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

Address: Shop 7, 720 Old Princes Highway Sutherland NSW 2232
Postal: P.O Box 66 Sutherland NSW 1499

Telephone: +61 2 8355 2440
Fax: +61 2 9521 7199
Web: www.mclarentraffic.com.au
Email: admin@mclarentraffic.com.au

Division of RAMTRANS Australia ABN: 45067491678 RPEQ: 19457

Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness

190305.01FA - 6th December 2019

Development Type: **Mixed-Use Development**

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

Prepared for: **Avenue Property**

Document reference: **190305.01FA**

Status	Issue	Prepared By	Checked By	Date
Draft	A	DF	CM	4th December 2019
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TABLE OF CONTENTS

1 INTRODUCTION

M^CLaren Traffic Engineering (MTE) was commissioned by *Avenue Property* to provide a Traffic and Parking Impact Assessment of the proposed Mixed-Use Development at 28 Lockwood Avenue, Belrose, as depicted in **Annexure A**.

1.1 Description and Scale of Development

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

- Residential component consisting of:
    - Three (3) x one-bedroom apartments;
    - 27 x two-bedroom apartments;
    - 21 x three-bedroom apartments;
- Retail with a total of 3,767m^2 Gross Floor Area (GFA) consisting of:
    - 1,756m^2 GFA Slow Trade;
    - 346m^2 GFA Fast Trade;
    - 1,665m^2 GFA Specialty Shops;
- Gymnasium with a total of 997m^2 GFA;

The site layout includes a basement car park with a total of **193** car parking spaces including 116 retail/gymnasium spaces (including 4 disabled) and 77 residential spaces (including 5 disabled and 10 visitor). 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.

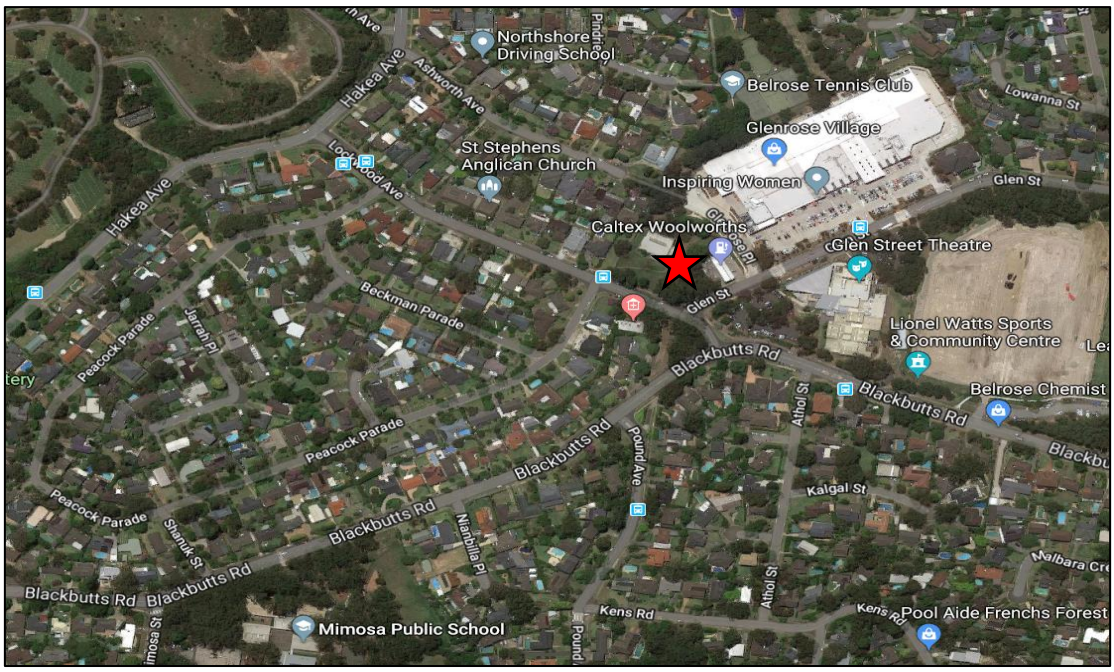
1.3 Site Description

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.

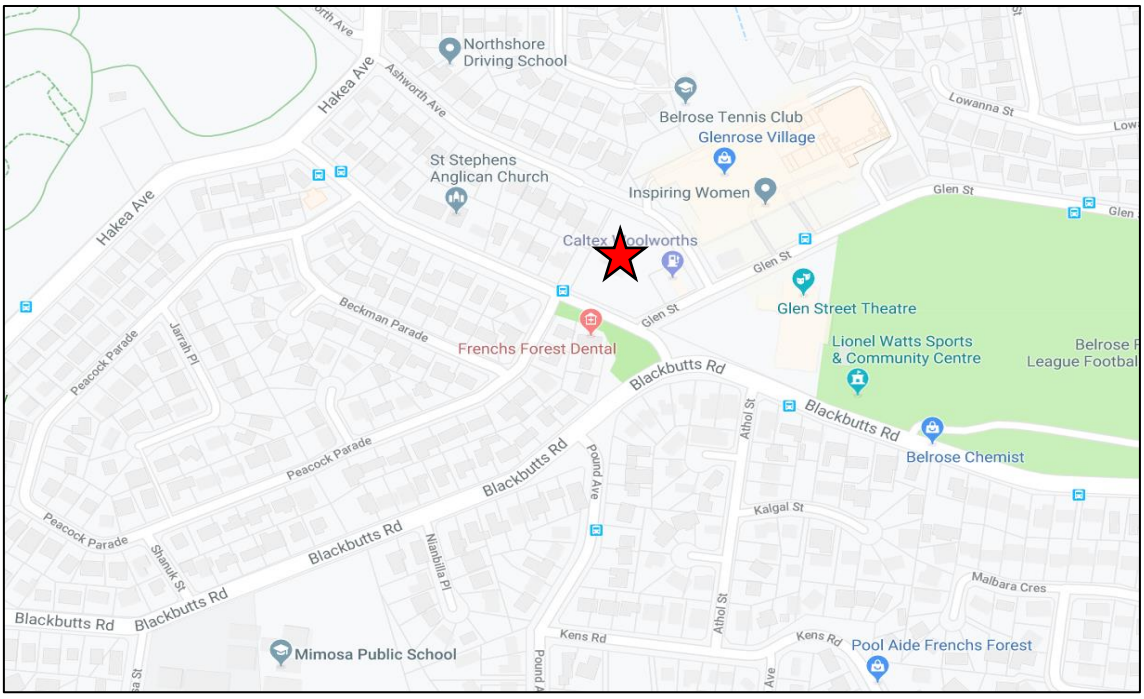
1.4 Site Context

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.

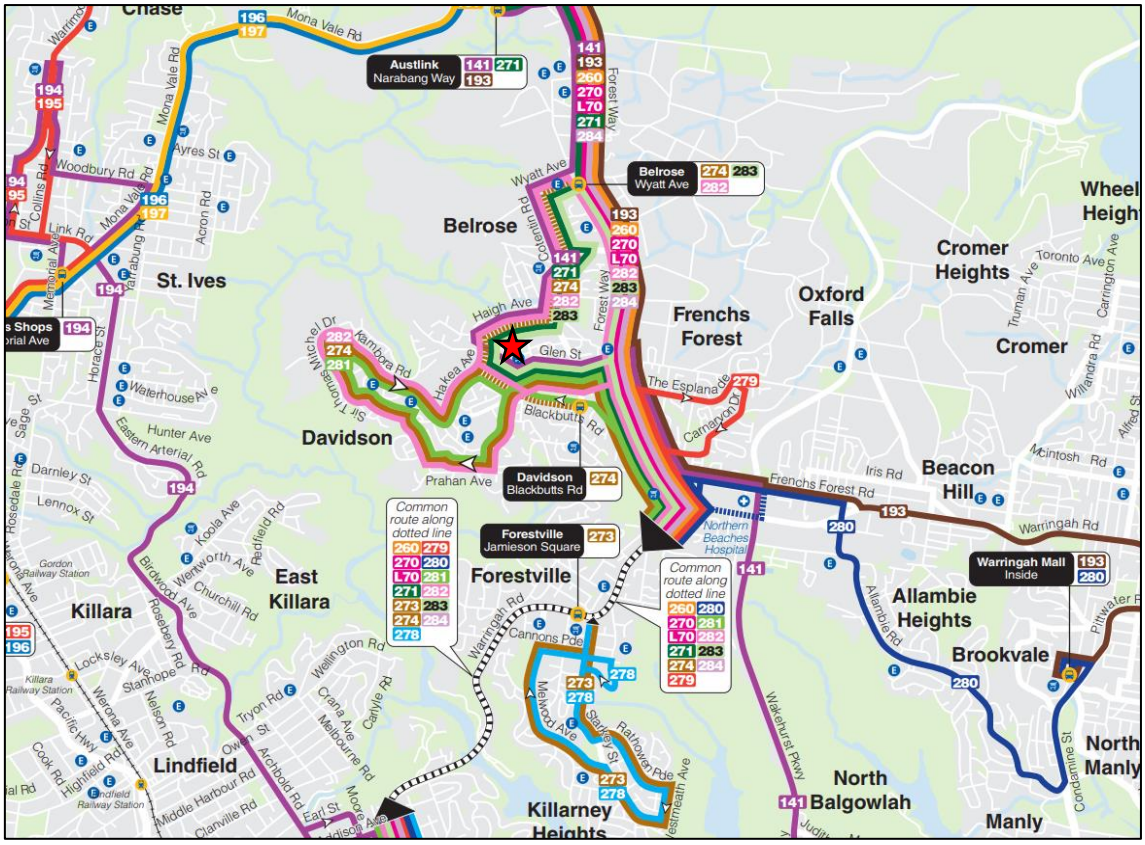


FIGURE 3: PUBLIC TRANSPORT MAP

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

Recreational and tourist facilities

Gymnasium

4.5 spaces per 100m^2 GFA

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	27	1.2 per dwelling	32.4
	Three-bedroom	21	1.5 per dwelling	31.5
	Visitor	51	1 per 5 dwellings	10
Residential Subtotal				77
Retail	0-10,000m^2 GLFA	2,825.25m^2 GLFA	6.1 per 100m^2 GLFA	172
Gym	Gymnasium	997m^2 GFA	4.5 per 100m^2	45
Retail/Gym Subtotal				217
Total				**294**

Note: (1) The GLFA is taken to be 75% of the GFA as per Section 5.7.1 of the RMS Guide

As shown, the car parking requirement based on the Council DCP is **294** spaces.

3.2 RMS Car Parking Requirement

Reference is made to the *RMS Guide to Traffic Generating Developments* which outlines the following car parking requirement for the shopping centre portion of the development.

Peak Parking Demand per 1,000m^2

PPD = 24 A(S) + 40 A(F) + 42 A(SM) + 45 A(SS) + 9 A(OM)

Where:

A(S): Slow Trade GLFA, include major Department stores such as David Jones and Grace Brothers, furniture, electrical and utility goods stores.

A(F): Faster Trade GLFA, includes discount department stores such as K-Mart and Target, together with larger specialist stores such Fosseys.

A(SM): Supermarket GLFA, includes stores such as Franklins and large fruit markets.

A(SS): Specialty Shops and Secondary retail GLFA, includes specialty shops and take-away stores such as McDonalds. These stores are grouped since they tend not to be primary attractors to the centre.

A(OM): Offices, medical GLFA

A(C): Cinemas

Gymnasium

Minimum - 4.5 spaces per 100m² GFA

The resulting RMS car parking requirements for the subject mixed-use development are summarised in **Table 3** below. It is noted that the site is not located within 800m of a train station or within 400m of a B3 or B4 zone. Therefore, the Council's DCP car parking rates apply to the development in accordance with the Apartment Design Guide.

TABLE 3: RELEVANT RMS AND DCP CAR PARKING REQUIREMENTS

Land Use	Type	Scale(1)	Rate(2)	Authority	Spaces Required
Residential	One-bedroom	3	1 per dwelling	Council DCP	3
	Two-bedroom	27	1.2 per dwelling		32.4
	Three-bedroom	21	1.5 per dwelling		31.5
	Visitor	51	1 per 5 dwellings		10
Residential Subtotal					77
Retail	A(S): Slow Trade	1,317m² GLFA	0.024 per m² GLFA	RMS Guide	31.6
	A(F): Faster Trade	259.5m² GLFA	0.040 per m² GLFA		10.38
	A(SS): Specialty Shops	1248.25m² GLFA	0.045 per m² GLFA		56.17
Gym	Gymnasium	997m² GFA	4.5 per 100m²	Council DCP	45
Retail/Gym Subtotal					143
Total	**-**	**-**	**-**		**220**

Note: (1) The GLFA is taken to be 75% of the GFA as per Section 5.7.1 of the RMS Guide
(2) The peak shopping centre parking demand occurs on Thursday

As shown, the development requires a total of **220** car parking spaces based upon the RMS car parking requirements. This requirement is 75 spaces fewer than the Council DCP car parking requirement summarised in **Table 2**.

It is relevant to note that 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*. The rates in this table are general and do not consider the specific type of retail uses within the shopping centre. The subject development does not include a supermarket, which is the highest parking generator in shopping centres. Therefore, the RMS parking requirement which provides consideration for types of retail uses is expected to provide a more accurate parking requirement for the subject site.

The site provides a total of **193** car parking spaces, representing a numerical shortfall of **27** parking spaces compared to the parking requirement summarised in **Table 3**. Justification for the parking shortfall is discussed in the following subsection.

3.3 Parking Shortfall Justification Strategy

Reference is made to the RMS Guide which states the following about complementary uses within retail precincts:

> *When it can be demonstrated that the time of peak demand for parking associated with the proposed shopping centre and the adjacent land uses do not coincide, or where common usage reduces total demand, a lower level of parking provision may be acceptable.*

The development contains a gymnasium and a shopping centre precinct, which are expected to experience peak usage at different times of the day and week. Based on an examination of the profile of "peak times" facility (available on website searches) which provides both real-time and historical usage data for commercial premises, retail in Belrose generally peaks during business hours whilst gyms peak before 8am and after 6pm. As such, it is reasonable that the car parking demands of the retail and gym can be accommodated within a shared pool of parking, as their peaks will not coincide. Comparison is made to Glenrose Village shopping precinct located across Glenrose Place from the subject development. Glenrose Village contains an all-hours gym, along with various specialty shops, supermarkets and other retail/commercial premises. MTE has utilised usage profile data from Glenrose Village to chart the expected peak car parking demands for the proposed gym and retail components, as shown in **Figure 4** through to **Figure 7**.

The working tables showing the Glenrose Village and gym peak usage profiles are reproduced in **Annexure D** for reference.

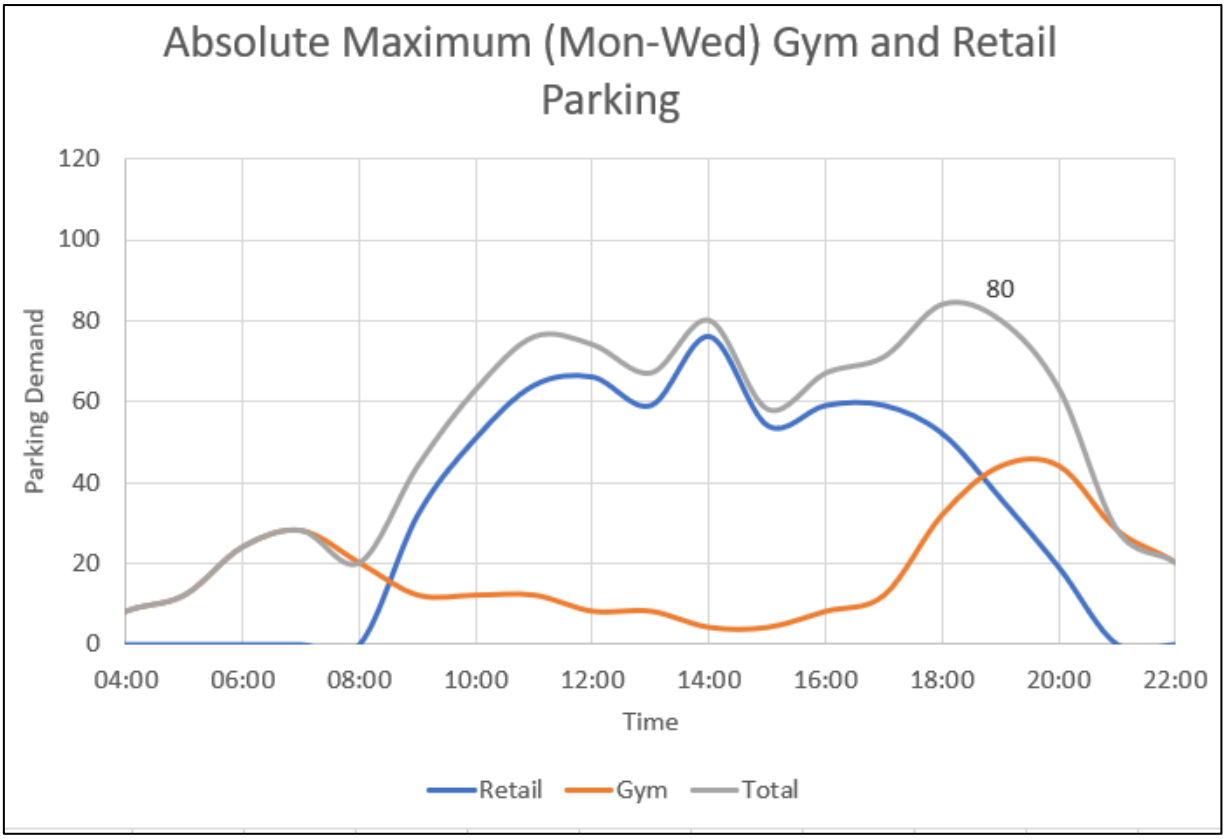


FIGURE 4: MONDAY-WEDNESDAY SHARED CAR PARKING DEMAND

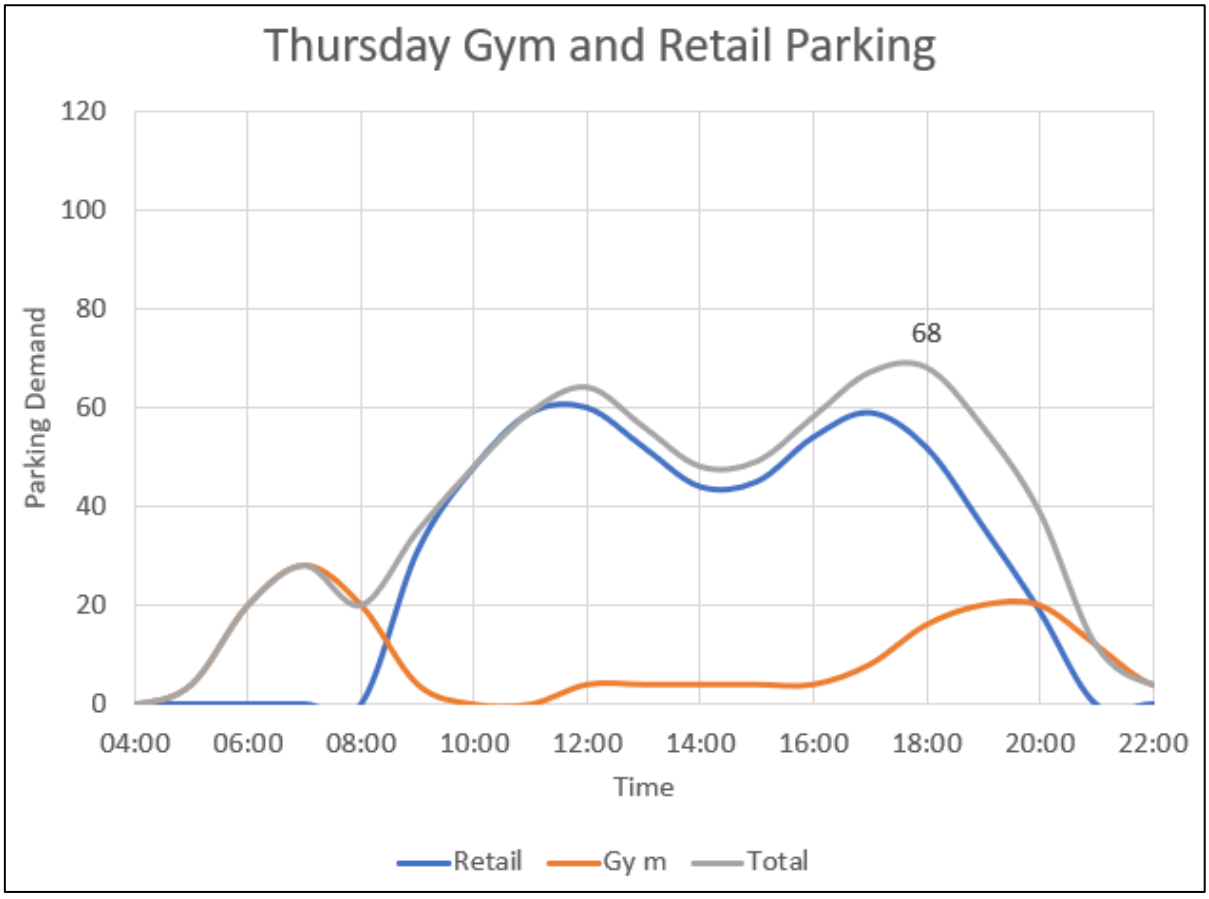


FIGURE 5: THURSDAY SHARED CAR PARKING DEMAND

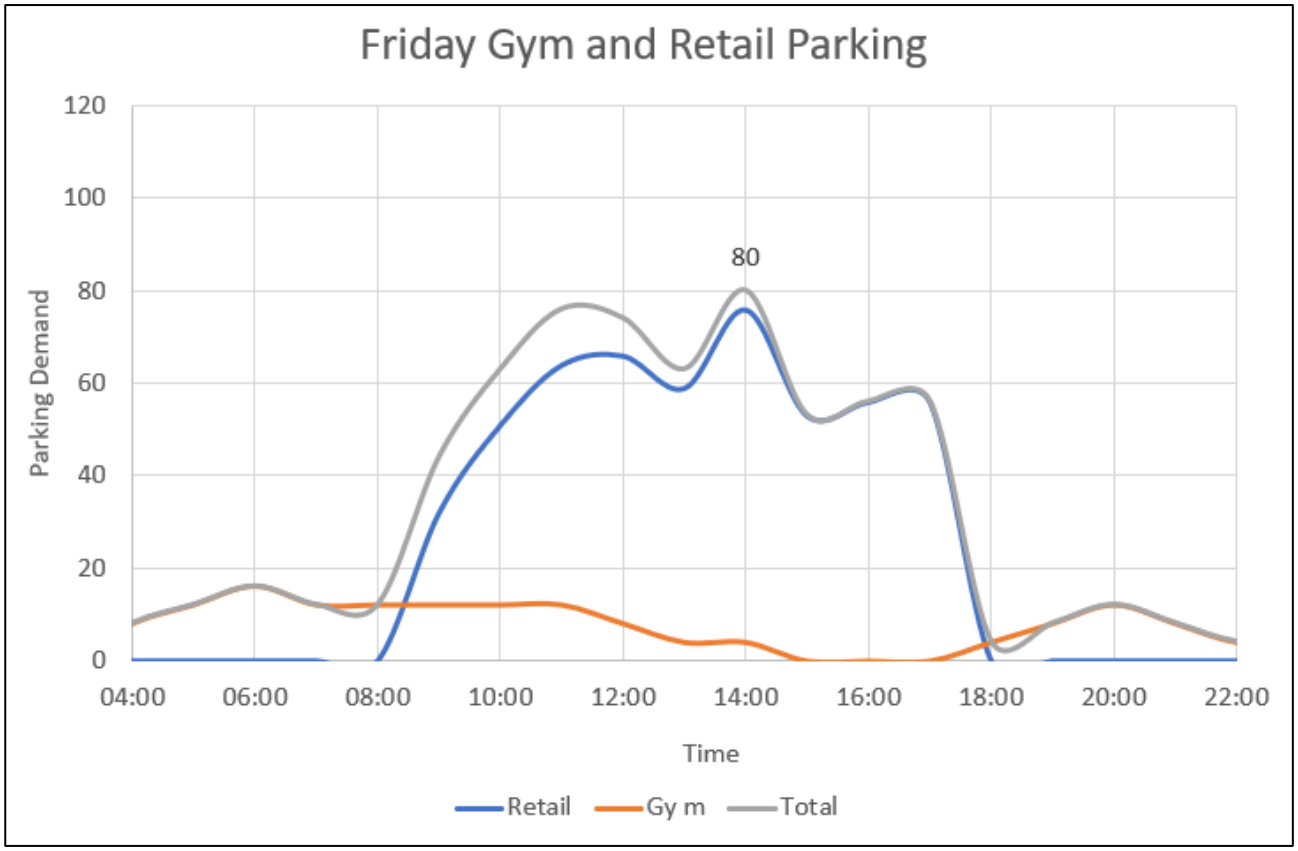


FIGURE 6: FRIDAY SHARED CAR PARKING DEMAND

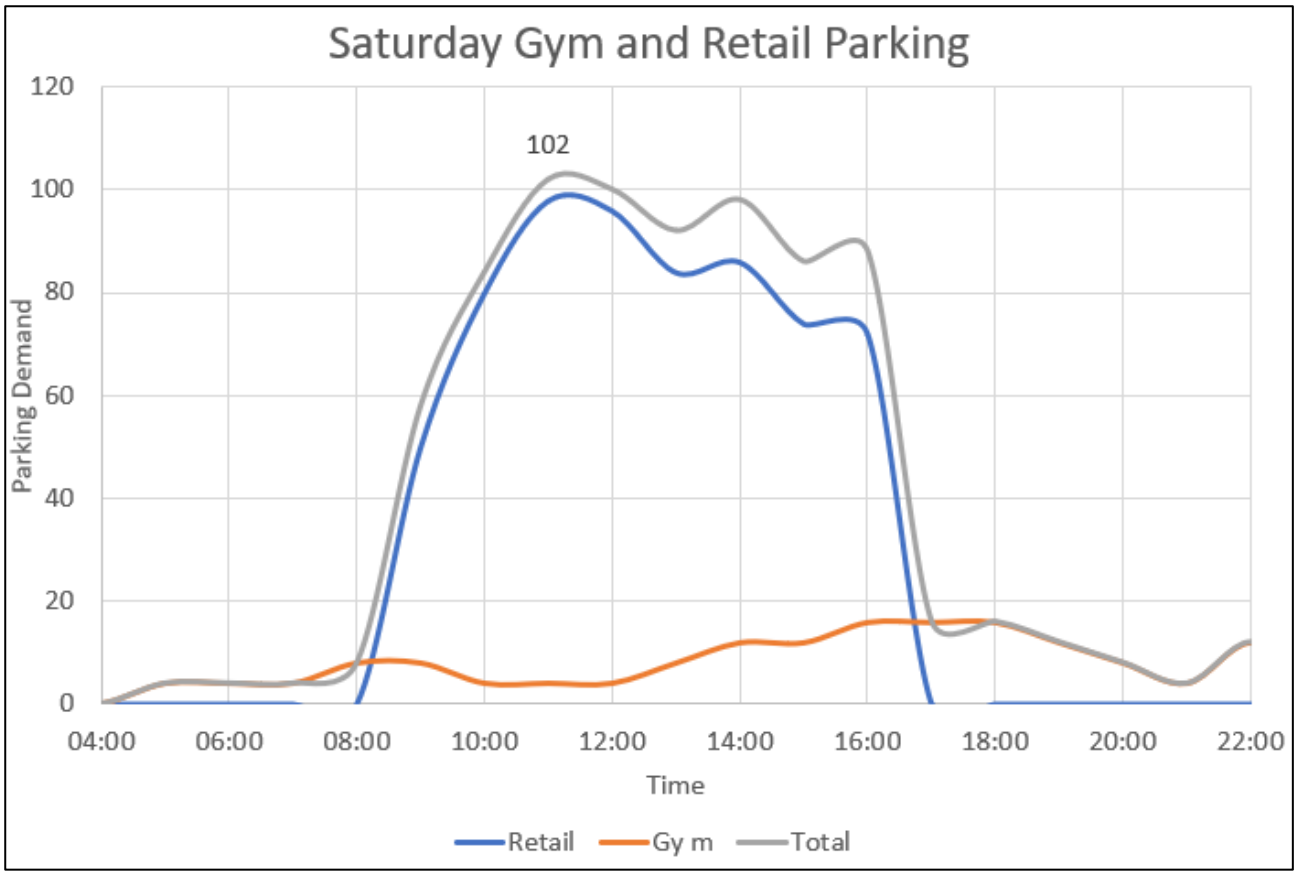


FIGURE 7: SATURDAY SHARED CAR PARKING DEMAND

As shown, the peak shared car parking demand for the gym and retail components is **102** parking spaces, which occurs on Saturday at 11:00am. The proposed plans provide **116** parking spaces for retail and gym shared parking, which satisfies the practical peak car parking demand of 102 spaces with a surplus of 14 spaces for sensitivity purposes.

The assessed car parking demand is summarised in **Table 4**.

TABLE 4: ASSESSED CAR PARKING DEMAND

Land Use	Type	Scale(1)	Rate	Spaces Required	Spaces Provided
Residential	One-bedroom	3	1 per dwelling	3	67
	Two-bedroom	27	1.2 per dwelling	32.4	
	Three-bedroom	21	1.5 per dwelling	31.5	
	Visitor	51	1 per 5 dwellings	10	10
Residential Subtotal				77	77
Retail/Gym Saturday AM	Retail	2,825.25m^2 GLFA	See **Figure 7**	102(2)	116
	Gym	997m^2 GFA			
Total	**-**	**-**	**-**	**179**	**193**

Note: (1) The GLFA is taken to be 75% of the GFA as per *Section 5.7.1* of the RMS Guide
(2) Demand

As shown, the assessed car parking demand is **179** spaces based upon data from Glenrose Village for shopping centre and gym demand. The development provides **193** spaces, which represents a 14-space surplus compared to the assessed car parking demand.

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

- The development provides 15 car wash spaces which have not been included in the parking provision. Carwash spaces in shopping centres operate as dual use spaces for uses within the development. For example, some portion of retail/gym patrons will utilise the car wash service facility and associated car parking space and have their car washed while they patronise the retail or gym uses. In this case, a retail/gym space will remain vacant, which reduces the gym/retail parking demand within the main and general car parking area.

- The development provides 12 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.

3.4 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 5** below.

TABLE 5: BICYCLE PARKING REQUIREMENTS

Land Use	Type	Scale(1)	Rate	Spaces Required
Residential	Column 1	51	1 per dwelling	51
	Column 2		1 per 12 dwelling	4
Business and Retail	Column 1	3,767m^2 GFA	1 per 200m^2 GFA	19
	Column 2		1 per 600m^2 GFA	6
Recreation	Column 1	997m^2 GFA	1 per 4 employees	3(2)
	Column 2		1 per 200m^2 GFA	5
Total	**-**	**-**	**-**	**88 (73 tenant; 15 visitors)**

Note: (1) Scale measured in GFA
(2) The gymnasium is expected to operate with a maximum 12 staff at any one time

The development therefore requires the provision of **88** bicycle spaces. A provision of **90** bicycle spaces are provided, satisfying Council requirements.

3.5 Motorcycle Parking Requirements

Council's DCP does not provide any motorcycle parking requirement for the proposed site. The development proposes 12 motorcycle spaces, which will theoretically reduce the car parking demand and should be looked upon favourably by Council.

3.6 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 116 car parking spaces for retail and gym uses but requires 142 car parking spaces in accordance with the RMS and DCP requirements. Nonetheless, applying the BCA rate of 1 space per 50 carparking spaces results in a requirement for three (3) disabled retail parking spaces. The site provides three (3) retail disabled spaces, satisfying the BCA 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.

3.7 Servicing & Loading

Council's DCP does not outline provision of loading facilities for uses within the proposed development. However, a loading area has been provided which can facilitate up to a 12.5m length Heavy Rigid Vehicle under a forward entry / forward out manoeuvre. This is considered adequate for the scale of the development.

The loading facility driveway is shared with the passenger vehicle exit driveway, and therefore must operate under traffic signal control. A concept of the traffic signal system is provided in **Annexure E** for reference, whilst the operation is summarised as follows:

- Signals are provided at the top and bottom of the exit ramp for passenger vehicles, and within the loading area for loading vehicles.
- Red lights for passenger vehicles are activated within the basement carpark when a loading vehicle enters the site.
- Loading vehicles are required to stop, as directed by an externally mounted "red" signal that faces approaching truck drivers along Glenrose Place upon entry into the site to allow any remaining passenger vehicles on the ramp to exit the site.
- Once the exit ramp is cleared, the loading vehicle enters the loading bay, and the exit ramp signal changes from red to green, allowing passenger vehicles to exit the site freely.
- Once loading is completed, the loading vehicle will wait within the loading area, activating the red light for the basement exit.
- Once the basement exit is clear of exiting vehicles, the loading signal turns from red to green and the loading vehicle exits the site.
- When sufficient time has passed, the basement exit signals turn from red to green, restoring the signal's default position when no loading vehicles are within the system.

The loading facility shall be managed amongst the tenancies under a Loading Dock Management Plan that includes time of the week schedule, given that the area can accommodate a single HRV at a time.

3.7.1 Passenger Vehicle Egress Queueing Analysis

MTE has completed a queueing analysis to demonstrate the potential queueing of passenger vehicles leaving the basement carpark level during the peak traffic generation scenarios when a service vehicle enters the site. The queueing calculations are summarised in **Table 6**.

TABLE 6: TRAFFIC SIGNAL INTERNAL CAR QUEUEING ANALYSIS

Peak Hour	Peak Hourly Exiting Volume	Service Time	98th Percentile Queue
Thursday - Friday AM	70 vehicles	20 seconds	4 vehicles
Thursday – Friday PM	103 vehicles		7 vehicles
Saturday Midday	146 vehicles		18 vehicles

It is considered that a queue over four (4) vehicles is undesirable given the geometry of the basement. The internal 98th percentile vehicle queue is not expected to be more than 4 cars outside of the peak times included in **Table 6**. Therefore, loading should be prohibited after 3pm on weekdays, after 10am on Saturdays and all day on Sundays.

Truck frequencies will also be restricted within the Loading Dock Management Plan so that no two trucks will enter the site within an hour of each other.

3.8 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 8**, whilst a more detailed concept plan reproduced in **Annexure F**. It is noted that the roundabout concept is subject to detailed design.

FIGURE 8: GLENROSE PLACE ROUNDABOUT CONCEPT

3.9 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 and gym 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.

Any required changes for compliance (including the signal system) are shown in **Annexure E** for reference.

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 7** 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 7: ESTIMATED TRAFFIC GENERATION

Land Use	Time	Scale	Rate	Traffic Generation	Direction
High density residential flat building	AM Peak	51 dwellings	0.29 per unit	15	3 in, 12 out
	PM Peak		0.29 per unit	15	12 in, 3 out
	Saturday		0.29 per unit(2)	15	7 in, 8 out
Retail – Slow Trade	AM Peak	1,317m^2 GLFA	0.010 per m^2 GLFA(3)	13	7 in, 6 out
	PM Peak		0.020 per m^2 GLFA	26	13 in, 13 out
	Saturday		0.038 per m^2 GLFA	50	25 in, 25 out
Retail – Faster Trade	AM Peak	259.5m^2 GLFA	0.026 per m^2 GLFA(2)	7	3 in, 4 out
	PM Peak		0.051 per m^2 GLFA	13	6 in, 7 out
	Saturday		0.013 per m^2 GLFA	3	1 in, 2 out
Retail – Specialty Shops	AM Peak	1,238.25m^2 GLFA	0.028 per m^2 GLFA(4)	7	4 in, 3 out
	PM Peak		0.056 per m^2 GLFA	70	35 in, 35 out
	Saturday		0.107 per m^2 GLFA	133	67 in, 66 out
Gymnasiums	AM Peak	997m^2 GFA	9 per 100m^2(3)	90	45 in, 45 out
	PM Peak				
	Saturday				
Total	**AM Peak**			**132**	**62 in, 70 out**
	PM Peak			**214**	**111 in, 103 out**
	Saturday			**291**	**145 in, 146 out**

NOTE:

(1) GLFA is taken to be 75% of GFA in accordance with *Section 5.7.1* of the RMS Guide
(2) Traffic generation for residential developments taken as 80% out, 20% during AM peak. Vice versa for PM peak.
(3) 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.
(4) Gymnasium rates are the evening peak hour vehicle trips for metropolitan sub-regional areas

As shown above, the peak traffic generation of the site has been estimated to be **132** (62 in; 70 out) trips during the AM peak period, **214** (111 in; 103 out) trips in the PM peak period and **291** (145 in, 146 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 9** below, with detailed SIDRA results reproduced in **Annexure C** for reference. The existing intersections are reproduced in **Table 8** for comparison.

TABLE 8: 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 9: 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:

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

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

(7) 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.

(8) 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 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 E**. The proposal is concept only and is subject to detailed design and approval from Council's Local Traffic Committee.

The site proposes a total of **193** car parking spaces for residents, visitors and retail staff, falling short of the requirements of Council's DCP, but satisfying the assessed peak car parking demand. 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 **132** (62 in; 70 out) trips during the AM peak period, **214** (111 in; 103 out) trips in the PM peak period and **291** (145 in, 146 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 largest vehicle which can utilise the on-site loading area is a 12.5m length HRV. A Loading Dock Management Plan will be required for the efficient operation of the loading facilities, given that the loading access is shared with the carpark exit driveway.

In view of the foregoing, the proposed Mixed-Use Development is fully supported in terms of its traffic and parking impacts, subject to the required changes and detailed design of the internal traffic signal system associated with the loading operation, provided in **Annexure E**.

ANNEXURE A: PROPOSED PLAN

DKO Architecture (NSW) Pty Ltd
42 Davies Street
Surry Hills, NSW 2010
ABN: 81956706590
NSW: Nominated Architects
Koos de Keijzer 5767 | David Randerson 8542

T +61 2 8346 4500
info@DKO.com.au
www.DKO.com.au

Rev.	Date	By	Ckd	Description
03	20/11/2019	WL	IL	CONSULTANT CO-ORDINATION
04	21/11/2019	WL	IL	DA SUBMISSION
05	26/11/2019	WL	IL	DA SUBMISSION
06	28/11/2019	WL	IL	DA SUBMISSION
A	29/11/2019	WL	IL	DA SUBMISSION

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	A

DKO

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06	28/11/2019	WL	IL	DA SUBMISSION
A	29/11/2019	WL	IL	DA SUBMISSION

Project Name	28 Lockwood Av. Belrose	Project Number	11574
Project Address	28 Lockwood Ave, Belrose, NSW 2085	Drawing Name	Basement 3
		Scale	1:400 @A3
		Date	Aug 2019
Client	Platinum Property Group	Drawing Number	**DA201**
		Revision	**A**

DKO Architecture (NSW) Pty Ltd
42 Davies Street
Surry Hills, NSW 2010
ABN: 81956706590
NSW: Nominated Architects
Koos de Keijzer 5767 | David Randerson 8542

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06	28/11/2019	WL	IL	DA SUBMISSION
A	29/11/2019	WL	IL	DA SUBMISSION

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	A

ANNEXURE B: TRAFFIC SURVEY DATA

Suburban:	Belrose
Customer:	McLaren

South:	Lockwood Ave
West:	N/A

Traffic Peak	AM:	7:45 AM-8:45 AM
	PM:	5:15 PM-6:15 PM

All Vehicles

Time		North Approach Lockwood Av			East Approach Glen St			South 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		North Approach Lockwood Av			East Approach Glen St			South 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

Pedestrians Crossing

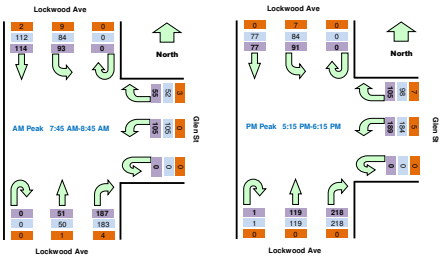
Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
07:00	07:15	4	4	1	0	4	4	55
07:15	07:30	4	12	0	0	0	0	52
07:30	07:45	3	13	1	0	0	0	53
07:45	08:00	1	2	2	0	0	0	45
08:00	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	

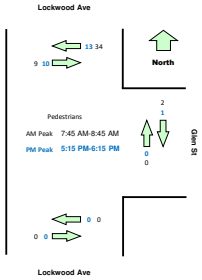
Peak Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
07:45	08:45	34	9	2	0	0	0	45
17:15	18:15	13	10	1	0	0	0	24

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 Lockwood Av			East Approach Glen St			South 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		North Approach Lockwood Av			East Approach Glen St			South 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		North Approach Lockwood Av			East Approach Glen St			South 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		North Approach Lockwood Av			East Approach Glen St			South 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 -33.74015, 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 Period	AM:	7:00 AM-9:00 AM
	PM:	4:00 PM-7:00 PM
Traffic Peak	AM:	7:45 AM-8:45 AM
	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	26	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	20	31		
18:45	19:00	0	24	0	10	0	2	32	4	0	2	1	5	0	6	25	29		

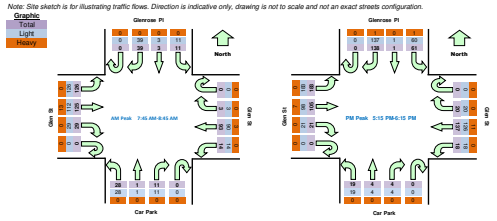
Peak Time		North Approach Glenrose Pl				East Approach Glen St				South Approach Car Park				West Approach Glen St				Peak
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
07:45	08:45	0	39	3	11	0	3	93	14	0	11	1	28	0	29	125	126	483
17:15	18:15	0	138	1	61	0	20	137	18	0	4	4	19	0	21	105	183	711

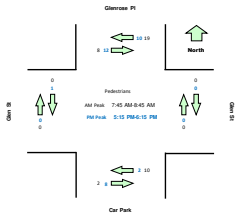
Pedestrians Crossing

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
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	total
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.





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
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
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	183	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	0	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
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	total
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 Period	AM:	7:00 AM-9:00 AM
	PM:	4:00 PM-7:00 PM
Traffic Peak	AM:	7:45 AM-8:45 AM
	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

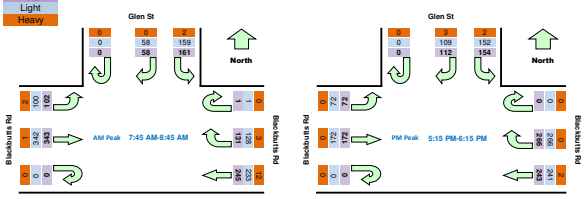
Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
07:00	07:15	1	0	0	0	0	1	11
07:15	07:30	0	0	0	1	0	6	10
07:30	07:45	0	0	0	0	0	2	4
07:45	08:00	0	0	0	0	0	0	7
08:00	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	

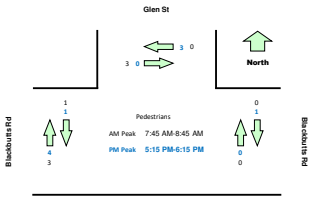
Peak Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
07:45	08:45	0	3	0	0	1	3	7
17:15	18:15	3	0	1	0	1	4	9

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

TRANS TRAFFIC SURVEY

trafficsurvey.com.au

TURNING MOVEMENT SURVEY

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		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
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		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
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

Pedestrians Crossing

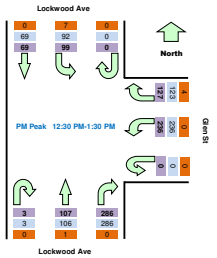
Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
10:00	10:15	0	4	0	0	0	0	42
10:15	10:30	9	3	0	0	0	0	48
10:30	10:45	6	11	0	1	0	0	46
10:45	11:00	3	5	0	0	0	0	34
11:00	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	

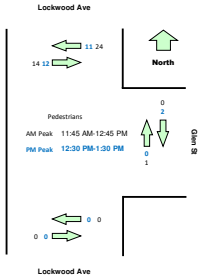
Peak Time		North Approach Lockwood Ave		East Approach Glen St		South Approach Lockwood Ave		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	
11:45	12:45	24	14	0	1	0	0	39
12:30	13:30	11	12	2	0	0	0	25

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		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
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		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
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		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
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		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
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 -33.74015, 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 Period	AM:	10:00 AM-12:00 PM
	PM:	12:00 PM-2:00 PM
Traffic Peak	AM:	11:45 AM-12:45 PM
	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 total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
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

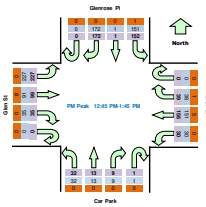
Pedestrians Crossing

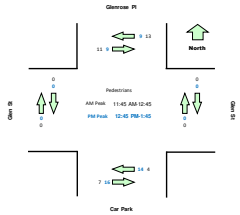
Time		North Approach Glenrose Pl		East Approach Glen St		South Approach Car Park		West Approach Glen St		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	
10:00	10:15	4	10	0	0	0	5	0	0	46
10:15	10:30	0	6	0	0	0	3	0	0	33
10:30	10:45	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 total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Westbound	Eastbound	Southbound	Northbound	
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 total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
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 total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
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
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
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

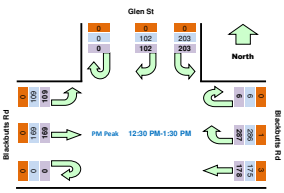
Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Hourly Total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
10:00	10:15	0	0	0	2	0	1	11
10:15	10:30	0	0	0	0	1	1	14
10:30	10:45	0	0	0	0	0	1	17
10:45	11:00	3	0	0	0	0	2	20
11:00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

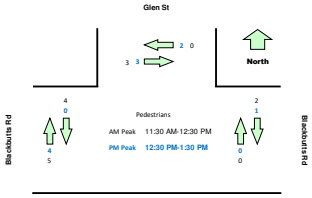
Peak Time		North Approach Glen St		East Approach Blackbutts Rd		West Approach Blackbutts Rd		Peak total
Period Start	Period End	Westbound	Eastbound	Southbound	Northbound	Southbound	Northbound	
11:30	12:30	0	3	2	0	4	5	14
12:30	13:30	2	3	1	0	0	4	10

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
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
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
Period Start	Period End	U	R	L	U	R	WB	U	EB	L	total
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

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: PEAK USAGE PROFILES

(Values within each cell are percentages of peak demand, with peak being 100%)

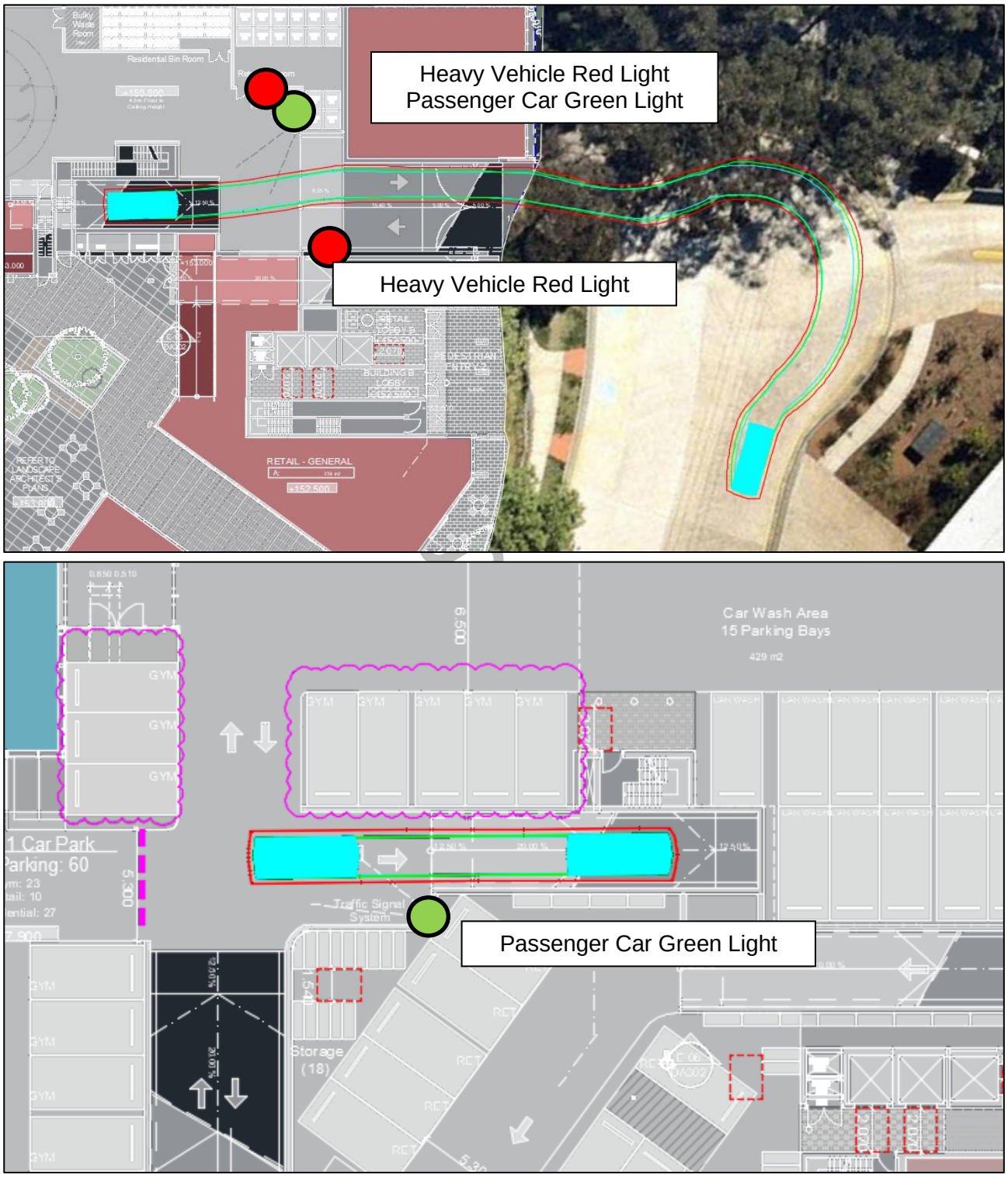
	Glenrose Village						
Time	Monday	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday
00:00	0	0	0	0	0	0	0
01:00	0	0	0	0	0	0	0
02:00	0	0	0	0	0	0	0
03:00	0	0	0	0	0	0	0
04:00	0	0	0	0	0	0	0
05:00	0	0	0	0	0	0	0
06:00	0	0	0	0	0	0	0
07:00	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0
09:00	32	27	31	32	33	51	0
10:00	45	41	48	49	52	82	70
11:00	54	50	60	60	65	100	89
12:00	57	51	62	61	67	98	96
1:00 PM	56	48	56	53	60	86	94
2:00 PM	54	47	53	45	78	88	88
3:00 PM	55	53	55	46	54	76	82
4:00 PM	56	57	60	55	57	73	0
5:00 PM	52	54	58	60	57	0	0
6:00 PM	0	0	0	53	0	0	0
7:00 PM	0	0	0	37	0	0	0
8:00 PM	0	0	0	19	0	0	0
9:00 PM	0	0	0	0	0	0	0
10:00 PM	0	0	0	0	0	0	0
11:00 PM	0	0	0	0	0	0	0

	Gym						
Time	Monday	Tuesday	Wednesd	Thursday	Friday	Saturday	Sunday
0	0	0	9	0	0	0	0
1	0	0	9	0	0	0	0
2	0	0	0	0	0	9	0
3	0	0	0	0	0	0	0
4	9	9	0	0	18	0	0
5	27	27	9	9	27	9	0
6	36	54	18	45	36	9	0
7	36	54	27	63	27	9	0
8	18	36	18	45	27	18	0
9	9	18	9	9	27	18	0
10	0	9	9	0	27	9	0
11	0	9	9	0	27	9	0
12	9	9	18	9	18	9	0
13	18	9	18	9	9	18	0
14	9	9	9	9	9	27	0
15	9	9	9	9	0	27	0
16	9	18	9	9	0	36	0
17	27	27	9	18	0	36	0
18	72	45	36	36	9	36	0
19	100	63	81	45	18	27	0
20	100	72	72	45	27	18	0
21	63	63	18	27	18	9	0
22	27	45	9	9	9	27	0
23	9	18	0	9	9	9	0

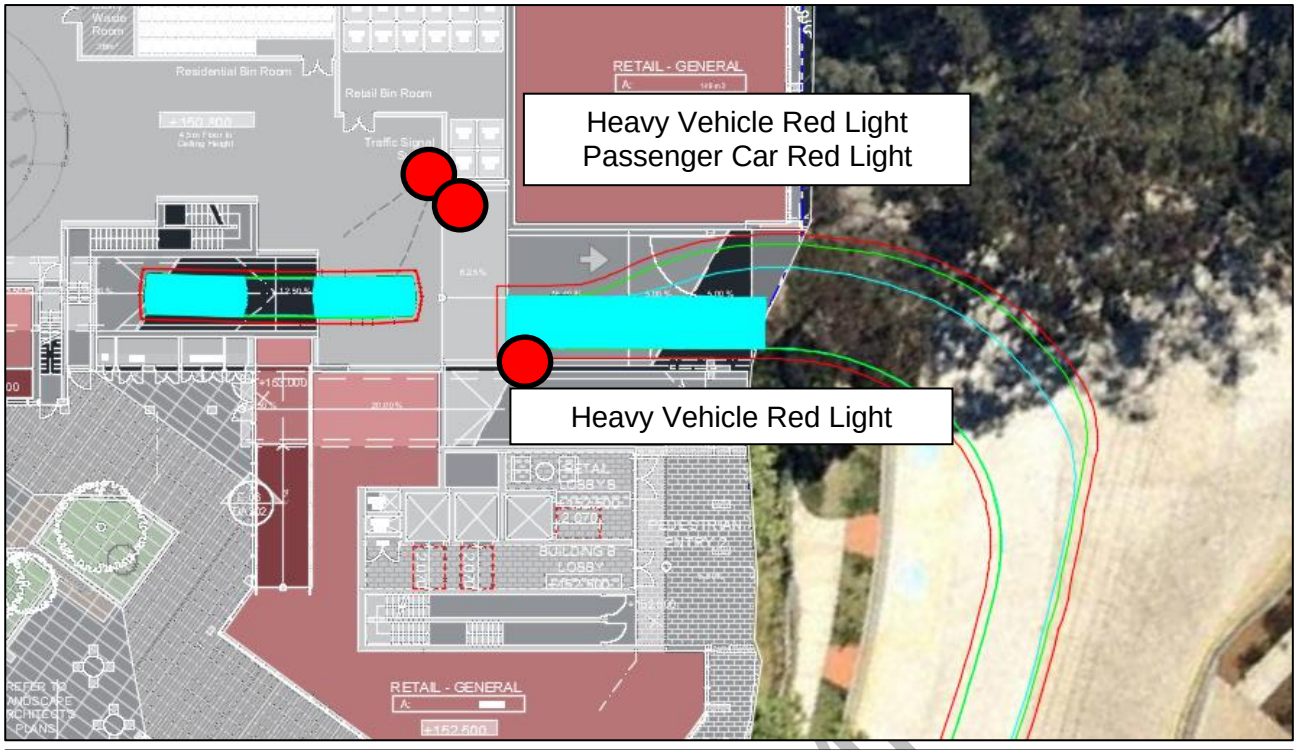
ANNEXURE E: REQUIRED CHANGES AND TRAFFIC SIGNAL CONCEPT

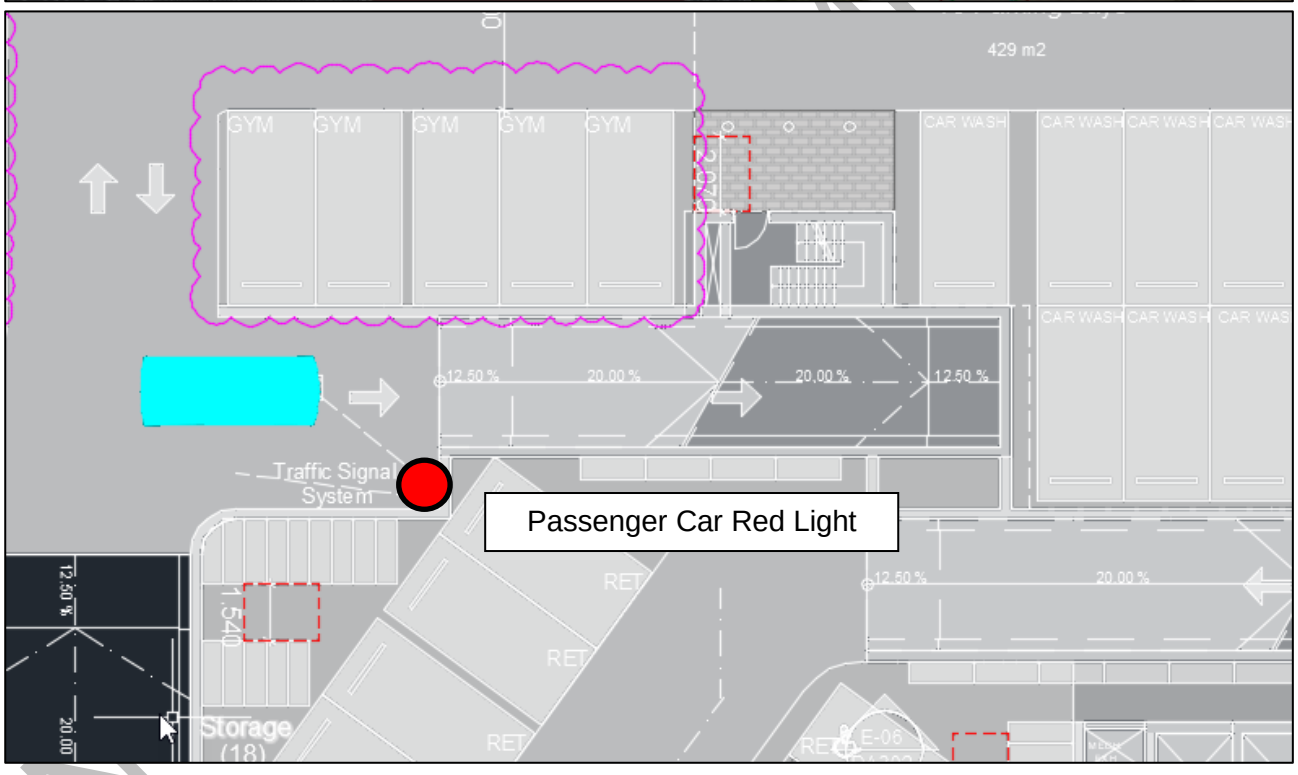
SIGNAL DESIGN CONCEPT FOR THE MIXED USE DEVELOPMENT AT 28 LOCKWOOD AVENUE, BELROSE

The default position is shown below, followed by the sequence of events which occurs when trucks arrive.

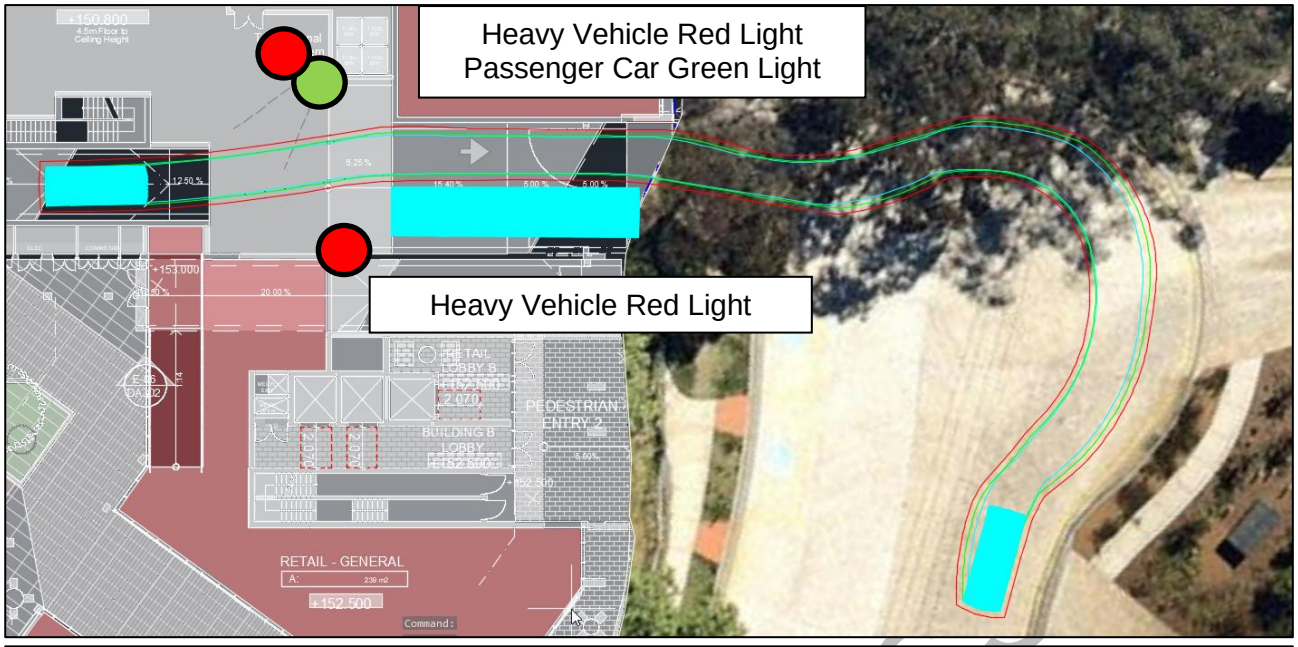


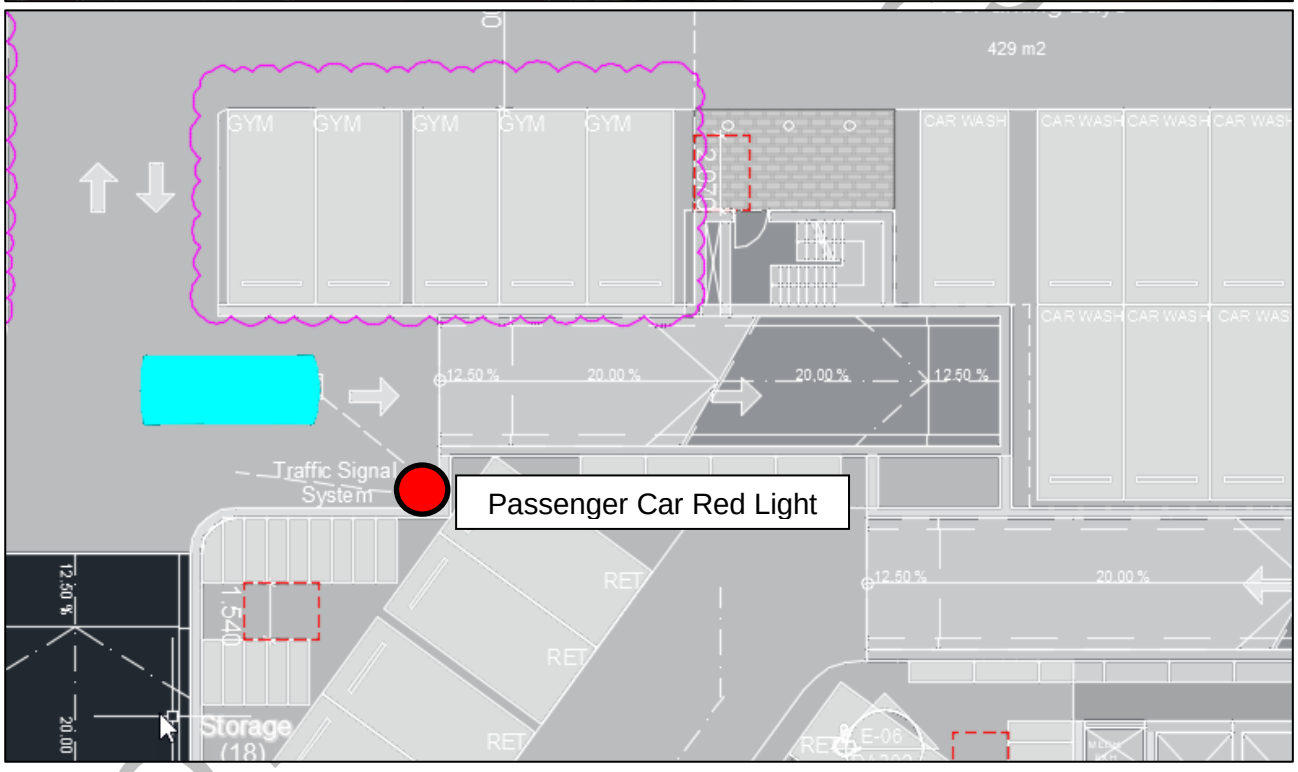
Default Position: Green lights for passenger cars at the top and bottom of the ramp. No trucks present.



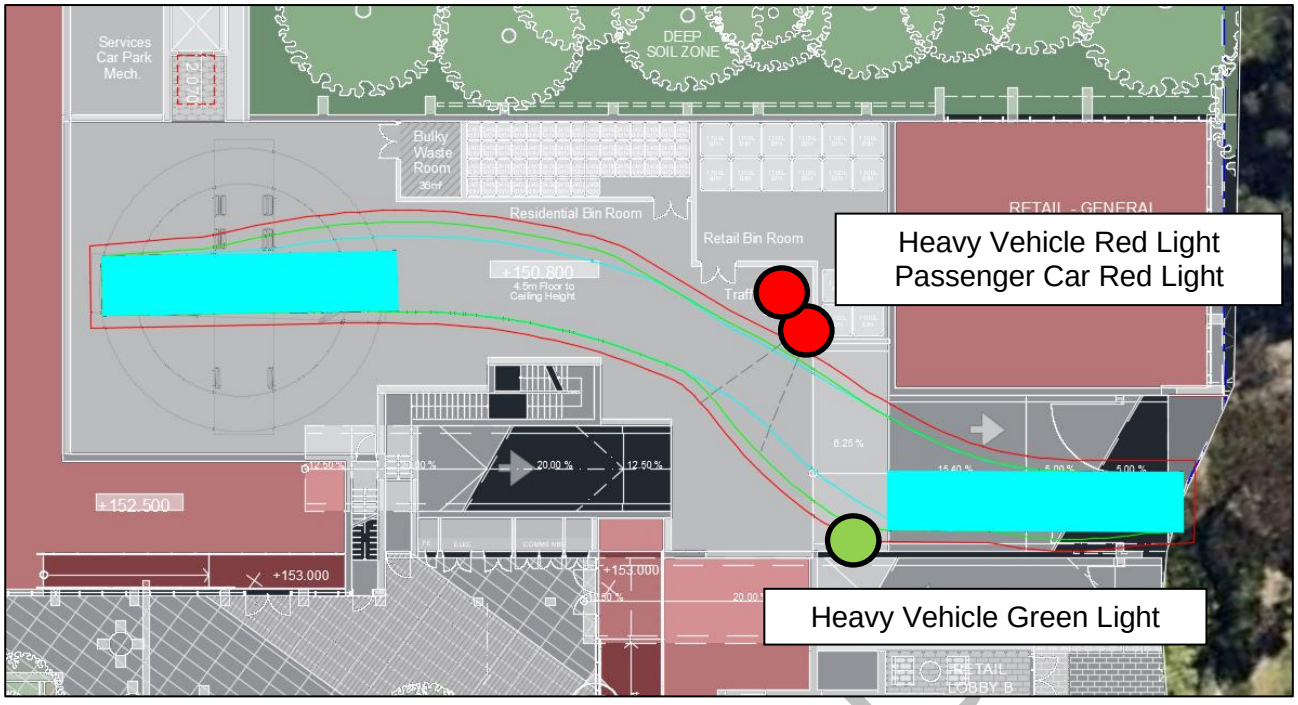


Stage 1: HRV enters the site, passenger cars are required to stop to allow HRV to stand in the position shown. All trucks must stop in this location upon entry. Passenger cars are stopped at the bottom of the ramp to avoid queueing on a steep gradient, but also at the top of the ramp in case any vehicles bypassed the first light before the red was triggered by the entering truck.

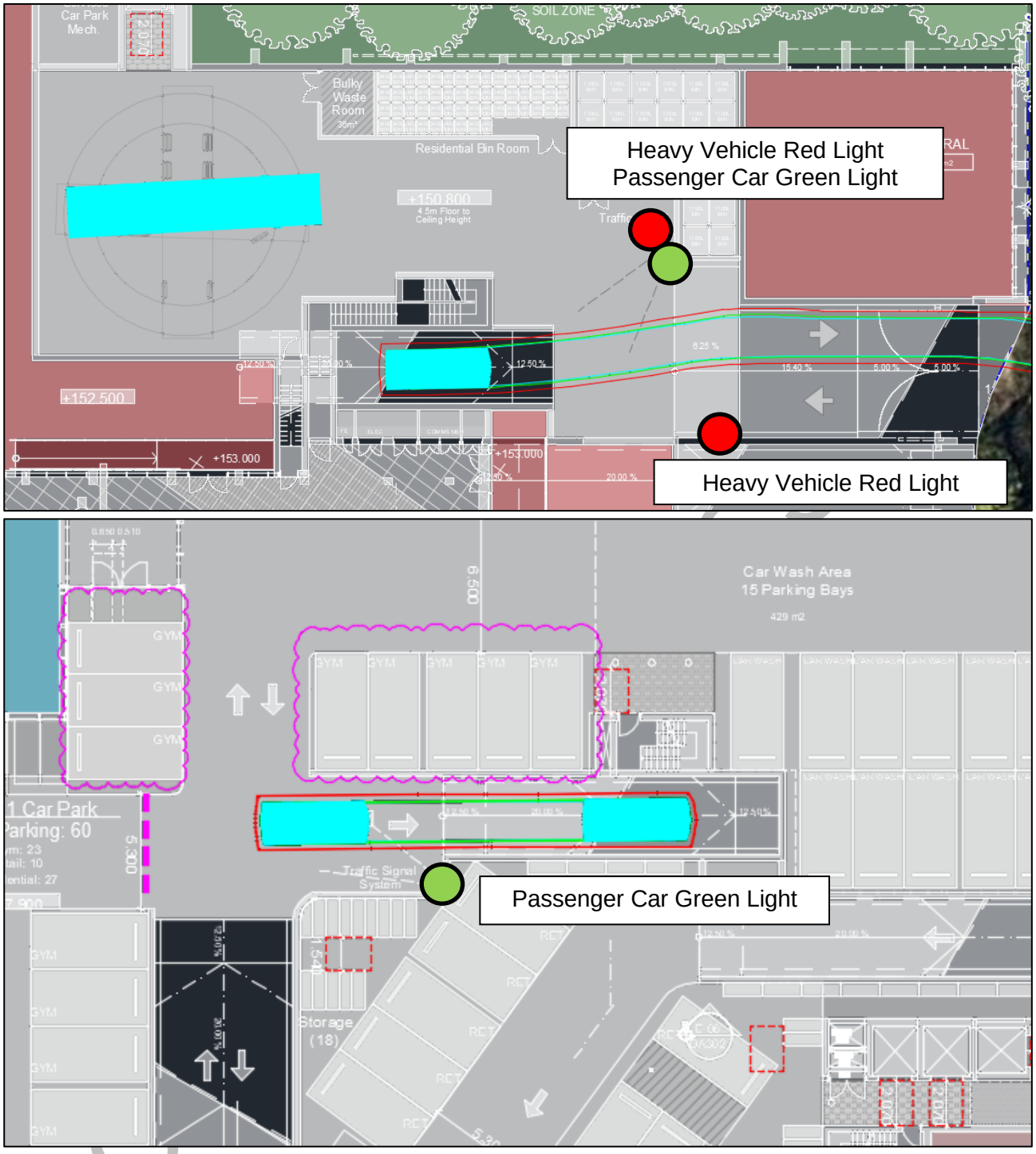




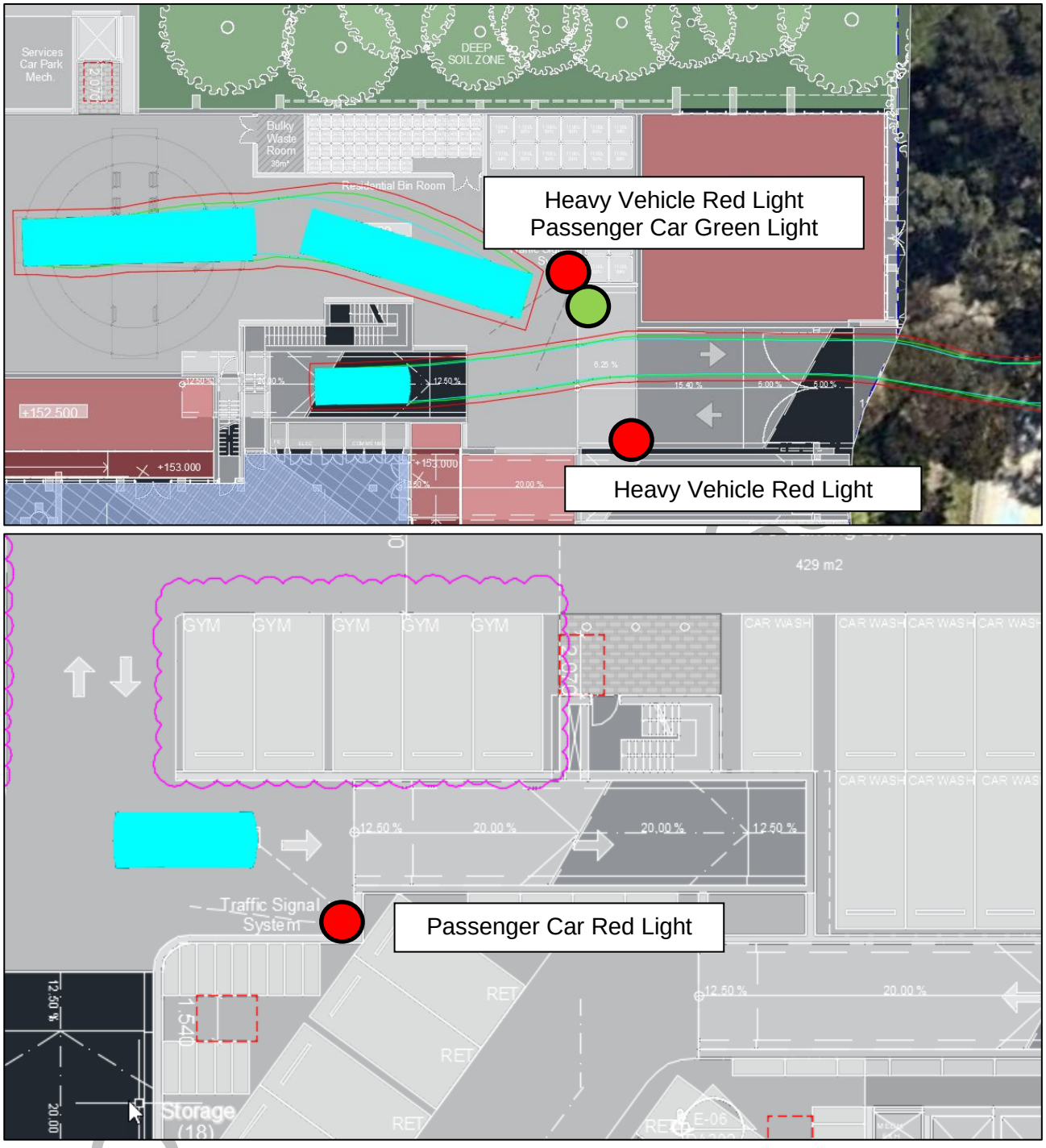
Stage 2: Once HRV stops in above location (which will happen every time a truck enters the site), the upper car light system turns green to allow the car to exit the site. The car light system at the bottom of the ramp remains red. The point of this stage is to clear the ramp queue of passenger car vehicles.



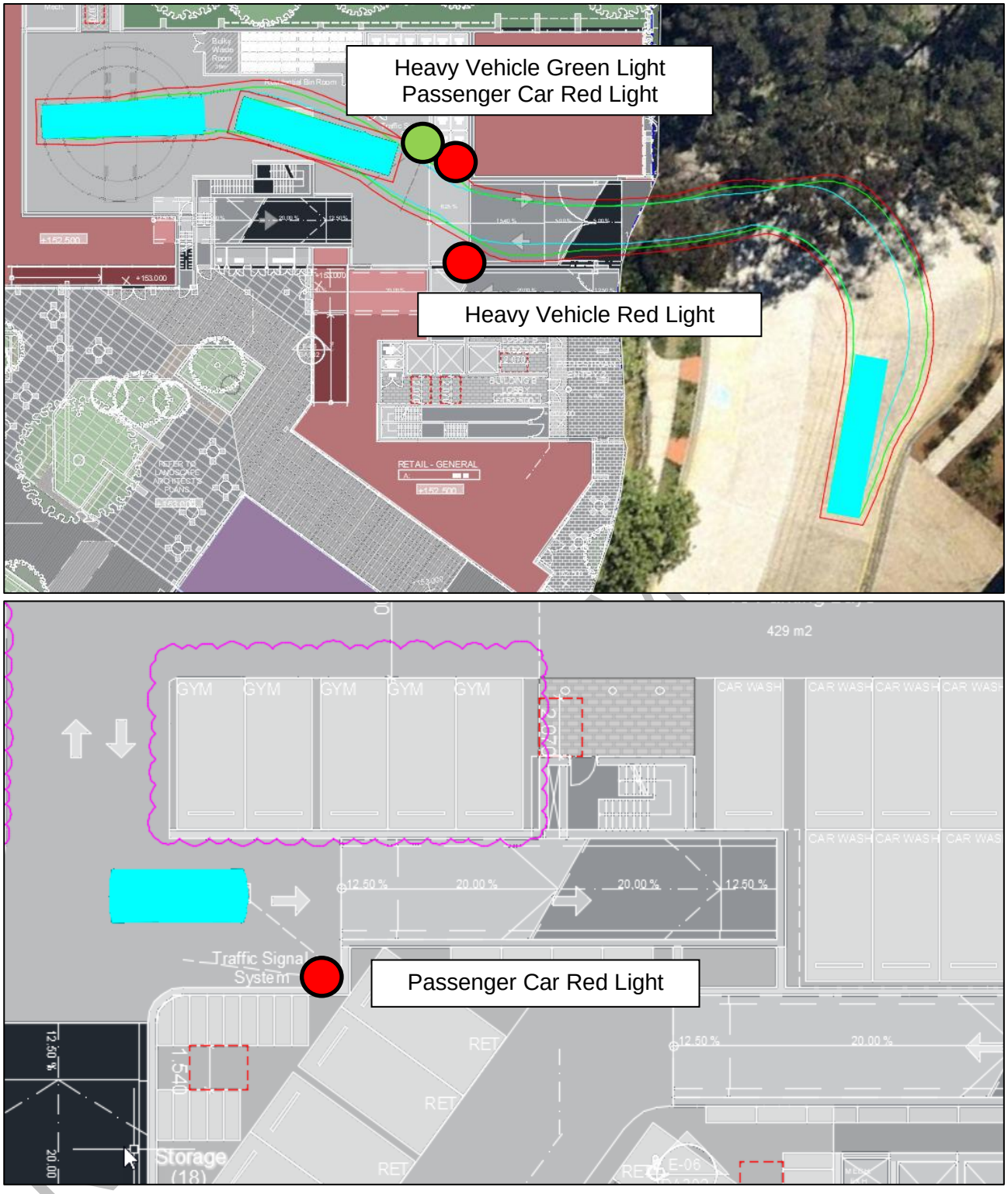
Stage 3: HRV enters loading area once ramp queue is cleared



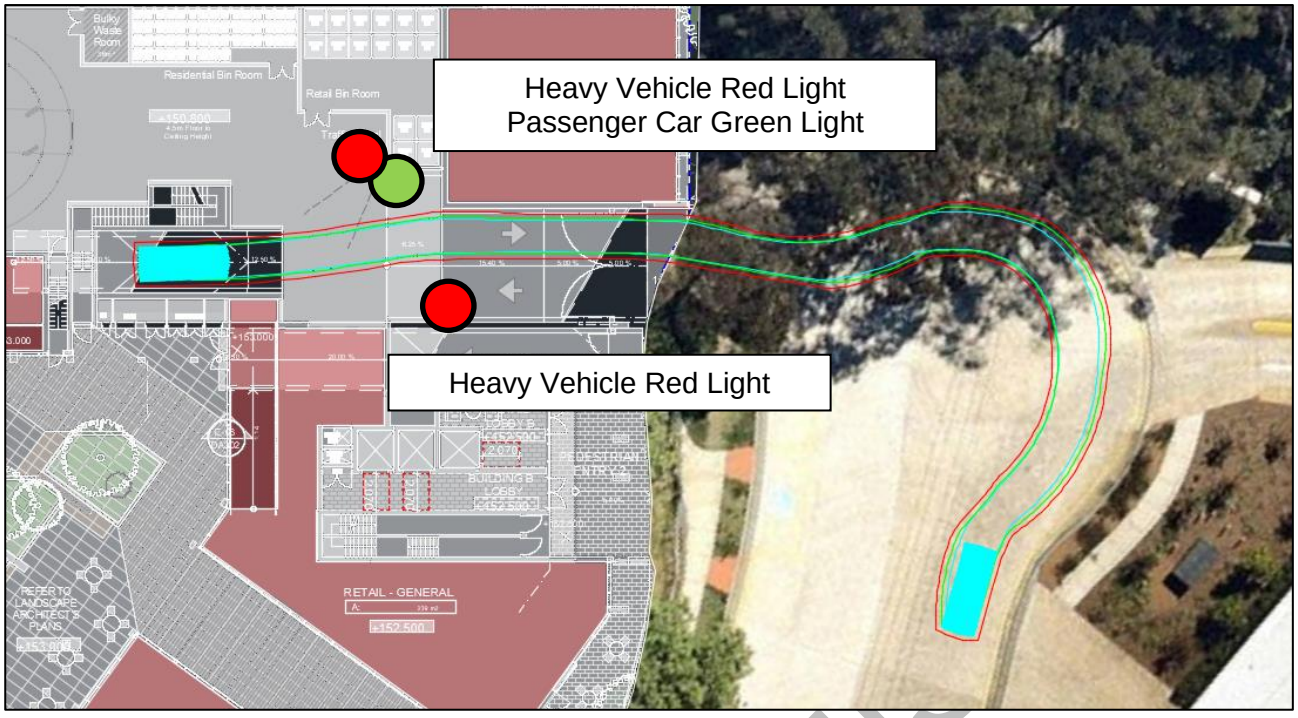
Stage 4: Passenger car lights both green while loading is taking place

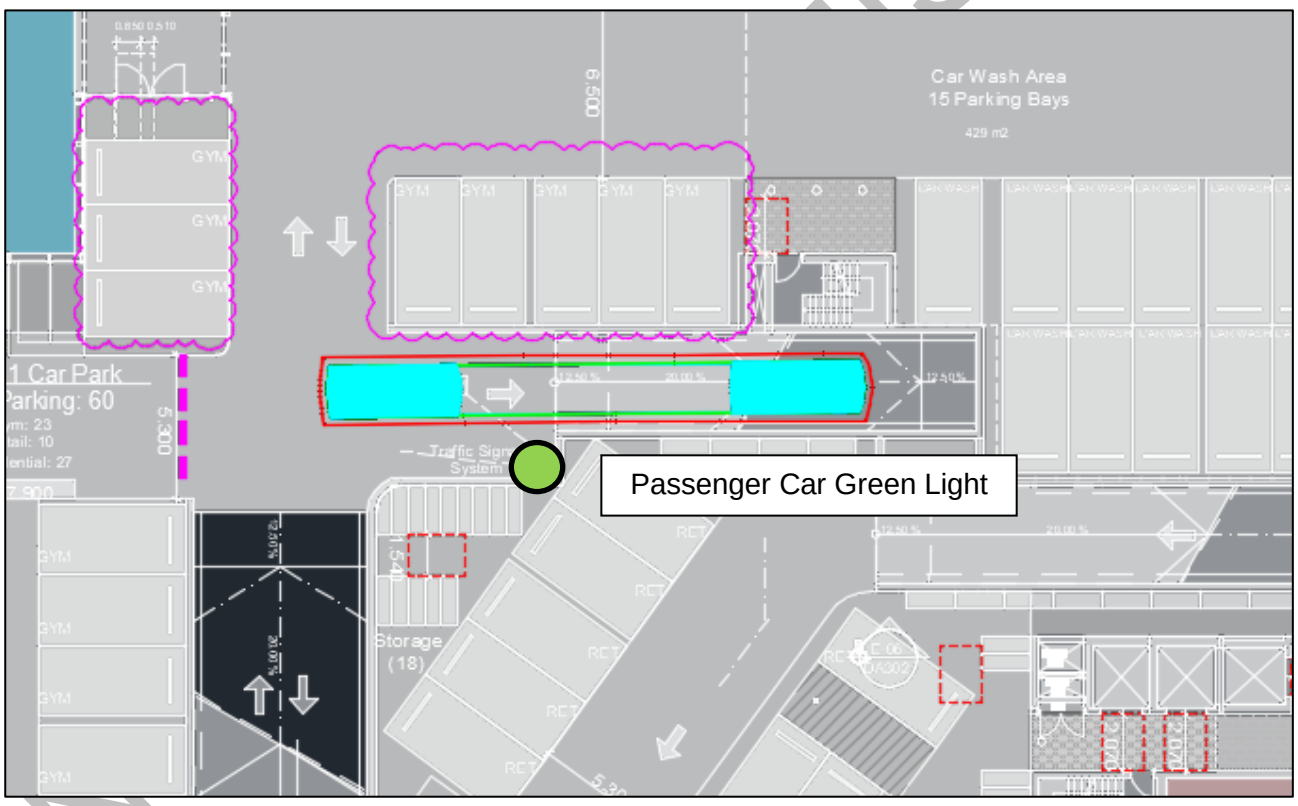


Stage 5: The HRV must stop at the light when leaving the site. This triggers a red light in the basement. The ground floor passenger car light stays green to allow any queue in the ramp to clear.

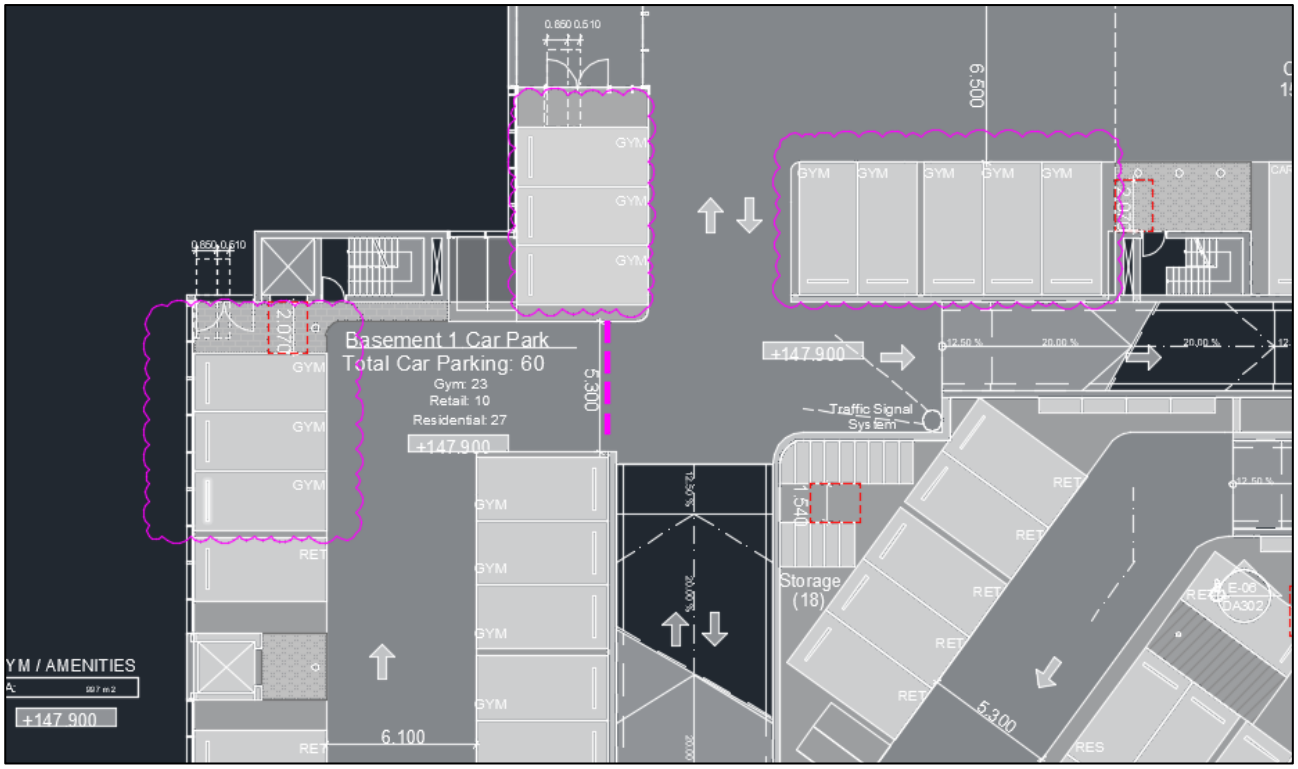


Stage 6: HRV free and clear to leave the site while passenger cars are queued at the bottom of the basement ramp.

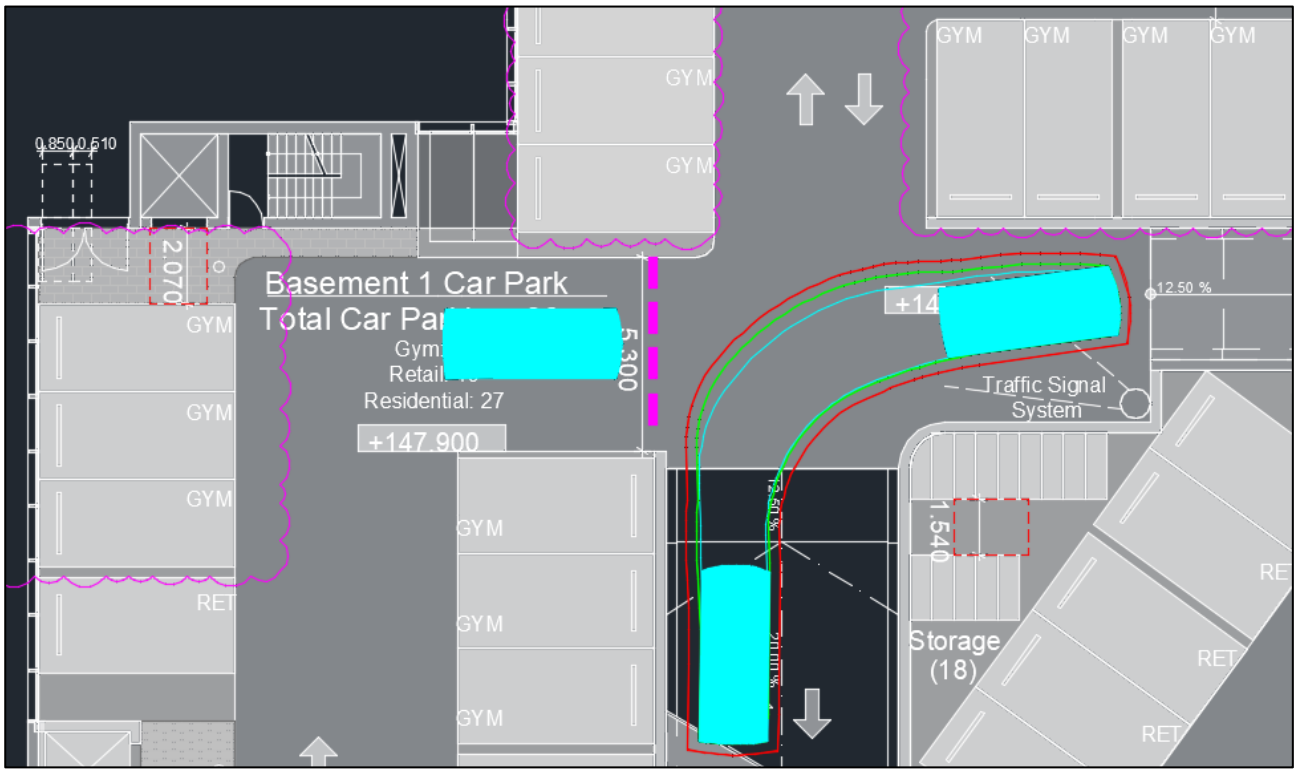




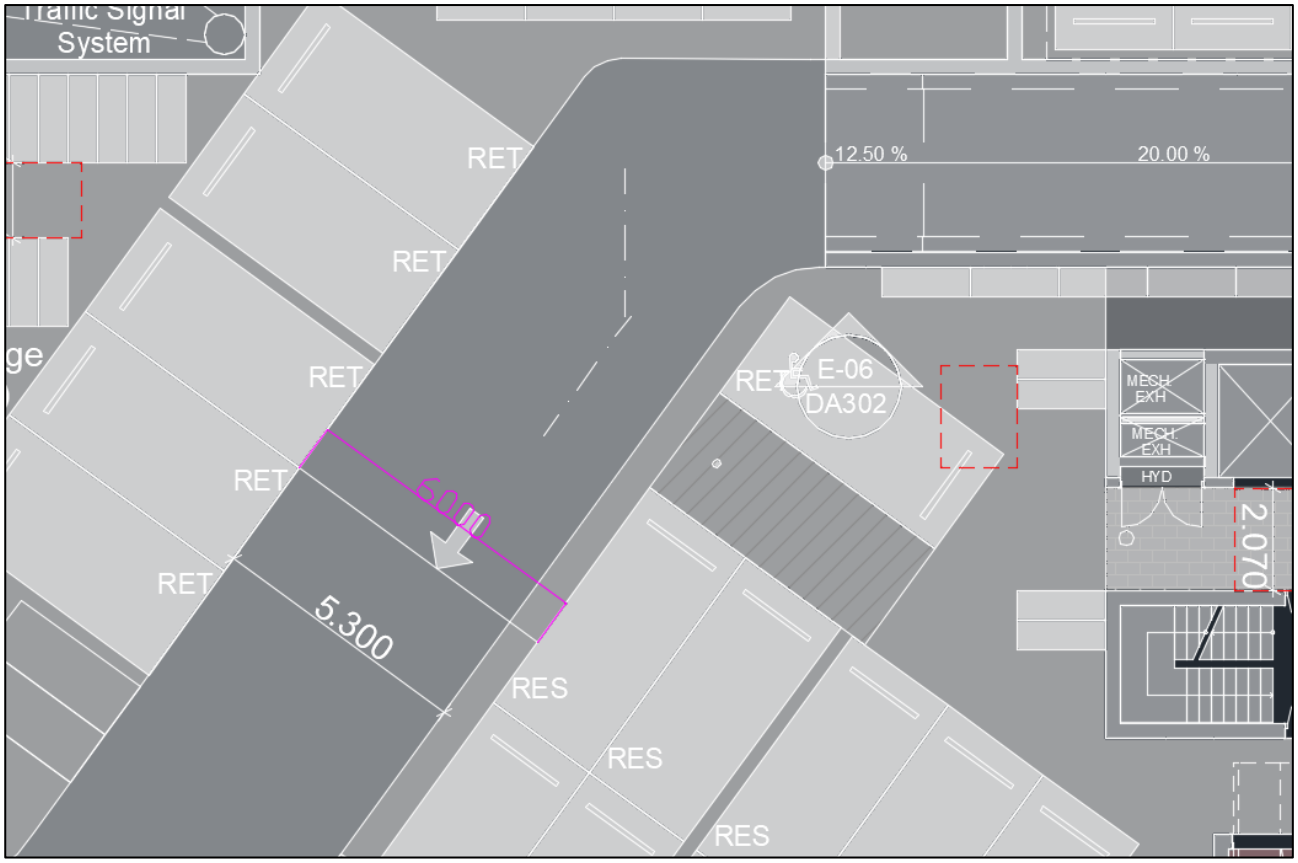
Default Position Restored: Green lights for passenger cars at the top and bottom of the ramp. No trucks present.



Gym spaces must be 2.6m in width. Currently they are shown as 2.4m wide

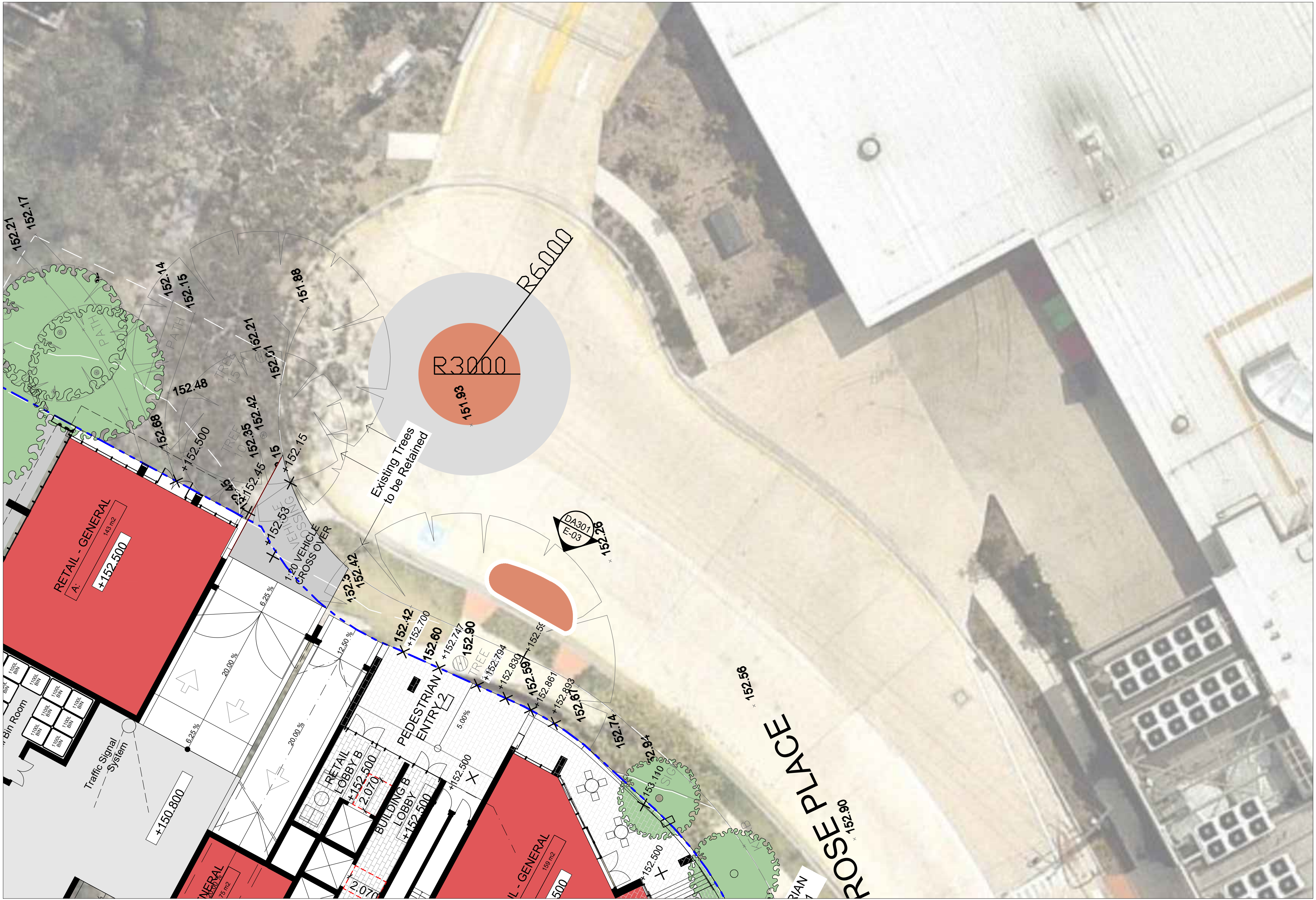


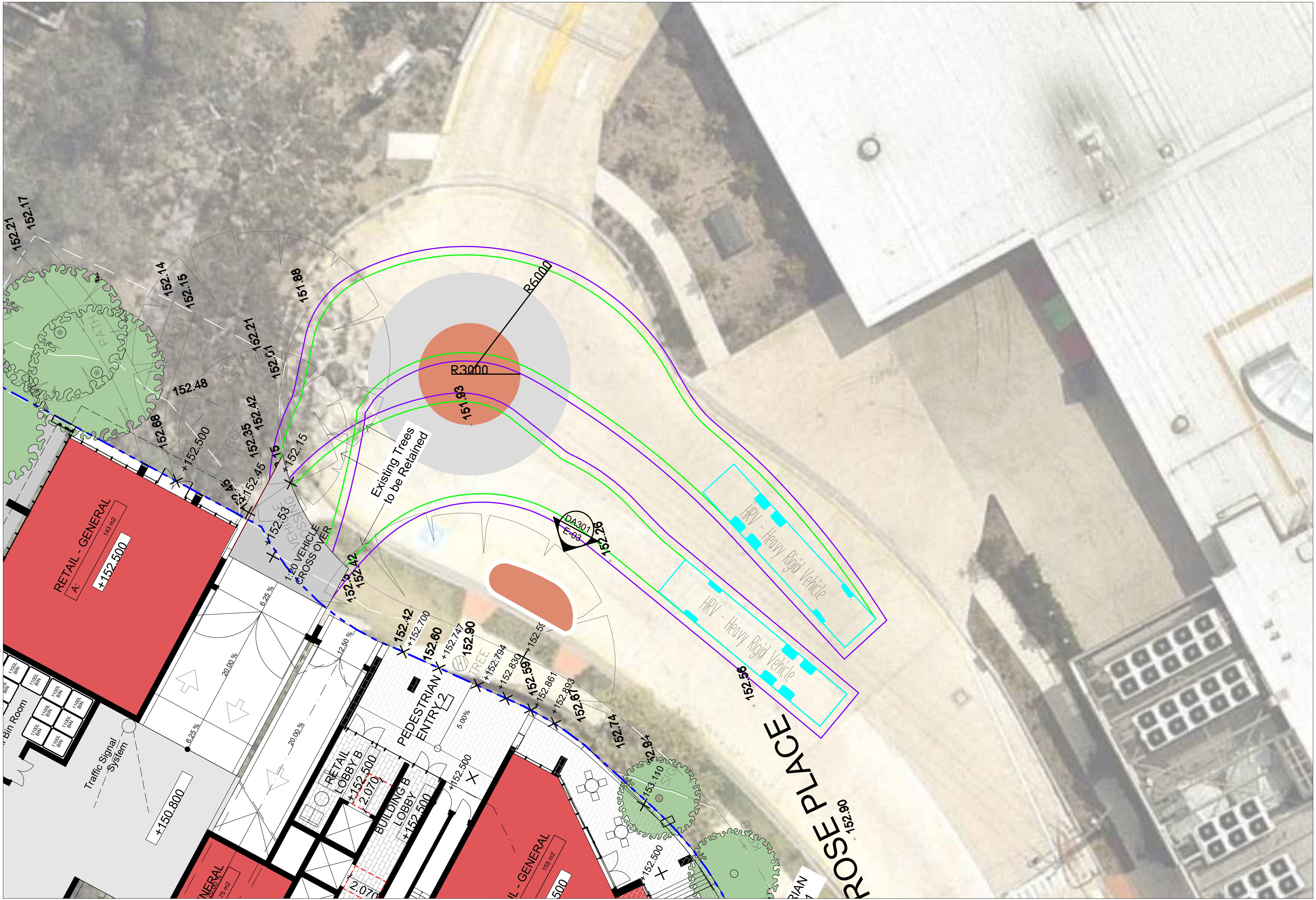
A give way line must be installed to give priority to vehicles exiting from the basement



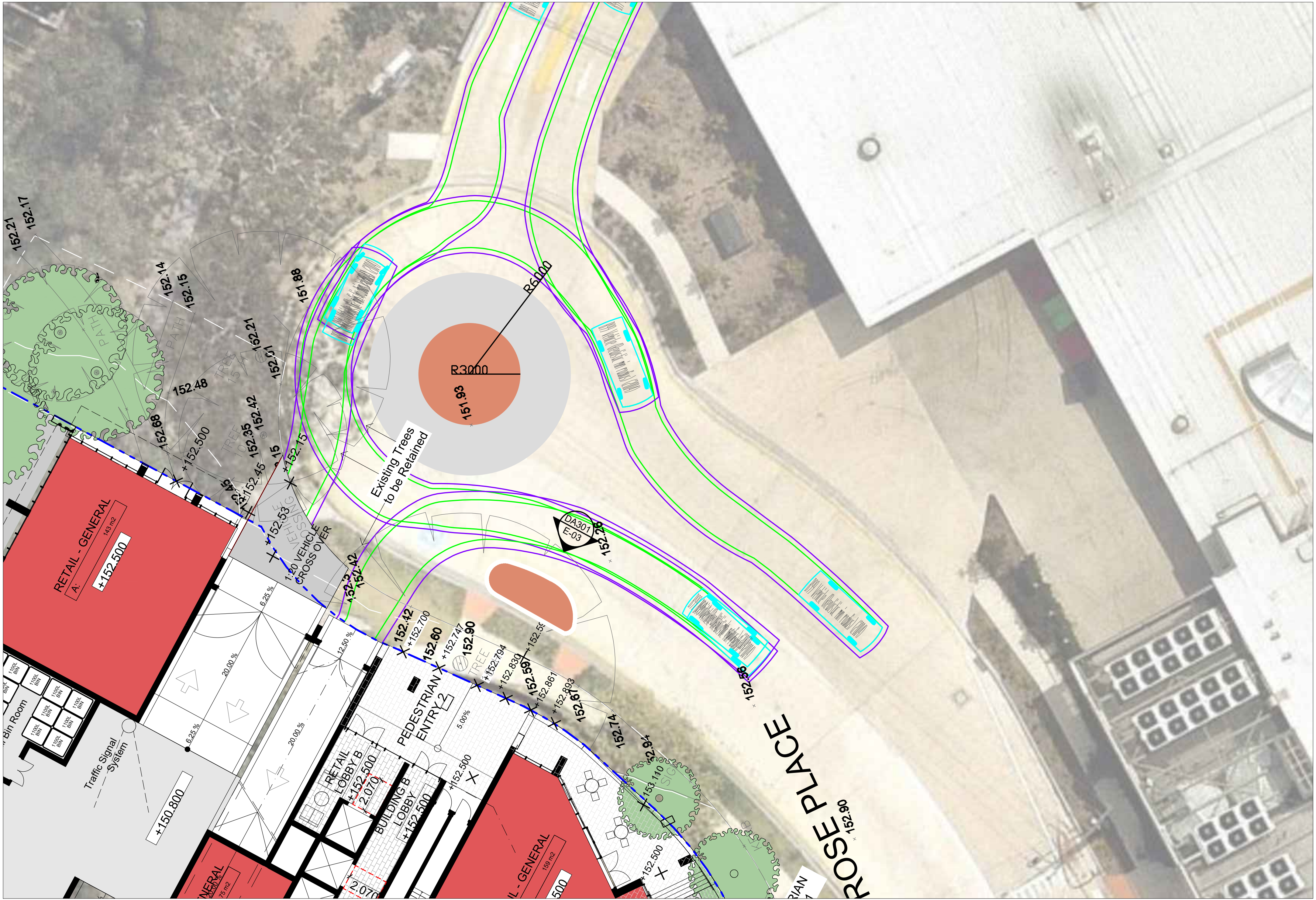
Aisle width is shown as 5.3m where 6m is available. The minimum allowable aisle width is 5.8m. The plans should be amended to show a minimum 5.8m aisle.

ANNEXURE F: PROPOSED GLENROSE PLACE ROUNDABOUT CONCEPT


R6000
R3000
151.93
Existing Trees to be Retained
DA301 E-03
RETAIL - GENERAL
143 m2
+152.500
1:20 VEHICLE CROSS OVER
PEDESTRIAN ENTRY 2
RETAIL LOBBY B
BUILDING B LOBBY
Traffic Signal System
+150.800
Bin Room
ROSE PLACE
152.90
152.56
152.42
152.60
152.90
152.74
152.94
152.48
152.21
152.17
152.14
152.15
151.88
152.21
152.01
152.68
152.35
152.42
152.15
+152.500
+152.45
+152.53
20.00 %
6.25 %
12.50 %
5.00%
+152.700
+152.747
+152.794
+152.839
+152.861
+152.893
+153.110
2.070



R6000
R3000
151.93
Existing Trees
to be Retained
HRV - Heavy Rigid Vehicle
HRV - Heavy Rigid Vehicle
DA301
E-03
RETAIL - GENERAL
143 m2
+152.500
1:20 VEHICLE
CROSS OVER
PEDESTRIAN
ENTRY 2
RETAIL
LOBBY B
BUILDING B
LOBBY
Bin Room
Traffic Signal
System
+150.800
ROSE PLACE
152.90
152.21
152.17
152.14
152.15
151.88
152.21
152.01
152.48
152.68
+152.500
152.35
152.42
152.45
152.15
+152.53
152.42
152.60
152.90
152.59
152.67
152.74
152.94
+153.110
152.56
152.26


R6000
R3000
151.93
Existing Trees to be Retained
DA301
E-03
RETAIL - GENERAL
143 m2
+152.500
1:20 VEHICLE CROSS OVER
PEDESTRIAN ENTRY 2
RETAIL LOBBY B
BUILDING B LOBBY
Traffic Signal System
Bin Room
+150.800
ROSE PLACE
152.90
152.48
152.88
152.21
152.17
152.14
152.15
151.88
152.42
152.60
152.90
152.74
152.94
152.67
152.56
152.26
20.00 %
6.25 %
12.50 %
5.00%
2.070
1100L BIN