The Bay Resort, Anna Bay

Traffic Impact Assessment

25th June 2020

SECAsolution

The Bay Resort, Anna Bay

Traffic Impact Assessment

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Client: RPS Australia Asia Pacific

Issue: Ver05

Reference: P0126

25 June 2020

Quality Review and Document History

Version	Date	Description	Prepared By	Approved By
Ver01	12/12/16	Draft	S Morgan	C Thomas
Ver02	22/4/16	Draft	S Morgan	C Thomas
Ver03	24/3/17	Final	S Morgan	C Thomas
Ver04	10/12/19	Draft-Revised Concept	S Morgan/T Neve	C Thomas
Ver05	25/6/2020	Final	S Morgan	C Thomas

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1 Introduction

1.1 Background

Seca Solution was commissioned by RPS Australia Asia Pacific (RPS) to prepare a Traffic Impact Assessment for the proposed Eco-Tourist resort located off Nelson Bay Road, to the west of Port Stephens Drive, Anna Bay. The report has been prepared for the revised concept plan which proposes a lighter footprint than the previous application reviewed by the Department of Planning and Environment (DPIE) and will provide supporting information for a revised submission.

This assessment has been prepared in accordance with Austroads Guidelines and the "RTA Guide to Traffic Generating Developments" published by the Roads and Maritime Services (RMS). In addition, it addresses the request for additional information relating to traffic in the DPIE correspondence dated April 2019.

1.2 Scope of Report

The scope of this report is to review the traffic, access and parking issues associated with the proposed development against the requirements of the Council DCP and the RTA Guide to Traffic Generating Developments and determine the mitigation requirements for the project.

1.3 Issues and Objectives of the study

The issues relative to the proposal are:

- Determine the extent of traffic generated by the development;
- Assess impact on the arterial and local road network due the additional traffic flows;
- Review the plans for the upgrade of Nelson Bay Road in this locality and how they relate to the subject site access;
- Review the access arrangements for the development;
- Assess any other transport impacts associated with the development including active transport options;
- Review the parking requirements for the project.

The objective of the report is to document the impacts of the proposed development and provide advice on any infrastructure work required on the external road network as part of the development.

1.4 Planning Context

In preparing this document, the following guides and publications were used:

- Guide to Traffic Generating Developments, Version 2.2 Dated October 2002;
- RMS TDT 2013/04 "Update Traffic surveys August 2013".
- Port Stephens Council Development Control Plan 2013 (DCP)

1.5 Authority Requirements

The following issues were included in the DGRs previously issued for the project and are addressed in the following sections of this traffic impact assessment.

Table 1-1 DGR Response

Comment	Report Inclusion
Estimate the total daily traffic movements associated with the development	4.1
Assess the impact of the development upon the local road network including intersection capacity modelling	4.3
Details of the intersection layout at the intersection of Nelson Bay Road and the Un-named Council Road	**Error! Reference source not found.**
Assess impacts upon the partially formed Un-named Council Road	4.3.1
Details access and parking provision including compliance with relevant Australian Standard	3.2 4.5
Detail any proposed cycleways proposed as part of the development	Not considered necessary within this development. RMS would have allowed for cyclists as appropriate on Nelson Bay Road

Source Planning & Infrastructure Ref SSD 13_5916

The DPIE has subsequently issued requests for additional information in relation to the revised concept for the development which are covered in the assessment following.

2 Existing Situation

2.1 Site Description and Proposed Activity

2.1.1 Site Location and Access

The site is located to the west of the roundabout controlled intersection of Nelson Bay Road and Port Stephens Drive, in the general locality of Anna Bay and within the Port Stephens Local Government Area (LGA), on Lot 2, DP747399, 4177 Nelson Bay Road. (refer Figure 2-1 below).

The subject site is located off Nelson Bay Road and is currently used for residential and rural use, with access direct onto Nelson Bay Road only.

The location of the site is shown below in Figure *2-1*.

Figure 2-1 - Site Location (Source: Nearmap)

Existing land use adjacent to the site is generally rural living type use with some agricultural use allowing for verge side stalls selling farm produce.

2.1.2 Zoning

The subject site is zone 1 (a) Rural Agricultural under Port Stephens Local Environmental Plan (LEP) 2000.

2.2 Existing Traffic Conditions

2.2.1 Road Hierarchy

The major road through the locality is Nelson Bay Road which provides an important road link between Newcastle and the M1 / Pacific Highway to the west and the Nelson Bay peninsula area to the east. It carries a reasonably high commuting traffic between these two localities during the working week whilst also providing access for the tourism trade to the east of the site in the Anna Bay and Nelson Bay areas. Nelson Bay Road forms part of the regional road network, and as such the Roads and Maritime Services (RMS) must provide concurrence for any access or new development adjacent to the road whilst the road authority is Port Stephens Council.

The remaining roads in the general locality of the subject site are all local roads under the control of Port Stephens Council.

Crown Road/Un-named Council Road

Enquiries with Port Stephens Council has revealed that the first 300 metres of the Crown Road that commences at the intersection with Nelson Bay Road and which is immediately east of the Project site has been transferred to Port Stephens Council. This transfer occurred via Government Gazette dated 24th February 2006 (941) and was done so due to proposed development over the Project site. This road is hereafter referred to as the Un-named Council Road.

Nelson Bay Road

Nelson Bay Road provides a mixture of one or two lanes of travel in both directions with additional lanes at the key intersections to maintain capacity. Adjacent to the site, Nelson Bay Road has been upgraded and provides:

- Two lanes of travel in both directions
- Provision of a raised central median to restrict right turn movements to the intersection only
- Sealed marked shoulders to allow for cyclists
- Provision of a U-turn facility at the location of the existing Un-named Council Road that provides access to the subject site
- Sheltered right turn lane to allow for vehicles to turn into the Un-named Council Road that provides access to the subject site and drivers to utilise the U-turn facility
- Allowance for left in and left out traffic movements to the Un-named Council Road and access to the U-turn facility and the subject site
- No allowance for traffic to turn right out of the Un-named Council Road.

There are no footpaths provided along the majority of its length and it operates under a posted speed limit of 80 km/h.

Nelson Bay Road has development along both sides and it provides access to a number of individual residential lots as well as rural holdings providing road side stalls. It forms part of the regional road network and provides a route between Newcastle and the M1 / Pacific Highway to the west and the Nelson Bay area to the east. It carries significant commuting traffic Monday to Friday as well as tourist traffic over the weekend.

To the east of the site, there is a 4-way roundabout that connects with Port Stephens Drive which connects from the north and Jessie Road that connects from the south. The roundabout provides two circulating lanes with flaring on the approach to allow for two traffic lanes to enter and exit the roundabout. The upgrade of Nelson Bay Road at this location will improve the operation of the roundabout with the continuation of two lanes of travel in both directions to the west of the roundabout.

Nelson Bay Road to the east of the roundabout provides two lanes of travel in both directions and a raised central median to restrict right turns to the intersections only. There are sealed shoulders provide along the majority of its length.

Port Stephens Drive

Port Stephens Drive to the east of the site provides a single lane of travel in both directions and operates under the posted speed limit of 80 km/h. It provides access to Taylors Beach and through to Soldiers Point.

Jessie Road

Jessie Road to the east of the site connects with the roundabout on Nelson Bay Road and provides access to a number of residential dwellings as well as a sand extraction site to the south. Traffic flows are very low on this road as it does not provide any through access for vehicles.

2.2.2 Roadworks

Nelson Bay Road in the vicinity of the site has been previously upgraded by Roads and Maritime Services (RMS) to provide for additional capacity and to improve road safety.

No other road works are planned in the locality, with the exception of road resurfacing as required.

2.2.3 Traffic Management Works

There are no traffic management works proposed in the locality. The raised central median restricts traffic movements and in particular the right turn out of the side roads to ensure road safety is maintained.

2.2.4 Pedestrian and Cycling Facilities

Generally, there are no pedestrian or cyclist facilities provided along the majority of Nelson Bay Road, reflective of the very low demand in this location. As part of the new upgrade works, a sealed shoulder has been provided along the length of the works which will allow for cyclists and the occasional pedestrian. This upgrade also allows for pedestrian connection across Nelson Bay Road adjacent to the bus stops that are located slightly off set from each other.

2.3 Traffic Flows

2.3.1 Peak Hour Flows

Seca Solution collected traffic data at the intersection of Nelson Bay Road and Port Stephens Drive during a weekday evening, as well as a Saturday morning, corresponding with peak traffic periods in the locality associated with the proposed type of tourist development. Traffic surveys were conducted on Friday 29th November 2019 from 3:30pm-6:00pm, with the peak hour determined as 3:30pm-4:30pm and Saturday 7th September 2019 from 9:45am-10:45am.

From the above counts, the traffic flows along Nelson Bay Road passing the subject site are as detailed in Table 2-1 below.

Table 2-1 Peak hour traffic flows

	Friday	Saturday
Eastbound	1093	614
Westbound	805	732
Two-way	1898	1346

2.3.2 Daily Traffic Flows

Peak hour flows typically represent 10% of the daily flows. Based on the above peak hour flows this gives two-way weekday volumes in the order of 19,000 vehicles per day passing the site.

2.3.3 Daily Traffic Flow Distribution

The daily traffic volumes are reasonably balanced in both directions. During the weekday afternoon peak period, the traffic flows have a bias eastbound reflective of commuter traffic returning home from work in the Newcastle area. It is expected that there is a bias in movement in the morning peak towards Newcastle along Nelson Bay Road.

2.3.4 Vehicle Speeds

No speed surveys were completed as part of the study work.

2.3.5 Existing Site Flows

The site is currently occupied by a rural holding and as such generates very little traffic movements.

2.3.6 Heavy Vehicle Flows

The volume of heavy vehicles using Nelson Bay Road is relatively low, as it does not provide a through route and the demand within the Nelson Bay area is low, with limited end of trips destinations. There are trucks associated with deliveries to shops and some of the light industry in the area, but heavy vehicles flows during the survey in the afternoon peak period were negligible.

2.3.7 Current Road Network Operation

Observations on site during the afternoon peak period showed that traffic currently flows reasonably well along Nelson Bay Road. The key intersection of Nelson Bay Road and Port Stephens Drive currently operates well with minimal delays and congestion for road users.

2.4 Traffic Safety and Accident History

Accident data provided on the TfNSW Centre for Road Safety website shows that there have been two accidents recorded in the immediate vicinity of the site approaching the roundabout at Port Stephens Drive. Both of these related to rear end type accidents, which tend to be typical of an approach to a roundabout. The road upgrades in this location have been designed and constructed in accordance with Council and RMS requirements and as such provide an appropriate level of safety for road users.

2.5 Parking Supply and Demand

2.5.1 On-street Parking Provision

Parking is permitted along both sides of Nelson Bay Road as required within the sealed/gravel shoulder.

2.5.2 Off-Street Parking Provision

It is considered that there is ample off-street parking in the general locality of the subject site, with no vehicles observed parked adjacent to the road. The residential lots in the locality are all relatively large and as such provide for off street parking demands.

2.5.3 Parking Demand and Utilisation

During the site visit no vehicles were observed parked along Nelson Bay Road. The development to both sides of this road caters for parking demands within each site and no spill over to Nelson Bay Road was observed.

2.5.4 Set down or pick up areas

There are no set down or pick up areas in the locality of the site.

2.6 Public Transport

Bus services on the peninsula are provided by Port Stephens Coaches with a number of routes terminating in Nelson Bay. Services passing the subject site include:

- Route 130 from Newcastle to Fingal Bay, via Anna Bay.
- Route 131 from Newcastle to Fingal Bay, via Taylors Beach
- Route 135 from Raymond Terrace, servicing Salamander Bay and Nelson Bay.

School bus services also service the area on school days. The site has limited access to rail public transport with the closest railway stations being at Hamilton or Hexham approximately 35 kilometres away. Buses do however connect Nelson Bay with the broader region including Williamtown (airport), Newcastle and Raymond Terrace.

The Newcastle Airport is located 24 kms west of the site along Nelson Bay Road. This airport provides access to numerous interstate flights as well as some international routes.

2.6.1 Rail Station Locations

Hexham Railway Station is approximately 35 kilometres to the west of the site. It provides access to the main northern railway line offering connections to Newcastle through to Sydney to the south and west through the lower Hunter. It services the Hunter Line with 3 westbound trains from Newcastle in the peak and similar from Maitland eastbound. Less services are available out of the peak period.

Hamilton Railway Station provides direct connection to both the Hunter Line and the Newcastle Central Coast Line.

2.6.2 Bus Stops and Associated Facilities

There are bus stops within the general locality of the subject site. These are simple bus stops with signs only with users flagging bus drivers when required. Bus bays are provided for the stops nearest the subject site to the west, allowing for pick up/set down clear of the through traffic along Nelson Bay Road.

2.7 Other Proposed Developments

There are no other major developments occurring within the general locality of the subject site that will impact upon the site operation. There is a DA pending for a change of use at 4187 Nelson Bay Road (off Un-named Road), however this would generate minimal traffic flows.

3 Proposed Development

3.1 The Development

The proposed development is to construct an eco-tourist facility incorporating a mix of 68 one and two bedroom units, 51 three bedroom villas (including 10 accessible units) and a multi-purpose amenity building comprising café/gym and administration as well as associated landscaping, roads and 112 space car park.

The proposal has a lighter footprint than the original design and achieves a greater connection with the natural environment.

3.1.1 Phasing and Timing

There is no phasing for the development. Traffic generation for the total development has been included in this assessment.

3.1.2 Access and Circulation Requirements

The main vehicle access to the site will be via the upgrade to the existing Un-named Council Road in this location. The upgrade works provided by the RMS have allowed for left in and left out movements as well as a right turn into the Un-named Council Road. This intersection upgrade also allows for U-turns to occur at this location. This intersection has been designed in accordance with the requirements of RMS and the Austroads Guidelines and as such provides a safe and acceptable access to the site.

As part of the project a left turn deceleration lane will provided in accordance with Austroads Guidelines and taking into account the posted speed limit. A concept plan for this left turn lane has been prepared by Northrop Engineering and is included as an attachment to this report. This includes works to adjust the existing U-turn facility at this location.

The existing right turn/U-turn lane provides a length of 110 metres and currently has low usage. This right turn lane will be retained as part of the project.

The design of the internal layout of the site allows vehicles to enter and exit the site in a forward direction and circulate as required.

3.2 Access

Access to the tourist accommodation and associated parking facilities will be via the Un-named Council Road with three driveways to be provided off this road. This Un-named Council Road provides access to the subject site and a number of adjacent properties but does not provide a through connection. The site accesses allow for two-way traffic movements and are designed in accordance with Council standards. The internal roadways then allow for circulation around the site to allow for entry and exit movements to occur in a forward direction.

All vehicles will exit via the Un-named Council Road and will be left turn out movements only onto Nelson Bay Road. Drivers with destinations to the west can complete a U-turn at the roundabout at Port Stephens Drive.

At the intersection of Nelson Bay Road and the Un-named Council Road, a deceleration lane will be designed and constructed in accordance with the RMS Road Design guidelines and a concept design has been prepared for the project.

3.2.1 Driveway Location

The main driveways to the site are located on a straight section of the Un-named Council Road offering good visibility in both directions and providing safe access to the site.

3.2.2 Service Vehicle Access

All service vehicles will be able to enter and exit the site in a forward direction, using the Un-named Council Road that connects between Nelson Bay Road and the subject site.

The design for the internal roads will be completed as part of the detailed design process and will include Autoturn simulation to demonstrate safe and appropriate access for coaches and service vehicles (waste collection) to the site. It is noted that the development will not be a major generator for large service vehicles, with the majority of service vehicles being small vans e.g. Toyota Hi-Ace type vehicles which have similar operational characteristics to a large 4WD.

3.2.3 Access to Public Transport

There will be no need for direct public transport to access the site, however there is a bus route along Nelson Bay Road with stops within the general vicinity of the subject site. There are pedestrian paths along the Un-named Council Road that could be used to access these buses.

The type of development proposed will not encourage significant use by public transport to the site and it is considered that there is no requirement to improve pedestrian access across Nelson Bay Road as part of this development to access the bus stop on the opposite side of Nelson Bay Road from the subject site. A pedestrian refuge has been provided in the raised central median as part of the recent road upgrades.

3.3 Circulation

3.3.1 Pattern of circulation

All vehicles will be able to enter and exit the site in a forward direction from the local road network. The internal site layout allows vehicles to access the various sections of the site and the car parks located on the southern section of the site. The major internal intersection is controlled by roundabout and the internal roads will operate under a low posted speed limit.

These internal driveways will be designed in accordance with the requirements of the site and are in accordance with AS2890.

3.3.2 Road width

The width of the internal driveways allows for two-way traffic movements and will be designed in accordance with Council requirements. The road within the crown road reserve will be constructed as a local street with a pavement width of 9 metres with a footpath to one side only in accordance with Council Guidelines. A turn head can be provided at the northern end of this public road to allow for a standard Council refuse truck to complete a U-turn as required. This will be detailed as part of the detailed design process for the project. The internal driveways within the site will operate as share ways with an operational speed limit of 20 km/h (with appropriate signage and controls to manage vehicle speeds) and will cater for pedestrian movements.

The internal roundabout will be designed and constructed to allow for the largest design vehicle to access the site and will provide a central median that can be driven over by larger vehicles. This will ensure driver safety and priority is maintained whilst minimising the extent of hard surface and road pavement / construction.

3.3.3 Internal Bus Movements

The site is not expected to be a large generator of bus movements, given the revised quantum and site uses. There may be intermittent demands for tourist coaches to pick up/drop with a suitable area to accommodate these to be allowed for on site.

3.3.4 Service Area Layout

The tourist accommodation will be typically serviced by large vans e.g. Toyota Hi-Ace size vans. The site will accommodate circulation for a waste collection vehicle, with the details for the servicing to be confirmed during the detailed design stage of the project.

3.4 Parking

The parking for the development has been assessed against the requirement of the Council DCP. The Port Stephens Council DCP provides the following parking requirements for this type of development:

- 1 space per unit / dwelling plus
- 1 space per 2 employees

The plans provide for a total of 119 tourist accommodation units. This provides a requirement of 119 parking spaces for units plus parking for employees. Advice from the project team has determined a total of 41 FTE employees for the site, giving a total parking demand for 140 parking spaces.

The plans for the site provide for a total of 112 spaces within the on-site car parks, including 6 accessible spaces (1 space per 20). There are a further 68 spaces associated directly with individual villas in the East and South blocks, giving a total provision of 170 spaces.

The additional parking provided within the site ensures all users as well as visitors can park within the site and not create any external parking demands that may impact upon Nelson Bay Road.

The car park will be designed and constructed in accordance with AS2890 which provides standards for parking spaces as well as aisle widths. The design will also allow for additional width at the end of blind aisles and accessible parking spaces will be provided in accordance with AS2890.6.

3.5 Pedestrian and Bicycle Facilities

It is considered that external pedestrian movements to and from the site will be minimal. There is potential for access to the site to be gained via the buses that run along Nelson Bay Road, mainly for the staff working on site. A path will be provided to allow for connection to Nelson Bay Road from the site. Pedestrians can cross Nelson Bay Road in this location by using the central median. It is not considered that an upgrade to allow for pedestrian access across Nelson Bay Road is required due to this development. The internal roads allow for cyclist use and these will link with the sealed shoulders provided along both sides of the newly upgraded Nelson Bay Road.

Bicycle parking will be provided within the site with this to be determined during the detailed design stage of the project. The DCP does nominates a rate of 1 bike space per 20 accommodation units. Parking for staff who cycle to work can be provided within the overall site footprint.

4 Transportation Analysis

4.1 Traffic Generation

The RTA Guide to Traffic Generating Developments indicates the following rates apply for motel / tourist type facilities:

- 3 trips per day per unit; and
- 0.4 trips per unit in the afternoon / evening peak.

The following traffic movements have thus been allowed for the development:

- 357 total movements per day, split between 179 inbound and 178 outbound per day;
- 48 movements in the afternoon / evening period with the majority (80%) being inbound

The RTA Guide does not provide any values for the morning peak, but it is assumed to be slightly lower than the afternoon rate. Given the type of development and its location within a busy tourist region, it is considered the peak demands for the development will occur on a Friday evening and across the weekend. As the existing flows on the road network are highest during the Friday afternoon peak, this report has allowed for assessment during this period as the worst case.

4.1.1 Daily and Seasonal Factors

The nature of the development will lead to typical peak demands on a Friday through the weekend for the tourist facilities.

It is considered that the development will generally be busier over the summer months.

4.1.2 Sight Distances

The internal driveways will operate as shared ways under a posted speed limit of 40 km/h and based upon AS2890 will require a sight distance of 55 metres desirable and 35 metres as a minimum. Based upon the concept plans prepared for the project (Appendix A), it is considered that these sight visibility lines will be available. The landscaping throughout the site will be designed to ensure the sight visibility lines are available at the intersections.

For the connection between the Un-named Council Road and Nelson Bay Road, the posted speed limit on Nelson Bay Road is 80 km/h. Based upon the Austroads Guide (Part 4A) the sight distance required is 181 metres. Note that this distance will only be required to the right for drivers exiting the site as the raised central median restricts movements to left turn out only. Nelson Bay Road in this location provides a relatively straight alignment with the Un-named Council Road located on the outside of a slight curve. Based upon the design plans provided by the RMS for the project it is considered that the visibility available exceeds 200 metres and as such exceeds the requirements of Austroads.

Similarly, for the drivers entering the site the visibility along Nelson Bay Road to observe vehicles approaching from the west exceeds 200 meters, allowing drivers to safely determine a suitable gap to turn right into the Un-named Council Road. The visibility will also allow for drivers entering the site from the west, to utilise the left turn deceleration lane into the Un-named Council Road.

4.1.3 Queuing at entrance to site

There are no vehicle queues expected at the site entry / exit point. Given the low overall traffic demands associated with the future development and the design of Nelson Bay Road with 2 lanes of travel in both directions, the delays and congestion for entering and exiting traffic movements is expected to be low.

For traffic turning right into the site, the existing sheltered right turn lane on Nelson Bay Road is considered to be adequate. This lane has a length of 110 metres and has capacity for a number of vehicles to prop in this location to turn right. The vast majority of demand for this movement will be light vehicles, with the occasional service

vehicle or coach. A typical coach is less than 15 metres and this right turn bay could hold a buses and still have 95 metres of space, catering for at least 14 cars. Given the traffic flows on Nelson Bay Road, it is not considered that the delays for the traffic turning right in will be high and therefore the queues for the right turn movement will be low and contained within this existing right turn bay.

4.1.4 Comparison with existing site access

The existing site is a simple driveway with an unsealed road connecting to Nelson Bay Road, with this intersection incorporating a U-turn facility for vehicles travelling westbound to complete a turning manoeuvre.

4.1.5 Pedestrian Movements

There are limited pedestrian movements expected to the site from external centres, due to the relatively remote location of the site. There is potential for some pedestrian movement within the site which will occur on the network of internal paths or along the internal roads which will act as share ways.

There will be a pedestrian path to link to Nelson Bay Road for connections to the bus stops on the road.

4.2 Traffic Distribution and Assignments

Guests associated with the accommodation will predominantly arrive from the west of the site, from the M1 / New England Highway / Pacific Highway as well as the airport. For local tourist trips, the majority of the attractions are to the east of the site.

4.2.1 Origin / destinations assignment

During the afternoon peak period, it is assumed that 80% of the traffic will arrive from the west along Nelson Bay Road and turn left into the site. The remaining 20% will arrive from tourist attractions to the east and turn right into the site. It is assumed that 80% of the traffic is inbound in the afternoon peak.

During the morning peak period, it is considered that the traffic flows would be equally balanced between eastbound and west bound, with the traffic being equally balanced between inbound and outbound movements.

4.3 Impact of Generated Traffic

4.3.1 Impact on daily / peak hour Traffic Flows

The existing daily traffic flows on Nelson Bay Road are in the order of 19,000 vehicles per day. The development could generate some 357 vehicle movements per day, with a split of 80% (286) to the west of the site access and 20% to the east (71). This would increase the daily flows on Nelson Bay Road to the west of the site to around 19,286 vehicles per day. This represents an increase of some 1.5% over the current flows.

The traffic data collected by Seca Solution shows that the 2-way flows on Nelson Bay Road adjacent to the site are 1,898 vehicles (1093 eastbound / 805 westbound) during the critical afternoon peak period. The RMS Guide provided advice on the capacity or urban roads based on peak hour flows per direction. Based on the origin/destination outlined above, the current volume of 1,093 vehicles per hour eastbound would increase by 30 vph to 1,123 vehicles per hour, whilst the westbound volume of 805 vehicles per hour would increase by 8 to 813 vehicles per hour.

For an urban road with two-lanes in each direction, 1400 vehicles per hour represents a level of service of B indicating minimal delays and good operation for road users. With the split in direction of traffic on Nelson Bay Road it can be seen that the single direction flow will be less than 1,400 vehicles per hour and therefore the level of service is B. It is considered that this additional traffic will not have a significant impact upon the operation of this road for existing road users.

The Un-named Council Road, being currently unformed, generates no traffic. The construction of this road will be to Council design requirements and will have adequate capacity to cater for the future development flows.

4.3.2 Peak Hour Impacts on Intersections

In peak hour, the intersection most likely to be impacted by the proposal could be the 4-way roundabout at the intersection of Nelson Bay Road and Port Stephens Drive. Observations on site indicate that this intersection currently works very well with minimal delays and congestion.

During the afternoon peak, the majority of the traffic associated with the development will not impact upon this intersection, as they will approach the site from the west and turn left into the site (30 vehicles). For the remaining trips (18 vehicles) the impact will be minimal.

The operation of the roundabout has been assessed with Sidra to confirm the current operation of this roundabout and the results are provided below:

Table 4-1 – Sidra modelling existing situation, roundabout of Nelson Bay Road and Port Stephens Road (PM Peak)

Approach	Level of service	Delay (seconds)	Queue (metres)
Jessie Road	A	8.5	2.5
Nelson Bay Road east	A	8.9	15.6
Port Stephens Road	A	12.3	12.1
Nelson Bay Road west	A	6.9	23.1

It can be seen the intersection currently operates well, with an overall LoS A on all approaches

The intersection has also been assessed allowing for the traffic flows associated with the development, with the results outlined below.

Table 4-2 – Sidra modelling with development flows, roundabout of Nelson Bay Road and Port Stephens Road (PM Peak)

Approach	Level of service	Delay (seconds)	Queue (metres)
Jessie Road	A	8.5	2.5
Nelson Bay Road east	A	9.0	15.8
Port Stephens Road	A	12.3	12.4
Nelson Bay Road west	A	6.9	23.5

It can be seen that allowing for the low increase in traffic flows associated with the development the intersection will operate in a similar manner to the existing situation.

4.3.3 Background traffic and other developments

In accordance with normal RTA requirements, the impact of the additional traffic has been reviewed allowing for 10 years background growth along Nelson Bay Road. As part of the planning for the upgrade of Nelson Bay Road, the RMS assessed the background growth along the road which would allow for development such as the development site and has designed the road and the connections accordingly. Therefore, it is concluded that the background growth together with the traffic associated with the development will have an acceptable impact.

To confirm this a Sidra analysis was completed, with all traffic movements increased by 20%. The results of this assessment are provided below.

Table 4-3 – Sidra modelling with development plus growth, roundabout of Nelson Bay Road and Port Stephens Road (PM Peak)

Approach	Level of service	Delay (seconds)	Queue (metres)
Jessie Road	A	9.4	3.7
Nelson Bay Road east	A	9.5	22.3
Port Stephens Road	A	13.3	19.6
Nelson Bay Road west	A	7.4	33.2

The Sidra results above show that the roundabout at the intersection of Nelson Bay Road and Port Stephens Drive will continue to operate with minimal delays and congestion allowing for background growth.

Given the traffic flows on Nelson Bay Road and the high level of service, it is considered that the delays for the traffic turning right into the site via the sheltered right turn lane will be low and the existing right turn lane length is adequate to cater for the additional traffic movements.

4.3.4 Impact of Construction Traffic

The majority of construction work will be contained within the site so there will be minimal impact upon the external road network. There will be a requirement for construction machinery to access the site and traffic associated with workers. A Traffic Management Plan will be required for work on site and access controls. This will be completed as part of the construction certificate process by the contractor on site. The main access to the site on Nelson Bay Road will require traffic management plans to be in place to support the upgrade of the Un-named Council Road. This will be determined and agreed during the detailed design stage of the project.

As shown in the Sidra analysis above (Section 4.3.2) the Nelson Bay Road/Port Stephens Drive roundabout has adequate spare capacity to cater for construction traffic.

All works on site will be governed by the requirements of Port Stephens Council as stipulated within any development consent granted.

4.4 Impact on Road Safety

The additional traffic flows associated with the development of the subject site will have a relatively low impact upon traffic safety. The key intersection of Nelson Bay Road and Port Stephens Drive is a roundabout designed in accordance with RMS requirements and provides a safe and acceptable layout. This roundabout has been reviewed as part of the upgrade of Nelson Bay Road and minor works were completed on the approach to the roundabout by RMS as part of this upgrade.

For the site access via the connection of the Un-named Council Road and Nelson Bay Road, the access is located in a relatively straight section of road allowing for good visibility for drivers entering and exiting the side road. The design of the upgrade in this location allows for left in and left out together with right turn in only, restricting the right turn out to improve road safety. It is considered that this access is designed in accordance with the RTA Road Design Guide and Austroads requirements and as such offers a safe access for all drivers.

4.5 Parking Analysis

Under the Council DCP the proposed development requires 140 parking spaces which compares with the provision on site of 170 spaces. It is considered that the parking provision is adequate as it exceeds the Council requirements and will ensure that there will be no off-site parking impacts.

4.6 Public Transport

4.6.1 Options for improving services

As part of the upgrade works along Nelson Bay Road, a bus bay was constructed adjacent to the site access and this will be impacted upon by the proposed upgrade to the left turn slip lane for the subject site. The design for the upgraded left turn slip has taken this bus stop into account. The bus stop will be relocated in discussion with and by agreement of Council as well as the bus company. This will be determined during the detailed design process for the project to ensure safety for users of the buses is maintained as well as drivers travelling along Nelson Bay Road.

Local tourist service providers will be able to pick up guests in shuttle buses within the site.

The limited access to public transport within the vicinity of the site reduces the opportunity to promote active transport as a viable option for staff. Bus services along Nelson Bay Road, although convenient, are not frequent. There is however the opportunity to promote a number of practical measures that can be implemented to reduce the demand for single driver trips by staff to the site. The following provides a summary of the various measures that can be implemented:

- Promote active transport to all new staff on induction including summary of how to access travel information
- Include Transport NSW trip planning tools on staff intranet to enable them to plan their trips
- Promote shared travel arrangements to all staff
- Provide end of trip facilities to staff who cycle or walk to work
- Investigate opportunities to connect with future shuttle services between the site and the surrounding tourist precincts.

4.6.2 Pedestrian Access to Bus Stops

A pedestrian path will link the site to Nelson Bay Road where there are bus stops. It is considered that the public buses running along Nelson Bay Road could be utilised by the staff at the site whilst visitors to the development site will be on private coach travel which will enter the site and park within the designated parking area in the site.

5 Improvement Analysis

5.1 Improvements to Accommodate Existing Traffic

RMS upgraded Nelson Bay Road in this location to provide 2 lanes of travel in both directions. This increased the capacity and improved road safety in this location and as such no further work is required to accommodate the existing traffic flows in this location.

5.2 Improvements to Accommodate Background Traffic

As part of the upgrade of Nelson Bay Road, RMS has determined the expected growth in traffic along this section of Nelson Bay Road and as such no further road upgrades are required to accommodate the background traffic growth in this location.

5.3 Additional Improvements to Accommodate Development Traffic

There are no capacity improvements required as the future traffic flows associated with the development will have a minimal impact upon the capacity of the road and the key intersection of Nelson Bay Road and Port Stephens Drive, as detailed in Section 4.3.1 above. These upgrades include a right turn lane into the Un-named Council Road.

In accordance with the requirements of RMS the Project will provide a deceleration land for the approach to the Un-named Council Road and the proposed left in only access off Nelson Bay Road. A concept plan for review by RMS will be prepared prior to approval of the EIS

5.4 Alternative Improvements

No alternative improvements are considered necessary for the project.

6 Summary and Recommendations

6.1 Summary

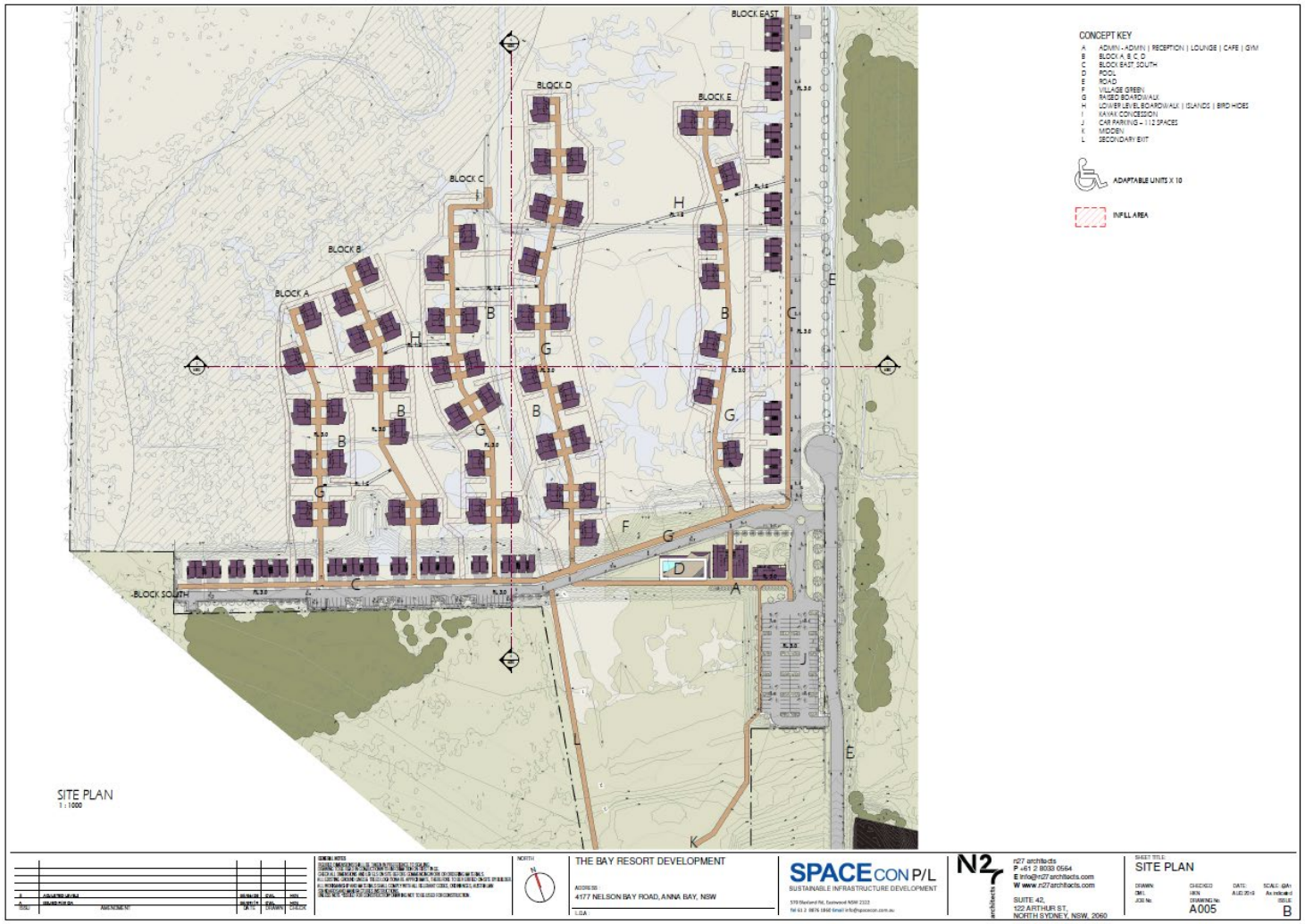
The following conclusions are drawn from the investigations into the proposed Eco-Tourism development at Anna Bay off Nelson Bay Road:

1. The proposal allows for an eco-tourist development providing accommodation consisting of a mix of one and two bedroom units and three bedroom villas, with associated amenities and car parking. The site is currently vacant.
2. The site has road frontage to both Nelson Bay Road and an unformed Un-named Council Road which connects with Nelson Bay Road via a simple give way control. Nelson Bay Road was upgraded by RMS to provide two lanes of travel in both directions and the intersection with the Un-named Council Road has been formalised. The upgraded intersection control at this location allows for left in and left out traffic movements as well as a right turn in, but restricts the right turn out of the side road. Traffic wishing to head west from this location from the Un-named Council Road is required to turn left onto Nelson Bay Road and then complete a U-turn at the roundabout to the east of the site at Port Stephens Drive.
3. Existing traffic movements have been surveyed by Seca Solution and the operation of the roundabout of Nelson Bay Road and Port Stephens Drive has been assessed with Sidra. The Sidra analysis confirms the on-site observations that the roundabout currently operates very well with minimal delays and congestion during the critical afternoon peak period.
4. Traffic flows along Nelson Bay Road are well within acceptable limits and with the upgrade having allowed for two lanes of travel in both directions will continue to operate well with background traffic growth.
5. The proposed development will gain access via the upgraded intersection of Nelson Bay Road and the Un-named Council Road. The traffic movements associated with the proposed development will have an acceptable impact upon the operation of this intersection as well as at the key intersection of Nelson Bay Road and Port Stephens Drive. Concept plans have been developed to provide for upgrades to the access point with the inclusion of a left turn slip lane off Nelson Bay Road.
6. The parking provision on site satisfies the Council DCP requirements and caters for the potential additional demands associated with people visiting the site, ensuring no impact upon the Nelson Bay Road corridor.

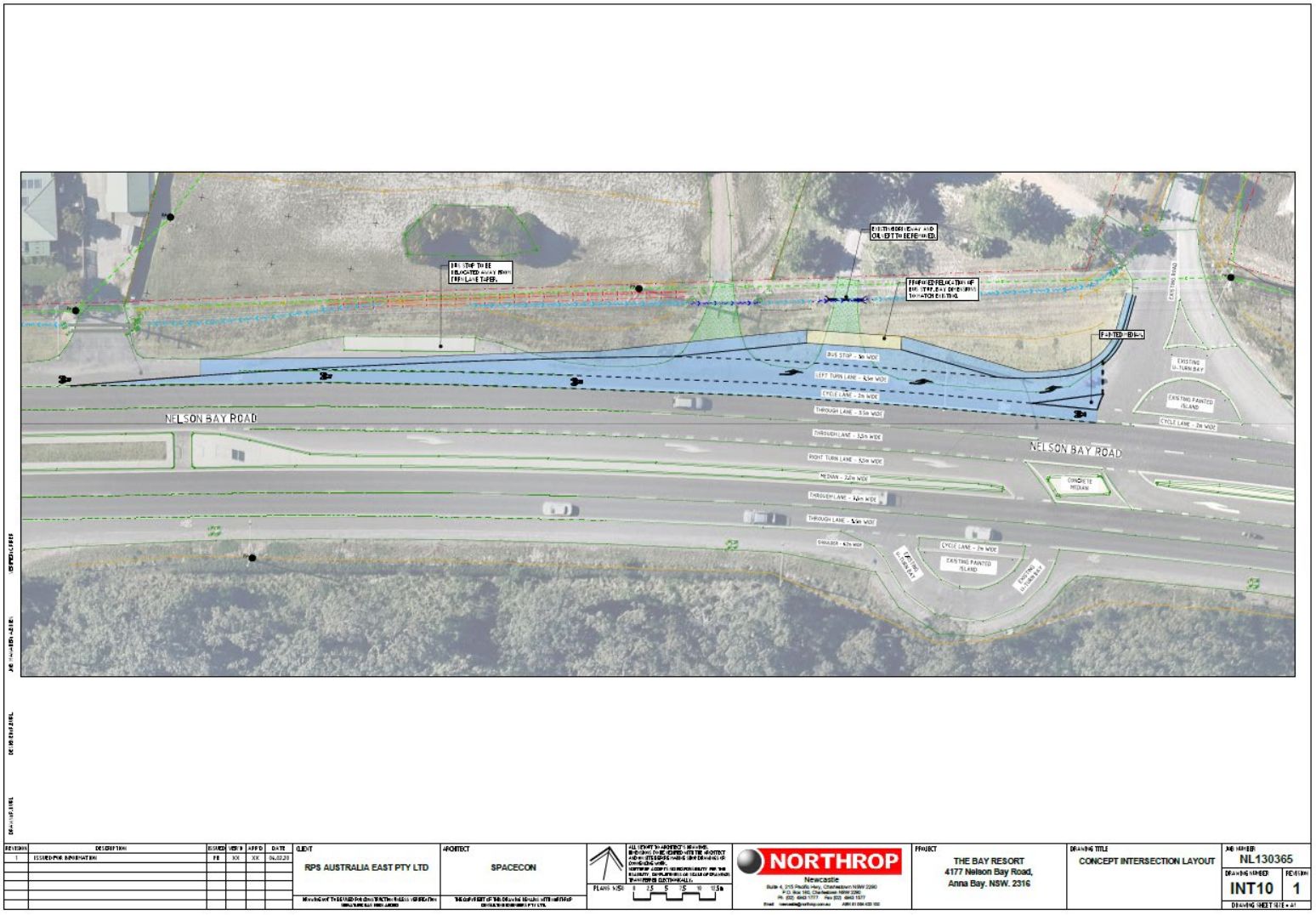
6.2 Recommendations

The overall recommendation from the investigations is that traffic and access arrangements for the development proposal are satisfactory and that there is no traffic or access impediments to the approval of the development.

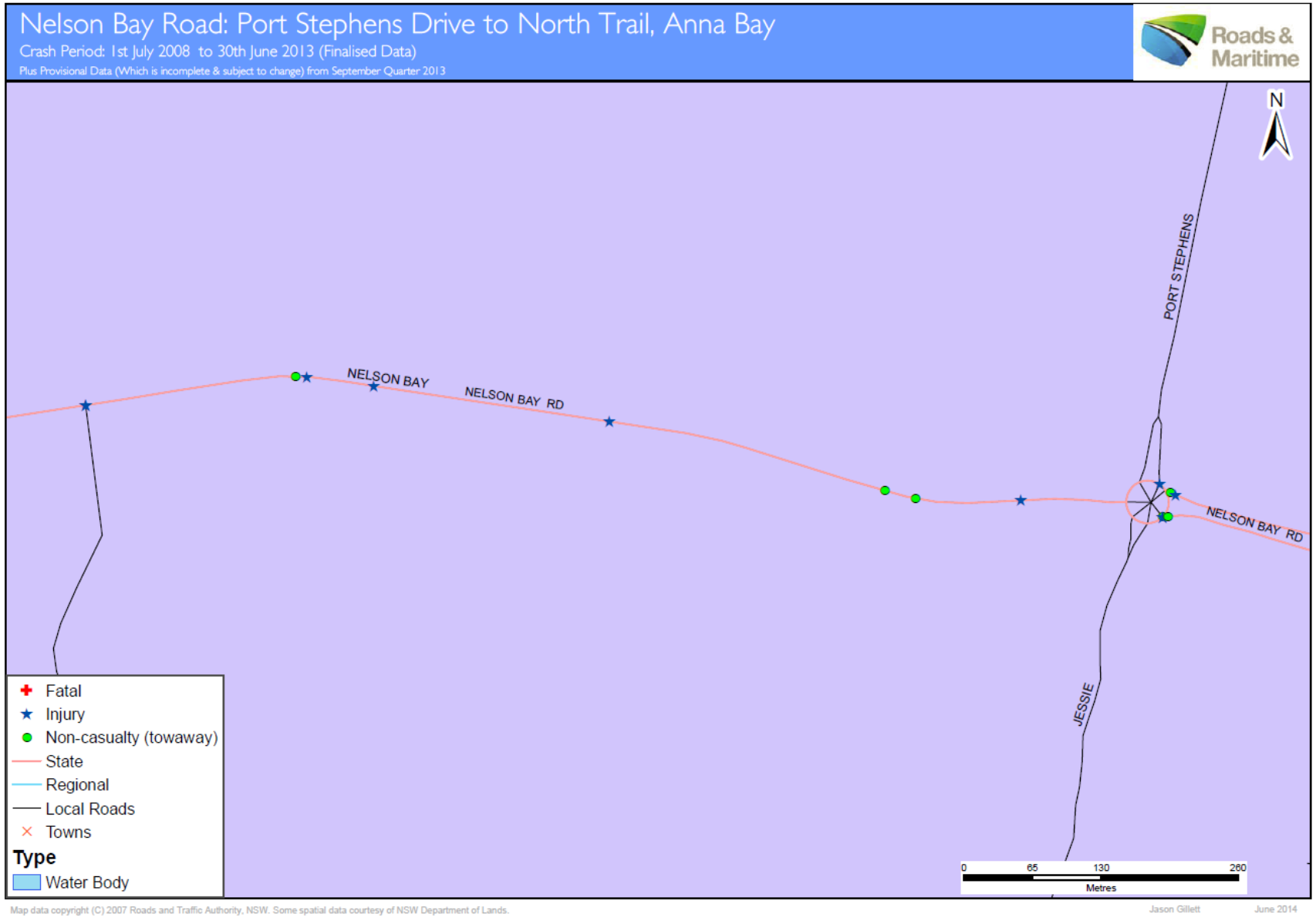
Appendix A Concept Plan



Appendix B Concept Plans for site access off Nelson Bay Road



Appendix C Accident Data



Summary Crash Report

Transport for NSW — Centre for Road Safety

# Crash Type		
Car Crash	15	93.8%
Light Truck Crash	1	6.3%
Rigid Truck Crash	0	0.0%
Articulated Truck Crash	0	0.0%
'Heavy Truck Crash	(0)	(0.0%)
Bus Crash	0	0.0%
"Heavy Vehicle Crash	(0)	(0.0%)
Emergency Vehicle Crash	0	0.0%
Motorcycle Crash	3	18.8%
Pedal Cycle Crash	0	0.0%
Pedestrian Crash	0	0.0%

' Rigid or Artic. Truck " Heavy Truck or Heavy Bus
These categories are NOT mutually exclusive

Location Type		
*Intersection	7	43.8%
Non intersection	9	56.3%

* Up to 10 metres from an intersection
~ 07:30-09:30 or 14:30-17:00 on school days

Collision Type		
Single Vehicle	6	37.5%
Multi Vehicle	10	62.5%

Road Classification		
Freeway/Motorway	0	0.0%
State Highway	0	0.0%
Other Classified Road	16	100.0%
Unclassified Road	0	0.0%

Contributing Factors		
Speeding	2	12.5%
Fatigue	1	6.3%

Weather		
Fine	9	56.3%
Rain	5	31.3%
Overcast	2	12.5%
Fog or mist	0	0.0%
Other	0	0.0%

Road Surface Condition		
Wet	7	43.8%
Dry	9	56.3%
Snow or ice	0	0.0%

Natural Lighting		
Dawn	0	0.0%
Daylight	14	87.5%
Dusk	1	6.3%
Darkness	1	6.3%

Crash Movement		
Intersection, adjacent approaches	1	6.3%
Head-on (not overtaking)	1	6.3%
Opposing vehicles; turning	0	0.0%
U-turn	0	0.0%
Rear-end	7	43.8%
Lane change	0	0.0%
Parallel lanes; turning	0	0.0%
Vehicle leaving driveway	0	0.0%
Overtaking; same direction	0	0.0%
Hit parked vehicle	0	0.0%
Hit railway train	0	0.0%
Hit pedestrian	0	0.0%
Permanent obstruction on road	0	0.0%
Hit animal	0	0.0%
Off road, on straight	1	6.3%
Off road on straight, hit object	3	18.8%
Out of control on straight	1	6.3%
Off road, on curve	0	0.0%
Off road on curve, hit object	2	12.5%
Out of control on curve	0	0.0%
Other crash type	0	0.0%

Speed Limit					
~ 40km/h or less				0	0.0%
40 km/h or less	0	0.0%	80 km/h zone	14	87.5%
50 km/h zone	0	0.0%	90 km/h zone	0	0.0%
60 km/h zone	2	12.5%	100 km/h zone	0	0.0%
70 km/h zone	0	0.0%	110 km/h zone	0	0.0%

CRASHES	16	
Fatal crash	0	0.0%
Injury crash	10	62.5%
Non-casualty crash	6	37.5%

CASUALTIES	12	
Killed	0	0.0%
Injured	12	100.0%
^ Unrestrained	0	0.0%

^ Belt fitted but not worn, No restraint fitted to position OR No helmet worn

Time Group		% of Day	
00:01 - 02:59	0	0.0%	12.5%
03:00 - 04:59	1	6.3%	8.3%
05:00 - 05:59	0	0.0%	4.2%
06:00 - 06:59	0	0.0%	4.2%
07:00 - 07:59	0	0.0%	4.2%
08:00 - 08:59	1	6.3%	4.2%
09:00 - 09:59	4	25.0%	4.2%
10:00 - 10:59	0	0.0%	4.2%
11:00 - 11:59	2	12.5%	4.2%
12:00 - 12:59	2	12.5%	4.2%
13:00 - 13:59	0	0.0%	4.2%
14:00 - 14:59	2	12.5%	4.2%
15:00 - 15:59	0	0.0%	4.2%
16:00 - 16:59	4	25.0%	4.2%
17:00 - 17:59	0	0.0%	4.2%
18:00 - 18:59	0	0.0%	4.2%
19:00 - 19:59	0	0.0%	4.2%
20:00 - 21:59	0	0.0%	8.3%
22:00 - 24:00	0	0.0%	8.3%

Street Lighting Off/Nil		% of Dark	
1	of	1 in Dark	100.0%

Crashes		Casualties
4	2013	3
2	2012	1
3	2011	2
2	2010	3
3	2009	3
2	2008	0

~ School Travel Time		
Involvement	4	25.0%

McLean Periods			% Week
A	1	6.3%	17.9%
B	1	6.3%	7.1%
C	6	37.5%	17.9%
D	2	12.5%	3.5%
E	2	12.5%	3.6%
F	1	6.3%	10.7%
G	2	12.5%	7.1%
H	1	6.3%	7.1%
I	0	0.0%	12.5%
J	0	0.0%	10.7%

Day of the Week						# Holiday Periods		
Monday	0	0.0%	Thursday	3	18.8%	Sunday	4	25.0%
Tuesday	2	12.5%	Friday	0	0.0%	WEEKDAY	10	62.5%
Wednesday	5	31.3%	Saturday	2	12.5%	WEEKEND	6	37.5%

New Year	0	0.0%	Queen's BD	0	0.0%	Easter SH	1	6.3%
Aust. Day	0	0.0%	Labour Day	0	0.0%	June/July SH	2	12.5%
Easter	0	0.0%	Christmas	0	0.0%	Sept./Oct. SH	0	0.0%
Anzac Day	0	0.0%	January SH	1	6.3%	December SH	0	0.0%

Crashid dataset Nelson Bay Road: Port Stephens Drive to North Trail, Anna Bay - 1/7/2008 to 2014*
Note: Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Percentages are percentages of all crashes. Unknown values for each category are not shown on this report.

Rep ID: REG01 **Office:** Hunter **User ID:** gillettj Page 1 of 1 Generated: 23/06/2014 11:28

Detailed Crash Report - sorted

NSW Transport for NSW — Centre for Road Safety

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
Natural Lighting																				**S F**
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
631244	16/07/2008	Wed	08:50	at	PORT STEPHENS DR	RDB	STR	Fine	Dry	80	2	UTE	M56	W in NELSON BAY RD	30	Proceeding in lane	N	0	0	
E34435006				Daylight		DCA : 303	Same - Rear right					CAR	F86	W in NELSON BAY RD	20	Turning right				
Hunter Region				**Port Stephens LGA**			**Bobs Farm**							**Nelson Bay Rd**						
640602	25/09/2008	Thu	16:12	200 m W	PORT STEPHENS DR	2WY	STR	Fine	Dry	80	3	CAR	M39	E in NELSON BAY RD	80	Proceeding in lane	N	0	0	
E34693030				Dusk		DCA : 301	Same - Rear end					WAG	M U	E in NELSON BAY RD	0	Stationary				
												CAR	M70	E in NELSON BAY RD	0	Wait turn right				
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
673311	21/06/2009	Sun	16:15	100 m W	PORT STEPHENS DR	2WY	STR	Raining	Wet	80	2	CAR	M21	W in NELSON BAY RD	70	Incorrect side	I	0	1	
E37826446				Daylight		DCA : 201	Opp - Head on					CAR	F46	E in NELSON BAY RD	70	Proceeding in lane				
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
683461	04/08/2009	Tue	16:00	at	PORT STEPHENS DR	RDB	STR	Fine	Dry	80	2	4WD	M29	S in PORT STEPHENS DR	5	Proceeding in lane	I	0	1	
E38208218				Daylight		DCA : 101	Adj - Cross traffic					M/C	M18	E in NELSON BAY RD	Unk	Proceeding in lane				
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
681089	03/09/2009	Thu	16:15	10 m E	PORT STEPHENS DR	RDB	STR	Overcast	Wet	60	1	CAR	M37	E in NELSON BAY RD	45	Proceeding in lane	I	0	1	
E40931386				Daylight		DCA : 703	Left off cway into object					Tree/bush								
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
700590	18/02/2010	Thu	12:00	790 m W	PORT STEPHENS DR	2WY	CRV	Fine	Dry	80	1	CAR	F20	E in NELSON BAY RD	80	Proceeding in lane	I	0	2	S
E40644342				Daylight		DCA : 803 R	Off right bend into obj					Tree/bush								
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
734342	16/11/2010	Tue	12:05	30 m E	UNION CHURCH OT	2WY	STR	Fine	Dry	80	3	TRK	M38	W in NELSON BAY RD	50	Proceeding in lane	I	0	1	
E43234942				Daylight		DCA : 301	Same - Rear end					CAR	M30	W in NELSON BAY RD	0	Stationary				
												TRK	M66	W in NELSON BAY RD	0	Stationary				
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
739378	23/01/2011	Sun	09:20	500 m W	PORT STEPHENS DR	2WY	STR	Fine	Dry	80	4	CAR	F29	W in NELSON BAY RD	40	Proceeding in lane	I	0	1	
E43612179				Daylight		DCA : 301	Same - Rear end					WAG	F33	W in NELSON BAY RD	10	Proceeding in lane				
												CAR	M37	W in NELSON BAY RD	10	Proceeding in lane				
												VAN	M37	W in NELSON BAY RD	Unk	Turning left				
Hunter Region				**Port Stephens LGA**			**Anna Bay**							**Nelson Bay Rd**						
755383	10/04/2011	Sun	14:10	230 m W	PORT STEPHENS DR	2WY	STR	Fine	Dry	80	1	CAR	M20	E in NELSON BAY RD	80	Proceeding in lane	N	0	0	
E44726867				Daylight		DCA : 703	Left off cway into object					Utility pole								

Rep ID: DCR02 **Office:** Hunter **User ID:** gillettj

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Generated: 23/06/2014 11:28

Detailed Crash Report - sorted

Transport for NSW – Centre for Road Safety

Crash No.	Date	Day of Week	Time	Distance	ID Feature	Loc Type	Alignment	Weather	Surface Condition	Speed Limit	No. of Tus	Tu Type/Obj	Age/Sex	Street Travelling	Speed Travelling	Manoeuvre	Degree of Crash	Killed	Injured	Factors
					Natural Lighting															S F
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
777172	23/11/2011	Wed	09:35	at	PORT STEPHENS DR	RDB	STR	Raining	Wet	80	2	CAR	M79	W in NELSON BAY RD	70 Proceeding in lane		I	0	1	
E46196513					Daylight	DCA : 704	Right off cway into obj					CAR	F40	E in NELSON BAY RD	20 Proceeding in lane					
												Falling object								
												Signpost								
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
804399	01/02/2012	Wed	14:00	5 m E	PORT STEPHENS DR	RDB	STR	Raining	Wet	60	2	CAR	F17	W in NELSON BAY RD	50 Proceeding in lane		N	0	0	
E177293395					Daylight	DCA : 301	Same - Rear end					4WD	F34	W in NELSON BAY RD	0 Stationary					
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
806712	11/08/2012	Sat	09:45	at	PORT STEPHENS DR	RDB	STR	Raining	Wet	80	1	M/C	F42	W in NELSON BAY RD	10 Proceeding in lane		I	0	1	F
E49329867					Daylight	DCA : 705	Out of control on cway													
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
832820	23/02/2013	Sat	11:15	5 m E	PORT STEPHENS DR	RDB	STR	Raining	Wet	80	1	CAR	F22	E in NELSON BAY RD	20 Proceeding in lane		N	0	0	
E51230869					Daylight	DCA : 701	Off carriageway to left													
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
832903	20/03/2013	Wed	11:50	1 km W	PORT STEPHENS DR	2WY	STR	Fine	Dry	80	2	M/C	M31	E in NELSON BAY RD	35 Proceeding in lane		I	0	2	
E50846175					Daylight	DCA : 301	Same - Rear end					CAR	M40	E in NELSON BAY RD	10 Proceeding in lane					
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
845835	26/06/2013	Wed	09:00	1 km W	PORT STEPHENS DR	2WY	STR	Overcast	Wet	80	2	WAG	F42	W in NELSON BAY RD	80 Proceeding in lane		I	0	1	
E51911726					Daylight	DCA : 301	Same - Rear end					VAN	F35	W in NELSON BAY RD	40 Proceeding in lane					
Hunter Region					Port Stephens LGA			Anna Bay						Nelson Bay Rd						
844654	07/07/2013	Sun	03:10	800 m W	PORT STEPHENS DR	2WY	CRV	Fine	Dry	80	1	CAR	M31	W in NELSON BAY RD	80 Proceeding in lane		N	0	0	S
E52421468					Darkness	DCA : 804 L	Off left bend into obj					Tree/bush								

Report Totals: Total Crashes: 16 Fatal Crashes: 0 Injury Crashes: 10 Killed: 0 Injured: 12

Crashid dataset Nelson Bay Road: Port Stephens Drive to North Trail, Anna Bay - 1/7/2008 to 2014*

Note: Ordered by: Crash Date. Data for the 9 month period prior to the generated date of this report are incomplete and are subject to change.

Rep ID: DCR02 **Office:** Hunter **User ID:** gillettj Page 2 of 2 Generated: 23/06/2014 11:28

Appendix D Traffic Data

Turn Count Summary

Location: Port Stephens Drive at Nelson Bay Road, Anna Bay
GPS Coordinates:
Date: 2019-11-29
Day of week: Friday
Weather:
Analyst: TN

Total vehicle traffic

Interval starts	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
15:29	0	0	0	0	0	0	0	0	0	0	1	0	1
15:30	19	1	78	2	154	36	0	2	2	91	191	0	576
15:45	33	8	54	3	134	48	0	7	7	81	171	3	549
16:00	36	7	78	6	119	48	0	0	5	88	148	4	539
16:15	34	2	65	1	122	36	1	10	9	101	214	1	596
16:30	40	0	62	0	97	45	0	0	0	94	182	1	521
16:45	38	1	61	0	118	43	0	1	1	86	171	3	523
17:00	48	1	69	1	105	32	0	1	0	96	183	0	536
17:15	29	2	55	0	105	24	0	0	1	87	176	0	479
17:30	27	0	51	1	99	25	1	0	1	67	200	0	472
17:45	23	0	49	1	97	15	0	0	0	66	173	1	425
18:00	0	0	3	0	0	0	0	0	0	2	7	0	12

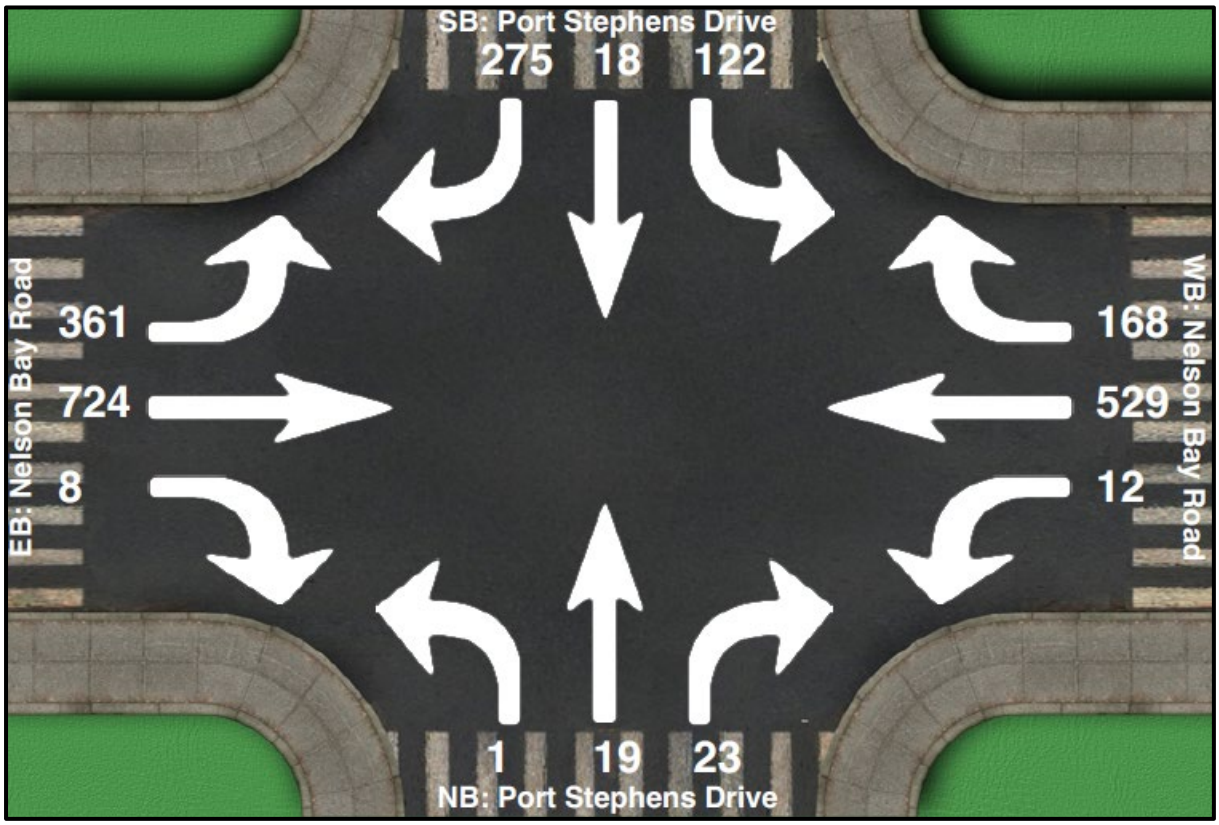
Intersection Peak Hour

15:30 - 16:30

	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Vehicle Total	122	18	275	12	529	168	1	19	23	361	724	8	2260
Factor	0.85	0.56	0.88	0.50	0.86	0.88	0.25	0.47	0.64	0.89	0.85	0.50	0.95
Approach Factor	0.86			0.92			0.54			0.86			

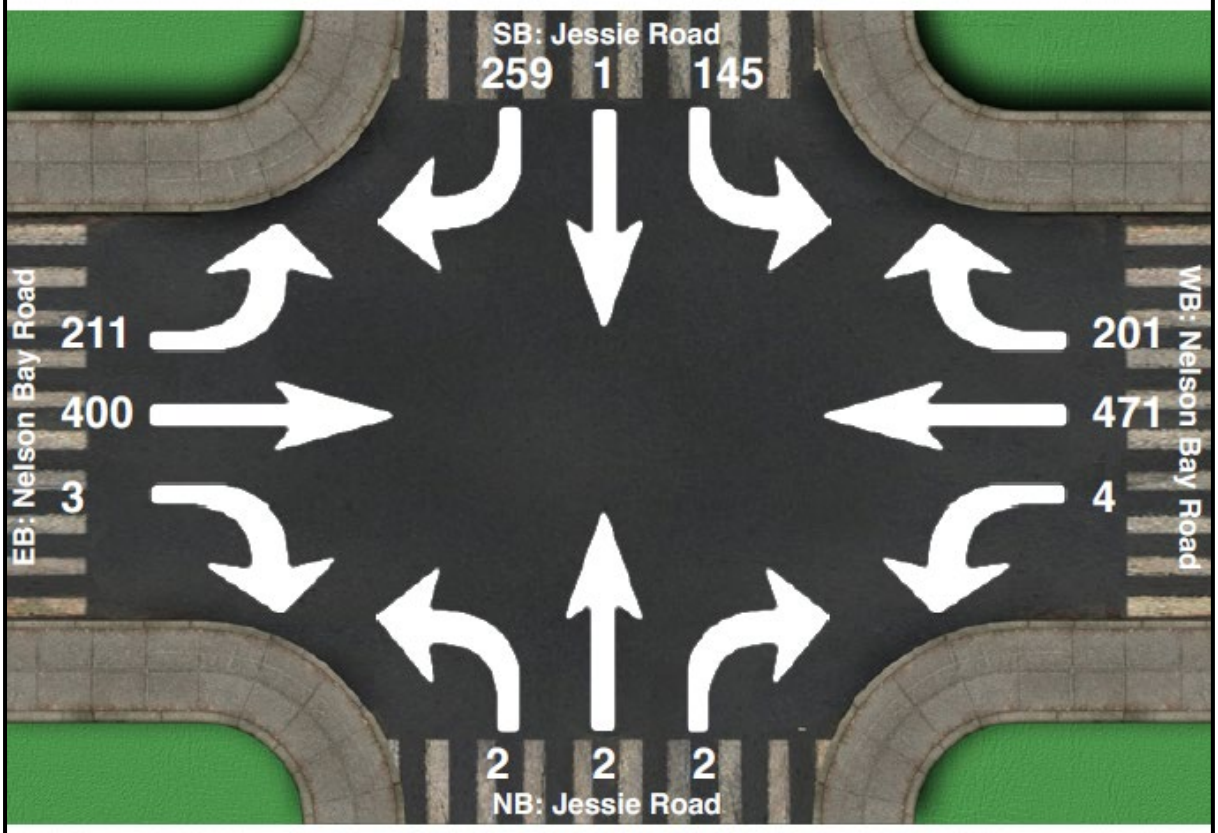
Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	119	15	262	12	515	160	0	14	19	352	714	3	2185
Truck	3	3	13	0	14	8	1	5	4	9	10	5	75



Intersection Peak Hour

Location: Jessie Road at Nelson Bay Road, Anna Bay
GPS Coordinates:
Date: 2019-09-07
Day of week: Saturday
Weather:
Analyst: SM



Intersection Peak Hour

09:45 - 10:45

Peak Hour Vehicle Summary

Vehicle	SouthBound			Westbound			Northbound			Eastbound			Total
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Car	143	1	257	4	469	200	2	2	2	207	387	3	1677
Truck	2	0	2	0	2	1	0	0	0	4	13	0	24

CONCEPT KEY

A	ADMIN - ADMIN | RECEPTION | LOUNGE | CAFE | GYM
B	BLOCK A, B, C, D
C	BLOCK EAST, SOUTH
D	POOL
E	ROAD
F	VILLAGE GREEN
G	RAISED BOARDWALK
H	LOWER LEVEL BOARDWALK | ISLANDS | BIRD HIDES
I	KAYAK CONCESSION
J	CAR PARKING – 112 SPACES
K	MIDDEN
L	SECONDARY EXIT

ADAPTABLE UNITS X 10

MAINTENANCE ACCESS
- REFER TO CIVIL ENGINEER'S DRAWING

VEHICLE SWEPT PATH
- REFER TO CIVIL ENGINEER'S DRAWING

SITE PLAN
1 : 1000

ISSU	AMENDMENT	DATE	DRAWN	CHECK
C	ADDED VEHICLE SWEPT PATHS	19/03/21	CWL	HKN
B	ADJUSTED LEVELS	08/06/20	CWL	HKN
A	ISSUED FOR DA	08/09/19	CWL	HKN

GENERAL NOTES
FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALING.
DRAWING TO BE READ IN CONJUCTION WITH INFORMATION ON FIRST PAGE.
CHECK ALL DIMENSIONS AND LEVELS ON SITE BEFORE COMMENCING WORK OR ORDERING MATERIALS.
ALL EXISTING GROUND LINES & TREES LOCATION ARE APPROXIMATE. THEREFORE TO BE VERIFIED ON-SITE BY BUILDER.
ALL WORKMANSHIP AND MATERIALS SHALL COMPLY WITH ALL RELEVANT CODES, ORDINANCES, AUSTRALIAN STANDARDS AND MANUFACTURES INSTRUCTIONS.
UNLESS NOTE 'ISSUED FOR CONSTRUCTION' DRAWING NOT TO BE USED FOR CONSTRUCTION.

NORTH

THE BAY RESORT DEVELOPMENT

ADDRESS :
4177 NELSON BAY ROAD, ANNA BAY, NSW

L.G.A :

SPACECON P/L
SUSTAINABLE INFRASTRUCTURE DEVELOPMENT
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DRAWN:	CHECKED	DATE:	SCALE: @A1
CWL	HKN	AUG 2019	As indicated
JOB No.	DRAWING No.		ISSUE
	A005		C