

MIRVAC HOMES (NSW) PTY LTD

TRANSPORT REPORT FOR
PROPOSED RESIDENTIAL
DEVELOPMENT, SECTOR 3,
WARRIEWOOD VALLEY

JULY 2005

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I. INTRODUCTION

I.1 Colston Budd Hunt and Kafes Pty Ltd has been commissioned by Mirvac Homes (NSW) Pty Ltd to prepare a report examining the transport implications of a proposed masterplan and rezoning application for a residential development comprising 131 dwellings in Warriewood Valley. The site is located north of Macpherson Street as shown in Figure 1.

I.2 The site is occupied by landscape businesses and rural properties, and is known as Sector 3 in the Warriewood Valley Urban Land Release. Sector 3 is one of 12 sectors identified for development in Warriewood Valley. Ultimately development of the 12 sectors will comprise some 1,900 dwellings and industrial and commercial uses. Pittwater Council has prepared Development Control Plan No. 29 Warriewood Valley Urban Land Release to guide development in the area. In association with DCP 29, the Warriewood Valley Roads Master Plan has been prepared and recommends works to accommodate the development in Warriewood Valley.

I.3 The overall transport implications of development in the area, including the development of Sector 3, have therefore been previously assessed. This report has been prepared in the context of previous studies, and assesses the transport implications of the proposed development through the following chapters:

- Chapter 2 – describing the existing conditions; and
 - Chapter 3 – assessing the transport implications of the proposed development.
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2. EXISTING CONDITIONS

Site Location and Road Network

- 2.1 The site is north of Macpherson Street and east of Garden Street in Warriewood as shown in Figure 1. The site extends to Brands Lane to the east and Narrabeen Creek to the north. The majority of the site is occupied by Flower Power. The remainder is occupied by other landscape businesses and rural properties which have vehicular access from Macpherson Street and Brands Lane.
- 2.2 Warriewood Valley is being developed for residential, retail and employment uses. To guide development in the area, Pittwater Council has prepared Development Control Plan No. 29 Warriewood Valley Urban Land Release. The site is identified in DCP 29 as Sector 3; one of 12 development sectors in Warriewood Valley. Development of a number of the other sectors is currently occurring or has been completed. Ultimately, development of the 12 sectors will comprise some 1,900 dwellings and industrial and commercial uses. Sector 3 is identified for development of some 165 dwellings.
- 2.3 The road network in the vicinity of the site includes Garden Street, Macpherson Street and Brands Lane. Garden Street runs north west from Pittwater Road at a signalised intersection. It provides access to commercial and industrial development north of Pittwater Road and open space and residential development further north. Near the site, Garden Street provides access to adjacent residential development being developed under DCP 29. Vehicular access to these developments is controlled by roundabouts. Garden Street provides for one traffic lane in each direction.
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- 2.4 Macpherson Street connects to Garden Street adjacent to the site. The intersection of these roads is an unsignalised t-intersection, with Macpherson Street having priority. The intersection is identified in the roads masterplan to be controlled by a roundabout. Macpherson Street provides a bus route and indented parking on the southern side of the road.
- 2.5 Brands Lane forms the eastern boundary of the site and provides access to the site and rural style properties. Brands Lane provides for one traffic lane in each direction and is currently unsealed. It terminates at Narrabeen Creek, north of Macpherson Street. The intersection of Brands Lane with Macpherson Street is unsignalised. Fantail Avenue forms a fourth (southern) approach to the intersection. It provides access to residential development in Sector II to the south. The intersection of Macpherson Street with Brands Lane and Fantail Avenue is identified in the roads masterplan to be controlled by a roundabout.

Roads Masterplan

- 2.6 In association with the DCP, a roads masterplan¹ has been prepared. The roads masterplan identifies a number of road, traffic and transport works in the release area to accommodate the development. These works include intersection controls and upgrades, pedestrian improvements (footpaths and refuges), cycle links, bus facilities, road widening and improvements, line marking and signage.
- 2.7 The intersections controls and upgrades identified in the masterplan include links to the external arterial road network and internal controls at existing and new intersections. The works identified in the vicinity of the site include:

¹ Warriewood Valley Roads Masterplan (2004 Review). Prepared for Pittwater Council by Masson Wilson Twiney and adopted by Council on 13 December 2004.

- ❑ a pedestrian refuge on Macpherson Street between Garden Street and Brands Lane;
 - ❑ a bus bay on Garden Street at Macpherson Street;
 - ❑ a roundabout at the intersection of Macpherson Street with Garden Street;
 - ❑ a roundabout at the intersection of Macpherson Street with Brands Lane/Fantail Avenue;
 - ❑ widening of Macpherson Street and Garden Street;
 - ❑ line marking and signage on Macpherson Street and Garden Street;
 - ❑ three tonne load limits on Garden Street and Macpherson Street; and
 - ❑ footpaths and cycle ways.
- 2.8 The works identified in the roads masterplan are included in Council's Warriewood Valley Section 94 Contributions Plan (Plan No. 15 Amendment No. 11). The proposed development will make appropriate contributions towards the works in accordance with Council's Section 94 plan.
- 2.9 The measures in the roads masterplan were identified to cater for the anticipated scale of development in the Warriewood Valley. The overall transport implications of development in Warriewood Valley have therefore previously been assessed. This report concentrates on local implications with respect to access, parking provision, servicing, internal layout and local traffic effects.
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Traffic Flows

2.10 In order to gauge traffic conditions, counts were undertaken during weekday morning and afternoon peak periods at the following intersections:

- Macpherson Street with Garden Street; and
- Macpherson Street with Brands Lane/Fantail Avenue.

2.11 The results of the surveys are shown in Figures 2 and 3 and summarised in Table 2.1.

Road	Location	AM peak hour	PM peak hour
Macpherson Street	West of Garden Street	855	735
	East of Garden Street	325	315
	West of Brands Lane	285	310
	East of Brands Lane	290	305
Garden Street	South of Macpherson Street	640	570
Brands Lane	North of Macpherson Street	15	15
Fantail Avenue	South of Macpherson Street	35	20

2.12 Table 2.1 shows that Macpherson Street (west of Garden Street) and Garden Street carried some 570 to 850 vehicles per hour two-way during the morning and afternoon peak periods. East of Garden Street, Macpherson Street carried lower flows of some 285 to 325 vehicles per hour two-way. Brands Lane and Fantail Avenue carried less than 50 vehicles per hour two-way.

Intersection Operations

2.13 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The surveyed intersections shown in Figures 2 and 3 have been analysed using the INTANAL program.

2.14 The INTANAL program simulates the operations of intersections to provide a number of performance measures. The most useful measure provided is average delay per vehicle expressed in seconds per vehicle. Based on average delay per vehicle, INTANAL estimates the following levels of service (LOS):

- For traffic signals, the average delay per vehicle in seconds is calculated as delay/(all vehicles), for roundabouts the average delay per vehicle in seconds is selected for the movement with the highest average delay per vehicle, equivalent to the following LOS:

0 to 14	=	"A"	Good
15 to 28	=	"B"	Good with minimal delays and spare capacity
29 to 42	=	"C"	Satisfactory with spare capacity
43 to 56	=	"D"	Satisfactory but operating near capacity
57 to 70	=	"E"	At capacity and incidents will cause excessive delays. Roundabouts require other control mode
>70	=	"F"	Unsatisfactory and requires additional capacity

- For give way and stop signs, the average delay per vehicle in seconds is selected from the movement with the highest average delay per vehicle, equivalent to following LOS:
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0 to 14	=	“A”	Good
15 to 28	=	“B”	Acceptable delays and spare capacity
29 to 42	=	“C”	Satisfactory but accident study required
43 to 56	=	“D”	Near capacity and accident study required
57 to 70	=	“E”	At capacity and requires other control mode
>70	=	“F”	Unsatisfactory and requires other control mode

- 2.15 It should be noted that for roundabouts, give way and stop signs, in some circumstances, simply examining the highest individual average delay can be misleading. The size of the movement with the highest average delay per vehicle should also be taken into account. Thus, for example, an intersection where all movements are operating at a level of service A, except one which is at level of service E, may not necessarily define the intersection level of service as E if that movement is very small. That is, longer delays to a small number of vehicles may not justify upgrading an intersection unless a safety issue was also involved.
- 2.16 The INTANAL analysis found that the unsignalised intersections of Macpherson Street with Garden Street and Brands Lane/Fantail Avenue are operating with average delays for the highest delayed movement of less than 15 seconds per vehicle during peak periods. This represents level of service A/B, a good level of service.
- 2.17 The analysis found that under roundabout control (as identified in the roads masterplan for Warriewood Valley), the above intersections would operate with average delays of less than 15 seconds per vehicle during peak periods. This represents level of service A/B, a good level of service.
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Public Transport

- 2.18 Local bus services are provided by Sydney Buses and Forest Coach Lines. The 285 service operates along Garden Street and Macpherson Street between Mona Vale, Narrabeen and Chatswood. It operates on a 60 minute headway in each direction, Monday to Saturday, with more frequent services during weekday peak periods.
- 2.19 The 185 and L85 services operate along Macpherson Street and Garden Street between Manly Vale and the city. They operate on a 30 minute headway in each direction, Monday to Saturday, with more frequent services during weekday peak periods. On Sunday, services are every 60 minutes in each direction.
- 2.20 The site is therefore close to bus services.

3. IMPLICATIONS OF PROPOSED DEVELOPMENT

3.1 The proposed development provides for 131 residential dwellings. Vehicular access will be provided from new internal roads running north from the intersection of Macpherson Street with Garden Street, and from Brands Lane. Access will also be provided from a new road running north from Macpherson Street approximately half way between Garden Street and Brands Lane.

3.2 This chapter assesses the implications of the proposed development through the following sections:

- public transport;
- parking provision;
- access and internal layout;
- traffic generation and effects; and
- summary.

Public Transport

3.2 As previously discussed, the site is close to existing bus services, which provide links to Mona Vale, Chatswood, the city and surrounding areas. Services operate on a 30 to 60 minute headway in each direction.

3.3 The proposed development will increase residential densities close to existing public transport services. The proposal will therefore strengthen the demand for these services.

- 3.4 In accordance with DCP 29, appropriate pedestrian and cycle links will be provided within and adjacent to the development to facilitate access to residential dwellings, open space and bus services. This is consistent with government policy and planning principles of:
- (a) improving accessibility to employment and services by walking, cycling, and public transport;
 - (b) improving the choice of transport and reducing dependence solely on cars for travel purposes;
 - (c) moderating growth in the demand for travel and the distances travelled, especially by car; and
 - (d) supporting the efficient and viable operation of public transport services.

Parking Provision

- 3.5 Pittwater DCP 29 indicates that detached and attached dwellings should provide a minimum of two car spaces per dwelling.
- 3.6 The proposed development is for 131 detached and attached dwellings. All dwellings have three or more bedrooms. Each dwelling will be provided with a double garage in accordance with DCP 29. The proposed parking provision is therefore considered appropriate.
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Access and Internal Layout

- 3.7 Vehicular access is proposed to be provided from a new internal road running north from the intersection of Macpherson Street with Garden Street. As previously identified, a roundabout will be constructed at this intersection. Inside the site, this road will run north and then bend east where it reaches Narrabeen Creek. It will then follow the creek line to Brands Lane on the eastern side of the site.
- 3.8 Vehicular access to the development will be provided from Brands Lane. The intersection of Brands Lane with Macpherson Street and Fantail Avenue will be controlled by a roundabout.
- 3.9 Access will also be provided from a new road running north from Macpherson Street, approximately half way between Garden Street and Brands Lane. This access will provide for all turns to and from the site by introduction of a 'seagull' type intersection on Macpherson Street. There is good sight distance along Macpherson Street in both directions at the proposed access location.
- 3.10 Internally, roads will generally provide 5.5 metre wide carriageways. This width provides for two-way traffic, or one traffic lane and one parking lane with passing opportunities. This carriageway width is identified in the Warriewood Valley Roads Masterplan for access streets. A number of dwellings will be accessed internally by driveways from access streets. These driveways will serve small numbers of dwellings (some four dwellings each).
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- 3.11 The north-south road in the centre of the site from Macpherson Street will provide a 7.5 metre carriageway width. This width provides for two-way traffic with one parking lane, or one traffic lane and two parking lanes with passing opportunities. This carriageway width is identified in the Warriewood Valley Roads Masterplan for local streets.
- 3.12 The internal road system will be provided to accommodate the swept path of a 10.7 metre large rigid truck. Trucks ranging in size up to 10.7 metres would be used for garbage collection, deliveries, removal vans, etc.
- 3.13 The internal road layout has been designed in accordance with the principles in AMCORD. Within residential areas, AMCORD distinguishes between two types of residential street: access streets and collector streets. On access streets the residential environment dominates. Traffic speeds and volumes are low and pedestrian/cycle movements encouraged. Vehicle speeds should, as far as possible, be controlled by street length, parked cars, landscaping design, built form and activity along the frontage. Bicycles are generally provided for on-street.
- 3.14 Collector streets collect traffic from access streets and generally carry higher flows. A good level of amenity and safety is maintained by restricting traffic volumes and speeds. Vehicle speeds on collector streets should be controlled by street alignment, parked cars, street length, intersection design, built form and by special measures at pedestrian/cycle crossings such as kerb extensions.
- 3.15 Overall, the proposed layout provides for an efficient subdivision pattern and a low speed environment in accordance with the principles in DCP 29 and AMCORD. Access, internal circulation and layout arrangements are considered appropriate.
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Traffic Generation and Effects

- 3.16 Traffic generated by the proposed development will have its greatest effects during morning and afternoon peak periods when it combines with commuter traffic. Surveys undertaken by the RTA found that detached residential dwellings generate some 0.85 vehicles per hour two-way during peak hours. Larger attached dwellings generate up to some 0.65 vehicles per hour two-way.
- 3.17 Based on the above, the proposed development would generate some 100 vehicles per hour two-way during morning and afternoon peak hours. Our traffic surveys indicated that Flower Power generated some 25 and 50 vehicles per hour two-way during the morning and afternoon peak periods respectively. Therefore, the increase in traffic generation would be some 75 and 50 vehicles per hour two-way during the morning and afternoon peak periods. This estimate of the additional traffic generation is conservative, as it makes no allowance for the existing traffic generated by the other uses on the site.
- 3.18 During the morning peak period, some 70 per cent of vehicles would be outbound from the development. The reverse would apply in the afternoon. The additional traffic has been assigned to the road network. Existing peak hour traffic flows with development traffic are shown in Figures 2 and 3, and summarised in Table 3.1.
- 3.19 Table 3.1 shows that traffic increases on Macpherson Street and Garden Street would be some 30 to 45 vehicles per hour during peak hours. Increases on Brands Lane would be lower at some 10 vehicles per hour two-way. Overall, these increases are low, equivalent to one vehicle every one to six minutes during peak hours.
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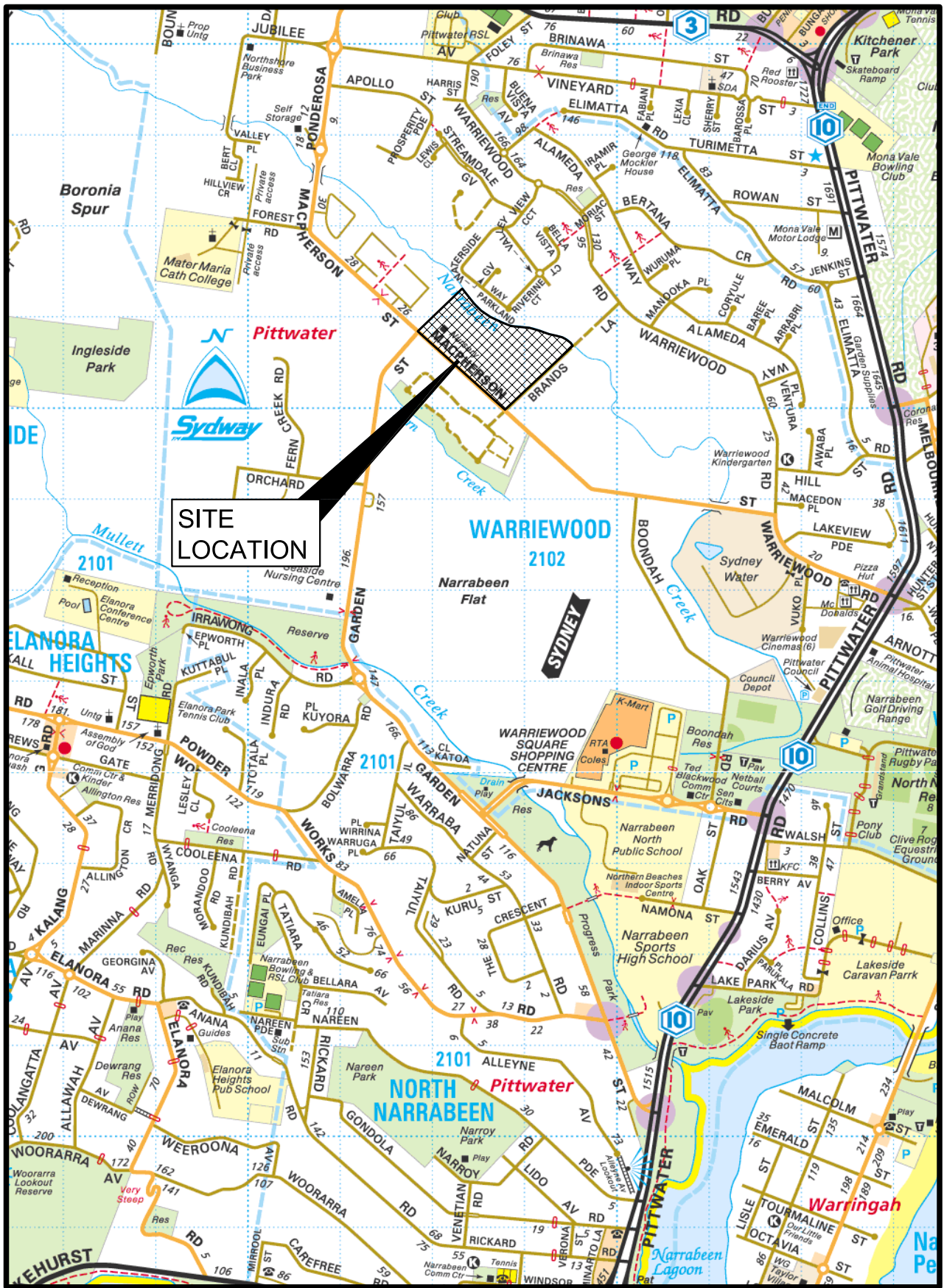
Road	Location	AM peak hour		PM peak hour	
		Existing	Plus development	Existing	Plus development
Macpherson Street	West of Garden Street	855	+20	735	+10
	East of Garden Street	325	+15	315	+20
	West of Brands Lane	285	+20	310	+20
	East of Brands Lane	290	+20	305	+20
Garden Street	South of Macpherson Street	640	+25	570	+20
Brands Lane	North of Macpherson Street	15	+10	15	+10
Fantail Avenue	South of Macpherson Street	35	-	20	-

- 3.20 At Macpherson Street, internal access roads would generally carry some 30 to 45 vehicles per hour two-way during peak hours. Further inside the development, flows on internal roads would be lower.
- 3.21 The intersections analysed in Chapter 2 have been re-analysed with INTANAL for the additional development traffic flows shown in Figures 2 and 3. The analysis found that intersections would continue to operate at their existing good levels of service A/B, with average delays of 15 seconds per vehicle or less, under existing controls and future roundabout controls. Intersections will operate with spare capacity to cater for future traffic as the area continues to develop.
- 3.22 The proposed access intersection on Macpherson Street, between Garden Street and Brands Lane, would operate at level of service A/B, with average delays of less than 15 seconds per vehicle during peak periods.

Summary

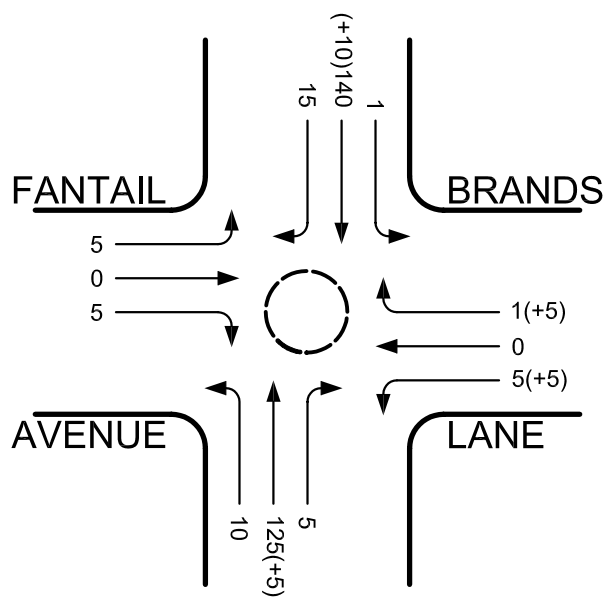
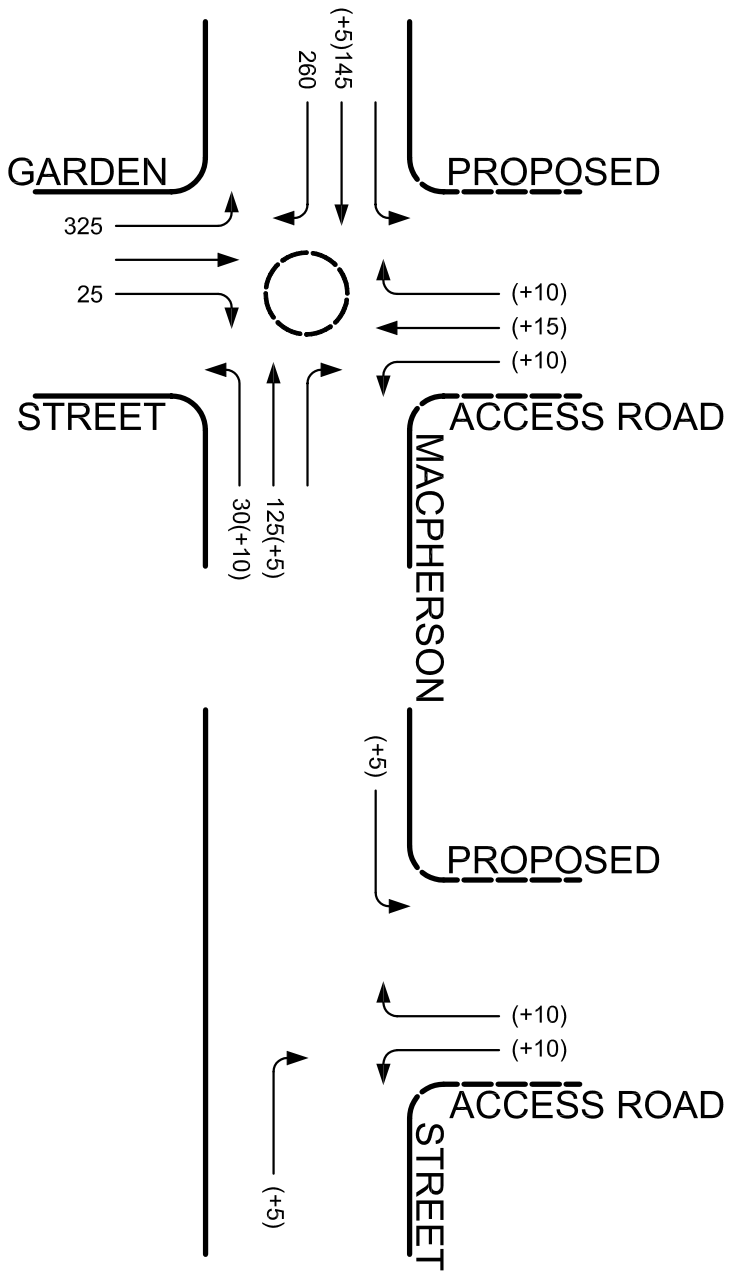
3.23 In summary, the main points relating to the transport implications of the proposed development are as follows:

- i) the proposed development provides for 131 residential dwellings;
- ii) the proposed development would increase residential densities close to public transport services;
- iii) the proposed parking provision is in accordance with DCP 29 and is considered appropriate;
- iv) access and internal layout provide for a low speed environment in accordance with the principles in DCP 29 and AMCORD, and are considered appropriate; and
- v) with the works identified for the area, the road network will be able to cater for the traffic generated by the proposed development and future development.



**SITE
LOCATION**

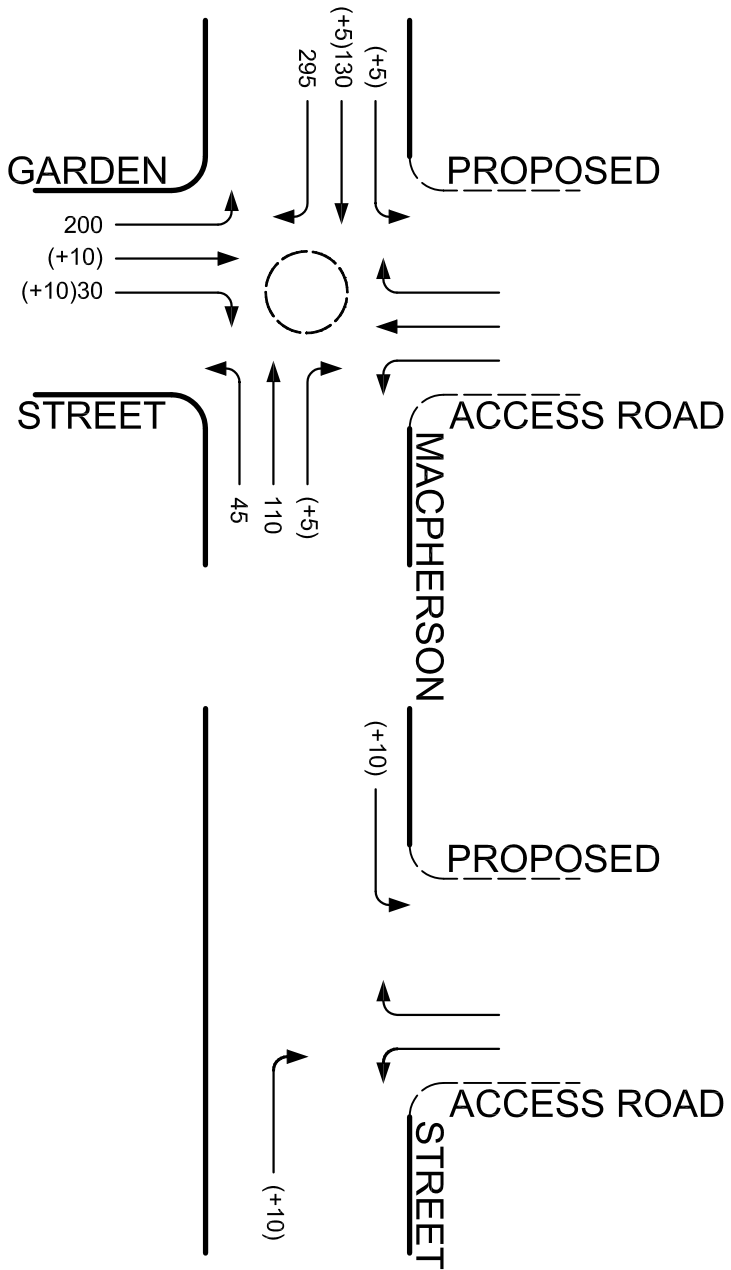
LOCATION PLAN



LEGEND:

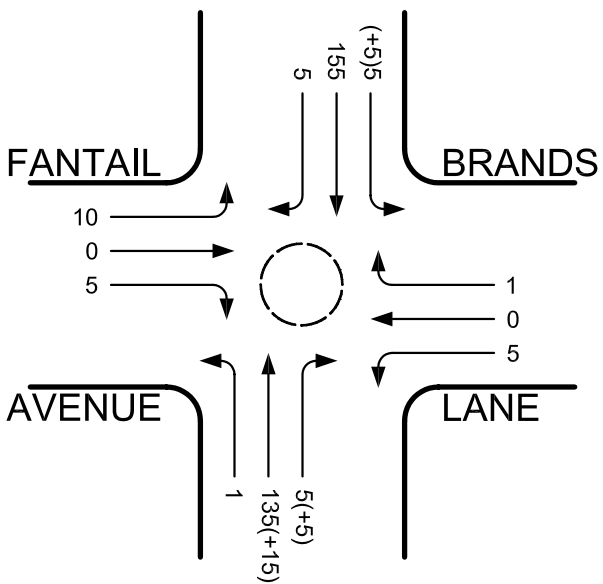
- 100 - Existing Peak Hour Flows
- (+10) - Additional Development Traffic
- - Future Roundabout

**EXISTING MORNING PEAK
 HOUR TRAFFIC FLOWS PLUS
 DEVELOPMENT TRAFFIC**



LEGEND:

- 100 - Existing Peak Hour Flows
- (+10) - Additional Development Traffic
- - Future Roundabout



EXISTING AFTERNOON PEAK HOUR TRAFFIC FLOWS PLUS DEVELOPMENT TRAFFIC