Transport Impact Assessment

Blueys Beach Subdivision
Development Application

50522032

Prepared for

Addenbrooke Pty Ltd

23 August 2022

Cardno

now

Stantec

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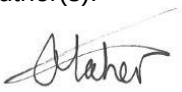
Document Information

Prepared for	Addenbrooke Pty Ltd
Project Name	Blueys Beach Subdivision Development Application
File Reference	Blueys Beach Subdivision Traffic Impact Assessment V02.docx
Job Reference	50522032
Date	23 August 2022
Version Number	02

Author(s):



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Effective Date 23/08/2022

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Date Approved 23/08/2022

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by
01	10/08/2022	Draft	TM	JS
02	23/08/2022	DA Submission	TM	JS

Table of Contents

Appendices

Appendix A SIDRA Outputs

Appendix B Traffic Data and Calculations

Appendix C Concept Masterplan

Tables

Figures

1 Introduction

Cardno, now Stantec was engaged by Addenbrooke Pty Ltd to undertake a local traffic network assessment to assess the potential traffic impacts generated by the proposed new development of 73 residential allotments and 2 commercial lots upon Lot 23 DP537919, Blueys Beach NSW, off Boomerang Drive.

1.1 Scope of Services

1.1.1 Literature Review and Data Gathering

Cardno, now Stantec have examined number of resources available for the project. This included *RTA Guide to Traffic Generating Developments (October 2002)*, *Guide to Traffic Generating Developments Updated Traffic Surveys (August 2013)*, *RMS Trip Generation Surveys*, *MidCoast Council Great Lakes Development Control Plan Chapters 9 & 10 (January 2019)*, MidCoast Council *AUS-SPEC Infrastructure Specifications 0041 Geometric Sealed Road Design (November 2020)*, MidCoast Council *Development Engineering Handbook Part E6 (August 2019)*, and *Austroads Guide to Traffic Management Part 12 – Traffic Impacts of Development Chapter 4 (August 2009)*.

1.1.2 Traffic Modelling

Four (4) intersections within direct proximity to the development will be investigated in order to determine the flow on affects from this development. Using SIDRA 9 traffic modelling software, Cardno, now Stantec undertook individual modelling of the following non-signalised intersections across the Boomerang Drive network (shown in **Table 1-1** and **Figure 1-1**).

Table 1-1 Nominated Intersections

No.	Intersection
1.	Croll Street / Boomerang Drive
2.	Proposed Road 02 / Croll Street
3.	Proposed Road 03 / Proposed Road 02
4.	Proposed Road 04 / Proposed Road 04 / Croll Street / View Street

1.1.3 Scenario Modelling

Cardno, now Stantec modelled the aforementioned intersections in both the AM and PM Peak hours for the following scenarios:

- Current 2022 Base Normal Conditions
- Current 2022 Base 100th Highest Hour Conditions
- Future 2032 'Pre-Development' Normal Conditions
- Future 2032 'Pre-Development' 100th Highest Hour Conditions
- Future 2032 'Post-Development' Normal Conditions
- Future 2032 'Post-Development' 100th Highest Hour Conditions

A total of 4 individual models with 16 varying scenarios each have been created for this exercise. The modelling is aimed to demonstrate the projected impact of development on the external road network. It is noted that the 100th hour assessment is a representation of the traffic volume modelled during infrequent localised peaks, typically experienced during holiday periods.

1.1.4 Reporting

Results and findings from the investigation have been compiled and summarised within this report.

1.2 Objectives

The purpose of this report is to assess the current operation of the existing Boomerang Drive traffic network and to determine the net effect that the proposed Blueys Beach subdivision development will have on the immediate road network.

Cardno, now Stantec have undertaken SIDRA traffic modelling for the local network which included the traffic survey data from local network and the proposed traffic generation volumes from the Blueys Beach subdivision residential development.

The purpose is to achieve in-principal support from the MidCoast Council confirming that the proposed Blueys Beach subdivision development will not have significant detrimental impact on the surrounding local traffic network.

1.3 Standards

The following standards were used in the preparation of this report.

Table 1-2 List of Standard Documentation

Standard	Authority	Year
Great Lakes Development Control Plan Chapters 9 - Subdivision	MidCoast Council	2019
Great Lakes Development Control Plan Chapter 10 – Car Parking, Access, Alternative and Active Travel	MidCoast Council	2019
AUS-SPEC Infrastructure Specifications 0041 - Geometric Sealed Road Design (November 2020)	MidCoast Council	2020
Traffic Modelling Guidelines 2002	NSW Transport Roads and Maritime Services (now TfNSW)	2013
Guide to Traffic Generating Developments - Updated Traffic Surveys	NSW Transport Roads and Maritime Services (now TfNSW)	2013
AGTM Part 12 Traffic Impacts of Development Chapter 4 – Traffic Impact Assessment	Austroads	2009

2 Existing Conditions

2.1 Location of Site

The site is located south west of the existing Bluey Beach township between Boomerang Drive, Croll Street and Newman Avenue, and is currently access via rural gates at Croll Street and Newman Avenue. The site is currently undeveloped and has previously been used as grazing land. The below figure provides an aerial image of the site and its surroundings.

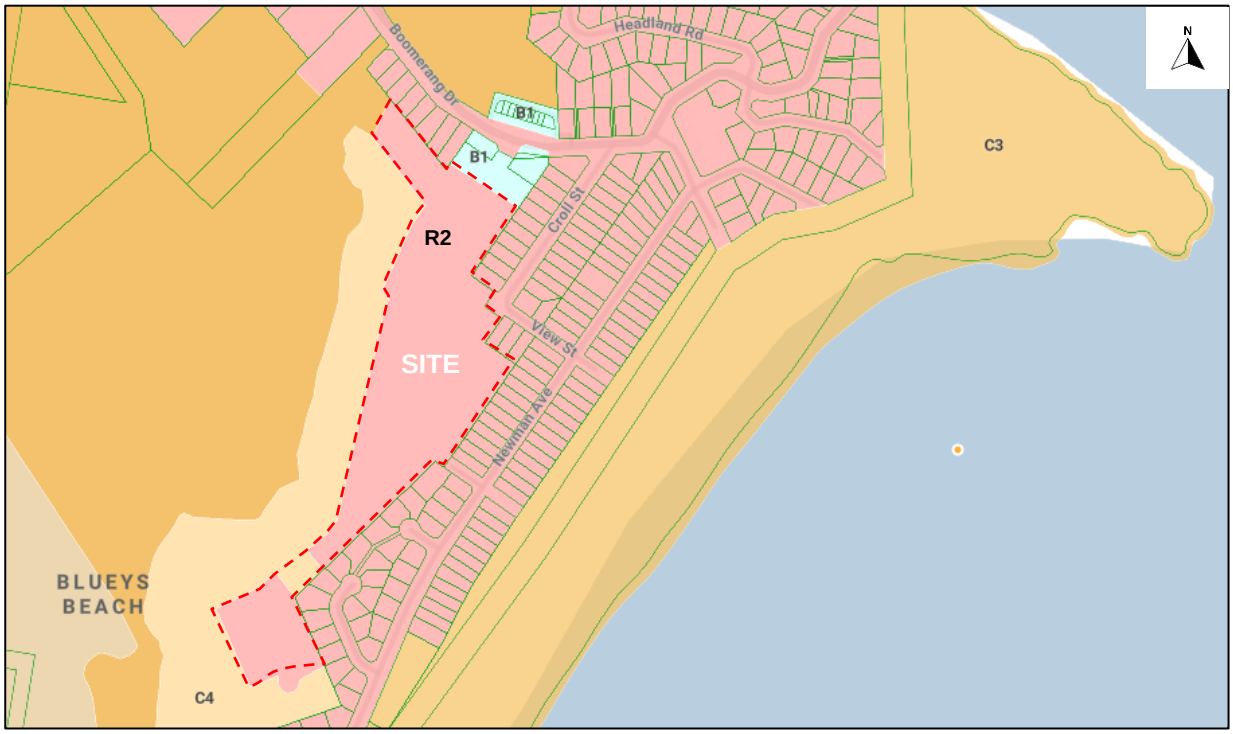
Figure 2-1 Aerial Image of the site and its surroundings

2.2 Land Use Zoning

The below figure show the land use zoning of the proposed development site in the context of the surrounding area including adajacent sites. Lot 23 DP 537919 contains various land uses across all 35 Hectares which include the following zones

- B1 Neighbourhood Centre;
- C4 Environmental Living;
- C2 Environmental Conservation;
- R2 Low Density Residential; and,
- RU2 Rural Landscape.

Figure 2-2 Land Use Zoning



2.3 Local Road and Intersection Descriptions

The local roads within direct proximity to the proposed Blueys Beach subdivision development are listed below. These roads have the potential to be impacted by the proposed development and as such will be subject to analysis within this assessment.

2.3.1 Boomerang Drive

Boomerang Drive is a local loop road connecting the townships of Blueys Beach, Boomerang Beach and Elizabeth Beach with The Lakes Way to the south and Lakeside Crescent to the north. Boomerang Drive has a single lane sealed carriageway of approximately 7 meters with accommodation for formal on-street car parking in the Blueys Beach and Boomerang Beach townships. Inside these areas, formal kerb and gutters are present. Outside of the townships, Boomerang Drive does not have a formal kerb and gutter which allows for informal car parking along the shoulders of the road. Boomerang Drive has a sign posted speed limit of 60 km/h outside of the Blueys Beach and Boomerang Beach townships and 50km/h inside these townships.

Figure 2-3 Boomerang Drive heading east towards the Town Centre and Croll Street

2.3.2 Croll Street

Croll Street is an access street within the Blueys Beach township and provides connection from Boomerang Drive to residential dwellings located to the south of Boomerang Drive along Croll Street and View Street. The configuration of Croll Street and View Street is such that it allows for a secondary connection from Boomerang Drive for residential dwellings located further south of Croll Street. Croll Street operates as a single carriage roadway of approximately 5 meters which intersects perpendicular to Boomerang Drive with give way control attributed to Croll Street. Croll Street has a speed limit of 50km/h and does not have formal kerb and gutters, which allows for informal car parking along the shoulders of the road.

Figure 2-4 Croll Street heading north towards Boomerang Drive

2.3.3 View Street

View Street is a short access street which connects Croll Street with Newman Avenue. View Street has equal characteristics of Croll Street as the two provide a secondary connection from Boomerang Drive to the southern Blueys Beach residential dwellings. View Street operates as a single carriage roadway of approximately 5 meters which intersects perpendicular to Newman Avenue with give way control attributed to View Street. View Street has a speed limit of 50km/h and does not have formal kerb and gutters, which allows for informal car parking along the shoulders of the road.

Figure 2-5 View Street heading west towards Croll Street

2.4 Active Travel

2.4.1 Footpaths and Cycling

Residents within Blueys Beach have limited access to active travel facilities through one main footpath along Boomerang Drive, which stretches from Reef Circuit through to Karnang Drive. This footpath provides opportunities for residents which front Boomerang Drive access to the Blueys Beach shops. The southern and eastern sections of Blueys Beach (including residents of Croll Street, and Newman Avenue) do not have a formal footpath network. Pedestrian activity occurs within the carriageway (road shoulders) and verges.

There are no dedicated bicycle lanes or routes in Blueys Beach. Due the low-speed nature of roads and the low daily volumes along the local road network, the area is considered to be bicycle friendly.

2.4.2 Bus Services

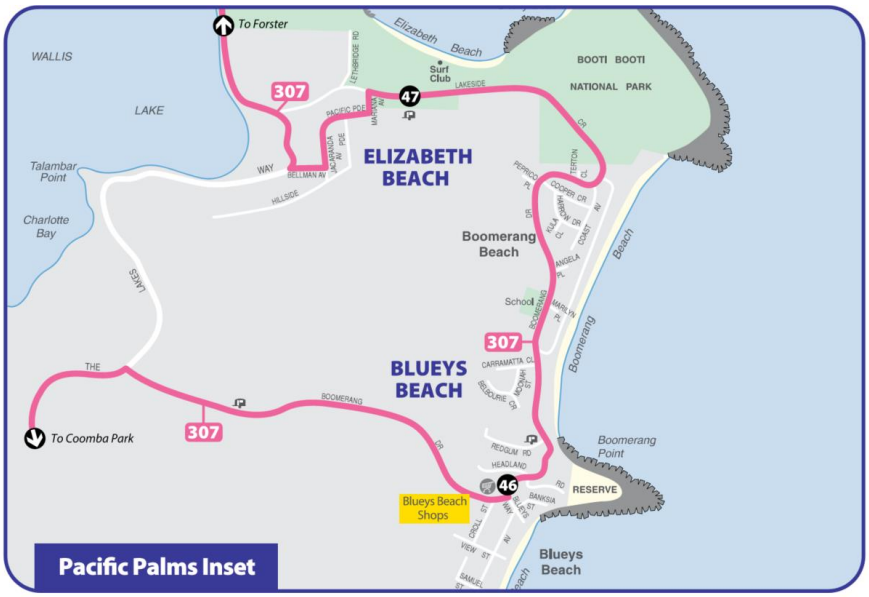
A regional bus service currently provides public transport opportunities for the Pacific Palms community to Forster. This service is operated by Buslines Group with Route 307 connecting Coomba Park to Forster. This service stops adjacent to the Blueys Beach shops and runs three times daily during weekdays and four times daily during school holidays. This service does not operate during weekends. A timetable and map of the route is displayed in **Table 2-1** and **Figure 2-6** below:

Table 2-1 Buslines Group Route 307 - Timetable

Number	Route	Origin Depart Time	Destination Arrival Time
307	Coomba Park to Forster	7:08	8:30
		9:00 [1]	10:00
		15:15 [2]	16:05
		7:50 [6]	9:00
307	Forster to Coomba Park	7:53 [3]	8:24 [3]
		13:20 [4]	14:15
		15:17 [5]	16:25
		13:25 [6]	14:35

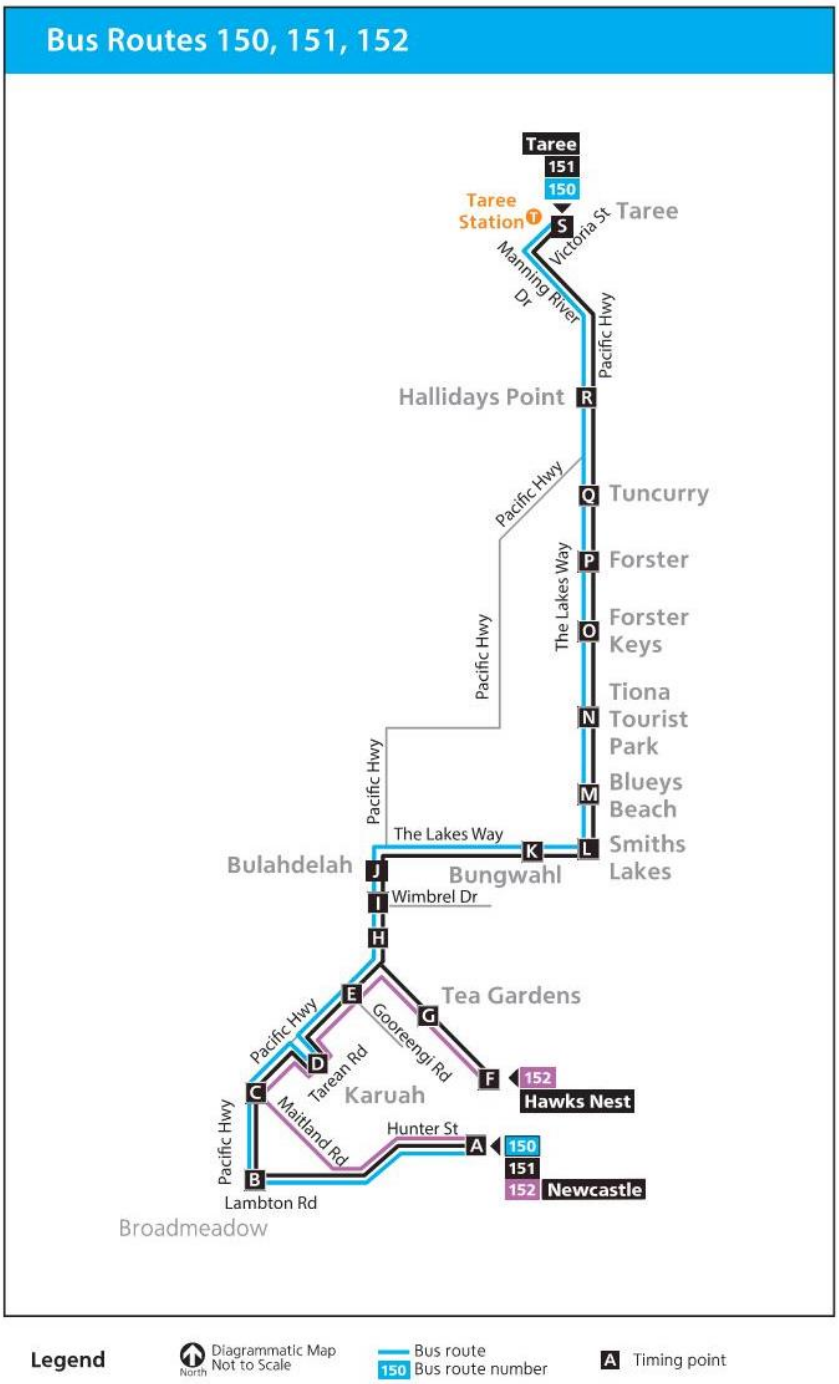
[1] Pickup from Tarbuck Bay (bus shelter)
[2] Pickup from Smiths Lake Shops
[3] Pickup near Stockland on Lakes Way and Drop off at either Smith Lakes Shops
[4] Drop off at Tarbuck Bay (bus shelter)
[5] Pickup from Forster Bowling Club
[6] Service only runs during school holidays.

Figure 2-6 Buslines Group Route 307 – Route Map



The community also has access to bus service routes 150, 151 and 152 which are operated by Busways Great Lakes. Users can access both Newcastle and Taree through this bus service which operates twice a day in the AM and PM during weekdays and once a day in the PM on weekends/public holidays. **Figure 2-7** below shows the routes and stops for the abovementioned bus routes.

Figure 2-7 Busways Great Lakes Routes 150, 151 and 152 (Newcastle to Taree) – Route Map



2.4.3 Road Safety and Crash History

Cardno have utilised crash history Data from the NSW Centre for Road Safety Interactive crash statistics to review the local traffic network, around the intersections being assessed, in the context of road safety. Overall, there have been 4 crashes in the assessment area since 2015. The search area for the proposed development includes the following roads:

- Boomerang Drive from Lakeside Crescent to The Lakes Way;
- The Lakes Way from Boomerang Drive to Coomba Road.

All crash locations within proximity to the intersections analysed in this report are listed in **Figure 2-6** with additional details listed in **Table 2-1** below.

The development has been reviewed in the context of road safety and possible issues arising from the development. The review considered existing transport infrastructure surrounding the site, as well as the proposed interfaces of new connections to be constructed.

Based on the review of available information, the proposed development is unlikely to have an adverse impact on the safety and operability of the road network surrounding the site.

Figure 2-8 Vehicle crash locations between 2016 and 2020 within proximity to the Boomerang Drive road network

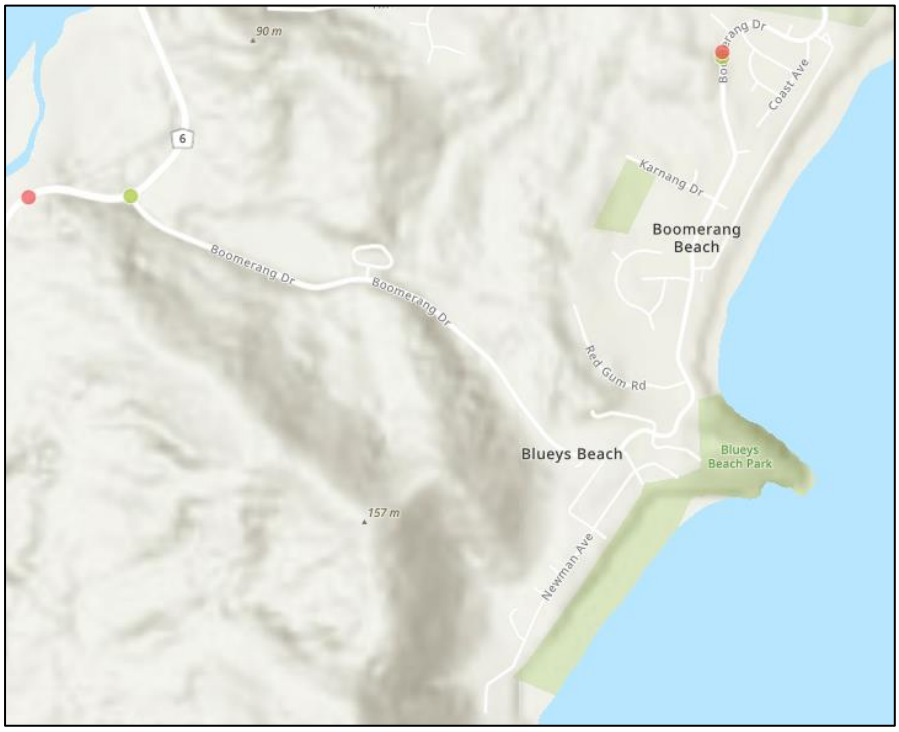


Table 2-2 Vehicle crash details between 2016 and 2020 within proximity to the Boomerang Drive road network

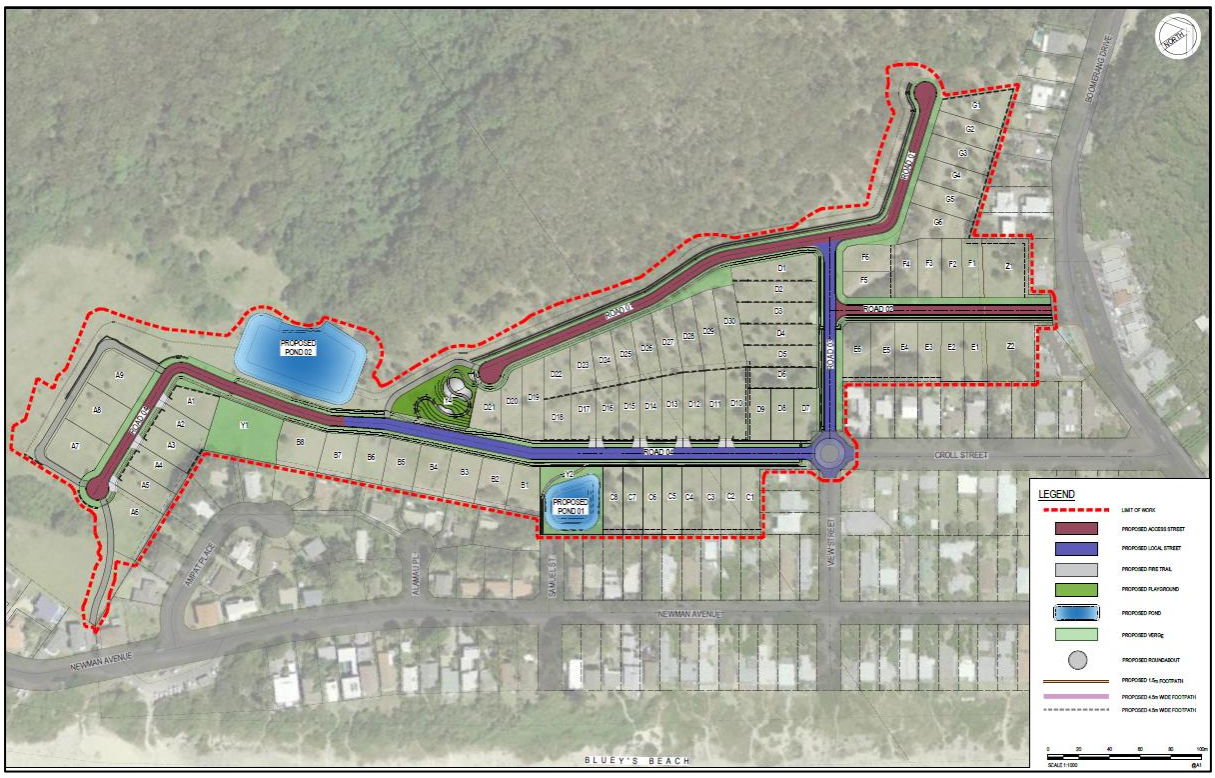
Year	Crash Id	Degree of crash	RUM code	RUM description	Type of location	Natural lighting	Longitude	Latitude	No. injured
2017	1157829	Serious Injury	20	Head on	2-way undivided	Daylight	152.54126	-32.33633	2
2018	1174740	Serious Injury	86	Off left/left bend	T-junction	Daylight	152.52061	-32.34047	1
2020	1230035	Non-casualty (towaway)	81	Off left/right bend => obj	2-way undivided	Darkness	152.51704	-32.34047	0
2020	1240016	Non-casualty (towaway)	85	Off right/left bend => obj	2-way undivided	Darkness	152.54126	-32.33619	0

3 Proposed Development

The proposed Blueys Beach subdivision development upon Lot 23 DP 537919, is new subdivision located to the south west of the existing Blueys Beach township.

The development is proposing to construct 73 residential allotments and 2 commercial allotments. Proposed access to the subdivision is to be gained via a T-intersection along Boomerang Drive and a roundabout off the intersection of Croll Street and View Street. Refer to **Figure 3-1** for further details.

Figure 3-1 Proposed Blueys Beach Subdivision Layout



3.2 Internal Roads

The concept layout shown in **Figure 3-1** above provides an indicative layout of the proposed subdivision and internal road network, of which will there will be four new roads and intersections. The concept plans have been assessed against *Annexure M5 – Road Classification Table from the MidCoast Council's Engineering Design Specifications (AUS-SPEC Infrastructure Specifications 0041 - Geometric Sealed Road Design, November 2020)* and developed accordingly.

- Roads 01 and 02 are classified as access streets with a 16-meter road reserve.
- Roads 03 and 04 are classified as local roads and with a 17-meter road reserve.

All internal roads will contain Roll Top Kerb and will provide access to residential dwellings and allowing for two lanes of traffic and passive parking opportunities on sides of the road. The speed environment would be expected to be < 50km/h, similar to typical residential streets within the local area.

3.3 Internal Footpaths

The proposed development will include pedestrian footpaths which integrate into the existing Blueys Beach footpath network. All footpaths are designed in accordance with *Annexure M5 – Road Classification Table from the MidCoast Council's Engineering Design Specifications (AUS-SPEC Infrastructure Specifications 0041 - Geometric Sealed Road Design, November 2020)*. Footpaths will be located along roads 01, 02, 03, and 04 will contain either 1.5 - 2-metre footpaths connecting proposed lots and recreation areas to Newman Avenue, Samuel Street, Croll Street and the Blueys Beach commercial centre.

4 Traffic Engineering Assessment

Cardno have undertaken a traffic assessment in accordance with *MidCoast Council Development Engineering Handbook* and relevant chapters within *AUSTROADS Guide to Traffic Management Part 12*, *RTA Guide to Traffic Generating Developments (2002)*, *RMS Guide to Traffic Generating Developments – Updated Traffic Surveys (2013)*, and *AS/NZS 2890 Parking Facilities set*.

4.1 Existing Traffic Volumes

Both historic and current traffic volume tube counts were provided by the MidCoast Council for the purpose of establishing an accurate base volume across the local traffic network. Tube counts were recorded along Boomerang Drive between 06 February 2021 through to 13 February 2021 with the 5-day average of 2861 vehicle trips per day (vtpd). Croll Street tube counts were recorded between 12 February 2022 through to 12 March 2022 with the 5-day average being 198 vehicle trips per day (vtpd). Historic tube count data from February 2015 was also provided by MidCoast Council to establish a volume growth rate for future scenario modelling.

Locations of the tube counters are displayed in **Figure 4-1** below.

Figure 4-1 Council Tube Count Locations

Based on the local characteristics of Boomerang Drive and Croll Street, a 50/50 directional split was applied to the tube count data to allow for directional peak hour volumes to be established for each approach.

Table 4-1 Base/Future Traffic Volumes based off Council Tube Count Data

Base / Future Traffic Volumes							
Road	**Direction**	**2022 Peak Hour**		**2022 AADT**	**2032 Peak Hour**		**2032 AADT**
		AM	**PM**	**All**	**AM**	**PM**	**All**
Boomerang Drive	Eastbound	151	151	3023	262	262	5247
	Westbound	151	151		262	262	
Croll Street	Northbound	10	10	198	15	15	306
	Southbound	10	10		15	15	

Table 4-2 Base/Future Traffic Volumes based off Council Tube Count Data (factored to the 100th highest hour)

100th Highest Hour Traffic Volumes							
Road	**Direction**	**2022 Highest Peak Hour**		**2022 AADT**	**2032 Highest Peak Hour**		**2032 AADT**
		AM	**PM**	**All**	**AM**	**PM**	**All**
Boomerang Drive	Eastbound	302	302	3023	525	525	5247
	Westbound	302	302		525	525	
Croll Street	Northbound	20	20	198	31	31	306
	Southbound	20	20		31	31	

4.2 Traffic Generation

RMS' *Guide to Traffic Generation Developments – Technical Direction 2013 04a (TDT 2013 /04a)* specifies traffic generation rates for different land uses. For low density residential dwellings in regional areas, as is being considered for the proposed subdivision, *TDT 2013/04a* recommends trip rates of 0.71 trips per dwelling per hour during the morning peak (AM), and 0.78 trips per dwelling per hour during the evening peak (PM). For commercial/retail, Section 3.6.1 of *RTA Guide to Traffic Generating Developments (2002)* recommends a trip generation rate of 12.5 trips per hour. A 25% discount was applied to the traffic generation to allow for multi-trips. As such, the expected trip generation for the subdivision is shown below in **Table 4-3**.

Table 4-3 Trip Generation Rates in the Peak Hour

Land Use	Yield	Peak Period	Trip Rate	Peak Direction	Peak Split	Trips
Single Residential	73	AM	0.71	In	0.20	10
				Out	0.80	41
		PM	0.78	In	0.70	40
				Out	0.30	17
Commercial Retail	900m^2 (GLFA)	AM	12.5/100m^2	In	0.50	42
				Out	0.50	42
		PM	12.5/100m^2	In	0.50	42
				Out	0.50	42
Total		**AM**		In		52
				Out		83
				Total		**135**
		PM		In		82
				Out		59
				Total		**141**

4.3 Proposed Access Roads

Access to and from the site will be gained via two locations to allow for improved vehicular circulation and permeability within the local network. Access from these locations will require construction of two new intersections, they will include:

1. A roundabout intersection at the junction of Proposed Road 04 / Proposed Road 03 / Croll Street / View Street (herein referred to as the Croll Street Roundabout); and,
2. A T-intersection at the northern end of Proposed Road 02 and Boomerang Drive (herein referred to as the Boomerang Drive T-Intersection).

It is envisaged that the Boomerang Drive T-intersection will contain local area traffic management treatments (LATM) i.e. reduced speed zones, speed bumps, raised threshold crossings, chicanes, textural changes to pavement to help create a low speed environment which is sympathetic to pedestrian activity within the Blueys Beach commercial area. Specific LATM treatments will be further refined and incorporated in the detailed design phase of the project. These treatments will aid in the improving both vehicle and pedestrian circulation in and around the Blueys Beach commercial area.

4.4 Traffic Distribution

Cardno has developed an assumption of traffic distribution to and from the development based on places of employment in the region, local services and likely destinations for visitors to the area. The traffic modelling incorporates the two points of access mentioned above. The percentage of residents accessing the proposed development via each access point was determined through analysis of the shortest route from the assumed origin.

The percentage split for vehicles accessing the proposed development for each intersection is listed in the table below:

Table 4-4 Percentage split for vehicles accessing the proposed development

Proposed Access Intersection	Percentage Split
Croll Street Roundabout	55%
Boomerang Drive T-Intersection	45%

4.4.2 Blueys Beach Subdivision Residential Development AM Peak Hour Traffic Distribution

Outbound via Croll Street Roundabout

- 10% (*2 vehicles*) turn left onto Croll Street from Proposed Road 03;
- 90% (*20 vehicles*) continue through onto the Croll Street from the Proposed Road 04;

Inbound via Croll Street Roundabout

- 10% (*1 vehicle*) turn right from Croll Street onto Proposed Road 03;
- 90% (*5 vehicles*) continue through to the development onto Proposed Road 04 from Croll Street.

Outbound via Boomerang Drive T-Intersection

- 50% (*9 vehicles*) turn left onto the Boomerang Drive from the development;
- 50% (*9 vehicles*) turn right onto the Boomerang Drive from the development;

Inbound via Boomerang Drive T-Intersection

- 50% (*2 vehicles*) turn left onto Proposed Road 02 from Boomerang Drive;
- 50% (*2 vehicles*) turn right onto Proposed Road 02 from Boomerang Drive.

4.4.3 Blueys Beach Subdivision Residential Development PM Peak Hour Traffic Distribution

Outbound via Croll Street Roundabout

- 10% (*1 vehicle*) turn left onto Croll Street from Proposed Road 03;
- 90% (*8 vehicles*) continue through onto the Croll Street from the Proposed Road 04;

Inbound via Croll Street Roundabout

- 10% (*2 vehicles*) turn right from Croll Street onto Proposed Road 03;
- 90% (*20 vehicles*) continue through to the development onto Proposed Road 04 from Croll Street.

Outbound via Boomerang Drive T-Intersection

- 50% (*4 vehicles*) turn left onto the Boomerang Drive from the development;
- 50% (*4 vehicles*) turn right onto the Boomerang Drive from the development;

Inbound via Boomerang Drive T-Intersection

- 50% (*9 vehicles*) turn left onto Proposed Road 02 from Boomerang Drive;
- 50% (*9 vehicles*) turn right onto Proposed Road 02 from Boomerang Drive.

4.4.4 Blueys Beach Subdivision Commercial Development AM Peak Hour Traffic Distribution

Outbound via Croll Street Roundabout

- 12% (*5 vehicle*) turn right onto Proposed Road 04 from Proposed Road 03;
- 23% (*10 vehicles*) continue through onto the View Street from the Proposed Road 03;

Inbound via Croll Street Roundabout

- 12% (*5 vehicles*) turn left onto Proposed Road 03 from Proposed Road 04;
- 23% (*10 vehicles*) continue through to Proposed Road 03 from View Street.

Outbound via Boomerang Drive T-Intersection

- 21% (*9 vehicles*) turn left onto the Boomerang Drive from Proposed Road 02;
- 44% (*18 vehicles*) turn right onto the Boomerang Drive from Proposed Road 02;

Inbound via Boomerang Drive T-Intersection

- 21% (*9 vehicles*) turn right onto Proposed Road 02 from Boomerang Drive;
- 44% (*18 vehicles*) turn left onto Proposed Road 02 from Boomerang Drive.

4.4.5 Blueys Beach Subdivision Commercial Development PM Peak Hour Traffic Distribution

Outbound via Croll Street Roundabout

- 12% (*5 vehicle*) turn right onto Proposed Road 04 from Proposed Road 03;
- 23% (*10 vehicles*) continue through onto the View Street from the Proposed Road 03;

Inbound via Croll Street Roundabout

- 12% (*5 vehicles*) turn left onto Proposed Road 03 from Proposed Road 04;
- 23% (*10 vehicles*) continue through to Proposed Road 03 from View Street.

Outbound via Boomerang Drive T-Intersection

- 21% (*9 vehicles*) turn left onto the Boomerang Drive from Proposed Road 02;
- 44% (*18 vehicles*) turn right onto the Boomerang Drive from Proposed Road 02;

Inbound via Boomerang Drive T-Intersection

- 21% (*9 vehicles*) turn right onto Proposed Road 02 from Boomerang Drive;
- 44% (*18 vehicles*) turn left onto Proposed Road 02 from Boomerang Drive.

4.4.6 Heavy Vehicles

Due to the regional nature of Boomerang Drive and Croll Street, the presence of heavy vehicles is much greater than standard local roads. Data provided from the MidCoast Council shows a base year heavy vehicle percentage of 11.7% for Croll Street and 13.1% for Boomerang Drive. These percentages were applied to all movements across existing local traffic network. A lower percentage of 5% was adopted for proposed roads within proposed development owing to their local nature and low interconnectivity with the existing network.

To reduce the complexity of the traffic volume application, it was assumed that the same percentage of heavy vehicles be applied to both directions of travel throughout the modelling.

4.4.7 Growth Rate

Linear growth rates were calculated for both Croll Street and Boomerang Drive utilising historical 5-day average traffic data provided from the MidCoast Council from 2015 through to 2022. These rates listed in **Tables 4-6** and **4-7** were applied to the base volumes for both 2032 future 'pre and 'post development modelling scenarios.

Table 4-5 Croll Street Linear Growth Rate

Year	2015	2022
Volume	150	198
Growth Rate		**4.05%**

Table 4-6 Boomerang Drive Linear Growth Rate

Year	2015	2021
Volume	1945	2861
Growth Rate		**5.67%**

4.5 Turn Warrant Assessment

4.5.1 Boomerang Drive T-Intersection

A turn warrant assessment of the proposed Boomerang Drive T-intersection was undertaken to determine the appropriate turn treatments allow for safe turning movements of east and westbound vehicles from Boomerang Drive into Proposed Road 02 and vice versa. The assessment was undertaken in accordance with *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossing Management,* and *Austroads Guide to Road Design Part 4A – Unsignalised and Signalised Intersections.*

From the calculated traffic volumes in **Tables 7-2**, and **7-6**, approximately 270 vehicles travel through the proposed intersection from both east and west approaches during both AM and PM peak hours. 30 vehicles turn left and 15 vehicles turn right from Boomerang Drive into Proposed Road 02 during the PM peak hour.

Further details are presented in **Figure 4-2**. In accordance with *Table 3.2.5* from the *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossing Management* these volumes warrant both Basic right-turn (BAR) and Basic left-turn (BAL) treatments at both east and west approaches of the Boomerang Drive T-intersection. An initial geometric assessment has confirmed that the existing carriageway has the capacity to house the required BAR turning treatment, see **Figure 4-3** for further details.

Specific line marking geometry associated with the below turn treatments will be further refined and incorporated in the detailed design phase of the project. These treatments will aid in ensuring both vehicle and pedestrian safety in and around the Blueys Beach commercial area and will be designed with appropriate LATM treatments.

Figure 4-2 Turn Warrant Assessment for Boomerang Drive T-intersection

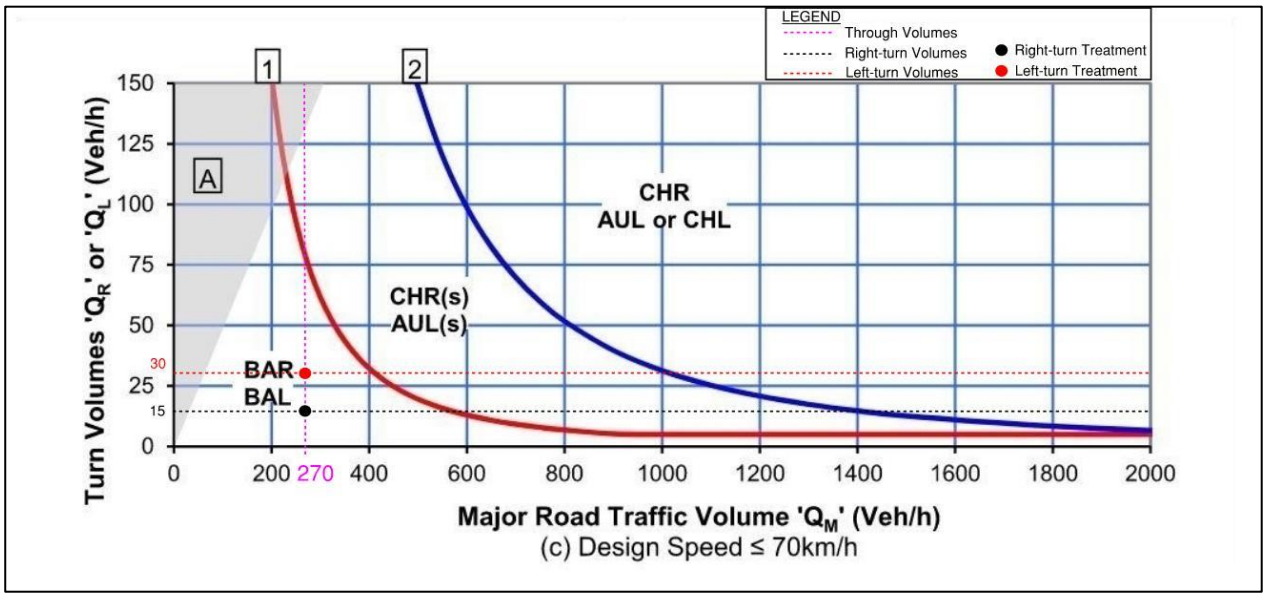
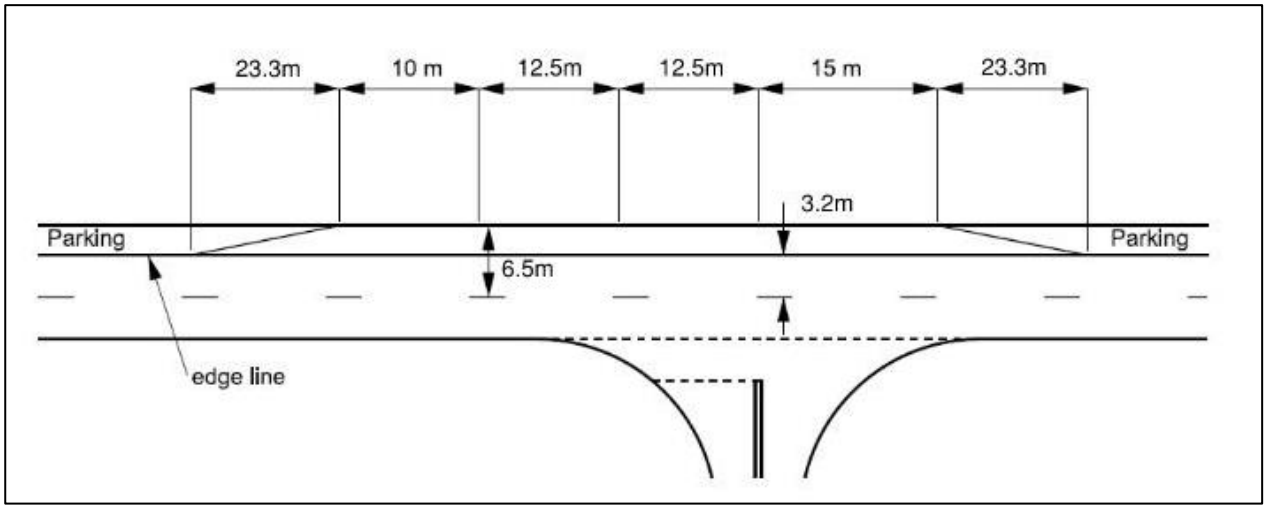


Figure 4-3 Initial Geometric Assessment for BAR Turn Treatment within Boomerang Drive T-intersection



4.6 Car Parking

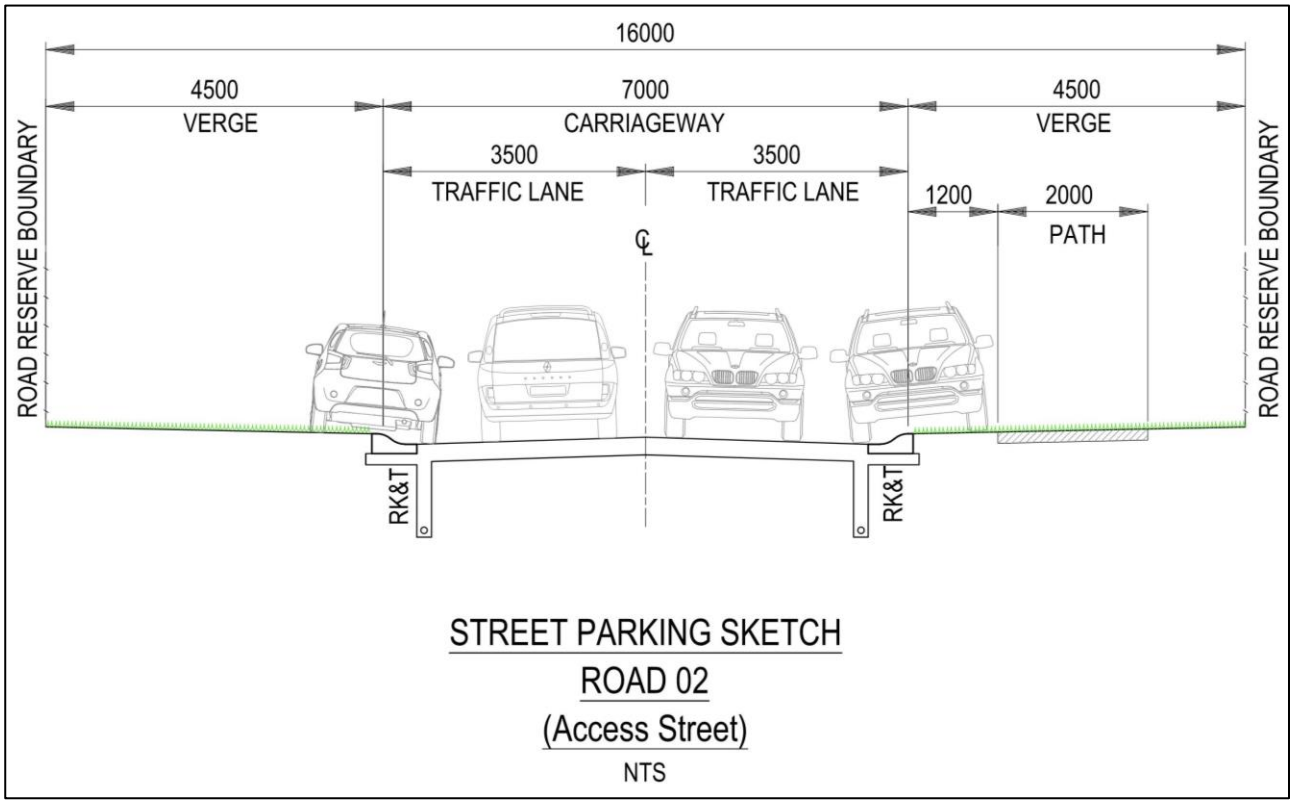
4.6.1 Commercial Component

Car parking requirements for the B1 zoned land within the proposed development will be addressed as part of a future development application. This is due to the requirements being sensitive to the land use, which is yet to be finalised. Future development within these lots will be required to provide adequate car parking facilities which meet all relevant requirements set out in both *AS/NZS 2890 Parking Facilities and* MidCoast Council's *Development Control Plan Chapter 10 - Section 10.3.1.*

4.6.2 Residential component

Residential car parking within the proposed development will be contained within owners' lots and driveways as per requirement MidCoast Council's DCP. The carriageway will contain roll top kerb throughout the entire development, which will allow passive parking opportunities within the road reserve for visitors during peak holiday periods. **Figure 4-4** below shows a cross section of the proposed access street road reserve and highlights sufficient clearances between through traffic and parked vehicles. It is noted that the access street is the narrowest formation proposed within the development and all wider formations also achieve two lane through traffic with on verge parking.

Figure 4-4 Typical Cross Section of Proposed Access Street within Blueys Beach Subdivision with Passive Car Parking Opportunties



5 Intersection Capacity Analysis

Intersection capacity has been assessed using SIDRA 9.0 which is a micro-modelling software package. SIDRA provides an indication of an intersection's performance capacity through the following key outputs:

- Degree of Saturation (DOS) - Ratio of Demand to Capacity;
- Average Delay (in seconds);
- 95th Percentile Queue Length (in meters);
- The Level of Service (LOS) criteria.

The SIDRA NETWORK model determines the backward spread of congestion as queues on downstream lanes block upstream lanes (queue spillback). SIDRA applies capacity constraint to oversaturated upstream lanes, hence limiting the flows entering downstream lanes. These two elements are highly interactive with opposing effects. A network wide iterative process is used to find a solution that balances these opposing effects.

Each model was set to 30 iterations which is the maximum number of iterations permissible by SIDRA. The following sections discuss the capacity modelling for the key external intersections.

5.1 Level of Service Criteria

Level of Service (LOS) is determined by the average delay for each vehicle (RMS NSW method). The range definitions for LOS are indicated in **Table 5-1** below.

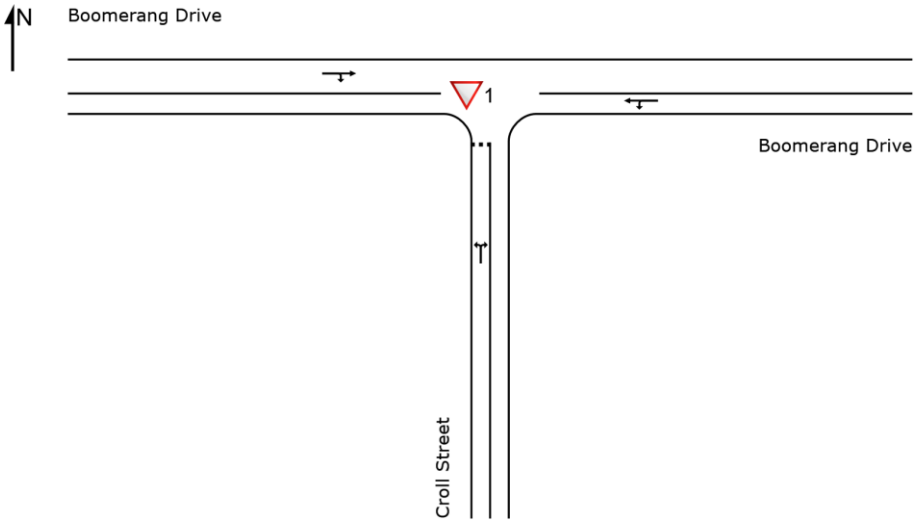
Table 5-1 Level of Service Definition Table

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

In general, intersections should operate at a minimum of LOS C to operate under satisfactory conditions. Note: For priority control signalised intersection (With Stop and Give Way signs or operating under the T-junction rule) the critical movement for Level of Service assessment should be that with the worst movement delay. **Figures 5-1,** and **5-2** below show all 2022 'Base', 2032 'Pre-Development' and 2032 'Post-Development' site / network layouts and intersection numbering utilised for reference during the assessment.

5.2 Site Layout

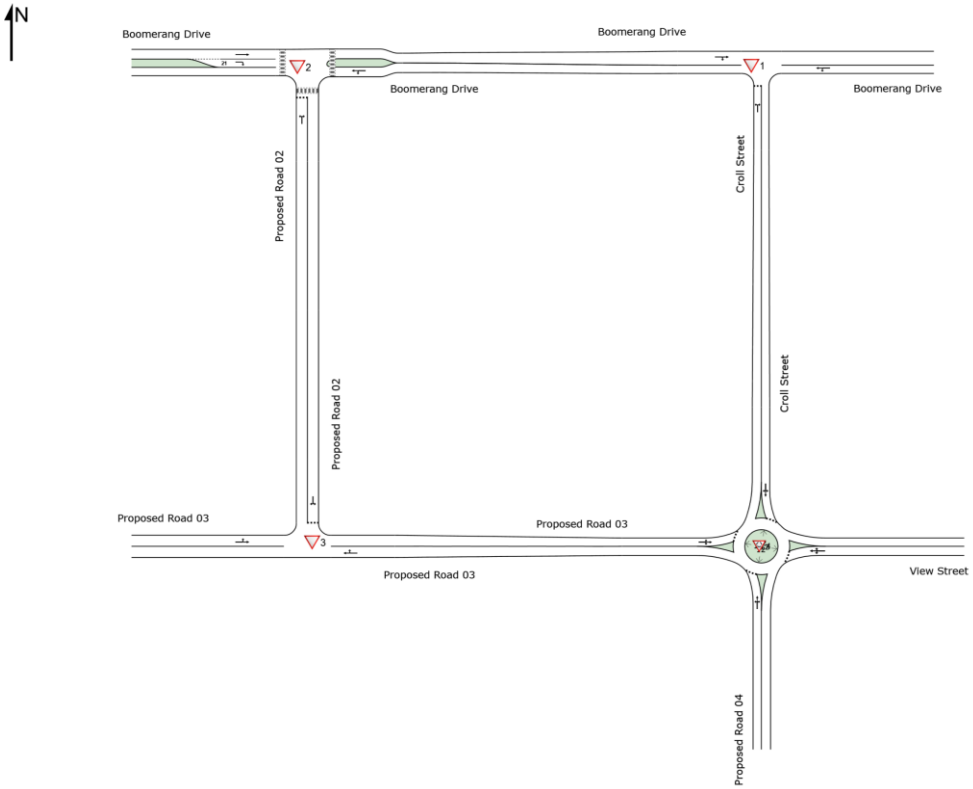
Figure 5-1 2022 Base and 2032 Pre-Development Site Layout



SITES	
Site ID	**Site Name**
1	Croll Street / Boomerang Drive

5.3 Network Layout

Figure 5-2 2032 Post-Development Network Layout



SITES IN NETWORK	
Site ID	**Site Name**
1	Croll Street / Boomerang Drive
2	Proposed Road 02 / Boomerang Drive
3	Proposed Road 02 / Proposed Road 03
4	Proposed Road 03 / Proposed Road 04 / Croll Street / View Street

5.4 Croll Street / Boomerang Drive Intersection SIDRA Outputs

Tables 5-2 and **5-3** below summarises the results of modelling the Croll Street / Boomerang Drive Intersection in the 2022 'Base Modelling' scenario.

5.4.1 2022 'Base Model' Normal Conditions

Table 5-2 2022 'Base Model' of the Croll Street / Boomerang Drive Intersection SIDRA Outputs in Normal Conditions

Approach Leg	Turning Movement	Normal AM Peak Hour				Normal PM Peak Hour			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Croll Street (south)	Left	0.010	5.6	LOS A	0.3	0.010	5.2	LOS A	0.3
	Right	0.010	6.1	LOS A	0.3	0.010	6.1	LOS A	0.3
Boomerang Drive (east)	Left	0.093	3.9	LOS A	0.0	0.093	3.9	LOS A	0.0
	Through	0.093	0.0	LOS A	0.0	0.093	0.0	LOS A	0.0
Boomerang Drive (west)	Through	0.085	0.0	LOS A	0.3	0.085	0.0	LOS A	0.3
	Right	0.085	5.5	LOS A	0.3	0.085	5.5	LOS A	0.3

5.4.2 2022 'Base Model' 100th Highest Hour Conditions

Table 5-3 Croll Street / Boomerang Drive Intersection SIDRA Outputs in 100th Highest Hour Conditions

Approach Leg	Turning Movement	100th Highest Hour AM				100th Highest Hour PM			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Croll Street (south)	Left	0.027	5.9	LOS A	0.7	0.027	5.9	LOS A	0.7
	Right	0.027	8.4	LOS A	0.7	0.027	8.4	LOS A	0.7
Boomerang Drive (east)	Left	0.186	3.9	LOS A	0.0	0.186	3.9	LOS A	0.0
	Through	0.186	0.0	LOS A	0.0	0.186	0.0	LOS A	0.0
Boomerang Drive (west)	Through	0.172	0.1	LOS A	0.9	0.172	0.1	LOS A	0.9
	Right	0.172	6.5	LOS A	0.9	0.172	6.5	LOS A	0.9

Tables 5-4 and **5-5** below summarises the results of modelling the Croll Street / Boomerang Drive Intersection in the 2032 'Pre-Development Modelling' scenario.

5.4.3 2032 'Pre-Development Model' Normal Conditions

Table 5-4 2032 'Pre-Development Model' of the Croll Street / Boomerang Drive Intersection SIDRA Outputs in Normal Conditions

Approach Leg	Turning Movement	Normal AM Peak Hour				Normal PM Peak Hour			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Croll Street (south)	Left	0.017	5.7	LOS A	0.5	0.017	5.7	LOS A	0.5
	Right	0.017	7.6	LOS A	0.5	0.017	7.6	LOS A	0.5
Boomerang Drive (east)	Left	0.160	3.9	LOS A	0.0	0.160	3.9	LOS A	0.0
	Through	0.160	0.0	LOS A	0.0	0.160	0.0	LOS A	0.0
Boomerang Drive (west)	Through	0.147	0.1	LOS A	0.6	0.147	0.1	LOS A	0.6
	Right	0.147	6.1	LOS A	0.6	0.147	6.1	LOS A	0.6

5.4.4 2032 'Pre-Development Model' 100th Highest Hour Conditions

Table 5-5 2032 'Pre-Development Model' of the Croll Street / Boomerang Drive Intersection SIDRA Outputs in 100th Highest Hour Conditions

Approach Leg	Turning Movement	100th Highest Hour AM				100th Highest Hour PM			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Croll Street (south)	Left	0.076	7.5	LOS A	1.8	0.076	7.5	LOS A	1.8
	Right	0.076	15.8	LOS B	1.8	0.076	15.8	LOS B	1.8
Boomerang Drive (east)	Left	0.322	3.9	LOS A	0.0	0.322	3.9	LOS A	0.0
	Through	0.322	0.0	LOS A	0.0	0.322	0.0	LOS A	0.0
Boomerang Drive (west)	Through	0.301	0.3	LOS A	2.5	0.301	0.3	LOS A	2.5
	Right	0.301	9.2	LOS A	2.5	0.301	9.2	LOS A	2.5

Tables 5-6 and **5-7** summarises the results of modelling the Croll Street / Boomerang Drive Intersection in the 2032 'Post-Development Modelling' scenario.

5.4.5 2032 'Post-Development Model' Normal Conditions

Table 5-6 2032 'Post-Development Model' of the Croll Street / Boomerang Drive Intersection SIDRA Outputs in Normal Conditions

Approach Leg	Turning Movement	Normal AM Peak Hour				Normal PM Peak Hour			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Croll Street (south)	Left	0.050	5.9	LOS A	1.3	0.033	5.9	LOS A	0.8
	Right	0.050	8.2	LOS A	1.3	0.033	8.4	LOS A	0.8
Boomerang Drive (east)	Left	0.176	3.9	LOS A	0.0	0.185	3.9	LOS A	0.0
	Through	0.176	0.0	LOS A	0.0	0.185	0.0	LOS A	0.0
Boomerang Drive (west)	Through	0.163	0.1	LOS A	0.8	0.174	0.2	LOS A	1.5
	Right	0.163	6.3	LOS A	0.8	0.174	6.5	LOS A	1.5

5.4.6 2032 'Post-Development Model' 100th Highest Hour Conditions

Table 5-7 2032 'Post-Development Model' of the Croll Street / Boomerang Drive Intersection SIDRA Outputs in 100th Highest Hour Conditions

Approach Leg	Turning Movement	100th Highest Hour AM				100th Highest Hour PM			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Croll Street (south)	Left	0.143	7.8	LOS A	3.5	0.109	7.8	LOS A	2.6
	Right	0.143	17.6	LOS B	3.5	0.109	18.1	LOS B	2.6
Boomerang Drive (east)	Left	0.337	3.9	LOS A	0.0	0.346	3.9	LOS A	0.0
	Through	0.337	0.0	LOS A	0.0	0.346	0.0	LOS A	0.0
Boomerang Drive (west)	Through	0.319	0.3	LOS A	3.2	0.333	0.5	LOS A	5.0
	Right	0.319	9.7	LOS A	3.2	0.333	10.1	LOS A	5.0

5.5 Proposed Boomerang Drive T-intersection SIDRA Outputs

Tables 5-8 and **5-9** summarises results of modelling the Proposed Boomerang Drive T-intersection in the 2032 'Post-Development Modelling' scenario.

5.5.1 2032 'Post-Development Model' Normal Conditions

Table 5-8 2032 'Post-Development Model' of the Proposed Boomerang Drive T-intersection SIDRA Outputs in Normal Conditions

Approach Leg	Turning Movement	Normal AM Peak Hour				Normal PM Peak Hour			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Proposed Road 02 (South)	Left	0.096	5.7	LOS A	2.7	0.080	5.7	LOS A	2.2
	Right	0.096	9.8	LOS A	2.7	0.080	9.9	LOS A	2.2
Boomerang Drive (East)	Left	0.172	4.6	LOS A	0.0	0.172	4.6	LOS A	0.0
	Through	0.172	0.0	LOS A	0.0	0.172	0.0	LOS A	0.0
Boomerang Drive (West)	Through	0.154	0.1	LOS A	0.0	0.159	0.1	LOS A	0.0
	Right	0.007	5.7	LOS A	0.2	0.012	5.7	LOS A	0.4

5.5.2 2032 'Post-Development Model' 100th Highest Hour Conditions

Table 5-9 2032 'Post-Development Model' of the Proposed Boomerang Drive T-intersection SIDRA Outputs in 100th Highest Hour Conditions

Approach Leg	Turning Movement	100th Highest Hour AM				100th Highest Hour PM			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Proposed Road 02 (South)	Left	0.238	8.3	LOS A	6.2	0.200	7.7	LOS A	4.9
	Right	0.238	24.9	LOS B	6.2	0.200	24.5	LOS B	4.9
Boomerang Drive (East)	Left	0.324	4.6	LOS A	0.0	0.324	4.6	LOS A	0.0
	Through	0.324	0.0	LOS A	0.0	0.324	0.0	LOS A	0.0
Boomerang Drive (West)	Through	0.308	0.2	LOS A	0.0	0.313	0.2	LOS A	0.0
	Right	0.010	7.4	LOS A	0.3	0.313	7.4	LOS A	0.5

5.6 Proposed Road 02 / Proposed Road 03 Intersection SIDRA Outputs

Tables 5-10 and **5-11** summarises results of modelling Proposed Road 02 / Proposed Road 03 Intersection in the 2032 'Post-Development Modelling' scenario.

5.6.1 2032 'Post-Development Model' Normal Conditions

Table 5-10 2032 'Post-Development Model' of the Proposed Road 02 / Proposed Road 03 Intersection SIDRA Outputs in Normal Conditions

Approach Leg	Turning Movement	Normal AM Peak Hour				Normal PM Peak Hour			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Proposed Road 03 (East)	Through	0.013	0.1	LOS A	0.4	0.013	0.0	LOS A	0.4
	Right	0.013	4.7	LOS A	0.4	0.013	4.7	LOS A	0.4
Proposed Road 02 (North)	Left	0.019	4.6	LOS A	0.5	0.031	4.6	LOS A	0.8
	Right	0.019	4.8	LOS A	0.5	0.031	4.7	LOS A	0.8
Proposed Road 03 (West)	Left	0.014	3.6	LOS A	0.0	0.008	3.6	LOS A	0.0
	Through	0.014	0.0	LOS A	0.0	0.008	0.0	LOS A	0.0

5.6.2 2032 'Post-Development Model' 100th Highest Hour Conditions

Table 5-11 2032 'Post-Development Model' of the Proposed Road 02 / Proposed Road 03 Intersection SIDRA Outputs in 100th Highest Hour Conditions

Approach Leg	Turning Movement	100th Highest Hour AM				100th Highest Hour PM			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Proposed Road 03 (East)	Through	0.013	0.1	LOS A	0.4	0.013	0.0	LOS A	0.4
	Right	0.013	4.7	LOS A	0.4	0.013	4.7	LOS A	0.4
Proposed Road 02 (North)	Left	0.019	4.6	LOS A	0.5	0.030	4.6	LOS A	0.8
	Right	0.019	4.8	LOS A	0.5	0.030	4.7	LOS A	0.8
Proposed Road 03 (West)	Left	0.014	3.6	LOS A	0.0	0.008	3.6	LOS A	0.0
	Through	0.014	0.0	LOS A	0.0	0.008	0.0	LOS A	0.0

5.7 Proposed Croll Street Roundabout SIDRA Outputs

Tables 5-12 and **5-13** summarises results of modelling the Proposed Croll Street Roundabout in the 2032 'Post-Development Modelling' scenario.

5.7.1 2032 'Post-Development Model' Normal Conditions

Table 5-12 2032 'Post-Development Model' of the Proposed Croll Street Roundabout SIDRA Outputs in Normal Conditions

Approach Leg	Turning Movement	Normal AM Peak Hour				Normal PM Peak Hour			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Proposed Road 04 (South)	Left	0.026	3.5	**LOS A**	1.0	0.015	3.5	**LOS A**	0.6
	Through	0.026	3.7	**LOS A**	1.0	0.015	3.7	**LOS A**	0.6
	Right	0.026	7.2	**LOS A**	1.0	0.015	7.2	**LOS A**	0.6
View Street (East)	Left	0.021	3.4	**LOS A**	0.1	0.022	3.5	**LOS A**	0.9
	Through	0.021	3.5	**LOS A**	0.1	0.022	3.6	**LOS A**	0.9
	Right	0.021	7.1	**LOS A**	0.1	0.022	7.2	**LOS A**	0.9
Croll Street (North)	Left	0.018	3.5	**LOS A**	0.1	0.030	3.5	**LOS A**	1.3
	Through	0.018	3.6	**LOS A**	0.1	0.030	3.6	**LOS A**	1.3
	Right	0.018	7.1	**LOS A**	0.1	0.030	7.1	**LOS A**	1.3
Proposed Road 03 (West)	Left	0.015	3.6	**LOS A**	0.1	0.011	3.5	**LOS A**	0.4
	Through	0.015	3.7	**LOS A**	0.1	0.011	3.6	**LOS A**	0.4
	Right	0.015	7.3	**LOS A**	0.1	0.011	7.2	**LOS A**	0.4

5.7.2 2032 'Post-Development Model' 100th Highest Hour Conditions

Table 5-13 2032 'Post-Development Model' of the Proposed Croll Street Roundabout SIDRA Outputs in 100th Highest Hour Conditions

Approach Leg	Turning Movement	100th Highest Hour AM				100th Highest Hour PM			
		Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)	Degree of Saturation	Average Delay (sec)	Level of Service	95% Queue (m)
Proposed Road 04 (South)	Left	0.026	3.6	LOS A	1.1	0.016	3.6	LOS A	0.6
	Through	0.026	3.8	LOS A	1.1	0.016	3.8	LOS A	0.6
	Right	0.026	7.3	LOS A	1.1	0.016	7.3	LOS A	0.6
View Street (East)	Left	0.032	3.4	LOS A	1.3	0.034	3.5	LOS A	1.4
	Through	0.032	3.5	LOS A	1.3	0.034	3.6	LOS A	1.4
	Right	0.032	7.1	LOS A	1.3	0.034	7.2	LOS A	1.4
Croll Street (North)	Left	0.029	3.5	LOS A	1.3	0.040	3.5	LOS A	1.8
	Through	0.029	3.6	LOS A	1.3	0.040	3.5	LOS A	1.8
	Right	0.029	7.1	LOS A	1.3	0.040	7.1	LOS A	1.8
Proposed Road 03 (West)	Left	0.015	3.7	LOS A	0.6	0.011	3.6	LOS A	0.5
	Through	0.015	3.8	LOS A	0.6	0.011	3.7	LOS A	0.5
	Right	0.015	7.4	LOS A	0.6	0.011	7.3	LOS A	0.5

6 Traffic Network Operation

In addition to **Section 5** above, the following section provides a site and network wide visual representation of the level of service and 95th percentile queue distance during each modelling scenario. As the proposed intersection modelling was undertaken for both pre and post-development scenarios, pre-development scenarios display site only outputs and post-development show outputs from the created network.

6.1 2022 'Base Model' Normal Conditions

6.1.1 2022 AM 'Base Model' Normal Conditions

Figure 6-1 2022 AM 'Base Model' Level of Service (LOS) in Normal Conditions

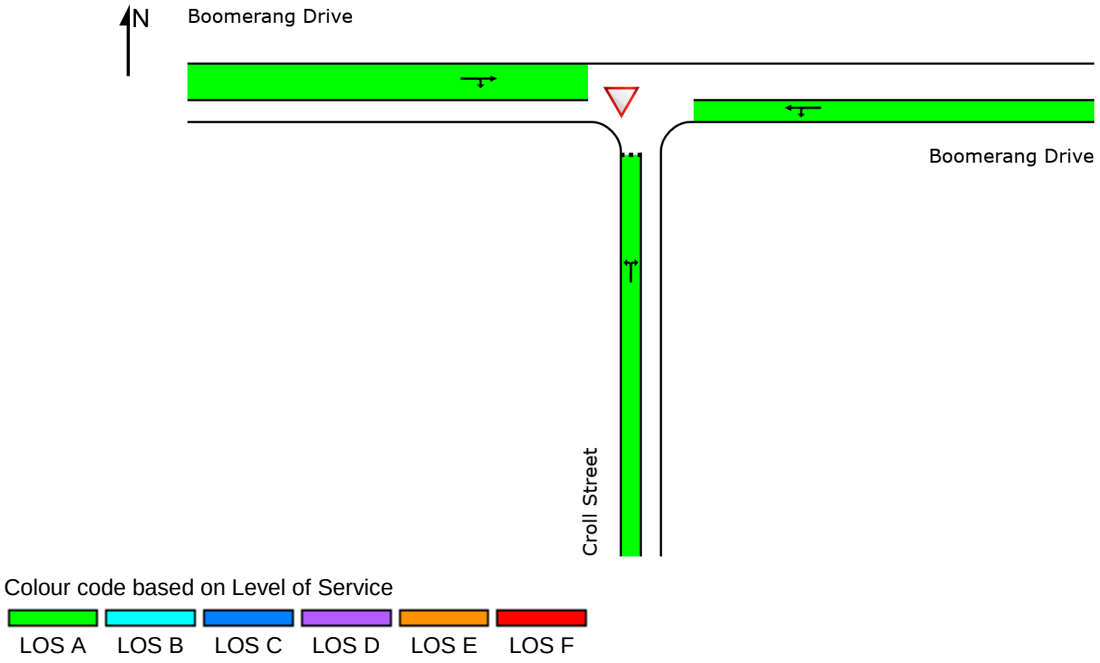
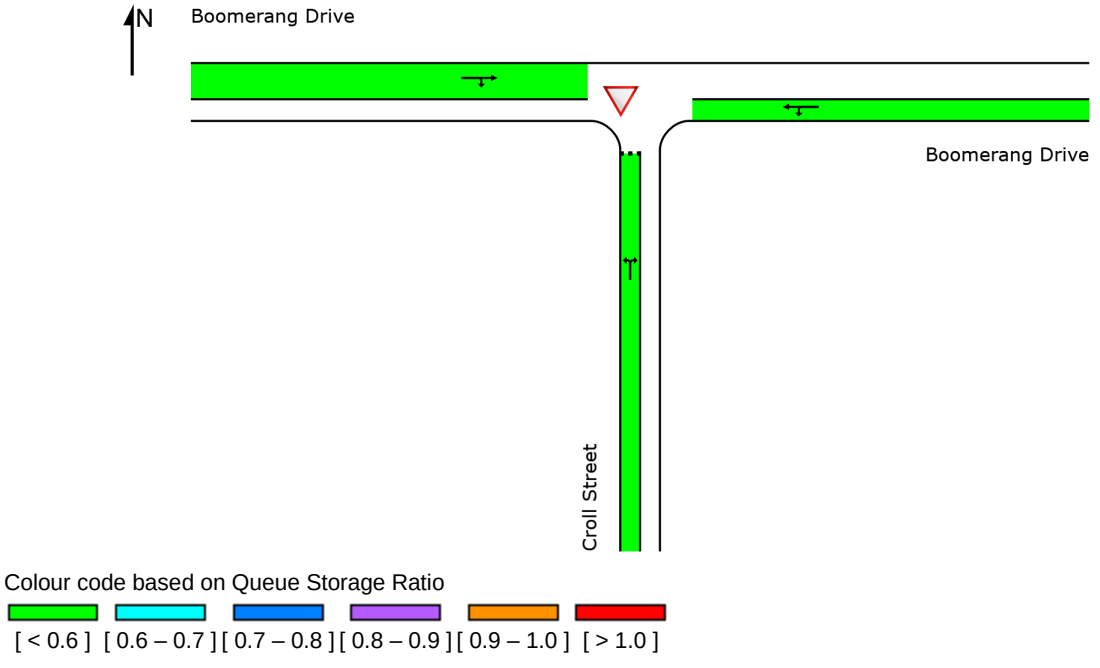


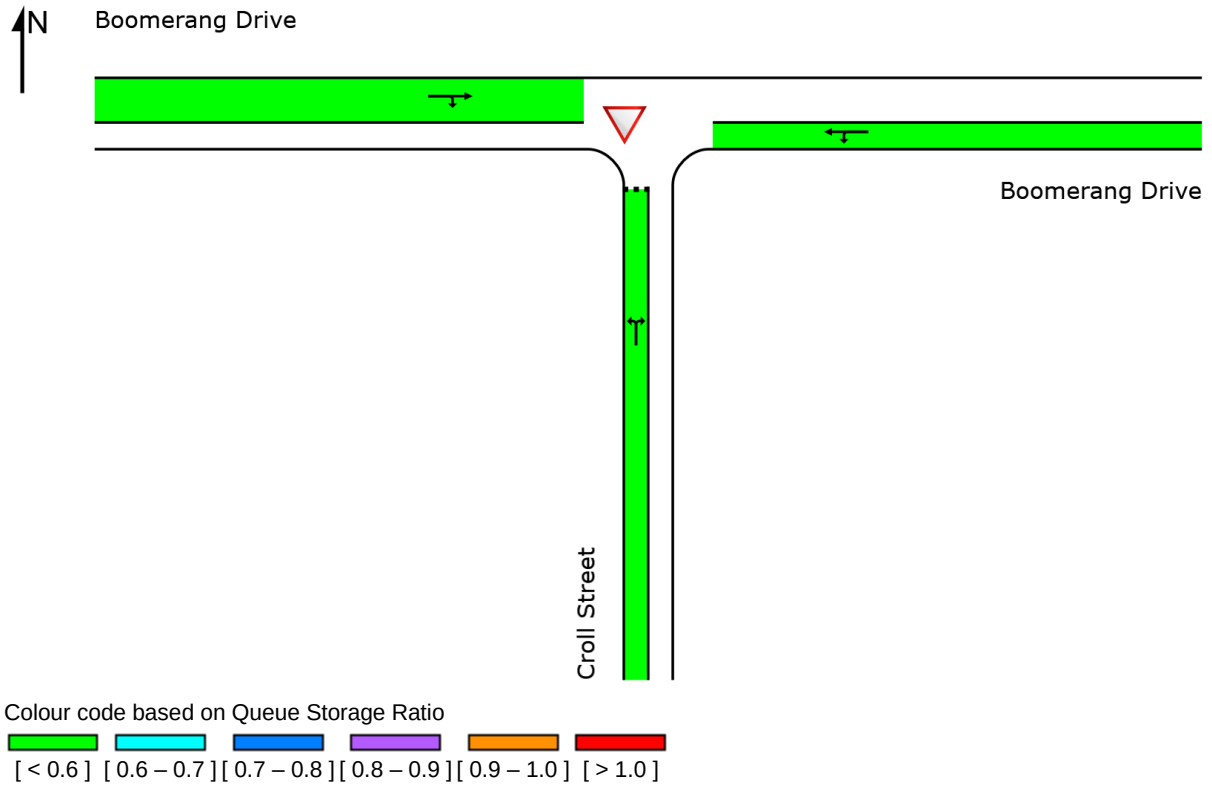
Figure 6-2 2022 AM 'Base Model' Queue Length (95th Percentile) in Normal Conditions



6.1.2 2022 PM 'Base Model' Scenario Normal Conditions

Figure 6-3 2022 PM 'Base Model' Level of Service (LOS) in Normal Conditions

Figure 6-4 2022 PM 'Base Model' Queue Length (95th Percentile) in Normal Conditions



6.2 2022 'Base Model' 100th Highest Hour Conditions

6.2.1 2022 AM 'Base Model' Scenario 100th Highest Hour Conditions

Figure 6-5 2022 AM 'Base Model' Level of Service (LOS) in 100th Highest Hour Conditions

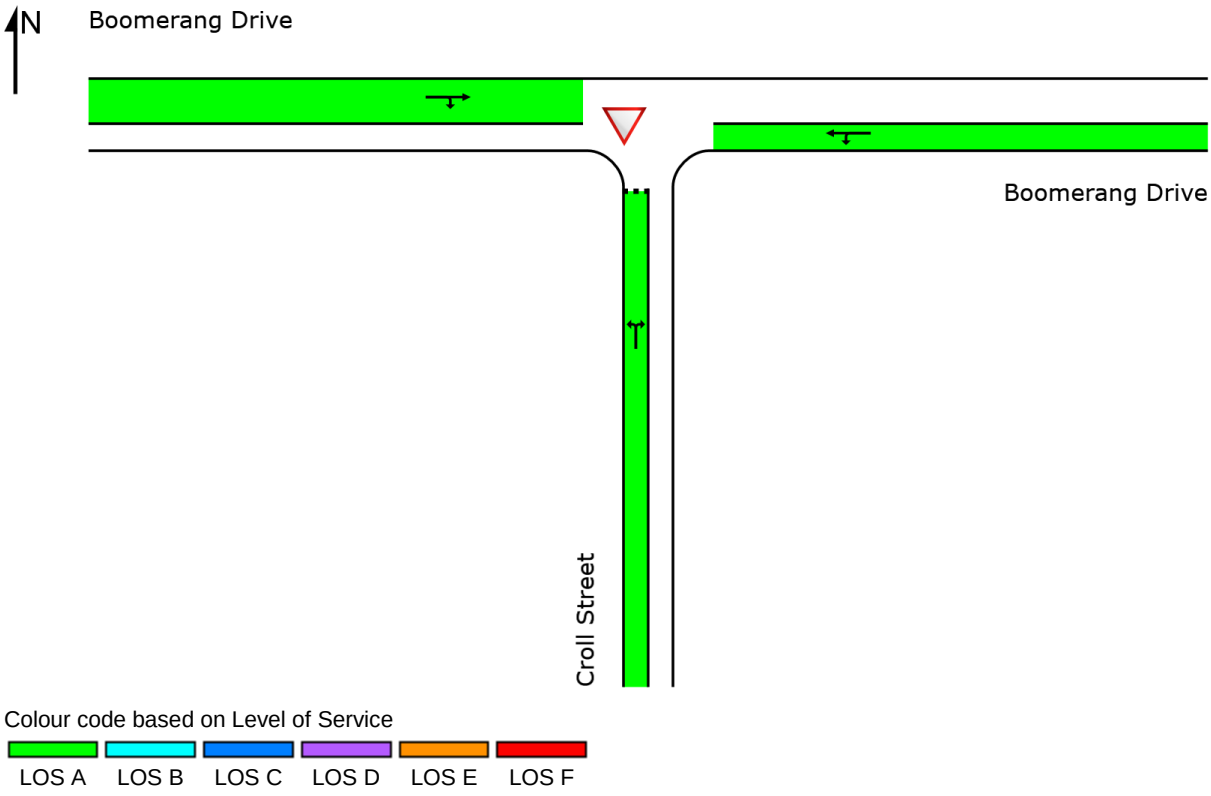
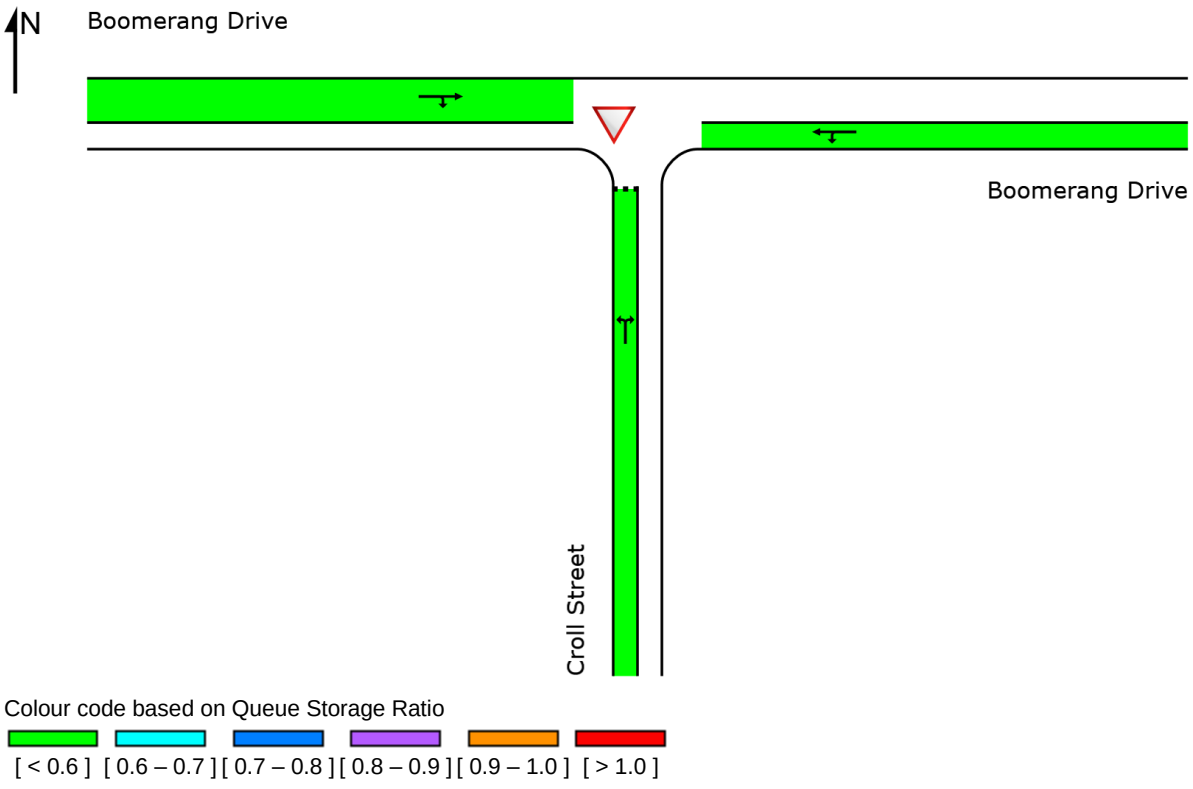


Figure 6-6 2022 AM 'Base Model' Queue Length (95th Percentile) in 100th Highest Hour Conditions



6.2.2 2022 PM 'Base Model' 100th Highest Hour Conditions

Figure 6-7 2022 PM 'Base Model' Level of Service (LOS) in 100th Highest Hour Conditions

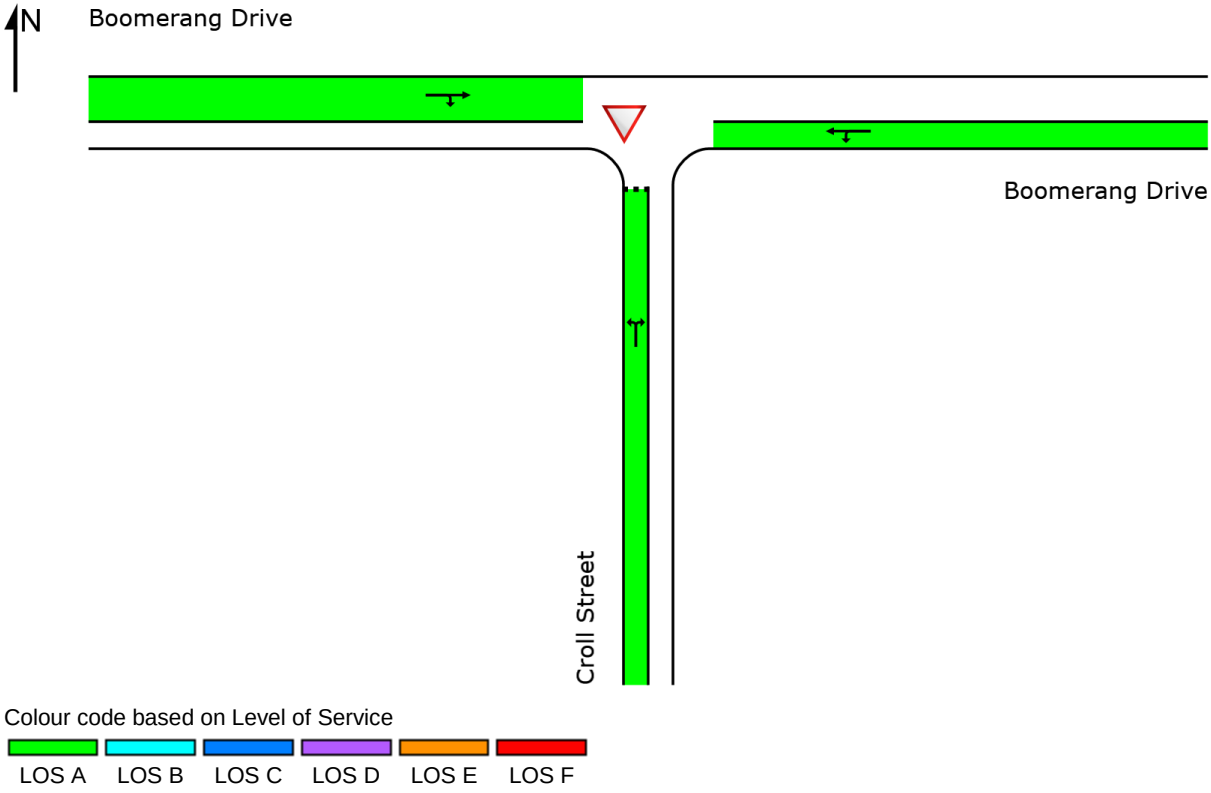
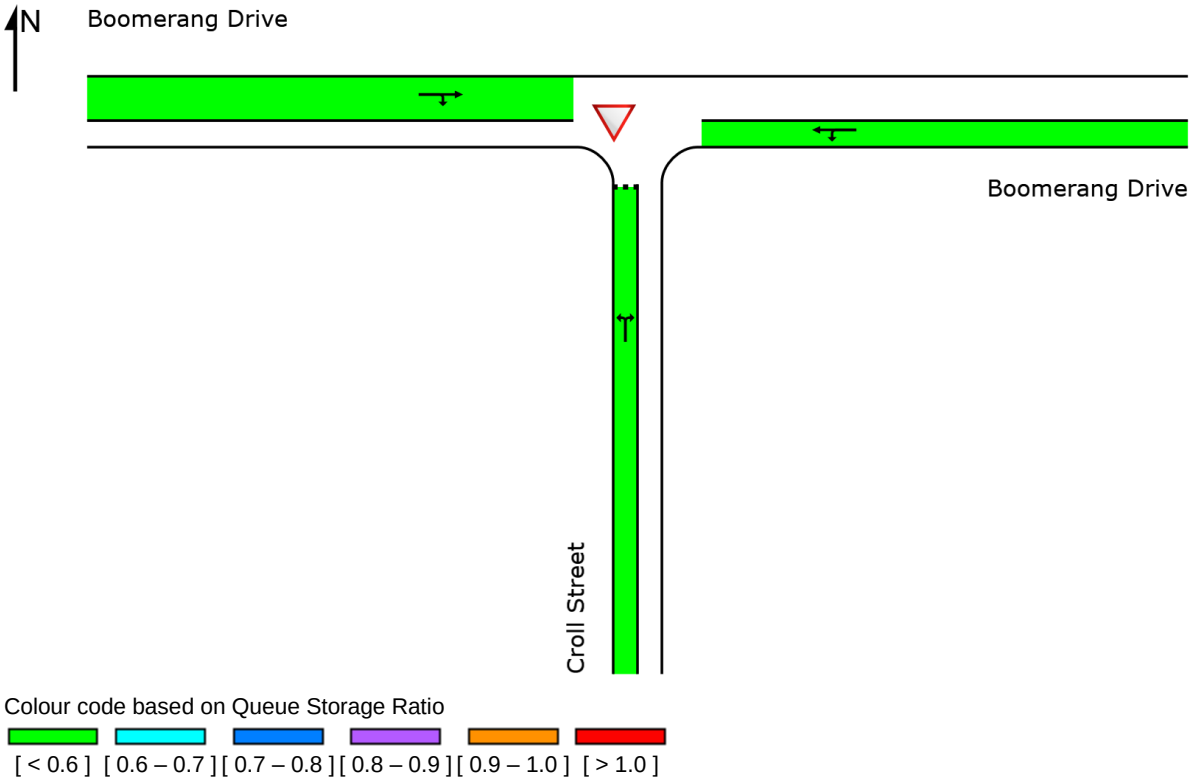


Figure 6-8 2022 PM 'Base Model' Queue Length (95th Percentile) in 100th Highest Hour Conditions



6.3 2032 'Pre-development Model' Normal Conditions

6.3.1 2032 AM 'Pre-development Model' Normal Conditions

Figure 6-9 2032 AM 'Pre-development Model' Level of Service (LOS) in Normal Conditions

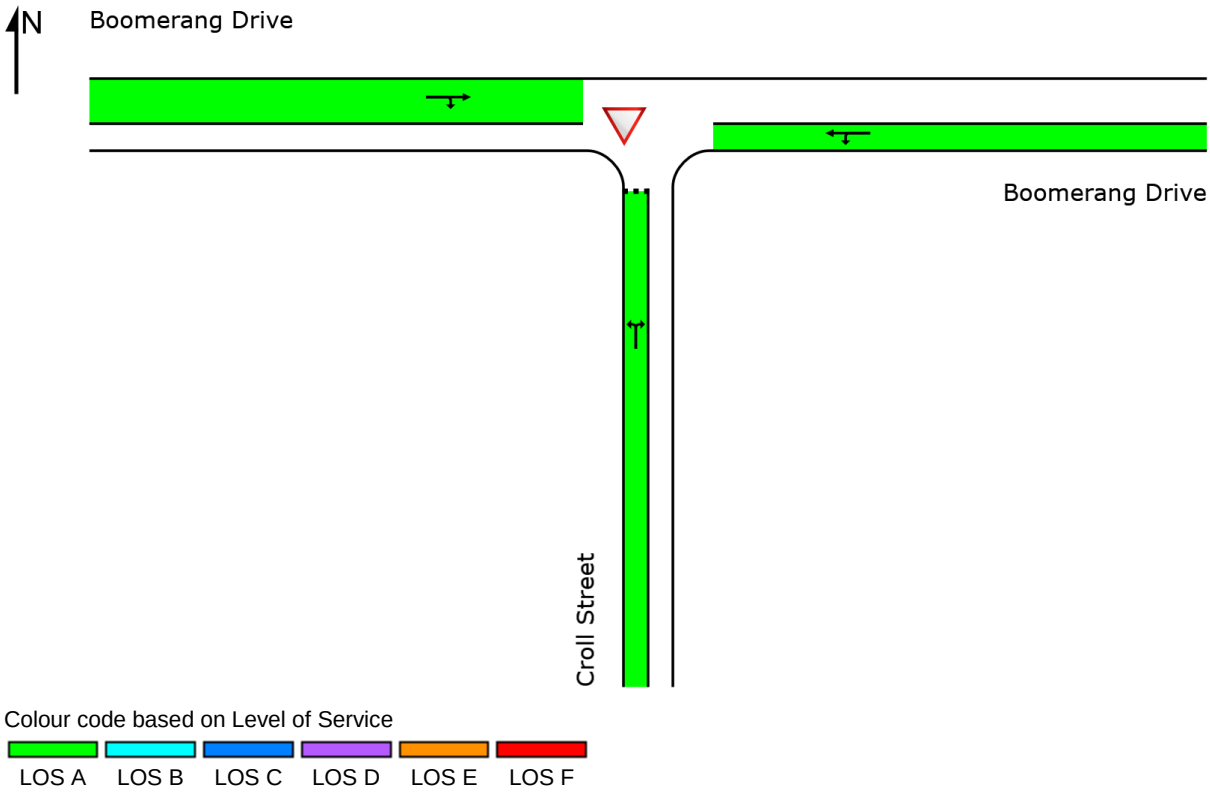
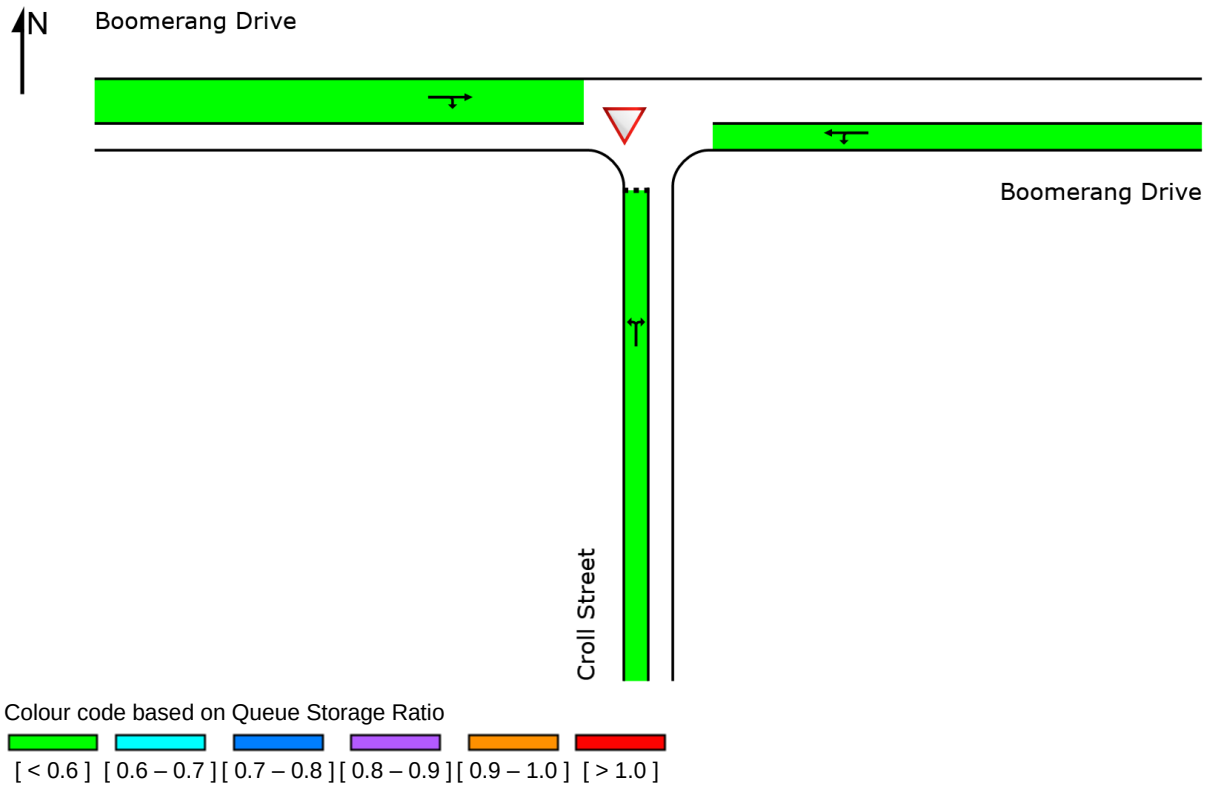


Figure 6-10 2032 AM 'Pre-development Model' Queue Length (95th Percentile) in Normal Conditions



6.3.2 2032 PM 'Pre-development Model' Scenario Normal Conditions

Figure 6-11 2032 PM 'Pre-development Model' Level of Service (LOS) in Normal Conditions

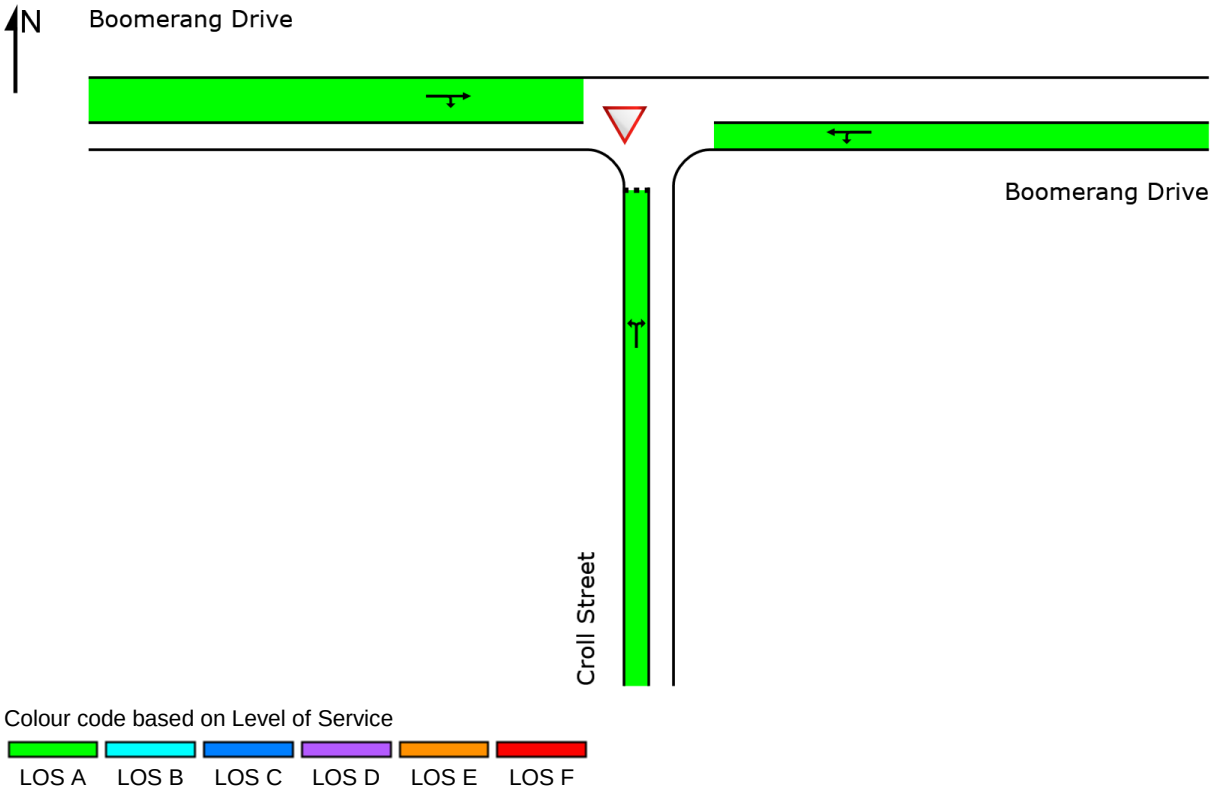
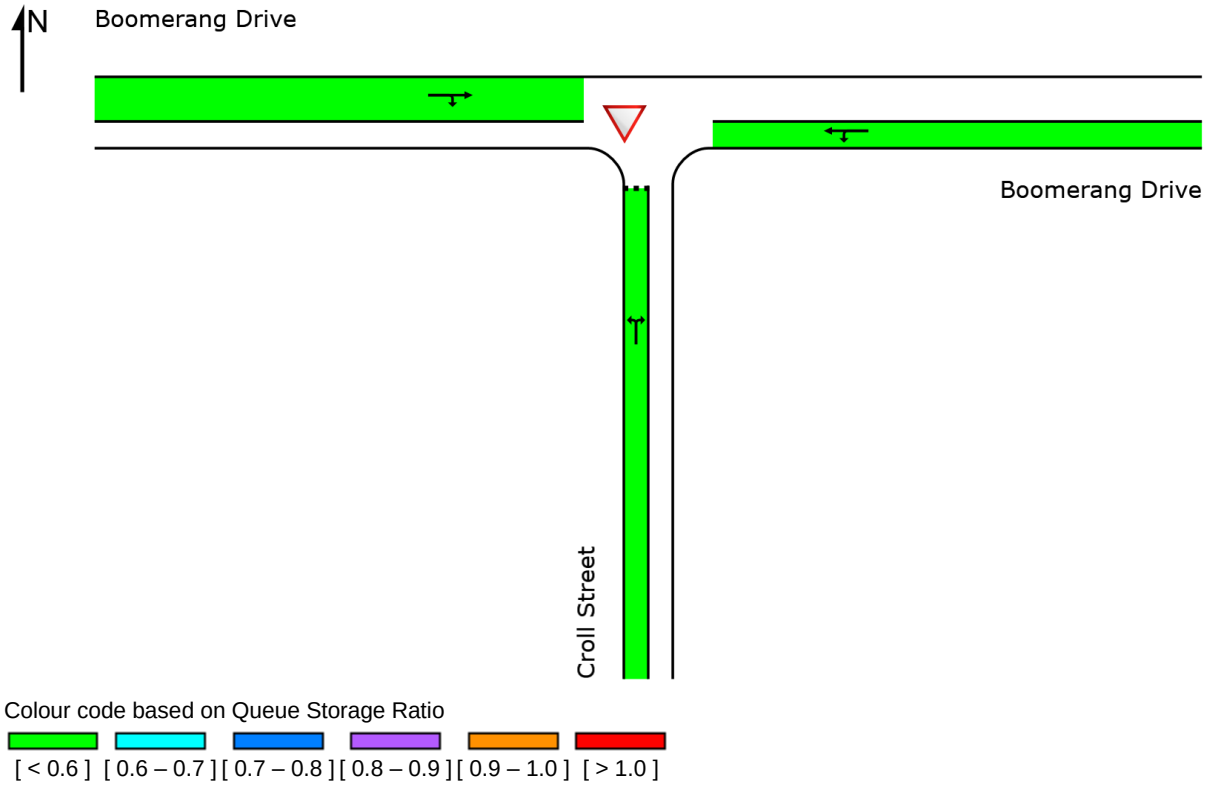


Figure 6-12 2032 PM 'Pre-development Model' Queue Length (95th Percentile) in Normal Conditions



6.4 2032 'Pre-development Model' 100th Highest Hour Conditions

6.4.1 2032 AM 'Pre-development Model' 100th Highest Hour Conditions

Figure 6-13 2032 AM 'Pre-development Model' Level of Service (LOS) in 100th Highest Hour Conditions

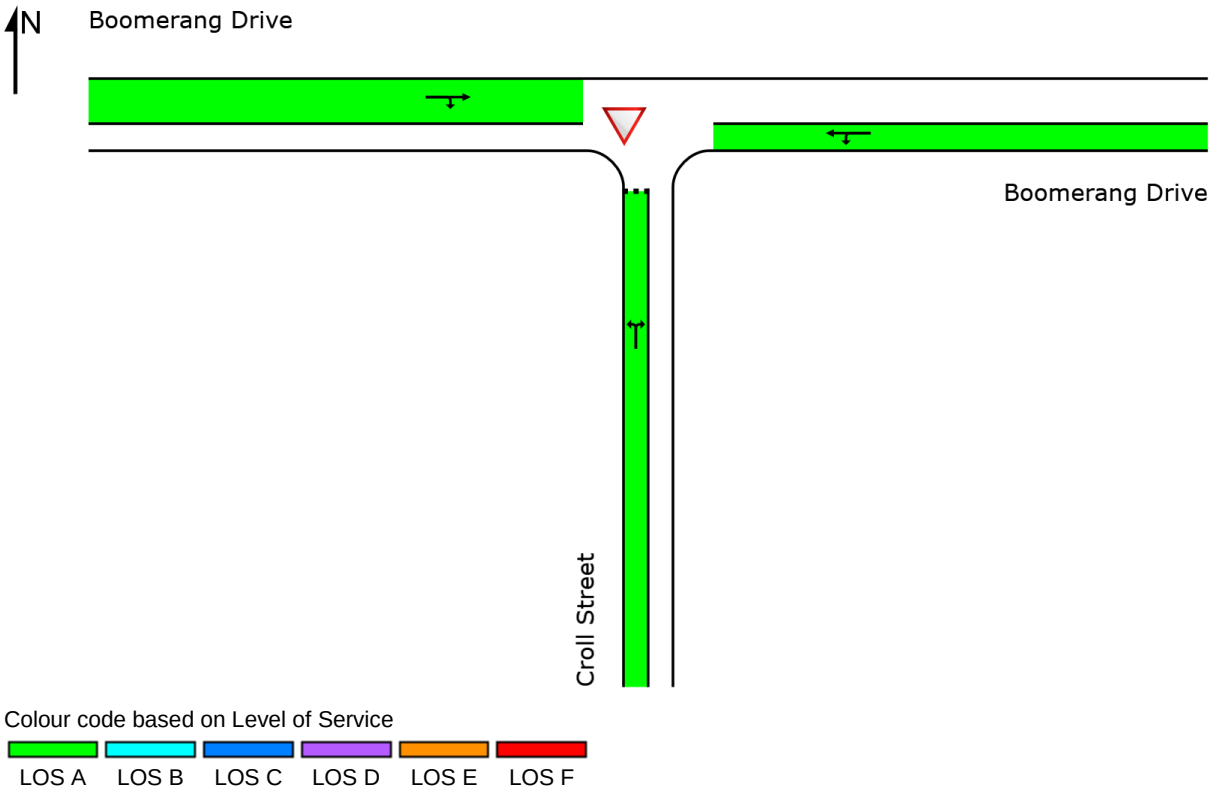
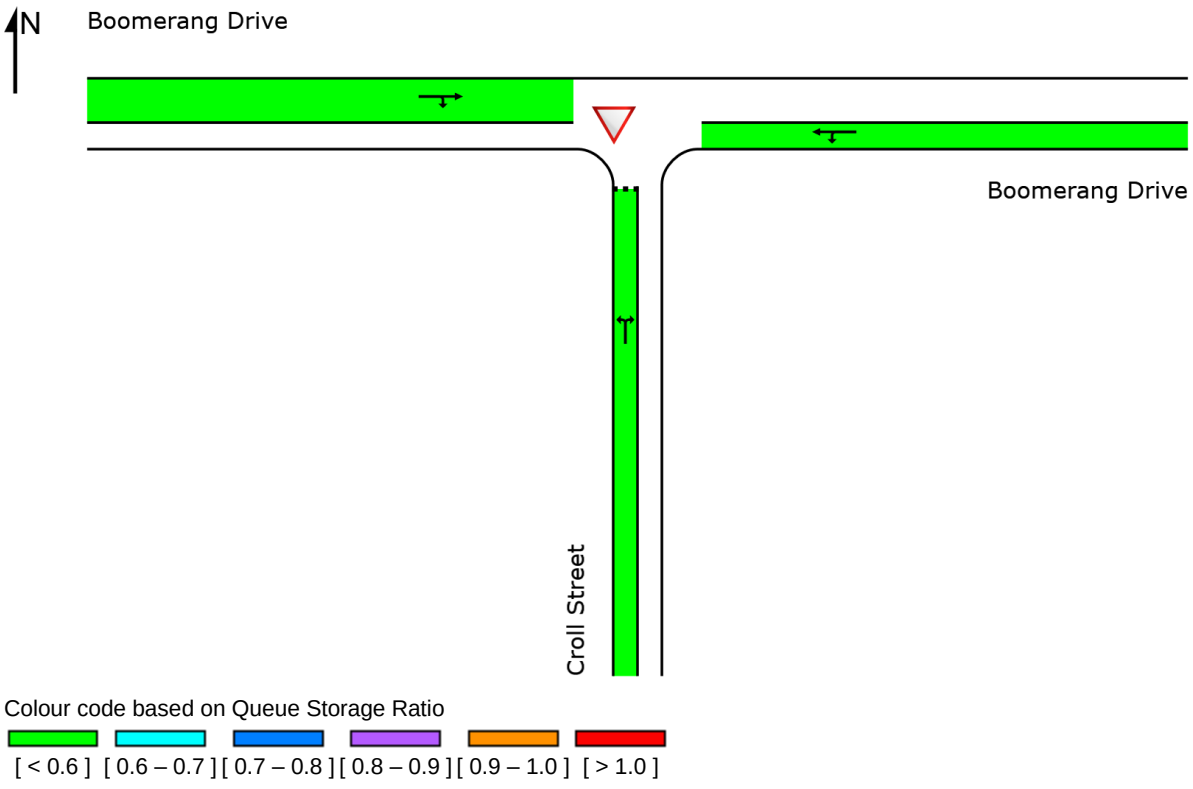


Figure 6-14 2032 AM 'Pre-development Model' Queue Length (95th Percentile) in 100th Highest Hour Conditions



6.4.2 2032 PM 'Pre-development Model' 100th Highest Hour Conditions

Figure 6-15 2032 PM 'Pre-development Model' Level of Service (LOS) in 100th Highest Hour Conditions

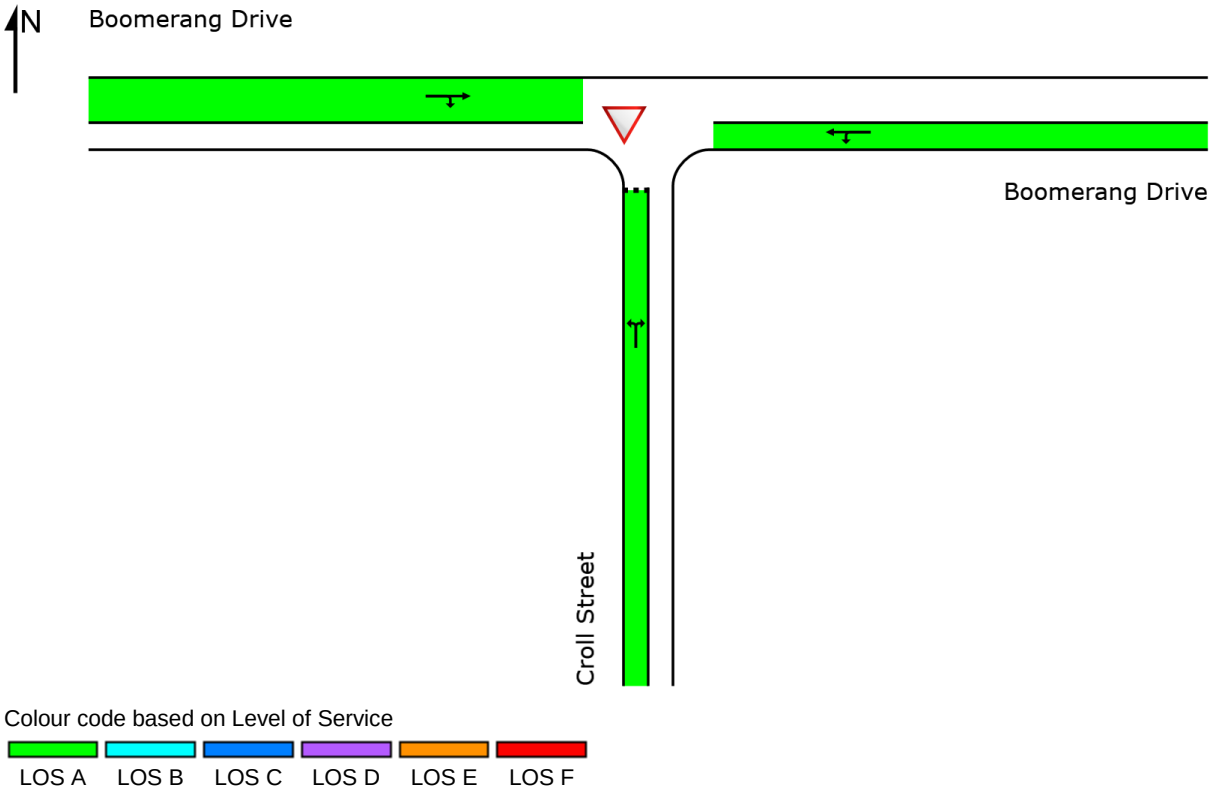
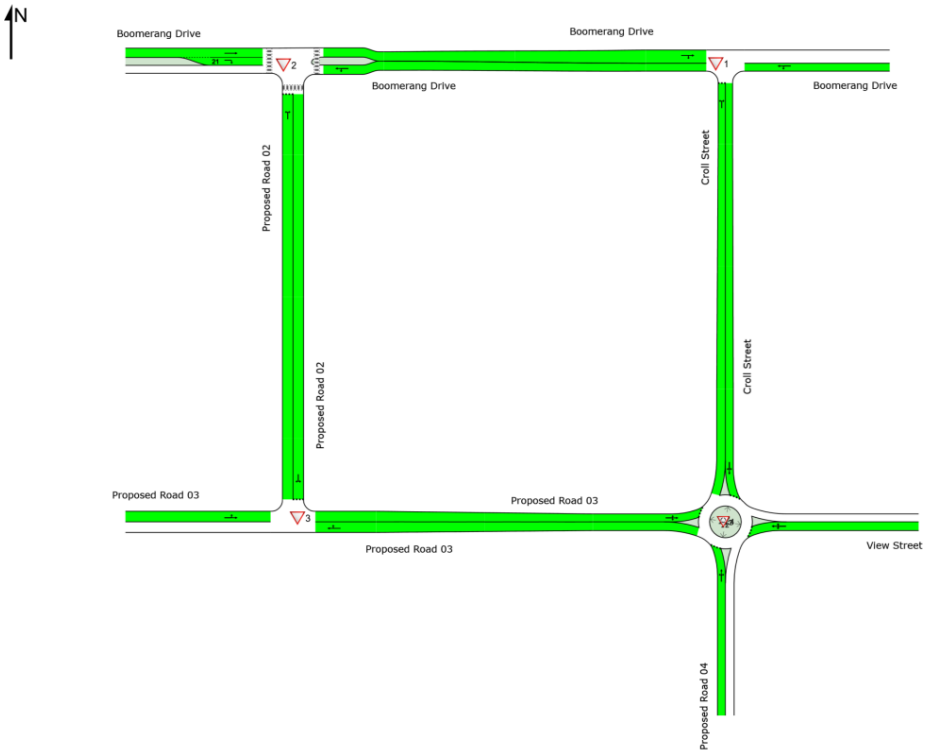


Figure 6-16 2032 PM 'Pre-development Model' Queue Length (95th Percentile) in 100th Highest Hour Conditions

6.5 2032 ‘Post-development Model’ Normal Conditions

6.5.1 2032 AM ‘Post-development Model’ Normal Conditions

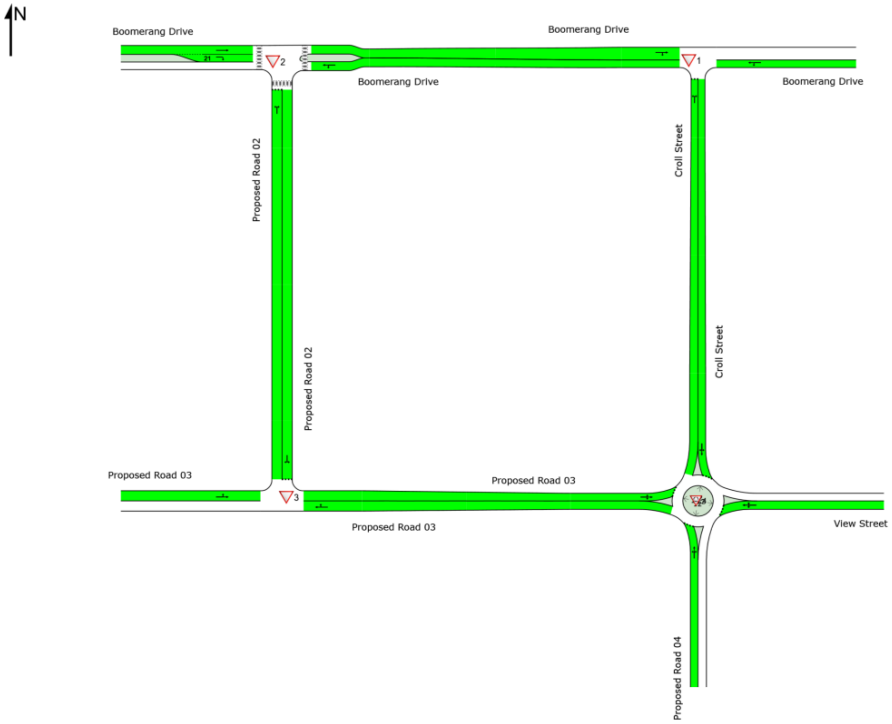
Figure 6-17 2032 AM ‘Post-development Model’ Level of Service (LOS) in Normal Conditions



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Figure 6-18 2032 AM ‘Post-development Model’ Queue Length (95th Percentile) in Normal Conditions

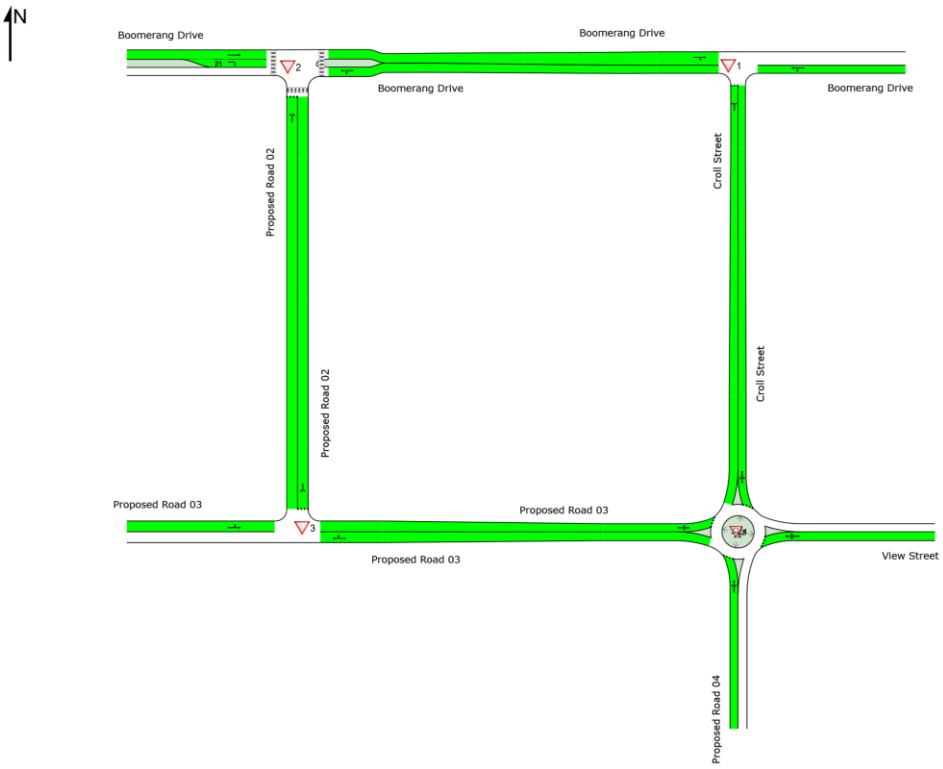


Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

6.5.2 2032 PM 'Post-development Model' Scenario Normal Conditions

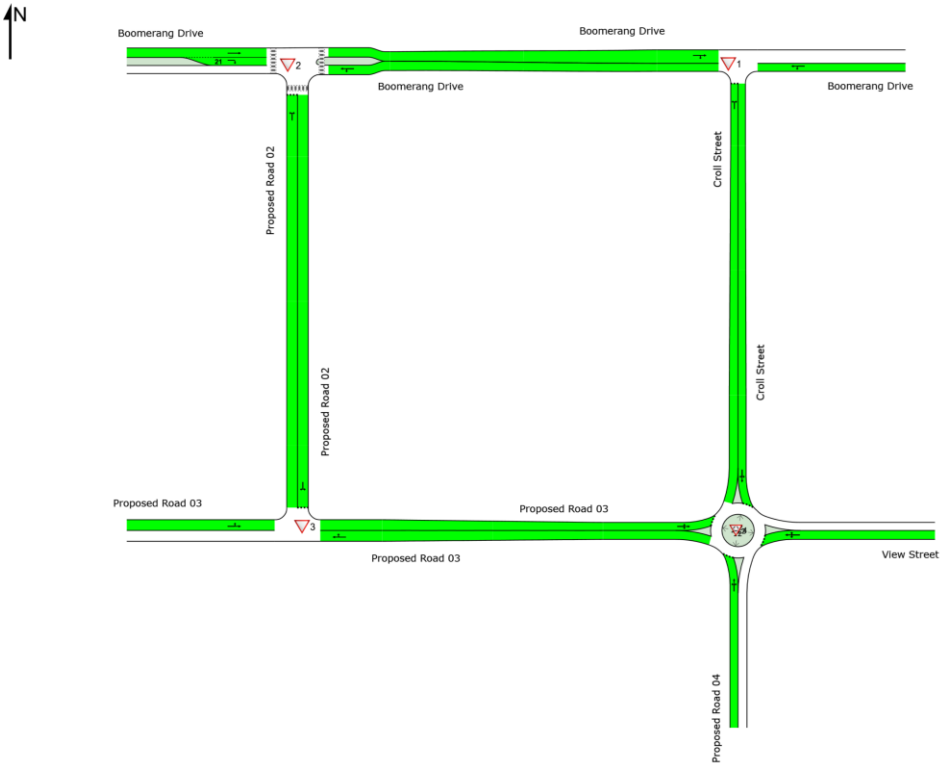
Figure 6-19 2032 PM 'Post-development Model' Level of Service (LOS) in Normal Conditions



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Figure 6-20 2032 PM 'Post-development Model' Queue Length (95th Percentile) in Normal Conditions



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

6.6 2032 'Post-development Model' 100th Highest Hour Conditions

6.6.1 2032 AM 'Post-development Model' 100th Highest Hour Conditions

Figure 6-21 2032 AM 'Post-development Model' Level of Service (LOS) in 100th Highest Hour Conditions

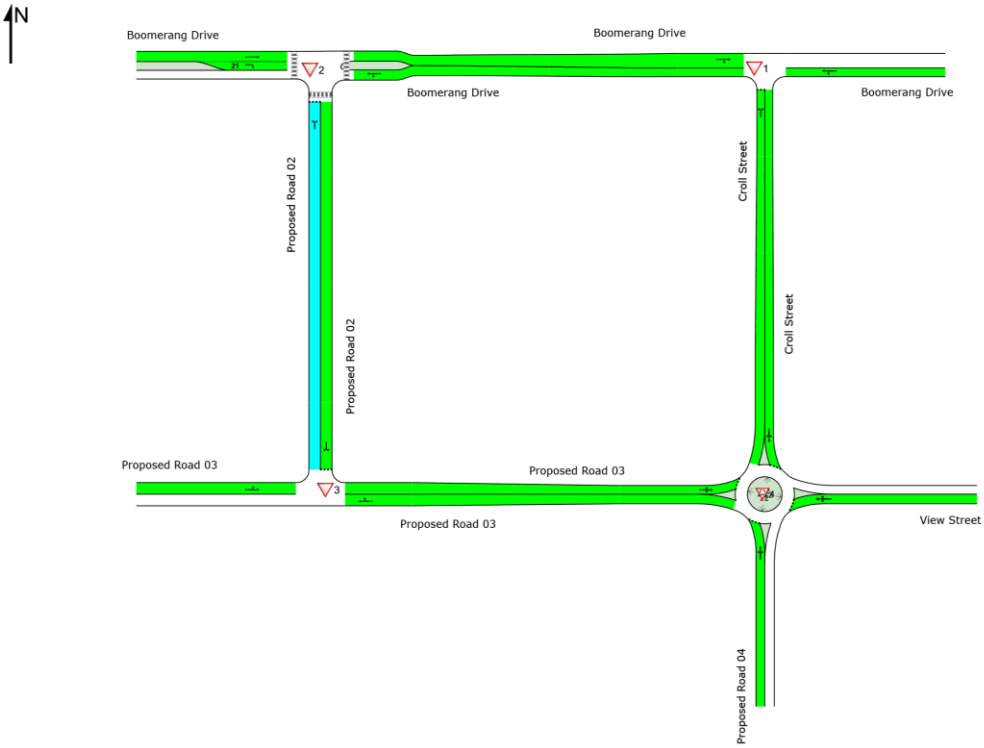
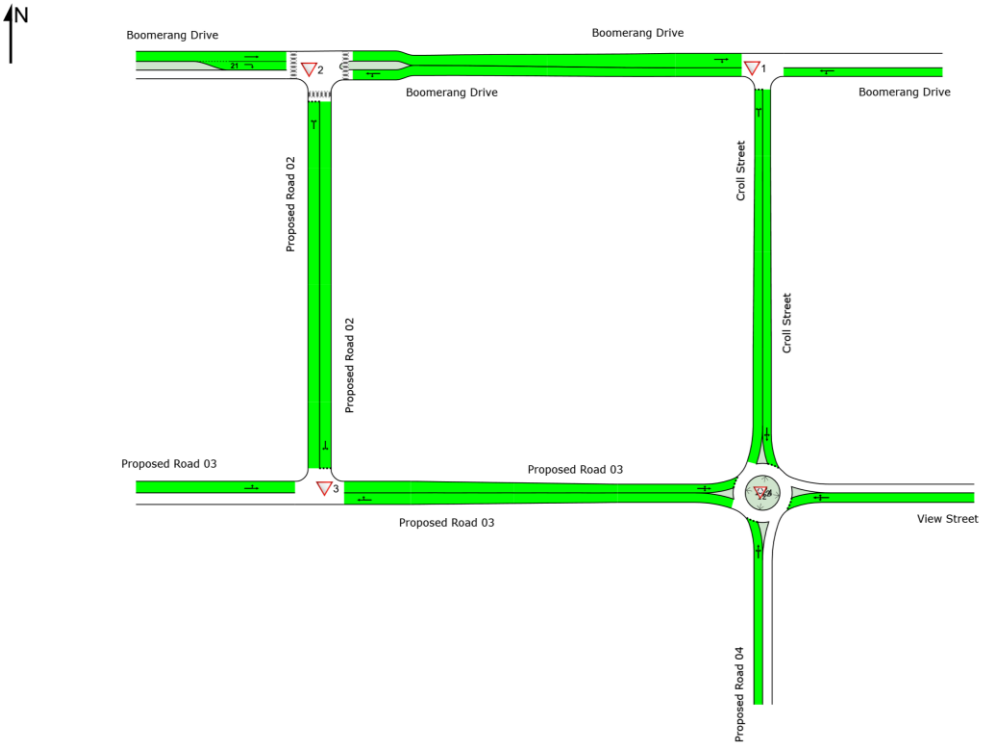
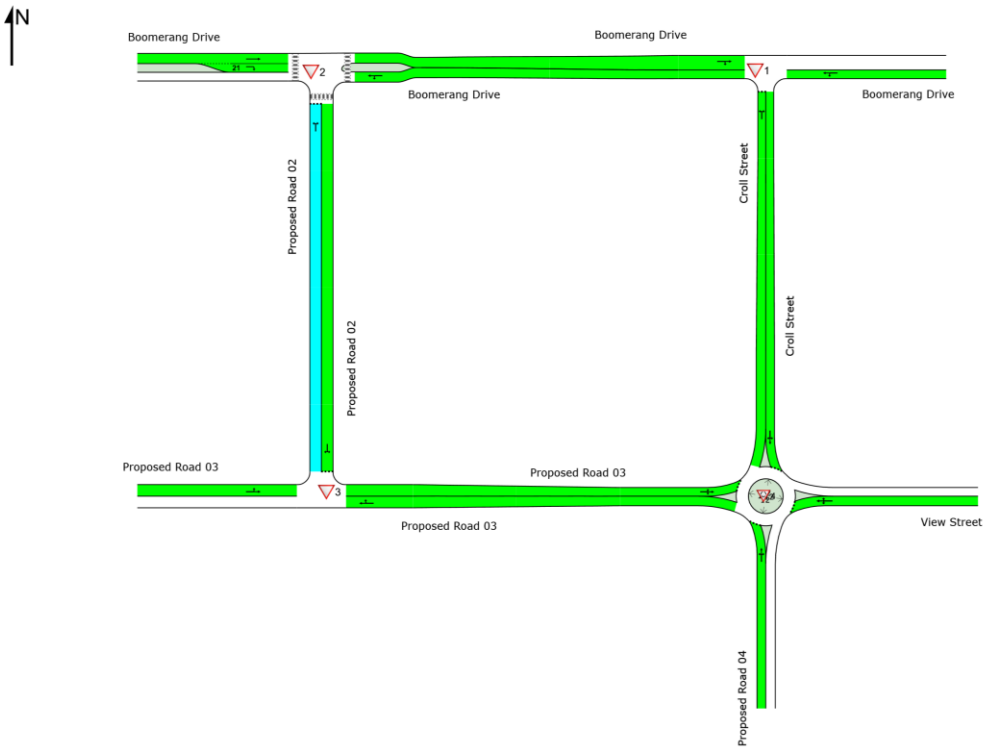


Figure 6-22 2032 AM 'Post-development Model' Queue Length (95th Percentile) in 100th Highest Hour Conditions



6.6.2 2032 PM 'Post-development Model' 100th Highest Hour Conditions

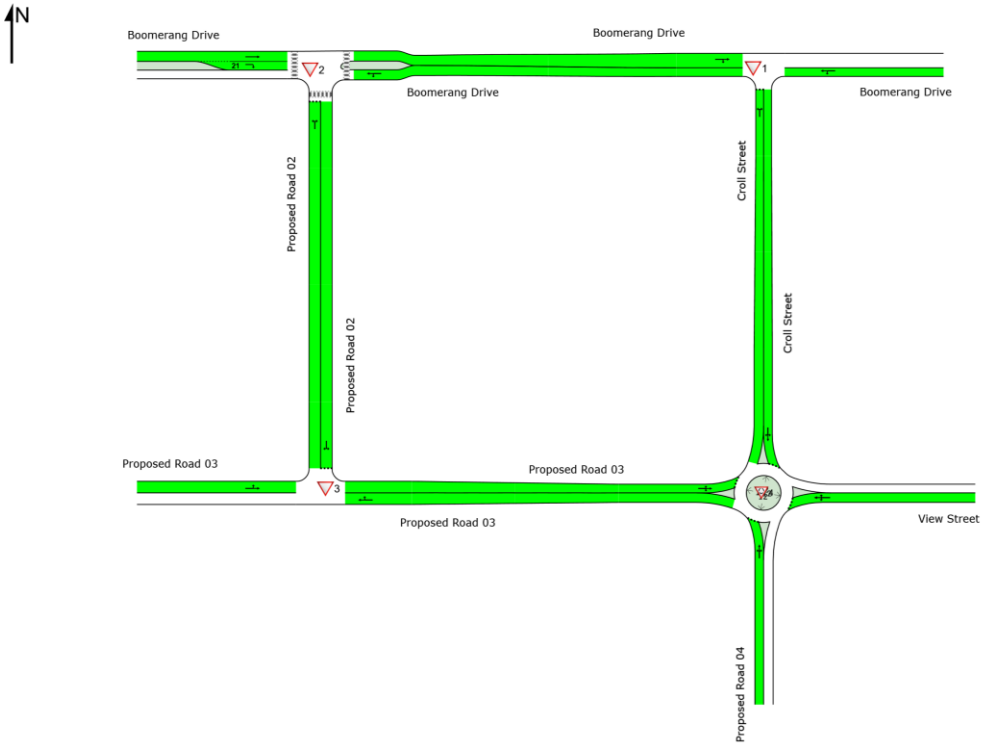
Figure 6-23 2032 PM 'Post-development Model' Level of Service (LOS) in 100th Highest Hour Conditions



Colour code based on Level of Service

LOS A LOS B LOS C LOS D LOS E LOS F

Figure 6-24 2032 PM 'Post-development Model' Queue Length (95th Percentile) in 100th Highest Hour Conditions



Colour code based on Queue Storage Ratio

[< 0.6] [0.6 – 0.7] [0.7 – 0.8] [0.8 – 0.9] [0.9 – 1.0] [> 1.0]

7 Summary and Conclusion

7.1 Detailed Intersection Summary

An assessment of the existing and proposed intersections within the local traffic network was undertaken to determine the impact from the proposed residential subdivision. **Tables 7-1** through to **7-16** below describe the increase in vehicles as a result of the proposed development across each SIDRA modelling scenario. These volumes are presented to provide context in determining the net impact of the development across the local network. **Tables 7-17** through to **7-20** present the level of service (LOS) outputs for each intersection approach leg across all scenarios and provides a key metric for analysing intersection performance. Additional intersection performance information detailing traffic volumes, degree of saturation, queue length, average delay and sign control analysis are listed in individual movement, lane and control summaries are included in **Section 5** and **Appendix A** of this report.

7.1.1 Croll Street / Boomerang Drive Intersection

Croll Street/ Boomerang Drive Intersection does not see any significant impact to the key performance indicators with the increase in traffic volumes as a result of the both upstream and downstream access points to the proposed development.

Tables 7-1, **7-5**, **7-9** and **7-13** highlight minor increases in traffic volume across the major flow approaches as a result of the proposed development in AM and PM peak hour periods under both normal and 100th highest hour conditions. The eastern approach experiences minor increases in traffic volumes as a result of the proposed development upon the commercial zoned lots, however these movements are not significant enough to impact the operational performance of the intersection.

It is noted that the level of service of the southern approach in 2032 post-development years increased from LOS A to LOS B during both AM and PM 100th highest hour post-development scenario. However, this increase is deemed acceptable within the RMS level of service method criteria with spare capacity remaining.

Overall the intersection experiences negligible impacts to the Degree of Saturation, Average Delay and 95th Percentile Queue Length across the design years (2022 'Base', 2032 'Pre-Development' and 2032 'Post-Development' scenarios). The level of service across all design years remains at LOS A – Good operation.

7.1.2 Proposed Boomerang Drive T-intersection Intersection

Much like the downstream intersection mentioned above, the Proposed Boomerang Drive T-intersection Intersection does not show any significant negative performance indicators with the increase in traffic volumes across Boomerang Drive as a result of the proposed development.

Tables 7-2, **7-6**, **7-10** and **7-14** highlight minor increases in traffic volume across the major flow approaches as a result of the proposed development in AM and PM 100th highest hour conditions. The intersection experiences minor impacts to the Degree of Saturation, Average Delay and 95th Percentile Queue Length across the all design years (2022 'Base', 2032 'Pre-Development' and 2032 'Post-Development' scenarios).

The overall level of service across all design years remains at LOS A – Good operation for the proposed intersection. It is noted that the level of service of the southern approach in 2032 post-development years increased from LOS A to LOS B during both AM and PM 100th highest hour post-development scenario. However, this increase is deemed acceptable within the RMS level of service method criteria with spare capacity remaining.

7.1.3 Proposed Road 02 / Proposed Road 03 Intersection

The performance of the Proposed Road 02 / Proposed Road 03 intersection does not show any negative performance indicators with the increase in traffic volumes across Boomerang Drive and Croll Street as a result of the proposed development access and the additional traffic generation.

Tables 7-3, **7-7**, **7-11** and **7-15** highlight increases in traffic volume across all approaches as a result of the proposed development in AM and PM peak hour periods. The intersection displays good levels of Degree of Saturation and Average Delay across the 2032 'post-development' design year. The level of service is LOS A – Good operation across all three approaches during both AM and PM peak hour periods. The 95th percentile queuing is minimal during both AM and PM scenarios.

7.1.4 Proposed Croll Street Roundabout Intersection

The performance of the Proposed Croll Street Roundabout intersection does not see any negative performance indicators with the increase in traffic volumes across Croll Street and View Street as a result of the proposed development access and the additional traffic generation.

Tables 7-4, **7-8**, **7-12** and **7-16** highlight negligible increases in traffic volume across the existing major flow approaches as a result of the proposed development in AM and PM peak hour periods under both normal and 100th highest hour conditions. The intersection displays good levels of Degree of Saturation and Average Delay across the 2032 'post-development' design year. The level of service is LOS A – Good operation across all four approaches during both AM and PM peak hour periods. The 95th percentile queuing is minimal for both AM and PM scenarios.

7.1.5 Increase in Traffic Volumes in Normal Conditions during the AM Scenario

Table 7-1 Increase in Croll Street / Boomerang Drive in the AM Post Developed Scenario (Normal Conditions)

	AM TRAFFIC Boomerang Dr / Croll St Intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
1	East		South		West	
	East Approach - Boomerang Dr		South Approach - Croll St		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	5	151	5	5	151	5
2032 Pre-Development	7	262	7	7	262	7
2032 Post-Development	10	286	19	19	286	10
Additional Trips 2032 Post-dev	3	23	11	11	24	3

Table 7-2 Increase in Boomerang Drive T-intersection in the AM Post Developed Scenario (Normal Conditions)

	AM TRAFFIC Boomerang Drive T-intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
2	East		South		West	
	East Approach - Boomerang Dr		South Approach – Proposed Road 02		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	0	151	0	0	151	0
2032 Pre-Development	0	262	0	0	262	0
2032 Post-Development	23	274	23	38	265	8
Additional Trips 2032 Post-dev	23	11	23	38	3	8

Table 7-3 Increase in Proposed Road 02 / Proposed Road 03 in the AM Post Developed Scenario (Normal Conditions)

	AM TRAFFIC Proposed Road 02 / Proposed Road 03 Intersection					
Intersection No.	Intersection Legs (Clockwise: North-East-West)					
3	North		East		West	
	North Approach – Proposed Road 02		East Approach - Proposed Road 03		West Approach - Proposed Road 02	
	L	T	L	R	T	R
2022 Base	0	0	0	0	0	0
2032 Pre-Development	0	0	0	0	0	0
2032 Post-Development	9	15	3	18	15	10
Additional Trips 2032 Post-dev	9	15	3	18	15	10

Table 7-4 Increase in Croll Street Roundabout in the AM Post Developed Scenario (Normal Conditions)

	AM TRAFFIC Croll Street Roundabout											
Intersection No.	Intersection Legs (Clockwise: North-East-South-West)											
4	North			East			South			West		
	North Approach - Croll St			East Approach - View St			South Approach - Road 04			West Approach - Road 03		
	L	T	R	L	T	R	L	T	R	L	T	R
2022 Base	10	0	0	0	0	10	0	0	0	0	0	0
2032 Pre-Development	15	0	0	0	0	15	0	0	0	0	0	0
2032 Post-Development	15	5	1	0	10	15	5	20	0	2	10	5
Additional Trips 2032 Post-dev	0	5	1	0	10	0	5	20	0	2	10	5

7.1.6 Increase in Traffic Volumes in Normal Conditions during the PM Scenario

Table 7-5 Increase in Croll Street / Boomerang Drive in the PM Post Developed Scenario (Normal Conditions)

	PM TRAFFIC Boomerang Dr / Croll St Intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
1	East		South		West	
	East Approach - Boomerang Dr		South Approach - Croll St		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	5	151	5	5	151	5
2032 Pre-Development	7	262	7	7	262	7
2032 Post-Development	18	292	12	12	294	18
Additional Trips 2032 Post-dev	11	30	5	5	32	11

Table 7-6 Increase in Boomerang Drive T-intersection in the PM Post Developed Scenario (Normal Conditions)

	PM TRAFFIC Boomerang Drive T-intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
2	East		South		West	
	East Approach - Boomerang Dr		South Approach – Proposed Road 02		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	0	151	0	0	151	0
2032 Pre-Development	0	262	0	0	262	0
2032 Post-Development	30	267	17	32	273	15
Additional Trips 2032 Post-dev	30	5	17	32	11	15

Table 7-7 Increase in Proposed Road 02 / Proposed Road 03 in the PM Post Developed Scenario (Normal Conditions)

	PM TRAFFIC Proposed Road 02 / Proposed Road 03 Intersection					
Intersection No.	Intersection Legs (Clockwise: North-East-West)					
3	North		East		West	
	North Approach – Proposed Road 02		East Approach - Proposed Road 03		West Approach - Proposed Road 02	
	L	T	L	R	T	R
2022 Base	0	0	0	0	0	0
2032 Pre-Development	0	0	0	0	0	0
2032 Post-Development	15	23	10	12	10	4
Additional Trips 2032 Post-dev	15	23	10	12	10	4

Table 7-8 Increase in Croll Street Roundabout in the PM Post Developed Scenario (Normal Conditions)

	PM TRAFFIC Croll Street Roundabout											
Intersection No.	Intersection Legs (Clockwise: North-East-South-West)											
4	North			East			South			West		
	North Approach - Croll St			East Approach - View St			South Approach - Road 04			West Approach - Road 03		
	L	T	R	L	T	R	L	T	R	L	T	R
2022 Base	10	0	0	0	0	10	0	0	0	0	0	0
2032 Pre-Development	15	0	0	0	0	15	0	0	0	0	0	0
2032 Post-Development	15	20	2	0	10	15	9	8	0	1	10	2
Additional Trips 2032 Post-dev	0	20	2	0	10	0	9	8	0	1	10	2

7.1.7 Increase in Traffic Volumes in 100th Highest Hour Conditions during the AM Scenario

Table 7-9 Increase in Croll Street / Boomerang Drive in the AM Post Developed Scenario (100th Highest Hour Conditions)

	AM TRAFFIC Boomerang Dr / Croll St Intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
1	East		South		West	
	East Approach - Boomerang Dr		South Approach - Croll St		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	10	302	10	10	302	10
2032 Pre-Development	15	525	15	15	525	15
2032 Post-Development	18	548	26	26	549	18
Additional Trips 2032 Post-dev	3	23	11	11	24	3

Table 7-10 Increase in Boomerang Drive T-intersection in the AM Post Developed Scenario (100th Highest Hour Conditions)

	AM TRAFFIC Boomerang Drive T-intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
2	East		South		West	
	East Approach - Boomerang Dr		South Approach – Proposed Road 02		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	0	302	0	0	302	0
2032 Pre-Development	0	525	0	0	525	0
2032 Post-Development	23	536	23	38	528	8
Additional Trips 2032 Post-dev	23	11	23	38	3	8

Table 7-11 Increase in Proposed Road 02 / Proposed Road 03 in the AM Post Developed Scenario (100th Highest Hour Conditions)

	AM TRAFFIC Proposed Road 02 / Proposed Road 03 Intersection					
Intersection No.	Intersection Legs (Clockwise: North-East-West)					
3	North		East		West	
	North Approach – Proposed Road 02		East Approach - Proposed Road 03		West Approach - Proposed Road 02	
	L	T	L	R	T	R
2022 Base	0	0	0	0	0	0
2032 Pre-Development	0	0	0	0	0	0
2032 Post-Development	9	15	3	18	15	10
Additional Trips 2032 Post-dev	9	15	3	18	15	10

Table 7-12 Increase in Croll Street Roundabout in the AM Post Developed Scenario (100th Highest Hour Conditions)

	AM TRAFFIC Croll Street Roundabout											
Intersection No.	Intersection Legs (Clockwise: North-East-South-West)											
4	North			East			South			West		
	North Approach - Croll St			East Approach - View St			South Approach - Road 04			West Approach - Road 03		
	L	T	R	L	T	R	L	T	R	L	T	R
2022 Base	20	0	0	0	0	20	0	0	0	0	0	0
2032 Pre-Development	29	0	0	0	0	29	0	0	0	0	0	0
2032 Post-Development	29	5	1	0	10	29	9	20	0	2	10	5
Additional Trips 2032 Post-dev	0	5	1	0	10	0	9	20	0	2	10	5

7.1.8 Increase in Traffic Volumes in 100th Highest Hour Conditions during the PM Scenario

Table 7-13 Increase in Croll Street / Boomerang Drive in the PM Post Developed Scenario (100th Highest Hour Conditions)

	PM TRAFFIC Boomerang Dr / Croll St Intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
1	East		South		West	
	East Approach - Boomerang Dr		South Approach - Croll St		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	10	302	10	10	302	10
2032 Pre-Development	15	525	15	15	525	15
2032 Post-Development	26	555	19	19	557	26
Additional Trips 2032 Post-dev	11	30	5	5	32	11

Table 7-14 Increase in Boomerang Drive T-intersection in the PM Post Developed Scenario (100th Highest Hour Conditions)

	PM TRAFFIC Boomerang Drive T-intersection					
Intersection No.	Intersection Legs (Clockwise: East-South-West)					
2	East		South		West	
	East Approach - Boomerang Dr		South Approach – Proposed Road 02		West Approach - Boomerang Dr	
	L	T	L	R	T	R
2022 Base	0	302	0	0	302	0
2032 Pre-Development	0	525	0	0	525	0
2032 Post-Development	30	529	17	32	536	15
Additional Trips 2032 Post-dev	30	5	17	32	11	15

Table 7-15 Increase in Proposed Road 02 / Proposed Road 03 in the PM Post Developed Scenario (100th Highest Hour Conditions)

	PM TRAFFIC Proposed Road 02 / Proposed Road 03 Intersection					
Intersection No.	Intersection Legs (Clockwise: North-East-West)					
3	North		East		West	
	North Approach – Proposed Road 02		East Approach - Proposed Road 03		West Approach - Proposed Road 02	
	L	T	L	R	T	R
2022 Base	0	0	0	0	0	0
2032 Pre-Development	0	0	0	0	0	0
2032 Post-Development	15	23	10	12	10	4
Additional Trips 2032 Post-dev	15	23	10	12	10	4

Table 7-16 Increase in Croll Street Roundabout in the PM Post Developed Scenario (100th Highest Hour Conditions)

	PM TRAFFIC Croll Street Roundabout											
Intersection No.	Intersection Legs (Clockwise: North-East-South-West)											
4	North			East			South			West		
	North Approach - Croll St			East Approach - View St			South Approach - Road 04			West Approach - Road 03		
	L	T	R	L	T	R	L	T	R	L	T	R
2022 Base	20	0	0	0	0	20	0	0	0	0	0	0
2032 Pre-Development	29	0	0	0	0	29	0	0	0	0	0	0
2032 Post-Development	29	20	2	0	10	29	9	8	0	1	10	2
Additional Trips 2032 Post-dev	0	20	2	0	10	0	9	8	0	1	10	2

7.2 Level of Service Performance Summary

The performance of each intersection in each scenario including both Normal and 100th Highest Hour Conditions are summarized in **Tables 7-17**, **7-18**, **7-19** and **7-20** below.

Table 7-17 Intersection Performance Summary AM Peak Hour

Intersection	Leg	2022 AM 'Base Model'	2032 AM 'Pre-Development' Model	2032 AM 'Post-Development' Model
Croll Street / Boomerang Drive	*East*	**LOS A**	**LOS A**	**LOS A**
	South	**LOS A**	**LOS A**	**LOS A**
	West	**LOS A**	**LOS A**	**LOS A**
	Intersection	**LOS A**	**LOS A**	**LOS A**
Boomerang Drive T-intersection	*East*	N/A	N/A	**LOS A**
	South	N/A	N/A	**LOS A**
	West	N/A	N/A	**LOS A**
	Intersection	N/A	N/A	**LOS A**
Proposed Road 02 / Proposed Road 03	*North*	N/A	N/A	**LOS A**
	East	N/A	N/A	**LOS A**
	West	N/A	N/A	**LOS A**
	Intersection	N/A	N/A	**LOS A**
Croll Street Roundabout	*North*	N/A	N/A	**LOS A**
	East	N/A	N/A	**LOS A**
	South	N/A	N/A	**LOS A**
	West	N/A	N/A	**LOS A**
	Intersection	N/A	N/A	**LOS A**

Table 7-18 Intersection Performance Summary PM Peak Hour

Intersection	Leg	2022 PM 'Base Model'	2032 PM 'Pre-Development' Model	2032 PM 'Post-Development' Model
Croll Street / Boomerang Drive	*East*	**LOS A**	**LOS A**	**LOS A**
	South	**LOS A**	**LOS A**	**LOS A**
	West	**LOS A**	**LOS A**	**LOS A**
	Intersection	**LOS A**	**LOS A**	**LOS A**
Boomerang Drive T-intersection	*East*	N/A	N/A	**LOS A**
	South	N/A	N/A	**LOS A**
	West	N/A	N/A	**LOS A**
	Intersection	N/A	N/A	**LOS A**
Proposed Road 02 / Proposed Road 03	*North*	N/A	N/A	**LOS A**
	East	N/A	N/A	**LOS A**
	West	N/A	N/A	**LOS A**
	Intersection	N/A	N/A	**LOS A**
Croll Street Roundabout	*North*	N/A	N/A	**LOS A**
	East	N/A	N/A	**LOS A**
	South	N/A	N/A	**LOS A**
	West	N/A	N/A	**LOS A**
	Intersection	N/A	N/A	**LOS A**

Table 7-19 Intersection Performance Summary AM 100th Highest Hour

Intersection	Leg	2022 AM 'Base Model' (100th HH)	2032 AM 'Pre-Development' Model (100th HH)	2032 AM 'Post-Development' Model (100th HH)
Croll Street / Boomerang Drive	*East*	LOS A	LOS A	LOS A
	South	LOS A	LOS A	LOS A
	West	LOS A	LOS A	LOS A
	Intersection	LOS A	LOS A	LOS A
Boomerang Drive T-intersection	*East*	N/A	N/A	LOS A
	South	N/A	N/A	LOS B
	West	N/A	N/A	LOS A
	Intersection	N/A	N/A	LOS A
Proposed Road 02 / Proposed Road 03	*North*	N/A	N/A	LOS A
	East	N/A	N/A	LOS A
	West	N/A	N/A	LOS A
	Intersection	N/A	N/A	LOS A
Croll Street Roundabout	*North*	N/A	N/A	LOS A
	East	N/A	N/A	LOS A
	South	N/A	N/A	LOS A
	West	N/A	N/A	LOS A
	Intersection	N/A	N/A	LOS A

Table 7-20 Intersection Performance Summary PM 100th Highest Hour

Intersection	Leg	2022 PM 'Base Model' (100th HH)	2032 PM 'Pre-Development' Model (100th HH)	2032 PM 'Post-Development' Model (100th HH)
Croll Street / Boomerang Drive	*East*	LOS A	LOS A	LOS A
	South	LOS A	LOS A	LOS A
	West	LOS A	LOS A	LOS A
	Intersection	LOS A	LOS A	LOS A
Boomerang Drive T-intersection	*East*	N/A	N/A	LOS A
	South	N/A	N/A	LOS B
	West	N/A	N/A	LOS A
	Intersection	N/A	N/A	LOS A
Proposed Road 02 / Proposed Road 03	*North*	N/A	N/A	LOS A
	East	N/A	N/A	LOS A
	West	N/A	N/A	LOS A
	Intersection	N/A	N/A	LOS A
Croll Street Roundabout	*North*	N/A	N/A	LOS A
	East	N/A	N/A	LOS A
	South	N/A	N/A	LOS A
	West	N/A	N/A	LOS A
	Intersection	N/A	N/A	LOS A

7.3 Conclusion

Cardno, now Stantec have undertaken a traffic assessment for the proposed Blueys Beach subdivision in Blueys Beach, NSW.

Traffic volume tube counts were undertaken by MidCoast Council on during February 2021 and 2022 on the below roads adjacent to the proposed development, which contributed to establishing the base traffic volumes within the Boomerang Drive network:

- Boomerang Drive; and,
- Croll Street.

The proposed development contains the following new intersections in which traffic modelling was undertaken for the 2022 base, 2032 pre-development and 2032 post-development scenarios during both AM and PM peak hours:

- Croll Street / Boomerang Drive Intersection;
- Proposed Road 02 / Boomerang Drive Intersection;
- Proposed Road 02 / Proposed Road 03 Intersection; and
- Proposed Road 03 / Proposed Road 04 / Croll Street / View Street Intersection.

Vehicular access to and from the site will be gain via two locations (Croll Street Roundabout and Boomerang Drive T-intersection) to allow for improved vehicular circulation and permeability of the local traffic network.

Pedestrian access will be provided through both abovementioned intersections and have been designed to integrate into the existing Blueys Beach footpath network. Footpaths will be located along roads 01, 02, 03, and 04 will contain either 1.5 - 2-metre footpaths connecting proposed lots and recreation areas to Newman Avenue, Samuel Street, Croll Street and the Blueys Beach commercial centre.

It is envisaged that the both intersections will contain local area traffic management treatments (LATM) i.e. reduces speed zones, speed bumps, raised threshold crossings, chicanes, textural changes to pavement to help create a low speed environment which is sympathetic to current and envisaged pedestrian activity within the Blueys Beach commercial area. Specific LATM treatments will be further refined and incorporated in the detailed design phase of the project. These treatments will aid in the improving both vehicle and pedestrian circulation in and around the Blueys Beach commercial area.

The modelling results revealed that each intersection experiences relatively low level of traffic during peak hours, which were assumed as the normal school term peak hours for the purposes of this assessment.

The proposed 73 lot residential and 2 lot commercial subdivision is expected to generate 135 and 141 vehicle trips per hour during the AM and PM peak hours, respectively. Based on the assessments completed, these additional trips reflect and addition 2-3 movements per minute in the peak hour; an additional load which is readily managed within the capacity of the existing road network. With the addition of this traffic to the existing network operations and allowing for an annual growth rate of 4.05% for Croll Street and 5.67% for Boomerang drive to a 2032 pre and post development model year, the SIDRA results indicate that all four intersections are expected to operate at Level of Service ‘A’ following completion of the subdivision.

The performance of all four intersections were also assessed utilising traffic volumes representative of the 100th Highest Hour (100 HH), which considers the scenario of a busy holiday period (e.g. Christmas/New Years and Easter). Within these periods, traffic volumes are considerably higher than the base case which is atypical of a holiday destination such as Pacific Palms. This assessment has shown that even in these periods, the existing road network has the capacity to perform in accordance with Good Operation with delays not exceeding 28 seconds in accordance with the RMS NSW method of assessment.

7.4 Closing

It is appreciated that local experiences with traffic, particularly in peak periods may differ from the outputs of the modelling presented within this report. In accordance with standards for the development of Traffic Impact Assessments, the model attempts to provide an accurate representation of the mean operating conditions. In this way, the assessment should be viewed as a tool for comparative assessment between the existing and proposed conditions. It is accepted that some parts of the existing road network may benefit from augmentation through this development process. The development team is committed to mitigating traffic impacts on the local community and welcomes feedback on how the performance and safety of the existing road and pedestrian networks may be further improved through this development.

APPENDIX A

SIDRA OUTPUTS

Cardno

now

Stantec

MOVEMENT SUMMARY

Site: 1 [AM - Croll Street / Boomerang Drive (Site Folder: 2022 Base)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	5	12.0	5	12.0	0.010	5.2	LOS A	0.0	0.3	0.29	0.54	0.29	46.5
3	R2	5	12.0	5	12.0	0.010	6.1	LOS A	0.0	0.3	0.29	0.54	0.29	35.2
Approach		10	12.0	11	12.0	0.010	5.6	LOS A	0.0	0.3	0.29	0.54	0.29	44.0
East: Boomerang Drive														
4	L2	5	12.0	5	12.0	0.093	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	47.1
5	T1	151	13.0	159	13.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.9
Approach		156	13.0	164	13.0	0.093	0.1	NA	0.0	0.0	0.00	0.02	0.00	49.9
West: Boomerang Drive														
11	T1	151	13.0	159	13.0	0.085	0.0	LOS A	0.0	0.3	0.02	0.02	0.02	49.8
12	R2	5	12.0	5	12.0	0.085	5.5	LOS A	0.0	0.3	0.02	0.02	0.02	48.8
Approach		156	13.0	164	13.0	0.085	0.2	NA	0.0	0.3	0.02	0.02	0.02	49.8
All Vehicles		322	12.9	339	12.9	0.093	0.3	NA	0.0	0.3	0.02	0.03	0.02	49.7

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM - Croll Street / Boomerang Drive (Site Folder: 2022 Base)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	5	12.0	5	12.0	0.010	5.2	LOS A	0.0	0.3	0.29	0.54	0.29	46.5
3	R2	5	12.0	5	12.0	0.010	6.1	LOS A	0.0	0.3	0.29	0.54	0.29	35.2
Approach		10	12.0	11	12.0	0.010	5.6	LOS A	0.0	0.3	0.29	0.54	0.29	44.0
East: Boomerang Drive														
4	L2	5	12.0	5	12.0	0.093	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	47.1
5	T1	151	13.0	159	13.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.9
Approach		156	13.0	164	13.0	0.093	0.1	NA	0.0	0.0	0.00	0.02	0.00	49.9
West: Boomerang Drive														
11	T1	151	13.0	159	13.0	0.085	0.0	LOS A	0.0	0.3	0.02	0.02	0.02	49.8
12	R2	5	12.0	5	12.0	0.085	5.5	LOS A	0.0	0.3	0.02	0.02	0.02	48.8
Approach		156	13.0	164	13.0	0.085	0.2	NA	0.0	0.3	0.02	0.02	0.02	49.8
All Vehicles		322	12.9	339	12.9	0.093	0.3	NA	0.0	0.3	0.02	0.03	0.02	49.7

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM - Croll Street / Boomerang Drive (100th hour) (Site Folder: 2022 Base (100th hour))]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	10	12.0	11	12.0	0.027	5.9	LOS A	0.1	0.7	0.44	0.63	0.44	45.8
3	R2	10	12.0	11	12.0	0.027	8.4	LOS A	0.1	0.7	0.44	0.63	0.44	33.5
Approach		20	12.0	21	12.0	0.027	7.2	LOS A	0.1	0.7	0.44	0.63	0.44	43.0
East: Boomerang Drive														
4	L2	10	12.0	11	12.0	0.186	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	47.1
5	T1	302	13.0	318	13.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.8
Approach		312	13.0	328	13.0	0.186	0.1	NA	0.0	0.0	0.00	0.02	0.00	49.8
West: Boomerang Drive														
11	T1	302	13.0	318	13.0	0.172	0.1	LOS A	0.1	0.9	0.04	0.02	0.04	49.8
12	R2	10	12.0	11	12.0	0.172	6.5	LOS A	0.1	0.9	0.04	0.02	0.04	48.7
Approach		312	13.0	328	13.0	0.172	0.3	NA	0.1	0.9	0.04	0.02	0.04	49.8
All Vehicles		644	12.9	678	12.9	0.186	0.4	NA	0.1	0.9	0.03	0.04	0.03	49.6

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM - Croll Street / Boomerang Drive (100th hour) (Site Folder: 2022 Base (100th hour))]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	10	12.0	11	12.0	0.027	5.9	LOS A	0.1	0.7	0.44	0.63	0.44	45.8
3	R2	10	12.0	11	12.0	0.027	8.4	LOS A	0.1	0.7	0.44	0.63	0.44	33.5
Approach		20	12.0	21	12.0	0.027	7.2	LOS A	0.1	0.7	0.44	0.63	0.44	43.0
East: Boomerang Drive														
4	L2	10	12.0	11	12.0	0.186	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	47.1
5	T1	302	13.0	318	13.0	0.186	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.8
Approach		312	13.0	328	13.0	0.186	0.1	NA	0.0	0.0	0.00	0.02	0.00	49.8
West: Boomerang Drive														
11	T1	302	13.0	318	13.0	0.172	0.1	LOS A	0.1	0.9	0.04	0.02	0.04	49.8
12	R2	10	12.0	11	12.0	0.172	6.5	LOS A	0.1	0.9	0.04	0.02	0.04	48.7
Approach		312	13.0	328	13.0	0.172	0.3	NA	0.1	0.9	0.04	0.02	0.04	49.8
All Vehicles		644	12.9	678	12.9	0.186	0.4	NA	0.1	0.9	0.03	0.04	0.03	49.6

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.
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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM - Croll Street / Boomerang Drive (Site Folder: 2032 Without Development)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	7	12.0	7	12.0	0.017	5.7	LOS A	0.1	0.5	0.40	0.60	0.40	46.0
3	R2	7	12.0	7	12.0	0.017	7.6	LOS A	0.1	0.5	0.40	0.60	0.40	34.1
Approach		14	12.0	15	12.0	0.017	6.7	LOS A	0.1	0.5	0.40	0.60	0.40	43.3
East: Boomerang Drive														
4	L2	7	12.0	7	12.0	0.160	3.9	LOS A	0.0	0.0	0.00	0.01	0.00	47.1
5	T1	262	13.0	276	13.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		269	13.0	283	13.0	0.160	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.8
West: Boomerang Drive														
11	T1	262	13.0	276	13.0	0.147	0.1	LOS A	0.1	0.6	0.03	0.02	0.03	49.8
12	R2	7	12.0	7	12.0	0.147	6.1	LOS A	0.1	0.6	0.03	0.02	0.03	48.8
Approach		269	13.0	283	13.0	0.147	0.2	NA	0.1	0.6	0.03	0.02	0.03	49.8
All Vehicles		552	12.9	581	12.9	0.160	0.3	NA	0.1	0.6	0.02	0.03	0.02	49.7

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM - Croll Street / Boomerang Drive (Site Folder: 2032 Without Development)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	7	12.0	7	12.0	0.017	5.7	LOS A	0.1	0.5	0.40	0.60	0.40	46.0
3	R2	7	12.0	7	12.0	0.017	7.6	LOS A	0.1	0.5	0.40	0.60	0.40	34.1
Approach		14	12.0	15	12.0	0.017	6.7	LOS A	0.1	0.5	0.40	0.60	0.40	43.3
East: Boomerang Drive														
4	L2	7	12.0	7	12.0	0.160	3.9	LOS A	0.0	0.0	0.00	0.01	0.00	47.1
5	T1	262	13.0	276	13.0	0.160	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		269	13.0	283	13.0	0.160	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.8
West: Boomerang Drive														
11	T1	262	13.0	276	13.0	0.147	0.1	LOS A	0.1	0.6	0.03	0.02	0.03	49.8
12	R2	7	12.0	7	12.0	0.147	6.1	LOS A	0.1	0.6	0.03	0.02	0.03	48.8
Approach		269	13.0	283	13.0	0.147	0.2	NA	0.1	0.6	0.03	0.02	0.03	49.8
All Vehicles		552	12.9	581	12.9	0.160	0.3	NA	0.1	0.6	0.02	0.03	0.02	49.7

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM - Croll Street / Boomerang Drive (100th hour) (Site Folder: 2032 Without Development (100th hour))]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	15	12.0	16	12.0	0.076	7.5	LOS A	0.2	1.8	0.67	0.81	0.67	43.7
3	R2	15	12.0	16	12.0	0.076	15.8	LOS B	0.2	1.8	0.67	0.81	0.67	28.9
Approach		30	12.0	32	12.0	0.076	11.6	LOS A	0.2	1.8	0.67	0.81	0.67	40.1
East: Boomerang Drive														
4	L2	15	12.0	16	12.0	0.322	3.9	LOS A	0.0	0.0	0.00	0.01	0.00	47.1
5	T1	525	13.0	553	13.0	0.322	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		540	13.0	568	13.0	0.322	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
West: Boomerang Drive														
11	T1	525	13.0	553	13.0	0.301	0.3	LOS A	0.3	2.5	0.06	0.02	0.07	49.7
12	R2	15	12.0	16	12.0	0.301	9.2	LOS A	0.3	2.5	0.06	0.02	0.07	48.6
Approach		540	13.0	568	13.0	0.301	0.5	NA	0.3	2.5	0.06	0.02	0.07	49.6
All Vehicles		1110	12.9	1168	12.9	0.322	0.6	NA	0.3	2.5	0.05	0.04	0.05	49.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM - Croll Street / Boomerang Drive (100th hour) (Site Folder: 2032 Without Development (100th hour))]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	15	12.0	16	12.0	0.076	7.5	LOS A	0.2	1.8	0.67	0.81	0.67	43.7
3	R2	15	12.0	16	12.0	0.076	15.8	LOS B	0.2	1.8	0.67	0.81	0.67	28.9
Approach		30	12.0	32	12.0	0.076	11.6	LOS A	0.2	1.8	0.67	0.81	0.67	40.1
East: Boomerang Drive														
4	L2	15	12.0	16	12.0	0.322	3.9	LOS A	0.0	0.0	0.00	0.01	0.00	47.1
5	T1	525	13.0	553	13.0	0.322	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		540	13.0	568	13.0	0.322	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.7
West: Boomerang Drive														
11	T1	525	13.0	553	13.0	0.301	0.3	LOS A	0.3	2.5	0.06	0.02	0.07	49.7
12	R2	15	12.0	16	12.0	0.301	9.2	LOS A	0.3	2.5	0.06	0.02	0.07	48.6
Approach		540	13.0	568	13.0	0.301	0.5	NA	0.3	2.5	0.06	0.02	0.07	49.6
All Vehicles		1110	12.9	1168	12.9	0.322	0.6	NA	0.3	2.5	0.05	0.04	0.05	49.5

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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM - Croll Street / Boomerang Drive (Site Folder: 2032 With Development)]

Network: 01 [2032 AM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	20	12.0	20	12.0	0.050	5.9	LOS A	0.2	1.3	0.43	0.65	0.43	34.4
3	R2	20	12.0	20	12.0	0.050	8.2	LOS A	0.2	1.3	0.43	0.65	0.43	33.6
Approach		40	12.0	40	12.0	0.050	7.1	LOS A	0.2	1.3	0.43	0.65	0.43	34.0
East: Boomerang Drive														
4	L2	11	12.0	11	12.0	0.176	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	48.5
5	T1	301	13.0	301	13.0	0.176	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	48.5
Approach		312	13.0	312	13.0	0.176	0.1	NA	0.0	0.0	0.00	0.02	0.00	48.5
West: Boomerang Drive														
11	T1	301	13.0	301	13.0	0.163	0.1	LOS A	0.1	0.8	0.04	0.02	0.04	48.7
12	R2	11	12.0	11	12.0	0.163	6.3	LOS A	0.1	0.8	0.04	0.02	0.04	48.2
Approach		312	13.0	312	13.0	0.163	0.3	NA	0.1	0.8	0.04	0.02	0.04	48.7
All Vehicles		663	12.9	663	12.9	0.176	0.6	NA	0.2	1.3	0.05	0.06	0.05	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [AM - Proposed Road 02 / Boomerang Drive (Site Folder: 2032 With Development)]

Network: 01 [2032 AM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 02														
1	L2	24	6.0	24	6.0	0.096	5.7	LOS A	0.4	2.7	0.51	0.70	0.51	44.7
3	R2	40	6.0	40	6.0	0.096	9.8	LOS A	0.4	2.7	0.51	0.70	0.51	29.1
Approach		64	6.0	64	6.0	0.096	8.3	LOS A	0.4	2.7	0.51	0.70	0.51	40.4
East: Boomerang Drive														
4	L2	24	6.0	24	6.0	0.172	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	47.9
5	T1	288	13.0	288	13.0	0.172	0.0	LOS A	0.0	0.0	0.00	0.04	0.00	49.7
Approach		313	12.5	313	12.5	0.172	0.4	NA	0.0	0.0	0.00	0.04	0.00	49.7
West: Boomerang Drive														
11	T1	279	13.0	279	13.0	0.154	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	8	6.0	8	6.0	0.007	5.7	LOS A	0.0	0.2	0.40	0.54	0.40	45.8
Approach		287	12.8	287	12.8	0.154	0.2	NA	0.0	0.2	0.01	0.02	0.01	49.8
All Vehicles		664	12.0	664	12.0	0.172	1.1	NA	0.4	2.7	0.05	0.09	0.05	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [AM - Proposed Road 03 / Proposed Road 02 (Site Folder: 2032 With Development)]

Network: 01 [2032 AM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Proposed Road 03														
5	T1	3	6.0	3	6.0	0.013	0.1	LOS A	0.1	0.4	0.09	0.44	0.09	35.3
6	R2	19	6.0	19	6.0	0.013	4.7	LOS A	0.1	0.4	0.09	0.44	0.09	31.1
Approach		22	6.0	22	6.0	0.013	4.0	NA	0.1	0.4	0.09	0.44	0.09	31.8
North: Proposed Road 02														
7	L2	9	6.0	9	6.0	0.019	4.6	LOS A	0.1	0.5	0.06	0.52	0.06	35.2
9	R2	16	6.0	16	6.0	0.019	4.8	LOS A	0.1	0.5	0.06	0.52	0.06	33.1
Approach		25	6.0	25	6.0	0.019	4.7	LOS A	0.1	0.5	0.06	0.52	0.06	33.8
West: Proposed Road 03														
10	L2	16	6.0	16	6.0	0.014	3.6	LOS A	0.0	0.0	0.00	0.31	0.00	33.0
11	T1	11	6.0	11	6.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	33.0
Approach		26	6.0	26	6.0	0.014	2.2	NA	0.0	0.0	0.00	0.31	0.00	33.0
All Vehicles		74	6.0	74	6.0	0.019	3.6	NA	0.1	0.5	0.05	0.42	0.05	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [AM - Proposed Road 04 / Proposed Road 03 / Croll Street / View Street (Site Folder: 2032 With Development)]

Network: 01 [2032 AM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 04														
1	L2	9	6.0	9	6.0	0.026	3.5	LOS A	0.1	1.0	0.15	0.40	0.15	45.1
2	T1	21	6.0	21	6.0	0.026	3.7	LOS A	0.1	1.0	0.15	0.40	0.15	45.1
3	R2	1	6.0	1	6.0	0.026	7.2	LOS A	0.1	1.0	0.15	0.40	0.15	46.0
Approach		32	6.0	32	6.0	0.026	3.7	LOS A	0.1	1.0	0.15	0.40	0.15	45.2
East: View Street														
4	L2	1	6.0	1	6.0	0.021	3.4	LOS A	0.1	0.8	0.08	0.53	0.08	43.9
5	T1	11	6.0	11	6.0	0.021	3.5	LOS A	0.1	0.8	0.08	0.53	0.08	31.0
6	R2	16	13.0	16	13.0	0.021	7.1	LOS A	0.1	0.8	0.08	0.53	0.08	31.0
Approach		27	10.0	27	10.0	0.021	5.6	LOS A	0.1	0.8	0.08	0.53	0.08	32.6
North: Croll Street														
7	L2	16	13.0	16	13.0	0.018	3.5	LOS A	0.1	0.8	0.11	0.44	0.11	40.5
8	T1	5	6.0	5	6.0	0.018	3.6	LOS A	0.1	0.8	0.11	0.44	0.11	47.0
9	R2	1	6.0	1	6.0	0.018	7.1	LOS A	0.1	0.8	0.11	0.44	0.11	39.8
Approach		22	11.0	22	11.0	0.018	3.7	LOS A	0.1	0.8	0.11	0.44	0.11	43.1
West: Proposed Road 03														
10	L2	2	6.0	2	6.0	0.015	3.6	LOS A	0.1	0.6	0.17	0.45	0.17	30.2
11	T1	11	6.0	11	6.0	0.015	3.7	LOS A	0.1	0.6	0.17	0.45	0.17	38.0
12	R2	5	6.0	5	6.0	0.015	7.3	LOS A	0.1	0.6	0.17	0.45	0.17	45.2
Approach		18	6.0	18	6.0	0.015	4.7	LOS A	0.1	0.6	0.17	0.45	0.17	41.3
All Vehicles		99	8.2	99	8.2	0.026	4.4	LOS A	0.1	1.0	0.13	0.45	0.13	42.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM - Croll Street / Boomerang Drive (Site Folder: 2032 With Development)]

Network: 02 [2032 PM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	13	12.0	13	12.0	0.033	5.9	LOS A	0.1	0.8	0.44	0.64	0.44	34.3
3	R2	13	12.0	13	12.0	0.033	8.4	LOS A	0.1	0.8	0.44	0.64	0.44	33.5
Approach		25	12.0	25	12.0	0.033	7.1	LOS A	0.1	0.8	0.44	0.64	0.44	33.8
East: Boomerang Drive														
4	L2	19	12.0	19	12.0	0.185	3.9	LOS A	0.0	0.0	0.00	0.03	0.00	47.5
5	T1	307	13.0	307	13.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	47.5
Approach		326	12.9	326	12.9	0.185	0.2	NA	0.0	0.0	0.00	0.03	0.00	47.5
West: Boomerang Drive														
11	T1	309	13.0	309	13.0	0.174	0.2	LOS A	0.2	1.5	0.07	0.03	0.07	47.8
12	R2	19	12.0	19	12.0	0.174	6.5	LOS A	0.2	1.5	0.07	0.03	0.07	47.0
Approach		328	12.9	328	12.9	0.174	0.5	NA	0.2	1.5	0.07	0.03	0.07	47.8
All Vehicles		680	12.9	680	12.9	0.185	0.6	NA	0.2	1.5	0.05	0.06	0.05	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [PM - Proposed Road 02 / Boomerang Drive (Site Folder: 2032 With Development)]

Network: 02 [2032 PM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 02														
1	L2	18	6.0	18	6.0	0.080	5.7	LOS A	0.3	2.2	0.51	0.70	0.51	44.6
3	R2	34	6.0	34	6.0	0.080	9.9	LOS A	0.3	2.2	0.51	0.70	0.51	28.8
Approach		52	6.0	52	6.0	0.080	8.4	LOS A	0.3	2.2	0.51	0.70	0.51	39.8
East: Boomerang Drive														
4	L2	32	6.0	32	6.0	0.172	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	47.4
5	T1	281	13.0	281	13.0	0.172	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	49.6
Approach		313	12.3	313	12.3	0.172	0.5	NA	0.0	0.0	0.00	0.05	0.00	49.6
West: Boomerang Drive														
11	T1	287	13.0	287	13.0	0.159	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	16	6.0	16	6.0	0.012	5.7	LOS A	0.1	0.4	0.40	0.55	0.40	45.8
Approach		303	12.6	303	12.6	0.159	0.4	NA	0.1	0.4	0.02	0.03	0.02	49.7
All Vehicles		667	12.0	667	12.0	0.172	1.0	NA	0.3	2.2	0.05	0.09	0.05	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [PM - Proposed Road 03 / Proposed Road 02 (Site Folder: 2032 With Development)]

Network: 02 [2032 PM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Proposed Road 03														
5	T1	11	6.0	11	6.0	0.013	0.0	LOS A	0.1	0.4	0.06	0.29	0.06	39.5
6	R2	13	6.0	13	6.0	0.013	4.7	LOS A	0.1	0.4	0.06	0.29	0.06	36.0
Approach		23	6.0	23	6.0	0.013	2.6	NA	0.1	0.4	0.06	0.29	0.06	37.8
North: Proposed Road 02														
7	L2	17	6.0	17	6.0	0.031	4.6	LOS A	0.1	0.8	0.03	0.53	0.03	35.5
9	R2	25	6.0	25	6.0	0.031	4.7	LOS A	0.1	0.8	0.03	0.53	0.03	33.3
Approach		42	6.0	42	6.0	0.031	4.7	LOS A	0.1	0.8	0.03	0.53	0.03	34.0
West: Proposed Road 03														
10	L2	11	6.0	11	6.0	0.008	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	31.1
11	T1	4	6.0	4	6.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.37	0.00	31.1
Approach		15	6.0	15	6.0	0.008	2.6	NA	0.0	0.0	0.00	0.37	0.00	31.1
All Vehicles		80	6.0	80	6.0	0.031	3.7	NA	0.1	0.8	0.03	0.43	0.03	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [PM - Proposed Road 04 / Proposed Road 03 / Croll Street / View Street (Site Folder: 2032 With Development)]

Network: 02 [2032 PM With Development (Network Folder: Normal)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 1
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 04														
1	L2	9	6.0	9	6.0	0.015	3.5	LOS A	0.1	0.6	0.15	0.42	0.15	45.1
2	T1	8	6.0	8	6.0	0.015	3.7	LOS A	0.1	0.6	0.15	0.42	0.15	45.1
3	R2	1	6.0	1	6.0	0.015	7.2	LOS A	0.1	0.6	0.15	0.42	0.15	46.0
Approach		19	6.0	19	6.0	0.015	3.8	LOS A	0.1	0.6	0.15	0.42	0.15	45.2
East: View Street														
4	L2	1	6.0	1	6.0	0.022	3.5	LOS A	0.1	0.9	0.13	0.52	0.13	43.7
5	T1	11	6.0	11	6.0	0.022	3.6	LOS A	0.1	0.9	0.13	0.52	0.13	30.5
6	R2	16	13.0	16	13.0	0.022	7.2	LOS A	0.1	0.9	0.13	0.52	0.13	30.5
Approach		27	10.0	27	10.0	0.022	5.7	LOS A	0.1	0.9	0.13	0.52	0.13	32.2
North: Croll Street														
7	L2	16	13.0	16	13.0	0.030	3.5	LOS A	0.2	1.3	0.10	0.42	0.10	40.6
8	T1	21	6.0	21	6.0	0.030	3.6	LOS A	0.2	1.3	0.10	0.42	0.10	47.0
9	R2	2	6.0	2	6.0	0.030	7.1	LOS A	0.2	1.3	0.10	0.42	0.10	39.9
Approach		39	8.8	39	8.8	0.030	3.7	LOS A	0.2	1.3	0.10	0.42	0.10	45.1
West: Proposed Road 03														
10	L2	1	6.0	1	6.0	0.011	3.5	LOS A	0.1	0.4	0.14	0.42	0.14	31.5
11	T1	11	6.0	11	6.0	0.011	3.6	LOS A	0.1	0.4	0.14	0.42	0.14	39.1
12	R2	2	6.0	2	6.0	0.011	7.2	LOS A	0.1	0.4	0.14	0.42	0.14	45.7
Approach		14	6.0	14	6.0	0.011	4.2	LOS A	0.1	0.4	0.14	0.42	0.14	40.9
All Vehicles		99	8.2	99	8.2	0.030	4.3	LOS A	0.2	1.3	0.12	0.45	0.12	42.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [AM - Croll Street / Boomerang Drive (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 03 [2032 AM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	27	12.0	27	12.0	0.143	7.8	LOS A	0.5	3.5	0.70	0.85	0.70	27.5
3	R2	27	12.0	27	12.0	0.143	17.6	LOS B	0.5	3.5	0.70	0.85	0.70	28.0
Approach		55	12.0	55	12.0	0.143	12.7	LOS A	0.5	3.5	0.70	0.85	0.70	27.8
East: Boomerang Drive														
4	L2	19	12.0	19	12.0	0.337	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	48.4
5	T1	577	13.0	577	13.0	0.337	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	48.4
Approach		596	13.0	596	13.0	0.337	0.1	NA	0.0	0.0	0.00	0.02	0.00	48.4
West: Boomerang Drive														
11	T1	578	13.0	578	13.0	0.319	0.3	LOS A	0.4	3.2	0.07	0.02	0.09	47.6
12	R2	19	12.0	19	12.0	0.319	9.7	LOS A	0.4	3.2	0.07	0.02	0.09	46.7
Approach		597	13.0	597	13.0	0.319	0.6	NA	0.4	3.2	0.07	0.02	0.09	47.5
All Vehicles		1247	12.9	1247	12.9	0.337	0.9	NA	0.5	3.5	0.07	0.05	0.07	45.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [AM - Proposed Road 02 / Boomerang Drive (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 03 [2032 AM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 02														
1	L2	24	6.0	24	6.0	0.238	8.3	LOS A	0.8	6.2	0.80	0.93	0.87	39.8
3	R2	40	6.0	40	6.0	0.238	24.9	LOS B	0.8	6.2	0.80	0.93	0.87	19.0
Approach		64	6.0	64	6.0	0.238	18.7	LOS B	0.8	6.2	0.80	0.93	0.87	32.7
East: Boomerang Drive														
4	L2	24	6.0	24	6.0	0.324	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	48.8
5	T1	564	13.0	564	13.0	0.324	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.7
Approach		588	12.7	588	12.7	0.324	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.7
West: Boomerang Drive														
11	T1	556	13.0	556	13.0	0.308	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
12	R2	8	6.0	8	6.0	0.010	7.4	LOS A	0.0	0.3	0.55	0.64	0.55	45.0
Approach		564	12.9	564	12.9	0.308	0.3	NA	0.0	0.3	0.01	0.01	0.01	49.8
All Vehicles		1217	12.4	1217	12.4	0.324	1.2	NA	0.8	6.2	0.05	0.06	0.05	49.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [AM - Proposed Road 03 / Proposed Road 02 (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 03 [2032 AM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Proposed Road 03														
5	T1	3	6.0	3	6.0	0.013	0.1	LOS A	0.1	0.4	0.09	0.44	0.09	35.3
6	R2	19	6.0	19	6.0	0.013	4.7	LOS A	0.1	0.4	0.09	0.44	0.09	31.1
Approach		22	6.0	22	6.0	0.013	4.0	NA	0.1	0.4	0.09	0.44	0.09	31.8
North: Proposed Road 02														
7	L2	9	6.0	9	6.0	0.019	4.6	LOS A	0.1	0.5	0.06	0.52	0.06	35.2
9	R2	16	6.0	16	6.0	0.019	4.8	LOS A	0.1	0.5	0.06	0.52	0.06	33.1
Approach		25	6.0	25	6.0	0.019	4.7	LOS A	0.1	0.5	0.06	0.52	0.06	33.8
West: Proposed Road 03														
10	L2	16	6.0	16	6.0	0.014	3.6	LOS A	0.0	0.0	0.00	0.31	0.00	33.0
11	T1	11	6.0	11	6.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.31	0.00	33.0
Approach		26	6.0	26	6.0	0.014	2.2	NA	0.0	0.0	0.00	0.31	0.00	33.0
All Vehicles		74	6.0	74	6.0	0.019	3.6	NA	0.1	0.5	0.05	0.42	0.05	33.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [AM - Proposed Road 04 / Proposed Road 03 / Croll Street / View Street (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 03 [2032 AM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 04														
1	L2	9	6.0	9	6.0	0.026	3.6	LOS A	0.1	1.1	0.19	0.40	0.19	44.9
2	T1	21	6.0	21	6.0	0.026	3.8	LOS A	0.1	1.1	0.19	0.40	0.19	44.9
3	R2	1	6.0	1	6.0	0.026	7.3	LOS A	0.1	1.1	0.19	0.40	0.19	45.8
Approach		32	6.0	32	6.0	0.026	3.8	LOS A	0.1	1.1	0.19	0.40	0.19	45.0
East: View Street														
4	L2	1	6.0	1	6.0	0.032	3.4	LOS A	0.2	1.3	0.08	0.55	0.08	43.4
5	T1	11	6.0	11	6.0	0.032	3.5	LOS A	0.2	1.3	0.08	0.55	0.08	30.1
6	R2	31	13.0	31	13.0	0.032	7.1	LOS A	0.2	1.3	0.08	0.55	0.08	30.1
Approach		42	11.1	42	11.1	0.032	6.2	LOS A	0.2	1.3	0.08	0.55	0.08	31.2
North: Croll Street														
7	L2	31	13.0	31	13.0	0.029	3.5	LOS A	0.2	1.3	0.11	0.44	0.11	40.6
8	T1	5	6.0	5	6.0	0.029	3.6	LOS A	0.2	1.3	0.11	0.44	0.11	47.1
9	R2	1	6.0	1	6.0	0.029	7.1	LOS A	0.2	1.3	0.11	0.44	0.11	39.9
Approach		37	11.8	37	11.8	0.029	3.6	LOS A	0.2	1.3	0.11	0.44	0.11	42.3
West: Proposed Road 03														
10	L2	2	6.0	2	6.0	0.015	3.7	LOS A	0.1	0.6	0.21	0.46	0.21	29.8
11	T1	11	6.0	11	6.0	0.015	3.8	LOS A	0.1	0.6	0.21	0.46	0.21	37.7
12	R2	5	6.0	5	6.0	0.015	7.4	LOS A	0.1	0.6	0.21	0.46	0.21	45.0
Approach		18	6.0	18	6.0	0.015	4.9	LOS A	0.1	0.6	0.21	0.46	0.21	41.1
All Vehicles		128	9.3	128	9.3	0.032	4.7	LOS A	0.2	1.3	0.13	0.47	0.13	41.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 1 [PM - Croll Street / Boomerang Drive (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 04 [2032 PM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Croll Street														
1	L2	20	12.0	20	12.0	0.109	7.8	LOS A	0.3	2.6	0.71	0.84	0.71	27.2
3	R2	20	12.0	20	12.0	0.109	18.1	LOS B	0.3	2.6	0.71	0.84	0.71	27.8
Approach		40	12.0	40	12.0	0.109	12.9	LOS A	0.3	2.6	0.71	0.84	0.71	27.6
East: Boomerang Drive														
4	L2	27	12.0	27	12.0	0.346	3.9	LOS A	0.0	0.0	0.00	0.02	0.00	47.9
5	T1	584	13.0	584	13.0	0.346	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	47.9
Approach		612	13.0	612	13.0	0.346	0.2	NA	0.0	0.0	0.00	0.02	0.00	47.9
West: Boomerang Drive														
11	T1	586	12.0	586	12.0	0.333	0.5	LOS A	0.6	5.0	0.11	0.03	0.13	46.4
12	R2	27	13.0	27	13.0	0.333	10.1	LOS A	0.6	5.0	0.11	0.03	0.13	45.2
Approach		614	12.0	614	12.0	0.333	1.0	NA	0.6	5.0	0.11	0.03	0.13	46.4
All Vehicles		1265	12.5	1265	12.5	0.346	1.0	NA	0.6	5.0	0.07	0.05	0.09	44.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 2 [PM - Proposed Road 02 / Boomerang Drive (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 04 [2032 PM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 02														
1	L2	18	6.0	18	6.0	0.200	7.7	LOS A	0.7	4.9	0.80	0.91	0.83	39.8
3	R2	34	6.0	34	6.0	0.200	24.5	LOS B	0.7	4.9	0.80	0.91	0.83	19.0
Approach		52	6.0	52	6.0	0.200	18.6	LOS B	0.7	4.9	0.80	0.91	0.83	32.1
East: Boomerang Drive														
4	L2	32	6.0	32	6.0	0.324	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	48.4
5	T1	557	13.0	557	13.0	0.324	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.7
Approach		588	12.6	588	12.6	0.324	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.6
West: Boomerang Drive														
11	T1	564	13.0	564	13.0	0.313	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
12	R2	16	6.0	16	6.0	0.018	7.4	LOS A	0.1	0.5	0.56	0.67	0.56	45.0
Approach		580	12.8	580	12.8	0.313	0.4	NA	0.1	0.5	0.02	0.02	0.02	49.7
All Vehicles		1220	12.4	1220	12.4	0.324	1.1	NA	0.7	4.9	0.04	0.06	0.04	49.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 3 [PM - Proposed Road 03 / Proposed Road 02 (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 04 [2032 PM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Proposed Road 03														
5	T1	11	6.0	11	6.0	0.013	0.0	LOS A	0.1	0.4	0.06	0.29	0.06	39.5
6	R2	13	6.0	13	6.0	0.013	4.7	LOS A	0.1	0.4	0.06	0.29	0.06	36.0
Approach		23	6.0	23	6.0	0.013	2.6	NA	0.1	0.4	0.06	0.29	0.06	37.8
North: Proposed Road 02														
7	L2	16	6.0	16	6.0	0.030	4.6	LOS A	0.1	0.8	0.03	0.53	0.03	35.5
9	R2	24	6.0	24	6.0	0.030	4.7	LOS A	0.1	0.8	0.03	0.53	0.03	33.3
Approach		40	6.0	40	6.0	0.030	4.7	LOS A	0.1	0.8	0.03	0.53	0.03	34.0
West: Proposed Road 03														
10	L2	11	6.0	11	6.0	0.008	3.6	LOS A	0.0	0.0	0.00	0.37	0.00	31.1
11	T1	4	6.0	4	6.0	0.008	0.0	LOS A	0.0	0.0	0.00	0.37	0.00	31.1
Approach		15	6.0	15	6.0	0.008	2.6	NA	0.0	0.0	0.00	0.37	0.00	31.1
All Vehicles		78	6.0	78	6.0	0.030	3.7	NA	0.1	0.8	0.03	0.43	0.03	34.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 4 [PM - Proposed Road 04 / Proposed Road 03 / Croll Street / View Street (100th hour) (Site Folder: 2032 With Development (100th hour))]

Network: 04 [2032 PM With Development (100th hour) (Network Folder: 100th hour)]

Blueys Beach Subdivision Traffic Impact Assessment
Site Category: Future Conditions 2
Roundabout

Vehicle Movement Performance

Mov ID	Turn	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road 04														
1	L2	9	6.0	9	6.0	0.016	3.6	LOS A	0.1	0.6	0.19	0.42	0.19	44.9
2	T1	8	6.0	8	6.0	0.016	3.8	LOS A	0.1	0.6	0.19	0.42	0.19	44.9
3	R2	1	6.0	1	6.0	0.016	7.3	LOS A	0.1	0.6	0.19	0.42	0.19	45.8
Approach		19	6.0	19	6.0	0.016	3.9	LOS A	0.1	0.6	0.19	0.42	0.19	45.0
East: View Street														
4	L2	1	6.0	1	6.0	0.034	3.5	LOS A	0.2	1.4	0.13	0.54	0.13	43.3
5	T1	11	6.0	11	6.0	0.034	3.6	LOS A	0.2	1.4	0.13	0.54	0.13	29.7
6	R2	31	13.0	31	13.0	0.034	7.2	LOS A	0.2	1.4	0.13	0.54	0.13	29.7
Approach		42	11.1	42	11.1	0.034	6.2	LOS A	0.2	1.4	0.13	0.54	0.13	30.8
North: Croll Street														
7	L2	31	13.0	31	13.0	0.040	3.5	LOS A	0.2	1.8	0.10	0.43	0.10	40.7
8	T1	21	6.0	21	6.0	0.040	3.5	LOS A	0.2	1.8	0.10	0.43	0.10	47.1
9	R2	2	6.0	2	6.0	0.040	7.1	LOS A	0.2	1.8	0.10	0.43	0.10	40.0
Approach		54	10.0	54	10.0	0.040	3.7	LOS A	0.2	1.8	0.10	0.43	0.10	44.3
West: Proposed Road 03														
10	L2	1	6.0	1	6.0	0.011	3.6	LOS A	0.1	0.5	0.18	0.42	0.18	31.0
11	T1	11	6.0	11	6.0	0.011	3.7	LOS A	0.1	0.5	0.18	0.42	0.18	38.7
12	R2	2	6.0	2	6.0	0.011	7.3	LOS A	0.1	0.5	0.18	0.42	0.18	45.5
Approach		14	6.0	14	6.0	0.011	4.3	LOS A	0.1	0.5	0.18	0.42	0.18	40.6
All Vehicles		128	9.3	128	9.3	0.040	4.6	LOS A	0.2	1.8	0.13	0.46	0.13	41.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

APPENDIX

B

TRAFFIC DATA AND CALCULATIONS

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Blueys Beach Traffic Count Data - Provided by MidCoast Council

Current

Croll Street 12/02/2022 to 12/03/2022	
5 day Average	198
7 day Average	204
HV Percentage	11.7
85th Percentage	41.5

Historical

Croll Street 18/02/2015 to 25/02/2015	
5 day Average	150
7 day Average	151
HV Percentage	7
85th Percentage	42

Boomerang Drive 06/02/2021 to 13/02	
5 day Average	2861
7 day Average	2942
HV Percentage	13.1
85th Percentage	45

Boomerang Drive 18/02/2015 to 25/02	
5 day Average	1945
7 day Average	1990
HV Percentage	8
85th Percentage	47

Peak Hourly Trips Normal Conditions					
Road	Direction	Volume			
		2022 AM	2022 PM	2032 AM	2032 PM
Boomerang Drive	Eastbound	151	151	262	262
	Westbound	151	151	262	262
Croll Street	Northbound	10	10	15	15
	Southbound	10	10	15	15

Peak Hourly Trips 100th Hour Conditions					
Road	Direction	Volume			
		2022 AM	2022 PM	2032 AM	2032 PM
Boomerang Drive	Eastbound	302	302	525	525
	Westbound	302	302	525	525
Croll Street	Northbound	20	20	31	31
	Southbound	20	20	31	31

Growth Rate

Croll Street		
Year	VPD	Growth
2015	150	
2022	198	4.05%
2032	306	

Assume 50/50 directional split

Boomerang Drive		
Year	VPD	Growth
2015	1945	
2021	2861	5.67%
2022	3023	
2032	5247	

100HH %	20%

Development Trip Generation Calculations

Land use	Unit	Trip Rate		Inbound		Outbound	
		AM	PM	AM	PM	AM	PM
Single Residential	Dwelling	0.71	0.78	20%	70%	80%	30%
Commercial Retail	GFA (100m^2)	0.125	0.125	50%	50%	50%	50%

Land use	Unit	Year
		2032
Single Residential	Per Dwelling	73
Commercial Retail	GFLA (m^2)	900

Assumed 50% FSR in B1 Zoned land, GLFA = 75% of GFA of 1200m^2

Land use	Trips	2032			
		AM		PM	
		In	Out	In	Out
Single Residential	Per Dwelling	10	41	40	17
Commercial Retail	GFA (m^2)	42	42	42	42
	Total	53	84	82	59

Assumed 25% discount for multi trip

Movement Splits		
Road	**Dwellings**	**Percent Split**
Croll Street	40	55%
Proposed Road 02	33	45%

Boomerang Dr Split	Percentage
East Approach	50%
West Approach	50%

vice versa for outbound vehicles

Commercial Split	Dwellings (approx.)	Split
Boomerang Dr East	310	50%
Boomerang Dr West	90	15%
Road 02	220	35%
Road 02 (new dev north)	*33*	*45%*
Road 02 (new dev south)	40	*55%*
Road 02 (new dev south + existing)	*187*	*85%*
Total	620	100%

APPENDIX

C

CONCEPT MASTERPLAN

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DATE PLOTTED: 19 August 2022 10:42 AM BY : MARIO QUITORIANO

XREFs: X-Base_GISextract_20211013, X-Final Cad Base_Option E, X-Limit of Works-BDY, X-Final Lot Areas_Option E, X-ROAD NAMES
CAD File: N:\Projects\505\FY22\033_BLUEYS BEACH DA\Drawings\Build\DA\50522033-C-1030-ATP.dwg

Rev.	Date	Description	Des.	Verif.	Appd.
C	18/08/2022	FOR DA SUBMISSION	TM/ML	GZ	JS
B	17/05/2022	FOR DA SUBMISSION	TM/ML	GZ	JS
A	09/05/2022	FOR DA SUBMISSION	TM/ML	GZ	JS

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Web: www.cardno.com.au

Drawn	MPQ	Date 09/05/2022
Checked	AS/TM	Date 09/05/2022
Designed	TM/ML	Date 09/05/2022
Verified	GZ	Date 09/05/2022
Approved	JS	09/05/2022

Client: ADDENBROOKE PTY LTD

Project: BLUEYS BEACH DEVELOPMENT
BOOMERANG DRIVE, BLUEYS BEACH, NEW SOUTH WALES

Title: ACTIVE TRAVEL PLAN

Status: FOR APPROVAL
NOT TO BE USED FOR CONSTRUCTION PURPOSES

Date	Datum	Scale	Size
09/05/2022	AHD	1:1000	A1

Drawing Number: 50522033-C-1030
Revision: C