300 Manchester Road Auburn

PAYCE

Traffic and Transport Impact Assessment

| Rev 5

11 December 2017

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300 Manchester Road Auburn

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Contents

1. Introduction

Jacobs has been commissioned by M Projects to prepare a traffic and transport impact assessment for the proposed rezoning of industrial land within 300 Manchester Road Auburn. This report assesses the existing traffic and transport conditions, description of the proposed development and assessment of the impact of the development on the transport network.

1.1 Background

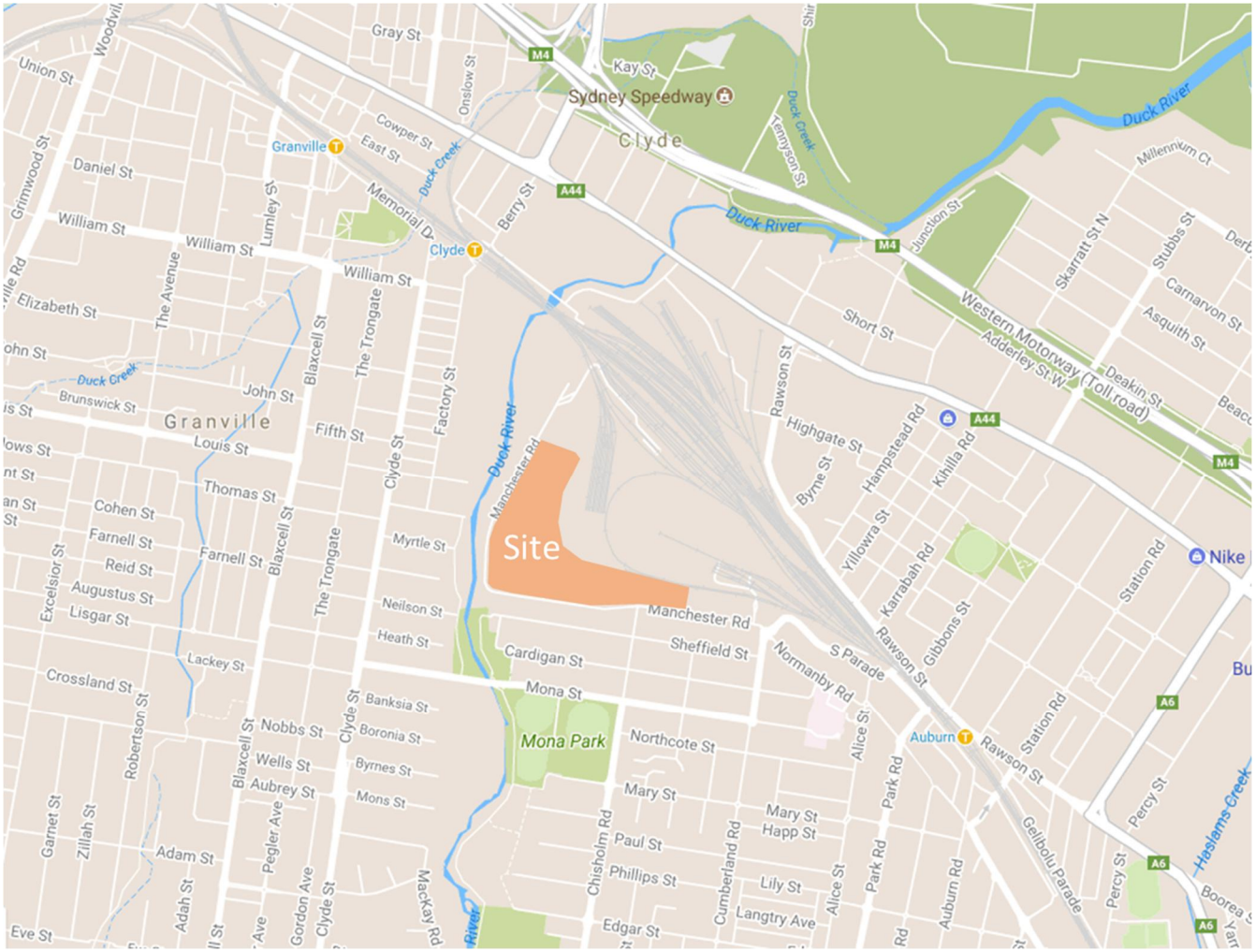
PAYCE is seeking to rezone an industrial land within the Auburn LGA. The location is currently a mix of 'brown field' and distribution centres and is zoned for industrial land use. The proposed land rezoning is to comprise a mix of the following proposed land uses:

- 1821 high-density residential dwellings
- 6,027m^2 of retail GFA
- 26,936m m^2 GFA of light industrial development
- Community Facility 2000m^2 GFA and childcare centre 1094m^2 GFA.

1.2 Location

The site is located at 300 Manchester Road Auburn, near the intersection of Chisholm Road and Manchester Road. The site's frontage is Manchester Road to the south and the end of Manchester road with Duck River (560m) to the west.

Figure 1.1 : Site Location



1.3 Report Structure

This report has the following structure:

- Section 2 Existing Conditions – Summarises the existing transport context of the site
- Section 3 Proposal – Provides a description of the projects
- Section 4 Traffic Impacts – Analysis of the impacts the development will have on the transport network.
- Section 5 Conclusion – Summarises the findings of the study

2. Existing Conditions

2.1 Overview

The following section outlines the existing traffic and transport conditions surrounding the site for traffic, public transport, pedestrians and cyclists.

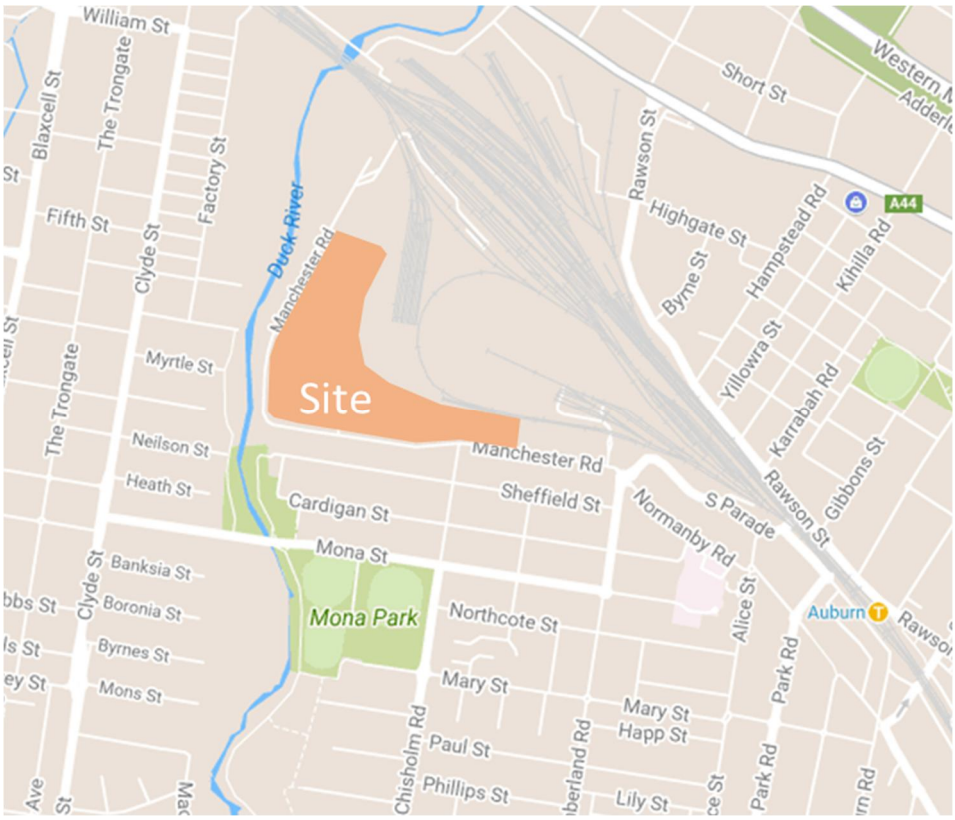
2.2 Existing developments

The site covers 14.2 hectares owned by PAYCE and is currently used for industrial purposes with a brown field, warehouse operated by UGL Unipart, Clyde Central Warehouse, BlueScope Steel Warehouses Buildings.

2.3 Road Network

The site is accessed by a single road into and out of the site on Manchester Road. The sites road connections are constrained by the railway to the north and the Duck River to the west of the site. The nearest arterial roads to the site are Parramatta Road to the north, the route A6 St Hilliers Road / Olympic Drive to the east and Woodville Road to the west.

Figure 2.1 : Existing Road Network



The roads that connect to the site are:

Manchester Road - a local road owned by Sydney Trains with a right of way to the land owned by PAYCE. It has a posted speed limit of 20km/h with 'no parking' restrictions on both sides of the road.

Chisholm Road - a local collector road connecting Manchester Road to Regents Park and is one of the main north south collector streets. It has a speed limit of 50km/h with parking allowed on both kerb side with one lane in each direction.

Mona Street - a local collector road that provides one of the few east-west crossings over the Duck River. It has a posted speed limit of 50km/h and generally has one lane in each direction.

The Crescent / South Parade - a collector road that links Manchester Road to Rawson Street via a bridge over the railway. It is one the main north-south links over the railway.

Rawson Street - a major collector road that links Parramatta Road with St Helliers Road (A6) and runs parallel to the railway line. It is generally two lanes in each direction however on-street parking is allowed in some sections.

Clyde Street - a north-south collector road west of the Duck River that runs parallel to Chisholm Road and perpendicular to Mona St. It provides the main route through to Clyde Station and Granville from the site.

2.4 Traffic Volumes

Traffic count data was collected 13 September 2017 at the following locations:

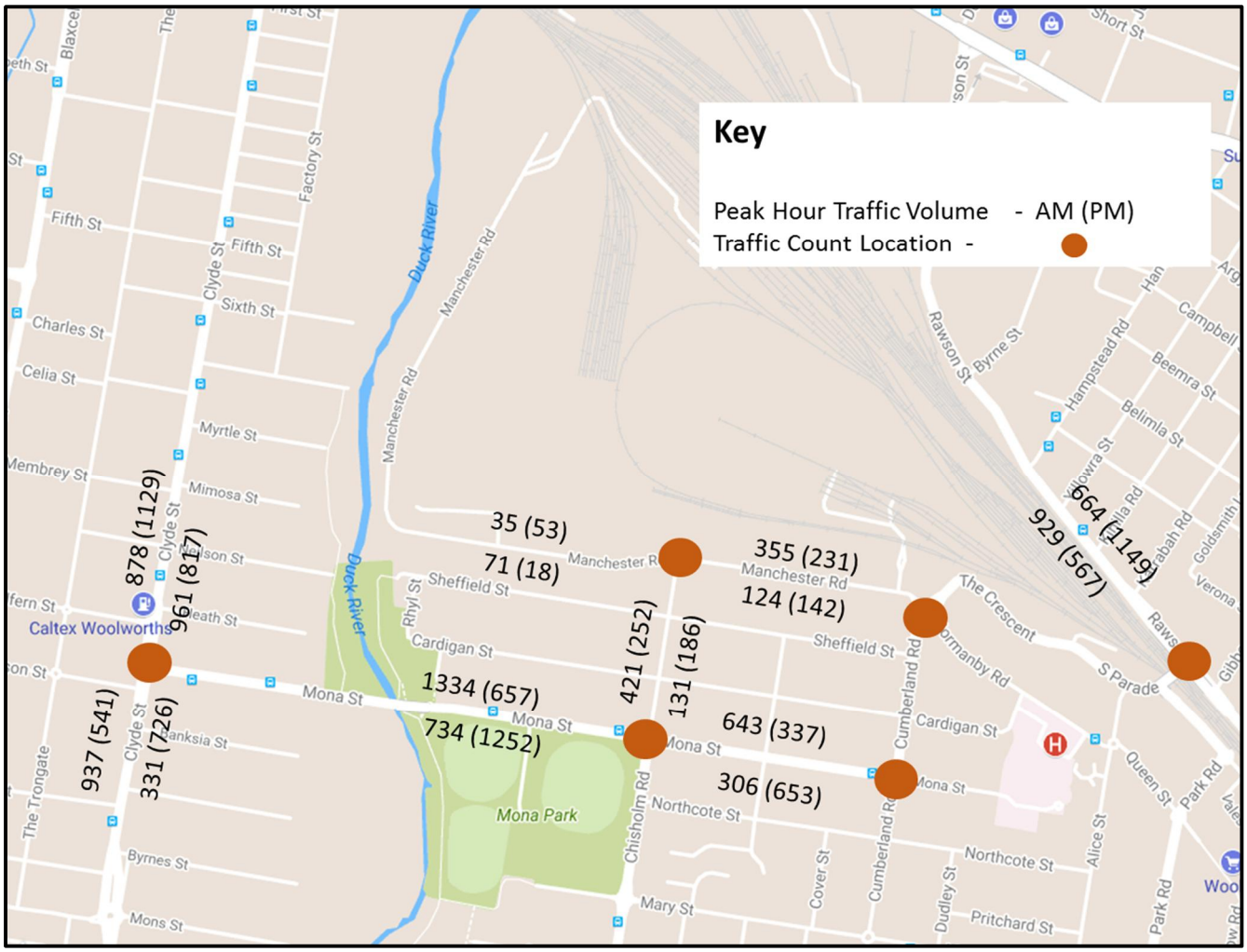
- Manchester Road and Cumberland Street Intersection
- Cumberland Street and Mona Street Intersection
- South Parade and Rawson Street Intersection
- Mona Street and Clyde Street Intersection

These counts included morning and evening traffic peaks from 6:00am – 10:00pm and 3:00pm – 7:00pm. In addition, intersection counts were undertaken on Wednesday 8 October 2014 and Thursday 30 October 2014 at the following sites:

- Manchester Road and Chisholm Road Intersection
- Mona Street and Chisholm Road Intersection
- Clyde Street and Mona Street Intersection
- Manchester Road, Cumberland Road and Normandy Street Intersection
- The Crescent and Alice Street Intersection
- The Crescent and South Parade Intersection
- Rawson Street and The Crescent Intersection

The counts covered a time period from 7:00am - 10:00am and 4:00pm – 7:00pm on a weekday. The midblock traffic volumes for the peak time periods are shown in Figure 2.2

Figure 2.2 : Peak Hour Midblock Traffic Volumes



2.5 Existing traffic generation

Traffic counts undertaken indicate that the traffic volumes on Manchester Road are relatively low. The volumes into and out of the site in the morning and afternoon peak was:

- Morning Peak Hour - 71 veh /h into the site and 35 veh/h out of the site
- Evening Peak Hour – 18 veh/h into the site and 53 veh/h out of the site.

This includes access to the rail site, BlueScope Steel and residential buildings along Manchester Road.

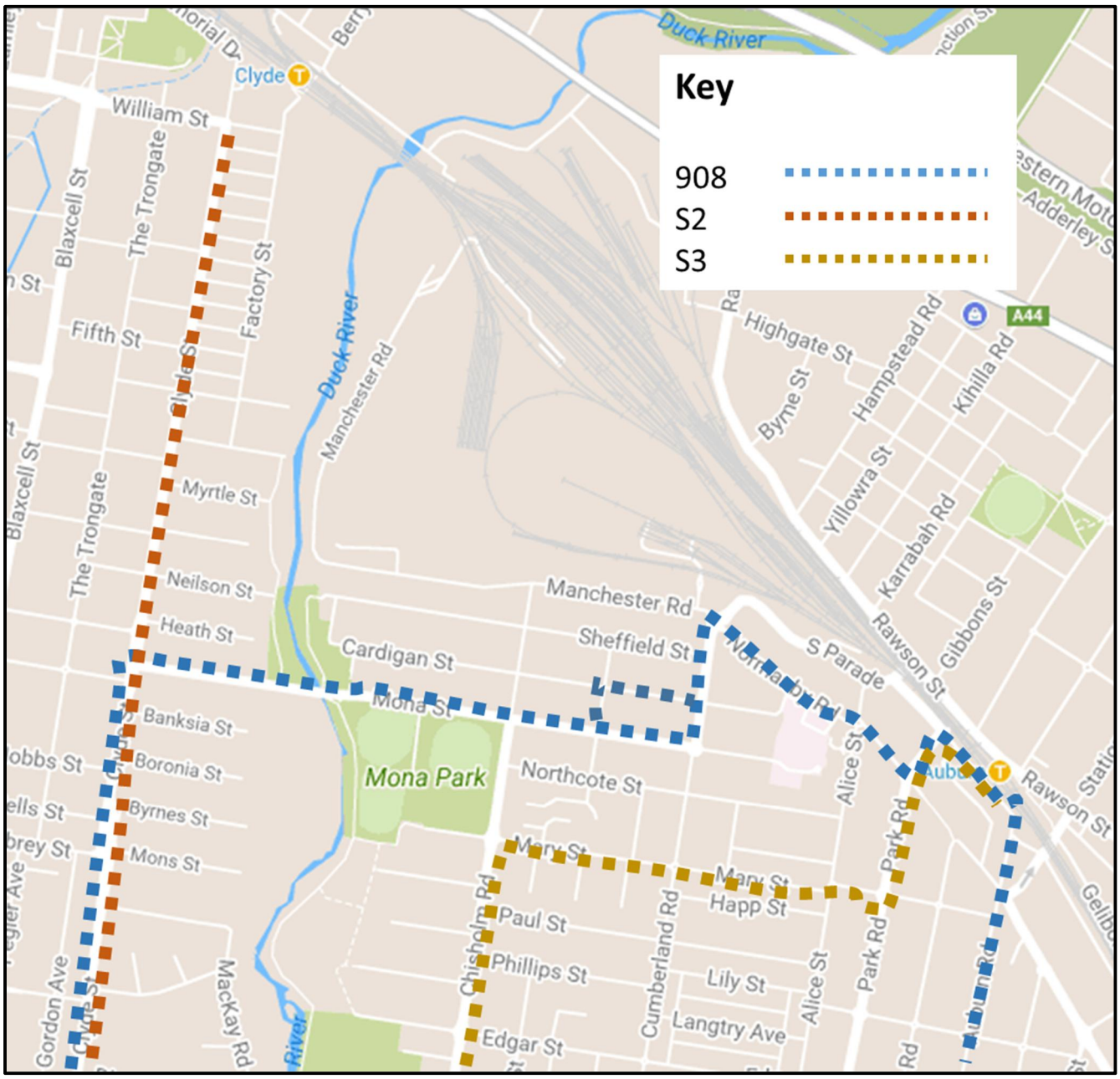
2.6 Vehicular Access

The site has access from Manchester Road. The existing developments on the site are accessed via driveway and internal road from Manchester Road. Manchester Road also provides access for the Sydney Trains site.

2.7 Public Bus Routes

The local bus routes are shown in Figure 2.3. Routes S2 and S3 operate only between the peak commuter periods.

Figure 2.3 : Bus Routes



The closest bus route is the 908 route. It operates from Bankstown to Merrylands via Birrong and Auburn. The buses are operated by Busways and have approximately 60 – 30 minute headways during peak periods. There are bus stops located approximately 200m walking distance south of the site on Cumberland Road and Mona Street. The frequency of buses is provided in Table 2.1.

Table 2.1 : Bus Route Frequency

Bus Route	Morning Peak	Evening Peak
908	2 per hour – Westbound 2 per hour - Eastbound	2 per hour Westbound 1 Per hour Eastbound

2.8 Trains

Clyde Station and Auburn Station are the closest rail stations to the site. Both Stations are considered to be within walking distance of the site. The northern portion of the site is within the typical 800m radius catchment for Clyde Station.

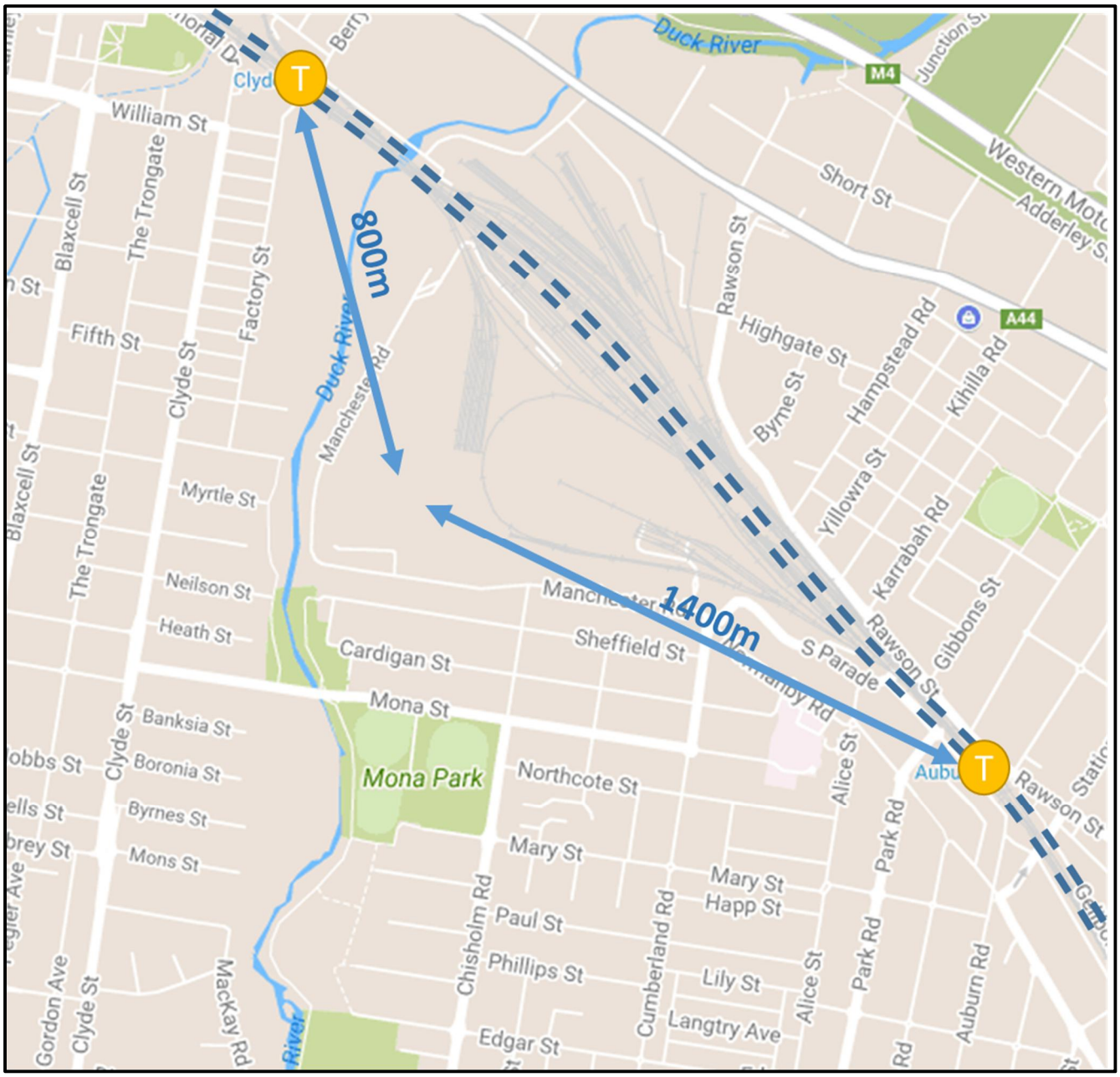
Clyde Station is about 1km walking distance from the centroid of the site. There is a public walkway that runs parallel to the railway line and provides walking access between the site and the station and a crossing of the Duck River. There are currently up to 11 services per hour that stop in the peak hour. There will be a new timetable adopted in November 2017.

- T1 Western Line services will remain the same westbound (peak of 4 per hour)
- T1 North Shore services will be removed eastbound (peak of 5 per hour dropped)
- T2 Inner West Services will be added (peak of 8 per hour added)
- Carlingford Line will be discontinued (peak of 2 services per hour dropped) when Parramatta Light Rail construction commences

Auburn Station is approximately 1.4km walking distance from the centroid of the site with access along public footpaths. There are approximately 18 services stopping at Auburn Station per hour. The peak stopping pattern in the evening peak is:

- T1 line Eastbound (4 per hour)
- T1 Line Westbound (4 per hour)
- T2 Inner West Line Eastbound (4 per hour)
- T2 Inner West Line Westbound (6 per hour)

Figure 2.4 : Train Station Locations



2.9 Active Transport

The site has access to existing off-road cycle routes adjacent to the Duck River. An extension of this shared path to the north has been identified within the bike plan. There are currently no bicycle routes marked that connect the site to the nearest train stations. There are walking connections to Auburn Station along the existing road side footpaths and a path connecting the site to Clyde Station.

Figure 2.5 : Bicycle and Pedestrian Paths

3. The Proposal

3.1 Description of the Development

The proposed rezoning is to allow for a mixed-use development comprising residential, retail and employment components. The residential component is planned to include 1821 high density residential dwellings. This will consist of:

- Studio Apartments: 2%
- 1 Bedroom: 25%
- 2 Bedroom: 65%
- 3 Bedroom: 5%
- Duplex Terrace: 3%

The retail is proposed to be 6027m^2 Gross Floor Area (GFA). For our analytical purposes we have assumed that the Gross Leasable Floor Area (GLFA) is 80% of the GFA. The retail is assumed to include a supermarket and a variety of smaller specialty shops.

The employment lands are proposed to be 26,936 m^2 GFA. For the purpose of traffic generation estimation, we have assumed that this would be equivalent to business park type development.

There would be other elements to the development that have been assumed to primarily service the development including a community centre and childcare. These are expected to generate trips that are contained within the development.

3.2 Vehicular Access and Internal Road Network

Vehicular access would remain predominantly from Manchester Road. As described in Section 4 it has been identified that there is a need for an additional vehicular access across the Duck River in the form an extension of Seventh Street.

An internal road network would be used to provide access to car parks below the development.

3.3 Active Transport

The proposed development would provide connections to the existing bicycle and pedestrian network. Auburn Council have identified a potential bicycle route that would follow the Duck River to the north crossing the railway. The developer would support this connection to encourage walking and cycling and better connectivity to rail stations.

3.4 Parking

The proposed parking is to be provided to meet the Cumberland Council (previously Auburn Council) requirement for a minimum level of car parking. The proposed parking levels compared to the Auburn DCP are provided in Table 3.1. Parking for the childcare facility is proposed to be contained within the light industrial area. No parking is proposed for studio apartments and the rate for visitor parking has been reduced to 0.1 to reflect the desire to reduce reliance on private vehicles.

Table 3.1 : Minimum Parking Provision

	Dwellings / Floor Area	Parking Rates	
		Rate	Car Spaces
Residential			
Studio	36	0	0
I Bed	455	1	455
2 Bed	1184	1	1184
3 Bed	91	2	182
4 Bed	55	2	109
Visitor		0.1	182
Sub total			2112
Retail			
Shopping Centre	4822m^2 GLFA	6.1 per 100m^2	295
Employment			
Industrial (Warehouse)	26,936m^2 GFA	1 per 300m^2	90
Child Care	1096 m^2 GFA	1 per 35m^2	31
Sub total			121
Site Total			**2528**

4. Traffic Impacts

This section of the report provides the assumptions, estimation of traffic and the forecast impacts on the road network as well as potential options to ameliorate the impacts.

4.1 Traffic Generation

The future traffic generation has been based on the available data and the Roads and Maritime, Guide to Traffic Generating Developments Technical Direction (2013). For the purpose of the analysis it has been assumed that the existing site generates only a small amount of traffic as identified in the traffic surveys so that the traffic generation has been added to the existing traffic volumes.

4.1.1 Residential Traffic Generation

Traffic generation rates for the residential component of the development has been derived from Roads and Maritime, Guide to Traffic Generating Developments Technical Direction (TDT 2013 / 04a). As only part of the subject site is within the typical walking catchment for a rail station (800m) and it is not located within a major centre thus, the average Sydney Rate is not considered appropriate in this instance. Three sites surveyed that have some of the same characteristics, based on their proximity to public transport, are considered to be:

- Rockdale – 11km from Sydney CBD – 17km from Parramatta
- Parramatta – 19km from Sydney CBD
- Liberty Grove – 11km from Sydney CBD

Table 4.1 : Residential Trip Rates Comparison (trips per dwelling)

Site	Morning Peak	Evening Peak	Distance From Sydney CBD (km)
Rockdale	0.32	0.18	11
Parramatta	0.27	0.12	19
Liberty Grove	0.28	0.41	11
Average	*0.29*	*0.24*	-
300 Manchester Road			17
Sydney Average	0.19 (0.07 – 0.32)	0.15 (0.06 – 0.41)	-

The following residential trip generation rates have therefore been adopted:

- 0.29 veh/dwelling (Morning Peak Hour)
- 0.24 veh/dwelling (Evening Peak Hour)

4.1.3 Retail Traffic Generation

The rates for the retail development have been based on the Roads and Maritime, Guide to Traffic Generating Developments Technical Direction (TDT 2013 / 04a). As the retail component is less than 10,000m^2 (GLFA) the rate of 12.3 veh / 100m^2 has been adopted for the evening peak.

A rate for the morning peak period is not provided in the technical direction. However, the data provided in the appendix allows an estimate rate for the morning peak period to be assumed. The raw survey results provided in the appendix indicate that the morning peak traffic generation for retail developments is approximately half the evening peak. Therefore, the following rates have been adopted:

- 12.3 veh /h per 100m^2 GLFA (Evening Peak)
- 6.1 veh / h per 100m^2 GLFA (Morning Peak)

It has been assumed that as the retail development would be part of a mixed used development some of the trips would be contained within the development by the residents walking to the site. Estimates of the catchment for the retail indicate that the primary and secondary retail catchments would have a population of 16,000 people. The development is assumed to have a population of 5099 people based on an average occupancy 2.8 people per dwelling.

It is assumed that the retail development would capture 24% (5099 / (16,000 + 5,099) of the total trips within the development who would walk. For our analysis it has been assumed conservatively that the traffic generation rate for retail could be reduced by 20% to reflect the trip containment.

- 20% Trip containment

It has been assumed that GLFA would be 80% of GFA.

4.1.4 Employment Traffic Generation

The employment area of the development is assumed to take the form of a business / industrial park. The traffic generation rate has been adopted form the RMS Guide to traffic generating developments.

- 0.52 Trips per 100m^2 of GFA (Morning Peak)
- 0.56 Trips per 100m^2 of GFA (Evening Peak)

4.1.5 Childcare Trips

The traffic generation rate has been adopted form the RMS Guide to traffic generating developments. The type of child care has been assumed to be long day care. It has been assumed that 50% of trips have are linked to the residential or employment lands therefore a reduction of 50% has been applied.

- 7.8m^2 per child
- 0.8 trips per child in the morning peak
- 0.7 trips per child in the evening peak

4.1.6 Community Facility

The community facility is forecast to generate no external vehicle trip in the peak periods.

4.1.7 Total Traffic Generation

The estimated traffic generation is shown in Table 4.2 and Table 4.3 present the estimated traffic generation for the morning and evening peaks. The adjusted traffic generation represents the discount as a result of trip containment between retail and employment land uses.

Table 4.2 : Morning Peak Traffic Generation

Land Use	Units / GFA / GLFA	Generation Rate	Traffic Generation	Adjusted Generation
Retail	4822m^2 (GLFA)	6.1 (per 100m^2)	294	235
Employment	26,936 m^2 (GFA)	0.52 (per 100m^2)	140	140
Dwellings	1821 Dwellings	0.29 (per dwelling)	528	528
Childcare	1094 m^2 (141 children)	0.8 trips per child	112	56
Total			**1074**	**960**

Table 4.3 : Evening Peak Traffic Generation

Land Use	Units / GFA / GLFA	Generation Rate	Traffic Generation	Adjusted Generation
Retail	4822m^2 (GLFA)	12.3 (per 100m^2)	593	474
Employment	26,936m^2 (GFA)	0.56 (per 100m^2)	151	151
Dwellings	1821 Dwellings	0.24 (per dwelling)	437	437
Childcare	1094 m^2 (141 children)	0.7 trips per child	112	49
Total			**1293**	**1112**

4.1.8 Directional Split

It is assumed directional split for traffic generated by the site is provided in Table 4.4.

Table 4.4 : Directional Split Assumptions

	Morning Peak		Evening Peak	
Land Use	To the Site	From the Site	To the Site	From the Site
Retail	50%	50%	50%	50%
Employment	80%	20%	20%	80%
Dwellings	20%	80%	80%	20%

4.2 Traffic Assignment

An assessment of the journey to work data has been used to estimate the traffic distribution. To obtain this estimated data, adjacent travel zones has been aggregated to get an estimate of where people are travelling to and from work.

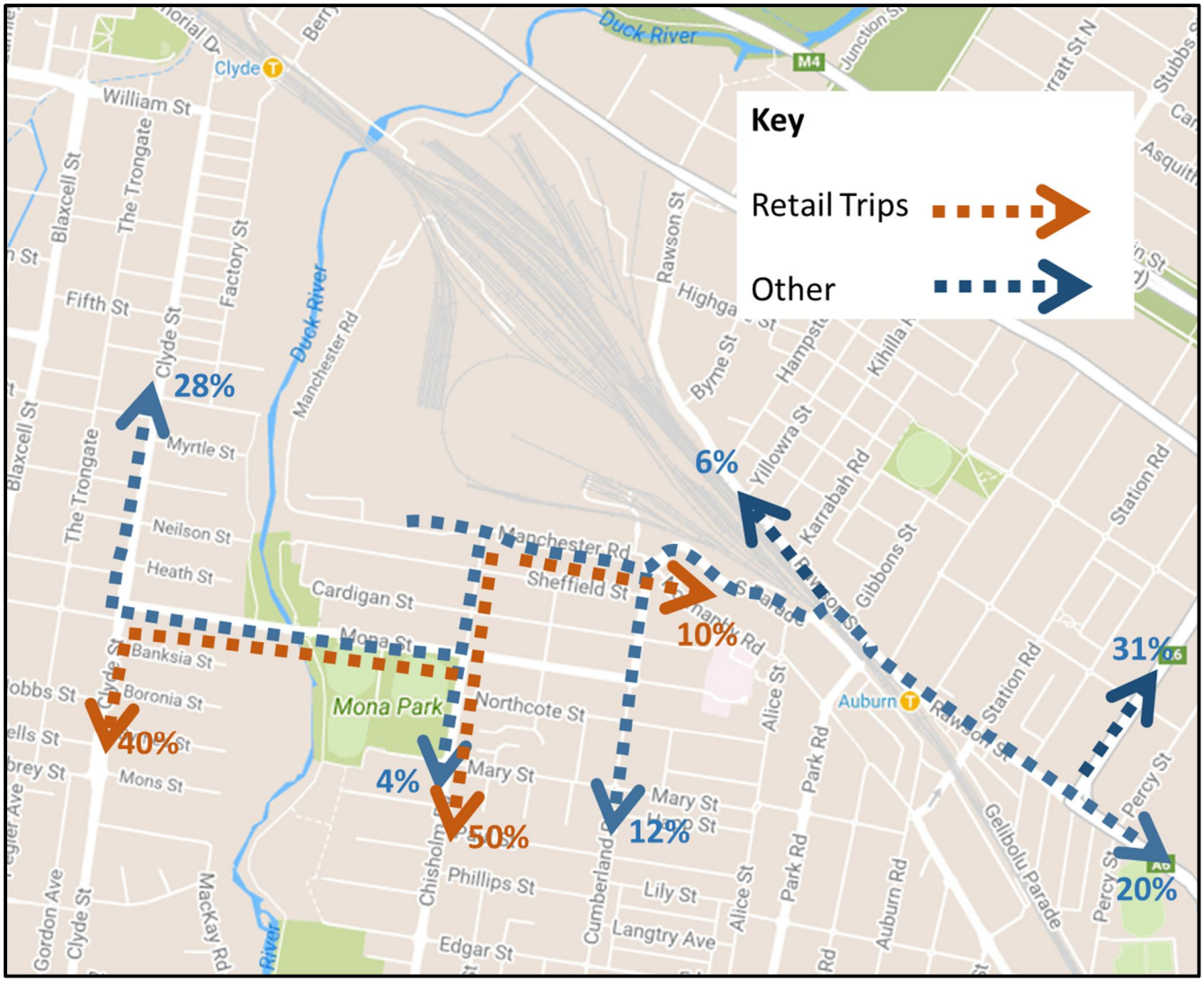
From this data the following assignment has been assumed:

- 28% from and to the Parramatta, Merrylands and Guildford north
- 6% from and to Auburn North
- 31% from and to the CBD East
- 20% from and to Strathfield South-East
- 12% from and to Bankstown South
- 4% from and to Fairfield Southwest

The traffic assignment for the retail component of the traffic generation is expected to come directly to and from the south. This is due to the competing retail services at Auburn and Grandville means that the primary catchment for the site will be directly to the south and immediately west of the Duck River. Therefore, this component has been assigned 40% to Clyde Street and 50% to Chisholm Road with 10% travelling to the east.

The assumed assignment routes are shown in Figure 4.1.

Figure 4.1 : Assumed Traffic Assignment



4.3 Intersection Performance

The following section provides:

- modelling outputs and assessment of the impacts on the road network
- description of proposed measures to mitigate the traffic constraints
- modelling outputs of the proposed mitigation options.

The key intersections have been modelled using Sidra Intersection. These intersections include:

- Mona Street / Clyde Street
- Mona Street / Chisholm Road
- Manchester Road / Cumberland Road
- Rawson Street / The Crescent
- Manchester Road / Chisholm Road

4.3.1 Assessment Criteria

The assessment of intersection performance is based on criteria outlined in and defined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority 2002). The average delay assessed for signalised intersections is for all movements, and for priority (sign-controlled) intersections is for the worst movement, and is expressed in seconds per vehicle.

Table 4.5 : LoS Criteria for Intersections

LoS	Average delay per vehicle (seconds / vehicle)	Traffic signals and roundabouts	Give way and stop signs
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity, and accident study required
E	57 to 70	At capacity; at signals, incidents will cause delays. Roundabouts require other control mode	At capacity, requires other control mode
F	Over 70	Extra capacity required	Extreme delay, traffic signal or other major treatment required

Source: Guide to Traffic Generating Developments (RMS, version 2.2, 2002)

4.3.3 Existing conditions

The results of the modelling with the existing traffic volumes are shown in Table 4.6. The results show that there is a capacity constraint at the intersection of Mona Street / Clyde Street that would restrict the amount of additional traffic that would be able to head west across the Duck River.

Table 4.6 : Existing Intersection Modelling Results

Intersection		LoS	Average Delay (Sec)	95th Percentile Queue (m)
Mona Street / Clyde Street	AM	E	63	396
	PM	D	35	300
Mona Street / Chisholm Road	AM	B	21	226
	PM	B	16	68
Manchester Road / Cumberland Road	AM	B	16	35
	PM	A	11	24
Rawson Street / The Crescent	AM	C	35	173
	PM	C	30	66
Manchester Road / Chisholm Road	AM	A	9	3
	PM	B	15	4

4.3.4 Do Minimum with development traffic

The results of the modelling with the development traffic are presented in Table 4.7. This scenario assumes no road upgrades.

Table 4.7 : Sidra Results With Development Traffic (no road improvements)

Intersection		LoS	Average Delay (Sec)	95th Percentile Queue (m)
Mona Street / Clyde Street	AM	F	112	690
	PM	F	73	586
Mona Street / Chisholm Road	AM	F	114	710
	PM	E	70	291
Manchester Road / Cumberland Road	AM	F	170	561
	PM	A	14	52
Rawson Street / The Crescent	AM	F	71	318
	PM	C	38	259
Manchester Road / Chisholm Road	AM	B	24	111
	PM	B	25	106

The modelling shows that there is a capacity constraint at the intersection of Mona Street and Clyde. As one of the few crossings of the Duck River there is considerable demand for traffic to use this road.

In addition, the intersection of Mona Street / Chisholm Road would also operate with high levels of intersection delay; as well as, capacity constraints at the intersection of Manchester Road / Chisholm Street.

4.3.5 Measures to mitigate traffic impacts

The 'do minimum' traffic modelling indicates that there would be significant impacts on the road network that would create additional delays and reduce the ability of vehicles to get into and out of the site. To mitigate these impacts a range of mitigation measures have been developed. These measures would increase traffic capacity and improve intersection performance to be as good or better than the existing Level of Service and benefit the wider community. The implementation of the road upgrades may be staged to meet the demands as they arise.

A summary of the options and a description of each of the upgrade measures is provided below in Table 4.8.

Table 4.8 : Summary of Mitigation Measure Options

Mitigation Measures	'Do Minimum'	Option 1	Option 2	Option 3
Rawson Street / South Parade upgrade		ü	ü	ü
Seventh Street Bridge				ü
Signalising Cumberland Road / Manchester Road		ü	ü	ü
Upgrade of Mona Street / Clyde Street (Extend No Parking)		ü	ü	ü
Upgrade of Mona Street / Clyde Street (Additional Turn Bays)		ü	ü	ü
Upgrade of Mona Street / Chisholm Street		ü		
Convert to Manchester Road / Chisholm Street to Roundabout		ü		
New Connection from Manchester Road to Mona Street			ü	
Widening of the Mona Street Bridge			ü	

They key features of the options are:

- **Option 1 -** Provides upgrades to existing intersections including upgrades of intersections along Mona Street.
- **Option 2 –** Features a new connection from Bangor Street to Mona Street.
- **Option 3** – Features a new crossing of the Duck River at Seventh Street and reduces the need for road network upgrades along Mona Street.

Figure 4.2 : Option 1 Upgrades

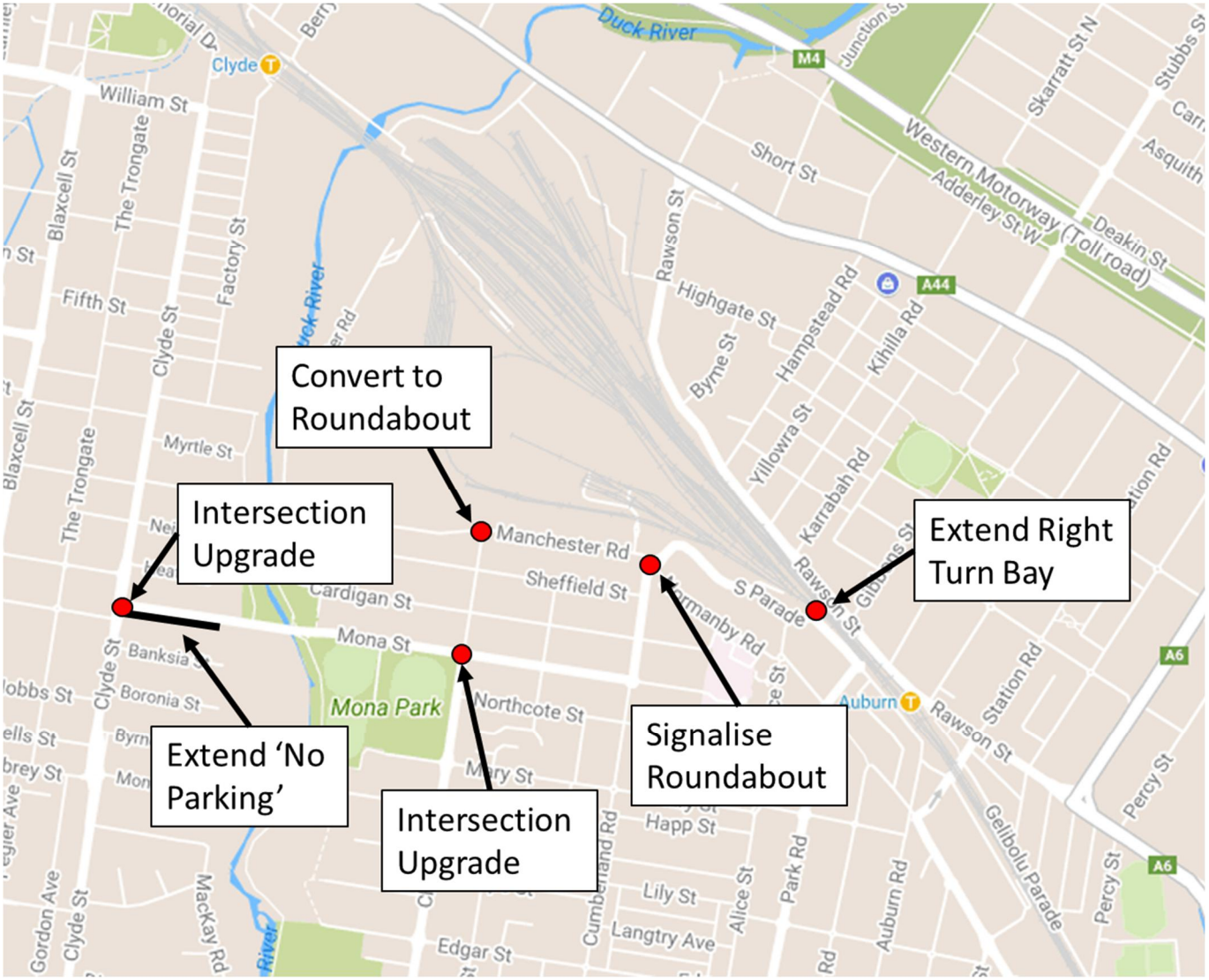


Figure 4.3 : Option 2 Upgrades

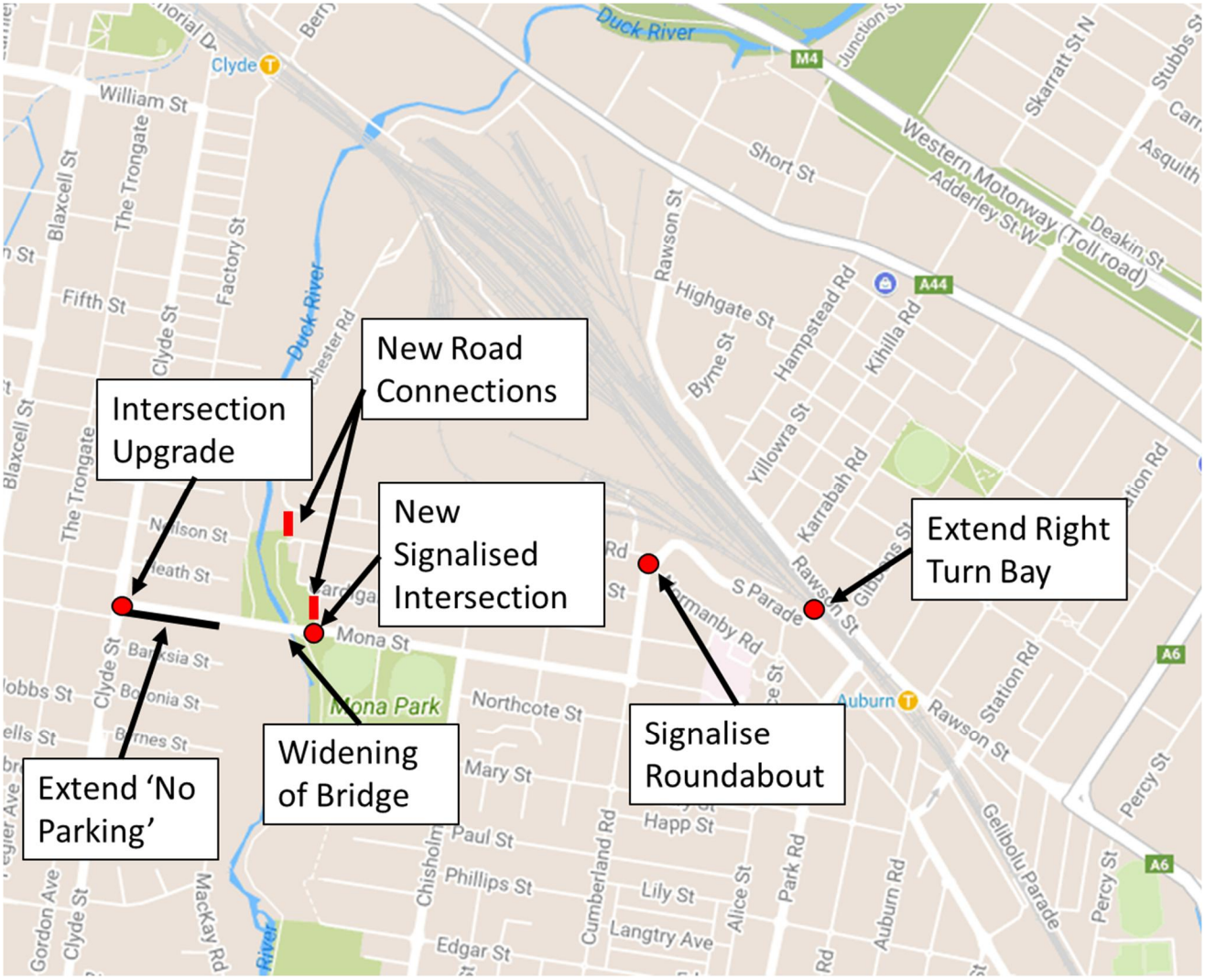
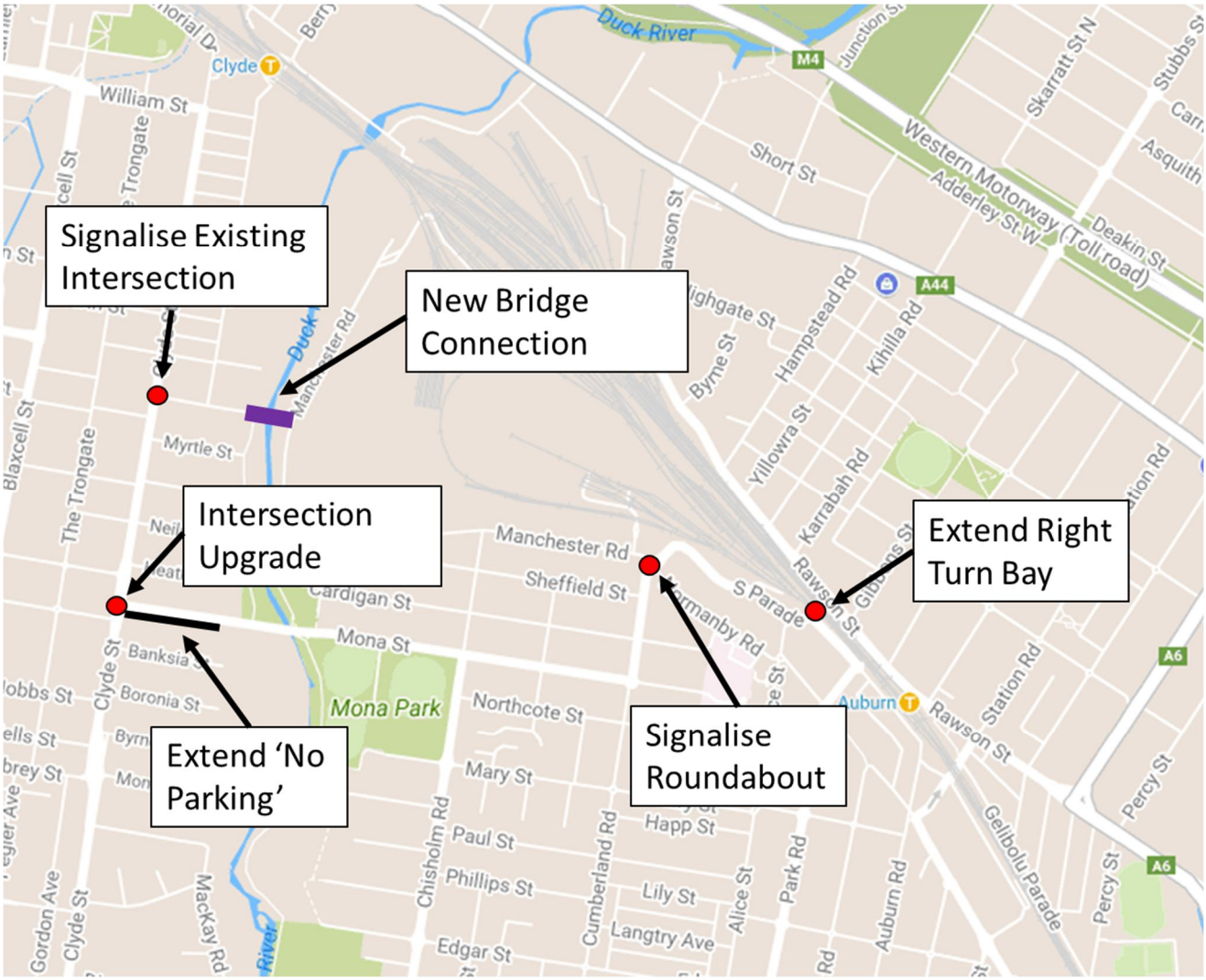


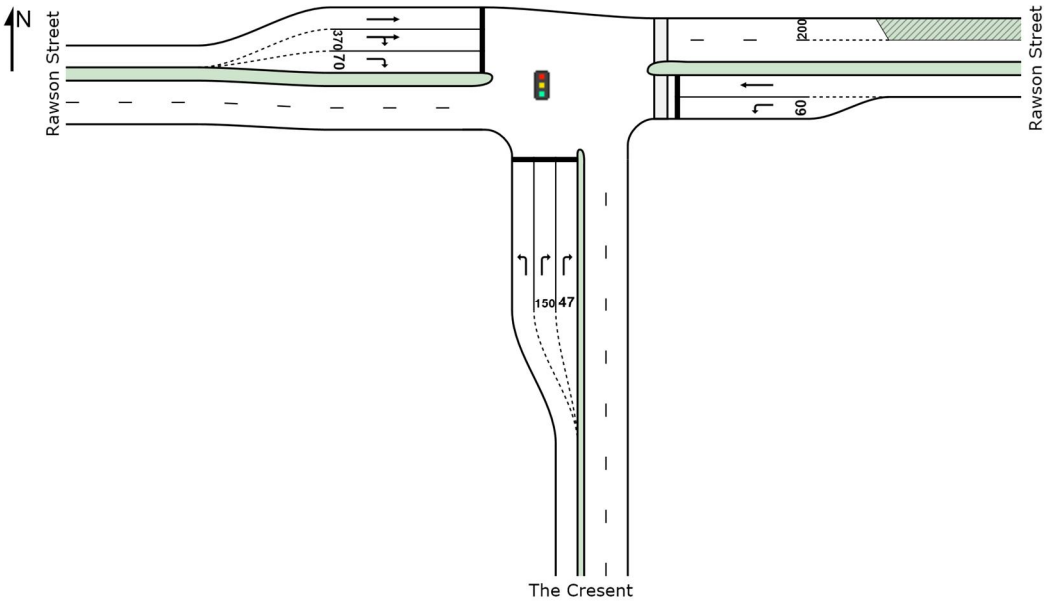
Figure 4.4 : Option 3 Upgrades



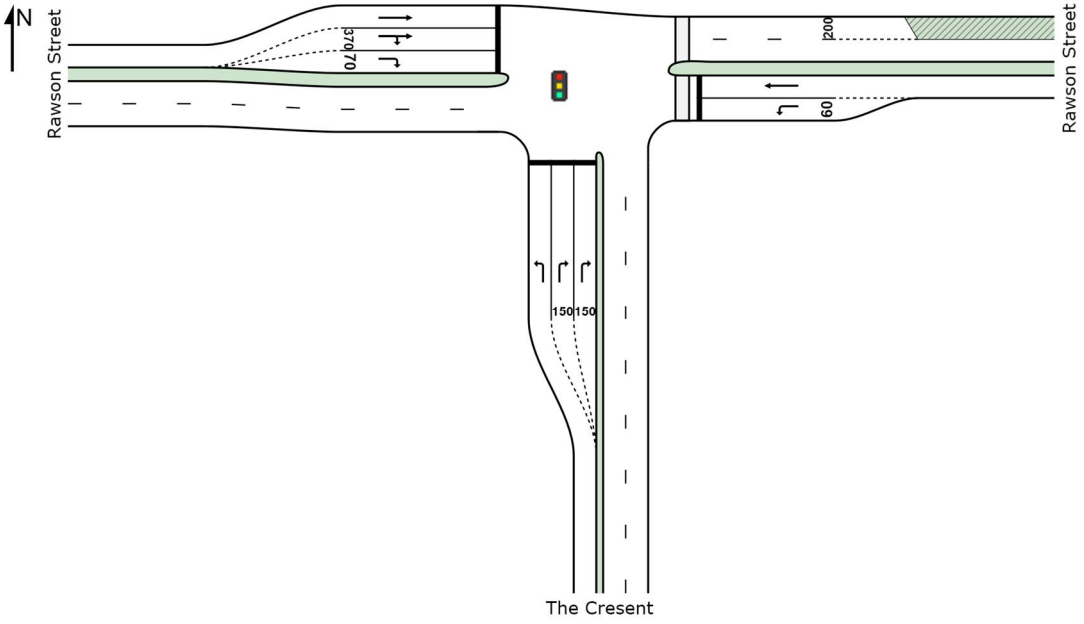
Extend Right Turn-Bay at South Parade / Rawson Street

The modelling has identified that due to the long cycle times at Rawson Street / South Parade the intersection would operate at LoS E in the afternoon peak with additional development traffic. Reducing the cycle time at this intersection would improve the results however this intersection is in coordination with other intersections along Rawson Street with higher cycle times of 120 seconds. To improve the intersection operation, the existing short right turn bay (50m) in South Parade could be extended to 150m to match the existing right turn bay. This would require widening of South Parade. It is understood that the proponent has purchased land between South Parade and the railway line that could be used for this purpose.

Figure 4.5 : Upgrade of Rawson Street and South Parade



Existing Layout

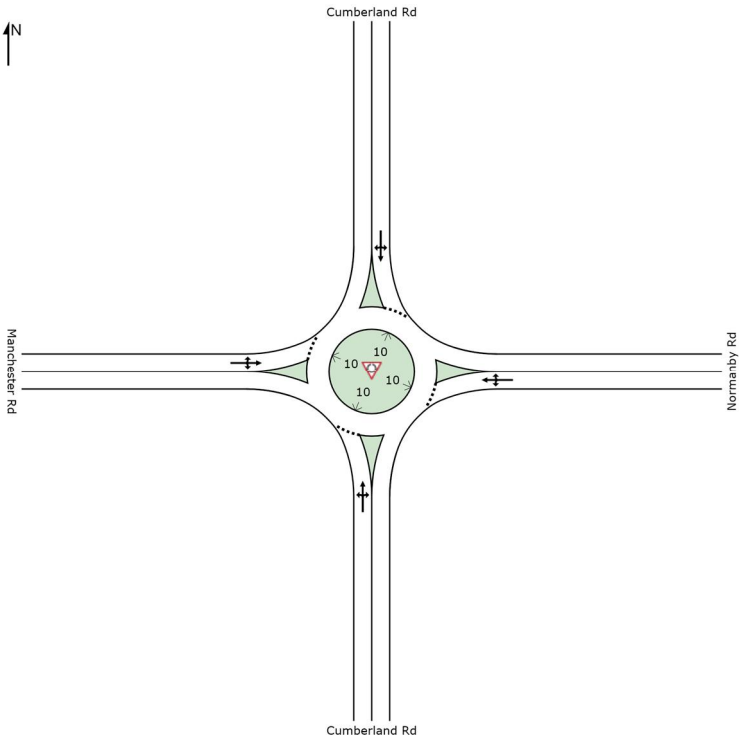


Proposed Intersection Layout

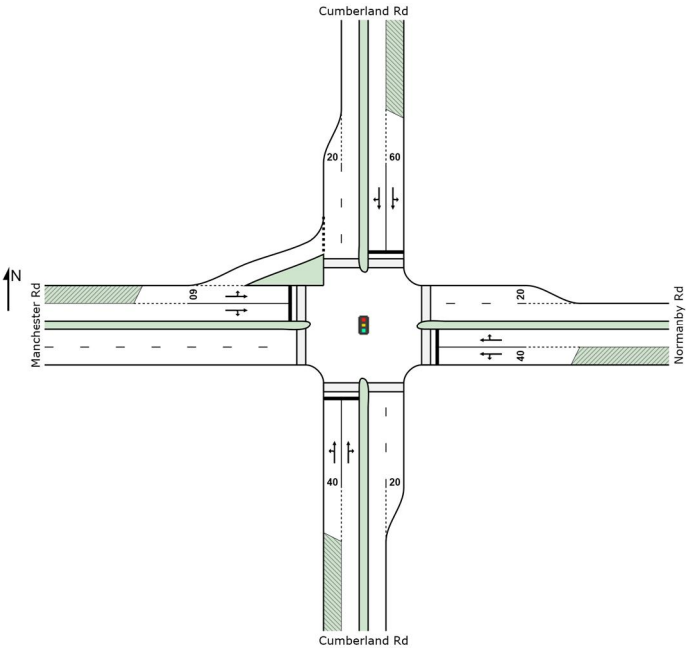
Signalising Cumberland Road / Manchester Road (Option 1, 2 and 3)

Modelling has identified the need to signalise the intersection of Manchester Road / Cumberland Road which is currently a roundabout. There appears to be sufficient space available to convert the intersection to traffic signals and provide a left turn slip lane from Manchester Road to Cumberland Road which is a heavy movement.

Figure 4.6 : Signalisation of Manchester Road / Cumberland Road



Existing Intersection Layout



Proposed Intersection Layout

Upgrade of Mona Street / Clyde Street (Extend No Parking, Options 1, 2 and 3)

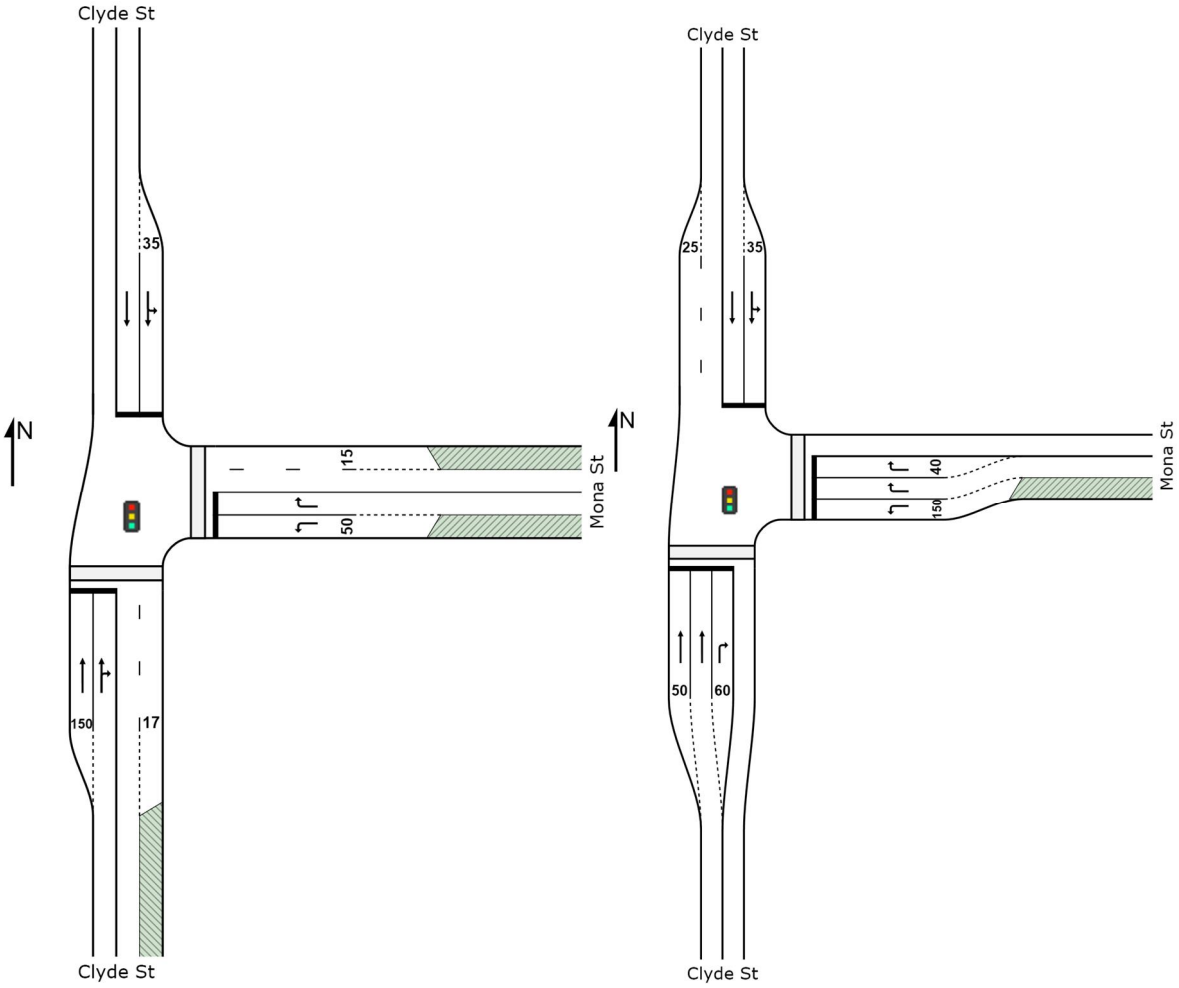
The minimum upgrade option would be to apply the current afternoon peak parking restriction to apply in the morning peak period. As shown in Figure 4.7 the 'No Parking' restriction could be extended to the morning peak as well as the evening peak.

Figure 4.7 : Extend Parking Restrictions to the Morning Peak Period

Upgrade of Mona Street / Clyde Street (Additional Right Turn Bays, Options 1, 2 and 3)

An upgrade of the Mona Street / Clyde Street intersection was developed to mitigate the impacts of the additional traffic. The concept design involves an additional right turn bay in Clyde Street and Mona Street. The need for road widening would be reduced by removing an exit lane on Mona Street and Clyde Street as shown in Figure 4.8.

Figure 4.8 : Mona Street / Clyde Street Intersection Upgrade

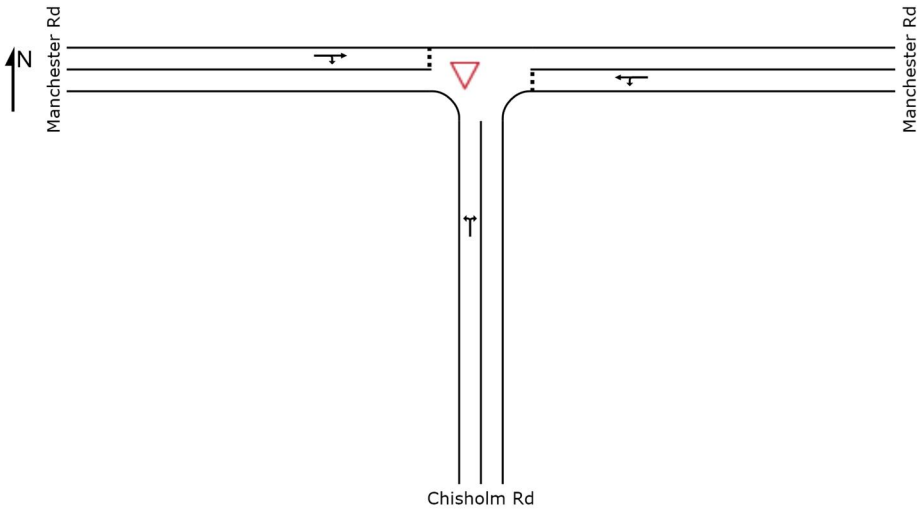


Existing Intersection Layout **Proposed Intersection Layout**

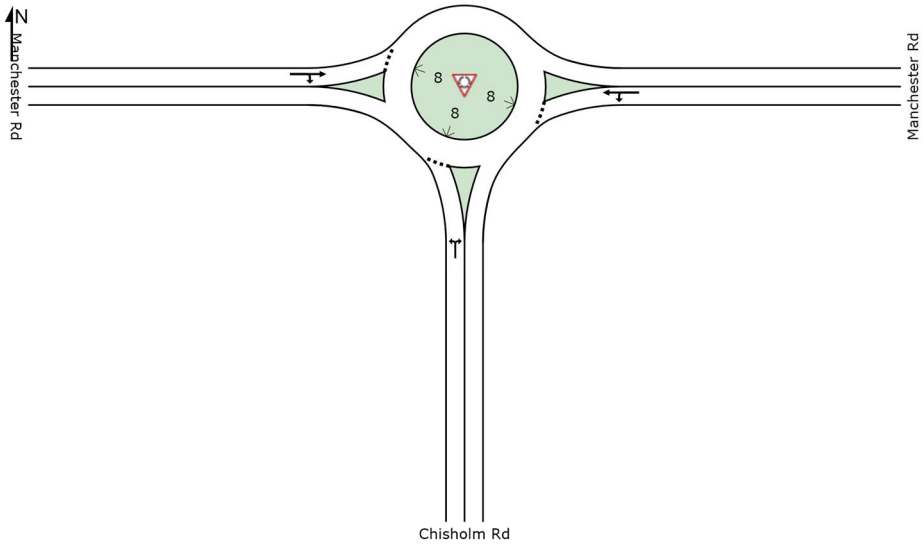
Manchester Road and Chisholm Road Roundabout (Option 1)

Modelling indicates that for Options 1 the intersection of Manchester Road and Chisholm Road would need to be upgraded to a roundabout from the current stop sign control.

Figure 4.9 : Manchester Road / Chisholm Road (Option 1)



Existing Intersection Layout

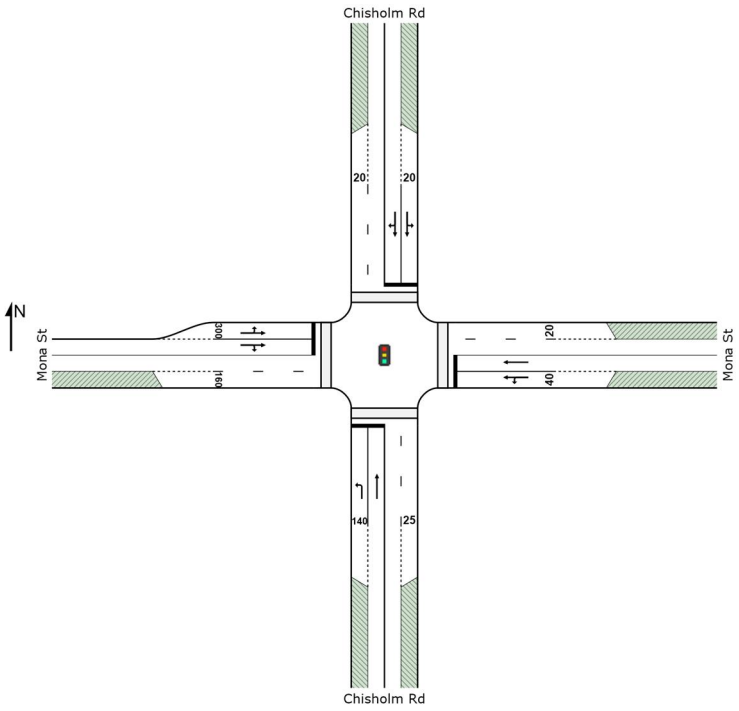


Proposed Intersection Layout

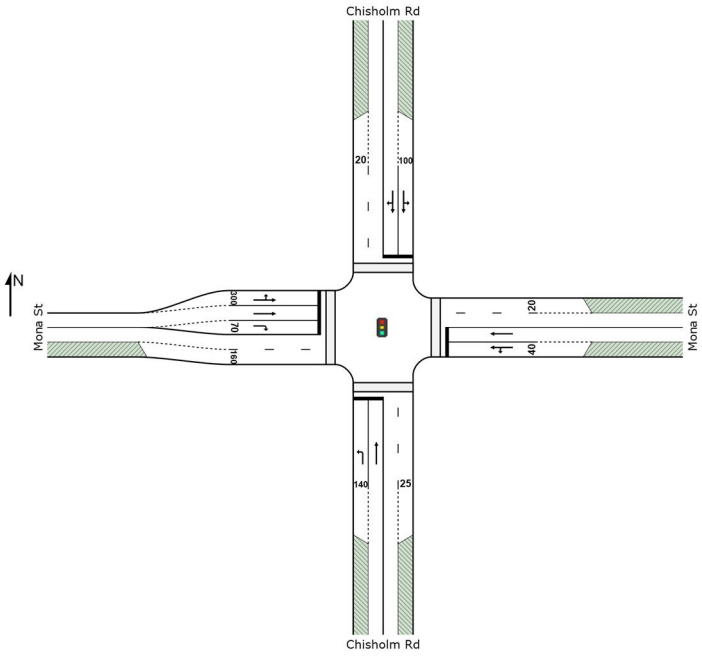
Upgrade of Mona Street / Chisholm Street (Option 1)

For Option 1 it has been assessed that a 70m right turn bay is required in Mona Street on the western approach. This will require road widening and potential of Mona Street.

Figure 4.10 : Mona Street and Chisholm Road Intersection Upgrade



Existing Intersection Layout



Proposed Intersection Layout

New Connection from Manchester Road to Mona Street (Option 2)

An option has been developed to consider a potential connection from Manchester Road to Mona Street. It is understood that the proponent has acquired the land between Manchester Road and Sheffield Street to facilitate a road connection. A constraint for the upgrade is the Mona Street bridge which is one lane in each direction. This bridge would need to be widened to two lanes to facilitate a signalised intersection at Bangor Street and Mona Street.

Figure 4.11 : New Road Connections

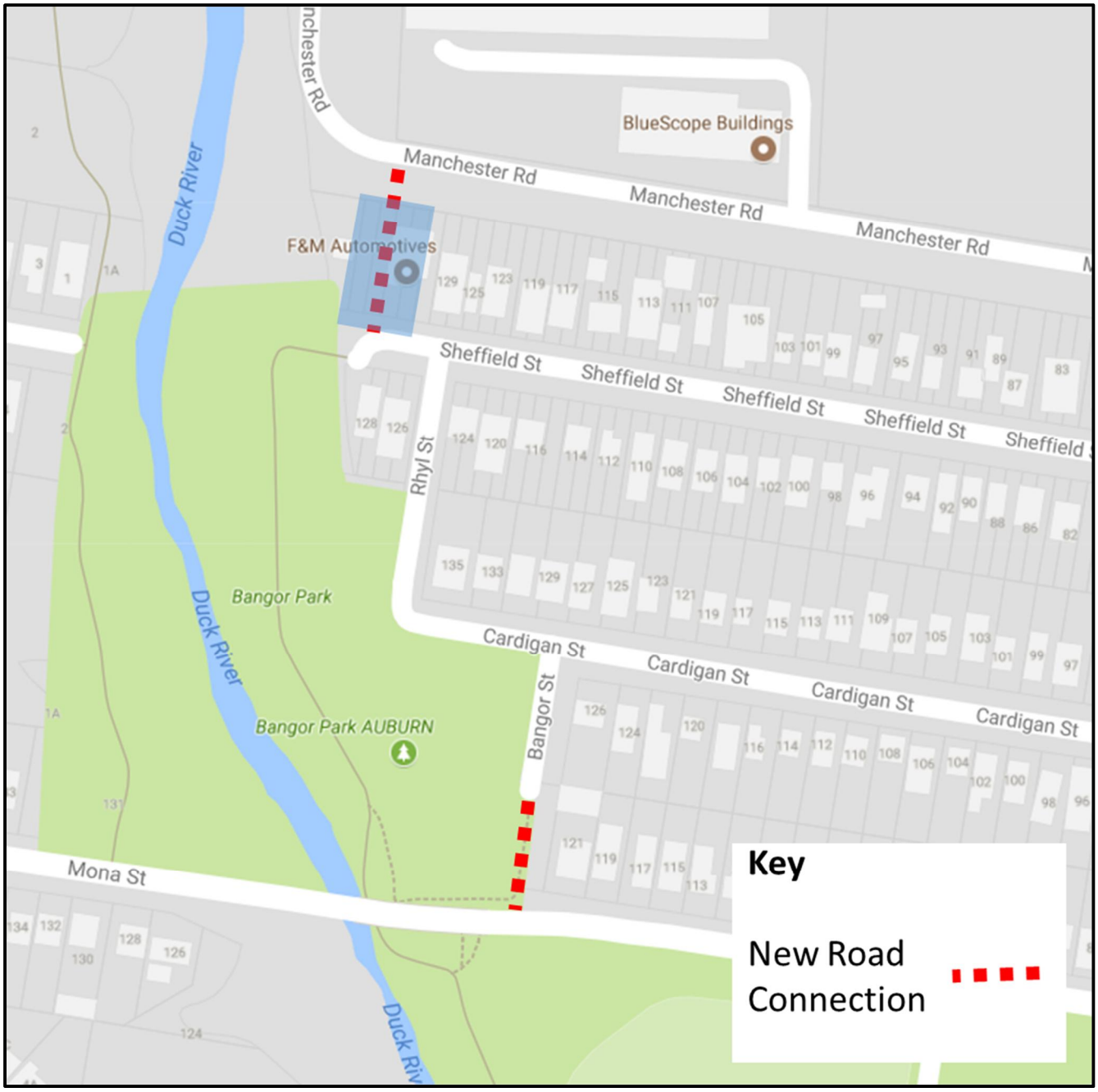
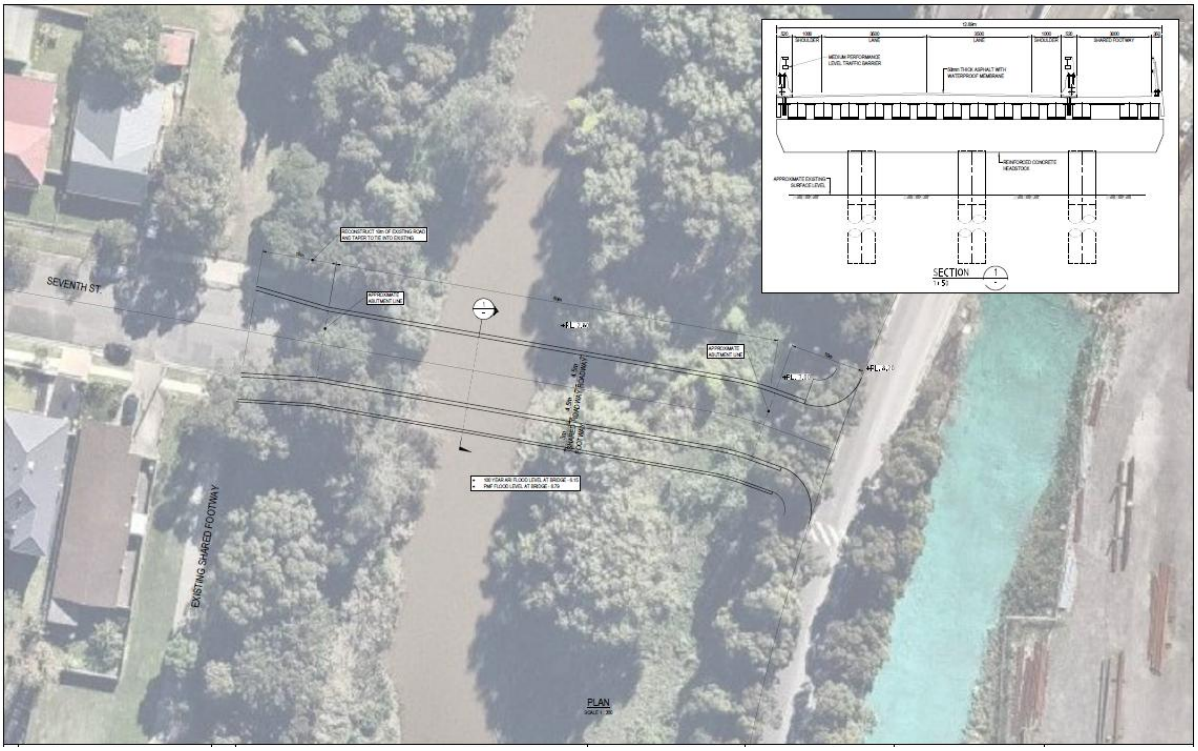


Figure 4.12 : Mona Street Bridge

Seventh Street Bridge (Option 3)

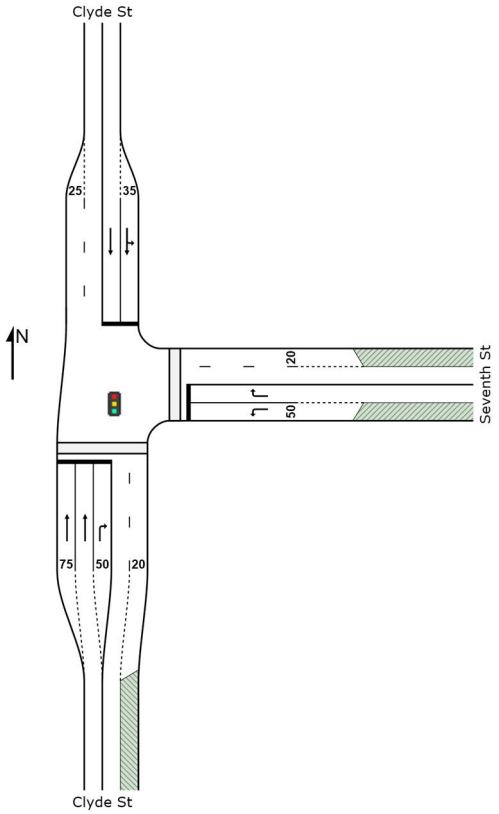
The key element of Option 3 is to provide a new bridge across duck river connecting with Seventh Street. This would provide a new connection to the west and reduce the impacts of the already over capacity intersection of Mona Street / Clyde Street. To facilitate this connection, the signalising of Clyde Street / Seventh Street has been assumed. To achieve a Level of Service 'B' a right turn bay is recommended in Clyde Street. Clyde Street currently has a wide median which may accommodate a right turn bay with minimal road widen. Concept designs for the Seventh Street bridge and upgrade of the Seventh Street / Clyde Street intersection is shown in Figure 4.13 and Figure 4.14.

Figure 4.13 : Seventh Street Bridge Concept Design



Source: Hyder: Duck River Bridge

Figure 4.14 : Signalisation of Clyde Street / Seventh Street



4.3.6 Model Results of Option Testing

4.3.6.1 Option 1: Intersection Upgrades Only

The results of the traffic modelling with the Option 1 Upgrades are shown in Table 4.9. With the proposed intersection upgrades, the intersections would operate at Level of Service D or better. The intersection of Mona Street / Clyde Street would improve on the existing level of service.

Table 4.9 : Intersection Operation with Development Traffic (Option 1)

Intersection		LoS	Average Delay (Sec)	95th Percentile Queue (m)
Mona Street / Clyde Street	AM	C	44	400
	PM	C	29	232
Mona Street / Chisholm Road	AM	B	19	120
	PM	C	40	168
Manchester Road / Cumberland Road	AM	A	12	59
	PM	A	12	39
Rawson Street / The Crescent	AM	C	38	204
	PM	C	38	259
Manchester Road / Chisholm Road	AM	A	9	65
	PM	A	10	47

4.3.6.2 Option 2: New Connection to Mona Street

The results of the traffic modelling with the Option 2 Upgrades are shown in Table 4.10. With the proposed intersection upgrades, the intersections would operate at Level of Service D or better. The new intersection of Bangor Street and Mona Street would need to be signalised and also require the widening of the Mona Street bridge in order to achieve acceptable levels of service. No upgrades of Mona Street / Chisholm Road and Manchester Road / Chisholm Road are required for this option.

Table 4.10 : Intersection Operation with Development Traffic (Option 2)

Intersection		LoS	Average Delay (Sec)	95th Percentile Queue (m)
Mona Street / Clyde Street	AM	C	44	400
	PM	C	29	232
Mona Street / Chisholm Road	AM	C	31	338
	PM	B	21	93
Manchester Road / Cumberland Road	AM	A	12	55
	PM	A	12	43
Rawson Street / The Crescent	AM	C	38	204
	PM	C	38	259
Manchester Road / Chisholm Road	AM	A	9	65
	PM	A	10	47
Bangor Street / Mona Street	AM	B	18	263
	PM	B	18	262

4.3.6.3 Option 3: Provision of a New Bridge at Seventh Street

To model the new access and bridge from Seventh Street it has been assumed that there would be no through-traffic attracted to this route. This may be achieved through traffic management and traffic calming within the site to make through-trips less attractive.

The results of the traffic modelling with these improvements are shown in Table 4.11 . It shows that:

- Mona Street / Clyde Street would need to be upgraded and under this scenario would achieve better performance than existing.
- The Mona Street / Chisolm Road would operate with an acceptable level of service D and C reduced from C and B respectively compared to the existing traffic performance.
- Manchester Road / Cumberland Road would operate at satisfactory LoS C
- The intersection of Seven Street / Clyde Street would need to be signalised and would operate with a Level of Service of B in the morning peak and D in the evening peak.

Table 4.11 : Intersection Operation with Development Traffic (Option 3)

Intersection		LoS	Average Delay (Sec)	95th Percentile Queue (m)
Mona Street / Clyde Street	AM	C	32	246
	PM	C	39	305
Mona Street / Chisholm Road	AM	C	31	338
	PM	B	21	93
Manchester Road / Cumberland Road	AM	A	12	55
	PM	A	12	43
Rawson Street / The Crescent	AM	C	38	204
	PM	C	38	259
Manchester Road / Chisholm Road	AM	A	9	65
	PM	A	10	47
Seventh Street / Clyde Street	AM	A	14	230
	PM	A	14	220

4.3.7 Discussion

The proposed options 1, 2 and 3 offer different levels of access to the road network. All options analysed would require upgrade of the Mona Street / Clyde Street intersection to achieve a level of service as good or better than the existing level of service. This intersection is critical to allowing traffic to travel west. The upgrade of this intersection is may be subject to the ability to acquire land near this intersection.

- Option 1 would require the upgrading of a number of intersections and concentrates the traffic growth on Chisholm Road.
- Option 2 would require the acquisition of Council land to facilitate the new connection from Bangor Street to Mona Street. Analysis of the traffic conditions indicates that widening of the bridge on Mona Street would also be needed to allow the new intersection at Bangor Street to operate at an acceptable level.
- Option 3 with a new bridge for road traffic at Seventh Street would distribute traffic evenly away from the site and remove the need for intersection upgrades on Chisholm Road. In addition, this option would provide opportunities for better pedestrian and cyclist connections to the site.

Option 3 is recommended as the option that would have the least overall impact on the surrounding road network and the optimal improvement for traffic and provide two access points to the development. The upgrades to intersections would have a wider benefit for general community by providing more road capacity at existing intersections than is currently provided.

4.4 Cumulative Impacts

At the time of preparing this submission Sydney Trains have recently completed the Engineering and Maintenance Hub at Clyde. The Hub will replace several old depots with a new building. This Central Hub comprises a five-storey office building and a two-storey amenities building (with a total floor area of 13,400 m2).

During a site visit in August 2017, it was observed that the car park was largely vacant and therefore it is assumed that traffic from this development may increase in the future. Due to the nature of the development it is assumed that the development would typically generate most traffic in line with trade hours that are typically earlier (6:00am – 7:00am) than the general commuter peak in the morning and earlier (3:00pm – 4:00pm) than the afternoon commuter peak.

The development design will need to include measures to maintain acceptable access to this site. Providing a new bridge crossing of the Duck River would support better access to this site.

The construction of a bridge on Seventh Street may impact on the amenity of residents in Seventh Street. It is forecast that during the peak periods the traffic volumes may increase by 300 veh/h two-way. In terms of environmental capacity, this would place the street at the upper limit of the environmental capacity for a local street.

The new retail centre may have broader impacts on the road network reducing the number of longer trips to Granville and Auburn town centres.

4.5 Public Transport

The primary focus for public transport will be having access to Clyde and Auburn stations to reduce dependence on private vehicles. The internal road network and pedestrian paths will be provided to link to existing pedestrian paths that access the local stations.

Rail services at Auburn Station come frequently with 3 major service lines connecting to city circle including T1 North Shore Line, T1 Western Line and T2 Inner West & South Line.

There is an opportunity to improve bus services by modifying the existing bus route 908 to service the site along Manchester Road and provide a bus connection to Auburn Station.

It is noted that there will be changes to the rail timetable and the Carlingford Line will which terminates at Clyde Station will close during the construction of the Parramatta Light Rail. However, regular services will remain to support the additional demand from the development and the Engineering and Maintenance Hub but with fewer express services to the Sydney CBD.

4.5.1 Developer initiatives

As an initiative, it is proposed to provide a shuttle bus to connect the development and the Auburn Station together. This would be in the form of an electric bus that would be operated free of charge to users for the first 5 years of the development. The bus would be an 18 – 22 seater Hino Poncho bus.

Figure 4.15 : Hino Poncho

4.6 Active Transport

The site will provide access to the shared paths along the Duck River. The off road path to Clyde Station provides good access to the station. Extension of the shared path along the Duck River to the north as identified in the Auburn Bike Plan would be supported by the development.

4.6.1 Developer initiatives

The developer has indicated they would be willing to provide a bike share scheme to promote cycling and reduce the dependency on cars within the development. This may help to reduce the reliance on private vehicles.

5. Conclusion

Jacobs has been commissioned by PAYCE to undertake a traffic and transport impact assessment for the proposed land zoning at Manchester road. The location is currently a mix of 'brown field' and distribution centres and is zoned for industrial land use. The proposed land rezoning is to comprise of mixed use of:

- 1821 high-density residential dwellings
- 6,027m^2 of retail GFA
- 26,936m m^2 GFA of industrial employment
- Community Facility 2000m^2 GFA and childcare centre 1094m^2 GFA.

5.1 Impacts on the road network

It has been estimated that the site would generate 960 veh/h in the morning peak and 1112 veh/h in the evening peak. It has been assumed that 20% of the retail trips would be contained within the site. The traffic distribution has been distributed based on journey to work data for employment and residential trips. Due to the catchment for retail being predominately to the south, retail trips have been distributed mostly to and from the south via Chisholm Road and Clyde Street.

Traffic modelling has identified capacity constraints at the Mona Street / Clyde Street intersection as well as significant delays at other intersections as a result of the traffic generated by the site.

A range of options that would reduce road user delay to be better than existing have been developed. This options were:

- Option 1: Upgrade of existing intersections
- Option 2: A new road access between Manchester Road and Mona Street
- Option 3: A new road bridge crossing of the Duck River to provide access to the west.

Each of the options assessed have identified that an upgrade of the intersection of Clyde Street and Mona Street will be needed. The upgrade involves the provision of turning bays on Mona Street and Clyde Street. This may require some widening of both Mona Street and Clyde Street which may involve land acquisition. All options would allow the intersection analysed to operate with acceptable levels of service at D or better which is better than the existing operation. The key findings are:

- Option 1 would require the upgrading of a number of intersections and concentrates the traffic growth on Chisholm Road.
- Option 2 would require the acquisition of Council land to facilitate the new connection from Bangor Street to Mona Street. Analysis of the traffic conditions indicates that widening of the bridge on Mona Street would also be needed to allow the new intersection at Bangor Street to operate at an acceptable level.
- Option 3 with a new bridge for road traffic at Seventh Street would distribute traffic evenly away from the site and remove the need for intersection upgrades on Chisholm Road. In addition, this option would provide opportunities for better pedestrian and cyclist connections to the site.

Option 3 is recommended as the option that would have the least overall impact on the surrounding road network and the optimal improvement for traffic and provide two access points to the development. The upgrades to intersections would have a wider benefit for general community by providing more road capacity at existing intersections than is currently provided.

5.2 Public Transport

The site is considered to be within walking distance of Clyde Station and Auburn Station and the site is partially within the 800m catchment for Clyde Station. The primary focus for public transport will be access to the

stations and Clyde and Auburn to reduce dependence on private vehicles. The internal road network and pedestrian paths will be provided to link to existing pedestrian paths that access the local stations.

There is an opportunity to improve bus services by modifying the existing bus route 908 to service the site along Manchester Road and provide a bus connection to Auburn Station.

It is noted that there will be changes to the rail timetable and the Carlingford Line will which terminates at Clyde will close during the construction of the Parramatta Light Rail. However, regular services will remain to support the additional demand from the development but with fewer express services to the Sydney CBD.

5.3 Active Transport

The site will provide access to the shared paths along the Duck River. The off road path to Clyde Station that has recently been upgraded as part of the works for the Engineering and Maintenance Hub provides good access to the station. Extension of the shared path along the Duck River to the north as identified in the Auburn Bike Plan would be supported by the development.

References

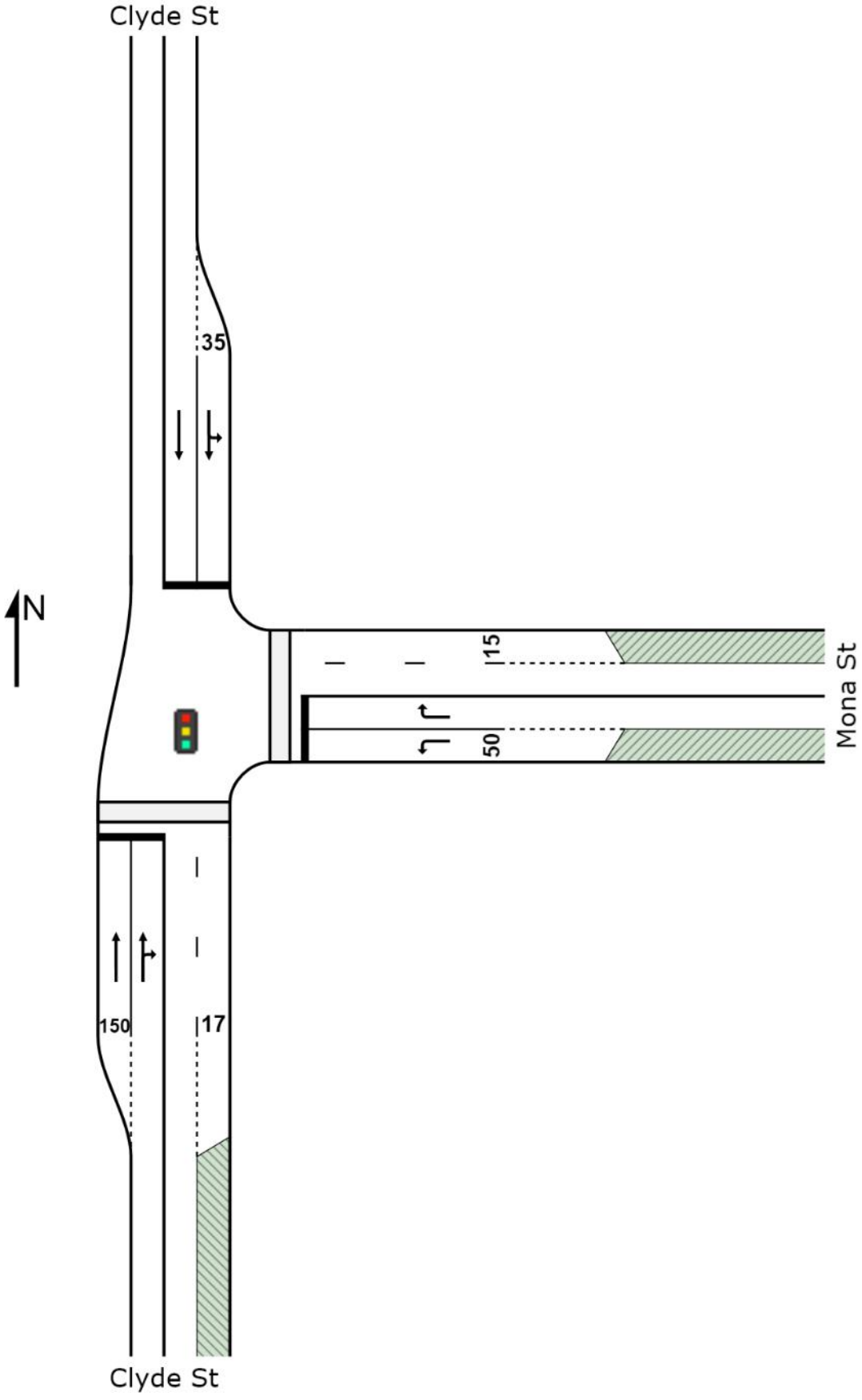
- Guide to Road Design, Park 4A: Unsignalised and Signalised Intersections, Austroads, August 2009
- RTA Guide to Traffic Generating Developments – RTA version 2.2 October 2002
- Austroads Guide to Traffic Management Part 12: Traffic Impacts of Developments – Austroads, August 2009

Appendix A. Sidra Model Outputs

SITE LAYOUT

Site: Mona Street / Clyde Street 2017AM

Clyde St / Mona St
Signals - Fixed Time Isolated



LANE SUMMARY

Site: Mona Street / Clyde Street 2017AM

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	221	2.0	1091	0.203	20[6]	10.1	LOS A	4.7	33.4	Short	150	0.0	NA
Lane 2	765	2.0	755	1.013	100	71.5	LOS F	47.8	340.3	Full	500	0.0	0.0
Approach	986	2.0		1.013		57.7	LOS E	47.8	340.3				
East: Mona St													
Lane 1	211	2.0	1261	0.167	100	9.8	LOS A	3.2	22.7	Short (P)	50	0.0	NA
Lane 2	468	2.0	466[1]	1.005	100	98.1	LOS F	34.2	243.7	Full	500	0.0	0.0
Approach	679	2.0		1.005		70.7	LOS F	34.2	243.7				
North: Clyde St													
Lane 1	874	2.0	892[1]	0.979	100	66.8	LOS E	55.7	396.4	Short	35	0.0	NA
Lane 2	138	2.0	342	0.403	41[5]	36.2	LOS C	5.5	39.2	Full	500	0.0	0.0
Approach	1012	2.0		0.979		62.6	LOS E	55.7	396.4				
Intersection	2677	2.0		1.013		62.9	LOS E	55.7	396.4				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Mona Street / Clyde Street 2017PM

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	168	2.0	770	0.218	23[6]	17.0	LOS B	4.3	30.7	Short	140	0.0	NA
Lane 2	401	2.0	425	0.943	100	58.6	LOS E	20.2	144.1	Full	500	0.0	0.0
Approach	569	2.0		0.943		46.3	LOS D	20.2	144.1				
East: Mona St													
Lane 1	486	2.0	1122	0.434	100	13.3	LOS A	10.0	70.9	Short (P)	150	0.0	NA
Lane 2	781	2.0	824	0.948	100	53.5	LOS D	42.8	304.7	Full	500	0.0	0.0
Approach	1267	2.0		0.948		38.1	LOS C	42.8	304.7				
North: Clyde St													
Lane 1	582	2.0	1396	0.417	44[5]	9.1	LOS A	7.8	55.7	Short	35	0.0	NA
Lane 2	278	2.0	295[1]	0.942	100	55.7	LOS D	14.1	100.7	Full	500	0.0	0.0
Approach	860	2.0		0.942		24.1	LOS B	14.1	100.7				
Intersection	2697	2.0		0.948		35.4	LOS C	42.8	304.7				

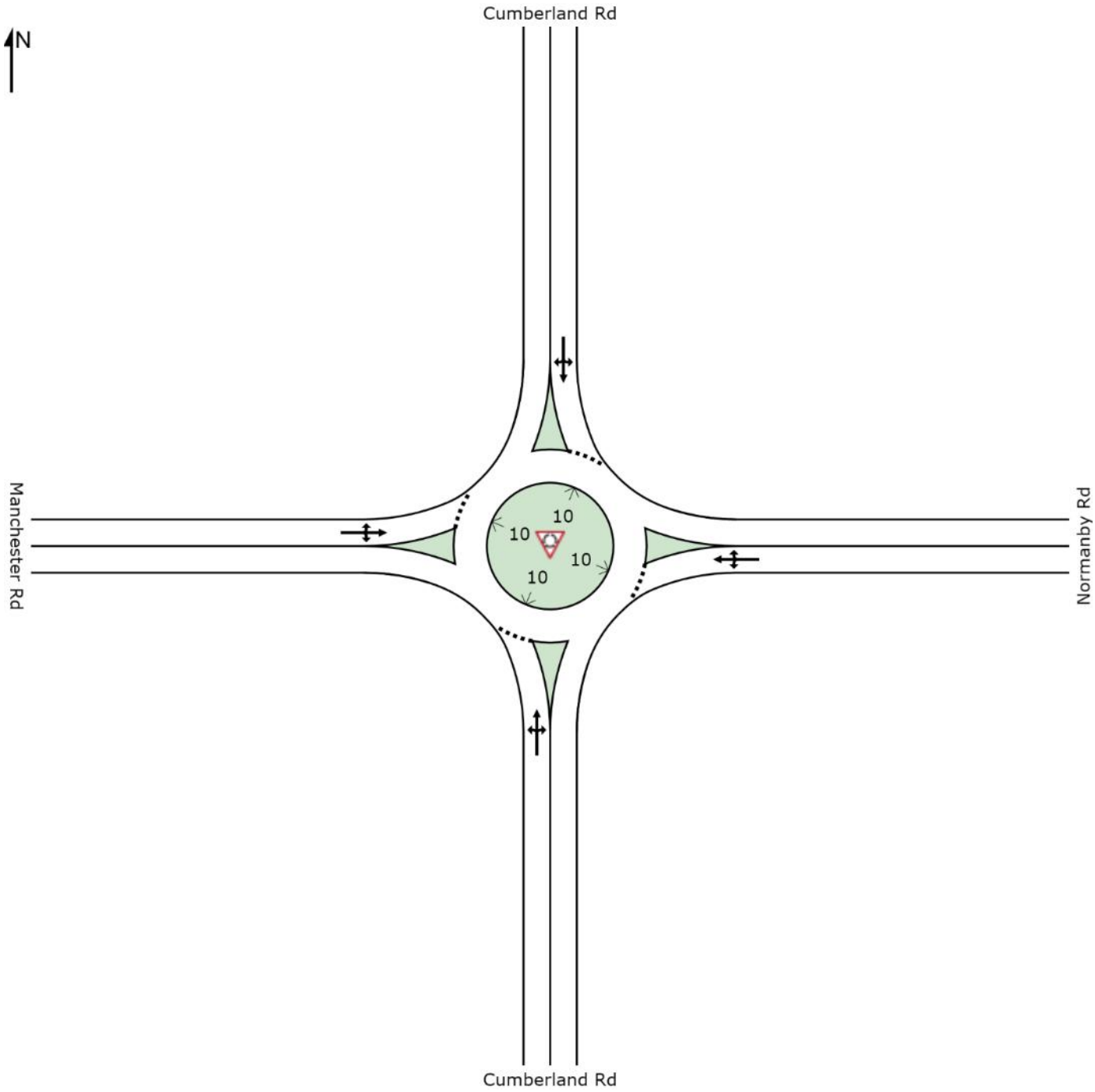
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Manchester Road / Cumberland Road 2017AM

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Roundabout



LANE SUMMARY

Site: Manchester Road / Cumberland Road 2017AM

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Rd													
Lane 1[d]	723	0.0	1290	0.561	100	6.5	LOS A	5.0	35.3	Full	500	0.0	0.0
Approach	723	0.0		0.561		6.5	LOS A	5.0	35.3				
East: Normanby Rd													
Lane 1[d]	74	0.0	898	0.082	100	6.9	LOS A	0.4	3.1	Full	500	0.0	0.0
Approach	74	0.0		0.082		6.9	LOS A	0.4	3.1				
North: Cumberland Rd													
Lane 1[d]	421	0.0	1101	0.383	100	7.1	LOS A	2.6	17.9	Full	500	0.0	0.0
Approach	421	0.0		0.383		7.1	LOS A	2.6	17.9				
West: Manchester Rd													
Lane 1[d]	353	0.0	675	0.522	100	12.3	LOS A	4.4	30.9	Full	500	0.0	0.0
Approach	353	0.0		0.522		12.3	LOS A	4.4	30.9				
Intersection	1571	0.0		0.561		8.0	LOS A	5.0	35.3				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

LANE SUMMARY

Site: Manchester Road / Cumberland Road 2017PM

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Rd													
Lane 1[d]	387	0.0	1469	0.264	100	5.8	LOS A	1.7	12.2	Full	500	0.0	0.0
Approach	387	0.0		0.264		5.8	LOS A	1.7	12.2				
East: Normanby Rd													
Lane 1[d]	103	0.0	859	0.120	100	7.4	LOS A	0.7	4.7	Full	500	0.0	0.0
Approach	103	0.0		0.120		7.4	LOS A	0.7	4.7				
North: Cumberland Rd													
Lane 1[d]	575	0.0	1236	0.465	100	5.9	LOS A	3.4	23.8	Full	500	0.0	0.0
Approach	575	0.0		0.465		5.9	LOS A	3.4	23.8				
West: Manchester Rd													
Lane 1[d]	236	0.0	962	0.245	100	7.0	LOS A	1.4	9.7	Full	500	0.0	0.0
Approach	236	0.0		0.245		7.0	LOS A	1.4	9.7				
Intersection	1301	0.0		0.465		6.2	LOS A	3.4	23.8				

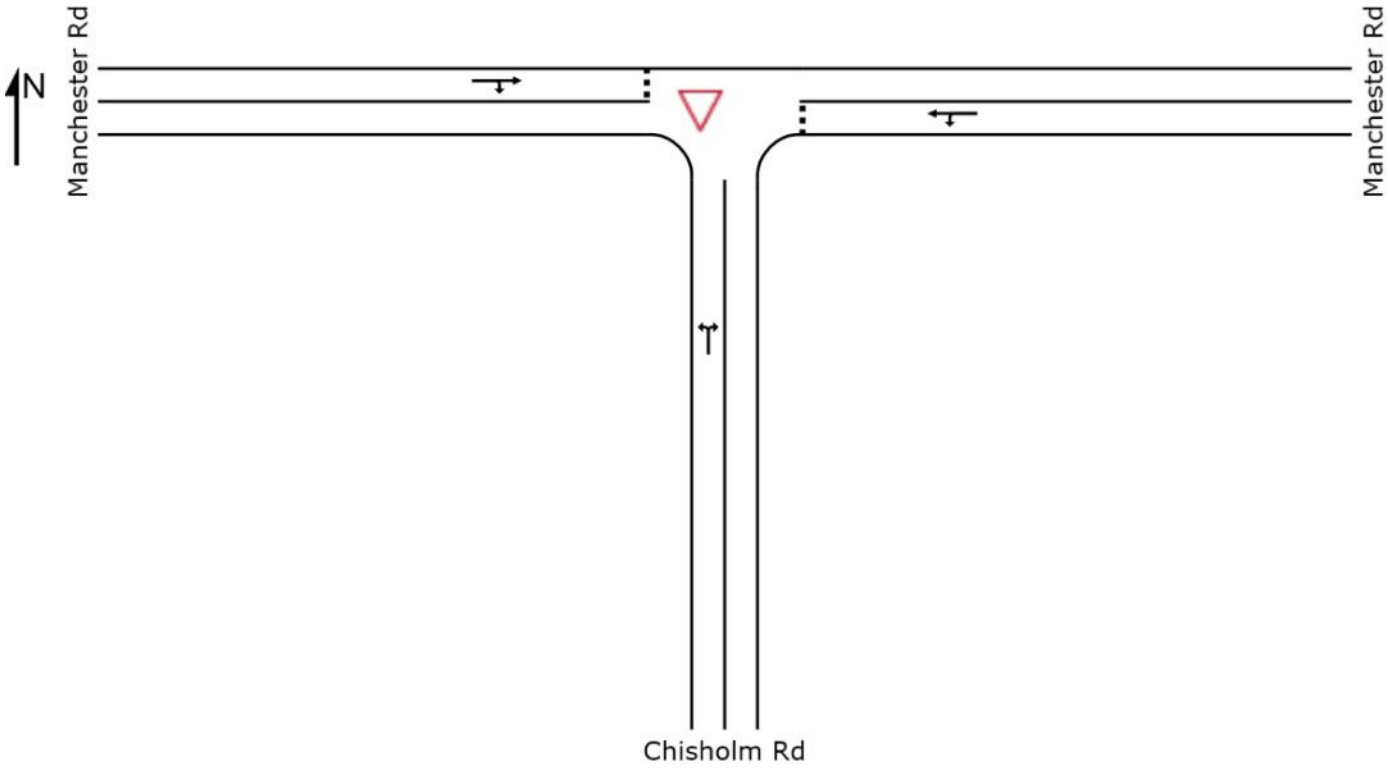
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

SITE LAYOUT

Site: Manchester Rd / Chisholm Rd AM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)



LANE SUMMARY

Site: Manchester Rd / Chisholm Rd AM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	395	2.0	1831	0.216	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	395	2.0		0.216		4.6	NA	0.0	0.0				
East: Manchester Rd													
Lane 1	109	2.0	1501	0.073	100	5.7	LOS A	0.4	2.7	Full	500	0.0	0.0
Approach	109	2.0		0.073		5.7	LOS A	0.4	2.7				
West: Manchester Rd													
Lane 1	37	2.0	908	0.041	100	3.1	LOS A	0.1	1.0	Full	500	0.0	0.0
Approach	37	2.0		0.041		3.1	LOS A	0.1	1.0				
Intersection	541	2.0		0.216		4.7	NA	0.4	2.7				

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

Lane LOS values are based on average delay per lane.

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

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

LANE SUMMARY

Site: Manchester Rd / Chisholm Rd PM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	214	2.0	1831	0.117	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	214	2.0		0.117		4.6	NA	0.0	0.0				
East: Manchester Rd													
Lane 1	178	2.0	1773	0.100	100	5.3	LOS A	0.5	3.9	Full	500	0.0	0.0
Approach	178	2.0		0.100		5.3	LOS A	0.5	3.9				
West: Manchester Rd													
Lane 1	56	2.0	1061	0.053	100	2.4	LOS A	0.2	1.3	Full	500	0.0	0.0
Approach	56	2.0		0.053		2.4	LOS A	0.2	1.3				
Intersection	447	2.0		0.117		4.6	NA	0.5	3.9				

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

Lane LOS values are based on average delay per lane.

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

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 lanes.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

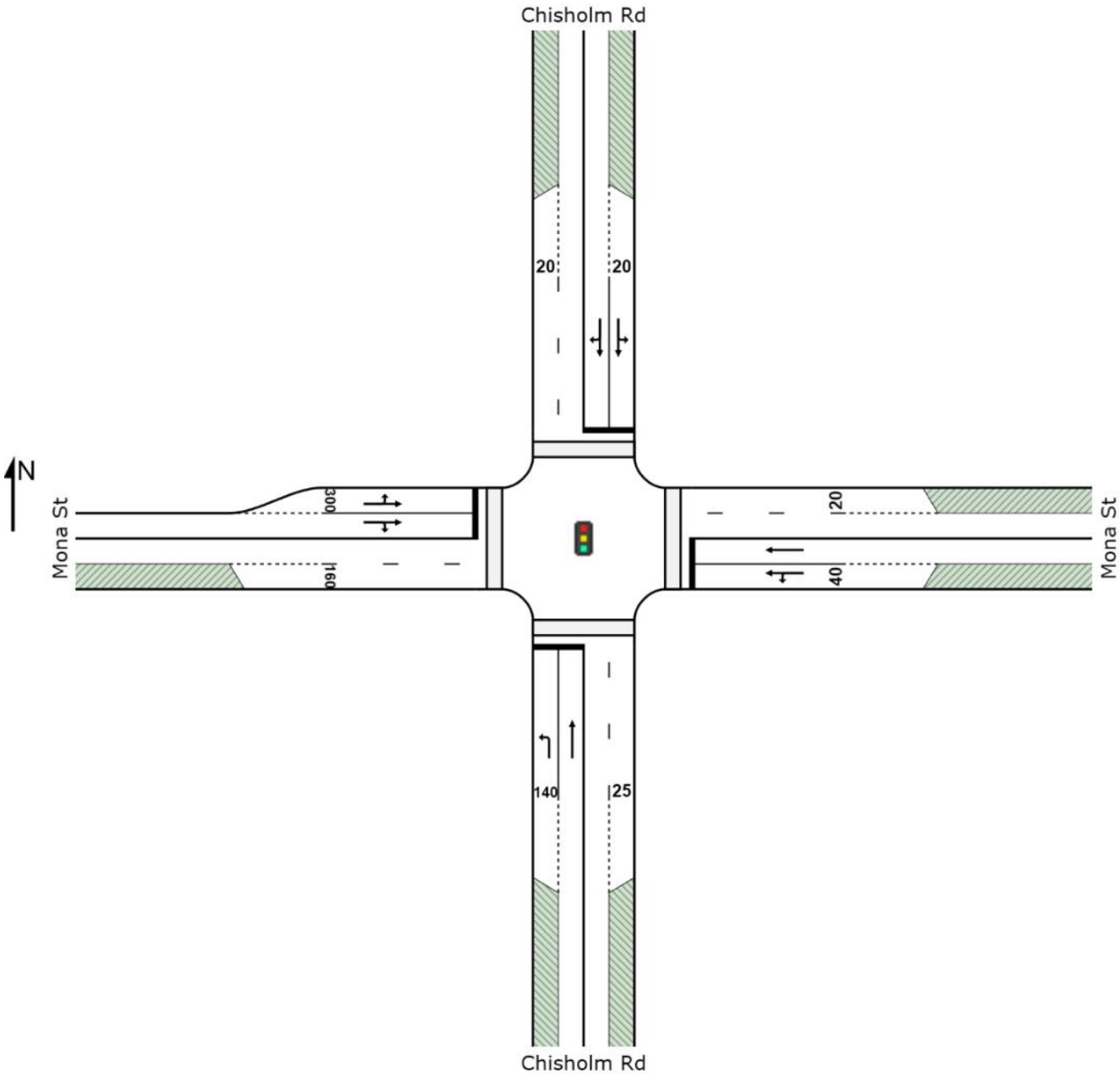
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

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

SITE LAYOUT

Site: Mona Street / Chrisholm Road 2017AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated



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Project: \\Jacobs.com\ANZ\IE\Projects\04_Eastern\IA162400\06 Technical\Sidra Modelling\Intersections (BASE & Future & West Lane Extension) v2.sip6

MOVEMENT SUMMARY

Site: Mona Street / Chrisholm Road 2017AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 85 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Chisholm Rd											
1	L2	395	2.8	0.288	8.1	LOS A	5.1	36.5	0.34	0.65	44.6
2	T1	106	2.8	0.524	40.9	LOS C	4.4	31.6	0.99	0.77	32.1
Approach		501	2.8	0.524	15.1	LOS B	5.1	36.5	0.48	0.67	41.2
East: Mona St											
4	L2	8	2.8	0.740	48.5	LOS D	6.6	47.3	1.00	0.89	31.0
5	T1	314	2.8	0.851	46.3	LOS D	8.1	58.2	1.00	0.96	30.6
Approach		322	2.8	0.851	46.4	LOS D	8.1	58.2	1.00	0.95	30.6
North: Chisholm Rd											
7	L2	1	2.8	0.197	43.6	LOS D	1.6	11.3	0.95	0.70	32.4
8	T1	74	2.8	0.850	44.8	LOS D	4.8	34.2	0.97	0.83	30.6
9	R2	64	2.8	0.850	55.8	LOS D	4.8	34.2	1.00	0.98	28.6
Approach		139	2.8	0.850	49.9	LOS D	4.8	34.2	0.98	0.90	29.6
West: Mona St											
10	L2	337	2.8	0.246	8.0	LOS A	4.2	29.9	0.32	0.64	44.7
11	T1	677	2.8	0.843	15.3	LOS B	31.6	226.3	0.82	0.93	40.6
12	R2	383	2.8	0.843	19.9	LOS B	31.6	226.3	0.82	0.93	40.2
Approach		1397	2.8	0.843	14.8	LOS B	31.6	226.3	0.70	0.86	41.4
All Vehicles		2359	2.8	0.851	21.2	LOS B	31.6	226.3	0.71	0.83	38.6

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	13	36.7	LOS D	0.0	0.0	0.93	0.93
P2	East Full Crossing	13	36.7	LOS D	0.0	0.0	0.93	0.93
P3	North Full Crossing	13	36.7	LOS D	0.0	0.0	0.93	0.93
P4	West Full Crossing	13	36.7	LOS D	0.0	0.0	0.93	0.93
All Pedestrians		51	36.7	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.

LANE SUMMARY

Site: Mona Street / Chrisholm Road 2017PM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 45 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	519	2.8	850	0.611	100	14.5	LOS B	8.8	62.7	Short (P)	140	0.0	NA
Lane 2	114	2.8	298	0.382	100	19.7	LOS B	2.4	17.3	Full	500	0.0	0.0
Approach	633	2.8		0.611		15.4	LOS B	8.8	62.7				
East: Mona St													
Lane 1	319	2.8	510	0.626	87[6]	17.0	LOS B	6.6	47.3	Short (P)	40	0.0	NA
Lane 2	368	2.8	511	0.721	100	18.5	LOS B	8.2	58.7	Full	500	0.0	0.0
Approach	687	2.8		0.721		17.8	LOS B	8.2	58.7				
North: Chisholm Rd													
Lane 1	50	2.8	297	0.169	23[6]	19.1	LOS B	1.0	7.3	Short (P)	20	0.0	NA
Lane 2	146	2.8	200	0.729	100	28.1	LOS B	3.6	25.8	Full	500	0.0	0.0
Approach	196	2.8		0.729		25.8	LOS B	3.6	25.8				
West: Mona St													
Lane 1	166	2.8	1057	0.157	22[6]	9.0	LOS A	1.7	12.2	Short	60	0.0	NA
Lane 2	526	2.8	723	0.727	100	14.5	LOS A	9.5	68.4	Full	500	0.0	0.0
Approach	692	2.8		0.727		13.2	LOS A	9.5	68.4				
Intersection	2207	2.8		0.729		16.4	LOS B	9.5	68.4				

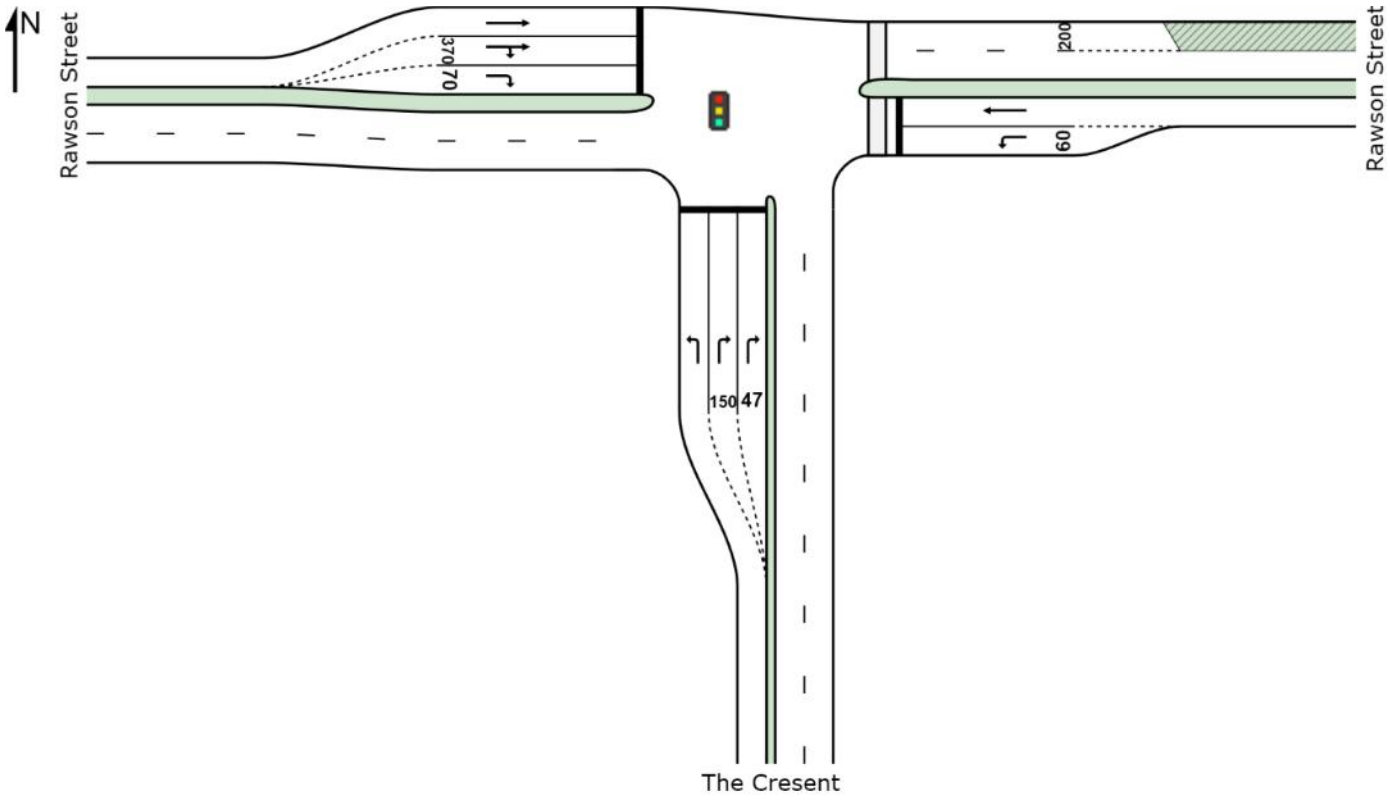
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Rawson Street / The Crescent 2017AM

Rawson St / The Crescent
Signals - Fixed Time Isolated



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LANE SUMMARY

Site: Rawson Street / The Crescent 2017AM

Rawson St / The Crescent
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: The Cresent													
Lane 1	597	5.0	971	0.614	100	23.5	LOS B	23.7	173.1	Full	500	0.0	0.0
Lane 2	337	5.0	426[1]	0.791	100	44.2	LOS D	17.7	129.1	Short	150	0.0	NA
Lane 3	337	5.0	426[1]	0.791	100	44.2	LOS D	17.7	129.1	Short	47	0.0	NA
Approach	1271	5.0		0.791		34.5	LOS C	23.7	173.1				
East: Rawson Street													
Lane 1	341	5.0	1315	0.259	100	10.1	LOS A	6.4	46.9	Short	60	0.0	NA
Lane 2	381	5.0	488[1]	0.780	100	36.5	LOS C	19.0	138.5	Full	500	0.0	0.0
Approach	722	5.0		0.780		24.1	LOS B	19.0	138.5				
West: Rawson Street													
Lane 1	218	5.0	1086	0.201	25[5]	12.9	LOS A	6.0	43.8	Full	500	0.0	0.0
Lane 2	241	5.0	299	0.805	100	62.0	LOS E	14.7	107.4	Short	370	0.0	NA
Lane 3	241	5.0	299	0.805	100	62.0	LOS E	14.7	107.4	Short	70	0.0	NA
Approach	699	5.0		0.805		46.7	LOS D	14.7	107.4				
Intersection	2692	5.0		0.805		34.9	LOS C	23.7	173.1				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

LANE SUMMARY

Site: Rawson Street / The Crescent 2017PM

Rawson St / The Crescent
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: The Cresent													
Lane 1	309	5.0	1121	0.276	100	14.2	LOS A	8.0	58.8	Full	500	0.0	0.0
Lane 2	228	5.0	401[1]	0.570	100	47.4	LOS D	11.9	86.6	Short	150	0.0	NA
Lane 3	228	5.0	401[1]	0.570	100	47.4	LOS D	11.9	86.6	Short	47	0.0	NA
Approach	766	5.0		0.570		34.0	LOS C	11.9	86.6				
East: Rawson Street													
Lane 1	528	5.0	761[1]	0.694	100	22.2	LOS B	19.1	139.5	Short	60	0.0	NA
Lane 2	287	5.0	519	0.553	100	40.2	LOS C	14.4	105.4	Full	500	0.0	0.0
Approach	816	5.0		0.694		28.5	LOS C	19.1	139.5				
West: Rawson Street													
Lane 1	455	5.0	1259	0.361	53[5]	9.3	LOS A	11.4	83.5	Full	500	0.0	0.0
Lane 2	377	5.0	550[1]	0.686	100	40.0	LOS C	18.4	134.4	Short	370	0.0	NA
Lane 3	377	5.0	550[1]	0.686	100	40.0	LOS C	18.4	134.4	Short	70	0.0	NA
Approach	1209	5.0		0.686		28.5	LOS B	18.4	134.4				
Intersection	2792	5.0		0.694		30.0	LOS C	19.1	139.5				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

LANE SUMMARY

Site: Mona Street / Clyde Street 2017AM

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	224	2.0	1007	0.223	20[6]	17.6	LOS B	7.5	53.6	Short	150	0.0	NA
Lane 2	811	2.0	728	1.115	100	145.2	LOS F	83.7	595.9	Full	500	0.0	20.9
Approach	1036	2.0		1.115		117.5	LOS F	83.7	595.9				
East: Mona St													
Lane 1	260	2.0	1437	0.181	100	8.3	LOS A	4.0	28.6	Short (P)	50	0.0	NA
Lane 2	609	2.0	552[1]	1.105	100	190.4	LOS F	75.0	534.2	Full	500	0.0	11.0
Approach	869	2.0		1.105		136.0	LOS F	75.0	534.2				
North: Clyde St													
Lane 1	946	2.0	907[1]	1.043	100	123.4	LOS F	100.7	717.1	Short	35	0.0	NA
Lane 2	138	2.0	237	0.582	56[5]	59.5	LOS E	8.5	60.4	Full	500	0.0	37.9[8]
Approach	1084	2.0		1.043		115.2	LOS F	100.7	717.1				
Intersection	2989	2.0		1.115		122.1	LOS F	100.7	717.1				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects
8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.

LANE SUMMARY

Site: Do Minimum - Mona Street / Clyde Street PM

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 75 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	202	2.0	821	0.246	23[6]	14.8	LOS B	4.7	33.7	Short	50	0.0	NA
Lane 2	468	2.0	441	1.061	100	102.3	LOS F	33.9	241.1	Full	500	0.0	0.0
Approach	669	2.0		1.061		75.9	LOS F	33.9	241.1				
East: Mona St													
Lane 1	586	2.0	1147	0.511	100	12.8	LOS A	11.7	83.6	Short (P)	150	0.0	NA
Lane 2	849	2.0	757	1.122	100	165.8	LOS F	82.3	586.1	Full	500	0.0	19.4
Approach	1436	2.0		1.122		103.3	LOS F	82.3	586.1				
North: Clyde St													
Lane 1	701	2.0	1004[1]	0.698	71[5]	11.2	LOS A	12.1	86.3	Short	35	0.0	NA
Lane 2	278	2.0	284[1]	0.979	100	66.9	LOS E	15.2	108.2	Full	500	0.0	0.0
Approach	979	2.0		0.979		27.0	LOS B	15.2	108.2				
Intersection	3084	2.0		1.122		73.1	LOS F	82.3	586.1				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Do Minimum - Mona Street / Chrisholm Road PM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 55 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	519	2.8	1092	0.475	100	11.3	LOS A	7.9	56.4	Short (P)	140	0.0	NA
Lane 2	239	2.8	731	0.327	100	13.2	LOS A	4.6	33.1	Full	500	0.0	0.0
Approach	758	2.8		0.475		11.9	LOS A	7.9	56.4				
East: Mona St													
Lane 1	319	2.8	347	0.919	87[6]	38.1	LOS C	11.4	81.8	Short (P)	40	0.0	NA
Lane 2	368	2.8	348	1.057	100	100.2	LOS F	23.0	165.0	Full	500	0.0	0.0
Approach	687	2.8		1.057		71.4	LOS F	23.0	165.0				
North: Chisholm Rd													
Lane 1	197	2.8	731	0.270	23[6]	12.9	LOS A	3.7	26.6	Short (P)	20	0.0	NA
Lane 2	302	2.8	259[1]	1.165	100	203.3	LOS F	30.0	215.1	Full	500	0.0	0.0
Approach	499	2.8		1.165		128.1	LOS F	30.0	215.1				
West: Mona St													
Lane 1	371	2.8	728	0.509	46[5]	18.3	LOS B	7.7	55.0	Short	60	0.0	NA
Lane 2	540	2.8	486	1.112	100	133.3	LOS F	40.6	291.2	Full	500	0.0	0.0
Approach	911	2.8		1.112		86.5	LOS F	40.6	291.2				
Intersection	2855	2.8		1.165		70.3	LOS E	40.6	291.2				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Do Minimum - Mona Street / Chrisholm Road AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	395	2.8	1411	0.280	100	7.3	LOS A	4.4	31.3	Short (P)	140	0.0	NA
Lane 2	168	2.8	575	0.293	100	23.4	LOS B	5.1	36.6	Full	500	0.0	0.0
Approach	563	2.8		0.293		12.1	LOS A	5.1	36.6				
East: Mona St													
Lane 1	150	2.8	143	1.044	87[6]	104.2	LOS F	10.5	75.1	Short (P)	40	0.0	NA
Lane 2	173	2.8	144	1.201	100	234.3	LOS F	19.9	142.5	Full	500	0.0	0.0
Approach	322	2.8		1.201		173.9	LOS F	19.9	142.5				
North: Chisholm Rd													
Lane 1	157	2.8	574	0.273	23[5]	23.2	LOS B	4.7	33.8	Short (P)	20	0.0	NA
Lane 2	255	2.8	213[1]	1.196	100	245.0	LOS F	30.5	218.8	Full	500	0.0	0.0
Approach	412	2.8		1.196		160.5	LOS F	30.5	218.8				
West: Mona St													
Lane 1	459	2.8	1001	0.458	40[5]	16.2	LOS B	10.8	77.1	Short	300	0.0	NA
Lane 2	1060	2.8	917	1.156	100	173.5	LOS F	99.1	710.3	Full	500	0.0	37.1
Approach	1519	2.8		1.156		126.0	LOS F	99.1	710.3				
Intersection	2816	2.8		1.201		113.8	LOS F	99.1	710.3				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Do Minimum - Manchester Road / Cumberland Road AM

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Rd													
Lane 1[d]	754	0.0	1056	0.713	100	9.8	LOS A	8.7	61.1	Full	500	0.0	0.0
Approach	754	0.0		0.713		9.8	LOS A	8.7	61.1				
East: Normanby Rd													
Lane 1[d]	86	0.0	731	0.118	100	8.3	LOS A	0.7	4.9	Full	500	0.0	0.0
Approach	86	0.0		0.118		8.3	LOS A	0.7	4.9				
North: Cumberland Rd													
Lane 1[d]	566	0.0	1045	0.542	100	8.5	LOS A	4.3	30.0	Full	500	0.0	0.0
Approach	566	0.0		0.542		8.5	LOS A	4.3	30.0				
West: Manchester Rd													
Lane 1[d]	708	0.0	614	1.153	100	170.6	LOS F	80.2	561.7	Full	500	0.0	8.5
Approach	708	0.0		1.153		170.6	LOS F	80.2	561.7				
Intersection	2115	0.0		1.153		63.3	LOS E	80.2	561.7				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

LANE SUMMARY

Site: Do Minimum- Manchester Road / Cumberland Road PM

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Rd													
Lane 1[d]	438	0.0	898	0.488	100	8.7	LOS A	3.7	25.8	Full	500	0.0	0.0
Approach	438	0.0		0.488		8.7	LOS A	3.7	25.8				
East: Normanby Rd													
Lane 1[d]	128	0.0	544	0.236	100	11.0	LOS A	1.6	11.1	Full	500	0.0	0.0
Approach	128	0.0		0.236		11.0	LOS A	1.6	11.1				
North: Cumberland Rd													
Lane 1[d]	813	0.0	1172	0.694	100	8.7	LOS A	7.5	52.2	Full	500	0.0	0.0
Approach	813	0.0		0.694		8.7	LOS A	7.5	52.2				
West: Manchester Rd													
Lane 1[d]	427	0.0	911	0.469	100	7.7	LOS A	3.5	24.4	Full	500	0.0	0.0
Approach	427	0.0		0.469		7.7	LOS A	3.5	24.4				
Intersection	1806	0.0		0.694		8.6	LOS A	7.5	52.2				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

LANE SUMMARY

Site: Do Minimum - Rawson Street / The Crescent AM

Rawson St / The Crescent
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: The Cresent													
Lane 1	627	5.0	1076	0.583	100	19.1	LOS B	22.3	162.5	Full	500	0.0	0.0
Lane 2	465	5.0	463[1]	1.006	100	128.3	LOS F	43.6	318.6	Short	150	0.0	NA[8]
Lane 3	465	5.0	463[1]	1.006	100	128.3	LOS F	43.6	318.6	Short	47	0.0	NA
Approach	1558	5.0		1.006		84.3	LOS F	43.6	318.6				
East: Rawson Street													
Lane 1	473	5.0	1360	0.348	100	9.6	LOS A	8.9	64.8	Short	60	0.0	NA
Lane 2	381	5.0	385[1]	0.989	100	89.7	LOS F	30.4	221.6	Full	500	0.0	0.0
Approach	854	5.0		0.989		45.4	LOS D	30.4	221.6				
West: Rawson Street													
Lane 1	218	5.0	929	0.235	24[5]	18.5	LOS B	7.2	52.6	Full	500	0.0	0.0
Lane 2	248	5.0	254	0.978	100	94.8	LOS F	19.6	143.2	Short	370	0.0	NA
Lane 3	248	5.0	254	0.978	100	94.8	LOS F	19.6	143.2	Short	70	0.0	NA
Approach	715	5.0		0.978		71.6	LOS F	19.6	143.2				
Intersection	3126	5.0		1.006		70.8	LOS F	43.6	318.6				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.

LANE SUMMARY

Site: Do Minimum - Rawson Street / The Crescent PM

Rawson St / The Crescent
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: The Cresent													
Lane 1	324	5.0	1091	0.297	100	15.3	LOS B	8.9	65.0	Full	500	0.0	0.0
Lane 2	291	5.0	358[1]	0.812	100	52.1	LOS D	16.6	121.1	Short	150	0.0	NA
Lane 3	291	5.0	358[1]	0.812	100	52.1	LOS D	16.6	121.1	Short	47	0.0	NA
Approach	906	5.0		0.812		39.0	LOS C	16.6	121.1				
East: Rawson Street													
Lane 1	745	5.0	854[1]	0.873	100	32.0	LOS C	35.5	259.3	Short	60	0.0	NA
Lane 2	287	5.0	551	0.522	100	38.3	LOS C	14.1	102.7	Full	500	0.0	0.0
Approach	1033	5.0		0.873		33.7	LOS C	35.5	259.3				
West: Rawson Street													
Lane 1	455	5.0	1212	0.375	42[5]	10.7	LOS A	12.3	89.9	Full	500	0.0	0.0
Lane 2	390	5.0	438[1]	0.890	100	59.9	LOS E	24.7	180.0	Short	370	0.0	NA
Lane 3	390	5.0	438[1]	0.890	100	59.9	LOS E	24.7	180.0	Short	70	0.0	NA
Approach	1235	5.0		0.890		41.8	LOS C	24.7	180.0				
Intersection	3174	5.0		0.890		38.4	LOS C	35.5	259.3				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

LANE SUMMARY

Site: Do Minimum - Manchester Rd / Chisholm Rd AM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	579	2.0	1831	0.316	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	579	2.0		0.316		4.6	NA	0.0	0.0				
East: Manchester Rd													
Lane 1	298	2.0	820	0.363	100	8.8	LOS A	2.0	14.5	Full	500	0.0	0.0
Approach	298	2.0		0.363		8.8	LOS A	2.0	14.5				
West: Manchester Rd													
Lane 1	644	2.0	706	0.912	100	20.1	LOS B	15.6	111.2	Full	500	0.0	0.0
Approach	644	2.0		0.912		20.1	LOS B	15.6	111.2				
Intersection	1521	2.0		0.912		12.0	NA	15.6	111.2				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: Do Minimum - Manchester Rd / Chisholm Rd PM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)

Lane Use and Performance

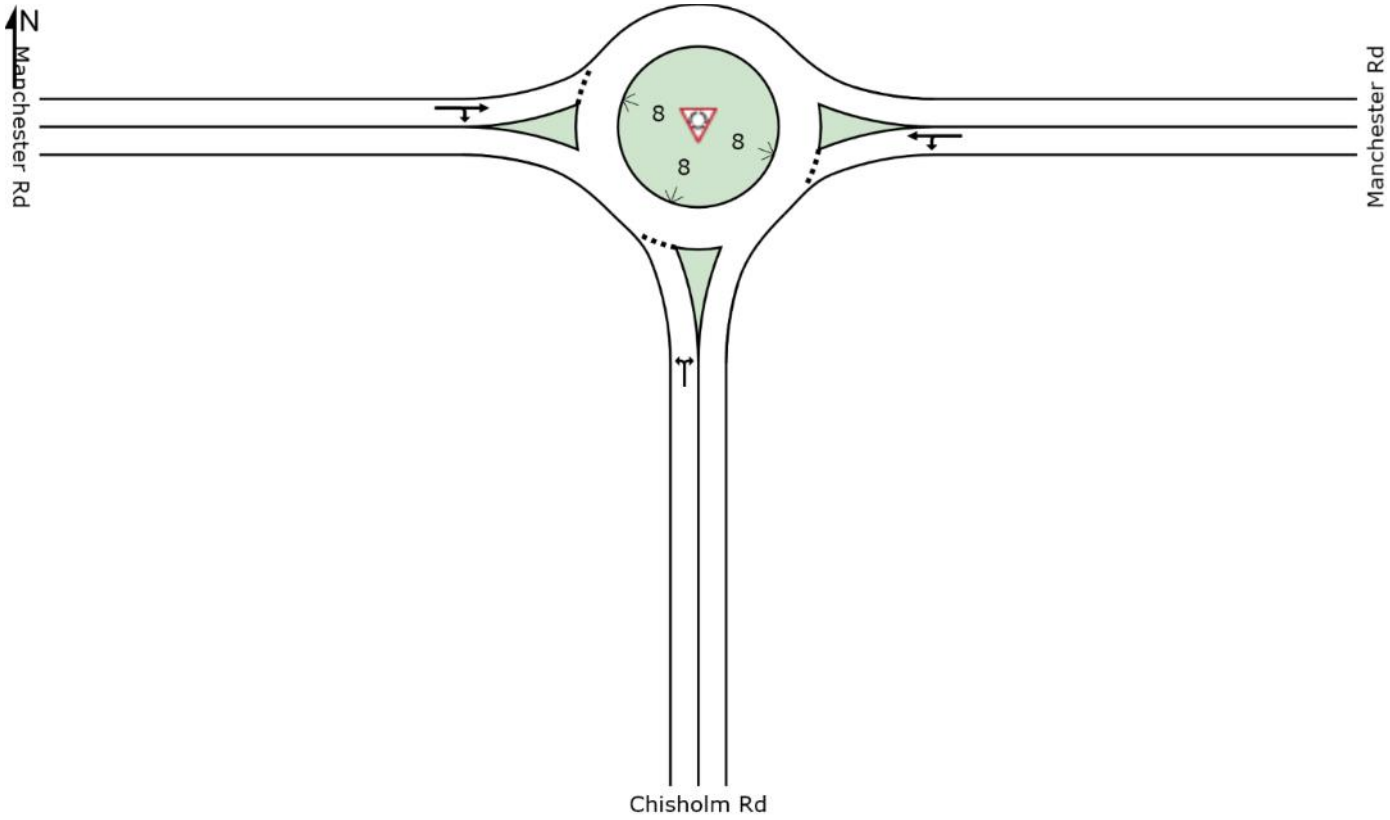
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	557	2.0	1831	0.304	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	557	2.0		0.304		4.6	NA	0.0	0.0				
East: Manchester Rd													
Lane 1	492	2.0	948	0.518	100	9.4	LOS A	4.0	28.6	Full	500	0.0	0.0
Approach	492	2.0		0.518		9.4	LOS A	4.0	28.6				
West: Manchester Rd													
Lane 1	551	2.0	597	0.922	100	25.4	LOS B	14.9	106.1	Full	500	0.0	0.0
Approach	551	2.0		0.922		25.4	LOS B	14.9	106.1				
Intersection	1599	2.0		0.922		13.3	NA	14.9	106.1				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: Option 1 - Manchester Rd / Chisholm Rd AM - Conversion

Manchester Rd / Chisholm Rd
Roundabout



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LANE SUMMARY

Site: Option 1 - Manchester Rd / Chisholm Rd AM - Conversion

Manchester Rd / Chisholm Rd
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1[d]	579	2.0	1076	0.538	100	7.8	LOS A	4.9	35.2	Full	500	0.0	0.0
Approach	579	2.0		0.538		7.8	LOS A	4.9	35.2				
East: Manchester Rd													
Lane 1[d]	298	2.0	933	0.319	100	5.9	LOS A	2.4	17.0	Full	500	0.0	0.0
Approach	298	2.0		0.319		5.9	LOS A	2.4	17.0				
West: Manchester Rd													
Lane 1[d]	644	2.0	914	0.705	100	8.8	LOS A	9.2	65.7	Full	500	0.0	0.0
Approach	644	2.0		0.705		8.8	LOS A	9.2	65.7				
Intersection	1521	2.0		0.705		7.8	LOS A	9.2	65.7				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

LANE SUMMARY

Site: Option 1 - Manchester Rd / Chisholm Rd PM - Conversion

Manchester Rd / Chisholm Rd
Roundabout

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1[d]	557	2.0	900	0.619	100	9.8	LOS A	6.6	47.3	Full	500	0.0	0.0
Approach	557	2.0		0.619		9.8	LOS A	6.6	47.3				
East: Manchester Rd													
Lane 1[d]	492	2.0	931	0.528	100	6.9	LOS A	4.6	32.6	Full	500	0.0	0.0
Approach	492	2.0		0.528		6.9	LOS A	4.6	32.6				
West: Manchester Rd													
Lane 1[d]	551	2.0	1078	0.510	100	4.3	LOS A	4.7	33.6	Full	500	0.0	0.0
Approach	551	2.0		0.510		4.3	LOS A	4.7	33.6				
Intersection	1599	2.0		0.619		7.0	LOS A	6.6	47.3				

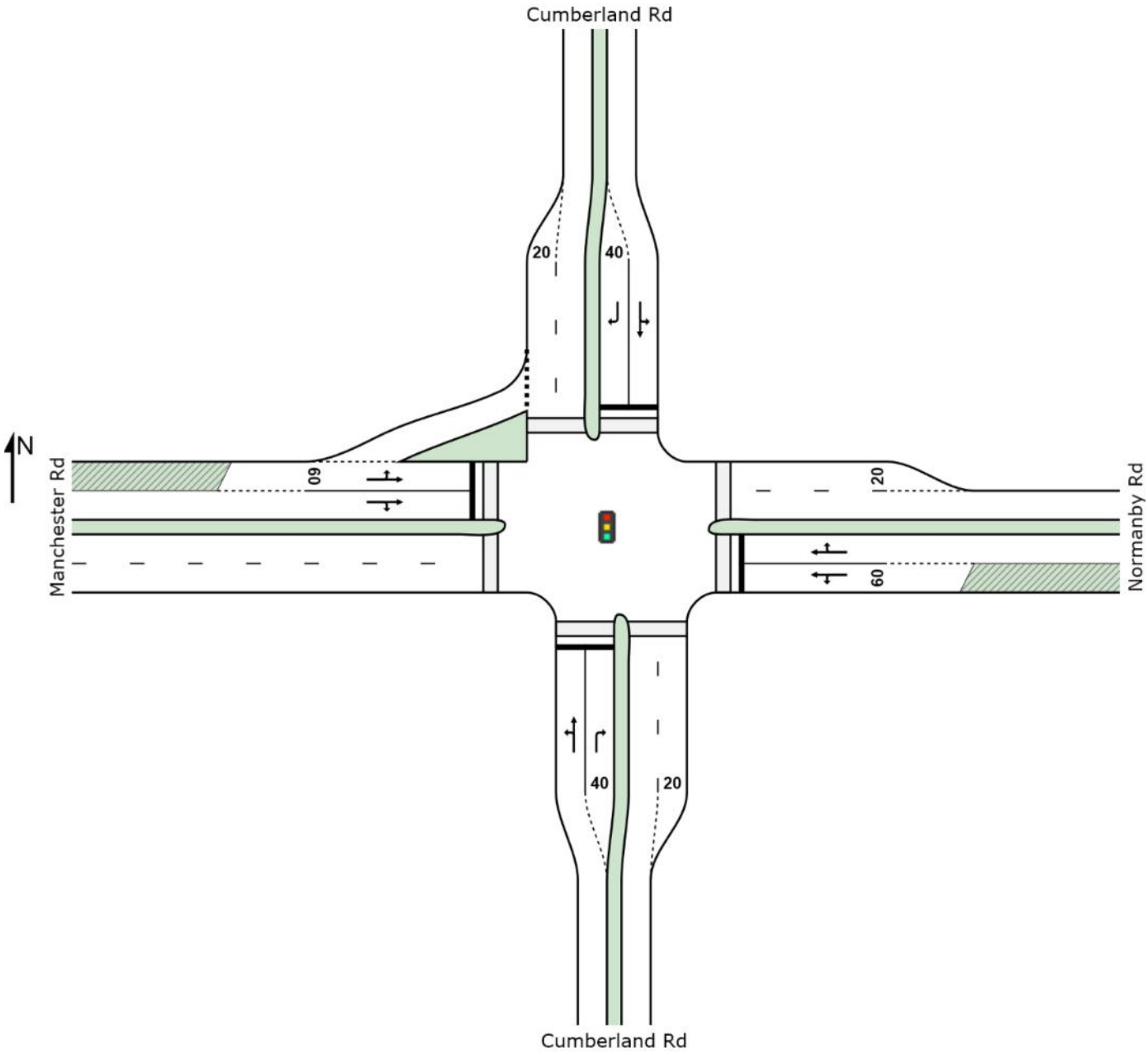
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

SITE LAYOUT

Site: Option 1 - Manchester Road / Cumberland Road AM - Conversion

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Signals - Fixed Time Isolated



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Project: \\Jacobs.com\ANZ\IE\Projects\04_Eastern\IA162400\06 Technical\Sidra Modelling\Intersections (Bridge) v2.sip6

LANE SUMMARY

Site: Option 1 - Manchester Road / Cumberland Road AM - Conversion

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Signals - Fixed Time Isolated Cycle Time = 40 seconds (Practical Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Rd													
Lane 1	592	0.0	1057	0.559	100	7.4	LOS A	8.0	55.7	Full	500	0.0	0.0
Lane 2	162	0.0	560	0.289	100	13.4	LOS A	2.1	14.7	Short	40	0.0	NA
Approach	754	0.0		0.559		8.7	LOS A	8.0	55.7				
East: Normanby Rd													
Lane 1	54	0.0	337	0.159	100	21.6	LOS B	0.9	6.6	Short (P)	60	0.0	NA
Lane 2	33	0.0	332	0.098	62[5]	16.3	LOS B	0.6	4.0	Full	500	0.0	0.0
Approach	86	0.0		0.159		19.6	LOS B	0.9	6.6				
North: Cumberland Rd													
Lane 1	318	0.0	1060	0.300	100	6.0	LOS A	3.6	25.0	Full	500	0.0	0.0
Lane 2	248	0.0	374	0.664	100	19.9	LOS B	4.8	33.3	Short	40	0.0	NA
Approach	566	0.0		0.664		12.1	LOS A	4.8	33.3				
West: Manchester Rd													
Lane 1	571	0.0	832	0.685	100	11.6	LOS A	7.4	51.8	Short (P)	60	0.0	NA
Lane 2	137	0.0	289	0.473	69[5]	19.9	LOS B	2.6	18.3	Full	500	0.0	0.0
Approach	707	0.0		0.685		13.2	LOS A	7.4	51.8				
Intersection	2114	0.0		0.685		11.6	LOS A	8.0	55.7				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program

LANE SUMMARY

Site: Option 1 - Manchester Road / Cumberland Road PM - Conversion

Cumberland Rd / Manchester Rd / The Crescent / Normanby Rd
Signals - Fixed Time Isolated Cycle Time = 30 seconds (Practical Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Cumberland Rd													
Lane 1	339	0.0	800	0.424	100	8.5	LOS A	3.8	26.3	Full	500	0.0	0.0
Lane 2	100	0.0	366	0.273	100	16.6	LOS B	1.3	9.2	Short	60	0.0	NA
Approach	439	0.0		0.424		10.3	LOS A	3.8	26.3				
East: Normanby Rd													
Lane 1	78	0.0	385	0.202	100	17.2	LOS B	1.0	7.2	Short (P)	60	0.0	NA
Lane 2	51	0.0	379	0.133	66[5]	11.9	LOS A	0.7	4.6	Full	500	0.0	0.0
Approach	128	0.0		0.202		15.1	LOS B	1.0	7.2				
North: Cumberland Rd													
Lane 1	463	0.0	808	0.573	100	8.0	LOS A	5.6	38.9	Full	500	0.0	0.0
Lane 2	349	0.0	438	0.798	100	20.9	LOS B	6.1	42.7	Short	60	0.0	NA
Approach	813	0.0		0.798		13.6	LOS A	6.1	42.7				
West: Manchester Rd													
Lane 1	321	0.0	991	0.324	100	8.0	LOS A	1.7	11.8	Short (P)	60	0.0	NA
Lane 2	106	0.0	347	0.307	95[5]	14.2	LOS A	1.5	10.2	Full	500	0.0	0.0
Approach	427	0.0		0.324		9.5	LOS A	1.7	11.8				
Intersection	1807	0.0		0.798		11.9	LOS A	6.1	42.7				

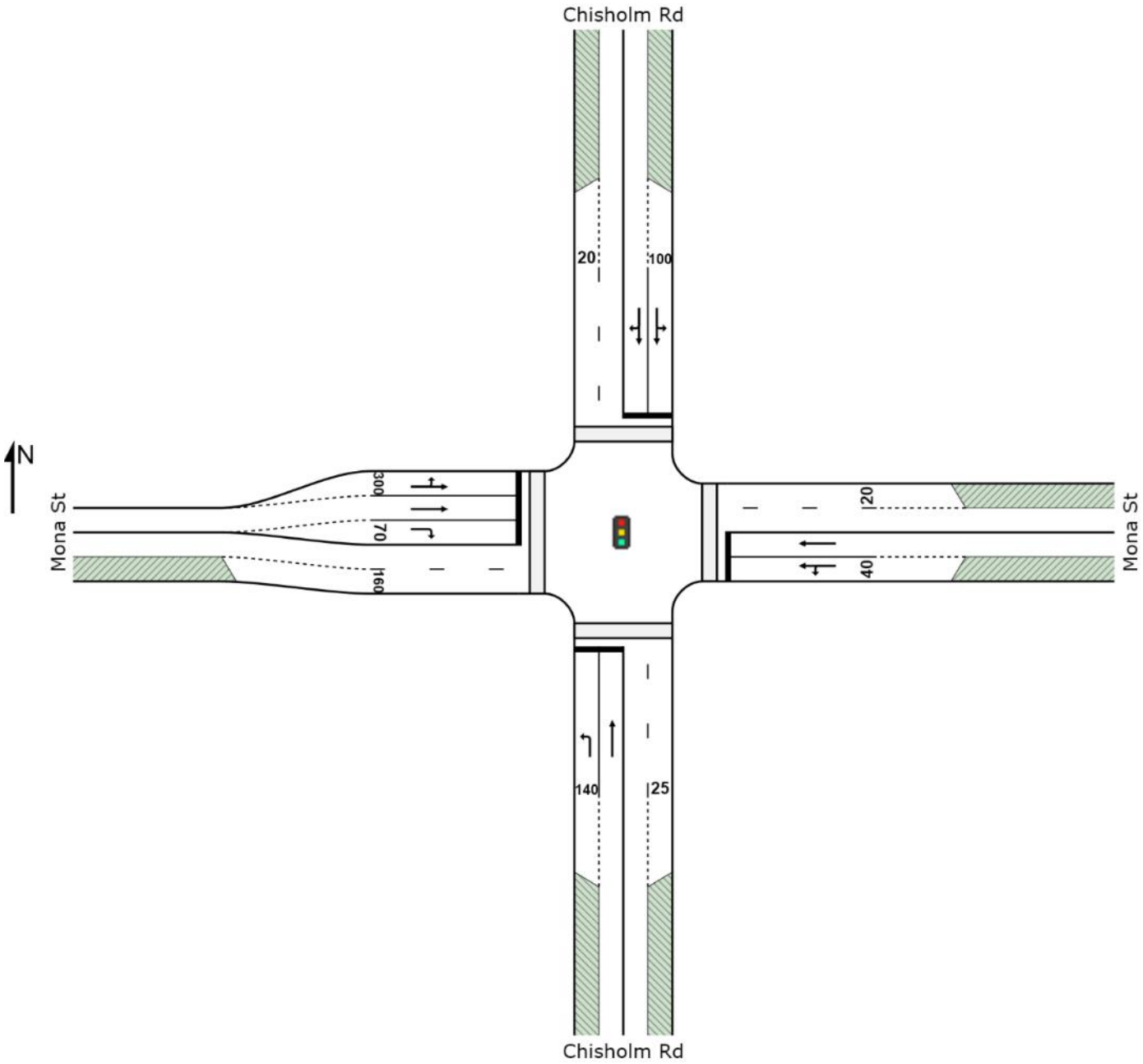
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

5 Lane under-utilisation found by the program

SITE LAYOUT

Site: Option 1 - Mona Street / Chrisholm Road AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated



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MOVEMENT SUMMARY

Site: Option 1 - Mona Street / Chrisholm Road AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 45 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total 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: Chisholm Rd											
1	L2	395	2.8	0.361	9.6	LOS A	4.5	32.2	0.54	0.71	43.8
2	T1	168	2.8	0.283	13.1	LOS A	2.9	20.7	0.80	0.64	42.5
Approach		563	2.8	0.361	10.6	LOS A	4.5	32.2	0.62	0.69	43.4
East: Mona St											
4	L2	8	2.8	0.587	26.4	LOS B	3.4	24.4	0.98	0.81	38.1
5	T1	314	2.8	0.676	22.3	LOS B	4.1	29.1	0.99	0.85	38.3
Approach		322	2.8	0.676	22.4	LOS B	4.1	29.1	0.99	0.85	38.3
North: Chisholm Rd											
7	L2	1	2.8	0.216	17.3	LOS B	2.2	15.5	0.78	0.62	42.2
8	T1	156	2.8	0.892	16.1	LOS B	8.8	63.1	0.82	0.73	40.7
9	R2	255	2.8	0.892	36.0	LOS C	8.8	63.1	1.00	1.22	33.5
Approach		412	2.8	0.892	28.4	LOS B	8.8	63.1	0.93	1.03	35.9
West: Mona St											
10	L2	459	2.8	0.597	15.8	LOS B	8.0	57.7	0.82	0.81	40.8
11	T1	677	2.8	0.837	18.8	LOS B	16.7	119.9	0.96	1.04	39.8
12	R2	383	2.8	0.850	26.9	LOS B	8.3	59.4	1.00	1.11	36.3
Approach		1519	2.8	0.850	19.9	LOS B	16.7	119.9	0.93	0.99	39.1
All Vehicles		2816	2.8	0.892	19.6	LOS B	16.7	119.9	0.87	0.92	39.3

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

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P1	South Full Crossing	13	16.9	LOS B	0.0	0.0	0.87	0.87
P2	East Full Crossing	13	16.9	LOS B	0.0	0.0	0.87	0.87
P3	North Full Crossing	13	16.9	LOS B	0.0	0.0	0.87	0.87
P4	West Full Crossing	13	16.9	LOS B	0.0	0.0	0.87	0.87
All Pedestrians		51	16.9	LOS B			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.

LANE SUMMARY

Site: Option 1- Mona Street / Chrisholm Road PM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 60 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	519	2.8	1092	0.475	100	11.9	LOS A	8.5	61.3	Short (P)	140	0.0	NA
Lane 2	239	2.8	766	0.312	100	13.5	LOS A	4.9	34.8	Full	500	0.0	0.0
Approach	758	2.8		0.475		12.4	LOS A	8.5	61.3				
East: Mona St													
Lane 1	329	2.8	382	0.860	87[6]	33.3	LOS C	11.3	81.2	Short (P)	40	0.0	NA
Lane 2	358	2.8	362[1]	0.990	100	62.0	LOS E	17.6	126.1	Full	500	0.0	0.0
Approach	687	2.8		0.990		48.3	LOS D	17.6	126.1				
North: Chisholm Rd													
Lane 1	197	2.8	765	0.258	24[6]	13.2	LOS A	3.9	28.0	Short (P)	100	0.0	NA
Lane 2	302	2.8	284	1.063	100	122.8	LOS F	22.7	162.5	Full	500	0.0	0.0
Approach	499	2.8		1.063		79.4	LOS F	22.7	162.5				
West: Mona St													
Lane 1	658	2.8	744	0.885	95[6]	31.9	LOS C	23.5	168.3	Short	300	0.0	NA
Lane 2	82	2.8	382	0.214	23[6]	22.6	LOS B	2.0	14.6	Full	500	0.0	0.0
Lane 3	170	2.8	182	0.936	100	49.3	LOS D	6.7	47.8	Short	70	0.0	NA
Approach	911	2.8		0.936		34.3	LOS C	23.5	168.3				
Intersection	2855	2.8		1.063		39.7	LOS C	23.5	168.3				

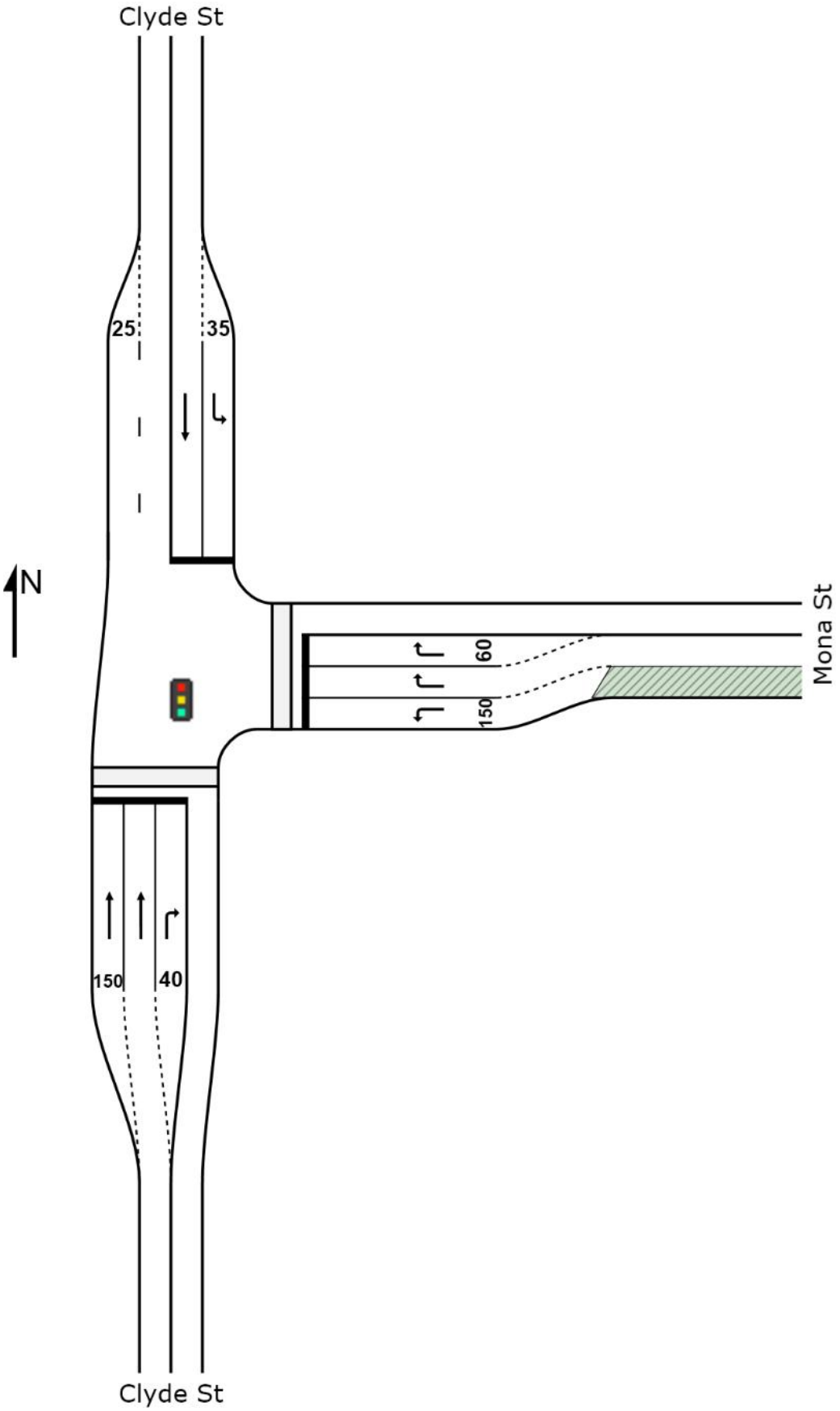
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Option 1 - Mona Street / Clyde Street AM

Clyde St / Mona St
Signals - Fixed Time Isolated



LANE SUMMARY

Site: Option 1 - Mona Street / Clyde Street AM

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	86	2.0	993	0.086	23[6]	12.3	LOS A	2.0	14.1	Short	150	0.0	NA
Lane 2	370	2.0	993	0.373	100	14.7	LOS B	10.2	72.5	Full	500	0.0	0.0
Lane 3	580	2.0	609	0.952	100	70.7	LOS F	32.9	234.0	Short	60	0.0	NA
Approach	1036	2.0		0.952		45.9	LOS D	32.9	234.0				
East: Mona St													
Lane 1	260	2.0	1272	0.204	100	10.0	LOS A	4.2	30.0	Short (P)	150	0.0	NA
Lane 2	122	2.0	655	0.186	22[6]	27.1	LOS B	3.9	27.6	Full	500	0.0	0.0
Lane 3	488	2.0	579[1]	0.842	100	40.8	LOS C	22.7	161.8	Short	40	0.0	NA
Approach	869	2.0		0.842		29.7	LOS C	22.7	161.8				
North: Clyde St													
Lane 1	946	2.0	988[1]	0.958	100	54.9	LOS D	56.2	400.3	Short	35	0.0	NA
Lane 2	138	2.0	344	0.400	100	38.0	LOS C	5.8	41.2	Full	500	0.0	0.0
Approach	1084	2.0		0.958		52.7	LOS D	56.2	400.3				
Intersection	2989	2.0		0.958		43.7	LOS D	56.2	400.3				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Option 1 - Mona Street / Clyde Street PM

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 75 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	77	2.0	744	0.103	23[6]	15.8	LOS B	1.8	12.7	Short	50	0.0	NA
Lane 2	331	2.0	744	0.444	100	18.5	LOS B	9.0	64.4	Full	500	0.0	0.0
Lane 3	262	2.0	274	0.958	100	65.8	LOS E	13.0	92.4	Short	60	0.0	NA
Approach	669	2.0		0.958		36.7	LOS C	13.0	92.4				
East: Mona St													
Lane 1	586	2.0	1123	0.522	100	13.4	LOS A	12.2	86.7	Short (P)	150	0.0	NA
Lane 2	172	2.0	830	0.207	22[6]	17.9	LOS B	3.8	27.0	Full	500	0.0	0.0
Lane 3	678	2.0	723[1]	0.937	100	48.3	LOS D	32.6	232.0	Short	40	0.0	NA
Approach	1436	2.0		0.937		30.4	LOS C	32.6	232.0				
North: Clyde St													
Lane 1	701	2.0	1075[1]	0.652	68[5]	9.3	LOS A	9.9	70.5	Short	35	0.0	NA
Lane 2	278	2.0	291[1]	0.956	100	57.6	LOS E	14.0	99.8	Full	500	0.0	0.0
Approach	979	2.0		0.956		23.0	LOS B	14.0	99.8				
Intersection	3084	2.0		0.958		29.4	LOS C	32.6	232.0				

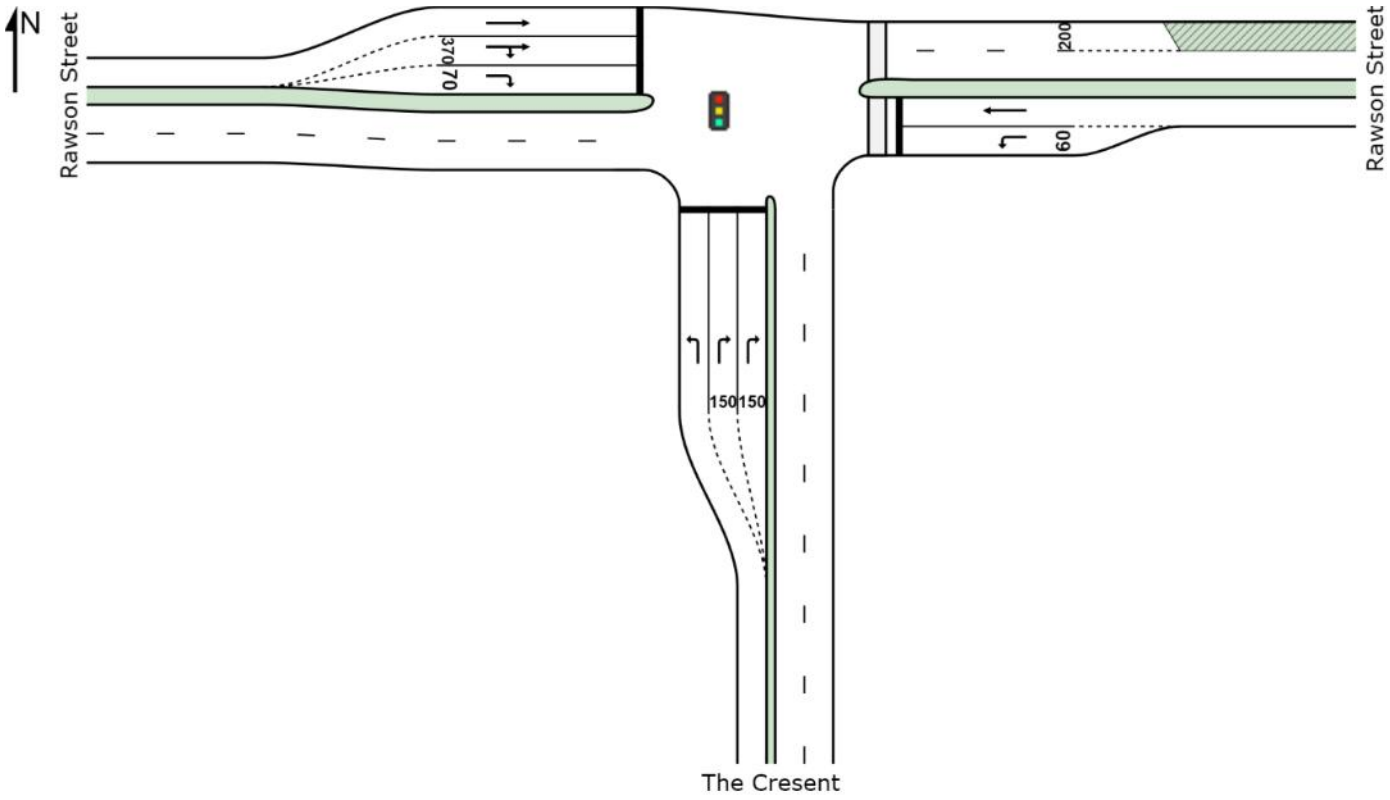
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Option 1 - Rawson Street / The Crescent AM

Rawson St / The Crescent
Signals - Fixed Time Isolated



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LANE SUMMARY

Site: Option 1 - Rawson Street / The Crescent AM

Rawson St / The Crescent
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: The Cresent													
Lane 1	625	5.0	941	0.664	100	25.6	LOS B	26.4	192.7	Full	500	0.0	0.0
Lane 2	465	5.0	553	0.841	100	51.6	LOS D	27.9	203.9	Short	150	0.0	NA[8]
Lane 3	465	5.0	553	0.841	100	51.6	LOS D	27.9	203.9	Short	150	0.0	NA
Approach	1556	5.0		0.841		41.1	LOS C	27.9	203.9				
East: Rawson Street													
Lane 1	473	5.0	1315	0.359	100	10.7	LOS A	9.8	71.6	Short	60	0.0	NA
Lane 2	381	5.0	447[1]	0.853	100	42.6	LOS D	20.7	150.8	Full	500	0.0	0.0
Approach	854	5.0		0.853		25.0	LOS B	20.7	150.8				
West: Rawson Street													
Lane 1	218	5.0	1117	0.195	23[5]	11.9	LOS A	5.8	42.0	Full	500	0.0	0.0
Lane 2	248	5.0	299	0.831	100	63.8	LOS E	15.5	113.3	Short	370	0.0	NA
Lane 3	248	5.0	299	0.831	100	63.8	LOS E	15.5	113.3	Short	70	0.0	NA
Approach	715	5.0		0.831		48.0	LOS D	15.5	113.3				
Intersection	3124	5.0		0.853		38.3	LOS C	27.9	203.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
8 Probability of Blockage has been set on the basis of a queue that overflows from an adjacent short lane.

LANE SUMMARY

Site: Option 1 - Rawson Street / The Crescent PM

Rawson St / The Crescent
Signals - Fixed Time Isolated Cycle Time = 120 seconds (User-Given Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: The Cresent													
Lane 1	324	5.0	1031	0.314	100	17.4	LOS B	9.7	70.6	Full	500	0.0	0.0
Lane 2	291	5.0	403	0.721	100	51.3	LOS D	16.2	118.6	Short	150	0.0	NA
Lane 3	291	5.0	403	0.721	100	51.3	LOS D	16.2	118.6	Short	150	0.0	NA
Approach	906	5.0		0.721		39.2	LOS C	16.2	118.6				
East: Rawson Street													
Lane 1	745	5.0	854[1]	0.873	100	32.0	LOS C	35.5	259.3	Short	60	0.0	NA
Lane 2	287	5.0	614	0.468	100	34.6	LOS C	13.4	97.5	Full	500	0.0	0.0
Approach	1033	5.0		0.873		32.7	LOS C	35.5	259.3				
West: Rawson Street													
Lane 1	455	5.0	1275	0.357	40[5]	8.8	LOS A	11.2	81.4	Full	500	0.0	0.0
Lane 2	390	5.0	438[1]	0.890	100	59.9	LOS E	24.7	180.0	Short	370	0.0	NA
Lane 3	390	5.0	438[1]	0.890	100	59.9	LOS E	24.7	180.0	Short	70	0.0	NA
Approach	1235	5.0		0.890		41.1	LOS C	24.7	180.0				
Intersection	3174	5.0		0.890		37.8	LOS C	35.5	259.3				

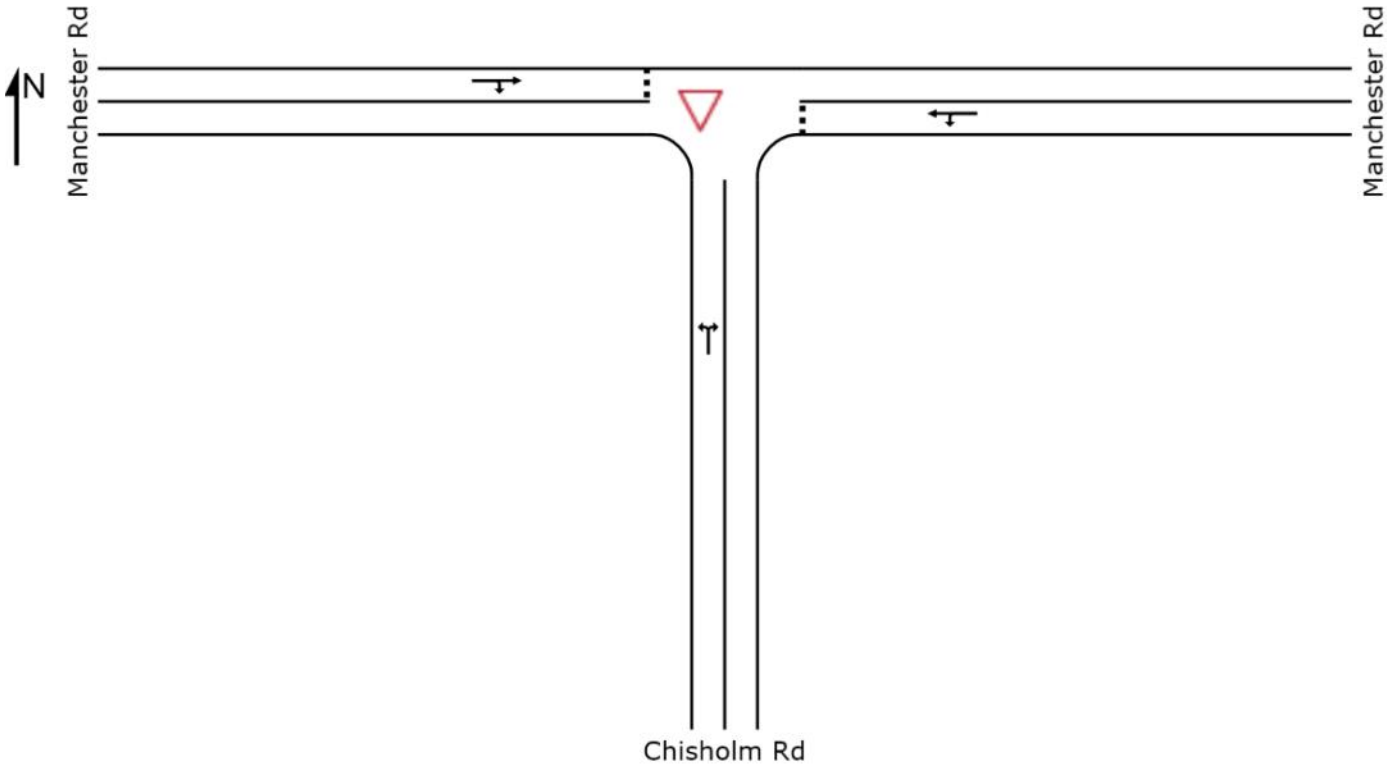
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program

SITE LAYOUT

Site: Option 2 - Manchester Rd / Chisholm Rd AM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)



LANE SUMMARY

Site: Option 2 - Manchester Rd / Chisholm Rd AM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	457	2.0	1831	0.249	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	457	2.0		0.249		4.6	NA	0.0	0.0				
East: Manchester Rd													
Lane 1	298	2.0	934	0.319	100	7.4	LOS A	1.7	12.1	Full	500	0.0	0.0
Approach	298	2.0		0.319		7.4	LOS A	1.7	12.1				
West: Manchester Rd													
Lane 1	474	2.0	888	0.534	100	5.4	LOS A	3.6	25.9	Full	500	0.0	0.0
Approach	474	2.0		0.534		5.4	LOS A	3.6	25.9				
Intersection	1228	2.0		0.534		5.6	NA	3.6	25.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

LANE SUMMARY

Site: Option 2 - Manchester Rd / Chisholm Rd PM

Manchester Rd / Chisholm Rd
Giveway / Yield (Two-Way)

Lane Use and Performance

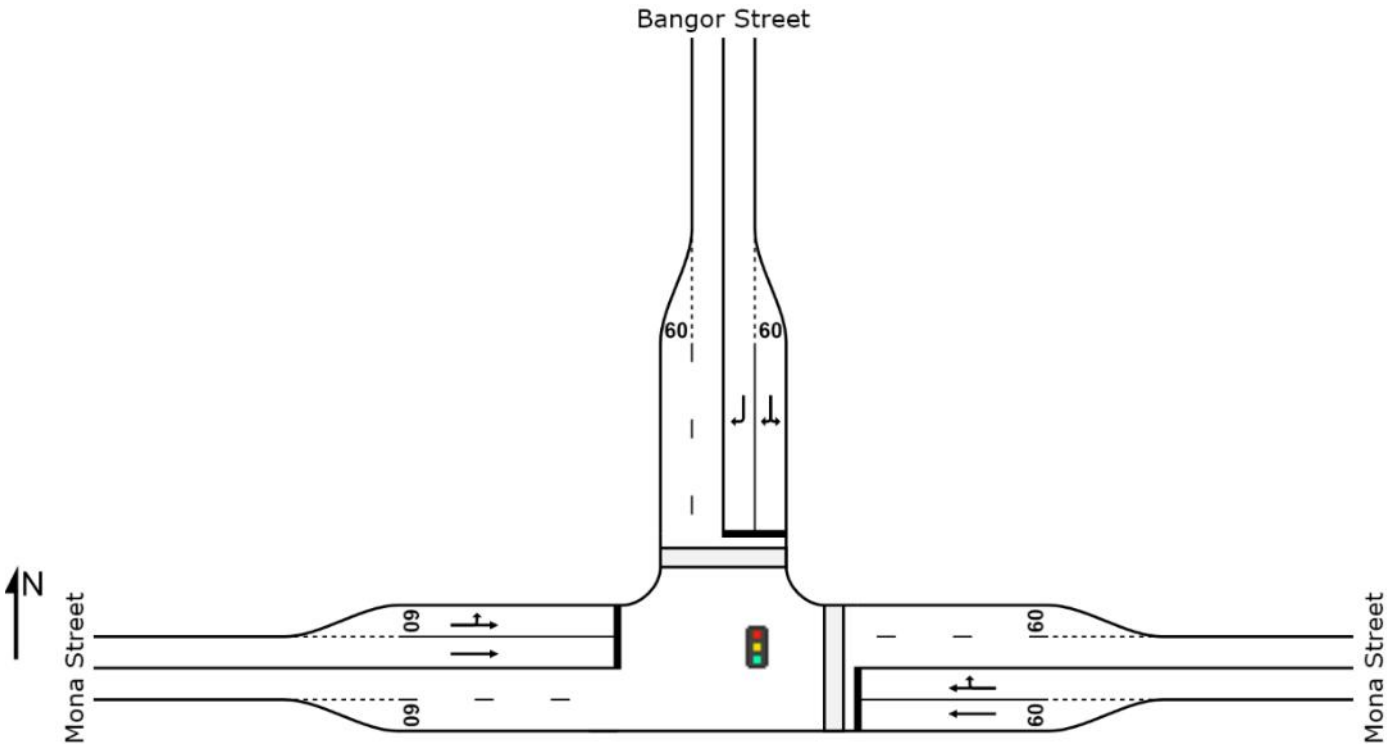
	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	339	2.0	1831	0.185	100	4.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	339	2.0		0.185		4.6	NA	0.0	0.0				
East: Manchester Rd													
Lane 1	475	2.0	1186	0.400	100	6.5	LOS A	2.7	19.2	Full	500	0.0	0.0
Approach	475	2.0		0.400		6.5	LOS A	2.7	19.2				
West: Manchester Rd													
Lane 1	363	2.0	782	0.464	100	5.9	LOS A	2.7	19.0	Full	500	0.0	0.0
Approach	363	2.0		0.464		5.9	LOS A	2.7	19.0				
Intersection	1177	2.0		0.464		5.8	NA	2.7	19.2				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: Option 2 New Intersection - PM

New Site
Signals - Fixed Time Isolated



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Project: \\Jacobs.com\ANZ\IE\Projects\04_Eastern\IA162400\06 Technical\Sidra Modelling\Intersections (Bridge) v2.sip6

LANE SUMMARY

Site: Option 2 New Intersection - AM

New Site
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Practical Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Mona Street													
Lane 1	363	2.0	1405	0.258	37[6]	4.7	LOS A	5.8	41.1	Short	60	0.0	NA
Lane 2	462	2.0	660[1]	0.700	100	15.8	LOS B	15.5	110.0	Full	500	0.0	0.0
Approach	825	2.0		0.700		10.9	LOS A	15.5	110.0				
North: Bangor Street													
Lane 1	53	2.0	201	0.261	38[5]	51.2	LOS D	2.4	17.4	Short	60	0.0	NA
Lane 2	191	2.0	275	0.694	100	51.6	LOS D	9.3	66.3	Full	500	0.0	0.0
Approach	243	2.0		0.694		51.5	LOS D	9.3	66.3				
West: Mona Street													
Lane 1	488	2.0	1463	0.334	37[6]	5.1	LOS A	7.2	51.4	Short	60	0.0	NA
Lane 2	1038	2.0	1148[1]	0.904	100	21.1	LOS B	37.0	263.7	Full	500	0.0	0.0
Approach	1526	2.0		0.904		16.0	LOS B	37.0	263.7				
Intersection	2595	2.0		0.904		17.7	LOS B	37.0	263.7				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Option 2 New Intersection - PM

New Site
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Practical Cycle Time)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Mona Street													
Lane 1	505	2.0	1505	0.336	37[6]	3.7	LOS A	7.8	55.8	Short	60	0.0	NA
Lane 2	865	2.0	950[1]	0.910	100	27.9	LOS B	36.9	262.7	Full	500	0.0	0.0
Approach	1371	2.0		0.910		19.0	LOS B	36.9	262.7				
North: Bangor Street													
Lane 1	59	2.0	200	0.296	36[6]	55.9	LOS D	3.0	21.5	Short	60	0.0	NA
Lane 2	162	2.0	200	0.811	100	63.7	LOS E	9.4	66.8	Full	500	0.0	0.0
Approach	221	2.0		0.811		61.6	LOS E	9.4	66.8				
West: Mona Street													
Lane 1	251	2.0	1441	0.174	37[6]	8.0	LOS A	3.3	23.7	Short	60	0.0	NA
Lane 2	712	2.0	1505	0.473	100	4.4	LOS A	12.9	92.2	Full	500	0.0	0.0
Approach	963	2.0		0.473		5.3	LOS A	12.9	92.2				
Intersection	2555	2.0		0.910		17.5	LOS B	36.9	262.7				

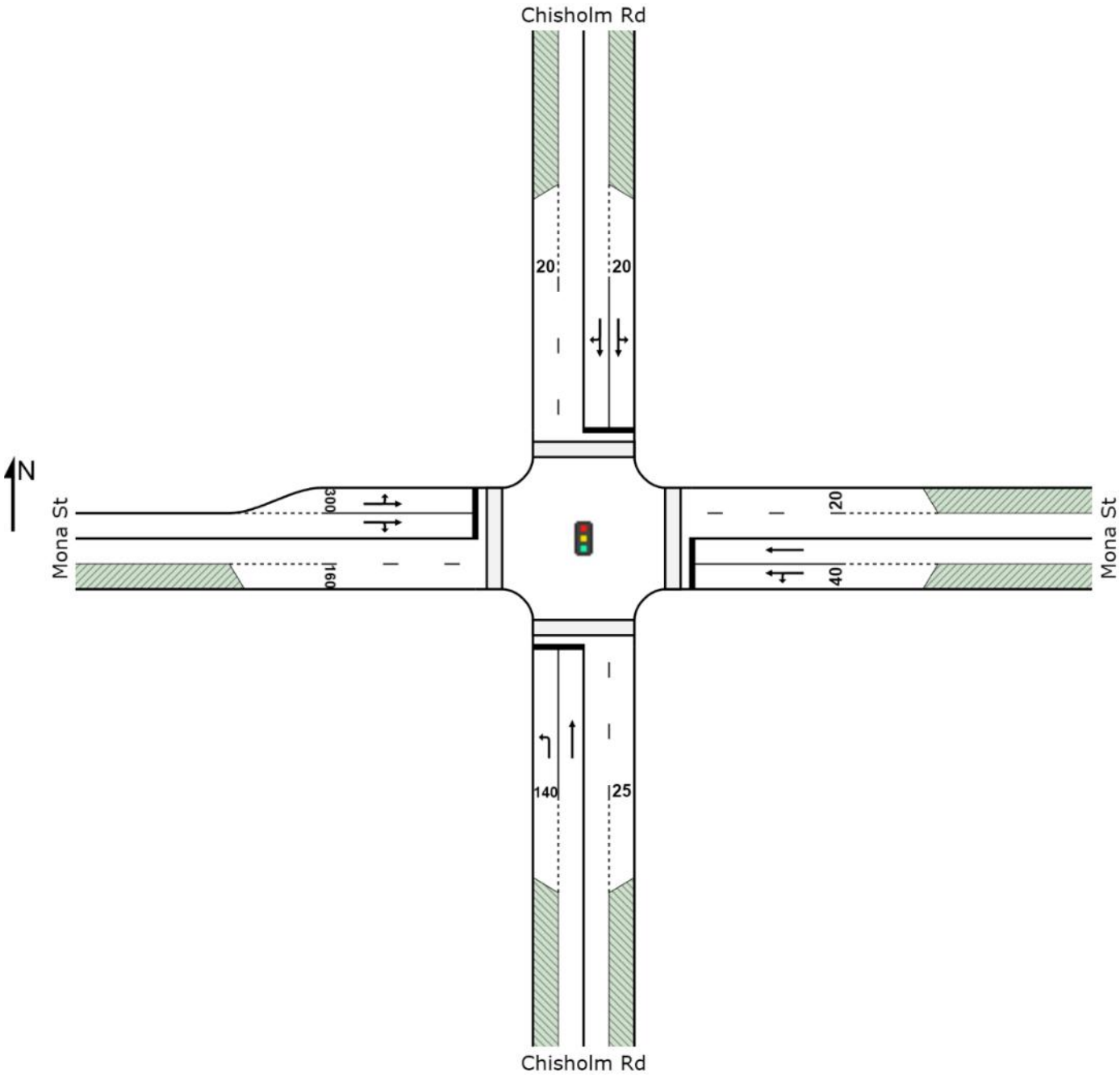
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
The results of iterative calculations indicate a somewhat unstable solution. See the Diagnostics section in the Detailed Output report.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Option 2 - Mona Street / Chrisholm Road AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated



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LANE SUMMARY

Site: Option 2 - Mona Street / Chrisholm Road AM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	395	2.8	1366	0.289	100	8.0	LOS A	4.9	34.8	Short (P)	140	0.0	NA
Lane 2	168	2.8	311	0.541	100	34.4	LOS C	6.3	45.0	Full	500	0.0	0.0
Approach	563	2.8		0.541		15.9	LOS B	6.3	45.0				
East: Mona St													
Lane 1	150	2.8	191	0.783	87[6]	43.4	LOS D	6.4	45.8	Short (P)	40	0.0	NA
Lane 2	173	2.8	192	0.901	100	50.3	LOS D	8.1	58.1	Full	500	0.0	0.0
Approach	322	2.8		0.901		47.1	LOS D	8.1	58.1				
North: Chisholm Rd													
Lane 1	65	2.8	311	0.209	23[6]	32.3	LOS C	2.3	16.3	Short (P)	20	0.0	NA
Lane 2	156	2.8	173[1]	0.904	100	53.9	LOS D	7.6	54.2	Full	500	0.0	0.0
Approach	221	2.8		0.904		47.5	LOS D	7.6	54.2				
West: Mona St													
Lane 1	337	2.8	1252	0.269	29[5]	9.7	LOS A	5.0	35.7	Short	300	0.0	NA
Lane 2	1060	2.8	1143	0.927	100	36.7	LOS C	47.2	338.4	Full	500	0.0	0.0
Approach	1397	2.8		0.927		30.2	LOS C	47.2	338.4				
Intersection	2503	2.8		0.927		30.7	LOS C	47.2	338.4				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Option 2 - Mona Street / Chrisholm Road PM

Mona Street / Chrisholm Road
Signals - Fixed Time Isolated Cycle Time = 45 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Chisholm Rd													
Lane 1	519	2.8	931	0.558	100	12.9	LOS A	8.0	57.3	Short (P)	140	0.0	NA
Lane 2	239	2.8	468	0.510	100	16.6	LOS B	4.8	34.2	Full	500	0.0	0.0
Approach	758	2.8		0.558		14.1	LOS A	8.0	57.3				
East: Mona St													
Lane 1	319	2.8	425	0.752	87[6]	21.0	LOS B	7.5	53.6	Short (P)	40	0.0	NA
Lane 2	368	2.8	426	0.865	100	26.1	LOS B	9.9	71.2	Full	500	0.0	0.0
Approach	687	2.8		0.865		23.7	LOS B	9.9	71.2				
North: Chisholm Rd													
Lane 1	95	2.8	467	0.203	23[6]	15.3	LOS B	1.7	12.4	Short (P)	20	0.0	NA
Lane 2	235	2.8	268[1]	0.876	100	31.9	LOS C	6.8	48.4	Full	500	0.0	0.0
Approach	329	2.8		0.876		27.1	LOS B	6.8	48.4				
West: Mona St													
Lane 1	172	2.8	895	0.192	22[6]	11.1	LOS A	2.2	15.5	Short	300	0.0	NA
Lane 2	520	2.8	586	0.888	100	27.5	LOS B	13.0	93.4	Full	500	0.0	0.0
Approach	692	2.8		0.888		23.5	LOS B	13.0	93.4				
Intersection	2466	2.8		0.888		21.1	LOS B	13.0	93.4				

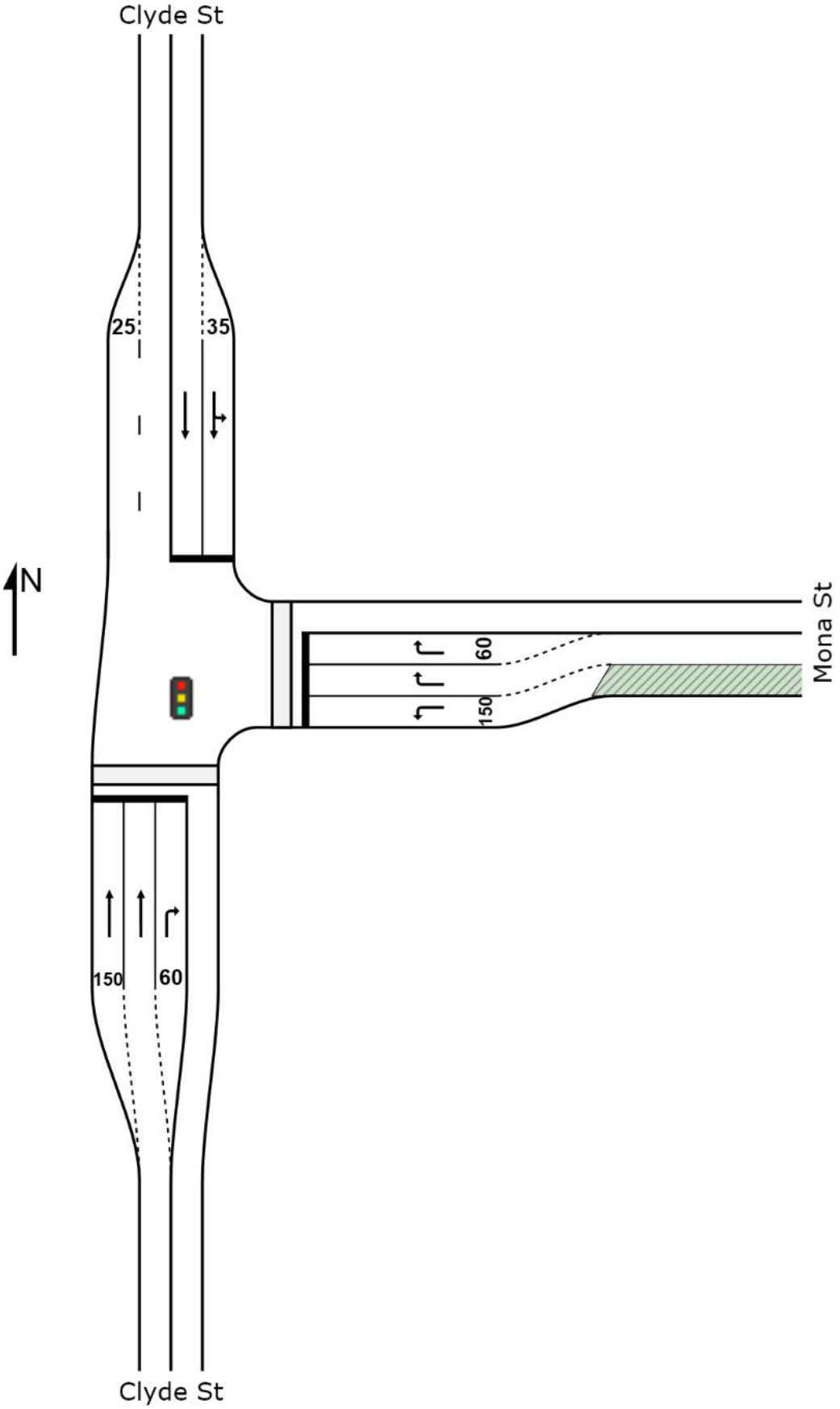
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Option 3 - Mona Street / Clyde Street PM - Copy

Clyde St / Mona St
Signals - Fixed Time Isolated



LANE SUMMARY

Site: Option 3 - Mona Street / Clyde Street PM - Copy

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 95 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	95	2.0	932	0.102	23[6]	14.1	LOS A	2.4	16.8	Short	150	0.0	NA
Lane 2	412	2.0	932	0.442	100	17.2	LOS B	12.4	88.6	Full	500	0.0	0.0
Lane 3	162	2.0	270	0.599	100	37.3	LOS C	7.0	49.6	Short	60	0.0	NA
Approach	669	2.0		0.599		21.6	LOS B	12.4	88.6				
East: Mona St													
Lane 1	486	2.0	944	0.515	100	20.8	LOS B	14.8	105.2	Short (P)	150	0.0	NA
Lane 2	155	2.0	713	0.217	22[6]	25.3	LOS B	4.8	34.0	Full	500	0.0	0.0
Lane 3	626	2.0	637[1]	0.983	100	76.6	LOS F	42.8	304.9	Short	60	0.0	NA
Approach	1267	2.0		0.983		48.9	LOS D	42.8	304.9				
North: Clyde St													
Lane 1	582	2.0	1484	0.392	39[5]	8.2	LOS A	7.4	52.4	Short	35	0.0	NA
Lane 2	378	2.0	378[1]	0.999	100	84.8	LOS F	26.0	184.9	Full	500	0.0	0.0
Approach	960	2.0		0.999		38.4	LOS C	26.0	184.9				
Intersection	2897	2.0		0.999		39.1	LOS C	42.8	304.9				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Option 3 - Mona Street / Clyde Street AM - Copy

Clyde St / Mona St
Signals - Fixed Time Isolated Cycle Time = 70 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	95	2.0	1100	0.086	23[6]	7.2	LOS A	1.4	10.3	Short	150	0.0	NA
Lane 2	410	2.0	1100	0.373	100	8.8	LOS A	7.6	54.2	Full	500	0.0	0.0
Lane 3	531	2.0	574	0.924	100	52.0	LOS D	21.7	154.7	Short	60	0.0	NA
Approach	1036	2.0		0.924		30.8	LOS C	21.7	154.7				
East: Mona St													
Lane 1	211	2.0	1046	0.201	100	12.4	LOS A	3.5	24.7	Short (P)	150	0.0	NA
Lane 2	88	2.0	471	0.187	22[6]	26.9	LOS B	2.4	17.0	Full	500	0.0	0.0
Lane 3	380	2.0	450[1]	0.845	100	38.6	LOS C	14.5	103.2	Short	40	0.0	NA
Approach	679	2.0		0.845		28.9	LOS C	14.5	103.2				
North: Clyde St													
Lane 1	874	2.0	955[1]	0.915	100	36.0	LOS C	34.6	246.2	Short	35	0.0	NA
Lane 2	187	2.0	495	0.379	41[5]	23.6	LOS B	5.4	38.4	Full	500	0.0	0.0
Approach	1061	2.0		0.915		33.8	LOS C	34.6	246.2				
Intersection	2776	2.0		0.924		31.5	LOS C	34.6	246.2				

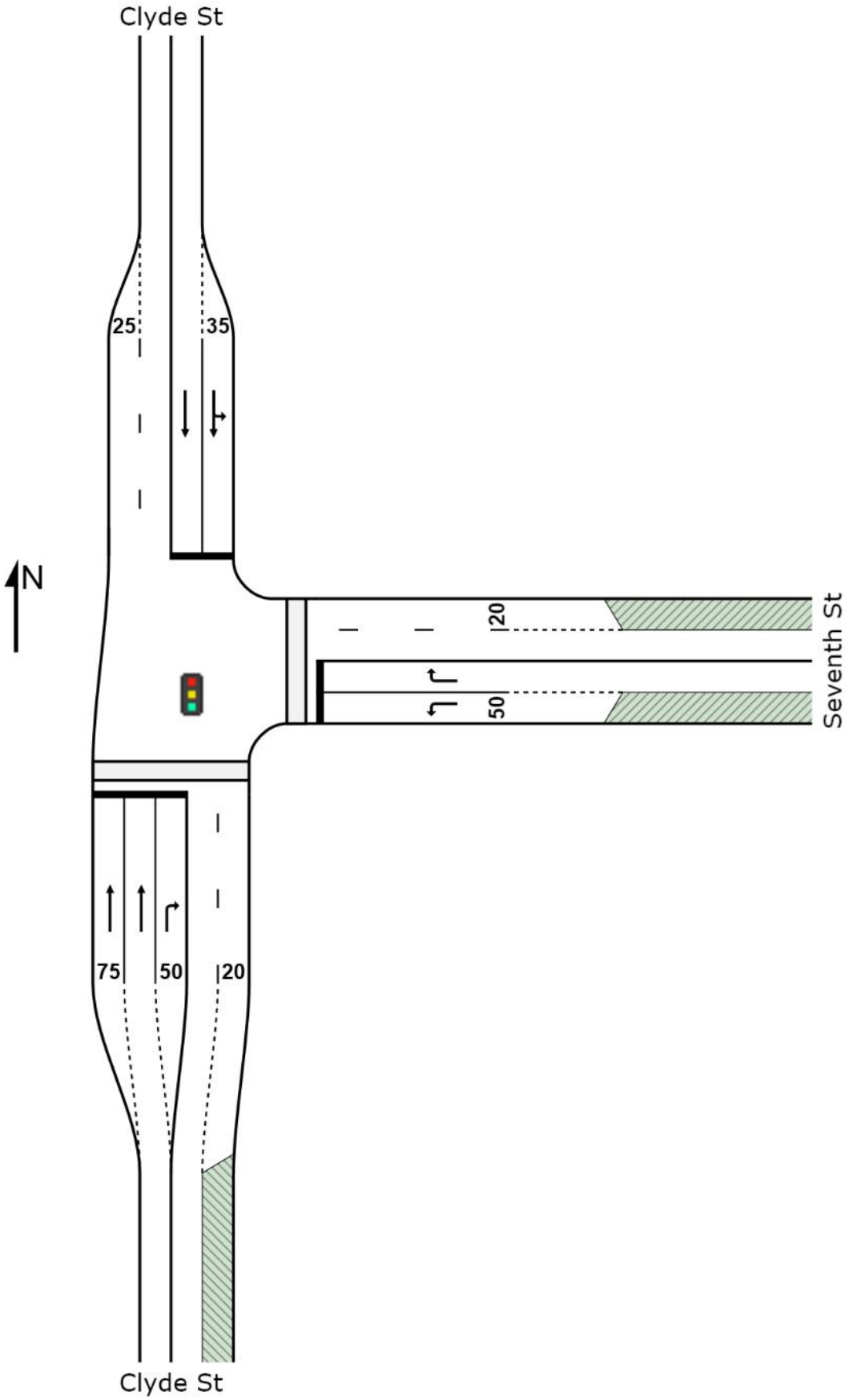
Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
5 Lane under-utilisation found by the program
6 Lane under-utilisation due to downstream effects

SITE LAYOUT

Site: Bridge - Seventh Street / Clyde Street AM

Clyde St / Seventh St
Signals - Fixed Time Isolated



LANE SUMMARY

Site: Option 3 - Seventh Street / Clyde Street AM

Clyde St / Seventh St
Signals - Fixed Time Isolated Cycle Time = 140 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	209	2.0	1499	0.139	23[6]	4.0	LOS A	3.4	24.4	Short	75	0.0	NA
Lane 2	715	2.0	1188[1]	0.602	100	5.7	LOS A	16.8	119.3	Full	500	0.0	0.0
Lane 3	55	2.0	264	0.207	100	25.8	LOS B	2.1	15.0	Short	50	0.0	NA
Approach	979	2.0		0.602		6.5	LOS A	16.8	119.3				
East: Seventh St													
Lane 1	55	2.0	405	0.135	100	51.4	LOS D	3.0	21.3	Short (P)	50	0.0	NA
Lane 2	146	2.0	248	0.589	100	67.1	LOS E	9.6	68.3	Full	500	0.0	0.0
Approach	201	2.0		0.589		62.8	LOS E	9.6	68.3				
North: Clyde St													
Lane 1	222	2.0	1310	0.169	22[6]	9.2	LOS A	4.7	33.6	Short	35	0.0	NA
Lane 2	868	2.0	1108[1]	0.783	100	12.6	LOS A	32.4	230.6	Full	500	0.0	0.0
Approach	1089	2.0		0.783		11.9	LOS A	32.4	230.6				
Intersection	2269	2.0		0.783		14.1	LOS A	32.4	230.6				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects

LANE SUMMARY

Site: Option 3 - Seventh Street / Clyde Street PM

Clyde St / Seventh St
Signals - Fixed Time Isolated Cycle Time = 145 seconds (Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows Total veh/h	HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Clyde St													
Lane 1	290	2.0	1513	0.192	23[6]	4.1	LOS A	5.0	35.6	Short	75	0.0	NA
Lane 2	898	2.0	1085[1]	0.828	100	6.5	LOS A	24.8	176.5	Full	500	0.0	0.0
Lane 3	105	2.0	350	0.301	100	25.9	LOS B	4.4	31.2	Short	50	0.0	NA
Approach	1294	2.0		0.828		7.5	LOS A	24.8	176.5				
East: Seventh St													
Lane 1	105	2.0	455	0.232	100	51.1	LOS D	5.9	42.1	Short (P)	50	0.0	NA
Lane 2	74	2.0	240	0.307	100	66.9	LOS E	4.8	34.1	Full	500	0.0	0.0
Approach	179	2.0		0.307		57.6	LOS E	5.9	42.1				
North: Clyde St													
Lane 1	190	2.0	1246	0.152	21[6]	12.3	LOS A	4.5	31.8	Short	35	0.0	NA
Lane 2	795	2.0	1084[1]	0.733	100	14.2	LOS A	30.9	220.3	Full	500	0.0	0.0
Approach	984	2.0		0.733		13.8	LOS A	30.9	220.3				
Intersection	2457	2.0		0.828		13.7	LOS A	30.9	220.3				

Level of Service (LOS) Method: Delay (RTA NSW).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the adjacent full-length lanes. Some upstream delays at entry to short lanes are not included.
6 Lane under-utilisation due to downstream effects