

APPENDIX E

**TRANSPORT REPORT FOR PROPOSED RESIDENTIAL SUBDIVISION,
ORCHARD STREET, WARRIEWOOD**

By Colston Budd Hunt and Kafes Pty Ltd

SEAFORTH MAC PTY LTD

TRANSPORT REPORT FOR
PROPOSED RESIDENTIAL
SUBDIVISION, ORCHARD
STREET, WARRIEWOOD

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I. INTRODUCTION

I.1 Colston Budd Hunt and Kafes Pty Ltd has been commissioned by Seaforth Mac Pty Ltd to prepare a report examining the transport implications of a proposed residential subdivision at 11, 13 and 15 Orchard Street, Warriewood. The site location is shown in Figure 1. It is proposed to subdivide 3 existing lots into 16 lots.

I.2 This report assesses the transport implications of the proposed residential subdivision through the following chapters:

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

2. EXISTING CONDITIONS

Site Location and Road Network

- 2.1 The site is located at the western end of Orchard Street in Warriewood as shown in Figure 1. It incorporates the properties at 11, 13 and 15 Orchard Street and is occupied by 3 residential dwellings. The site area is some 28,600m².
- 2.2 Surrounding land use is predominantly low density residential. There is a new residential subdivision east of the site with frontage to Garden Street and the southern side of Orchard Street. North of the site, land use has a rural character.
- 2.3 The road network in the vicinity of the site is made up of Garden Street and Orchard Street. Garden Street runs from Pittwater Road in the south to Macpherson Street in the north. It provides access to commercial and industrial development and areas of open space near Pittwater Road, and residential development further north. It has signalised intersections with Pittwater Road and Powderworks Road. In the vicinity of Orchard Street, Garden Street provides for one traffic lane in each direction. Bus stops are provided on both sides of the road.
- 2.4 Orchard Street runs west from Garden Street. Some 300 metres west of Garden Street it terminates. A right of way runs south from the western end of Orchard Street for some 150 metres. The right of way is also known as Orchard Street and existing properties with access from the right of way have Orchard Street addresses. The intersection of Orchard Street with Garden Street is controlled by stop signs.
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Traffic Flows

- 2.5 In order to establish traffic conditions, traffic counts were undertaken during weekday morning and afternoon peak periods at the intersection of Orchard Street and Garden Street. The results of the surveys are shown in Figure 2 and summarised in Table 2.1.

Table 2.1: Existing two-way (sum of both directions) peak hour traffic flows

Road	Location	Morning peak hour	Afternoon peak hour
Garden Street	North of Orchard Street	615	575
	South of Orchard Street	625	585
Orchard Street	West of Garden Street	30	30

- 2.6 Table 2.1 shows that Garden Street carried some 575 to 625 vehicles per hour two-way during the morning and afternoon peak periods. Orchard Street, during the same peak periods, carried some 30 vehicles per hour two-way.

Intersection Operations

- 2.7 The capacity of the road network is largely determined by the capacity of its intersections to cater for peak period traffic flows. The intersection of Garden Street with Orchard Street has been analysed using the INTANAL program.
- 2.8 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:

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

- 2.9 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.

- 2.10 The INTANAL analysis found that the sign controlled intersection of Garden Street with Orchard Street is operating with average delays of less than 15 seconds per vehicle during the morning and afternoon peak periods. This represents levels of service A/B, a good level of service.

Residential Amenity

- 2.11 The definition of the impact on residential amenity by varying levels of traffic flow is extremely complex. Perceptions of impact vary greatly from person to person. Traffic flows that one person may find perfectly acceptable may be considered excessive by another. Impact is affected by the nature of the street and the area in which it is located, its width, building setbacks, grades, etc. as well as by the speed of traffic and the mix of cars and heavy vehicles.
- 2.12 The Roads and Traffic Authority has undertaken considerable research into environmental capacity performance standards on residential streets. Their "Guide to Traffic Generating Developments" defines the following environmental capacity performance standards for local residential streets and collector roads:

- Local Roads
 - Environmental goal – 200 vehicles per hour in the peak hour;
 - Maximum flow – 300 vehicles per hour in the peak hour;

- Collector Roads
 - Environmental goal – 300 vehicles per hour in the peak hour;
 - Maximum flow – 500 vehicles per hour in the peak hour.

2.13 Table 2.1 shows that Orchard Street is carrying traffic volumes less than the RTA's environmental goal for local roads.

Public Transport

2.14 Local bus services are provided by Sydney Buses. There are bus stops close to the site on Garden Street.

2.15 The 185 and L85 services operate along Garden Street between Wynyard, Warriewood Valley and Mona Vale. On weekdays, they operate on a 30 minute headway in each direction. On weekends, the service is every 30 to 60 minutes.

2.16 The site is therefore accessible by bus services.

3. IMPLICATIONS OF PROPOSED DEVELOPMENT

3.1 It is proposed to subdivide the existing lots into 16 lots, of which 14 would be for residential development. Parking would be provided in accordance with Council's requirements. This chapter assesses the implications of the proposed development through the following sections:

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

Public Transport

3.2 As previously discussed, the site is within walking distance of bus stops on Garden Street. Bus services generally operate on a 30 minute headway in each direction and provide a link to Mona Vale and the city. The site is therefore accessible by bus services.

3.3 The proposed subdivision would increase residential densities within close proximity to existing public transport services. The proposal would therefore strengthen the existing demand for bus services.

Access and Layout

3.4 Vehicular access to the development is proposed from the right of way running south from Orchard Street. Most lots would have access from the right of way. New rights of way would be created to provide access to the other lots.

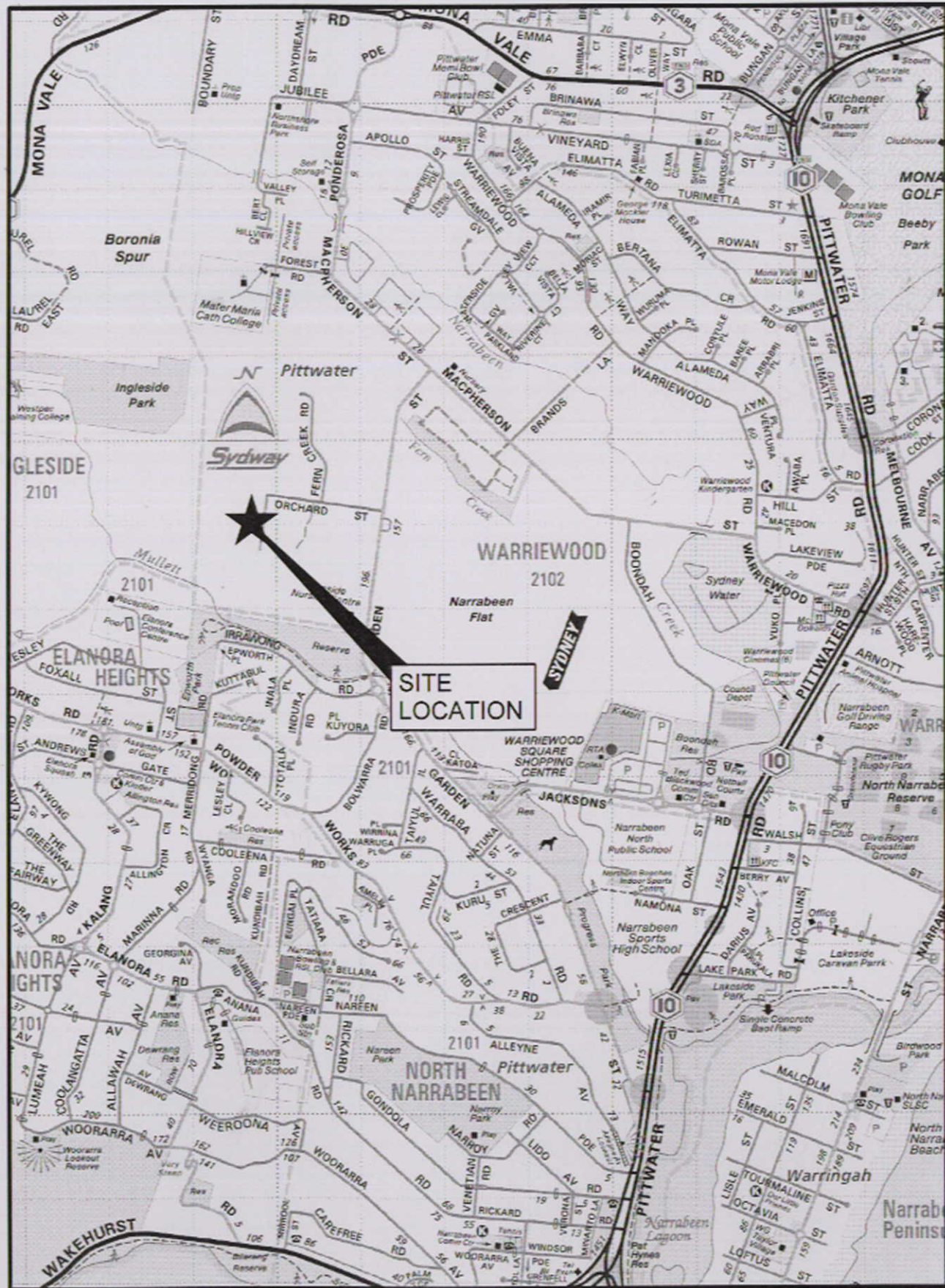
Traffic Generation and Effects

- 3.5 Traffic generated by the proposed development will have its largest 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.
- 3.6 The proposed development would therefore generate some 12 vehicles per hour two-way during peak hours. The existing dwellings on the site would generate some 2 to 3 vehicles per hour two way during peak hours. The net increase in traffic generation would therefore be some 9 to 10 vehicles per hour two-way during peak hours. This is a low additional generation, equivalent to 1 vehicle every 6 to 7 minutes.
- 3.7 During the morning peak period, some 70 per cent of vehicles would be outbound from the development. The reverse would apply in the afternoon.
- 3.8 Such a low traffic generation would not have noticeable effects on the operation or amenity of the surrounding road network.

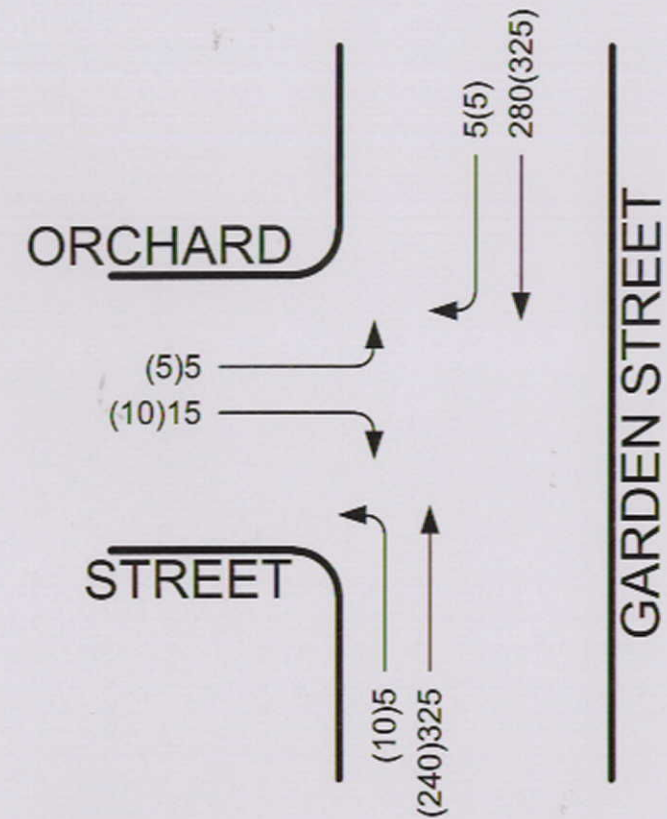
Summary

- 3.9 In summary, the main points relating to the transport implications of the proposed development are as follows:
- i) It is proposed to subdivide 3 lots to provide 16 lots;

- ii) the proposed subdivision would increase residential densities within close proximity to existing public transport services;
- iii) primary access is proposed from the right of way off Orchard Street;
- iv) the proposed development would have a low additional traffic generation, only one vehicle every 6 to 7 minutes; and
- v) such a low traffic generation would not have noticeable effects on the operation or amenity of the surrounding road network.



LOCATION PLAN



LEGEND:

- 100 - Morning Peak Hour Traffic Flows
- (110) - Afternoon Peak Hour Traffic Flows

EXISTING MORNING AND
AFTERNOON PEAK HOUR
TRAFFIC FLOWS