EG Funds Management

1A Queen Street, Auburn

Transport Assessment

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Job number 231001

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1 Introduction

1.1 Project Background

Arup was commissioned by EG Funds Management to undertake a transport assessment for the proposed rezoning of 1A Queen Street, Auburn.

In April 2013 the Joint Regional Planning Panel (JRPP) met to discuss the planning proposal for 1A Queen Street, Auburn. The record of decision of the JRPP in relation to the site outlined the issues required to be addressed before the planning proposal is to go on public exhibition. The JRPP made the following comment specifically related to the transport assessment for the site:

The Panel is concerned that the resulting development not generate unacceptable local traffic and related amenity impacts and considers that this aspect of the Proposal also requires further assessment. This should include the cumulative impacts of traffic generated by the current and planned provisions of ALEP in relation to the Auburn Town Centre.

This traffic and transport assessment therefore responds to the above comment and assesses the impact of the rezoning application in the context of the future development within the Auburn Town Centre. The assessment considers the cumulative impacts of the planned development within the Auburn Town Centre and the effects on nearby intersections.

1.2 Study Objectives

The key objectives of the study are as follows:

- Review of key background documentation, including:
  - Auburn City Urban Design Study (AECOM, September 2012)
  - Auburn City Council Traffic Modelling (Hyder, October 2012)
  - Auburn City Council Transport and Accessibility Study (Auburn City Council, 2012)
- Existing transport conditions surrounding the proposed site
- Description of the proposed development
- Assessment of the impacts on the local road network
- Transport assessment of wider public transport and walking/cycling provision
- Summary and conclusions to be drawn from the assessment

1.3 Consultation

Over the course of this assessment, Arup consulted with both the Department of Planning and Infrastructure and Auburn City Council to confirm both the scope and methodology of the study:

2 Existing Transport Conditions

2.1 Site Location

The site is located in the Auburn Local Government Area (LGA) and is bounded by Marion Street, Queen Street, the main western railway corridor and another commercial warehouse fronting Queen Street. The site location is outlined below in Figure 1.

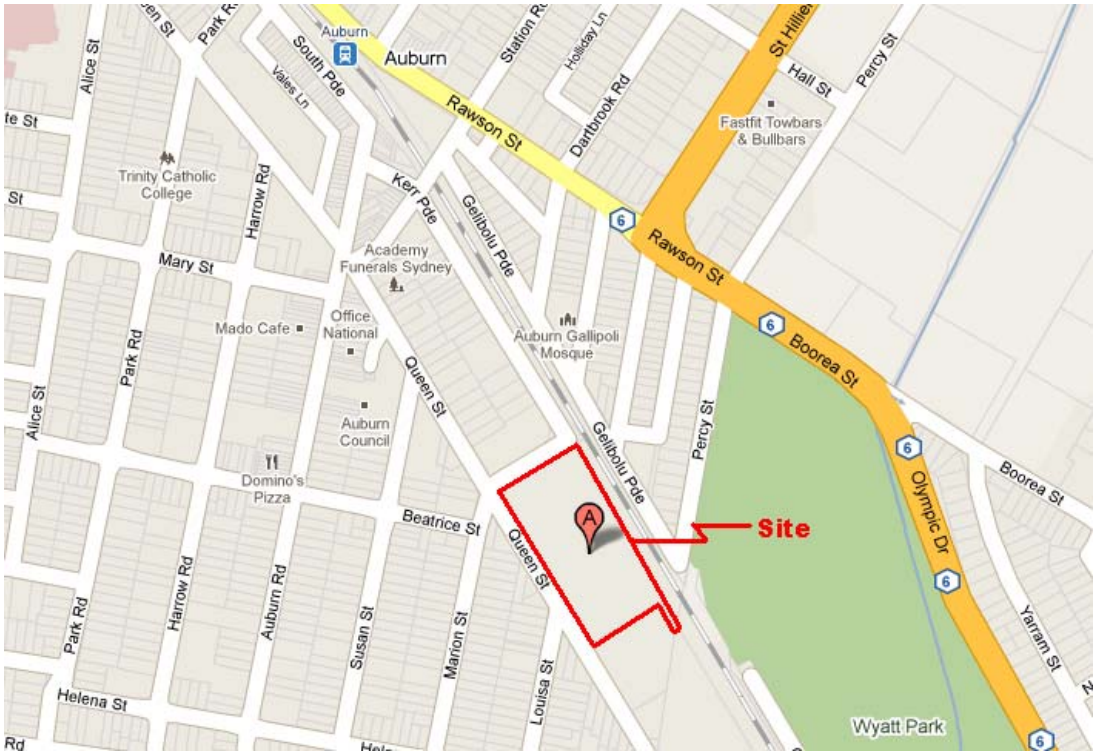


Figure 1: Existing Site

The total site area is approximately 2.7 hectares and is currently occupied by a number of industrial tenants. The existing site has four vehicular accesses, two on Queen Street and the other two on Marion Street. The surrounding land uses are predominantly industrial and residential in nature along both sides of the railway line. Auburn railway station is located approximately 550m north-west of the site. Other characteristic land uses in the locality include:

- Existing high density residential unit blocks on Vales Lane, in the vicinity of Auburn Station (refer to Photograph 1)
- Auburn Gallipoli Mosque (eastern side of the railway line on Gelibolu Parade – refer to Photograph 2).

Photograph 1 Existing High Density Residential Unit block on Vales Lane near Auburn Railway Station

Photograph 2 Auburn Gallipoli Mosque

2.2 Road Network Conditions

The main roads in the vicinity of the site are:

- **Metroad 6 (Joseph Street / Olympic Drive / Boorea Street / Rawson Street / St Hillers Road / Silverwater Road)**. This state road provides a major north-south connection through the Sydney metropolitan area. The northern section of the route carries significant volume of industrial traffic, especially where it intersects with Parramatta Road and provides on/off ramps to the M4 motorway. Left-in, left-out access is available from the western side of the road and is accessed from Bridge Street (south of the site). Alternatively, all movements are permitted at the Rawson Street intersection north of the site.
- **Rawson Street** is a regional road that provides an east-west road connection between Metroad 6 and Parramatta Road, along the north eastern side of the railway line at Auburn. Rawson Street provides connections to the south western side of the railway corridor via two railway overbridges in the vicinity of the Auburn Town Centre at Station Road and The Crescent.
- **Station Road / Civic Road / Queen Street** is a continuous local road that provides a north-south connection over the western railway line. This road intersects with Parramatta Road and Rawson Street and becomes Civic Road / Queen Street at a bend south of the railway line. Queen Street is a major local road which runs along the south western boundary of the site (refer to Photograph 3).
- **Kerr Parade / Marion Street**. Kerr Parade runs along the south western side of the railway line corridor (refer to Photograph 4) between the proposed rezoning site and the Auburn Town Centre. At the southern end, it meets Marion Street on a right angle bend. Marion Street intersects with Queen Street at an unusual four way roundabout and continues south. This street is currently heavily utilised for on street commuter parking for the Auburn railway station and includes a section of sixty degree angle parking near the northern end.

Photograph 3 Queen Street (looking north)

Photograph 4 Kerr Parade (looking south)

2.3 Public Transport Network

2.3.1 Trains

Auburn Station is the main transport hub of the Auburn town centre, providing access to rail and bus services. Auburn is located on the Western Rail Line, and is therefore connected directly to the city's two major centres, the Sydney and Parramatta CBDs. The station is located approximately 800m from the site, which is within a 10 minute walk.

High frequency train services are available during peak hours in both directions. Auburn Station is serviced by the Western Line (operating from North Shore to Emu Plains or Richmond via Parramatta) and the South Line (which operates from Campbelltown to City Circle via Granville). Table 1 summarises the number of services that stop at Auburn railway station.

Table 1: Peak Hour Train Services at Auburn Station

Peak	South Line		Western Line		Total Services
	Citybound	Outbound	Citybound	Outbound	
AM Peak	4	4	3	3	14
PM Peak	4	4	3	4	15

2.3.2 Buses

There are a number of buses serving the area of Auburn operated by both Veolia Transport and STA (Sydney Buses). The nearest bus stop to the site is located on Auburn Road, within 5 minutes walk. This stop is serviced by Route 908, which provides a north-south bus link from Parramatta to Bankstown via Auburn and Regents Park.

There are also a number of bus services are provided in Auburn town centre and adjacent to the railway station. Bus stops south of the station are operated by Veolia Transport and provide Routes 909, 911, and S3. Bus stops north of the station are operated by STA and provide Routes 540 and 544, and the N60 night ride service. These routes and their frequencies for AM peak are listed below in Table 2.

Table 2: Bus Services

Route	Origin	Destination	Number of Peak Hour Bus Services	
			AM (in/out-bound)	PM (in/out-bound)
908	Bankstown	Parramatta	2 / 0	2 / 2
909	Bankstown	Parramatta	1 / 3	2 / 2
911	Bankstown	Auburn	2 / 2	2 / 2
S3	Auburn	Auburn Botanical Gardens	0 / 0	0 / 0
540	Auburn	Newington	2 / 1	1 / 2
544	Auburn	Macquarie Centre	2 / 3	2 / 2
Total Peak Hour Services			**18**	**19**

2.4 Walking and Cycling Network

2.4.1 Walking

Footpaths are currently provided on both sides of all the local streets e.g. Queen Street and Marion Street but on Kerr Parade pedestrian facilities are provided on the western side of the street only. The existing pedestrian connections elsewhere throughout the assessed area are nevertheless of a consistent standard and provide good direct walking connections to the nearby Auburn Town Centre and railway station. Numerous pedestrian crossing facilities, such as pedestrian refuges and marked pedestrian crossings are currently provided at strategic locations throughout the area. There is high pedestrian activity currently in the areas surrounding Auburn railway station at all times of the day.

2.4.2 Cycling

The roads surrounding the site are generally provided with wide travel lanes and, as such, support safe cycling. However minimal cycle traffic activity was observed currently in the areas surrounding the site. The indicated cycle route within close vicinity of the site is Marion Street and Kerr Parade. This is shown below in Figure 2.

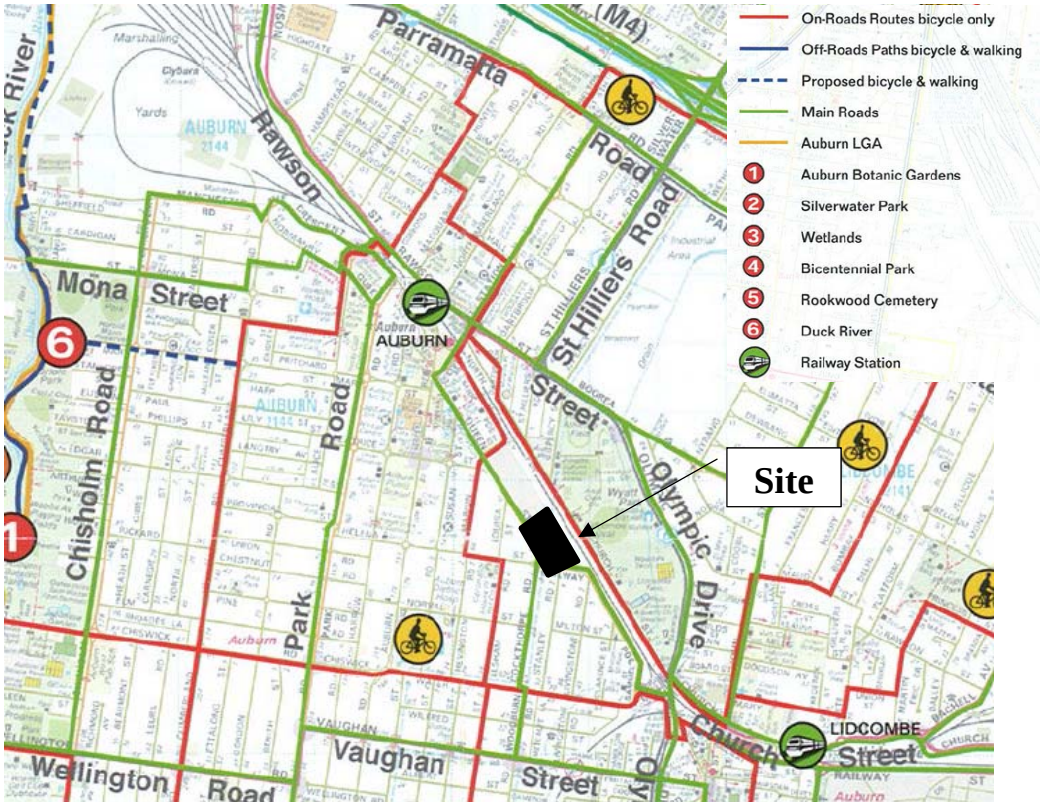


Figure 2: Bicycle and Walking Map (Auburn Council, 2011)

2.5 Existing Demographics & Travel Patterns

The 2011 Journey to Work (JTW) was analysed for the surrounding travel zone (TZ) of 1309 and the Auburn LGA. The mode split data for trips originating within the immediate travel zone is shown Table 3.

Table 3: Journey to Work Mode Split 2011

Mode	**Proportion of Trips from Auburn Town Centre**
Train	49%
Vehicle Driver	37%
Walked Only	7%
Vehicle Passenger	5%
Bus	1%
Other	1%
Total	**100%**

As a point of comparison, the trips within the town centre (TZ: 1309) were compared with the Auburn LGA JTW data. This comparison is shown in Figure 3.

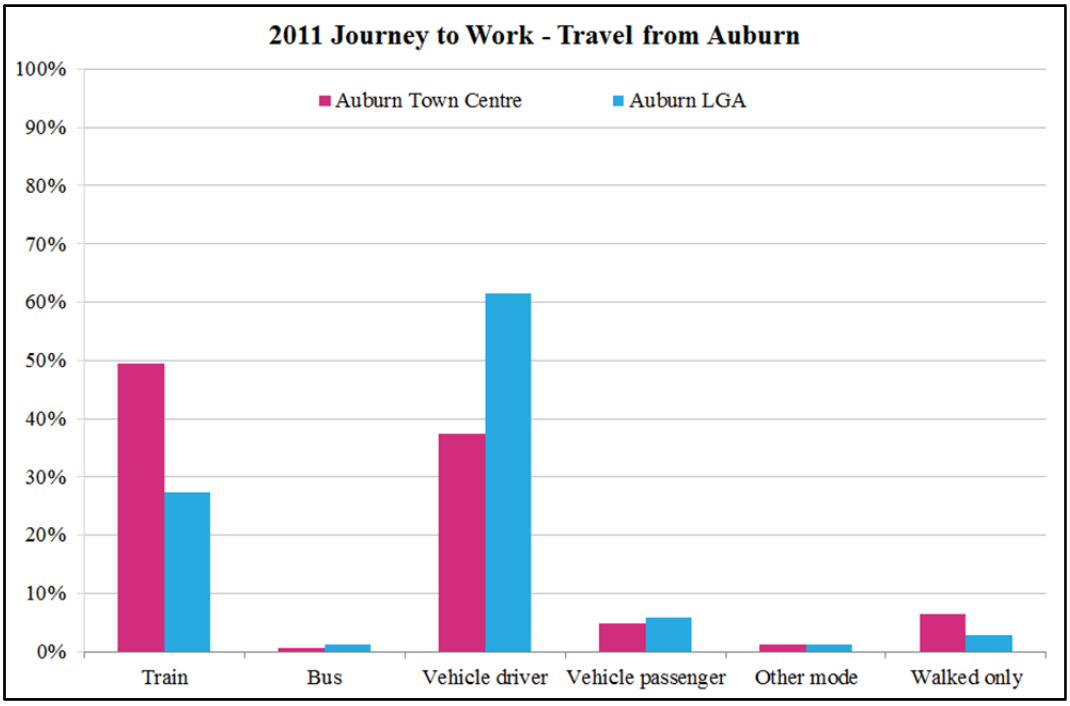


Figure 3: Existing Travel Patterns for Auburn

The mode split analysis demonstrates that public transport usage within the Auburn town centre (50% of total trips) is significantly higher than across the wider LGA (29%). The majority of these public transport trips are via the heavy rail system.

The top 5 trip destination LGAs for those travelling via private vehicle to work from the Auburn town centre are shown below in Table 4. This provides an indication of the likely traffic distribution from the future development in the town centre.

Table 4: Auburn Journey to Work Trip Distribution

Destination LGA	**% of Vehicle Trips**
Auburn	21%
Parramatta	9%
Bankstown	8%
Sydney	7%
Canada Bay	5%
Other	50%
Total	**100%**

3 Development Description

3.1 Proposed Development

The development proposal for the Queen Street site consists of the demolition of the existing Industrial Estate and the construction of a residential development, with a Floor Space Ratio (FSR) of approximately 2:08:1.

3.2 Auburn Town Centre Development

Auburn City Council has proposed an uplift in floor space ratio (FSR) for lands zoned as B4 (Mixed Use) and R4 (High Density Residential) in the Auburn town centre, as well as sites in Lidcombe, Berala, Regents Park and Newington. The 2011 Auburn City Urban Design Study, prepared by AECOM, tested and recommended changes to floor space ratios and height controls within these areas.

As a component of the Urban Design Study, Hyder prepared a transport assessment for Council which assessed the traffic impacts from this uplift in development. The study considered two scenarios:

- Do nothing scenario: A growth rate of 0.5% annually on the road network was applied to existing volumes based on forecast increases in population and employment.
- Growth scenario: An increase in traffic associated with the full development potential of the town centres, based on the FSR controls outlined in the AECOM urban design study.

Auburn Council have recently updated the projected dwelling and employment forecasts for the town centres within the LGA, which considers a higher development potential relative to that initially envisaged in the 2011 Urban Design Study. This is summarised in Table 5.

Table 5: Future Development Potential – Auburn/Lidcombe Town Centres

Town Centre	Development Scenario	Capacity for additional dwellings	Capacity of Mixed use podium GFA
Auburn	2011 Urban Design Study	1,943	110,498m^2
	Revised 2013 Forecasts	4,013	98,364m^2
	Difference	**+2,070**	**-12,134m^2**
Lidcombe	2011 Urban Design Study	1,179	42,533m^2
	Revised 2013 Forecasts	3,081	64,500m^2
	Difference	**+1,902**	**+21,967m^2**

3.3 Pedestrian and Vehicular Access

3.3.1 Vehicular Access

Vehicular movements within the site are to be minimised, with carpark entry points located close to the site boundaries, and servicing for retail/commercial

uses within the plaza space (to be managed during non-peak times). Two single level basement car parks are envisaged which will service the building. Some on-street parking may be provided on Queen Street and within the site.

3.3.2 Pedestrian and Cycle Access

The site area is proposed to include numerous through site pedestrian links which are in line with the major pedestrian desire lines approaching the site from the south, west and north west. A wide pedestrian and cycle path is proposed through the site, which will provide a direct connection to the town centre, bus stops and railway station. The future pedestrian and cycle links are shown in Figure 4.

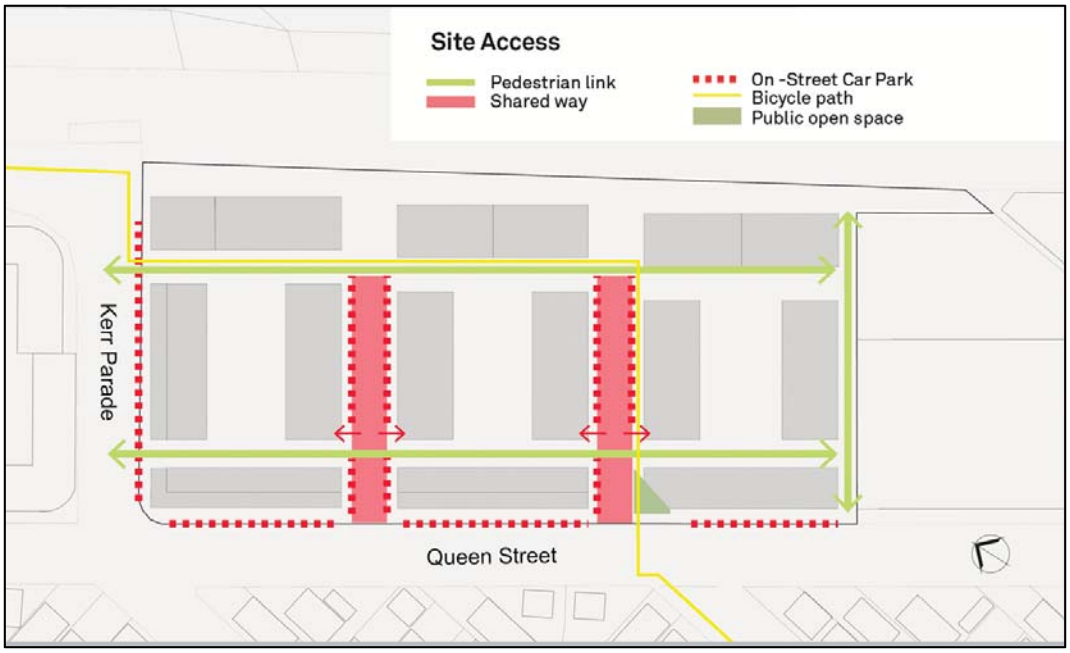


Figure 4: Potential Pedestrian and Cycle Links

Source: Hassell, 2014

4 Road Network Impacts

The potential road network impacts generated from the development of the Queen Street site has been assessed in the context of the future development of the Auburn and Lidcombe town centres. The following sections outline the methodology utilised to assess the cumulative impacts of development in the area, which satisfy the requests of the DP&I and Auburn City Council for the analysis of the road network.

4.1 Traffic Generation

4.1.1 Generation Rates

Traffic generation rates were adopted from the RMS Technical Direction (TDT 2013/04) released in May 2013, which provides an update to the rates previously outlined in the RTA Guide to Traffic Generating Developments, Version 2.2, October 2002. These are shown below in Table 6.

Table 6: Peak Hour Traffic Generation Rates

Land Use	**Peak Hour Generation Rate^ (RMS, 2013)**		**Peak Hour Generation Rate (RTA, 2002)**	
High Density Residential (per dwelling)	0.19	AM peak	0.29	AM peak
	0.15	PM peak	0.29	PM peak
Retail (per 100m^2 of GLFA*)	1.68	AM peak	2.76	AM peak
	3.41	PM peak	4.60	PM peak
Office/commercial (per 100m^2 of GFA)	1.60	AM peak	2.00	AM peak
	1.20	PM peak	2.00	PM peak

** GLFA is 75% of the GFA*

^ Rates calculated using a weighted average for surveyed sites across Sydney Metropolitan Area

It should be noted that Hyder used the traffic generation rates from the 2002 RTA guide in their 2012 traffic study for Council.

4.1.2 Forecast Town Centre Traffic Generation

The total peak hour vehicle trips for the Auburn Town Centre and Lidcombe Town Centre, excluding the future Queen Street development, are shown below Table 7.

Table 7: Town Centre Trip Generation Comparison

Town Centre	Capacity of additional dwellings	Capacity of Mixed use podium GFA^	Total Vehicle Trips*	
			AM Peak	PM Peak
Auburn	4,013	98,364m^2	2,119	2,650
Lidcombe	3,081	64,500m^2	1,475	1,805

^ *Assumed split of 35% office/commercial and 65% retail*

** Based on 2013 RMS traffic generation rates*

Adoption of the updated RMS traffic generation rates (compared with those outlined in the 2002 guide) results in significant fewer peak hour vehicle trips in both town centres, which are as follows:

- Auburn town centre: reduction of 1,050 and 1,400 trips in the AM/PM peak
- Lidcombe town centre: reduction of 980 and 1,400 trips in the AM/PM peak

4.1.3 Forecast Site Traffic Generation

Based on a site FSR for 2:08, a development yield of between 500 and 550 dwellings is envisaged. The traffic analysis has taken a worst case scenario and assumed a yield of 550 dwellings - which generates 105 and 83 AM and PM peak hour vehicle trips respectively.

The existing traffic flows of the industrial development have to also be subtracted. There were a total of 26 trips and 21 trips in the AM and PM peaks respectively, based on driveway survey data undertaken in 2010. It should be noted that these trips are the opposite direction to the likely residential trips.

Therefore the additional peak hour traffic resulting from the proposed site is as follows:

- AM Peak (8am – 9am): 79 vehicles
- PM Peak (5pm – 6pm): 62 vehicles

100% of this traffic has been forecast to be outbound trips in the AM peak and inbound trips in the PM peak.

4.2 Traffic Distribution

Traffic related to development with the Auburn and Lidcombe town centres (excluding the Queen Street site) has been distributed based on the strategic traffic model developed by Hyder for the town centres study.

As the majority of the proposed site development is residential, the general future traffic distribution of the proposed Queen Street development has been estimated from the 2011 Census Data for Journey to Work car travel for residents of the locality of Auburn. The data shows the greatest proportion of the car trips are generated to / from areas to the east (refer to Table 8).

Table 8: 2011 Census Journey to Work Car Trips for Existing Locality Residents

Direction	JTW Proportions
North	26%
South	19%
East	34%
West	20%

The distribution applied to the local road network shows the most likely routes which will be taken by future vehicular traffic travelling from the site to the above directions. Figure 5 below depicts the local road proportions from the site in the AM Peak, with the traffic flows in the opposite direction where possible to the site in the PM peak.

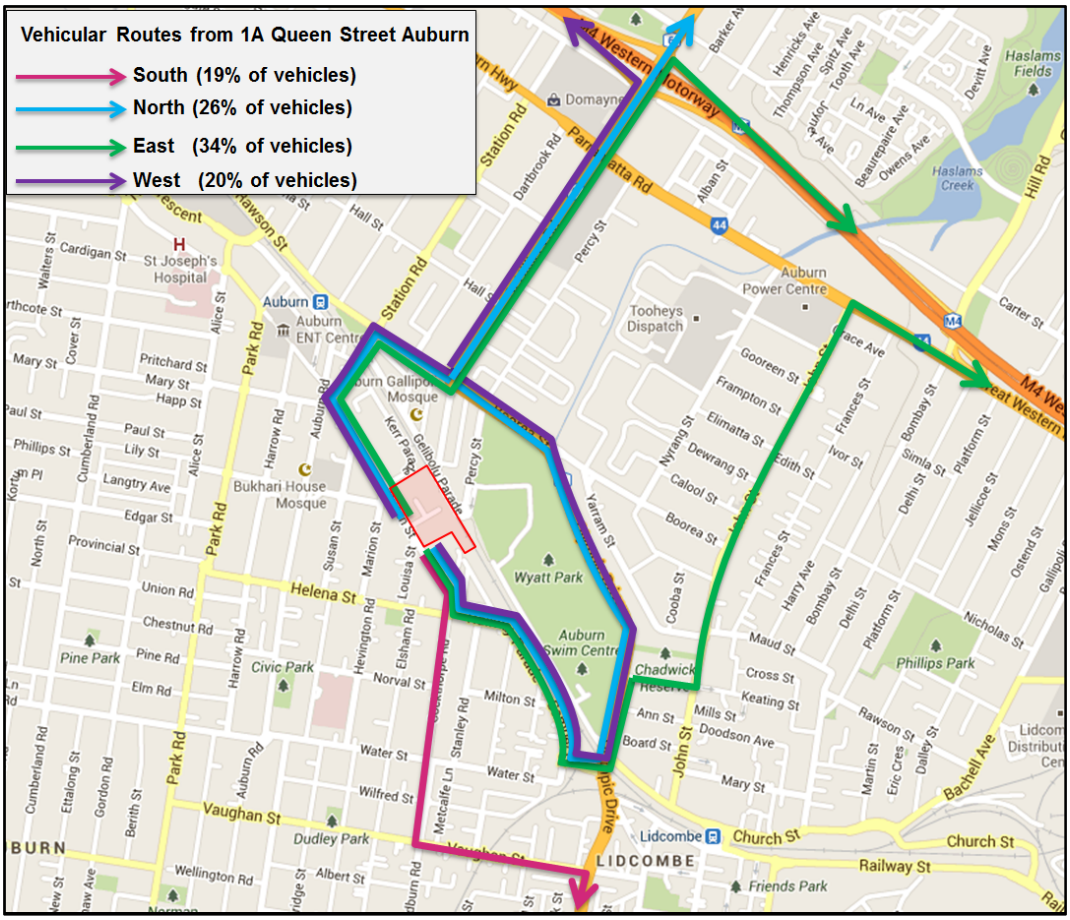


Figure 5: Forecast Traffic Distribution

4.3 Traffic Modelling

4.3.1 Methodology

In order to determine the future road network impact resulting from the proposed site, the existing and planned development within the Auburn and Lidcombe town centres must be considered.

In the return brief to the DP&I regarding this study, Arup proposed to model a series of key intersections adjacent to the Queen Street site. The intersections originally proposed by Arup included:

- Kerr Parade / Civic Road / Station Road;
- Rawson Street / Station Road;
- Rawson Street / St Hilliers Road;
- Northumberland Road / Rawson Street;

Auburn City Council reviewed these intersections and requested that Arup undertake addition modelling of the following intersections:

- Queen Street / Marion Street / Kerr Parade;
- Vaughn Street / Olympic Drive; and
- Church Street / Olympic Drive.

A diagram indicating the intersections assessed is shown in Figure 6.

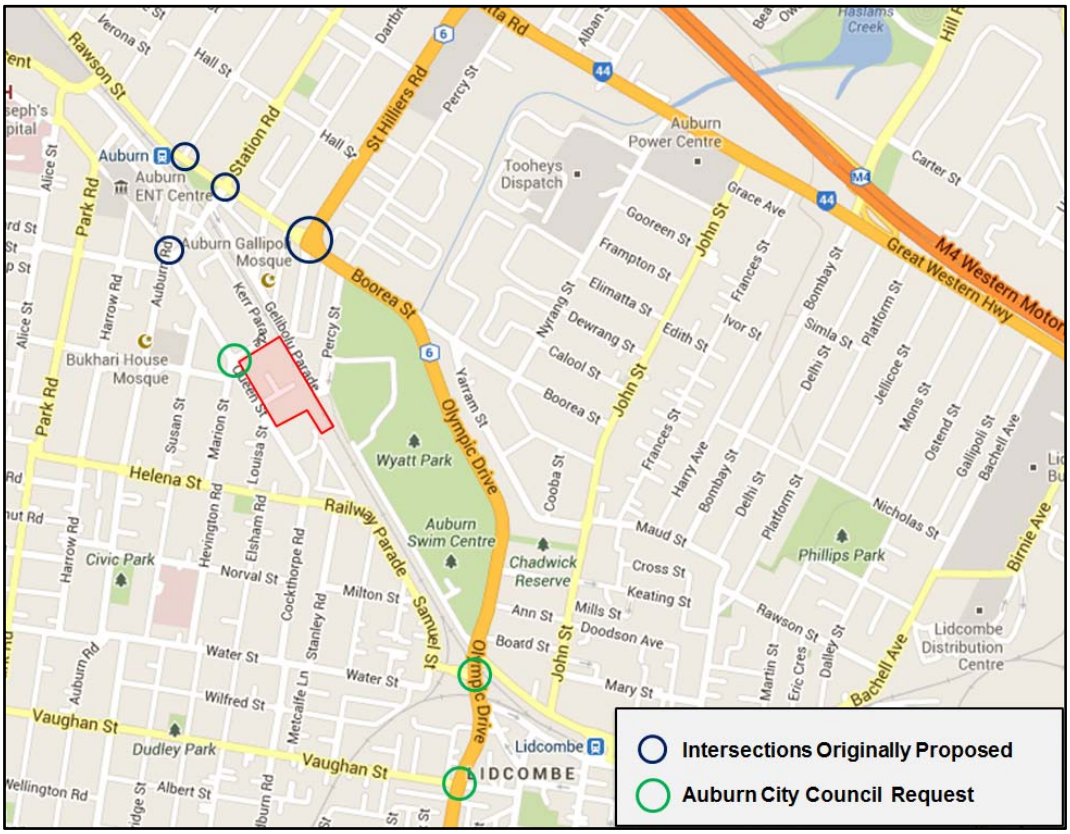


Figure 6: Intersections Assessed

4.3.2 Scenarios Assessed

Modelling was calibrated to the existing observed conditions and the outputs presented by Hyder in 2012. Two following scenarios were modelled in this assessment:

- **2021 development:** Proposed town centre development up to 2021 based on revised 2013 dwelling/population forecasts provided by Council, excluding the proposed Queen Street development
- **2021 development including Queen Street:** Proposed town centre development up to 2021 including the proposed Queen Street development

4.3.3 Intersection Performance Standards

The intersections have been assessed using RMS approved software SIDRA software.

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. This is further described in Appendix A of this report.

Another common measure of intersection performance is the degree of saturation (DOS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DOS of 1.0 indicates that an intersection is operating at capacity. The desirable maximum degree of saturation for an intersection is 0.9.

The existing intersection performance is assessed in this report in terms of the following three factors for each intersection.

- Degree of Saturation
- Average Delay (Seconds per vehicle)
- Level of Service

4.3.4 Modelling Results

The results of the scenarios tested are shown in Table 9 on the following page. The detailed SIDRA outputs are provided as an Appendix C.

Table 9: Intersection Modelling Results – Existing Layouts

Intersection	Peak	Scenario	LOS	DOS	Delay (s)
Bridge Street / Olympic Drive	AM	2021 development	**A**	**0.64**	**2**
		2021 development including Queen St	**A**	**0.78**	**2**
	PM	2021 development	**A**	**0.81**	**1**
		2021 development including Queen St	**A**	**0.81**	**1**
Queen Street / Marion Street / Kerr Parade	AM	2021 development	**A**	**0.43**	**7**
		2021 development including Queen St	**A**	**0.43**	**7**
	PM	2021 development	**A**	**0.31**	**6**
		2021 development including Queen St	**A**	**0.40**	**6**
Queen Street / Civic Road / Auburn Road	AM	2021 development	**D**	**0.90**	**47**
		2021 development including Queen St	**D**	**0.91**	**50**
	PM	2021 development	**C**	**0.79**	**35**
		2021 development including Queen St	**C**	**0.79**	**35**
Northumberland Road / Rawson Street	AM	2021 development	**C**	**0.97**	**43**
		2021 development including Queen St	**C**	**0.97**	**43**
	PM	2021 development	**F**	**1.13**	**92**
		2021 development including Queen St	**F**	**1.13**	**92**
Station Road / Rawson Street	AM	2021 development	**D**	**0.98**	**56**
		2021 development including Queen St	**D**	**1.01**	**56**
	PM	2021 development	**F**	**1.17**	**105**
		2021 development including Queen St	**F**	**1.17**	**102**
Rawson Street / St Hilliers Road	AM	2021 development	**F**	**1.10**	**89**
		2021 development including Queen St	**F**	**1.16**	**109**
	PM	2021 development	**D**	**1.02**	**57**
		2021 development including Queen St	**D**	**1.02**	**56**
Vaughan Street / Olympic Drive	AM	2021 development	**E**	**1.02**	**64**
		2021 development including Queen St	**E**	**1.04**	**67**
	PM	2021 development	**F**	**1.22**	**165**
		2021 development including Queen St	**F**	**1.23**	**166**

4.3.5 Analysis

The traffic modelling demonstrates that in only 8 of the 28 scenarios assessed do intersections surrounding the Queen Street site fail to operate satisfactorily following the full development of the town centres. Outside of weekday commuter peak hours, it is expected these intersections will operate at much improved levels of service.

The traffic modelling has identified four intersections which fail to operate satisfactorily in one of the commuter peak hours following the full development of the town centre. These occur at the following locations:

- Rawson Street / Station Road (PM peak only)
- Rawson Street / St Hilliers Road (AM peak only)
- Northumberland Road / Rawson Street (PM peak only)
- Vaughn Street / Olympic Drive (PM peak only)

It is important to understand that the above intersections are already approaching or at their operational capacity during the existing commuter peak hours. In this context it is unsurprising that following the significant development of the town centre these intersections would come under further pressures.

The key point to emerge from the traffic modelling is that the manner in which the assessed intersections operate in future years is unaffected by the proposed Queen Street development. This is due to the relatively small traffic contribution the Queen Street development generates compared with the net increase due to the FSR uplift in the Auburn and Lidcombe town centres (refer Figure 7).

Therefore upgrade works at these locations would be required even if the proposed Queen Street development were not to proceed. This was recognised in the Hyder 2012 traffic study, which noted:

“the FSR planning proposal would have significant impacts on the existing road network. A maximum level of additional dwelling and mixed use GFA would need to be supported by future road and intersection improvements”

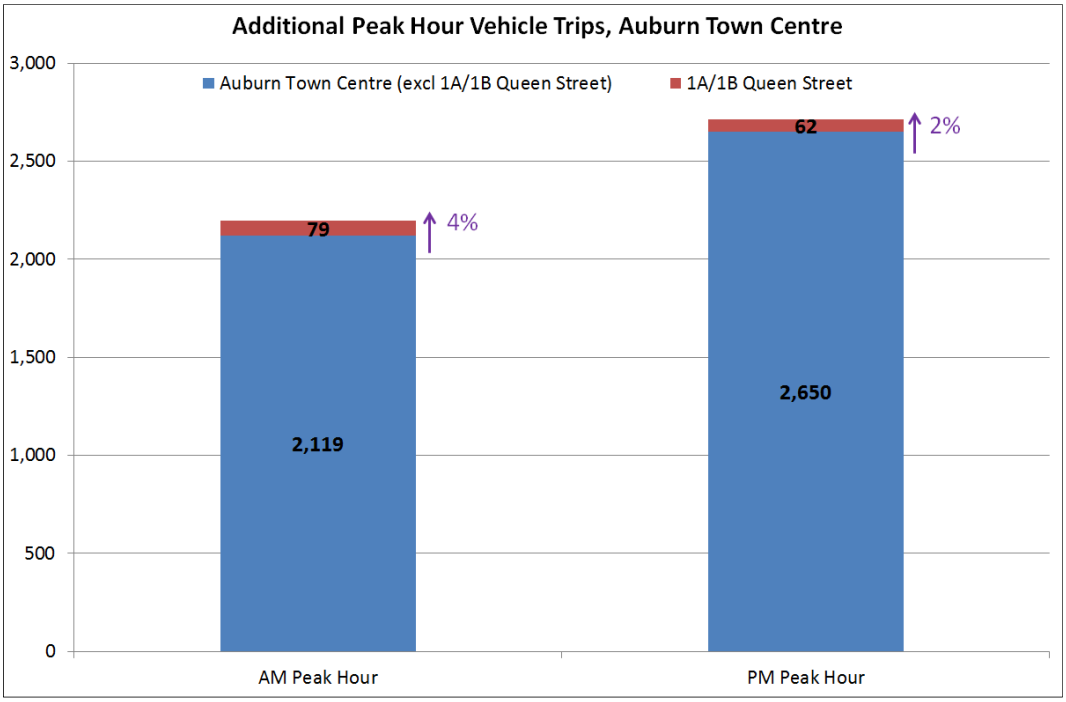


Figure 7: Traffic Increase Attributable to Queen Street Development

This demonstrates Queen Street would be responsible for only a minor increase (4% / 2% in the AM/PM peaks) in traffic over and above that forecast following the full development of the Auburn town centre.

Potential road network upgrades are described in further detail in Section 5.1 of this report.

4.3.6 Limitations and Qualifications

It should be noted that the traffic modelling undertaken for this study has assumed a 'worst case' scenario in respect to future road network performance. The intersection modelling has assumed the unlikely scenario that development in the town centres will achieve the maximum yield potential as envisaged by Council. In reality the market will dictate the scale of development which may not achieve the maximum allowable FSRs for each site.

5 Transport Assessment

5.1 Potential Road Network Improvements

As identified in the traffic modelling results, four intersections in the precinct fail to operate satisfactorily following the full development of the Auburn and Lidcombe town centres.

To ameliorate these impacts, a series of upgrade works have been identified by Hyder in the 2012 traffic modelling report for Auburn Council. These upgrades are outlined in Section 3.6 of the Hyder study and are provided as an Appendix B to this report.

Arup has modelled the effect of these potential intersection improvements on the operation of the critical intersections previously identified. The results of this assessment are summarised in Table 10.

Table 10: Intersection Modelling Results – Upgraded Layouts

Intersection	Peak	Scenario	LOS	DOS	Delay (s)
Northumberland Road / Rawson Street	AM	2021 development	**B**	**0.65**	**26**
		2021 development including Queen St	**B**	**0.65**	**26**
	PM	2021 development	**B**	**0.75**	**26**
		2021 development including Queen St	**B**	**0.75**	**26**
Station Road / Rawson Street	AM	2021 development	**B**	**0.79**	**28**
		2021 development including Queen St	**C**	**0.78**	**30**
	PM	2021 development	**C**	**0.85**	**35**
		2021 development including Queen St	**C**	**0.87**	**36**
Rawson Street / St Hilliers Road	AM	2021 development	**C**	**0.93**	**42**
		2021 development including Queen St	**D**	**0.95**	**44**
	PM	2021 development	**C**	**0.88**	**38**
		2021 development including Queen St	**C**	**0.93**	**40**
Vaughan Street / Olympic Drive	AM	2021 development	**D**	**0.95**	**45**
		2021 development including Queen St	**D**	**0.95**	**46**
	PM	2021 development	**C**	**0.85**	**39**
		2021 development including Queen St	**C**	**0.85**	**40**

The modelling demonstrates the identified improvements have the potential to improve traffic flow and intersection operation within the town centre during the commuter peak hours. All intersections are shown to operate at a Level of Service D or above. The introduction of the Queen Street development results in negligible changes in the operation of these intersections.

Therefore, should the town centres achieve their full development potential, implementation of the above road/intersection upgrades will be effective in ameliorating the associated traffic impacts.

It should be noted that many of these improvement works require intersection widening and associated land acquisition. More detailed studies will be required should the planning proposals proceed which identifies the feasibility of these upgrade works. Consultation with the RMS will be required given many of the intersections are located on state roads.

5.2 Parking Assessment

Parking rates for residential developments should ensure an appropriate balance between meeting the demands of residents (and ensuring there are no adverse on-street parking impacts) and reducing traffic generation resulting from a higher quantum of on-site car parking.

Reduced parking rates should be considered where residential developments are located in areas with good public transport availability in close proximity to town centres. The DCPs of neighbouring Councils, such as Holroyd, Fairfield and Parramatta, have lower parking rates for developments in town centres. This reduces the traffic impacts in town centres associated with high levels of on-site parking.

Therefore it is considered appropriate, given the good proximity of the proposed development to Auburn Railway Station, to provide on-site parking at the following rates.

Table 11: Proposed Parking Rates - 1A Queen Street

Dwelling Type	Minimum Parking Rate (per dwelling)
Studio	0.4
1 Bed	0.7
2 Bed	1.0
3+ Bed	1.5

These rates are similar to that recommended in the RMS Guide to Traffic Generating Developments for high density residential buildings outside of Metropolitan Regional Centres.

The amount of visitor car parking which is required for strict compliance with the Auburn Council DCP is 125 car parking spaces. Given the scale of the Queen Street development and the good proximity to public transport and retail in the Auburn Town Centre, this level of visitor parking is considered excessive.

For this development, a reasonable on-site visitor parking rate is 1 space / 7 dwellings, requiring up to 78 spaces based on the maximum yield of 550 dwellings for the site. This is considered to be a reasonable number of visitor parking spaces to meet the needs of a development of this scale and in this location.

Parking for any retail or commercial uses within the development should be provided at the rate of 1 space / 40m^2 GFA – consistent with the Auburn DCP.

Motorcycle parking should be provided at the rate of 1 motorcycle space/25 car parking spaces. On-site bicycle parking should be provided at the rate of 1/5 apartments and 1/10 employees (retail/commercial).

5.3 Travel Demand Assessment

Section 2.5 identified the existing travel characteristics of residents in the Auburn Town Centre based on 2011 journey to work data. This analysis indicated a high level of public transport use, particularly heavy rail (almost 50% of total trips). Additionally, it can be expected that residents living in medium or high density development as is proposed will have a greater focus on public transport usage and be less reliant on private vehicle use.

Based on 2 persons per unit and 550 units across the site, a total population of 1,100 may be predicted. Assuming 70% are in the workforce and 50% travel in the peak hour, approximately 385 people travel to work in the AM peak hour. The potential distribution of these trips across the various transport modes is shown in Figure 8.

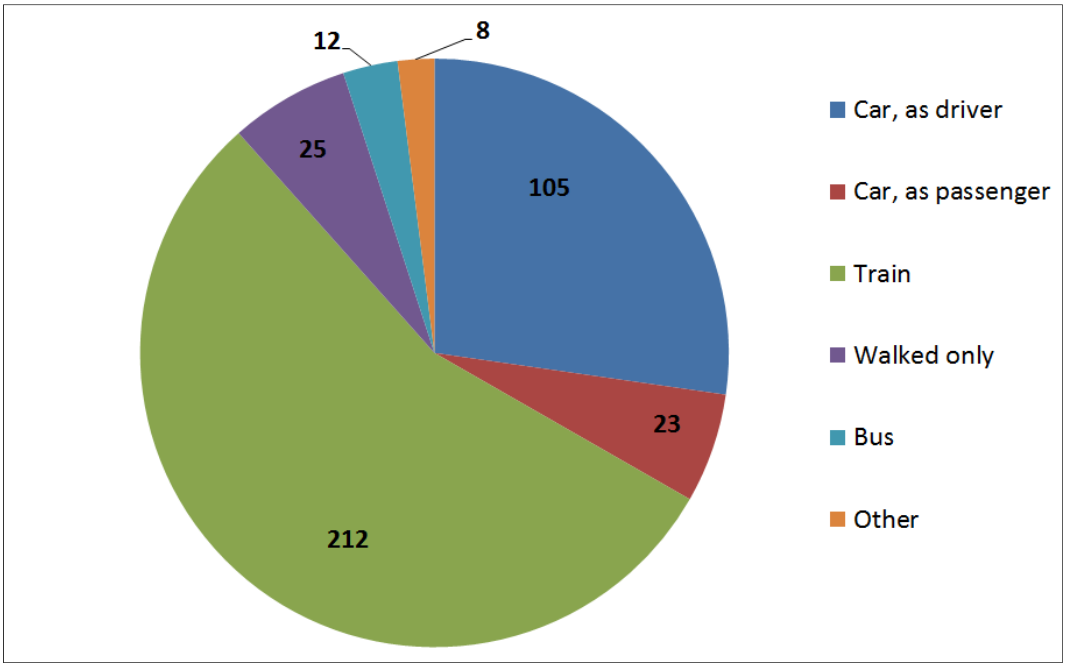


Figure 8: Forecast Peak Hour Trips

5.4 Public Transport

The site is considered well located for public transport access, with Auburn railway station within a 10 minute walk of the site. The site has the potential to be a premier Transit Oriented Development (TOD) due to its proximity to existing public transport infrastructure.

The extensive and conveniently accessible public transport facilities which are present in the area will encourage future residents from the proposed development to use either train or bus for most commuter trips. This good availability of public transport services should help the future residential development to operate with relatively low levels of site traffic generation and parking activity, in comparison to traditional residential development standards.

5.5 Walking and Cycling

The proposed development will improve pedestrian and cyclist accessibility in the local area by the provision of safe and efficient pedestrian links through the site. The principal pedestrian footpath through the site is to be provided in accordance with the desire lines for pedestrians travelling to bus or rail stops. Locating the basement car parking access points to the edge of the development will facilitate good pedestrian movement within and through the site. The good accessibility of the site with respect to the town centre and railway station is shown in Figure 9.

A key component of the new development will include new pedestrian and cycle links through the site. The new public through link creates a cycle connection between Kerr Parade and Louisa Street (with potential for extension east) – providing direct access to the town centre and Auburn railway station.

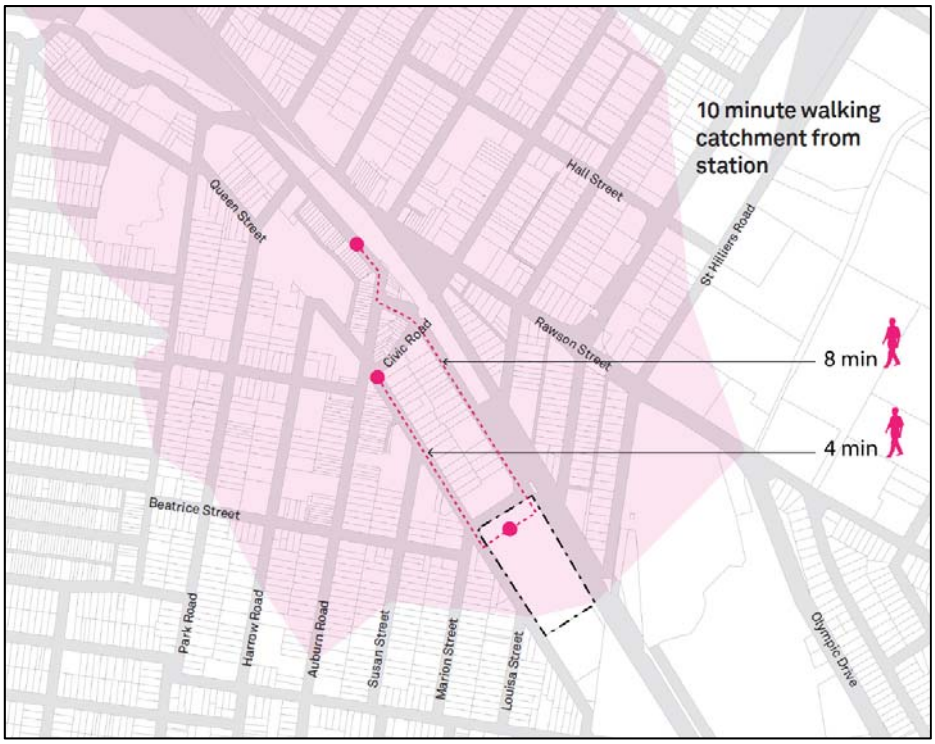


Figure 9: Site Walking Catchment

Source: Hassell, 2013

6 Summary and Conclusions

This report has addressed the anticipated transport impacts for the proposed development site at 1A Queen Street, Auburn. The key issues of the rezoning traffic & transport assessment are summarised below:

- The proposal involves the rezoning of an existing active industrial site immediately to the south east of the Auburn Town Centre to permit future residential development
- The development is located within a 10 minute walk of Auburn railway station and has the potential to be a premier Transit Oriented Development
- The development will improve pedestrian and cyclist accessibility in the local area by the provision of safe and efficient pedestrian links through the site, linking with the town centre and public transport nodes
- The Queen Street development would be responsible for only a minor increase in peak hour traffic (4% / 2% in the AM/PM peak) over and above that forecast following the full development of the town centre
- Traffic modelling demonstrates that in only 8 of the 28 scenarios assessed do intersections surrounding the Queen Street site fail to operate satisfactorily following the full development of the town centres.
- The manner in which the assessed intersections operate in future years is unaffected by the proposed Queen Street development, due to the minimal traffic contribution of the proposed site
- The planned development would result in operational issues at four intersections in the AM and PM peak hours. These improvements are necessary both with and without a future Queen Street residential development
- After implementing a series of road and intersection upgrades, revised traffic modelling indicates these measures will significantly improve traffic flow and intersection operation during the peak hours. The introduction of the Queen Street development results in minimal changes in the operation of these intersections.

It is therefore considered that the traffic and transport impacts arising from the development proposal can be appropriately managed.

Appendix A

Level of Service Definition

The performance of intersections in urban areas is quantified in terms of the Level of Service, which is based on the average delay per vehicle. LOS criteria is summarised in Table 12, and ranges from A = very good to F = unsatisfactory

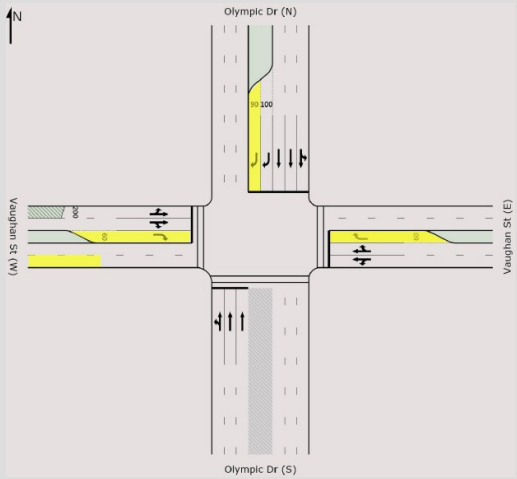
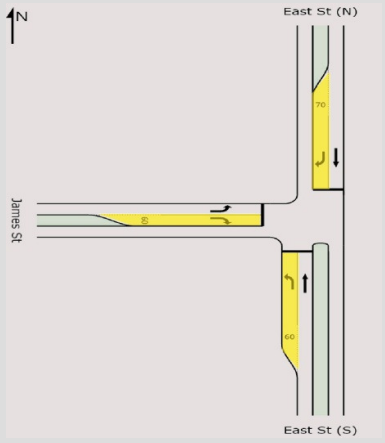
Table 12: Level of Service Criteria for Intersections

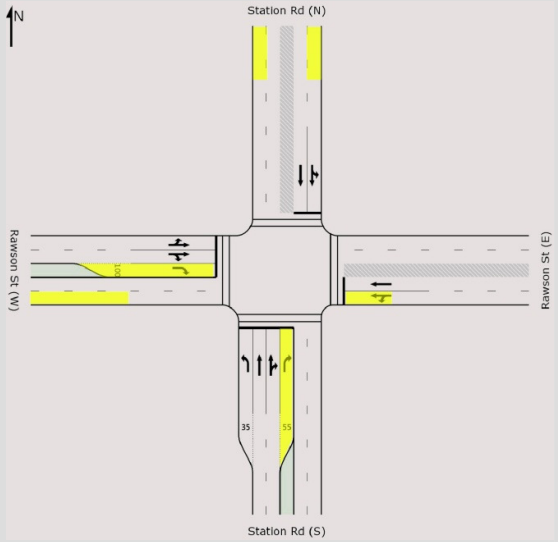
Level of Service	Average Delay (seconds per vehicle)	Description
A	Less than 14	Good operation
B	15 to 28	Good with acceptable delays and spare capacity
C	29 to 42	Satisfactory
D	43 to 56	Operating near capacity.
E	57 to 70	At Capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode
F	Greater than 71	Unsatisfactory with excessive queuing

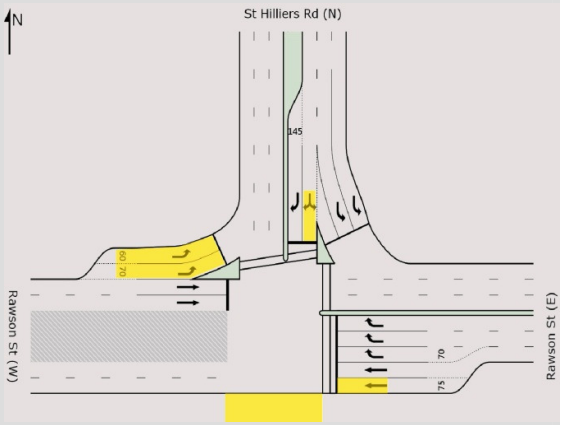
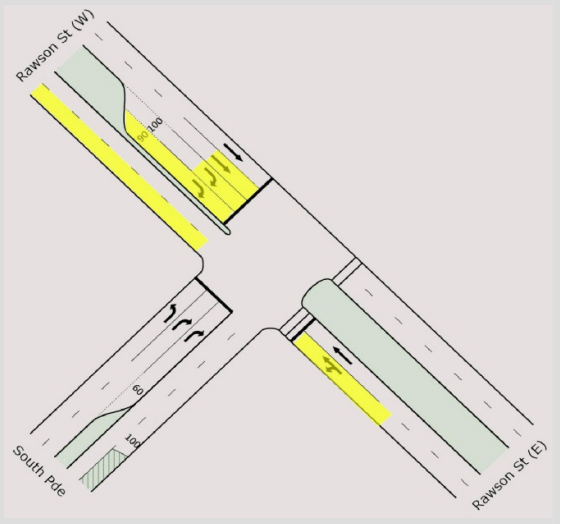
Appendix B

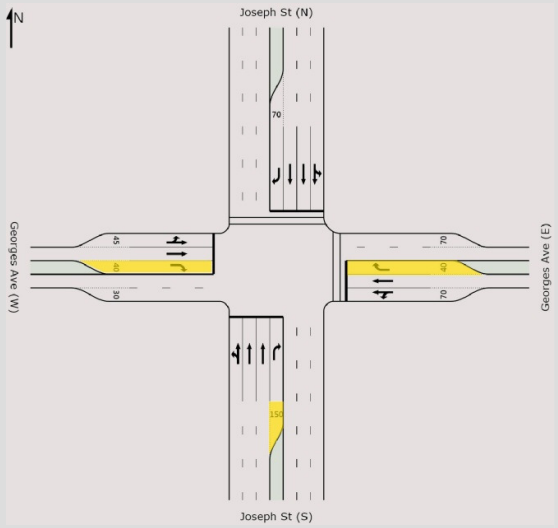
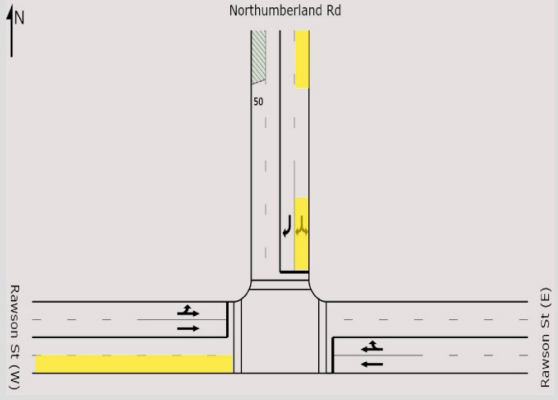
Potential Road Network Upgrades (Hyder, 2012)

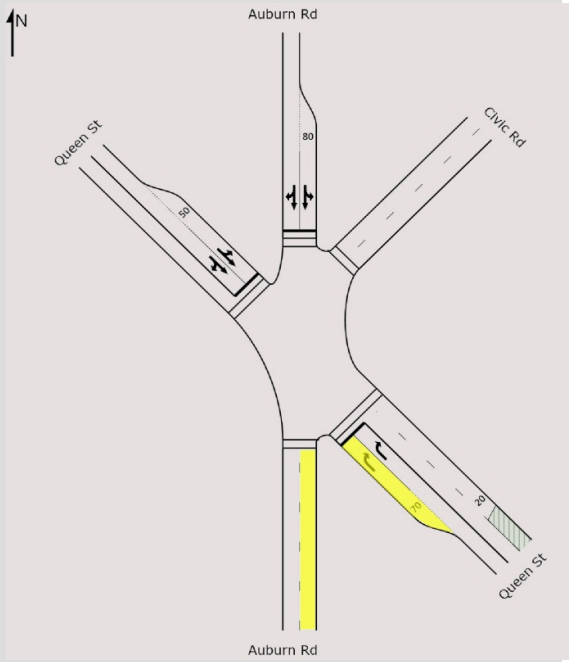
Table 3-10 Preliminary Improvements Tested

ID	Intersect.	Control	Improvement Tested	Potential Constraints.	Indicative Upgrade Sketch
I-13	Vaughan St / Olympic Dr	Signal	▪ Provide one additional exclusive right turn bay on Olympic Dr northern approach. ▪ To accommodate double right turn from Olympic Drive north to Vaughan St west, a clearway is proposed during peak period on Vaughan St western exit lane. ▪ Provide additional exclusive short right turn bay on Vaughan St eastern and western approaches. ▪ Possible removal of pedestrian crossing across Olympic Dr northern approach. This may provide additional capacity.	Olympic Drive is a classified state road. The identified widening may require property acquisition and utilities (service) relocation.	
I-14	James St / East St	Roundabout	▪ Provide new traffic light. ▪ Provide exclusive short right turn bay on East St northern approach. ▪ Provide exclusive short left turn bay on East St southern approach. ▪ Provide exclusive short right turn bay on James St approach.	East Street is a classified regional road. Further investigation will be required to satisfy the RMS warrants for a new traffic light.	

ID	Intersect.	Control	Improvement Tested	Potential Constraints.	Indicative Upgrade Sketch
I-22	Station Rd / Rawson St	Signal	▪ Provide clearway during peak period on Station Rd northern approach in both directions. ▪ Provide additional exclusive short right turn bay on Station St southern approach allowing double lane right turn from Station St south to Rawson St east. ▪ Provide additional exclusive short right turn bay on Rawson St western approach allowing double lane right turn from Rawson St west to Station St south. ▪ Provide two through lanes in westbound direction on Rawson St west of Northumberland Rd. ▪ Lane discipline change on Rawson St eastern approach allowing two through lanes (one shared left-through and one exclusive through lane) in westbound direction along Rawson St.	Rawson Street is a classified regional road. The identified widening may require property acquisition and utilities (service) relocation.	

ID	Intersect.	Control	Improvement Tested	Potential Constraints.	Indicative Upgrade Sketch
I-37	St Hilliers Rd / Rawson St	Signal	▪ Possible conversion of four leg intersection to three -leg T-junction. This can be achieved by closing St Hilliers Rd south approach, as this approach carries small traffic volumes (less than 20 vehicles in one hour). ▪ Provide alternative access for traffic to/from St Hilliers Rd south potentially via North Pde-Dartbrook Rd and North Pde-Percy St. ▪ Provide double left turn signalised slip lanes on Rawson St western approach.	St Hilliers Rd (north) and Rawson St (east) form part of the state road. The possible closure of St Hilliers Rd southern approach will adversely impact accessibility of residents particularly visitors to the Auburn Gallipoli Mosque. A detailed accessibility and impact assessment should be undertaken should this identified upgrade proceeds.	
I-39	Rawson St / South Pde	Signal	▪ Provide two through lanes in westbound direction on Rawson St east and west of South Pde. ▪ Lane discipline change on Rawson St eastern approach allowing two through lanes (one shared left-through and one exclusive through lane) in westbound direction along Rawson St. ▪ Provide additional exclusive short right turn bay on Rawson St western approach allowing double right turn and two eastbound exclusive through lanes at the stop line.	Rawson Street is a classified regional road. Due to adjacent railway reserve, it may not be possible to widen Rawson St on the southern side. Property acquisition may be required to widen Rawson St on the northern side.	

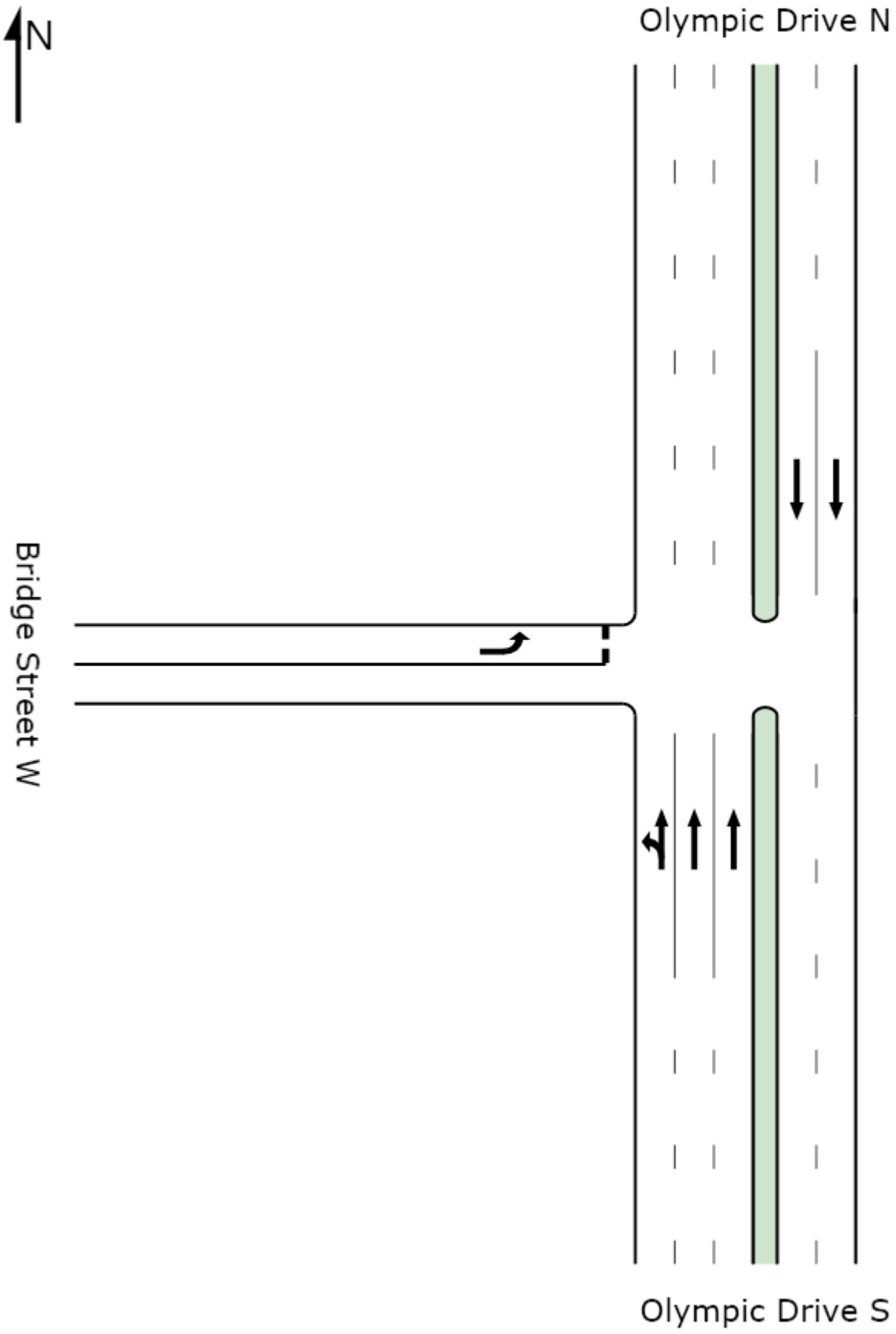
ID	Intersect.	Control	Improvement Tested	Potential Constraints.	Indicative Upgrade Sketch
I-44	Georges Ave / Joseph St	Signal	▪ Provide additional exclusive short right turn bay on Georges Ave eastern and western approaches allowing lane discipline change from shared right-through lanes to excusive through lanes in eastbound and westbound direction. ▪ Extend the length of existing right turn bay on Joseph St southern approach.	The identified widening may require property acquisition and utilities (service) relocation.	
I-51	Northumberland Rd / Rawson St	Signal	▪ Provide clearway condition during peak period on Northumberland Rd in southbound direction. ▪ Change lane discipline on Northumberland Rd providing one exclusive right lane and one shared left-right turn lane allowing double right turn from Northumberland Rd to Rawson St west. ▪ Provide two through exit lanes in westbound direction on Rawson St west of Northumberland Rd.	Rawson Street is a classified regional road. The identified widening may require property acquisition and utilities (service) relocation.	

ID	Intersect.	Control	Improvement Tested	Potential Constraints.	Indicative Upgrade Sketch
I-49	Queen St / Auburn Rd / Civic Rd	Future Signal Recommended by Council in Auburn Town Centre, Improvement Works	▪ Provide additional short right turn bay at Queen St approach allowing double-lane right turn from Queen St to Civic Rd. ▪ Provide two through exit lanes in southbound direction on Auburn Rd in order to accommodate southbound through traffic along Auburn Rd.	This upgrade requires further changes to proposed Auburn Town Centre Public Doman works.	

Appendix C

SIDRA Intersection Results

C1.1 Existing Intersection Layouts


N
Olympic Drive N
Bridge Street W
Olympic Drive S

MOVEMENT SUMMARY

Site: AM Future (2021 development)

Bridge Street and Olympic Drive
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Drive S											
1	L	108	0.0	0.498	8.2	LOS A	0.0	0.0	0.00	1.01	38.5
2	T	2797	0.0	0.498	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		2905	0.0	0.498	0.3	NA	0.0	0.0	0.00	0.04	58.8
North: Olympic Drive N											
8	T	1813	0.0	0.465	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1813	0.0	0.465	0.0	NA	0.0	0.0	0.00	0.00	60.0
West: Bridge Street W											
10	L	307	0.0	0.641	23.1	LOS B	4.1	28.6	0.88	1.18	36.6
Approach		307	0.0	0.641	23.1	LOS B	4.1	28.6	0.88	1.18	36.6
All Vehicles		5025	0.0	0.641	1.6	NA	4.1	28.6	0.05	0.09	54.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

MOVEMENT SUMMARY

Site: AM Future (2021 development including Queen Street)

Bridge Street and Olympic Drive
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Drive S											
1	L	108	0.0	0.498	8.2	LOS A	0.0	0.0	0.00	1.01	38.5
2	T	2797	0.0	0.498	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		2905	0.0	0.498	0.3	NA	0.0	0.0	0.00	0.04	58.8
North: Olympic Drive N											
8	T	1813	0.0	0.465	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1813	0.0	0.465	0.0	NA	0.0	0.0	0.00	0.00	60.0
West: Bridge Street W											
10	L	376	0.0	0.784	28.7	LOS C	6.5	45.8	0.93	1.38	33.5
Approach		376	0.0	0.784	28.7	LOS C	6.5	45.8	0.93	1.38	33.5
All Vehicles		5094	0.0	0.784	2.3	NA	6.5	45.8	0.07	0.12	52.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

MOVEMENT SUMMARY

Site: PM Future (2021 development)

Bridge Street and Olympic Drive
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Drive S											
1	L	64	0.0	0.315	8.2	LOS A	0.0	0.0	0.00	1.02	38.5
2	T	1778	0.0	0.315	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1842	0.0	0.315	0.3	NA	0.0	0.0	0.00	0.04	58.9
North: Olympic Drive N											
8	T	3157	0.0	0.809	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		3157	0.0	0.809	0.0	NA	0.0	0.0	0.00	0.00	60.0
West: Bridge Street W											
10	L	227	0.0	0.276	12.4	LOS A	1.2	8.7	0.63	0.90	44.7
Approach		227	0.0	0.276	12.4	LOS A	1.2	8.7	0.63	0.90	44.7
All Vehicles		5226	0.0	0.809	0.6	NA	1.2	8.7	0.03	0.05	57.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

MOVEMENT SUMMARY

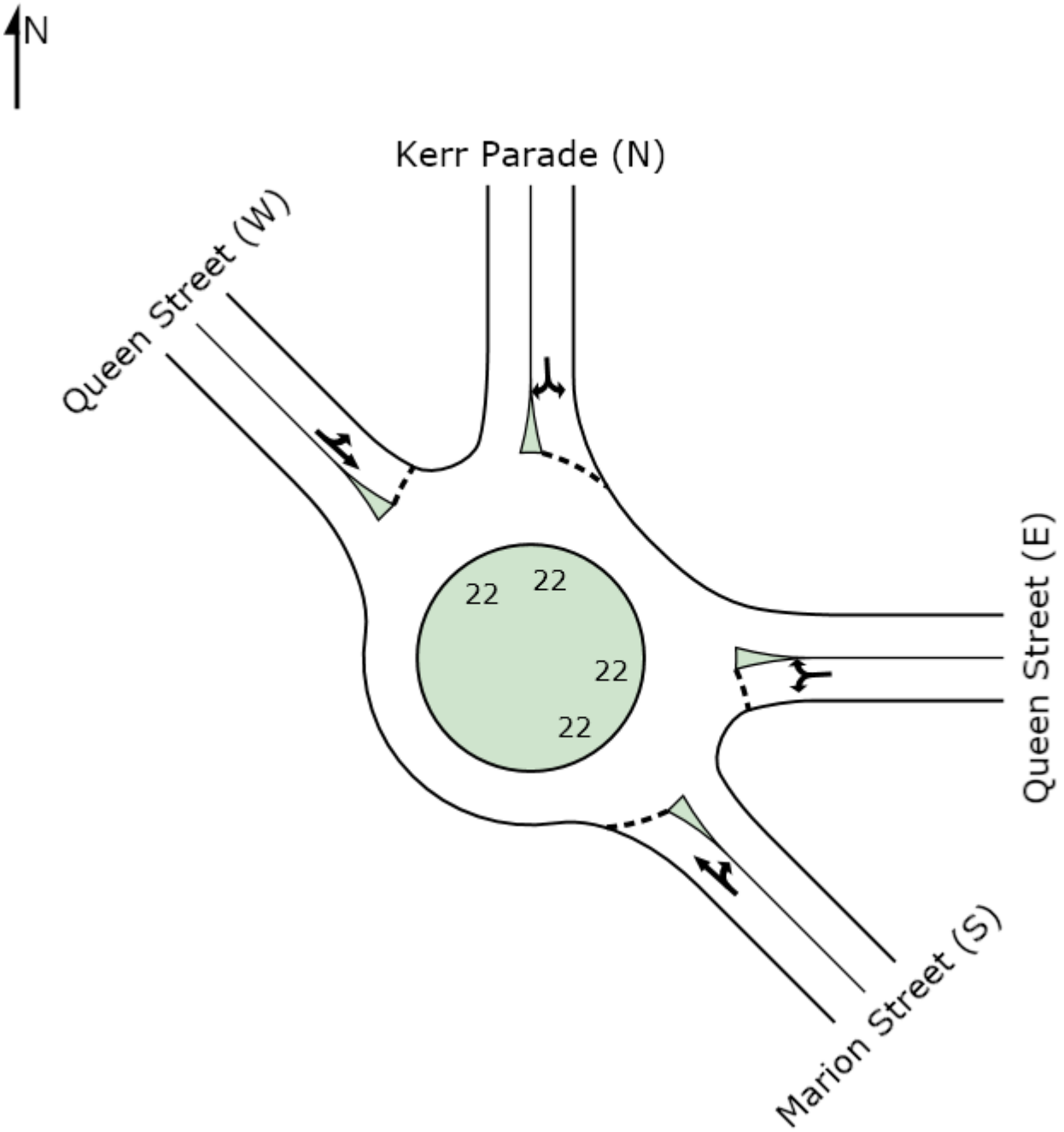
Site: PM Future (2021 development including Queen Street)

Bridge Street and Olympic Drive
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Drive S											
1	L	64	0.0	0.315	8.2	LOS A	0.0	0.0	0.00	1.02	38.5
2	T	1778	0.0	0.315	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		1842	0.0	0.315	0.3	NA	0.0	0.0	0.00	0.04	58.9
North: Olympic Drive N											
8	T	3157	0.0	0.809	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		3157	0.0	0.809	0.0	NA	0.0	0.0	0.00	0.00	60.0
West: Bridge Street W											
10	L	227	0.0	0.276	12.4	LOS A	1.2	8.7	0.63	0.90	44.7
Approach		227	0.0	0.276	12.4	LOS A	1.2	8.7	0.63	0.90	44.7
All Vehicles		5226	0.0	0.809	0.6	NA	1.2	8.7	0.03	0.05	57.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.


N
Kerr Parade (N)
Queen Street (W)
Queen Street (E)
Marion Street (S)
22
22
22
22

MOVEMENT SUMMARY

Site: AM Future (2021 development)

Kerr Parade / Queen Street / Marion Street
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Marion Street (S)											
21	L	113	0.0	0.200	5.3	LOS A	1.2	8.2	0.57	0.57	42.6
22	T	71	0.0	0.200	10.2	LOS A	1.2	8.2	0.57	0.78	41.0
23	R	9	0.0	0.200	12.0	LOS A	1.2	8.2	0.57	0.82	39.9
Approach		193	0.0	0.200	7.4	LOS A	1.2	8.2	0.57	0.66	41.9
East: Queen Street (E)											
4	L	13	0.0	0.329	8.9	LOS A	2.0	14.2	0.69	0.76	40.8
5	T	214	0.0	0.329	11.9	LOS A	2.0	14.2	0.69	0.81	39.2
6	R	56	0.0	0.329	12.8	LOS A	2.0	14.2	0.69	0.82	38.7
Approach		282	0.0	0.329	11.9	LOS A	2.0	14.2	0.69	0.81	39.2
North: Kerr Parade (N)											
7	L	95	0.0	0.429	4.5	LOS A	3.2	22.3	0.16	0.45	44.5
8	T	457	0.0	0.429	3.3	LOS A	3.2	22.3	0.16	0.32	45.4
9	R	126	0.0	0.429	10.0	LOS A	3.2	22.3	0.16	0.85	40.9
Approach		678	0.0	0.429	4.7	LOS A	3.2	22.3	0.16	0.43	44.3
North West: Queen Street (W)											
27	L	14	0.0	0.026	5.6	LOS A	0.1	0.9	0.29	0.53	43.5
28	T	14	0.0	0.026	3.7	LOS A	0.1	0.9	0.29	0.35	44.5
29	R	4	0.0	0.026	3.7	LOS A	0.1	0.9	0.29	0.35	44.5
Approach		32	0.0	0.026	4.5	LOS A	0.1	0.9	0.29	0.43	44.1
All Vehicles		1184	0.0	0.429	6.9	LOS A	3.2	22.3	0.36	0.56	42.5

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: AM Future (2021 development with Queen Street)

Kerr Parade / Queen Street / Marion Street
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Marion Street (S)											
21	L	113	0.0	0.214	5.8	LOS A	1.3	9.1	0.63	0.61	42.3
22	T	71	0.0	0.214	10.6	LOS A	1.3	9.1	0.63	0.80	40.7
23	R	9	0.0	0.214	12.5	LOS A	1.3	9.1	0.63	0.83	39.7
Approach		193	0.0	0.214	7.9	LOS A	1.3	9.1	0.63	0.69	41.5
East: Queen Street (E)											
4	L	13	0.0	0.408	9.2	LOS A	2.7	18.6	0.73	0.79	40.6
5	T	282	0.0	0.408	12.1	LOS A	2.7	18.6	0.73	0.83	39.0
6	R	56	0.0	0.408	13.1	LOS A	2.7	18.6	0.73	0.84	38.5
Approach		351	0.0	0.408	12.2	LOS A	2.7	18.6	0.73	0.83	39.0
North: Kerr Parade (N)											
7	L	95	0.0	0.430	4.5	LOS A	3.2	22.4	0.16	0.45	44.5
8	T	457	0.0	0.430	3.3	LOS A	3.2	22.4	0.16	0.32	45.4
9	R	126	0.0	0.430	10.0	LOS A	3.2	22.4	0.16	0.85	40.9
Approach		678	0.0	0.430	4.7	LOS A	3.2	22.4	0.16	0.43	44.3
North West: Queen Street (W)											
27	L	14	0.0	0.026	5.6	LOS A	0.1	0.9	0.29	0.53	43.5
28	T	14	0.0	0.026	3.7	LOS A	0.1	0.9	0.29	0.35	44.5
29	R	4	0.0	0.026	3.7	LOS A	0.1	0.9	0.29	0.35	44.5
Approach		32	0.0	0.026	4.5	LOS A	0.1	0.9	0.29	0.43	44.1
All Vehicles		1253	0.0	0.430	7.3	LOS A	3.2	22.4	0.40	0.58	42.2

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

MOVEMENT SUMMARY

Site: PM Future (2021 development)

Kerr Parade / Queen Street / Marion Street
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Marion Street (S)											
21	L	46	0.0	0.088	4.2	LOS A	0.4	3.1	0.39	0.42	43.7
22	T	34	0.0	0.088	9.1	LOS A	0.4	3.1	0.39	0.70	41.4
23	R	19	0.0	0.088	10.9	LOS A	0.4	3.1	0.39	0.75	40.5
Approach		99	0.0	0.088	7.2	LOS A	0.4	3.1	0.39	0.58	42.2
East: Queen Street (E)											
4	L	3	0.0	0.116	6.6	LOS A	0.6	4.2	0.46	0.57	42.3
5	T	99	0.0	0.116	9.5	LOS A	0.6	4.2	0.46	0.66	40.6
6	R	20	0.0	0.116	10.4	LOS A	0.6	4.2	0.46	0.67	40.1
Approach		122	0.0	0.116	9.6	LOS A	0.6	4.2	0.46	0.66	40.6
North: Kerr Parade (N)											
7	L	126	0.0	0.306	4.7	LOS A	1.9	13.2	0.25	0.45	44.0
8	T	191	0.0	0.306	3.5	LOS A	1.9	13.2	0.25	0.34	44.7
9	R	111	0.0	0.306	10.2	LOS A	1.9	13.2	0.25	0.78	40.8
Approach		427	0.0	0.306	5.6	LOS A	1.9	13.2	0.25	0.49	43.4
North West: Queen Street (W)											
27	L	3	0.0	0.046	5.4	LOS A	0.2	1.6	0.21	0.56	43.9
28	T	53	0.0	0.046	3.5	LOS A	0.2	1.6	0.21	0.34	45.2
29	R	3	0.0	0.046	3.5	LOS A	0.2	1.6	0.21	0.34	45.2
Approach		59	0.0	0.046	3.6	LOS A	0.2	1.6	0.21	0.36	45.1
All Vehicles		707	0.0	0.306	6.3	LOS A	1.9	13.2	0.30	0.52	42.8

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.

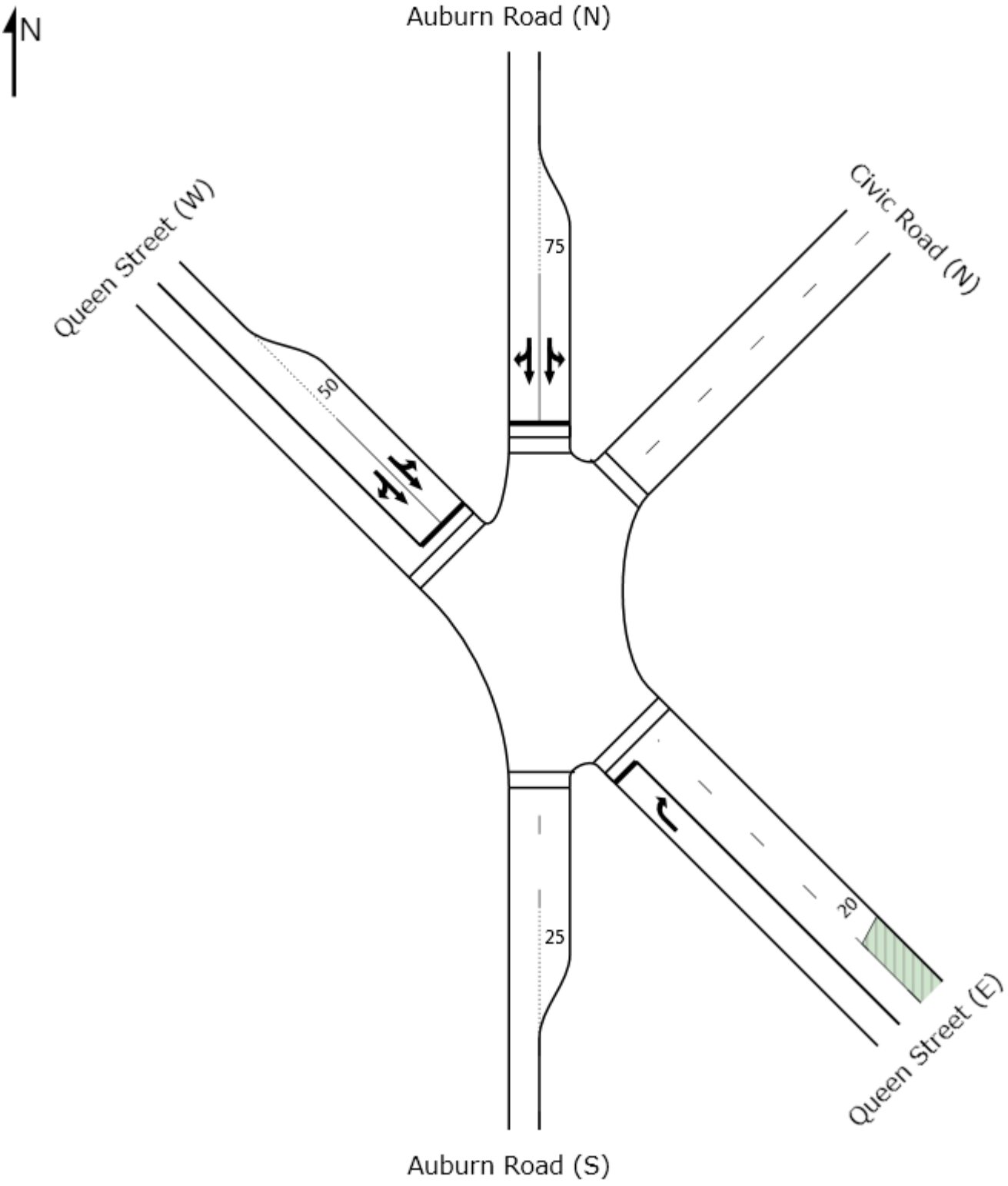
MOVEMENT SUMMARY

Site: PM Future (2021 development with Queen Street)

Kerr Parade / Queen Street / Marion Street
Roundabout

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Marion Street (S)											
21	L	46	0.0	0.088	4.2	LOS A	0.4	3.1	0.39	0.42	43.7
22	T	34	0.0	0.088	9.1	LOS A	0.4	3.1	0.39	0.70	41.4
23	R	19	0.0	0.088	10.9	LOS A	0.4	3.1	0.39	0.75	40.5
Approach		99	0.0	0.088	7.2	LOS A	0.4	3.1	0.39	0.58	42.2
East: Queen Street (E)											
4	L	3	0.0	0.116	6.6	LOS A	0.6	4.3	0.46	0.57	42.3
5	T	99	0.0	0.116	9.5	LOS A	0.6	4.3	0.46	0.66	40.6
6	R	20	0.0	0.116	10.4	LOS A	0.6	4.3	0.46	0.67	40.0
Approach		122	0.0	0.116	9.6	LOS A	0.6	4.3	0.46	0.66	40.5
North: Kerr Parade (N)											
7	L	261	0.0	0.396	4.8	LOS A	2.7	19.0	0.28	0.45	43.9
8	T	191	0.0	0.396	3.6	LOS A	2.7	19.0	0.28	0.35	44.5
9	R	111	0.0	0.396	10.3	LOS A	2.7	19.0	0.28	0.77	40.7
Approach		562	0.0	0.396	5.5	LOS A	2.7	19.0	0.28	0.48	43.4
North West: Queen Street (W)											
27	L	3	0.0	0.046	5.4	LOS A	0.2	1.6	0.21	0.56	43.9
28	T	53	0.0	0.046	3.5	LOS A	0.2	1.6	0.21	0.34	45.2
29	R	3	0.0	0.046	3.5	LOS A	0.2	1.6	0.21	0.34	45.2
Approach		59	0.0	0.046	3.6	LOS A	0.2	1.6	0.21	0.36	45.1
All Vehicles		842	0.0	0.396	6.1	LOS A	2.7	19.0	0.31	0.51	42.9

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model used.


N
Auburn Road (N)
Queen Street (W)
Civic Road (N)
75
50
25
20
Queen Street (E)
Auburn Road (S)

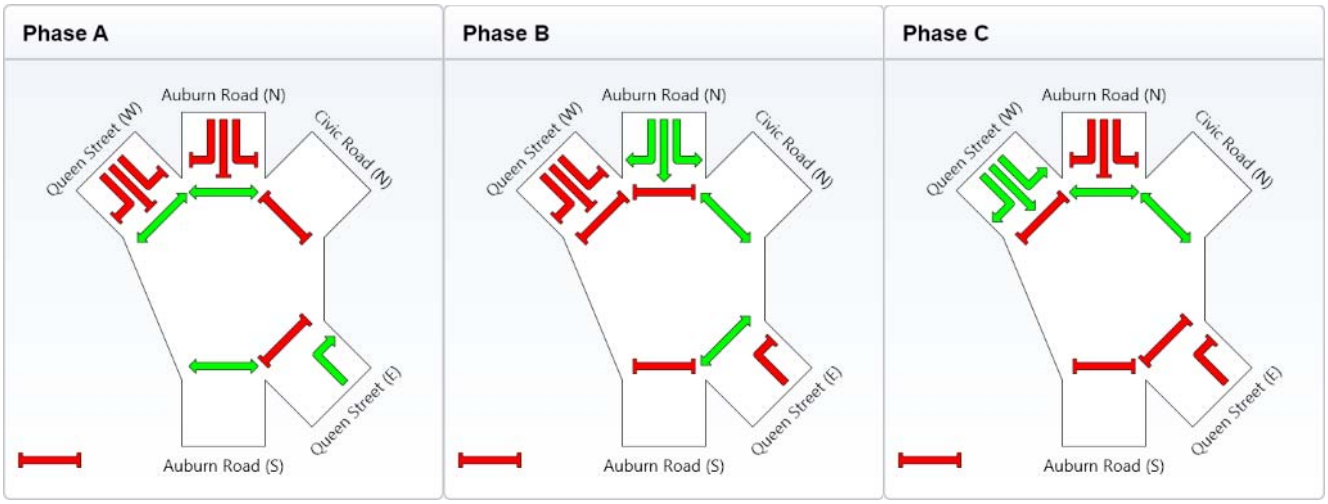
PHASING SUMMARY

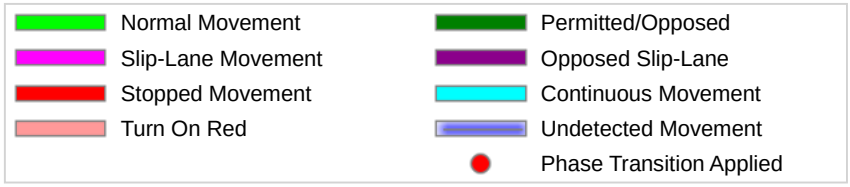
Auburn Rd / Civic Rd / Queen St
Signals - Fixed Time Cycle Time = 85 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	28	25	14
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	34	31	20
Phase Split	40 %	36 %	24 %





MOVEMENT SUMMARY

Site: AM Future (2021 development)

Auburn Rd / Civic Rd / Queen St
Signals - Fixed Time Cycle Time = 85 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Queen Street (E)											
23	R	548	0.0	0.896	50.9	LOS D	27.1	189.4	1.00	0.99	24.9
Approach		548	0.0	0.896	50.9	LOS D	27.1	189.4	1.00	0.99	24.9
North: Auburn Road (N)											
7	L	19	0.0	0.196	31.4	LOS C	2.7	19.3	0.78	0.80	33.3
8	T	403	1.9	0.880	38.5	LOS C	23.2	166.8	0.96	0.98	27.3
9	R	152	6.5	0.880	51.0	LOS D	23.2	166.8	1.00	1.06	26.0
Approach		574	3.1	0.880	41.6	LOS C	23.2	166.8	0.97	0.99	27.1
North West: Queen Street (W)											
27	L	236	0.0	0.857	53.8	LOS D	11.0	76.8	1.00	0.97	24.2
28	T	45	0.0	0.330	34.8	LOS C	3.9	27.3	0.93	0.73	28.5
29	R	58	0.0	0.330	42.2	LOS C	3.9	27.3	0.93	0.78	28.2
Approach		339	0.0	0.857	49.3	LOS D	11.0	76.8	0.98	0.91	25.3
All Vehicles		1461	1.2	0.896	46.9	LOS D	27.1	189.4	0.98	0.97	25.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	22.6	LOS C	0.1	0.1	0.73	0.73
P9	Across SE approach	53	26.4	LOS C	0.1	0.1	0.79	0.79
P11	Across NE approach	53	11.9	LOS B	0.1	0.1	0.53	0.53
P5	Across N approach	53	10.4	LOS B	0.1	0.1	0.49	0.49
P13	Across NW approach	53	24.1	LOS C	0.1	0.1	0.75	0.75
All Pedestrians		265	19.1	LOS B			0.66	0.66

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: AM Future (2021 development with Queen Street)

Auburn Rd / Civic Rd / Queen St
Signals - Fixed Time Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Queen Street (E)											
23	R	617	0.0	0.911	52.0	LOS D	31.4	220.1	1.00	1.01	24.6
Approach		617	0.0	0.911	52.0	LOS D	31.4	220.1	1.00	1.01	24.6
North: Auburn Road (N)											
7	L	19	0.0	0.204	32.3	LOS C	2.8	20.1	0.79	0.80	32.9
8	T	403	1.9	0.913	43.7	LOS D	24.9	178.9	0.96	1.03	25.7
9	R	152	6.5	0.913	57.2	LOS E	24.9	178.9	1.00	1.12	24.2
Approach		574	3.1	0.913	46.9	LOS D	24.9	178.9	0.97	1.05	25.4
North West: Queen Street (W)											
27	L	235	0.0	0.898	59.1	LOS E	11.7	81.6	1.00	1.02	22.8
28	T	45	0.0	0.385	37.1	LOS C	4.0	28.3	0.95	0.75	27.6
29	R	58	0.0	0.385	44.5	LOS D	4.0	28.3	0.95	0.78	27.4
Approach		339	0.0	0.898	53.7	LOS D	11.7	81.6	0.99	0.94	24.1
All Vehicles		1529	1.1	0.913	50.4	LOS D	31.4	220.1	0.98	1.01	24.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	20.5	LOS C	0.1	0.1	0.69	0.69
P9	Across SE approach	53	27.2	LOS C	0.1	0.1	0.80	0.80
P11	Across NE approach	53	13.6	LOS B	0.1	0.1	0.56	0.56
P5	Across N approach	53	9.9	LOS A	0.1	0.1	0.48	0.48
P13	Across NW approach	53	21.9	LOS C	0.1	0.1	0.72	0.72
All Pedestrians		265	18.6	LOS B			0.65	0.65

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: PM Future (2021 development)

I-49 Auburn Rd / Civic Rd / Queen St
Signals - Fixed Time Cycle Time = 85 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Queen Street (E)											
23	R	449	0.0	0.791	41.3	LOS C	18.6	130.3	0.98	0.91	28.0
Approach		449	0.0	0.791	41.3	LOS C	18.6	130.3	0.98	0.91	28.0
North: Auburn Road (N)											
7	L	9	0.0	0.174	24.6	LOS B	2.3	16.4	0.66	0.83	37.2
8	T	488	1.9	0.780	24.8	LOS B	22.5	161.9	0.89	0.81	33.2
9	R	177	6.5	0.780	35.8	LOS C	22.5	161.9	0.94	0.94	31.7
Approach		675	3.1	0.780	27.7	LOS B	22.5	161.9	0.90	0.85	32.8
North West: Queen Street (W)											
27	L	51	0.0	0.330	50.4	LOS D	2.1	14.7	0.98	0.74	25.1
28	T	40	0.0	0.745	46.0	LOS D	5.2	36.4	1.00	0.87	24.6
29	R	76	0.0	0.745	53.4	LOS D	5.2	36.4	1.00	0.87	24.6
Approach		166	0.0	0.745	50.7	LOS D	5.2	36.4	0.99	0.83	24.7
All Vehicles		1291	1.6	0.791	35.4	LOS C	22.5	161.9	0.94	0.87	29.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	24.1	LOS C	0.1	0.1	0.75	0.75
P9	Across SE approach	53	19.8	LOS B	0.1	0.1	0.68	0.68
P11	Across NE approach	53	10.9	LOS B	0.1	0.1	0.51	0.51
P5	Across N approach	53	15.3	LOS B	0.1	0.1	0.60	0.60
P13	Across NW approach	53	25.6	LOS C	0.1	0.1	0.78	0.78
All Pedestrians		265	19.1	LOS B			0.66	0.66

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: PM Future (2021 development with Queen Street)

I-49 Auburn Rd / Civic Rd / Queen St
Signals - Fixed Time Cycle Time = 85 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

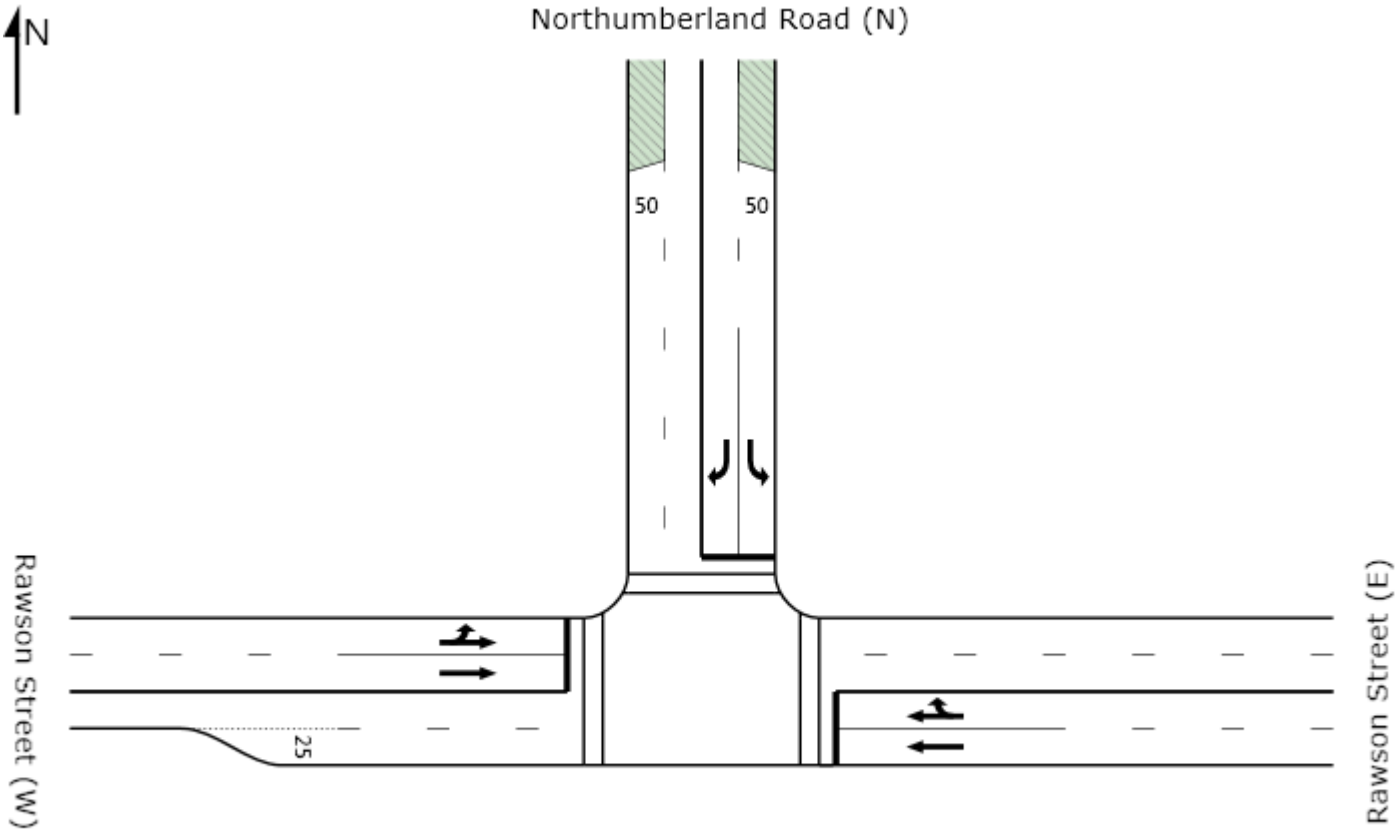
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: Queen Street (E)											
23	R	449	0.0	0.791	41.3	LOS C	18.6	130.3	0.98	0.91	28.0
Approach		449	0.0	0.791	41.3	LOS C	18.6	130.3	0.98	0.91	28.0
North: Auburn Road (N)											
7	L	9	0.0	0.174	24.6	LOS B	2.3	16.4	0.66	0.83	37.2
8	T	488	1.9	0.780	24.8	LOS B	22.5	161.9	0.89	0.81	33.2
9	R	177	6.5	0.780	35.8	LOS C	22.5	161.9	0.94	0.94	31.7
Approach		675	3.1	0.780	27.7	LOS B	22.5	161.9	0.90	0.85	32.8
North West: Queen Street (W)											
27	L	51	0.0	0.330	50.4	LOS D	2.1	14.7	0.98	0.74	25.1
28	T	40	0.0	0.745	46.0	LOS D	5.2	36.4	1.00	0.87	24.6
29	R	76	0.0	0.745	53.4	LOS D	5.2	36.4	1.00	0.87	24.6
Approach		166	0.0	0.745	50.7	LOS D	5.2	36.4	0.99	0.83	24.7
All Vehicles		1291	1.6	0.791	35.4	LOS C	22.5	161.9	0.94	0.87	29.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	24.1	LOS C	0.1	0.1	0.75	0.75
P9	Across SE approach	53	19.8	LOS B	0.1	0.1	0.68	0.68
P11	Across NE approach	53	10.9	LOS B	0.1	0.1	0.51	0.51
P5	Across N approach	53	15.3	LOS B	0.1	0.1	0.60	0.60
P13	Across NW approach	53	25.6	LOS C	0.1	0.1	0.78	0.78
All Pedestrians		265	19.1	LOS B			0.66	0.66

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.


N
Northumberland Road (N)
50
50
Rawson Street (W)
25
Rawson Street (E)

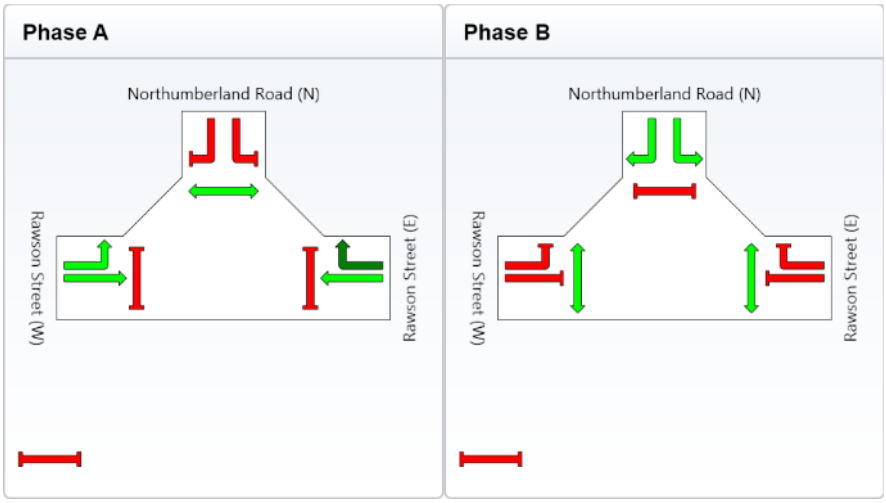
PHASING SUMMARY

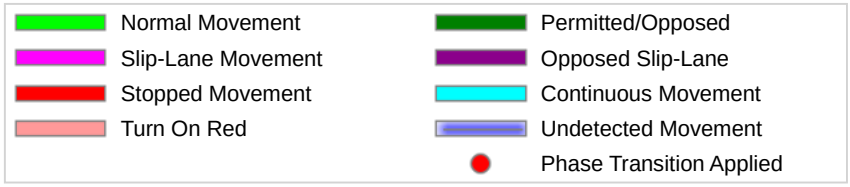
Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, B
Output Sequence: A, B

Phase Timing Results

Phase	A	B
Green Time (sec)	45	43
Yellow Time (sec)	4	4
All-Red Time (sec)	2	2
Phase Time (sec)	51	49
Phase Split	51 %	49 %





MOVEMENT SUMMARY

Site: AM Future (2021 development)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	804	11.4	0.952	41.9	LOS C	40.9	313.4	0.89	1.00	26.7
6	R	34	1.9	0.952	58.0	LOS E	40.9	313.4	1.00	1.17	24.2
Approach		838	11.0	0.952	42.6	LOS D	40.9	313.4	0.89	1.00	26.6
North: Northumberland Road (N)											
7	L	44	6.5	0.153	26.7	LOS B	1.3	9.5	0.62	0.73	34.7
9	R	458	2.7	0.967	82.9	LOS F	34.3	245.4	1.00	1.14	18.3
Approach		502	3.0	0.967	77.9	LOS F	34.3	245.4	0.97	1.10	19.1
West: Rawson Street (W)											
10	L	80	1.9	0.455	25.3	LOS B	9.6	72.0	0.59	0.90	36.5
11	T	652	10.5	0.455	17.1	LOS B	10.0	76.3	0.59	0.51	39.1
Approach		732	9.6	0.455	18.0	LOS B	10.0	76.3	0.59	0.56	38.8
All Vehicles		2072	8.6	0.967	42.5	LOS C	40.9	313.4	0.80	0.87	27.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	526	22.4	LOS C	1.0	1.0	0.67	0.67
P5	Across N approach	53	21.1	LOS C	0.1	0.1	0.65	0.65
P7	Across W approach	526	22.4	LOS C	1.0	1.0	0.67	0.67
All Pedestrians		1105	22.4	LOS C			0.67	0.67

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: AM Future (2021 development with Queen Street)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 100 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	804	11.4	0.952	41.9	LOS C	40.9	313.4	0.89	1.00	26.7
6	R	34	1.9	0.952	58.0	LOS E	40.9	313.4	1.00	1.17	24.2
Approach		838	11.0	0.952	42.6	LOS D	40.9	313.4	0.89	1.00	26.6
North: Northumberland Road (N)											
7	L	44	6.5	0.153	26.7	LOS B	1.3	9.5	0.62	0.73	34.7
9	R	458	2.7	0.967	82.9	LOS F	34.3	245.4	1.00	1.14	18.3
Approach		502	3.0	0.967	77.9	LOS F	34.3	245.4	0.97	1.10	19.1
West: Rawson Street (W)											
10	L	80	1.9	0.455	25.3	LOS B	9.6	72.0	0.59	0.90	36.5
11	T	652	10.5	0.455	17.1	LOS B	10.0	76.3	0.59	0.51	39.1
Approach		732	9.6	0.455	18.0	LOS B	10.0	76.3	0.59	0.56	38.8
All Vehicles		2072	8.6	0.967	42.5	LOS C	40.9	313.4	0.80	0.87	27.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	526	22.4	LOS C	1.0	1.0	0.67	0.67
P5	Across N approach	53	21.1	LOS C	0.1	0.1	0.65	0.65
P7	Across W approach	526	22.4	LOS C	1.0	1.0	0.67	0.67
All Pedestrians		1105	22.4	LOS C			0.67	0.67

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: PM Future (2021 development)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	767	11.4	1.132	115.7	LOS F	69.7	528.2	0.79	1.41	14.0
6	R	111	1.9	1.132	177.2	LOS F	69.7	528.2	1.00	1.96	10.4
Approach		878	10.2	1.132	123.5	LOS F	69.7	528.2	0.82	1.48	13.4
North: Northumberland Road (N)											
7	L	38	6.5	0.142	32.0	LOS C	1.2	9.1	0.72	0.74	32.0
9	R	419	2.7	1.130	193.9	LOS F	47.2	338.0	1.00	1.52	9.5
Approach		457	3.0	1.130	180.5	LOS F	47.2	338.0	0.98	1.46	10.0
West: Rawson Street (W)											
10	L	117	1.9	0.439	18.3	LOS B	7.8	58.1	0.44	0.90	40.9
11	T	720	10.5	0.439	10.1	LOS A	8.2	62.6	0.44	0.39	45.2
Approach		837	9.3	0.439	11.2	LOS A	8.2	62.6	0.44	0.46	44.6
All Vehicles		2172	8.3	1.132	92.2	LOS F	69.7	528.2	0.71	1.08	16.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	526	28.0	LOS C	1.1	1.1	0.77	0.77
P5	Across N approach	53	15.3	LOS B	0.1	0.1	0.57	0.57
P7	Across W approach	526	28.0	LOS C	1.1	1.1	0.77	0.77
All Pedestrians		1105	27.4	LOS C			0.76	0.76

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: PM Future (2021 development with Queen Street)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

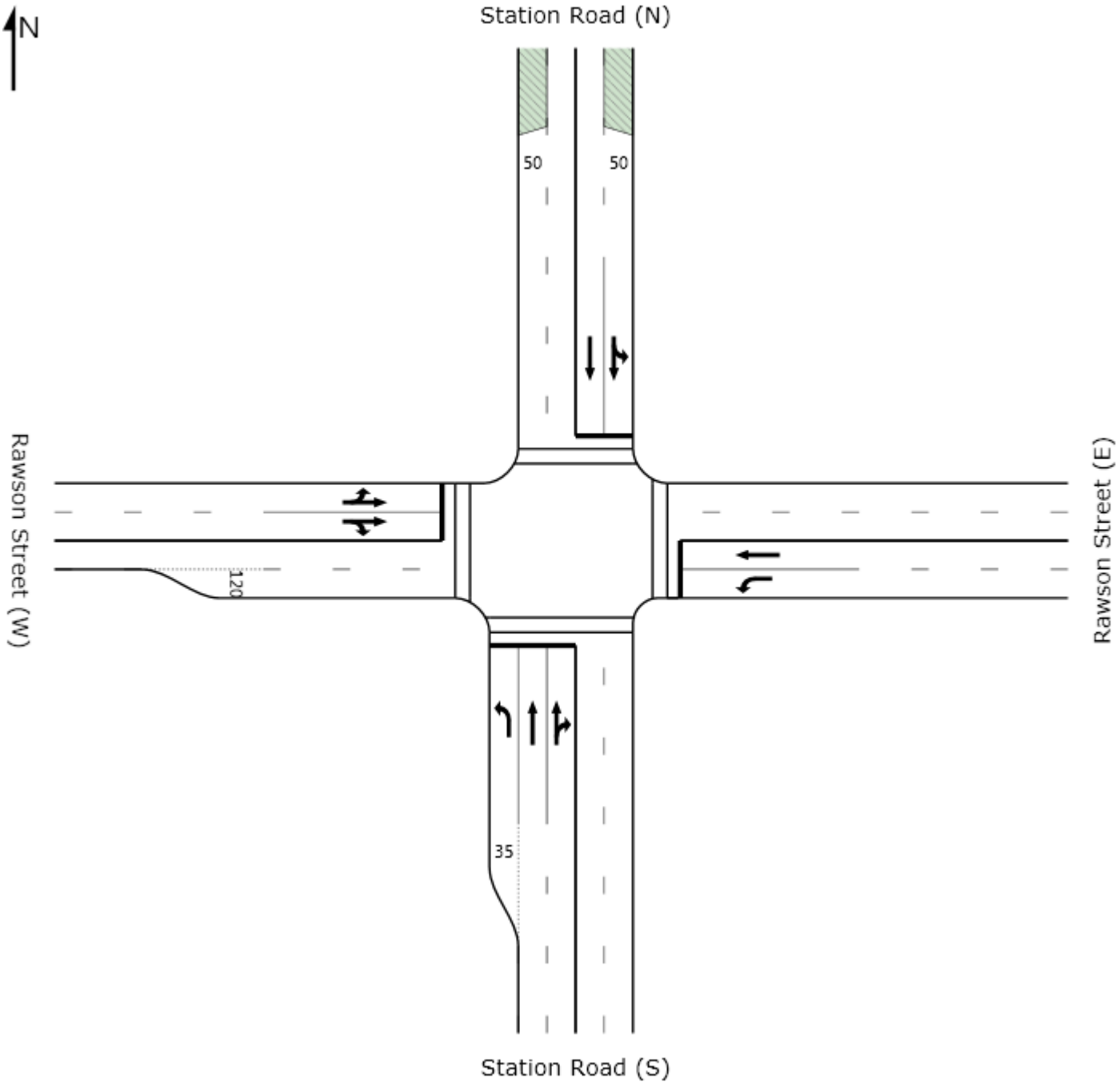
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	767	11.4	1.132	115.7	LOS F	69.7	528.2	0.79	1.41	14.0
6	R	111	1.9	1.132	177.2	LOS F	69.7	528.2	1.00	1.96	10.4
Approach		878	10.2	1.132	123.5	LOS F	69.7	528.2	0.82	1.48	13.4
North: Northumberland Road (N)											
7	L	38	6.5	0.142	32.0	LOS C	1.2	9.1	0.72	0.74	32.0
9	R	419	2.7	1.130	193.9	LOS F	47.2	338.0	1.00	1.52	9.5
Approach		457	3.0	1.130	180.5	LOS F	47.2	338.0	0.98	1.46	10.0
West: Rawson Street (W)											
10	L	117	1.9	0.439	18.3	LOS B	7.8	58.1	0.44	0.90	40.9
11	T	720	10.5	0.439	10.1	LOS A	8.2	62.6	0.44	0.39	45.2
Approach		837	9.3	0.439	11.2	LOS A	8.2	62.6	0.44	0.46	44.6
All Vehicles		2172	8.3	1.132	92.2	LOS F	69.7	528.2	0.71	1.08	16.8

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	526	28.0	LOS C	1.1	1.1	0.77	0.77
P5	Across N approach	53	15.3	LOS B	0.1	0.1	0.57	0.57
P7	Across W approach	526	28.0	LOS C	1.1	1.1	0.77	0.77
All Pedestrians		1105	27.4	LOS C			0.76	0.76

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.


N
Station Road (N)
50
50
Rawson Street (W)
120
Rawson Street (E)
35
Station Road (S)

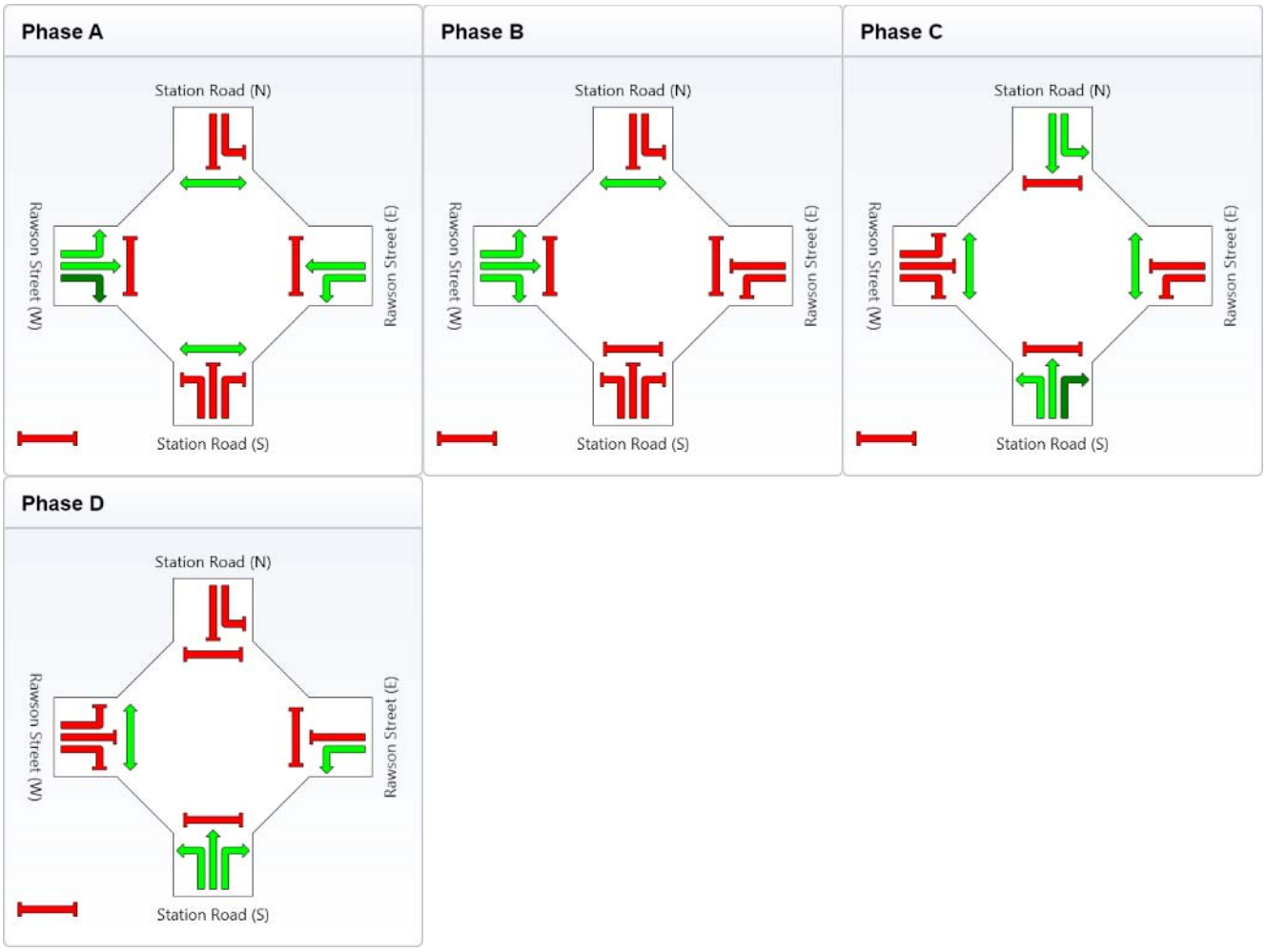
PHASING SUMMARY

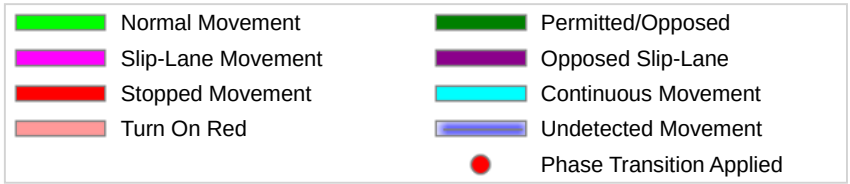
I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 145 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	55	6	16	44
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	61	12	22	50
Phase Split	42 %	8 %	15 %	34 %





MOVEMENT SUMMARY

Site: AM Future (2021 development)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 145 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	125	3.1	0.663	36.2	LOS C	5.4	38.7	0.64	0.77	30.1
2	T	466	2.6	0.972	52.4	LOS D	51.6	369.0	0.81	0.86	23.5
3	R	423	2.3	0.972	98.5	LOS F	51.6	369.0	1.00	1.26	16.3
Approach		1015	2.5	0.972	69.6	LOS E	51.6	369.0	0.87	1.02	20.3
East: Rawson Street (E)											
4	L	503	2.4	0.381	9.9	LOS A	2.7	19.4	0.08	0.69	47.2
5	T	680	9.4	0.976	75.0	LOS F	60.2	455.2	1.00	1.13	19.0
Approach		1183	6.4	0.976	47.3	LOS D	60.2	455.2	0.61	0.94	25.4
North: Station Road (N)											
7	L	21	14.3	0.892	89.9	LOS F	11.2	80.5	1.00	1.00	17.8
8	T	314	0.8	0.892	81.2	LOS F	15.1	106.5	1.00	1.00	18.0
Approach		335	1.6	0.892	81.7	LOS F	15.1	106.5	1.00	1.00	18.0
West: Rawson Street (W)											
10	L	34	0.0	0.704	35.3	LOS C	28.0	214.0	0.73	0.94	31.7
11	T	558	11.4	0.704	27.1	LOS B	28.0	214.0	0.73	0.66	32.9
12	R	115	4.5	0.890	91.2	LOS F	8.7	63.4	1.00	1.02	17.1
Approach		706	9.7	0.890	37.9	LOS C	28.0	214.0	0.78	0.73	28.6
All Vehicles		3239	5.4	0.976	55.8	LOS D	60.2	455.2	0.77	0.93	23.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	36.6	LOS D	0.2	0.2	0.71	0.71
P3	Across E approach	53	66.6	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	26.7	LOS C	0.1	0.1	0.61	0.61
P7	Across W approach	53	27.3	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		212	39.3	LOS D			0.72	0.72

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: AM Future (2021 development with Queen Street)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	125	3.1	0.648	34.0	LOS C	5.2	37.1	0.63	0.77	31.0
2	T	466	2.6	1.014	40.6	LOS C	55.0	392.6	0.79	0.76	27.0
3	R	492	2.3	1.014	75.3	LOS F	55.0	392.6	1.00	1.07	19.7
Approach		1083	2.5	1.014	55.6	LOS D	55.0	392.6	0.87	0.90	23.4
East: Rawson Street (E)											
4	L	503	2.4	0.381	9.9	LOS A	2.7	19.4	0.08	0.69	47.2
5	T	680	9.4	1.012	97.3	LOS F	67.4	509.7	1.00	1.24	15.9
Approach		1183	6.4	1.012	60.1	LOS E	67.4	509.7	0.61	1.00	22.1
North: Station Road (N)											
7	L	21	14.3	0.892	89.9	LOS F	11.2	80.5	1.00	1.00	17.8
8	T	314	0.8	0.892	81.2	LOS F	15.1	106.5	1.00	1.00	18.0
Approach		335	1.6	0.892	81.7	LOS F	15.1	106.5	1.00	1.00	18.0
West: Rawson Street (W)											
10	L	34	0.0	0.726	37.3	LOS C	29.4	224.5	0.77	0.94	30.9
11	T	558	11.4	0.726	29.2	LOS C	29.4	224.5	0.77	0.69	31.9
12	R	115	4.5	0.890	91.2	LOS F	8.7	63.4	1.00	1.02	17.1
Approach		706	9.7	0.890	39.6	LOS C	29.4	224.5	0.80	0.76	27.9
All Vehicles		3307	5.4	1.014	56.4	LOS D	67.4	509.7	0.78	0.92	23.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	38.0	LOS D	0.2	0.2	0.72	0.72
P3	Across E approach	53	66.6	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	27.9	LOS C	0.1	0.1	0.62	0.62
P7	Across W approach	53	26.1	LOS C	0.1	0.1	0.60	0.60
All Pedestrians		212	39.7	LOS D			0.73	0.73

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: PM Future (2021 development)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 135 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	151	3.1	0.744	43.0	LOS D	6.8	48.6	0.72	0.83	27.5
2	T	497	2.6	1.173	78.8	LOS F	89.6	640.2	0.80	0.85	18.3
3	R	561	2.3	1.173	199.8	LOS F	89.6	640.2	1.00	1.36	9.3
Approach		1208	2.5	1.173	130.5	LOS F	89.6	640.2	0.88	1.09	13.0
East: Rawson Street (E)											
4	L	713	2.4	0.561	11.2	LOS A	6.9	49.1	0.16	0.71	45.9
5	T	756	9.4	1.157	207.4	LOS F	101.5	767.6	1.00	1.78	8.8
Approach		1468	6.0	1.157	112.2	LOS F	101.5	767.6	0.59	1.26	14.5
North: Station Road (N)											
7	L	46	14.3	1.000[3]	72.6	LOS F	11.2	81.6	1.00	0.81	20.6
8	T	368	0.8	1.063	120.3	LOS F	26.0	183.1	1.00	1.16	13.6
Approach		415	2.3	1.063	115.0	LOS F	26.0	183.1	1.00	1.12	14.1
West: Rawson Street (W)											
10	L	56	0.0	0.799	36.6	LOS C	33.0	251.4	0.83	0.93	31.3
11	T	601	11.4	0.799	28.4	LOS B	33.0	251.4	0.83	0.75	32.1
12	R	166	4.5	1.095	137.1	LOS F	18.0	130.8	1.00	1.10	12.6
Approach		823	9.2	1.095	50.9	LOS D	33.0	251.4	0.86	0.84	24.4
All Vehicles		3915	5.2	1.173	105.3	LOS F	101.5	767.6	0.78	1.10	15.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	37.0	LOS D	0.2	0.2	0.74	0.74
P3	Across E approach	53	61.6	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	26.1	LOS C	0.1	0.1	0.62	0.62
P7	Across W approach	53	25.5	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		212	37.6	LOS D			0.73	0.73

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: PM Future (2021 development with Queen Street)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 135 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	151	3.1	0.744	43.0	LOS D	6.8	48.6	0.72	0.83	27.5
2	T	497	2.6	1.173	78.8	LOS F	89.6	640.2	0.80	0.85	18.3
3	R	561	2.3	1.173	199.8	LOS F	89.6	640.2	1.00	1.36	9.3
Approach		1208	2.5	1.173	130.5	LOS F	89.6	640.2	0.88	1.09	13.0
East: Rawson Street (E)											
4	L	848	2.4	0.667	11.6	LOS A	10.3	73.8	0.21	0.72	45.5
5	T	756	9.4	1.157	207.4	LOS F	101.5	767.6	1.00	1.78	8.8
Approach		1604	5.7	1.157	103.8	LOS F	101.5	767.6	0.58	1.22	15.4
North: Station Road (N)											
7	L	46	14.3	1.000[3]	72.6	LOS F	11.2	81.6	1.00	0.81	20.6
8	T	368	0.8	1.063	120.3	LOS F	26.0	183.1	1.00	1.16	13.6
Approach		415	2.3	1.063	115.0	LOS F	26.0	183.1	1.00	1.12	14.1
West: Rawson Street (W)											
10	L	56	0.0	0.799	36.6	LOS C	33.0	251.4	0.83	0.93	31.3
11	T	601	11.4	0.799	28.4	LOS B	33.0	251.4	0.83	0.75	32.1
12	R	166	4.5	1.095	137.1	LOS F	18.0	130.8	1.00	1.10	12.6
Approach		823	9.2	1.095	50.9	LOS D	33.0	251.4	0.86	0.84	24.4
All Vehicles		4051	5.1	1.173	102.2	LOS F	101.5	767.6	0.77	1.09	15.5

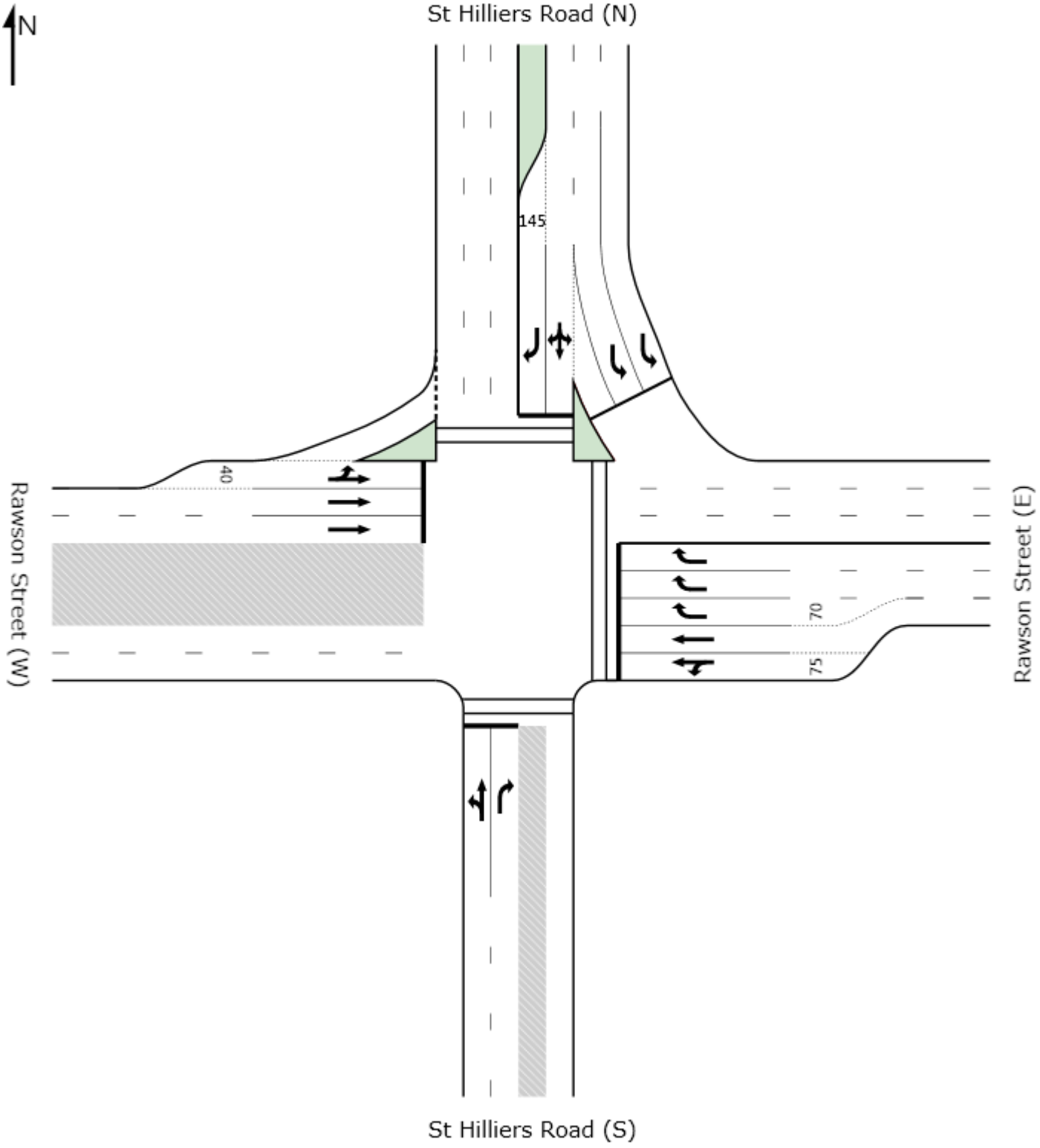
Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	37.0	LOS D	0.2	0.2	0.74	0.74
P3	Across E approach	53	61.6	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	26.1	LOS C	0.1	0.1	0.62	0.62
P7	Across W approach	53	25.5	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		212	37.6	LOS D			0.73	0.73

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.


N
St Hilliers Road (N)
145
40
Rawson Street (W)
70
75
Rawson Street (E)
St Hilliers Road (S)

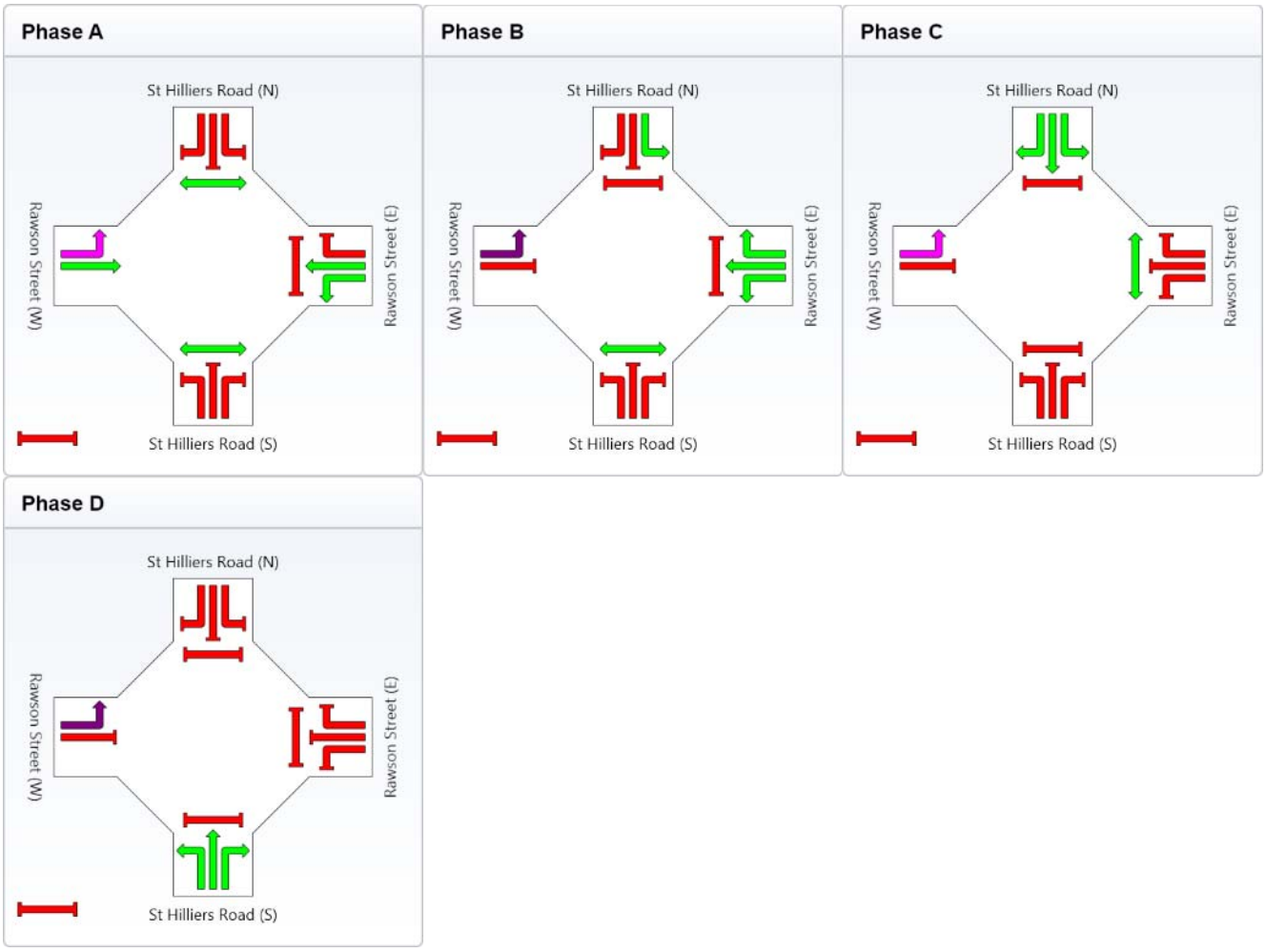
PHASING SUMMARY

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 138 seconds (User-Given Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	27	54	27	6
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	33	60	33	12
Phase Split	24 %	43 %	24 %	9 %



MOVEMENT SUMMARY

Site: AM Future (2021 development)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 138 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: St Hilliers Road (S)											
1	L	1	0.0	0.125	80.0	LOS F	0.7	5.0	0.99	0.68	19.3
2	T	9	0.0	0.125	71.9	LOS F	0.7	5.0	0.99	0.67	19.5
3	R	12	16.7	0.161	81.2	LOS F	0.8	6.4	0.99	0.68	18.7
Approach		22	8.7	0.161	77.1	LOS F	0.8	6.4	0.99	0.67	19.0
East: Rawson Street (E)											
4	L	11	0.0	0.368	14.9	LOS B	4.1	30.1	0.25	1.02	43.4
5	T	728	6.6	0.368	6.5	LOS A	6.6	48.8	0.25	0.22	49.8
6	R	1887	6.5	1.103	146.6	LOS F	93.1	687.7	1.00	1.22	12.0
Approach		2626	6.5	1.103	107.2	LOS F	93.1	687.7	0.79	0.94	15.2
North: St Hilliers Road (N)											
7	L	1149	7.4	0.459	15.8	LOS B	12.7	94.0	0.30	0.69	42.1
8	T	9	11.1	0.459	16.8	LOS B	12.7	94.0	0.49	0.44	38.5
9	R	440	6.1	0.459	38.1	LOS C	12.7	94.0	0.64	0.78	29.4
Approach		1599	7.1	0.459	21.9	LOS B	12.7	94.0	0.40	0.71	37.7
West: Rawson Street (W)											
10	L	253	5.8	1.000[3]	29.8	LOS C	9.8	72.2	0.83	0.80	33.3
11	T	828	7.2	1.103	175.8	LOS F	48.9	363.5	1.00	1.53	10.1
Approach		1081	6.9	1.103	141.7	LOS F	48.9	363.5	0.96	1.36	12.1
All Vehicles		5328	6.8	1.103	88.5	LOS F	93.1	687.7	0.71	0.96	17.5

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	12.2	LOS B	0.1	0.1	0.42	0.42
P3	Across E approach	53	63.1	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	55.7	LOS E	0.2	0.2	0.90	0.90
All Pedestrians		159	43.7	LOS E			0.76	0.76

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: AM Future (2021 development with Queen Street)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 138 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: St Hilliers Road (S)											
1	L	1	0.0	0.125	80.0	LOS F	0.7	5.0	0.99	0.68	19.3
2	T	9	0.0	0.125	71.9	LOS F	0.7	5.0	0.99	0.67	19.5
3	R	12	16.7	0.161	81.2	LOS F	0.8	6.4	0.99	0.68	18.7
Approach		22	8.7	0.161	77.1	LOS F	0.8	6.4	0.99	0.67	19.0
East: Rawson Street (E)											
4	L	11	0.0	0.368	14.9	LOS B	4.1	30.2	0.25	1.02	43.4
5	T	728	6.6	0.368	6.6	LOS A	6.6	48.8	0.25	0.22	49.8
6	R	1926	6.5	1.156	184.7	LOS F	107.4	794.0	1.00	1.31	9.9
Approach		2665	6.5	1.156	135.4	LOS F	107.4	794.0	0.79	1.01	12.7
North: St Hilliers Road (N)											
7	L	1149	7.4	0.463	16.4	LOS B	13.1	96.9	0.32	0.69	41.7
8	T	9	11.1	0.463	17.5	LOS B	13.1	96.9	0.51	0.45	37.9
9	R	440	6.1	0.463	38.8	LOS C	13.1	96.9	0.65	0.78	29.2
Approach		1599	7.1	0.463	22.5	LOS B	13.1	96.9	0.41	0.72	37.3
West: Rawson Street (W)											
10	L	281	5.8	1.000[3]	24.1	LOS B	9.5	69.8	0.59	0.75	36.2
11	T	868	7.2	1.148	217.3	LOS F	58.2	432.7	1.00	1.70	8.5
Approach		1148	6.8	1.148	171.4	LOS F	58.2	432.7	0.90	1.41	10.5
All Vehicles		5435	6.7	1.156	109.3	LOS F	107.4	794.0	0.70	1.01	15.1

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	12.2	LOS B	0.1	0.1	0.42	0.42
P3	Across E approach	53	63.1	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	54.8	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		159	43.4	LOS E			0.76	0.76

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: PM Future (2021 development)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 138 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: St Hilliers Road (S)											
1	L	4	0.0	0.238	81.0	LOS F	1.4	9.7	1.00	0.70	19.1
2	T	16	0.0	0.238	72.8	LOS F	1.4	9.7	1.00	0.70	19.2
3	R	24	16.7	0.336	82.4	LOS F	1.7	13.6	1.00	0.71	18.5
Approach		44	9.1	0.336	78.9	LOS F	1.7	13.6	1.00	0.71	18.8
East: Rawson Street (E)											
4	L	11	0.0	0.483	17.5	LOS B	5.8	42.5	0.36	1.00	41.7
5	T	954	6.6	0.483	8.0	LOS A	10.1	74.6	0.32	0.28	48.0
6	R	1520	6.5	1.017	99.1	LOS F	58.4	431.6	1.00	1.06	16.2
Approach		2484	6.5	1.017	63.8	LOS E	58.4	431.6	0.73	0.76	21.8
North: St Hilliers Road (N)											
7	L	1813	7.4	0.735	23.9	LOS B	29.0	214.9	0.61	0.79	36.5
8	T	13	11.1	0.735	23.0	LOS B	29.0	214.9	0.72	0.65	33.8
9	R	574	6.1	0.735	46.7	LOS D	29.0	214.9	0.83	0.85	26.4
Approach		2399	7.1	0.735	29.4	LOS C	29.0	214.9	0.66	0.80	33.4
West: Rawson Street (W)											
10	L	301	5.8	1.000[3]	23.3	LOS B	9.6	70.4	0.67	0.77	36.8
11	T	967	7.2	1.017	114.3	LOS F	47.8	355.5	1.00	1.34	14.2
Approach		1268	6.9	1.017	92.7	LOS F	47.8	355.5	0.92	1.20	16.6
All Vehicles		6196	6.8	1.017	56.5	LOS D	58.4	431.6	0.75	0.87	23.4

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	12.2	LOS B	0.1	0.1	0.42	0.42
P3	Across E approach	53	63.1	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	48.8	LOS E	0.2	0.2	0.84	0.84
All Pedestrians		159	41.4	LOS E			0.74	0.74

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

MOVEMENT SUMMARY

Site: PM Future (2021 development with Queen Street)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 138 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: St Hilliers Road (S)											
1	L	4	0.0	0.238	81.0	LOS F	1.4	9.7	1.00	0.70	19.1
2	T	16	0.0	0.238	72.8	LOS F	1.4	9.7	1.00	0.70	19.2
3	R	24	16.7	0.336	82.4	LOS F	1.7	13.6	1.00	0.71	18.5
Approach		44	9.1	0.336	78.9	LOS F	1.7	13.6	1.00	0.71	18.8
East: Rawson Street (E)											
4	L	11	0.0	0.483	17.5	LOS B	5.8	42.5	0.36	1.00	41.7
5	T	954	6.6	0.483	8.0	LOS A	10.1	74.6	0.32	0.28	48.0
6	R	1520	6.5	1.017	99.1	LOS F	58.4	431.6	1.00	1.06	16.2
Approach		2484	6.5	1.017	63.8	LOS E	58.4	431.6	0.73	0.76	21.8
North: St Hilliers Road (N)											
7	L	1813	7.4	0.779	24.1	LOS B	31.8	235.6	0.65	0.81	36.4
8	T	13	11.1	0.779	23.0	LOS B	31.8	235.6	0.75	0.68	33.6
9	R	709	6.1	0.779	45.1	LOS D	31.8	235.6	0.84	0.86	26.9
Approach		2535	7.1	0.779	30.0	LOS C	31.8	235.6	0.70	0.82	33.1
West: Rawson Street (W)											
10	L	301	5.8	1.000[3]	23.3	LOS B	9.6	70.4	0.67	0.77	36.8
11	T	967	7.2	1.018	114.7	LOS F	47.9	356.1	1.00	1.34	14.1
Approach		1268	6.9	1.018	93.0	LOS F	47.9	356.1	0.92	1.20	16.5
All Vehicles		6332	6.8	1.018	56.2	LOS D	58.4	431.6	0.76	0.87	23.5

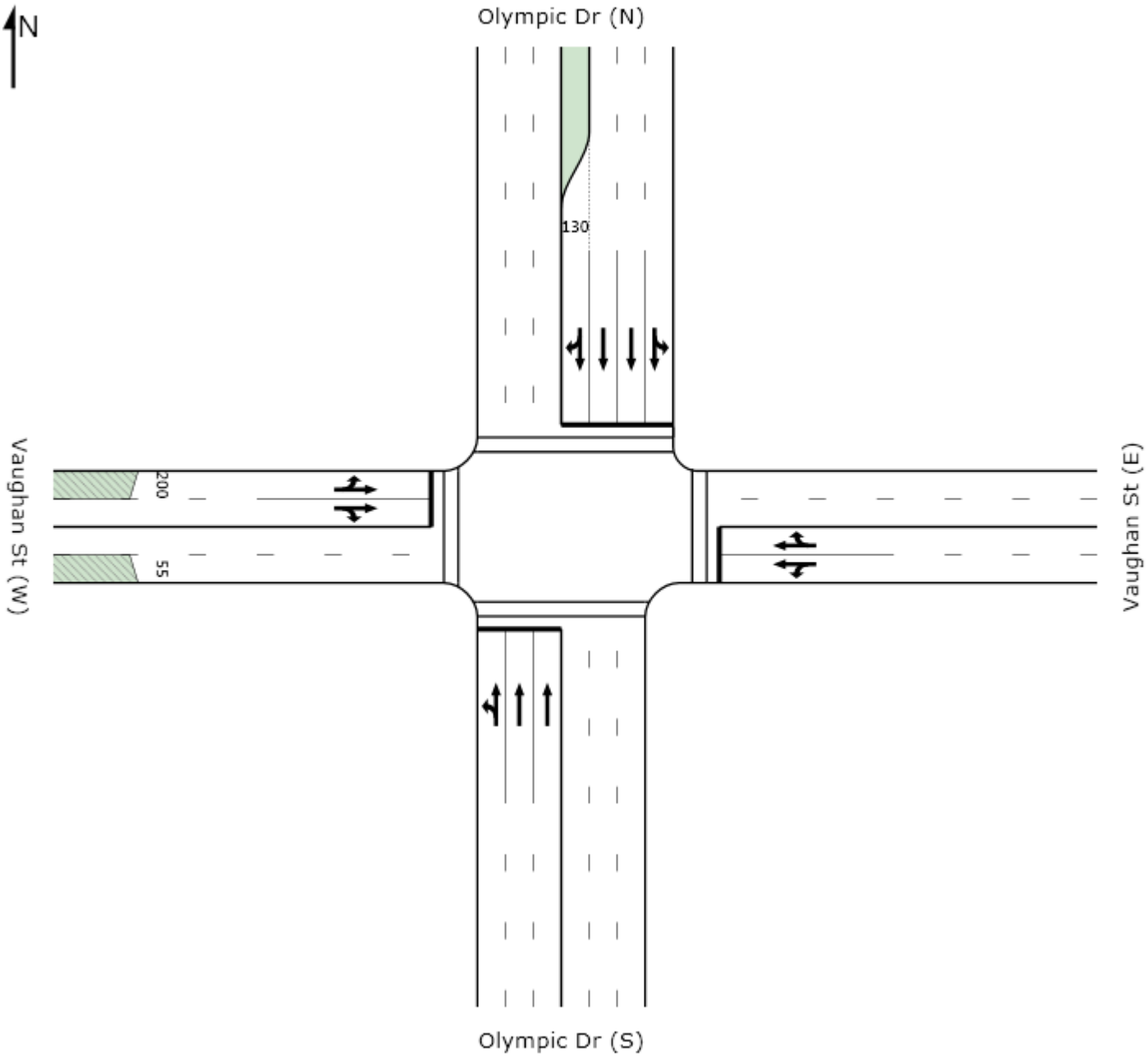
Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	12.2	LOS B	0.1	0.1	0.42	0.42
P3	Across E approach	53	63.1	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	48.8	LOS E	0.2	0.2	0.84	0.84
All Pedestrians		159	41.4	LOS E			0.74	0.74

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


N
Olympic Dr (N)
130
Vaughan St (W)
200
55
Vaughan St (E)
Olympic Dr (S)

PHASING SUMMARY

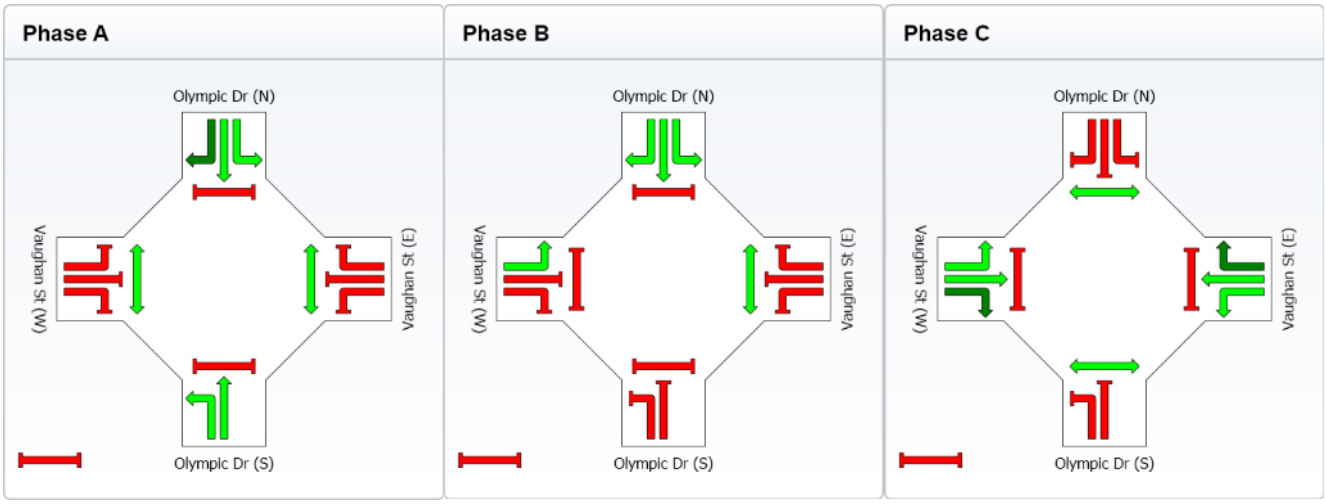
Site: PM Future (2021 development w Queen St)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	45	29	58
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	51	35	64
Phase Split	34 %	23 %	43 %



Normal Movement
Slip-Lane Movement
Stopped Movement
Turn On Red
Permitted/Opposed
Opposed Slip-Lane
Continuous Movement
Undetected Movement
Phase Transition Applied

MOVEMENT SUMMARY

Site: AM Future (2021 development)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	119	1.8	1.010	95.2	LOS F	84.6	624.1	1.00	1.19	17.0
2	T	2403	7.0	1.010	86.9	LOS F	84.8	629.2	1.00	1.20	17.2
Approach		2522	6.8	1.010	87.3	LOS F	84.8	629.2	1.00	1.20	17.2
East: Vaughan St (E)											
4	L	49	0.0	0.407	43.0	LOS D	15.7	114.0	0.77	0.89	28.4
5	T	341	5.0	1.044	63.5	LOS E	29.7	211.7	0.83	0.83	21.0
6	R	168	0.9	1.044	153.2	LOS F	29.7	211.7	1.00	1.28	11.6
Approach		559	3.3	1.044	88.7	LOS F	29.7	211.7	0.88	0.97	17.2
North: Olympic Dr (N)											
7	L	114	2.9	0.167	22.3	LOS B	3.9	28.2	0.36	0.78	37.5
8	T	1675	8.5	0.836	22.7	LOS B	42.2	317.1	0.77	0.71	35.3
9	R	138	6.6	1.122	165.8	LOS F	17.2	126.9	1.00	1.10	10.8
Approach		1926	8.0	1.122	33.0	LOS C	42.2	317.1	0.76	0.74	30.4
West: Vaughan St (W)											
10	L	134	10.1	0.678	46.3	LOS D	25.7	187.6	0.85	0.89	27.3
11	T	435	3.1	0.678	42.0	LOS C	25.7	187.6	0.87	0.76	26.3
12	R	115	5.4	0.678	61.2	LOS E	15.1	109.5	0.93	0.85	22.8
Approach		683	4.9	0.678	46.1	LOS D	25.7	187.6	0.88	0.80	25.8
All Vehicles		5691	6.6	1.122	64.1	LOS E	84.8	629.2	0.89	0.97	21.1

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	38.2	LOS D	0.2	0.2	0.71	0.71
P3	Across E approach	53	21.9	LOS C	0.1	0.1	0.54	0.54
P5	Across N approach	53	39.6	LOS D	0.2	0.2	0.73	0.73
P7	Across W approach	53	28.8	LOS C	0.1	0.1	0.62	0.62
All Pedestrians		212	32.1	LOS D			0.65	0.65

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: AM Future (2021 development w Queen St)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	119	1.8	1.025	106.1	LOS F	88.1	650.1	1.00	1.23	15.7
2	T	2403	7.0	1.025	97.9	LOS F	88.3	655.4	1.00	1.25	15.8
Approach		2522	6.8	1.025	98.2	LOS F	88.3	655.4	1.00	1.25	15.8
East: Vaughan St (E)											
4	L	49	0.0	0.406	43.7	LOS D	15.5	112.3	0.78	0.89	28.2
5	T	341	5.0	1.039	65.2	LOS E	30.2	215.4	0.84	0.84	20.6
6	R	168	0.9	1.039	149.9	LOS F	30.2	215.4	1.00	1.27	11.8
Approach		559	3.3	1.039	88.8	LOS F	30.2	215.4	0.88	0.97	17.2
North: Olympic Dr (N)											
7	L	114	2.9	0.165	21.7	LOS B	3.8	27.4	0.35	0.78	37.9
8	T	1675	8.5	0.826	21.7	LOS B	41.0	307.6	0.75	0.69	35.9
9	R	138	6.6	0.941	101.4	LOS F	11.3	83.8	1.00	1.11	15.9
Approach		1926	8.0	0.941	27.4	LOS B	41.0	307.6	0.74	0.73	33.0
West: Vaughan St (W)											
10	L	134	10.1	0.742	48.3	LOS D	29.0	211.9	0.89	0.89	26.7
11	T	435	3.1	0.742	43.2	LOS D	29.0	211.9	0.90	0.80	25.9
12	R	140	5.4	0.742	66.2	LOS E	15.2	110.2	0.95	0.88	21.6
Approach		708	4.9	0.742	48.7	LOS D	29.0	211.9	0.91	0.83	25.1
All Vehicles		5716	6.6	1.039	67.3	LOS E	88.3	655.4	0.89	0.99	20.5

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	38.9	LOS D	0.2	0.2	0.72	0.72
P3	Across E approach	53	21.3	LOS C	0.1	0.1	0.53	0.53
P5	Across N approach	53	40.3	LOS E	0.2	0.2	0.73	0.73
P7	Across W approach	53	29.5	LOS C	0.1	0.1	0.63	0.63
All Pedestrians		212	32.5	LOS D			0.65	0.65

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: PM Future (2021 development)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	145	1.8	1.053	143.3	LOS F	64.3	471.9	1.00	1.31	12.3
2	T	1581	7.0	1.053	135.0	LOS F	64.5	478.9	1.00	1.35	12.5
Approach		1726	6.6	1.053	135.7	LOS F	64.5	478.9	1.00	1.34	12.4
East: Vaughan St (E)											
4	L	36	0.0	0.469	44.8	LOS D	18.5	134.5	0.80	0.90	27.9
5	T	473	5.0	1.202	119.1	LOS F	53.0	380.5	0.87	1.04	13.7
6	R	172	0.9	1.202	279.2	LOS F	53.0	380.5	1.00	1.68	7.0
Approach		680	3.7	1.202	155.6	LOS F	53.0	380.5	0.90	1.19	11.2
North: Olympic Dr (N)											
7	L	99	2.9	0.244	22.3	LOS B	6.0	44.1	0.37	0.86	37.8
8	T	2679	8.5	1.222	230.1	LOS F	194.0	1456.8	0.97	1.79	8.1
9	R	295	6.6	1.000[3]	82.9	LOS F	28.6	212.2	1.00	1.13	18.5
Approach		3073	8.1	1.222	209.3	LOS F	194.0	1456.8	0.95	1.69	8.8
West: Vaughan St (W)											
10	L	136	10.1	0.806	51.4	LOS D	33.5	244.1	0.92	0.91	25.7
11	T	403	3.1	0.806	43.5	LOS D	33.5	244.1	0.92	0.84	25.9
12	R	139	5.4	0.806	78.2	LOS F	11.2	82.2	0.99	0.92	19.1
Approach		678	5.0	0.806	52.2	LOS D	33.5	244.1	0.93	0.87	24.1
All Vehicles		6157	6.9	1.222	165.4	LOS F	194.0	1456.8	0.96	1.45	10.7

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	38.9	LOS D	0.2	0.2	0.72	0.72
P3	Across E approach	53	21.3	LOS C	0.1	0.1	0.53	0.53
P5	Across N approach	53	40.3	LOS E	0.2	0.2	0.73	0.73
P7	Across W approach	53	44.9	LOS E	0.2	0.2	0.77	0.77
All Pedestrians		212	36.4	LOS D			0.69	0.69

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: PM Future (2021 development w Queen St)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Practical Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	171	1.8	1.045	136.7	LOS F	63.9	468.5	1.00	1.28	12.8
2	T	1581	7.0	1.045	128.4	LOS F	64.2	476.5	1.00	1.32	12.9
Approach		1752	6.5	1.045	129.2	LOS F	64.2	476.5	1.00	1.32	12.9
East: Vaughan St (E)											
4	L	36	0.0	0.469	44.8	LOS D	18.5	134.5	0.80	0.90	27.9
5	T	473	5.0	1.202	119.1	LOS F	53.0	380.5	0.87	1.04	13.7
6	R	172	0.9	1.202	279.2	LOS F	53.0	380.5	1.00	1.68	7.0
Approach		680	3.7	1.202	155.6	LOS F	53.0	380.5	0.90	1.19	11.2
North: Olympic Dr (N)											
7	L	99	2.9	0.246	22.3	LOS B	6.0	44.4	0.37	0.86	37.8
8	T	2679	8.5	1.229	236.2	LOS F	197.0	1479.2	0.97	1.81	7.9
9	R	295	6.6	1.000[3]	86.6	LOS F	28.6	212.2	1.00	1.14	17.9
Approach		3073	8.1	1.229	215.0	LOS F	197.0	1479.2	0.95	1.71	8.6
West: Vaughan St (W)											
10	L	136	10.1	0.806	51.4	LOS D	33.5	244.1	0.92	0.91	25.7
11	T	403	3.1	0.806	43.5	LOS D	33.5	244.1	0.92	0.84	25.9
12	R	139	5.4	0.806	78.2	LOS F	11.2	82.2	0.99	0.92	19.1
Approach		678	5.0	0.806	52.2	LOS D	33.5	244.1	0.93	0.87	24.1
All Vehicles		6182	6.8	1.229	166.3	LOS F	197.0	1479.2	0.96	1.45	10.6

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

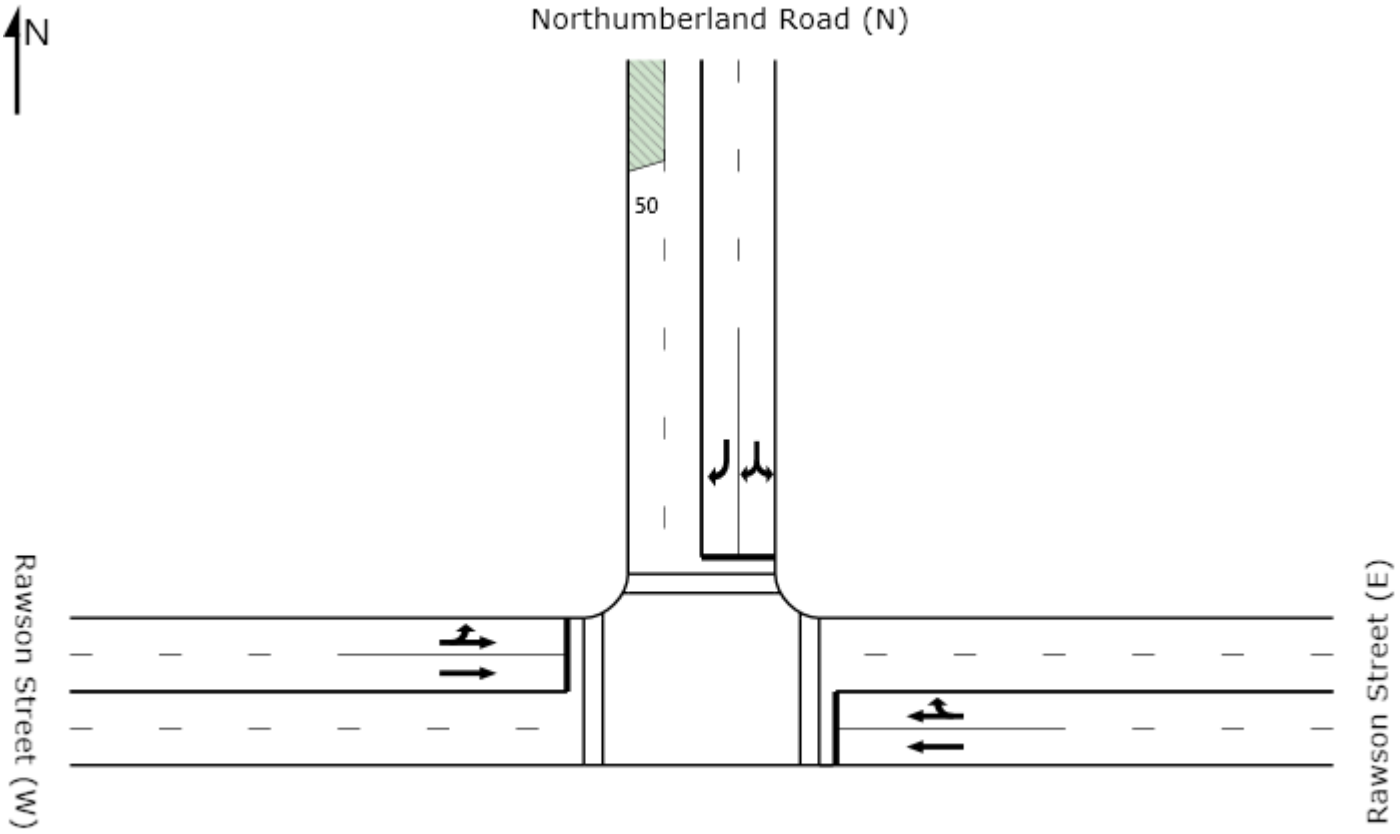
3 x = 1.00 due to short lane. Refer to the Lane Summary report for information about excess flow and related conditions.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	38.9	LOS D	0.2	0.2	0.72	0.72
P3	Across E approach	53	21.3	LOS C	0.1	0.1	0.53	0.53
P5	Across N approach	53	40.3	LOS E	0.2	0.2	0.73	0.73
P7	Across W approach	53	44.1	LOS E	0.2	0.2	0.77	0.77
All Pedestrians		212	36.2	LOS D			0.69	0.69

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.

C1.2 Modified (Improved) Intersection Layouts


N
Northumberland Road (N)
50
Rawson Street (W)
Rawson Street (E)

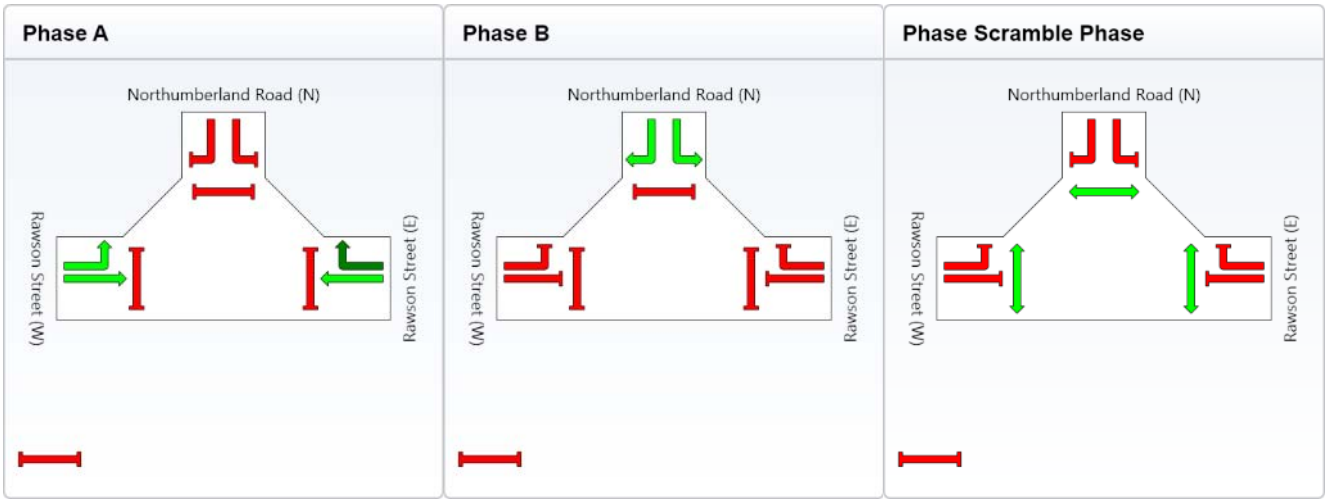
PHASING SUMMARY

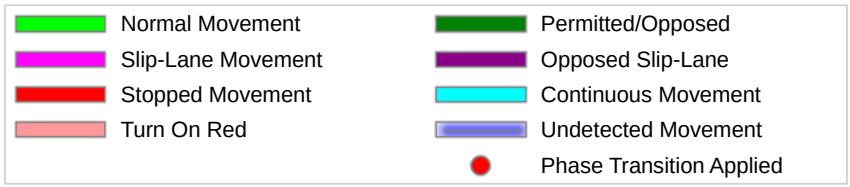
Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Two-Phase
Input Sequence: A, B, Scramble Phase
Output Sequence: A, B, Scramble Phase

Phase Timing Results

Phase	A	B	Scramble Phase
Green Time (sec)	37	19	16
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	43	25	22
Phase Split	48 %	28 %	24 %





MOVEMENT SUMMARY

Site: AM MOD Future (2021 development)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	804	11.4	0.638	21.0	LOS B	14.6	112.0	0.75	0.66	36.3
6	R	34	1.9	0.638	30.4	LOS C	11.6	88.6	0.77	0.91	34.2
Approach		838	11.0	0.638	21.4	LOS B	14.6	112.0	0.76	0.67	36.2
North: Northumberland Road (N)											
7	L	44	6.5	0.654	44.6	LOS D	10.4	75.0	0.97	0.84	27.0
9	R	458	2.7	0.654	44.5	LOS D	10.5	75.0	0.97	0.84	27.0
Approach		502	3.0	0.654	44.5	LOS D	10.5	75.0	0.97	0.84	27.0
West: Rawson Street (W)											
10	L	80	1.9	0.487	26.8	LOS B	9.9	74.6	0.66	0.90	35.8
11	T	652	10.5	0.487	18.6	LOS B	9.9	75.7	0.66	0.57	37.9
Approach		732	9.6	0.487	19.5	LOS B	9.9	75.7	0.66	0.61	37.7
All Vehicles		2072	8.6	0.654	26.3	LOS B	14.6	112.0	0.77	0.69	33.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		159	39.2	LOS D			0.93	0.93

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: AM MOD Future (2021 development with Queen Street)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	804	11.4	0.638	21.0	LOS B	14.6	112.0	0.75	0.66	36.3
6	R	34	1.9	0.638	30.4	LOS C	11.6	88.6	0.77	0.91	34.2
Approach		838	11.0	0.638	21.4	LOS B	14.6	112.0	0.76	0.67	36.2
North: Northumberland Road (N)											
7	L	44	6.5	0.654	44.6	LOS D	10.4	75.0	0.97	0.84	27.0
9	R	458	2.7	0.654	44.5	LOS D	10.5	75.0	0.97	0.84	27.0
Approach		502	3.0	0.654	44.5	LOS D	10.5	75.0	0.97	0.84	27.0
West: Rawson Street (W)											
10	L	80	1.9	0.487	26.8	LOS B	9.9	74.6	0.66	0.90	35.8
11	T	652	10.5	0.487	18.6	LOS B	9.9	75.7	0.66	0.57	37.9
Approach		732	9.6	0.487	19.5	LOS B	9.9	75.7	0.66	0.61	37.7
All Vehicles		2072	8.6	0.654	26.3	LOS B	14.6	112.0	0.77	0.69	33.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P7	Across W approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		159	39.2	LOS D			0.93	0.93

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: PM MOD Future (2021 development)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	767	11.4	0.747	17.6	LOS B	23.9	183.9	0.70	0.64	38.5
6	R	111	1.9	0.747	38.7	LOS C	8.1	59.2	0.79	0.92	29.5
Approach		878	10.2	0.747	20.3	LOS B	23.9	183.9	0.71	0.68	37.1
North: Northumberland Road (N)											
7	L	38	6.5	0.727	57.5	LOS E	12.2	87.8	1.00	0.86	23.2
9	R	419	2.7	0.727	57.4	LOS E	12.2	87.8	1.00	0.86	23.2
Approach		457	3.0	0.727	57.4	LOS E	12.2	87.8	1.00	0.86	23.2
West: Rawson Street (W)											
10	L	117	1.9	0.442	21.2	LOS B	9.9	74.0	0.48	0.90	38.9
11	T	720	10.5	0.442	13.0	LOS A	9.9	75.4	0.48	0.42	42.5
Approach		837	9.3	0.442	14.2	LOS A	9.9	75.4	0.48	0.49	42.0
All Vehicles		2172	8.3	0.747	25.7	LOS B	23.9	183.9	0.68	0.64	34.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		159	49.2	LOS E			0.95	0.95

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: PM MOD Future (2021 development with Queen Street)

Northumberland Rd / Rawson St
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

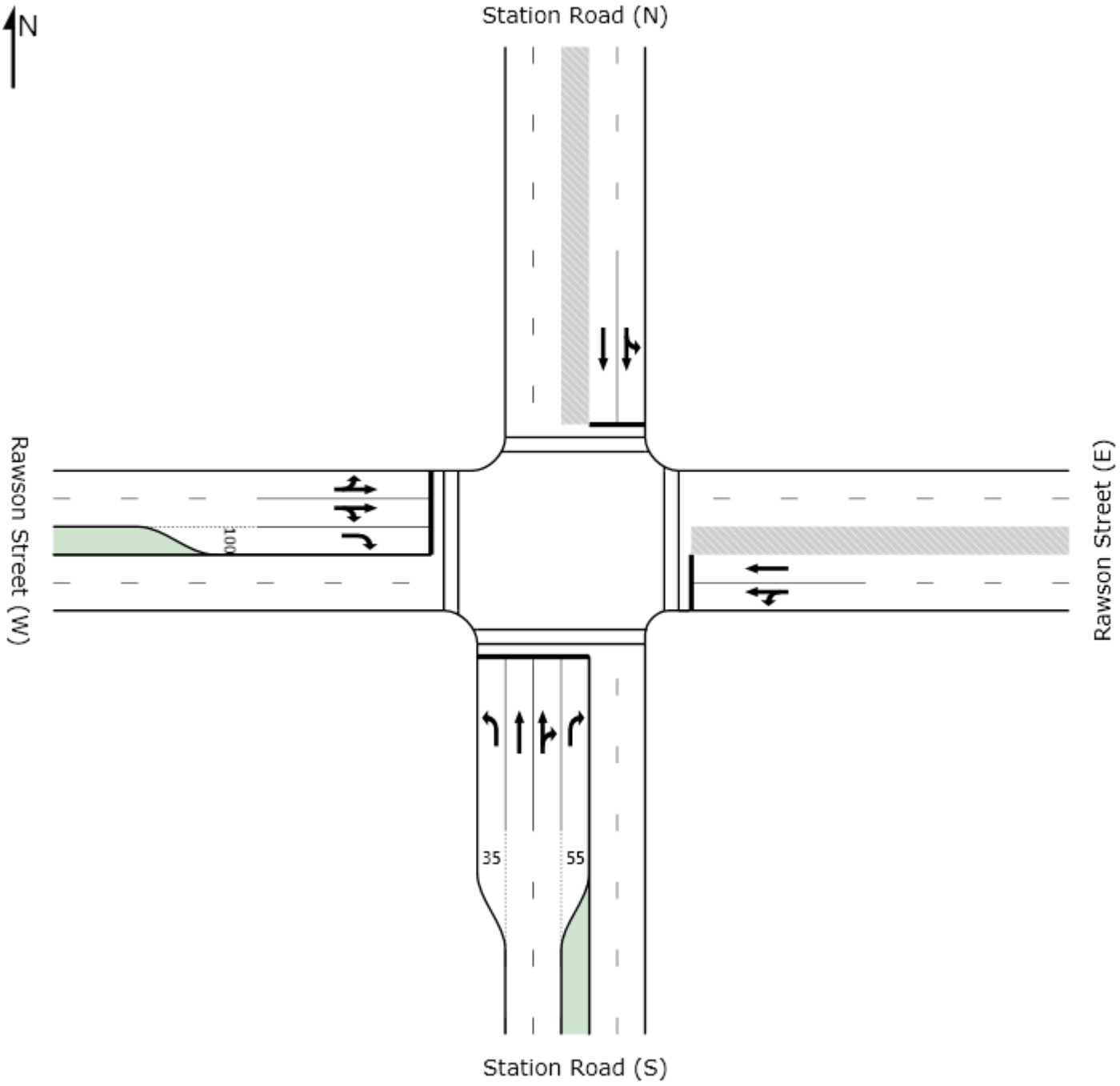
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	767	11.4	0.747	17.6	LOS B	23.9	183.9	0.70	0.64	38.5
6	R	111	1.9	0.747	38.7	LOS C	8.1	59.2	0.79	0.92	29.5
Approach		878	10.2	0.747	20.3	LOS B	23.9	183.9	0.71	0.68	37.1
North: Northumberland Road (N)											
7	L	38	6.5	0.727	57.5	LOS E	12.2	87.8	1.00	0.86	23.2
9	R	419	2.7	0.727	57.4	LOS E	12.2	87.8	1.00	0.86	23.2
Approach		457	3.0	0.727	57.4	LOS E	12.2	87.8	1.00	0.86	23.2
West: Rawson Street (W)											
10	L	117	1.9	0.442	21.2	LOS B	9.9	74.0	0.48	0.90	38.9
11	T	720	10.5	0.442	13.0	LOS A	9.9	75.4	0.48	0.42	42.5
Approach		837	9.3	0.442	14.2	LOS A	9.9	75.4	0.48	0.49	42.0
All Vehicles		2172	8.3	0.747	25.7	LOS B	23.9	183.9	0.68	0.64	34.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P7	Across W approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		159	49.2	LOS E			0.95	0.95

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.


N
Station Road (N)
Rawson Street (W)
Rawson Street (E)
Station Road (S)
100
35
55

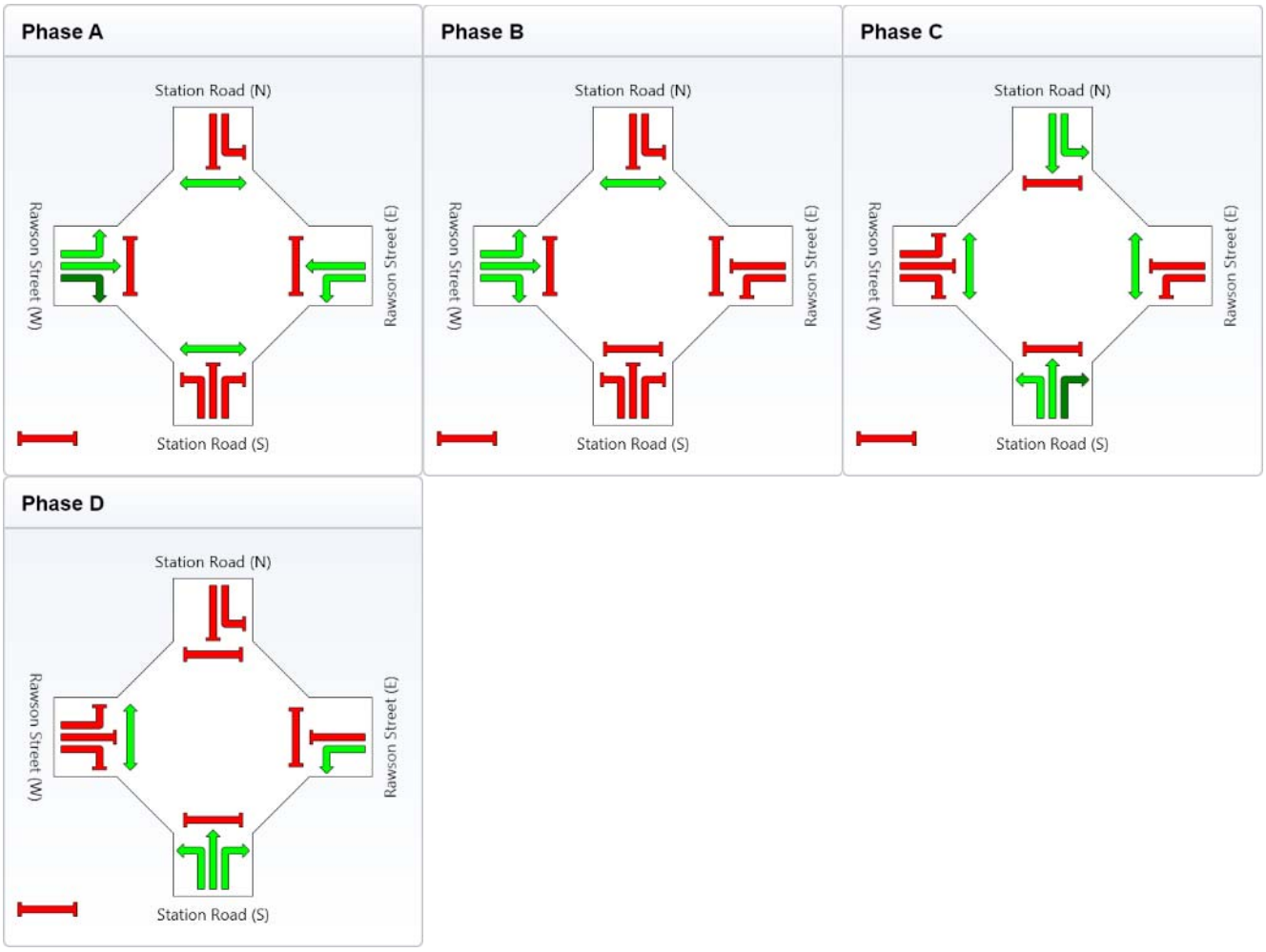
PHASING SUMMARY

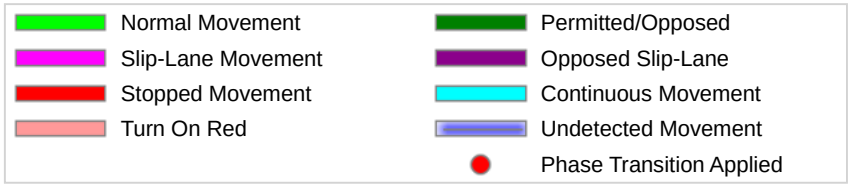
I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C, D
Output Sequence: A, B, C, D

Phase Timing Results

Phase	A	B	C	D
Green Time (sec)	32	6	16	7
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	38	12	22	13
Phase Split	45 %	14 %	26 %	15 %





MOVEMENT SUMMARY

Site: AM MOD Future (2021 development)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	125	3.1	0.501	29.7	LOS C	3.7	26.5	0.75	0.76	33.0
2	T	466	2.6	0.713	27.0	LOS B	17.2	123.2	0.93	0.82	32.8
3	R	423	2.3	0.771	47.8	LOS D	8.9	63.4	1.00	1.00	25.9
Approach		1015	2.5	0.771	36.0	LOS C	17.2	123.2	0.94	0.89	29.5
East: Rawson Street (E)											
4	L	503	2.4	0.786	28.4	LOS B	16.8	121.3	0.82	1.00	34.0
5	T	680	9.4	0.786	24.5	LOS B	19.8	149.4	0.87	0.83	33.8
Approach		1183	6.4	0.786	26.1	LOS B	19.8	149.4	0.85	0.91	33.9
North: Station Road (N)											
7	L	21	14.3	0.463	42.6	LOS D	6.3	45.0	0.94	0.83	29.1
8	T	314	0.8	0.463	34.0	LOS C	6.4	45.2	0.94	0.76	29.5
Approach		335	1.6	0.463	34.5	LOS C	6.4	45.2	0.94	0.76	29.5
West: Rawson Street (W)											
10	L	34	0.0	0.398	18.1	LOS B	6.6	50.5	0.46	0.96	41.4
11	T	558	11.4	0.398	12.5	LOS A	6.6	50.5	0.52	0.45	42.8
12	R	115	4.5	0.398	35.7	LOS C	5.9	45.0	0.83	0.81	30.6
Approach		706	9.7	0.398	16.5	LOS B	6.6	50.5	0.57	0.53	40.1
All Vehicles		3239	5.4	0.786	28.0	LOS B	19.8	149.4	0.82	0.80	33.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	28.0	LOS C	0.1	0.1	0.81	0.81
P3	Across E approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	15.3	LOS B	0.1	0.1	0.60	0.60
P7	Across W approach	53	28.0	LOS C	0.1	0.1	0.81	0.81
All Pedestrians		212	27.0	LOS C			0.79	0.79

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: AM MOD Future (2021 development with Queen Street)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	125	3.1	0.515	29.9	LOS C	3.8	27.4	0.73	0.76	32.9
2	T	466	2.6	0.684	26.8	LOS B	17.6	125.7	0.91	0.80	32.9
3	R	492	2.3	0.773	49.9	LOS D	10.6	75.7	1.00	1.02	25.3
Approach		1083	2.5	0.773	37.6	LOS C	17.6	125.7	0.93	0.90	28.9
East: Rawson Street (E)											
4	L	503	2.4	0.783	28.3	LOS B	17.2	124.7	0.81	1.00	34.1
5	T	680	9.4	0.783	25.2	LOS B	20.6	155.8	0.86	0.83	33.5
Approach		1183	6.4	0.783	26.5	LOS B	20.6	155.8	0.84	0.90	33.7
North: Station Road (N)											
7	L	21	14.3	0.490	45.5	LOS D	6.7	48.3	0.95	0.82	28.0
8	T	314	0.8	0.490	36.9	LOS C	6.9	48.4	0.95	0.77	28.4
Approach		335	1.6	0.490	37.4	LOS C	6.9	48.4	0.95	0.77	28.4
West: Rawson Street (W)											
10	L	34	0.0	0.414	19.1	LOS B	7.5	56.8	0.47	0.96	40.7
11	T	558	11.4	0.414	14.1	LOS A	7.5	56.8	0.54	0.47	41.4
12	R	115	4.5	0.414	38.1	LOS C	6.4	49.0	0.84	0.81	29.6
Approach		706	9.7	0.414	18.2	LOS B	7.5	56.8	0.59	0.55	38.9
All Vehicles		3307	5.4	0.783	29.5	LOS C	20.6	155.8	0.83	0.81	32.3

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	28.8	LOS C	0.1	0.1	0.80	0.80
P3	Across E approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	16.2	LOS B	0.1	0.1	0.60	0.60
P7	Across W approach	53	28.0	LOS C	0.1	0.1	0.79	0.79
All Pedestrians		212	28.1	LOS C			0.78	0.78

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: PM MOD Future (2021 development)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 105 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	151	3.1	0.709	38.1	LOS C	5.9	42.7	0.75	0.82	29.3
2	T	497	2.6	0.735	32.3	LOS C	22.4	160.4	0.94	0.83	30.3
3	R	561	2.3	0.817	57.7	LOS E	14.1	100.9	1.00	1.04	23.2
Approach		1208	2.5	0.817	44.8	LOS D	22.4	160.4	0.94	0.93	26.4
East: Rawson Street (E)											
4	L	713	2.4	0.853	28.4	LOS B	25.8	185.8	0.81	1.01	33.9
5	T	756	9.4	0.853	29.5	LOS C	31.1	235.5	0.90	0.89	31.4
Approach		1468	6.0	0.853	29.0	LOS C	31.1	235.5	0.85	0.95	32.6
North: Station Road (N)											
7	L	46	14.3	0.713	56.9	LOS E	10.5	75.8	1.00	0.87	24.3
8	T	368	0.8	0.713	48.2	LOS D	10.8	76.2	1.00	0.87	24.6
Approach		415	2.3	0.713	49.2	LOS D	10.8	76.2	1.00	0.87	24.6
West: Rawson Street (W)											
10	L	56	0.0	0.572	20.7	LOS B	13.7	104.5	0.52	0.96	39.6
11	T	601	11.4	0.572	16.8	LOS B	13.7	104.5	0.59	0.52	39.1
12	R	166	4.5	0.572	51.0	LOS D	7.4	55.9	0.94	0.85	25.3
Approach		823	9.2	0.572	24.0	LOS B	13.7	104.5	0.66	0.61	35.3
All Vehicles		3915	5.2	0.853	35.0	LOS C	31.1	235.5	0.85	0.86	29.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	28.2	LOS C	0.1	0.1	0.73	0.73
P3	Across E approach	53	46.7	LOS E	0.1	0.1	0.94	0.94
P5	Across N approach	53	16.6	LOS B	0.1	0.1	0.56	0.56
P7	Across W approach	53	31.2	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		212	30.7	LOS D			0.75	0.75

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

MOVEMENT SUMMARY

Site: PM MOD Future (2021 development with Queen Street)

I-22 Station Road / Rawson Street
Signals - Fixed Time Cycle Time = 110 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

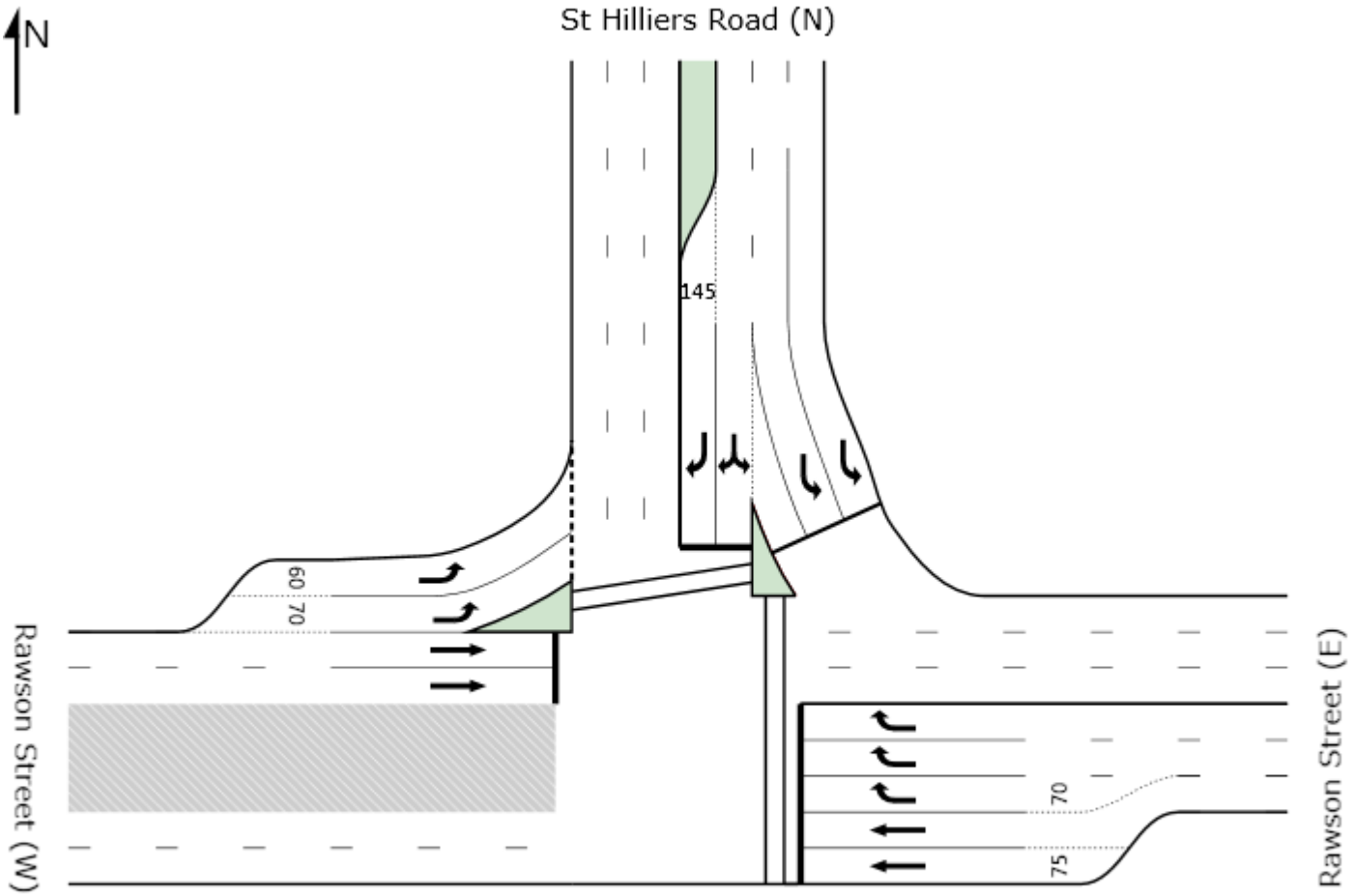
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Station Road (S)											
1	L	151	3.1	0.745	42.2	LOS C	6.5	46.7	0.75	0.85	27.8
2	T	497	2.6	0.750	34.9	LOS C	23.9	170.8	0.95	0.85	29.3
3	R	561	2.3	0.858	62.0	LOS E	16.0	114.3	1.00	1.06	22.2
Approach		1208	2.5	0.858	48.4	LOS D	23.9	170.8	0.95	0.94	25.3
East: Rawson Street (E)											
4	L	848	2.4	0.869	25.9	LOS B	26.9	193.1	0.76	0.98	35.2
5	T	756	9.4	0.869	30.8	LOS C	35.0	265.0	0.90	0.89	30.9
Approach		1604	5.7	0.869	28.2	LOS B	35.0	265.0	0.83	0.94	33.0
North: Station Road (N)											
7	L	46	14.3	0.747	60.7	LOS E	11.2	80.8	1.00	0.89	23.3
8	T	368	0.8	0.747	52.0	LOS D	11.5	81.3	1.00	0.89	23.6
Approach		415	2.3	0.747	53.0	LOS D	11.5	81.3	1.00	0.89	23.6
West: Rawson Street (W)											
10	L	56	0.0	0.580	20.4	LOS B	14.4	110.0	0.51	0.96	39.8
11	T	601	11.4	0.580	16.2	LOS B	14.4	110.0	0.57	0.50	39.6
12	R	166	4.5	0.580	54.3	LOS D	7.2	53.7	0.95	0.85	24.3
Approach		823	9.2	0.580	24.2	LOS B	14.4	110.0	0.64	0.60	35.2
All Vehicles		4051	5.1	0.869	35.9	LOS C	35.0	265.0	0.84	0.87	29.5

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	27.7	LOS C	0.1	0.1	0.71	0.71
P3	Across E approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	53	16.4	LOS B	0.1	0.1	0.55	0.55
P7	Across W approach	53	32.8	LOS D	0.1	0.1	0.77	0.77
All Pedestrians		212	31.5	LOS D			0.74	0.74

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


N
St Hilliers Road (N)
145
60
70
Rawson Street (W)
70
75
Rawson Street (E)

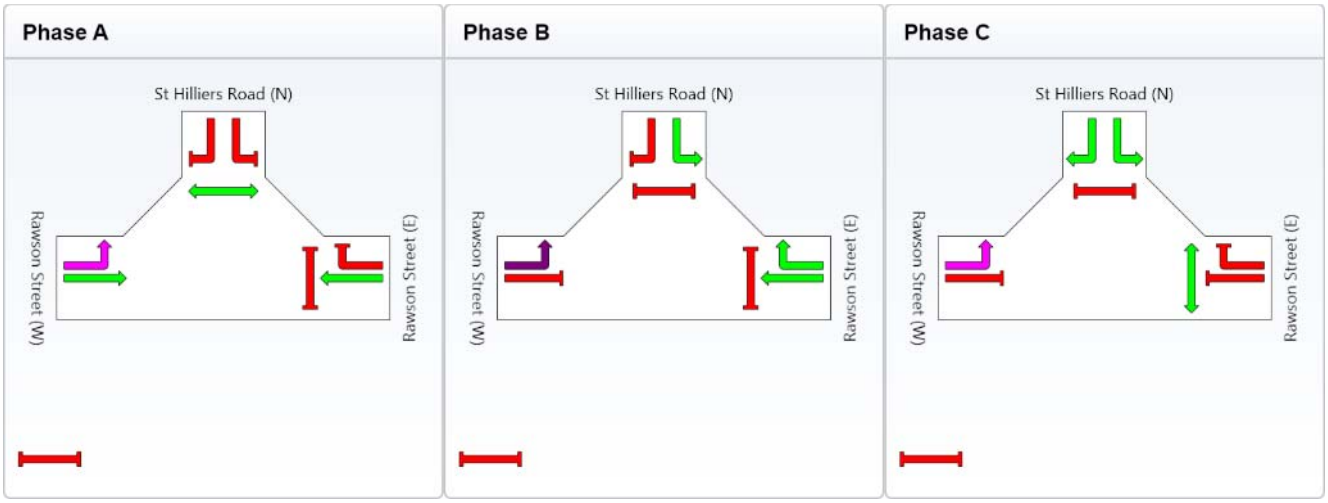
PHASING SUMMARY

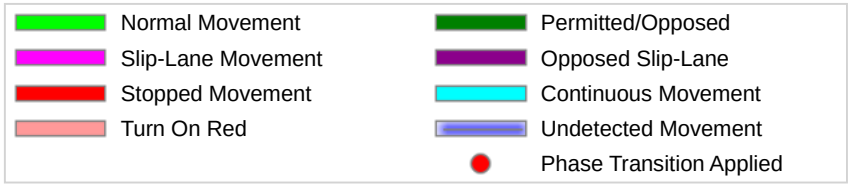
I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: A, B, C
Output Sequence: A, B, C

Phase Timing Results

Phase	A	B	C
Green Time (sec)	36	69	27
Yellow Time (sec)	4	4	4
All-Red Time (sec)	2	2	2
Phase Time (sec)	42	75	33
Phase Split	28 %	50 %	22 %





MOVEMENT SUMMARY

Site: AM MOD Future (2021 development)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	728	6.6	0.271	1.8	LOS A	1.8	13.2	0.09	0.08	56.7
6	R	1887	6.5	0.931	56.1	LOS D	58.3	430.9	0.97	0.95	23.7
Approach		2616	6.5	0.931	41.0	LOS C	58.3	430.9	0.72	0.71	28.3
North: St Hilliers Road (N)											
7	L	1149	7.4	0.479	11.7	LOS A	6.8	50.6	0.18	0.65	45.7
9	R	440	6.1	0.687	70.9	LOS F	14.9	109.5	0.96	0.83	20.5
Approach		1589	7.0	0.687	28.1	LOS B	14.9	109.5	0.40	0.70	34.1
West: Rawson Street (W)											
10	L	253	5.8	0.358	23.4	LOS B	4.5	33.3	0.53	0.71	36.7
11	T	828	7.2	0.926	79.5	LOS F	35.3	262.2	1.00	1.09	18.3
Approach		1081	6.9	0.926	66.4	LOS E	35.3	262.2	0.89	1.00	20.7
All Vehicles		5286	6.8	0.931	42.3	LOS C	58.3	430.9	0.66	0.77	27.7

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	53.8	LOS E	0.2	0.2	0.85	0.85
All Pedestrians		106	61.4	LOS F			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: AM MOD Future (2021 development with Queen Street)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	728	6.6	0.271	1.8	LOS A	1.8	13.2	0.09	0.08	56.7
6	R	1926	6.5	0.951	61.3	LOS E	63.8	471.1	0.99	0.98	22.5
Approach		2655	6.5	0.951	45.0	LOS D	63.8	471.1	0.74	0.73	26.9
North: St Hilliers Road (N)											
7	L	1149	7.4	0.479	11.7	LOS A	6.8	50.6	0.18	0.65	45.7
9	R	440	6.1	0.687	70.9	LOS F	14.9	109.5	0.96	0.83	20.5
Approach		1589	7.0	0.687	28.1	LOS B	14.9	109.5	0.40	0.70	34.1
West: Rawson Street (W)											
10	L	320	5.8	0.463	25.3	LOS B	6.1	45.1	0.57	0.73	35.6
11	T	828	7.2	0.926	79.5	LOS F	35.3	262.2	1.00	1.09	18.3
Approach		1148	6.8	0.926	64.4	LOS E	35.3	262.2	0.88	0.99	21.2
All Vehicles		5393	6.7	0.951	44.1	LOS D	63.8	471.1	0.67	0.78	27.0

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P5	Across N approach	53	53.8	LOS E	0.2	0.2	0.85	0.85
All Pedestrians		106	61.4	LOS F			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: PM MOD Future (2021 development)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 150 seconds (User-Given Cycle Time)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	954	6.6	0.358	2.3	LOS A	2.6	19.6	0.12	0.10	55.8
6	R	1520	6.5	0.876	55.9	LOS D	42.2	312.1	0.93	0.91	23.8
Approach		2474	6.5	0.876	35.2	LOS C	42.2	312.1	0.62	0.60	30.5
North: St Hilliers Road (N)											
7	L	1813	7.4	0.829	20.1	LOS B	35.8	266.7	0.60	0.80	39.0
9	R	574	6.1	0.863	79.2	LOS F	21.8	160.6	1.00	0.92	19.0
Approach		2386	7.1	0.863	34.3	LOS C	35.8	266.7	0.70	0.83	31.1
West: Rawson Street (W)											
10	L	301	5.8	0.369	18.3	LOS B	4.5	32.7	0.45	0.70	40.1
11	T	967	7.2	0.866	61.1	LOS E	36.4	270.7	1.00	0.97	21.6
Approach		1268	6.9	0.866	50.9	LOS D	36.4	270.7	0.87	0.91	24.3
All Vehicles		6128	6.8	0.876	38.1	LOS C	42.2	312.1	0.70	0.75	29.2

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	68.2	LOS F	0.2	0.2	0.95	0.95
P5	Across N approach	53	46.4	LOS E	0.2	0.2	0.79	0.79
All Pedestrians		106	57.3	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: PM MOD Future (2021 development with Queen Street)

I-37 St Hilliers Road / Rawson Street
Signals - Fixed Time Cycle Time = 125 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

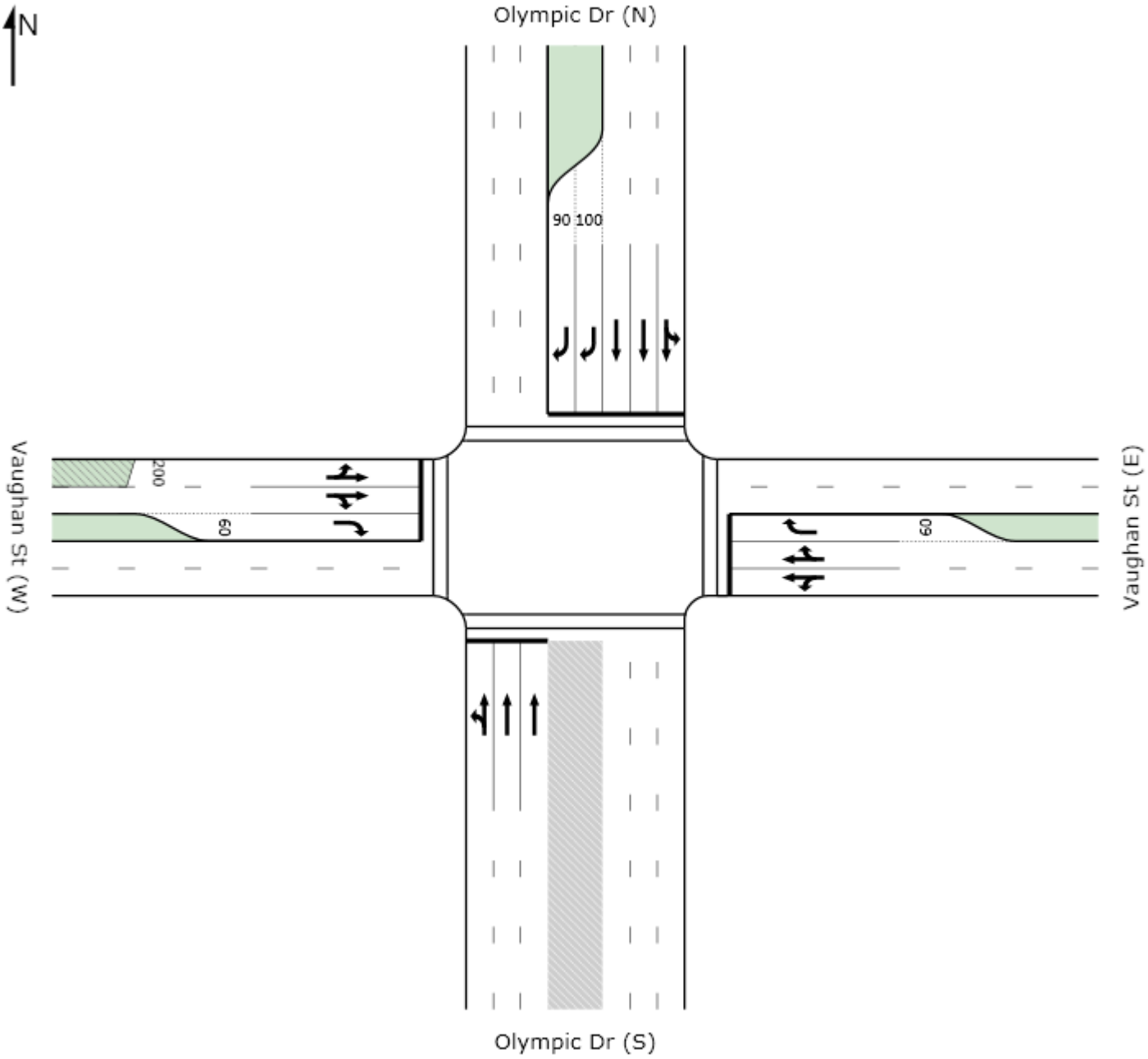
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Rawson Street (E)											
5	T	954	6.6	0.391	3.3	LOS A	3.9	28.7	0.17	0.15	54.2
6	R	1520	6.5	0.928	60.8	LOS E	40.8	301.4	0.98	0.97	22.6
Approach		2474	6.5	0.928	38.6	LOS C	40.8	301.4	0.67	0.65	29.1
North: St Hilliers Road (N)											
7	L	1813	7.4	0.823	17.6	LOS B	29.1	216.4	0.58	0.79	40.7
9	R	709	6.1	0.923	74.9	LOS F	24.8	182.7	1.00	0.99	19.7
Approach		2522	7.0	0.923	33.8	LOS C	29.1	216.4	0.70	0.85	31.4
West: Rawson Street (W)											
10	L	301	5.8	0.322	17.5	LOS B	3.9	28.4	0.48	0.70	40.7
11	T	967	7.2	0.927	66.9	LOS E	35.4	262.9	1.00	1.12	20.4
Approach		1268	6.9	0.927	55.2	LOS D	35.4	262.9	0.88	1.02	23.2
All Vehicles		6264	6.8	0.928	40.0	LOS C	40.8	301.4	0.72	0.81	28.5

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	56.6	LOS E	0.2	0.2	0.95	0.95
P5	Across N approach	53	42.4	LOS E	0.2	0.2	0.82	0.82
All Pedestrians		106	49.5	LOS E			0.89	0.89

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.


N
Olympic Dr (N)
90
100
Vaughan St (W)
200
60
Vaughan St (E)
60
Olympic Dr (S)

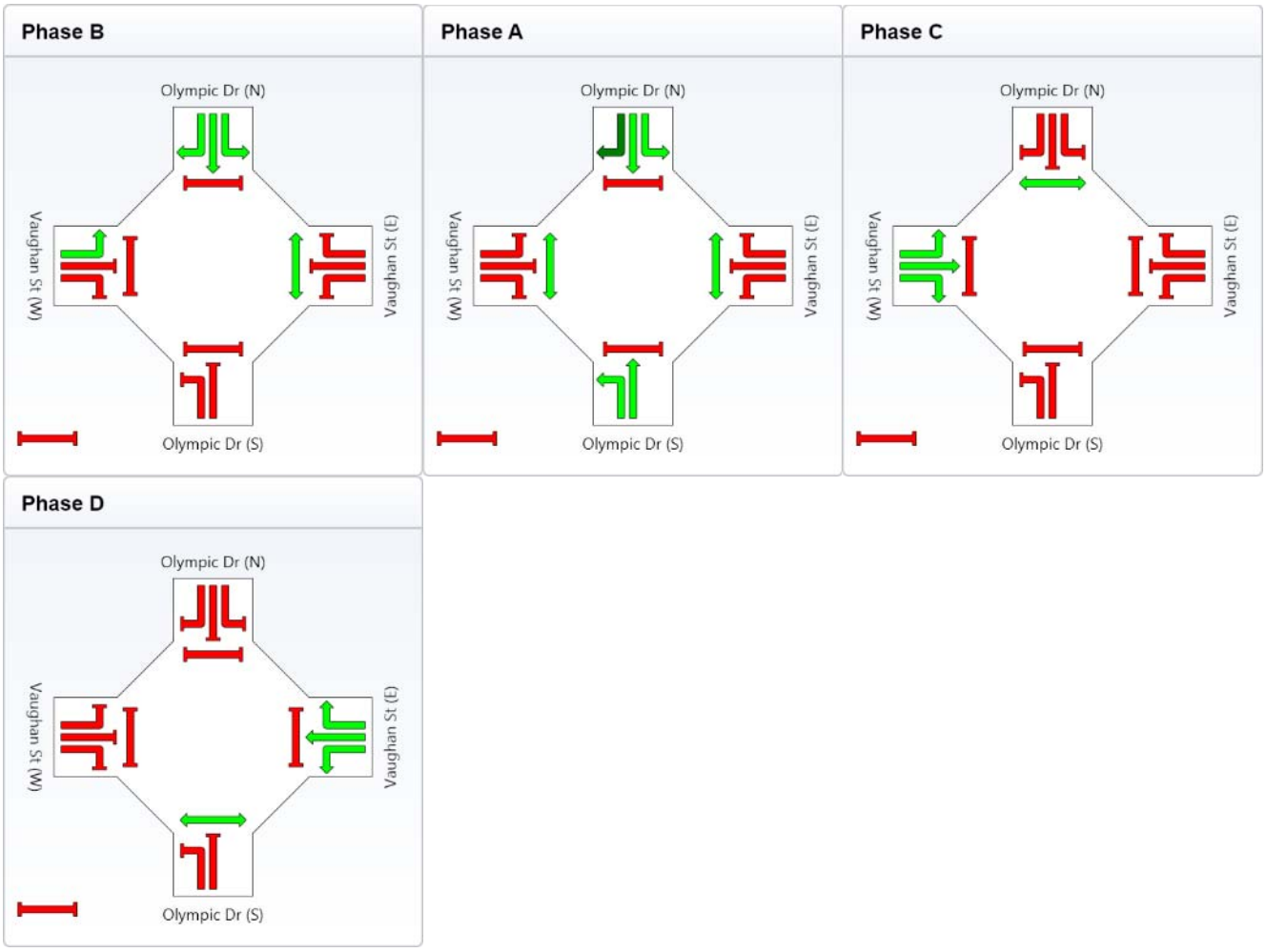
PHASING SUMMARY

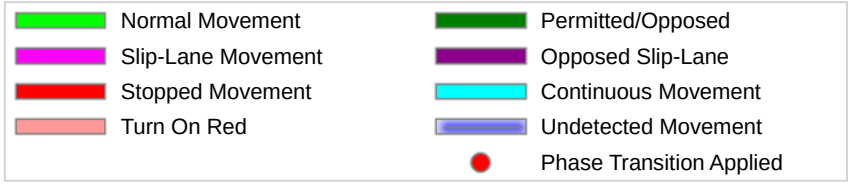
I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program
Sequence: Split Phasing
Input Sequence: B, A, C, D
Output Sequence: B, A, C, D

Phase Timing Results

Phase	B	A	C	D
Green Time (sec)	6	71	27	22
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	12	77	33	28
Phase Split	8 %	51 %	22 %	19 %





MOVEMENT SUMMARY

Site: AM MOD Future (2021 development)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	119	1.8	0.953	61.7	LOS E	68.5	505.3	1.00	1.05	23.1
2	T	2403	7.0	0.953	53.4	LOS D	68.6	509.4	1.00	1.05	23.3
Approach		2522	6.8	0.953	53.8	LOS D	68.6	509.4	1.00	1.05	23.3
East: Vaughan St (E)											
4	L	49	0.0	0.747	77.2	LOS F	15.0	108.7	1.00	0.87	19.7
5	T	341	5.0	0.747	69.0	LOS E	15.1	109.5	1.00	0.87	19.9
6	R	168	0.9	0.747	75.7	LOS F	15.1	109.5	0.98	0.86	19.6
Approach		559	3.3	0.747	71.7	LOS F	15.1	109.5	0.99	0.87	19.8
North: Olympic Dr (N)											
7	L	114	2.9	0.584	24.0	LOS B	19.7	146.4	0.50	0.94	37.2
8	T	1675	8.5	0.584	15.7	LOS B	19.7	148.1	0.50	0.45	40.4
9	R	138	6.6	0.550	46.4	LOS D	2.7	20.1	0.98	0.77	26.4
Approach		1926	8.0	0.584	18.4	LOS B	19.7	148.1	0.53	0.50	38.7
West: Vaughan St (W)											
10	L	134	10.1	0.823	72.2	LOS F	20.1	148.4	1.00	0.96	20.5
11	T	435	3.1	0.823	67.3	LOS E	21.3	152.7	1.00	0.94	20.2
12	R	115	5.4	0.582	66.6	LOS E	7.4	54.2	0.92	0.78	21.2
Approach		683	4.9	0.823	68.1	LOS E	21.3	152.7	0.99	0.92	20.4
All Vehicles		5691	6.6	0.953	45.3	LOS D	68.6	509.4	0.84	0.83	25.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P3	Across E approach	53	21.3	LOS C	0.1	0.1	0.53	0.53
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	28.2	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		212	46.9	LOS E			0.77	0.77

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: AM MOD Future (2021 development with Queen Street)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	119	1.8	0.953	61.7	LOS E	68.5	505.3	1.00	1.05	23.1
2	T	2403	7.0	0.953	53.4	LOS D	68.6	509.4	1.00	1.05	23.3
Approach		2522	6.8	0.953	53.8	LOS D	68.6	509.4	1.00	1.05	23.3
East: Vaughan St (E)											
4	L	49	0.0	0.747	77.2	LOS F	15.0	108.7	1.00	0.87	19.7
5	T	341	5.0	0.747	69.0	LOS E	15.1	109.5	1.00	0.87	19.9
6	R	168	0.9	0.747	75.7	LOS F	15.1	109.5	0.98	0.86	19.6
Approach		559	3.3	0.747	71.7	LOS F	15.1	109.5	0.99	0.87	19.8
North: Olympic Dr (N)											
7	L	114	2.9	0.584	24.0	LOS B	19.7	146.4	0.50	0.94	37.2
8	T	1675	8.5	0.584	15.7	LOS B	19.7	148.1	0.50	0.45	40.4
9	R	138	6.6	0.550	46.4	LOS D	2.7	20.1	0.98	0.77	26.4
Approach		1926	8.0	0.584	18.4	LOS B	19.7	148.1	0.53	0.50	38.7
West: Vaughan St (W)											
10	L	134	10.1	0.823	72.2	LOS F	20.1	148.4	1.00	0.96	20.5
11	T	435	3.1	0.823	67.3	LOS E	21.3	152.7	1.00	0.94	20.2
12	R	146	5.4	0.744	71.2	LOS F	10.1	73.6	0.94	0.85	20.3
Approach		715	4.9	0.823	69.0	LOS E	21.3	152.7	0.99	0.93	20.3
All Vehicles		5722	6.6	0.953	45.6	LOS D	68.6	509.4	0.84	0.83	25.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P3	Across E approach	53	21.3	LOS C	0.1	0.1	0.53	0.53
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	28.2	LOS C	0.1	0.1	0.61	0.61
All Pedestrians		212	46.9	LOS E			0.77	0.77

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: PM MOD Future (2021 development)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	144	1.8	0.811	48.0	LOS D	36.0	264.4	0.89	0.91	26.7
2	T	1639	7.0	0.811	39.8	LOS C	36.1	268.1	0.89	0.81	27.4
Approach		1783	6.6	0.811	40.4	LOS C	36.1	268.1	0.89	0.82	27.4
East: Vaughan St (E)											
4	L	36	0.0	0.830	80.4	LOS F	19.1	138.5	1.00	0.94	19.3
5	T	464	5.0	0.830	72.2	LOS F	19.1	139.6	1.00	0.94	19.4
6	R	166	0.9	0.830	79.1	LOS F	19.1	139.6	0.97	0.91	19.0
Approach		666	3.7	0.830	74.3	LOS F	19.1	139.6	0.99	0.94	19.3
North: Olympic Dr (N)											
7	L	83	2.9	0.851	30.6	LOS C	44.6	333.3	0.79	0.95	34.1
8	T	2463	8.5	0.851	22.4	LOS B	44.6	335.2	0.79	0.73	35.4
9	R	308	6.6	0.598	39.1	LOS C	5.6	41.2	0.93	0.82	29.0
Approach		2855	8.1	0.851	24.4	LOS B	44.6	335.2	0.80	0.75	34.5
West: Vaughan St (W)											
10	L	136	10.1	0.779	67.2	LOS E	18.1	134.0	1.00	0.93	21.5
11	T	405	3.1	0.779	63.7	LOS E	19.5	139.9	1.00	0.91	20.9
12	R	139	5.4	0.706	69.6	LOS E	9.4	68.5	0.94	0.83	20.6
Approach		680	5.0	0.779	65.6	LOS E	19.5	139.9	0.99	0.90	21.0
All Vehicles		5984	6.8	0.851	39.4	LOS C	44.6	335.2	0.87	0.81	27.9

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	67.2	LOS F	0.2	0.2	0.95	0.95
P3	Across E approach	53	22.4	LOS C	0.1	0.1	0.55	0.55
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	36.1	LOS D	0.2	0.2	0.69	0.69
All Pedestrians		212	48.7	LOS E			0.79	0.79

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: PM MOD Future (2021 development with Queen Street)

I-13 Vaughan St/Olympic Dr
Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Olympic Dr (S)											
1	L	176	1.8	0.826	49.1	LOS D	37.5	275.1	0.91	0.92	26.3
2	T	1639	7.0	0.826	40.9	LOS C	37.7	279.7	0.91	0.83	27.0
Approach		1815	6.5	0.826	41.7	LOS C	37.7	279.7	0.91	0.84	26.9
East: Vaughan St (E)											
4	L	36	0.0	0.830	80.4	LOS F	19.1	138.5	1.00	0.94	19.3
5	T	464	5.0	0.830	72.2	LOS F	19.1	139.6	1.00	0.94	19.4
6	R	166	0.9	0.830	79.1	LOS F	19.1	139.6	0.97	0.91	19.0
Approach		666	3.7	0.830	74.3	LOS F	19.1	139.6	0.99	0.94	19.3
North: Olympic Dr (N)											
7	L	83	2.9	0.851	30.6	LOS C	44.6	333.3	0.79	0.95	34.1
8	T	2463	8.5	0.851	22.4	LOS B	44.6	335.2	0.79	0.73	35.4
9	R	308	6.6	0.601	39.5	LOS C	5.6	41.3	0.94	0.82	28.9
Approach		2855	8.1	0.851	24.4	LOS B	44.6	335.2	0.80	0.75	34.5
West: Vaughan St (W)											
10	L	136	10.1	0.779	67.2	LOS E	18.1	134.0	1.00	0.93	21.5
11	T	405	3.1	0.779	63.7	LOS E	19.5	139.9	1.00	0.91	20.9
12	R	139	5.4	0.706	69.6	LOS E	9.4	68.5	0.94	0.83	20.6
Approach		680	5.0	0.779	65.6	LOS E	19.5	139.9	0.99	0.90	21.0
All Vehicles		6016	6.8	0.851	39.8	LOS C	44.6	335.2	0.88	0.81	27.7

Level of Service (LOS) Method: Delay (RTA NSW).
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 used.

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	Across S approach	53	67.2	LOS F	0.2	0.2	0.95	0.95
P3	Across E approach	53	22.4	LOS C	0.1	0.1	0.55	0.55
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	36.1	LOS D	0.2	0.2	0.69	0.69
All Pedestrians		212	48.7	LOS E			0.79	0.79

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.

ARUP

Subject 1A & 1B Queen Street Auburn - Revised car parking and traffic assesment

Date 17 May 2016 Job No/Ref 231001

1 Proposed Development

Following agent feedback from Colliers and CBRE, the yield table has been updated to reflect a more marketable mix and sizing of units as shown in Table 1.

Table 1: Updated Yield Table

Residential numbers and mix									
Building	**Unit Type**		**1B**	**1B+ Study**	**1B Flexi**	**2B + nook**	**2B + study**	**3B + study**	**Total**
	Mix		5%	5%	5%	50%	30%	5%	**100%**
	Average NSA		52	55	58	73	78	95	
GFA	1.93 FSR	51,856							
NSA	89%		2,308	2,308	2,308	23,076	3,846	2,308	**46,152**
Units			**44**	**42**	**40**	**316**	**178**	**24**	**644**

Site area 26,876 m^2

2 Car Parking

Parking rates for residential developments should ensure an appropriate balance between meeting the demands of residents (ensuring there are no adverse on-street parking impacts) and reducing traffic generation resulting from a higher quantum of on-site car parking.

Reduced parking rates should be considered where residential developments are located in areas with good public transport availability in close proximity to town centres. The DCPs of neighbouring Councils, such as Holroyd, Fairfield and Parramatta, have lower parking rates for developments in town centres than the Auburn DCP. This reduces the traffic impacts in town centres associated with high levels of on-site parking.

A comparison of residential car parking rates is shown in Table 2.

Table 2: Comparison of Residential Car Parking Rates

Dwelling Type	Auburn	Parramatta	RMS		Recommended
			Sub-regional Centres	Metropolitan CBD Centres	
Studio	0	0	0	0	0.4
1 Bed	1	1	0.6	0.4	0.7
2 Bed	1	1	0.9	0.7	1.0
3 Bed	2	1.2	1.4	1.2	1.5
4 + Bed	2	2	1.4	1.2	1.5
Visitor	0.2	0.25	0.2	0.15	0.15

Therefore it is considered appropriate, given the good proximity of the proposed development to Auburn Railway Station, to provide on-site parking at the rates recommended in Table 2 which are higher than RMS rates but slightly less than Auburn rates.

Table 3: Proposed Parking Rates - 1A &1B Queen Street

Dwelling Type	Number	Rate	Spaces
Studio	0	0.4	0
1 Bed	126	0.7	88
2 Bed	494	1.0	494
3 Bed	24	1.5	36
4 + Bed	0	1.5	0
Visitor	644	0.15	97
Total	**644**		**715**

Parking for any retail or commercial uses within the development should be provided at the rate of 1 space / 40m^2 GFA – consistent with the Auburn DCP.

3 Traffic Generation

3.1 Generation Rates

Traffic generation rates were adopted from the RMS Technical Direction (TDT 2013/04) released in May 2013, which provides an update to the rates previously outlined in the RTA Guide to Traffic Generating Developments, Version 2.2, October 2002. These are shown below in Table 4.

Table 4: Peak Hour Traffic Generation Rates

Land Use	**Peak Hour Generation Rate^ (RMS, 2013)**		**Peak Hour Generation Rate (RTA, 2002)**	
High Density Residential (per dwelling)	0.19	AM peak	0.29	AM peak
	0.15	PM peak	0.29	PM peak
Retail (per 100m^2 of GLFA*)	1.68	AM peak	2.76	AM peak
	3.41	PM peak	4.60	PM peak
Office/commercial (per 100m^2 of GFA)	1.60	AM peak	2.00	AM peak
	1.20	PM peak	2.00	PM peak

** GLFA is 75% of the GFA*

^ Rates calculated using a weighted average for surveyed sites across Sydney Metropolitan Area

It should be noted that Hyder used the traffic generation rates from the 2002 RTA guide in their 2012 traffic study for Council.

3.2 Forecast Town Centre Traffic Generation

The total peak hour vehicle trips for the Auburn Town Centre and Lidcombe Town Centre, excluding the future Queen Street development, are shown below Table 5.

Table 5: Town Centre Trip Generation Comparison

Town Centre	**Capacity of additional dwellings**	**Capacity of Mixed use podium GFA^**	**Total Vehicle Trips***	
			AM Peak	**PM Peak**
Auburn	4,013	98,364m^2	2,119	2,650
Lidcombe	3,081	64,500m^2	1,475	1,805

^ Assumed split of 35% office/commercial and 65% retail

** Based on 2013 RMS traffic generation rates*

Adoption of the updated RMS traffic generation rates (compared with those outlined in the 2002 guide) results in significant fewer peak hour vehicle trips in both town centres, which are as follows:

- Auburn town centre: reduction of 1,050 and 1,400 trips in the AM/PM peak
- Lidcombe town centre: reduction of 980 and 1,400 trips in the AM/PM peak

3.3 Forecast Site Traffic Generation

Based on a site FSR for 1.93, a development yield of between 644 dwellings is envisaged - which generates 122 AM and 96 PM peak hour vehicle trips respectively.

The existing traffic flows of the industrial development have to also be subtracted. There were a total of 26 trips and 21 trips in the AM and PM peaks respectively, based on driveway survey data undertaken in 2010. It should be noted that these trips are the opposite direction to the likely residential trips.

Therefore the additional peak hour traffic resulting from the proposed site is as follows:

- AM Peak (8am – 9am): 96 vehicles (+ 17 compared with 79 vehicles for 550 dwellings)
- PM Peak (5pm – 6pm): 75 vehicles (+13 compared with 62 vehicles for 550 dwellings)

100% of this traffic has been forecast to be outbound trips in the AM peak and inbound trips in the PM peak.

3.4 Traffic Distribution

Traffic related to development with the Auburn and Lidcombe town centres (excluding the Queen Street site) has been distributed based on the strategic traffic model developed by Hyder for the town centres study.

As the majority of the proposed site development is residential, the general future traffic distribution of the proposed Queen Street development has been estimated from the 2011 Census Data for Journey to Work car travel for residents of the locality of Auburn. The data shows the greatest proportion of the car trips are generated to / from areas to the east (refer to Table 6).

Table 6: 2011 Census Journey to Work Car Trips for Existing Locality Residents

Direction	JTW Proportions
North	26%
South	19%
East	34%
West	20%

The distribution applied to the local road network shows the most likely routes which will be taken by future vehicular traffic travelling from the site to the above directions.

The peak hour traffic flows distributed onto the network are shown in Figure 1 and Figure 2. The key intersections which traffic travels through have also been identified.

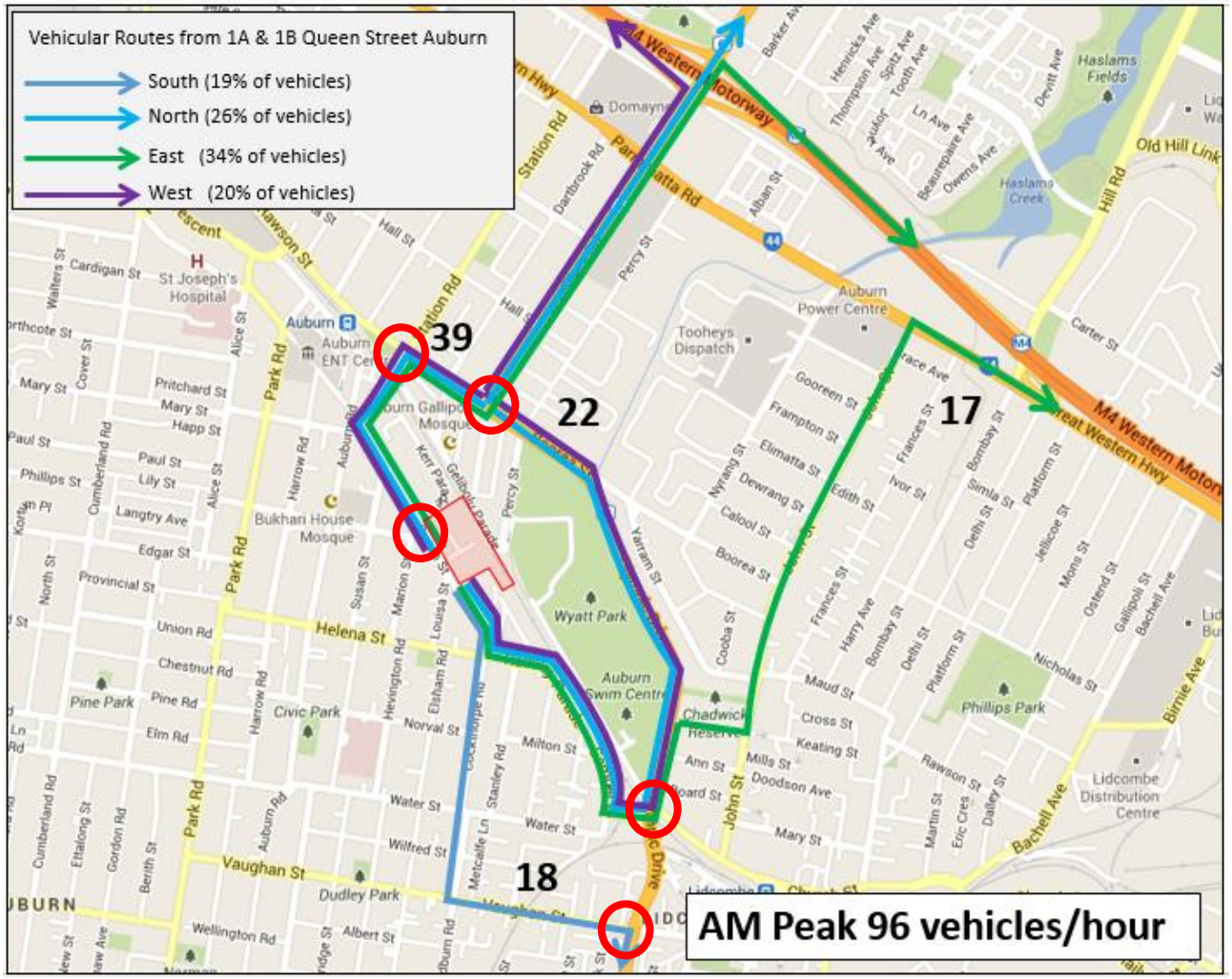


Figure 1: AM Peak traffic distribution

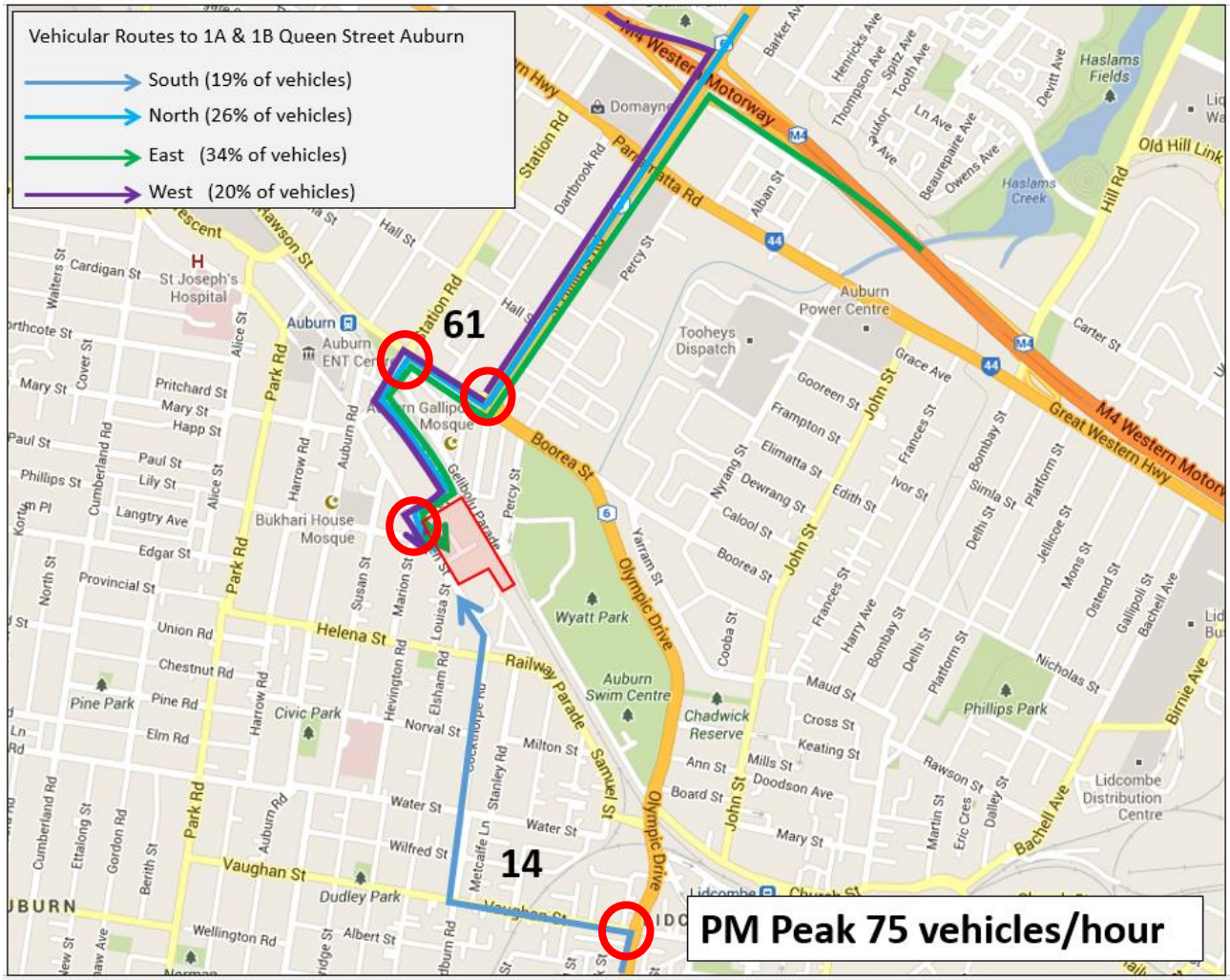


Figure 2: PM Peak traffic distribution

3.5 Traffic Assessment

The 2012 existing traffic volumes from the Hyder Traffic Study have been used to assess the movement increases expected from the development. These are shown in Figure 3 and Figure 4 for the AM and PM Peak Hours.

Figure 3: AM Peak traffic flows

Intersection	Movement	Development	Existing	Increase
Rawson Street / St Hilliers Road	Left W to N	39	206	19%
	Right E to N	22	1802	1%
Station Road / Rawson Street	Right S to E	39	265	15%
Queen Street / Marion Street / Kerr Parade	Straight E to W	39	-	-
Bridge Street / Olympic Drive	Left W to N	39	-	-
Vaughan Street / Olympic Drive	Right W to S	18	111	16%

Figure 4: PM Peak traffic flows

Intersection	Movement	Development	Existing	Increase
Rawson Street / St Hilliers Road	Right N to W	61	229	27%
Station Road / Rawson Street	Left E to S	61	540	11%
Queen Street / Marion Street / Kerr Parade	Left N to E	61	-	-
Vaughan Street / Olympic Drive	Left S to W	14	139	10%