

Report
Prepared for
BC Mount Waverley Project Pty Ltd

November 2019

ADVERTISED COPY

Traffic Engineering

445-467 Blackburn Road, Mount
Waverley

ratio:impact

ratio:

r:

ratio:consultants8 Gwynne Street
Cremorne VIC 3121
ABN 93 983 380 225**Prepared for:**BC Mount Waverley Project Pty Ltd
Our reference 16439T-REP01-
F01.docx

Version	Date	Reason for Issue	Prepare By	Check By
D01	30/10/2019	Draft	L. Inglis L. Brown	S. Hunt
F01	1/11/2019	Final	L. Inglis	S. Hunt

Directory Path	\\ratiomelfp01\Traffic\16000-16500\16439T - 445-467 Blackburn Road Mount Waverley\Work\Reports\16439T-REP01-F01.docx
----------------	--

ratio:consultants pty ltd

This work is copyright. Apart from any use as permitted under Copyright Act 1968, no part may be reproduced without written permission of **ratio:consultants** pty ltd.

Disclaimer: neither **ratio:consultants** pty ltd nor any member or employee of **ratio:consultants** pty ltd takes responsibility in anyway whatsoever to any person or organisation (other than that for which this report is being prepared) in respect of the information set out in this report, including any errors or omissions therein. **ratio:consultants** pty ltd is not liable for errors in plans, specifications, documentation or other advice not prepared or designed by **ratio:consultants** pty ltd.

Table of contents:

Chapter / Section	Page No.
1 Introduction:	6
1.1 Background.....	6
2 Existing Conditions:	8
2.1 Site Locality.....	8
2.2 Road Network	10
2.3 Traffic Conditions	15
2.4 Existing Site Traffic Generation	19
2.5 Sustainable Transport	21
3 Proposal:	23
3.1 Overview.....	23
3.2 Access	23
4 Car Parking Assessment:	24
4.1 Clause 52.06 Car Parking Requirements	24
4.2 Car Parking Allocation	26
5 Access Arrangements and Car Parking Layout:.....	27
5.1 Clause 52.06-9 Design Standard Assessment.....	27
5.2 Other Traffic Matters	30
5.3 Swept Path Assessment.....	31
6 Bicycle Assessment:	32
6.1 Clause 52.34 Bicycle Parking Requirements	32
7 Loading Assessment:.....	33
7.1 Loading Arrangements and Ambulance Access	33
7.2 Waste Collection	33
8 Traffic Assessment:	34
8.1 Background.....	34
8.2 Traffic Generation and Distribution.....	36
8.3 Future Volumes.....	36
8.4 Future Conditions SIDRA Analysis	38
8.5 Summary	39
9 Conclusion:.....	40

Appendices:

Appendix A	Existing Conditions SIDRA Results
Appendix B	Swept Path Assessment
Appendix C	Bicycle Parking Specifications
Appendix D	Future Conditions SIDRA Results

List of Figures:

Figure 2.1: Site Location and Surrounding Road Network.....	8
Figure 2.2: Aerial Photograph of Site and Surrounds.....	9
Figure 2.3: View of Blackburn Road Facing North.....	10
Figure 2.4: View of Blackburn Road Facing South.....	10
Figure 2.5: View of Lemont Avenue Facing East.....	11
Figure 2.6: View of Lemont Avenue Facing West.....	11
Figure 2.7: View of Monash Freeway Off-Ramp Facing West.....	12
Figure 2.8: View of Pedestrian Crossing on the Left Turn Slip Lane.....	12
Figure 2.9: Intersection Locality.....	13
Figure 2.10: Intersection of Blackburn Road and Lemont Avenue.....	14
Figure 2.11: Existing Blackburn Road/Lemont Avenue Intersection Volumes.....	15
Figure 2.12: SIDRA Analysis Network Layout.....	16
Figure 2.13: Existing Lemont Avenue Site Access Point Volumes.....	19
Figure 2.14: Existing Site-Generated Volumes - Blackburn Road / Lemont Avenue.....	20
Figure 2.15: Local Public Transport Services.....	21
Figure 2.16: Local Cycling and Walking Network.....	22
Figure 4.1 Principle Public Transport Network Area Map – Monash Planning Scheme.....	25
Figure 8.1: Future Site Generated Volumes.....	36
Figure 8.2: Future Intersection Volumes.....	37

List of tables:

Table 2-1: Ratings of Degree of Saturation	16
Table 2-2: Existing Conditions SIDRA Results - AM Peak, Northbound	18
Table 2-3: Existing Conditions SIDRA Results - AM Peak, Southbound	18
Table 2-4: Existing Conditions SIDRA Results - PM Peak, Northbound	18
Table 2-5: Existing Conditions SIDRA Results - PM Peak, Southbound	19
Table 2-6 Existing Bruce County Motel – Peak Hour Site Generation 23/05/2018	19
Table 2.7: Convenient Public Transport Services	21
Table 4.1: Clause 52.06 Planning Scheme Assessment	25
Table 5-1: Design Standard 1 Assessment - Accessways	27
Table 5-2: Design Standard 2 Assessment – Car Parking Spaces	28
Table 5-3: Design Standard 3 Assessment - Gradients	29
Table 6-1: Bicycle Parking Statutory Requirements	32
Table 8-1: Development Summaries	35
Table 8-2: Total Traffic Movements	35
Table 8-3: AM Peak Hour Inbound and Outbound Movements	36
Table 8-4: PM Peak Hour Inbound and Outbound Movements	36
Table 8-5: Future Conditions SIDRA Results - AM Peak, Northbound	38
Table 8-6: Future Conditions SIDRA Results - AM Peak, Southbound	38
Table 8-7: Future Conditions SIDRA Results - PM Peak, Northbound	38
Table 8-8: Future Conditions SIDRA Results - PM Peak, Southbound	39

1 Introduction:

Ratio Consultants has been engaged by BC Mount Waverly Project Pty Ltd to assess the traffic and parking aspects of the proposed mixed-use development at 445-467 Blackburn Road, Mount Waverley.

The proposed development involves the construction of a multi-level building with two levels of associated basement car parking, comprising of the following:

- 186 independent living units (ILU), comprising;
 - 70 x 1-bed ILU;
 - 86 x 2-bed ILU; and
 - 30 x 3-bed ILU;
- Child care centre accommodating 80 children;
- A total of 252 car parking spaces provided within two levels of basement car parking, comprising;
 - 32 spaces for the use of the childcare centre and visitors to the ILUs within the upper basement level;
 - 88 spaces within the upper basement level for use of the ILUs;
 - 132 spaces within the lower basement level for use of the ILUs;
- A total of 58 bicycle parking spaces, comprising;
 - 38 bicycle parking spaces for residents provided within the upper basement level;
 - 20 bicycle parking spaces for visitors provided at ground level.
- A loading area is provided adjacent the main accessway, which accommodates loading by a small rigid vehicle (SRV) and may be utilised for loading of patients to and from an ambulance.

This report has been prepared to address the traffic and parking needs of the proposed development.

1.1 Background

An application for a planning permit for a proposed mixed use development comprising multiple dwellings, residential hotel, retirement village, childcare centre, medical centre, convenience shop and food and drink premises and a reduction in the car parking requirements, reduction in the loading and unloading requirements and reduction in bicycle facilities requirements at 445-467 Blackburn Road, Mount Waverley was lodged with Monash City Council on 23 March 2017.

A request for further information (RFI) was issued by Council following the 2017 town planning application, which was responded to by the applicant, inclusive of a Traffic Impact Assessment prepared by OneMileGrid.

It is noted that the current application, for which this report has been prepared, includes a revised development plan with an overall decrease to the number of different uses, lesser number of storeys, and fewer anticipated traffic movements than the original proposal.

A referral response from VicRoads requested further information and advised concerns regarding the capacity of the existing right-turn lane on Blackburn Road into Lemont Avenue, and the requirement for a left turn deceleration lane on Blackburn Road into Lemont Avenue.

The application was ultimately refused by Monash City Council on 31 January 2018. Subsequently, an appeal was lodged by the applicant with VCAT. Steve Hunt, of Ratio Consultants, acted as an expert witness for traffic engineering for the proposal.

A letter responding to the VicRoads' RFI dated 15th June 2018 was prepared by Ratio Consultants and forwarded to VicRoads, which provided a detailed traffic analysis. It is understood that, on the basis of the information provided, VicRoads informed VCAT that it did not object to the application and withdrew as a party to the hearing.

The matter subsequently proceeded to a full hearing before VCAT in August 2018. The application was ultimately refused at VCAT on a number of grounds, none of which relating to transport, car parking or access.

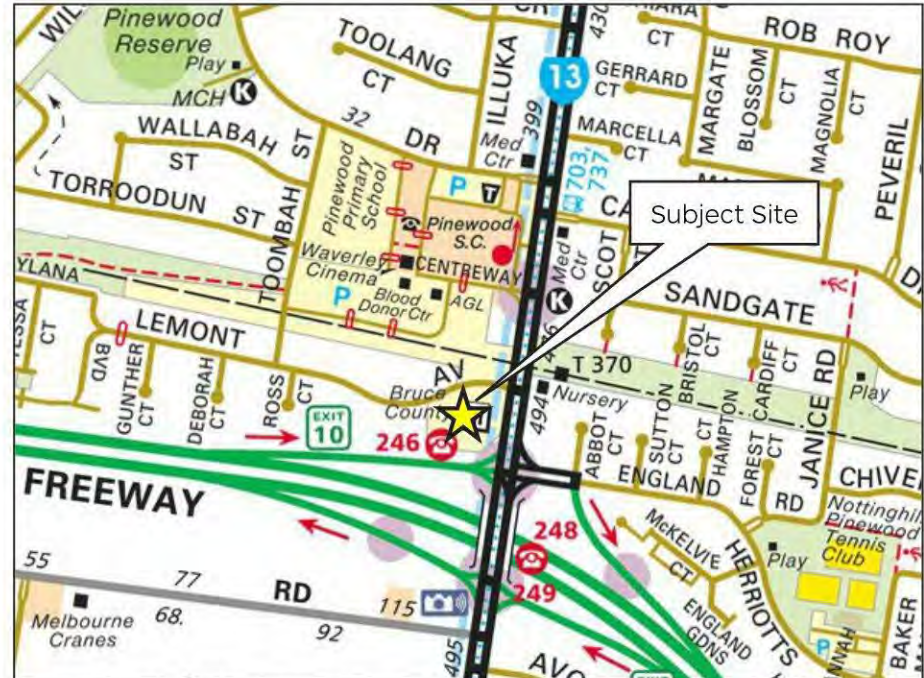
A new town planning application to Council is now proposed, with a revised development plan. This Traffic Impact Assessment has been prepared to accompany the new town planning application.

2 Existing Conditions:

2.1 Site Locality

The subject site is located on the southwest corner of Blackburn Road and Lemont Avenue. The site's location relative to the surrounding road network is displayed in Figure 2.1.

Figure 2.1: Site Location and Surrounding Road Network



Source: online.melway.com.au/melway

The subject site is bound by Lemont Avenue to the north, Blackburn Road to the east and the Monash Freeway off-ramp to the south. Each road frontage to the site measures as follows;

- Lemont Avenue frontage of 66.00 metres,
- Blackburn Road frontage of 57.10 metres,
- Monash Freeway off-ramp frontage of 70.47 metres.

Land uses in the vicinity of the site are a mix of residential, commercial and special use. Land to the east and west of the site is zoned for residential use (GRZ2), Blackburn Road and the Monash Freeway are designated as Road Zones (RDZ1) in the ownership and care of VicRoads and the land to the south of the freeway is a mixture of special use zone (SUZ6) and general residential.

The site is currently occupied by a number of buildings ranging from single to double storey which collectively operate as the Hotel Bruce Country comprising a hotel, wine bar, conference facilities, and short stay accommodation. 87 car parking spaces are provided on-site to the existing use. The existing car park is accessed via double-width crossover to Lemont Avenue at the site's northern boundary.

Some key non-residential land within the vicinity of the site include;

- Pinewood Shopping Village immediately north of the subject site,
- Pinewood Primary School 400 metres to the north,
- Pinewood tennis club 510 metres to the east,
- Mount Waverley Business Hub 820 Metres to the southwest,
- Waverly Private Hospital 1.0 kilometres to the north.

An aerial view of the site in context with its surroundings is displayed in Figure 2.2.

Figure 2.2: Aerial Photograph of Site and Surrounds



Source: maps.au.nearmap.com

2.2 Road Network

Blackburn Road

Blackburn Road is a Primary Arterial Road in a north-south alignment, owned and operated by VicRoads.

In vicinity of the site, Blackburn Road comprises a dual carriageway measuring approximately 23.5 metres in width with three lanes of traffic in each direction. Dedicated right turn lanes on Blackburn Road are provided within the width of the centre median to minor roads. Concrete footpaths are provided on both sides of the road.

Direct lot access is provided to residential dwellings in the vicinity of the site on both the east and west sides of the road.

Blackburn Road is controlled by a 70 km/h speed limit in the vicinity of the subject site.

A view of Blackburn Road facing north and south is displayed in Figure 2.3 and Figure 2.4, respectively.

Figure 2.3: View of Blackburn Road Facing North



Figure 2.4: View of Blackburn Road Facing South



Lemont Avenue

Lemont Avenue is a Local Road owned by Monash City Council and functions as a Connector Street, with its primary function being to provide a connection to local residential Access Streets.

Lemont Avenue comprises a single carriageway of approximately 7.0 metres in width, accommodating two way traffic.

At the frontage of the subject site, 'No Stopping' signage is in place on both sides of Lemont Avenue. West of the subject site, the following parking restrictions are in place on each side of Lemont Avenue;

- Permit Only Parking; 8am – 6pm Monday to Friday (northern side),
- 2P; 8am – 6pm Monday to Friday (southern side).

Lemont Avenue is subject to a default speed limit of 50 km/h.

A view of Blackburn Road facing east and west is displayed in Figure 2.5 and Figure 2.6, respectively.

Figure 2.5: View of Lemont Avenue Facing East



Figure 2.6: View of Lemont Avenue Facing West



Monash Freeway and Off-Ramp

The Monash Freeway off-ramp comprises of three lanes of eastbound traffic at the frontage of the subject site, two right turn lanes, and one through lane. A left turn slip lane is provided directly to Blackburn Road. A pedestrian zebra-crossing has been newly installed to the left turn slip lane.

A speed limit of 70 km/h is in place on the off-ramp prior to the beginning of the of the left turn slip lane.

A view of the Monash Freeway off-ramp is displayed in Figure 2.7, and a view of the pedestrian crossing in Figure 2.8.

Figure 2.7: View of Monash Freeway Off-Ramp Facing West



Figure 2.8: View of Pedestrian Crossing on the Left Turn Slip Lane



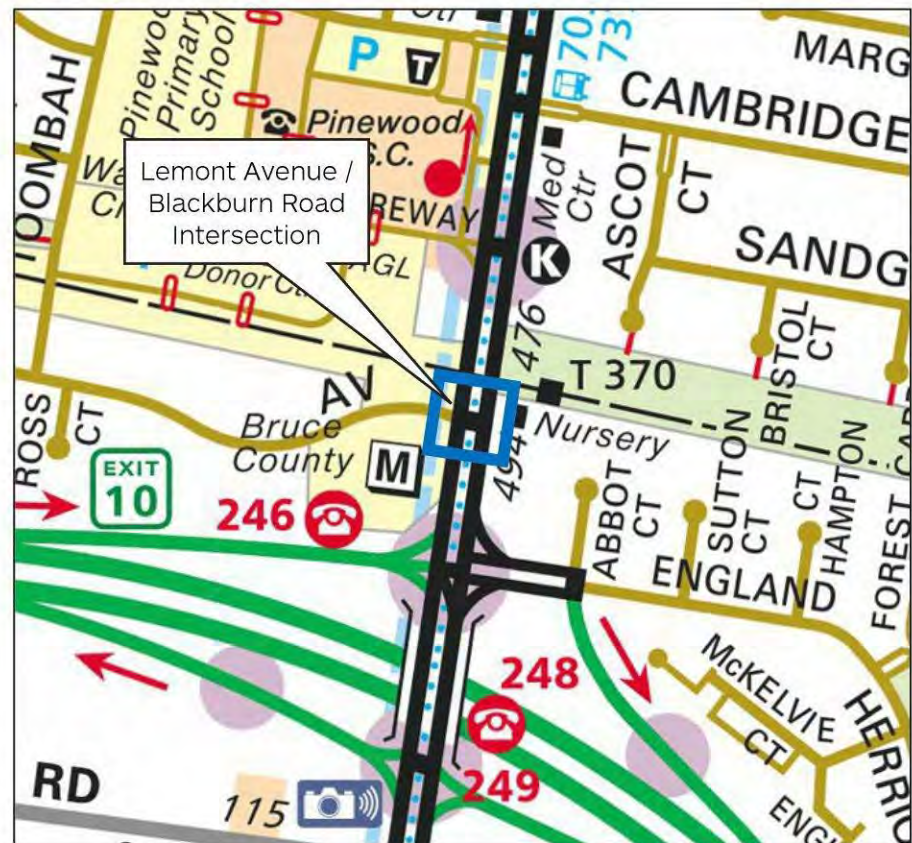
Intersection of Blackburn Road and Lemont Avenue

The intersection of Blackburn Road and Lemont Avenue in Mount Waverley is a linemarked give way intersection situated approximately 166 metres north of the Monash Freeway.

Located approximately 90 metres south of the Blackburn Road and Lemont Avenue intersection is the signalised intersection of Blackburn Road, the Monash Freeway off-ramp and England Road.

The locality of the Blackburn Road and Lemont Avenue intersection with respect to the adjacent road network is displayed in Figure 2.9.

Figure 2.9: Intersection Locality



Source: online.melway.com.au/melway/

The left turn slip lane is provided directly to Blackburn Road, from the Monash off-ramp, tapers over a distance of 55 metres before merging with the northbound traffic lanes prior to the intersection of Lemont Avenue and Blackburn Road. Priority is afforded to the northbound traffic on Blackburn Road, delineated by a dashed holding line as shown in Figure 2.10.

Figure 2.10: Intersection of Blackburn Road and Lemont Avenue



Source: maps.au.nearmap.com

Northbound traffic in Blackburn Road seeking to turn left into Lemont Avenue is currently required to decelerate within the kerbside through lane, with traffic entering Lemont Avenue from the Monash Freeway off-ramp required to merge with northbound traffic in Blackburn Road prior to turning left into Lemont Avenue.

Consistent to all intersecting streets along Blackburn Road, there is no left turn deceleration lane on the approach to Lemont Avenue, with the kerbside lane in both directions operating as a combined bus lane/auxiliary lane, catering for a mix of traffic including traffic deceleration to turn left into abutting streets and driveways, bus stops and through traffic.

2.3 Traffic Conditions

Blackburn Road / Lemont Avenue Intersection

Turning movement surveys were commissioned by Ratio Consultants on Wednesday 23 May 2018 at the following locations;

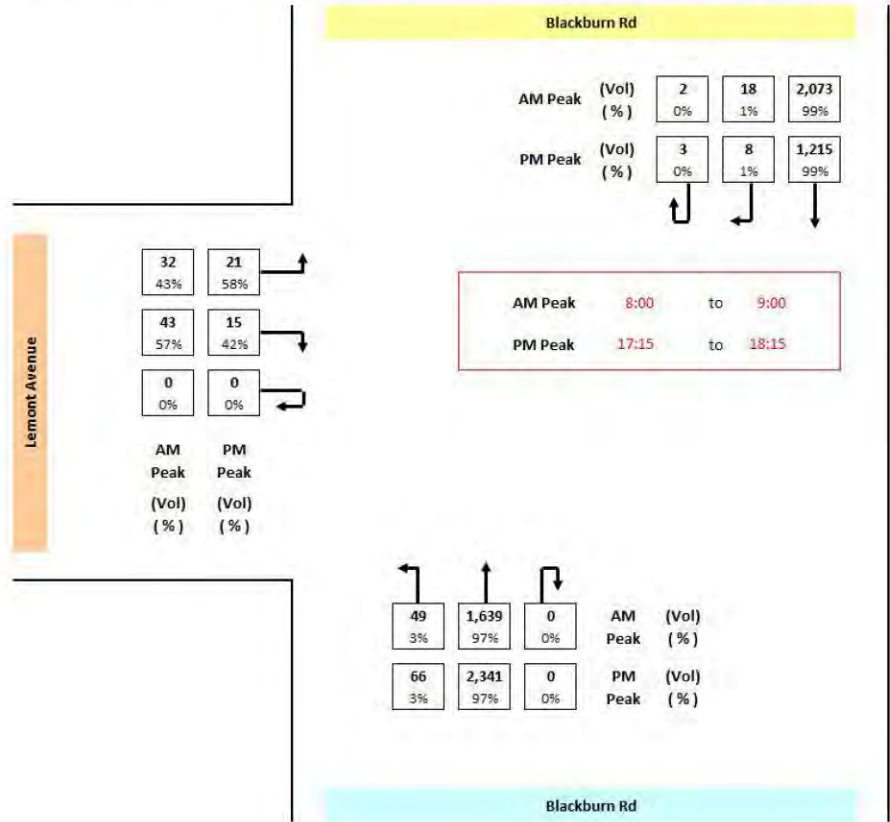
- Blackburn Road / Lemont Avenue intersection,
- Lemont Avenue site access point.

Surveys were undertaken between 7:00am and 10:00am, and from 3:00pm to 7:00pm in order to capture each of the AM and PM peak periods.

The AM peak hour was found to be from 8:00am to 9:00am, and the PM peak hour from 5:15pm to 6:15pm.

The surveyed peak hour volumes are displayed in Figure 2.11.

Figure 2.11: Existing Blackburn Road/Lemont Avenue Intersection Volumes

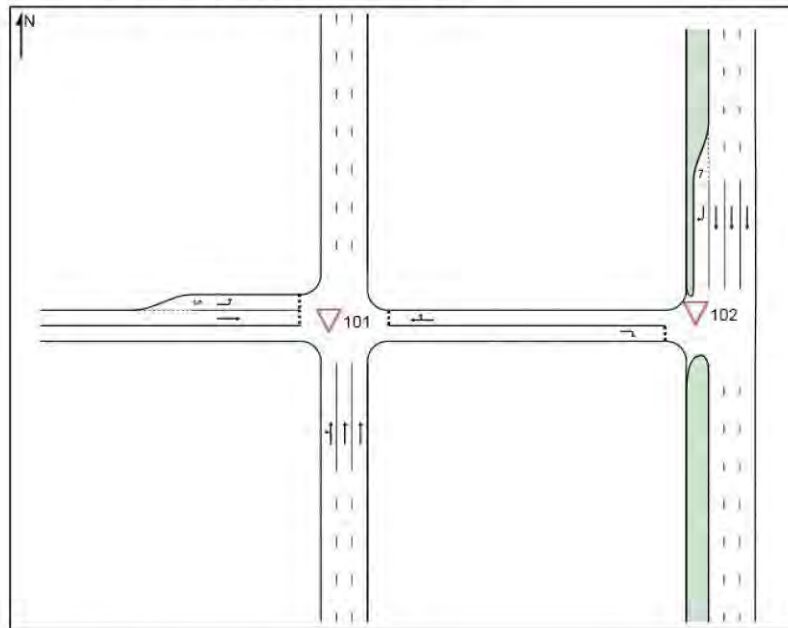


SIDRA Analysis

The intersection of Blackburn Road and Lemont Avenue includes a staged right turn. In order to simulate the staged right turn queueing capacity in SIDRA, the intersection has been modelled as a SIDRA network as presented in Figure 2.12. This is the recommended method by SIDRA Solutions to model a staged right turn intersection.

The combined length of the SIDRA network model's right turn lane on Blackburn Road in the southbound direction, plus the westbound lane of the staged right turn, is 47 metres. This is equal to the length of the Blackburn Road right turn lane into Lemont Avenue under existing conditions.

Figure 2.12: SIDRA Analysis Network Layout



Key SIDRA Parameters

The key parameters used to determine the operational capacity of an intersection are queue length, average delay and degree of saturation (or volume to capacity ratio).

Degree of Saturation is a ratio of arrival (or demand) flow to capacity. Degrees of saturation above 1.0 represent oversaturated conditions and degrees of saturation below 1.0 represent undersaturated conditions. The operational rating associated with the degree of saturation is summarised in Table 2-1.

Table 2-1: Ratings of Degree of Saturation

Degree of Saturation (DOS)	Rating
Up to 0.6	Excellent
0.61 – 0.70	Very Good
0.71 – 0.80	Good
0.81 – 0.90	Fair
0.91 – 1.00	Poor
Greater than 1.00	Very poor

Although operating conditions with a degree of saturation around 1.00 are undesirable, it is acknowledged that this level of congestion is typical of many metropolitan intersections during the AM and PM peak hours.

The 95th percentile queue length is the value below which 95 percent of all observed cycle queue lengths fall, or 5 percent of all observed queue lengths exceed.

Average Delay is the average time, in seconds, that all vehicles making a particular movement can expect to wait at an intersection.

Gap Calibration

In order to calibrate the SIDRA model to more accurately represent the surveyed and observed existing conditions, Ratio Consultants collected traffic gap data on Wednesday 23 May 2018 from the time of 7:00am to 10:00am, and 3:00pm to 7:00pm at the intersection of Lemont Avenue and Blackburn Road.

Gaps in the traffic stream were counted and timed with consideration to all three lanes of northbound traffic being clear.

Austrroads Guide to Road Design Part 4A provides critical acceptance gaps and follow-up headways for movements to and from a major road according to the number of lanes on the major road.

As the intersection of Lemont Avenue and Blackburn Road includes a staged right turn, the right turn movement both to and from Lemont Avenue is considered to be a 'crossing movement' on Table 3.5 from the Austrroads Guide to Road Design Part 4A. The critical gap (t_a) and follow-up headway (t_f) of a vehicle crossing three lanes of traffic as provided by Austrroads Table 3.5 is as follows:

- $t_a = 6$ seconds,
- $t_f = 3$ seconds.

By adopting the above default gap and headway values, the gap analysis survey data showed capacity of the right turn into Lemont Avenue and the right turn out of Lemont Avenue to be:

- 383 vehicles in the AM Peak Hour, and
- 221 vehicles in the PM Peak Hour.

In order to calibrate the SIDRA model for the intersection of Lemont Avenue and Blackburn Road to more closely reflect the above capacities surveyed under existing conditions, the critical gap and follow-up headway was reduced by 30 percent in the model. The adopted gap and headway values are; $t_a = 4$ seconds and $t_f = 2$ seconds. The resulting capacities in SIDRA for the right turn movements to and from Lemont Avenue are as follows:

- 282 vehicles in the AM Peak Hour, and
- 92 vehicles in the PM Peak Hour.

It is noted that the above right turn capacities calculated in SIDRA are less than the actual capacities calculated through the gap acceptance data, and are therefore considered conservative.

The existing volumes presented in Figure 2.11 were applied to the intersection layout presented in Figure 2.12. A summary of the AM peak hour results is presented in Table 2-2 and Table 2-3.

A detailed summary of the SIDRA results is presented in Appendix A.

Table 2-2: Existing Conditions SIDRA Results - AM Peak, Northbound

Approach	Movement	AM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
South: Blackburn Road (northbound)	Left	0.31	0	6
	Thru	0.31	0	0
East: Staged right turn	Thru	0.08	2	16
	Right	0.08	2	31
West: Lemont Avenue	Left	0.05	1	9
	Thru	0.22	4	19
Intersection		0.31		

Table 2-3: Existing Conditions SIDRA Results - AM Peak, Southbound

Approach	Movement	AM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
North: Blackburn Road (southbound)	Thru	0.38	0	0
	Right	0.01	0	6
West: Staged right turn	Right	0.51	12	60
Intersection		0.51		

A summary of the PM peak hour results is presented in Table 2-4 and Table 2-5. A detailed summary of the SIDRA results is presented in Appendix A.

Table 2-4: Existing Conditions SIDRA Results - PM Peak, Northbound

Approach	Movement	PM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
South: Blackburn Road (northbound)	Left	0.45	0	6
	Thru	0.45	0	0
East: Staged right turn	Thru	0.19	4	48
	Right	0.19	4	112
West: Lemont Avenue	Left	0.05	1	13
	Thru	0.17	4	47
Intersection		0.45		

Table 2-5: Existing Conditions SIDRA Results - PM Peak, Southbound

Approach	Movement	PM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
North: Blackburn Road (southbound)	Thru	0.22	0	0
	Right	0.01	0	6
West: Staged right turn	Right	0.05	1	12
Intersection		0.22		

The above results show that the intersection of Lemont Avenue and Blackburn Road is operating well under capacity under existing conditions and the right turn queue length comfortably contained within the 47-metre length of the lane. This is consistent with on-site observations.

2.4 Existing Site Traffic Generation

Traffic surveys undertaken on Wednesday 23 May 2018 at the existing access point to the subject site showed the following traffic movements into and out of the site from Lemont Avenue displayed in Figure 2.13 and summarised in Table 2-6.

Figure 2.13: Existing Lemont Avenue Site Access Point Volumes

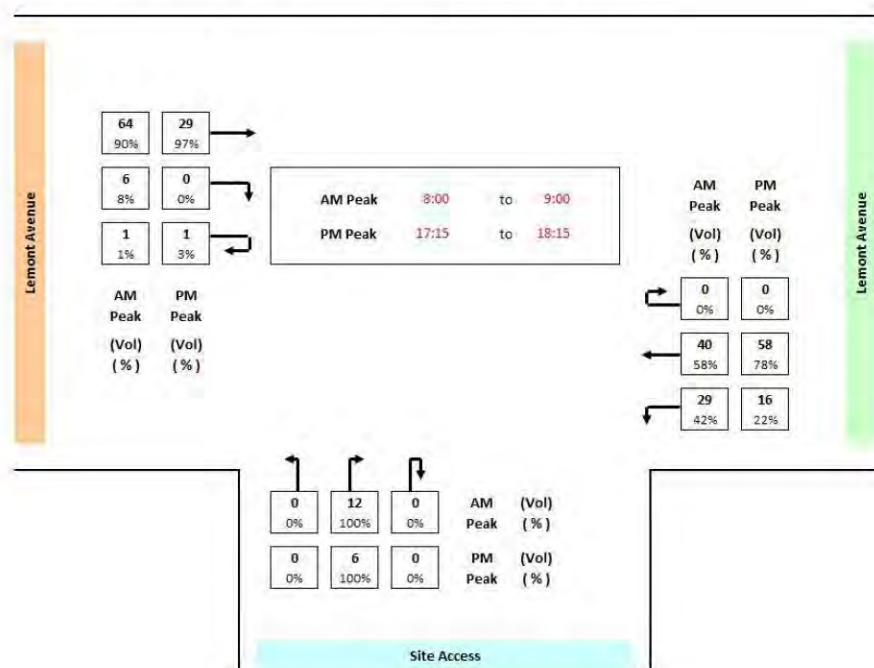


Table 2-6 Existing Bruce County Motel – Peak Hour Site Generation 23/05/2018

	In	Out	Total
AM Peak	29	12	41 vph
PM Peak	16	6	38 vph



Ratio Consultants has been advised that, on the day of the survey, the following activity events occurred on the site on the day of the survey:

Accommodation

- In House guests - 19
- Departing guests – 9
- Arriving Guests – 12

Conference

- 2 full day conferences
- 1 half day conference
- 56 attendees in total

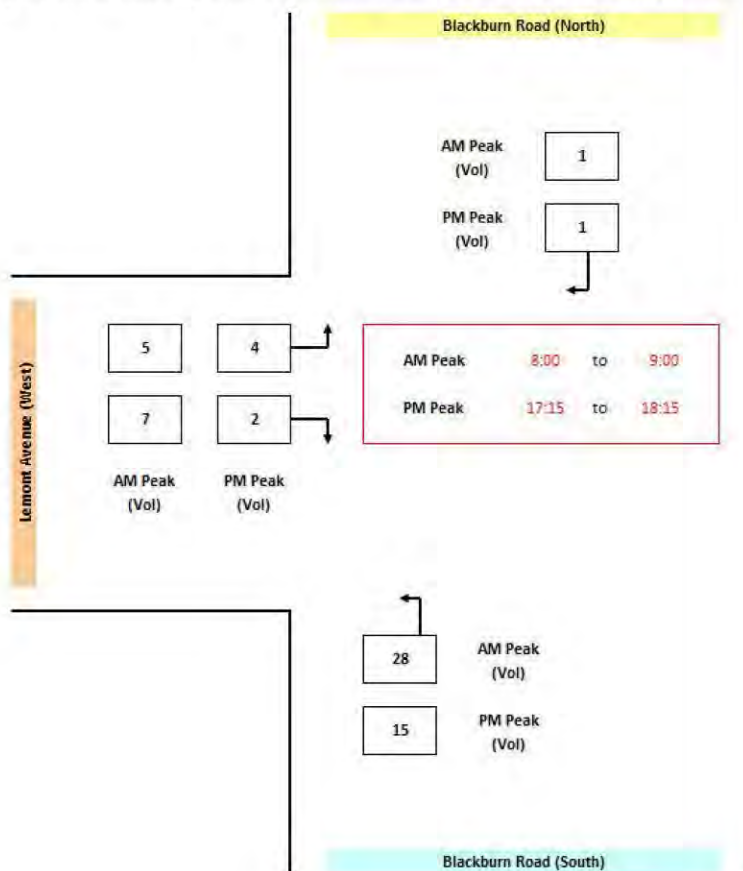
Restaurant

- Lunch - 23 patrons
- Dinner – 30 patrons

It is noted that, while alternate connection to the arterial network is available from the subject site via the local street network to the west and north, all traffic accessing the subject site approached and departed via the adjacent Blackburn Road / Lemont Avenue intersection.

Based on the directional splits of traffic entering and exiting Lemont Avenue from Blackburn Road, the site generated volumes through the intersection of Blackburn Road and Lemont Avenue are displayed in Figure 2.14.

Figure 2.14: Existing Site-Generated Volumes - Blackburn Road / Lemont Avenue



2.5 Sustainable Transport

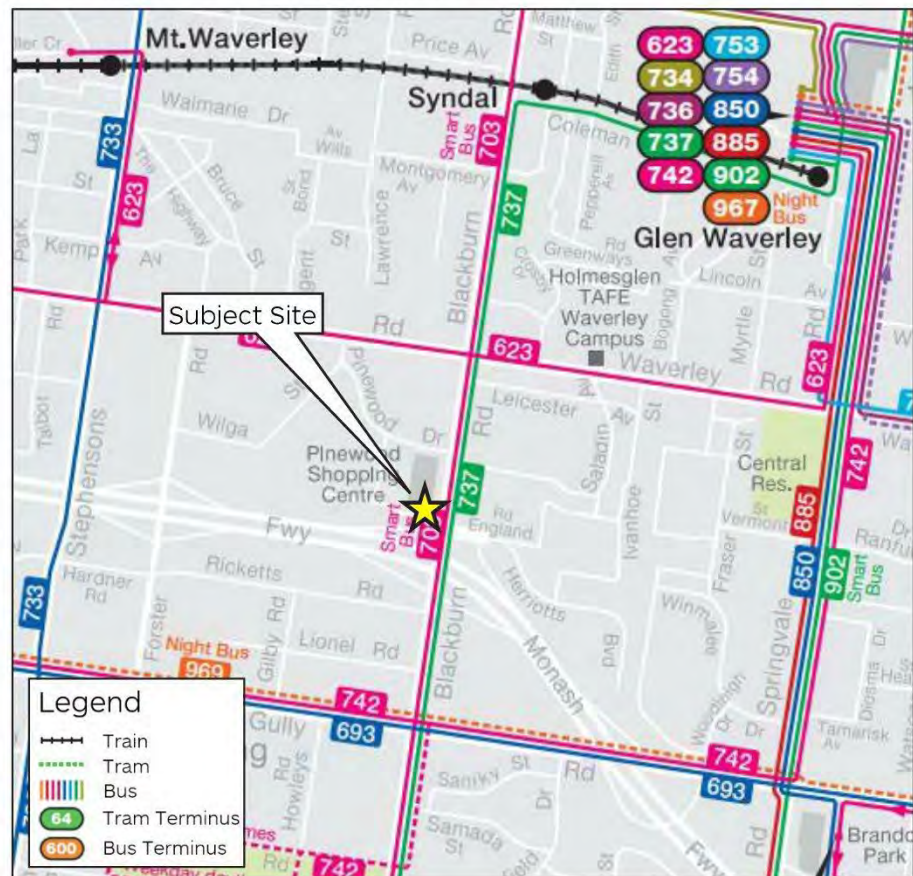
Public Transport

The subject site has access to public transport with two bus routes operating along the Blackburn Road site frontage within the Principal Public Transport Network. The public transport services located within convenient walking distance of the site are detailed below in Table 2.7 and displayed graphically in Figure 2.15.

Table 2.7: Convenient Public Transport Services

Service	Route Number	Description	Transport Services	Walking Distance to Nearest Stop
Bus	703	Middle Brighton to Blackburn via Bentleigh, Clayton, Monash University	Blackburn Road, Pinewood Shopping Centre	250 Metres ~3 minutes walk
	737	Croydon to Monash University via Boronia, Knox City Shopping Centre, Glen Waverley		

Figure 2.15: Local Public Transport Services



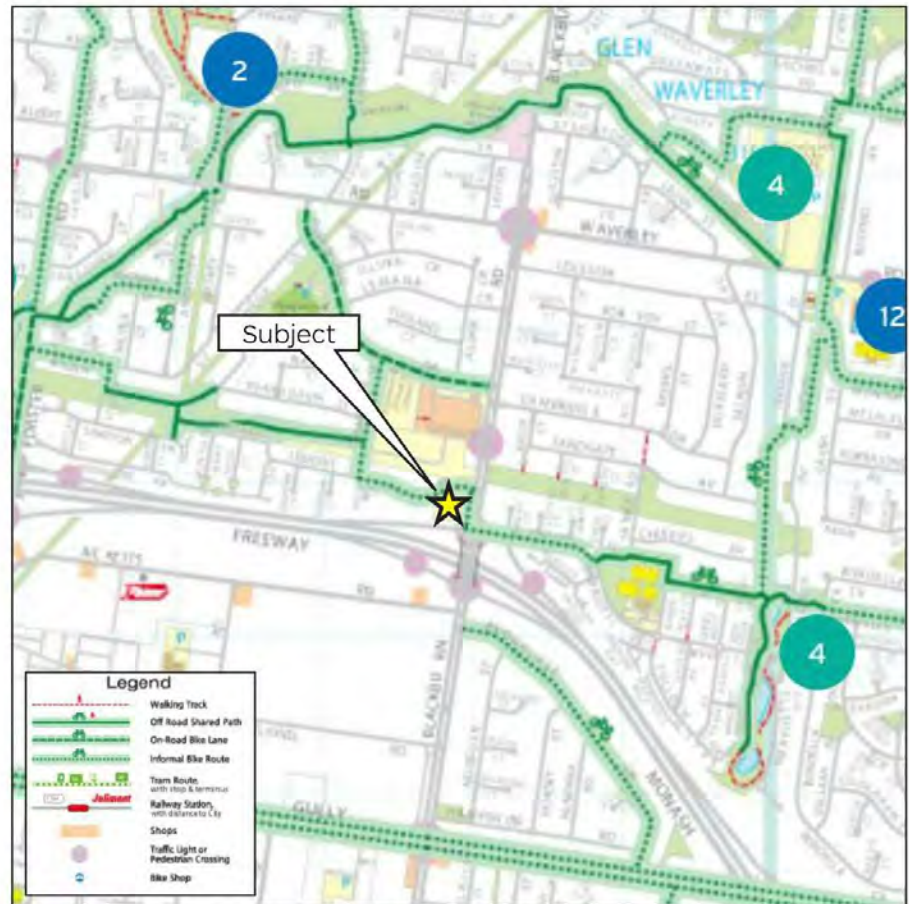
Source: ptv.vic.gov.au

Bicycle Network

Some cycling infrastructure is available in the vicinity of the site, with the Scotchmans Creek Trail located to the west of the subject site and the local road network providing an informal bicycle network throughout the neighbouring residential subjects.

The bicycle network of the Monash City Council located in the vicinity of the subject site is displayed in Figure 2.16.

Figure 2.16: Local Cycling and Walking Network



Source: www.monash.vic.gov.au

3 Proposal:

3.1 Overview

The subject site located at 445-467 Blackburn Road in Mount Waverley is proposed for a multi-level mixed-use development with two levels of associated basement car parking, comprising of the following:

- 186 independent living units (ILU), comprising;
 - 70 x 1-bed ILU;
 - 86 x 2-bed ILU; and
 - 30 x 3-bed ILU;
- Child care centre accommodating 80 children;
- A total of 252 car parking spaces provided within two levels of basement car parking, comprising;
 - 32 spaces for the use of the childcare centre and visitors to the ILUs within the upper basement level;
 - 88 spaces within the upper basement level for use of the ILUs;
 - 132 spaces within the lower basement level for use of the ILUs;
- 58 bicycle parking spaces;
 - 38 bicycle parking spaces for residents provided within the upper basement level;
 - 20 bicycle parking spaces for visitors provided at ground level.
- A loading area is provided adjacent the main accessway, which accommodates loading by a small rigid vehicle (SRV) and may be utilised for loading of patients to and from an ambulance.

3.2 Access

Vehicular access is proposed to be provided via a new double-vehicle width crossover to/from Lemont Avenue at the western end of the Lemont Avenue site frontage.

The existing double-vehicle width crossover to the eastern end of the Lemont Avenue site frontage is proposed to be closed, with verge, channel and kerb reinstated to the satisfaction of the responsible authority.

4.1 Clause 52.06 Car Parking Requirements

Parking requirements for a range of uses are set out under Clause 52.06 of the Monash Planning Scheme. The purpose of the Clause, among other things, is:

- To ensure that car parking is provided in accordance with the State Planning Policy Framework and Local Planning Policy Framework.
- To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.
- To support sustainable transport alternatives to the motor car.
- To promote the efficient use of car parking spaces through the consolidation of car parking facilities.
- To ensure that car parking does not affect the amenity of the locality.
- To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.

Table 1 of Clause 52.06 sets out the car parking requirement that applies to a use listed in the Table. A car parking requirement in Table 1 is calculated by multiplying the figure in Column A or Column B (which ever applies) by the measure in Column C.

Column A applies unless Column B applies.

Column B applies if:

- Any part of the land is identified as being within the Principal Public Transport Network Area as shown on the Principal Public Transport Network Area Maps (State Government of Victoria, 2018); or
- A schedule to the Parking Overlay or another provision of the Planning Scheme specifies that Column B applies.

Additionally, the car parking requirement specified for a use listed in Table 1 does not apply if:

- A car parking requirement for the use is specified under another provision of the Planning Scheme: or
- A schedule to the Parking Overlay specifies the number of car parking spaces required for the use.

The uses are not subject to another provision of the Planning Scheme and the subject site is not subject to a Parking Overlay.

Figure 4.1 shows that the subject site is located within the Principal Public Transport Network Area and therefore the development shall be assessed against Column B of Table 1 of Clause 52.06-5, as set out in Table 4.1.

Figure 4.1 Principle Public Transport Network Area Map – Monash Planning Scheme



Source: planningschemes.dpcd.vic.gov.au

Table 4.1: Clause 52.06 Planning Scheme Assessment

Land Use	Type	Size and Number	Statutory Parking Rate (Column B)	Statutory Requirement
Retirement Village (ILU)	1-bedroom	70 x one-bedroom units	1 space per dwelling	70 spaces
	2-bedroom	86 x two-bedroom units	1 space per dwelling	86 spaces
	3-bedroom	30 x three-bedroom units	2 spaces per dwelling	60 spaces
	Visitors	186 units	Nil	0 spaces
Childcare Centre		80 children	0.22 spaces to each child	17 spaces
Total				233 spaces

Therefore, on the basis of the above assessment, the proposal has a statutory requirement to provide a total of **233** car parking spaces; comprising 216 spaces for the use of independent living units and 17 spaces for the use of the childcare centre. The proposal has no statutory requirement to provide car parking spaces for visitors on site.

The proposal includes a total of **252** car parking spaces with the two levels of basement car park, exceeding the statutory requirement.

As such, a dispensation for car parking is not sought, or required in association with the application.

4.2 Car Parking Allocation

It is proposed to provide car parking for the proposed development within a two level basement car park, with

- the upper basement level (Basement 1) containing a total of **120** spaces;
 - a total of **32** spaces are provided within a semi-public area of the basement, which are to be utilised by the childcare use and visitors to the ILUs,
 - the remaining **88** spaces within Basement 1 are secured by a security door and are to be assigned to use of the ILUs,
- the lower level (Basement 2) containing **132** spaces, all of which are to be dedicated to the ILUs.

Therefore, a total of 220 car parking spaces are to be provided to the ILUs, exceeding the statutory requirement to of 216 spaces for the ILUs.

The development does not have a statutory requirement to provide visitor car parking. Nonetheless, the proposal seeks to provide for use of up to 15 spaces within the shared semi-public car park area (to be shared with the childcare use).

As such, the allocation and provision of car parking exceeds the minimum statutory requirements and is therefore considered satisfactory.

5 Access Arrangements and Car Parking Layout:

5.1 Clause 52.06-9 Design Standard Assessment

The proposed access arrangements and car parking layouts have been designed in accordance with the objectives and design requirements of Clause 52.06-9 of the Monash Planning Scheme, AS/NZS 2890.6:2009 and the relevant sections of AS/NZS 2890.1:2004.

An assessment against the relevant design standards of Clause 52.06-9 of the Planning Scheme is provided below:

Design Standard 1 – Accessways

Design Standard 1 of Clause 52.06-9 relates to the design of accessways. The requirements of Design Standard 1 are assessed against the proposal in Table 5-1.

Table 5-1: Design Standard 1 Assessment - Accessways

Requirement	Comments
Must be at least 3m wide.	Satisfied – The access ramps between Ground Level, Basement 1 and Basement 2 have been provided with a minimum width of 5.5 metres. Accessways which provide direct access to car parking spaces are provided at a width of 6.4 metres within the two basement levels.
Have an internal radius of at least 4m at changes of direction or intersection or be at least 4.2m wide.	Satisfied – the access ramp from Basement 1 to Basement 2 is provided with an internal radius of 4.5 metres and widens to 6.5 metres at the change of direction. All other accessways within the basement levels are provided at a width of 6.4m at change of directions.
Allow vehicles parked in the last space of a dead-end accessway in public car parks to exit in a forward direction with one manoeuvre.	Satisfied – the dead-end aisle within Basement 1 is provided with a blind aisle extension of 640mm. The single car parking space at the end of the aisle is dedicated as Small Car Only, in order to allow manoeuvrability to and from the space. Within Basement 2, the dead end aisle beneath the top of the ramp is provided with a blind aisle extension of 4.1 metres, which is well in excess of the 1.0 metre requirement as outlined in AS2890.1.
Provide at least 2.1m headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8m.	Satisfied – Minimum headroom clearance of 2.2 metres ¹ has been provided to all access ramps. Refer to Appendix B for the Swept Path Assessment inclusive of the Vertical Clearance Check. Vehicle circulation areas throughout the basement levels has been provided at a minimum of 2.5 metres headroom.
If the accessway serves four or more car spaces or connects to a road in a Road Zone, the accessway must be designed so that cars can exit the site in a forward direction.	Satisfied - Vehicles are able to exit the site in a forward direction.

¹ Minimum requirement under AS/NZS 2890.6:2009

Requirement	Comments
Provide a passing area at the entrance at least 5m wide and 7m long if the accessway serves ten or more car parking spaces and is either more than 50m long or connects to a road in a Road Zone.	Satisfied – The main accessway leading to the basement car park has been designed to facilitate two-way simultaneous movements to/from Lemont Avenue.
Have a corner splay or area at least 50% clear of visual obstructions extending at least 2m along the frontage road from the edge of an exit lane and 2.5m along the exit lane from the frontage, to provide a clear view of pedestrians on the footpath of the frontage road. The area clear of visual obstructions may include an adjacent entry or exit lane where more than one lane is provided, or adjacent landscaped areas, provided the landscaping in those areas is less than 900mm in height.	Satisfied – A pedestrian sightline splay measuring 2.0 metres along the frontage road and 2.5 metres along the accessway has been provided to the exit lane of the accessway.
If an accessway to four or more car parking spaces is from land in a Road Zone, the access to the car spaces must be at least 6m from the road carriageway.	Satisfied – Although Lemont Avenue is not a Road Zone, all car parking spaces are located greater than 6 metres from Lemont Avenue.

Design Standard 2 – Car Parking Spaces

Design Standard 2 of Clause 52.06-9 relates to the design of car parking spaces. The requirements of Design Standard 2 are assessed against the proposal in Table 5-2.

Table 5-2: Design Standard 2 Assessment – Car Parking Spaces

Requirement	Comments
Car parking spaces and accessways must have the minimum dimensions as outlined in Table 2 of Design Standard 2.	Satisfied – Typical spaces are provided at a width of 2.6 metres and a length of 4.9 metres, accessed via a minimum 6.4 metre wide aisle.
A wall, fence, column, tree, tree guard or any other structure that abuts a car space must not encroach into the area marked 'clearance required' on Diagram 1 of Design Standard 2, other than: <ul style="list-style-type: none"> - A column, tree or tree guard, which may project into a space if it is within the area marked 'tree or column permitted' on Diagram 1. - A structure, which may project into the space if it is at least 2.1m above the space. 	Satisfied – All car spaces located adjacent to a wall or other structure have been provided with a minimum 300 mm clearance to that object.
Car spaces in garages or carports must be at least 6m long and 3.5m wide for a single space and 5.5m wide for a double space measured inside the garage or carport.	N/A – No garages are proposed
Where parking spaces are provided in tandem (one space behind the other) an additional 500mm in length must be provided between each space.	N/A – No tandem spaces are proposed.

Requirement	Comments
Where two or more car parking spaces are provided for a dwelling, at least one space must be under cover.	Satisfied – All of the car parking spaces are provided within the basement.
Disabled car parking spaces must be designed in accordance with Australian Standard AS2890.6-2009 (disabled) and the Building Code of Australia. Disabled car parking spaces may encroach into an accessway width specified in Table 2 of Design Standard 2 by 500mm.	Satisfied – The accessible space and adjacent shared zone have been provided in accordance with AS/NZS 2890.6:2009 at a width of 2.6 metres (car space and shared zone) and a length of 5.4 metres (of which 500mm encroaches into the accessway), accessed from a 6.4 metre-wide aisle.

Design Standard 3 – Gradients

Design Standard 3 of Clause 52.06-9 relates to the design of gradients. The requirements of Design Standard 3 are assessed against the proposal in Table 5-3.

Table 5-3: Design Standard 3 Assessment - Gradients

Requirement	Comments
Accessway grades must not be steeper than 1:10 (10%) within 5m of the frontage to ensure safety for pedestrians and vehicles. The design must have regard to the wheelbase of the vehicle being designed for; pedestrian and vehicular traffic volumes; the nature of the car park; and the slope and configuration of the vehicle crossover at the site frontage. This does not apply to accessways serving three dwellings or less.	<p>Satisfied – The ramps have been provided with the following ramp profiles in accordance with Clause 52.06:</p> <p>G-B1</p> <ul style="list-style-type: none"> – Initial 1:33 gradient for 5.57 metres – Transition gradient of 1:8 for 2.0 metres – Midblock gradient of 1:5 for 16.3 metres – Final 1:8 gradient for 2.0 metres <p>B1-B2 (inside kerb)</p> <ul style="list-style-type: none"> – Initial 1:8 gradient for 2.0 metres – Midblock gradient of 1:5 for 11.5 metres – Final 1:8 gradient for 2.0 metres <p>B1-B2 (outside kerb)</p> <ul style="list-style-type: none"> – Initial 1:8 gradient for 2.0 metres; – Midblock gradient of 1:5 for 7.05 metres – Midblock gradient of 1:11.5 for 5.89 metres – Final 1:8 gradient for 2.0 metres. <p>The crossfall between kerbs of the B1-B2 ramp does not exceed 1:20, in accordance with AS2890.1.</p>
Where the difference in grade between two sections of ramp or floor is greater than 1:8 (12.5%) for a summit grade change, or greater than 1:6.7 (15%) for a sag grade change, the ramp must include a transition section of at least 2 metres to prevent vehicles scraping or bottoming.	Satisfied – Appropriate transition sections have been provided to prevent scraping or bottoming.
Plans must include an assessment of grade changes of greater than 1:5.6 (18%) or less than 3 metres apart for clearances, to the satisfaction of the responsible authority.	A ground clearance assessment has been conducted using a B99 design vehicle and a 6.4 metres mini rear-loader waste vehicle, as presented in Appendix B.

Requirement	Comments
Ramps (except within 5 metres of the frontage) must have the maximum grades as outlined in Table 3 of Design Standard 3 and be designed for vehicles travelling in a forward direction.	Satisfied - The proposed grades are in accordance with Table 3 of Design Standard 3, with grades no steeper than 1:5.

5.2 Other Traffic Matters

Security Gate

As discussed in Section 4.2, a semi-public component of the Basement 1 car park is to be provided for use of the childcare centre and visitors to the ILUs.

A security gate is proposed to control access and provide security to the portion of the upper basement car park dedicated to the ILUs, and all of the lower basement car park. Residents and staff members with allocated parking spaces within the secured portion of the basement car park level, will have convenient access via remote control units (or similar).

Proposed Crossover

Vehicular access is proposed to be provided via a new double-vehicle width crossover to/from Lemont Avenue at the western end of the Lemont Avenue site frontage.

The crossover has been designed in general accordance with Monash City Council's standard drawing for vehicle crossings. The crossover design is subject to approval by the responsible authority.

A clearance of 1.0 metres has been provided to the existing power pole to the west of the proposed crossover, and the edge of the crossover, in accordance with the requirements of Monash City Council.

The existing double-vehicle width crossover to the eastern end of the Lemont Avenue site frontage is proposed to be closed, with verge, channel and kerb reinstated to the satisfaction of the responsible authority.

Landscaping

It is understood that a landscape plan has been prepared by Land Design Partnership to accompany the town planning application.

Ratio has been advised that landscaping provided within the pedestrian sightline triangle on the western side of the main accessway has been provided at a height less than 900mm. Therefore, the requirements of Clause 52.06 for accommodating pedestrian sightline triangles are considered to be satisfied.

Additionally, Ratio has been advised that the tree indicated on the landscape plan immediately adjacent the turnaround area of the loading bay will not encroach on the 3.5 metre vertical clearance of the loading and turnaround area. On this basis, the landscaping response is considered satisfactory with respect to traffic matters.

5.3 Swept Path Assessment

An assessment (refer to Appendix B) of the ground clearance along the basement ramp has been conducted using the 'Autodesk Vehicle Tracking' software. The B99 (99.8th percentile car) was used in the assessment and it was found that the B99 vehicle could gain access (ingress and egress) in a satisfactory manner without scraping.

Additionally, an assessment (refer to Appendix B) of the accessibility to/from the site and critical parking bays using the 'Autodesk Vehicle Tracking' software has been conducted. The B99 and B85 (99th and 85th percentile car) were used in the assessment and it was found that the site access arrangements and each space could be accessed (ingress and egress) in a satisfactory manner, with vehicles able to enter and exit the site in a forwards direction.

Some corrective manoeuvres may be required, which is in accordance with AS/NZS2890.1:2004 (Table 1.1). This table specifies that three-point turn movements to enter and exit 90 degree parking spaces are permitted for Class 1A users, as it is recognised that these developments will have low turnover and users are generally prepared to accept some inconvenience when entering or leaving a parking space.

One car parking space within the upper basement level is to be dedicated as Small Car Only, as discussed in Table 5-1. The swept path assessment for this car space is included within Appendix B.

The assessment indicates that the access arrangements and the car parking layouts have been designed appropriately and in general accordance with the requirements of the Monash Planning Scheme, AS/NZS 2890.6:2009 and/or AS/NZS 2890.1:2004, subject to the adoption of the aforementioned Design Recommendations

6.1 Clause 52.34 Bicycle Parking Requirements

The provisions set out under Clause 52.34-3 of the Monash Planning Scheme require that bicycle parking be provided at the following rates, as shown in Table 6-1:

Table 6-1: Bicycle Parking Statutory Requirements

Use	Type	Size	Statutory Parking Rate	Statutory Requirement
Independent Living Units (assessed as Dwellings)	Resident bicycle parking	186 units	In developments of four or more storeys, 1 to each 5 dwellings	37 spaces
	Visitor bicycle parking		In developments of four or more storeys, 1 to each 10 dwellings	19 spaces
Total				56 spaces

Childcare is not a listed use in Table 1 of Clause 52.34, as such there is no bicycle parking requirement for the childcare use.

The above assessment shows that the proposed development has a requirement to provide a total of 56 bicycle parking spaces.

The development proposes to provide a total of **58** bicycle parking spaces on site, in the following arrangements:

- 20 visitor bicycle spaces provided at 10 horizontal 'Arc De Triomphe' hoops (or similar) at ground level at the Lemont Street site frontage;
- 8 resident bicycle spaces at 4 horizontal 'Arc De Triomphe' hoops (or similar) within the secure area of the upper basement level;
- 30 resident bicycle spaces provided in vertical wall mounted parking systems such as 'The Cradle'.

Therefore, the proposal meets the bicycle parking requirements of the Monash Planning Scheme and is considered satisfactory.

A total of 28 out of 58 bicycle spaces have been provided in horizontal arrangement, accounting for over 48% of the provision. The bicycle parking layout has therefore been designed in accordance with AS2890.3:2015 - Bicycle Parking, which requires at least 20% of the bicycle parking spaces to be provided in a horizontal Bicycle Parking Device.

Refer to Appendix C for the bicycle parking specifications.

7.1 Loading Arrangements and Ambulance Access

Loading Arrangements

The development proposes for loading arrangements, such as delivery of goods or furniture removal services to/from ILUs, to occur at ground level in the loading bay adjacent the main access ramp.

Large or bulky loading such as furniture removal and unloading of moving vans are to be booked in advance and coordinated through the central building management of the development.

A swept path assessment (Refer to Appendix B) has been conducted using the 'Autodesk Vehicle Tracking' software for the development's loading arrangements for a Small Rigid Vehicle (SRV). The SRV is 6.4 metres in length, and has a vertical clearance requirement of 3.5 metres.

The SRV was found to be able to ingress and egress the site in a forward direction.

Ambulance Access and Patient Loading

The loading area at ground level has also been designed in order to accommodate access and loading by an ambulance.

A grade of 1:33 has been adopted to the loading area in which paramedics or medical staff may be required to load or unload stretchers into an ambulance.

The maximum grade for the loading and unloading of the ambulance has been adopted in accordance with the maximum grade for parking spaces for people with disabilities, as outlined in the Australian Standards for Off-Street Parking for People with Disabilities AS/NZS 2890.6:2009.

Section 2.3 of AS/NZS 2890.6:2009 states that a parking space for people with disabilities is not to exceed a maximum grade of 1:33 if the surface is a bituminous seal and the parking space is out of doors.

The swept path assessment in Appendix B shows that the ambulance is able to ingress the site in a forward direction, manoeuvre into the loading bay, and egress the site in a forward direction.

7.2 Waste Collection

Waste collection is to occur in the upper basement level within the designated loading bay provided.

It is understood that the Waste Management Plan prepared by Leigh Design has been prepared to accompany the town planning application, and recommends waste collection to occur via private collection using a 6.4 metre long Mini Rear Loader.

A swept path assessment (Refer to Appendix B) using a Mini Rear Loader (6.4 metre long vehicle) was used in the assessment and it was found that suitable access has been provided and that the truck will be able to enter and exit the site in a forward direction.

Accordingly, the loading/waste arrangements are considered acceptable and appropriate in this instance.

8.1 Background

Previous Application and Referral Response

As previously outlined in Section 1.1, the original town planning application for the a mixed-use development of the subject site was lodged with Monash City Council in March 2017, supported by a traffic impact assessment prepared by OneMileGrid.

VicRoads, as a statutory referral authority considered the application and requested further information as follows:

1. *Electronic SIDRA files for the SIDRA analysis undertaken at the intersection of Blackburn Road/Lemont Avenue.*
2. *An assessment of the proposed traffic impact against Austroads' warrants for turn treatments and if applicable, details of turn treatments required.*

In addition, VicRoads advised the following concerns:

1. *It is unclear whether the existing right-turn lane on Blackburn Road can accommodate the additional traffic generated by the proposed development. Electronic SIDRA files will enable VicRoads to identify if any further mitigating treatments are required in relation to the existing right-turn lane.*
2. *It would appear that the anticipated traffic generation of the development proposal may meet the warrants for a left turn deceleration lane. However, this assessment appears to be absent from the submitted document.*

Ratio was asked to review the application on behalf of the applicant and, amongst other things, respond to the RFI issued raised by VicRoads.

A letter was subsequently forwarded to VicRoads dated 15th June 2018, responding to the RFI and providing detailed analysis as to the operation of the intersection of Blackburn Road / Lemont Avenue and the requirements (or otherwise) for the provision of a left turn deceleration lane into Lemont Avenue.

It is understood that, on the basis of the information provided, VicRoads informed VCAT that it did not object to the application and withdrew as a party to the hearing.

The matter subsequently proceeded to a full hearing before VCAT in August 2018 , with amended plans substituted prior to the hearing. The VCAT plans marginally reduced the development yield below the draft revised proposal which was the basis of the analysis provided to VicRoads in June 2018.

VCAT ordered that the decision of Monash City Council to refuse a permit be upheld and that no permit should issue.

It is noted that the reasons for refusal of the application by VCAT did not relate top either traffic or car parking adequacy.

Revised Application

Following the VCAT decision, the applicant has prepared a revised proposal for the site, which seeks to address the urban design issues which were identified in the VCAT determination.

The plans further reduce the intensity of the proposed development of the site by removing the residential townhouses, and the hotel and ancillary components.

A summary of the changes to the proposed development is shown in Table 8-1.

Table 8-1: Development Summaries

Component	Compulsory Conference Plans*	VCAT Plans	Current Proposal
Hotel	82 Rooms	86 Rooms	Nil
Townhouses	18 dwellings	15 dwellings	Nil
Independent Living Units	110 units	108 units	186 units
Serviced Apartments	13 units	8 units	Nil
Child Care	80 Places	80 Places	80 Places
Ancillary to the Hotel Use			
Restaurant	243sqm	160 patrons	Nil
Conference	198 sqm	224 sqm	Nil
Well-being Centre	596.8sqm	596.7 sqm	Nil
Car Spaces	246 spaces	246 spaces	252 spaces

*Basis of traffic impact assessment provided to VicRoads in letter dated June 2018.

The relative traffic generation characteristics of the revised scheme have been analysed, compared with the plans considered in the analysis provided to VicRoads and the subsequent VCAT plans.

The overall anticipated reduction in peak hour traffic is shown below in Table 8-2.

Table 8-2: Total Traffic Movements

	Compulsory Conference Plans*	VCAT Plans	Current Proposal
AM Peak			
Inbound	85 vph	76 vph	45 vph
Outbound	89 vph	78 vph	84 vph
Total Traffic	174 vph	154 vph	129 vph
PM Peak			
Inbound	116 vph	69 vph	65 vph
Outbound	103 vph	78 vph	53 vph
Total Traffic	219 vph	147 vph	118 vph

*Basis of traffic impact assessment provided to VicRoads in letter dated June 2018.

As can be seen in the above table, the revised proposal is anticipated to generate significantly lower volumes of traffic than previously considered and, in our opinion, traffic impacts can be expected to be further reduced.

A SIDRA analysis has been undertaken to examine the impact of the revised proposal on the intersection of Lemont Avenue and Blackburn Road, as discussed within the following sections.

8.2 Traffic Generation and Distribution

Based on traffic generation and distribution characteristics anticipated to be generated by each of the component uses, projected inbound and outbound movements are presented in Table 8-3 for the AM peak hour, and Table 8-4 for the PM peak hour.

Table 8-3: AM Peak Hour Inbound and Outbound Movements

	Type	No.	Rate	Inbound		Outbound	
				Percent	Volume	Percent	Volume
ILU	Dwellings	186	0.40	20%	15	80%	60
Childcare	Staff	80	0.07	100%	6	0%	0
	Pickups	80	0.60	50%	24	50%	24
TOTAL					45		84

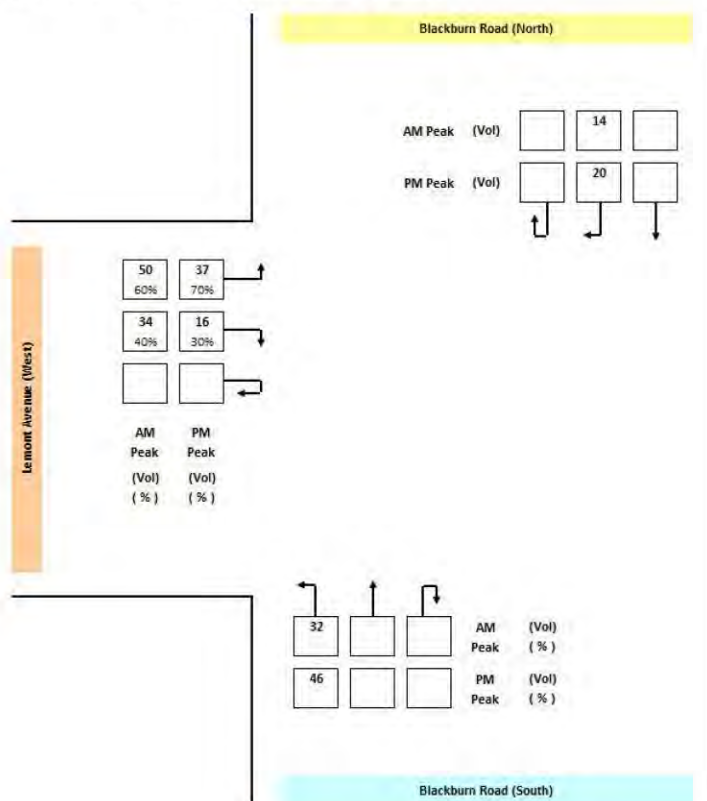
Table 8-4: PM Peak Hour Inbound and Outbound Movements

	Type	No.	Rate	Inbound		Outbound	
				Percent	Volume	Percent	Volume
ILU	Dwellings	102	0.40	60%	45	40%	30
Childcare	Staff	80	0.04	0%	0	100%	3
	Pickups	80	0.50	50%	20	50%	20
TOTAL					65		53

8.3 Future Volumes

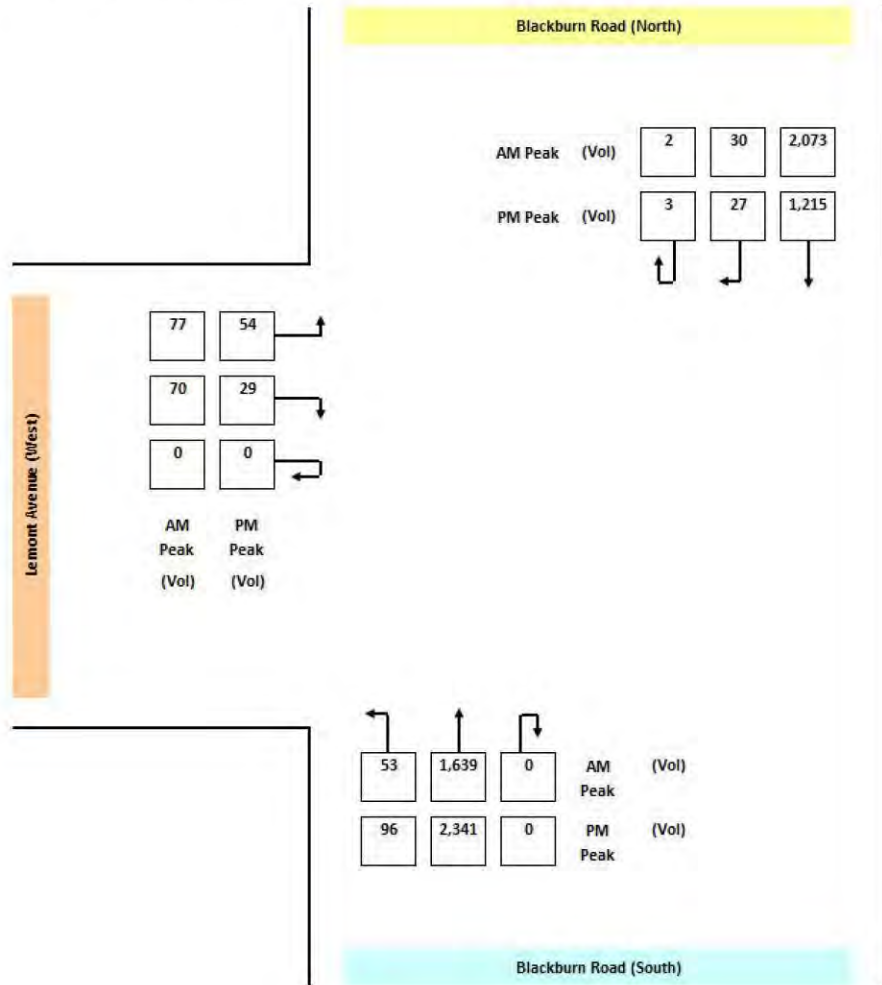
The anticipated site generated traffic movements at the intersection of Blackburn Road and Lemont Avenue are presented in Figure 8.1.

Figure 8.1: Future Site Generated Volumes



Projected post development volumes at the intersection of Blackburn Road and Lemont Avenue, including reductions for existing site generated traffic are presented in Figure 8.2.

Figure 8.2: Future Intersection Volumes



8.4 Future Conditions SIDRA Analysis

SIDRA files documenting the SIDRA analysis undertaken at the intersection for the current proposal have been provided to VicRoads on 22 October 2019.

The future intersection volumes presented in Figure 8.2 were analysed using SIDRA under the networked intersection geometry as presented previously in Figure 2.12.

A summary of the AM peak hour results is presented in Table 8-5 and Table 8-6, with detailed results provided in Appendix D.

Table 8-5: Future Conditions SIDRA Results - AM Peak, Northbound

Approach	Movement	AM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
South: Blackburn Road (northbound)	Left	0.31	0	6
	Thru	0.31	0	0
East: Staged right turn	Thru	0.13	3	16
	Right	0.13	3	34
West: Lemont Avenue	Left	0.13	4	10
	Thru	0.53	8	28
Intersection		0.53		

Table 8-6: Future Conditions SIDRA Results - AM Peak, Southbound

Approach	Movement	AM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
North: Blackburn Road (southbound)	Thru	0.38	0	0
	Right	0.02	0	6
West: Staged right turn	Right	0.83	17	100
Intersection		0.83		

A summary of the PM peak hour results is presented in Table 8-7 and Table 8-8, with detailed results provided in Appendix D.

Table 8-7: Future Conditions SIDRA Results - PM Peak, Northbound

Approach	Movement	PM Peak		
		DOS	95%ile Queue (m)	Average Delay (s)
South: Blackburn Road (northbound)	Left	0.45	0	6
	Thru	0.45	0	0
East: Staged right turn	Thru	0.44	10	68
	Right	0.44	10	142
West: Lemont Avenue	Left	0.13	3	12
	Thru	0.36	8	61
Intersection		0.45		

Table 8-8: Future Conditions SIDRA Results - PM Peak, Southbound

Approach	Movement	PM Peak		
		DOS	95 th ile Queue (m)	Average Delay (s)
North: Blackburn Road (southbound)	Thru	0.22	0	0
	Right	0.02	0	6
West: Staged right turn	Right	0.10	2	12
Intersection		0.22		

The results suggest that satisfactory intersection operation will occur, with acceptable increases to delays and queues.

Notably, in response to the issues raised by VicRoads in relation to the adequacy of the existing right turn lane storage available from Blackburn Road during the original town planning application, the modelled queue length at the right turn into Lemont Avenue from Blackburn Road is not anticipated to exceed the length of the existing right turn lane.

The revised analysis, as summarised above, shows marginally reduced traffic impacts to the SIDRA analysis as presented in the letter to VicRoads preceding the Compulsory Conference.

8.5 Summary

Based on the preceding assessment it is summarised that:

- An application for development of the subject site was previously appealed at VCAT, for which VicRoads was a referral authority. VicRoads did not object to the development as appealed at VCAT, following receipt of the SIDRA analysis of the Blackburn Road/Lemont Avenue intersection undertaken by Ratio;
- The revised proposal is anticipated to generate less traffic than the proposal as considered before VCAT;
- A revised SIDRA analysis has been undertaken of the intersection of Blackburn Road and Lemont Avenue under future conditions and shows the traffic impacts to be less than the previous VCAT scheme;
- Under future conditions, right turn queueing of traffic generated by the proposed development is not anticipated to exceed the length of the existing right turn lane.

9 Conclusion:

The preceding assessment is summarised as follows:

- The subject site is located at 445-467 Blackburn Road in Mount Waverley. The subject site is currently occupied by a number of buildings ranging from single to double storey, which operate as the Hotel Bruce County comprising a hotel, wine bar, conference facilities and short stay accommodation.
- The proposed development involves the construction of a multi-level building with two levels of associated basement car parking, comprising of the following:
 - 186 independent living units (ILU), comprising;
 - 70 x 1-bed ILU;
 - 86 x 2-bed ILU; and
 - 30 x 3-bed ILU;
 - Child care centre accommodating 80 children;
 - A total of 252 car parking spaces provided within two levels of basement car parking, comprising;
 - 32 spaces for the use of the childcare centre and visitors to the ILUs within the upper basement level;
 - 88 spaces within the upper basement level for use of the ILUs;
 - 132 spaces within the lower basement level for use of the ILUs;
 - A total of 58 bicycle parking spaces, comprising;
 - 38 bicycle parking spaces for residents provided within the upper basement level;
 - 20 bicycle parking spaces for visitors provided at ground level.
 - A loading area is provided adjacent the main accessway, which accommodates loading by a small rigid vehicle (SRV) and may be utilised for loading of patients to and from an ambulance.
- The proposal has a statutory requirement to provide a total of 233 car parking spaces, comprising 216 spaces for use by the ILUs and 17 spaces for use by the childcare centre.
- The proposal seeks to provide a total of 252 car parking spaces (220 spaces to the ILUs, 17 spaces to the childcare centre and the remaining 15 spaces available for use by visitors to the ILUs), exceeding the statutory requirement and is therefore considered satisfactory.
- The proposal has a statutory requirement to provide a total of 56 bicycle parking spaces, which is exceeded by the proposal and therefore considered satisfactory. Bicycle parking arrangements have been designed in accordance with AS2890.3:2015 and are therefore considered satisfactory.
- Vehicular access is proposed to be provided via a new double-vehicle width crossover to/from Lemont Avenue at the western end of the Lemont Avenue site frontage.
- The existing double-vehicle width crossover to the eastern end of the Lemont Avenue site frontage is proposed to be closed, with verge, channel and kerb reinstated to the satisfaction of the responsible authority.
- Waste collection is to occur within the upper basement level via private collection by a 6.4m mini rear loader waste collection vehicle.
- The two levels of basement car park and access ramps are designed in general accordance with Clause 52.06 of the Planning Scheme and relevant sections of the Australian Standards; the access and car

parking arrangements of the proposal are therefore considered satisfactory.

- A SIDRA analysis has been undertaken of the intersection of Blackburn Road and Lemont Avenue under existing and future conditions, with key points summarised as follows:
 - An application for development of the subject site was previously appealed at VCAT, for which VicRoads was a referral authority. VicRoads did not object to the development as appealed at VCAT, following receipt of the SIDRA analysis of the Blackburn Road/Lemont Avenue intersection undertaken by Ratio;
 - The revised proposal is anticipated to generate less traffic than the proposal as considered before VCAT;
 - A revised SIDRA analysis has been undertaken of the intersection of Blackburn Road and Lemont Avenue under future conditions and shows the traffic impacts to be less than the previous VCAT scheme;
 - Under future conditions, right turn queueing of traffic generated by the proposed development is not anticipated to exceed the length of the existing right turn lane.

AM Peak Hour Existing Conditions Movement Summaries

MOVEMENT SUMMARY

Site: 101 [EX AM Blackburn Northbound]

Network: N101 [EX AM]

New Site
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blackburn Road													
1	L2	52	4.0	52	4.0	0.312	5.6	LOS A	0.0	0.0	0.00	0.05	57.7
2	T1	1725	4.0	1725	4.0	0.312	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		1777	4.0	1777	4.0	0.312	0.2	NA	0.0	0.0	0.00	0.02	59.7
East: Staged right turn													
5	T1	19	4.0	19	4.0	0.084	16.0	LOS C	0.3	2.1	0.86	0.93	38.2
6	R2	2	4.0	2	4.0	0.084	31.0	LOS D	0.3	2.1	0.86	0.93	37.2
Approach		21	4.0	21	4.0	0.084	17.5	LOS C	0.3	2.1	0.86	0.93	38.1
West: Lemont Ave													
10	L2	34	4.0	34	4.0	0.054	9.3	LOS A	0.2	1.4	0.52	0.72	50.7
11	T1	45	4.0	45	4.0	0.215	19.1	LOS C	0.6	4.3	0.86	0.95	37.0
Approach		79	4.0	79	4.0	0.215	14.9	LOS B	0.6	4.3	0.72	0.85	44.1
All Vehicles		1877	4.0	1877	4.0	0.312	1.0	NA	0.6	4.3	0.04	0.06	58.9

MOVEMENT SUMMARY

Site: 102 [EX AM Blackburn Southbound]

Network: N101 [EX AM]

New Site
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North: Blackburn Road													
8	T1	2182	4.0	2182	4.0	0.383	0.1	LOS A	0.0	0.0	0.00	0.00	59.9
9	R2	21	4.0	21	4.0	0.012	5.8	LOS A	0.0	0.0	0.00	0.63	50.5
Approach		2203	4.0	2203	4.0	0.383	0.1	NA	0.0	0.0	0.00	0.01	59.8
West: Staged right turn													
12	R2	45	4.0	45	4.0	0.509	60.1	LOS F	1.7	12.3	0.96	1.04	19.8
Approach		45	4.0	45	4.0	0.509	60.1	LOS F	1.7	12.3	0.96	1.04	19.8
All Vehicles		2248	4.0	2248	4.0	0.509	1.3	NA	1.7	12.3	0.02	0.03	58.6

PM Peak Hour Existing Conditions Movement Summaries

MOVEMENT SUMMARY

Site: 101 [EX PM Blackburn Northbound]

Network: N101 [EX PM]

New Site
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Blackburn Road													
1	L2	69	4.0	69	4.0	0.445	5.6	LOS A	0.0	0.0	0.00	0.05	57.6
2	T1	2464	4.0	2464	4.0	0.445	0.1	LOS A	0.0	0.0	0.00	0.02	59.7
Approach		2534	4.0	2534	4.0	0.445	0.2	NA	0.0	0.0	0.00	0.02	59.7
East: Staged right turn													
5	T1	8	4.0	8	4.0	0.192	48.3	LOS E	0.5	3.9	0.97	0.99	19.9
6	R2	3	4.0	3	4.0	0.192	111.5	LOS F	0.5	3.9	0.97	0.99	19.6
Approach		12	4.0	12	4.0	0.192	65.5	LOS F	0.5	3.9	0.97	0.99	19.8
West: Lemont Ave													
10	L2	22	4.0	22	4.0	0.052	12.5	LOS B	0.2	1.3	0.65	0.84	48.6
11	T1	16	4.0	16	4.0	0.171	46.7	LOS E	0.5	3.8	0.96	0.98	23.9
Approach		38	4.0	38	4.0	0.171	26.7	LOS D	0.5	3.8	0.78	0.90	38.1
All Vehicles		2583	4.0	2583	4.0	0.445	0.9	NA	0.5	3.9	0.02	0.03	59.0



MOVEMENT SUMMARY

Site: 102 [EX PM Blackburn Southbound]

Network: N101 [EX PM]

New Site

Giveway / Yield (Two-Way)

Movement Performance - Vehicles													
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Arrival Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
North: Blackburn Road													
8	T1	1279	4.0	1279	4.0	0.224	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	12	4.0	12	4.0	0.006	5.8	LOS A	0.0	0.0	0.00	0.63	50.5
Approach		1291	4.0	1291	4.0	0.224	0.1	NA	0.0	0.0	0.00	0.01	59.9
West: Staged right turn													
12	R2	16	4.0	16	4.0	0.050	11.9	LOS B	0.2	1.2	0.74	0.88	40.7
Approach		16	4.0	16	4.0	0.050	11.9	LOS B	0.2	1.2	0.74	0.88	40.7
All Vehicles		1306	4.0	1306	4.0	0.224	0.2	NA	0.2	1.2	0.01	0.02	59.7

Appendix B Swept Path Assessment

