TRAFFIC AND PARKING IMPACT ASSESSMENT OF MIXED-USE DEVELOPMENT AT 28 LOCKWOOD AVENUE, BELROSE

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210075.05FA - 21st June 2021

Development Type: **Mixed-Use Development**

Site Address: **28 Lockwood Avenue, Belrose**

Prepared for: **Avenue Property**

Document reference: **210075.05FA**

Status	Issue	Prepared By	Checked By	Date
Draft	A	DF	DF	1st June 2021
Final	A	DF	DF	21st June 2021

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1 INTRODUCTION

M^CLaren Traffic Engineering (MTE) was commissioned by *Avenue Property* to provide a Traffic and Parking Impact Assessment (TPIA) for the proposed Mixed-Use Development at 28 Lockwood Avenue, Belrose, as depicted in **Annexure A**. This TPIA is an amended report which responds to Council's comments within a letter dated 11 August 2020. Council's commentary is discussed in **Section 5** of this report.

1.1 Description and Scale of Development

The proposed mixed-use development has the following scale relevant to traffic and parking:

- 49 residential apartments consisting of:
    - Three (3) x one-bedroom apartments;
    - 29 x two-bedroom apartments;
    - 17 x three-bedroom apartments;
- Retail with a total of 3,323m^2 Gross Leasable Floor Area (GLFA).

The site layout includes a basement car park with a total of **238** car parking spaces including 65 residential spaces, 10 residential visitor spaces and 163 retail spaces. Vehicular access to the car park is proposed via separated one-way driveways from Glenrose Place, the lower order road.

1.2 State Environmental Planning Policy (Infrastructure) 2007

The proposed development includes over 2,000m^2 of shop area and therefore does qualify as a development with relevant size and/or capacity under Clause 104 of the SEPP (Infrastructure) 2007. Accordingly, formal referral to the Roads and Maritime Services (RMS) is necessary and Northern Beaches Council officers can determine this proposal with input from the RMS, should RMS provide any comments or conditions.

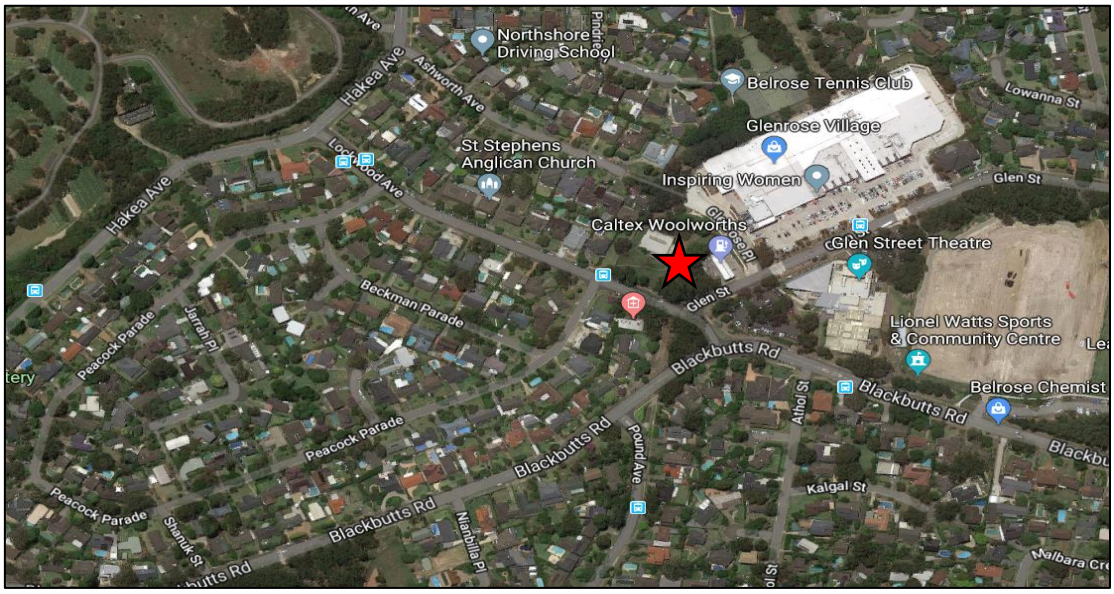
1.3 Site Description

The subject site is currently occupied by a vacant building, formerly known as the Belrose Library, and is zone *B2 – Local Centre* by the *Warringah Local Environmental Plan 2011 (LEP).* The site fronts Glenrose Place to the north, Glen Street to the east and Lockwood Avenue to the west. Vehicular access to the basement carpark is provided via separated one-way entry and exit driveways onto Glenrose Place. Access for loading vehicles is shared with the one-way passenger vehicle exit driveway.

The site is generally surrounded by low to medium-density residential dwellings. Glenrose Village is located directly north-east from the subject site, Glen Street Theatre is located directly east from the site, Mimosa Public School and Davidson High School are located south of the site and a Caltex Woolworth service station adjoins the site to the south.

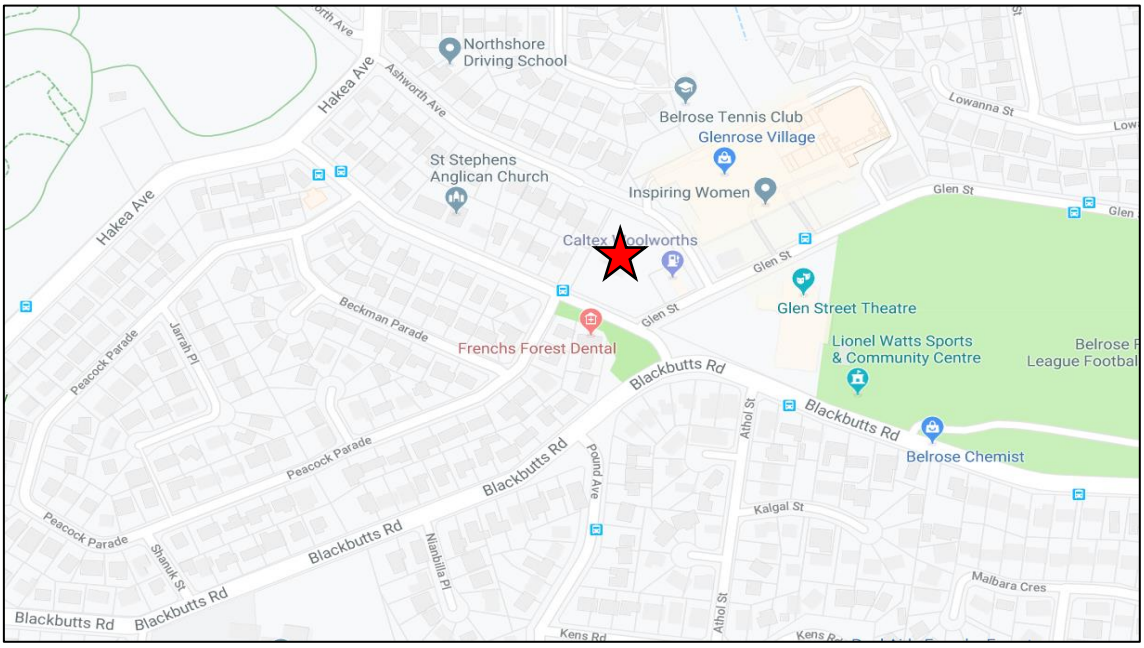
1.4 Site Context

The location of the site is shown in **Figure 1** & **Figure 2** below.



Site Location

FIGURE 1: SITE CONTEXT – AERIAL PHOTO



Site Location

FIGURE 2: SITE CONTEXT – STREET MAP

2 EXISTING TRAFFIC AND PARKING CONDITIONS

2.1 Road Hierarchy

The road network servicing the site has the following characteristics:

2.1.1 Lockwood Avenue

- Unclassified LOCAL Road;
- Approximately 13m in width facilitating two traffic flow lanes (one in each direction) and kerbside parking;
- No speed limit signposted, default 50km/h applies;
- Unrestricted kerbside parking permitted on both sides of the road with areas of "No-Stopping" along the site frontage.

2.1.2 Glen Street

- Unclassified LOCAL Road;
- Approximately 11m in width facilitating two traffic flow lanes (one in each direction) and kerbside parking;
- Signposted 50km/h speed limit;
- "No-Stopping" restriction throughout the street;
- Unrestricted kerbside parking permitted along both sides of the street to the north of Glenrose Village.

2.1.3 Glenrose Place

- Unclassified LOCAL Road;
- Approximately 12m in width facilitating three traffic flow lanes (one northbound; 2 southbound);
- No speed limit signposted, default 50km/h applies;
- Two (2) disabled kerbside parking spaces available at the end of the street;
- No other kerbside parking permitted along both sides of the street.

2.2 Existing Traffic Management

- Priority controlled intersection of Glen Street / Glenrose Place;
- 'GIVE-WAY' sign-controlled intersection of Lockwood Avenue / Glen Street;

- Pedestrian crossing across Lockwood Avenue adjacent to the intersection of Lockwood Avenue / Glen Street;

- Pedestrian crossing across Glen Street adjacent to the intersection of Glen Street / Glenrose Place.

2.3 Existing Traffic and Parking Environment

Traffic counts were completed at the intersections Glen Street / Glenwood Place, Glen Street / Blackbutts Road, and Glen Street / Lockwood Avenue on Thursday 25th July 2019 between 7-9am and 4-7pm, and Saturday 27th July 2019 between 10am-2pm representing a typical weekday and weekend peak traffic flow periods. The results of the surveys are reproduced in **Annexure B** for reference.

2.3.1 Intersection Performances

The traffic volumes recorded in the surveys have been used to assess the existing intersection performance using SIDRA INTERSECTION 8.0. The results of the analysis are summarised in **Table 1** below, with detailed SIDRA outputs reproduced in **Annexure C** for reference.

TABLE 1: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Glen St / Lockwood Av	AM	0.22	4.1 (Worst: 8.6)	**NA** (Worst: A)	Give Way	RT from st: Glen Street	1 veh (7.1m) st: Glen Street
	PM	0.30	4.4 (Worst: 9.4)	**NA** (Worst: A)		RT from st: Glen Street	1.6 veh (11.1m) st: Glen Street
	SAT	0.34	4.7 (Worst: 10.2)	**NA** (Worst: A)		RT from st: Glen Street	1.9 veh (13.2m) st: Glen Street
Glen Street / Blackbutts Road	AM	0.24	2.8 (Worst: 10.5)	**NA** (Worst: A)	Give Way	RT from Glen Street	0.6 veh (4.2m) Glen Street
	PM	0.25	3.8 (Worst: 10.1)	**NA** (Worst: A)		RT from Glen Street	1 veh (7m) Blackbutts Road
	SAT	0.23	4.1 (Worst: 9.6)	**NA** (Worst: A)		RT from Glen Street	1.1 veh (7.8m) Blackbutts Road
Glen Street / Glenwood Place	AM	0.23	3.5 (Worst: 7.3)	**NA** (Worst: A)	Give Way	RT from Glenrose Place	1.2 veh (8.4m) Glen Street
	PM	0.25	4.4 (Worst: 8.1)	**NA** (Worst: A)		RT from Glenrose Place	1.3 veh (9.3m) Glen Street
	SAT	0.29	5.1 (Worst: 9.7)	**NA** (Worst: A)		RT from Glenrose Place	1.6 veh (11.2m) Glen Street

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.
(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.
(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.
(4) NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

As shown above, the nearby intersections operate at Level of Service (LoS) A during the weekday morning, weekday afternoon and Saturday midday peak periods. This represents minimal delays and additional capacity.

2.4 Public Transport

The subject site is within 200m walking distance of existing bus stops (ID: 208668, ID:2086104, ID:208687, ID:208558, ID 208668, ID: 2086104, ID 208687, ID: 208558) servicing bus routes 141 (Austlink to Manly via Frenchs Forest & Seaforth), 271 (Belrose to City QVB), 274 (City QVB to Davidson via Frenchs Forest), 281 (Davidson to Chatswood), 282 (Davidson & Belrose to Chatswood) and 283 (Belrose to Chatswood) provided by Forest Coach Lines. The location of the site is shown on a local public transport network map in **Figure 3** below, indicating that the site is very well located with respect to public bus services.

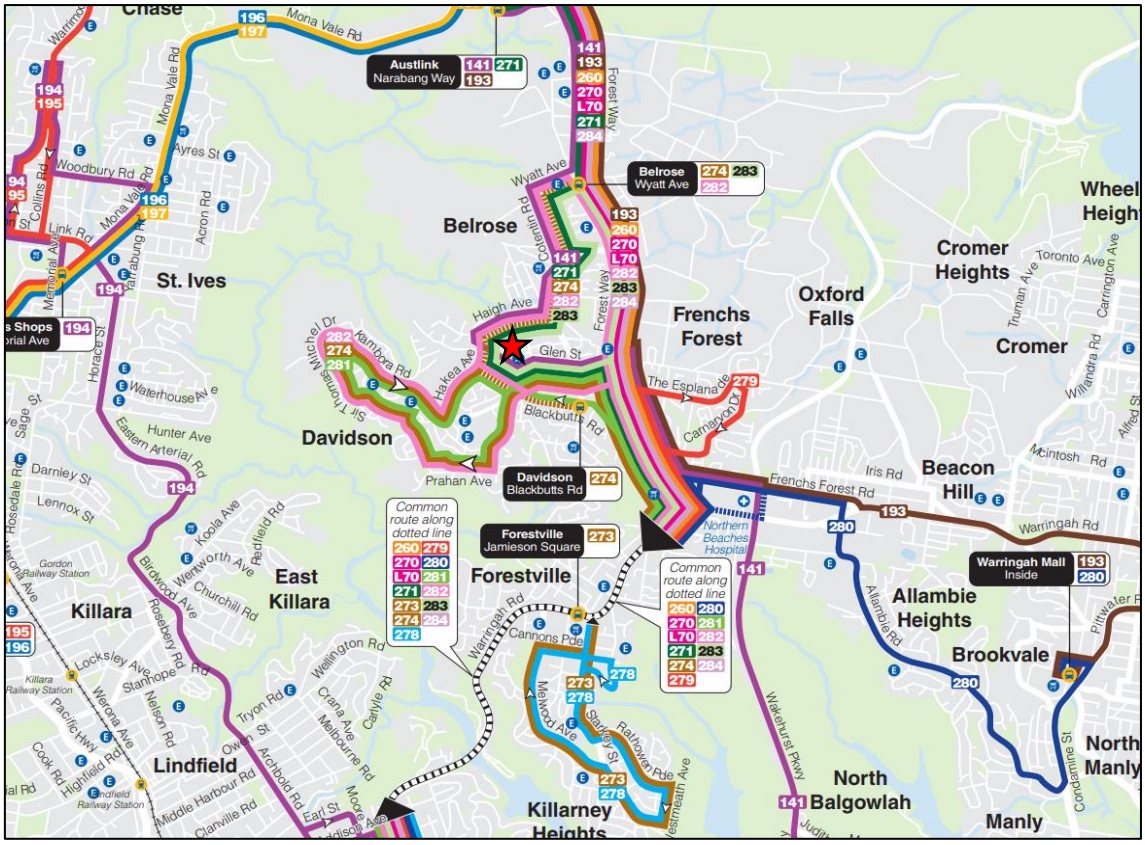


FIGURE 3: PUBLIC TRANSPORT MAP

2.5 Future Road and Infrastructure Upgrades

From *Northern Beaches Council* Development Application tracker and RMS Projects website, it appears that there are no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

3 PARKING ASSESSMENT

3.1 Council Car Parking Requirement

Reference is made to *Warringah Development Control Plan – Part H: Appendices – Appendix 1: Car Parking Requirements* which outlines the following car parking requirements for mixed use developments:

Residential

Multi-dwelling housing, Residential flat buildings, serviced apartments…

1 space per 1-bedroom dwelling

1.2 spaces per 2-bedroom dwelling

1.5 spaces per 3-bedroom dwelling

1 visitor space per 5 units or part of dwellings

Retail and Commercial

Shop (includes retail / business component of shop top housing, retail premises and neighbourhood shop)

1 space per 16.4m^2 GLFA (6.1 spaces per 100m^2 GLFA)

The above rate may be varied in shopping centre complexes, such as shopping malls, where multi-purpose trips predominate, in accordance with the following:

For 0-10,000m^2 GLFA – 6.1 spaces per 100m^2 GLFA

For 10,000-20,000m^2 GLFA – 5.6 spaces per 100m^2 GLFA

For 20,000-30,000m^2 GLFA – 4.3 spaces per 100m^2 GLFA

For more than 20,000m^2 GLFA – 4.1 spaces per 100m^2 GLFA

The car parking requirement based upon the Council car parking rates is summarised in **Table 2**.

TABLE 2: COUNCIL DCP CAR PARKING REQUIREMENT

Land Use	Type	Scale[(1)]	Rate	Spaces Required
Residential	One-bedroom	3	1 per dwelling	3
	Two-bedroom	29	1.2 per dwelling	34.8
	Three-bedroom	17	1.5 per dwelling	25.5
	Visitor	49	1 per 5 dwellings	10
Residential Subtotal				64
Retail	0-10,000m^2 GLFA	3,323m^2 GLFA	6.1 per 100m^2 GLFA	203
(dual use reduction)[(1)]		-20%		-40
Retail Subtotal				163
Total				**227**

Note: (1) Given the site location nearby Glenrose Place, it is appropriate to apply a 20% dual use reduction factor.

As shown, the car parking requirement based on the Council DCP is **227** spaces. The proposal provides **228** spaces, which satisfies the Council's car parking requirement.

The above assessment is considered to be conservative based upon the following factors:

- The development provides 8 motorcycle parking spaces where none are required by the DCP, which represents an oversupply of motorcycle parking. The provision of motorbike spaces where none are required will theoretically reduce car parking requirements, given that some portion of shopping centre staff and retail patrons are expected to ride motorcycles.

- The Council's DCP parking rate for retail is quoted directly from the RTA (now RMS) Guide to Traffic Generating Developments. This document is not recent enough to include shopping centre developments with residential units on the same site; which is the most recent and prominent trend in the development of town centre sites in NSW. Considering the efficiencies that are gained for both residents and commercial premises in having potential customers/staff living on-site, it is likely that the car parking demand and traffic generation for these sites will be lower than those expressed in either study.

3.2 Bicycle Storage Requirements

Warringah DCP 2011 outlines the following bicycle parking requirement for the proposed development:

> ***Residential Accommodation containing 3 or more dwellings (excluding group homes; boarding houses; hostels; seniors housing):***
>
> *Column 1 (High-Medium Security Level*)*
>
> *1 per dwelling*
>
> *Column 2 (High-Low Security Level**)*
>
> *Visitor: 1 per 12 dwellings*
>
> ***Business and Retail Premises:***
>
> *Column 1 (High-Medium Security Level*)*
>
> *1 per 200m^2 GFA*
>
> *Column 2 (High-Low Security Level**)*
>
> *Visitors: 1 per 600m^2 GFA*
>
> ***Recreation Facility (indoor, outdoor, or major):***
>
> *Column 1 (High-Medium Security Level*)*
>
> *1 per 4 employees PLUS*
>
> *1 per 1500 spectator places*
>
> *Column 2 (High-Low Security Level**)*
>
> *1 per 200m^2 GFA*
>
> *1 per 250 spectator places*
>
> **Bicycles are stored in individual or locked to rails within a secure room / enclosure (Refer to Part 7.6 of the NSW Planning Guidelines to Walking and Cycling for more detail.)*
>
> ***Bicycle frames and wheel are locked to high quality rails. (Refer to Part 7.6 of the NSW Planning Guidelines to Walking and Cycling for more detail.)*

The resulting bicycle parking requirements for the subject mixed-use development are summarised in **Table 3** below.

TABLE 3: BICYCLE PARKING REQUIREMENTS

Land Use	Type	Scale[(1)]	Rate	Spaces Required
Residential	Column 1	49	1 per dwelling	49
	Column 2		1 per 12 dwelling	4
Business and Retail	Column 1	3,323m^2 GFA	1 per 200m^2 GFA	17
	Column 2		1 per 600m^2 GFA	6
Total	**-**	**-**	**-**	**76 (66 tenant; 10 visitors)**

The development therefore requires the provision of **76** bicycle spaces. This includes **66** for tenants and **10** for visitors. A provision of **68** secure bicycle spaces are provided within the basements for residents / staff, whilst **12** visitor bicycle parking spaces are provided, satisfying Council requirements.

3.3 Motorcycle Parking Requirements

Council's DCP does not provide any motorcycle parking requirement for the proposed site. The development proposes 8 motorcycle spaces, which will theoretically reduce the car parking demand and should be looked upon favourably by Council.

3.4 Disabled Parking

Council's DCP does not outline provisions for disabled parking. According to the *Building Code of Australia,* the proposed development uses are classified as the following building classes:

Class 6

> *A shop or other building for the of goods by retail or the supply to services direct to the public.*

The disabled car parking requirement for a Class 6 building is 1 space for every 50 carparking spaces or part thereof. The proposed development provides 163 car parking spaces for retail use. Applying the National Construction Code (NCC) rate of 1 space per 50 carparking spaces results in a requirement for four (4) disabled retail parking spaces. The site provides four (4) retail disabled spaces, satisfying the NCC requirements.

The proposed development includes five (5) adaptable units. It is best practice to provide a disabled space for each adaptable unit. The plans provide five (5) disabled spaces, satisfying the requirements of AS4299 for adaptable housing.

3.5 Servicing & Loading

Council's DCP does not outline provision of loading facilities for uses within the proposed development. Therefore, reference is made to Table 5.1 of the RMS Guide to Traffic Generating Developments, which provides the following requirements for loading.

Commercial Premises (< 20,000m^2 GFA) – 1 space per 4,000m^2 GFA (50% adequate for trucks);

Department Stores (< 6,000m^2 GFA) – 1 space per 1,500m^2 GFA;

Residential Flat Buildings (<200 flats) – 1 space per 50 flats.

The resultant loading requirements are provided in **Table 4**.

TABLE 4: RMS GUIDE SERVICING AND LOADING REQUIREMENTS

Land Use	Type	Scale(1)	Rate	Loading Spaces Required (adequate for trucks)
Commercial Premises	< 20,000m^2 GFA	3,323m^2 GFA	1 space per 4,000m^2 GFA	0.8 (0.4)
Residential Flat Buildings	<200 flats	49	1 per 50	0.98
Total				2 (1)

As shown, the development requires two (**2**) loading spaces, one (1) of which shall be adequate for trucks. The development provides a loading area which facilitates up to three (**3**) 12.5m length Heavy Rigid Vehicles under a forward entry / forward out manoeuvre. This satisfies the RMS Guide requirements and is therefore considered adequate for the scale of the development.

3.6 Proposed Roundabout Treatment on Glenrose Place

It is noted that the proposed access is on a cul-de-sac at the end of Glenrose Place, just opposite the entry and exit driveway to Glenrose Village. MTE proposes that this cul-de-sac be redesigned to operate as a roundabout, with a mountable island in the centre for service vehicles. Roundabout signage would be required within the subject site and the driveway for Glenrose Village. The new road treatment is subject to approval by Council's Local Traffic Committee. An image of the proposed roundabout treatment is shown in **Figure 4**, whilst a more detailed concept plan reproduced in **Annexure D**. It is noted that the roundabout concept is subject to detailed design. The final design of the roundabout can be conditioned and is also subject to an approval under s138 of the *Roads Act*.

FIGURE 4: GLENROSE PLACE ROUNDABOUT CONCEPT

3.7 Car Park Design & Compliance

The car parking layouts of the basement level have been assessed and found to be generally compliant with the relevant clauses of AS2890.1:2004, AS2890.2:2002 and AS2890.6:2009. The design achieves the following:

- Car parking spaces of minimum 2.6m x 5.4m for retail visitors;
- Disabled car parking spaces with minimum dimensions of 2.4m in width by 5.4m in length (AS2890.6) with equivalent shared zone area, or 5.4m length x 3.8m width (AS4299);
- Tandem car parking spaces for use by staff or residents of the same unit only.
- Maximum driveway ramp grade of 1:5 (20%);
- Loading facilities suitable for vehicles up to and including a 12.5m length HRV;

- Minimum headroom areas as follows:
    - 4.5m within loading areas and accesses thereto;
    - 2.5m above disabled spaces and shared spaces;
    - 2.2m above all vehicle manoeuvring areas.

It should be noted that while we have assessed the plans to be compliant with the relevant standards or to function acceptably, it is usual that a design certification is required at the Construction Certificate Stage to account for any design changes during the Development Application process.

4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

4.1 Traffic Generation

The estimated traffic generation level for the mixed-use development is based upon the RMS *Guide to Traffic Generating Developments October 2002* and more recent supplements (*TDT 2013 4a*). The traffic generation is summarised in **Table 5** below.

According to the *TDT 2013 4a*, the Sydney average traffic generation rates for residential uses are 0.19 and 0.15 trips per unit in the AM and PM peak hour periods respectively. As a conservative assessment, the rate provided in the 2002 RMS Guide (0.29 trips per unit) has been utilised for the subject development, given that the site is not located within walking distance of a train station.

TABLE 5: ESTIMATED TRAFFIC GENERATION

Land Use	Time	Scale	Rate	Traffic Generation	Direction
High density residential flat building	AM Peak	49 dwellings	0.29 per unit	14	2 in, 12 out
	PM Peak		0.29 per unit	14	12 in, 2 out
	Saturday		0.29 per unit(2)	14	7 in, 7 out
Retail – Slow Trade	AM Peak	1,198m^2 GLFA	0.010 per m^2 GLFA(3)	12	6 in, 6 out
	PM Peak		0.020 per m^2 GLFA	24	12 in, 12 out
	Saturday		0.038 per m^2 GLFA	46	23 in, 23 out
Retail – Specialty Shops	AM Peak	2,125m^2 GLFA	0.028 per m^2 GLFA(4)	60	30 in, 30 out
	PM Peak		0.056 per m^2 GLFA	119	59 in, 60 out
	Saturday		0.107 per m^2 GLFA	228	114 in, 114 out
Total	**AM Peak**			**86**	**38 in, 48 out**
	PM Peak			**157**	**83 in, 74 out**
	Saturday			**288**	**144 in, 144 out**

NOTE:

(1) Traffic generation for residential developments taken as 80% out, 20% during AM peak. Vice versa for PM peak.

(2) AM peak traffic generation rate for shopping centres is conservatively assumed to be 50% of the PM peak. Friday and Thursday rates differ, so the larger of the two was chosen for the weekday PM peak.

As shown above, the peak traffic generation of the site has been estimated to be **86** (38 in; 48 out) trips during the AM peak period, **157** (83 in; 74 out) trips in the PM peak period and **288** (144 in, 144 out) in the Saturday midday period. As a conservative assessment, the existing pedestrian volumes on the zebra crossings have been doubled in the future condition.

4.2 Traffic Assignment

Given the surrounding road network, the available routes to/from the site, and the existing traffic flows into Glenrose Village, the following trip assignment is assumed:

- 20% arriving from / departing toward the east along Glen Street;
- 30% arriving from / departing toward the west along Blackbutts Road;
- 30% arriving from / departing toward the east along Blackbutts Road;
- 20% arriving from / departing toward the north along Lockwood Avenue.

4.3 Traffic Impact

The traffic generation outlined in **Section 4.1 & 4.2** above has been added to the existing traffic volumes recorded and SIDRA INTERSECTION 8.0 used to assess the resulting performance of each intersection. The purpose of this assessment is to compare the existing intersection operations to the future scenario under the increased traffic load. The results of this assessment are shown in **Table 7** below, with detailed SIDRA results reproduced in **Annexure C** for reference. The existing intersections are reproduced in **Table 6** for comparison.

TABLE 6: EXISTING INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement	95th Percentile Queue
EXISTING PERFORMANCE							
Glen St / Lockwood Av	AM	0.22	4.1 (Worst: 8.6)	**NA** (Worst: A)	Give Way	RT from st: Glen Street	1 veh (7.1m) st: Glen Street
	PM	0.30	4.4 (Worst: 9.4)	**NA** (Worst: A)		RT from st: Glen Street	1.6 veh (11.1m) st: Glen Street
	SAT	0.34	4.7 (Worst: 10.2)	**NA** (Worst: A)		RT from st: Glen Street	1.9 veh (13.2m) st: Glen Street
Glen Street / Blackbutts Road	AM	0.24	2.8 (Worst: 10.5)	**NA** (Worst: A)	Give Way	RT from Glen Street	0.6 veh (4.2m) Glen Street
	PM	0.25	3.8 (Worst: 10.1)	**NA** (Worst: A)		RT from Glen Street	1 veh (7m) Blackbutts Road
	SAT	0.23	4.1 (Worst: 9.6)	**NA** (Worst: A)		RT from Glen Street	1.1 veh (7.8m) Blackbutts Road
Glen Street / Glenwood Place	AM	0.23	3.5 (Worst: 7.3)	**NA** (Worst: A)	Give Way	RT from Glenrose Place	1.2 veh (8.4m) Glen Street
	PM	0.25	4.4 (Worst: 8.1)	**NA** (Worst: A)		RT from Glenrose Place	1.3 veh (9.3m) Glen Street
	SAT	0.29	5.1 (Worst: 9.7)	**NA** (Worst: A)		RT from Glenrose Place	1.6 veh (11.2m) Glen Street

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

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

TABLE 7: FUTURE INTERSECTION PERFORMANCES (SIDRA INTERSECTION 8.0)

Intersection	Peak Hour	Degree of Saturation[1]	Average Delay[2] (sec/veh)	Level of Service[3][4]	Control Type	Worst Movement	95th Percentile Queue
FUTUTE PERFORMANCE (Post Development)							
Glen St / Lockwood Av	AM	0.25	4.4 (Worst: 9.5)	**NA** (Worst: A)	Give Way	RT from st: Glen Street	1.2 veh (8.3m) st: Glen Street
	PM	0.35	4.7 (Worst: 10.5)	**NA** (Worst: A)		RT from st: Glen Street	1.9 veh (13.5m) st: Glen Street
	SAT	0.42	5.4 (Worst: 13.2)	**NA** (Worst: A)		RT from st: Glen Street	2.5 veh (17.2m) st: Glen Street
Glen Street / Blackbutts Road	AM	0.25	3.1 (Worst: 11)	**NA** (Worst: A)	Give Way	RT from Glen Street	0.7 veh (4.8m) Glen Street
	PM	0.32	4.3 (Worst: 11.6)	**NA** (Worst: A)		RT from Glen Street	1.4 veh (10m) Glen Street
	SAT	0.33	4.7 (Worst: 11.7)	**NA** (Worst: A)		RT from Glen Street	1.4 veh (10.1m) Glen Street
Glen Street / Glenwood Place	AM	0.27	4.4 (Worst: 7.9)	**NA** (Worst: A)	Give Way	RT from Car Park	1.5 veh (10.2m) Glen Street
	PM	0.32	5.5 (Worst: 9.4)	**NA** (Worst: A)		RT from Glenrose Place	1.7 veh (12.1m) Glen Street
	SAT	0.50	6.5 (Worst: 12.9)	**NA** (Worst: A)		RT from Glenrose Place	2.7 veh (18.7m) Glenrose Place

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

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

As shown the surrounding intersections remain unaltered under the future scenario. The existing Level of Service (LoS) for each intersection has been retained, indicating minimal impact under the future scenario.

5 RESPONSE TO COUNCIL COMMENTS

This letter is in response to the Northern Beaches Council's comments within a letter dated 11 August 2020 for DA No: DA2020/033. The comments made by Council relevant to traffic and parking are shown below (italicised) with *M^CLaren Traffic Engineering*'s (MTE) response thereafter.

> *Parking Facilities*
>
> *…the shortfall equates to 56 spaces. Council cannot accept this significant shortfall. The applicant has identified that the RMS rates would suggest that there is only a shortfall of 27 spaces. However, the rates adopted by RMS are only general in nature whereas the rates adopted by Council are specific to the area.*

MTE Response: The Council's DCP car parking requirement for shopping centres is taken directly from *Table 5.2* of the *RMS Guide to Traffic Generating Developments*, as reproduced in **Table 8**. Nonetheless, the plans have been amended to comply with the DCP requirement. Below is a discussion on why the Council rates are an overestimate for this site.

TABLE 8: COUNCIL DCP / RMS GUIDE CAR GENERAL SHOPPING CENTRE CAR PARKING RATES

Shopping Centre Area	Car Parking Rate
0-10,000m^2 GLFA	6.1 spaces per 100m^2 GLFA
10,000-20,000m^2 GLFA	5.6 spaces per 100m^2 GLFA
20,000-30,000m^2 GLFA	4.3 spaces per 100m^2 GLFA
30,000m^2 GLFA +	4.1 spaces per 100m^2 GLFA

These rates were developed through a thorough study of several locations in the Sydney region; whereby the sites selected to had range of sizes, geographical locations and public transport characteristics. Therefore, the rates adopted by Council are not specific to the local area, contrary to their italicised statement above.

Further, the RMS Guide states the following about the parking rates provided in **Table 8**.

> *The parking provisions outlined above are aggregated retail categories. The relative parking demand characteristics of different floor area types can be seen in the following indicative model:*
>
> *Peak Parking = 24 A(S) + 40 A(F) + 42 A(SM) + 45 A(SS)*

The Council (and RMS)'s parking rates in **Table 8** are general and are based upon an aggregate of all types of retail categories, including supermarkets, which demand a higher amount of parking compared to other types of retail use. The italicised formula categorises parking demand for each type of retail use, and therefore provides a more specialised

parking demand for the type of floor area within the shopping centre. The proposed shopping centre does not include a supermarket and therefore should not be represented by the Council's DCP parking rates, which are based upon aggregated retail categories including supermarkets.

The peak parking demand formula provided within the *RMS Guide* presents an R^2 value of 0.97, representing a high degree of accuracy within the model. Therefore, the specialised parking rates provided in the *RMS Guide to Traffic Generating Developments 2002* are considered to be the best available source of data for the estimation of parking demands for the proposed shopping centre.

It should also be noted that the RMS studies are not recent enough to include shopping centre developments with residential units on the same site; which is the most recent and prominent trend in the development of town centre sites in NSW. Considering the efficiencies that are gained for both residents and commercial premises in having potential customers/staff living on-site, it is likely that the car parking demand and traffic generation for these sites will be lower than those expressed in either study.

> *Bicycle parking*
>
> *The proposal includes the provision of 90 bicycle spaces provided within the car park. The bicycle spaces are not in compliance with the Warringah DCP with regards to the security level and the design of the spaces, therefore is not considered satisfactory*

MTE Response: The updated plans provide resident / staff bicycle parking spaces within secure lockers at both basement parking levels. Visitor bicycle parking rails have been provided within the courtyard area. This is in compliance with Council's bicycle parking rates, as summarised in **Table 3**.

> *Vehicular access*
>
> *Vehicular access to the car park is proposed via separated one-way driveways from Glenrose Place. This would be considered acceptable subject to the provision of detail design of the roundabout proposed at the cul-de-sac as well as the provision of separated vehicular access for service vehicles as explained later in the assessment comments.*

MTE Response: A concept design for the proposed roundabout is provided in **Annexure D**. This concept provides adequate turning facilities for the design vehicle, which is a 12.5m length Heavy Rigid Vehicle. The detailed design of the roundabout is for others to address under a condition of consent.

> *Loading/unloading area*
>
> *…the proposed shared exit driveway and service vehicle access is not considered acceptable. This also raises concerns regarding restricted pedestrian sigh[sic] line for vehicle exiting the driveway when a service*

vehicle is waiting in the designated waiting area, as well as the conflict between the truck turning into the waiting area and the vehicle exiting the driveway.

The proposal has not addressed the provision of service vehicle area for the residential use. The commercial loading area could be used by the residential service vehicles such as removalists subject to the provision of access to the residential area from the proposed loading area and inclusion in the Loading Dock Management Plan.

MTE Response: The plans have been amended to separate the service vehicle and passenger vehicle accesses. The pedestrian and vehicular sightlines comply with *AS2890.1:2004* and *AS2890.2:2018*. As shown in **Table 4**, the provision for three (3) loading bays sufficient for 12.5m length HRVs satisfies the loading requirements of the site.

Traffic Generation

…the proposed traffic intensification is considered a significant increase to the existing traffic volume resulting in adverse impact on the pedestrian safety…The following should be implemented to improve the pedestrian safety around the site:

- *Provision of Pedestrian Refuge Island on Glenrose Pl at its intersection with Glen St.*
    - *Note: the existing zebra crossing location on Glenrose Pl is away from the intersection and not within the pedestrian desire line.*
- *Construction of formal footpath, kerb and guttering between Glenrose Pl and the adjoining driveway to reduce the crossing distance.*
- *Provision of a Pedestrian Refuge Island on Glen St at its intersection with Lockwood Ave.*
- *Replacement of the existing zebra crossing located on Lockwood Ave outside the subject site with a raised pedestrian crossing lit in compliance with Australian Standards.*

MTE Response: Each pedestrian facility is discussed under individual subheadings within this response.

Pedestrian Refuge Island – Glenrose Place

Glenrose Village has a supermarket which serviced by HRVs. Swept path analysis has been completed showing a 12.5m length HRVs turning onto Glenrose Place from Glen Street. MTE has overlaid a 2m width pedestrian refuge island on an aerial image of Glenrose Place at its intersection with Glen Street. This is the minimum pedestrian refuge width in

accordance with *Figure 7* of *AS1742.10*. The swept path tests of the HRV on this aerial are shown in **Figure 5**.

FIGURE 5: HRV SWEPT PATHS OVERLAID ONTO A PEDESTRIAN REFUGE

As shown, the HRV paths conflict with the pedestrian refuge which Council has requested. If a pedestrian refuge were to be installed in this location, it would prohibit delivery vehicles from arriving to the proposed development and Glenrose Village. Further, there is an existing wombat pedestrian crossing approximately 30m from this junction which provides a safe place to cross Glenrose Place. A pedestrian refuge in the location requested by Council is therefore not appropriate.

<u>Formal footpath, kerb and guttering along site frontage to Glenrose Place</u>
MTE agrees with this Council recommendation.

<u>Pedestrian refuge island on Glen Street at its intersection with Lockwood Avenue</u>
Glenrose Village has a supermarket which serviced by HRVs. Swept path analysis has been completed showing a 12.5m length HRVs turning right onto Glen Street from Lockwood Avenue. MTE has overlaid a 2m width pedestrian refuge island on an aerial image. This is the minimum pedestrian refuge width in accordance with *Figure 7* of *AS1742.10*. The swept path tests of the HRV on this aerial are shown in **Figure 6**.

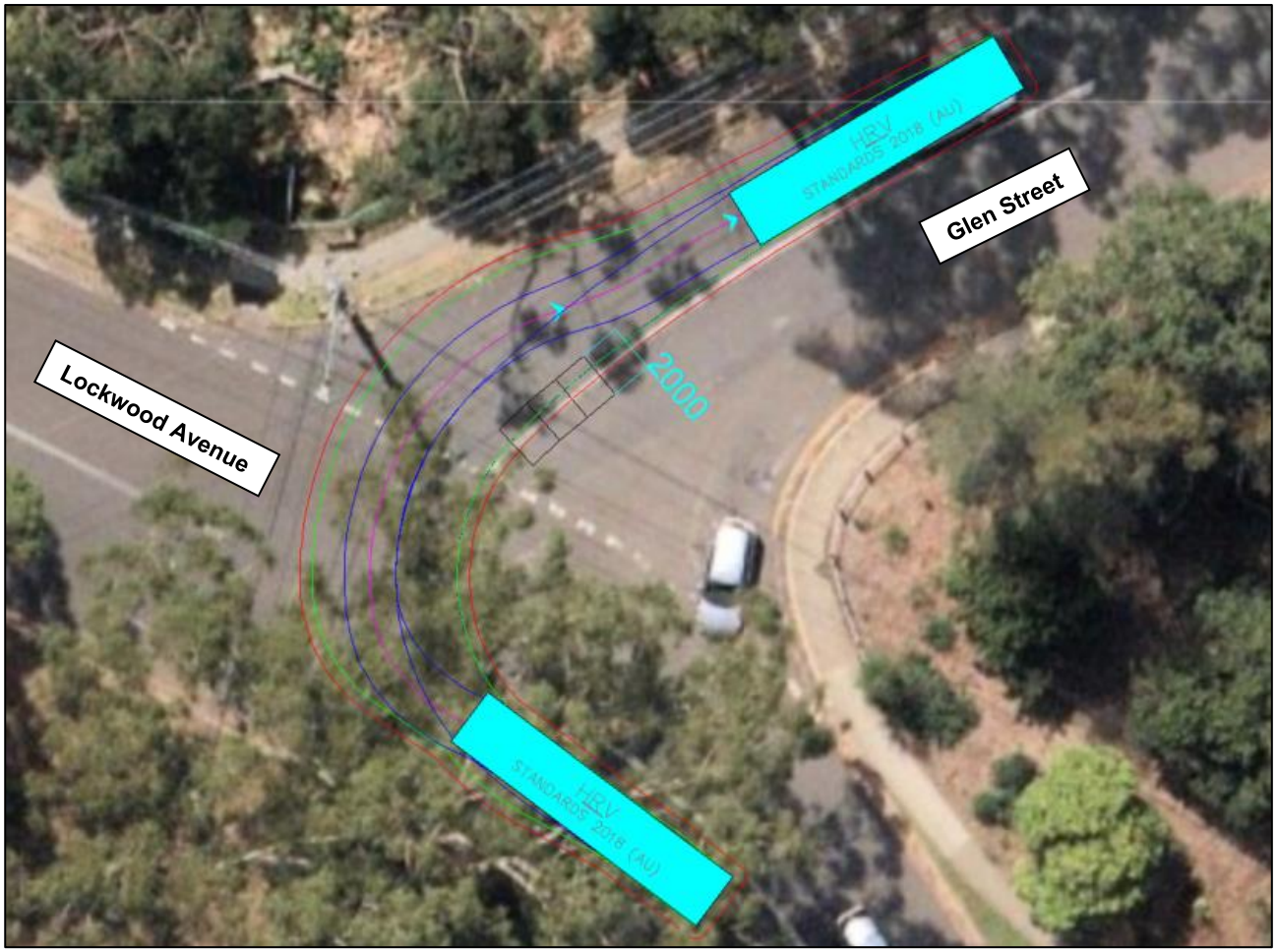


FIGURE 6: HRV SWEPT PATHS OVERLAID ONTO A PEDESTRIAN REFUGE

As shown, the HRV paths conflict with the pedestrian refuge which Council has requested. If a pedestrian refuge were to be installed in this location, it would prohibit delivery vehicles from arriving to the proposed development and Glenrose Village from this direction.

It is the view of MTE that pedestrians are unlikely to cross Glen Street at this location. **Figure 7** shows the existing pedestrian facilities within the area.

As shown in this image, there are existing crossings on Lockwood Avenue and Glen Street within very close proximity to their junction. The pedestrian origins / destinations on the southern side of Glen Street are the Glen Street Theatre, Library and the sports fields. The existing pedestrian crossing is in a more convenient crossing location for pedestrians departing the proposed development or Glenrose Village when compared to the location of Council's requested refuge. Similarly, the pedestrian destinations / origins to the west of the development (across Lockwood Avenue) are better serviced by the existing pedestrian crossing rather than Council's proposed pedestrian refuge. In fact, the Council's requested refuge does not aid pedestrians wishing to cross Lockwood Avenue.

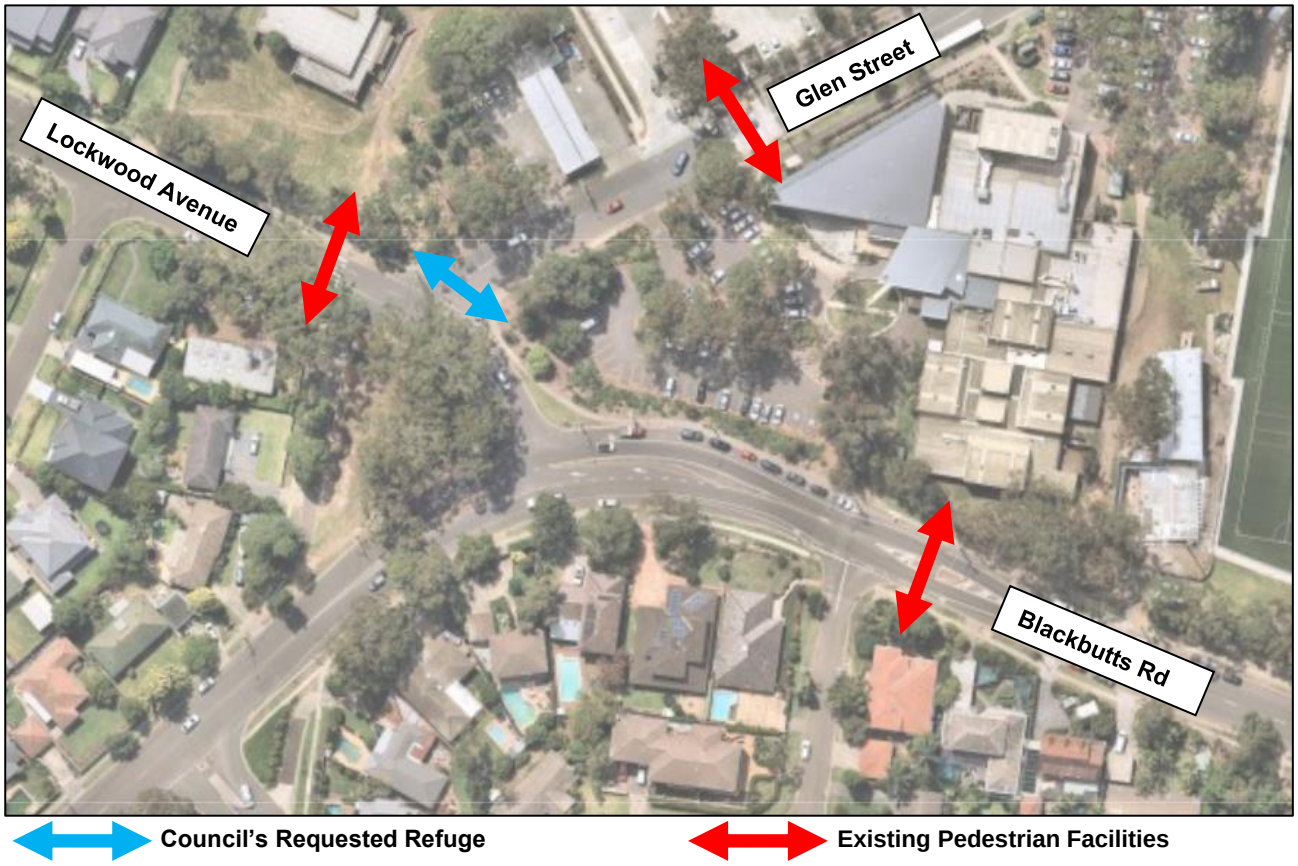


FIGURE 7: PEDESTRIAN ROUTES

The only benefit that Council's requested pedestrian refuge would provide is a convenient access between the Glen Street car park and the proposed development. The proposed development provides all parking on site. Therefore, there would be no reason to provide a pedestrian connection between the Glen Street car park and the proposed development. The residential area to the south of the Glen Street Library precinct is serviced by an existing pedestrian refuge on Blackbutts Road. The best route the subject site to/from the southern residential area would be via the Glen Street precinct and the existing pedestrian facilities on Blackbutts Road and Glen Street.

In summary, the requested pedestrian refuge would limit service vehicle routes to the site and would provide no meaningful benefit to pedestrians within the area. Therefore, the requested pedestrian refuge is not appropriate.

Raised Pedestrian Crossing on Lockwood Avenue

AS1742.10 provides the relevant standards for pedestrian control and protection, including zebra and wombat crossings. In terms of warrants, there is no difference between a raised pedestrian crossing (wombat) and an at-grade pedestrian crossing (zebra). *AS1742.10* states the following with reference to the difference between wombat and zebra crossings.

> *For improved visibility for approaching drivers the crossing may be installed as a raised pedestrian crossing.*

Lockwood Avenue to the west of the existing pedestrian crossing is flat and has no horizontal curves. Therefore, there is excellent sight distance to the crossing from Lockwood Avenue's western approach. Lockwood Avenue's eastern approach to the crossing has a horizontal curve but provides approximately 45m of stopping sight distance (SSD) to the crossing. This is a compliant SSD for vehicles traveling up to 47km/h in accordance with *Austroads Guide to Road Design*. As shown in **Figure 8**, a driver will be alert, having just turned onto Lockwood Avenue. A vehicle is highly unlikely to be traveling at 47 km/h or faster at this location. Therefore, the sight distances to the existing zebra crossing are satisfactory.

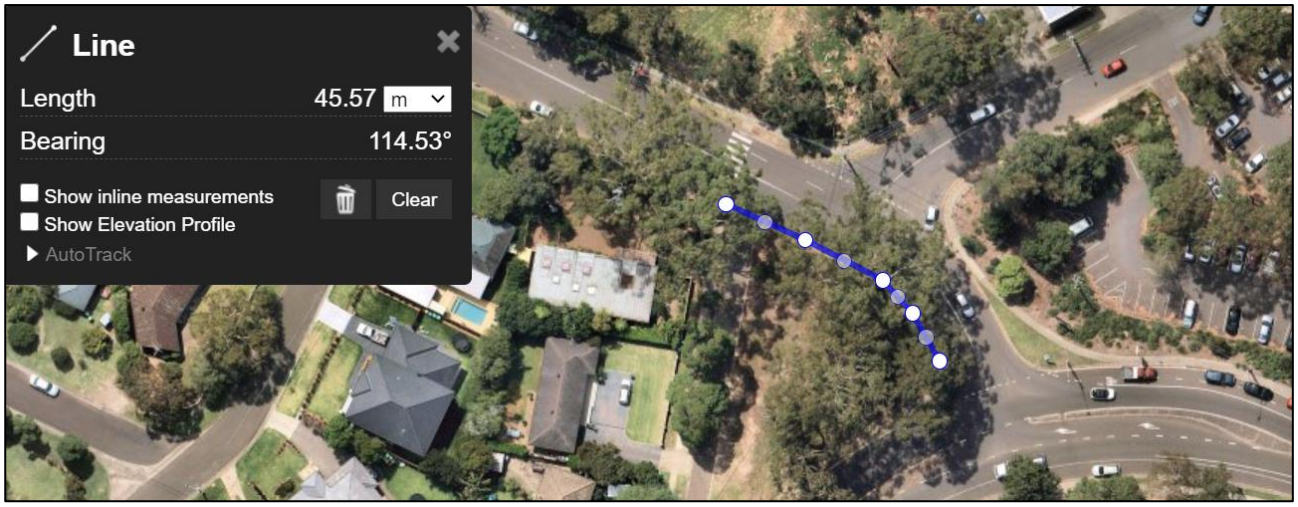


FIGURE 8: LOCKWOOD AVENUE SSD TO EXISTING PEDESTRIAN CROSSING

In addition to the SSD requirements, MTE has researched TfNSW crash data statistics in the last five (5) years at this location. There have been no pedestrian-related incidents at this crossing or at any of the crossings surrounding Glenrose Village.

In summary, the existing pedestrian crossing is satisfactory in terms of sight distances and has not had a history of crashes, it is not considered to be a mandatory requirement to upgrade the existing pedestrian crossing to a raised pedestrian crossing.

> *Car park design*
>
> *The car parking area and driveways are to be designed in compliance with Australian Standards AS2890. In this regard, there are a number of sub-standard aisle widths within the car park to be amended. The disable parking spaces within the non-residential car parking area are to be located in a location that enables the people with disabilities to conveniently access the lifts. At the entry point, sufficient queuing area is to be provided between the vehicular control pint[sic] and the property boundary in compliance with Australian Standards.*

MTE Response: The car park has been amended to comply with the relevant requirements of *AS28900.1:2004*, specifically in terms of aisle width. One (1) of the non-residential commercial disabled spaces is located directly adjacent to the lift, whilst the other is within close proximity of a lift. This is considered satisfactory for convenient access to the lifts.

6 CONCLUSION

The traffic and parking impacts of the proposed Mixed-Use Development at 28 Lockwood Avenue, Belrose, as depicted in **Annexure A** for reference, have been assessed.

The car parking layout has been assessed to generally comply with the relevant dimensional requirements and objectives of AS2890.1, AS2890.2 and AS2890.6, subject to the detailed design of a traffic signal system and Loading Dock Management Plan.

A roundabout is proposed at the end of the Glenrose Place cul-de-sac to manage traffic entering and exiting both the subject development and the adjacent Glenrose Village shopping centre, as shown in **Annexure D**. The proposal is concept only and is subject to detailed design and approval from Council's Local Traffic Committee. The final design of the roundabout cul-de-sac can be conditioned and is also subject to an approval under s138 of the *Roads Act*.

The site proposes a total of **228** car parking spaces for residents, visitors and retail staff, meeting the requirements of Council's DCP. The provision is therefore considered appropriate and acceptable. In addition, the respective BCA and DCP requirements for adaptable, disabled, bicycle and motorcycle parking are met or exceeded.

The peak traffic generation of the proposed development has been estimated to be **86** (38 in; 48 out) trips during the AM peak period, **157** (83 in; 74 out) trips in the PM peak period and **288** (144 in, 144 out) in the Saturday midday period. The additional traffic generation has been assessed to have no noticeable impact on the surrounding network in terms of level of service or delays.

Waste collection for the development will occur within the loading area along with deliveries for the retail portion of the development. The site provides three (3) loading spaces, which satisfies the RMS requirements. The largest vehicle which can utilise the on-site loading area is a 12.5m length HRV. Waste collection is expected to occur on Lockwood Avenue on the site's western boundary.

In view of the foregoing, the proposed Mixed-Use Development is fully supported in terms of its traffic and parking impacts.

ANNEXURE A: PROPOSED PLAN

DKO Architecture (NSW) Pty Ltd
42 Davies Street
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NSW: Nominated Architects
Koos de Keijzer 5767 | David Randerson 8542

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Rev.	Date	By	Ckd	Description
F	9/04/2021	WL	NB	S34 PRELIMINARY REVISED PROPOSAL
G	13/04/2021	WL	NB	S34 PRELIMINARY REVISED PROPOSAL
H	16/04/2021	WL	NB	S34 REVISED PROPOSAL

Project Name	28 Lockwood Av. Belrose	Project Number	11574
Project Address	28 Lockwood Ave, Belrose, NSW 2085	Drawing Name	Basement 4
		Scale	1:400 @A3
		Date	Aug 2019
Client	Platinum Property Group	Drawing Number	**DA200**
		Revision	**H**

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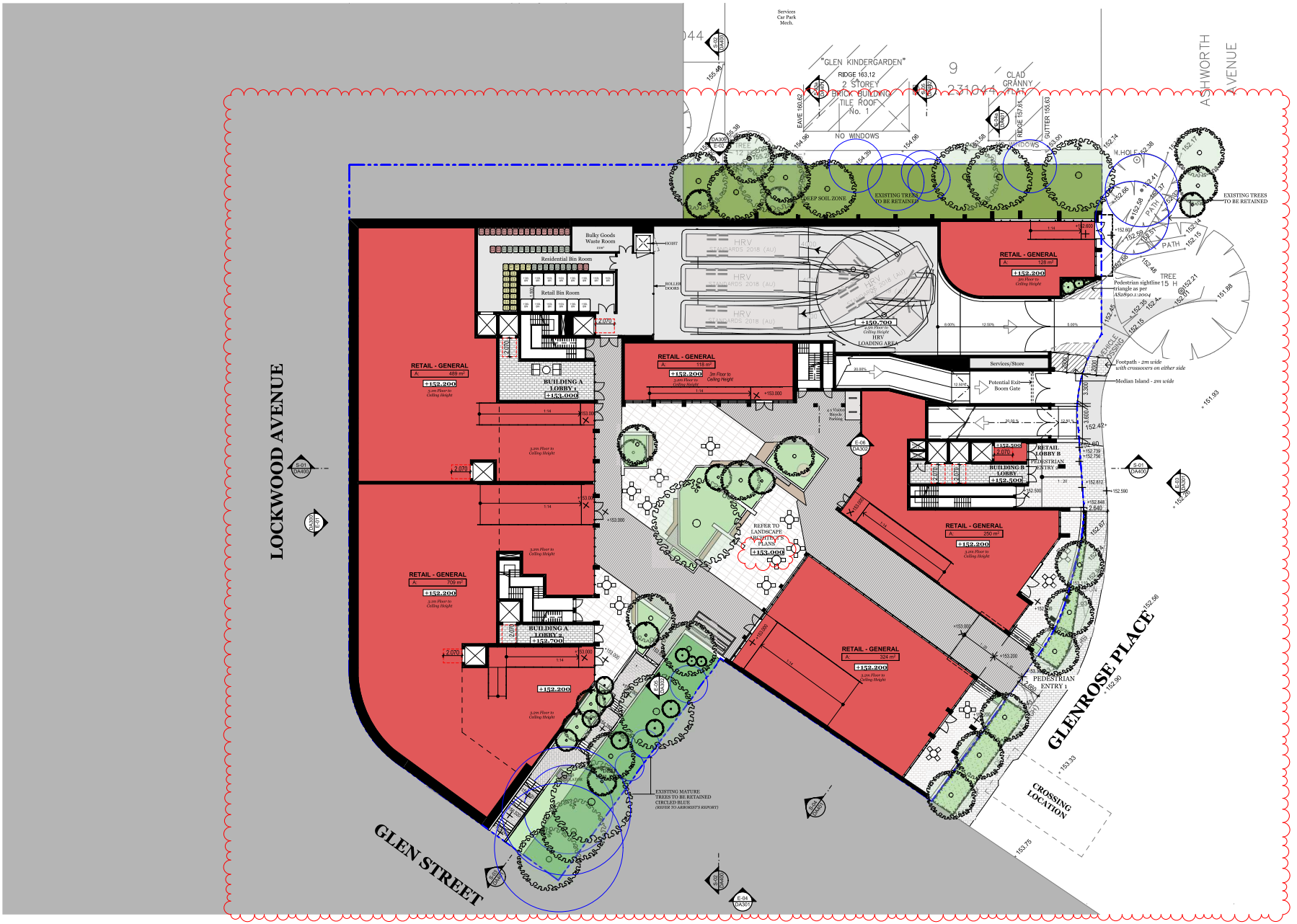
H	16/04/2021	WL	NB	S34 REVISED PROPOSAL

Project Name
Project Address
28 Lockwood Av. Belrose
28 Lockwood Ave,
Belrose, NSW 2085

Client
Platinum Property Group

Project Number 11574
Drawing Name Basement 3
Scale 1:400 @A3
Date Aug 2019

Drawing Number **DA201**
Revision **H**



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Rev.	Date	By	Ckd	Description
G	13/04/2021	WL	NB	S34 PRELIMINARY REVISED PROPOSAL
H	16/04/2021	WL	NB	S34 REVISED PROPOSAL
I	7/05/2021	WL	NB	S34 REVISED PROPOSAL

Project Name	28 Lockwood Av. Belrose	Project Number	11574
Project Address	28 Lockwood Ave, Belrose, NSW 2085	Drawing Name	Basement 2
		Scale	1:400 @A3
		Date	Aug 2019
Client	Platinum Property Group	Drawing Number	DA202
		Revision	I

ANNEXURE B: TRAFFIC SURVEY DATA

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of Glen St and Lockwood Ave, Belrose

GPS -33.7405, 151.20879

Date:	Thu 25/07/19
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Lockwood Ave
East:	Glen St
South:	Lockwood Ave
West:	N/A

Survey	AM:	10:00 AM-12:00 PM
Period	PM:	12:00 PM-2:00 PM
Traffic	AM:	11:45 AM-12:45 PM
Peak	PM:	12:30 PM-1:30 PM

All Vehicles

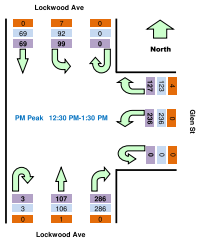
Time		North Approach Lockwood Ave			East Approach Glen St			South Approach Lockwood Ave			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
10:00	10:15	0	14	18	0	25	40	0	59	11	751	
10:15	10:30	0	27	20	0	18	53	0	64	15	751	
10:30	10:45	0	23	18	0	28	43	0	58	24	740	
10:45	11:00	0	18	26	0	14	45	0	69	21	767	
11:00	11:15	0	15	19	0	21	41	0	53	18	784	
11:15	11:30	0	16	20	0	17	50	0	60	23	828	
11:30	11:45	0	23	21	0	23	56	0	69	29	847	
11:45	12:00	0	18	23	0	21	54	0	68	26	865	
12:00	12:15	0	20	22	0	30	54	0	66	19	894	
12:15	12:30	0	22	25	0	22	59	0	62	15	899	
12:30	12:45	0	19	30	0	28	63	2	72	25	927	Peak
12:45	13:00	0	21	29	0	28	56	0	73	32	889	
13:00	13:15	0	18	15	0	34	47	1	75	26	867	
13:15	13:30	0	11	25	0	37	70	0	66	24		
13:30	13:45	0	14	13	0	26	62	0	65	21		
13:45	14:00	0	19	21	0	28	66	0	62	21		

Peak Time		North Approach Lockwood Ave			East Approach Glen St			South Approach Lockwood Ave			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
11:45	12:45	0	79	100	0	101	230	2	268	85	865
12:30	13:30	0	69	99	0	127	236	3	286	107	927

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

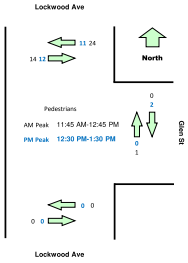
Total
Light
Heavy



Pedestrians Crossing

Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
10:00	10:15	0	4	0	0	0	0	42
10:15	10:30	9	3	0	0	0	0	48
10:30	10:45	6	11	0	1	0	0	46
10:45	11:00	3	5	0	0	0	0	34
11:00	11:15	2	7	1	0	0	0	47
11:15	11:30	6	4	0	0	0	0	46
11:30	11:45	3	3	0	0	0	0	40
11:45	12:00	13	7	0	1	0	0	39
12:00	12:15	7	2	0	0	0	0	24
12:15	12:30	4	0	0	0	0	0	20
12:30	12:45	0	5	0	0	0	0	25
12:45	13:00	1	3	2	0	0	0	25
13:00	13:15	4	1	0	0	0	0	23
13:15	13:30	6	3	0	0	0	0	
13:30	13:45	1	4	0	0	0	0	
13:45	14:00	3	0	0	1	0	0	

Peak Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
11:45	12:45	24	14	0	1	0	0	39
12:30	13:30	11	12	2	0	0	0	25



Light Vehicles

Time		North Approach Lockwood Ave			East Approach Glen St			South Approach Lockwood Ave		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
10:00	10:15	0	14	18	0	22	40	0	59	11
10:15	10:30	0	26	19	0	18	52	0	64	15
10:30	10:45	0	23	17	0	27	43	0	58	24
10:45	11:00	0	18	24	0	14	45	0	69	20
11:00	11:15	0	15	19	0	18	41	0	53	18
11:15	11:30	0	16	19	0	17	49	0	60	23
11:30	11:45	0	23	20	0	22	56	0	69	29
11:45	12:00	0	18	21	0	21	54	0	68	26
12:00	12:15	0	20	22	0	27	54	0	65	19
12:15	12:30	0	22	23	0	22	59	0	62	15
12:30	12:45	0	19	30	0	27	63	2	72	25
12:45	13:00	0	21	26	0	28	56	0	73	32
13:00	13:15	0	18	15	0	31	47	1	75	25
13:15	13:30	0	11	21	0	37	70	0	66	24
13:30	13:45	0	14	12	0	24	62	0	65	21
13:45	14:00	0	19	19	0	28	64	0	62	21

Peak Time		North Approach Lockwood Ave			East Approach Glen St			South Approach Lockwood Ave			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
11:45	12:45	0	79	96	0	97	230	2	267	85	856
12:30	13:30	0	69	92	0	123	236	3	286	106	915

Heavy Vehicles

Time		North Approach Lockwood Ave			East Approach Glen St			South Approach Lockwood Ave		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
10:00	10:15	0	0	0	0	3	0	0	0	0
10:15	10:30	0	1	1	0	0	1	0	0	0
10:30	10:45	0	0	1	0	1	0	0	0	0
10:45	11:00	0	0	2	0	0	0	0	0	1
11:00	11:15	0	0	0	0	3	0	0	0	0
11:15	11:30	0	0	1	0	0	1	0	0	0
11:30	11:45	0	0	1	0	1	0	0	0	0
11:45	12:00	0	0	2	0	0	0	0	0	0
12:00	12:15	0	0	0	0	3	0	0	1	0
12:15	12:30	0	0	2	0	0	0	0	0	0
12:30	12:45	0	0	0	0	1	0	0	0	0
12:45	13:00	0	0	3	0	0	0	0	0	0
13:00	13:15	0	0	0	0	3	0	0	0	1
13:15	13:30	0	0	4	0	0	0	0	0	0
13:30	13:45	0	0	1	0	2	0	0	0	0
13:45	14:00	0	0	2	0	0	2	0	0	0

Peak Time		North Approach Lockwood Ave			East Approach Glen St			South Approach Lockwood Ave			Peak total
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	
11:45	12:45	0	0	4	0	4	0	0	1	0	9
12:30	13:30	0	0	7	0	4	0	0	0	1	12

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of Glen St and Glenrose Pl, Belrose

GPS -33.740115, 151.203445

Date:	Thu 25/07/19
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Glenrose Pl
East:	Glen St
South:	Car Park
West:	Glen St

Survey	AM:	10:00 AM-12:00 PM
Period	PM:	12:00 PM-2:00 PM
Traffic	AM:	11:45 AM-12:45 PM
Peak	PM:	12:45 PM-1:45 PM

All Vehicles

Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
10:00	10:15	0	32	0	15	0	9	31	1	0	2	3	2	0	1	33	43	748	
10:15	10:30	0	32	0	13	0	8	34	1	0	3	0	5	0	9	22	53	760	
10:30	10:45	0	33	1	26	0	9	22	7	0	6	5	16	0	3	25	48	767	
10:45	11:00	0	29	0	23	0	10	27	5	0	3	0	3	0	6	33	56	780	
11:00	11:15	0	31	0	37	0	5	22	4	0	3	1	9	0	2	14	56	803	
11:15	11:30	0	33	0	22	0	11	31	3	0	2	2	3	0	7	20	53	832	
11:30	11:45	0	39	0	31	0	10	32	2	0	2	0	8	0	9	28	53	860	
11:45	12:00	0	42	0	38	0	9	32	3	0	1	1	1	0	2	16	73	882	
12:00	12:15	0	43	0	22	0	13	35	3	0	1	2	6	0	6	32	50	906	
12:15	12:30	0	46	0	30	0	12	32	4	0	0	1	3	1	3	31	52	932	
12:30	12:45	0	45	2	27	0	8	37	3	0	1	2	9	1	4	36	61	961	
12:45	13:00	0	31	0	43	0	7	46	2	0	2	2	7	0	12	37	53	966	Peak
13:00	13:15	0	45	0	44	0	16	30	6	0	2	0	6	0	9	20	61	957	
13:15	13:30	0	53	1	32	0	5	47	4	0	3	1	7	0	5	32	54		
13:30	13:45	0	43	0	33	0	11	33	18	1	2	10	12	0	9	10	59		
13:45	14:00	0	46	2	25	0	14	39	5	0	4	6	9	0	7	16	60		

Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
11:45	12:45	0	176	2	117	0	42	136	13	0	3	6	19	2	15	115	236	882
12:45	13:45	0	172	1	152	0	39	156	30	1	9	13	32	0	35	99	227	966

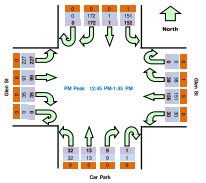
Pedestrians Crossing

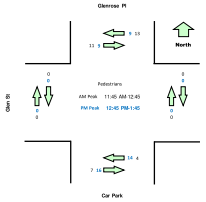
Time		North Approach Glenrose Pl	East Approach Glen St			South Approach Car Park		West Approach Glen St		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	
10:00	10:15	4	10	0	0	0	5	0	0	46
10:15	10:30	0	6	0	0	0	3	0	0	33
10:30	10:45	3	8	0	0	0	0	0	0	33
10:45	11:00	0	5	0	0	1	1	0	0	35
11:00	11:15	3	2	0	0	0	1	0	0	39
11:15	11:30	2	3	0	0	2	0	1	1	41
11:30	11:45	6	6	0	0	0	1	0	0	35
11:45	12:00	6	3	0	0	0	2	0	0	35
12:00	12:15	6	2	0	0	0	0	0	0	33
12:15	12:30	1	1	0	0	1	0	0	0	47
12:30	12:45	0	5	0	0	3	5	0	0	50
12:45	13:00	0	0	0	0	5	4	0	0	48
13:00	13:15	9	4	0	0	1	8	0	0	54
13:15	13:30	0	0	0	0	3	3	0	0	
13:30	13:45	0	5	0	0	5	1	0	0	
13:45	14:00	6	7	0	0	0	2	0	0	

Peak Time		North Approach Glenrose Pl	East Approach Glen St			South Approach Car Park		West Approach Glen St		Peak hour
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	total
11:45	12:45	13	11	0	0	4	7	0	0	35
12:45	13:45	9	9	0	0	14	16	0	0	48

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic
Total
Light
Heavy





Light Vehicles

Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
10:00	10:15	0	32	0	14	0	9	28	1	0	2	3	2	0	1	33	43
10:15	10:30	0	32	0	13	0	8	33	1	0	3	0	5	0	9	21	53
10:30	10:45	0	33	1	26	0	9	21	7	0	6	5	16	0	3	24	48
10:45	11:00	0	29	0	23	0	10	27	5	0	3	0	3	0	6	31	56
11:00	11:15	0	31	0	37	0	5	19	4	0	3	1	9	0	2	14	56
11:15	11:30	0	33	0	22	0	11	30	3	0	2	2	3	0	7	19	53
11:30	11:45	0	39	0	31	0	10	31	2	0	2	0	8	0	9	27	53
11:45	12:00	0	42	0	38	0	9	32	3	0	1	1	1	0	2	14	73
12:00	12:15	0	43	0	22	0	13	32	3	0	1	2	6	0	6	32	49
12:15	12:30	0	46	0	29	0	12	32	4	0	0	1	3	1	3	29	52
12:30	12:45	0	45	2	27	0	7	36	3	0	1	2	9	1	4	36	61
12:45	13:00	0	31	0	42	0	6	46	2	0	2	2	7	0	12	34	53
13:00	13:15	0	45	0	44	0	16	27	6	0	2	0	6	0	9	20	61
13:15	13:30	0	53	1	32	0	5	47	4	0	3	1	7	0	5	28	54
13:30	13:45	0	43	0	33	0	11	31	18	1	2	10	12	0	9	9	59
13:45	14:00	0	45	2	25	0	14	38	5	0	4	6	9	0	7	14	60

Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
11:45	12:45	0	176	2	116	0	41	132	13	0	3	6	19	2	15	111	235	871
12:45	13:45	0	172	1	151	0	38	151	30	1	9	13	32	0	35	91	227	951

Heavy Vehicles

Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
10:00	10:15	0	0	0	1	0	0	3	0	0	0	0	0	0	0	0	0
10:15	10:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
10:30	10:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
10:45	11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
11:00	11:15	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
11:15	11:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
11:30	11:45	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0
11:45	12:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
12:00	12:15	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1
12:15	12:30	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2	0
12:30	12:45	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
12:45	13:00	0	0	0	1	0	1	0	0	0	0	0	0	0	0	3	0
13:00	13:15	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
13:15	13:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
13:30	13:45	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
13:45	14:00	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2	0

Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
11:45	12:45	0	0	0	1	0	1	4	0	0	0	0	0	0	0	4	1	11
12:45	13:45	0	0	0	1	0	1	5	0	0	0	0	0	0	0	8	0	15

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY trafficsurvey.com.au

Intersection of Blackbutts Rd and Glen St, Belrose

GPS -33.74081, 151.20905

Date:	Sat 08/10/16
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Glen St
East:	Blackbutts Rd
South:	N/A
West:	Blackbutts Rd

Survey	AM:	10:00 AM-12:00 PM
Period	PM:	12:00 PM-2:00 PM
Traffic	AM:	11:30 AM-12:30 PM
Peak	PM:	12:30 PM-1:30 PM

All Vehicles

Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
10:00	10:15	0	18	36	0	54	27	0	46	16	908	
10:15	10:30	0	24	56	0	54	34	0	45	25	932	
10:30	10:45	0	23	43	1	63	31	0	50	19	925	
10:45	11:00	0	14	49	1	67	31	0	58	23	970	
11:00	11:15	0	16	40	0	55	43	0	51	16	1008	
11:15	11:30	0	14	52	1	63	40	0	41	20	1041	
11:30	11:45	0	22	57	1	75	44	0	53	23	1060	Peak
11:45	12:00	0	26	46	0	70	57	0	58	24	1045	
12:00	12:15	0	24	50	0	63	35	0	60	22	1032	
12:15	12:30	0	24	57	2	49	38	0	52	28	1039	
12:30	12:45	0	35	47	3	76	31	0	45	23	1054	
12:45	13:00	0	22	55	3	73	48	0	35	32	1041	
13:00	13:15	0	18	47	0	71	46	0	48	31	1036	
13:15	13:30	0	27	54	0	67	53	0	41	23		
13:30	13:45	0	28	48	0	64	43	0	42	22		
13:45	14:00	0	23	62	0	58	43	0	52	25		

Peak Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
11:30	12:30	0	96	210	3	257	174	0	223	97	1060
12:30	13:30	0	102	203	6	287	178	0	169	109	1054

Pedestrians Crossing

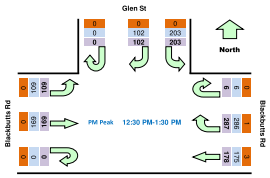
Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
10:00	10:15	0	0	0	2	0	1	11
10:15	10:30	0	0	0	0	1	1	14
10:30	10:45	0	0	0	0	0	1	17
10:45	11:00	3	0	0	0	0	2	20
11:00	11:15	2	1	0	0	2	1	19
11:15	11:30	2	1	0	0	0	2	15
11:30	11:45	0	1	2	0	0	1	14
11:45	12:00	0	1	0	0	1	2	13
12:00	12:15	0	0	0	0	2	0	13
12:15	12:30	0	1	0	0	1	2	14
12:30	12:45	1	1	0	0	0	1	10
12:45	13:00	0	2	0	0	0	2	7
13:00	13:15	1	0	1	0	0	1	9
13:15	13:30	0	0	0	0	0	0	
13:30	13:45	0	0	0	0	0	0	
13:45	14:00	0	1	0	0	2	3	

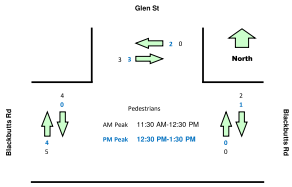
Peak Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
11:30	12:30	0	3	2	0	4	5	14
12:30	13:30	2	3	1	0	0	4	10

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

Total
Light
Heavy





Light Vehicles

Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd		
Period Start	Period End	U	R	L	U	R	WB	U	EB	L
10:00	10:15	0	18	36	0	54	27	0	46	16
10:15	10:30	0	24	54	0	54	32	0	44	25
10:30	10:45	0	23	43	1	63	31	0	50	19
10:45	11:00	0	14	49	1	66	31	0	58	23
11:00	11:15	0	16	40	0	55	43	0	51	16
11:15	11:30	0	14	51	1	63	39	0	41	20
11:30	11:45	0	22	57	1	75	44	0	52	23
11:45	12:00	0	26	46	0	70	57	0	58	24
12:00	12:15	0	24	50	0	62	35	0	60	22
12:15	12:30	0	24	57	2	49	38	0	52	28
12:30	12:45	0	35	47	3	76	29	0	45	23
12:45	13:00	0	22	55	3	73	48	0	35	32
13:00	13:15	0	18	47	0	70	46	0	48	31
13:15	13:30	0	27	54	0	67	52	0	41	23
13:30	13:45	0	28	48	0	64	43	0	42	22
13:45	14:00	0	23	60	0	58	43	0	52	25

Peak Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
11:30	12:30	0	96	210	3	256	174	0	222	97	1058
12:30	13:30	0	102	203	6	286	175	0	169	109	1050

Heavy Vehicles

Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd		
Period Start	Period End	U	R	L	U	R	WB	U	EB	L
10:00	10:15	0	0	0	0	0	0	0	0	0
10:15	10:30	0	0	2	0	0	2	0	1	0
10:30	10:45	0	0	0	0	0	0	0	0	0
10:45	11:00	0	0	0	0	1	0	0	0	0
11:00	11:15	0	0	0	0	0	0	0	0	0
11:15	11:30	0	0	1	0	0	1	0	0	0
11:30	11:45	0	0	0	0	0	0	0	1	0
11:45	12:00	0	0	0	0	0	0	0	0	0
12:00	12:15	0	0	0	0	1	0	0	0	0
12:15	12:30	0	0	0	0	0	0	0	0	0
12:30	12:45	0	0	0	0	0	2	0	0	0
12:45	13:00	0	0	0	0	0	0	0	0	0
13:00	13:15	0	0	0	0	1	0	0	0	0
13:15	13:30	0	0	0	0	0	1	0	0	0
13:30	13:45	0	0	0	0	0	0	0	0	0
13:45	14:00	0	0	2	0	0	0	0	0	0

Peak Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
11:30	12:30	0	0	0	0	1	0	0	1	0	2
12:30	13:30	0	0	0	0	1	3	0	0	0	4

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Glen St and Glenrose Pl, Belrose

GPS *-33.7401, 151.20961*

Date:	Thu 25/07/19
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Glenrose Pl
East:	Glen St
South:	Glenrose Pl
West:	Glen St

Survey Period
Traffic Peak

All Vehicles

Time		Glen St		Glenrose Pl	
Period Start	**Period End**	**SB**	**NB**	**WB**	**EB**
10:00	10:15	8	9	7	4
10:15	10:30	11	7	4	1
10:30	10:45	10	11	3	6
10:45	11:00	9	9	4	4
11:00	11:15	10	12	9	4
11:15	11:30	6	12	1	2
11:30	11:45	17	14	2	4
11:45	12:00	1	15	9	3
12:00	12:15	12	13	7	1
12:15	12:30	6	11	2	2
12:30	12:45	5	9	5	7
12:45	13:00	4	25	5	1
13:00	13:15	11	11	6	3
13:15	13:30	9	16	9	2
13:30	13:45	23	2	5	9
13:45	14:00	86	6	3	4

Suburban:	Belrose	***South:***	Lockwood Ave	***Traffic***	AM:	7:45 AM-8:45 AM
Customer:	McLaren	***West:***	N/A	***Peak***	PM:	5:15 PM-6:15 PM

All Vehicles

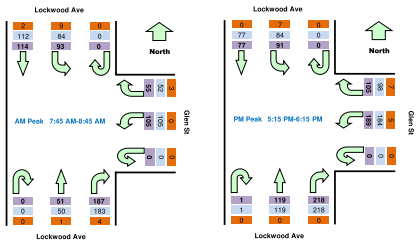
Time		orth Approach Lockwood Av			East Approach Glen St			outh Approach Lockwood Av			Hourly Total	
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	Hour	Peak
07:00	07:15	0	23	11	1	4	12	0	23	4	436	
07:15	07:30	0	28	15	0	2	9	0	30	4	512	
07:30	07:45	0	32	19	0	6	15	0	34	6	567	
07:45	08:00	0	34	23	0	19	21	0	48	13	605	Peak
08:00	08:15	0	28	20	0	14	29	0	53	10	573	
08:15	08:30	0	25	22	0	8	32	0	42	14		
08:30	08:45	0	27	28	0	14	23	0	44	14		
08:45	09:00	0	21	23	0	12	23	0	39	8		
16:00	16:15	0	16	25	0	26	41	0	50	26	733	
16:15	16:30	0	29	21	0	26	40	0	49	19	721	
16:30	16:45	0	23	23	0	22	39	0	49	30	747	
16:45	17:00	0	17	11	0	25	49	1	50	26	769	
17:00	17:15	0	16	19	0	32	39	0	42	24	792	
17:15	17:30	0	14	27	0	31	51	0	62	25	800	Peak
17:30	17:45	0	16	19	0	25	42	0	68	38	749	
17:45	18:00	0	28	24	0	27	42	0	45	36	690	
18:00	18:15	0	19	21	0	22	54	1	43	20	659	
18:15	18:30	0	16	8	0	18	58	0	41	18		
18:30	18:45	0	18	12	0	17	35	0	48	19		
18:45	19:00	0	20	12	0	19	42	1	48	29		

Peak Time		orth Approach Lockwood Av			East Approach Glen St			outh Approach Lockwood Av			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
07:45	08:45	0	114	93	0	55	105	0	187	51	605
17:15	18:15	0	77	91	0	105	189	1	218	119	800

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic

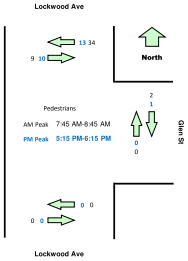
Total
Light
Heavy



Pedestrians Crossing

Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
07:00	07:15	4	4	1	0	4	4	55
07:15	07:30	4	12	0	0	0	0	52
07:30	07:45	3	13	1	0	0	0	53
07:45	08:00	1	2	2	0	0	0	45
08:00	08:15	13	1	0	0	0	0	47
08:15	08:30	14	3	0	0	0	0	
08:30	08:45	6	3	0	0	0	0	
08:45	09:00	4	2	1	0	0	0	
16:00	16:15	1	2	1	0	0	0	49
16:15	16:30	14	16	0	0	0	0	51
16:30	16:45	2	0	1	0	0	0	28
16:45	17:00	2	3	5	2	0	0	34
17:00	17:15	0	6	0	0	0	0	27
17:15	17:30	4	3	0	0	0	0	24
17:30	17:45	7	2	0	0	0	0	20
17:45	18:00	0	4	1	0	0	0	13
18:00	18:15	2	1	0	0	0	0	12
18:15	18:30	1	2	0	0	0	0	
18:30	18:45	2	0	0	0	0	0	
18:45	19:00	2	1	0	1	0	0	

Peak Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
07:45	08:45	34	9	2	0	0	0	45
17:15	18:15	13	10	1	0	0	0	24



Light Vehicles

Time		orth Approach Lockwood Av			East Approach Glen St			outh Approach Lockwood Av		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
07:00	07:15	0	23	9	1	3	11	0	23	4
07:15	07:30	0	28	15	0	2	8	0	29	4
07:30	07:45	0	31	15	0	6	15	0	34	6
07:45	08:00	0	34	21	0	18	21	0	47	12
08:00	08:15	0	28	18	0	12	29	0	51	10
08:15	08:30	0	25	21	0	8	32	0	41	14
08:30	08:45	0	25	24	0	14	23	0	44	14
08:45	09:00	0	21	19	0	11	22	0	36	8
16:00	16:15	0	15	24	0	22	41	0	49	25
16:15	16:30	0	29	18	0	24	40	0	49	19
16:30	16:45	0	23	22	0	20	39	0	49	30
16:45	17:00	0	17	10	0	23	49	1	50	25
17:00	17:15	0	16	17	0	30	38	0	42	24
17:15	17:30	0	14	25	0	30	50	0	62	25
17:30	17:45	0	16	17	0	23	41	0	68	38
17:45	18:00	0	28	23	0	26	41	0	45	36
18:00	18:15	0	19	19	0	19	52	1	43	20
18:15	18:30	0	16	8	0	17	56	0	41	18
18:30	18:45	0	18	11	0	15	34	0	48	19
18:45	19:00	0	20	11	0	16	40	1	48	29

Peak Time		orth Approach Lockwood Av			East Approach Glen St			outh Approach Lockwood Av			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
07:45	08:45	0	112	84	0	52	105	0	183	50	586
17:15	18:15	0	77	84	0	98	184	1	218	119	781

Heavy Vehicles

Time		orth Approach Lockwood Av			East Approach Glen St			outh Approach Lockwood Av		
Period Start	Period End	U	SB	L	U	R	L	U	R	NB
07:00	07:15	0	0	2	0	1	1	0	0	0
07:15	07:30	0	0	0	0	0	1	0	1	0
07:30	07:45	0	1	4	0	0	0	0	0	0
07:45	08:00	0	0	2	0	1	0	0	1	1
08:00	08:15	0	0	2	0	2	0	0	2	0
08:15	08:30	0	0	1	0	0	0	0	1	0
08:30	08:45	0	2	4	0	0	0	0	0	0
08:45	09:00	0	0	4	0	1	1	0	3	0
16:00	16:15	0	1	1	0	4	0	0	1	1
16:15	16:30	0	0	3	0	2	0	0	0	0
16:30	16:45	0	0	1	0	2	0	0	0	0
16:45	17:00	0	0	1	0	2	0	0	0	1
17:00	17:15	0	0	2	0	2	1	0	0	0
17:15	17:30	0	0	2	0	1	1	0	0	0
17:30	17:45	0	0	2	0	2	1	0	0	0
17:45	18:00	0	0	1	0	1	1	0	0	0
18:00	18:15	0	0	2	0	3	2	0	0	0
18:15	18:30	0	0	0	0	1	2	0	0	0
18:30	18:45	0	0	1	0	2	1	0	0	0
18:45	19:00	0	0	1	0	3	2	0	0	0

Peak Time		orth Approach Lockwood Av			East Approach Glen St			outh Approach Lockwood Av			Peak
Period Start	Period End	U	SB	L	U	R	L	U	R	NB	total
07:45	08:45	0	2	9	0	3	0	0	4	1	19
17:15	18:15	0	0	7	0	7	5	0	0	0	19

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY

trafficsurvey.com.au

Intersection of Glen St and Glenrose Pl, Belrose

GPS -33.740115, 151.20945

Date:	Thu 25/07/19
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Glenrose Pl
East:	Glen St
South:	Car Park
West:	Glen St

Survey	AM:	7:00 AM-9:00 AM
Period	PM:	4:00 PM-7:00 PM
Traffic	AM:	7:45 AM-8:45 AM
Peak	PM:	5:15 PM-6:15 PM

All Vehicles

Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
07:00	07:15	0	3	0	1	0	1	9	2	0	4	0	5	0	7	15	12	326	
07:15	07:30	0	6	0	0	0	0	3	3	0	1	0	2	0	4	21	20	393	
07:30	07:45	0	6	0	0	0	2	10	3	0	2	0	5	0	7	27	19	442	
07:45	08:00	0	8	0	4	0	0	25	7	0	4	0	7	0	12	31	28	483	Peak
08:00	08:15	0	9	1	1	0	0	30	3	0	5	0	4	0	8	35	30	477	
08:15	08:30	0	16	0	2	0	1	16	0	0	2	0	8	0	5	25	34		
08:30	08:45	0	6	2	4	0	2	22	4	0	0	1	9	0	4	34	34		
08:45	09:00	0	14	0	6	0	8	16	5	0	3	1	5	0	3	24	35		
16:00	16:15	0	36	0	10	0	2	30	3	0	2	1	1	0	4	23	48	629	
16:15	16:30	0	35	0	14	0	3	29	2	0	4	0	2	0	8	15	47	631	
16:30	16:45	0	30	1	12	0	3	26	4	0	2	2	5	0	3	28	43	670	
16:45	17:00	0	36	0	7	0	5	34	1	0	4	1	4	0	2	20	39	692	
17:00	17:15	0	34	1	18	0	6	31	2	0	2	1	6	0	4	16	41	706	
17:15	17:30	0	34	0	14	0	4	44	5	0	2	2	4	0	3	32	54	711	Peak
17:30	17:45	0	37	0	17	0	6	26	1	0	0	1	4	0	4	26	57	653	
17:45	18:00	0	41	0	18	0	5	26	5	0	1	0	2	0	7	27	35	605	
18:00	18:15	0	26	1	12	0	5	41	7	0	1	1	9	0	7	20	37	578	
18:15	18:30	0	32	1	9	0	0	40	3	0	2	0	4	0	4	22	23		
18:30	18:45	0	14	1	8	0	2	37	5	0	1	2	1	1	8	29	31		
18:45	19:00	0	24	0	10	0	2	32	4	0	2	1	5	0	6	25	29		

Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
07:45	08:45	0	39	3	11	0	3	93	14	0	11	1	28	0	29	125	126	483
17:15	18:15	0	138	1	61	0	20	137	18	0	4	4	19	0	21	105	163	711

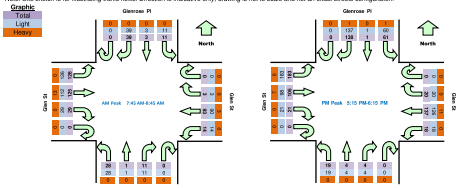
Pedestrians Crossing

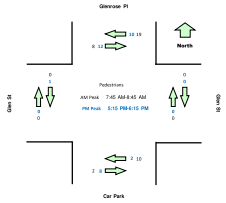
Time		North Approach Glenrose Pl		East Approach Glen St		South Approach Car Park		West Approach Glen St		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	
07:00	07:15	1	0	0	0	0	0	1	0	30
07:15	07:30	3	6	0	0	2	1	0	0	40
07:30	07:45	1	5	0	0	0	0	0	0	39
07:45	08:00	5	1	0	0	3	1	0	0	39
08:00	08:15	6	2	0	0	3	1	0	0	31
08:15	08:30	7	3	0	0	1	0	0	0	
08:30	08:45	1	2	0	0	3	0	0	0	
08:45	09:00	1	1	0	0	0	0	0	0	
16:00	16:15	6	2	0	0	1	0	0	0	27
16:15	16:30	2	6	0	0	1	0	0	0	26
16:30	16:45	3	0	0	0	2	0	0	0	24
16:45	17:00	2	2	0	0	0	0	0	0	28
17:00	17:15	4	4	0	0	0	0	0	0	33
17:15	17:30	3	4	0	0	0	0	0	0	33
17:30	17:45	2	2	0	0	2	2	1	0	31
17:45	18:00	3	5	0	0	0	1	0	0	29
18:00	18:15	2	1	0	0	0	5	0	0	23
18:15	18:30	0	0	0	0	0	5	0	0	
18:30	18:45	0	1	0	0	1	3	0	2	
18:45	19:00	2	1	0	0	0	0	0	0	

Peak Time		North Approach Glenrose Pl		East Approach Glen St		South Approach Car Park		West Approach Glen St		Peak hour total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	
07:45	08:45	19	8	0	0	10	2	0	0	39
17:15	18:15	10	12	0	0	2	8	1	0	33

Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

Graphic: Total / Light / Heavy





Light Vehicles

Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
07:00	07:15	0	3	0	1	0	1	7	2	0	4	0	5	0	7	13	12
07:15	07:30	0	6	0	0	0	0	2	3	0	1	0	2	0	4	21	19
07:30	07:45	0	6	0	0	0	2	10	3	0	2	0	5	0	7	23	19
07:45	08:00	0	8	0	4	0	0	24	7	0	4	0	7	0	12	28	28
08:00	08:15	0	9	1	1	0	0	28	3	0	5	0	4	0	8	31	30
08:15	08:30	0	16	0	2	0	1	16	0	0	2	0	8	0	5	23	34
08:30	08:45	0	6	2	4	0	2	22	4	0	0	1	9	0	4	30	34
08:45	09:00	0	13	0	5	0	7	15	5	0	3	1	5	0	3	19	33
16:00	16:15	0	36	0	10	0	1	26	3	0	2	1	1	0	4	21	48
16:15	16:30	0	35	0	14	0	2	27	2	0	4	0	2	0	8	12	47
16:30	16:45	0	30	1	12	0	2	24	4	0	2	2	5	0	3	25	43
16:45	17:00	0	36	0	6	0	5	32	1	0	4	1	4	0	2	19	39
17:00	17:15	0	34	1	18	0	6	28	2	0	2	1	6	0	4	14	41
17:15	17:30	0	33	0	14	0	4	43	5	0	2	2	4	0	3	30	54
17:30	17:45	0	37	0	16	0	6	23	1	0	0	1	4	0	4	24	57
17:45	18:00	0	41	0	18	0	5	24	5	0	1	0	2	0	7	26	35
18:00	18:15	0	26	1	12	0	5	36	7	0	1	1	9	0	7	18	37
18:15	18:30	0	32	1	9	0	0	37	3	0	2	0	4	0	4	22	23
18:30	18:45	0	14	1	8	0	2	34	5	0	1	2	1	1	8	19	31
18:45	19:00	0	24	0	10	0	2	27	4	0	2	1	5	0	6	24	29

Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
07:45	08:45	0	39	3	11	0	3	90	14	0	11	1	28	0	29	112	126	467
17:15	18:15	0	137	1	60	0	20	126	18	0	4	4	19	0	21	98	163	691

Heavy Vehicles

Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St			
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L
07:00	07:15	0	0	0	0	0	0	2	0	0	0	0	0	0	0	2	0
07:15	07:30	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1
07:30	07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
07:45	08:00	0	0	0	0	0	0	1	0	0	0	0	0	0	0	3	0
08:00	08:15	0	0	0	0	0	0	2	0	0	0	0	0	0	0	4	0
08:15	08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0
08:30	08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0
08:45	09:00	0	1	0	1	0	1	1	0	0	0	0	0	0	0	5	2
16:00	16:15	0	0	0	0	0	1	4	0	0	0	0	0	0	0	2	0
16:15	16:30	0	0	0	0	0	1	2	0	0	0	0	0	0	0	3	0
16:30	16:45	0	0	0	0	0	1	2	0	0	0	0	0	0	0	1	0
16:45	17:00	0	0	0	1	0	0	2	0	0	0	0	0	0	0	1	0
17:00	17:15	0	0	0	0	0	0	3	0	0	0	0	0	0	0	2	0
17:15	17:30	0	1	0	0	0	0	1	0	0	0	0	0	0	0	2	0
17:30	17:45	0	0	0	1	0	0	3	0	0	0	0	0	0	0	2	0
17:45	18:00	0	0	0	0	0	0	2	0	0	0	0	0	0	0	1	0
18:00	18:15	0	0	0	0	0	0	5	0	0	0	0	0	0	0	2	0
18:15	18:30	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
18:30	18:45	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0
18:45	19:00	0	0	0	0	0	0	5	0	0	0	0	0	0	0	1	0

Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
07:45	08:45	0	0	0	0	0	0	3	0	0	0	0	0	0	0	13	0	16
17:15	18:15	0	1	0	1	0	0	11	0	0	0	0	0	0	0	7	0	20

TRANS TRAFFIC SURVEY

TURNING MOVEMENT SURVEY trafficsurvey.com.au

Intersection of Blackbutts Rd and Glen St, Belrose

GPS -33.74081, 151.20905

Date:	Thu 25/07/19
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Glen St
East:	Blackbutts Rd
South:	N/A
West:	Blackbutts Rd

Survey	AM:	7:00 AM-9:00 AM
Period	PM:	4:00 PM-7:00 PM
Traffic	AM:	7:45 AM-8:45 AM
Peak	PM:	5:15 PM-6:15 PM

All Vehicles

Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Hourly Total	
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	Hour	Peak
07:00	07:15	0	7	28	2	18	16	0	59	9	757	
07:15	07:30	0	9	28	1	15	27	0	58	19	885	
07:30	07:45	0	8	39	0	23	50	0	80	17	992	
07:45	08:00	0	4	51	1	37	52	0	80	19	1041	Peak
08:00	08:15	0	20	37	0	42	57	0	90	21	1013	
08:15	08:30	0	19	38	0	25	72	0	79	31		
08:30	08:45	0	15	35	0	27	64	0	94	31		
08:45	09:00	0	12	32	0	22	45	0	80	25		
16:00	16:15	0	15	42	0	58	58	0	47	18	976	
16:15	16:30	0	22	47	1	46	53	0	64	22	968	
16:30	16:45	0	24	38	0	62	50	0	46	17	977	
16:45	17:00	0	22	44	0	60	60	0	43	17	1010	
17:00	17:15	0	24	31	0	52	62	0	47	14	1012	
17:15	17:30	0	27	38	0	67	69	0	43	20	1019	Peak
17:30	17:45	0	30	28	0	84	63	0	43	22	977	
17:45	18:00	0	28	42	0	68	57	0	40	13	918	
18:00	18:15	0	27	46	0	47	54	0	46	17	892	
18:15	18:30	0	29	45	1	47	50	0	38	12		
18:30	18:45	0	21	32	0	55	61	0	30	12		
18:45	19:00	0	20	42	1	56	51	0	30	22		

Peak Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
07:45	08:45	0	58	161	1	131	245	0	343	102	1041
17:15	18:15	0	112	154	0	266	243	0	172	72	1019

Pedestrians Crossing

Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
07:00	07:15	1	0	0	0	0	1	11
07:15	07:30	0	0	0	1	0	6	10
07:30	07:45	0	0	0	0	0	2	4
07:45	08:00	0	0	0	0	0	0	7
08:00	08:15	0	0	0	0	0	1	10
08:15	08:30	0	0	0	0	0	1	
08:30	08:45	0	3	0	0	1	1	
08:45	09:00	2	0	0	0	0	1	
16:00	16:15	0	1	0	0	7	0	20
16:15	16:30	1	1	2	0	1	1	16
16:30	16:45	0	1	0	0	1	0	12
16:45	17:00	3	1	0	0	0	0	12
17:00	17:15	0	2	0	0	1	1	12
17:15	17:30	0	0	0	0	0	2	9
17:30	17:45	0	0	1	0	1	0	8
17:45	18:00	3	0	0	0	0	1	8
18:00	18:15	0	0	0	0	0	1	9
18:15	18:30	0	0	0	0	1	0	
18:30	18:45	0	0	1	0	1	0	
18:45	19:00	1	0	0	0	1	3	

Peak Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
07:45	08:45	0	3	0	0	1	3	7
17:15	18:15	3	0	1	0	1	4	9

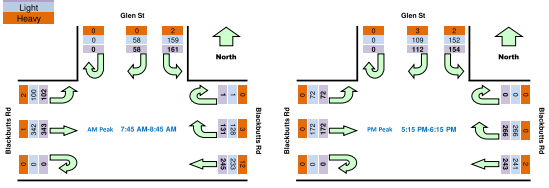
Note: Site sketch is for illustrating traffic flows. Direction is indicative only, drawing is not to scale and not an exact streets configuration.

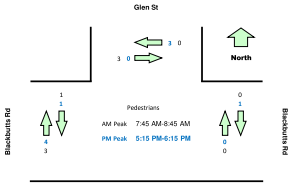
Graphic

Total

Light

Heavy





Light Vehicles

Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd		
Period Start	Period End	U	R	L	U	R	WB	U	EB	L
07:00	07:15	0	7	27	2	18	13	0	58	9
07:15	07:30	0	9	27	0	15	25	0	58	18
07:30	07:45	0	8	38	0	23	48	0	79	17
07:45	08:00	0	4	51	1	35	51	0	80	19
08:00	08:15	0	20	37	0	42	52	0	90	19
08:15	08:30	0	19	38	0	24	69	0	79	31
08:30	08:45	0	15	33	0	27	61	0	93	31
08:45	09:00	0	12	31	0	20	44	0	78	24
16:00	16:15	0	14	42	0	56	53	0	46	18
16:15	16:30	0	22	47	0	46	53	0	64	22
16:30	16:45	0	24	38	0	62	50	0	45	17
16:45	17:00	0	22	44	0	59	59	0	43	17
17:00	17:15	0	23	31	0	52	62	0	47	14
17:15	17:30	0	27	37	0	67	68	0	43	20
17:30	17:45	0	30	27	0	84	63	0	43	22
17:45	18:00	0	27	42	0	68	56	0	40	13
18:00	18:15	0	25	46	0	47	54	0	46	17
18:15	18:30	0	27	45	1	47	50	0	38	12
18:30	18:45	0	21	31	0	55	61	0	30	12
18:45	19:00	0	18	42	1	56	49	0	30	22

Peak Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
07:45	08:45	0	58	159	1	128	233	0	342	100	1021
17:15	18:15	0	109	152	0	266	241	0	172	72	1012

Heavy Vehicles

Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd		
Period Start	Period End	U	R	L	U	R	WB	U	EB	L
07:00	07:15	0	0	1	0	0	3	0	1	0
07:15	07:30	0	0	1	1	0	2	0	0	1
07:30	07:45	0	0	1	0	0	2	0	1	0
07:45	08:00	0	0	0	0	2	1	0	0	0
08:00	08:15	0	0	0	0	0	5	0	0	2
08:15	08:30	0	0	0	0	1	3	0	0	0
08:30	08:45	0	0	2	0	0	3	0	1	0
08:45	09:00	0	0	1	0	2	1	0	2	1
16:00	16:15	0	1	0	0	2	5	0	1	0
16:15	16:30	0	0	0	1	0	0	0	0	0
16:30	16:45	0	0	0	0	0	0	0	1	0
16:45	17:00	0	0	0	0	1	1	0	0	0
17:00	17:15	0	1	0	0	0	0	0	0	0
17:15	17:30	0	0	1	0	0	1	0	0	0
17:30	17:45	0	0	1	0	0	0	0	0	0
17:45	18:00	0	1	0	0	0	1	0	0	0
18:00	18:15	0	2	0	0	0	0	0	0	0
18:15	18:30	0	2	0	0	0	0	0	0	0
18:30	18:45	0	0	1	0	0	0	0	0	0
18:45	19:00	0	2	0	0	0	2	0	0	0

Peak Time		North Approach Glen St			East Approach Blackbutts Rd			West Approach Blackbutts Rd			Peak total
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	
07:45	08:45	0	0	2	0	3	12	0	1	2	20
17:15	18:15	0	3	2	0	0	2	0	0	0	7

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

Intersection of Glen St and Glenrose Pl, Belrose

GPS *-33.7401, 151.20961*

Date:	Thu 25/07/19
Weather:	Overcast
Suburban:	Belrose
Customer:	McLaren

North:	Glenrose Pl
East:	Glen St
South:	Glenrose Pl
West:	Glen St

Survey Period
Traffic Peak

Peds crossing

Time		Glen St		Glenrose Pl	
Period Start	Period End	SB	NB	WB	EB
07:00	07:15	3	5	3	0
07:15	07:30	1	6	0	2
07:30	07:45	1	5	1	0
07:45	08:00	7	4	4	0
08:00	08:15	4	22	7	2
08:15	08:30	2	8	10	1
08:30	08:45	4	2	2	2
08:45	09:00	2	3	3	0
16:00	16:15	4	7	6	6
16:15	16:30	8	5	7	13
16:30	16:45	2	10	3	4
16:45	17:00	1	6	6	2
17:00	17:15	3	10	2	4
17:15	17:30	8	4	2	2
17:30	17:45	3	10	8	1
17:45	18:00	5	5	3	2
18:00	18:15	4	6	5	1
18:15	18:30	1	17	5	2
18:30	18:45	2	11	4	1
18:45	19:00	4	8	0	3

ANNEXURE C: SIDRA INTERSECTION 8 DETAILED MOVEMENT SUMMARIES

MOVEMENT SUMMARY

Site: 101 [(AM Existing) Lockwood Avenue / Glen Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Glen Street												
5	T1	54	0.0	0.216	0.3	LOS A	1.0	7.1	0.24	0.47	0.24	54.3
6	R2	197	0.0	0.216	4.3	LOS A	1.0	7.1	0.24	0.47	0.24	51.8
Approach		251	0.0	0.216	3.5	NA	1.0	7.1	0.24	0.47	0.24	52.3
NorthEast: Glen Street												
7	L2	111	0.0	0.068	5.6	LOS A	0.3	2.0	0.08	0.55	0.08	48.4
9	R2	58	0.0	0.084	8.6	LOS A	0.3	2.2	0.51	0.72	0.51	51.1
Approach		168	0.0	0.084	6.6	LOS A	0.3	2.2	0.22	0.61	0.22	49.7
NorthWest: Lockwood Avenue												
10	L2	98	0.0	0.088	5.7	LOS A	0.4	2.7	0.14	0.46	0.14	53.9
11	T1	120	0.0	0.088	0.3	LOS A	0.4	3.0	0.16	0.13	0.16	57.4
Approach		218	0.0	0.088	2.7	NA	0.4	3.0	0.15	0.28	0.15	55.3
All Vehicles		637	0.0	0.216	4.1	NA	1.0	7.1	0.21	0.44	0.21	52.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(AM Existing) Glen Street / Blackbutts Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackbutts Road												
5	T1	258	0.0	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	139	0.0	0.124	7.4	LOS A	0.5	3.8	0.50	0.69	0.50	46.4
Approach		397	0.0	0.133	2.6	NA	0.5	3.8	0.18	0.24	0.18	56.3
North: Glen Street												
7	L2	169	0.0	0.145	4.7	LOS A	0.6	4.2	0.42	0.63	0.42	50.3
9	R2	61	0.0	0.144	10.5	LOS A	0.5	3.6	0.68	0.86	0.68	43.1
Approach		231	0.0	0.145	6.2	LOS A	0.6	4.2	0.49	0.69	0.49	48.2
West: Blackbutts Road												
10	L2	107	0.0	0.243	5.6	LOS A	0.0	0.0	0.00	0.14	0.00	29.8
11	T1	361	0.0	0.243	0.0	LOS A	0.0	0.0	0.00	0.14	0.00	58.7
Approach		468	0.0	0.243	1.3	NA	0.0	0.0	0.00	0.14	0.00	51.8
All Vehicles		1096	0.0	0.243	2.8	NA	0.6	4.2	0.17	0.29	0.17	52.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(AM Existing) Glen Street / Genrose Place]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park												
1	L2	29	0.0	0.035	5.8	LOS A	0.1	0.9	0.20	0.56	0.20	53.1
2	T1	1	0.0	0.035	5.9	LOS A	0.1	0.9	0.20	0.56	0.20	53.2
3	R2	12	0.0	0.035	7.2	LOS A	0.1	0.9	0.20	0.56	0.20	47.5
Approach		42	0.0	0.035	6.2	LOS A	0.1	0.9	0.20	0.56	0.20	52.0
East: Glen Street												
4	L2	15	0.0	0.100	4.7	LOS A	0.5	3.4	0.18	0.14	0.18	55.2
5	T1	98	0.0	0.100	0.4	LOS A	0.5	3.4	0.18	0.14	0.18	57.8
6	R2	3	0.0	0.100	5.6	LOS A	0.5	3.4	0.18	0.14	0.18	54.8
Approach		116	0.0	0.100	1.1	NA	0.5	3.4	0.18	0.14	0.18	57.4
North: Glenrose Place												
7	L2	12	0.0	0.008	6.1	LOS A	0.0	0.2	0.26	0.54	0.26	47.5
8	T1	3	0.0	0.056	5.6	LOS A	0.2	1.3	0.39	0.65	0.39	52.5
9	R2	41	0.0	0.056	7.3	LOS A	0.2	1.3	0.39	0.65	0.39	51.8
Approach		56	0.0	0.056	6.9	LOS A	0.2	1.3	0.36	0.63	0.36	51.3
West: Glen Street												
10	L2	133	0.0	0.231	5.8	LOS A	1.2	8.4	0.19	0.35	0.19	55.0
11	T1	129	0.0	0.231	0.4	LOS A	1.2	8.4	0.19	0.35	0.19	54.0
12	R2	31	0.0	0.231	6.1	LOS A	1.2	8.4	0.19	0.35	0.19	54.4
Approach		293	0.0	0.231	3.4	NA	1.2	8.4	0.19	0.35	0.19	54.6
All Vehicles		506	0.0	0.231	3.5	NA	1.2	8.4	0.20	0.35	0.20	54.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(PM Existing) Lockwood Avenue / Glen Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Glen Street												
5	T1	126	0.0	0.297	0.2	LOS A	1.6	11.1	0.15	0.38	0.15	55.3
6	R2	229	0.0	0.297	4.2	LOS A	1.6	11.1	0.15	0.38	0.15	52.8
Approach		356	0.0	0.297	2.8	NA	1.6	11.1	0.15	0.38	0.15	53.6
NorthEast: Glen Street												
7	L2	199	0.0	0.122	5.5	LOS A	0.5	3.7	0.01	0.57	0.01	48.7
9	R2	112	0.0	0.173	9.4	LOS A	0.7	4.8	0.56	0.79	0.56	50.5
Approach		311	0.0	0.173	6.9	LOS A	0.7	4.8	0.21	0.65	0.21	49.6
NorthWest: Lockwood Avenue												
10	L2	96	0.0	0.069	5.6	LOS A	0.3	2.0	0.09	0.54	0.09	53.4
11	T1	81	0.0	0.069	0.2	LOS A	0.3	2.3	0.11	0.04	0.11	58.9
Approach		177	0.0	0.069	3.1	NA	0.3	2.3	0.10	0.31	0.10	55.0
All Vehicles		843	0.0	0.297	4.4	NA	1.6	11.1	0.16	0.46	0.16	52.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(PM Existing) Glen Street / Blackbutts Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackbutts Road												
5	T1	256	0.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	280	0.0	0.197	6.5	LOS A	1.0	6.8	0.39	0.61	0.39	46.9
Approach		536	0.0	0.197	3.4	NA	1.0	6.8	0.20	0.32	0.20	54.4
North: Glen Street												
7	L2	162	0.0	0.116	3.9	LOS A	0.5	3.4	0.28	0.54	0.28	51.0
9	R2	118	0.0	0.248	10.1	LOS A	1.0	7.0	0.67	0.87	0.73	43.4
Approach		280	0.0	0.248	6.5	LOS A	1.0	7.0	0.45	0.68	0.47	47.5
West: Blackbutts Road												
10	L2	76	0.0	0.134	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	29.7
11	T1	181	0.0	0.134	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	58.4
Approach		257	0.0	0.134	1.6	NA	0.0	0.0	0.00	0.18	0.00	49.5
All Vehicles		1073	0.0	0.248	3.8	NA	1.0	7.0	0.22	0.38	0.22	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(SAT Existing) Lockwood Avenue / Glen Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Glen Street												
5	T1	113	0.0	0.340	0.4	LOS A	1.9	13.2	0.23	0.43	0.23	54.9
6	R2	304	0.0	0.340	4.1	LOS A	1.9	13.2	0.23	0.43	0.23	52.4
Approach		417	0.0	0.340	3.1	NA	1.9	13.2	0.23	0.43	0.23	53.0
NorthEast: Glen Street												
7	L2	248	0.0	0.152	5.6	LOS A	0.7	4.8	0.05	0.56	0.05	48.6
9	R2	134	0.0	0.227	10.2	LOS A	0.9	6.3	0.59	0.83	0.60	49.9
Approach		382	0.0	0.227	7.2	LOS A	0.9	6.3	0.24	0.65	0.24	49.2
NorthWest: Lockwood Avenue												
10	L2	69	0.0	0.057	5.7	LOS A	0.2	1.7	0.12	0.49	0.12	53.7
11	T1	73	0.0	0.057	0.3	LOS A	0.3	1.9	0.15	0.10	0.15	57.8
Approach		142	0.0	0.057	2.9	NA	0.3	1.9	0.14	0.29	0.14	55.1
All Vehicles		941	0.0	0.340	4.7	NA	1.9	13.2	0.22	0.50	0.22	51.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(SAT Existing) Glen Street / Blackbutts Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackbutts Road												
5	T1	187	0.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	308	0.0	0.225	6.7	LOS A	1.1	7.8	0.42	0.63	0.42	46.8
Approach		496	0.0	0.225	4.2	NA	1.1	7.8	0.26	0.39	0.26	52.9
North: Glen Street												
7	L2	214	0.0	0.152	3.9	LOS A	0.7	4.6	0.29	0.54	0.29	51.0
9	R2	107	0.0	0.220	9.6	LOS A	0.9	6.0	0.65	0.85	0.67	43.9
Approach		321	0.0	0.220	5.8	LOS A	0.9	6.0	0.41	0.65	0.42	48.4
West: Blackbutts Road												
10	L2	115	0.0	0.153	5.6	LOS A	0.0	0.0	0.00	0.23	0.00	29.4
11	T1	178	0.0	0.153	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	57.9
Approach		293	0.0	0.153	2.2	NA	0.0	0.0	0.00	0.23	0.00	46.3
All Vehicles		1109	0.0	0.225	4.1	NA	1.1	7.8	0.24	0.42	0.24	49.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(PM Existing) Glen Street / Genrose Place]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park												
1	L2	20	0.0	0.025	6.0	LOS A	0.1	0.6	0.25	0.56	0.25	53.0
2	T1	4	0.0	0.025	6.5	LOS A	0.1	0.6	0.25	0.56	0.25	53.2
3	R2	4	0.0	0.025	7.7	LOS A	0.1	0.6	0.25	0.56	0.25	47.4
Approach		28	0.0	0.025	6.3	LOS A	0.1	0.6	0.25	0.56	0.25	52.5
East: Glen Street												
4	L2	19	0.0	0.159	4.7	LOS A	0.8	5.6	0.18	0.18	0.18	54.8
5	T1	144	0.0	0.159	0.4	LOS A	0.8	5.6	0.18	0.18	0.18	57.4
6	R2	21	0.0	0.159	5.9	LOS A	0.8	5.6	0.18	0.18	0.18	54.4
Approach		184	0.0	0.159	1.5	NA	0.8	5.6	0.18	0.18	0.18	56.7
North: Glenrose Place												
7	L2	64	0.0	0.045	6.0	LOS A	0.2	1.3	0.25	0.55	0.25	47.6
8	T1	1	0.0	0.202	6.2	LOS A	0.7	5.1	0.47	0.75	0.47	51.8
9	R2	145	0.0	0.202	8.1	LOS A	0.7	5.1	0.47	0.75	0.47	51.2
Approach		211	0.0	0.202	7.5	LOS A	0.7	5.1	0.40	0.69	0.40	50.4
West: Glen Street												
10	L2	193	0.0	0.254	5.8	LOS A	1.3	9.3	0.18	0.39	0.18	54.5
11	T1	111	0.0	0.254	0.4	LOS A	1.3	9.3	0.18	0.39	0.18	53.3
12	R2	22	0.0	0.254	6.3	LOS A	1.3	9.3	0.18	0.39	0.18	54.0
Approach		325	0.0	0.254	4.0	NA	1.3	9.3	0.18	0.39	0.18	54.2
All Vehicles		748	0.0	0.254	4.4	NA	1.3	9.3	0.25	0.43	0.25	53.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(SAT Existing) Glen Street / Genrose Place]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park												
1	L2	34	0.0	0.063	6.1	LOS A	0.2	1.6	0.34	0.61	0.34	52.5
2	T1	14	0.0	0.063	7.5	LOS A	0.2	1.6	0.34	0.61	0.34	52.6
3	R2	11	0.0	0.063	9.3	LOS A	0.2	1.6	0.34	0.61	0.34	46.6
Approach		58	0.0	0.063	7.0	LOS A	0.2	1.6	0.34	0.61	0.34	51.8
East: Glen Street												
4	L2	32	0.0	0.231	4.8	LOS A	1.2	8.6	0.18	0.21	0.18	54.4
5	T1	196	0.0	0.231	0.4	LOS A	1.2	8.6	0.18	0.21	0.18	56.9
6	R2	41	0.0	0.231	6.3	LOS A	1.2	8.6	0.18	0.21	0.18	54.0
Approach		268	0.0	0.231	1.8	NA	1.2	8.6	0.18	0.21	0.18	56.2
North: Glenrose Place												
7	L2	160	0.0	0.112	6.1	LOS A	0.5	3.3	0.26	0.56	0.26	47.5
8	T1	1	0.0	0.292	7.5	LOS A	1.2	8.3	0.55	0.85	0.63	50.6
9	R2	181	0.0	0.292	9.7	LOS A	1.2	8.3	0.55	0.85	0.63	50.0
Approach		342	0.0	0.292	8.0	LOS A	1.2	8.3	0.42	0.71	0.46	49.1
West: Glen Street												
10	L2	239	0.0	0.294	5.8	LOS A	1.6	11.2	0.18	0.43	0.18	54.2
11	T1	104	0.0	0.294	0.5	LOS A	1.6	11.2	0.18	0.43	0.18	52.8
12	R2	38	0.0	0.294	6.7	LOS A	1.6	11.2	0.18	0.43	0.18	53.7
Approach		381	0.0	0.294	4.4	NA	1.6	11.2	0.18	0.43	0.18	53.9
All Vehicles		1049	0.0	0.294	5.1	NA	1.6	11.2	0.27	0.48	0.28	52.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(AM Future) Lockwood Avenue / Glen Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Glen Street												
5	T1	54	0.0	0.247	0.7	LOS A	1.2	8.3	0.33	0.51	0.33	53.9
6	R2	228	0.0	0.247	4.4	LOS A	1.2	8.3	0.33	0.51	0.33	51.5
Approach		282	0.0	0.247	3.7	NA	1.2	8.3	0.33	0.51	0.33	52.0
NorthEast: Glen Street												
7	L2	145	0.0	0.090	5.6	LOS A	0.4	2.7	0.07	0.55	0.07	48.5
9	R2	65	0.0	0.106	9.5	LOS A	0.4	2.8	0.55	0.77	0.55	50.5
Approach		211	0.0	0.106	6.8	LOS A	0.4	2.8	0.22	0.62	0.22	49.3
NorthWest: Lockwood Avenue												
10	L2	104	0.0	0.095	5.9	LOS A	0.4	2.9	0.20	0.48	0.20	53.6
11	T1	120	0.0	0.095	0.6	LOS A	0.5	3.2	0.24	0.17	0.24	56.8
Approach		224	0.0	0.095	3.1	NA	0.5	3.2	0.22	0.31	0.22	54.8
All Vehicles		717	0.0	0.247	4.4	NA	1.2	8.3	0.27	0.48	0.27	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(AM Future) Glen Street / Blackbutts Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackbutts Road												
5	T1	258	0.0	0.133	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	155	0.0	0.140	7.5	LOS A	0.6	4.3	0.52	0.71	0.52	46.4
Approach		413	0.0	0.140	2.8	NA	0.6	4.3	0.19	0.27	0.19	56.0
North: Glen Street												
7	L2	186	0.0	0.159	4.7	LOS A	0.7	4.6	0.43	0.63	0.43	50.3
9	R2	78	0.0	0.190	11.0	LOS A	0.7	4.8	0.70	0.87	0.70	42.6
Approach		264	0.0	0.190	6.6	LOS A	0.7	4.8	0.51	0.70	0.51	47.7
West: Blackbutts Road												
10	L2	123	0.0	0.251	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	29.7
11	T1	361	0.0	0.251	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.6
Approach		484	0.0	0.251	1.4	NA	0.0	0.0	0.00	0.15	0.00	50.9
All Vehicles		1161	0.0	0.251	3.1	NA	0.7	4.8	0.18	0.32	0.18	52.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(AM Future) Glen Street / Genrose Place]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park												
1	L2	29	0.0	0.037	5.8	LOS A	0.1	1.0	0.20	0.57	0.20	53.0
2	T1	1	0.0	0.037	6.3	LOS A	0.1	1.0	0.20	0.57	0.20	53.1
3	R2	12	0.0	0.037	7.9	LOS A	0.1	1.0	0.20	0.57	0.20	47.3
Approach		42	0.0	0.037	6.4	LOS A	0.1	1.0	0.20	0.57	0.20	51.9
East: Glen Street												
4	L2	15	0.0	0.128	4.9	LOS A	0.6	4.3	0.27	0.28	0.27	53.8
5	T1	98	0.0	0.128	0.7	LOS A	0.6	4.3	0.27	0.28	0.27	56.3
6	R2	28	0.0	0.128	6.1	LOS A	0.6	4.3	0.27	0.28	0.27	53.4
Approach		141	0.0	0.128	2.3	NA	0.6	4.3	0.27	0.28	0.27	55.4
North: Glenrose Place												
7	L2	39	0.0	0.029	6.3	LOS A	0.1	0.8	0.31	0.56	0.31	47.3
8	T1	3	0.0	0.113	5.9	LOS A	0.4	2.7	0.43	0.70	0.43	52.1
9	R2	82	0.0	0.113	7.7	LOS A	0.4	2.7	0.43	0.70	0.43	51.5
Approach		124	0.0	0.113	7.2	LOS A	0.4	2.7	0.39	0.66	0.39	50.6
West: Glen Street												
10	L2	171	0.0	0.274	6.0	LOS A	1.5	10.2	0.28	0.41	0.28	54.4
11	T1	129	0.0	0.274	0.9	LOS A	1.5	10.2	0.28	0.41	0.28	53.1
12	R2	31	0.0	0.274	6.4	LOS A	1.5	10.2	0.28	0.41	0.28	53.9
Approach		331	0.0	0.274	4.1	NA	1.5	10.2	0.28	0.41	0.28	54.0
All Vehicles		638	0.0	0.274	4.4	NA	1.5	10.2	0.30	0.44	0.30	53.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(PM Future) Lockwood Avenue / Glen Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Glen Street												
5	T1	126	0.0	0.348	0.4	LOS A	1.9	13.5	0.26	0.43	0.26	54.8
6	R2	284	0.0	0.348	4.3	LOS A	1.9	13.5	0.26	0.43	0.26	52.3
Approach		411	0.0	0.348	3.1	NA	1.9	13.5	0.26	0.43	0.26	53.0
NorthEast: Glen Street												
7	L2	253	0.0	0.154	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	48.8
9	R2	122	0.0	0.215	10.5	LOS A	0.8	5.9	0.60	0.84	0.60	49.8
Approach		375	0.0	0.215	7.2	LOS A	0.8	5.9	0.20	0.66	0.20	49.3
NorthWest: Lockwood Avenue												
10	L2	106	0.0	0.077	5.7	LOS A	0.3	2.2	0.13	0.54	0.13	53.2
11	T1	81	0.0	0.072	0.3	LOS A	0.3	2.4	0.17	0.06	0.17	58.6
Approach		187	0.0	0.077	3.4	NA	0.3	2.4	0.15	0.33	0.15	54.7
All Vehicles		973	0.0	0.348	4.7	NA	1.9	13.5	0.21	0.50	0.21	51.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(PM Future) Glen Street / Blackbutts Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackbutts Road												
5	T1	256	0.0	0.132	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	307	0.0	0.222	6.6	LOS A	1.1	7.7	0.42	0.63	0.42	46.8
Approach		563	0.0	0.222	3.6	NA	1.1	7.7	0.23	0.34	0.23	54.0
North: Glen Street												
7	L2	188	0.0	0.135	3.9	LOS A	0.6	4.0	0.29	0.54	0.29	51.0
9	R2	144	0.0	0.322	11.6	LOS A	1.4	10.0	0.71	0.92	0.87	42.0
Approach		333	0.0	0.322	7.3	LOS A	1.4	10.0	0.47	0.71	0.54	46.7
West: Blackbutts Road												
10	L2	103	0.0	0.148	5.6	LOS A	0.0	0.0	0.00	0.22	0.00	29.5
11	T1	181	0.0	0.148	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	58.1
Approach		284	0.0	0.148	2.0	NA	0.0	0.0	0.00	0.22	0.00	47.3
All Vehicles		1180	0.0	0.322	4.3	NA	1.4	10.0	0.24	0.41	0.26	50.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(PM Future) Glen Street / Genrose Place]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park												
1	L2	20	0.0	0.027	6.0	LOS A	0.1	0.7	0.26	0.57	0.26	52.8
2	T1	4	0.0	0.027	7.2	LOS A	0.1	0.7	0.26	0.57	0.26	53.0
3	R2	4	0.0	0.027	8.8	LOS A	0.1	0.7	0.26	0.57	0.26	47.2
Approach		28	0.0	0.027	6.6	LOS A	0.1	0.7	0.26	0.57	0.26	52.3
East: Glen Street												
4	L2	19	0.0	0.210	5.0	LOS A	1.1	7.4	0.29	0.33	0.29	53.1
5	T1	144	0.0	0.210	0.8	LOS A	1.1	7.4	0.29	0.33	0.29	55.5
6	R2	65	0.0	0.210	6.7	LOS A	1.1	7.4	0.29	0.33	0.29	52.7
Approach		228	0.0	0.210	2.8	NA	1.1	7.4	0.29	0.33	0.29	54.4
North: Glenrose Place												
7	L2	106	0.0	0.078	6.2	LOS A	0.3	2.2	0.30	0.58	0.30	47.3
8	T1	1	0.0	0.319	7.4	LOS A	1.4	9.6	0.54	0.85	0.63	50.8
9	R2	209	0.0	0.319	9.4	LOS A	1.4	9.6	0.54	0.85	0.63	50.2
Approach		317	0.0	0.319	8.4	LOS A	1.4	9.6	0.46	0.76	0.52	49.5
West: Glen Street												
10	L2	258	0.0	0.318	6.1	LOS A	1.7	12.1	0.29	0.45	0.29	53.9
11	T1	111	0.0	0.318	1.0	LOS A	1.7	12.1	0.29	0.45	0.29	52.3
12	R2	22	0.0	0.318	6.7	LOS A	1.7	12.1	0.29	0.45	0.29	53.4
Approach		391	0.0	0.318	4.7	NA	1.7	12.1	0.29	0.45	0.29	53.6
All Vehicles		964	0.0	0.319	5.5	NA	1.7	12.1	0.34	0.53	0.36	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(SAT Future) Lockwood Avenue / Glen Street]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Glen Street												
5	T1	113	0.0	0.420	0.8	LOS A	2.5	17.2	0.36	0.50	0.36	54.0
6	R2	379	0.0	0.420	4.5	LOS A	2.5	17.2	0.36	0.50	0.36	51.6
Approach		492	0.0	0.420	3.6	NA	2.5	17.2	0.36	0.50	0.36	52.2
NorthEast: Glen Street												
7	L2	323	0.0	0.197	5.5	LOS A	0.0	0.0	0.00	0.58	0.00	48.8
9	R2	148	0.0	0.312	13.2	LOS A	1.4	9.6	0.69	0.91	0.83	48.0
Approach		472	0.0	0.312	8.0	LOS A	1.4	9.6	0.22	0.68	0.26	48.4
NorthWest: Lockwood Avenue												
10	L2	119	0.0	0.089	5.8	LOS A	0.4	2.6	0.18	0.54	0.18	53.1
11	T1	73	0.0	0.067	0.5	LOS A	0.3	2.2	0.23	0.10	0.23	58.1
Approach		192	0.0	0.089	3.8	NA	0.4	2.6	0.20	0.37	0.20	54.2
All Vehicles		1155	0.0	0.420	5.4	NA	2.5	17.2	0.27	0.55	0.29	50.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(SAT Future) Glen Street / Blackbutts Road]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Blackbutts Road												
5	T1	187	0.0	0.097	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	346	0.0	0.263	6.9	LOS A	1.3	9.2	0.46	0.66	0.46	46.6
Approach		534	0.0	0.263	4.5	NA	1.3	9.2	0.30	0.43	0.30	52.5
North: Glen Street												
7	L2	252	0.0	0.179	3.9	LOS A	0.8	5.6	0.30	0.55	0.30	51.0
9	R2	145	0.0	0.325	11.7	LOS A	1.4	10.1	0.71	0.92	0.88	42.0
Approach		397	0.0	0.325	6.8	LOS A	1.4	10.1	0.45	0.68	0.51	47.3
West: Blackbutts Road												
10	L2	153	0.0	0.173	5.6	LOS A	0.0	0.0	0.00	0.27	0.00	29.3
11	T1	178	0.0	0.173	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	57.5
Approach		331	0.0	0.173	2.6	NA	0.0	0.0	0.00	0.27	0.00	44.0
All Vehicles		1261	0.0	0.325	4.7	NA	1.4	10.1	0.27	0.47	0.29	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [(SAT Future) Glen Street / Genrose Place]

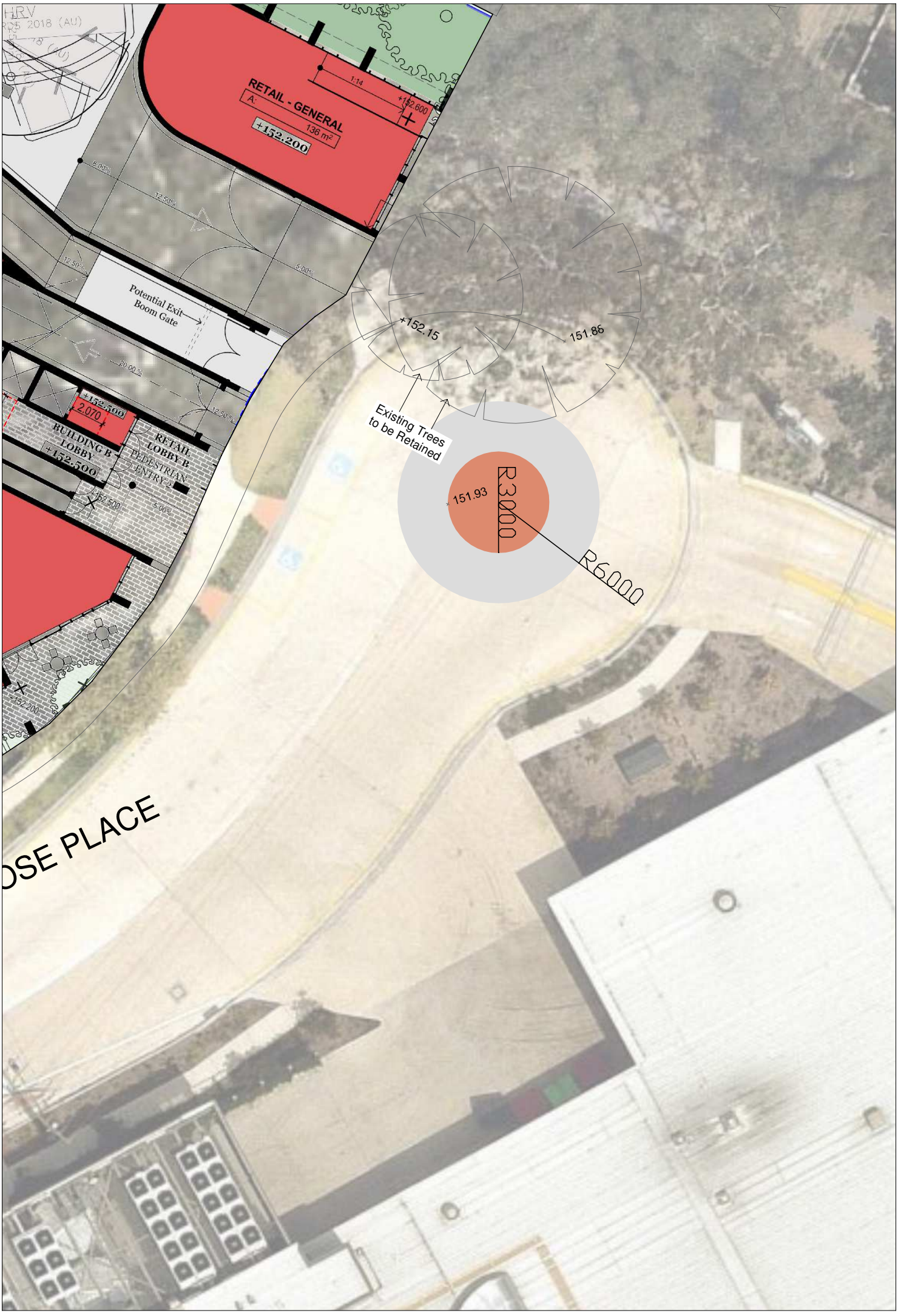
New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Car Park												
1	L2	34	0.0	0.072	6.1	LOS A	0.3	1.8	0.36	0.63	0.36	51.9
2	T1	14	0.0	0.072	9.0	LOS A	0.3	1.8	0.36	0.63	0.36	52.1
3	R2	11	0.0	0.072	11.2	LOS A	0.3	1.8	0.36	0.63	0.36	45.9
Approach		58	0.0	0.072	7.7	LOS A	0.3	1.8	0.36	0.63	0.36	51.2
East: Glen Street												
4	L2	32	0.0	0.308	5.0	LOS A	1.7	11.7	0.31	0.37	0.31	52.4
5	T1	196	0.0	0.308	0.9	LOS A	1.7	11.7	0.31	0.37	0.31	54.8
6	R2	101	0.0	0.308	7.4	LOS A	1.7	11.7	0.31	0.37	0.31	52.0
Approach		328	0.0	0.308	3.3	NA	1.7	11.7	0.31	0.37	0.31	53.7
North: Glenrose Place												
7	L2	220	0.0	0.161	6.3	LOS A	0.7	4.9	0.32	0.59	0.32	47.3
8	T1	1	0.0	0.499	10.3	LOS A	2.7	18.7	0.68	0.98	1.04	48.5
9	R2	271	0.0	0.499	12.9	LOS A	2.7	18.7	0.68	0.98	1.04	47.9
Approach		492	0.0	0.499	10.0	LOS A	2.7	18.7	0.52	0.81	0.72	47.7
West: Glen Street												
10	L2	328	0.0	0.379	6.1	LOS A	2.2	15.3	0.30	0.48	0.30	53.6
11	T1	104	0.0	0.379	1.0	LOS A	2.2	15.3	0.30	0.48	0.30	51.8
12	R2	38	0.0	0.379	7.2	LOS A	2.2	15.3	0.30	0.48	0.30	53.1
Approach		471	0.0	0.379	5.1	NA	2.2	15.3	0.30	0.48	0.30	53.3
All Vehicles		1348	0.0	0.499	6.5	NA	2.7	18.7	0.38	0.58	0.46	51.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

ANNEXURE D: PROPOSED GLENROSE PLACE ROUNDABOUT CONCEPT


RETAIL - GENERAL
A:
136 m²
+152.200
+152.600
1:14
Potential Exit
Boom Gate
+152.500
2.070
BUILDING B
LOBBY
+152.500
RETAIL
LOBBY B
PEDESTRIAN
ENTRY-2
+152.15
151.86
Existing Trees
to be Retained
151.93
R3.000
R6.000
OSE PLACE