Transport & Parking Analysis
170-174 Highbury Road Mount Waverley

Prepared for Preveza Enterprizes Pty Ltd

10 August 2016

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Contents

1. Introduction

1.1. Context

This report presents an updated traffic impact assessment in support of a planning permit application to amend a proposed development located at 170-174 Highbury Road, Mount Waverley (at its intersection with Huntingdale Road, south-east corner).

On 21 October 2014 the City of Monash issued a permit for a mixed-use development at 170-174 Highbury Road, Mount Waverley. The permit specifically allows for development of a three storey building with basement car parking and use for a medical centre (up to 17 practitioners), child care centre (up to 130 children), occasional child care (up to 45 children), cafe (40 seats) and dwellings and associated parking dispensation and alteration of access to a road zone, category 1.

1.2. The Proposed Amendment to the Development

A number of modifications have been introduced to the development scheme – triggering a new application to amend the existing planning permit. The new development application includes:

- Retention of the ground floor medical centre with 17 practitioners (unchanged from current permit)
- Retention of ground floor café with a capacity of 40 seats (unchanged from current permit)
- Marginal increase in the child care centre numbers from 130 children to 144 children (the first floor childcare capacity is unchanged at 130 kids – however, the overall childcare function increases to 144 children, as 14 new child care spaces are proposed on the ground floor – these are part of the same child care complex/business)
- Deletion of occasional child care centre for 45 children
- Provision of 10 residential dwellings on the second floor (an increase of one dwelling from the previous nine) – comprising 9 two bedroom units and a single one bedroom unit
- Provision of 10 residential dwellings on a new third floor (comprising 9 two bedroom units and a single one bedroom unit)
- Increase in the number of off-street parking spaces from 102 to 118 – all parking is located in a two-level basement accessed from Highbury Road (using a left-in/left-out arrangement designed in accordance with VicRoads requirements)
- Alteration to 'loading dock' access – the direct access off Huntingdale Road (as previously endorsed) is to change and 'loading access' is proposed to occur via the laneway abutting the site's southern boundary. This removes all direct interaction between service/delivery vehicles and Huntingdale Road.

1.3. This Report

The following report provides an assessment of the traffic and parking impacts of the proposed amended development. More specifically, this report includes an assessment of the following:

- The provisions of the Planning Scheme in so far as they relate to carparking and the appropriateness of the off-street carparking supply;
- Suitability of the proposed parking in terms of layout;
- Proposed access/egress arrangements for the site; and
- Likely traffic impacts.

This report concludes that the proposed parking supply is satisfactory and that the traffic generation associated with the amended proposal is lower than the existing approved development. Thus, there are no traffic engineering reasons why the proposed development should not be allowed.

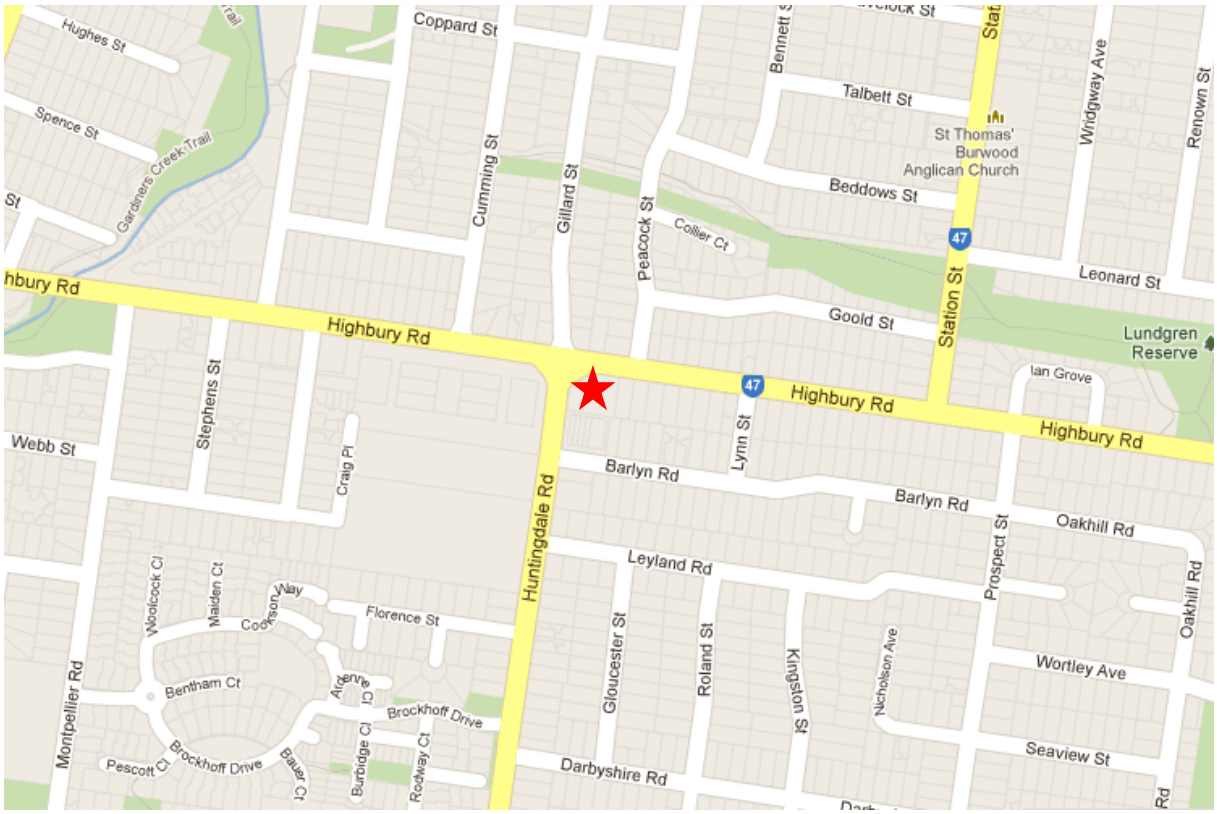
In particular:

- The traffic generated by the development at 170-174 Highbury Road is not only **very low**, in absolute terms, but is also expected to have a **negligible impact on the operation of surrounding roads**.
- The provision of a left-in / left-out access driveway on Highbury Road (for residents, visitors and staff) will **safely** and **adequately cater** for the **expected peak traffic movements** associated with the development.
- SIDRA analysis at the Highbury Road / Huntingdale Road / Gillard Street intersection indicates **no adverse impacts on intersection performance**. The intersection is adequately capable of satisfying the traffic demand generated by the development. The intersection level of service remains at current rating of C and there are only marginal changes to operational aspects.
- The proposal provides **adequate parking**. Specifically, the **car parking supply** for the development (118 spaces) **satisfies the Car Parking Demand Assessment** that has been undertaken and justifies a small reduction in the statutory parking requirement. Furthermore, the **bicycle parking supply** (14 spaces) **exceeds the statutory requirement** of 9 spaces.
- The **parking layout** is **satisfactory** as it accords with the design guidelines set out in the Planning Scheme and Australian Standard AS2890.
- The development's **'waste pick-up' point off the laneway abutting the subject site's southern boundary** is appropriately designed to enable garbage trucks to undertake waste collection fully off-street.

2. Existing Conditions

2.1. Location & Land Use

This development site at 170-174 Highbury Road was formerly occupied by a petrol station and is located on the corner with Huntingdale Road, as shown by the star in the image below. A neighbourhood activity centre is located adjacent to the site, immediately to its south. Residential areas exist to the north and east, whereas a large business park and other commercial uses are located across Huntingdale Road to the west and south of the subject site.



2.2. Surrounding Road Network

Highbury & Huntingdale Roads

Highbury and Huntingdale Roads are undivided arterial roads under the control of VicRoads. In the vicinity of the subject site both roads feature 2 lanes in each direction. They form part of Metropolitan Route 47 – which is a collection of predominantly north/south arterial roads stretching from Eltham to Oakleigh. The majority of route 47 is single (undivided) carriageway. The section of Highbury Road that forms part of route 47 is relatively short (from Huntingdale Road to Station Street). This section of Highbury Road runs east-west.

2.3. Public Transport

The subject site is well serviced by public transport. Bus Route 767 services the site and links two major regional destinations – Southland Shopping Centre to Box Hill Central. Route 767 travels past the site along Huntingdale Road, Highbury Road and then turns into Station Street – providing an interchange with tram route 75 on the Burwood Highway (about 1 kilometre from the subject site) as well as linking with other bus routes – 732 and 281. Bus route 767 also provides direct connectivity to Jordanville train station (Glen Waverley line) which is located approximately 2 kilometres south of the site, just off the east side of Huntingdale Road. Together these public transport services offer excellent connectivity into the surrounding residential catchment as well as convenient access to multiple attractions and destinations in the metropolitan area and towards the inner city and major modal interchange locations, such as Box Hill.

2.4. Sustainable Transport

The subject site is well serviced by pedestrian and bicycle networks. All streets in the surrounding neighbourhood are equipped with footpaths – providing a comprehensive, safe, convenient and connected pedestrian network enabling full accessibility by foot. Safe bike riding conditions are also found in residential streets abutting the subject site and there are a number of dedicated off-road local and regional bicycle facilities that exist; including the Gardiners Creek bicycle trail (around 500 metres west of the subject site) as well as smaller off-street links such as those along Lundgren Chain Reserve (just north of the subject site) and Damper Creek Reserve (east of the subject site). Furthermore, Huntingdale Road, Highbury Road and Station Street all form part of the metropolitan Principal Bicycle Network – and thus are likely to be the location of future cyclist improvement schemes by VicRoads. Importantly, the City of Monash has produced a *Walking and Cycling Strategy* where it has expressed a clear commitment to developing a city that is walking and cycling friendly and one where residents of all ages and abilities can easily walk and cycle as their preferred form of exercise and transport.

2.5. Existing Planning Permit

On 21 October 2014 the City of Monash issued a permit for a mixed-use development at 170-174 Highbury Road, Mount Waverley. The permit specifically allows for development of a three storey building with basement car parking and use for a medical centre (up to 17 practitioners), child care centre (up to 130 children), occasional child care (up to 45 children), cafe (40 seats) and dwellings and associated parking dispensation and alteration of access to a road zone, category 1. A number of conditions were incorporated in that permit requiring that the plans be modified to show several changes. The endorsed plans feature 102 on-site parking spaces, including a tandem pair of parking spaces marked as 'café staff' (though there is no express requirement for this under the permit conditions). The most relevant conditions, from a traffic and parking perspective were:

Condition 1

1 e) The provision of physical measures and associated signage within the site to support the left-in/left-out restriction for access to and from Highbury Road;

1 f) Provision a corner splay or area at least 50% clear of visual obstructions (or with a height of less than 1.2 metres) extending at least 2.0 metres long x 2.5 metres deep {within the property) from the edge of the exit lane of each vehicle crossing to provide a clear view of pedestrians on the footpath of the frontage road;

1 g) Provision of signage advising approaching vehicles of the visitor parking entrance are to be installed at the Highbury Road entrance;
1 h) On-site medical staff, child care staff, cafe staff and residential parking spaces are required to be clearly marked;
1 i) Ramp grades between Basement Level 1 and Basement Level 2 designed to provide a minimum 2.0 metre grade transitions between different section of ramp or floor for changes in grade in excess of 12.5% (summit grade change) or 15% (sag grade change);
1 j) Provide an additional 500mm in length between each tandem parking space;
1 k) Accessible car spaces relocated adjacent to the basement lift well/gayer;
1 l) Accessible parking spaces should generally be designed in accordance with the Australian Standard for Off-Street Parking for people with disabilities, AS/NZS 2890.6. The vehicle path to and from each accessible space shall have a minimum headroom of 2200mm. The headroom above each dedicated space and adjacent shared area shall be a minimum of 2500mm;
1 m) Provision of a continuous accessible path of travel is required to be provided from each accessible space to the liftwell and all medical suites, in accordance with the Australian Standard for Design for access and mobility, AS 1428.1 2009.
1 n) A minimum of thirteen on-site bicycle spaces and 2 showers/change rooms to be provided. Bicycle parking facilities shall generally follow the design and signage requirements set out in Clause 52.34 of the Monash Planning Scheme;
1 o) Provision of a minimum headroom of 3.5m to the Loading Bay for a small rigid vehicle of 6.4m;
1 p) Existing redundant crossings are to be removed and replaced with kerb and channel;
1 q) Access and egress to Highbury Road restricted to left-in and left out only, with the provision of signs to introduce a statutory prohibition and a traffic island at the access to provide physical support for the prohibition (VicRoads requirement);
1 r) Swept path for B99 car entering and exiting the at the Highbury Road access overlaid on the layout plan (VicRoads requirement);
1 s) Approach Sight Distance (ASD) to the pedestrian crossing achieved and all vegetation within this sight distance marked on the plans as being no greater than 0.2 metres in height. ASD Shall be in accordance with AustRoads -Part 4A, Section 3.2.1 and shall be to V60 conditions (VicRoads requirement);
1 t) Truck loading bay design as per Movendo Drawing SK002, Job No. NIC002-13 Revision A dated 23.05.14 (VicRoads requirement).

Condition 29 – No less than 53 car spaces must be provided on the land for the medical centre use. Any future subdivision of the approved development must provide for appropriate allocation of medical centre car parking on Title to the satisfaction of the Responsible Authority.

Condition 30 – No less than 38 car spaces must be provided on the land for the childcare centre use. Any future subdivision of the approved development must provide for appropriate allocation of childcare centre car parking on Title to the satisfaction of the Responsible Authority.

Condition 31 –No less than 1 car space must be provided on the land for each dwelling. Any future subdivision of the approved development must provide allocation of 1car space per dwelling on Title to the satisfaction of the Responsible Authority.

Condition 40 – Vehicles larger than a 6.4m small rigid vehicle (as defined by Australian Standard Parking Facilities Part 2: Off-street commercial vehicle facilities) must not enter the site at any time.

3. Proposed Development

3.1. The Zoning

The subject site is shown by the 'hatched' area in Figure 1 and is located in a General Residential Zone – Schedule 2 (GRZ2) of the Monash Planning Scheme. A Commercial 1 Zone (C1Z) exists immediately adjacent to and to the south of the site, as can be seen in the map. To the west of the site (across Huntingdale Road) there is an extensive Industrial 1 Zone (IN1Z).

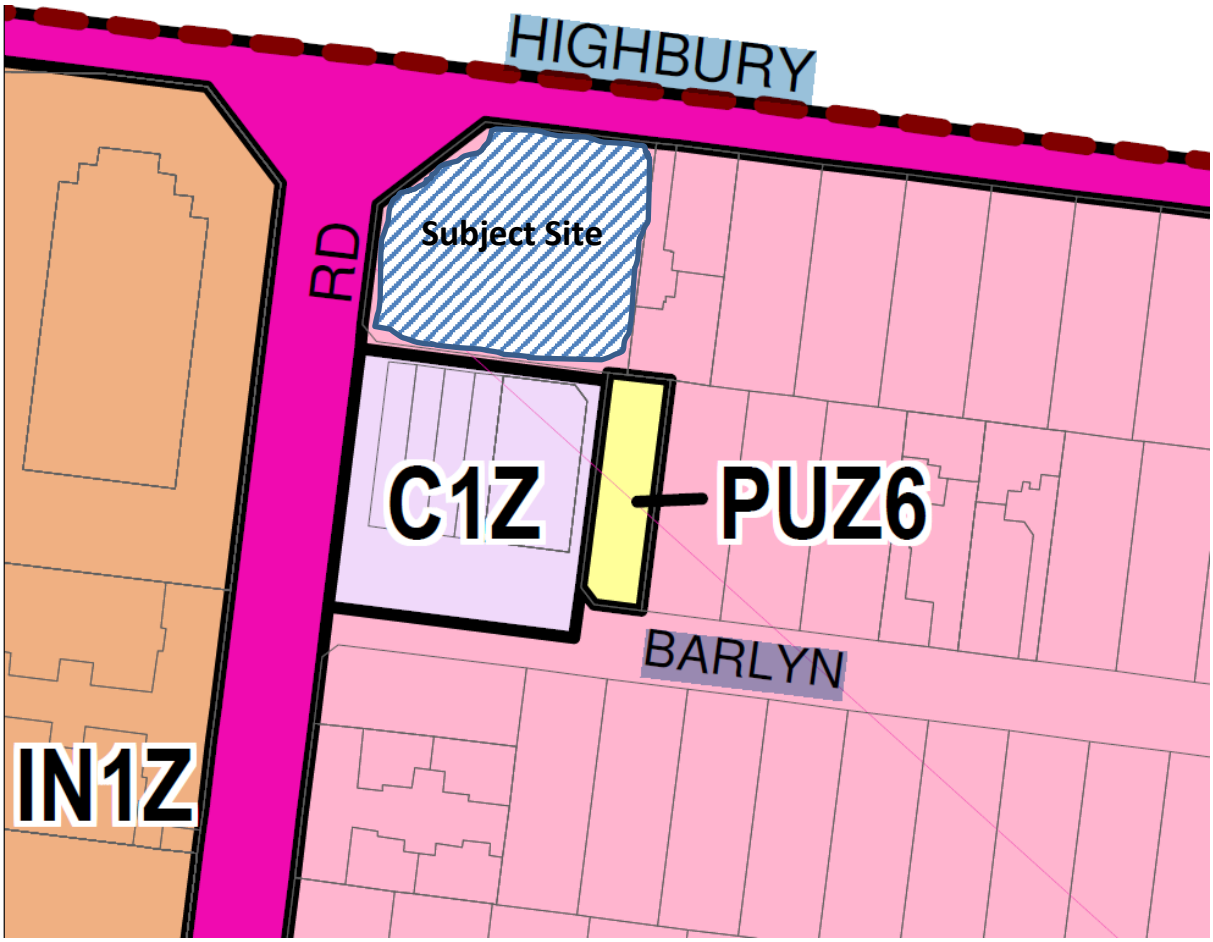


Figure 1: Zoning

While GRZ2 is designed to provide for residential development at a range of densities and with a variety of dwellings, it is also designed, in appropriate locations, to allow educational, recreational, religious, **community** and a limited **range of other non-residential uses** to **serve local community needs**. Uses such as *Childcare Centre* and *Medical Centre* – both of which serve local communities – are clearly the type of uses that would be appropriate within GRZ2, where circumstances are deemed favourable.

The subject site's location at the interface with C1Z and IN1Z zones provides the appropriate context for inclusion of important community services such as *Childcare* and *Medical Centre*. Both these uses are important to sustain the viability of residential communities and will also complement and strengthen the synergy with abutting C1Z and IN1Z Zones. The proposed use as *Medical Centre* is explicitly identified as a ***Permit Required*** use in a GRZ2 zone. The proposed use as *Childcare Centre* also requires a permit (by virtue of not being identified as either a *Permit Not Required* or as a *Prohibited* use in a GRZ2 zone). Thus, this development falls into the ***Permit required*** category and will be subject to the issue of a planning permit.

3.2. Composition

The proposed development scheme includes the following components:

- Childcare centre with a capacity for 144 children
- Medical centre capable of accommodating 17 practitioners
- Ground floor café (approximately 256m^2) with capacity for 40 seats
- Provision of 20 residential dwellings (comprising 18 two-bedroom units and 2 one-bedroom units)
- 118 car parking spaces (including 2 disabled bays) – all parking is located in a two-level basement accessed from Highbury Road (using a left-in/left-out arrangement designed in accordance with VicRoads requirements).
- 14 bicycle parking spaces

3.3. Vehicular Access & Operating Hours

Access to off-street parking is proposed entirely via Highbury Road. No access to the site will occur via Huntingdale Road.

The proposed operating hours for the various uses match the hours allowed under the existing permit:

- Child care – this facility is proposed to operate between the hours of 7am and 7pm on weekdays (Monday to Friday)
- Medical centre tenancies and Café – these uses are proposed to operate during the following hours:
  - 8am to 9pm Monday to Friday
  - 9am to 5pm Saturday

4. Parking Assessment

4.1. Statutory Parking Requirement

The starting point in assessing the adequacy of car-parking arrangements servicing the development, is to utilise the parking rates stipulated under the Planning Scheme. Thus, for the purposes of this analysis, the parking rates for the development's components are obtained from Table 1 in Clause 52.06-5 of the Monash Planning Scheme, as follows:

- Childcare centre – 0.22 spaces per child
- Medical centre – 5 spaces to the first person providing health services plus 3 spaces to every other person providing health services
- Dwellings – 1 car space to each one or two bedroom plus1 car space for visitors to every 5 dwellings for developments of 5 or more dwellings
- Café – This is an innominate use. The current 40 seat café has been endorsed by the City of Monash and, under the current planning permit, there is no specific car parking requirement for this café, a reflection that the responsible authority is satisfied with this arrangement (in contrast to the permit conditions for the medical centre, childcare and residential components – all of which require specific allocation of parking for those uses). Thus, it is accepted that the café patrons are primarily associated with the other uses on the subject site and do not generate separate parking demands.

Application of the above rates yields the following parking requirements:

- Childcare centre – 31 spaces (based on the presence of 144 children)
- Medical centre – 53 spaces (based on the presence of 17 medical practitioners)
- Dwellings – 24 spaces (based on 20 dwellings)

The overall total parking requirement is 108 spaces. The proposed provision of 118 parking spaces exceeds the statutory requirement by 10 spaces. Under the new development proposal, two spaces have been assigned to café staff (consistent with the endorsed plans for the existing planning permit – though there is no express requirement for this under the permit conditions). Unlike the current endorsed plans (where café staff parking is provided in tandem) the new proposal features two individually accessible spaces.

In summary, this proposal for an amended development obviates any need for a parking waiver, and is a net improvement from the current endorsed planning permit.

4.2. Bicycle Parking & Facilities

Bicycle parking requirements are found in Clause 52.34-3 of the Planning Scheme. The relevant rates are reproduced below.

- Childcare centre (using the "primary school" category as defined under table 1 to clause 52.34-3) – 1 to each 20 employees
- Medical centre – 1 to each 8 practitioners for staff and 1 to each 4 practitioners for visitors

- Café (using the "restaurant" category as defined under table 1 to clause 52.34-3) – 1 to each 100 m^2 of floor area available to the public for staff and 2 plus 1 to each 200 m^2 of floor area available to the public if the floor area available to the public exceeds 400 m^2

For dwellings, the clause stipulates that bicycle parking needs to be provided for developments of four or more storeys. Thus the current development does not need to provide residential bicycle parking. Application of the above rates yields the following bicycle parking requirements:

- Childcare centre – 1 space (for staff)
- Medical centre – 6 spaces (2 for staff and 4 for visitors)
- Café – 2 spaces (both for staff – based on an area of 256m^2)
- Dwellings – 0 spaces

The total parking requirement is therefore 9 spaces – comprising 5 spaces for staff and 4 for visitors. The proposed provision of 14 bicycle parking spaces exceeds the statutory parking requirement in the Planning Scheme.

Table 2 to Clause 52.34-3 also defines the "shower" requirement for cyclists, namely if 5 or more employee bicycle spaces are required, 1 shower for the first 5 employee bicycle spaces, plus 1 to each 10 employee bicycle spaces thereafter. Furthermore, table 3 to Clause 52.34-3 requires 1 change room or direct access to a communal change room to each shower. The change room may be a combined shower and change room. Under the above principles, the presence of 5 bicycle parking spaces for staff would trigger a requirement for 1 shower and associated change room. This have been provided on the ground floor.

4.3. Parking Management

The parking spaces in the basement will be clearly signed and linemarked for reserved long-term and short-term use and for the various occupants and visitor (including areas identified for medical practitioner patients and parents dropping off / picking up children from the childcare centre). More specifically, the following reservation of parking spaces will be adopted:

- 20 reserved resident parking spaces (one for each dwelling)
- 31 long-term spaces for the commercial tenancies (including 12 for the staff of the childcare centre, 17 for medical suites' staff and 2 for any café staff)
- 36 short-term spaces for use by medical centre visitors
- 20 short-term spaces for use by pick-up/drop-off activities at the childcare centre
- 11 generic visitor spaces (which may be used by residents' visitors and any other visitors)

This proposed apportionment of spaces is fully consistent with the minimum requirements outlined under the existing planning permit (specifically conditions 29, 30 and 31), as:

- 53 car spaces are provided for the medical centre use – this provision is unchanged as the number of medical practitioners under the current application is the same as the number allowed in the existing planning permit.
- The existing permit required 38 car spaces to be provided for the childcare centre use (with 175 children) – equivalent to a rate of 0.217 spaces/child. The current proposal provides proportionally more parking – with 32 spaces for 144 children at a rate of 0.222 spaces/child
- 1 car space is provided for each dwelling

4.4. Access Arrangements & Parking Layout

The proposed 118 carparking spaces are located in a 2-level underground basement that will be accessed off Highbury Road, as shown in Appendix A. Only left-in / left-out movements will be permitted at this location, which is approximately 50 metres east of the Huntingdale Road intersection. The left-in / left-out arrangement and indicative signage and geometric design of the driveway are consistent with VicRoads' requirements under the existing planning permit. The ultimate detailed design of the driveway will fully conform with VicRoads' design requirements. The carpark layout and design has been based on the design guidelines set out in the Planning Scheme and the Australian Standard for Parking Facilities (Off-street car parking) [AS/NZS 2890.1]. The carpark satisfies all key design aspects outlined in those documents. The design also addresses all relevant requirements set out under the existing panning permit. There are no carpark control measures proposed (such as mechanical boom gates) to control access during public opening hours and/or otherwise affect vehicle movements into and out of the development. All vehicle movements will be free-flowing.

4.5. Waste Collection Arrangements

The current planning permit endorses an on-site loading dock accessed directly off Huntingdale Road. This loading dock area has been deleted under the new development plans for this application to amend the planning permit.

The proposed arrangement is to collect waste from a purpose-designed on-site area located on the development's southern boundary, adjacent to the Bin Stores and abutting the laneway on the southern side of the development. This area is around 16 metres long and is fully recessed to a width of 4 metres inside the property (as shown by the 'shaded yellow' area in Figure 2 below) – the broader ground floor footprint is shown in full at Appendix A. The generous dimensions of the waste pick-up point will enable vehicles to undertake waste-collection fully within the site.

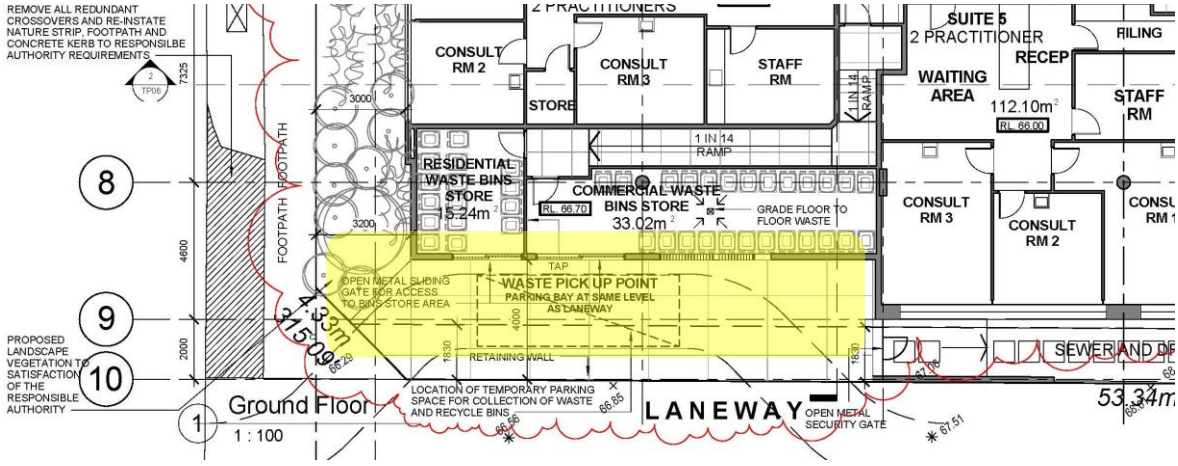


Figure 2: Development Waste pick-up Point

Under this arrangement, waste-collection vehicles will enter the laneway from Huntingdale Road (driving in a forward direction) and drive into the 'waste pick-up point' to collect bins. Upon completing their pick-up, vehicles will follow the laneway (continuing to drive in a forward direction) and exit at Barlyn Road. The manoeuvring sequence is shown in Figure 3.

Review of conditions along the laneway reveal that the geometry is suitable to allow a 6.4m long service vehicle to readily navigate the 'circuit' in a clockwise direction from Huntingdale Road and get back onto Barlyn Road in a single forward-facing movement.

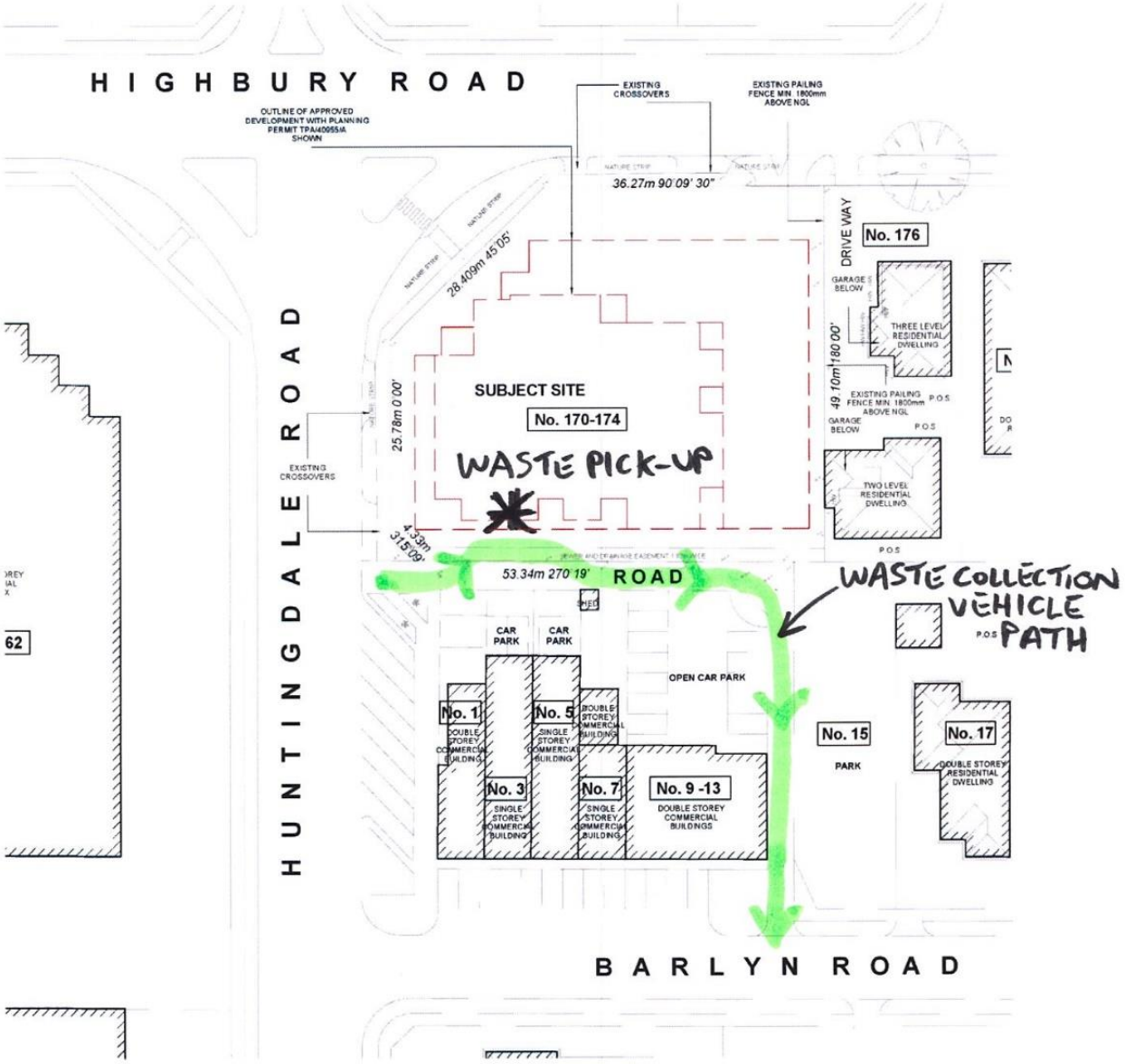


Figure 3: Waste Collection – Driving Sequence along Laneway into Site and Exit onto Barlyn Road

A detailed Waste Management Plan (WMP) for the development has been prepared by Wastech Services Pty Ltd. The WMP identifies that waste collection will be performed by small rigid vehicle with an overall length of 6.4m which will easily manoeuvre into the 16-metre long waste-collection bay. Garbage and recycling will be collected up to four times per week. Collections will be performed by a private contractor nominated by the Body Corporate.

As a private waste collection is proposed, the hours during which waste and recycling is collected will be consistent with the Council's Community Local Laws. These are as follows:

- 7am to 8pm Monday to Saturday; and
- 9am to 8pm Sunday and public holidays

5. Traffic Impact

The traffic analysis has been structured as follows:

- Prediction of the likely peak hour generation in traffic volume;
- Distribution of this traffic volume on the road network; and
- Assessment of the ability of roads to accommodate the predicted traffic flows.

5.1. Traffic Generation

5.1.1 Overview of Trip-making Characteristics

The analysis in a transport assessment may focus on one or more peak hours depending on the type of land use proposed and the specific issues to be addressed. Firstly, the peak hours should be identified on the basis of the 'worst case' combination of site-generated trips plus background trips on the adjacent road network. To determine this, two peak scenarios should be considered:

- peak period(s) for the surrounding roads
- peak period(s) for the development

The peak periods for the "surrounding roads" are the standard peak periods found across this part of metropolitan Melbourne, namely 8am to 9am (AM peak) and 5pm to 6pm (PM peak). Car trips associated with residents of the development will also manifest the same peak hour characteristics (with most residents 'leaving home' and 'returning home' in those traditional commuter peak hours). The other uses on site – namely the proposed childcare centre, café and medical centre will already be 'open-for-business' during the AM and PM peak periods (thus attracting some trips in those hours).

While the childcare centre is expected to exhibit peak trip-making activity that closely mirrors the commuter peaks on the surrounding roads (as parents drop children off in the morning and pick them up in the late afternoon/early evening) the medical centre is likely to exhibit a "flatter" traffic generation profile as patient arrivals and departures will be steady throughout the day and staff is likely to arrive prior to opening and leave after closing time (as will staff of the childcare centre) – thus avoiding the commuter peaks. In this regard it is relevant to note that the proposed weekday operating hours for the development's uses are as follows:

- Childcare – 7:00am and 7:00pm on weekdays (Monday to Friday)
- Medical centre tenancies and Café – 8:00am to 9:00pm. Monday to Friday

It is evident, when taking these operating hours into consideration, that most of the staff attending the childcare, medical centre and café premises will be 'on-site' well before the start of the morning commuter peak (8am) and departing after the end of the evening commuter peak (6pm). Furthermore, the café is expected to be largely patronised by visitors to the medical centre and childcare centre – and it will be assumed that it does not generate any significant number of car trips separate to those two uses during weekday peak hours.

In summary, for the purposes of establishing the "worst-case" scenario, both the AM and PM traffic generation characteristics will be examined and their 'impact' will be assessed with regard to existing traffic volumes on the road network.

5.1.2 Empirical Evidence & Other Data

Empirical data sourced from other existing medical and childcare centres has been used to forecast car trips associated with this development proposal.

Research undertaken at medical centres of various size and function across Melbourne has revealed that trip generation rates can vary significantly, depending on ease of accessibility by alternative modes to the car, as well as the intended catchment of the medical services offered within individual centres and the duration of visits. In this instance, the medical centre's size and neighbourhood location is clear testament to the predominantly local focus of the proposed medical business. The patient catchment is therefore likely to be largely sourced from the immediate neighbourhood and, in all probability, exhibit moderate levels of car use – commensurate with the middle-suburban setting and availability of public transport.

Consideration of the peak traffic generation rate for medical centres across metropolitan Melbourne reveals that it varies from as low as 0 car trips per hour (typical of medical centres in CBD locations and its environs, where there is no car parking provided) to levels as high as 8 trips per practitioner per hour during a weekday in outer suburbs (locations that are devoid of public transport and/or walking /cycling options and that are totally car-dependant for access). Lower traffic generation rates of around 3 to 4 trips per practitioner per hour are found in inner and middle suburbs (based on 30 minute appointments). In order to obtain a better understanding of the likely traffic generation for the subject site, *movendo* personnel surveyed the trip generation rates associated with a medical centre at 412 Racecourse Road, Flemington (which lies around 5 kilometres from the CBD) and another medical centre at 232 Mickleham Road, Tullamarine (which lies around 14 kilometres from the CBD). By way of context, the subject site is also located around 14 kilometres from the CBD. These surveys revealed an average peak rate of just under 3 car trips per practitioner per hour on a weekday in Flemington and 4.5 car trips per practitioner per hour in Tullamarine. The trips at both locations were generally split evenly between inbound and outbound movements.

In view of the above, it has been conservatively assumed that the **trip generation at the proposed Mount Waverley medical centre will be 5 trips per practitioner per hour**; representing peak patient arrival/departures per hour by car. This will apply in both the AM and PM peak hours. Staff and doctors will arrive/depart outside of the peak hours (consistent with the proposed operating hours of 8am to 9pm Monday to Friday – meaning most staff in the morning shift will arrive well before 8am and staff leaving in the evening are likely to do so near or after 9pm).

With respect to childcare centres, and in order to gain an understanding of the actual set-down / pick-up parking demand generated by a childcare centre in Mount Waverley, data has been used from a previous survey of an existing childcare facility at 364 McKinnon Road, East Bentleigh, located around 14 kilometres from the CBD – similar to the subject site. This East Bentleigh centre can be described as a middle suburban area in metropolitan Melbourne – and its traffic generating characteristics can be regarded as a good guide for the Mount Waverley site. Arrivals and departures at the McKinnon Road childcare centre were surveyed over extended morning and afternoon / evening periods. The key findings for the McKinnon Road centre were:

- AM peak traffic generation = **0.348 car trips per child per hour** (in & out movements combined)
- PM peak traffic generation = **0.313 car trips per child per hour** (in & out movements combined)

The directional split has been assumed at 50% each way (for both the medical and childcare centres) as, under the proposed operating hours, the majority of staff are expected to arrive and leave both the childcare and medical centres before and after the AM and PM peaks respectively. Thus, it is assumed that each parent arriving to drop-off and pick-up children in the peak hours undertakes incoming and outgoing trips within the same hour. It is also assumed that for each patient arriving to the medical centre there is also a patient departing within the same peak hour period.

Having established both the traffic generation rates for the medical and childcare centres, the remaining land uses that need to be accounted for are the café and the apartments.

As previously indicated in section 4.3, a survey at a Moonee Ponds development with similar characteristics to the proposed development at 170-174 Highbury Road, has demonstrated that café patronage is overwhelmingly drawn from people already visiting, attending and/or working in the other uses in the development (in other words most café patrons are also visitors to the medical centre, childcare centre or residents). It was also assumed (conservatively) that in the AM peak period, the occupancy of the café would be equivalent to the lunchtime peak generating a net parking demand for 1 car (1 incoming trip and 1 outgoing trip). The single entry/exit movements in the peak hour are the car trips associated with those patrons who are not using the café in association with any of the other uses on-site. It will also be assumed that the PM peak generates a similar traffic volume.

With regard to the residential trip generation rate, there are abundant statistics across metropolitan Melbourne that show that multi-unit developments (townhouse/apartment style) in middle to outer suburban areas with reasonable public transport access are likely to generate traffic movements at the rate of 4 to 6 vehicle trips per dwelling per day – of which 10% will occur in any given peak hour – equivalent to around **0.4 to 0.6 vehicle trips/dwelling/hour**. Such trip rates are considered reasonable for this location, particularly given the presence of bus stops immediately near the site. In view of the above, it is reasonable to adopt a trip generation rate of **0.6 trips/dwelling/hour** – this is conservative as it represents the higher end of the trip generation range measured for similar developments across Melbourne's middle suburbs. It will also be assumed (consistent with patterns measured in Melbourne) that in the AM peak hour, 88% of residential trips are outgoing and 12% incoming; and in the PM peak 30% outgoing and 70% incoming.

In summary, the following peak hour traffic generation rates have been used for the various land uses (total incoming and outgoing):

- Childcare centre – 0.348 car trips per child per hour in the AM peak and 0.313 car trips per child per hour in the PM peak
- Medical centre – 5 car trips per practitioner per peak hour
- Residential Apartments – 0.6 car trips per dwelling per peak hour
- Café – 1 car trip per peak hour (in & out respectively)

5.1.3 Total Trip Generation

Application of the above rates to the development's components (144 childcare places, 17 medical practitioners, 40-seat cafe and 20 apartments) yields a total of **147 vehicle trips** in the **AM peak hour** (down from the forecast 179.5 under the existing planning permit) and **144 vehicle trips** in the **PM peak hour** (down from the forecast 173.5 under the existing planning permit). These are summarised in Table 1.

Land Use	Vehicle Trips per Peak Hour			
	AM Peak		PM Peak	
	IN	OUT	IN	OUT
Medical Centre	42.5	42.5	42.5	42.5
Child Centre	25	25	22.5	22.5
Café	1	1	1	1
Apartments	0.5	10.5	8	4
Totals	**69**	**78**	**74**	**70**
	147		**144**	

Table 1: Trip Generation Summary

It is relevant to note that under the existing planning permit the forecast number of peak hour trips was higher, namely:

- AM Peak 87.5 incoming (instead of the current 69) and 92 outgoing (instead of the current 78)
- PM peak 88 incoming (instead of the current 74) and 85.5 outgoing (instead of the current 70)

The reason for the decrease in the number of forecast trips, under this amended development application, is primarily associated with a reduction in the number of child spaces (down from 175 to 144) and a revision in the number of trips associated with the café (based on empirical research at a comparable development).

5.2. Traffic Distribution

There are two aspects to consider with respect to peak hour traffic distribution – the pattern associated with residents and that associated with people attending the medical, café and childcare centres.

Firstly, with regard to residents, it will be assumed that the majority are bound for the central city via the Toorak Road corridor / Monash Freeway-City Link. Thus after exiting via a left turn from the development onto Highbury Road, it will be assumed that all residential traffic continues across the Huntingdale Road intersection in a westerly direction. The return trips will be via Toorak Road / Burwood Road / Station Street – to be able to turn left in to the development.

Secondly, there is a requirement to consider traffic movements associated with the medical and childcare centres as well as the café. In the absence of detailed knowledge on the potential origin of future café patrons and the patients and children attending the medical and childcare centres, it is necessary to assume a logical geographic distribution with respect to the subject site – based on the principle that patronage will be predominantly sourced from existing nearby residents (a simplified yet logical assumption).

Ultimately, as the café patrons, medical centre patients and the parents dropping off and picking up children at the childcare centre approach the basement carpark, all arrivals will, by necessity, be manifested as left turns off Highbury Road from the east (irrespective of geographic origin) and all departures will be manifested as left-turns to the west – departures will subsequently either turn left into Huntingdale Road or proceed westward on Highbury Road, depending on the ultimate destination. Within this context, consideration of the existing pattern of residential development is important – this is presented in section 5.2.1.

5.2.1 Likely Residential Location (by Precinct) of Patients/Childcare Patrons

The existing residential land use pattern within 2-3 kilometres of the subject site can be summarised as follows:

1. To the **north-west** – residential density is modest as there are Deakin University and Presbyterian Ladies College campuses, Burwood Cemetery and significant commercial uses on Highbury Road. Gardiners Creek Reserve also occupies a large area within 1-1.5 kilometres of the subject site. CONCLUSION: It will be assumed that **15%** of future users of the café, medical and childcare centres reside in this catchment.
2. To the **north-east** – residential density is reasonable although there are also significant non-residential uses including Box Hill Golf Club, Mount Scopus Memorial College campus, various business parks and shopping centres. CONCLUSION: It will be assumed that **25%** of future users of the café, medical and childcare centres reside in this catchment.
3. To the **south-west** – residential density is reasonable but there are also significant commercial uses off Huntingdale and Highbury Roads, as well as educational and recreational uses such as Parkhill Primary, Ashwood College, the Waverley District Netball Association and Gardiners Reserve. CONCLUSION: It will be assumed that **20%** of future users of the café, medical and childcare centres reside in this catchment.
4. To the **south-east** – residential density is highest in this quadrant particularly the first 1.5 kilometres around the subject site. There are educational and recreational uses including Essex Heights Primary, Riversdale Golf Club, Mount Waverley Secondary College and Essex Heights Tennis Club. CONCLUSION: It will be assumed that **40%** of future users of the café, medical and childcare centres reside in this catchment.

5.2.2 Trip Generation by Residential Location

Application of the "precinct" traffic distribution (presented in section 5.2.1) to the total trip generation (previously established in section 5.1.3) yields the following peak hour car trips to/from residential areas surrounding the subject site:

Residential Catchment	Vehicle Trips per Peak Hour			
	AM Peak		PM Peak	
	IN	OUT	IN	OUT
North-West (15%) plus all residents	11	20	18	14
North-East (25%)	17	17	17	17
South-West (20%)	14	14	13	13
South-East (40%)	27	27	26	26
Totals	**69**	**78**	**74**	**70**

Table 2: Peak Hour Trip Generation / Distribution by "Catchment"

Note: For the AM and PM peaks, incoming residential trips are assumed to be all from the North-West (Burwood Highway – Station Street). Outgoing trip are assumed to be all to the North-West.

It should be noted that the number of trips entering and exiting the development and bound for the 4 residential catchments is typically lower for this amended development proposal compared to the proposal for which a planning permit has already been issued. The difference in traffic generation is shown in Table 3.

RESIDENTIAL CATCHMENT	Vehicle Trips per Peak Hour			
	AM Peak		PM Peak	
	IN	OUT	IN	OUT
North-West Current Development Proposal	11	20	18	14
Development under Existing Planning Permit	*13*	*18*	*12.5*	*14*
North-East Current Development Proposal	17	17	17	17
Development under Existing Planning Permit	*22.5*	*22*	*25*	*21*
South-West Current Development Proposal	14	14	13	13
Development under Existing Planning Permit	*17*	*17*	*17*	*17*
South-East Current Development Proposal	27	27	26	26
Development under Existing Planning Permit	*35*	*35*	*33.5*	*33.5*

Table 3: Comparison of Peak Hour Trip Generation (current proposal versus proposal under existing planning permit)

The next step is to distribute the forecast trips onto the road network, in accordance with the assumptions described in sections 5.2.1, 5.2.2 and 5.2.3 – a task that essentially involves the following distributing the following traffic movements:

ARRIVALS

All arrivals will be from Highbury Road (travelling from the east). This is a total of 69 left-turn movements in the AM peak hour and 74 left-turn movements in the PM peak hour.

DEPARTURES

All departures will occur into Highbury Road (travelling towards the west). This is a total of 78 left-turn movements in the AM peak hour and 70 left-turn movements in the PM peak hour. These volumes immediately split at the Highbury Road / Huntingdale Road intersection and gradually get reabsorbed into the surrounding road networks.

The detailed process of assigning trips onto the road network is described in section 5.2.3.

5.2.3 Proximity Factors & Route Assignment

The route choices made by medical patients and childcare centre users will be partly influenced by the distance between their homes and the subject site. It is entirely reasonable, for those residents in immediate proximity, to use their local street network to access Highbury Road near the subject site. In practical terms this is most relevant for the following categories of nearby residents:

- People living in the area **south-east** of the subject site – whose origins are in the block bounded by Highbury Road, Huntingdale Road, High Street and Damper Creek Reserve (this represents a catchment of approximately 1.6 kilometres from the subject site). When heading to the medical/childcare centre development, the majority of these residents (at least those living within a kilometre of the subject site) can conveniently elect to exit the precinct at Lynn Street, just east of the subject site.
- People living in the areas **north-west** and **north-east** of the subject site – whose origins are in the block bounded by Highbury Road, Station Street, Burwood Highway and Gardiners Creek Reserve (this represents a catchment of approximately 700 metres from the subject site). When heading to the medical/childcare centre development, these residents can conveniently exit their precinct at Peacock Street, just east of the subject site.

Thus, in order to calculate how many car trips will have the option to use local roads to access Highbury Road in the vicinity of the subject site, it is first necessary to predict how many of the future patients/childcare patrons will live in sufficient proximity to avail themselves of those choices. To this end, surveys were conducted at an existing similar complex (with childcare and medical facilities) at 767 Mt Alexander Road, Moonee Ponds. These surveys were designed to establish average "distances" between the childcare/medical complex and patrons' homes. The following profile was established:

- Home located **0-500 metres** from complex – **31%** of patients/childcare/café patrons
- Home located **500-1,000 metres** from complex – **26%** of patients/childcare/café patrons
- Home located **1,000-1,500 metres** from complex – **18%** of patients/childcare/café patrons
- Home located **1,500-2,000 metres** from complex – **15%** of patients/childcare/café patrons
- Home located **2,000-2,500 metres** from complex – **7%** of patients/childcare/café patrons
- Home located **over 2,000 metres** from complex – **3%** of patients/childcare/café patrons

Having established the likely origin and destination of users of the medical and childcare centres and the corresponding traffic generation (split by 4 geographic quadrants around the subject site – for both peak periods) the next step is to assign car trips onto the road network in a manner that reflects the assumed residential distribution and proximity of people's homes to the subject site.

Application of the above arrival/departure patterns has enabled calculation of the forecast **additional traffic volumes at key points on the road network** for the **AM and PM peak** hours. These are tabulated below and shown diagrammatically in the images (Figure 4 and Figure 5) on subsequent pages. The table also includes a comparison with the corresponding movement forecasts under the existing planning permit. It is evident that **there are no substantial increases** in any of the **traffic movements** to and from the site in the peak periods when comparing the current amended proposal to the already-approved development scheme.

TRAFFIC MOVEMENT	FORECAST DEVELOPMENT TRAFFIC VOLUME (vehicles/hour)			
	AM Peak		PM Peak	
	Current Proposal	Previous Proposal (existing Planning Permit)	Current Proposal	Previous Proposal (existing Planning Permit)
Left-turn from Lynn St onto Highbury Rd (just east of subject site)	**18**	*19*	**20**	*22*
Right-turn from Peacock St onto Highbury Rd (just east of subject site)	**12**	*12*	**14**	*14*
Right-turn from Station St onto Highbury Rd	**17**	*20.5*	**19**	*19*
Westbound "through" movement along Highbury Rd and across Station St	**22**	*36*	**21**	*33*
Right-turn from Burwood Highway onto Station St	**9**	*13.5*	**10**	*17.5*
Left-turn from Stephensons Rd onto Highbury Rd	**10**	*10*	**11**	*12*
Left-turn from Highbury Rd onto Huntingdale Rd	**37**	*44*	**36**	*43*
Westbound "through" movement along Highbury Rd and across Huntingdale Rd	**41**	*48*	**34**	*42.5*

Table 4: Comparison of key traffic volume increases on surrounding road network (current proposal versus proposal under existing planning permit)

WEEKDAY AM PEAK HOUR

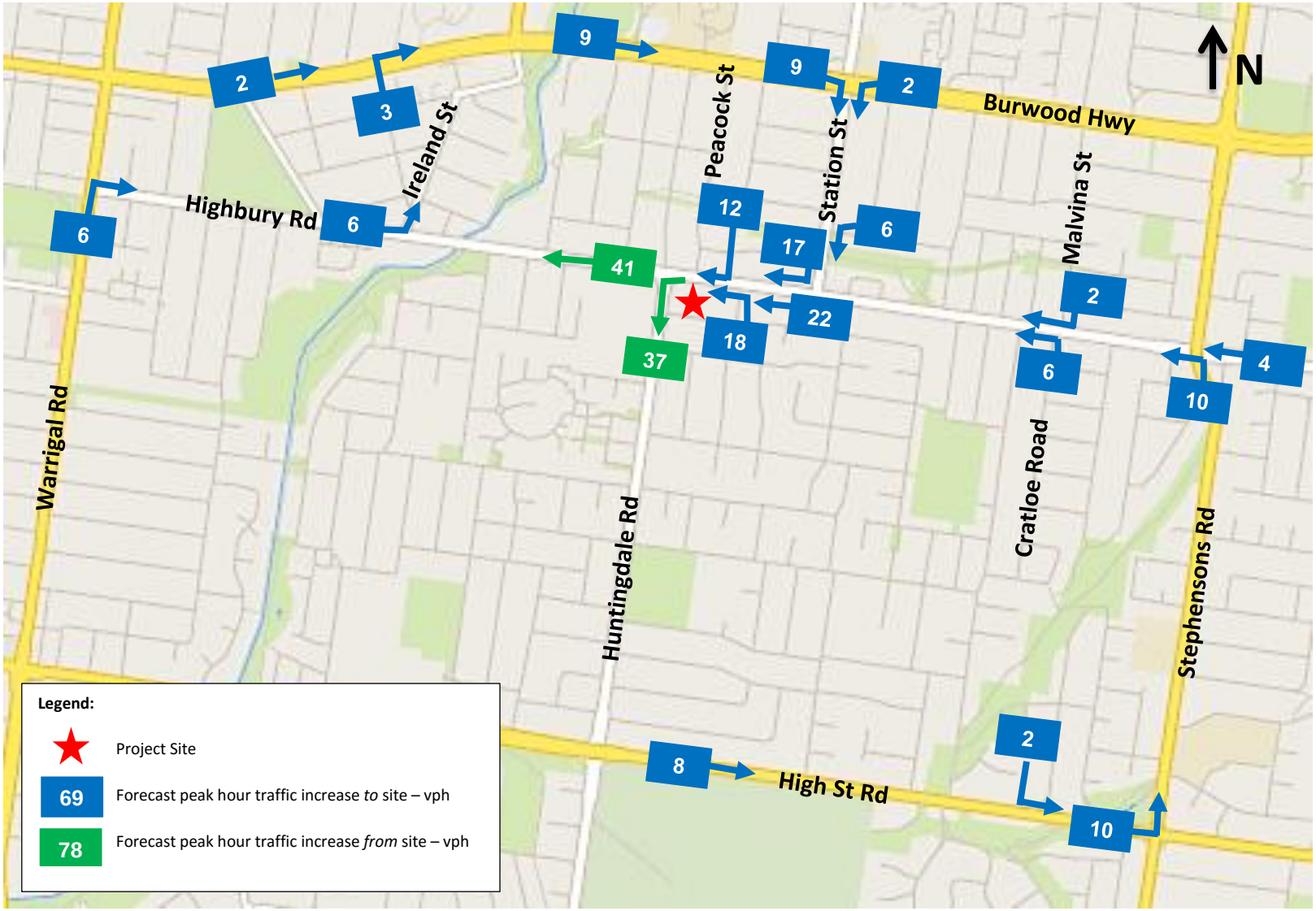


Figure 4: Traffic Volume Increases to/from Subject Site – AM Peak Period

WEEKDAY PM PEAK HOUR

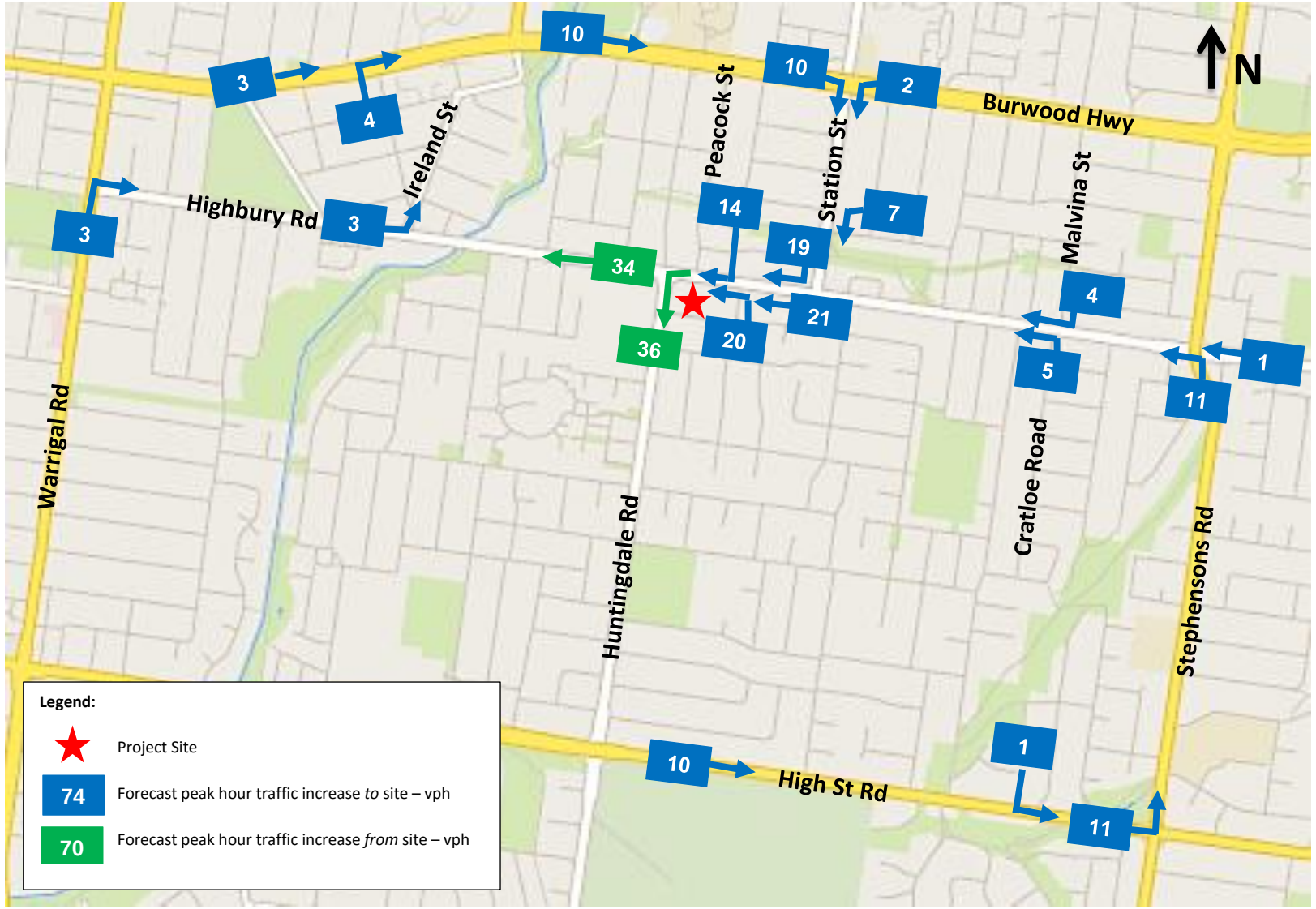


Figure 5: Traffic Volume Increases to/from Subject Site – PM Peak Period

5.3. Traffic Capacity Analysis

5.3.1 Existing Traffic Volumes & Operation

As part of the preparation of the original Transport and Parking Analysis report (submitted in support of the application for the Planning Permit that has now been issued) traffic counts were undertaken to establish existing AM and PM weekday traffic volumes on Highbury and Huntingdale Roads. This occurred in October 2012. Recent surveillance (July 2016) of the main traffic movements in each peak period has revealed that traffic volumes have remained steady and thus the full intersection survey is still representative of current conditions (particularly given absence of any major transport network and/or land-use changes in the vicinity). The October 2012 traffic volumes are as follows:

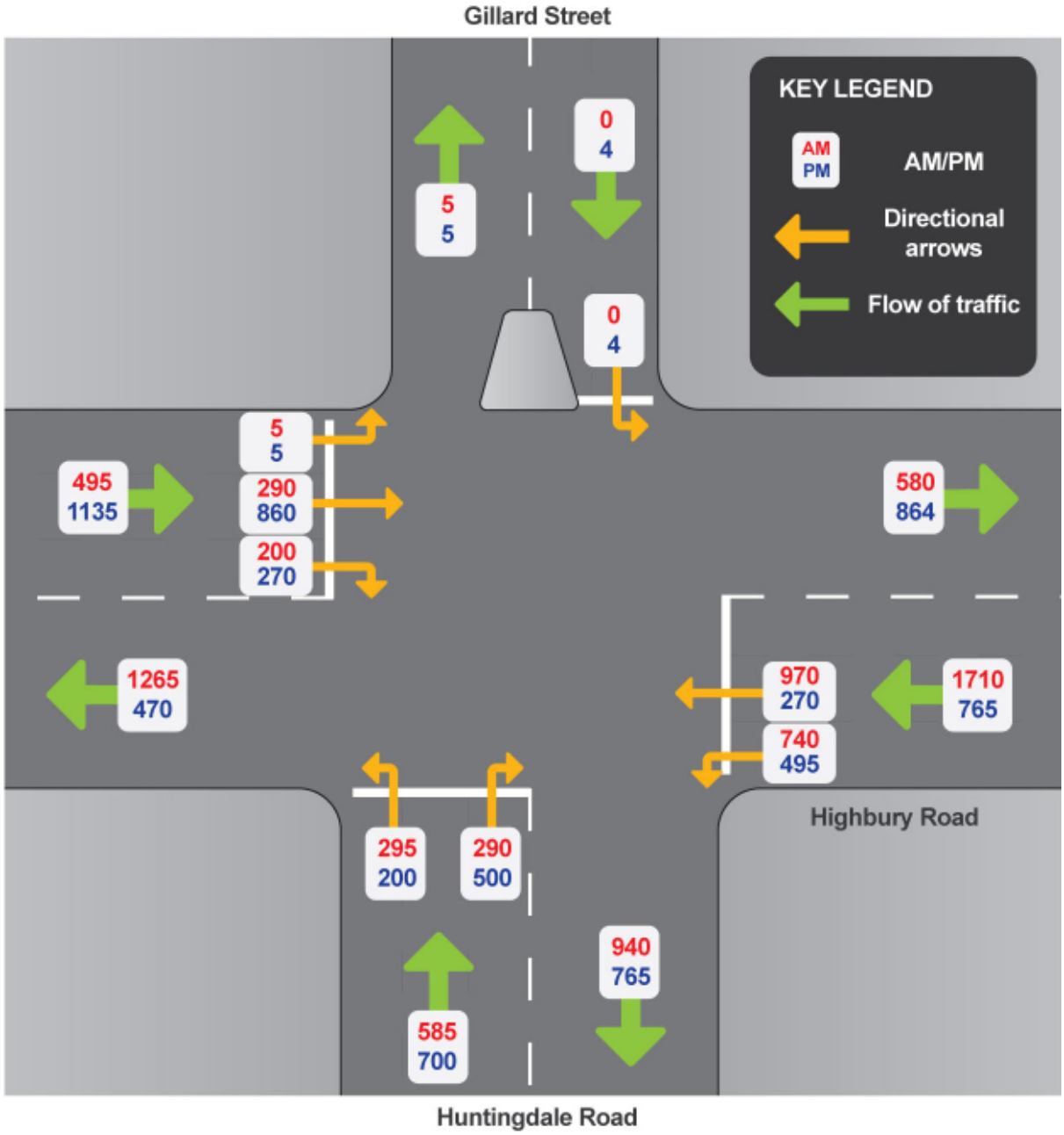


Figure 6: Highbury Rd / Huntingdale Rd; Peak Hour Existing Traffic Volumes (AM & PM periods)

The most relevant approach, in the context of the subject site, is the **east leg of the intersection** (which carries 1,710 and 765 vehicles/hour in the AM and PM peaks respectively). The basement left-in/left-out access point will be located approximately 50 metres east of Huntingdale Road – attracting the forecast 69 incoming and 78 outgoing movements in the AM peak and 74 incoming and 70 outgoing movements in the PM peak.

These forecast volumes for the current 'amended' development application are lower than the traffic volumes forecast under the previous analysis for the existing Planning Permit.

When assessing potential impacts, it is important to consider that the highest additional traffic volumes (78 outgoing and 74 incoming vehicles per hour in the AM and PM peaks respectively) are only expected to 'materialise' in the immediate vicinity of the subject site. The 78 vehicles/hour exiting the subject site in the AM peak hour will immediately be split into 41 westbound movements (across Huntingdale Road) and 37 left-turners (into Huntingdale Road). In other words, the 'additional' traffic volume of 78 vehicles/hour only exists for approximately 30 metres across the subject site's Highbury Road frontage – before it starts to disperse. Similarly, in the PM peak hour, the 74 vehicles/hour entering the subject site only 'materialise' over a short distance – once the vehicles forecast to exit the local area to the north of Highbury Road join the traffic stream bound for the childcare and medical centres at Peacock Street. Thus both the AM and PM peak hour maximum traffic volumes will only be manifested over very short distances of 20-30 metres on either side of the subject site's access point – namely the area to the west of Peacock Street and Huntingdale Road. Put simply, the **highest additional westbound traffic volumes on Highbury Street** (in the AM and PM peak periods respectively) associated with the subject site are expected to be as follows:

AM Peak

- Turning left into subject site – 69 vehicles/hour
- East of Peacock Street – 57 vehicles/hour
- East of Lynn Street – 39 vehicles/hour
- East of Station Street – 22 vehicles/hour
- Turning left out of subject site – 78 vehicles/hour
- West of Huntingdale Road – 41 vehicles/hour

PM Peak

- Turning left into subject site – 74 vehicles/hour
- East of Peacock Street – 60 vehicles/hour
- East of Lynn Street – 40 vehicles/hour
- East of Station Street – 21 vehicles/hour
- Turning left out of subject site – 70 vehicles/hour
- West of Huntingdale Road – 34 vehicles/hour

The above statistics demonstrate the **rapid diminution** in traffic volume bound for and leaving the subject site over a relatively short distance of only a few hundred metres. Furthermore, when moving further away from the site, Table 4 in section 5.2.4 highlighted that the forecast traffic volume increases on the broader road network at key intersections to the north, east and south of the subject site (in the AM and PM peak hours) are exceptionally low.

All of the forecast increases are lower, under this application for amendment to the planning permit, compared to the traffic forecasts under the existing planning permit. In most cases the increases are equivalent to volumes in the range of 1 vehicle every 3 to 6 minutes (10 to 20 vehicles/hour). These increases are insignificant from a traffic capacity perspective.

Within the context of the above considerations, it is also relevant to note that detailed observations were conducted of existing queuing and traffic operation on all legs of the Highbury Road / Huntingdale Road intersection. These observations were undertaken in conjunction with the original traffic counts and, more recently, during the surveillance undertaken to confirm traffic volume levels in July 2016. These observations revealed that the **east approach operated well within capacity** – always comfortably clearing the traffic queues present at the commencement of green traffic signal cycles.

5.3.2 Additional Traffic Volumes – Proportions in Vicinity of the Subject Site

The addition of, possibly, 69 incoming and 78 outgoing movements in the AM peak hour and 74 incoming and 70 outgoing movements in the PM peak hour travelling **westbound on Highbury Road** (before and after the basement carpark entrance respectively) represents a **very low increase on the existing traffic volume** (**west of Station Street and east of Huntingdale Road**). It is just under 4.6% of the total traffic flow of 1,710 vehicles/hour in the AM peak hour (this is the peak direction of flow) and just under 9.7% of the total traffic flow of 765 vehicles/hour in the PM peak (which is the counter-peak direction – and exhibits high spare capacity as the total volume is only around 45% of the morning peak).

Furthermore, on the next block of **Highbury Road** – **west of Huntingdale Road** – the westbound traffic associated with the development (41 vehicles/hour) represents **less than 3.3%** of the total traffic flow in the AM peak hour (1,265 vehicles/hour). The flow of 34 vehicles/hour in the evening represents **around 7.2%** of the existing total flow of 470 vehicles/hour in the PM peak (this is the less critical counter-peak direction of flow).

Finally, on Huntingdale Road – southbound – the traffic associated with the development (37 and 36 vehicles/hour in the AM and PM peaks respectively) represents around 3.9% of the existing total traffic flow in the AM peak hour (940 vehicles/hour) and 4.7% in the PM peak hour (765 vehicles/hour). It should be noted that peak and counter-peak directions of flow are less defined on Huntingdale Road – which is an arterial that exhibits bi-directional peak flow characteristics.

In summary, the total additional traffic volume arriving and departing the subject site in the AM and PM peak hours represents only small proportions of the existing traffic on Highbury and Huntingdale Roads. Thus, the proportional traffic volume increases described in this section are considered inconsequential in terms of road network performance. Furthermore, as previously indicated, the intersection of Highbury and Huntingdale Roads has been observed operating well within capacity and the addition of the small forecast traffic volumes associated with the subject site is expected to have an inconsequential impact on intersection operation.

The widely-accepted industry-practice in Victoria is that traffic volume increases below 10% are generally considered to be insignificant given that daily variations in background traffic flow may fluctuate by this amount – in fact typically by even much greater amounts. Therefore, any changes in traffic flows below 10% are commonly assumed to result in no discernible impact.

In this regard, it is relevant to note that the latest Traffic Monitor 2012-13 report published by VicRoads in September 2014 recognises that traffic volumes vary significantly based on the day of the week and time of the year. More specifically, the report determined that "there is as much as a 10% variation in weekday traffic volumes depending on the day of the week". In fact, site-specific studies by VicRoads and other agencies have identified that daily traffic volumes can vary by more than 10% from Monday to Friday. Within this context, VicRoads has concluded that variations in traffic that fall under 10% can be considered insignificant as they are within the range of normal daily fluctuations identified for roads within the metropolitan Melbourne area.

Within this context, it is reasonable to conclude that the traffic generated by the development at 170-174 Highbury Road is not only very low, in absolute terms, but is also expected to have a negligible impact on the operation of surrounding roads.

5.3.3 Traffic Capacity on Highbury Road – Peak Hour Analysis

It is evident from the discussion in sections 5.3.1 and 5.3.2 that forecast traffic volume increases are expected to be very low – both in absolute terms and as a proportion of existing traffic volumes. Thus it is reasonable to conclude that the additional traffic can be easily absorbed onto Highbury Road and other parts of the road network and that they will have no overall adverse impact on the operation of the road network.

The other aspect that needs additional consideration, from a traffic capacity perspective, is the ability to absorb turning traffic volumes at unsignalised intersections. More specifically, this will occur at the intersections of Highbury Road with Peacock and Lynn Streets respectively.

The scenarios to be considered are as follows:

- AM peak – 12 right turners (North to West) from Peacock Street into Highbury Road and 18 left turners (South to West) from Lynn Street into Highbury Road. These turning vehicles are entering traffic streams of 2,307 vehicles/hour and 1,710 vehicles/hour respectively.
- PM peak – 14 right turners (North to West) from Peacock Street into Highbury Road and 20 left turners (South to West) from Lynn Street into Highbury Road. These turning vehicles are entering traffic streams of 1,645 vehicles/hour and 765 vehicles/hour respectively.

From the above it is clear that, in overall terms, the AM peak hour is the busiest period. The question at hand is "*To what extent is it possible for 12 right turners from Peacock Street and 18 left turners from Lynn Street to enter the Highbury Road traffic stream?*"

In order to appropriately answer this question, a simple examination of the total existing traffic flows on Highbury Road is neither sufficient nor adequate. Rather, it is essential to consider the combined impact of the nearby signalised intersections of Highbury Road with Huntingdale Road and Station Street. More specifically it is necessary to establish to what extent the operating arrangements at these two signalised sites generate sufficiently long gaps in the Highbury Road westbound and eastbound traffic streams to enable the safe and convenient entry of vehicles from side streets. To this end, measurements were taken during the October 2012 survey program and repeated in July 2016 – to measure the total time – in both the AM and PM peak hours – when right turns and left turns out of Peacock and Lynn Streets can be safely made. It was found that for each traffic signal cycle at the Highbury Road / Huntingdale Road intersection, future right-turners at Peacock Street and left-turners at Lynn Street would have enjoyed around 12-15 seconds and 18-20 seconds of available turning time respectively. This is equivalent to capacities of at least approximately 180 right turners from Peacock Street and 270 left turners from Lynn Street respectively. These capacities are well in excess of the forecast turning volumes of 12 right turners and 19 left turners.

In summary, based on the matters discussed in all of the preceding sections, it is concluded that the **traffic generated** by the development can be **readily accommodated** onto Highbury Road and the overall **traffic consequences** on the broader network are expected to be **insignificant**. Thus, it is concluded that the traffic impact of the proposed residential, café, childcare and medical centre development on the area is expected to be inconsequential, as the forecast traffic movements in the AM and PM peak hours can be readily accommodated within current operational arrangements.

5.3.4 Intersection Operation – Highbury Road / Huntingdale Road, Peak Hour Analysis

In addition to the examination of Highbury Road's ability to absorb development traffic it is also useful to understand to what extent the development may impact on the operation of the nearby intersection at Highbury Road / Huntingdale Road.

In order to forecast likely impacts, an analysis using SIDRA was undertaken. SIDRA is a well-recognised traffic modelling software program which evaluates level of service (LOS) and queue lengths at intersections. It is particularly useful for comparative analysis – when examining the operation under existing conditions and comparing those with a scenario where traffic volumes/patterns at a given location have altered as a result of a land-use or traffic management changes. Such a change is precisely what will occur at Highbury Road / Huntingdale Road as a result of development at the subject site.

The following two scenarios have been evaluated in SIDRA during both the AM and PM peak hours to help identify the likely traffic impacts associated with the project at the Highbury Road / Huntingdale Road intersection.

- Existing Traffic Conditions
- Existing + *Development Traffic* Conditions

Development Traffic

Trip generation forecasts of traffic volumes to and from the subject site have been developed described, tabulated and shown on the maps in section 5.2.4 (Figure 4 and Figure 5). It is relevant to note that given the proposed left-in / left-out arrangements at the development site's carpark entrance, additional traffic volumes are only generated at the east leg of the intersection of Highbury Road with Huntingdale Road. In other words, this intersection is impacted only by traffic volumes leaving the subject site as all traffic arriving at the site will come from the east in order to execute a left turn entry movement from Highbury Road (and 'arrival traffic' will therefore have no impact on the operation of the Highbury Road / Huntingdale Road intersection).

Existing + Development Traffic

The combination of existing traffic volumes (reported in Figure 6 of section 5.3.1 in this report) and traffic volumes generated by the development during the peak hours is shown in Figure 7 over the page.

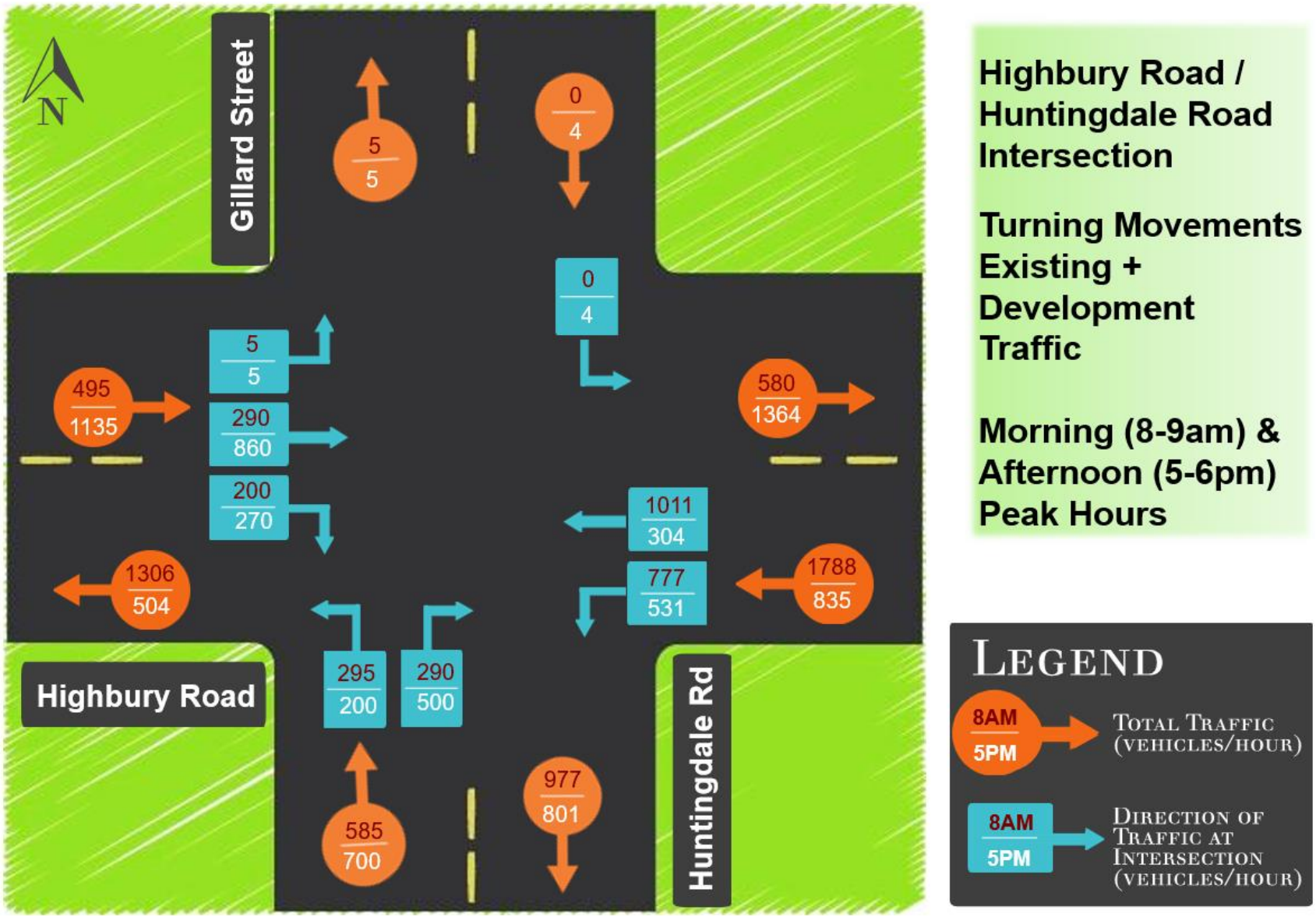


Figure 7: Highbury Rd / Huntingdale Rd; Peak Hour Traffic Volumes (AM & PM periods) – Existing Traffic + Development Traffic

SIDRA Analysis and Results

The overall SIDRA outputs, relevant to intersection performance, at the Highbury Road / Huntingdale Road / Gillard Street intersection have been tabulated below for the respective peak hours.

AM Peak Hour	Level of Service		Maximum Queue Length** (95th %ile)	
Approach	Existing Traffic*	Existing + Development Traffic	Existing Traffic*	Existing + Development Traffic
South Leg (Huntingdale Road)	C	C	42m	59m
East Leg (Highbury Road)	C	B	245m	258m
North Leg (Gillard Street) ***	F	F	1m	1m
West Leg (Highbury Road)	C	C	65m	70m
Total Intersection	C	C	245m	258m

Table 5: AM Peak Hour; Highbury Rd / Huntingdale Rd Intersection – SIDRA Results

PM Peak Hour	Level of Service		Maximum Queue Length** (95th %ile)	
Approach	Existing Traffic*	Existing + Development Traffic	Existing Traffic*	Existing + Development Traffic
South Leg (Huntingdale Road)	C	C	79m	79m
East Leg (Highbury Road)	B	B	52m	57m
North Leg (Gillard Street) ***	F	F	3m	3m
West Leg (Highbury Road)	B	B	92m	92m
Total Intersection	B	B	92m	92m

Table 6: PM Peak Hour; Highbury Rd / Huntingdale Rd Intersection – SIDRA Results

NOTES:

* Existing analysis based on traffic data collected in October 2012

** Queue lengths are the maximum queue experienced on each approach

*** Performance on North leg is immaterial due to extremely low traffic volumes and subsequent lack of relevance on overall intersection performance.

From the tables above the following can be concluded for the Highbury Road / Huntingdale Road / Gillard Street intersection:

- The intersection currently operates at:
  - LOS C during the AM Peak hour; and
  - LOS B during the PM Peak hour.
- Following the addition of traffic generated by the development under the current planning permit application, the intersection will continue to operate satisfactorily with **no deterioration in the level of service**. The intersection is forecast to operate at:
  - LOS C during the AM Peak hour; and
  - LOS B during the PM Peak hour.
- During the **AM peak** hour, SIDRA predicts only a **marginal increase in queues**; the main impact is confined to the east leg where:
  - The 95th percentile maximum queue will increase by less than 20 metres. (This is a conservative estimate as the SIDRA model is based on "double cycling" the Gillard Street north leg when in reality that phase will seldom be called. Thus, more time will be available for busier phases such as Highbury Road resulting in lower maximum queues than modelled by SIDRA).
- During the **PM peak** hour, **no significant impacts** arise with only marginal increases in the maximum queue reported by SIDRA on the east leg.

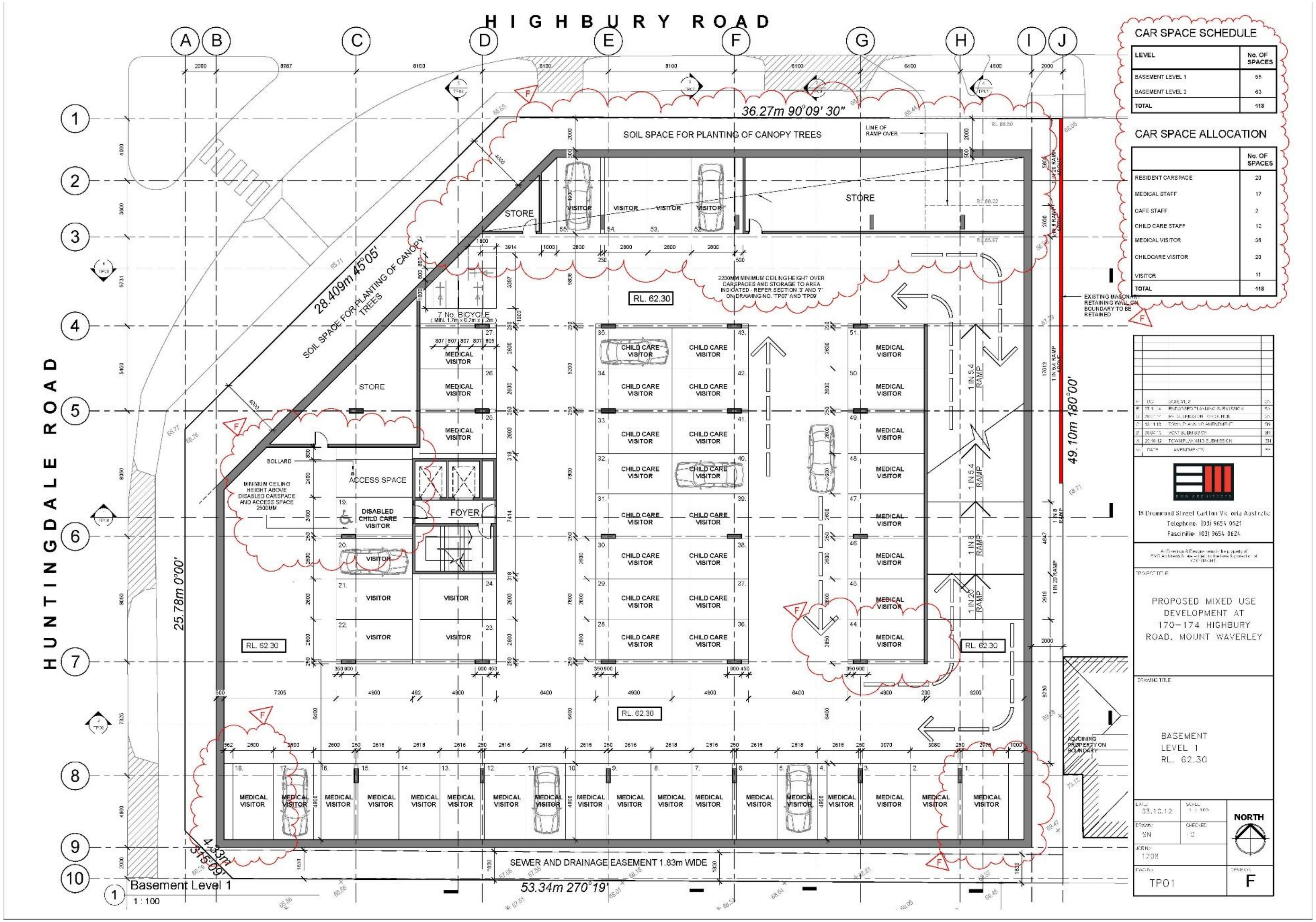
6. Conclusions

The application for a proposed amendment to an approved development at 170-174 Highbury Road, Mount Waverley, involves the deletion of the occasional child care centre for 45 children, marginal increase in the capacity of the child care centre from 130 children to 144 children, addition of a new floor for residential use, with the overall creation of 11 new dwellings (increasing the total from 9 to 20 dwellings) as well as the retention of existing approved medical practitioner and café uses. The on-site parking supply has been increased from 102 to 118 spaces.

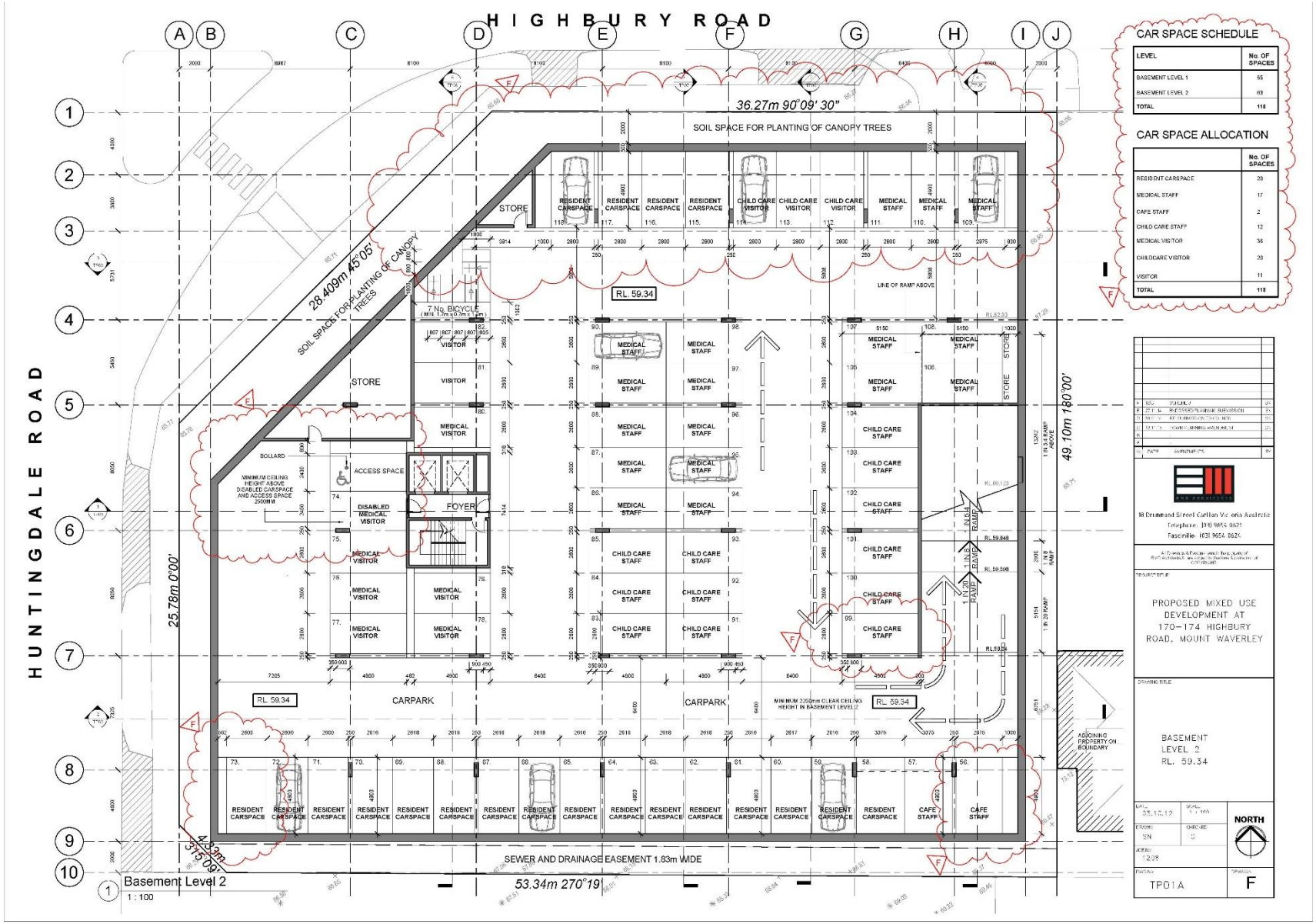
This report concludes that there are no traffic engineering reasons why the proposed amended development should not proceed, given that the proposed parking supply (118 spaces) is well in excess of the statutory requirement (108 spaces). Furthermore, the traffic generation associated with the amended proposal is lower than the existing approved development. More specifically, based on the matters discussed in this report, it is concluded that:

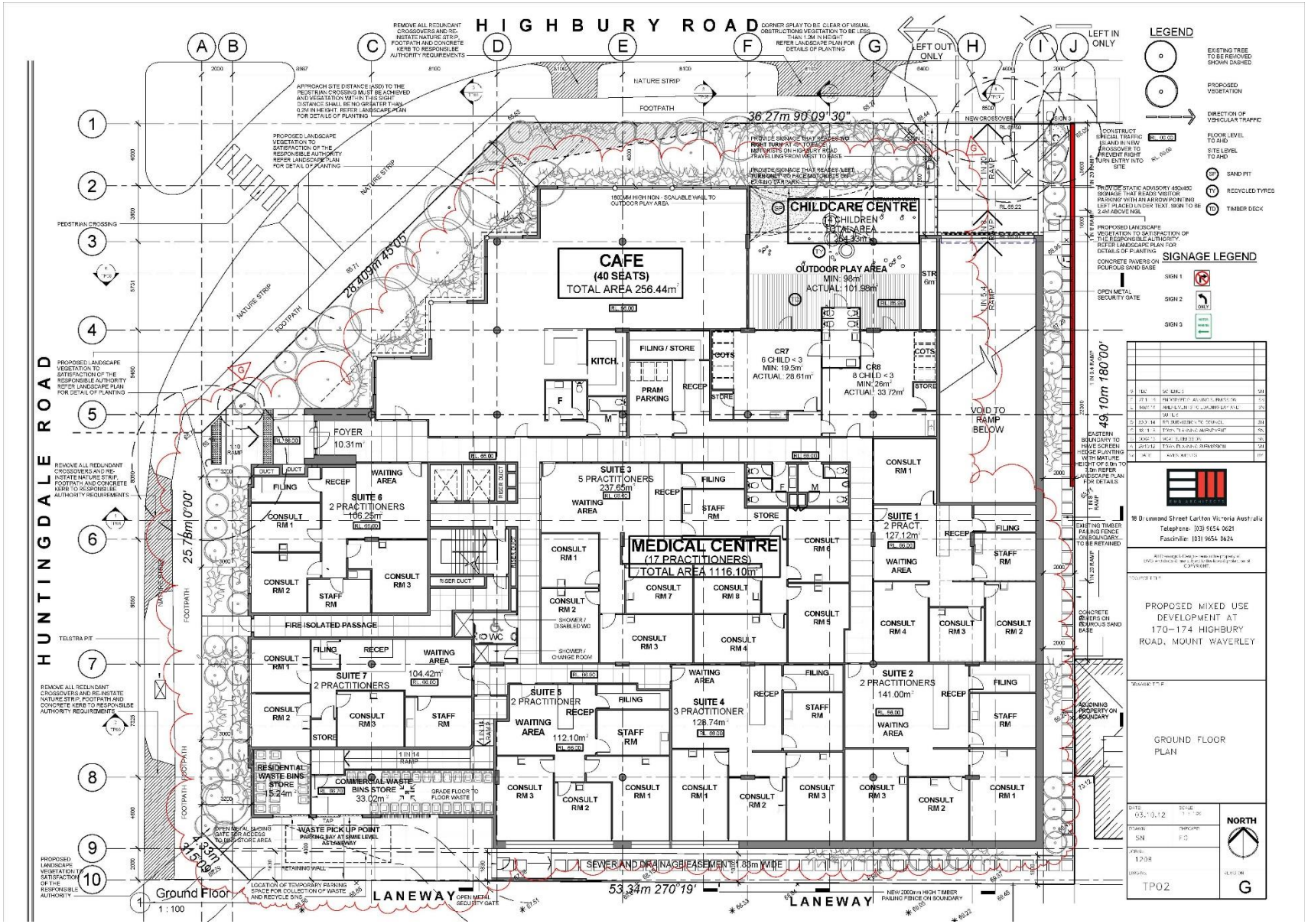
- The traffic generated by the development at 170-174 Highbury Road is not only **very low**, in absolute terms (it represents a decrease in the number of forecast trips compared with the existing approved development) but is also expected to have a **negligible impact on the operation of surrounding roads**.
- The provision of a left-in / left-out access driveway on Highbury Road (for residents, visitors and staff) will **safely** and **adequately cater** for the **expected peak traffic movements** associated with the development.
- SIDRA analysis at the Highbury Road / Huntingdale Road / Gillard Street intersection indicates **no adverse impacts on intersection performance**. The intersection is adequately capable of satisfying the traffic demand generated by the development. The intersection level of service remains at current rating of C and there are only marginal changes to operational aspects.
- The proposal provides **adequate parking**. Specifically, the **car parking supply** for the development (118 spaces) **exceeds the statutory parking requirement** of 108 spaces. Furthermore, the **bicycle parking supply** (14 spaces) **exceeds the statutory requirement** of 9 spaces.
- The **parking layout** is **satisfactory** as it accords with the design guidelines set out in the Planning Scheme and Australian Standard AS2890.
- The development's **'waste pick-up' point off the laneway abutting the subject site's southern boundary** is appropriately designed to enable garbage trucks to undertake waste collection fully off-street.

7. Appendix A Carpark Plans



HIGHBURY ROAD
HUNTINGDALE ROAD
CAR SPACE SCHEDULE
LEVEL | No. OF SPACES
BASEMENT LEVEL 1 | 55
BASEMENT LEVEL 2 | 63
TOTAL | 118
CAR SPACE ALLOCATION
No. OF SPACES
RESIDENT CARSPACE | 20
MEDICAL STAFF | 17
CAFE STAFF | 2
CHILD CARE STAFF | 12
MEDICAL VISITOR | 36
CHILDCARE VISITOR | 20
VISITOR | 11
TOTAL | 118
EXISTING MASONARY RETAINING WALL ON BOUNDARY TO BE RETAINED
36.27m 90°09' 30"
SOIL SPACE FOR PLANTING OF CANOPY TREES
28.409m 45°05'
STORE
ACCESS SPACE
FOYER
DISABLED CHILD CARE VISITOR
MEDICAL VISITOR
CHILD CARE VISITOR
VISITOR
7 No. BICYCLE
RL. 62.30
25.78m 0°00'
49.10m 180°00'
1 IN 5.4 RAMP
1 IN 8 RAMP
1 IN 20 RAMP
SEWER AND DRAINAGE EASEMENT 1.83m WIDE
53.34m 270°19'
Basement Level 1
1 : 100
PROPOSED MIXED USE DEVELOPMENT AT 170-174 HIGHBURY ROAD, MOUNT WAVERLEY
BASEMENT LEVEL 1 RL. 62.30
NORTH
TP01
F


HIGHBURY ROAD
HUNTINGDALE ROAD
36.27m 90°09' 30"
28.409m 45°05'
49.10m 180°00'
25.78m 0°00'
53.34m 270°19'
SOIL SPACE FOR PLANTING OF CANOPY TREES
SOIL SPACE FOR PLANTING OF CANOPY TREES
SEWER AND DRAINAGE EASEMENT 1.83m WIDE
CARPARK
CARPARK
RL. 59.34
STORE
FOYER
ACCESS SPACE
7 No. BICYCLE
LINE OF RAMP ABOVE
ADJOINING PROPERTY ON BOUNDARY
Basement Level 2
1 : 100
CAR SPACE SCHEDULE
LEVEL
No. OF SPACES
BASEMENT LEVEL 1 55
BASEMENT LEVEL 2 63
TOTAL 118
CAR SPACE ALLOCATION
No. OF SPACES
RESIDENT CARSPACE 29
MEDICAL STAFF 17
CAFE STAFF 2
CHILD CARE STAFF 12
MEDICAL VISITOR 36
CHILDCARE VISITOR 29
VISITOR 11
TOTAL 118
PROPOSED MIXED USE DEVELOPMENT AT 170–174 HIGHBURY ROAD, MOUNT WAVERLEY
BASEMENT LEVEL 2 RL. 59.34
NORTH
TP01A
F


HIGHBURY ROAD
HUNTINGDALE ROAD
LANEWAY
LANEWAY
CHILDCARE CENTRE
(11 CHILDREN)
CAFE
(40 SEATS)
TOTAL AREA 256.44m²
MEDICAL CENTRE
(17 PRACTITIONERS)
TOTAL AREA 1116.10m²
SUITE 1
2 PRACT.
127.12m²
SUITE 2
2 PRACTITIONERS
141.00m²
SUITE 3
5 PRACTITIONERS
237.65m²
SUITE 4
3 PRACTITIONER
126.74m²
SUITE 5
2 PRACTITIONER
112.10m²
SUITE 6
2 PRACTITIONERS
106.25m²
SUITE 7
2 PRACTITIONERS
104.42m²
OUTDOOR PLAY AREA
MIN: 98m²
ACTUAL: 101.98m²
FOYER
10.31m²
VOID TO RAMP BELOW
SEWER AND DRAINAGE EASEMENT 1.83m WIDE
WASTE PICK UP POINT
PARKING BAY AT SAME LEVEL AS LANEWAY
RESIDENTIAL WASTE BINS STORE
COMMERCIAL WASTE BINS STORE
Ground Floor
1 : 100
LEGEND
SIGNAGE LEGEND
PROPOSED MIXED USE DEVELOPMENT AT 170–174 HIGHBURY ROAD, MOUNT WAVERLEY
GROUND FLOOR PLAN
NORTH
TP02
G