

445 Blackburn Road, Mount Waverley

Transport Impact Assessment



16651TIA001D-F

5 June 2017

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1 INTRODUCTION

onemilegrid has been requested by Hollerich Town Planning Pty Ltd to undertake a Transport Impact Assessment of the proposed hotel redevelopment at 445 Blackburn Road, Mount Waverley.

An application for the proposed redevelopment was submitted to Council. Council Officers undertook a preliminary assessment of the application and issued a request for further information (RFI) pursuant to Section 54 of the Planning and Environmental Act 1987. Amongst other items, two were in relation to car parking and traffic, reproduced below:

- *Traffic report and car park demand assessment prepared by a suitably qualified traffic engineer assessing the car parking provision and vehicle access arrangements having regard to the provisions of Clause 52.06, allocation and management of car parking on the site; and*
- *Bicycle facilities assessment detailing the adequacy of proposed bicycle facilities and justification of the proposed reduction sought having regard to the requirements of Clause 22.13 of the Monash Planning scheme.*

As part of this assessment the subject site has been inspected with due consideration of the development proposal, traffic data has been sourced and relevant background reports have been reviewed.

2 EXISTING CONDITIONS

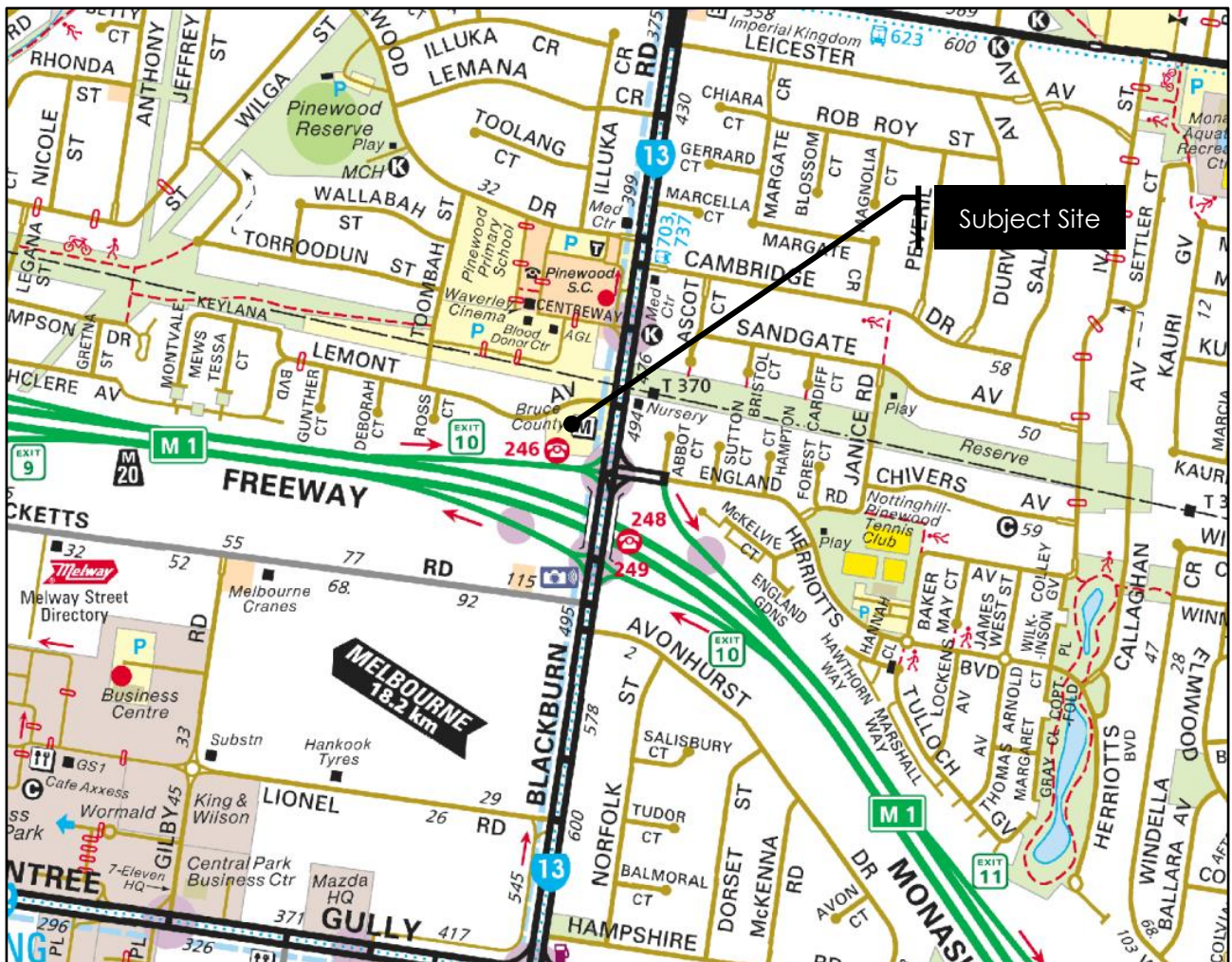
2.1 Site Location

The subject site is located at the south-western corner of the intersection between Blackburn Road and Lemont Avenue, as shown in Figure 1.

The site is irregular in shape and has a frontage to Blackburn Road of approximately 85 metres and a frontage to Lament Avenue of 100 metres and occupies a site area of approximately 6,350m².

The site is currently occupied by The Hotel Bruce County with on-site car parking provided around the surrounds of the hotel and vehicle access from Lemont Avenue.

Figure 1 Site Location



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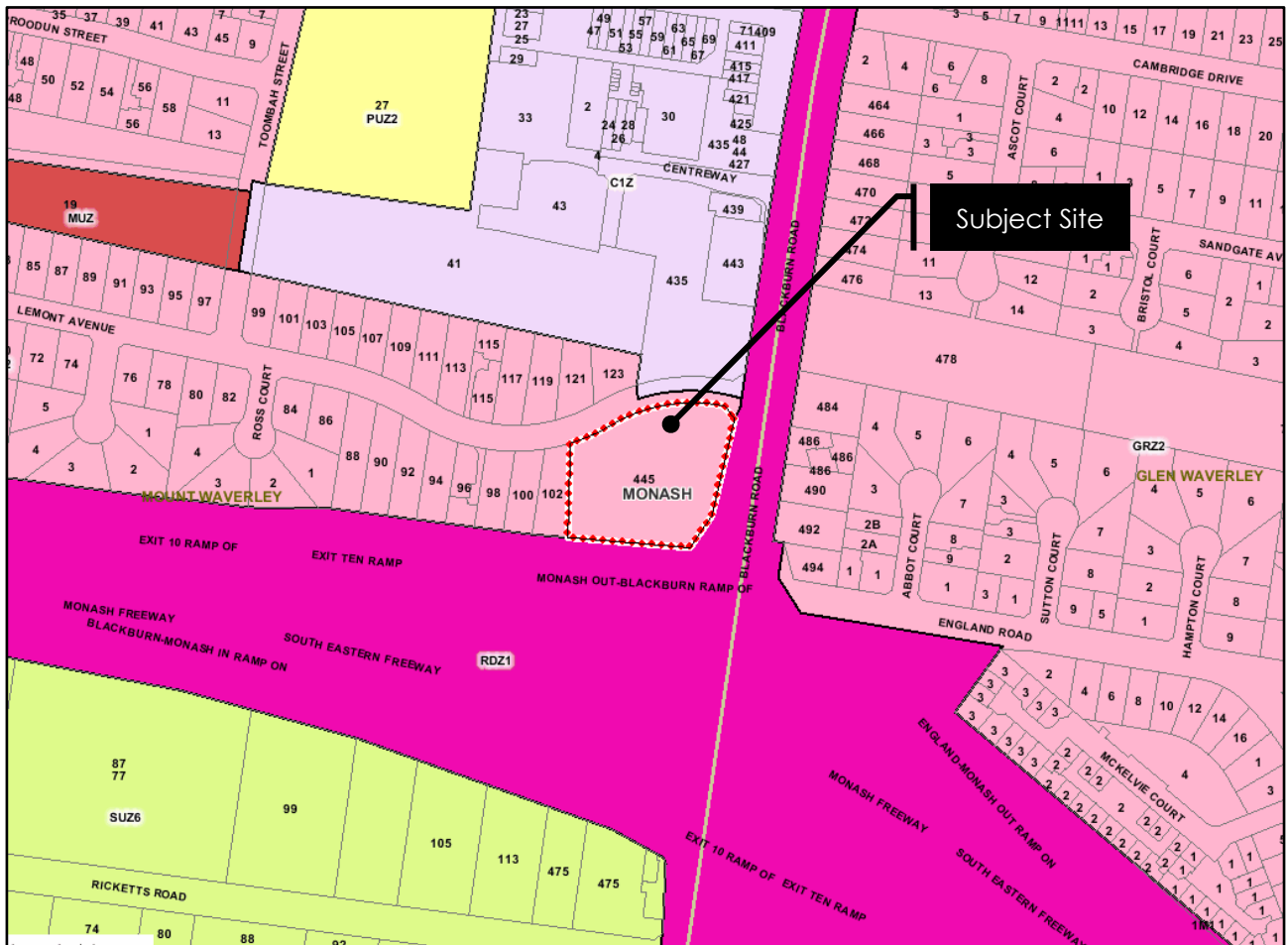
Land use in the immediate vicinity is mixed in nature with residential land uses to the east and west, Pinewood Shopping Village and Pinewood Primary School to the north, and special use developments to the south.

2.2 Planning Zones

It is shown in Figure 2 that the site is located within a General Residential Zone – Schedule 2 (GRZ2), for which permitted uses are listed in Clause 32.08 of the Monash Planning Scheme.

Additionally, Vegetation Protection Overlay – Schedule 1 (VPO1) applies to the site.

Figure 2 Planning Scheme Zones



2.3 Road Network

2.3.1 Blackburn Road

Blackburn Road is a VicRoads controlled arterial generally aligned north-south, running between Railway Road in Blackburn, and Princes Highway in Clayton. At the site frontage, Blackburn Road accommodates three traffic lanes in each direction.

2.3.2 Lemont Avenue

Lemont Avenue is a local road generally aligned east-west, running between Blackburn Road in the east, and Keylana Boulevard in the west. Lemont Avenue provides a single traffic lane in each direction adjacent to the site. Within the vicinity of the site, 'no standing' restrictions are in place kerbside, however further west of the site, kerbside parking is generally permitted on both sides of the road, with 2P restrictions operating along the southern side and permit parking on the northern side.

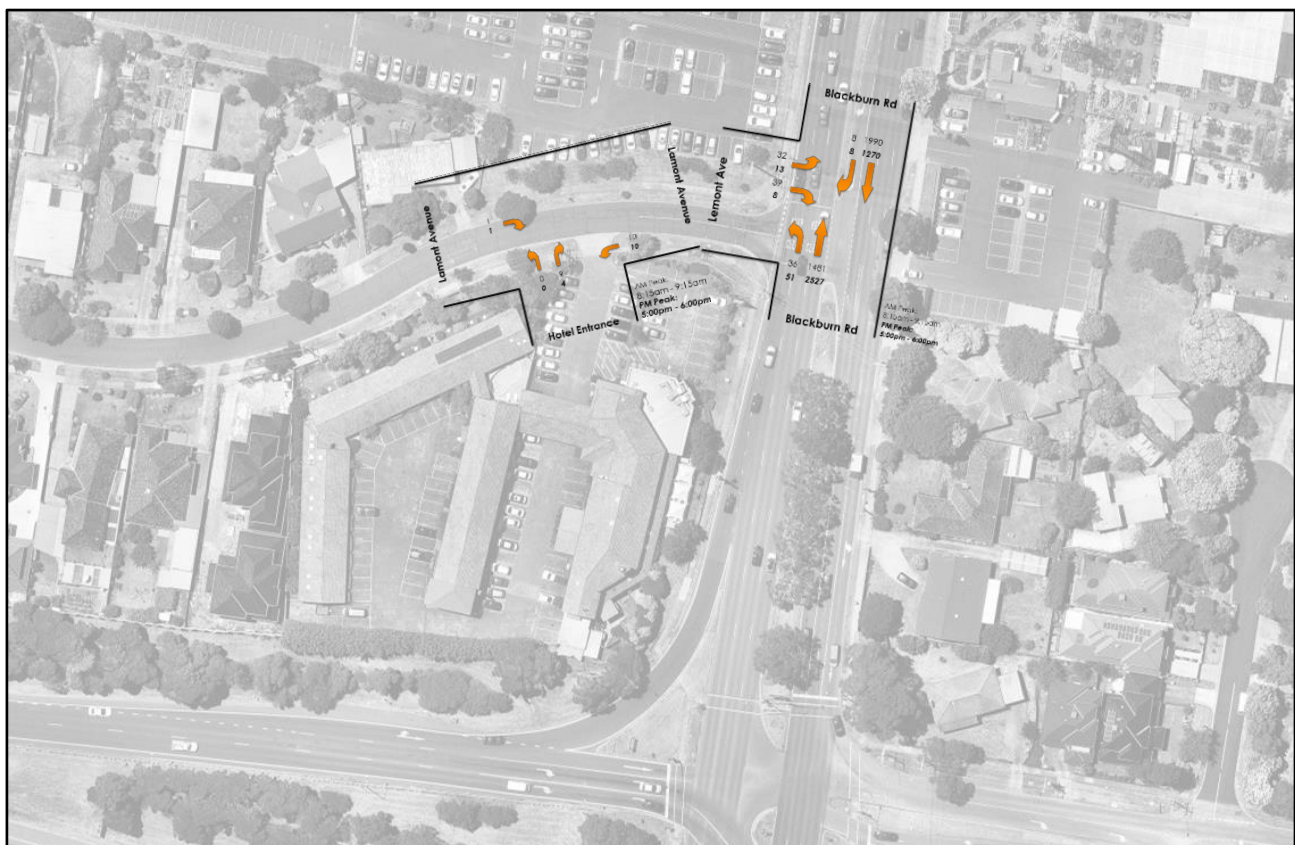
2.4 Traffic Volumes

In order to determine the existing traffic volumes in the vicinity of the area, traffic volume surveys were undertaken by Trans Traffic on behalf of **onemilegrid** on Wednesday 7th December 2016, between 6:30am and 10:00am, and 3:00pm and 7:00pm, at the following intersections:

- Blackburn Road and Lemont Avenue; and
- Hotel Bruce County crossover to Lemont Avenue.

An aerial encompassing the intersections and the peak hour results is shown in Figure 3.

Figure 3 Existing Traffic Volumes – Wednesday 7th December 2016



2.5 Existing Intersection Operation

To assess the operation of the intersection the traffic volumes have been input into SIDRA Intersection, a traffic modelling software package.

The SIDRA Intersection software package has been developed to provide information on the capacity of an intersection with regard to a number of parameters. Those parameters considered relevant are, Degree of Saturation (DoS), 95th Percentile Queue, and Average Delay as described below.

Table 1 SIDRA Intersection Parameters

| Parameter | Description | | | | | | | | | | | | | | |
|--|---|----------------------|--------|------------|-----------|-------------|-----------|-------------|------|-------------|------|-------------|------|------------|-----------|
| Degree of Saturation (DoS) | The DoS represents the ratio of the traffic volume making a particular movement compared to the maximum capacity for that particular movement. The value of the DoS has a corresponding rating depending on the ratio as shown below. | | | | | | | | | | | | | | |
| | <table border="1"> <thead> <tr> <th>Degree of Saturation</th> <th>Rating</th> </tr> </thead> <tbody> <tr> <td>Up to 0.60</td> <td>Excellent</td> </tr> <tr> <td>0.61 – 0.70</td> <td>Very Good</td> </tr> <tr> <td>0.71 – 0.80</td> <td>Good</td> </tr> <tr> <td>0.81 – 0.90</td> <td>Fair</td> </tr> <tr> <td>0.91 – 1.00</td> <td>Poor</td> </tr> <tr> <td>Above 1.00</td> <td>Very Poor</td> </tr> </tbody> </table> | Degree of Saturation | Rating | Up to 0.60 | Excellent | 0.61 – 0.70 | Very Good | 0.71 – 0.80 | Good | 0.81 – 0.90 | Fair | 0.91 – 1.00 | Poor | Above 1.00 | Very Poor |
| | Degree of Saturation | Rating | | | | | | | | | | | | | |
| | Up to 0.60 | Excellent | | | | | | | | | | | | | |
| | 0.61 – 0.70 | Very Good | | | | | | | | | | | | | |
| | 0.71 – 0.80 | Good | | | | | | | | | | | | | |
| | 0.81 – 0.90 | Fair | | | | | | | | | | | | | |
| 0.91 – 1.00 | Poor | | | | | | | | | | | | | | |
| Above 1.00 | Very Poor | | | | | | | | | | | | | | |
| It is noted that whilst the range of 0.91 – 1.00 is rated as 'poor', it is acceptable for critical movements at an intersection to be operating within this range during high peak periods, reflecting actual conditions in a significant number of suburban signalised intersections. | | | | | | | | | | | | | | | |
| Average Delay (seconds) | Average delay is the time delay that can be expected for all vehicles undertaking a particular movement in seconds. | | | | | | | | | | | | | | |
| 95th Percentile (95%ile) Queue | 95%ile queue represents the maximum queue length in metres that can be expected in 95% of observed queue lengths in the peak hour | | | | | | | | | | | | | | |

The results of the analysis are provided in Table 2 below.

Table 2 Blackburn Road / Lemont Avenue

| Approach | DoS | Avg Delay (sec) | Queue (m) |
|-------------------------------|---------|-----------------|-----------|
| AM Peak Hour | | | |
| Blackburn Road (South) | Through | 0.282 | 0 |
| | Left | 0.282 | 5.6 |
| Blackburn Road (north) | Through | 0.370 | 7.4 |
| | Right | 0.031 | 19.4 |
| Lemont Avenue (west) | Left | 0.191 | 5.6 |
| | Right | 0.525 | 87.9 |
| PM Peak Hour | | | |
| Blackburn Road (South) | Through | 0.013 | 11.9 |
| | Left | 0.075 | 57.9 |
| Blackburn Road (north) | Through | 0.002 | 5.6 |
| | Right | 0.221 | 104.1 |
| Lemont Avenue (west) | Left | 0.153 | 7.8 |
| | Right | 0.212 | 102.6 |

As shown above the intersection is operating under excellent conditions during both the morning and afternoon peak hours with minimal queues and delays experienced by motorists. In view of the foregoing, the proposed arrangement is considered satisfactory.

2.6 Sustainable Transport

2.6.1 Public Transport

The full public transport provision in the vicinity of the site is shown in Figure 4 and Table 3.

Figure 4 Public Transport Provision

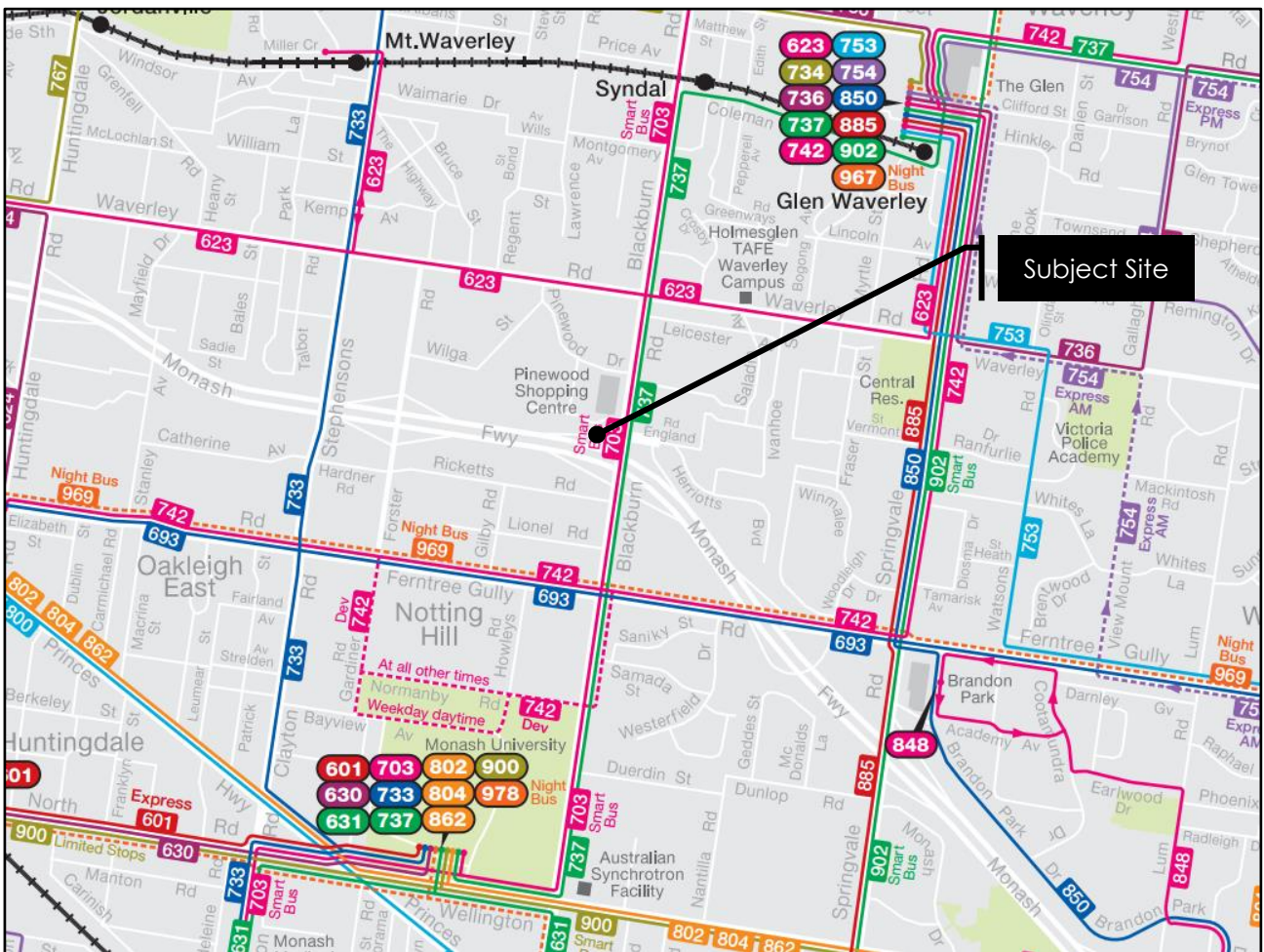


Table 3 Public Transport Provision

| Mode | Route No | Route Description | Nearest Stop/Station |
|------|----------|--|----------------------|
| Bus | 703 | Middle Brighton - Blackburn via Bentleigh, Clayton, Monash University (SMARTBUS Service) | Pinewood |
| | 737 | Croydon - Monash University via Boronia, Knox City Shopping Centre, Glen Waverley | Shopping Centre |

It is shown that public transport in the area is limited to bus services.

SmartBus routes provide high frequency services and high speed services, with bus priority measures along the route, and real time information at bus stops.

3 DEVELOPMENT PROPOSAL

3.1 General

It is proposed to demolish the existing hotel and construct a new facility for the purposes of a mixed-use development, retaining the existing hotel operation, with the addition of residential, child care centre, retirement village, medical centre and a convenience shop, as shown in Table 4 below.

Table 4 Proposed Redevelopment

| <i>Component</i> | <i>No/Area</i> |
|---|---------------------------------------|
| Hotel | 120 Rooms |
| Residential – Townhouses | 10 Units |
| Residential – Apartments | 47 Apartments |
| Residential – Serviced Apartments | 8 Service Apartments |
| Child Care | 140 Children |
| Allied Health Facility / Medical Centre | 851 m ² (12 practitioners) |
| Convenience Shop | 240 m ² |
| Retirement Village Units | 60 I.L.U |

It is noted that the ground floor level contains a food and beverage component within the hotel foyer, which is ancillary to the Hotel use.

3.2 Car Parking and Vehicular Access

Access to the site is proposed via a new double width crossover to Lemont Avenue at the northern boundary of the site, west of the existing crossover, leading to a ramp down to a basement car park. The existing crossover to the site will be reinstated with kerb and channel, however will not result in additional on-street car parking.

Car parking is to be provided within one basement level, containing a total of 135 car spaces on-site.

4 DESIGN CONSIDERATIONS

4.1 General

onemilegrid has undertaken an assessment of the car parking layout and access for the proposed development with due consideration of the Design Standards detailed with Clause 52.06-8 of the Planning Scheme. A review of those relevant Design Standards is provided in the following section.

4.2 Design Standard 1 – Accessways

A summary of the assessment for Design Standard 1 is provided in Table 5.

Table 5 Clause 52.06-8 Design Assessment – Design Standard 1

| <i>Requirement</i> | <i>Comments</i> |
|---|--|
| Be at least 3 metres wide | Satisfied – minimum width of ramp is 6.0metres |
| Have an internal radius of at least 4 metres at changes of direction or intersection or be at least 4.2 metres wide | Satisfied |
| 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 |
| Provide at least 2.1 metres headroom beneath overhead obstructions, calculated for a vehicle with a wheel base of 2.8 metres | Satisfied |
| 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 |
| Provide a passing area at the entrance at least 5 metres wide and 7 metres long if the accessway serves ten or more car parking spaces and is either more than 50 metres long or connects to a road in a Road Zone | N/A – Does not connect to a road zone |
| Have a corner splay or area at least 50 per cent clear of visual obstructions extending at least 2 metres along the frontage road from the edge of an exit lane and 2.5 metres 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 |
| 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 6 metres from the road carriageway. | Satisfied |

4.3 Design Standard 2 – Car Parking Spaces

All car spaces on-site are proposed with a minimum width of 2.5 metres, length of 4.9 metres and are accessed from aisles of no less than 6.0 metres.

It is recommended that all car spaces on-site be designed in accordance with Design Standard 2 of the Planning Scheme or alternatively the Australian Standard AS2890.1-2004 (off street)

4.4 Design Standard 3 – Gradients

It is recommended the proposed ramp providing access to the basement car park be designed in accordance with the requirements of Design Standard 3 of the Planning Scheme.

4.5 Waste Collection

A bin storage area is located within the basement car park. It is expected the bins are to be collected by a private contractor.

4.6 Bicycle Parking

It is recommended that bicycle parking provided be designed in accordance with the Planning Scheme requirements, Clause 22.13 of the Monash Planning scheme and in accordance with typical advice from Bicycle Network Victoria.

5 BICYCLE PARKING CONSIDERATIONS

5.1 Statutory Requirements – Clause 52.34

The bicycle parking requirements for the subject site are identified in Clause 52.34 of the Monash Planning Scheme, which specifies the following requirements for the different components of the proposed development.

Table 6 Clause 52.34 – Bicycle Parking Requirements

| Component | No/Area | Requirement | Total |
|---|--------------------|---|-----------|
| Dwelling (four or more storeys) | 57 dwellings | 1 space per 5 dwellings for residents | 11 |
| | | 1 space per 10 dwellings for visitors | 6 |
| Medical Centre | 12 practitioners | 1 space per 8 practitioners for employees | 1 |
| | | 1 space per 4 practitioners for visitors | 3 |
| Residential Building (four or more storeys) | 128 rooms | 1 space per 10 rooms for employee | 13 |
| | | 1 space per 10 rooms for visitors | 13 |
| Shop (greater than 1000m ²) | 240 m ² | 1 space per 600m ² for employees | - |
| | | 1 space per 500m ² for visitors | - |
| Total | | Residents | 11 |
| | | Employees | 14 |
| | | Visitors | 22 |

It is noted that the Planning Scheme does not specifically refer to parking requirements for a Child Care Centre or retirement village, therefore, no bicycle parking is required for this component. Notwithstanding it is recommended that some spaces are provided on-site for child care staff and visitors to the retirement village.

Furthermore, where 5 or more employee bicycle spaces are provided, employee facilities are required in accordance with Clause 52.34 of the Monash Planning Scheme, as identified below.

Table 7 Clause 52.34 – Bicycle Facility Requirements

| Facility | Employee Bicycle Spaces | Requirement | Total |
|----------|-------------------------|--|-------|
| Showers | 14 spaces | 1 shower for the first 5 employee bicycle spaces; plus 1 to each 10 employee bicycle spaces thereafter | 2 |

Showers must have access to a communal change room, or combined shower and change room

5.2 Adequacy of Proposed Facilities

It is recommended that bicycle parking spaces and employee showers be provided in accordance with the Planning Scheme requirements, whilst meeting the objectives of Clause 22.13 of the Monash Planning scheme to promote the use of cycling and minimise car dependency.

6 CAR PARKING CONSIDERATIONS

6.1 Statutory Car Parking Requirements - Clause 52.06

The car parking requirements for the subject site are identified in Clause 52.06 of the Monash Planning Scheme, which specifies the following requirements for the different components of the proposed development.

Table 8 Clause 52.06 – Car Parking Requirements

| Use | No/Area | Rate | Car Parking Measure | Total |
|------------------------|---------|------|--|------------|
| Convenience restaurant | | 10 | To each premise | 10 |
| Child care centre | 140 | 0.22 | to each child | 30 |
| Dwelling | 51 | 1 | to each one or two bedroom dwelling, plus | 51 |
| | 6 | 2 | to each three or more bedroom dwelling (with studies or studios that are separate rooms counted as bedrooms), plus | 12 |
| | 57 | 1 | for visitors to every 5 dwellings for developments of 5 or more dwellings | 11 |
| Medical centre | 1 | 5 | to the first person providing health services, plus | 5 |
| | 11 | 3 | to every other person providing health services | 33 |
| Retirement Village | 60 | 1 | to each one or two bedroom dwelling, plus | 60 |
| | - | 2 | to each three or more bedroom dwelling (with studies or studios that are separate rooms counted as bedrooms), plus | - |
| | 60 | 1 | for visitors to every five dwellings for developments of five or more dwellings | 12 |
| Total | | | | 224 |

Based on the above calculations, a total of 224 parking spaces are required for the proposed development.

With regard to the proposed hotel component, the Planning Scheme does not specifically refer to parking requirements for residential hotel uses, therefore, the parking provision must be to the satisfaction of the responsible authority.

In view of this, an empirical assessment of car parking demand of the overall proposed development will be undertaken.

6.2 Car Parking Demand Assessment

6.2.1 Child Care Parking Demand

It has been our experience that child care uses typically generate parking demands at a comparable rate to that specified in the Planning Scheme, being 0.22 spaces per child, in this case equating to total demands for 30 car spaces, inclusive of parent pick-up/drop-off demands and staff parking demands.

6.2.2 Residential Parking Demand

For the purposes of this assessment, the Clause 52.06 rates for resident car parking will be adopted equating to a demand for 63 car spaces.

6.2.3 Visitor Parking Demand

Car parking surveys undertaken by other consultants have shown that car parking demands vary throughout the day with approximately half of the total peak demand generated during business hours.

For the purposes of this assessment, a peak visitor parking demand of 0.2 spaces per dwelling will be adopted in accordance with the Planning Scheme. Outside of peak periods, a demand half of the peak rate will be adopted commensurate with the observations at other residential developments equating to a demand for 6 spaces and 13 spaces during weekday morning/afternoon and weekday evening / weekend periods respectively.

6.2.4 Retirement Village Demand

For the purposes of this assessment, the Clause 52.06 rates for retirement village unit car parking will be adopted equating to a demand for 60 car spaces.

6.2.5 Allied Health/Medical Centre Demand

For the purposes of this assessment, the Clause 52.06 rates for medical centre car parking will be adopted equating to a demand for 38 car spaces.

6.2.6 Hotel Demand

With regard to the Hotel component, other traffic engineering consultants have undertaken case studies of residential hotels throughout the metropolitan area. A review of surveys undertaken at similar locations with comparable characteristics to the proposed development indicates peak parking demands of between 0.2 – 0.33 spaces per occupied room.

Residential hotel parking demands typically peak overnight, consistent with time when most guests are on site. At other times, a proportion of guests of the hotel will be off-site, with those that arrive by private vehicle often making use of their own transport to do so. Staff parking demand typically peaks during the day.

Hotel occupancy varies during the week and is typically less than 100 percent occupied except at peak times, such as during large events and holiday periods.

For the purpose of this assessment, considering the location of the site, and the number of rooms, a rate of 0.3 spaces per room will be adopted and a conservative 100 percent occupancy rate assumed. Application of these rates equates to a demand for 38 spaces.

6.2.7 Convenience Shop

Case studies undertaken by a number of firms have revealed shop car parking generation rates ranging between 1 – 4 car spaces per 100 square metres. It is considered that due to the location of the site with respect to public transport and moreover residential/hotel/retirement village catchments that the demand will be towards the lower end of the range. Nevertheless, for the purposes of this assessment, it will be assumed that the convenience shop will generate a demand for 1 car spaces per 100 m² of leasable floor area. Application of this rate equates to a demand for 2 car spaces.

It is noted that the tenancy is likely to service residents and visitors staying within the hotel component rather than generate a car parking demand in its own right and as such on the whole it is expected that the customer demand to be minimal.

6.2.8 Total Parking Demand

Based on the above, the anticipated parking demands generated by the proposal can be summarised in Table 9 below.

Table 9 Table Title

| Use | Weekday | | Weekend | |
|------------------------------|---------------------|------------|---------------------|------------|
| | Morning & Afternoon | Evening | Morning & Afternoon | Evening |
| Child Care | 30 | 0 | 0 | 0 |
| Residents | 63 | 63 | 63 | 63 |
| Residential Visitors | 6 | 13 | 13 | 13 |
| Retirement Village Residents | 60 | 60 | 60 | 60 |
| Allied Health/Medical Centre | 38 | 38 | 38 | 0 |
| Hotel | 38 | 38 | 38 | 38 |
| Convenience Store | 2 | 0 | 2 | 0 |
| Total | 237 | 212 | 214 | 174 |

6.3 Anticipated Car Parking Demand

As indicated above, peak parking demand is projected to occur during the day when all uses are generating a car parking demand. At this time, it is projected that there will be a total demand for 237 spaces comprising 30 child care spaces, 63 resident spaces, 6 visitor spaces, 60 retirement village resident spaces, 38 medical centre spaces, 38 hotel spaces and 2 convenience store spaces.

As 135 car spaces are provided on-site, the car parking demands projected equates to a shortfall of 102 spaces.

Therefore, it is recommended that an additional 102 car spaces be provided on-site.

6.4 Accessible Car Parking

The Building Code of Australia (BCA) specifies the minimum requirements for provision of accessible car parking.

The proposed components of the development have the following classifications and required provisions of accessible car parking:

- Child Care, classified as a Class 9B land-use, requires provision of one accessible car spaces for every 50 car parking spaces or part thereof;
- Residential Part of Hotel and Accommodation for the aged, classified as a Class 3 land-use, requires provision of one accessible car spaces for every 100 car parking spaces or part thereof;
- Medical Centre, classified as a Class 9A land-use, requires provision of one accessible car spaces for every 50 car parking spaces or part thereof; and
- Convenience Store, classified as a Class 6 land-use, requires provision of one accessible car spaces for every 50 car parking spaces or part thereof.

It is recommended that accessible parking space be provided in accordance with the BCA requirements.

7 TRAFFIC CONSIDERATIONS

7.1 Traffic Generation

7.1.1 Residential

Surveys undertaken by other traffic engineering firms at residential dwellings have shown that the daily traffic generation rates vary depending on the size, location and type of the dwelling, the parking provision and proximity to local facilities and public transport.

Medium to high density dwelling in inner areas generate traffic with rates between 3.0 and 6.0 movements per dwelling. Considering the location of the subject site and more access to public transport, it is expected that generation rates will be towards the middle of the range.

Nevertheless, for the purposes of this assessment a daily rate of in the order of 6.0 movements per day per dwelling will be adopted with 10% occurring during the peak hours.

Application of the above rates indicates that the 57 dwellings with car parking will generate 342 movements per day, inclusive of 34 vehicle movements during the morning and afternoon peak hours.

Residential traffic is typically tidal in nature, with the majority of movements during the AM peak hour occurring in the outbound direction and most movements in the PM peak hour occurring in the inbound direction. The following splits are typical for traffic movements generated by residential uses:

- AM peak hour: 80 % outbound / 20 % inbound; and
- PM peak hour: 40 % outbound / 60 % inbound.

Traffic volumes anticipated to be generated by the proposed development are outlined in Table 10.

Table 10 Anticipated Peak Hour Traffic Generation

| <i>Period</i> | <i>Two-Way Volume</i> | <i>Inbound Volume</i> | <i>Outbound Volume</i> |
|---------------|-----------------------|-----------------------|------------------------|
| AM Peak Hour | 34 movements | 7 movements | 27 movements |
| PM Peak Hour | 34 movements | 20 movements | 14 movements |

7.1.2 Convenience Store

With regard to the convenience store, it is anticipated that one arrival and one departure movement will be generated during the AM and PM peak hour per allocated car space. Given the size of the tenancy, it is expected that one space is to be allocated, therefore, one movement is projected during the peak hour periods.

7.1.3 Child Care Centre

The New South Wales Roads and Traffic Authority (now the Department of Transport, Roads and Maritime Services) produced the document "Guide to Traffic Generating Developments" (the RTA Guide) dated October 2002, which aims to assist with the assessment and preparation of development applications.

The RTA Guide identifies peak traffic rates for a variety of land uses based on surveys of existing facilities including child-care centres. While there is no Victorian equivalent of this document, it is generally accepted that the rates outlined are applicable in the Victorian context.

The RTA Guide rates for childcare centres are specified in Table 11. It is expected that vehicle movements will be distributed evenly between inbound and outbound movements.

Table 11 RTA Guide Child Care Traffic Generation

| Centre Type | Peak Vehicle Movements / Child | | |
|---------------|--------------------------------|---------------|---------------|
| | 7:00AM-9:00AM | 2:30PM-4:30PM | 4:00PM-6:00PM |
| Long Day Care | 0.8 (2 hour) | 0.3 (2 hour) | 0.7 (2 hour) |

Application of these rates to the proposed 140 place child-care centre equates 112 movements during the 7:00am-9:00am period, 42 movements during the 2:30pm-4:30pm period and 98 movements during the 4:00pm-6:00pm period.

The above estimates are across two hour periods and as such during the critical peak hour it is estimated that the development would generate approximately 55% of the two-hour peak, or up to 62 and 54 vehicle movements in the AM and PM peak periods respectively.

Allowing for the even distribution between inbound and outbound movements, the anticipated AM and PM peak hour traffic generation is summarised in Table 12.

Table 12 Anticipated Peak Hour Traffic Generation

| Period | Inbound | Outbound |
|--------------|---------|----------|
| AM Peak Hour | 31 | 31 |
| PM Peak Hour | 27 | 27 |

7.1.4 Retirement Village

In order to estimate retirement village traffic generation rate, **onemilegrid** has undertaken a case-study at Hunters Green Retirement Village in Cranbourne. The retirement village consist of 135 units and has a single access point via the local road network, comprising of a roundabout intersection along Rochester Parade, Cranbourne, providing an opportunity to derive a specific traffic generation rate for retirement village uses. Traffic movement counts and tube counts were commissioned at the roundabout and site access point respectively on Thursday 30th March 2017 recording a total of 422 traffic movements generated by the village.

Based on the surveys, the following traffic generation rates for retirement village units were recorded:-

- 3.1 vehicle movements per day per unit
- 0.36 vehicle movements per hour per unit during the AM Peak
- 0.35 vehicle movements per hour per unit during the PM Peak

For the purpose of this assessment, traffic generation rates of 4 movements per day per dwelling will be adopted, with 10% occurring during the peak periods

Therefore the 60 retirement village units equates to a daily traffic generation of 240 movements, or 24 movements during the peak periods.

Allowing for the even distribution between inbound and outbound movements, the anticipated AM and PM peak hour traffic generation is summarised in Table 13.

Table 13 Retirement Village Units Traffic Generation

| Direction | AM Peak | PM Peak |
|--------------|-----------|-----------|
| Inbound | 12 | 12 |
| Outbound | 12 | 12 |
| Total | 24 | 24 |

7.1.5 Medical Centre

With regard to the allied health/medical centre use, the peak traffic generation is expected to be directly related to the frequency of appointments. For the purposes of analysis, it is assumed that appointments will occur at not less than at 30 minute intervals, therefore, over the course of one hour, and assuming all 12 practitioners will be on-site at any one time, a peak traffic generation of no more than 19 inbound and 19 outbound vehicle trips will be generated, assuming 80% of patients drive to the centre and the remaining 20% will be generated by the residential/hotel/retirement village catchments on-site.

The expected traffic generated by the medical centre will be approximately less than 1 inbound and 1 outbound trip every 3 minutes.

7.1.6 Hotel

The RTA NSW Guide to Traffic Generating Developments (version 2.2) lists motels (casual accommodation) with a daily traffic generation rate of 3 trips per unit and evening peak hour traffic generation of 0.4 trips per unit.

It is noted that these rates are based on 100% occupancy of units and that, drawing a comparison between similar developments where occupancy data is provided, an 85% occupancy may be more appropriate. Applying an 85% factor to the above rates equates to daily traffic generation rates of 2.55 trips per unit and an evening peak hour traffic generation of 0.34 trips per unit, both split evenly between inbound and outbound movements.

Based on the proposed provision of 128 units within the hotel, the proposed development is anticipated to generate traffic movements as summarised in Table 14.

Table 14 Traffic Generation

| <i>Period</i> | <i>Inbound</i> | <i>Outbound</i> | <i>Total</i> |
|-------------------|----------------|-----------------|--------------|
| Daily | 163 | 163 | 326 |
| Evening Peak Hour | 22 | 22 | 44 |

7.1.7 Existing Use Reduction

As previously shown in Section 2.4 and Figure 3, the existing hotel use on-site is currently generating the following peak hour traffic volumes.

Table 15 Existing Hotel Traffic Generation

| <i>Direction</i> | <i>AM Peak</i> | <i>PM Peak</i> |
|------------------|----------------|----------------|
| Inbound | 11 | 11 |
| Outbound | 9 | 4 |
| Total | 20 | 15 |

The above existing hotel traffic generation is expected to be removed from the local road network with the demolition of the existing site in order to construct the proposed development.

7.1.8 Total Traffic Generation

Total traffic volumes anticipated to be generated by the development during the AM and PM peak hours are outlined in Table 16 and Table 17 respectively.

Table 16 Anticipated AM Peak Hour Traffic Generation

| <i>Period</i> | <i>Inbound Movements</i> | <i>Outbound Movements</i> |
|------------------------------|--------------------------|---------------------------|
| Residential | 7 | 27 |
| Convenience Store | 1 | 0 |
| Child Care Centre | 31 | 31 |
| Retirement Units | 12 | 12 |
| Allied Health/Medical Centre | 19 | 19 |
| Hotel | - | - |
| Existing Hotel | -11 | -9 |
| Total | 59 | 80 |

Table 17 Anticipated PM Peak Hour Traffic Generation

| <i>Period</i> | <i>Inbound Movements</i> | <i>Outbound Movements</i> |
|------------------------------|--------------------------|---------------------------|
| Residential | 20 | 14 |
| Convenience Store | 0 | 1 |
| Child Care Centre | 27 | 27 |
| Retirement Units | 12 | 12 |
| Allied Health/Medical Centre | 19 | 19 |
| Hotel | 22 | 22 |
| Existing Hotel | -11 | -4 |
| Total | 89 | 91 |

7.2 Traffic Distribution

The vehicle movements generated by the proposed development will be made to Blackburn Road and then further distributed northbound or southbound. As outlined in Section 2.4 traffic volume surveys were undertaken at Blackburn Road / Lamont Avenue intersection.

For the purposes of the following assessment, the existing Blackburn through traffic distribution based on the surveys is as follows:

- AM Peak – 57% of the traffic movements will be southbound and 43% northbound.
- PM Peak - 33% of the traffic movements will be southbound and 67% northbound.

The peak hour traffic generated by the proposed development distributed along Blackburn Road is as shown in Table 18 and Figure 5 and Figure 6.

Table 18 Anticipated Peak Hour Traffic Distribution

| <i>Period</i> | <i>Inbound Movements</i> | | <i>Outbound Movements</i> | |
|---------------|--------------------------|-------------------|---------------------------|-------------------|
| | <i>Southbound</i> | <i>Northbound</i> | <i>Southbound</i> | <i>Northbound</i> |
| AM Peak Hour | 34 | 25 | 46 | 34 |
| PM Peak Hour | 29 | 60 | 30 | 61 |

Figure 5 AM Peak Hour Traffic Generation

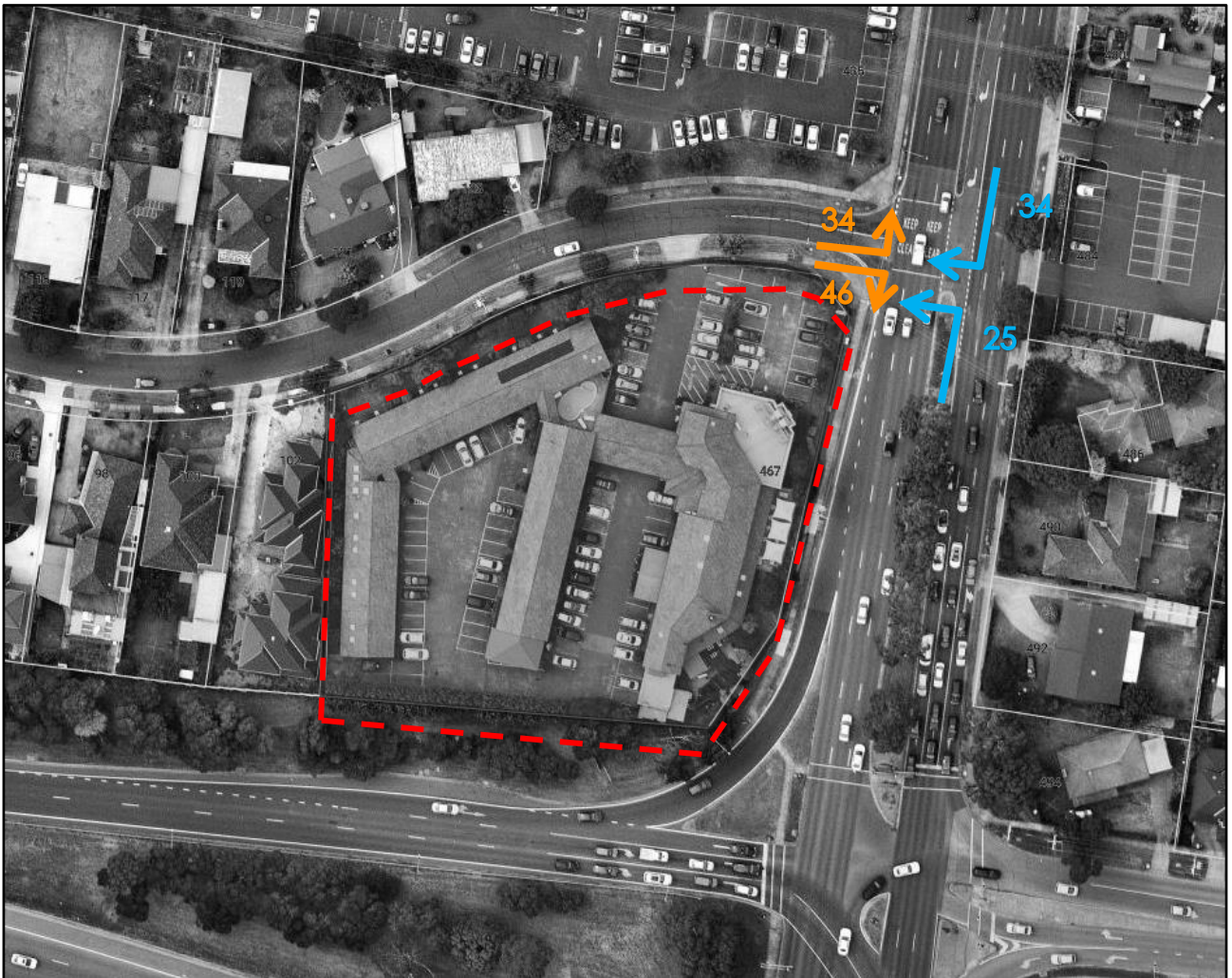
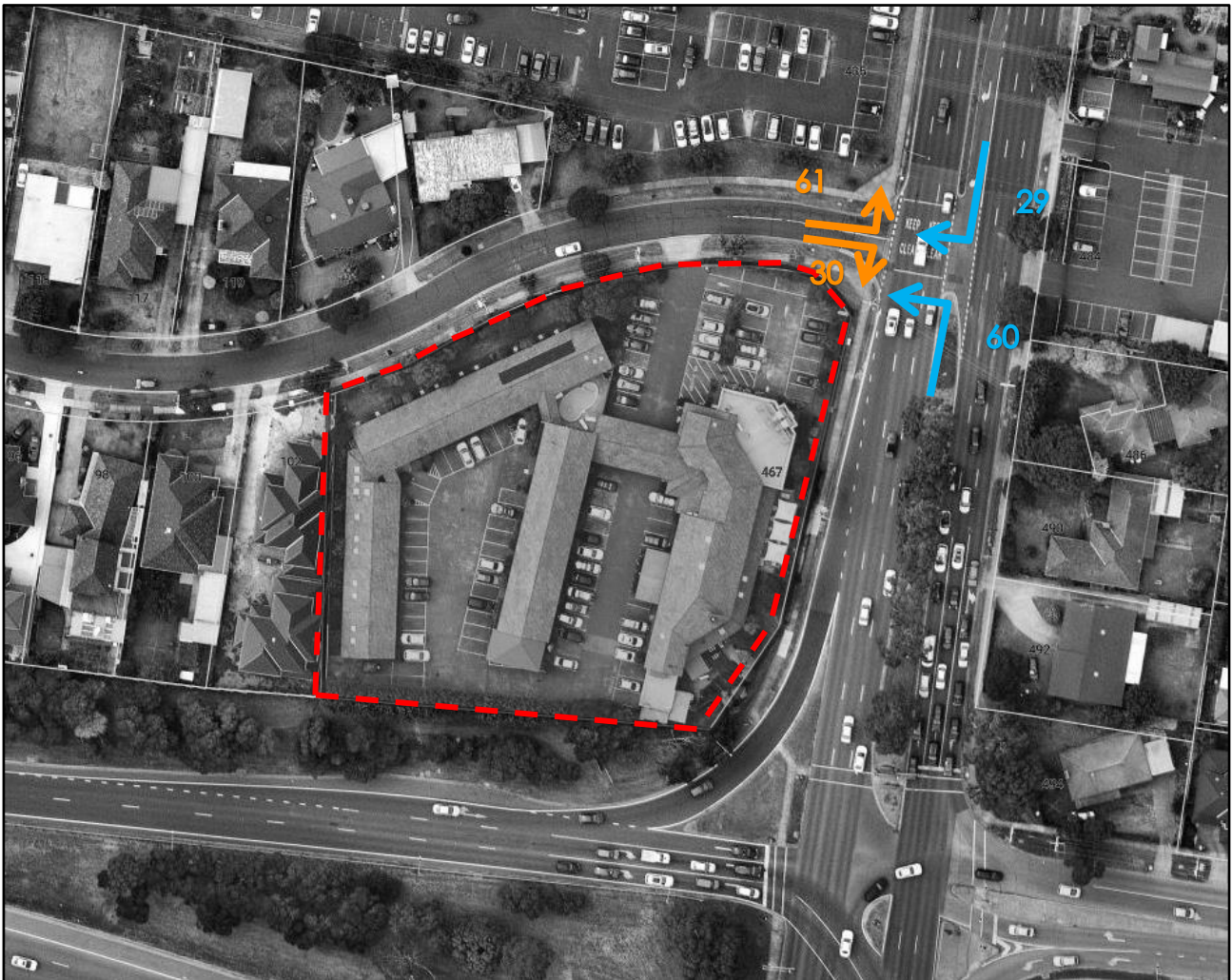


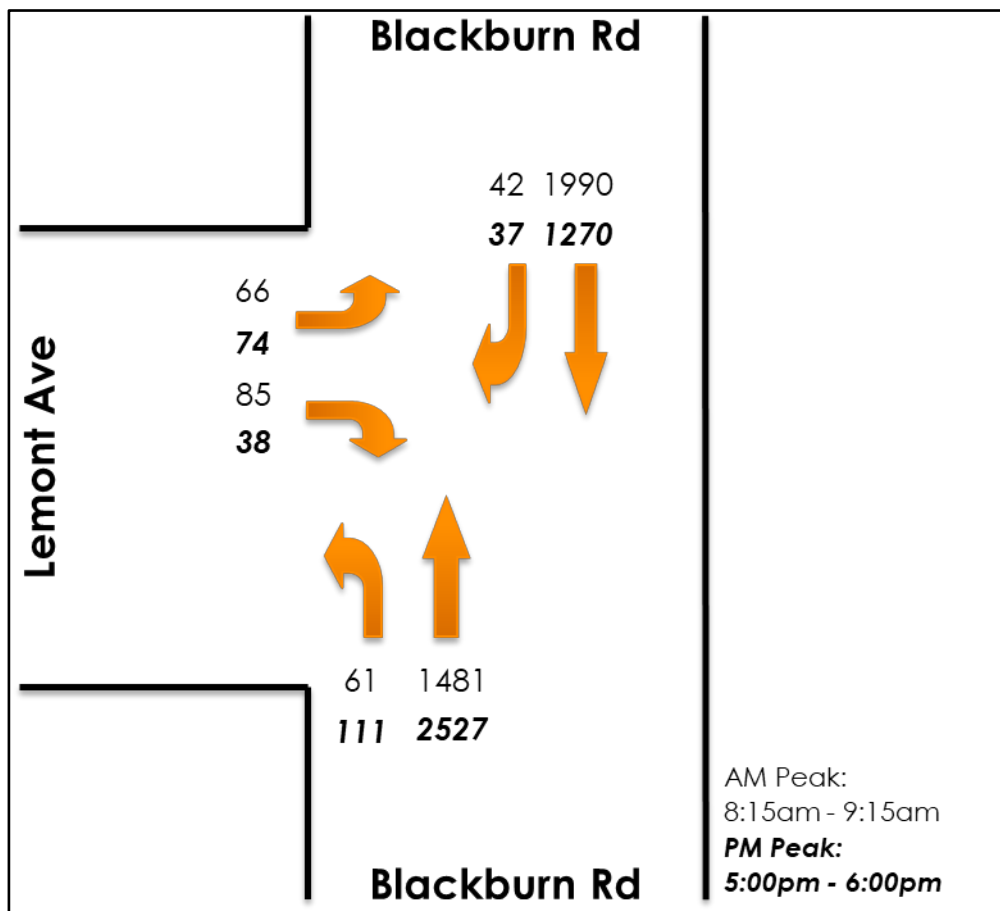
Figure 6 PM Peak Hour Traffic Generation



7.3 Traffic Impact

The volumes anticipated to be generated by the development have been superimposed onto the existing surveyed traffic volumes of the Blackburn Road/Lemont Avenue intersection as shown in Figure 6 below.

Figure 7 Post-Development Traffic Volumes - Blackburn Road / Lemont Avenue



The results of the Sidra analysis for the above volumes is shown below.

Table 19 Post-Development Blackburn Road / Lemont Avenue

| Approach | DoS | Avg Delay (sec) | Queue (m) |
|------------------------|-------|-----------------|-----------|
| AM Peak Hour | | | |
| Blackburn Road (South) | 0.287 | 0.3 | 0 |
| Blackburn Road (north) | 0.370 | 16.8 | 3 |
| Lemont Avenue (west) | 0.235 | 11.7 | 6.5 |
| PM Peak Hour | | | |
| Blackburn Road (South) | 0.491 | 0.3 | 0 |
| Blackburn Road (north) | 0.442 | 59.3 | 8.8 |
| Lemont Avenue (west) | 0.456 | 28.8 | 11 |

Reference to Table 19 above indicates that the intersection of Blackburn Road/Lemont Avenue is anticipated to be able to accommodate the expected traffic generated by the proposed development. The both peak hour periods are expected to continue to operate under 'excellent' conditions with minimum queues and delays expected to be experienced by motorists.

Furthermore, a 'keep clear' road restriction is provided at the intersection of Lamont Avenue with the northbound lanes of Blackburn Road, allowing vehicle clearance to/from Lamont Avenue when Blackburn Road experiences queuing from the Pinewood Shopping Village.

In view of the foregoing, the proposed arrangement is considered satisfactory.

8 CONCLUSIONS

It is proposed to develop the subject site for the purposes of a mixed-use development, retaining the existing hotel operation, with the addition of residential, child care centre, retirement village, medical centre and a convenience shop uses with 135 car parking spaces.

Considering the analysis presented above, it is concluded that:

- The proposed car parking, bicycle parking and access design is considered appropriate;
- It is recommended that an additional 102 car spaces be provided on-site to accommodate the projected car parking demands;
- The proposed development is expected to generate up to 84 inbound and 103 outbound vehicle movements in the AM peak hour, and 114 inbound and 109 outbound movements during the PM peak hour;
- The anticipated traffic volumes generated by the development are not expected to have an impact on the operation of the Blackburn Road/Lamont Avenue intersection or the surrounding road network and;
- Subject to the provision of additional car parking, there are no traffic engineering reasons which would preclude a permit from being issued for this proposal.