



ACT Land Pty Ltd
Bay Ridge Estate, Batemans Bay
Traffic Impact Assessment

October 2017

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Appendix C – Staging Plan Drawing

1. Introduction

1.1 Overview

GHD has been engaged by ACT Land Pty Ltd to undertake a traffic impact assessment in support of the application for modification of the existing development consent for the proposed residential subdivision development located at the Bay Ridge Estate in North Batemans Bay, within Eurobodalla Shire Council area. The proposed development area is located in the northern area of Batemans Bay and adjoins Kings Highway, and Princes Highway, and is mostly separated from Clyde Road by other properties.

This Traffic Impact Assessment report discusses the following:

- Existing Conditions – a review of the existing road network and traffic conditions, such as traffic volumes.
- Proposed Development – a review of additional traffic generated as a result of the proposed modified subdivision.
- Development Impact – assessment of the performance of the existing intersections (delays, and level of service) resulting from the proposed subdivision.
- Parking assessment - A review of the parking requirements has been undertaken in relation to the proposed development application with regards to Eurobodalla Shire Council *Development Control Plan 2012 Residential Zones (DCP)*, Eurobodalla Shire Council *Parking and Access Code 2011* and the Roads and Maritime Services *Guide to Traffic Generating Developments*

1.2 Subject Site

1.2.1 Background

The proposed residential development constitutes part of Development Approval (172-7-2005) issued by the Minister for Planning under Part 3A of the Environmental Planning and Assessment Act. The original development approval had been granted consent under Part 3A of the EPA of the EPA&A Act with respect to a total of 157 lots with minimum lot size of 2,500 m² within the proposed residential development.

Modifications to the Eurobodalla Local Environmental Plan 2012 (LEP) resulted in a reduction of the permissible minimum lot size from 2,500 m² to 1,500 m². A proposed modification to the Development Approval that aligns with the objectives of the LEP was deemed Part 3A under S8J(8) EP&A Regs and considered as a Section 75W Modification.

The proposed subdivision development lies within the footprint of the existing approved development with the modification intending to re-subdivide the previously approved 100 allotments to create a further 48 additional lots, reaching a total of 205 lots within the proposed development.

1.2.2 Site Location

The subject site is located within the Eurobodalla Shire Council local government area (LGA), approximately 3.8 km from the Batemans Bay town centre. The current approved residential development consists of 157 lots within DP 1216682, DP 1141334, DP 1186305 and DP 1211931, located on the northern side of Batemans Bay, at the intersection of Kings Highway and Princes Highway.

Access from the south of the proposed development will be via the existing roundabout of Kings Highway / Bayridge Drive / Old Punt Road. The northern access will be via the proposed left in/left out intersection of Kings Highway / Bayridge Drive.

The site location is shown in Figure 1.



Figure 1 Site location

Source: Six maps – Modified by GHD

1.2.3 Proposed development summary

The proposed development consists of ten separate stages, with each stage involving the development of small lot residential dwellings and the associated internal local road network. Development stages 1 through to 2B2 have been completed with stages 3A through to 7 currently in progress.

The staging plan for the proposed development is shown in Figure 2.



Figure 2 Proposed Development Staging Plan

Source: Bay Ridge Estate Staging Plan Drawing – Drawn by GHD

The stages of development and the respective work carried out in each stage is outlined in Table 1.

Table 1 Proposed development breakdown

Stage	Number of Lots Developed	Adjoining Road Network and Other Services Developed
1	2 Lots	No works required – These lots have access from Clyde Road <i>Complete</i>
2A	23 Lots	Part construction of Bayridge Drive ¹ , Construction of Apple Berry Place ³ , Kings Highway intersection and associated services - <i>Complete</i>
2B1	20 Lots	Construction of Spotted Gum Place ² and associated services- <i>Complete</i>
2B2	12 Lots	Part construction of Bayridge Drive and associated services- <i>Complete</i>
3A	32 Lots	Part construction of Bayridge Drive, part construction of Road 4, associated services and fire trail
3B	26 Lots	Part construction of Road 4, associated services, fire trail, electrical lines relocation and construction of Basin C
4	13 Lots	Part construction of Bayridge Drive, Kings Highway intersection, construction of Road 5, associated services, fire trail, part construction of Road 6
5A	16 Lots	Construction of water reservoir and high end water main, construction of highway underpass
5B	23 Lots	Part construction of Road 6, part construction of Road 7, associated services and construction of basin D
6	20 Lots	Part construction of Road 7, construction of Road 8, fire trail, public reserve and associated services
7	18 Lots	Part construction of Road 6, fire trail and public reserve
Total Small Lot Dwellings	205 Lots	

¹ Road 1 has been formally named as Bayridge Drive

² Road 2 has been formally named as Spotted Gum Place

³ Road 3 has been formally named as Apple Berry Place

1.3 Study assumptions and limitations

This study has been limited by the following:

- The analysis is a desktop study and no site visits have been undertaken.
- The conditions of the surrounding network are based on information either obtained by local knowledge or Google Maps / Streetview.
- Trip generation rates for both the existing and future developments have been taken from the ESC Infrastructure design standard

This report and assessment for the proposed development are based on the following drawings (refer to Table 2). The Staging Plan drawing is attached in Appendix C.

Table 2 Proposal drawing list

Drawing Number	Issue Date	Revision	Title
23-11947-C002B	24/6/2014	O	Staging Plan

1.4 Report structure

The report is structured as follows:

- Section 2 Existing Conditions;
- Section 3 Traffic Impact and Assessment;
- Section 4 Summary and Conclusions.

2. Existing conditions

2.1 The site

The site is located within Eurobodalla Shire Council LGA on the northern side of Batemans Bay, at the intersection of Kings Highway and Princes Highway.

The site is located entirely in a R5 (Large Lot Residential) zone, which extends to the north and east of the site. Land to the west of the site is zoned as DM (Deferred Matter) with land south of the site having a mixed zoning structure including R2 (Low Density Residential), R3 (Medium Density Residential), E2 (Environmental Conservation), RE1 (Public Recreation) and B5 (Business Development), as shown in Figure 3.

The site currently consists predominately of a greenfield area, with the southern corner of the site cleared of vegetation. The adjacent road network in the southern corner of the site with respect to Spotted Gum Place, Apple Berry Place and parts of Bayridge Drive have been completed.

Access from the south of the proposed development will be via the existing roundabout of Kings Highway / Bayridge Drive / Old Punt Road. The northern access will be via the proposed intersection of Kings Highway / Bayridge Drive.

South of the site is a local road network providing access to the residential dwellings located within the residential zones. Kings Highway to the west of the site connects Batemans Bay to Nelligen and Princes Highway to the east of the site provides access to Ulladulla from Batemans Bay.

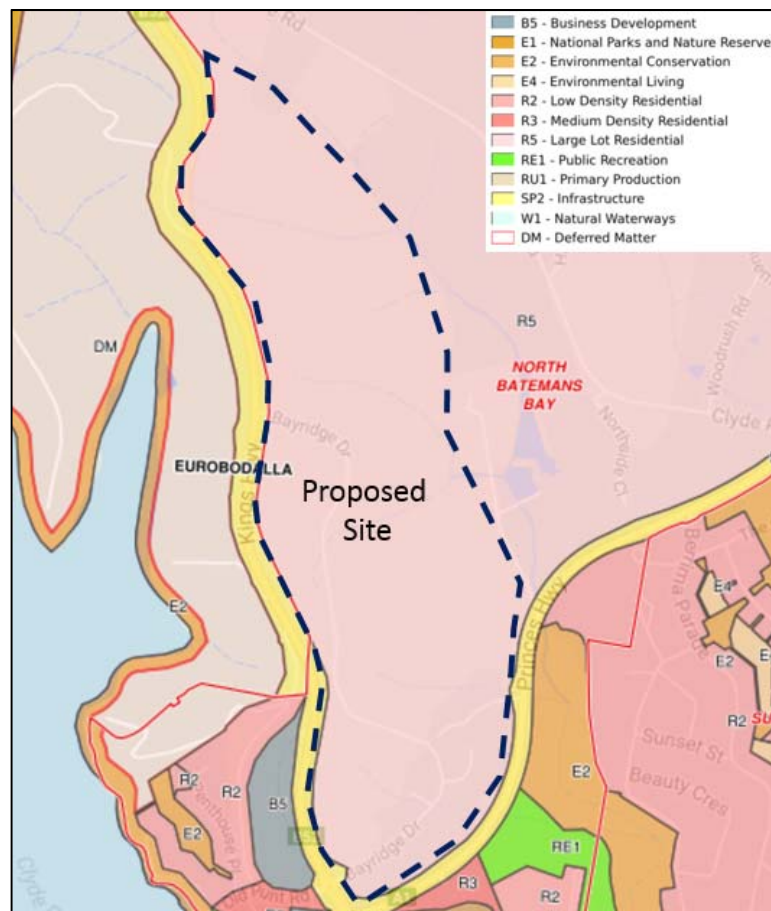


Figure 3 Land zoning

Source: www.planningportal.nsw.gov.au – Modified by GHD

2.2 Existing road network characteristics

This section provides an understanding of the existing road network surrounding the site of the proposed subdivision development.

2.2.1 Overview of the Road hierarchy

Roads within NSW are categorised in following two ways:

- By Classification (ownership)
- By the function that they perform.

Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Roads and Maritime Services (Roads and Maritime) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Roads and Maritime has three administrative classes of roads. These are:

- **State Roads** – Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Roads and Maritime with maintenance fully funded by Roads and Maritime. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Roads and Maritime funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Roads and Maritime. Regional Roads may or all part of all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by Roads and Maritime.
- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Roads and Maritime may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Roads and Maritime.

Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Roads and Maritime define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Roads and Maritime or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).

- **Collector Roads** – provide connectivity between local roads and the arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

The road hierarchy of the surrounding network is shown in Figure 4

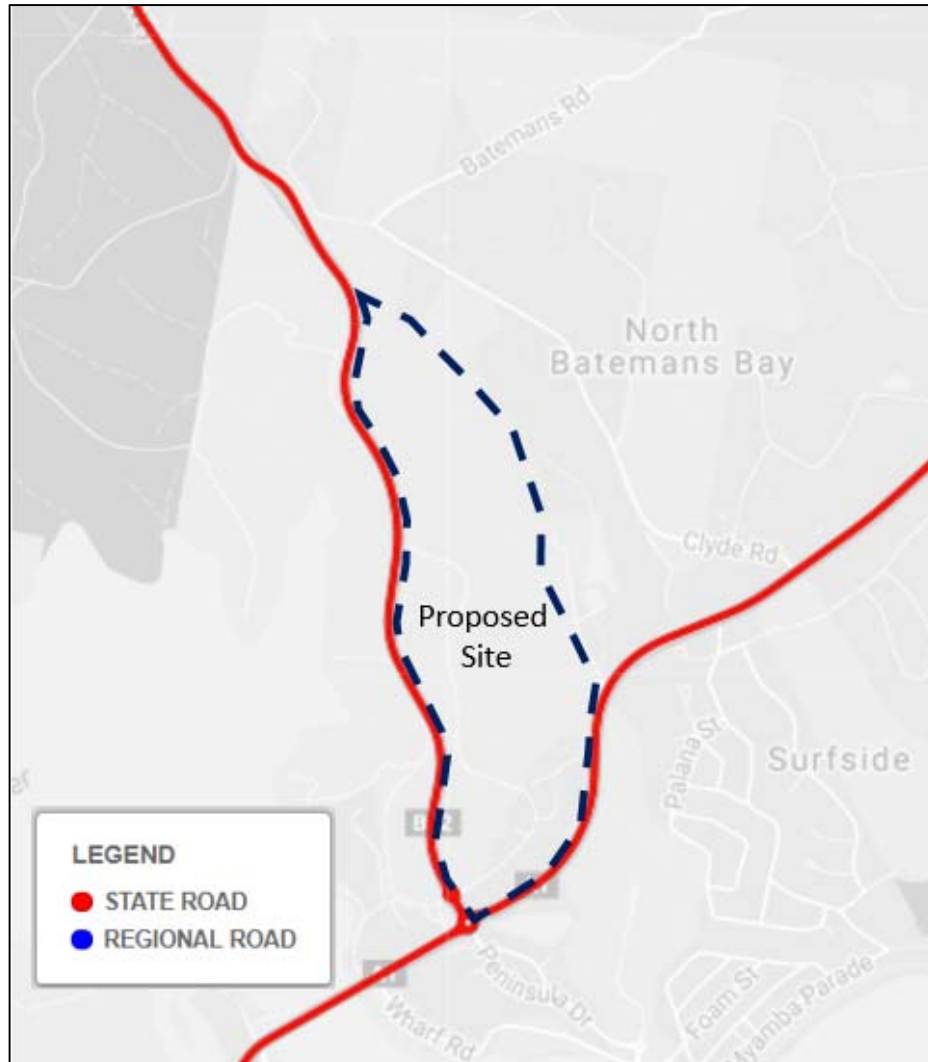


Figure 4 Surrounding road network

Source: Transport for NSW maps – Modified by GHD

2.2.2 Princes Highway

The Princes Highway has arterial road functional characteristics and is a strategic route used for state, regional and local based trips. The alignment follows the coast from southern areas of Sydney past the regional centres of Wollongong, Nowra, Ulladulla, Batemans Bay and Moruya to southern parts of NSW and Victoria. The highway is a major tourist and trucking route, which is used to gain access to coastal areas, urban centres and other inner rural settlements.

The speed environment is generally 100 km/h, which is reduced to 60 km/h around urban development. This speed limit change occurs along the southeastern edge of the subject site, approximately 300 m northeast of the roundabout with Kings Highway and Peninsula Drive. At this point, southbound traffic travelling into Batemans Bay is reduced from 100 km/h to 60 km/h and vice versa for northbound traffic.

Princes Highway has the following key features within proximity of site as outlined in Table 3.

Table 3 Princes Highway key features

Feature	Description
Carriageway	There is typically one travel lane in each direction; with an undivided carriageway Turn lanes are provided on the approach to the Princes Highway / Kings Highway / Peninsula Drive roundabout
Parking	Unrestricted; however, there is no provision for parking
Speed Limit	100 km/h with a reduction to 60 km/h on the approach to the Princes Highway / Kings Highway / Peninsula Drive roundabout
Pedestrian Facilities	No dedicated facilities; shared footpath on the southern side ends approximately 65 m from the roundabout
Bicycle Facilities	No dedicated facilities; shared footpath on the southern side ends approximately 65 m from the roundabout
Public Transport	No dedicated facilities

The carriageway incorporates two travel lanes, one in each direction. Additional auxiliary traffic lanes are provided approaching the intersection with the Kings Highway.



Figure 5 Princes Highway south of the site (looking west)

Source: Google maps Streetview

2.2.3 Kings Highway

Kings Highway has arterial road functional characteristics and provides an generally a northwest-southeast connection between the Princes Highway and Batemans Bay in the southeast to Queanbeyan, the ACT, and the Barton and Monaro Highways in the west. The road also splits at Doughboy providing connections to the Hume Highway and Goulburn to the northwest.

The speed environment is generally 100 km/h, which is reduced to 60 km/h around urban development. The change in speed limits occurs along the western edge of the subject site, approximately 150 m north of the intersection with Old Punt Road as the road curves and then descends southbound towards Batemans Bay. The road follows the western boundary of the subject site and falls from north to south towards the Clyde River. Traffic management

measures to slow traffic have been installed on the northern approach to the Old Punt Road intersection, which includes the use of raised thermoplastic pavement markings.

The Kings Highway typically has one traffic lane in each direction, however an additional traffic lane is provided along steep road sections to accommodate slow ascending traffic. Additional traffic lanes are provided on the southbound approach to the roundabout with the Princes Highway, in order to increase the capacity and separate movements at the intersection.

Kings Highway has the following key features within proximity of site as outlined in Table 4.

Table 4 Kings Highway key features

Feature	Description
Carriageway	There is typically one travel lane in the southbound direction and two travel lanes in the northbound direction; with an undivided carriageway Turn lanes are provided on the approach to the Princes Highway / Kings Highway / Peninsula Drive and Kings Highway / Old Punt Road / Bayridge Drive roundabouts
Parking	Unrestricted; however, there is no provision for parking
Speed Limit	100 km/h with a reduction to 60 km/h on the approach to the Princes Highway / Kings Highway / Peninsula Drive and Kings Highway / Old Punt Road / Bayridge Drive roundabouts
Pedestrian Facilities	Newly constructed shared path on both sides of Kings Highway between the Princes Highway / Kings Highway / Peninsula Drive and Kings Highway / Old Punt Road / Bayridge Drive roundabouts
Bicycle Facilities	Newly constructed shared path on both sides of Kings Highway between the Princes Highway / Kings Highway / Peninsula Drive and Kings Highway / Old Punt Road / Bayridge Drive roundabouts
Public Transport	No dedicated facilities

The carriageway incorporates three travel lanes, one in the southbound direction and two in the northbound direction. Additional auxiliary traffic lanes are provided approaching the intersection with the Princes Highway.



Figure 6 Princes Highway south of the site (looking north)

Source: Google maps Streetview

2.2.4 Old Punt Road

Old Punt Road performs the function of a local road with a sign posted speed limit of 50 km/h. The road serves a small residential area with a restaurant, boat hire and work sheds along the northern riverbank. Old Punt Road connects to Kings Highway at a roundabout just 60 m north of Princes Highway, opposite Bayridge Drive.

Old Punt Road has the following key features within proximity of site as outlined in Table 5.

Table 5 Old Punt Road key features

Feature	Description
Carriageway	There is typically one travel lane in each direction; with an undivided carriageway No turn lanes are provided on the approach to the Kings Highway / Old Punt Road / Bayridge Drive roundabout
Parking	Unrestricted; however, there is no provision for parking
Speed Limit	50 km/h
Pedestrian Facilities	No dedicated facilities
Bicycle Facilities	No dedicated facilities
Public Transport	No dedicated facilities



Figure 7 Old Punt Road south west of the site (looking east)

Source: Google maps Streetview

2.2.5 Bayridge Drive

Bayridge Drive performs the function of a local road with a sign posted speed limit of 50 km/h. The road directly serves the small lot residential dwellings within the Bay Ridge Estate and provides residents with access to Kings Highway and Princes Highway. Bayridge Drive crosses Kings Highway at a roundabout just 60 m north of Princes Highway and will also intersect Kings Highway one kilometre north of this roundabout at the centre of the proposed development.

Bayridge Drive has the following key features within proximity of site as outlined in Table 6.

Table 6 Bayridge Drive key features

Feature	Description
Carriageway	There is typically one travel lane in each direction; with an undivided carriageway No turn lanes are provided on the approach to the Kings Highway / Old Punt Road / Bayridge Drive roundabout
Parking	Unrestricted; however, there is no provision for parking
Speed Limit	50 km/h
Pedestrian Facilities	390 m shared path along the northern side of Bayridge Drive currently with a proposed extension as part of the development. A 2.5 m wide shared path for pedestrians is proposed along the south-western side of Bayridge Drive as a continuation of a similarly located path constructed in the previous stages.
Bicycle Facilities	390 m shared path along the northern side of Bayridge Drive currently with a proposed extension as part of the development. A 2.5 m wide shared path for pedestrians is proposed along the south-western side of Bayridge Drive as a continuation of a similarly located path constructed in the previous stages.
Public Transport	Proposed bus route to service Bayridge Drive with indented bus bays to be installed as part of the development



Figure 8 Bay Ridge Drive south west of the site (looking east)

Source: Google maps Streetview

2.3 Existing road network performance

This section provides an understanding of the current traffic volumes.

2.3.1 Existing traffic volumes

Roads and Maritime Services have developed a traffic volume viewer which indicates average annual daily traffic (AADT) volumes. The traffic volume viewer in conjunction with the AADT information provided by Eurobodalla Council was utilised to estimate intersection traffic turning counts. The turn counts were estimated for the two intersections directly impacted by the development for the AM and PM periods on a typical weekday. These following two intersections are illustrated in Figure 9:

- Site 1: Kings Highway / Princes Highway
- Site 2: Old Punt Road / Kings Highway



Figure 9 Survey intersections

Source: Six maps – Modified by GHD

The AADT volumes received from the Eurobodalla Council represent the 2017 intersection traffic counts at three sites, namely:

- Site 415: Kings Highway between Bayridge Road and Rotary Drive
- Site 624: Old Punt Road west of the Service Station Driveway
- Site 5003: Bayridge Drive at Kings Highway

These counts were supplemented by the northbound and southbound traffic volumes gathered from the permanent count station 08052, located on Princes Highway approximately 70m east of its intersection with Kings Highway.

These volumes were adopted for assessment of the surrounding road network.

Table 7 summarises the average annual daily traffic volumes along the key roads.

Table 7 AADT traffic volumes

Location	Direction	Average Annual Daily Traffic (veh/day)*
Princes Highway	Both	8918
Kings Highway	Both	4107
Old Punt Road	Both	946
Bayridge Drive	Both	357

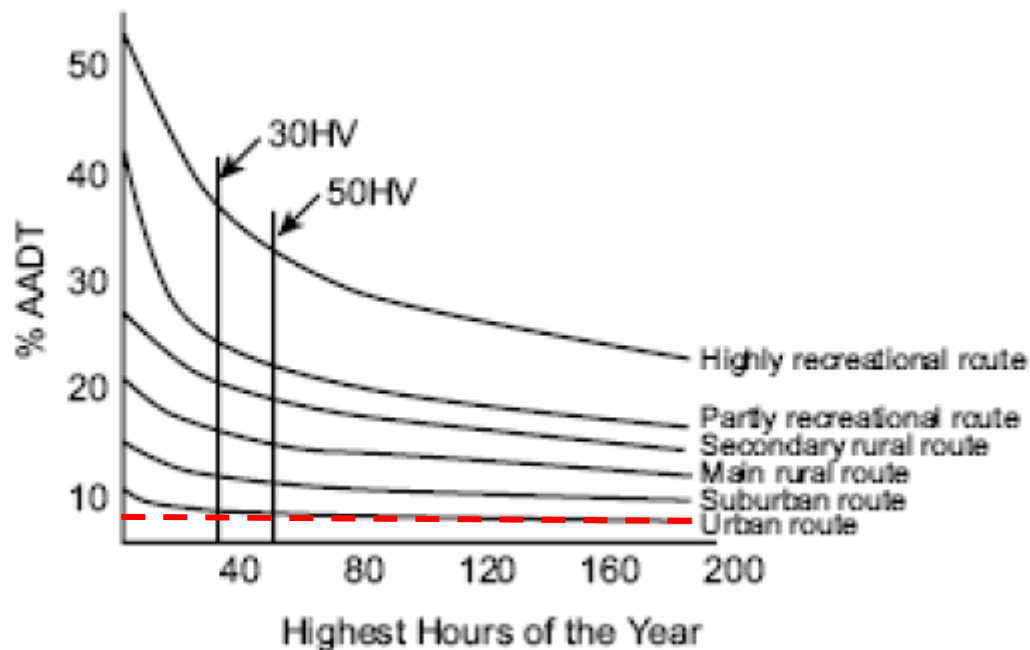
Notes:

(*) veh/day = vehicles per day

The classification of roads within the existing road network can be used as an indication of the functional role each road plays with respect to the volume of traffic they should appropriately carry.

2.3.2 Determining peak hour volumes from AADT

AADT volumes obtained in the vicinity of the proposed development do not clearly highlight an indicative AM and PM peak period that can be utilised to determine peak hour volumes for the base case scenario in the year 2017. Austroads' Guide to Traffic Management, *Part 3: Traffic Studies and Analysis – Section A.4.4*, highlights a method of estimating design hourly volumes from AADT based on the relationship illustrated in Figure 10.

**Figure 10 Typical relationships between hourly volumes and AADT**

Kings Highway and Princes Highway can be classified as urban routes due to their location and proximity to Bateman's Bay CBD. The 30th highest hourly volume (denoted as 30 HV) is often used in designing rural roads whereas an 80 HV or 120 HV is chosen for recreational routes, taking into consideration the traffic growth over a design period.

The highest hour of the year is estimated to be 10% of AADT with lower values dropping to approximately 4 – 5% of AADT. Traffic demand usually varies widely in a day and throughout a year and 10% can be considered to a conservative approach. This was also checked against the permanent count station data at Princes highway. This data indicated that both the morning and the evening peak hours was between 7 % to 8% of the AADT.

The AM and PM peak periods were adopted to have hourly volumes of 10% of the AADT and are summarised in Table 8.

Table 8 Peak Hour traffic volumes derived from AADT

Location	Direction	Peak Hour Traffic (veh/h)*
Princes Highway	Northbound	490
	Southbound	402
	Total	892
Kings Highway	Total	411
Old Punt Road	Total	95
Bayridge Drive	Total	36

Roads and Maritime Services have also developed a set of road hierarchy classifications detailed in Table 9, which indicate typical nominal average annual daily traffic (AADT) volumes for various classes of roads.

Table 9 Functional classification of roads

Location	Traffic Volume (vpd*)	Peak Hour Volume (vph*)
Motorway/Freeway	>15,000	>5,600
Arterial Road	>15,000	1,500 – 5,600
Sub-Arterial Road	5,000 – 20,000	500 – 2,000
Collector Road	2,000 – 10,000	200 – 1,000
Local Road	<2,000	0 – 200

Source: NSW Roads and Maritime Service (formerly NSW RTA), Road Design Guide and AMCORD

*Note vpd = vehicles per day, vph = vehicles per hour

Based upon the surveyed results outlined in Table 7 and Table 8, the peak hour traffic volumes fall within the criteria provided in Table 9 for the relevant classification.

2.3.3 Heavy and light vehicle ratio

The AADT volumes gathered from the Roads and Maritime traffic volume viewer do not provide a classification of vehicles on the key roads of Kings Highway and Princes Highway, for recent years. However, based on the traffic survey data collected from older count stations (2007) on Kings Highway and Princes Highway located north and south of the proposed residential development, the average heavy vehicle percentage for each road within immediate access to the proposed development is outlined in Table 10.

Table 10 Heavy vehicle ratio

Location	% HV*
Princes Highway	10 %
Kings Highway	5 %

Notes:

(*) HV = heavy vehicles/buses

2.3.4 Journey to work travel modes

A review was undertaken utilising the NSW Government Bureau of Transport and Statistics Journey to Work 2011 data to review the typical mode of transport from the travel zone incorporating the proposed site to a destination of work. The site is located within TZ 7229 which outlines the primary mode of transport to the zone is as a vehicle driver (82 percent) or vehicle passenger (eight percent). This illustrates a high dependency on private vehicle use for the area for journey to work.

The limited availability of public transport options outline the lack of dependency on trains and buses with none of the current residents opting to use public transport.

Details of the statistics for TZ 7229 are illustrated in Figure 11.

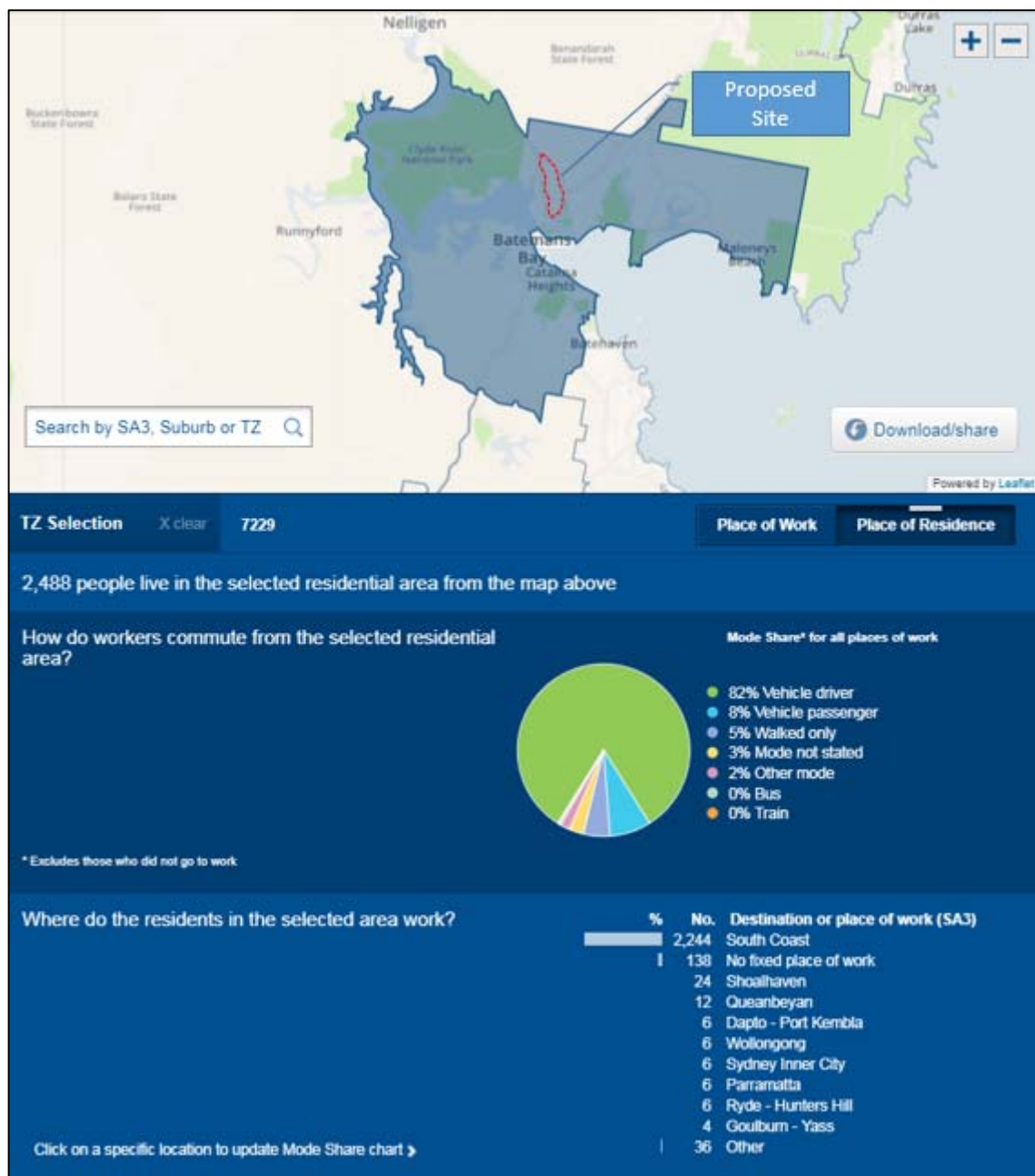


Figure 11 Journey to work data

Source: NSW Government Bureau of Transport and Statics Journey to Work – Modified by GHD

2.4 Existing intersection performance

The performance of the existing road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA intersection modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network.

The criteria for evaluating the operational performance of intersections is provided by the Guide to Traffic Generating Developments (Roads and Maritime Services, 2002) and reproduced in Table 11. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service), which is applied to each band of average vehicle delay.

Table 11 Level of service criteria for intersections

Level of Service	Average Delay per Vehicle (seconds/veh)	Traffic Signals, Roundabouts	Give Way & Stop Signs
A	< 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays Roundabouts require other control modes	At capacity, requires other control mode
F	> 70	Over Capacity Unstable operation	Over Capacity Unstable operation

Source: Guide to Traffic Generating Developments (Roads and Maritime Services 2002)

2.4.1 Existing (2017 base) intersection performance

The base 2017 traffic models were developed using the AM and PM peak hour estimated data results. Existing traffic flows at key intersections, (refer to Figure 12 and Figure 13), were analysed using SIDRA7 to obtain the current operation of the key intersections.

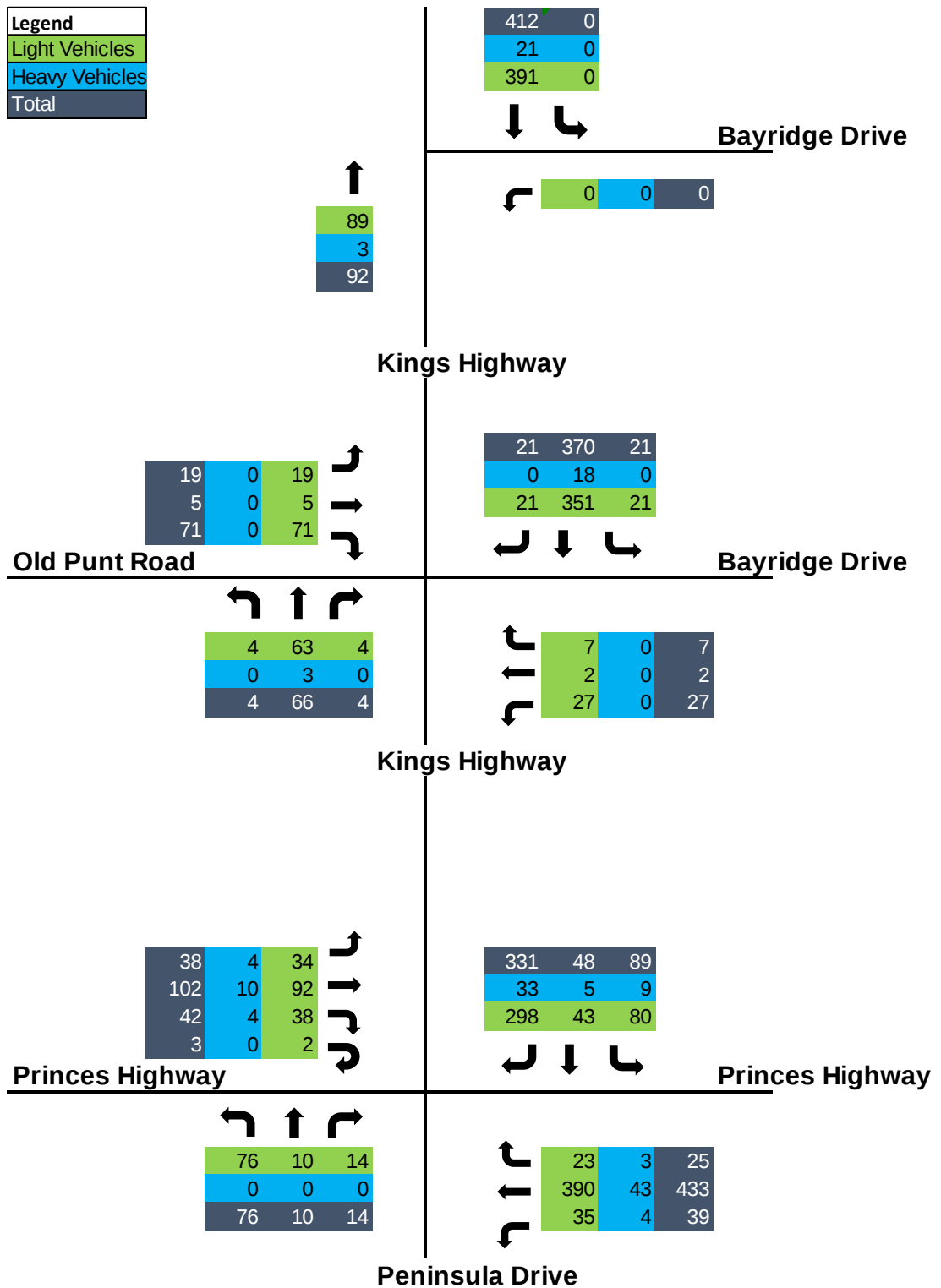


Figure 12 Existing AM peak hour traffic flows

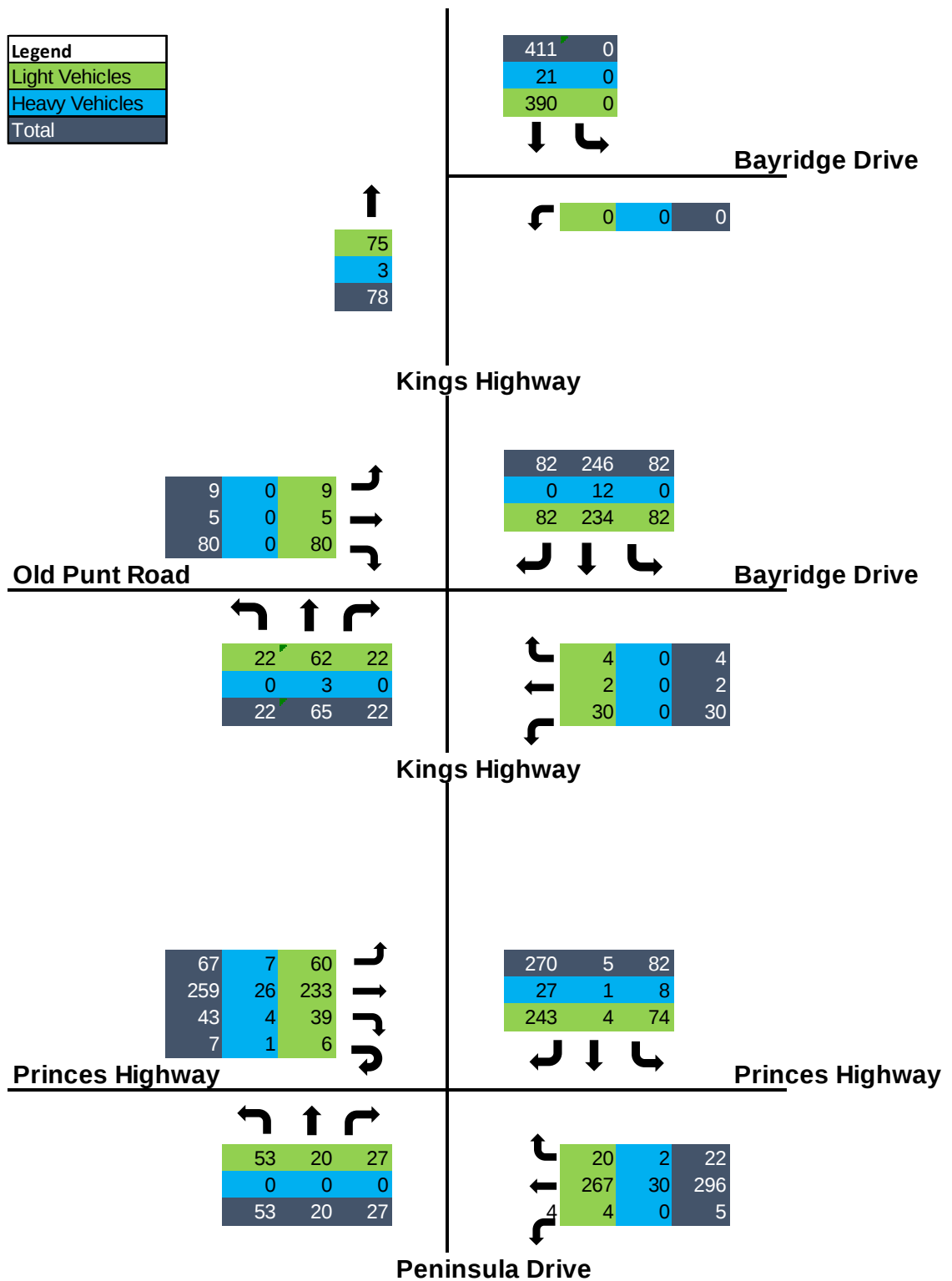


Figure 13 Existing PM peak hour traffic flows

A summary of the results is outlined in Table 12 and detailed in Appendix A.

Table 12 Existing intersection operations (2017)

Intersection	AM Peak			PM Peak		
	Average Delay (s)	LoS	Degree of Saturation	Average Delay (s)	LoS	Degree of Saturation
Site 1: Princes Highway / Kings Highway	11	A	0.31	11	A	0.25
Site 2: Kings Highway / Old Punt Road / Bayridge Drive	10	A	0.31	9	A	0.32
Site 3: Kings Highway / Bayridge Drive	8	A	0.22	8	A	0.22

Notes:

- The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
- The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
- The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
- Average delay is given in seconds per vehicle.
- Sites 1, 2 and 3 were modelled in SIDRA as a network operation

Table 12 indicates that all of the analysed intersections currently have an acceptable Level of Service (i.e. better than Level of Service D) with spare capacity in both peak periods. Detailed SIDRA results of these intersections are provided in Appendix A.

2.5 Crash data review

A review of crash data provided from the Transport for NSW Centre for Road Safety website has been undertaken. This has been based on a five-year period (2012-2016) for roads within the vicinity of the proposal site as shown in Figure 14.



Figure 14 Study area crash data

Source: Transport for NSW Centre for Road Safety

A summary of the five-year crash data resulting in injury is summarised in Table 13.

Table 13 Summary of crash injuries (2012-2016)

Location	Number of injuries		
	Fatal	Injured	Total
Kings Highway	0	1	1
Princes Highway	0	0	0
At or near intersection of Kings Highway and Princes Highway	0	6	6
Total	0	7	7

A summary of the predominant crash types recorded on Kings Highway, Princes Highway and at intersections in the vicinity of the site is shown in Table 14. The crash data indicates that the most common crash type these intersections involved:

- Vehicles travelling on a curve or bend, deviating off-path and hitting an object;
- Vehicles travelling in one direction colliding with vehicles travelling in the adjacent direction at intersections; and
- Vehicles travelling on a straight, deviating off-path and hitting an object).

Table 14 Crash types within vicinity of proposed development (2012-2016)

Intersection	Crash type (number of crashes)	Year of Crash
Kings Highway	Off-path on curve or turning (1)	2013
	Off-path on curve or turning (1)	2014
	Off-path on curve or turning (1)	2016
Princes Highway	Off-path on straight (1)	2012
	Off-path on curve or turning (1)	2014
At or near intersection of Kings Highway and Princes Highway	Vehicles from adjacent direction (2)	2012
	Vehicles from adjacent direction (1)	2013
	Opposing vehicles; opposing direction (1)	2013
	Vehicles from same direction (1)	2013
	Off-path on curve or turning (1)	2014
	Off-path on straight (2)	2015
	Vehicles from same direction (1)	2016
TOTAL	14 crashes	7 injuries

2.6 Existing public and active transport

In reviewing the site and its accessibility to public transport opportunity, reference is made to the NSW Planning Guidelines for Walking and Cycling (2004). This document outlines a recommended walkable distance of 400 m to 800 m to public transport and other local amenities or a 1.5 km cycle distance. Details of the accessibility to public transport opportunities are outlined below.

Details of the accessibility to public transport, walking and bicycle riding access is provided in the following sections.

2.6.1 Bus services

Bus stops are located to the south of the proposed development (approximately 500 m from the southern access to the site) on Peninsula Drive after Lincoln Crescent and to the south west of the proposed development (approximately 550 m from the southern access) on Wharf Road.

The bus stops are illustrated in Figure 15, with the bus routes serving the stops outlined in Table 15.

Table 15 Bus services

Route	Frequency	Coverage
757	Weekdays: approx. 60 minute intervals (AM/PM peak only), two hour intervals (off-peak) Saturdays and Public Holidays: two services approximately two and a half hours apart	Batemans Bay – Long Beach Loop service

Source: www.transportnsw.info website

As part of the residential development, Bayridge Drive is proposed to act as a bus route to service the residents of the small lot dwellings within the Bay Ridge Estate. The development will see the construction of indented bus bays along Bayridge Drive, which is further explained in Section 3.2.1.

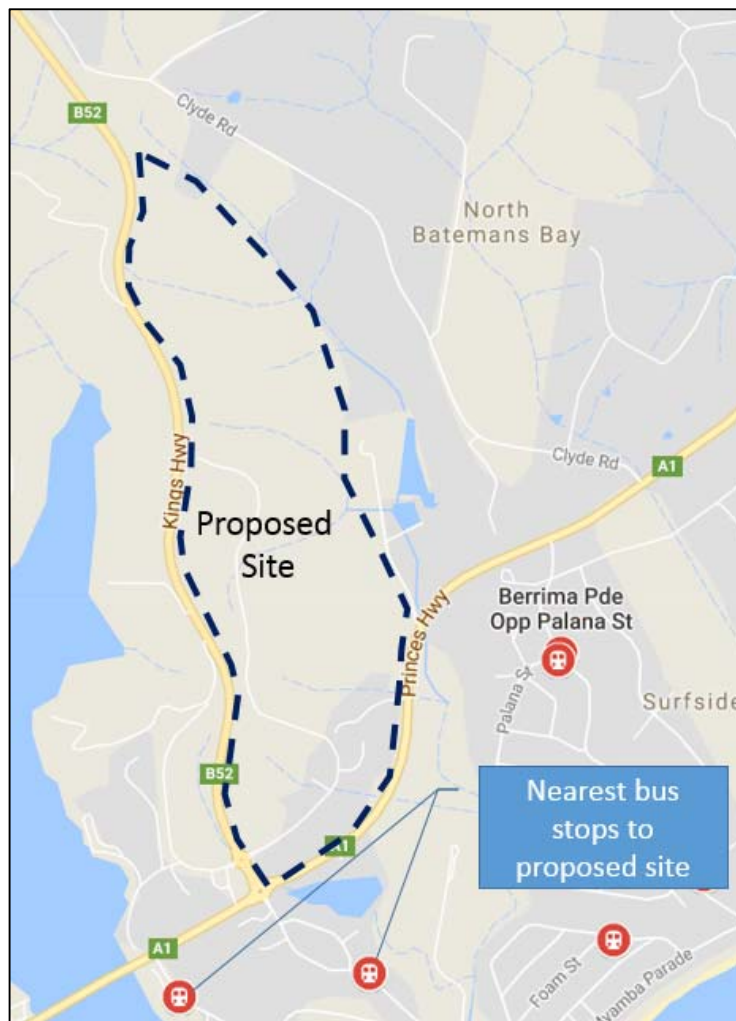


Figure 15 Bus stops

Source: Google maps – Modified by GHD

2.6.2 Train services

Currently, no public train routes service the Batemans Bay area. Commuters wishing to travel to Batemans Bay via train are required to travel by train to Bomaderry Station or Bungendore Station and then connect with private coach services to get to Batemans Bay.

2.6.3 Bicycle riding

Figure 16 illustrates the current off-road and on-road shared path facilities within proximity of the site as outlined in Roads and Maritime Services Cycleway Finder website.

It identifies that currently there are limited bicycle routes close to the site. However, the Eurobodalla Shire Council Pathways Strategy 2016 highlights the importance of cycling routes and cycling infrastructure, which will see the construction of new bike paths within the proposed development area, along Bayridge Drive, to service the proposed residential dwellings. This is further elaborated in Section 3.6.

The site does not provide formal bicycle parking facilities as it consists of small lot residential dwellings.

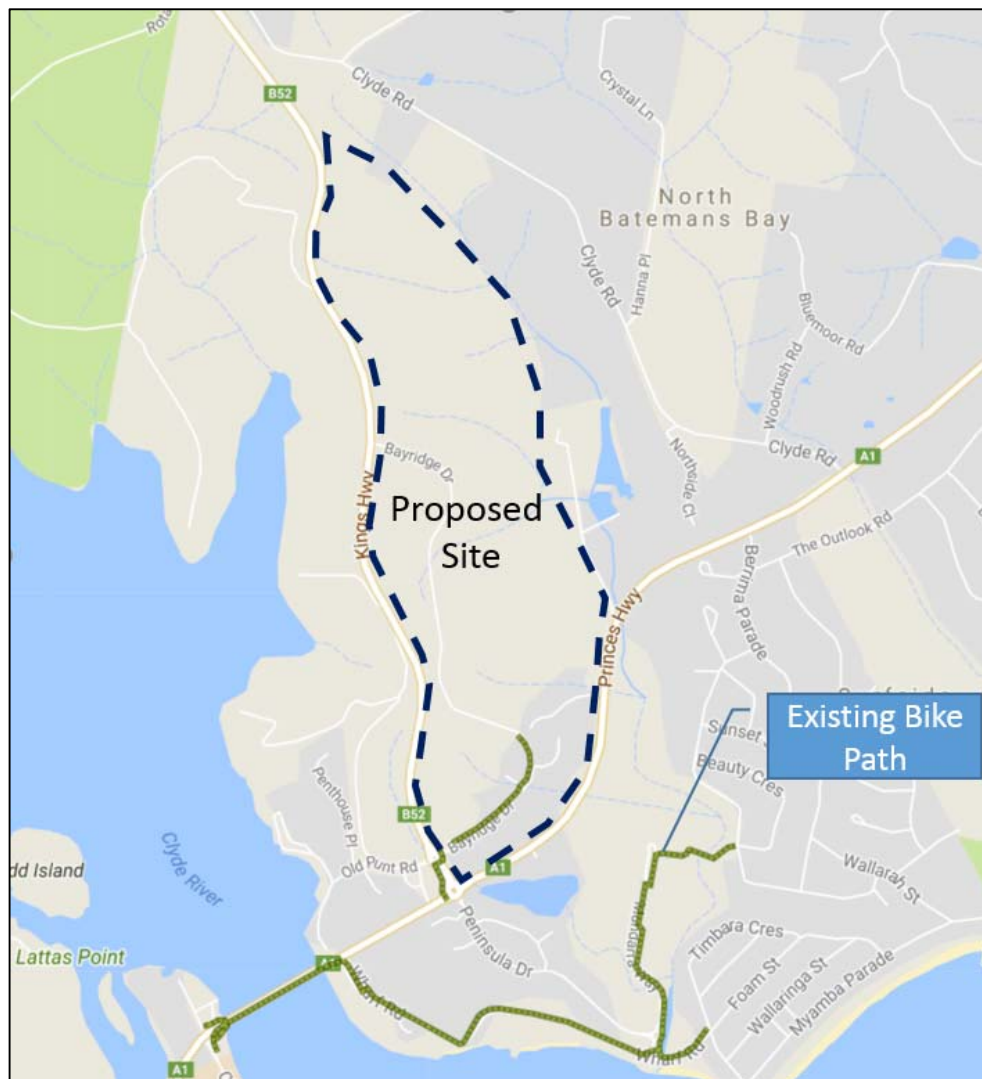


Figure 16 Existing cycle network

Source: Roads and Maritime Cycleway Finder / Eurobodalla Shire Council Pathways Strategy 2016– Modified by GHD

2.6.4 Walking

The proposed development is located on the southern corner of Kings Highway and Princes Highway. The high speed environment of 100 km/h along both these arterial roads minimise the provision of pedestrian footpaths and as such the area surrounding the proposed site has limited pedestrian mobility and accessibility.

The lack of signalised intersections in the vicinity eliminate the presence of signalised pedestrian crossings, which further reduces pedestrian accessibility along the arterial road corridors. Formalised pedestrian paths are provided in close proximity to the Kings Highway / Princes Highway / Peninsula Drive roundabout, where the posted speed limit of 60 km/h applies.

A newly constructed 380 m sealed pedestrian footpath exists along the northern and western side of Bayridge Drive with a proposed extension as part of the proposed residential development, as explained in Section 3.6.

The pedestrian facilities in proximity to the proposed development are displayed in Figure 17.

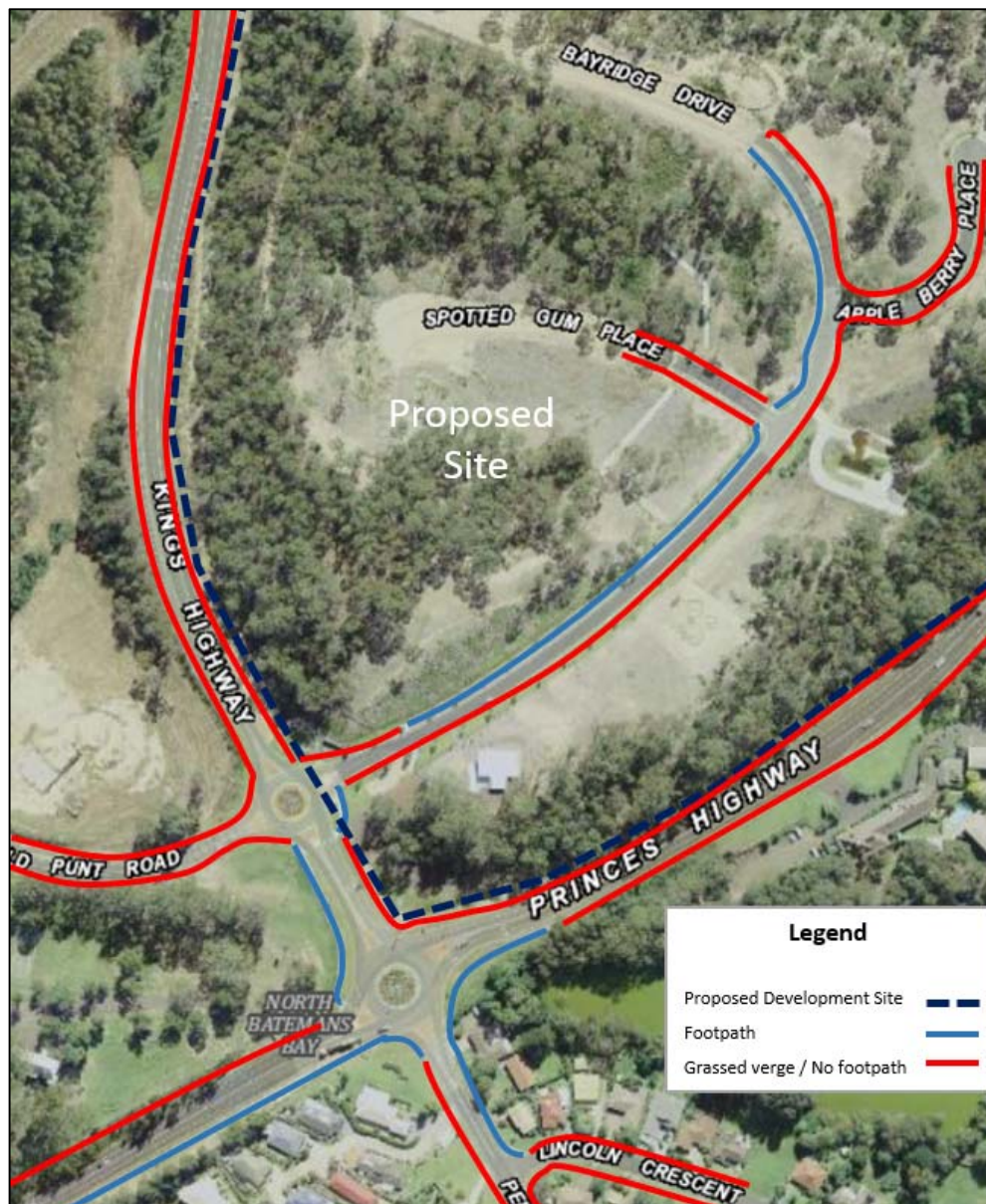


Figure 17 Pedestrian facilities in proximity to the proposed development

Source: Six Maps – Modified by GHD

3. Traffic impact assessment

This section outlines the proposed development and summarises the traffic and parking impact analysis of the proposed development.

3.1 Overview of proposed development

The proposed site consists of a residential development containing 205 small lot residential dwellings. As part of the development, eight new local roads are proposed to be built including a public reserve and a left in /left out intersection at the T-Junction of Bayridge Drive and Kings Highway. The final layout of the proposed residential development is shown in Figure 18. Details of the proposed initial building uses are outlined in Table 1 and summarised in Table 16.

Figure 18 Proposed residential development layout

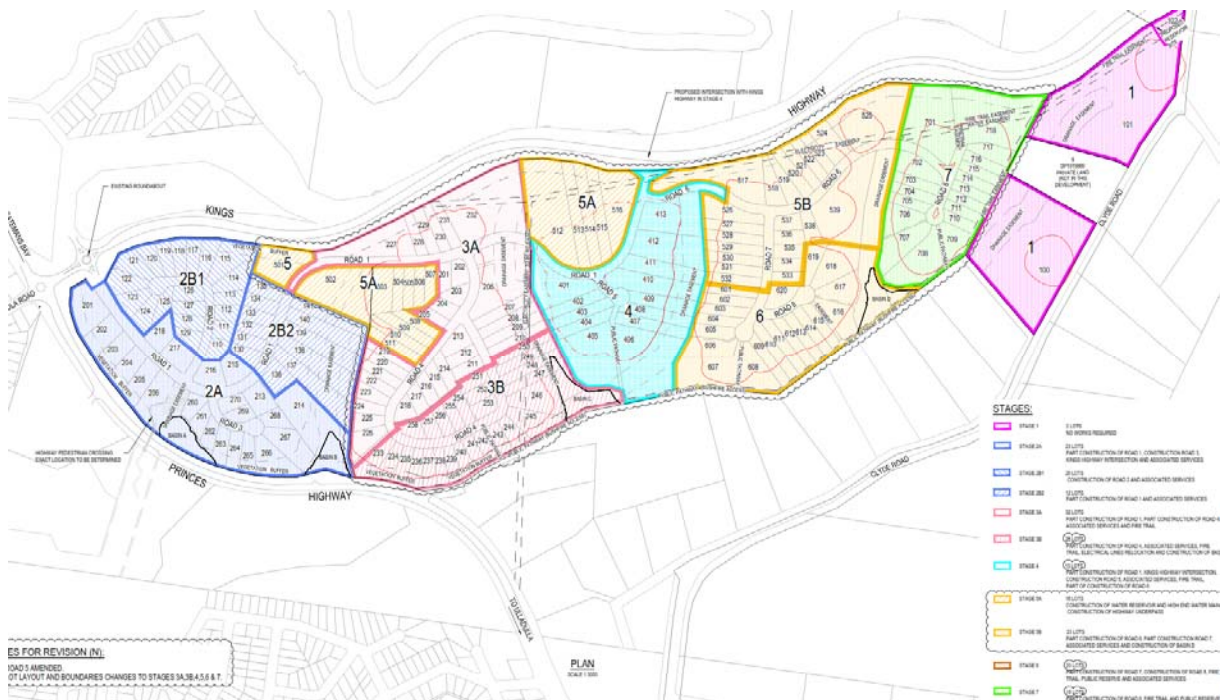


Table 16 Proposed development breakdown summary

Stage of Development	Residential Dwellings
1	2 Lots - Completed
2A	23 Lots - Completed
2B1	20 Lots - Completed
2B2	12 Lots - Completed
3A	32 Lots
3B	26 Lots
4	13 Lots
5A	16 Lots
5B	23 Lots
6	20 Lots
7	18 Lots
Total Dwellings	205 Lots

3.2 Road network layout

Existing conditions and geometry of the Princes Highway, Kings Highway, Old Punt Road and Bayridge Drive in close proximity to the development, are highlighted in Section 2.2. A schematic layout of the priority controlled intersections in the vicinity of the proposed residential development is shown in Figure 19.

3.2.1 Proposed residential development road network layout

Bayridge Drive is currently as a 7.5 metre wide sealed road with upright kerb and gutter through stages 2A, 2B1 and 2B2 for a distance of approximately 600 metres, with 2.5 metre shared path on the left hand verge. The existing road formation continues as basic gravel access beyond that point for fire egress. The road geometry for Bayridge Drive has been designed for 50 km/h design speed in accordance with Eurobodalla Shire Council Development Specifications and in line with previous stages. The road geometry for other proposed roads have been design for 50 km/h design speed.

The road layout for the extension of the proposed subdivision provides connections to the surrounding road and pathway systems and good access to the proposed blocks.

The cross-section for the extension of Bayridge Drive is a continuation of the existing section, with a 7.5 m carriageway, upright kerb and gutter, 2.5 m shared path and provision for indented bus bays. It functions as a local street with a bus route. Road 04 is a local street without a bus route, with a 7.5 m carriageway, layback kerb and gutter, and a 1.5 m footpath on one side. Other roads are typical Council streets conforming to Council's Infrastructure Design Specification.

Formal access to Kings Highway from the northern end of the development towards Batemans Bay will be via the northern intersection with Bayridge Drive. The intersection of the northern end of Bayridge Drive with Kings Highway will be configured to allow left turn in and left turn out only.

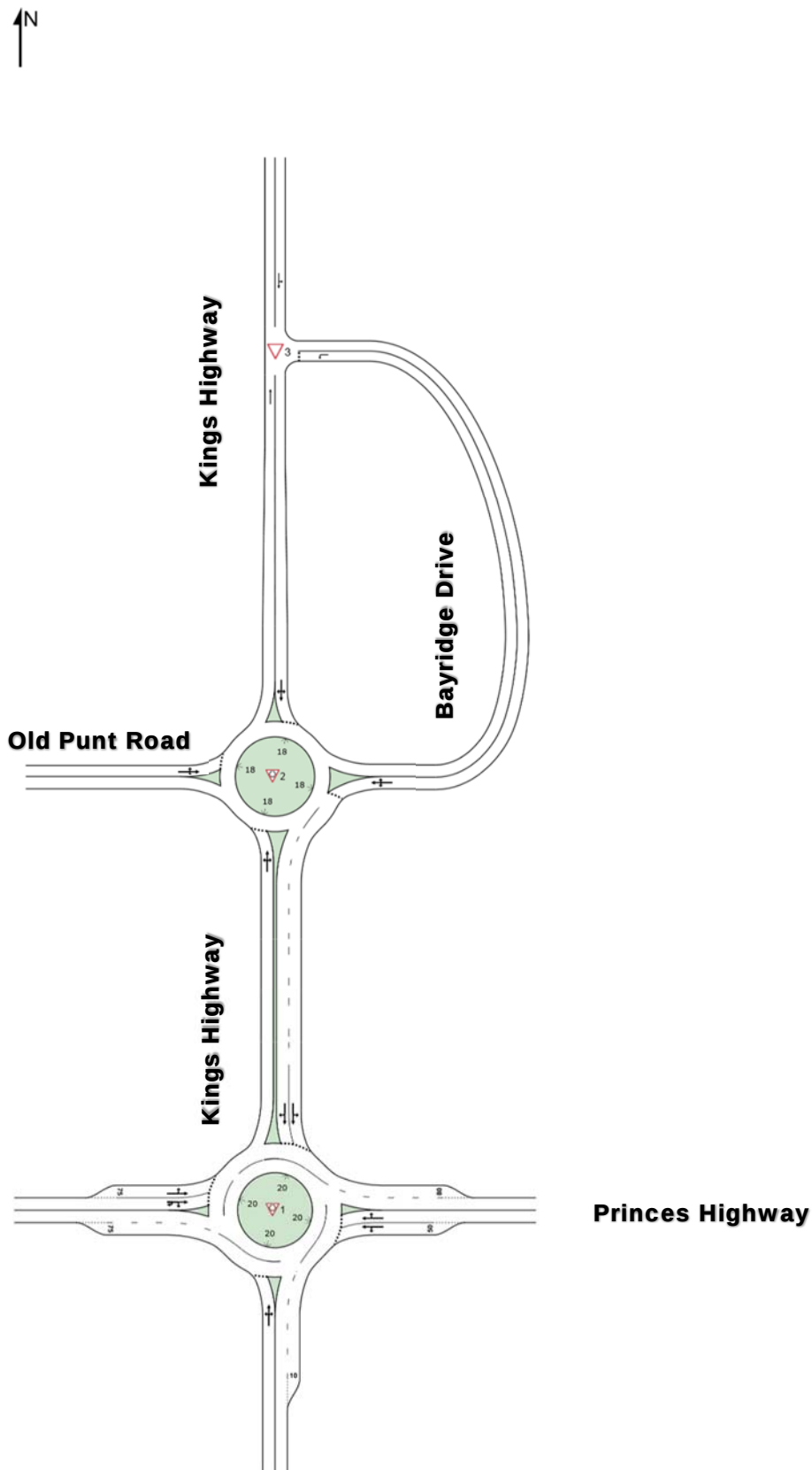


Figure 19 Intersection Layouts

3.3 Traffic generation

Estimates of traffic generation were referenced from the ESC Infrastructure Design Guide.

Table 17 outlines the potential traffic generation rates based on the following assumptions.

Residential Development

Table 17 Future development peak hour trip generation

A trip rate of 12 per day per dwelling was agreed upon in consultation with the Council. This rate is referenced from the ESC Infrastructure Design Standard.

Facility Type	Quantity	Trip Rate	Trips Generated	Source
Residential	203 lots 203 dwellings (Stage 1 excluded)	12 per day per dwelling	2460	ESC Infrastructure design

Access and egress to the development has been assumed to be via two separate access points. Access from the south is assumed to be via the Kings Highway / Bayridge Drive / Old Punt Road roundabout, whereas access from the north is assumed to be from the eastern arm of the proposed intersection at Kings Highway and Bayridge Drive, restricted to left in/left out only.

Distribution of the traffic to the north and south along Kings Highway has been based on existing traffic distribution, as Kings Highway currently provides access to the proposed residential area located both immediately north and south of the site.

Based on the supplied AADT volumes in Table 7, Bayridge Drive currently has a total of 357 vehicles per day in both directions. This confirms that for the existing length of Bayridge Drive that has been constructed, the roadway meets the traffic volume requirements for a local street with bus route, as shown in Figure 20.

With full development, the highest AADT occurs at the start of Bayridge Drive near the roundabout at 1888 vpd and reduces along the road. This peak locally exceeds the traffic volumes in Council's Infrastructure Design Specification for a local street, with bus route.

The 7.5 m carriageway width in the existing section was provided in earlier stages of the development and is difficult to widen, with the fully developed verge landscaping along both sides. As there is only one lot with direct vehicular access on the left hand side of Bayridge Drive between Kings Highway and Spotted Gum Place, the road formation can accommodate the proposed peak traffic volume.

Street type	Indicative maximum traffic volume ⁽¹⁾ vpd	Maximum speed ⁽²⁾ kph	Carriageway width ^(3 & 4) metre	Minimum road reserve width ^(5 & 6) metre	Parking provision within carriageway ⁽³⁾	Pedestrian/cycle provision within road reserve ^{(7) (11)} metre	Kerb and gutter ⁽⁴⁾ &(5)
Dual occupancy access driveways ⁽¹⁰⁾	NA	NA	3	NA		NA	
Battle-axe access driveways ⁽¹¹⁾	NA	NA	3	4m		NA	
Right of Way ⁽⁹⁾	60	50	4 minimum	10m			
Access street	<200	40	7.5 (min length 50m, max length 150m)	17	Carriageway	1.5 footpath on 1 side of road	Layback ⁽⁶⁾
Local street with WSUD	<1000	50	7.5m	18.5m	carriageway	1.5 footpath on 1 side of road	Edge-strip
Local street (not bus route)	<1000	50	7.5m	18.5m	Carriageway	1.5m Footpath on 1 side of road	Layback ⁽⁶⁾
Local street (bus route)	<1000	50	7.5	18.5	Carriageway 2.5 wide indented bus bays	1.5 footpath on both sides of road	Layback ⁽⁶⁾
Collector street	<2000 – with access to allotments	50 ⁽⁷⁾	12.5 (refer to parking provisions)	18.5 (no bus bay)	2.5 wide ⁽⁸⁾ indented parking and bus bays not more than 75m apart	1.5 footpath on 1 side of road, 2.5 cyclepath on other side of road	Layback
Distributor road	>2000 – no allotment access	60	Special design	25m	No parking on carriageway ⁽⁸⁾	2.5m cyclepath on 1 side of road	Barrier kerb
Industrial/business ⁽⁸⁾			12.5m	25m	Both sides of carriageway		Barrier kerb

Figure 20 Urban road characteristics - Eurobodalla Shire Council Infrastructure Design Standard

As shown in Table 17, a vehicle trip rate for future development peak hour trip generation was adopted to be 12 trips per day per dwelling, with a total of 2346 trips generated from the proposed development in a day. Assuming 10% peak hour traffic (Section 2.3.2), the development is estimated to generate about 244 trips per hour.

A traffic distribution split of 90% / 10% has been used for vehicles travelling to and from Princes Highway and to and from Nelligen, respectively. This would represent an arrival/departure ratio for the proposed site.

An incoming and outgoing traffic distribution split was utilised for the proposed development in the AM and PM peak periods. A split of 80% outgoing vehicles and 20% incoming vehicles was used for the AM period and this split was reversed for the PM period.

A summary of the trips generated in the AM peak period as a result of the proposed development is shown in Table 18.

Table 18 Trips generated in the AM peak hour

Stages	Number of Lots	Northern Access		Southern Access			
		Left In	Left Out	Left In	Right In	Left Out	Right Out
		Incoming	Outgoing	Incoming	Incoming	Outgoing	Outgoing
1 excluded - access via Clyde Road	2	-	-	-	-	-	-
2A, 2B1 and 2B2 combined	55	0	0	1	12	48	5
3A and 3B and part 5A	69	2	0	0	15	60	7

4 and part 5A	18	0	16	0	4	0	2
5B, 6 and 7 together	61	1	53	0	13	0	6
Total	205	4	68	1	44	107	19

Figure 21 outlines the potential trips generated in the AM peak period at key intersections with the proposed development.

A summary of the trips generated in the PM peak period as a result of the proposed development is shown in Table 19.

Table 19 Trips generated in the PM peak period

Stages	Number of Lots	Northern Access		Southern Access			
		Left In	Left Out	Left In	Right In	Left Out	Right Out
		Incoming	Outgoing	Incoming	Incoming	Outgoing	Outgoing
1 excluded - access via Clyde Road	2	-	-	-	-	-	-
2A, 2B1 and 2B2 combined	55	0	0	5	48	12	1
3A and 3B and part 5A	69	7	0	0	60	15	2
4 and part 5A	18	2	4	0	16	0	0
5B, 6 and 7 together	61	6	13	0	53	0	1
Total	205	10	12	4	124	19	3

Figure 22 outlines the potential trips generated in the PM peak period at key intersections with the proposed development.

AM Peak Trip Generation

Legend
Light Vehicles
Heavy Vehicles
Total

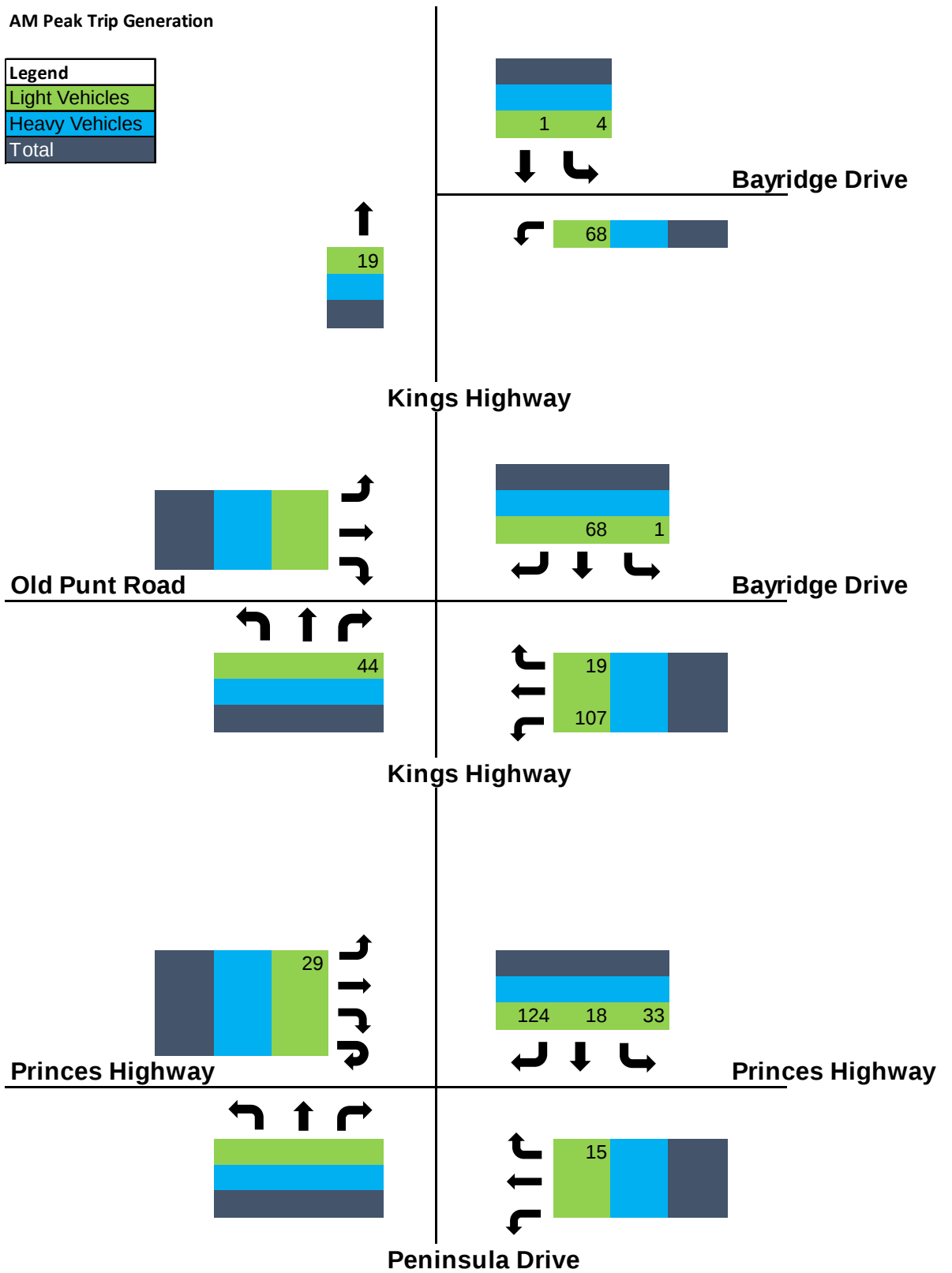


Figure 21 Post development traffic distribution volumes (AM peak)

PM Peak Trip Generation

Legend
Light Vehicles
Heavy Vehicles
Total

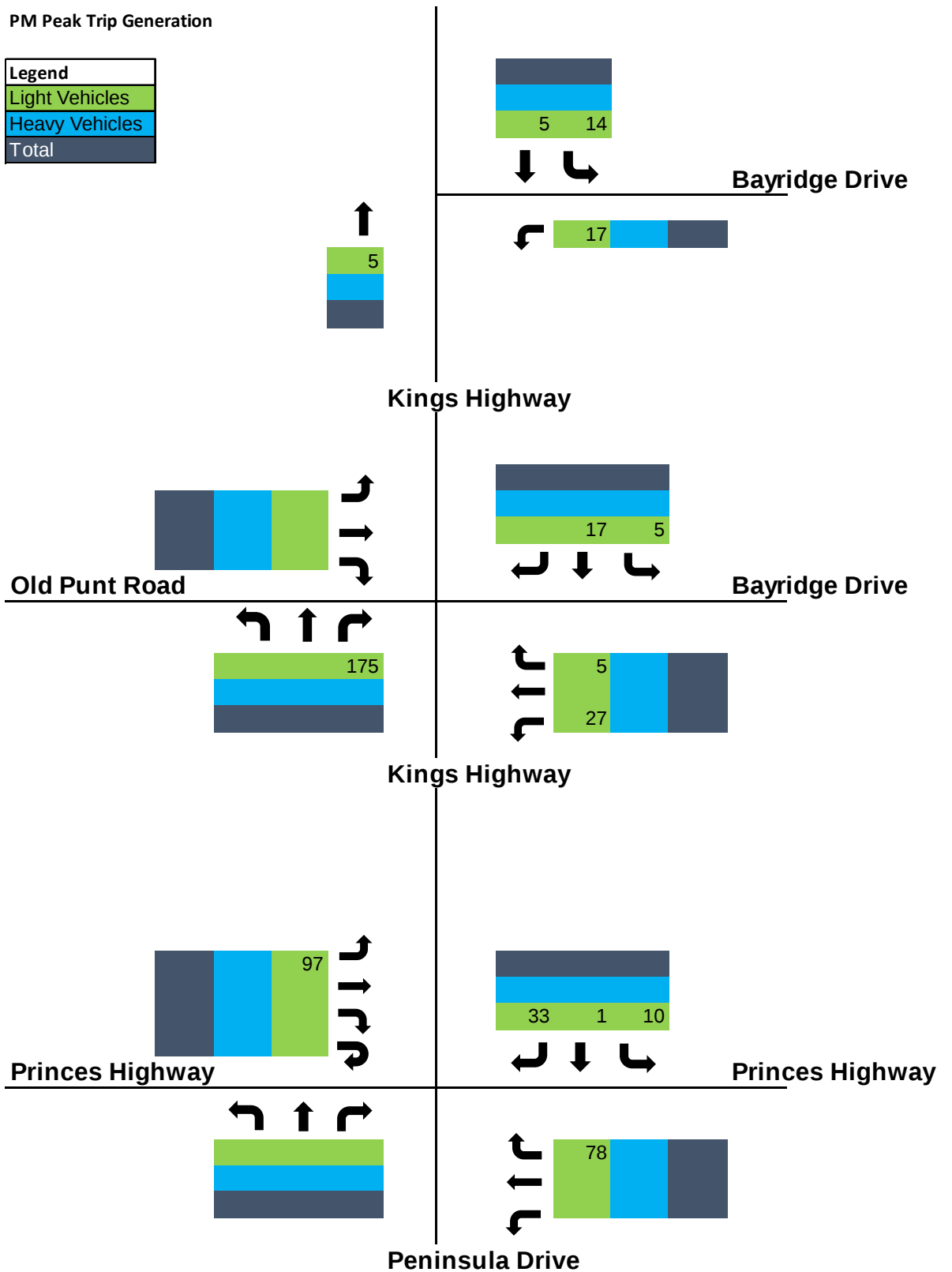


Figure 22 Post development traffic distribution volumes (PM peak)

3.4 Future Intersection performance

The performance of the road network is largely dependent on the operating performance of key intersections, which are critical capacity control points on the road network. SIDRA intersection modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network. The criteria for evaluating the operational performance of intersections is provided by the Guide to Traffic Generating Developments (Roads and Maritime Services, 2002) and reproduced in Table 11. The criteria for evaluating the operational performance of intersections is based on a qualitative measure (i.e. Level of Service), which is applied to each band of average vehicle delay.

3.4.1 Future base case 2022 base traffic model

A future state base model was developed for five years (2022) for the future year of the opening of the proposed development. The future base traffic model was developed utilising growth rates calculated for the road network surrounding the site from the Roads and Maritime permanent count stations.

Table 20 outlines the AADT volumes for years 2013 – 2017 and Table 21 outlines the growth rates that have been used to calculate an average to be applied to the base 2017 model for the existing situation to ascertain a five year future growth base model 2022.

Table 20 Road network AADT (vpd)*

Location	Direction	2013	2014	2015	2016	2017
Princes Highway / Kings Highway	<i>Northbound</i>	3292	3474	3582	3667	4004
	<i>Southbound</i>	4091	4190	4278	4405	4896

*Note vpd = vehicles per day

Table 21 Road network growth rate

Location	2013 - 2014	2014 - 2015	2015 - 2016	2016 - 2017
Princes Highway / Kings Highway	3.81%	2.56%	2.70%	10.26%

The growth rate between the years 2016 to 2017 was observed to be significantly higher when compared to the other years and was omitted from the average calculation to avoid skewing the growth rate.

The average growth rate was calculated using the increase in traffic from years 2013 – 2016 and was adopted as approximately three per cent (3%). This growth rate has been applied to the approach through routes resulting in the 2022 base traffic volumes shown in Figure 23 and Figure 24.

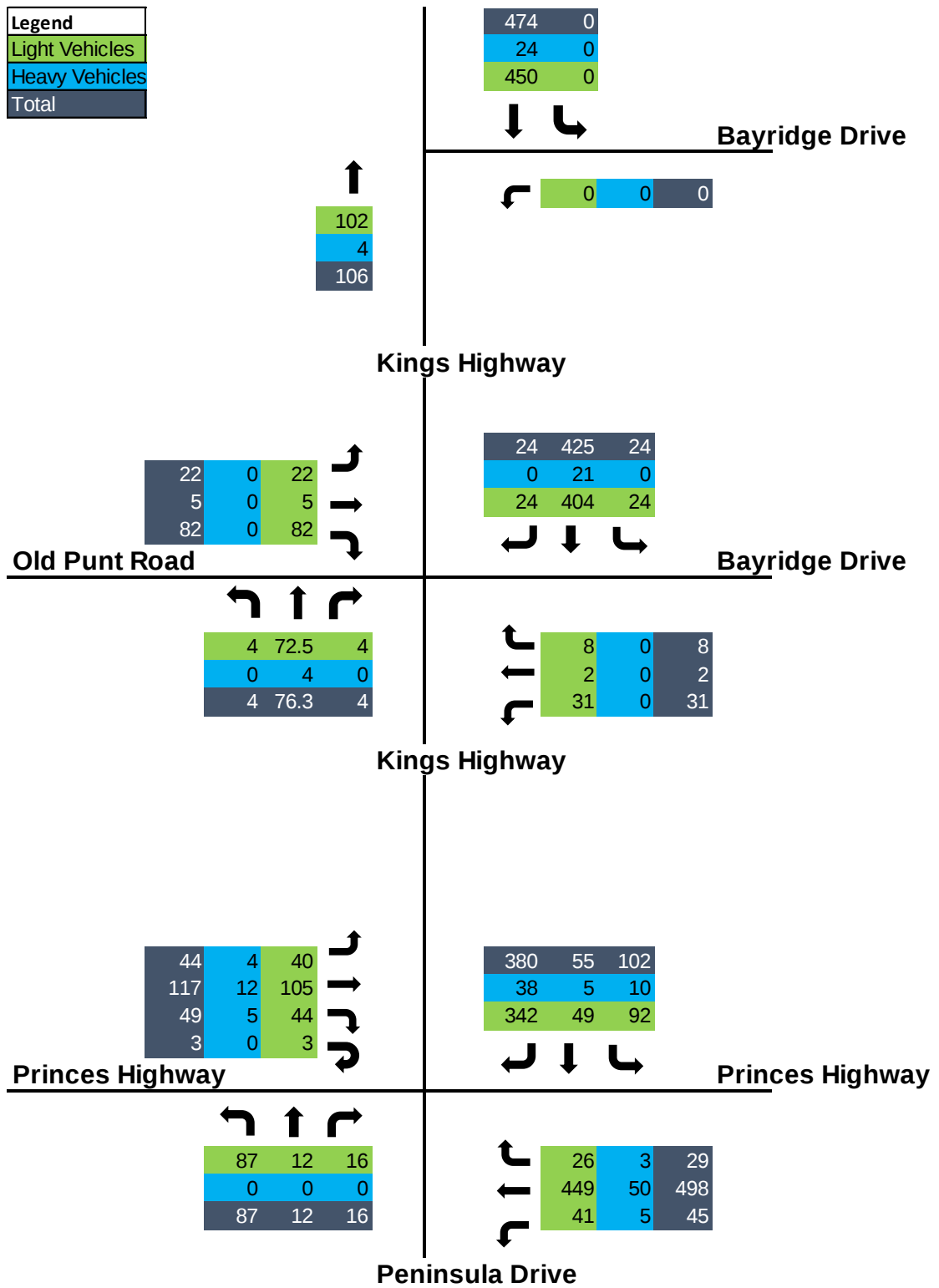


Figure 23 2022 Base Case AM peak hour traffic flows (No Development)

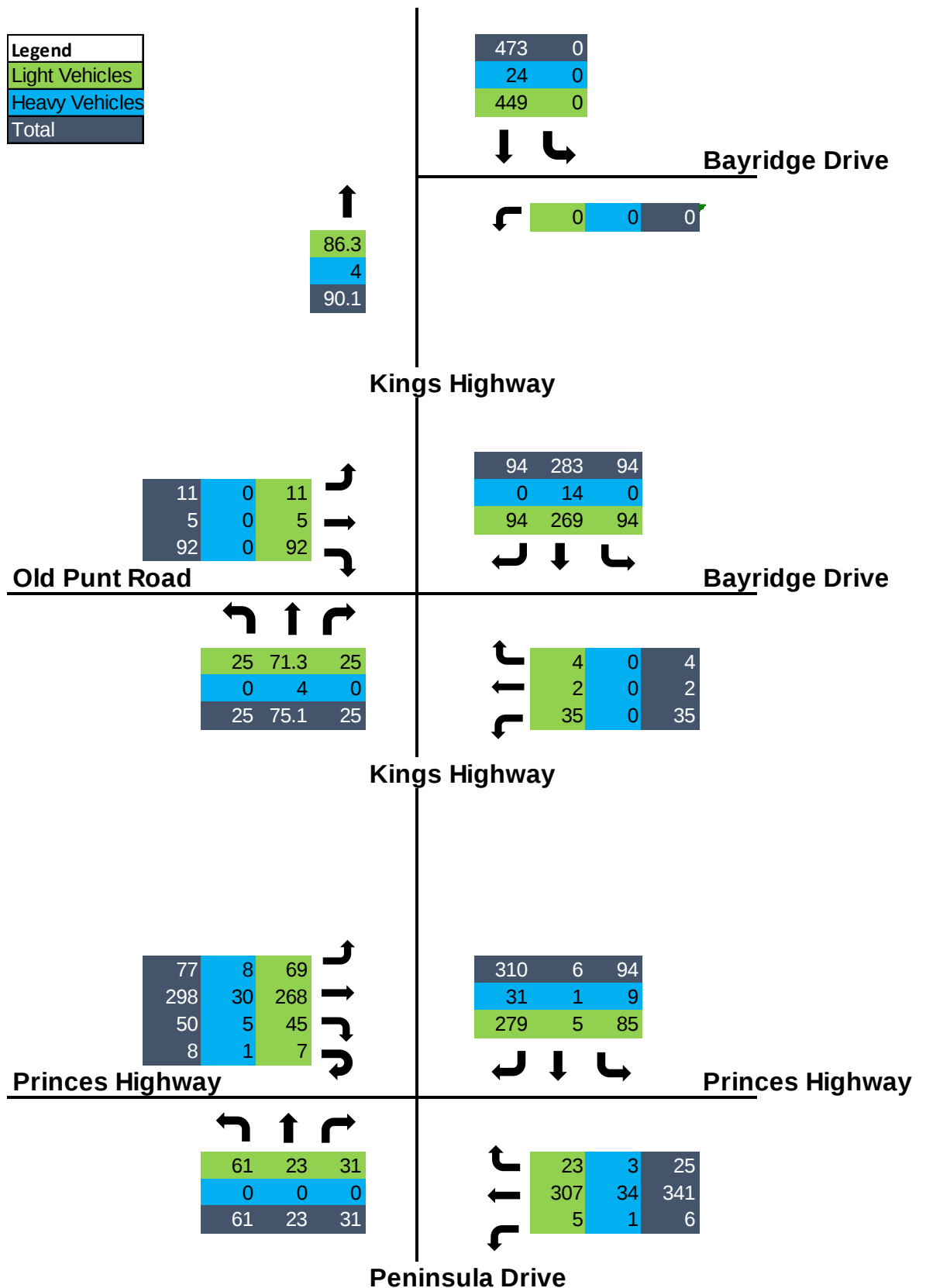


Figure 24 2022 Base Case PM peak hour traffic flows (No Development)

A summary of the SIDRA results for the 2022 traffic volumes on the existing intersection layouts results are outlined in Table 22 and detailed in Appendix C.

Table 22 Network Performance (2022 Base Case) – No Development

Intersection	AM Peak			PM Peak		
	Average Delay (s)	LoS	Degree of Saturation	Average Delay (s)	LoS	Degree of Saturation
Site 1: Princes Highway / Kings Highway	12	A	0.37	11	A	0.30
Site 2: Kings Highway / Old Punt Road / Bayridge Drive	10	A	0.36	10	A	0.37
Site 3: Kings Highway / Bayridge Drive	8	A	0.25	8	A	0.25

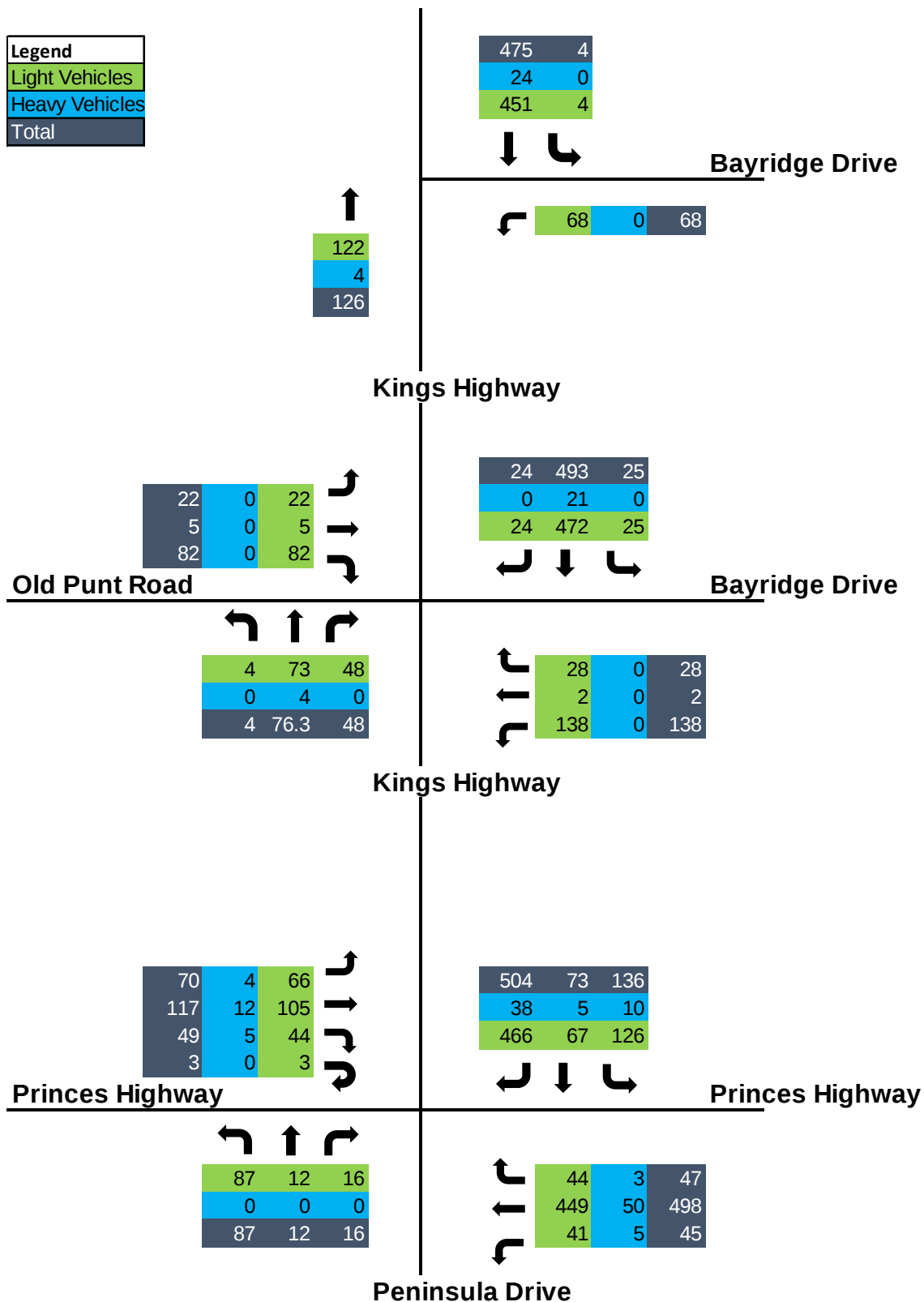
Notes:

- The average delay for priority-controlled intersections is selected from the movement on the movement with the highest average delay.
- The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
- The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
- Average delay is given in seconds per vehicle.
- Sites 1, 2 and 3 were modelled in SIDRA as a network operation

Table 22 indicates that each of the analysed intersections in its current layout would have an acceptable Level of Service (i.e. better than Level of Service D) with spare capacity in both the morning and evening peak periods in 2022. Detailed SIDRA results of these intersections are provided in Appendix A. The detailed analysis with the development is given in sections below.

3.4.2 2022 post development scenario

Figure 25 and Figure 26 outlines the potential traffic distribution with development based on 2020 base traffic volumes.



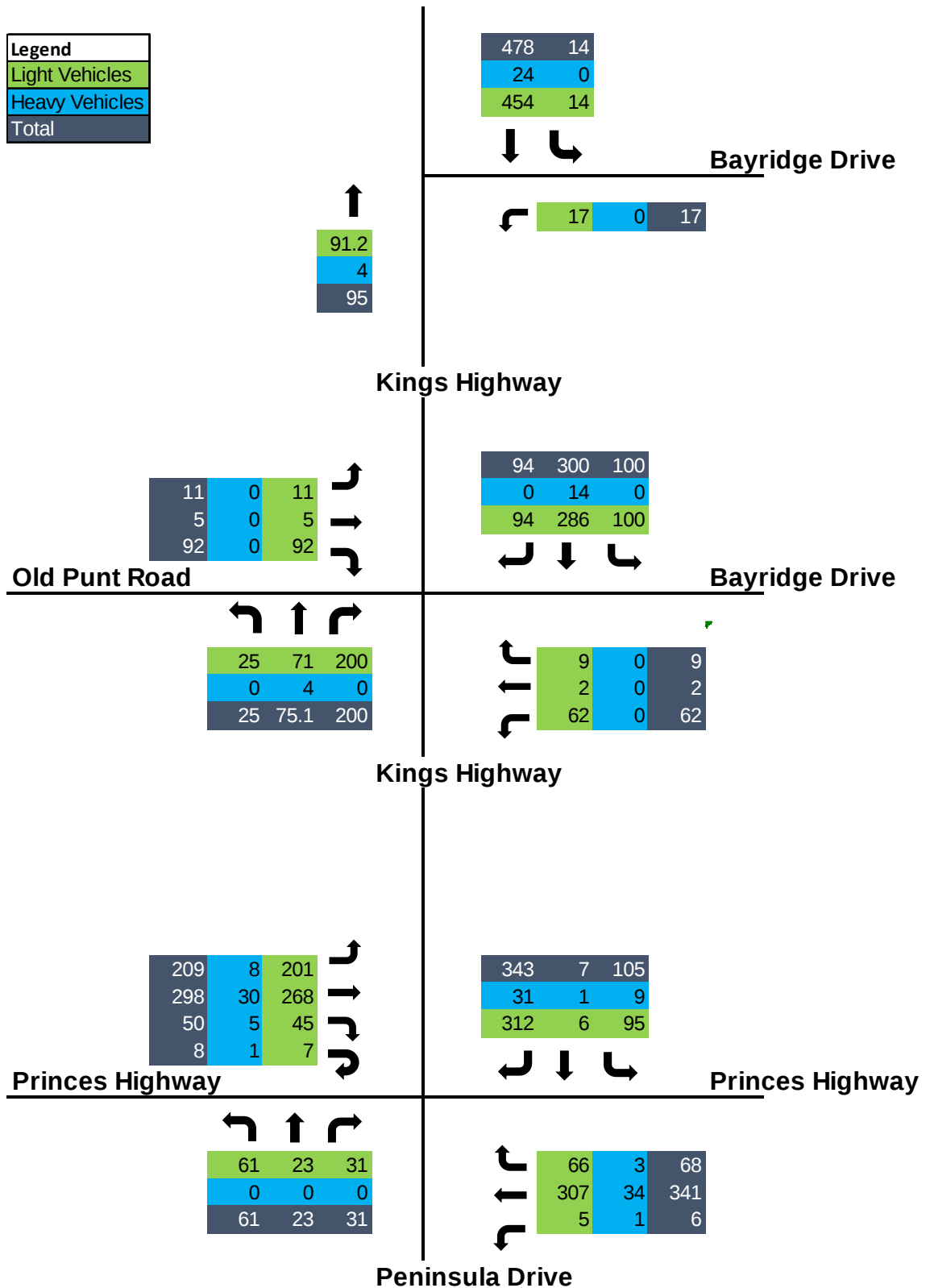


Figure 26 Post development PM peak hour 2022 traffic flows

The post development traffic volumes incorporating base 2022 traffic volumes at the intersections, were analysed using SIDRA 7 to obtain the proposed operational performance. A summary of results outlined in Table 23 and detailed in Appendix A.

Table 23 Post development intersection operations (2022)

Intersection	AM Peak			PM Peak		
	Average Delay (s)	LoS	Degree of Saturation	Average Delay (s)	LoS	Degree of Saturation
Site 1: Princes Highway / Kings Highway	13	A	0.45	11	A	0.33
Site 2: Kings Highway / Old Punt Road / Bayridge Drive	11	A	0.44	11	A	0.48
Site 3: Kings Highway / Bayridge Drive	8	A	0.25	8	A	0.26

Notes:

- The average delay for priority-controlled intersections is selected from the movement on the approach with the highest average delay.
- The level of service for priority-controlled intersections is based on the highest average delay per vehicle for the most critical movement.
- The degree of saturation is defined as the ratio of the arrival flow (demand) to the capacity of each approach.
- Average delay is given in seconds per vehicle.
- Sites 1, 2 and 3 were modelled in SIDRA as a network operation

Table 23 indicates that the intersections analysed would operate at an acceptable Level of Service (i.e. better than Level of Service D) with the additional traffic from the application development based on potential 2022 future traffic data in both AM and PM peak periods. Detailed SIDRA results of these intersections are provided in Appendix A.

3.5 Summary of Network Performance

From the SIDRA results it is observed that the proposed development traffic has marginal impact on the performance of the road network. The SIDRA analysis has indicated that there will be minor increases in delay, particularly for the east and south approaches of Princes Highway roundabout in the AM peak in 2022.

GHD understands that Roads and Maritime is currently addressing the traffic delays at the intersection of Kings Highway / Princes Highway, particularly for weekend peak periods, as part of the planned future works to replace Batemans Bay Bridge.

3.6 Active transport – future pedestrian and bicycle infrastructure works

Sound planning for the provision of high quality facilities for pedestrians and cyclists constitute a crucial element of the transport strategy for the development. The proposed development should be developed on the basis that there will be safe, amenable and attractive pedestrian environment linking the site to nearby facilities such as Batemans Bay Village Centre, Batemans Bay Public School, and public transport facilities.

Similarly, cycling should be promoted through a network of dedicated bicycle facilities and streets that are made safe for cycling through traffic planning, carriageway design and streetscape treatments as outlined in Council's Pathways Strategy Plan.

The provision and management of walking and cycling facilities should be undertaken in such a way that:

- Understands the need for the separation of pedestrians and cyclists from motor vehicle traffic (Kings Highway and Princes Highway);

- Recognises that all trips involve walking at either the beginning or end of the journey, resulting in the need for connections between parking and public transport areas at destinations (Bus stops located on Peninsula Drive);
- Recognise that walking and cycling paths can be key routes between destinations; and
- Understand that walking and cycling trips perform a variety of functions, not only travel from an origin to a destination, but such trips are also for recreation and/or health benefits, which can be influenced by the amenity of the route.

3.6.1 Background

GHD was previously engaged in 2005 by the Canberra Investment Corporation Limited, the previous developer of the proposed residential development, to develop a pedestrian and cycleway masterplan for North Batemans Bay. The Bay Ridge Estate North Batemans Bay – Pedestrian and Cycleway Masterplan Report” - Ref 23/10955/R dated July 2005 addressed the Bay Ridge Estate in the context of developments of surrounding sites anticipated at that time.

The recommendations made in the report are as follows and illustrated in Appendix B:

- A. Utilisation of the proposed fire trail along the eastern boundary of the development site as an informal off-street shared pedestrian/cycle path, with linkages to the site via public reserves located at various points along the route - *relevant to current proposal*
- B. New off-street pedestrian/cycle path incorporated within the proposed redevelopment of the existing “Country Comfort” site - *Not relevant to current proposal*
- C. New shared link into future service station outlet adjacent to proposed Country Comfort development - *Complete, but not relevant to current proposal*
- D. New pedestrian/cyclist crossing of the Princes Highway - Relevant to current proposal
 - To be detailed in a separate Development Application, and delivered as part of Stage 5 of Bay Ridge;
 - Three (3) options currently under consideration; underpass, overpass, or a form of pedestrian signalisation in the vicinity of the Kings Hwy/Princes Hwy intersection;
- E. If required by the Princes Hwy crossing point; new off-street shared pedestrian/cycle path on the eastern side of the Princes Highway between the proposed pedestrian/cyclist crossing point and the existing footpath at Peninsula Drive to be widened (Across frontage of Lincoln Downs Motel)
- F. Widened and upgraded footpaths located along the eastern side of Princes Highway, including relocation of guide signs, to produce shared pedestrian/cycle facilities; (guide signs moved, but narrow footpath only)
- G. New pedestrian/cyclist crossing refuges at Kings Highway/Old Punt Road roundabout, Peninsula Drive/Princes Highway roundabout and Wharf Road/Princes Highway intersection - *Complete*
- H. Improved pedestrian/cyclist underpass at the northern end of the Clyde River Bridge – *Complete*
- I. New pedestrian/cyclist ramps linking existing and new road-level footpaths to the proposed improved pedestrian underpass located under the northern end of the Clyde River Bridge - *Complete*

3.6.2 Completed pedestrian and bicycle infrastructure

Since the GHD Pedestrian and Cycleway Masterplan Report in 2005, the following changes have occurred.

- The subdivision works completed have included the provision of a 2.5 metre wide shared path along Bay Ridge Drive, shared path connections across Kings Highway and Princes Highway and between these crossings and the indented bus bay in Stage 2.
- Shared path connections under the Princes Highway Bridge at Clyde River have been constructed.

3.6.3 Future pedestrian and bicycle infrastructure

The next stages of the development will extend the shared path along the full length Bayridge Drive, provide indented bus bays in Bayridge Drive and a path along Road 6. The shared paths along Road 1 (Bayridge Drive) and Road 6 will be provided progressively as these roads are constructed.

The extension of Bayridge Drive through to Kings Highway facilitates a viable bus route through the estate for school children and other passenger services. The intersection of the northern end of Bayridge Drive with Kings Highway will be configured to allow left turn in and out only, facilitating a bus route in a northerly direction, so that bus stops need only be provided on the left hand (western side).

The development of stage 3B adds the initial stage of the shared path along the eastern side of the estate, which is constructed to serve as informal additional recreational path and fire trail, along a corridor dedicated as public path. This will ultimately also link with a pathway along the Princes Highway frontage as far as the planned underpass. The link along the Princes Highway frontage should not be constructed until the underpass is constructed, in order to avoid creating a desire line before the Princes Highway crossing infrastructure is built.

The development consent conditions currently require that "The grade-separated pedestrian crossing point for the Princes Highway is to be completed in Stage 3 of the subdivision. It is proposed that this crossing be deferred to Stage 5 of the development. The intent behind the pedestrian crossing of Princes Highway is to facilitate access between the estate and the Batemans Bay Public School. Experience to date with the occupants of the Bay Ridge Estate has yielded very few school-aged children, although this may change in future stages. The proposed underpass links to the Batemans Bay Public School and to the adjacent public recreation facilities, which represents only a proportion of pedestrian and bicycle traffic generated within Bay Ridge Estate. The provision of the underpass as part of the Stage 5 subdivision works would adequately service the pedestrian needs for the whole Bay Ridge Estate.

The concurrent work required with the underpass construction includes the pedestrian path along the northern side of Princes Highway adjacent to the road reserve boundary, linking the informal pathways along the eastern side of the estate to the underpass. The proposed link to the Batemans Bay Public School will pass across Council public reserve land, allowing access to the northern edge of the school grounds. This pedestrian link is an existing deficit in Council's path network and not solely required for the Bay Ridge Estate.

In summary, shared paths will be provided progressively to service the Bay Ridge Estate as it is developed, with the underpass across Princes Highway and connecting paths proposed to be constructed as part of the Stage 5 subdivision works.

These works are all shown in Appendix B.

3.7 Parking provision

A review of the parking requirements has been undertaken in relation to the proposed development application with regards to Eurobodalla Shire Council *Development Control Plan 2012 Residential Zones* (DCP), Eurobodalla Shire Council *Parking and Access Code 2011* and the Roads and Maritime Services *Guide to Traffic Generating Developments*.

3.7.1 Parking planning policy requirements

Eurobodalla Shire Council Development Control Plan 2012

Statutory parking requirements has been reviewed against the requirements presented in Eurobodalla Shire Council *Development Control Plan 2012* (DCP) and the Eurobodalla Shire Council *Parking and Access Code 2011*. The site is located entirely in a R5 (large Lot Residential) zone, which extends to the north and east of the site.

The DCP 2012 Section 2.6 and the Parking and Access Code 2011 Section 3.2 outline the minimum required parking provision for residential dwelling houses in residential zones is:

- Two car spaces per dwelling

The lot size of 1,500 m² within the proposed residential development will see the provision of onsite parking for each lot. The DCP 2012 Section 2.3 outline the requirements for carports and garages on lots:

- Less than or equal to 1,500 m² or where a minimum lot size in that range applies, must not be greater than 60 m²

In context of the proposed development, it is considered that the following minimum parking provision be reviewed in line with the DCP requirements for the site as a whole at completion, as outlined in Table 24.

Table 24 Site parking requirement: DCP requirements

Large Lot Dwellings				
Component	Use Type	Number of Dwellings	DCP Rate	Minimum Car Spaces required
Residential	Dwelling	205	2 spaces per dwelling	410
	Residential Subtotal			410
Total minimum car spaces required (Large Lot Dwellings)				410

Minimum parking provision requirement

With consideration given to the future uses within the development application for residential components, the DCP outlines that a minimum of 410 car spaces to be provided within the development with carports and garages not exceeding 60 m² per lot.

4. Summary and Conclusion

4.1 Overview

GHD has been engaged by ACT Land Pty Ltd to undertake a traffic impact assessment in support of the application for modification of the existing development consent for the proposed residential subdivision development located at the Bay Ridge Estate in North Batemans Bay, within Eurobodalla Shire Council area. The proposed development area is located in the northern area of Batemans Bay and adjoins Kings Highway, and Princes Highway, and is mostly separated from Clyde Road by other properties.

The proposed development consists of ten separate stages with each stage involving the development of small lot residential dwellings and the adjoining road network. A total of 205 small lot dwellings are proposed to be constructed within the next five years.

4.2 Key Findings

A traffic impact assessment was carried out to observe the impacts of the proposed development on the existing network. The following key findings were identified:

- All of the analysed intersections for existing 2017 conditions currently have an acceptable Level of Service (i.e. better than Level of Service D).
- All intersections perform at very good levels of service and are observed to have adequate additional capacity to accommodate the traffic generated by the development.
- It is understood that RMS is addressing capacity issues at the intersection of Princes Highway and Kings Highway, particularly for weekend peak periods, as part of the Batemans Bay Bridge replacement project.
- With consideration given to the future uses within the development application for residential components, the DCP outlines that a minimum of 410 car spaces to be provided within the development.

4.2.1 Conclusion

The traffic generated by the Bayridge development has minor impacts on the network performance. Both access points are estimated to perform at good levels of service.

Appendices

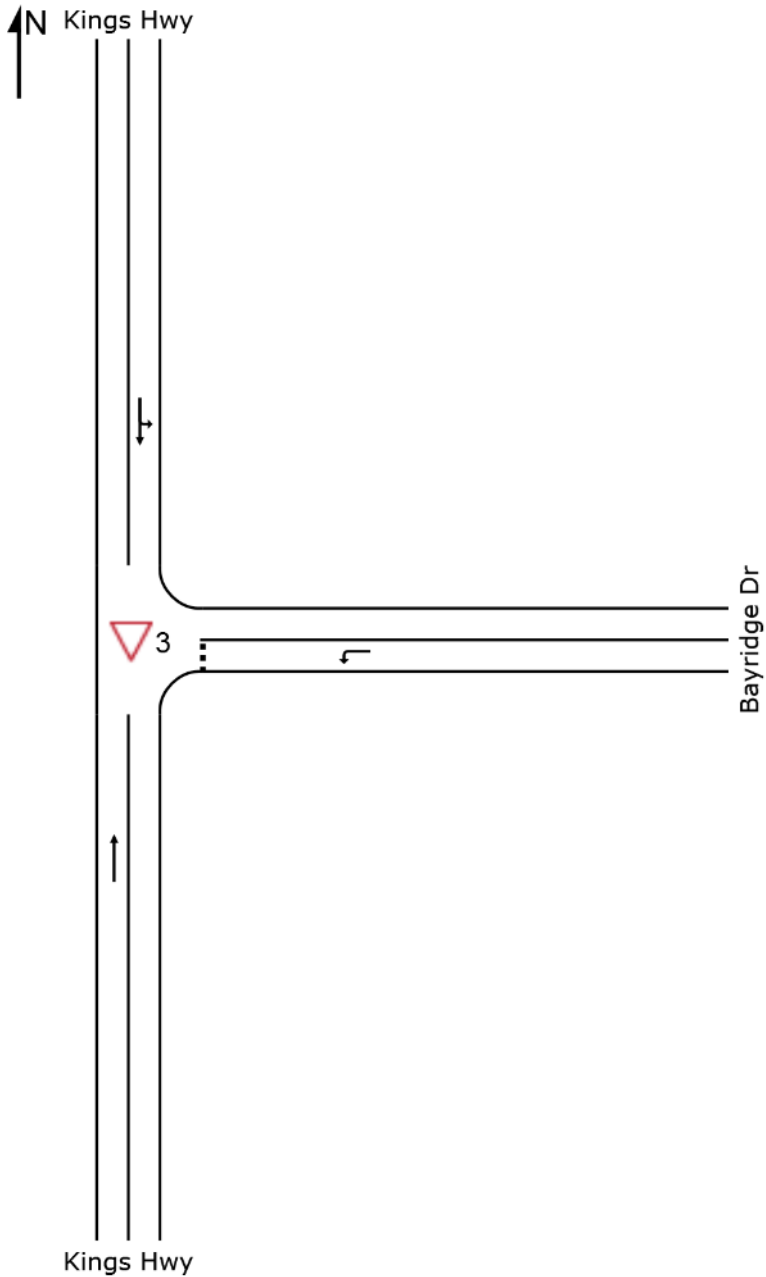
Appendix A – SIDRA Results

Content

SITE LAYOUT

▽ Site: 3 [2017_AM_Existing_Bayridge Dr / Kings Hwy]

2017_AM_Existing_Bayridge Dr / Kings Hwy
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 3 [2017_AM_Existing_Bayridge Dr / Kings Hwy]

2017_AM_Existing_Bayridge Dr / Kings Hwy
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
2	T1	92	3.3	0.048	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		92	3.3	0.048	0.0	NA	0.0	0.0	0.00	0.00	100.0
East: Bayridge Dr											
4	L2	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.42	0.51	49.9
Approach		1	0.0	0.001	5.9	LOS A	0.0	0.0	0.42	0.51	49.9
North: Kings Hwy											
7	L2	1	0.0	0.219	7.9	LOS A	0.0	0.0	0.00	0.00	93.8
8	T1	412	5.1	0.219	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		413	5.1	0.219	0.0	NA	0.0	0.0	0.00	0.00	99.8
All Vehicles		506	4.7	0.219	0.0	NA	0.0	0.0	0.00	0.00	99.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

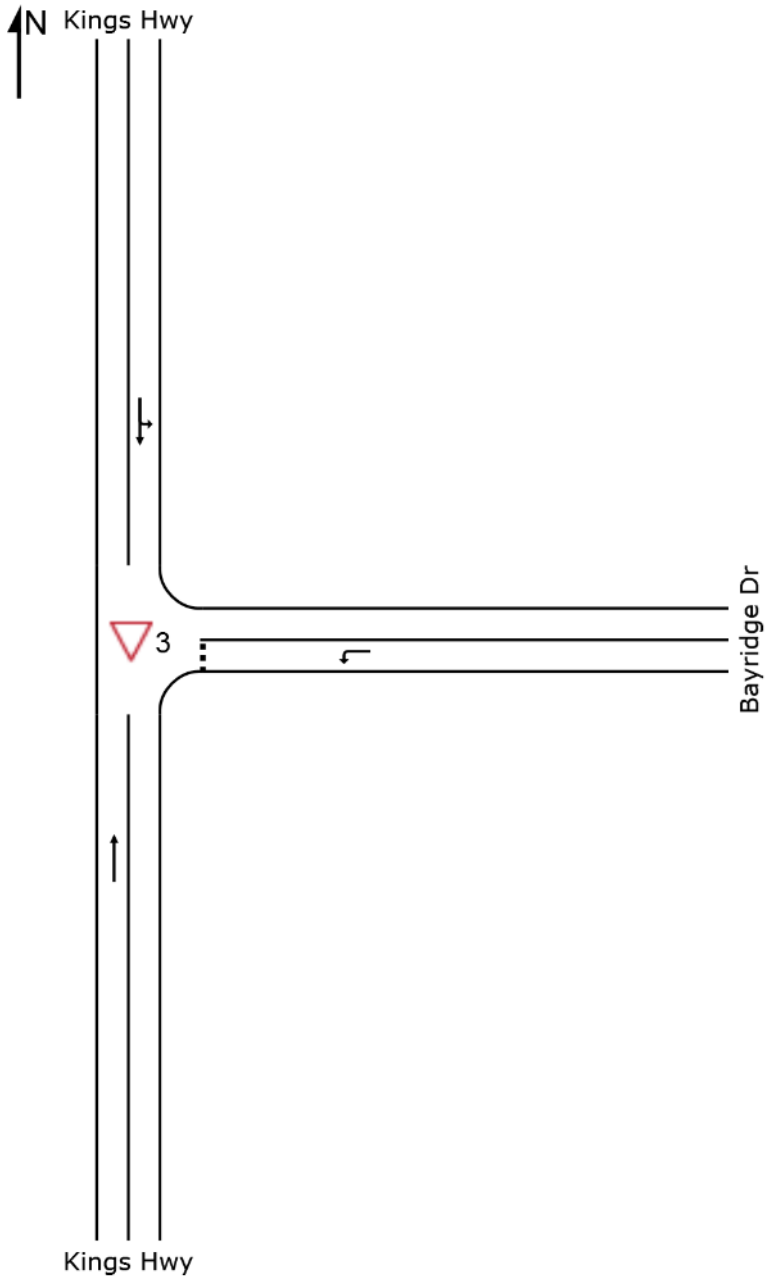
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 3 [2017_PM_Existing_Bayridge Dr / Kings Hwy]

2017_PM_Existing_Bayridge Dr / Kings Hwy
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 3 [2017_PM_Existing_Bayridge Dr / Kings Hwy]

2017_PM_Existing_Bayridge Dr / Kings Hwy
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
2	T1	78	3.8	0.041	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		78	3.8	0.041	0.0	NA	0.0	0.0	0.00	0.00	100.0
East: Bayridge Dr											
4	L2	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.42	0.51	49.9
Approach		1	0.0	0.001	5.9	LOS A	0.0	0.0	0.42	0.51	49.9
North: Kings Hwy											
7	L2	1	0.0	0.218	7.9	LOS A	0.0	0.0	0.00	0.00	93.8
8	T1	411	5.1	0.218	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		412	5.1	0.218	0.0	NA	0.0	0.0	0.00	0.00	99.8
All Vehicles		491	4.9	0.218	0.0	NA	0.0	0.0	0.00	0.00	99.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

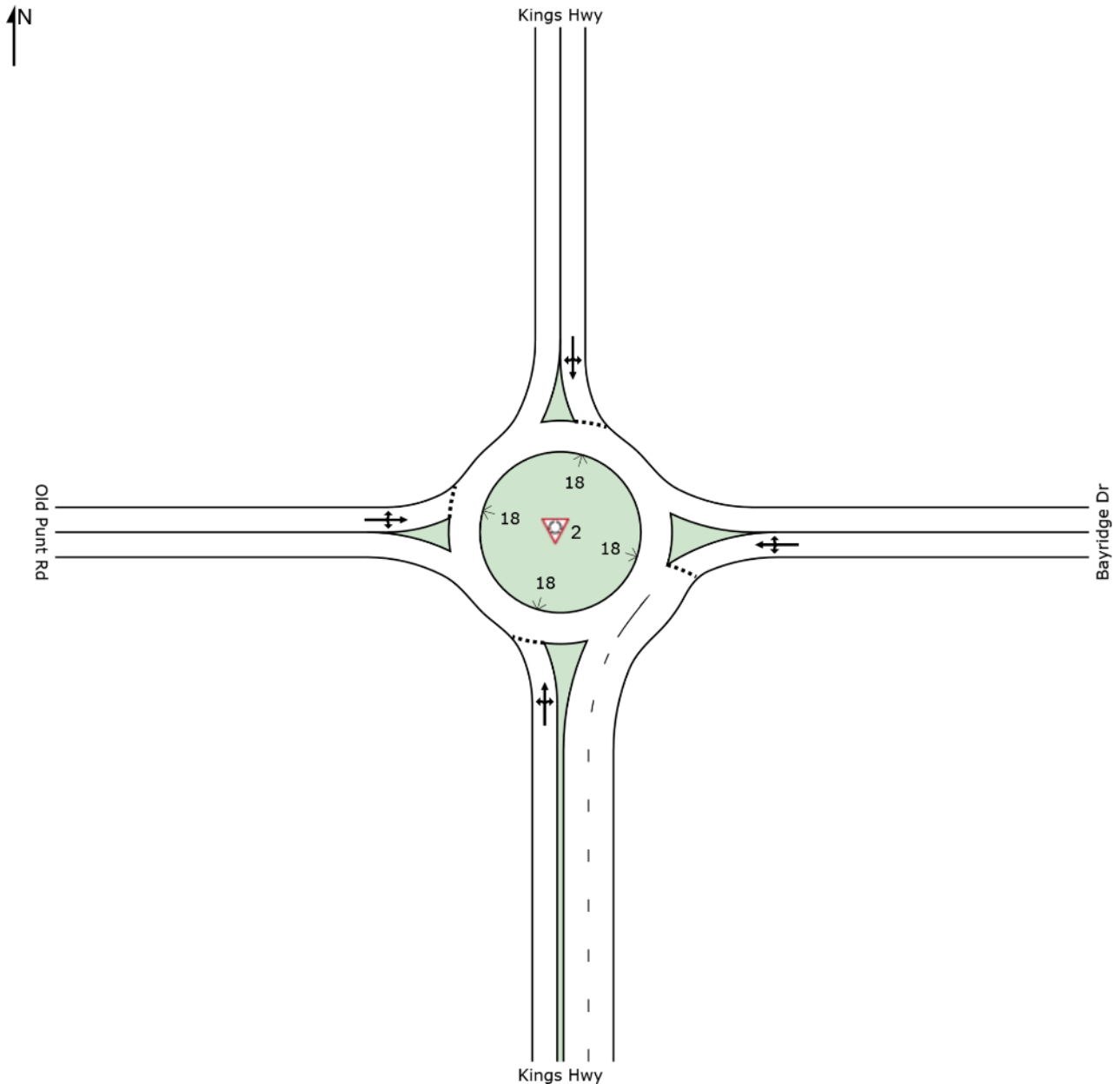
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT



Site: 2 [2017_AM_Existing_Old Punt Rd / Bayridge Dr]

2017_AM_Existing_Old Punt Rd / Bayridge Dr
Roundabout



MOVEMENT SUMMARY

 **Site: 2 [2017_AM_Existing_Old Punt Rd / Bayridge Dr]**

2017_AM_Existing_Old Punt Rd / Bayridge Dr
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
1	L2	4	0.0	0.056	3.1	LOS A	0.3	2.0	0.13	0.42	46.5
2	T1	66	4.5	0.056	3.3	LOS A	0.3	2.0	0.13	0.42	69.5
3	R2	4	0.0	0.056	7.6	LOS A	0.3	2.0	0.13	0.42	49.3
Approach		74	4.1	0.056	3.5	LOS A	0.3	2.0	0.13	0.42	65.2
East: Bayridge Dr											
4	L2	27	0.0	0.040	5.3	LOS A	0.2	1.4	0.54	0.59	47.0
5	T1	2	0.0	0.040	5.2	LOS A	0.2	1.4	0.54	0.59	48.3
6	R2	7	0.0	0.040	9.5	LOS A	0.2	1.4	0.54	0.59	54.9
Approach		36	0.0	0.040	6.1	LOS A	0.2	1.4	0.54	0.59	48.8
North: Kings Hwy											
7	L2	21	0.0	0.310	4.4	LOS A	2.0	14.2	0.27	0.45	50.6
8	T1	369	4.9	0.310	4.6	LOS A	2.0	14.2	0.27	0.45	51.6
9	R2	21	0.0	0.310	8.9	LOS A	2.0	14.2	0.27	0.45	52.3
Approach		411	4.4	0.310	4.8	LOS A	2.0	14.2	0.27	0.45	51.5
West: Old Punt Rd											
10	L2	19	0.0	0.076	3.3	LOS A	0.4	2.6	0.22	0.55	58.3
11	T1	5	0.0	0.076	3.2	LOS A	0.4	2.6	0.22	0.55	48.1
12	R2	71	0.0	0.076	7.5	LOS A	0.4	2.6	0.22	0.55	41.7
Approach		95	0.0	0.076	6.5	LOS A	0.4	2.6	0.22	0.55	46.5
All Vehicles		616	3.4	0.310	5.0	LOS A	2.0	14.2	0.26	0.47	51.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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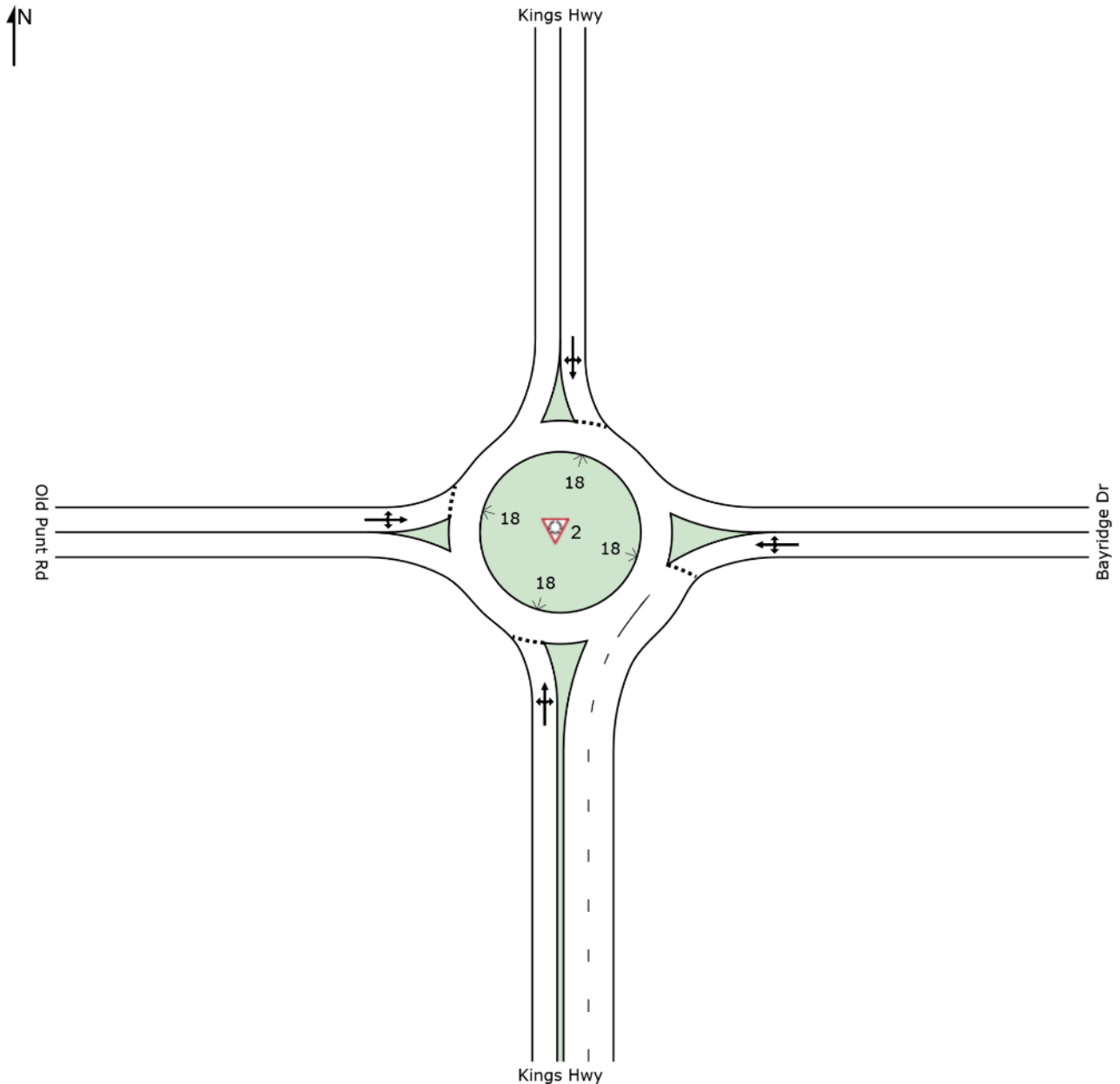
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SITE LAYOUT



Site: 2 [2017_PM_Existing_Old Punt Rd / Bayridge Dr]

2017_PM_Existing_Old Punt Rd / Bayridge Dr
Roundabout



MOVEMENT SUMMARY

 **Site: 2 [2017_PM_Existing_Old Punt Rd / Bayridge Dr]**

2017_PM_Existing_Old Punt Rd / Bayridge Dr
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
1	L2	22	0.0	0.090	3.4	LOS A	0.5	3.3	0.25	0.49	45.5
2	T1	65	4.6	0.090	3.6	LOS A	0.5	3.3	0.25	0.49	67.7
3	R2	22	0.0	0.090	7.9	LOS A	0.5	3.3	0.25	0.49	48.9
Approach		109	2.8	0.090	4.4	LOS A	0.5	3.3	0.25	0.49	56.1
East: Bayridge Dr											
4	L2	30	0.0	0.038	5.0	LOS A	0.2	1.4	0.51	0.56	47.3
5	T1	2	0.0	0.038	4.9	LOS A	0.2	1.4	0.51	0.56	48.6
6	R2	4	0.0	0.038	9.2	LOS A	0.2	1.4	0.51	0.56	55.1
Approach		36	0.0	0.038	5.5	LOS A	0.2	1.4	0.51	0.56	48.3
North: Kings Hwy											
7	L2	82	0.0	0.320	4.6	LOS A	2.0	14.5	0.32	0.51	50.4
8	T1	246	4.9	0.320	4.7	LOS A	2.0	14.5	0.32	0.51	50.9
9	R2	82	0.0	0.320	9.1	LOS A	2.0	14.5	0.32	0.51	51.8
Approach		410	2.9	0.320	5.6	LOS A	2.0	14.5	0.32	0.51	50.9
West: Old Punt Rd											
10	L2	9	0.0	0.077	3.4	LOS A	0.4	2.7	0.25	0.57	57.8
11	T1	5	0.0	0.077	3.3	LOS A	0.4	2.7	0.25	0.57	47.9
12	R2	80	0.0	0.077	7.6	LOS A	0.4	2.7	0.25	0.57	41.3
Approach		94	0.0	0.077	7.0	LOS A	0.4	2.7	0.25	0.57	44.1
All Vehicles		649	2.3	0.320	5.6	LOS A	2.0	14.5	0.31	0.52	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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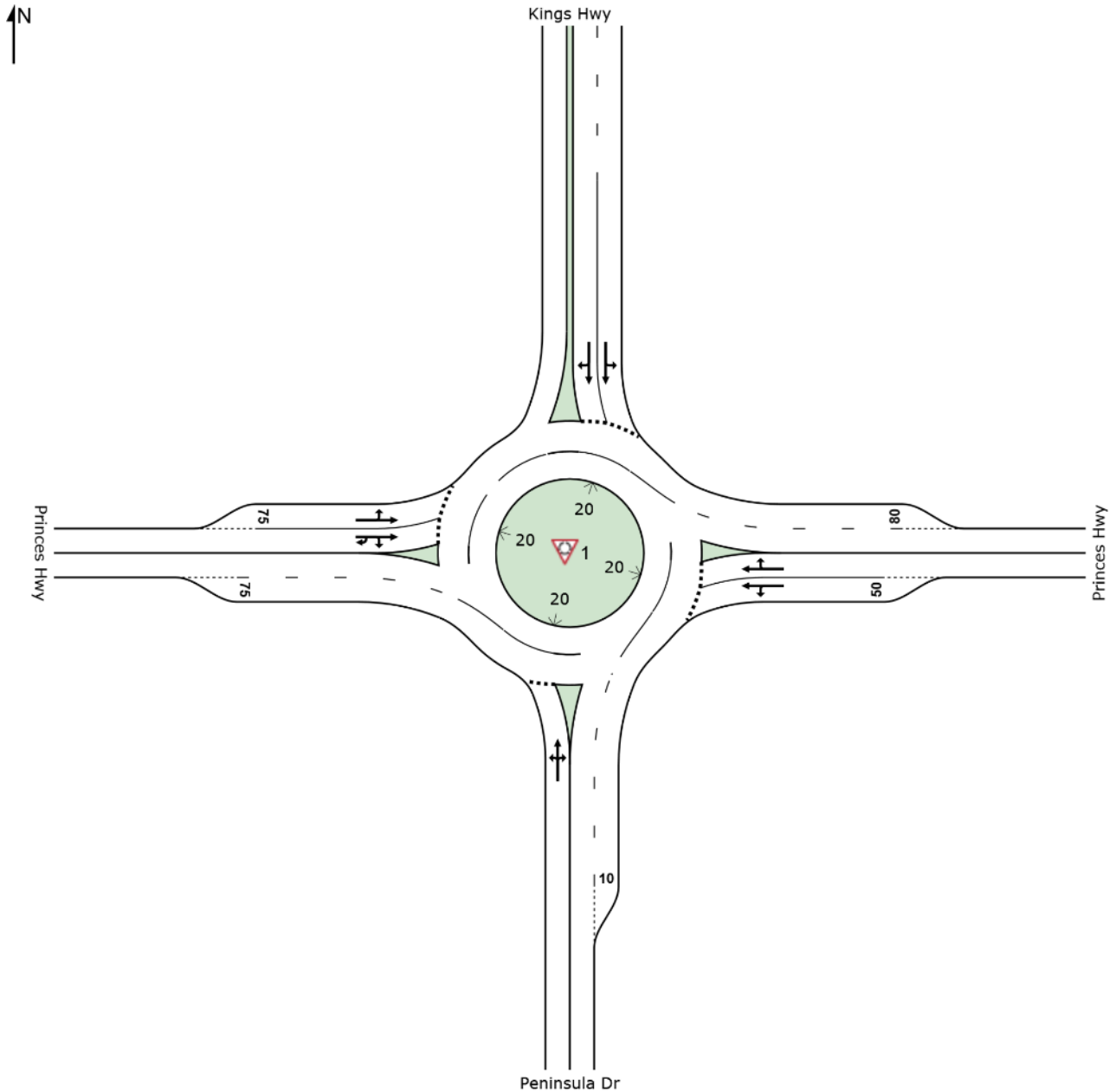
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SITE LAYOUT



Site: 1 [2017_AM_Existing_Princes Hwy / Kings Hwy]

2017_AM_Existing_Princes Hwy / Kings Hwy
Roundabout



MOVEMENT SUMMARY

 **Site: 1 [2017_AM_Existing_Princes Hwy / Kings Hwy]**

2017_AM_Existing_Princes Hwy / Kings Hwy
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Peninsula Dr											
1	L2	76	0.0	0.139	6.3	LOS A	0.6	4.4	0.62	0.74	48.9
2	T1	10	0.0	0.139	6.3	LOS A	0.6	4.4	0.62	0.74	37.5
3	R2	14	0.0	0.139	10.8	LOS A	0.6	4.4	0.62	0.74	56.4
Approach		100	0.0	0.139	6.9	LOS A	0.6	4.4	0.62	0.74	49.0
East: Princes Hwy											
4	L2	39	10.3	0.163	6.5	LOS A	0.8	5.9	0.52	0.62	49.5
5	T1	433	9.9	0.306	6.2	LOS A	1.7	13.3	0.54	0.60	54.1
6	R2	26	11.5	0.306	10.7	LOS A	1.7	13.3	0.54	0.60	46.8
Approach		498	10.0	0.306	6.4	LOS A	1.7	13.3	0.54	0.61	53.4
North: Kings Hwy											
7	L2	89	10.1	0.116	4.5	LOS A	0.5	3.5	0.33	0.53	61.3
8	T1	48	10.4	0.298	4.0	LOS A	1.5	11.1	0.32	0.63	44.9
9	R2	331	10.0	0.298	8.5	LOS A	1.5	11.1	0.32	0.63	49.4
Approach		468	10.0	0.298	7.3	LOS A	1.5	11.1	0.32	0.61	50.6
West: Princes Hwy											
10	L2	38	10.5	0.053	4.5	LOS A	0.2	1.6	0.17	0.46	43.6
11	T1	102	9.8	0.098	4.4	LOS A	0.4	3.2	0.15	0.49	60.0
12	R2	42	9.5	0.098	9.0	LOS A	0.4	3.2	0.15	0.49	51.4
12u	U	2	0.0	0.098	11.1	LOS A	0.4	3.2	0.15	0.49	56.1
Approach		184	9.8	0.098	5.6	LOS A	0.4	3.2	0.16	0.48	55.0
All Vehicles		1250	9.2	0.306	6.7	LOS A	1.7	13.3	0.41	0.60	52.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

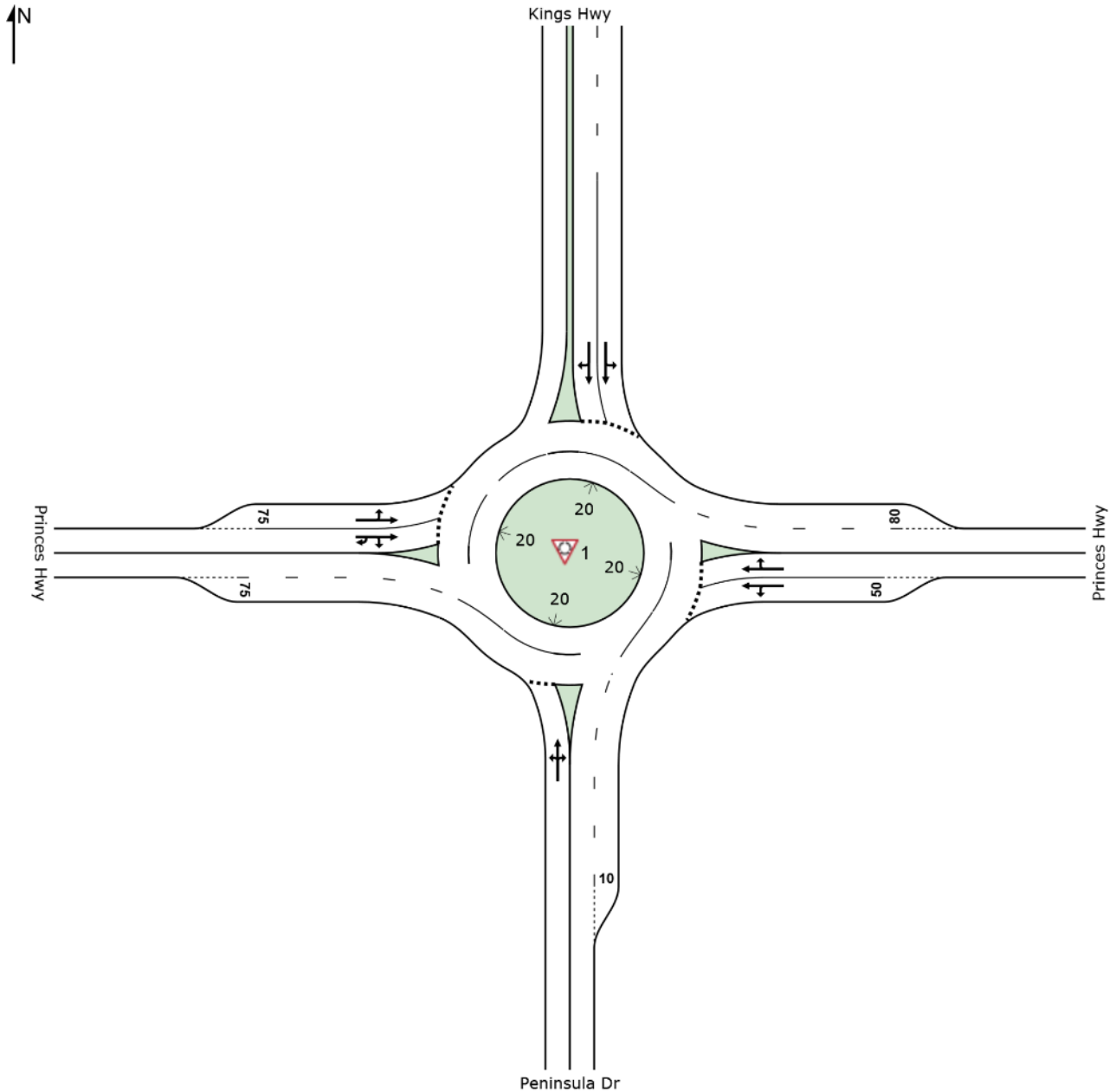
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT



Site: 1 [2017_PM_Existing_Princes Hwy / Kings Hwy]

2017_PM_Existing_Princes Hwy / Kings Hwy
Roundabout



MOVEMENT SUMMARY

 **Site: 1 [2017_PM_Existing_Princes Hwy / Kings Hwy]**

2017_PM_Existing_Princes Hwy / Kings Hwy
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Peninsula Dr											
1	L2	53	0.0	0.120	5.3	LOS A	0.5	3.6	0.53	0.67	49.1
2	T1	20	0.0	0.120	5.2	LOS A	0.5	3.6	0.53	0.67	37.8
3	R2	27	0.0	0.120	9.7	LOS A	0.5	3.6	0.53	0.67	56.7
Approach		100	0.0	0.120	6.5	LOS A	0.5	3.6	0.53	0.67	49.2
East: Princes Hwy											
4	L2	4	0.0	0.100	5.6	LOS A	0.5	3.4	0.45	0.55	49.8
5	T1	297	10.1	0.188	5.6	LOS A	1.0	7.4	0.45	0.55	54.4
6	R2	22	9.1	0.188	10.0	LOS A	1.0	7.4	0.45	0.54	47.4
Approach		323	9.9	0.188	5.9	LOS A	1.0	7.4	0.45	0.55	54.1
North: Kings Hwy											
7	L2	82	9.8	0.115	5.6	LOS A	0.5	3.4	0.46	0.63	59.5
8	T1	5	20.0	0.254	5.0	LOS A	1.2	8.9	0.46	0.72	44.0
9	R2	270	10.0	0.254	9.3	LOS A	1.2	8.9	0.46	0.72	48.3
Approach		357	10.1	0.254	8.4	LOS A	1.2	8.9	0.46	0.70	50.3
West: Princes Hwy											
10	L2	72	16.7	0.119	4.7	LOS A	0.5	4.2	0.21	0.46	43.3
11	T1	278	16.2	0.219	4.6	LOS A	1.1	8.7	0.21	0.46	59.1
12	R2	47	17.0	0.219	9.2	LOS A	1.1	8.7	0.21	0.46	51.5
12u	U	6	0.0	0.219	11.1	LOS A	1.1	8.7	0.21	0.46	56.4
Approach		403	16.1	0.219	5.2	LOS A	1.1	8.7	0.21	0.46	55.8
All Vehicles		1183	11.2	0.254	6.5	LOS A	1.2	8.9	0.38	0.57	53.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

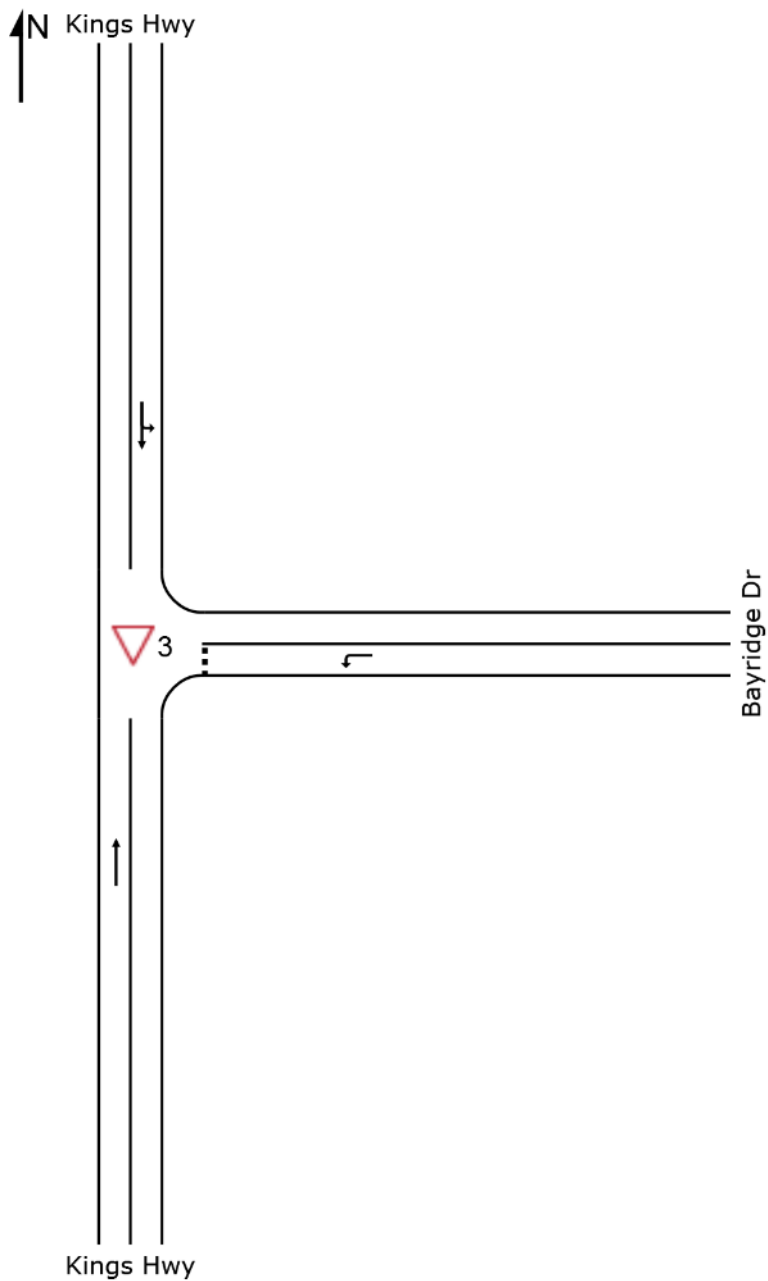
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 3 [2022_AM_Future_Bayridge Dr / Kings Hwy_NoDev]

2022_AM_Future_Bayridge Dr / Kings Hwy_NoDev
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

 Site: 3 [2022_AM_Future_Bayridge Dr / Kings Hwy_NoDev]

2022_AM_Future_Bayridge Dr / Kings Hwy_NoDev
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
2	T1	106	3.8	0.056	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		106	3.8	0.056	0.0	NA	0.0	0.0	0.00	0.00	100.0
East: Bayridge Dr											
4	L2	1	0.0	0.001	6.2	LOS A	0.0	0.0	0.45	0.52	49.9
Approach		1	0.0	0.001	6.2	LOS A	0.0	0.0	0.45	0.52	49.9
North: Kings Hwy											
7	L2	1	0.0	0.252	7.9	LOS A	0.0	0.0	0.00	0.00	93.8
8	T1	474	5.1	0.252	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		475	5.1	0.252	0.0	NA	0.0	0.0	0.00	0.00	99.8
All Vehicles		582	4.8	0.252	0.0	NA	0.0	0.0	0.00	0.00	99.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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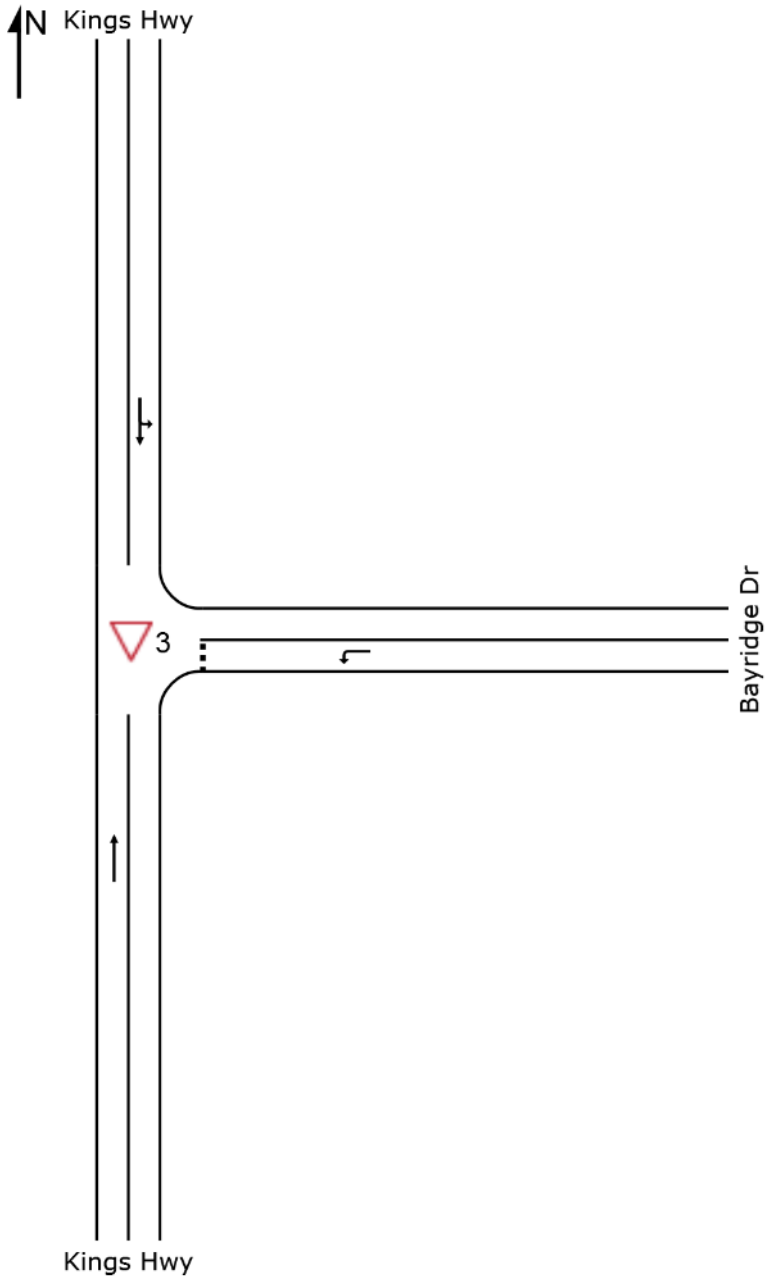
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Project: N:\AU\Canberra\Projects\23\15907\Tech\Traffic\SIDRA Models\2022_Future - SQ.sip7

SITE LAYOUT

▽ Site: 3 [2022_PM_Future_Bayridge Dr / Kings Hwy_NoDev]

2022_PM_Future_Bayridge Dr / Kings Hwy_NoDev
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 3 [2022_PM_Future_Bayridge Dr / Kings Hwy_NoDev]

2022_PM_Future_Bayridge Dr / Kings Hwy_NoDev
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
2	T1	90	4.4	0.047	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		90	4.4	0.047	0.0	NA	0.0	0.0	0.00	0.00	100.0
East: Bayridge Dr											
4	L2	1	0.0	0.001	6.2	LOS A	0.0	0.0	0.45	0.52	49.9
Approach		1	0.0	0.001	6.2	LOS A	0.0	0.0	0.45	0.52	49.9
North: Kings Hwy											
7	L2	1	0.0	0.251	7.9	LOS A	0.0	0.0	0.00	0.00	93.8
8	T1	472	5.1	0.251	0.0	LOS A	0.0	0.0	0.00	0.00	99.8
Approach		473	5.1	0.251	0.0	NA	0.0	0.0	0.00	0.00	99.8
All Vehicles		564	5.0	0.251	0.0	NA	0.0	0.0	0.00	0.00	99.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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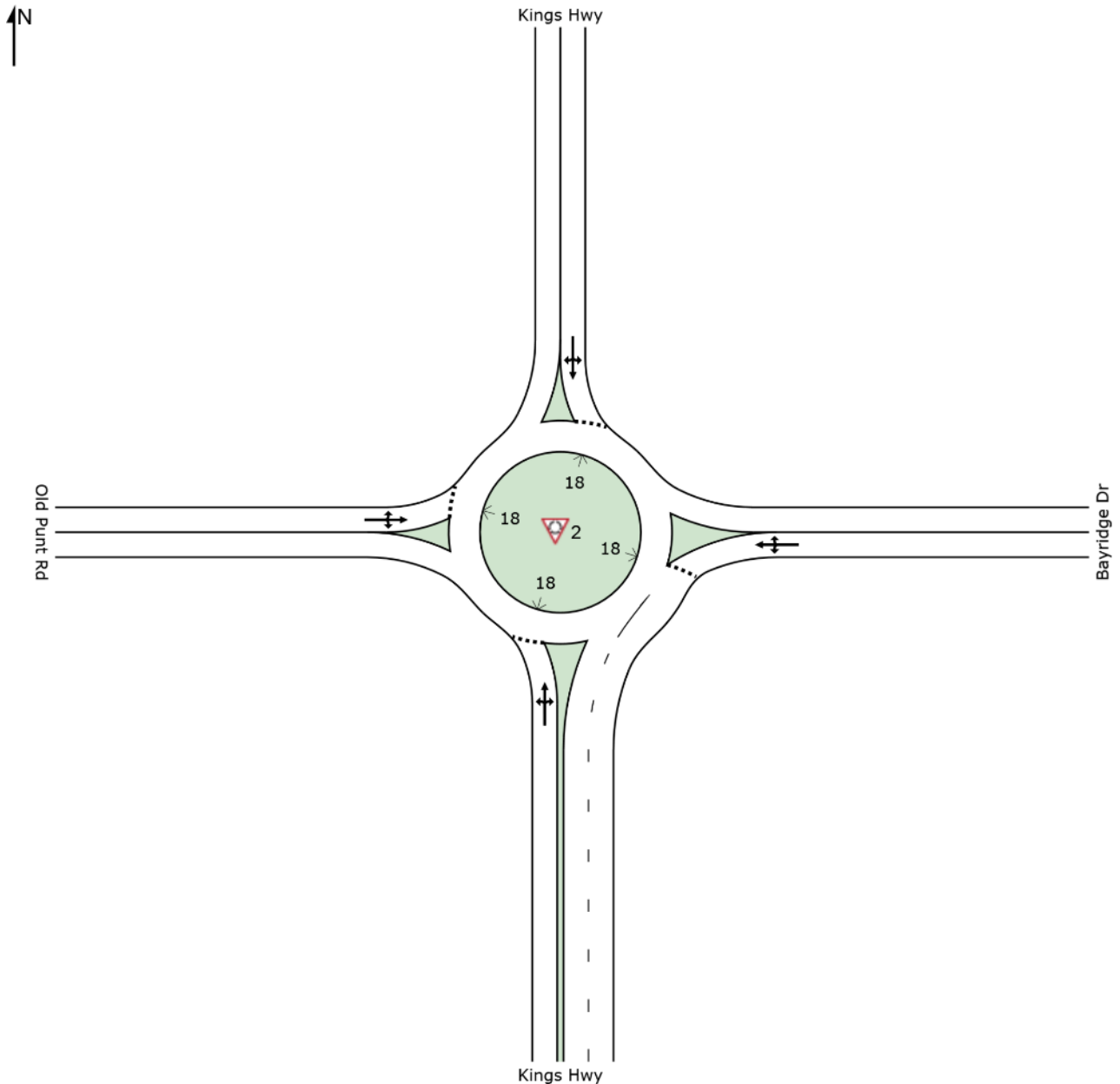
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SITE LAYOUT



Site: 2 [2022_AM_Future_Old Punt Rd / Bayridge Dr_NoDev]

2022_AM_Future_Old Punt Rd / Bayridge Dr_NoDev
Roundabout



MOVEMENT SUMMARY

 Site: 2 [2022_AM_Future_Old Punt Rd / Bayridge Dr_NoDev]

2022_AM_Future_Old Punt Rd / Bayridge Dr_NoDev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
1	L2	4	0.0	0.064	3.1	LOS A	0.3	2.3	0.14	0.42	46.4
2	T1	77	5.2	0.064	3.3	LOS A	0.3	2.3	0.14	0.42	69.2
3	R2	4	0.0	0.064	7.6	LOS A	0.3	2.3	0.14	0.42	49.3
Approach		85	4.7	0.064	3.5	LOS A	0.3	2.3	0.14	0.42	65.4
East: Bayridge Dr											
4	L2	31	0.0	0.048	5.8	LOS A	0.3	1.8	0.59	0.62	46.8
5	T1	2	0.0	0.048	5.7	LOS A	0.3	1.8	0.59	0.62	48.2
6	R2	8	0.0	0.048	10.0	LOS A	0.3	1.8	0.59	0.62	54.7
Approach		41	0.0	0.048	6.6	LOS A	0.3	1.8	0.59	0.62	48.6
North: Kings Hwy											
7	L2	24	0.0	0.361	4.5	LOS A	2.4	17.6	0.31	0.46	50.6
8	T1	425	4.9	0.361	4.7	LOS A	2.4	17.6	0.31	0.46	51.4
9	R2	24	0.0	0.361	9.0	LOS A	2.4	17.6	0.31	0.46	52.1
Approach		473	4.4	0.361	4.9	LOS A	2.4	17.6	0.31	0.46	51.4
West: Old Punt Rd											
10	L2	22	0.0	0.088	3.4	LOS A	0.4	3.0	0.24	0.56	58.2
11	T1	5	0.0	0.088	3.3	LOS A	0.4	3.0	0.24	0.56	48.1
12	R2	82	0.0	0.088	7.6	LOS A	0.4	3.0	0.24	0.56	41.6
Approach		109	0.0	0.088	6.6	LOS A	0.4	3.0	0.24	0.56	46.4
All Vehicles		708	3.5	0.361	5.1	LOS A	2.4	17.6	0.30	0.48	51.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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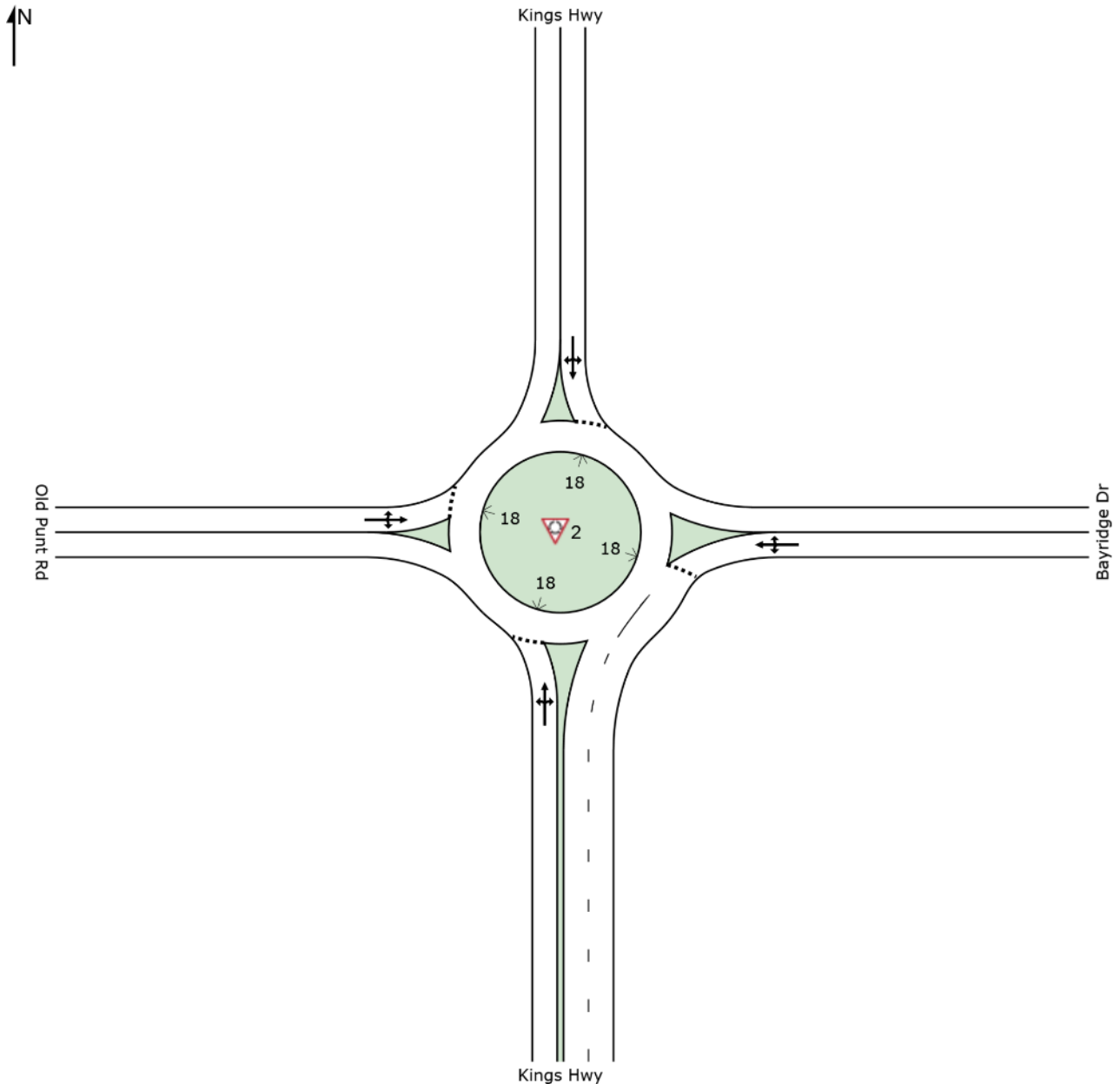
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SITE LAYOUT



Site: 2 [2022_PM_Future_Old Punt Rd / Bayridge Dr_NoDev]

2022_PM_Future_Old Punt Rd / Bayridge Dr_NoDev
Roundabout



MOVEMENT SUMMARY

 **Site: 2 [2022_PM_Future_Old Punt Rd / Bayridge Dr_NoDev]**

2022_PM_Future_Old Punt Rd / Bayridge Dr_NoDev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
1	L2	25	0.0	0.104	3.5	LOS A	0.5	3.9	0.27	0.49	45.4
2	T1	75	5.3	0.104	3.7	LOS A	0.5	3.9	0.27	0.49	67.2
3	R2	25	0.0	0.104	8.0	LOS A	0.5	3.9	0.27	0.49	48.9
Approach		125	3.2	0.104	4.5	LOS A	0.5	3.9	0.27	0.49	56.0
East: Bayridge Dr											
4	L2	35	0.0	0.046	5.4	LOS A	0.2	1.7	0.55	0.59	47.1
5	T1	2	0.0	0.046	5.3	LOS A	0.2	1.7	0.55	0.59	48.4
6	R2	4	0.0	0.046	9.6	LOS A	0.2	1.7	0.55	0.59	55.0
Approach		41	0.0	0.046	5.8	LOS A	0.2	1.7	0.55	0.59	48.1
North: Kings Hwy											
7	L2	94	0.0	0.373	4.7	LOS A	2.5	17.9	0.37	0.53	50.3
8	T1	283	4.9	0.373	4.9	LOS A	2.5	17.9	0.37	0.53	50.7
9	R2	94	0.0	0.373	9.2	LOS A	2.5	17.9	0.37	0.53	51.7
Approach		471	3.0	0.373	5.7	LOS A	2.5	17.9	0.37	0.53	50.8
West: Old Punt Rd											
10	L2	11	0.0	0.089	3.5	LOS A	0.5	3.2	0.27	0.57	57.8
11	T1	5	0.0	0.089	3.3	LOS A	0.5	3.2	0.27	0.57	47.9
12	R2	92	0.0	0.089	7.7	LOS A	0.5	3.2	0.27	0.57	41.2
Approach		108	0.0	0.089	7.1	LOS A	0.5	3.2	0.27	0.57	44.1
All Vehicles		745	2.4	0.373	5.7	LOS A	2.5	17.9	0.35	0.53	50.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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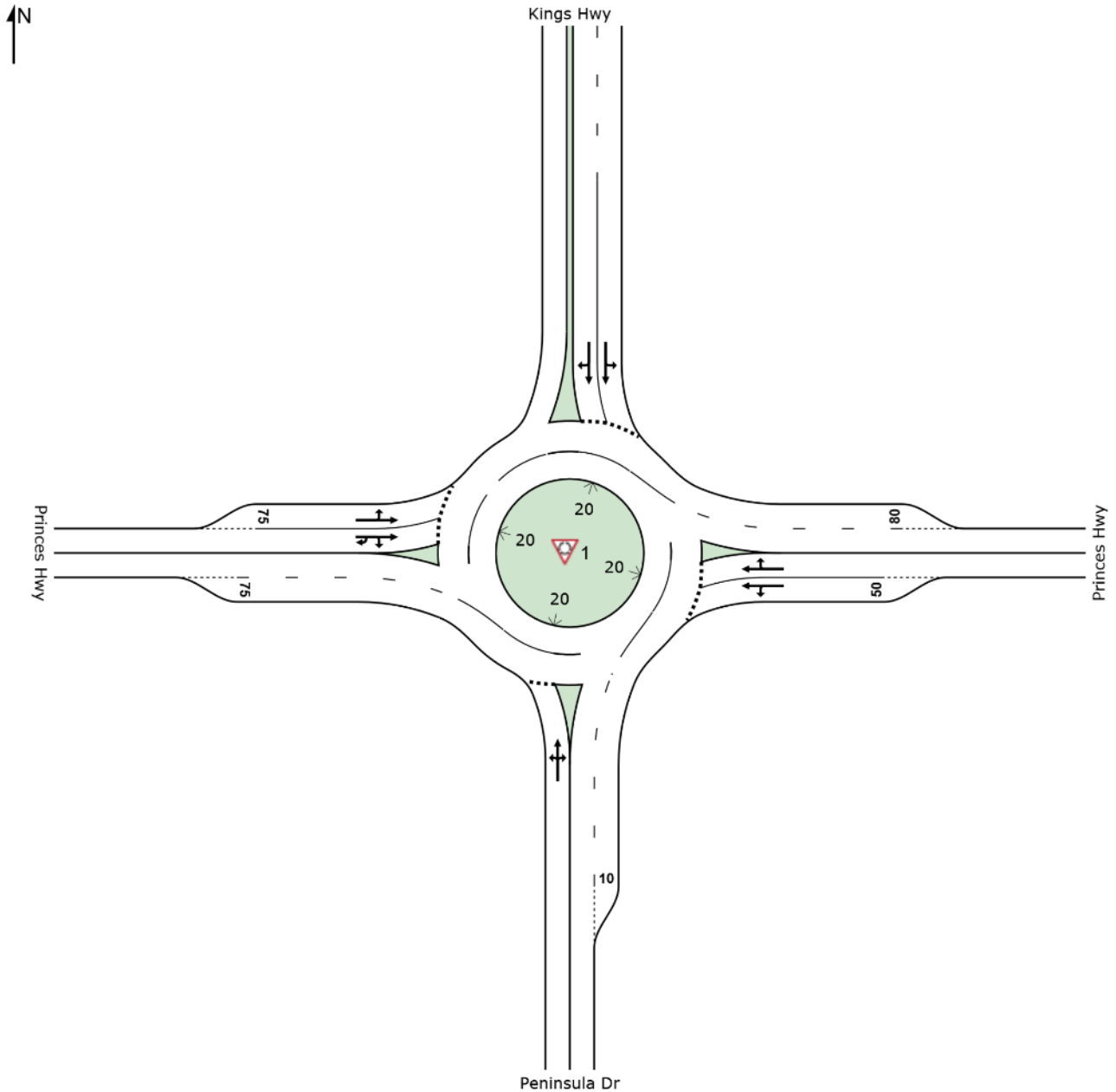
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SITE LAYOUT



Site: 1 [2022_AM_Future_Princes Hwy / Kings Hwy_NoDev]

2022_AM_Future_Princes Hwy / Kings Hwy_NoDev
Roundabout



MOVEMENT SUMMARY

 **Site: 1 [2022_AM_Future_Princes Hwy / Kings Hwy_NoDev]**

2022_AM_Future_Princes Hwy / Kings Hwy_NoDev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Peninsula Dr											
1	L2	87	0.0	0.176	7.1	LOS A	0.8	5.9	0.68	0.80	48.4
2	T1	12	0.0	0.176	7.1	LOS A	0.8	5.9	0.68	0.80	37.0
3	R2	16	0.0	0.176	11.6	LOS A	0.8	5.9	0.68	0.80	55.8
Approach		115	0.0	0.176	7.7	LOS A	0.8	5.9	0.68	0.80	48.4
East: Princes Hwy											
4	L2	46	10.9	0.198	7.0	LOS A	1.0	7.5	0.57	0.67	49.2
5	T1	499	10.0	0.371	6.6	LOS A	2.3	17.4	0.61	0.65	53.7
6	R2	29	10.3	0.371	11.2	LOS A	2.3	17.4	0.62	0.64	46.4
Approach		574	10.1	0.371	6.9	LOS A	2.3	17.4	0.61	0.65	53.1
North: Kings Hwy											
7	L2	102	9.8	0.136	4.7	LOS A	0.5	4.1	0.36	0.55	61.0
8	T1	54	9.3	0.348	4.2	LOS A	1.8	13.6	0.36	0.65	44.8
9	R2	380	10.0	0.348	8.6	LOS A	1.8	13.6	0.36	0.65	49.2
Approach		536	9.9	0.348	7.4	LOS A	1.8	13.6	0.36	0.63	50.5
West: Princes Hwy											
10	L2	44	9.1	0.062	4.6	LOS A	0.3	2.0	0.18	0.46	43.5
11	T1	117	10.3	0.114	4.4	LOS A	0.5	3.9	0.17	0.49	59.8
12	R2	49	10.2	0.114	9.1	LOS A	0.5	3.9	0.17	0.50	51.3
12u	U	4	25.0	0.114	11.4	LOS A	0.5	3.9	0.17	0.50	55.0
Approach		214	10.3	0.114	5.7	LOS A	0.5	3.9	0.17	0.49	54.8
All Vehicles		1439	9.2	0.371	7.0	LOS A	2.3	17.4	0.46	0.63	52.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

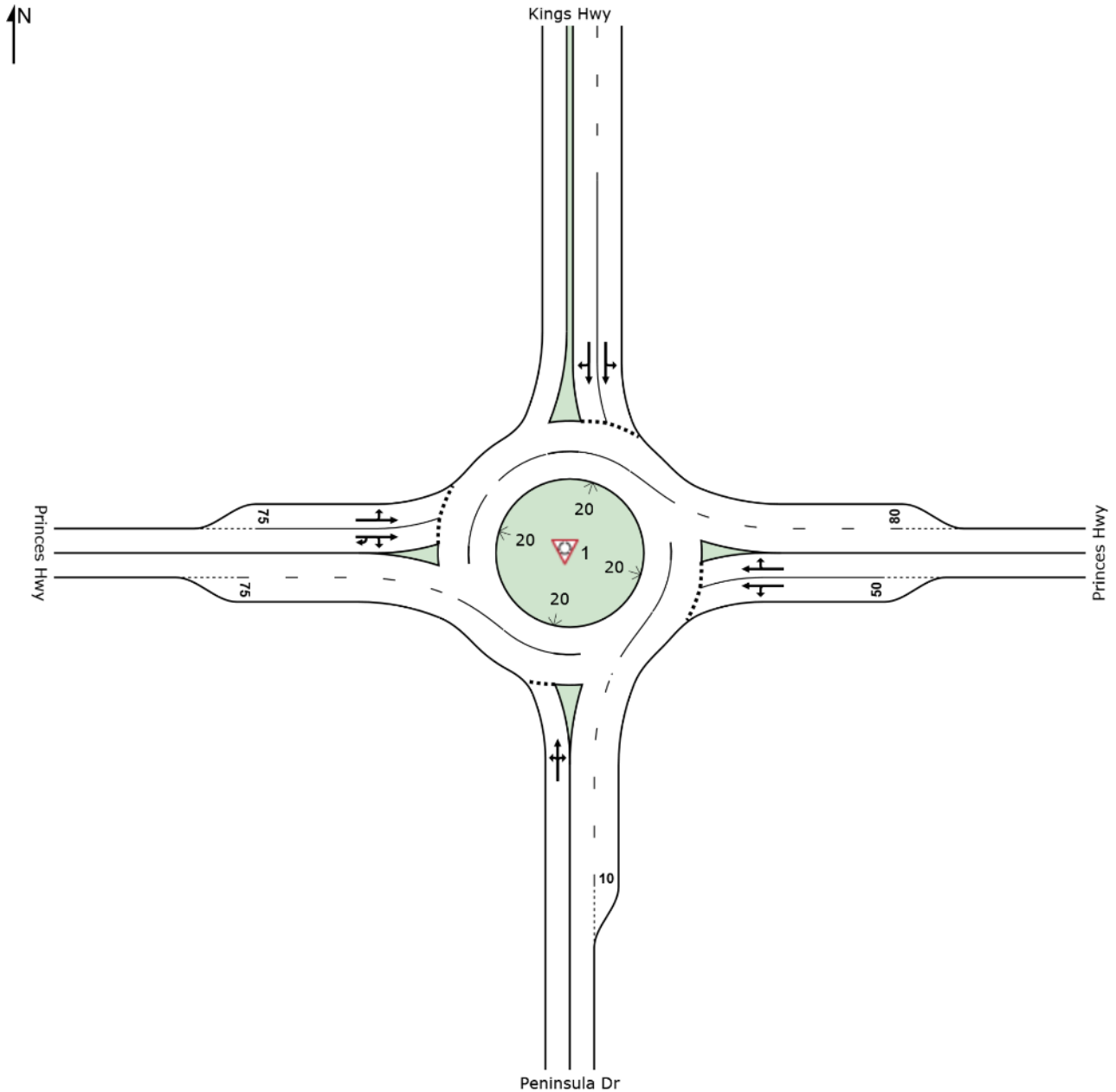
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT



Site: 1 [2022_PM_Future_Princes Hwy / Kings Hwy_NoDev]

2022_PM_Future_Princes Hwy / Kings Hwy_NoDev
Roundabout



MOVEMENT SUMMARY

 **Site: 1 [2022_PM_Future_Princes Hwy / Kings Hwy_NoDev]**

2022_PM_Future_Princes Hwy / Kings Hwy_NoDev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Peninsula Dr											
1	L2	61	0.0	0.147	5.7	LOS A	0.6	4.5	0.58	0.71	48.8
2	T1	23	0.0	0.147	5.7	LOS A	0.6	4.5	0.58	0.71	37.5
3	R2	31	0.0	0.147	10.2	LOS A	0.6	4.5	0.58	0.71	56.3
Approach		115	0.0	0.147	6.9	LOS A	0.6	4.5	0.58	0.71	48.9
East: Princes Hwy											
4	L2	10	50.0	0.122	7.2	LOS A	0.6	4.5	0.49	0.58	49.1
5	T1	341	10.0	0.229	5.8	LOS A	1.3	9.5	0.50	0.57	54.2
6	R2	26	11.5	0.229	10.3	LOS A	1.3	9.5	0.50	0.57	47.1
Approach		377	11.1	0.229	6.2	LOS A	1.3	9.5	0.50	0.57	53.7
North: Kings Hwy											
7	L2	94	9.6	0.134	5.7	LOS A	0.5	4.0	0.48	0.65	59.4
8	T1	6	16.7	0.295	5.1	LOS A	1.4	10.8	0.48	0.73	43.9
9	R2	310	10.0	0.295	9.4	LOS A	1.4	10.8	0.48	0.73	48.2
Approach		410	10.0	0.295	8.5	LOS A	1.4	10.8	0.48	0.71	50.2
West: Princes Hwy											
10	L2	77	10.4	0.127	4.7	LOS A	0.6	4.3	0.23	0.47	43.3
11	T1	298	10.1	0.232	4.6	LOS A	1.2	9.0	0.23	0.47	60.1
12	R2	50	10.0	0.232	9.2	LOS A	1.2	9.0	0.23	0.47	51.6
12u	U	8	12.5	0.232	11.4	LOS A	1.2	9.0	0.23	0.47	55.8
Approach		433	10.2	0.232	5.2	LOS A	1.2	9.0	0.23	0.47	56.5
All Vehicles		1335	9.5	0.295	6.7	LOS A	1.4	10.8	0.41	0.59	53.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

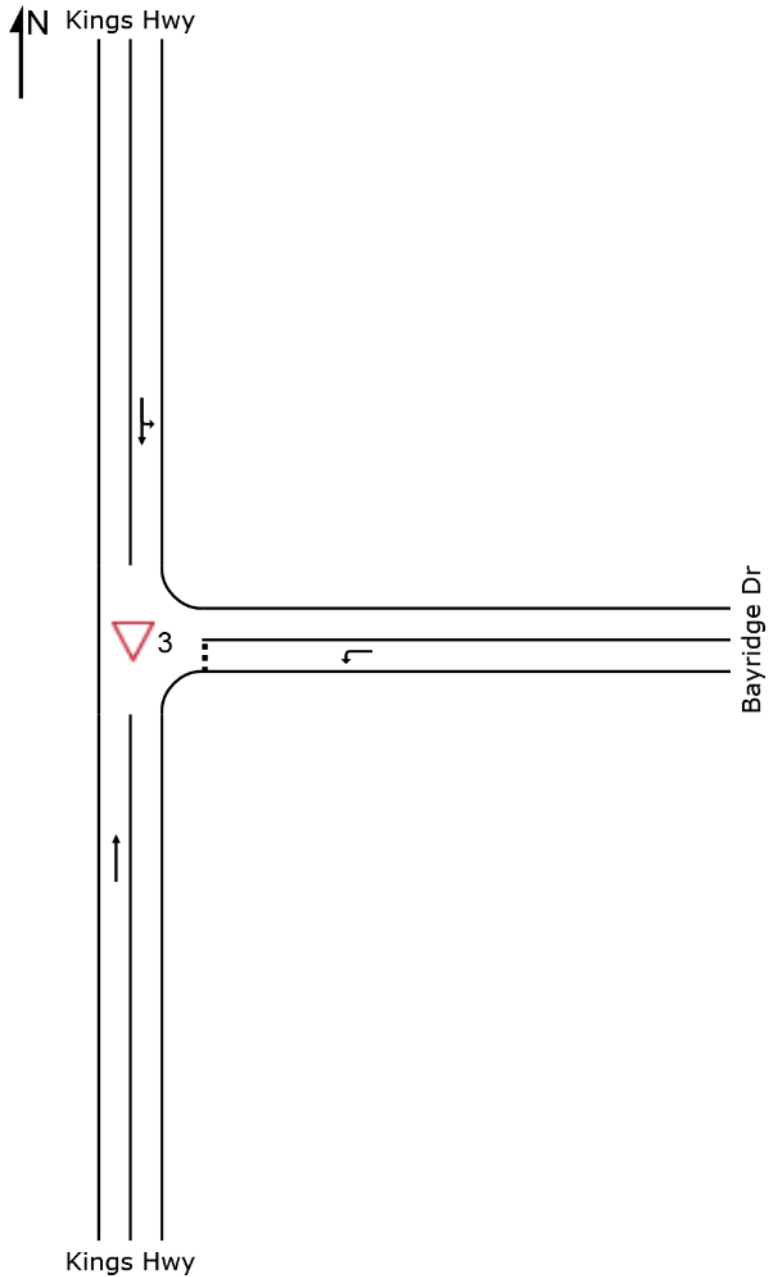
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 3 [2022_AM_Future_Bayridge Dr / Kings Hwy_Dev]

2022_AM_Future_Bayridge Dr / Kings Hwy_Dev
Giveaway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 3 [2022_AM_Future_Bayridge Dr / Kings Hwy_Dev]

2022_AM_Future_Bayridge Dr / Kings Hwy_Dev
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
2	T1	126	3.2	0.066	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		126	3.2	0.066	0.0	NA	0.0	0.0	0.00	0.00	100.0
East: Bayridge Dr											
4	L2	68	0.0	0.067	6.5	LOS A	0.3	1.8	0.47	0.65	49.8
Approach		68	0.0	0.067	6.5	LOS A	0.3	1.8	0.47	0.65	49.8
North: Kings Hwy											
7	L2	4	0.0	0.254	7.9	LOS A	0.0	0.0	0.00	0.01	93.7
8	T1	475	5.1	0.254	0.0	LOS A	0.0	0.0	0.00	0.01	99.7
Approach		479	5.0	0.254	0.1	NA	0.0	0.0	0.00	0.01	99.6
All Vehicles		673	4.2	0.254	0.7	NA	0.3	1.8	0.05	0.07	85.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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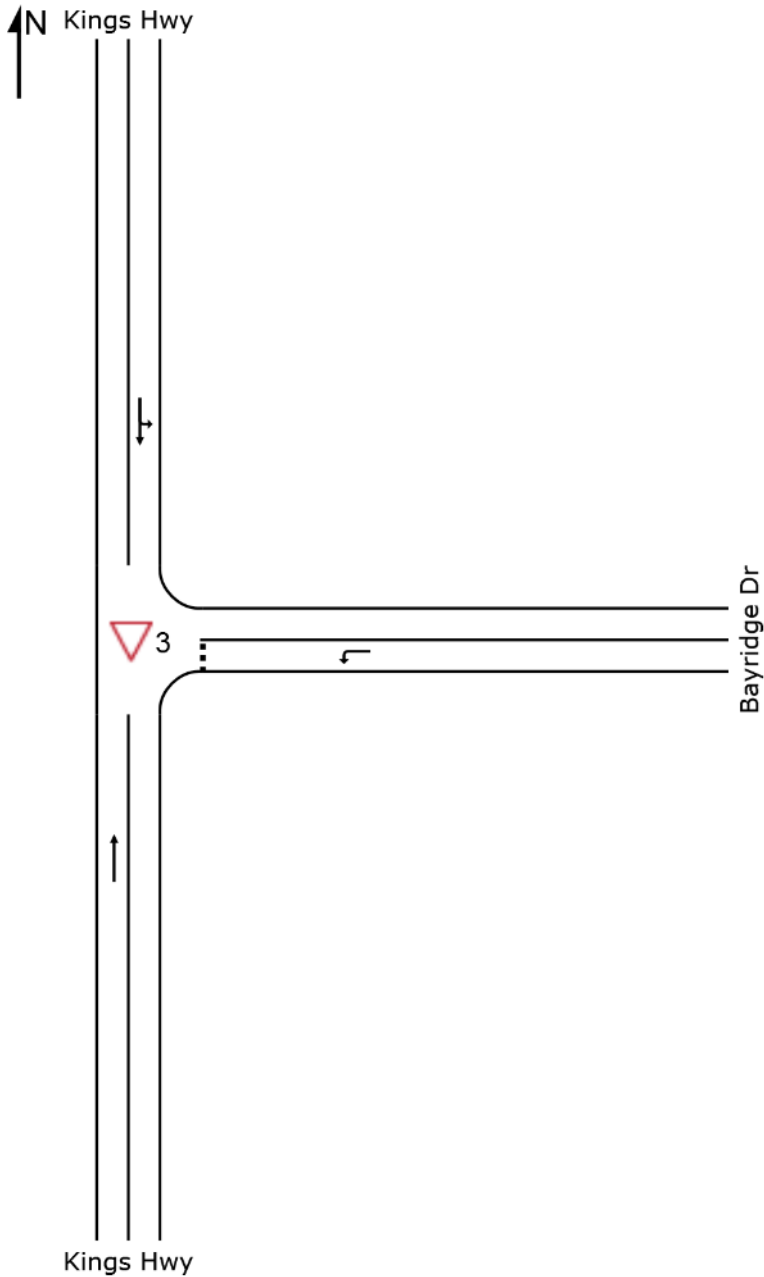
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SITE LAYOUT

▽ Site: 3 [2022_PM_Future_Bayridge Dr / Kings Hwy_Dev]

2022_PM_Future_Bayridge Dr / Kings Hwy_Dev
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

▽ Site: 3 [2022_PM_Future_Bayridge Dr / Kings Hwy_Dev]

2022_PM_Future_Bayridge Dr / Kings Hwy_Dev
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
2	T1	95	4.2	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	100.0
Approach		95	4.2	0.050	0.0	NA	0.0	0.0	0.00	0.00	100.0
East: Bayridge Dr											
4	L2	17	0.0	0.017	6.4	LOS A	0.1	0.4	0.46	0.60	49.9
Approach		17	0.0	0.017	6.4	LOS A	0.1	0.4	0.46	0.60	49.9
North: Kings Hwy											
7	L2	14	0.0	0.261	7.9	LOS A	0.0	0.0	0.00	0.02	93.5
8	T1	478	5.0	0.261	0.0	LOS A	0.0	0.0	0.00	0.02	99.3
Approach		492	4.9	0.261	0.3	NA	0.0	0.0	0.00	0.02	99.0
All Vehicles		604	4.6	0.261	0.4	NA	0.1	0.4	0.01	0.03	94.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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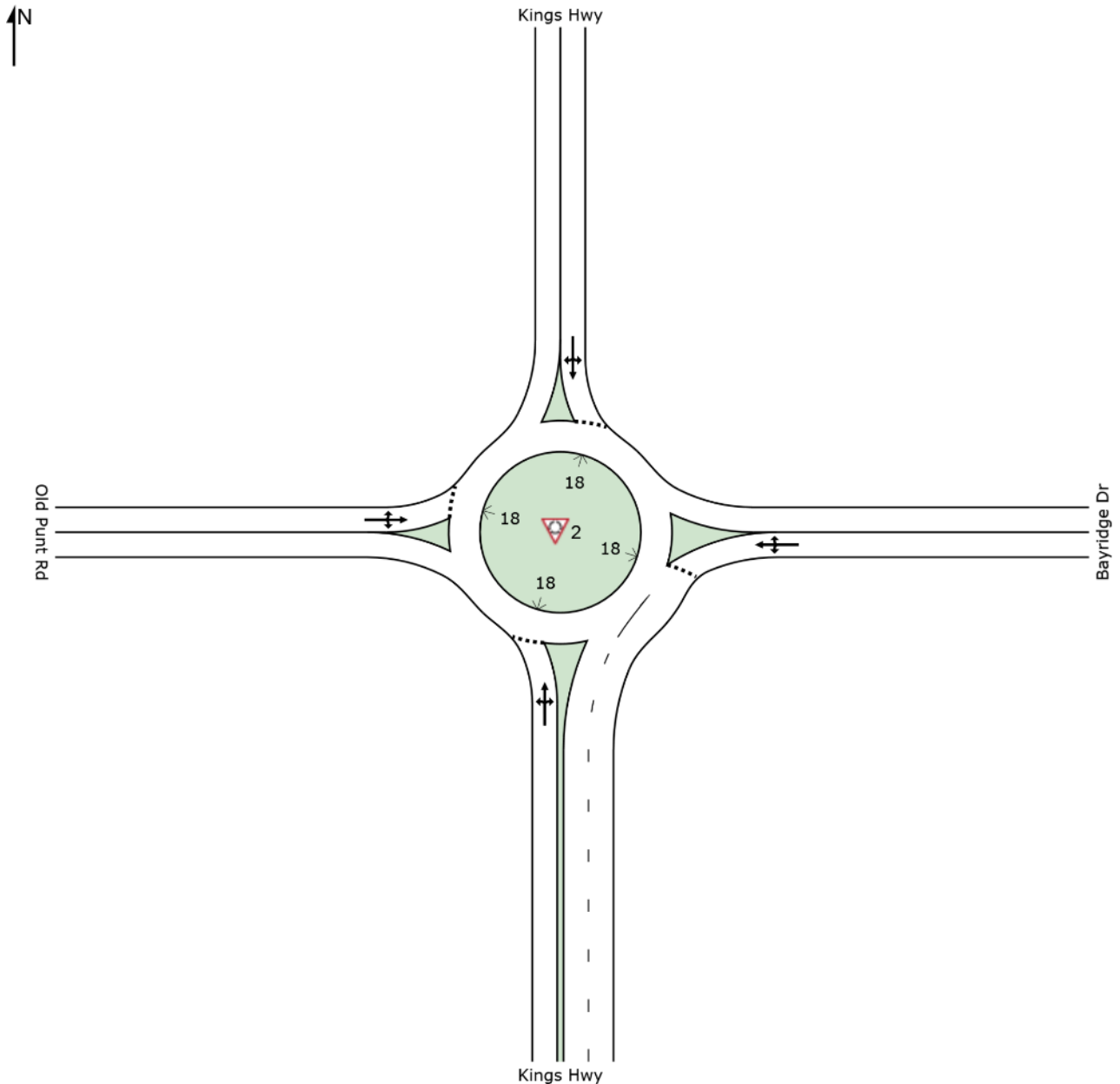
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SITE LAYOUT



Site: 2 [2022_AM_Future_Old Punt Rd / Bayridge Dr_Dev]

2022_AM_Future_Old Punt Rd / Bayridge Dr_Dev
Roundabout



MOVEMENT SUMMARY

 **Site: 2 [2022_AM_Future_Old Punt Rd / Bayridge Dr_Dev]**

2022_AM_Future_Old Punt Rd / Bayridge Dr_Dev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
1	L2	4	0.0	0.099	3.2	LOS A	0.5	3.8	0.19	0.51	45.0
2	T1	77	5.2	0.099	3.4	LOS A	0.5	3.8	0.19	0.51	66.4
3	R2	48	0.0	0.099	7.7	LOS A	0.5	3.8	0.19	0.51	48.7
Approach		129	3.1	0.099	5.0	LOS A	0.5	3.8	0.19	0.51	54.8
East: Bayridge Dr											
4	L2	138	0.0	0.214	6.8	LOS A	1.3	9.0	0.69	0.74	46.5
5	T1	2	0.0	0.214	6.7	LOS A	1.3	9.0	0.69	0.74	47.9
6	R2	28	0.0	0.214	11.0	LOS A	1.3	9.0	0.69	0.74	54.4
Approach		168	0.0	0.214	7.5	LOS A	1.3	9.0	0.69	0.74	48.0
North: Kings Hwy											
7	L2	25	0.0	0.435	4.9	LOS A	3.1	22.5	0.41	0.50	50.4
8	T1	493	4.3	0.435	5.0	LOS A	3.1	22.5	0.41	0.50	51.0
9	R2	24	0.0	0.435	9.4	LOS A	3.1	22.5	0.41	0.50	51.8
Approach		542	3.9	0.435	5.2	LOS A	3.1	22.5	0.41	0.50	50.9
West: Old Punt Rd											
10	L2	22	0.0	0.094	3.7	LOS A	0.5	3.3	0.32	0.58	58.0
11	T1	5	0.0	0.094	3.6	LOS A	0.5	3.3	0.32	0.58	48.0
12	R2	82	0.0	0.094	7.9	LOS A	0.5	3.3	0.32	0.58	41.4
Approach		109	0.0	0.094	6.9	LOS A	0.5	3.3	0.32	0.58	46.1
All Vehicles		948	2.6	0.435	5.8	LOS A	3.1	22.5	0.42	0.55	50.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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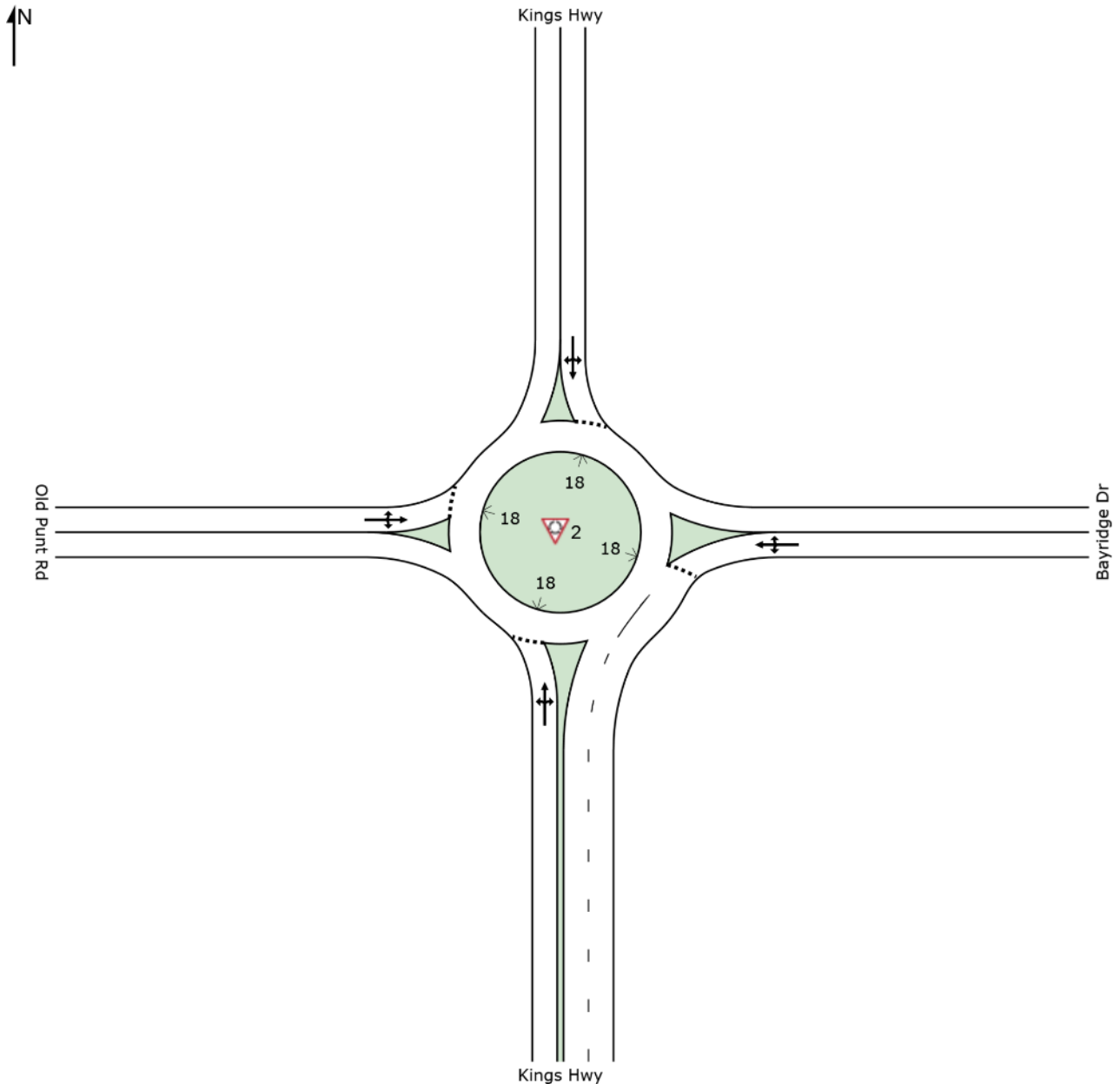
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SITE LAYOUT



Site: 2 [2022_PM_Future_Old Punt Rd / Bayridge Dr_Dev]

2022_PM_Future_Old Punt Rd / Bayridge Dr_Dev
Roundabout



MOVEMENT SUMMARY

 Site: 2 [2022_PM_Future_Old Punt Rd / Bayridge Dr_Dev]

2022_PM_Future_Old Punt Rd / Bayridge Dr_Dev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Kings Hwy											
1	L2	25	0.0	0.243	3.6	LOS A	1.5	11.0	0.33	0.58	43.7
2	T1	79	10.1	0.243	3.8	LOS A	1.5	11.0	0.33	0.58	61.9
3	R2	200	0.0	0.243	8.0	LOS A	1.5	11.0	0.33	0.58	48.1
Approach		304	2.6	0.243	6.6	LOS A	1.5	11.0	0.33	0.58	49.5
East: Bayridge Dr											
4	L2	62	0.0	0.086	5.6	LOS A	0.5	3.3	0.60	0.63	47.0
5	T1	2	0.0	0.086	5.5	LOS A	0.5	3.3	0.60	0.63	48.3
6	R2	9	0.0	0.086	9.8	LOS A	0.5	3.3	0.60	0.63	54.9
Approach		73	0.0	0.086	6.1	LOS A	0.5	3.3	0.60	0.63	48.2
North: Kings Hwy											
7	L2	100	0.0	0.476	6.2	LOS A	3.3	24.0	0.61	0.67	49.9
8	T1	300	4.7	0.476	6.4	LOS A	3.3	24.0	0.61	0.67	49.6
9	R2	94	0.0	0.476	10.7	LOS A	3.3	24.0	0.61	0.67	50.9
Approach		494	2.8	0.476	7.2	LOS A	3.3	24.0	0.61	0.67	50.0
West: Old Punt Rd											
10	L2	11	0.0	0.105	4.5	LOS A	0.6	3.9	0.46	0.63	57.2
11	T1	5	0.0	0.105	4.3	LOS A	0.6	3.9	0.46	0.63	47.7
12	R2	92	0.0	0.105	8.7	LOS A	0.6	3.9	0.46	0.63	40.6
Approach		108	0.0	0.105	8.0	LOS A	0.6	3.9	0.46	0.63	43.5
All Vehicles		979	2.2	0.476	7.0	LOS A	3.3	24.0	0.50	0.64	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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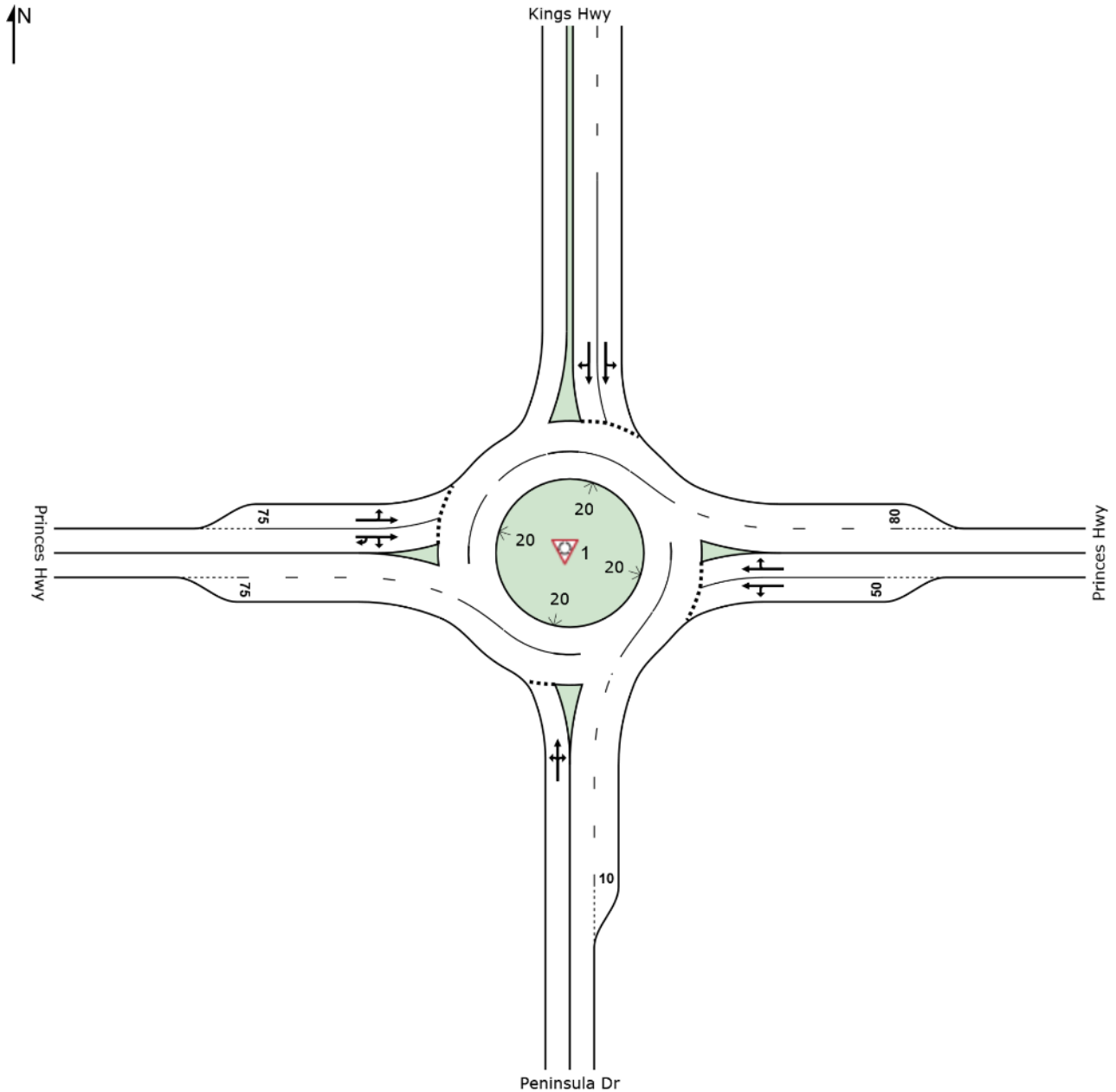
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SITE LAYOUT



Site: 1 [2022_AM_Future_Princes Hwy / Kings Hwy_Dev]

2022_AM_Future_Princes Hwy / Kings Hwy_Dev
Roundabout



MOVEMENT SUMMARY

 **Site: 1 [2022_AM_Future_Princes Hwy / Kings Hwy_Dev]**

2022_AM_Future_Princes Hwy / Kings Hwy_Dev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Peninsula Dr											
1	L2	87	0.0	0.199	8.2	LOS A	1.0	7.0	0.74	0.85	47.7
2	T1	12	0.0	0.199	8.2	LOS A	1.0	7.0	0.74	0.85	36.3
3	R2	16	0.0	0.199	12.7	LOS A	1.0	7.0	0.74	0.85	54.8
Approach		115	0.0	0.199	8.8	LOS A	1.0	7.0	0.74	0.85	47.7
East: Princes Hwy											
4	L2	46	10.9	0.228	8.1	LOS A	1.2	9.3	0.66	0.74	48.8
5	T1	499	10.0	0.427	7.7	LOS A	2.9	22.1	0.72	0.74	53.1
6	R2	47	6.4	0.427	12.1	LOS A	2.9	22.1	0.74	0.74	45.6
Approach		592	9.8	0.427	8.0	LOS A	2.9	22.1	0.72	0.74	52.3
North: Kings Hwy											
7	L2	136	7.4	0.179	4.8	LOS A	0.8	5.7	0.38	0.56	61.8
8	T1	72	6.9	0.451	4.3	LOS A	2.7	20.2	0.41	0.65	44.7
9	R2	504	7.5	0.451	8.8	LOS A	2.7	20.2	0.41	0.65	49.1
Approach		712	7.4	0.451	7.6	LOS A	2.7	20.2	0.40	0.63	50.5
West: Princes Hwy											
10	L2	70	5.7	0.071	4.6	LOS A	0.3	2.2	0.22	0.49	43.4
11	T1	117	10.3	0.130	4.5	LOS A	0.6	4.7	0.21	0.49	59.6
12	R2	49	10.2	0.130	9.2	LOS A	0.6	4.7	0.21	0.49	51.3
12u	U	3	0.0	0.130	11.1	LOS A	0.6	4.7	0.21	0.49	56.0
Approach		239	8.8	0.130	5.6	LOS A	0.6	4.7	0.21	0.49	53.7
All Vehicles		1658	8.0	0.451	7.5	LOS A	2.9	22.1	0.51	0.67	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

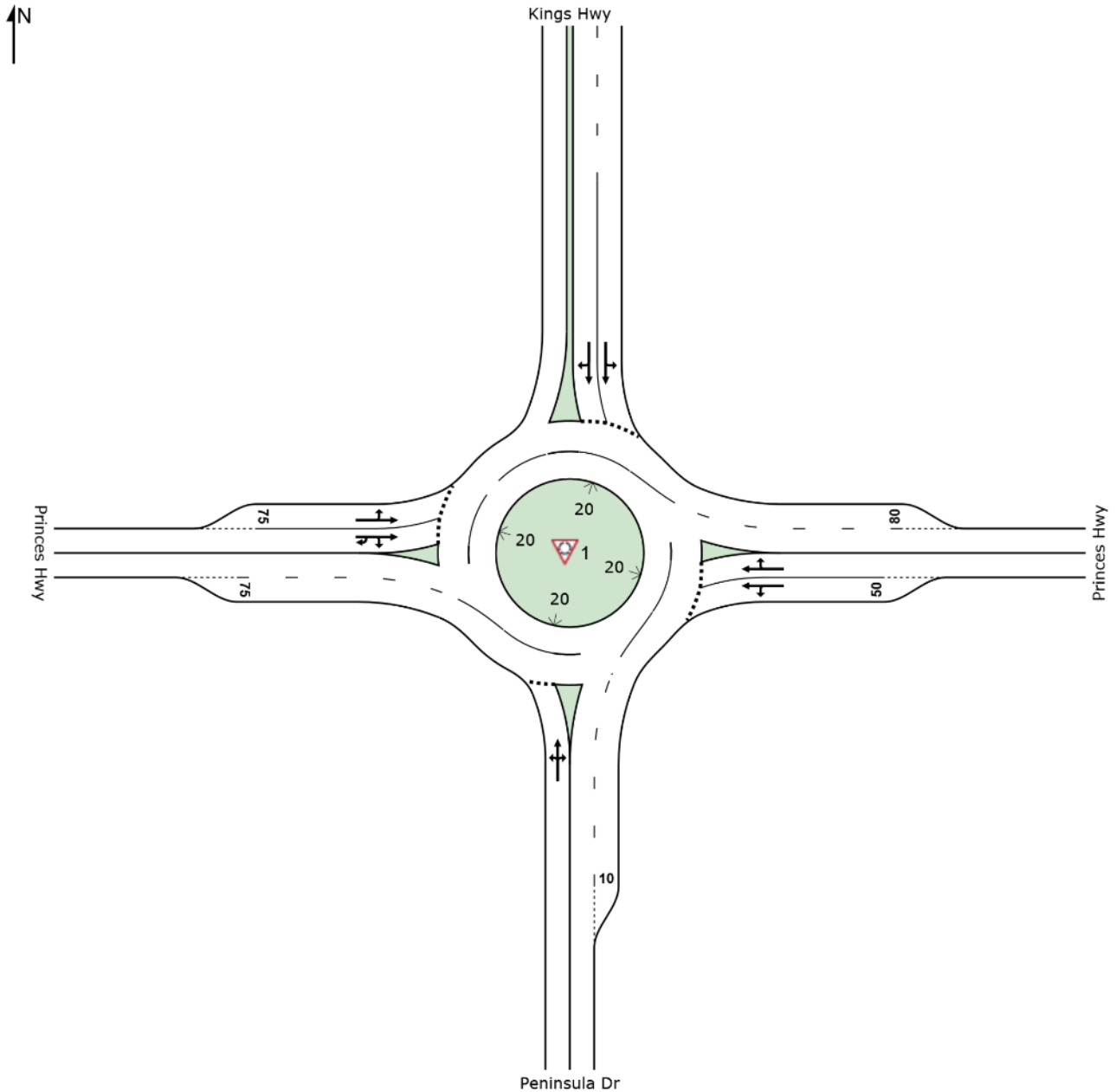
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT



Site: 1 [2022_PM_Future_Princes Hwy / Kings Hwy_Dev]

2022_PM_Future_Princes Hwy / Kings Hwy_Dev
Roundabout



MOVEMENT SUMMARY

 **Site: 1 [2022_PM_Future_Princes Hwy / Kings Hwy_Dev]**

2022_PM_Future_Princes Hwy / Kings Hwy_Dev
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Peninsula Dr											
1	L2	61	0.0	0.155	6.1	LOS A	0.7	4.9	0.61	0.74	48.6
2	T1	23	0.0	0.155	6.1	LOS A	0.7	4.9	0.61	0.74	37.3
3	R2	31	0.0	0.155	10.6	LOS A	0.7	4.9	0.61	0.74	56.0
Approach		115	0.0	0.155	7.3	LOS A	0.7	4.9	0.61	0.74	48.7
East: Princes Hwy											
4	L2	6	16.7	0.137	6.5	LOS A	0.7	5.0	0.52	0.60	49.3
5	T1	341	10.0	0.256	6.0	LOS A	1.5	11.1	0.53	0.61	53.8
6	R2	69	4.3	0.256	10.4	LOS A	1.5	11.1	0.54	0.61	46.6
Approach		416	9.1	0.256	6.8	LOS A	1.5	11.1	0.53	0.61	52.9
North: Kings Hwy											
7	L2	104	8.7	0.151	6.0	LOS A	0.7	5.0	0.51	0.66	59.2
8	T1	7	14.3	0.334	5.4	LOS A	1.9	14.0	0.54	0.74	43.7
9	R2	343	9.0	0.334	9.8	LOS A	1.9	14.0	0.54	0.74	48.0
Approach		454	9.0	0.334	8.8	LOS A	1.9	14.0	0.53	0.72	50.0
West: Princes Hwy											
10	L2	209	3.8	0.190	4.8	LOS A	0.9	6.4	0.28	0.52	49.7
11	T1	298	10.1	0.281	4.7	LOS A	1.5	11.1	0.29	0.49	59.7
12	R2	50	10.0	0.281	9.4	LOS A	1.5	11.1	0.29	0.49	51.4
12u	U	8	12.5	0.281	11.6	LOS A	1.5	11.1	0.29	0.49	55.6
Approach		565	7.8	0.281	5.3	LOS A	1.5	11.1	0.29	0.50	55.9
All Vehicles		1550	7.9	0.334	6.9	LOS A	1.9	14.0	0.45	0.61	52.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Appendix B – North Batemans Bay Masterplan Pedestrian and Bicycle Infrastructure



Memorandum

20 December 2016

To ACT Land Pty Ltd

Copy to

From John Wearne

Tel +61 2 6113 3396

Subject Bay Ridge Estate,
Pedestrian and Bicycle Transport Strategy

Job no. 2315907

Purpose

This Memorandum outlines the pedestrian and bicycle infrastructure required to service the Bay Ridge Estate in the context of the application to modify the development consent to reflect the reduction in minimum lot size now permitted by the Eurobodalla Local Environmental Plan 2012.

With the partial completion of the Bay Ridge Estate by its former developer and changed circumstances for surrounding potential developments, it is timely to review the pedestrian and bicycle transport facilities required for this estate development.

Background

The development consent number 172-7-2005 granted by the Minister for planning on 7 December 2006 referenced the GHD report "Bay Ridge Estate North Batemans Bay – Pedestrian and Cycleway Masterplan Report" Ref 23/10955/R dated July 2005. That report addressed the Bay Ridge Estate in the context of developments of surrounding sites anticipated at that time.

The recommendations made in the previous report are as follows (with comments added):

The key elements of the proposed pedestrian/cycleway facilities include (refer to Figure 7 Rev.2): (This figure provided as Attachment 1.)

- A. Utilisation of the proposed fire trail along the eastern boundary of the development site as an informal off-street shared pedestrian/cycle path, with linkages to the site via public reserves located at various points along the route; (Relevant to current proposal)
- B. New off-street pedestrian/cycle path incorporated within the proposed redevelopment of the existing "Country Comfort" site; (Not relevant to current proposal)
- C. New shared link into future service station outlet adjacent to proposed Country Comfort development. (Complete, but not relevant to current proposal)
- D. New pedestrian/cyclist crossing of the Princes Highway: (Relevant to current proposal)
 - a. To be detailed in a separate Development Application, and delivered as part of Stage 5 of Bay Ridge;



Memorandum

- b. Three (3) options currently under consideration; underpass, overpass, or a form of pedestrian signalisation in the vicinity of the Kings Hwy/Princes Hwy intersection;
- E. If required by the Princes Hwy crossing point; new off-street shared pedestrian/cycle path on the eastern side of the Princes Highway between the proposed pedestrian/cyclist crossing point and the existing footpath at Peninsula Drive (to be widened); (Across frontage of Lincoln Downs Motel)
- F. Widened and upgraded footpaths located along the eastern side of Princes Highway, including relocation of guide signs, to produce shared pedestrian/cycle facilities; (guide signs moved, but narrow footpath only)
- G. New pedestrian/cyclist crossing refuges at Kings Highway/Old Punt Road roundabout, Peninsula Drive/Princes Highway roundabout and Wharf Road/Princes Highway intersection; (These works complete)
- H. Improved pedestrian/cyclist underpass at the northern end of the Clyde River Bridge; (These works complete), and
- I. New pedestrian/cyclist ramps linking existing and new road-level footpaths to the proposed improved pedestrian underpass located under the northern end of the Clyde River Bridge. (Completed)

The approved drawings for development consent number 172-7-2005 included drawing 23-11848-C005-Revision F - Transport Plan. The development consent conditions included the following which relates to the timing of provision of these works.

1.7 Staging of the Development

The staging of the development is to occur in accordance with the *Staging Plan*, prepared by GHD, Drawing No 23-11848-C002, Revision E dated 11 October 2006 except as amended by the conditions of this consent, in particular the following conditions:-

- (i) The proposed northern access point with the Kings Highway and Road No 1 must be constructed in Stage 2 of the subdivision;
- (ii) The pedestrian and cyclist facilities required by this development consent at the intersection of Proposed Road No 1 and Old Punt Road must be provided in Stage 2 of the subdivision;
- (iii) Public transport infrastructure in accordance with the '*Transport Plan*' prepared by GHD Drawing No 23-11848-C005 Revision F dated 29 September 2006 shall be provided in stage 3 of the subdivision;
- (iv) The grade-separated pedestrian crossing point for the Princes Highway is to be completed in Stage 3 of the subdivision; and
- (v) All services are to be provided to each individual allotment prior to their release, with the exception of Stage 1 which only requires telecommunications and electricity services.



Memorandum

2.11 Grade Separated Pedestrian Crossing Point

A grade separated pedestrian crossing shall be provided to link the subject site to the eastern side of the Princes Highway (north of the Kings Highway junction) in accordance with the requirements of the RTA. The exit from the structure on the eastern side of the Princes Highway will require approvals from adjoining properties owners (Department of Education and Training and the Council) to construct on their land.

Suitable treatments shall also be provided to corral pedestrians to the controlled facilities and prevent pedestrians crossing the Princes Highway at uncontrolled locations in accordance with the requirements of the RTA. A pathway is to be provided to the school grounds to a position in consultation with the Council and the Department of Education and Training). The design of the facility and the design and provision of pedestrian infrastructure should encourage the use of this facility. The design must accommodate an additional north bound passing lane on the Princes Highway.

Details of this grade separated pedestrian crossing point shall be provided on the Construction Certificate plans for Stage 3 of the subdivision, with tendering documentation to be completed prior to the commencement of Stage 3. The construction of the pedestrian crossing point must be completed prior to release of the Subdivision Certificate for Stage 3.

2.12 Pedestrian/cyclist Refuge Facilities

Pedestrian/cyclist refuge facilities shall be provided at the Old Punt Road roundabout and shall include splitter islands and kerb blisters. Suitable treatments shall be provided to corral pedestrians to the controlled facilities and prevent pedestrians crossing the Kings Highway at uncontrolled locations. Details shall be provided on the Construction Certificate plans for Stage 2.

2.13 Cycleway

The cycleway is to be extended to the roundabout on the Princes Highway. Plans for the above are to be submitted to and approved by Council prior to issue of any construction certificate. All works to be completed prior to registration of stage 3 of the proposal.

2.14 Footpath Construction

The pedestrian/cyclist paths shall be constructed in accordance with the requirements of the Council, with footpaths to be constructed on one side of Road No 1 and Road No 6 in accordance with the approved plans. Details shall be provided on the Construction Certificate plans for each stage.

The 3 modifications of the development consent have not materially changed these requirements.



Memorandum

Current situation

Since the GHD Pedestrian and Cycleway Masterplan Report in 2005, the following changes have occurred.

Stages 1 and 2 of the Bay Ridge Estate have been completed.

The subdivision works completed have included the provision of a 2.5 metre wide shared path along Bay Ridge Drive, shared path connections across Kings Highway and Princes Highway and between these crossings and the indented bus bay in Stage 2. Conditions 2.12 and 2.13 have been satisfied.

Developments of the “Country Comfort” site have proceeded, possibly differently from the previous concepts from 2005 which were not specifically detailed in the GHD report “Bay Ridge Estate North Batemans Bay – Pedestrian and Cycleway Masterplan Report” Ref 23/10955/R dated July 2005. A Woolworths Petrol service station has been constructed on the western side of Kings Highway between Princes Highway and Old Punt Road.

The Lincoln Downs site on the southern side of Princes Highway has not been redeveloped.

Shared path connections under the Princes Highway Bridge at Clyde River have been constructed.

Proposed works

The next stages of the development will extend the shared path along the full length Bayridge Drive, provide indented bus bays in Bayridge Drive and a path along Road 6. This addresses condition 2.14.

The intersection of the northern end of Bayridge Drive with Kings Highway will be configured to allow left turn in and out only, facilitating a bus route in a northerly direction only, so that bus stops need only be provided on the left hand (western side).

The development consent conditions currently require that “The grade-separated pedestrian crossing point for the Princes Highway is to be completed in Stage 3 of the subdivision”. Refer to conditions 1.7 and 2.11. It is proposed that this crossing is deferred to Stage 5. See discussion below.

These works are all shown on drawing 23011848-C005-Revision I.

Consultation with Roads and Maritime Services

GHD has consulted with RMS and received the following advice:

“RMS has reviewed the information provided and acknowledges the case for change presented regarding condition 2.11 of the Determination of Development Application 172-7-2005, that is, a grade separated pedestrian/cycling crossing of the Princes Highway as part of Stage 3 of the Bay Ridge Estate development.

“RMS considers that the need for the grade separated pedestrian crossing is based off of the potential generation of pedestrians and while the initial occupancy of the land within the



Memorandum

estate may not have “generated any significant number of school aged children” that does not preclude the potential generation of school aged children in the future.

“There is an identified pedestrian desire line running directly from the Bay Ridge Estate to Batemans Bay Public School that the grade separate pedestrian crossing caters for. RMS notes that the case for change is to remove the condition for the grade separated crossing, or after discussions with John Wearne of GHD possibly defer the condition to a later stage of the development. If the crossing were to be removed from the conditions of consent, RMS has concerns with requiring pedestrians (particularly school aged children) to cross the Kings Highway, the Princes Highway and Peninsula Drive uncontrolled and at grade to get to the school.

“RMS would consider deferral of the condition to a later stage of the development if the deferral was supported and justified by an appropriate pedestrian and cycleway plan that identified the appropriate pedestrian and cycle infrastructure at each stage of the development that was designed, as per condition 2.11 “the design and provision of pedestrian infrastructure should encourage the use of this facility” with this facility being the grade separated crossing.

“RMS would only consider the removal of the grade separated crossing as a condition if an alternative proposal for pedestrian and cycle access from the Bay Ridge Estate was identified and set in place as a condition that provides for safe and efficient access for pedestrians and cyclists that was in accordance with all relevant Austroads guidelines and RMS supplements and standards to RMS satisfaction.

“It must be noted that RMS has no plans to upgrade the roundabout at the intersection of the Kings Highway and Princes Highway to traffic signals, however RMS would be willing to consider signalisation of the intersection as a part of the Bay Ridge Estate, subject to traffic modelling and design requirements to RMS satisfaction.

“Given the above, RMS does not support the removal of the requirement to provide the grade separated pedestrian crossing of the Princes Highway in its current form.

In the light of the advice above, the development will need to provide the crossing point across Princes Highway to facilitate access between the estate and the Batemans Bay Public School, generally as shown in the Transport Plan drawing 23-11848-C005-Revision F, as previously approved.

As the carriageway of Princes Highway is above the surrounding landform at the proposed crossing location, the only viable option to provide a grade-separated pedestrian crossing is to pass the pedestrian traffic under the highway carriageway in a suitable concrete box culvert type structure with ramped access at both ends.

The alternative for a bridge to cross above the highway would require a high structure to pass large (or over-sized) vehicles, with very extensive ramps at both ends to meet disabled access standards.



Memorandum

The path level would be at least 6 metres above the roadway, with disabled compliant ramp lengths of at least 90 metres at both ends.

A signalised crossing at road level is not acceptable at the transition from 100 km/h rural highway into the 60 km/h urban speed zone, in part due to risks that vehicles approaching at speed may not stop.

The provision of a signalised crossing for pedestrian traffic at the intersection of Kings Highway and Princes Highway is only practical as part of a complete reconfiguration of this intersection. RMS has advised that it will not fund this work, and the costs would be prohibitive for the subdivision in isolation.

Proposed staging of works and justification

Proposed transport connections are shown on drawing 23-11848-C005 Revision I – Transport Plan, addressing shared paths, bus route and bus bays.

The shared paths along Road 1 (Bayridge Drive) and Road 6 will be provided progressively as these roads are constructed.

The intent behind the pedestrian crossing of Princes Highway is to facilitate access between the estate and the Batemans Bay Public School. Experience to date with the occupants of the Bay Ridge Estate has yielded very few school-aged children, although this may change in future stages.

The extension of Bayridge Drive through to Kings Highway facilitates a viable bus route through the estate for school children and other passenger services.

These considerations serve to delay the time by which the underpass is required.

The provision of the underpass as part of stage 5 of the development, as originally proposed in the GHD report “Bay Ridge Estate North Batemans Bay – Pedestrian and Cycleway Masterplan Report” Ref 23/10955/R dated July 2005, would be viable for the development.

At December 2016, a total of 55 lots have already been created in Stage 2A and 2B. The existing shared path along Bayridge Drive and connecting across Kings Highway and Princes Highway is providing an acceptable level of service.

Stage 3 brings an additional 58 lots, or 113 in total. The inclusion of Stage 4 adds a further 13 lots, taking this to a total number of 126 lots in stages 2, 3 and 4. These lots can be adequately connected to surrounding neighbourhoods, including central Batemans Bay, by the shared path along Bayridge Drive and connections to the southern side of Princes Highway.

The development of stage 3B adds the initial stage of the shared path along the eastern side of the estate, which is constructed to serve as informal additional recreational path and fire trail, along a corridor dedicated as public path. This will ultimately also link with a pathway along the Princes Highway frontage as far as the planned underpass. The link along the Princes Highway frontage should not be constructed until the underpass is constructed, in order to avoid creating a desire line before the Princes Highway crossing infrastructure is built.



Memorandum

The informal shared path/fire trail access will progressively extend around the eastern and northern sides of the estate, linking to Road 5 in Stage 4, Road 7 in Stage 6 and Road 6 in Stage 7.

The generation of pedestrian traffic lags behind the subdivision infrastructure due to the time taken for lots to sell, houses to be built and families to become established.

At full development, the Bay Ridge Estate will contain a total of 203 lots with potential benefit from the underpass across Princes Highway. Two lots in Stage 1 have no access through the estate.

The proposed underpass links to the Batemans Bay Public School and to the adjacent public recreation facilities, which represents only a proportion of pedestrian and bicycle traffic generated within Bay Ridge Estate. The provision of the underpass as part of the Stage 5 subdivision works would adequately service the pedestrian needs for the whole Bay Ridge Estate.

The concurrent work required with the underpass construction includes the pedestrian path along the northern side of Princes Highway adjacent to the road reserve boundary, linking the informal pathways along the eastern side of the estate to the underpass. The proposed link to the Batemans Bay Public School will pass across Council public reserve land, allowing access to the northern edge of the school grounds. Aerial photograph views of this site show a well-worn pedestrian track encroaching across the corner of the Lincoln Downs site and connecting to the sporting fields and Surfside residential area. This indicates that this pedestrian link is an existing deficit in Council's path network and not solely required for the Bay Ridge Estate.

There would be additional value in providing a pedestrian link along the southern side of Princes Highway between the underpass and the existing paths near Peninsula Drive, completing an alternative pedestrian connection towards central Batemans Bay. This path should be formed behind the existing guardrail barrier fence. This is also an existing deficit in the Council's path network. Some pedestrian traffic presently uses the shoulder of the Princes Highway pavement, in dangerous proximity to highway traffic. This work is not included in proposed works for Bay Ridge Estate.

In summary, shared paths will be provided progressively to service the Bay Ridge Estate as it is developed, with the underpass across Princes Highway and connecting paths proposed to be constructed as part of the Stage 5 subdivision works.

Regards

A handwritten signature in blue ink, appearing to read 'John Wearne', is written above the printed name.

John Wearne

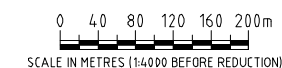
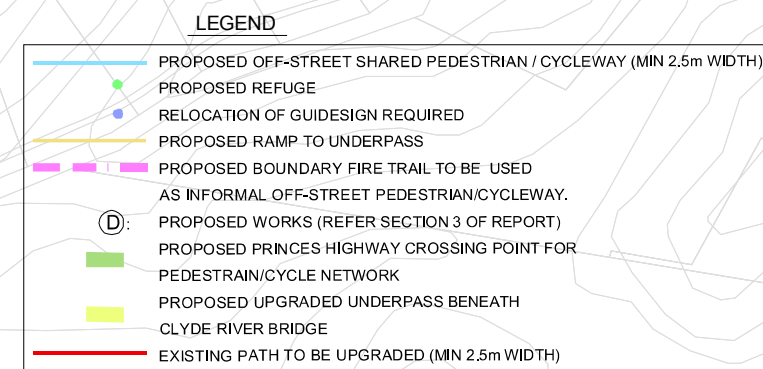
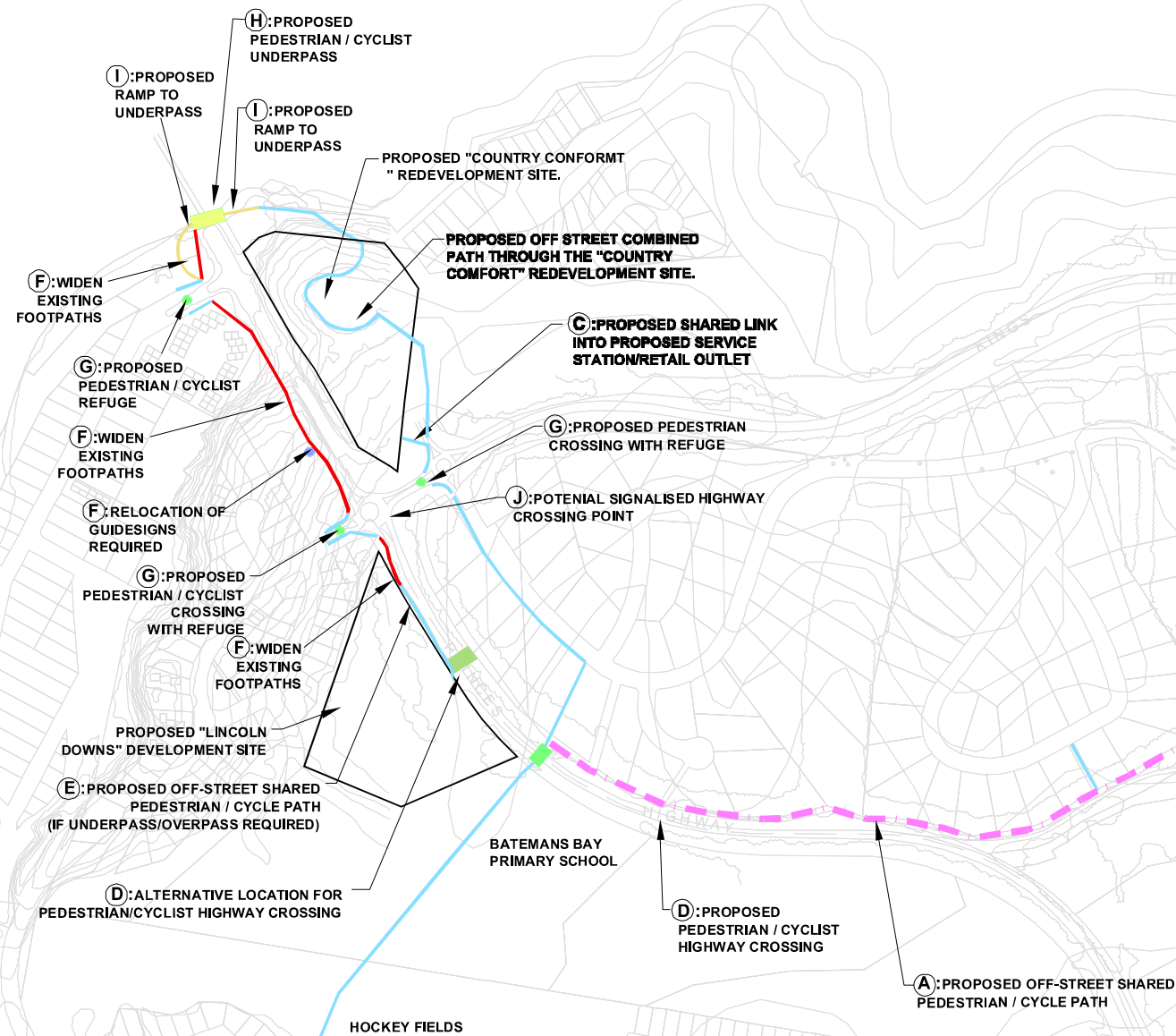
Principal Civil Engineer

Attachments:

Figure 7 Rev 2 from July 2005 report

drawing 23-11848-C005-Revision F – Transport plan

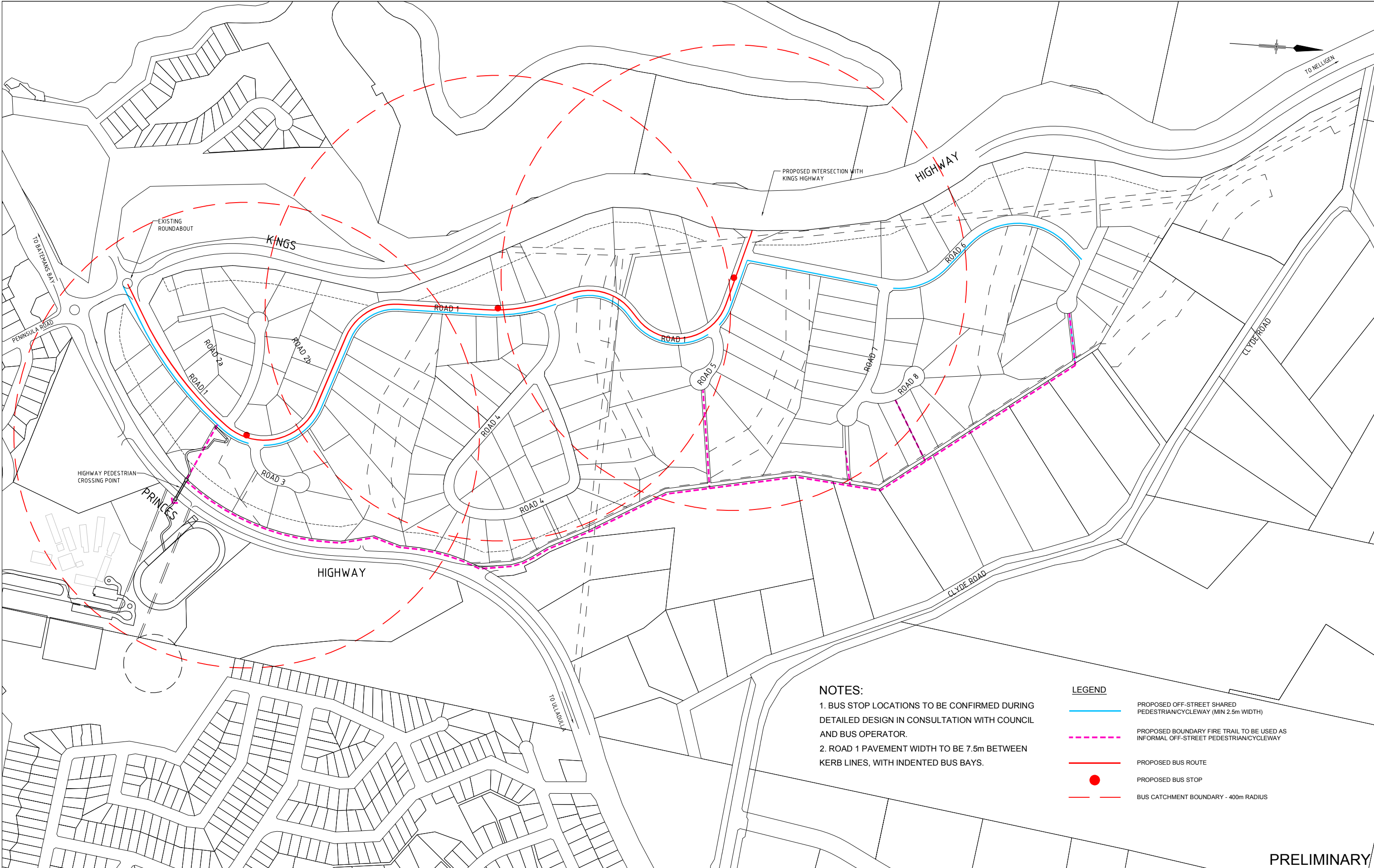
drawing 23-11848-C005-Revision J – Transport plan



BAY RIDGE
NORTH BATEMANS BAY



FIGURE 7 (REV.2)
PEDESTRIAN AND CYCLEWAY
MASTERPLAN
PROPOSED PEDESTRIAN AND CYCLEWAY
NETWORK



F	REVISED DA	GD	PE	PE	29/09/06
E	DRAWING RENUMBERED TO SK014	MW			2/05/06
D	MINOR AMENDMENTS	SH	GG	GG	12/04/06
C	SHARED PATH ARRANGEMENTS ALTERED	DBA	GG	GG	20/02/06
B	SHARED PATH EXTENDED ON ROAD 6	MW	GG		09/02/06
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing			
		Drawn	Checked	Approved	Date



Canberra Investment Corporation Limited



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- NOTES:**
- BUS STOP LOCATIONS TO BE CONFIRMED DURING DETAILED DESIGN IN CONSULTATION WITH COUNCIL AND BUS OPERATOR.
 - ROAD 1 PAVEMENT WIDTH TO BE 7.5m BETWEEN KERB LINES, WITH INDENTED BUS BAYS.

- LEGEND**
- PROPOSED OFF-STREET SHARED PEDESTRIAN/CYCLEWAY (MIN 2.5m WIDTH)
 - PROPOSED BOUNDARY FIRE TRAIL TO BE USED AS INFORMAL OFF-STREET PEDESTRIAN/CYCLEWAY
 - PROPOSED BUS ROUTE
 - PROPOSED BUS STOP
 - BUS CATCHMENT BOUNDARY - 400m RADIUS

Client **CANBERRA INVESTMENT CORPORATION**

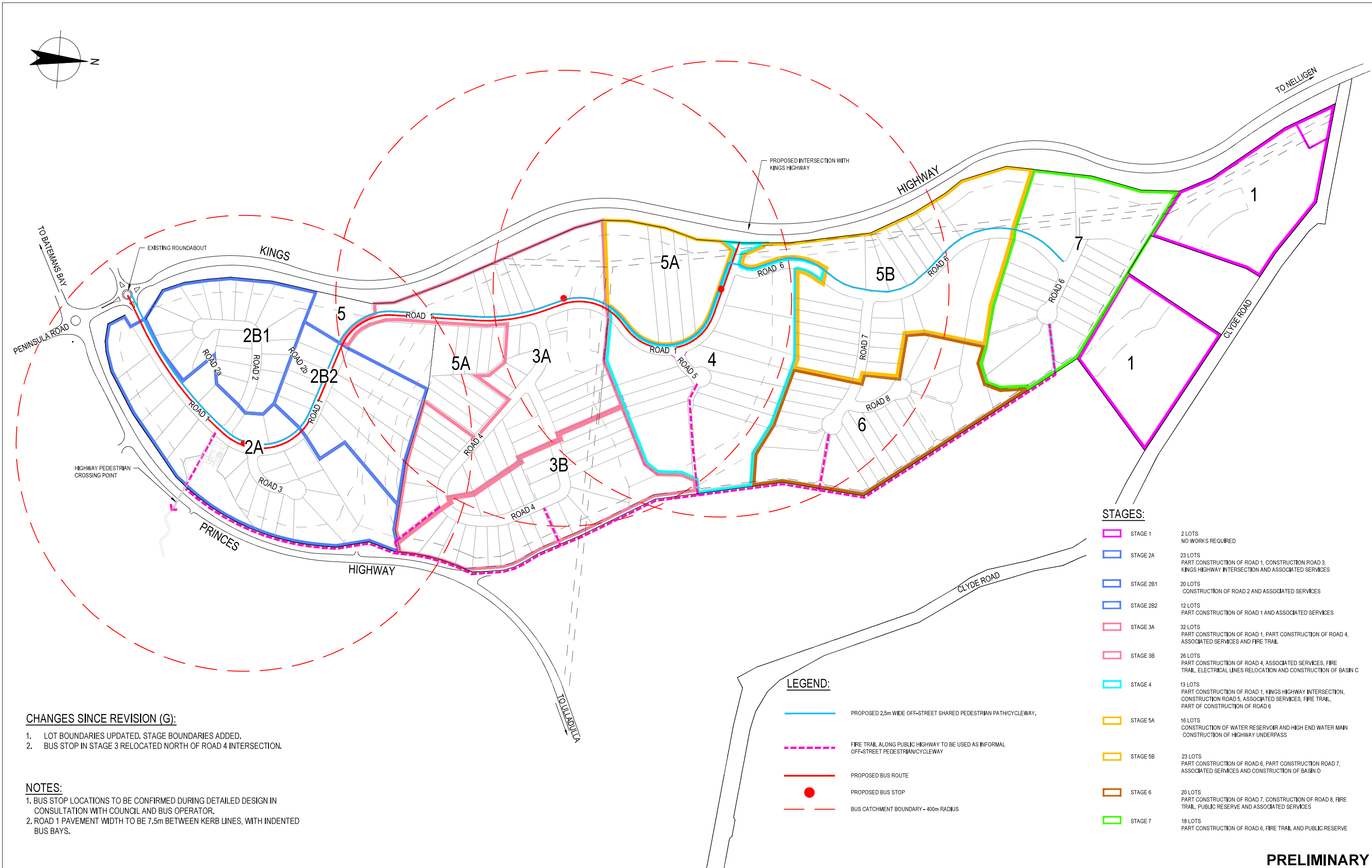
Project **BAY RIDGE ESTATE**

Title **TRANSPORT PLAN**

Original Size **A1**

Drawing No: **23-11848-C005**

Rev: **F**



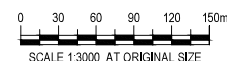
1. LOT BOUNDARIES UPDATED. STAGE BOUNDARIES ADDED.
2. BUS STOP IN STAGE 3 RELOCATED NORTH OF ROAD 4 INTERSECTION.

1. BUS STOP LOCATIONS TO BE CONFIRMED DURING DETAILED DESIGN IN CONSULTATION WITH COUNCIL AND BUS OPERATOR.
2. ROAD 1 PAVEMENT WIDTH TO BE 7.5m BETWEEN KERB LINES, WITH INDENTED BUS BAYS.

	STAGE 1	2 LOTS NO WORKS REQUIRED
	STAGE 2A	23 LOTS PART CONSTRUCTION OF ROAD 1, CONSTRUCTION ROAD 3, KINGS HIGHWAY INTERSECTION AND ASSOCIATED SERVICES
	STAGE 2B1	20 LOTS CONSTRUCTION OF ROAD 2 AND ASSOCIATED SERVICES
	STAGE 2B2	12 LOTS PART CONSTRUCTION OF ROAD 1 AND ASSOCIATED SERVICES
	STAGE 3A	32 LOTS PART CONSTRUCTION OF ROAD 1, PART CONSTRUCTION OF ROAD 4, ASSOCIATED SERVICES AND FIRE TRAIL
	STAGE 3B	26 LOTS PART CONSTRUCTION OF ROAD 4, ASSOCIATED SERVICES, FIRE TRAIL, ELECTRICAL LINES RELOCATION AND CONSTRUCTION OF BASIN C
	STAGE 4	13 LOTS PART CONSTRUCTION OF ROAD 1, KINGS HIGHWAY INTERSECTION, CONSTRUCTION ROAD 5, ASSOCIATED SERVICES, FIRE TRAIL, PART OF CONSTRUCTION OF ROAD 6
	STAGE 5A	16 LOTS CONSTRUCTION OF WATER RESERVOIR AND HIGH END WATER MAIN CONSTRUCTION OF HIGHWAY UNDERPASS
	STAGE 5B	23 LOTS PART CONSTRUCTION OF ROAD 6, PART CONSTRUCTION ROAD 7, ASSOCIATED SERVICES AND CONSTRUCTION OF BASIN D
	STAGE 6	20 LOTS PART CONSTRUCTION OF ROAD 7, CONSTRUCTION OF ROAD 8, FIRE TRAIL, PUBLIC RESERVE AND ASSOCIATED SERVICES
	STAGE 7	18 LOTS PART CONSTRUCTION OF ROAD 6, FIRE TRAIL AND PUBLIC RESERVE

	PROPOSED 2.5m WIDE OFF-STREET SHARED PEDESTRIAN PATH/CYCLEWAY
	FIRE TRAIL ALONG PUBLIC HIGHWAY TO BE USED AS INFORMAL OFF-STREET PEDESTRIAN/CYCLEWAY
	PROPOSED BUS ROUTE
	PROPOSED BUS STOP
	BUS CATCHMENT BOUNDARY - 400m RADIUS

J	LOT DETAILS		RM	GP*	JW*	30.06.17
I	REVISED DA SUBMISSION		RM	GP*	JW*	16.12.16
H	REVISED DA - LOTS AMENDED		RM	GP*	JW*	21.10.16
G	REVISED DA REISSUE		SR	JW*	JW*	20.12.07
F	REVISED DA		GD	PE	PE	29.09.06
No	Revision	Note.* indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date



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	Drafting JW*
	Approved J. WEARNE* (Project Director)
	Date 20.12.2007

Design Check	JW*
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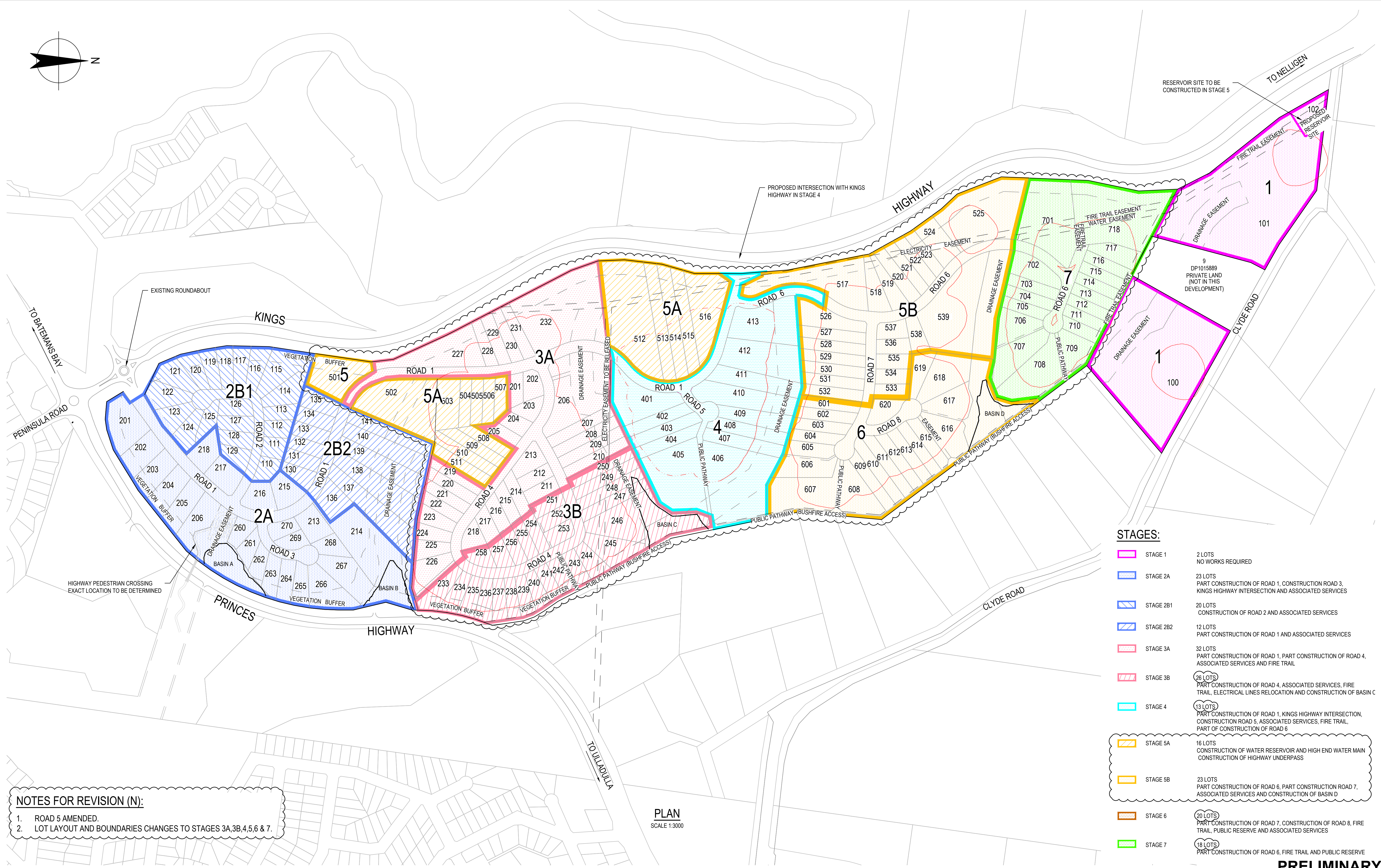
	Project
	Title

Original Size	
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Original Size	A1	Drawing No:	23-11848-C005
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Rev: J

Appendix C – Staging Plan Drawing



NOTES FOR REVISION (N):

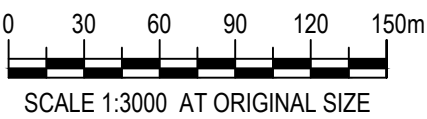
- 1. ROAD 5 AMENDED.
- 2. LOT LAYOUT AND BOUNDARIES CHANGES TO STAGES 3A,3B,4,5,6 & 7.

STAGES:

- STAGE 1: 2 LOTS, NO WORKS REQUIRED
- STAGE 2A: 23 LOTS, PART CONSTRUCTION OF ROAD 1, CONSTRUCTION ROAD 3, KINGS HIGHWAY INTERSECTION AND ASSOCIATED SERVICES
- STAGE 2B1: 20 LOTS, CONSTRUCTION OF ROAD 2 AND ASSOCIATED SERVICES
- STAGE 2B2: 12 LOTS, PART CONSTRUCTION OF ROAD 1 AND ASSOCIATED SERVICES
- STAGE 3A: 32 LOTS, PART CONSTRUCTION OF ROAD 1, PART CONSTRUCTION OF ROAD 4, ASSOCIATED SERVICES AND FIRE TRAIL
- STAGE 3B: 26 LOTS, PART CONSTRUCTION OF ROAD 4, ASSOCIATED SERVICES, FIRE TRAIL, ELECTRICAL LINES RELOCATION AND CONSTRUCTION OF BASIN C
- STAGE 4: 13 LOTS, PART CONSTRUCTION OF ROAD 1, KINGS HIGHWAY INTERSECTION, CONSTRUCTION ROAD 5, ASSOCIATED SERVICES, FIRE TRAIL, PART OF CONSTRUCTION OF ROAD 6
- STAGE 5A: 16 LOTS, CONSTRUCTION OF WATER RESERVOIR AND HIGH END WATER MAIN, CONSTRUCTION OF HIGHWAY UNDERPASS
- STAGE 5B: 23 LOTS, PART CONSTRUCTION OF ROAD 6, PART CONSTRUCTION ROAD 7, ASSOCIATED SERVICES AND CONSTRUCTION OF BASIN D
- STAGE 6: 20 LOTS, PART CONSTRUCTION OF ROAD 7, CONSTRUCTION OF ROAD 8, FIRE TRAIL, PUBLIC RESERVE AND ASSOCIATED SERVICES
- STAGE 7: 18 LOTS, PART CONSTRUCTION OF ROAD 6, FIRE TRAIL AND PUBLIC RESERVE

PRELIMINARY

O	LOT DETAILS	RM	GP*	JW*	30.06.17		
N	REVISED DA	RM	GP*	JW*	16.12.16		
M	CHANGES TO REVISION CLOUD	EP	GD*	JW*	24.06.14		
L	REVISED DA - STAGE 2B	RC	GD*	JW*	25.02.14		
K	REVISED DA - STAGE 2B	RC	GD*	JW*	20.02.14		
No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing		Drawn	Job Manager	Project Director	Date



DO NOT SCALE		Drawn S. Ritchie	Designer S. Ritchie	Client	ACT LAND PTY LTD		
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		Approved (Project Director)		Title	STAGING PLAN		
		Date	This Drawing must not be used for Construction unless signed as Approved		Original Size	Drawing No: 23-11947-C002B	
		Scale 1:3000			A1	Rev: O	

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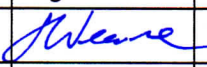
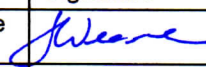
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Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	Darren D'Souza	John Weame		John Weame		26/10/17

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