SECAsolution
ABN: 14164611652 ACN: 164611652
admin@secasolution.com.au

Technical Design Note

Project: P1102 KDC 71 Gan Gan Road Anna Bay

Subject: Preliminary Traffic Assessment

Date: 13th December 2017

Attention: Rachel Hodge

Dear Rachel,

The following document has been prepared to provide advice for a proposed development of a Seniors Living Facility to be located at 71 Gan Gan Road, Anna Bay, NSW, as shown below in Figure 1. The RMS Guide to Traffic Generating Developments has been utilised to assess the operation of the existing road network and provide advice on the capacity of the road network to cater for the proposed development.

The Austroads Guide to Road Design Part 4A has been used to ensure vehicle movements at the future access locations for the subject site can occur in a safe manner.

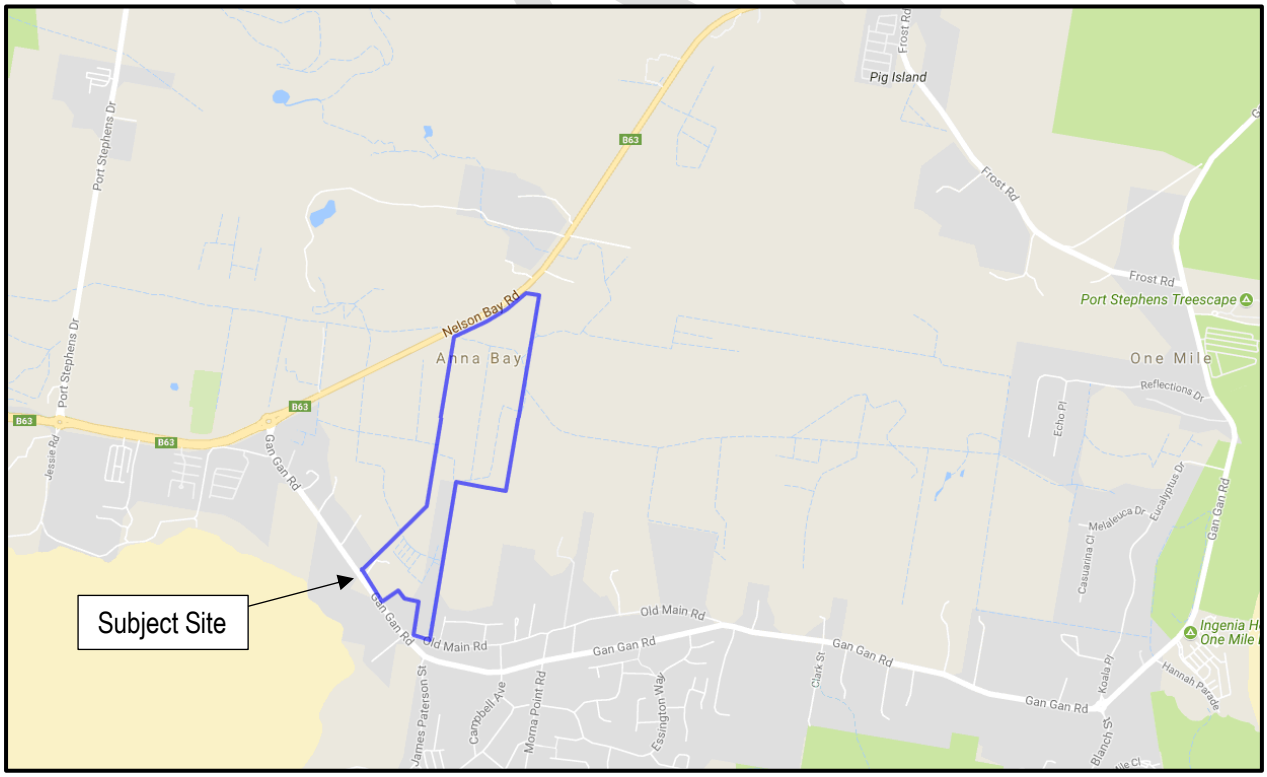

Figure 1: Subject site in the context of the local road network

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Newcastle Office:
Suite 1, 161 Scott St
Newcastle NSW 2300
Ph (02) 4032-7979

Central Coast Office:
Unit 8, 1 Bounty Close
Tuggerah NSW 2259
Ph (02) 4353-5885

Existing Situation

Road Hierarchy

Gan Gan Road is an urban collector road which operates under the posted speed limit of 80km/hr passing the subject site, with the speed limit dropping to 50km/hr to the south of the existing site access. In the vicinity of the proposed development, it provides one lane of travel in each direction, with no kerb or guttering present. It provides the primary route between Anna Bay and Nelson Bay Road for access to the external road network. It meets Nelson Bay Road at a roundabout intersection, with three legs. There is one lane of travel in both directions at the southern leg of the roundabout (Gan Gan Road), however the road widens to 6 metres just prior to the intersection allowing sufficient space for two vehicles to sit side by side to allow for the left and right turning movements. The eastern and western legs (Nelson Bay Road) provide two lanes of travel in each direction in the proximity of the roundabout, enabling efficient turning and through movements.

Nelson Bay Road is a state classified road forming part of the B63 route from Nelson Bay, through to the Pacific Highway at Adamstown Heights. It operates under the posted speed limit of 80km/hr passing Gan Gan Road. It provides the primary route for vehicles in the locality to access Newcastle Airport, Newcastle CBD and Sydney to the south, as well as the Pacific Highway via several routes for travel northbound.

Traffic Flows

A traffic survey was conducted by Seca Solution at the roundabout intersection of Gan Gan Road and Nelson Bay Road on Thursday 7th December from 5PM – 6PM. There was a total of 1,398 vehicle movements recorded during this period, with the movement summary outlined below in Figure 2.

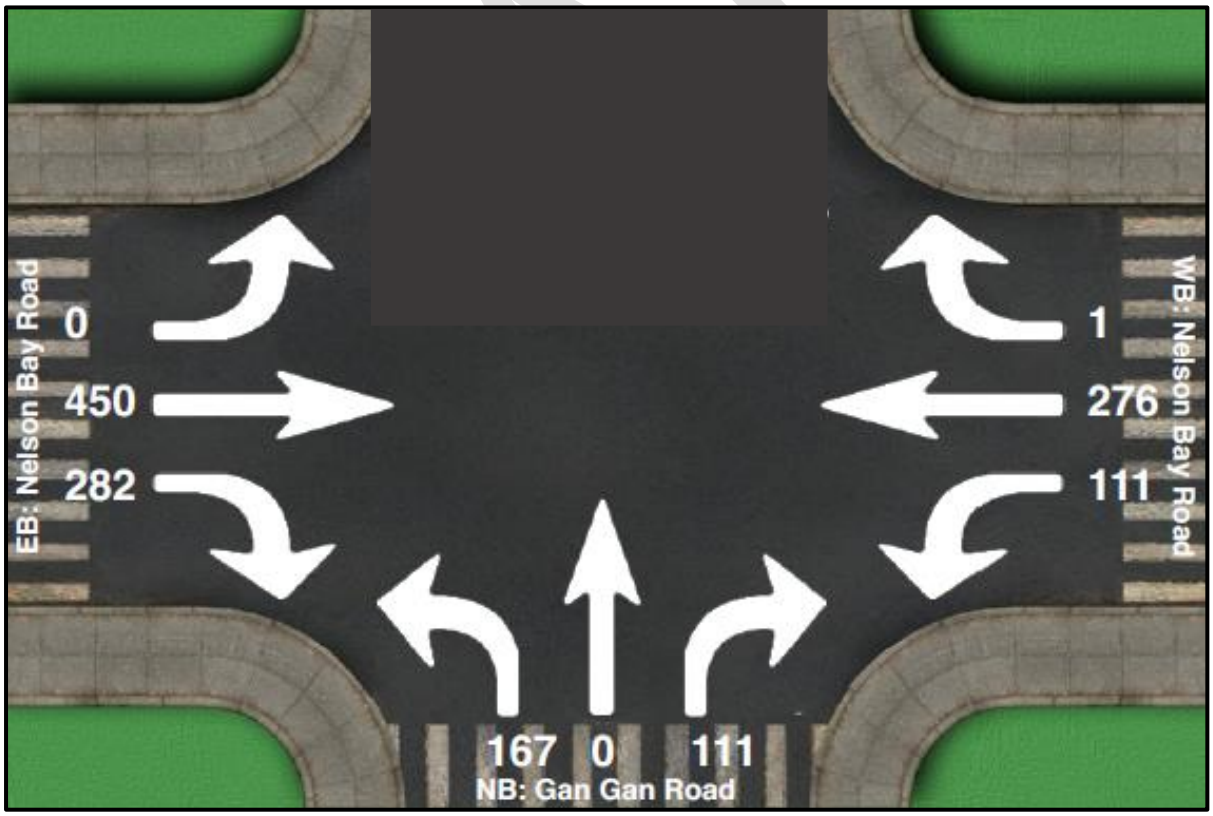

Figure 2: Vehicle movements at the intersection of Gan Gan Road and Nelson Bay Road

From the survey data it is determined that two-way flows along Gan Gan Road immediately to the south of the intersection are 671vph during the PM peak, with 278 northbound and 393 southbound, whilst two-way flows along Nelson Bay Road to the north-east of the roundabout are 949vph, with 388 westbound and 561 eastbound.

Proposed Development

The proposal relates to the construction of a Seniors Living Facility, with the lot yield to be determined.

Site Access

From a review of the plans there are two access points proposed for the development, with one located on Gan Gan Road and a further access off Nelson Bay Road to the north-east. Any access off Nelson Bay Road will require the concurrence of the RMS as a state classified road. Given the development is able to be accessed by a road other than this classified road (off Gan Gan Road), in accordance with the Infrastructure SEPP it is unlikely the RMS will support such an access off Nelson Bay Road.

To negotiate an access onto Nelson Bay Road discussions shall be required with the RMS, in which case a left in/left out access only may be considered. This involves an expensive and time consuming approvals and construction process involving deceleration lanes etc and a WAD to undertake such works. If an additional access is required to satisfy emergency vehicle access requirements then an informal gated access could be sought in this location, to be used in the case of emergencies only and remain locked at all other times.

Access is to be designed in accordance with the requirements of Port Stephens Council and RMS, this preliminary assessment has examined the road layout and sight lines available.

Sight Distance

Gan Gan Road Access

Gan Gan Road provides a straight alignment in the vicinity of the subject site. At the existing site access, which is to be in close proximity to the proposed site access, visibility is as below:

- Visibility to the north exceeds 300 metres as shown in **Error! Reference source not found.** below,
- Visibility to the south is 200 metres before the road dips away, partially impeding vision of oncoming vehicles as shown in **Error! Reference source not found.** to follow.

Photo 1 Sight distance to the north at existing driveway at 71 Gan Gan Road

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Photo 2 Sight distance to the south at existing driveway at 71 Gan Gan Road

The posted speed limit at the site access on Gan Gan Road is 80km/hr, with the speed limit dropping to 50km/hr, 50 metres to the south of the existing driveway. The access has been assessed in accordance with the Austroads Guide to Road Design – Part 4A.

Internal roads for the development have been assumed to operate under a 40km/hr speed limit. For this travel speed along the minor road, the Austroads Guide specifies an approach sight distance (ASD) of 40 metres, which will be required to be provided for each access on-site pending detailed plans. A minimum gap sight distance (MGSD) of 111 metres is required for the critical right-hand turn movement from the subject site onto Gan Gan Road, which is satisfied in each direction.

Safe intersection sight distance (SISD) provides sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation. Along the major road (Gan Gan Road) SISD of 181 metres is specified for the posted speed limit of 80km/hr, which is satisfied in both directions.

Nelson Bay Road Access

Nelson Bay Road provides a good road alignment along the site frontage for the proposed development, with a posted speed limit of 90km/hr in this location.

- Visibility to the west is unimpeded and is in excess of 500 metres,
- Visibility to the east is in the order of 220 metres at the proposed access, prior to the road curving away to the north-east.

This sight distance will require further assessment pending the exact location of an access.

The ASD will be the same as the previous site access, requiring 40 metres on the internal road for this access. A MGSD of 125 metres is required for the critical right-hand turn movement from the subject site onto Nelson Bay Road, which is satisfied in each direction. Along Nelson Bay Road SISD of 214 metres is specified for the posted speed limit of 90km/hr, which is satisfied in both directions.

As such it is considered there is sufficient sight distance available to design an adequate access on both Gan Gan Road and Nelson Bay Road.

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Traffic Analysis

The capacity of Gan Gan Road has been assessed in order to determine the spare capacity to cater for increased vehicle movements as a result of the proposed development. The survey data shows a total of 671 vehicle movements to the south of the roundabout. All of these vehicles have been assumed to travel past the future site access, allowing for a worst-case scenario where all recorded vehicles travel along Gan Gan Road, with no vehicles utilising Gordon Close.

Nelson Bay Road provides one lane of travel in each direction passing the subject site. From the survey the two-way flows in this location are 949vph..

The RMS Guide to Traffic Generating Developments, Section 4 provides guidance as to the operating level of service for urban roads at various ranges of mid-block traffic volumes. Table 4.4 is reproduced below.

Table 4.4
Urban road peak hour flows per direction

Level of Service	One Lane (veh/hr)	Two Lanes (veh/hr)
A	200	900
B	380	1400
C	600	1800
D	900	2200
E	1400	2800

According to Table 4.4, the roads surrounding the subject site are currently operating at the following levels of service during peak periods:

- Nelson Bay Road: 1 lane each direction, 561 vehicles per hour– LoS C
- Gan Gan Road: 1 lane each direction, 393 vehicles per hour – LoS C

For both Nelson Bay Road and Gan Gan Road as undivided roads, the one-way mid-block lane capacity is 900 vehicles in each direction to maintain a LoS D however given the semi -rural nature of Nelson Bay Road with minimal interaction and intersections a LoS E would be acceptable. As such, Gan Gan Road currently operates with significant spare capacity, with 393 southbound representing the capacity to accommodate up to 500 more vehicle movements southbound in the PM peak. Nelson Bay Road carries significantly higher traffic flows and with 500 more vehicle movements would operate at LoS E.

Traffic Generation

Standard traffic generation rates provided by RMS have been used as a basis for determining the future traffic flows associated with the development. For seniors living developments, using updated RMS rates (TDT 2013/04A), a peak generation rate of 0.4 vehicles per dwelling in the evening peak and 2.1 trips per dwelling per day is specified. It can be seen from these rates that Seniors Living developments are not typically high traffic generators.

Based on current flows the spare capacity available on the local roads equates to 500 vph inbound in the PM peak, with capacity to cater for significant development in the locality.

For a seniors living development the potential would be to accommodate up to 1500 lots/dwellings. This does not however take into consideration any other development approved but not yet built.

Quality Traffic Advice

Table 1 Traffic generaiton associated with Seniors Living Development

Lot/dwelling yield	PM traffic volume	Inbound	Outbound
1000 lots/dwellings	400 vph	320	80
1200 lots/dwellings	480 vph	384	96
1500 lots/dwellings	600 vph	480	120

Parking

There shall be adequate capacity within the site to a provide sufficient parking to cater for the expected demands, with no external impacts.

Conclusion

The above assessment demonstrates that the existing road network, in the vicinity of the site, has the capacity to accommodate a further 500 vehicles per hour in the PM peak. The evening peak has been assessed as it reflects the associated peak for a senior living development. Based on the current RMS Guide traffic rates of 0.4vph the site could yield up to 1500 lots/dwellings with the associated 600vph (480 inbound/120 outbound). The layout of the road network, including sight distance, will allow for adequate access to be provided for the development. Any access off Nelson Bay Road (a state classified road) shall require the concurrence of the RMS which may not be supported given access is available from Gan Gan Road. The requirements for the design of the access are to be determined once the lot yield for the development is known and vehicle movements can be quantified.

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Attachment A – Traffic Survey Data

Intersection Peak Hour

17:00 - 18:00

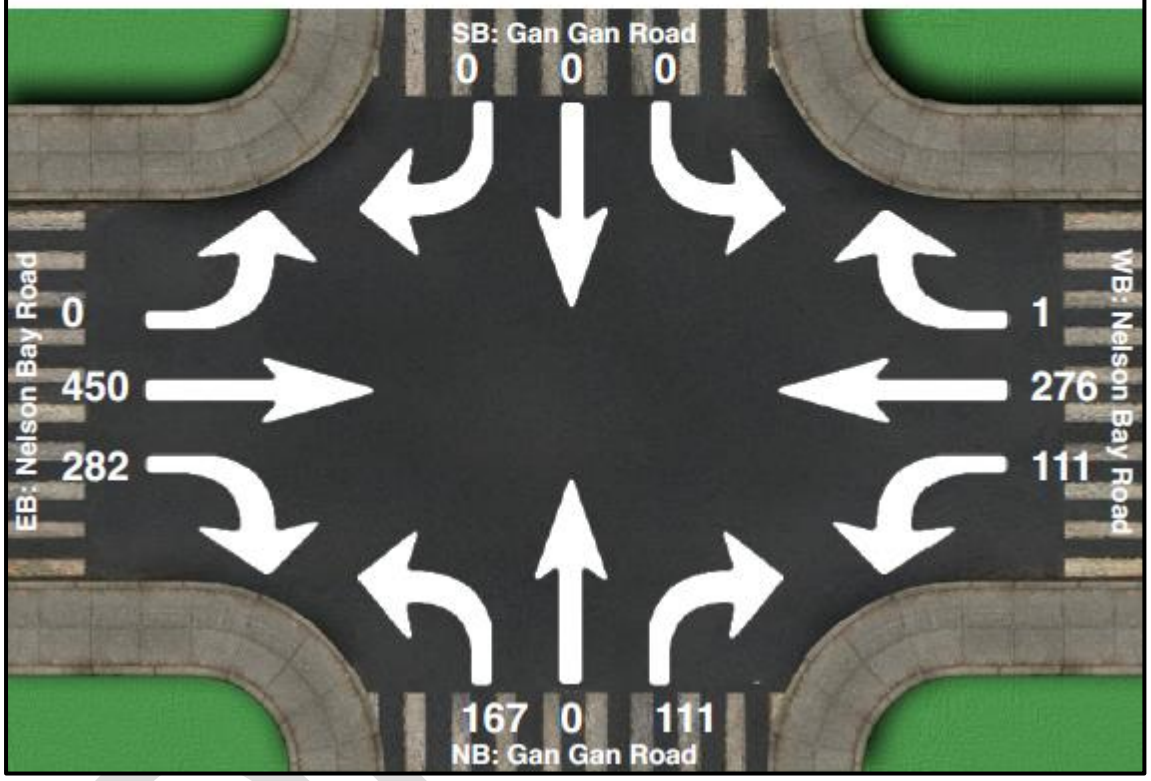
	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	0	0	0	111	276	1	167	0	111	0	450	282	1398
Factor	0.00	0.00	0.00	0.96	0.80	0.25	0.73	0.00	0.82	0.00	0.94	0.77	0.89
Approach Factor	0.00			0.86			0.87			0.90			

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	0	0	0	111	276	1	167	0	111	0	450	282	1398

Peak Hour Pedestrians

	NE			NW			SW			SE			Total
	Left	Right	Total	Left	Right	Total	Left	Right	Total	Left	Right	Total	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0

Intersection Peak Hour

Location: Gan Gan Road at Nelson Bay Road, Anna Bay
GPS Coordinates:
Date: 2017-12-07
Day of week: Thursday
Weather:
Analyst: TN