# Stockland

# Lourdes Retirement Village

# Traffic Assessment

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# 1 Introduction

Architectus, on behalf of Stockland, has commissioned Arup to undertake a transport assessment as part of the concept masterplan and strategy for Lourdes Retirement Village. The assessment will support the planning submission to change the existing zoning of Lourdes Retirement Village.

Lourdes Retirement Village is an existing site located in the Upper North Shore suburb of Killara. The current accommodation at Lourdes consists of 108 independent living units (ILU's), 49 serviced apartments (SA's), and an 83 bed Aged Care facility.

The project will ensure Lourdes Retirement village can provide the range of accommodation that future retirees are seeking.

## 1.1 Background

The Village was initially constructed in 1983, and now needs significant renewal. Since 1983 the village has been developed on a piecemeal basis without the benefit of a whole of site master plan.

The only major event has been the redevelopment of the nursing home in 2003 and additional garages. The layout of the site restricts accessibility for residents and visitors with disabilities.

The two storey buildings provide limited access to the upper levels and access ramps and pathways are substandard. Internally the units are very small and lack facilities to enable ageing in place and many existing dwellings do not provide the range of accommodation that future retirees are seeking.

## 1.2 Scope

This traffic impact assessment supports the concept masterplan application of Lourdes Retirement Village (the site) and will outline the following:

- Existing transport conditions
- Forecast traffic generation
- Road network impacts
- Parking provisions
- Access arrangements
- Public transport availability

# 2 Existing conditions

## 2.1 Site location

The site sits within the Ku-Ring-Gai Council jurisdiction. It is located some 1.5km from Killara Station and 17km north of Sydney CBD. The site is located east of the Pacific Highway with the location shown in Figure 2.


Figure 1 Local context plan

Source: Google maps, modified by Arup

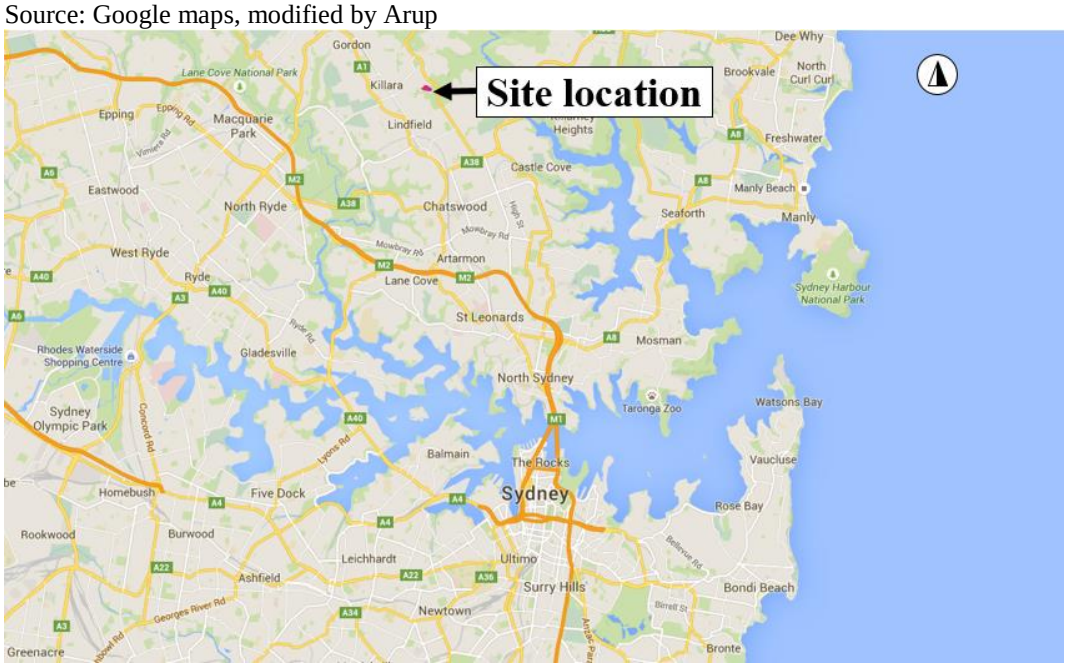


Figure 2 Regional context plan

Source: Google maps, modified by Arup

## 2.2 Site accommodation

The site currently consists of a variety of accommodation types that have been built over the past 30 years. The site is approx. 4.9Ha in size at the end of Stanhope Road.

Lourdes Retirement Village is an established retirement village currently offering:

- 108, one, two and three bedroom independent living units
- 49 serviced apartments
- 83 bed Registered Aged Care Facility
- Chapel
- Community Activity Centre with café, pool, library and craft room

## 2.3 Road network and access

Access to the site is illustrated in Figure 3.

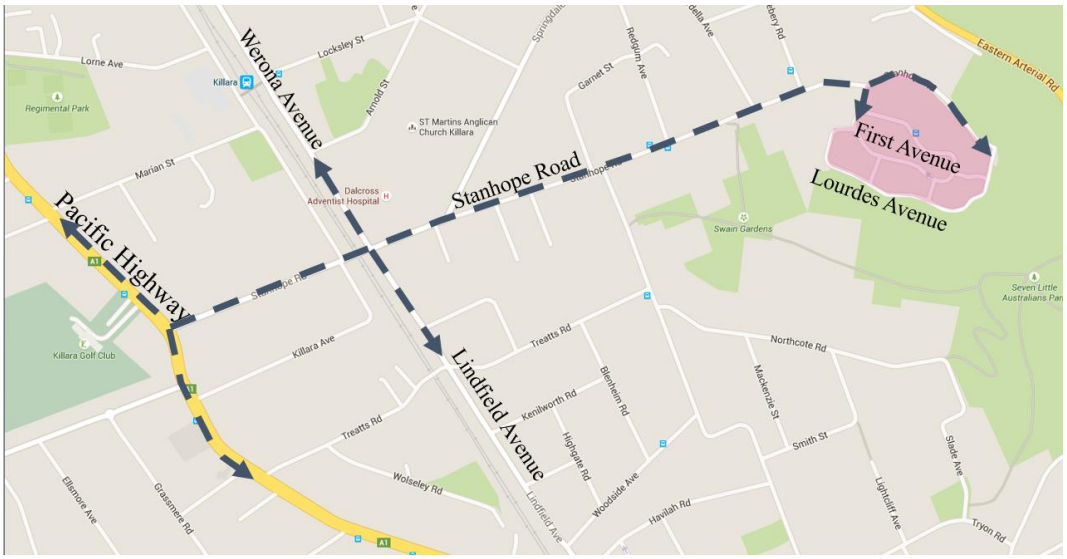


Figure 3 Road access of the site

Source: Google maps, modified by Arup

### 2.3.1 Stanhope Road

The site is bounded by Stanhope Road to the north. The main access point is located east of Rosebery Road shown in Photograph 1.


Photograph 1 Main entrance to site

A secondary access is located at the end of the road, shown in Photograph 2. This access is not currently being utilised by residents.

Photograph 2 Eastern entrance from site

Stanhope Road, east of Springdale Road, is a two-way local road which provides access to low density residential housing. Intermittent kerbside parking is permitted on either sides of the road. Stanhope Road provides a link to the Pacific Highway and has a posted speed limit of 50km/h.

### 2.3.2 First Avenue

First Avenue forms a loop for internal access to the site and also connects Stanhope Road. Steep topography can be found on this road which is an issue for residents. This can be seen in Photograph 3.

Photograph 3 First Avenue

### 2.3.3 Pacific Highway

The Pacific Highway, which is a state classified road, runs north to south, parallel to the rail corridor. It also provides access to the Sydney CBD. The Pacific Highway / Stanhope Road intersection is unsignalised. Right turns from Stanhope Road onto the Pacific Highway are permitted. The Pacific Highway has a posted speed limit of 60km/h within the vicinity of the site. The intersection of Pacific Highway / Stanhope Road can be seen in Photograph 4.


Photograph 4 Stanhope Road, facing Pacific Highway

### 2.3.4 Lindfield Avenue and Werona Avenue

Lindfield Avenue and Werona Avenue form an intersection with Stanhope Road from the north and south approach respectively, as shown in Figure 4. The intersection is signalised with a posted speed limit of 50km/h on all approaches. Parking is permitted on the eastern side of Werona Avenue.


Figure 4: Stanhope Road / Lindfield Ave / Werona Ave intersection

Source: Google maps

## 2.4 Public transport

Local bus route 556, operates daily from Lindfield Station to East Killarra. It services the site directly via the first avenue loop and three bus stops within the site as illustrated in Figure 5. The bus route operates daily with the following peak hour frequencies:

Table 1 Bus route 556 peak hour frequencies

| Day | Time | Frequency |
|---|---|---|
| Weekday | 7am to 8am | 2 services |
| | 12pm to 1pm | 1 service |
| | 5pm to 6pm | 2 services |
| Weekends | 12pm to 1pm | 1 service |

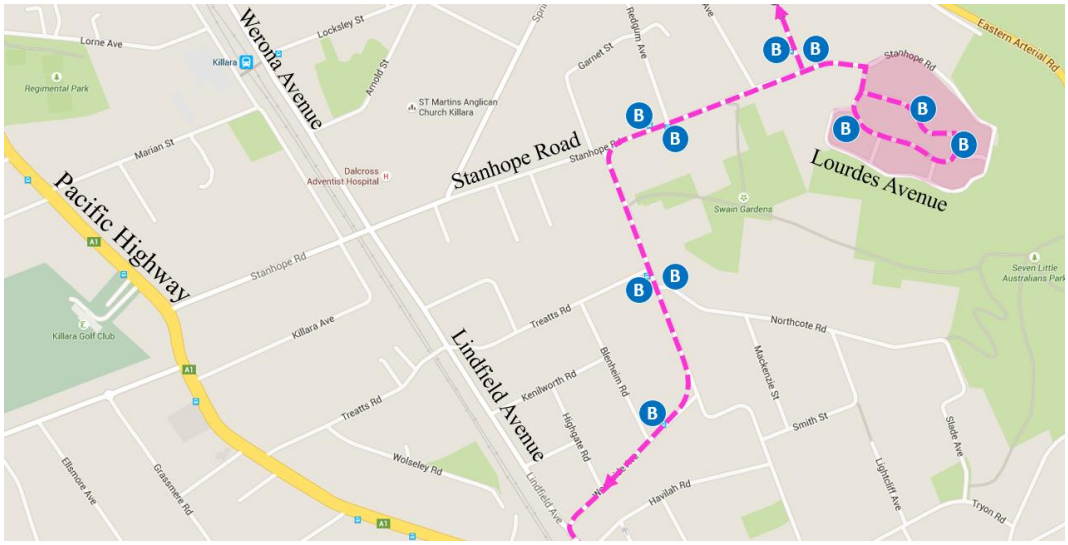


Figure 5 Local bus route 556

## 2.5 Walking

Pedestrian access to the site is generally poor and relatively undesirable given the steep topography of the area. Footpaths along Stanhope Road leading to the site are generally narrow and discontinuous with no pedestrian crossing facilities. Being located some 1.4km away from Killara Station, the site is well outside the suitable walking distance.

The site is therefore mainly accessed by private vehicles or the local bus 556.

## 2.6 Traffic surveys

### 2.6.1 Intersection counts

Intersection counts were carried out at the signalised intersection of Lindfield Avenue / Stanhope Road, on:

- Tuesday 16 June 2015, from 7am to 9am
- Tuesday 16 June 2015, from 4pm to 6pm
- Saturday 13 June 2015, from 11am to 1pm

The counts assist in understanding the impacts the development of the site would have on the intersection and will be discussed in section 4.3.

### 2.6.2 Weekly tube counts

Traffic flow data was collected over a one week period at two locations on Stanhope Road as shown in Figure 6. The counts were undertaken each side of the two entry points to the Village. This was done so that a count of Village activity could be determined by subtracting the eastern count from the western count. There is very little Village access provided further east from this point.


Figure 6: Traffic count locations - weekly tube counts

The hourly flows for the period were taken over a seven day period from Monday 15 June to Sunday 21 June 2015. The busier period on Stanhope Road west of the Village is between 9am and 4pm. This confirms that the Village occupants choose to avoid the road peak hours which occur before 9am and after 5pm.

The 7 day average traffic flows indicates that an estimated 320 vehicles per day access the village, while an estimated average of 174 vehicles leave the site per day. This indicates that during the period of the survey, there were more people staying in the village rather than leaving.

### 2.6.3 Entries into site

Survey results demonstrate a weekly average of 20 vehicles per hour entered the site at approximately 12pm during the weekdays. This was found to be the highest number of vehicle entering during the week. Weekend vehicle entries were found to be lower but had a similar peak hour of 12pm.

The number of vehicles entering the site is determined by subtracting the easterly count from the west count, as discussed in section 2.6.2. The average daily traffic counts for vehicles entering the site is shown in Figure 7.

This confirms that residents avoid the network peak hours on weekdays. Over the week, an average of 275 vehicles per day entered the site.

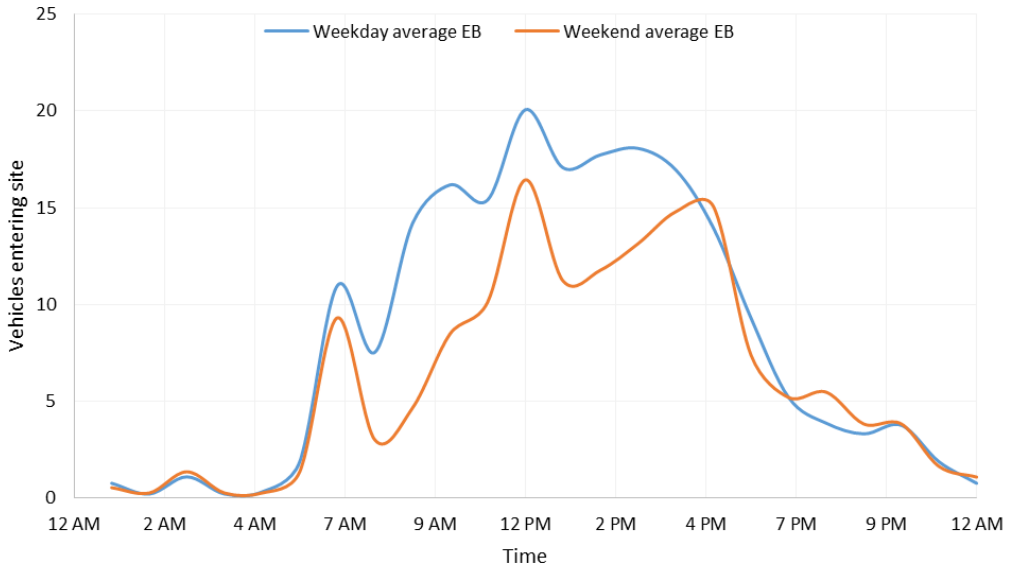


Figure 7 Average daily traffic entering the site

### 2.6.4 Leaving the site

The peak period for people leaving the site was at 1pm for both weekdays and weekends. The highest average number of people leaving the site was found to be 21 vehicles on a weekday. The average daily traffic counts for vehicles leaving the site is shown in Figure 8.

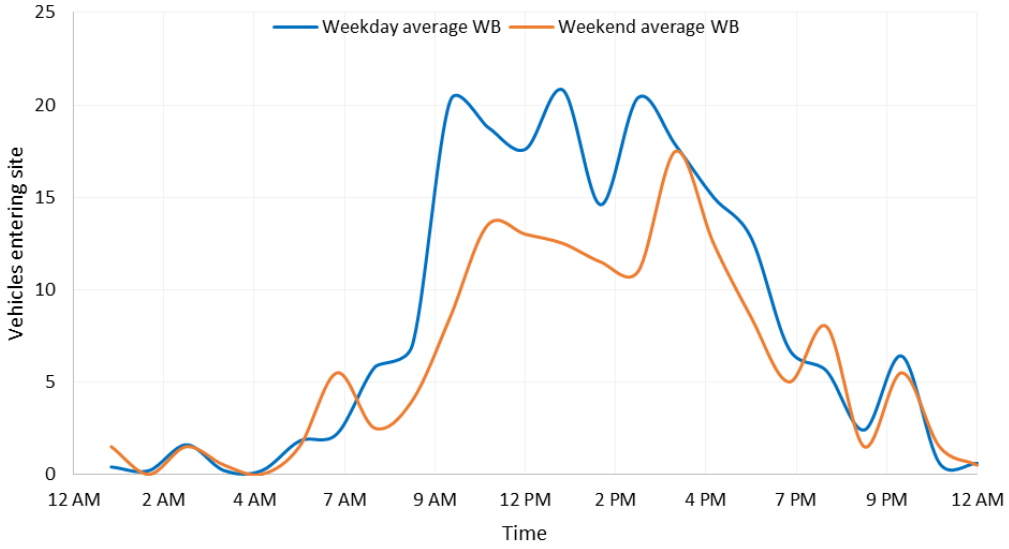


Figure 8 Average daily traffic leaving the site

# 3 Planning proposal

This Traffic and Transport Assessment accompanies a Planning Proposal which seeks to amend the following planning provisions to the Ku-ring-gai LEP 2015:

- Land Use Zone: The land use zoning is proposed to be changed to an R3 Medium Density Residential Zone to allow for taller seniors' housing development to occur.
- Height: The maximum building height is proposed to be increased to between 11.5 and 24.0 metres across the site.
- Floor Space Ratio: The maximum floor space ratio is proposed to be increased to 0.8:1

## 3.1 Indicative masterplan

An indicative master plan has been prepared by Architectus to support a Planning Proposal to amend the land use, height and floor space ratio controls for the site. The proposed master plan provides solutions to the site's existing issues, whilst maintaining the Village's landscaped character and minimising impacts on surrounding neighbours.

The indicative masterplan will comprise of 266 new homes and the retention of 74 existing dwellings. A new purpose built community centre will also form part of the initial development stage. A model is shown in Figure 9.

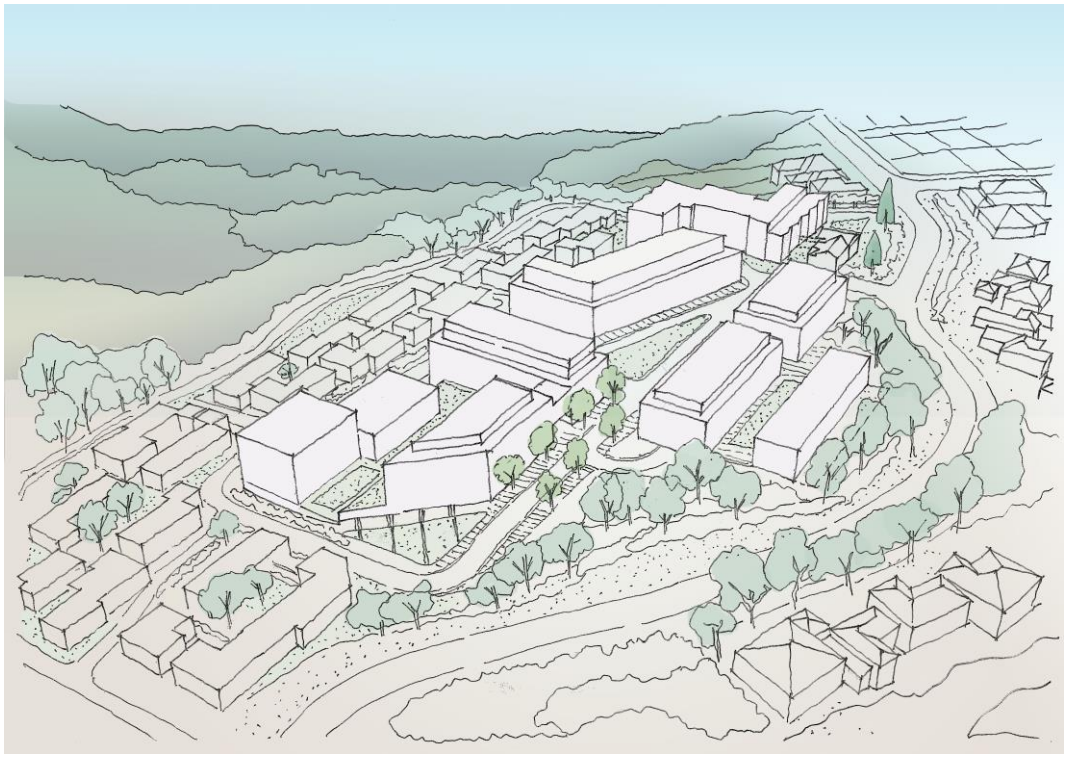

Figure 9 Masterplan model

Source: Architectus

# 4 Transport and parking assessment

## 4.1 Internal site roadways

The master plan proposes the realignment of several internal roads, the most notable being the realignment of the western end of Lourdes Avenue to connect through to Stanhope Road. The indicative layout of the internal road network is shown in Figure 10. It provides an efficient network to provide access to the future building arrangements.

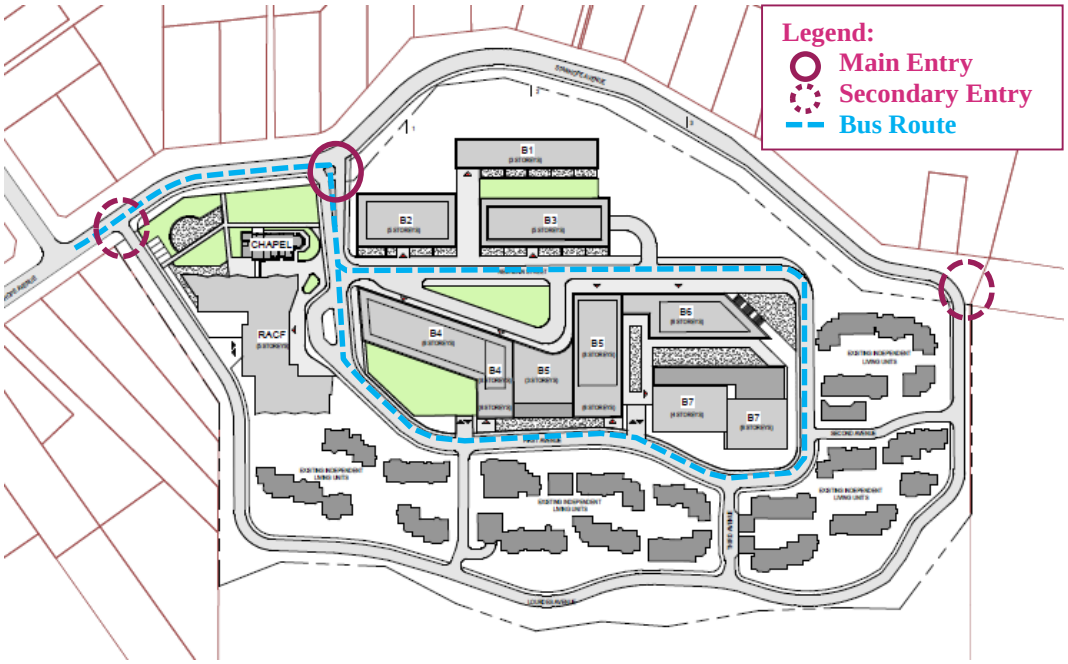


Figure 10 Indicative road internal road network

Source: Architectus

### 4.1.1 Traffic access

The existing secondary access located east of Stanhope Road is proposed to be improved. This would link Stanhope Road with the existing mini roundabout. No changes are proposed for the existing main entrance on the west of Stanhope Road.

### 4.1.2 Buses

The three existing bus stops within the site are proposed to be relocated as shown in Figure 10. The bus stops are proposed to be located at major destinations including the Admin and Community Centre and the RACF, and will be easily accessible to residents.

## 4.2 Parking and service assessment

The parking access arrangements of the indicative masterplan are shown in Figure 11.

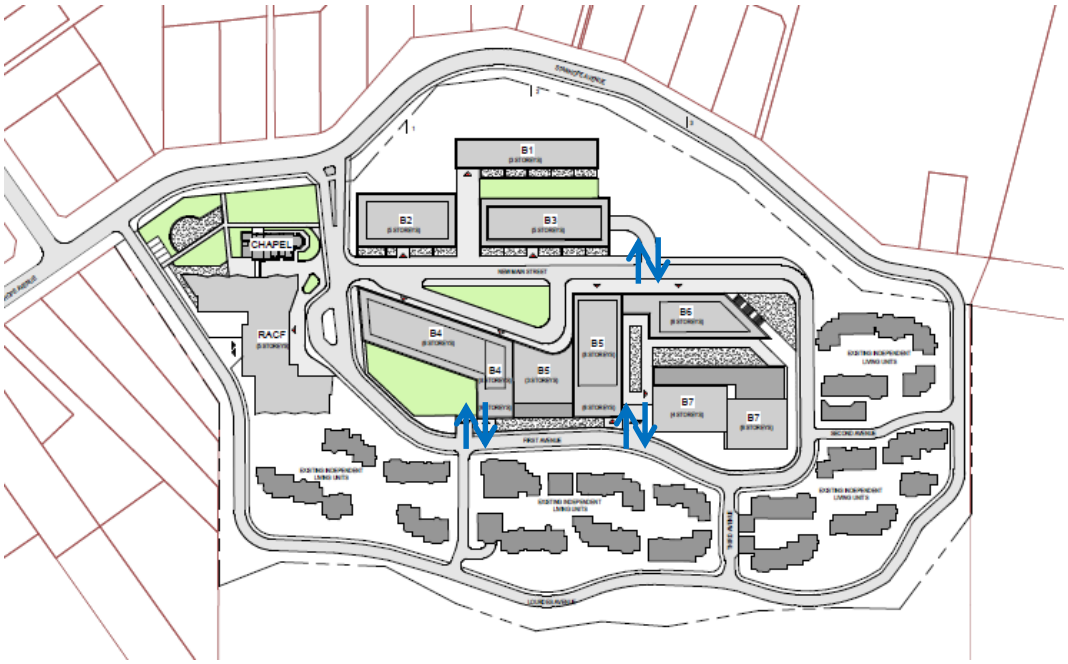


Figure 11 Indicative masterplan

Source: Architectus

### 4.2.1 Off-street parking

Each building is proposed to have access to parking in basement levels. The parking strategy aims to reduce excavation by using the natural falls in the site to locate parking below common spaces. Parking access is generally located off the main circulation spine of First Avenue and generally consists of level limiting ramps.

The Ku-ring-gai Local Centres Development Control Plan 2016 (KDCP) suggests the following rates parking rates for senior housing dwellings:

- 1.5 spaces per self contained units plus
- 1 visitor space for every 5 units

It also states that "for self contained units, additional visitor parking will not be required if at least half the spaces for residents are unassigned and accessible to visitors."

The site is proposed to comply with these requirements and therefore would not require visitor parking spaces.

The indicative masterplan proposes to provide some 400 parking spaces at basement levels. The breakdown of the number of parking spaces in each building is shown in Table 2.

Table 2 Indicative parking spaces provided

| Site Building | No. of Apartments | Parking spaces (1.5 / apartment) |
|---|---|---|
| B1 | 16 | 25 |
| B2 | 33 | 49 |
| B3 | 38 | 58 |
| B4 | 57 | 86 |
| B5 | - | - |
| B5 | 28 | 41 |
| B5 | 11 | 17 |
| B6 | 48 | 73 |
| B7 | 22 | 32 |
| B7 | 13 | 20 |
| **Total** | **266 units** | **400 spaces** |

### 4.2.2 Accessible spaces

The State Environmental Planning Policy (Housing for Seniors or People with a Disability) 2004 provides parking rates for disabled spaces. Schedule 3 of the policy states that 5% of the total number of car parking spaces must be designed to enable the width of the spaces to be increased to 3.8 metres.

Therefore of the 400 proposed car spaces, 20 spaces should be designed as such. The spaces would be designed in accordance to AS2890.

### 4.2.3 On-street parking

On-street parking is proposed to be distributed around the site for general visitor use.

### 4.2.4 Service vehicles

A service area with 4.5m clearance is proposed to be located adjacent to the lower floor of the Community Centre. The design height is in accordance with the KDCP guidelines. The service area will be a centralised point for deliveries and larger waste collections. This can be accessed off First Avenue.

## 4.3 Road network analysis

This section investigates the impacts the site would have on the key Lindfield Avenue / Stanhope Road intersection. Based on the survey findings discussed in section 2.6.1, the following peak hours (highest traffic volume through the intersection) were found:

- AM Peak - 8am to 9am
- PM Peak - 5pm to 6pm
- Saturday Peak - 11.30am to 12.30pm

For the purpose of this study, the above peak hour times will be used in the traffic modelling.

### 4.3.1 Forecast traffic generation

The RMS Guide to Traffic Developments provides indicative traffic generation rates for "Housing for aged and disabled persons". The rates recommended are:

- 1 to 2 trips per dwelling per day
- 0.1 to 0.2 trips per dwelling during evening peak hours.

Based on the 266 units, the site would generate some 537 trips per day.

The existing 74 dwellings would not generate any additional traffic on top of the existing surveyed traffic volumes.

**Arrival profile**

The existing profile in which residents arrive and leave the site can be assessed based on the weekly tube counts, discussed in section 2.6.2. The traffic generated in each peak hour, by the completion of the site is shown in Table 3.

This is derived by multiplying the daily 537 trips generated, by the proportion of residents arriving during the particular peak hour. As a conservative estimate, it is assumed that trips generated to the site would leave within the same hour.

Table 3 Arrival profile and traffic generated

| Peak period | Existing proportion of daily arrivals and departures to site during the hour | Existing two-way trips generated by site during the hour (vehicles) | Trips generated by masterplan (daily trips multiplied by proportion) | Additional trips generated |
|---|---|---|---|---|
| 8am to 9am | 3% | 13 trips | 16 trips | 3 trips |
| 5pm to 6pm | 7% | 38 trips | 39 trips | 1 trip |
| 11.30am to 12.30pm | 10% | 29 trips | 54 trips | 25 trips |

### 4.3.2 Trip distribution

The proportion of trips generated to the site in each direction is shown in Figure 12. It is assumed that a similar split will be adopted for trips leaving the site.

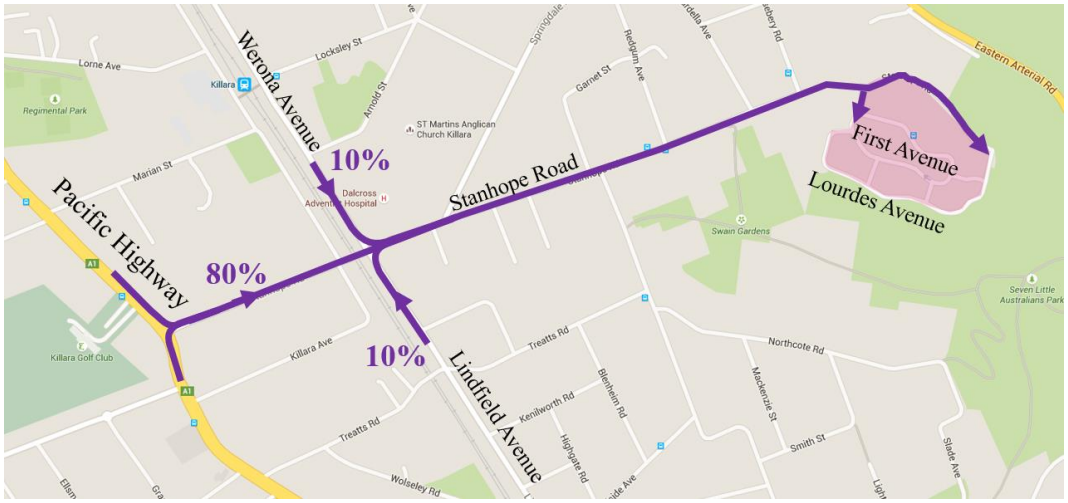


Figure 12 Inbound trip distribution to the site

### 4.3.3 Traffic modelling

The intersections have been assessed using RMS approved SIDRA software. The existing intersection performance is assessed in this report in terms of the following three factors for each intersection.

- Degree of Saturation
- Average Delay (seconds per vehicle)
- Level of Service

In urban areas, the traffic capacity of the major road network is generally a function of the performance of key intersections. This performance is quantified in terms of Level of Service (LoS), is based on the average delay per vehicle. LoS ranges from A = very good to F = unsatisfactory (see Table 4).

Table 4: Level of service criteria for intersections

| Level of Service | Average delay (seconds) | Description |
|---|---|---|
| A | Less than 14 | Good operation |
| B | 15 to 28 | Good with acceptable delays and spare capacity |
| C | 29 to 42 | Satisfactory |
| D | 43 to 56 | Operating near capacity |
| E | 57 to 70 | At Capacity. At signals, incidents will cause excessive delays. Roundabouts require other control mode |
| F | Greater than 71 | Unsatisfactory with excessive queuing |

Another common measure of intersection performance is the Degree of Saturation (DoS), which provides an overall measure of the capability of the intersection to accommodate additional traffic. A DoS of 1.0 indicates that an intersection is

operating at capacity. The desirable maximum degree of saturation for an intersection is 0.9.

### 4.3.4 Traffic assessment

The results of the surrounding intersections are summarised in Table 5. This includes the following scenarios:

- Existing 2015 scenario to calibrate to existing traffic conditions
- Existing 2015 traffic with addition of site generated traffic

The existing condition of the intersection operates at an efficient level of service B. Based on a conservative modelling approach, the completion of the site is unlikely affect the key intersection of Lindfield Avenue / Stanhope Road.

Table 5 SIDRA results

| Intersection | Scenario | | LoS | Delay | DoS |
|---|---|---|---|---|---|
| Lindfield Avenue / Stanhope Road | AM Peak | Existing | B | 25 | 0.538 |
| | | Existing+Development | B | 25 | 0.545 |
| | PM Peak | Existing | B | 22 | 0.442 |
| | | Existing+Development | B | 23 | 0.458 |
| | Saturday Peak | Existing | B | 23 | 0.396 |
| | | Existing+Development | B | 24 | 0.428 |

# 5 Conclusion

The site sits within the Ku-Ring-Gai Council Local Government Area. The indicative masterplan will comprise of 266 new homes. A new purpose built community centre will also form part of the initial development stage. A traffic and transport assessment has been carried out to examine the existing and future transport issues. The key findings are:

- Tube counts indicate that peak arrivals into the site occurred around 12pm while peak departures occurred around 2pm. This confirms that residents avoid the network peak hours on weekdays.
- The site has an efficient bus route which services the various key locations directly.
- Pedestrian access to the site is generally poor and relatively undesirable given the steep topography of the area. Footpaths along Stanhope Road leading to the site are generally narrow and discontinuous with no pedestrian crossing facilities.
- The master plan proposes the realignment of several internal roads which provides an efficient network to provision the future building arrangements.
- The existing secondary access located east of Stanhope Road is proposed to be improved. This would link Stanhope Road with the existing mini round-a-bout. No changes are proposed for the existing main entrance on the west of Stanhope Road.
- The three existing bus stops within the site are proposed to be relocated at major destinations such as the Admin and Community Centre and the RACF, and would be easily accessible to residents.
- The existing condition of the intersection operates at an efficient level of service B. Based on a conservative modelling approach, the completion of the site is unlikely affect the key intersection of Lindfield Avenue / Stanhope Road.