Memorandum

Traffic Engineers and Transport Planners

Project:	87-131 Bell Street, Ivanhoe
Our Ref:	G25654M-02A
Date:	6th August, 2019

RE: Response to Council's Memorandum prepared by One Mild Grid (dated 11th July, 2019)
Proposed Mixed Use Development at 87-131 Bell Street, Ivanhoe

1 Introduction

We have been instructed to review a set of amended plans prepared as part of a Section 57A amendment to a current planning application for a proposed mixed use development at 87-131 Bell Street, Ivanhoe.

The principal changes from a traffic engineering point of view relate to a reduction in the number of dwellings, minor reduction in office floor area and associated reduction in the provision of car parking on the site. Adjustments have been made to the car parking arrangements as a result of these changes and in order to respond to a number of concerns outlined within a Memorandum prepared by One Mile Grid (dated 11th July, 2019) on behalf of Council.

This Memorandum follows on from our Traffic Engineering Assessment (Ref: G25654R-01B, dated April 2019) which accompanied the original application. Our findings relating to traffic engineering matters outlined in that assessment remain the same and we continue to be of the opinion that the proposed development will not result in any detrimental impacts to the surrounding road network.

2 Amended Development Scheme

2.1 Amended Proposal

The proposal is for a multi-storey mixed use development on the site, comprising a number of apartments and commercial tenancies.

The proposal in generally consistent with that outlined in our previous assessment in terms of access locations and access arrangements, with the following key changes:

- A reduction in the number of apartments by 30 from 520 to 490.
- A reduction in the office floor area from 1,756m^2 to 1,689m^2.
- A reduction in 35 car spaces across the site.
- A reduction in motorcycle parking from 35 to 33 spaces.

The drop-off and pick-up arrangements also remain the same as per the previously submitted application.

Table 1 below provides a detailed summary of the amended development and proposed car parking allocation.

Table 1: Amended Development Summary

Use	No.	Car Parking Allocation	Resultant Car Parking Rate
Residential			
One-bedroom apt.	105	105	Min. 1 space / apartment
Two-bedroom apt.	336	336	Min. 1 space / apartment
Three-bedroom apt.	49	98	Min. 2 spaces / apartment
Visitors	490 (apts.)	49	*0.1 spaces / apartment*
Residential Subtotal	*520*	*588*	
Commercial			
Office	1,689m^2	50	Approx. 3 spaces / 100m^2
Shop	545.1m^2	19	Approx. 3.5 spaces / 100m^2
TOTAL		**657**	
Motorcycle Parking		33	1 space / 20 car spaces
Bike Parking		327	-

The development will provide a total of 657 car spaces across a two-level basement, lower ground and ground level carpark, which caters for residential, visitor, office and shop parking.

The application plans which form the basis of this updated assessment have been prepared by Rothe Lowman Architects (dated July, 2019).

An updated statutory car parking assessment is provided at Section 2.2.

2.2 Updated Statutory Car Parking Assessment

Clause 52.06 & Schedule 2 to Clause 45.09

The statutory car parking requirements for the proposed development are outlined in Parking Overlay Schedule 2 (PO2) to Clause 45.09 of the Banyule Planning Scheme. Schedule 2 operates in conjunction with, and varies the requirements of, Clause 52.06.

The purpose of Clause 52.06 is:

- *To ensure that car parking is provided in accordance with the Municipal Planning Strategy and the 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 adversely 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.*

The purpose of Schedule 2 to Clause 45.09 of the Banyule Planning Scheme is to:

- *To appropriately manage the provision of car parking within the Heidelberg Precinct Core Area (shown on the planning scheme map as PO2).*
- *To improve both public car parking provision and sustainable transport infrastructure within the centre.*
- *To provide for the collection of financial contributions in lieu of parking waivers to contribute to the construction of publicly-accessible off-street parking facilities within the Heidelberg Precinct Core Area.*

The uses listed in Schedule 2 to Clause 45.09 include Dwelling, for which the following applies:

- *0.8 car parking spaces to each 1 or 2 bedroom dwelling (with studies or studios that are separate rooms counted as a bedroom), plus*
- *1 car parking space for visitors to every 10 dwellings or part for developments of 10 or more.*

With respect to car parking rates, Schedule 2 to Clause 45.09 states for uses not listed under Table 1 that;

> *"for all other uses listed in Table 1 of Clause 52.06-5, the number of car parking spaces required for a use shall be calculated by using the Rate in Column B of that Table (representing a minimum rate)."*

An assessment of the relevant parking rates is provided at Table 2.

Table 2: Statutory Car Parking Requirements (Clause 52.06 & Schedule 2 to 45.09)

Use	No / Size	Statutory Requirement	Car Parking Requirement (Note 1)	Car Parking Provision
Residential Apartments	441	0.8 car space to each 1 & 2-bed dwelling for residents (Schedule 2)	352 spaces	441 spaces
	49	2 car spaces to each 3-bed dwelling for residents (Clause 52.06)	98 spaces	98 spaces
	490 (apts)	1 car space to every 10 dwellings for visitors (Schedule 2)	49 spaces	49 spaces
Shop	545.1 m^2	3.5 spaces to each 100 square metres (Clause 52.06)	19 spaces	19 spaces
Office	1,689 m^2	3 car spaces to each 100 square metres (Clause 52.06)	50 spaces	50 spaces
Total			**568 spaces**	**657 spaces**

Notes:

1. Clause 52.06-5 specifies that where a car parking calculation results in a requirement that is not a whole number, the number of spaces should be rounded down to the nearest whole number.

Based on the table above, the development is statutorily required to provide 568 car spaces, comprising the 450 spaces for residents of the apartments, 49 spaces for residential visitors and 69 spaces for the commercial uses.

The application proposes the provision of 657 car spaces, comprising 539 spaces for residents of the apartments, 49 spaces for residential visitors and 69 spaces for the commercial uses and therefore a reduction in the parking provisions is not required.

3 Review of Traffic Impacts

This review follows on from our Traffic Engineering Assessment (Ref: G25654R-01B, dated April 2019) which accompanied the original application. Our findings relating to traffic engineering matters outlined in that assessment remain the same and we continue to be of the opinion that the proposed development will not result in any detrimental impacts to the surrounding road network.

3.1 Traffic Generation

Based on the traffic generation rates outlined in our previous Traffic Engineering Assessment, it is projected that the proposal will generate up to 239 vehicle movements during the AM peak hour and 256 vehicle movements during the PM peak hour.

A summary of the traffic generation is provided in Table 3.

Table 3: Projected Site Traffic Generation

Use	AM Peak			PM Peak		
	In	Out	Total	In	Out	Total
Residential	41	165	206	124	82	206
Office	25	0	25	0	25	25
Shop	8	0	8	12	13	25
Total	**74**	**165**	**239**	**136**	**120**	**256**

Figure 1 outlines the expected future traffic volumes for each movement to and from the site generated by the proposed development based on the distribution of traffic as described within our previous traffic assessment.

The traffic volumes detailed at Figure 1 have been superimposed onto the existing traffic volumes (as detailed in our previous assessment) in order to produce post-development traffic volumes, which are shown at Figure 2.

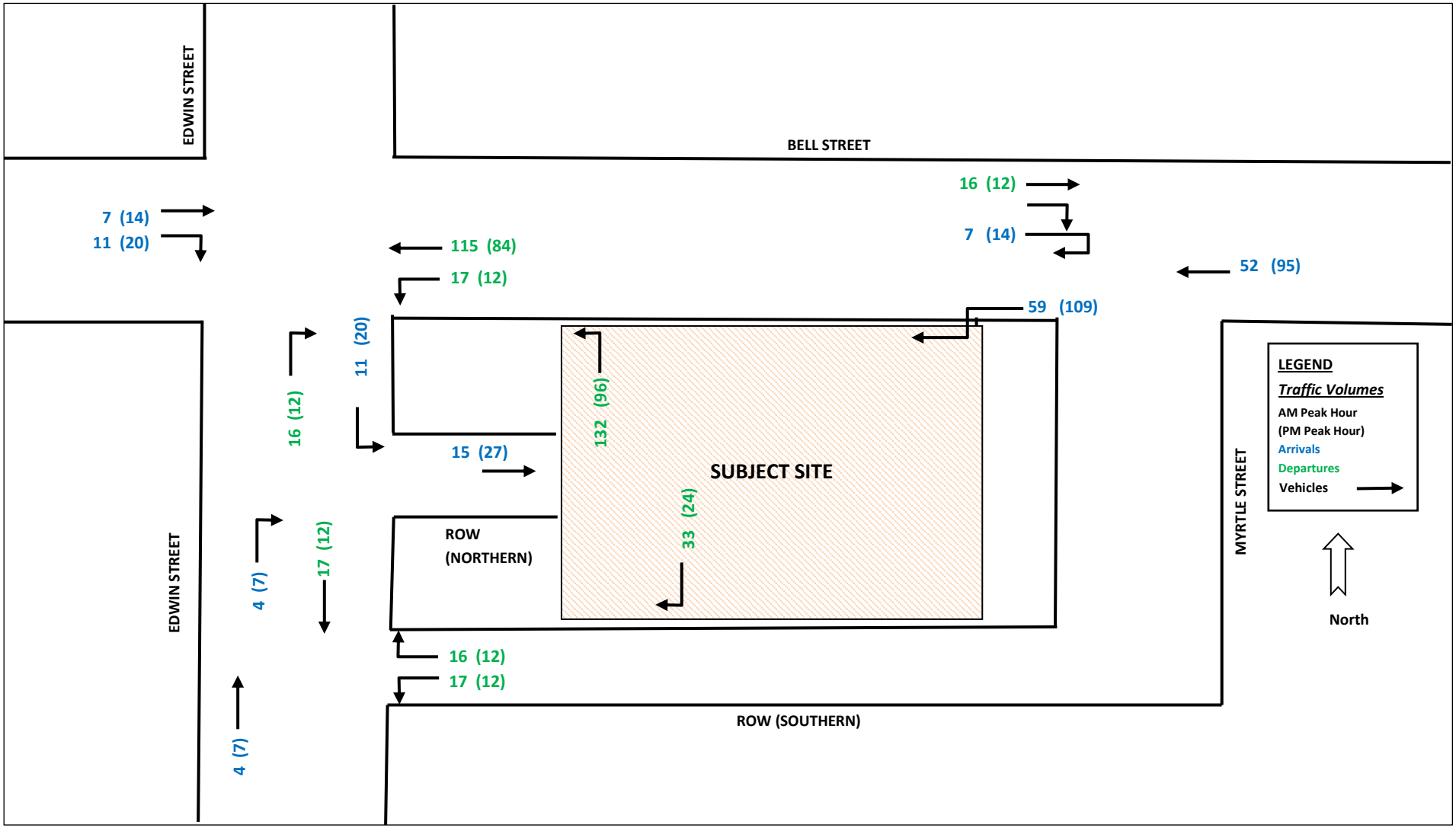

Figure 1: Development peak hour volumes

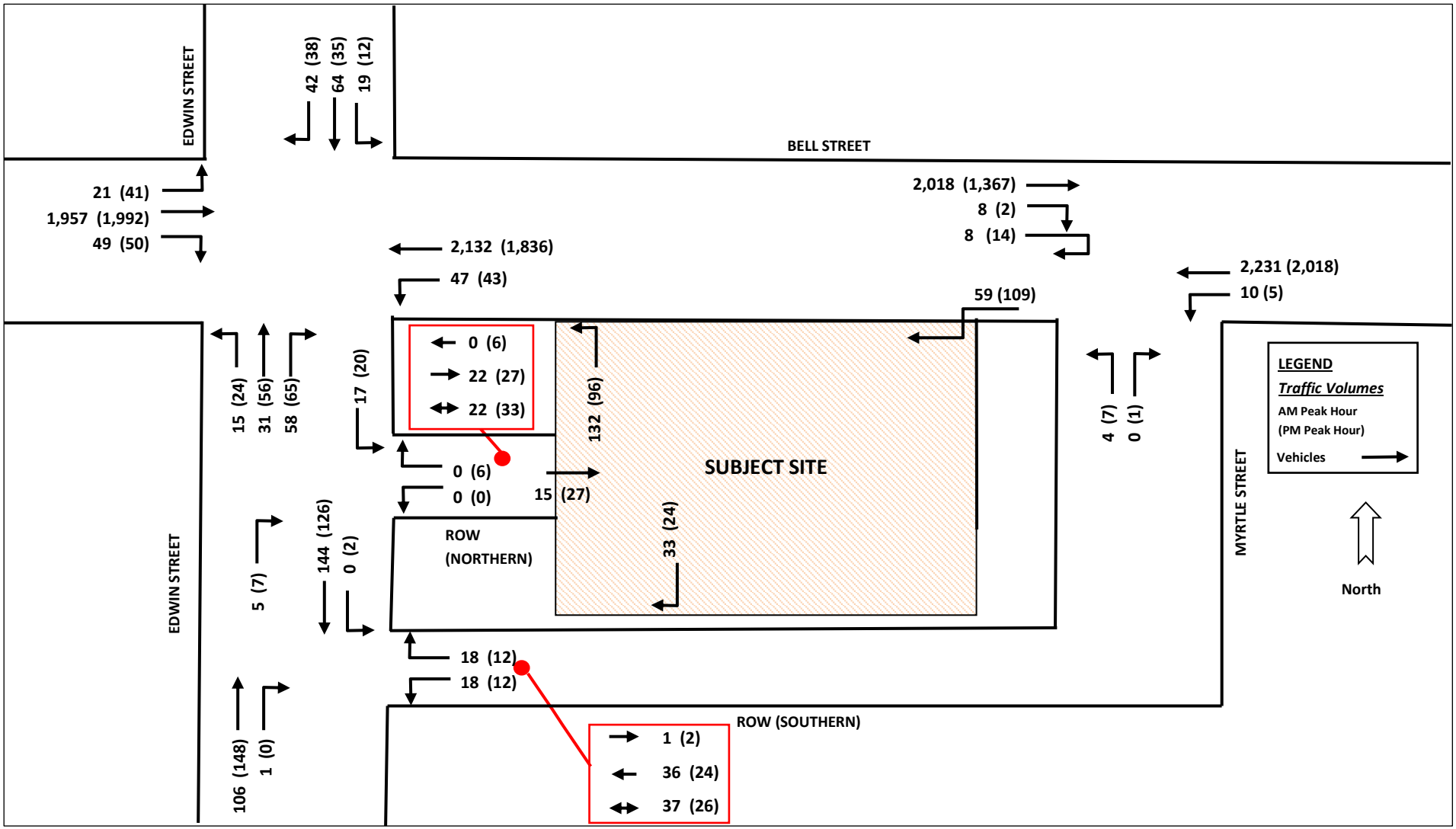

Figure 2: Post-development peak hour traffic volumes

3.2 Traffic Impact & Future Intersection Operation

Based on the preceding and the information outlined in our previous assessment, we expect that the proposal will generate in the order of 239-256 additional movements during the network peak hours.

Once split between different access routes to/from the site, Figure 1 demonstrates that the additional number of movements to any one intersection and movement will be relatively low to moderate in traffic engineering terms and is unlikely to have a significant impact on the operation of the surrounding network.

There will not be a detrimental impact on the operation of Edwin Street, Myrtle Street, Bell Street or the surrounding road network.

We continue to be of the opinion that the proposed development will not result in any detrimental impacts to the surrounding road network.

4 Council's Traffic Concerns

Council outlined within a Memorandum prepared by One Mile Grid (dated 11th July, 2019) that it had concerns regarding traffic volumes within the single-width sections of the northern and southern laneways to and from Edwin Street, as follows:

> *It should be noted that the Planning Scheme identifies the indicative capacity of the RoW as 300 vehicles per day. It is typically accepted that peak hour volumes represent 10% of the daily traffic volumes for a street, and the Traffix report projects a PM peak hour volume of 35 vehicle movements along the northern RoW. It can therefore be determined that the expected post-development daily traffic volumes of the norther RoW will exceed the indicative capacity. It is recommended that a vehicle conflict analysis be undertake to understand the probability of two opposing vehicles meeting along the norther RoW and subsequently, how many vehicles would be required to queue as a result of a conflict.*

In order to respond to this concern, a review of the post-development traffic volumes at these locations has been undertaken below.

4.1 Updated Right-Of-Way Volumes

The development proposes secondary vehicle access points to and from the surrounding ROWs which connect to the site.

As detailed previously, the northern ROW extends between Edwin Street and terminates at the site's western boundary, while the southern ROW extends between Edwin Street and Myrtle Street, including along the site's southern boundary.

In regards to specific impacts to the operation of both ROWs, these roads are typically configured with two-way, single lane carriageways with widths between 3.6m and 3.8m. Both of these ROWs currently only formally accommodate a single lane of traffic at any one time.

Clause 3.2.2 of AS2890.1-2004 provides guidelines for the provision of passing areas along low volume driveways and connecting roadways, which provides some guidance on determining the need for a vehicle passing area where an accessway connects to a local street. This clause states:

> *As a guide, 30 or more movements in a peak hour (in and out combined) would usually require provision for two vehicles to pass on the driveway, i.e. a minimum width of 5.5 metres. On long driveways, passing opportunities should be provided at least every 30 metres.*
>
> *Reversing movements to public roads shall be prohibited wherever possible.*
>
> *When two-way traffic volumes exceed 30 vehicles per hour, passing areas should be provided to accommodate simultaneous two-way traffic flow.*

Northern ROW

The development proposes an 'entry only' secondary vehicle entry point from the northern ROW connecting into the site at the site's western boundary, which primarily aims to provide an entry option into the site for traffic arriving from Edwin Street from the south or traffic arriving from Bell Street from the west (who do not choose to perform a U-turn at Myrtle Street). No traffic will be permitted to exit to this laneway from the site and accordingly, there will not be any conflicts between traffic associated with the proposed development. All site traffic within the northern ROW will be travelling in a one-way eastbound direction. It is noted that the shops located along the northern side of this laneway will continue to enter and exit from Edwin Street as it is a dead-end laneway.

There are informal passing opportunities available at various locations within the northern ROW due to the setback of buildings and fences at the rear of a number of commercial properties which front Bell Street between Edwin Street and the site.

Under existing conditions, there is minimal vehicle activity within the northern ROW, with 7 'entry' movements recorded in the AM peak hour and 6 'exit' movements recorded in the PM peak hour. These travel patterns relate to staff of the commercial tenancies which front Bell Street arriving to work in the AM peak hour and departing from work in the PM peak hour.

The proposed development is expected to generate 15 and 27 vehicle movements in the AM and PM peak hours, respectively. As a result, post-development, this level of traffic marginally exceeds the 30 vehicle movement guideline in the PM peak hour.

It is important to consider the practical implications of this arrangement. In the AM peak hour, there will be a total of 22 vehicles within the northern ROW, however all are expected to be 'inbound' movements; resulting in no conflicts between opposing vehicles within the ROW.

In the PM peak hour, there will be a total of 33 vehicles within the northern ROW, comprising 27 'inbound' movements and 6 existing 'outbound' movements. There will be a very heavy bias towards inbound traffic, meaning that the number of conflicts will be significantly lower than if the split of inbound and outbound traffic was 50/50.

As detailed above, there are informal passing opportunities within the northern ROW in the event that a conflict did occur mid-block (noting that the chance of this occurring is very low).

Based on this assessment, we are satisfied that the northern ROW will operate to an acceptable level.

In order to further respond to Council's concerns, a conflict analysis for the single-width section of the northern ROW is outlined at Section 4.2.

Southern ROW

The development proposes two 'exit only, right-turn only' secondary vehicle exit points to the southern ROW from both the ground floor and lower ground carpark levels at the site's southern boundary, which primarily aim to provide an exit option from the site for traffic wishing to depart towards the south along Edwin Street, as well as traffic wishing to turn right at Bell Street in order to travel towards the east. No traffic will be permitted to enter the site from the southern laneway and accordingly, there will not be any conflicts between traffic associated with the proposed development. All site traffic within the southern ROW will be travelling in a one-way westbound direction.

Under existing conditions, there is minimal vehicle activity within the southern ROW, with 1 and 2 'entry' movements recorded in the AM and PM peak hours, respectively, and 3 'exit' movements recorded in the PM peak hour. There are minimal properties accessed via the southern ROW at the present time.

We understand that there is an approval for a residential development comprising 6 dwellings at No. 53 Myrtle Street, Ivanhoe (Planning Permit No. P1061/2017, dated 10th October, 2018). Each of the dwellings are provided with a garage, with vehicle access to/from the Northern ROW, located at the eastern end towards Myrtle Street. We expect all traffic arriving to and departing from that site to utilise Myrtle Street, given its proximity to the site. There will be minimal to no impact on the subject site or to traffic within the southern ROW.

The proposed development is expected to generate 33 and 24 vehicle movements in the AM and PM peak hours, respectively. As a result, post-development, this level of traffic exceeds the 30 vehicle movement guideline for passing opportunities within the AM peak hour.

It is important to consider the practical implications of this arrangement. In the AM peak hour, there will be a total of 37 vehicles within the northern ROW (to the west of the site), however 36 of these are expected to be 'outbound/westbound' movements; resulting in minimal conflicts between opposing vehicles within the ROW.

In the PM peak hour, there will be a total of 26 vehicles within the northern ROW, comprising 24 'outbound' movements and 2 existing 'inbound' movements. There will be a very heavy bias towards outbound traffic, meaning that the number of conflicts will be significantly lower than if the split of inbound and outbound traffic was 50/50.

It is noted that based on a site inspection conducted by our office, there are minimal other vehicle access points to this southern ROW (besides from the subject site), with one located between Edwin Street and the site's western boundary, where an existing apartment building informally stores 3 vehicles within its front setback. These vehicles make up all vehicle movements recorded within the southern ROW during our traffic surveys. This property is located nearby to Edwin Street and the chance that a vehicle from the subject site is between the car parking location of this property and the western end of the ROW (at Edwin Street) is minimal. In addition to this property, there is an approval (as detailed previously) for a 6-dwelling development at the eastern end of the southern ROW, while

there is also a lock up gate on the southern side of the ROW opposite the site, which is not currently in use.

Furthermore, a number of significant passing opportunities have been provided along the site's southern boundary at ground level (to a width of at least 6.1m as per AS2890.1-2004) in order to provide future passing opportunities within this southern ROW in the event that further future development occurs.

Based on this assessment, we are satisfied that the southern ROW will operate to an acceptable level.

In order to further respond to Council's concerns, a conflict analysis for the single-width section of the southern ROW is outlined at Section 4.2.

4.2 Right-Of-Way Volumes – Conflict Analysis

As detailed previously, Council's traffic referral outlined some concerns regarding the capacity of the northern and southern ROW's to accommodate the post-development traffic volumes.

In order to respond to these concerns, we have reviewed the probability of vehicle conflicts within the laneways based on the expected volume of data and length of travel.

Traffix Group has previously undertaken detailed analysis of an extensive number of traffic tube counters in order to understand the frequency of two-way vehicle movements for given sections of road.

This study involved automatic traffic tube counters being placed across a large number of local roads. From further analysis of this traffic data, we were able to determine the average number of vehicle conflicts (i.e. chance that two vehicles would pass each other within a given window of time) based on certain lengths of road and the expected volume of traffic across an hour. This data has been used to determine an average number of conflicts within the northern and southern ROWs.

Northern ROW

Based on the updated post-development traffic volumes forecast at Section 3.1 and shown at Figure 2, it is expected that in the PM peak hour, there will be a two-way volume of 33 vehicles, comprising 27 'inbound' movements and 6 'outbound' movements. All 27 inbound movements will relate to site generated traffic. This level of traffic is marginally above the threshold to provide for two-way passing opportunities, as directed by AS2890.1-2004. Lower volumes are expected in the AM peak hour.

Based on a review of our conflict data, an average of 1.2 conflicts are expected within the northern ROW across the PM peak hour.

It needs to be acknowledged that this is a highly conservative analysis, as it considers that the inbound/outbound split of traffic is 50/50, compared to the post-development situation which will be closer to 80/20 (i.e. less conflicts expected). This analysis also considered that all traffic was required to travel along the entire length of the ROW, whereas in practice a number of 'outbound' movements from the existing properties on the north side of the ROW would occur at various locations along the ROW, reducing the travel length. There would also be informal opportunities for passing within the laneway which haven't been considered in this analysis.

An average of 1.2 conflicts per PM peak hour is low and acceptable in our view. In the event that a conflict does occur, there are a number of possible scenarios:

- An inbound vehicle is already travelling along the northern ROW when an outbound vehicle exits a property to the ROW. The vehicle exiting a property to the ROW would momentarily wait within their property (and reverse back to previous position if necessary) whilst the inbound vehicle passes by,
- The two opposing vehicles find a location to pass within the ROW (i.e. there are a number of setbacks to the ROW), or
- An inbound vehicle arrives at the northern ROW whilst a vehicle is already exiting the northern ROW, in which case the inbound vehicle will need to momentarily wait on Edwin Street at the entrance to the ROW whilst that vehicle exits the ROW.

An average of 1.2 conflicts in the PM peak hour means that across the peak hour, typically only 1 conflict is expected (i.e. 1 per 60 minutes). This conflict can be resolved via the means outlined above and no adverse impacts are expected.

We are satisfied that this level of traffic will not result in any adverse impacts to the operation of the northern ROW or the nearby road network.

Southern ROW

Based on the updated post-development traffic volumes forecast at Section 3.1 and shown at Figure 2, it is expected that in the AM peak hour, there will be a two-way volume of 37 vehicles, comprising 1 'inbound' movement and 36 'outbound' movements. 33 of the 36 outbound movements will relate to site generated traffic. This level of traffic is marginally above the threshold to provide for two-way passing opportunities, as directed by AS2890.1-2004. Lower volumes are expected in the PM peak hour, which will be within this threshold.

Based on a review of our conflict data, an average of 1.6 conflicts are expected within the southern ROW across the PM peak hour.

It needs to be acknowledged that this is a highly conservative analysis, as it considers that the inbound/outbound split of traffic is 50/50, compared to the post-development situation which will be closer to 5/95 (i.e. less conflicts expected).

The development site has provided a number of setbacks at ground level to create 'passing bays' in the event that any conflicting movements occur within this section (noting that none are anticipated at this stage in time), allowing for 'future proofing' in this area. This development site is not able to create any passing opportunities within the single-width section of the southern ROW between the west of the site boundary and Edwin Street. The properties located along the northern and southern sides of the southern ROW in this location may have an opportunity to create passing opportunities in the future in the event that they are redeveloped, however at this point in time, we have not relied on this occurring.

Another option for Council to explore in the future in the event that the laneway isn't widened via redevelopment of other properties, is for the southern ROW to operate in a one-way, westbound

direction given its long length. This would greatly increase its capacity. The development site has been designed to consider this as well.

An average of 1.6 conflicts per AM peak hour is low and acceptable in our view. In the event that a conflict does occur, there are a number of possible scenarios:

- An outbound vehicle is exiting the site as an inbound vehicle is already travelling along the ROW. The vehicle exiting the subject site could easily wait within the setback section of the southern laneway in one of the passing bays whilst the inbound vehicle passes by.
- An inbound vehicle arrives at the southern ROW whilst a vehicle is already exiting the ROW, in which case the inbound vehicle will need to momentarily wait on Edwin Street at the entrance to the ROW whilst that vehicle exits the ROW.

An average of 1.6 conflicts in the AM peak hour means that across the peak hour, typically only 1 to 2 conflicts are expected (i.e. 1 per 30 to 60 minutes). This conflict can be resolved via the means outlined above and no adverse impacts are expected.

We are satisfied that this level of traffic will not result in any adverse impacts to the operation of the southern ROW or the nearby road network.

4.3 Outstanding Council Concerns

We understand that the traffic Memorandum prepared by One Mile Grid (dated 11th July, 2019) also outlined an additional traffic related concern relating to the operation of the intersection of Bell Street and Myrtle Street, as follows:

> *A gap survey and/or SIDRA analysis of the Bell Street / Myrtle Street intersection should be undertaken to determine if vehicle can comfortably undertake U-turn movements from the northern side of Bell Street to access the site as proposed.*

This intersection has already been previously analysed at Section 5.5.2 within our Traffic Report which accompanied the town planning submission (Ref: G25654R-01B). This analysis undertook a gap acceptance review of U-turn movements at this intersection, which were found to be satisfactory.

We have also considered comments provided via Council's internal traffic referral (undated), which provided a series of comments primarily relating to internal design items within the carparks. A number of changes have been made to address these comments, where appropriate. We note that the Memorandum prepared by One Mile Grid outlined that the design of the car parking and access arrangements were satisfactory.

5 Conclusions

Based on our various investigations, we consider that our findings relating to traffic engineering matters outlined in our previous detailed assessment remain the same and we continue to be of the opinion that the proposed development will not result in any detrimental impacts to the surrounding road network.

Overall, we are satisfied that there are no traffic engineering reasons why the application for a mixed use development at 87-131 Bell Street, Ivanhoe, should not be approved subject to appropriate conditions. Please contact myself at Traffix Group if you require any further information.

Yours faithfully,

TRAFFIX GROUP PTY LTD

JASON STONE

Senior Traffic Engineer