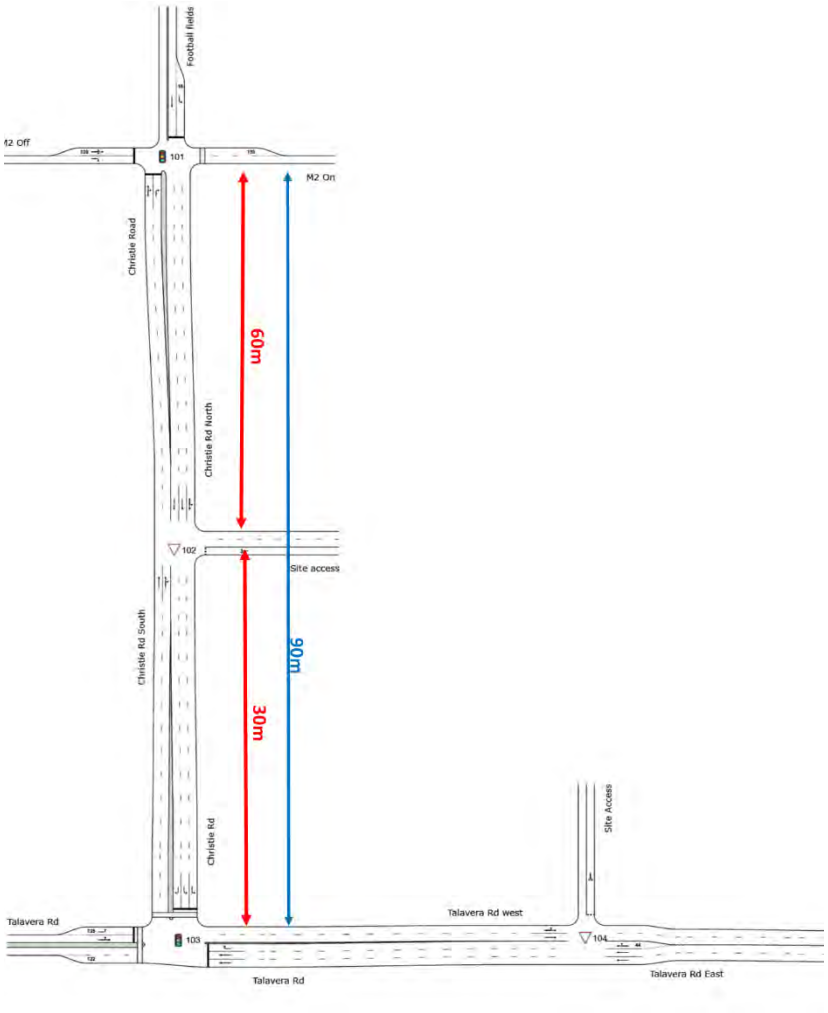


Figure 19: Network Layout and Approaches distances

Pedestrians:

Peak flow factors have been changed to 30minutes (default) in the updated Sidra models.

Volumes:

Peak flow periods have been changed to 30minutes (default) in the updated Sidra models.

Priorities:

Opposed and opposing movements for right running vehicles have been corrected in the updated models.

Phasing and Timing:

- Network shows filter right turns as observed in videos/site visits.
- The reference phase has been changed to phase A in the updated models.
- The videos have been checked and seen that the cycle time of 115sec occurred during the AM peak period.
- All red time of 3 seconds have been applied for A and B phases.

A1.2 Talavera Road / Herring Road / M2 Ramp (5_Base) - AM & PM Peak

Lane Geometry

South Approach: The approach distance has been corrected in the updated Sidra models. One short exit lane (Bus only) has also been added to the south approach.
West Approach: Please see Figure 18.
North Approach: They have been corrected in the updated Sidra models.
East Approach: They have been corrected in the updated Sidra models.

Pedestrians:

Peak flow factors have been changed to 30minutes (default) in the updated Sidra models.

Volumes:

Peak flow periods have been changed to 30minutes (default) in the updated Sidra models.

Priorities:

Opposed and opposing movements for right running vehicles have been corrected in the updated models.

Vehicle Movement Data Signals:

The arrival type has been changed to type 3 (default) which represents random arrivals.

Phasing and Timing:

- The 4 phases (A, D, E and F) and SCATS cycle times have been applied to this intersection in the updated models.
- All red time of 3 seconds have been applied to A, D and E phases. The all red time for phase F has been changed to 4sec in the updated models.

A1.3 Christie Road / Football Fields / M2 Ramps (6_base) - AM & PM Peak

Lane Geometry

South Approach: Please see Figure 19.

West Approach: They have been corrected in the updated Sidra models.

North Approach: They have been corrected in the updated Sidra models.

Pedestrians:

Peak flow factors have been changed to 30minutes (default) in the updated Sidra models.

Volumes:

Peak flow periods have been changed to 30minutes (default) in the updated Sidra models.

Priorities:

Opposed and opposing movements for right running vehicles have been corrected in the updated models.

Phasing and Timing:

- The 3 phases (A, B and C) and SCATS cycle times have been applied to this intersection in the updated models.
- The reference phase has been changed to phase B in the updated models.
- The cycle time option has been changed to user given cycle time in the updated models.

A1.4 Christie Road / Site Access - AM & PM Peak

Lane Geometry

East Approach: It has been corrected in the updated Sidra models.

The videos have been checked for this intersection. The Observed traffic volumes indicates that all movements are allowed from/to this access.

Pedestrians:

Peak flow factors have been changed to 30minutes (default) in the updated Sidra models.

Volumes:

Peak flow periods have been changed to 30minutes (default) in the updated Sidra models.

A1.5 Talavera Road / Site Access (3_Base): AM & PM Peak

Lane Geometry

The videos have been checked for this intersection. The Observed traffic volumes indicates that all movements are allowed from/to this access.

Sidra Network Model Comments

The coordination system has been removed in the updated models.

MOVEMENT SUMMARY

Site: 103 [103_Base_AM_ Talavera Rd/ Christie Rd]

Network: N101 [AM_Base]

Talavera Rd/ Christie Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd														
5	T1	433	2.4	433	2.4	0.197	7.1	LOS A	5.2	37.4	0.39	0.33	0.39	43.5
6	R2	51	0.0	51	0.0	0.305	57.2	LOS E	2.7	19.1	0.97	0.72	0.97	8.4
Approach		483	2.2	483	2.2	0.305	12.3	LOS A	5.2	37.4	0.45	0.37	0.45	35.4
North: Christie Rd														
7	L2	756	5.3	756	5.3	1.005	106.7	LOS F	6.7	49.0	1.00	1.17	1.71	1.5
9	R2	271	0.8	271	0.8	0.802	56.6	LOS E	6.9	49.0	1.00	0.90	1.15	10.2
Approach		1026	4.1	1026	4.1	1.005	93.5	LOS F	6.9	49.0	1.00	1.10	1.56	3.1
West: Talavera Rd														
10	L2	79	2.7	79	2.7	0.052	7.5	LOS A	0.8	5.6	0.19	0.62	0.19	34.8
11	T1	658	1.1	658	1.1	1.006	93.8	LOS F	61.8	436.9	1.00	1.40	1.60	6.0
Approach		737	1.3	737	1.3	1.006	84.6	LOS F	61.8	436.9	0.91	1.32	1.45	6.6
All Vehicles		2246	2.8	2246	2.8	1.006	73.1	LOS F	61.8	436.9	0.85	1.02	1.29	6.9

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	68	18.4	LOS B	0.1	0.1	0.57	0.57
P4	West Full Crossing	55	46.2	LOS E	0.2	0.2	0.90	0.90
All Pedestrians		123	30.8	LOS D			0.71	0.71

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.

MOVEMENT SUMMARY

Site: 101 [101_Base_AM_M2 On Off /Christie Road]

Network: N101 [AM_Base]

M2 On Off /Christie Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Road														
2	T1	1	0.0	1	0.0	0.386	48.6	LOS D	2.1	15.3	0.99	0.74	0.99	6.4
3	R2	105	2.0	105	2.0	0.530	53.9	LOS D	3.0	21.2	1.00	0.75	1.01	22.9
Approach		106	2.0	106	2.0	0.530	53.8	LOS D	3.0	21.2	1.00	0.75	1.01	22.8
North: Football fields														
7	L2	1	0.0	1	0.0	0.013	52.5	LOS D	0.0	0.3	0.97	0.58	0.97	22.6
8	T1	1	0.0	1	0.0	0.015	46.8	LOS D	0.0	0.3	0.94	0.57	0.94	2.9
Approach		2	0.0	2	0.0	0.015	49.6	LOS D	0.0	0.3	0.96	0.58	0.96	15.5
West: M2 Off														
10	L2	1	0.0	1	0.0	0.571	14.5	LOS B	8.7	62.8	0.57	0.77	0.57	24.7
11	T1	1	0.0	1	0.0	0.571	9.0	LOS A	8.7	62.8	0.57	0.77	0.57	48.5
12	R2	1017	3.1	1017	3.1	0.571	14.3	LOS A	16.3	116.9	0.57	0.77	0.57	40.9
Approach		1019	3.1	1019	3.1	0.571	14.3	LOS A	16.3	116.9	0.57	0.77	0.57	40.9
All Vehicles		1127	3.0	1127	3.0	0.571	18.1	LOS B	16.3	116.9	0.61	0.77	0.61	37.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		53	41.8	LOS E			0.94	0.94

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.

MOVEMENT SUMMARY

Site: 105 [105_Base_AM_Talavera Rd/ Herring Road/ M2 Ramps]

Network: N101 [AM_Base]

Talavera Rd/ Herring Road/ M2 Ramps
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Herring Road														
1	L2	110	2.7	110	2.7	0.333	31.3	LOS C	3.6	25.6	0.92	0.77	0.92	24.4
2	T1	221	14.5	221	14.5	1.010	108.5	LOS F	24.8	175.7	1.00	1.26	1.80	18.7
3	R2	280	0.7	280	0.7	1.010	110.3	LOS F	24.8	175.7	1.00	1.19	1.72	13.4
Approach		611	6.1	611	6.1	1.010	95.4	LOS F	24.8	175.7	0.99	1.14	1.60	16.5
East: Talavera Road (E)														
4	L2	98	2.0	98	2.0	0.147	32.0	LOS C	3.7	26.7	0.70	0.73	0.70	29.6
5	T1	250	0.8	250	0.8	0.175	26.6	LOS B	4.8	34.0	0.71	0.57	0.71	18.3
6	R2	65	4.6	65	4.6	0.367	69.4	LOS E	2.0	14.4	1.00	0.72	1.00	21.2
Approach		413	1.7	413	1.7	0.367	34.6	LOS C	4.8	34.0	0.75	0.63	0.75	22.3
North: M2 Ramps														
7	L2	404	4.5	404	4.5	0.360	40.3	LOS C	9.2	66.8	0.83	0.79	0.83	28.7
9	R2	158	1.9	158	1.9	0.427	51.3	LOS D	8.2	58.2	0.92	0.80	0.92	21.5
Approach		562	3.7	562	3.7	0.427	43.4	LOS D	9.2	66.8	0.85	0.79	0.85	26.7
West: Talavera Road (W)														
10	L2	66	6.1	66	6.1	0.971	84.4	LOS F	26.3	186.0	1.00	1.22	1.67	18.4
11	T1	1268	0.7	1268	0.7	0.971	76.7	LOS F	26.4	186.0	1.00	1.22	1.53	11.6
12	R2	35	100.0	35	100.0	0.657	75.0	LOS F	2.3	29.7	1.00	0.82	1.21	16.3
Approach		1369	3.5	1369	3.5	0.971	77.0	LOS F	26.4	186.0	1.00	1.21	1.53	12.2
All Vehicles		2955	3.8	2955	3.8	1.010	68.5	LOS E	26.4	186.0	0.93	1.04	1.31	16.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	43.4	LOS E	0.2	0.2	0.85	0.85
P2S	East Slip/Bypass Lane Crossing	53	21.1	LOS C	0.1	0.1	0.82	0.82
P3	North Full Crossing	53	33.8	LOS D	0.1	0.1	0.75	0.75
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		211	38.2	LOS D			0.84	0.84

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.

MOVEMENT SUMMARY

Site: 102 [102_Base_AM_Christie Rd / Site Access]

Network: N101 [AM_Base]

Christie Rd / Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Rd South														
2	T1	105	2.0	105	2.0	0.045	1.3	LOS A	0.2	1.7	0.11	0.06	0.11	37.0
3	R2	13	0.0	13	0.0	0.045	11.6	LOS A	0.2	1.7	0.62	0.34	0.62	22.4
Approach		118	1.8	118	1.8	0.045	2.4	NA	0.2	1.7	0.17	0.09	0.17	32.0
East: Site access														
4	L2	5	0.0	5	0.0	0.018	5.9	LOS A	0.0	0.2	0.43	0.60	0.43	23.4
6	R2	1	0.0	1	0.0	0.018	18.9	LOS B	0.0	0.2	0.43	0.60	0.43	23.4
Approach		6	0.0	6	0.0	0.018	8.1	LOS A	0.0	0.2	0.43	0.60	0.43	23.4
North: Christie Rd North														
7	L2	32	0.0	32	0.0	0.178	4.3	LOS A	13.6	97.9	0.00	0.05	0.00	38.5
8	T1	985	3.2	985	3.2	0.178	0.0	LOS A	13.6	97.9	0.00	0.02	0.00	58.2
Approach		1017	3.1	1017	3.1	0.178	0.1	NA	13.6	97.9	0.00	0.02	0.00	56.5
All Vehicles		1141	3.0	1141	3.0	0.178	0.4	NA	13.6	97.9	0.02	0.03	0.02	53.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [104_Base_AM_ Talavera Rd/ Site Access]

Network: N101 [AM_Base]

Talavera Rd/ Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd East														
5	T1	484	1.7	484	1.7	0.115	1.8	LOS A	0.6	4.5	0.06	0.22	0.06	47.2
6	R2	40	0.0	40	0.0	0.115	15.4	LOS B	0.6	4.5	0.75	0.48	0.75	28.4
Approach		524	1.6	524	1.6	0.115	2.8	NA	0.6	4.5	0.11	0.24	0.11	43.5
North: Site Access														
7	L2	5	0.0	5	0.0	0.040	9.1	LOS A	0.1	0.5	0.68	0.74	0.68	17.9
9	R2	1	0.0	1	0.0	0.040	52.0	LOS D	0.1	0.5	0.68	0.74	0.68	17.9
Approach		6	0.0	6	0.0	0.040	16.2	LOS B	0.1	0.5	0.68	0.74	0.68	17.9
West: Talavera Rd west														
10	L2	26	0.0	26	0.0	0.362	5.5	LOS A	27.7	199.1	0.00	0.21	0.00	39.2
11	T1	1356	3.3	1356	3.3	0.362	1.1	LOS A	27.7	199.1	0.00	0.21	0.00	53.0
Approach		1382	3.3	1382	3.3	0.362	1.2	NA	27.7	199.1	0.00	0.21	0.00	52.4
All Vehicles		1913	2.8	1913	2.8	0.362	1.7	NA	27.7	199.1	0.03	0.22	0.03	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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [103_Base_PM_ Talavera Rd/ Christie Rd]

Network: N101 [PM_Base]

Talavera Rd/ Christie Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd														
5	T1	679	0.8	679	0.8	0.378	8.0	LOS A	6.7	47.5	0.59	0.50	0.59	41.9
6	R2	184	5.7	184	5.7	0.384	17.9	LOS B	3.7	27.0	0.81	0.78	0.81	20.5
Approach		863	1.8	863	1.8	0.384	10.1	LOS A	6.7	47.5	0.63	0.56	0.63	37.3
North: Christie Rd														
7	L2	153	15.2	153	15.2	0.098	12.8	LOS A	1.3	9.9	0.59	0.68	0.59	10.6
9	R2	151	0.0	151	0.0	0.405	26.6	LOS B	4.0	28.1	0.91	0.78	0.91	17.9
Approach		303	7.6	303	7.6	0.405	19.6	LOS B	4.0	28.1	0.75	0.73	0.75	15.9
West: Talavera Rd														
10	L2	140	0.0	140	0.0	0.393	23.1	LOS B	5.5	38.4	0.82	0.75	0.82	19.9
11	T1	335	1.6	335	1.6	0.393	17.6	LOS B	5.6	39.8	0.82	0.70	0.82	21.6
Approach		475	1.1	475	1.1	0.393	19.2	LOS B	5.6	39.8	0.82	0.72	0.82	21.1
All Vehicles		1641	2.7	1641	2.7	0.405	14.5	LOS B	6.7	47.5	0.71	0.64	0.71	28.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	68	24.4	LOS C	0.1	0.1	0.90	0.90
P4	West Full Crossing	55	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		123	24.4	LOS C			0.90	0.90

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.

MOVEMENT SUMMARY

Site: 101 [101_Base_PM_M2 On Off /Christie Road]

Network: N101 [PM_Base]

M2 On Off /Christie Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Road														
2	T1	1	0.0	1	0.0	0.199	14.2	LOS A	3.2	22.8	0.67	0.73	0.67	15.3
3	R2	346	1.5	346	1.5	0.274	19.2	LOS B	4.7	33.1	0.70	0.74	0.70	37.3
Approach		347	1.5	347	1.5	0.274	19.2	LOS B	4.7	33.1	0.70	0.74	0.70	37.3
North: Football fields														
7	L2	1	0.0	1	0.0	0.010	38.3	LOS C	0.0	0.2	0.96	0.58	0.96	27.0
8	T1	1	0.0	1	0.0	0.006	32.3	LOS C	0.0	0.2	0.93	0.55	0.93	4.1
Approach		2	0.0	2	0.0	0.010	35.3	LOS C	0.0	0.2	0.95	0.56	0.95	19.6
West: M2 Off														
10	L2	1	0.0	1	0.0	0.272	28.5	LOS B	3.4	25.8	0.84	0.77	0.84	21.0
11	T1	1	0.0	1	0.0	0.272	22.9	LOS B	3.4	25.8	0.84	0.77	0.84	40.9
12	R2	243	8.7	243	8.7	0.272	28.5	LOS B	3.4	25.8	0.84	0.77	0.84	31.2
Approach		245	8.6	245	8.6	0.272	28.5	LOS B	3.4	25.8	0.84	0.77	0.84	31.2
All Vehicles		595	4.4	595	4.4	0.274	23.1	LOS B	4.7	33.1	0.76	0.75	0.76	34.6

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
All Pedestrians		53	29.3	LOS C			0.92	0.92

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.

MOVEMENT SUMMARY

Site: 105 [105_Base_PM_Talavera Rd/ Herring Road/ M2 Ramps]

Network: N101 [PM_Base]

Talavera Rd/ Herring Road/ M2 Ramps
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Herring Road														
1	L2	161	6.8	161	6.8	0.253	22.4	LOS B	3.8	27.8	0.76	0.76	0.76	29.4
2	T1	286	7.3	286	7.3	0.788	55.7	LOS D	19.3	137.3	0.96	0.88	1.10	27.9
3	R2	218	0.0	218	0.0	0.788	62.4	LOS E	19.3	137.3	1.00	0.90	1.09	20.6
Approach		665	4.8	665	4.8	0.788	49.8	LOS D	19.3	137.3	0.92	0.86	1.01	25.5
East: Talavera Road (E)														
4	L2	234	0.9	234	0.9	0.688	57.2	LOS E	13.8	97.2	0.97	0.84	0.98	21.3
5	T1	582	0.2	582	0.2	0.798	56.2	LOS D	20.3	142.0	0.99	0.91	1.10	10.3
6	R2	472	0.2	472	0.2	0.780	65.3	LOS E	15.2	106.4	1.00	0.88	1.11	22.1
Approach		1288	0.3	1288	0.3	0.798	59.7	LOS E	20.3	142.0	0.99	0.89	1.08	17.7
North: M2 Ramps														
7	L2	52	1.9	52	1.9	0.032	27.4	LOS B	0.9	6.5	0.59	0.68	0.59	34.2
9	R2	60	3.3	60	3.3	0.152	50.1	LOS D	3.1	22.2	0.85	0.74	0.85	21.8
Approach		112	2.7	112	2.7	0.152	39.5	LOS C	3.1	22.2	0.73	0.71	0.73	27.1
West: Talavera Road (W)														
10	L2	113	0.0	113	0.0	0.710	55.4	LOS D	15.3	106.8	0.98	0.90	1.26	23.9
11	T1	441	0.0	441	0.0	0.710	51.6	LOS D	16.8	117.8	0.99	0.87	1.10	15.6
12	R2	1	100.0	1	100.0	0.006	54.3	LOS D	0.1	0.7	0.85	0.61	0.85	20.3
Approach		555	0.2	555	0.2	0.710	52.4	LOS D	16.8	117.8	0.99	0.87	1.13	17.7
All Vehicles		2620	1.5	2620	1.5	0.798	54.8	LOS D	20.3	142.0	0.96	0.87	1.06	20.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P2S	East Slip/Bypass Lane Crossing	53	14.3	LOS B	0.1	0.1	0.66	0.66
P3	North Full Crossing	53	53.7	LOS E	0.2	0.2	0.91	0.91
P4	West Full Crossing	53	52.8	LOS E	0.2	0.2	0.90	0.90
All Pedestrians		211	45.0	LOS E			0.86	0.86

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.

MOVEMENT SUMMARY

Site: 102 [102_Base_PM_Christie Rd / Site Access]

Network: N101 [PM_Base]

Christie Rd / Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Rd South														
2	T1	321	1.6	321	1.6	0.084	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	59.5
3	R2	1	0.0	1	0.0	0.084	4.3	LOS A	0.0	0.1	0.00	0.00	0.00	43.4
Approach		322	1.6	322	1.6	0.084	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.3
East: Site access														
4	L2	68	0.0	68	0.0	0.103	5.1	LOS A	0.4	3.0	0.18	0.55	0.18	27.3
6	R2	25	0.0	25	0.0	0.103	9.4	LOS A	0.4	3.0	0.18	0.55	0.18	27.3
Approach		94	0.0	94	0.0	0.103	6.2	LOS A	0.4	3.0	0.18	0.55	0.18	27.3
North: Christie Rd North														
7	L2	2	0.0	2	0.0	0.044	4.3	LOS A	0.0	0.0	0.00	0.02	0.00	39.4
8	T1	241	8.7	241	8.7	0.044	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.4
Approach		243	8.7	243	8.7	0.044	0.0	NA	0.0	0.0	0.00	0.01	0.00	58.9
All Vehicles		659	4.0	659	4.0	0.103	0.9	NA	0.4	3.0	0.03	0.08	0.03	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.
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [104_Base_PM_ Talavera Rd/ Site Access]

Network: N101 [PM_Base]

Talavera Rd/ Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd East														
5	T1	858	1.7	858	1.7	0.150	1.1	LOS A	0.1	0.4	0.01	0.20	0.01	52.0
6	R2	5	0.0	5	0.0	0.150	7.8	LOS A	0.1	0.4	0.02	0.20	0.02	47.5
Approach		863	1.7	863	1.7	0.150	1.1	NA	0.1	0.4	0.01	0.20	0.01	52.0
North: Site Access														
7	L2	36	0.0	36	0.0	0.056	6.6	LOS A	0.2	1.5	0.39	0.60	0.39	27.0
9	R2	4	0.0	4	0.0	0.056	24.5	LOS B	0.2	1.5	0.39	0.60	0.39	27.0
Approach		40	0.0	40	0.0	0.056	8.5	LOS A	0.2	1.5	0.39	0.60	0.39	27.0
West: Talavera Rd west														
10	L2	3	0.0	3	0.0	0.136	5.5	LOS A	0.0	0.0	0.00	0.21	0.00	39.4
11	T1	489	5.2	489	5.2	0.136	1.1	LOS A	0.0	0.0	0.00	0.20	0.00	53.3
Approach		493	5.1	493	5.1	0.136	1.1	NA	0.0	0.0	0.00	0.20	0.00	53.1
All Vehicles		1396	2.9	1396	2.9	0.150	1.3	NA	0.2	1.5	0.02	0.21	0.02	51.2

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [103_2021_AM_ Talavera Rd/ Christie Rd]

Network: N101 [AM_2021]

Talavera Rd/ Christie Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd														
5	T1	669	1.6	669	1.6	0.300	7.2	LOS A	8.6	61.0	0.41	0.36	0.41	43.2
6	R2	78	0.0	78	0.0	0.339	46.1	LOS D	3.8	26.6	0.92	0.78	0.92	10.0
Approach		747	1.4	747	1.4	0.339	11.3	LOS A	8.6	61.0	0.46	0.40	0.46	36.6
North: Christie Rd														
7	L2	620	6.5	620	6.5	0.776	46.4	LOS D	6.6	49.0	0.97	0.90	1.07	3.4
9	R2	271	0.8	271	0.8	0.842	60.2	LOS E	6.9	49.0	1.00	0.93	1.22	9.7
Approach		891	4.7	891	4.7	0.842	50.6	LOS D	6.9	49.0	0.98	0.91	1.11	5.9
West: Talavera Rd														
10	L2	79	2.7	79	2.7	0.052	7.5	LOS A	0.8	5.6	0.19	0.62	0.19	34.8
11	T1	658	1.1	658	1.1	0.883	36.8	LOS C	39.1	276.1	0.94	0.99	1.09	13.3
Approach		737	1.3	737	1.3	0.883	33.6	LOS C	39.1	276.1	0.86	0.95	1.00	14.2
All Vehicles		2375	2.6	2375	2.6	0.883	33.0	LOS C	39.1	276.1	0.78	0.76	0.87	14.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	68	17.9	LOS B	0.1	0.1	0.56	0.56
P4	West Full Crossing	55	47.1	LOS E	0.2	0.2	0.91	0.91
All Pedestrians		123	30.9	LOS D			0.71	0.71

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.

MOVEMENT SUMMARY

Site: 101 [101_2021_AM_M2 On Off /Christie Road]

Network: N101 [AM_2021]

M2 On Off /Christie Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Road														
2	T1	1	0.0	1	0.0	0.264	42.0	LOS C	2.5	17.5	0.94	0.75	0.94	7.2
3	R2	133	1.6	133	1.6	0.363	47.2	LOS D	3.4	24.5	0.95	0.76	0.95	24.8
Approach		134	1.6	134	1.6	0.363	47.2	LOS D	3.4	24.5	0.95	0.76	0.95	24.7
North: Football fields														
7	L2	1	0.0	1	0.0	0.013	52.5	LOS D	0.0	0.3	0.97	0.58	0.97	22.6
8	T1	1	0.0	1	0.0	0.007	44.7	LOS D	0.0	0.3	0.94	0.56	0.94	3.1
Approach		2	0.0	2	0.0	0.013	48.6	LOS D	0.0	0.3	0.96	0.57	0.96	15.7
West: M2 Off														
10	L2	1	0.0	1	0.0	0.393	15.1	LOS B	10.1	73.1	0.54	0.75	0.54	24.5
11	T1	1	0.0	1	0.0	0.393	9.6	LOS A	10.1	73.1	0.54	0.75	0.54	48.1
12	R2	881	3.6	881	3.6	0.393	15.1	LOS B	10.1	73.1	0.54	0.75	0.54	40.2
Approach		883	3.6	883	3.6	0.393	15.1	LOS B	10.1	73.1	0.54	0.75	0.54	40.2
All Vehicles		1019	3.3	1019	3.3	0.393	19.4	LOS B	10.1	73.1	0.59	0.75	0.59	36.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		53	41.8	LOS E			0.94	0.94

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.

MOVEMENT SUMMARY

Site: 105 [105_2021_AM_Talavera Rd/ Herring Road/ M2 Ramps]

Network: N101 [AM_2021]

Talavera Rd/ Herring Road/ M2 Ramps
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Herring Road														
1	L2	99	3.0	99	3.0	0.263	29.0	LOS C	2.9	20.9	0.88	0.76	0.88	25.5
2	T1	242	13.2	242	13.2	0.948	77.9	LOS F	17.6	136.8	1.00	1.14	1.53	23.3
3	R2	325	0.6	325	0.6	0.969	90.1	LOS F	25.2	177.0	1.00	1.10	1.53	15.7
Approach		666	5.6	666	5.6	0.969	76.6	LOS F	25.2	177.0	0.98	1.07	1.43	19.4
East: Talavera Road (E)														
4	L2	201	1.0	201	1.0	0.336	37.8	LOS C	8.8	62.1	0.80	0.78	0.80	27.2
5	T1	272	0.7	272	0.7	0.214	30.6	LOS C	5.7	39.9	0.76	0.62	0.76	16.6
6	R2	131	2.3	131	2.3	0.728	72.7	LOS F	4.2	29.8	1.00	0.83	1.22	20.6
Approach		604	1.2	604	1.2	0.728	42.1	LOS C	8.8	62.1	0.82	0.72	0.87	21.8
North: M2 Ramps														
7	L2	142	12.7	142	12.7	0.127	36.1	LOS C	2.9	22.5	0.74	0.73	0.74	29.9
9	R2	398	0.8	398	0.8	0.984	95.5	LOS F	32.5	228.6	1.00	1.10	1.56	13.8
Approach		540	3.9	540	3.9	0.984	79.9	LOS F	32.5	228.6	0.93	1.00	1.34	16.8
West: Talavera Road (W)														
10	L2	34	11.8	34	11.8	0.990	97.3	LOS F	26.3	186.0	1.00	1.29	1.79	16.6
11	T1	1179	0.8	1179	0.8	0.990	89.1	LOS F	26.4	186.0	1.00	1.29	1.64	10.3
12	R2	31	100.0	31	100.0	0.578	74.0	LOS F	2.0	25.8	1.00	0.78	1.12	16.5
Approach		1244	3.5	1244	3.5	0.990	88.9	LOS F	26.4	186.0	1.00	1.28	1.63	10.7
All Vehicles		3054	3.6	3054	3.6	0.990	75.4	LOS F	32.5	228.6	0.95	1.07	1.39	15.4

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	47.8	LOS E	0.2	0.2	0.89	0.89
P2S	East Slip/Bypass Lane Crossing	53	19.3	LOS B	0.1	0.1	0.79	0.79
P3	North Full Crossing	53	37.7	LOS D	0.1	0.1	0.79	0.79
P4	West Full Crossing	53	52.4	LOS E	0.2	0.2	0.94	0.94
All Pedestrians		211	39.3	LOS D			0.85	0.85

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.

MOVEMENT SUMMARY

Site: 102 [102_2021_AM_Christie Rd / Site Access]

Network: N101 [AM_2021]

Christie Rd / Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Rd South														
2	T1	133	1.6	133	1.6	0.049	1.2	LOS A	0.3	1.8	0.13	0.05	0.13	37.0
3	R2	13	0.0	13	0.0	0.049	10.0	LOS A	0.3	1.8	0.45	0.19	0.45	27.2
Approach		145	1.4	145	1.4	0.049	2.0	NA	0.3	1.8	0.16	0.07	0.16	34.5
East: Site access														
4	L2	5	0.0	5	0.0	0.017	5.7	LOS A	0.0	0.2	0.39	0.58	0.39	24.5
6	R2	1	0.0	1	0.0	0.017	16.4	LOS B	0.0	0.2	0.39	0.58	0.39	24.5
Approach		6	0.0	6	0.0	0.017	7.5	LOS A	0.0	0.2	0.39	0.58	0.39	24.5
North: Christie Rd North														
7	L2	32	0.0	32	0.0	0.154	4.3	LOS A	7.4	53.0	0.00	0.06	0.00	38.3
8	T1	849	3.7	849	3.7	0.154	0.0	LOS A	8.3	59.6	0.00	0.02	0.00	58.0
Approach		881	3.6	881	3.6	0.154	0.2	NA	8.3	59.6	0.00	0.02	0.00	56.1
All Vehicles		1033	3.3	1033	3.3	0.154	0.5	NA	8.3	59.6	0.02	0.03	0.02	52.4

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.
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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [104_2021_AM_ Talavera Rd/ Site Access]

Network: N101 [AM_2021]

Talavera Rd/ Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd East														
5	T1	748	1.1	748	1.1	0.158	2.1	LOS A	1.0	6.9	0.10	0.21	0.10	45.3
6	R2	40	0.0	40	0.0	0.158	14.7	LOS B	1.0	6.9	0.55	0.26	0.55	33.4
Approach		788	1.1	788	1.1	0.158	2.7	NA	1.0	6.9	0.12	0.21	0.12	43.9
North: Site Access														
7	L2	5	0.0	5	0.0	0.048	8.5	LOS A	0.1	0.6	0.70	0.75	0.70	16.4
9	R2	1	0.0	1	0.0	0.048	67.3	LOS E	0.1	0.6	0.70	0.75	0.70	16.4
Approach		6	0.0	6	0.0	0.048	18.3	LOS B	0.1	0.6	0.70	0.75	0.70	16.4
West: Talavera Rd west														
10	L2	26	0.0	26	0.0	0.327	5.5	LOS A	25.6	184.7	0.00	0.22	0.00	39.1
11	T1	1220	3.7	1220	3.7	0.327	1.1	LOS A	25.6	184.7	0.00	0.21	0.00	52.9
Approach		1246	3.6	1246	3.6	0.327	1.2	NA	25.6	184.7	0.00	0.21	0.00	52.3
All Vehicles		2041	2.6	2041	2.6	0.327	1.8	NA	25.6	184.7	0.05	0.21	0.05	48.7

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [103_2021_PM_ Talavera Rd/ Christie Rd]

Network: N101 [PM_2021]

Talavera Rd/ Christie Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd														
5	T1	695	0.8	695	0.8	0.399	8.7	LOS A	7.2	50.7	0.61	0.53	0.61	40.9
6	R2	181	5.8	181	5.8	0.403	18.6	LOS B	3.7	27.3	0.82	0.78	0.82	20.0
Approach		876	1.8	876	1.8	0.403	10.7	LOS A	7.2	50.7	0.66	0.58	0.66	36.5
North: Christie Rd														
7	L2	354	6.5	354	6.5	0.214	13.4	LOS A	3.1	22.9	0.63	0.71	0.63	10.2
9	R2	151	0.0	151	0.0	0.374	25.5	LOS B	3.9	27.4	0.90	0.78	0.90	18.4
Approach		504	4.6	504	4.6	0.374	17.0	LOS B	3.9	27.4	0.71	0.73	0.71	14.4
West: Talavera Rd														
10	L2	140	0.0	140	0.0	0.393	23.1	LOS B	5.5	38.4	0.82	0.75	0.82	19.9
11	T1	335	1.6	335	1.6	0.393	17.6	LOS B	5.6	39.8	0.82	0.70	0.82	21.6
Approach		475	1.1	475	1.1	0.393	19.2	LOS B	5.6	39.8	0.82	0.72	0.82	21.1
All Vehicles		1855	2.4	1855	2.4	0.403	14.6	LOS B	7.2	50.7	0.71	0.66	0.71	27.0

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	68	24.4	LOS C	0.1	0.1	0.90	0.90
P4	West Full Crossing	55	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		123	24.4	LOS C			0.90	0.90

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.

MOVEMENT SUMMARY

Site: 101 [101_2021_PM_M2 On Off /Christie Road]

Network: N101 [PM_2021]

M2 On Off /Christie Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Road														
2	T1	1	0.0	1	0.0	0.255	18.8	LOS B	3.7	26.5	0.77	0.76	0.77	12.9
3	R2	348	1.5	348	1.5	0.350	24.0	LOS B	5.4	38.4	0.80	0.77	0.80	34.3
Approach		349	1.5	349	1.5	0.350	24.0	LOS B	5.4	38.4	0.80	0.77	0.80	34.3
North: Football fields														
7	L2	1	0.0	1	0.0	0.010	38.3	LOS C	0.0	0.2	0.96	0.58	0.96	27.0
8	T1	1	0.0	1	0.0	0.006	32.3	LOS C	0.0	0.2	0.93	0.55	0.93	4.1
Approach		2	0.0	2	0.0	0.010	35.3	LOS C	0.0	0.2	0.95	0.56	0.95	19.6
West: M2 Off														
10	L2	1	0.0	1	0.0	0.362	24.4	LOS B	5.8	42.3	0.79	0.79	0.79	22.0
11	T1	1	0.0	1	0.0	0.362	18.9	LOS B	5.8	42.3	0.79	0.79	0.79	42.8
12	R2	444	4.7	444	4.7	0.362	24.4	LOS B	5.8	42.3	0.79	0.79	0.79	33.5
Approach		446	4.7	446	4.7	0.362	24.4	LOS B	5.8	42.3	0.79	0.79	0.79	33.5
All Vehicles		798	3.3	798	3.3	0.362	24.2	LOS B	5.8	42.3	0.80	0.78	0.80	33.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
All Pedestrians		53	29.3	LOS C			0.92	0.92

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.

MOVEMENT SUMMARY

Site: 105 [105_2021_PM_Talavera Rd/ Herring Road/ M2 Ramps]

Network: N101 [PM_2021]

Talavera Rd/ Herring Road/ M2 Ramps
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Herring Road														
1	L2	134	8.2	134	8.2	0.200	24.6	LOS B	4.4	32.7	0.72	0.74	0.72	28.0
2	T1	409	5.1	409	5.1	0.846	61.2	LOS E	21.2	152.0	0.98	0.95	1.19	26.6
3	R2	131	0.0	131	0.0	0.846	67.3	LOS E	21.2	152.0	1.00	0.96	1.17	19.9
Approach		674	4.7	674	4.7	0.846	55.1	LOS D	21.2	152.0	0.93	0.91	1.09	25.4
East: Talavera Road (E)														
4	L2	416	0.5	416	0.5	0.874	57.1	LOS E	26.4	185.4	0.91	0.93	1.10	21.3
5	T1	603	0.2	603	0.2	0.487	35.3	LOS C	16.0	112.1	0.83	0.71	0.83	15.0
6	R2	538	0.2	538	0.2	0.844	66.4	LOS E	17.8	124.7	1.00	0.93	1.20	21.9
Approach		1557	0.3	1557	0.3	0.874	51.9	LOS D	26.4	185.4	0.91	0.84	1.03	20.1
North: M2 Ramps														
7	L2	31	3.2	31	3.2	0.027	38.7	LOS C	0.7	4.8	0.72	0.68	0.72	29.3
9	R2	78	2.6	78	2.6	0.786	78.4	LOS F	5.4	38.6	1.00	0.87	1.27	16.1
Approach		109	2.8	109	2.8	0.786	67.1	LOS E	5.4	38.6	0.92	0.82	1.11	19.1
West: Talavera Road (W)														
10	L2	61	0.0	61	0.0	0.584	46.7	LOS D	19.2	134.7	0.87	0.81	1.17	27.0
11	T1	696	0.0	696	0.0	0.584	38.9	LOS C	19.4	136.0	0.87	0.78	1.01	19.2
12	R2	15	100.0	15	100.0	0.070	52.1	LOS D	0.8	10.0	0.84	0.70	0.84	20.9
Approach		772	1.9	772	1.9	0.584	39.8	LOS C	19.4	136.0	0.87	0.78	1.02	20.1
All Vehicles		3112	1.7	3112	1.7	0.874	50.1	LOS D	26.4	185.4	0.91	0.84	1.04	21.4

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	48.4	LOS E	0.2	0.2	0.86	0.86
P2S	East Slip/Bypass Lane Crossing	53	15.9	LOS B	0.1	0.1	0.64	0.64
P3	North Full Crossing	53	38.5	LOS D	0.1	0.1	0.77	0.77
P4	West Full Crossing	53	53.7	LOS E	0.2	0.2	0.91	0.91
All Pedestrians		211	39.1	LOS D			0.80	0.80

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.

MOVEMENT SUMMARY

Site: 102 [102_2021_PM_Christie Rd / Site Access]

Network: N101 [PM_2021]

Christie Rd / Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Rd South														
2	T1	323	1.6	323	1.6	0.085	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	59.2
3	R2	1	0.0	1	0.0	0.085	5.6	LOS A	0.0	0.1	0.01	0.00	0.01	43.3
Approach		324	1.6	324	1.6	0.085	0.0	NA	0.0	0.1	0.00	0.00	0.00	59.0
East: Site access														
4	L2	68	0.0	68	0.0	0.120	5.3	LOS A	0.5	3.4	0.28	0.58	0.28	25.4
6	R2	25	0.0	25	0.0	0.120	11.8	LOS A	0.5	3.4	0.28	0.58	0.28	25.4
Approach		94	0.0	94	0.0	0.120	7.1	LOS A	0.5	3.4	0.28	0.58	0.28	25.4
North: Christie Rd North														
7	L2	2	0.0	2	0.0	0.078	4.3	LOS A	0.0	0.0	0.00	0.01	0.00	39.5
8	T1	442	4.8	442	4.8	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		444	4.7	444	4.7	0.078	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.4
All Vehicles		862	3.1	862	3.1	0.120	0.8	NA	0.5	3.4	0.03	0.07	0.03	49.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [104_2021_PM_ Talavera Rd/ Site Access]

Network: N101 [PM_2021]

Talavera Rd/ Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd East														
5	T1	871	1.7	871	1.7	0.153	1.1	LOS A	0.1	0.6	0.01	0.20	0.01	51.9
6	R2	5	0.0	5	0.0	0.153	9.3	LOS A	0.1	0.6	0.03	0.20	0.03	47.3
Approach		876	1.7	876	1.7	0.153	1.2	NA	0.1	0.6	0.01	0.20	0.01	51.8
North: Site Access														
7	L2	36	0.0	36	0.0	0.088	7.0	LOS A	0.3	1.8	0.49	0.65	0.49	24.5
9	R2	4	0.0	4	0.0	0.088	35.5	LOS C	0.3	1.8	0.49	0.65	0.49	24.5
Approach		40	0.0	40	0.0	0.088	10.0	LOS A	0.3	1.8	0.49	0.65	0.49	24.5
West: Talavera Rd west														
10	L2	3	0.0	3	0.0	0.229	5.5	LOS A	0.0	0.0	0.00	0.20	0.00	39.4
11	T1	691	3.7	691	3.7	0.229	1.1	LOS A	0.0	0.0	0.00	0.20	0.00	53.3
Approach		694	3.6	694	3.6	0.229	1.1	NA	0.0	0.0	0.00	0.20	0.00	53.2
All Vehicles		1609	2.5	1609	2.5	0.229	1.4	NA	0.3	1.8	0.02	0.21	0.02	51.2

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103 [103_2031_AM_ Talavera Rd/ Christie Rd] — Network: N101 [AM_2031]

Talavera Rd/ Christie Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 115 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd														
5	T1	842	1.3	788	1.3	0.340	6.3	LOS A	9.7	68.8	0.39	0.35	0.39	44.8
6	R2	98	0.0	92	0.0	0.546	59.1	LOS E	5.1	35.4	1.00	0.80	1.11	8.1
Approach		940	1.1	880 N1	1.2	0.546	11.8	LOS A	9.7	68.8	0.45	0.39	0.47	36.0
North: Christie Rd														
7	L2	466	8.6	466	8.6	0.861	61.0	LOS E	6.5	49.0	1.00	0.99	1.31	2.6
9	R2	271	0.8	271	0.8	0.991	96.2	LOS F	6.9	49.0	1.00	1.11	1.68	6.6
Approach		737	5.7	737	5.7	0.991	73.9	LOS F	6.9	49.0	1.00	1.04	1.45	4.6
West: Talavera Rd														
10	L2	79	2.7	79	2.7	0.052	7.5	LOS A	0.8	5.6	0.19	0.62	0.19	34.8
11	T1	658	1.1	658	1.1	0.986	80.3	LOS F	57.9	408.9	1.00	1.33	1.51	6.9
Approach		737	1.3	737	1.3	0.986	72.5	LOS F	57.9	408.9	0.91	1.25	1.37	7.6
All Vehicles		2414	2.6	2354 N1	2.6	0.991	50.2	LOS D	57.9	408.9	0.77	0.86	1.06	11.4

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	68	16.2	LOS B	0.1	0.1	0.53	0.53
P4	West Full Crossing	55	49.9	LOS E	0.2	0.2	0.93	0.93
All Pedestrians		123	31.2	LOS D			0.71	0.71

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.

MOVEMENT SUMMARY

Site: 101 [101_2031_AM_M2 On Off /Christie Road]

Network: N101 [AM_2031]

M2 On Off /Christie Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Road														
2	T1	1	0.0	1	0.0	0.248	39.8	LOS C	2.6	18.8	0.92	0.75	0.92	7.5
3	R2	153	1.4	147	1.4	0.341	45.0	LOS D	3.7	26.4	0.94	0.76	0.94	25.4
Approach		154	1.4	148 N1	1.4	0.341	45.0	LOS D	3.7	26.4	0.94	0.76	0.94	25.4
North: Football fields														
7	L2	1	0.0	1	0.0	0.013	52.5	LOS D	0.0	0.3	0.97	0.58	0.97	22.6
8	T1	1	0.0	1	0.0	0.007	44.7	LOS D	0.0	0.3	0.94	0.56	0.94	3.1
Approach		2	0.0	2	0.0	0.013	48.6	LOS D	0.0	0.3	0.96	0.57	0.96	15.7
West: M2 Off														
10	L2	1	0.0	1	0.0	0.339	15.7	LOS B	8.4	61.2	0.54	0.75	0.54	24.4
11	T1	1	0.0	1	0.0	0.339	10.1	LOS A	8.4	61.2	0.54	0.75	0.54	47.7
12	R2	727	4.3	727	4.3	0.339	15.7	LOS B	8.4	61.2	0.54	0.75	0.54	39.8
Approach		729	4.3	729	4.3	0.339	15.7	LOS B	8.4	61.2	0.54	0.75	0.54	39.7
All Vehicles		885	3.8	880 N1	3.8	0.341	20.7	LOS B	8.4	61.2	0.61	0.75	0.61	35.9

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	41.8	LOS E	0.1	0.1	0.94	0.94
All Pedestrians		53	41.8	LOS E			0.94	0.94

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.

MOVEMENT SUMMARY

Site: 105 [105_2031_AM_Talavera Rd/ Herring Road/ M2 Ramps]

Network: N101 [AM_2031]

Talavera Rd/ Herring Road/ M2 Ramps
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Herring Road														
1	L2	125	2.4	125	2.4	0.283	26.8	LOS B	3.2	22.6	0.86	0.76	0.86	26.6
2	T1	270	11.9	270	11.9	0.954	78.9	LOS F	19.8	153.0	0.99	1.16	1.52	23.1
3	R2	431	0.5	431	0.5	1.123	187.3	LOS F	50.7	356.3	1.00	1.44	2.19	8.5
Approach		826	4.5	826	4.5	1.123	127.6	LOS F	50.7	356.3	0.98	1.24	1.77	13.0
East: Talavera Road (E)														
4	L2	253	0.8	253	0.8	0.552	47.2	LOS D	12.9	90.7	0.92	0.82	0.92	24.0
5	T1	283	0.7	283	0.7	0.287	38.4	LOS C	6.6	46.7	0.85	0.69	0.85	14.0
6	R2	230	1.3	230	1.3	1.088	161.8	LOS F	12.0	84.9	1.00	1.27	2.23	11.2
Approach		766	0.9	766	0.9	1.088	78.4	LOS F	12.9	90.7	0.92	0.91	1.28	14.9
North: M2 Ramps														
7	L2	156	11.5	156	11.5	0.120	31.8	LOS C	3.0	22.7	0.69	0.73	0.69	31.8
9	R2	544	0.6	544	0.6	1.131	192.3	LOS F	65.9	463.5	1.00	1.39	2.20	7.6
Approach		700	3.0	700	3.0	1.131	156.5	LOS F	65.9	463.5	0.93	1.24	1.86	9.6
West: Talavera Road (W)														
10	L2	41	9.8	41	9.8	1.125	169.9	LOS F	26.2	186.0	1.00	1.51	2.17	9.2
11	T1	1039	0.9	1039	0.9	1.125	173.7	LOS F	26.4	186.0	1.00	1.63	2.17	5.3
12	R2	17	100.0	17	100.0	0.273	69.9	LOS E	1.0	13.5	0.99	0.71	0.99	17.2
Approach		1097	2.7	1097	2.7	1.125	171.9	LOS F	26.4	186.0	1.00	1.61	2.15	5.5
All Vehicles		3389	2.8	3389	2.8	1.131	136.8	LOS F	65.9	463.5	0.96	1.29	1.80	9.5

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P2S	East Slip/Bypass Lane Crossing	53	17.7	LOS B	0.1	0.1	0.77	0.77
P3	North Full Crossing	53	45.2	LOS E	0.2	0.2	0.87	0.87
P4	West Full Crossing	53	49.6	LOS E	0.2	0.2	0.91	0.91
All Pedestrians		211	41.7	LOS E			0.87	0.87

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.

MOVEMENT SUMMARY

Site: 102 [102_2031_AM_Christie Rd / Site Access]

Network: N101 [AM_2031]

Christie Rd / Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Rd South														
2	T1	153	1.4	147	1.4	0.050	0.8	LOS A	0.2	1.5	0.11	0.05	0.11	40.9
3	R2	13	0.0	12	0.0	0.050	8.2	LOS A	0.2	1.5	0.32	0.13	0.32	31.7
Approach		165	1.3	159[N1]	1.3	0.050	1.4	NA	0.2	1.5	0.12	0.05	0.12	38.9
East: Site access														
4	L2	5	0.0	5	0.0	0.015	5.5	LOS A	0.0	0.2	0.33	0.56	0.33	25.8
6	R2	1	0.0	1	0.0	0.015	13.6	LOS A	0.0	0.2	0.33	0.56	0.33	25.8
Approach		6	0.0	6	0.0	0.015	6.9	LOS A	0.0	0.2	0.33	0.56	0.33	25.8
North: Christie Rd North														
7	L2	32	0.0	32	0.0	0.128	4.3	LOS A	4.3	31.3	0.00	0.08	0.00	38.0
8	T1	696	4.5	696	4.5	0.128	0.0	LOS A	8.3	60.3	0.00	0.02	0.00	57.6
Approach		727	4.3	727	4.3	0.128	0.2	NA	8.3	60.3	0.00	0.03	0.00	55.3
All Vehicles		899	3.7	893[N1]	3.8	0.128	0.5	NA	8.3	60.3	0.02	0.03	0.02	52.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 104 [104_2031_AM_ Talavera Rd/ Site Access] — Network: N101 [AM_2031]

Talavera Rd/ Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd East														
5	T1	941	0.9	881	0.9	0.174	1.8	LOS A	0.9	6.0	0.09	0.21	0.09	46.8
6	R2	40	0.0	37	0.0	0.174	13.0	LOS A	0.9	6.0	0.38	0.22	0.38	38.1
Approach		981	0.9	918[N1]	0.9	0.174	2.2	NA	0.9	6.0	0.10	0.21	0.10	46.0
North: Site Access														
7	L2	5	0.0	5	0.0	0.044	8.0	LOS A	0.1	0.5	0.68	0.72	0.68	17.4
9	R2	1	0.0	1	0.0	0.044	61.5	LOS E	0.1	0.5	0.68	0.72	0.68	17.4
Approach		6	0.0	6	0.0	0.044	16.9	LOS B	0.1	0.5	0.68	0.72	0.68	17.4
West: Talavera Rd west														
10	L2	26	0.0	26	0.0	0.288	5.5	LOS A	28.2	204.2	0.00	0.22	0.00	39.1
11	T1	1066	4.2	1066	4.2	0.288	1.1	LOS A	30.6	221.9	0.00	0.21	0.00	52.9
Approach		1093	4.1	1093	4.1	0.288	1.2	NA	30.6	221.9	0.00	0.21	0.00	52.1
All Vehicles		2080	2.6	2017[N1]	2.7	0.288	1.7	NA	30.6	221.9	0.05	0.21	0.05	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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 103 [103_2031_PM_ Talavera Rd/ Christie Rd]

Network: N101 [PM_2031]

Talavera Rd/ Christie Rd
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd														
5	T1	718	0.7	718	0.7	0.399	8.1	LOS A	7.2	50.9	0.59	0.51	0.59	41.8
6	R2	187	5.6	187	5.6	0.390	17.9	LOS B	3.7	27.5	0.81	0.78	0.81	20.4
Approach		905	1.7	905	1.7	0.399	10.2	LOS A	7.2	50.9	0.64	0.57	0.64	37.3
North: Christie Rd														
7	L2	526	4.4	526	4.4	0.313	14.0	LOS A	4.9	35.3	0.66	0.74	0.66	9.8
9	R2	151	0.0	151	0.0	0.405	26.6	LOS B	4.0	28.1	0.91	0.78	0.91	17.9
Approach		677	3.4	677	3.4	0.405	16.8	LOS B	4.9	35.3	0.72	0.75	0.72	13.1
West: Talavera Rd														
10	L2	140	0.0	140	0.0	0.393	23.1	LOS B	5.5	38.4	0.82	0.75	0.82	19.9
11	T1	335	1.6	335	1.6	0.393	17.6	LOS B	5.6	39.8	0.82	0.70	0.82	21.6
Approach		475	1.1	475	1.1	0.393	19.2	LOS B	5.6	39.8	0.82	0.72	0.82	21.1
All Vehicles		2057	2.1	2057	2.1	0.405	14.4	LOS A	7.2	50.9	0.71	0.66	0.71	26.3

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.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P3	North Full Crossing	68	24.4	LOS C	0.1	0.1	0.90	0.90
P4	West Full Crossing	55	24.4	LOS C	0.1	0.1	0.90	0.90
All Pedestrians		123	24.4	LOS C			0.90	0.90

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.

MOVEMENT SUMMARY

Site: 101 [101_2031_PM_M2 On Off /Christie Road]

Network: N101 [PM_2031]

M2 On Off /Christie Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Road														
2	T1	1	0.0	1	0.0	0.317	22.4	LOS B	4.2	29.7	0.84	0.77	0.84	11.5
3	R2	355	1.5	355	1.5	0.436	27.7	LOS B	6.0	42.9	0.87	0.78	0.87	32.3
Approach		356	1.5	356	1.5	0.436	27.7	LOS B	6.0	42.9	0.87	0.78	0.87	32.3
North: Football fields														
7	L2	1	0.0	1	0.0	0.010	38.3	LOS C	0.0	0.2	0.96	0.58	0.96	27.0
8	T1	1	0.0	1	0.0	0.006	32.3	LOS C	0.0	0.2	0.93	0.55	0.93	4.1
Approach		2	0.0	2	0.0	0.010	35.3	LOS C	0.0	0.2	0.95	0.56	0.95	19.6
West: M2 Off														
10	L2	1	0.0	1	0.0	0.427	22.1	LOS B	7.7	55.8	0.77	0.79	0.77	22.6
11	T1	1	0.0	1	0.0	0.427	16.5	LOS B	7.7	55.8	0.77	0.79	0.77	44.0
12	R2	617	3.4	617	3.4	0.427	22.1	LOS B	7.7	55.8	0.77	0.79	0.77	34.9
Approach		619	3.4	619	3.4	0.427	22.0	LOS B	7.7	55.8	0.77	0.79	0.77	34.9
All Vehicles		977	2.7	977	2.7	0.436	24.1	LOS B	7.7	55.8	0.80	0.79	0.80	33.8

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P2	East Full Crossing	53	29.3	LOS C	0.1	0.1	0.92	0.92
All Pedestrians		53	29.3	LOS C			0.92	0.92

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.

MOVEMENT SUMMARY

Site: 105 [105_2031_PM_Talavera Rd/ Herring Road/ M2 Ramps]

Network: N101 [PM_2031]

Talavera Rd/ Herring Road/ M2 Ramps
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Herring Road														
1	L2	166	6.6	166	6.6	0.260	23.6	LOS B	5.2	38.6	0.72	0.75	0.72	28.6
2	T1	469	4.5	469	4.5	0.977	90.8	LOS F	35.8	254.8	0.98	1.17	1.51	21.0
3	R2	250	0.0	250	0.0	0.977	95.6	LOS F	35.8	254.8	1.00	1.16	1.47	15.3
Approach		885	3.6	885	3.6	0.977	79.6	LOS F	35.8	254.8	0.94	1.09	1.35	19.8
East: Talavera Road (E)														
4	L2	447	0.4	447	0.4	1.005	111.8	LOS F	42.9	301.4	1.00	1.15	1.60	13.3
5	T1	560	0.2	560	0.2	0.478	37.3	LOS C	14.9	104.8	0.84	0.72	0.84	14.3
6	R2	537	0.2	537	0.2	0.974	98.0	LOS F	22.3	156.2	1.00	1.08	1.56	16.9
Approach		1544	0.3	1544	0.3	1.005	80.0	LOS F	42.9	301.4	0.94	0.97	1.31	15.0
North: M2 Ramps														
7	L2	37	2.7	37	2.7	0.033	39.6	LOS C	0.8	5.8	0.73	0.69	0.73	29.0
9	R2	117	1.7	117	1.7	0.912	85.4	LOS F	8.6	61.2	1.00	0.99	1.49	15.1
Approach		154	1.9	154	1.9	0.912	74.4	LOS F	8.6	61.2	0.94	0.92	1.31	17.6
West: Talavera Road (W)														
10	L2	75	0.0	75	0.0	0.766	54.0	LOS D	26.5	185.2	0.96	0.90	1.31	24.8
11	T1	846	0.0	846	0.0	0.766	45.5	LOS D	26.5	185.2	0.96	0.88	1.13	17.2
12	R2	15	100.0	15	100.0	0.079	55.0	LOS D	0.8	10.4	0.86	0.70	0.86	20.2
Approach		936	1.6	936	1.6	0.766	46.4	LOS D	26.5	185.2	0.96	0.87	1.14	18.1
All Vehicles		3519	1.5	3519	1.5	1.005	70.7	LOS F	42.9	301.4	0.95	0.97	1.28	17.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate
P1	South Full Crossing	53	51.0	LOS E	0.2	0.2	0.89	0.89
P2S	East Slip/Bypass Lane Crossing	53	14.9	LOS B	0.1	0.1	0.63	0.63
P3	North Full Crossing	53	40.9	LOS E	0.2	0.2	0.79	0.79
P4	West Full Crossing	53	50.1	LOS E	0.2	0.2	0.88	0.88
All Pedestrians		211	39.2	LOS D			0.80	0.80

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.

MOVEMENT SUMMARY

Site: 102 [102_2031_PM_Christie Rd / Site Access]

Network: N101 [PM_2031]

Christie Rd / Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Christie Rd South														
2	T1	329	1.6	329	1.6	0.086	0.0	LOS A	0.0	0.1	0.01	0.00	0.01	58.8
3	R2	1	0.0	1	0.0	0.086	7.0	LOS A	0.0	0.1	0.01	0.00	0.01	43.2
Approach		331	1.6	331	1.6	0.086	0.1	NA	0.0	0.1	0.01	0.00	0.01	58.6
East: Site access														
4	L2	68	0.0	68	0.0	0.164	5.5	LOS A	0.5	3.8	0.35	0.60	0.35	23.5
6	R2	25	0.0	25	0.0	0.164	15.0	LOS B	0.5	3.8	0.35	0.60	0.35	23.5
Approach		94	0.0	94	0.0	0.164	8.1	LOS A	0.5	3.8	0.35	0.60	0.35	23.5
North: Christie Rd North														
7	L2	2	0.0	2	0.0	0.124	4.3	LOS A	0.0	0.0	0.00	0.01	0.00	39.6
8	T1	615	3.4	615	3.4	0.124	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.8
Approach		617	3.4	617	3.4	0.124	0.0	NA	0.0	0.0	0.00	0.00	0.00	59.6
All Vehicles		1041	2.5	1041	2.5	0.164	0.8	NA	0.5	3.8	0.03	0.06	0.03	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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 104 [104_2031_PM_ Talavera Rd/ Site Access]

Network: N101 [PM_2031]

Talavera Rd/ Site Access
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Talavera Rd East														
5	T1	900	1.6	900	1.6	0.158	1.1	LOS A	0.1	0.7	0.01	0.20	0.01	51.7
6	R2	5	0.0	5	0.0	0.158	10.8	LOS A	0.1	0.7	0.04	0.20	0.04	47.0
Approach		905	1.6	905	1.6	0.158	1.2	NA	0.1	0.7	0.01	0.20	0.01	51.6
North: Site Access														
7	L2	36	0.0	36	0.0	0.170	7.5	LOS A	0.3	2.2	0.57	0.72	0.57	22.1
9	R2	4	0.0	4	0.0	0.170	49.3	LOS D	0.3	2.2	0.57	0.72	0.57	22.1
Approach		40	0.0	40	0.0	0.170	11.9	LOS A	0.3	2.2	0.57	0.72	0.57	22.1
West: Talavera Rd west														
10	L2	3	0.0	3	0.0	0.444	5.6	LOS A	0.0	0.0	0.00	0.20	0.00	39.3
11	T1	863	2.9	863	2.9	0.444	1.1	LOS A	0.0	0.0	0.00	0.20	0.00	53.3
Approach		866	2.9	866	2.9	0.444	1.1	NA	0.0	0.0	0.00	0.20	0.00	53.2
All Vehicles		1812	2.2	1812	2.2	0.444	1.4	NA	0.3	2.2	0.02	0.21	0.02	51.1

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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.