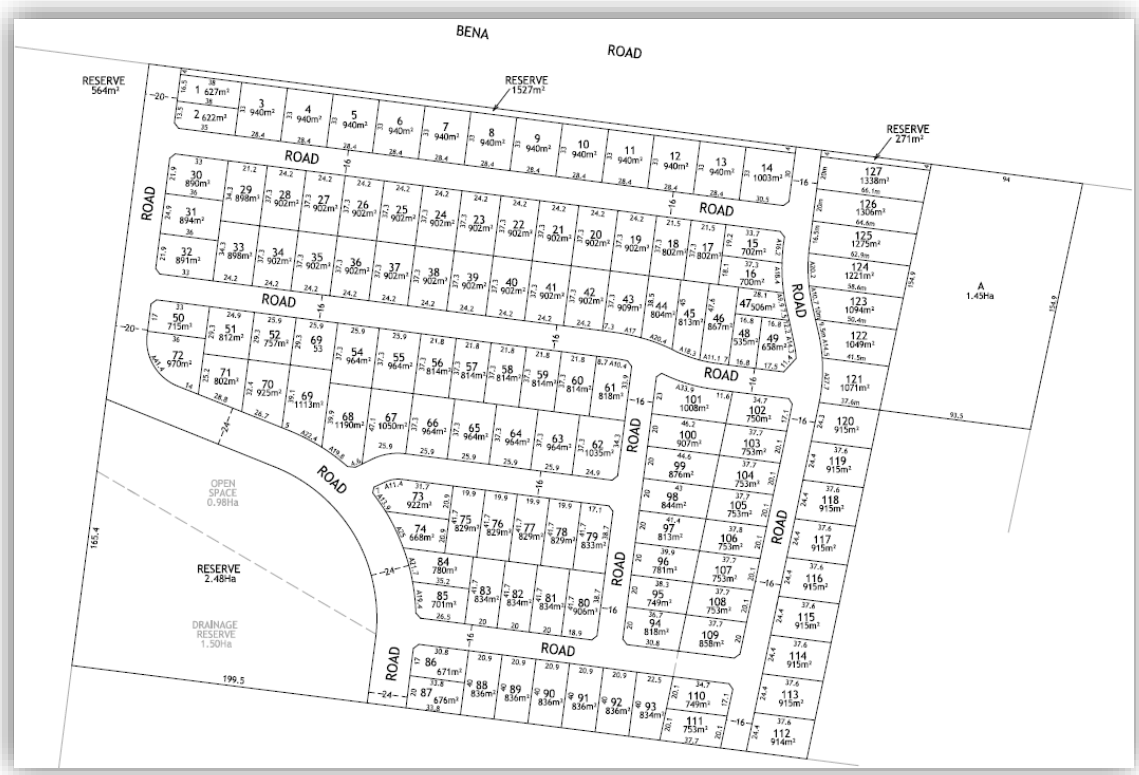
Traffic Impact Assessment Report

Proposed Residential Development

99 Bena Road, Korumburra



Hill Rise View Pty Ltd

May 2022

Document Issue Record

Project:		99 Bena Road, Korumburra – Traffic Impact Assessment Report		
Project Number:		19040		
Client:		Hill Rise View Pty Ltd		
Filename:		19040 Bena Road TIAR_Final.docx		
Issue	**Date**	**Prepared by:**	**Checked by:**	**Approved by:**
A	16/05/22	Michael Marsicovetere	Tony Dinh	Michael Marsicovetere
Description:		Final – Issued For Council submission		

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

1.1 Background

Transport & Traffic Solutions Pty Ltd (T&TS) has been engaged by Hill Rise View Pty Ltd to prepare a Traffic Impact Assessment Report (TIAR) for their proposal to develop 99 Bena Road, Korumburra (*the site*) into 127 standard residential density lots, one 1.45 hectare superlot and 2.66 hectares of reserve. Access to the site is proposed from Bena Road via two new road intersections. The 1.45 hectare superlot will be subject to a separate planning permit application.

A TIAR dated 26 April 2016 was completed by T&TS for the existing residential development site located at 66 & 90 Bena Road, Korumburra (Botanica Development). Reference to this TIAR will be made within this report.

1.2 Aim of this Report

The aim of this report is to address the requirements of Schedule 6 to Clause 43.04 Development Plan Overlay (DPO6) of the South Gippsland Planning Scheme. This will include an assessment of the:

- Existing road network adjacent to the site.
- Proposed development.
- Traffic impacts due to development of the site.
- Site access point and internal road network.
- Path network.

1.3 References

The following references were used to assist in the preparation of this report:

- Department of Environment, Land, Water and Planning, VicPlan and Planning Schemes Online, State Government of Victoria, Accessed October 2021;
- Austroads Guide to Road Design, Austroads Guide to Traffic Management, Australian Standards, and the VicRoads Supplement to the Austroads Guide and Australian Standards, as detailed in this report;
- Transport Impact Assessment, Proposed Residential Development, 66 & 90 Bena Road, Korumburra, Transport & Traffic Solutions Pty Ltd, Rev B, 26 April 2016,
- South Gippsland Shire Council Road Management Plan 28 June 2017 and Public Road Register 9 October 2019;
- Infrastructure Design Manual v5.30, Local Government Infrastructure Design Association, 24 March 2020;
- Plan of Proposed Subdivision Rev E, Land Slope Plan Rev E, Plan of Proposed Subdivision – Contours Rev E, and Staging Plan Rev E, 99 Bena Road, Korumburra, Brosnan Engineering Solutions, 17 November 2021; and
- Other documents as referenced within this report.

2 EXISTING CONDITIONS ASSESSMENT

2.1 Site Location and Land Use

The site (99 Bena Road, Korumburra) is located on the south side of Bena Road, approximately 480m west of its intersection with George Street / Radovick Street. The site is bounded by Bena Road to the north, existing residential dwellings to the east, farming land to the south and an unmade road to the west.

The site is currently vacant rural property with a total site area of approximately 19.1 hectares with a frontage to Bena Road of approximately 580 metres. The site is located approximately 1.1km south-west of the Korumburra Town Centre. Refer Figure 2.1 for the site location.

Existing residential dwellings including the recently constructed Stage 1 of the Botanica development site is located to the north of Bena Road.

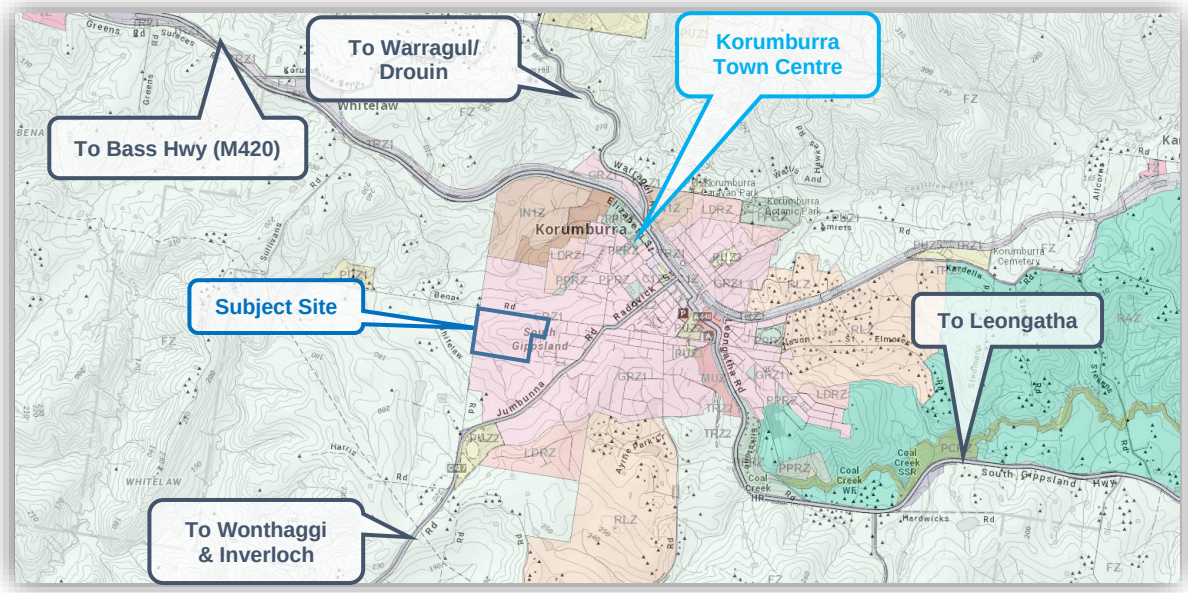


Figure 2.1: Locality Plan[1]

The site is located within a General Residential Zone (GRZ1). A Development Plan Overlay – Schedule 6 (DPO6) applies to the site. Jumbunna Road (C437) to the east of the site is categorised as a Principal Road Network (TRZ2). Refer Figure 2.2.

Figure 2.2: Land Use Plan[1]

[1] VicPlan Version 2.3.1, Department of Environment, Land, Water and Planning, State Government of Victoria, May 2022

2.2 Existing Road Network Characteristics

An inspection of Bena Road and its intersection with George Street / Radovick Street and Korumburra-Whitelaw Road was undertaken on Thursday 7 October 2021, between the hours of 10:00am and 11:00am. Details of the site inspection are as follows.

2.2.1 Bena Road

Bena Road is a sealed two-way local road with no through access at its western end. It runs in a mainly east-west direction from George Street in the east and provides direct access to residential dwellings and rural properties as well as a wastewater treatment plant located at its western end.

Referring to the South Gippsland Shire Council's Public Road Register, Bena Road between George Street and CH720 is classified as an "Access Street" where-as between CH720 and its end is classified as an "Access Road". Bena Road provides access to residential and rural properties.

Adjacent to the site, the Bena Road road reservation is approximately 20 metres wide with a 5.5 metre wide sealed carriageway in the east of the site and a 4.4 metre wide carriageway in the west of the site. A grass verge including open drain is located on both sides of the carriageway. SM2 kerb and channel is present on the north side of Bena Road fronting the Botanica development site. Refer Figure 2.3 and Figure 2.4.

The road alignment immediately adjacent to the site is generally straight with a gradual fall to the west. A crest is located adjacent to the eastern boundary of the site. The posted speed limit adjacent to the site is 60km/h which increases to 100km/h west of the site's western boundary.

Figure 2.3: Bena Road, looking east from Mountain Ash Drive

Figure 2.4: Berrys Creek Road, looking east from the site's western boundary

2.2.2 Bena Rd/ George St/ Radovick St/ Jumbunna Rd Intersection

The Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection comprises two closely spaced T-intersections. The Bena Road/ George Street T-intersection is controlled with a Stop sign on the Bena Road approach where-as the George Street/ Radovick Street/ Jumbunna Road intersection is controlled with a Give Way sign on the George Street approach. A channelised right-turn short lane (CHR(S)) treatment is provided on Radovick Street on the approach to George Street. Refer Figure 2.5.

A posted speed limit of 60 km/h applies to Radovick Street/ Jumbunna Road where-as the 50km/h urban default speed limit applies to George Street.

Figure 2.5: Bena Road/ George Street/ Radovick Street Intersection

2.2.3 Bena Road/ Whitelaw Road Intersection

The Bena Road/ Whitelaw Road intersection is a priority controlled cross intersection. Bena Road forms the major road leg where-as the Whitelaw Road approaches form the minor road legs controlled by a Stop sign. Refer Figure 2.6.

Figure 2.6: Bena Road/ Whitelaw Road intersection, looking south

2.3 Existing Road Network Traffic Volumes

2.3.1 Historical Bena Road Daily Two-way Traffic Volume[2]

South Gippsland Shire Council provided historical traffic volume data for Bena Road, 50m west of its intersection with George Street for July 2008 and May 2013. The weekday average daily traffic volume recorded at this location was 304 and 382 vehicles per day respectively. Based on the historical traffic volume data, it was concluded that the traffic volumes on Bena Road grew at a rate equivalent to 4.67% per annum over the 5 year period between 2008 and 2013.

Council also provided traffic volume data for Bena Road directly adjacent to the site which was collected in February 2011. The weekday average traffic volume recorded at this location was 112 vehicles per day and 11 vehicles per hour in both the AM & PM peak hour.

2.3.2 2021 Bena Road Daily Two-way Traffic Volume

South Gippsland Shire Council provided traffic volume data for Bena Road between Monday 4 October 2021 and Sunday 10 October 2021.

[2] Traffic Impact Assessment Report, Proposed Residential Development, 66 & 90 Bena Road, Korumburra, Transport & Traffic Solutions Pty Ltd, 26 April 2016

A summary of the traffic volumes for all vehicles on Bena Road is provided in Table 2.1. Refer Appendix A for a copy of the traffic volume summary.

Table 2.1: Traffic Volume Survey Results – Bena Road

	Direction		Combined	Average Speed	85th Percentile Speed
	East	West			
Weekday Average (Monday-Friday)	192 vpd	185 vpd	377 vpd	41.1 km/h	48.6 km/h
MDWK Average AM Peak (8:00 to 9:00)	19 vph	15 vph	34 vph		
MDWK Average PM Peak (15:00 to 16:00)	17 vph	19 vph	36 vph		

A summary of the existing traffic volumes as detailed in Table 2.1 follows:

- The 24-hour two-way daily traffic volume for Bena Road is 377 vehicles per day, with 192 vpd (51%) travelling eastbound and 185 vpd (49%) travelling westbound.
- The two-way mid-week average AM peak hour traffic volume is 34 vehicles per hour (9.0% of the daily traffic volume), with 19 vph (56%) travelling eastbound and 15 vph (44%) travelling westbound.
- The two-way mid-week average PM peak hour traffic volume is 36 vehicles per hour (9.5% of the daily traffic volume), with 17 vph (47%) travelling eastbound and 19 vph (53%) travelling westbound.
- The combined weekday average speed is 41.1 km/h.
- The combined weekday 85th percentile speed is 48.6 km/h.

Further to the above:

- Approximately 8.6% of vehicles recorded on Bena Road were commercial vehicles.

Based on the traffic volume data recorded back in 2013, it is observed that the traffic volumes on Bena Road have not grown over the last 8 years (2013 and 2021).

As detailed in section 2.2.1, Bena Road is classified as an access street and access road which has a capacity of up to 2,500 vpd as per the IDM. Therefore, the recorded traffic volume on Bena Road is well below its expected capacity.

2.3.3 Intersection Turning Movement Volume

Intersection turning movement count data for the Bena Road/ George Street/ Radovick Street intersection and the Bena Road/ Whitelaw Road intersection were sourced from the Botanica development TIAR, April 2016.

Figure 2.7 and Figure 2.8 provides a summary of the AM and PM Peak intersection turning movement volumes at both intersections as taken from the April 2016 TIAR.

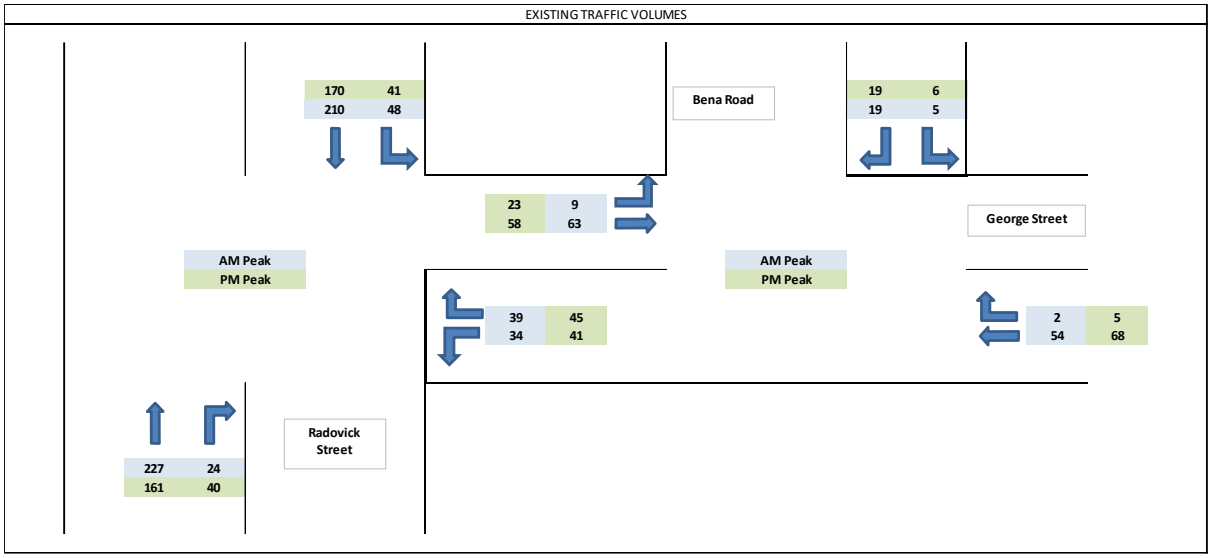


Figure 2.7: Intersection Turning Movement Volume – Bena Rd / George St / Radovick St/ Jumbunna Road Intersection

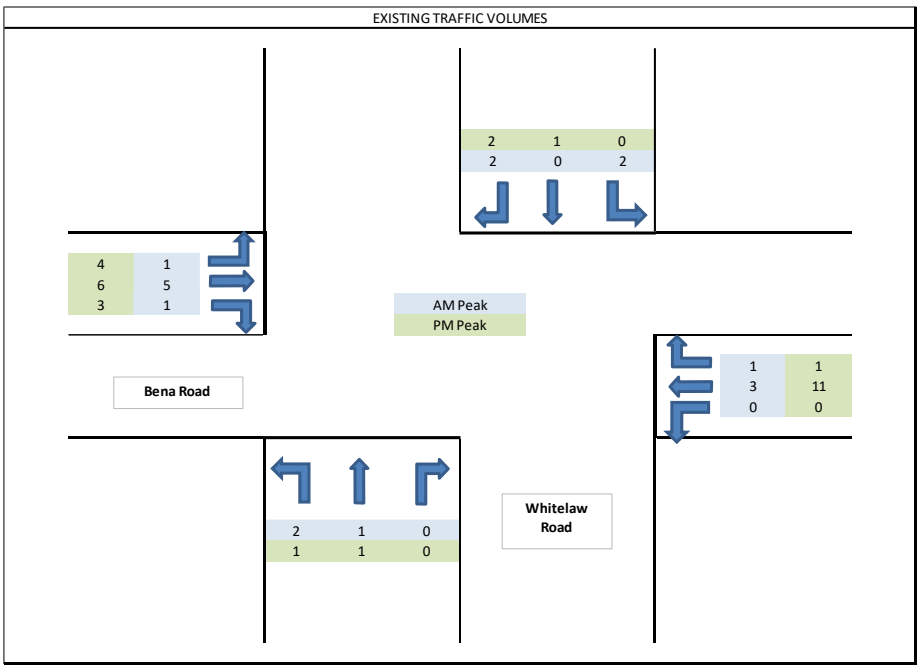


Figure 2.8: Intersection Turning Movement Volume – Bena Road/ Whitelaw Road Intersection

To understand what impact the proposed development traffic will have on the existing Bena Road/ George Street/ Radovick Street intersection and the Bena Road/ Whitelaw Road Intersection, a check of the operational performance of the existing intersections was undertaken using SIDRA Intersection 9.0 software. The Degree of Saturation, Average Delay, Level of Service, and 95% Back of Queue Distance results of the analysis for the “total approach” for both intersections are provided in Table 2.2 and Table 2.3. Full results can be found in Appendix A.

Table 2.2: SIDRA Summary Results – Existing Bena Rd / George St / Radovick St Intersection

Period	Bena Rd / George St Intersection			George St / Radovick St Intersection		
Approach Leg	**George St (East)**	**Bena Rd (North)**	**George St (West)**	**Radovick St (South)**	**George St (East)**	**Radovick St (North)**
AM Peak						
Degree of Saturation	0.030	0.018	0.038	0.121	0.061	0.138
Average Delay (sec)	0.2	8.0	0.3	0.6	3.5	1.1
Level of Service	-	A	-	-	A	-
95% Queue Distance (m)	0	1	0	1	2	0
PM Peak						
Degree of Saturation	0.039	0.019	0.044	0.086	0.067	0.113
Average Delay (sec)	0.4	8.0	0.7	1.2	3.2	1.1
Level of Service	-	A	-	-	A	-
95% Queue Distance (m)	0	1	0	1	2	0

As detailed in Table 2.2, at the Bena Road/ George Street intersection, the Bena Road approach has a Level of Service A, Degree of Saturation below 0.02, Average Delay less than 9 seconds, and a 95% Queue Distance of less than 1 metre during both the AM and PM peak periods. Where-as the George Street approach legs have a Degree of Saturation below 0.05, Average Delay less than 1 second, and a 95% Queue Distance of less than 1 metre long during both the AM and PM peak periods.

At the George Street/ Radovick Street Intersection, the George Street approach has a Level of Service A, Degree of Saturation below 0.07, Average Delay less than 4 seconds, and a 95% Queue Distance of less than 3 metres long during both the AM and PM peak periods. Where-as the Radovick Street approach legs have a Degree of Saturation below 0.1,4 Average Delay less than 2 seconds, and a 95% Queue Distance of less than 1 metre long during both the AM and PM peak periods.

Table 2.3: SIDRA Summary Results – Existing Bena Road/ Whitelaw Road Intersection

Approach Leg	Whitelaw Road (South)	Bena Road (East)	Whitelaw Road (North)	Bena Road (West)
AM Peak				
Degree of Saturation	0.003	0.003	0.004	0.004
Average Delay (sec)	9.3	3.1	9.2	2.2
Level of Service	A	-	A	-
95% Queue Distance (m)	0.1	0	0.1	0
PM Peak				
Degree of Saturation	0.003	0.007	0.004	0.007
Average Delay (sec)	9.2	1.2	9.1	4.2
Level of Service	A	-	A	-

95% Queue Distance (m)	0.1	0	0.1	0.1

As detailed in Table 2.3, the Bena Road approach legs have a Degree of Saturation below 0.01, Average Delay less than 5 seconds, and a 95% Queue Distance of less than 1 metre long during both the AM & PM peak periods. Where-as the Whitelaw Road approach legs have a Level of Service A, Degree of Saturation below 0.01, Average Delay less than 10 seconds, and a 95% Queue Distance of less than 1 metre long during both the AM & PM peak periods.

These results indicate that the Bena Road/ George Street/ Radovick Street intersection and the Bena Road/ Whitelaw Road Intersection were operating well below their expected capacity in 2016.

2.4 Casualty Crash Statistics

The casualty crash history of Bena Road adjacent to the site and the existing Bena Road / George Street / Radovick Street intersection and the Bena Road/ Whitelaw Road intersection was sourced from the VicRoads' Crashstats database. The database indicates that no casualty crashes were recorded on Bena Road and at the existing Bena Road/ George Street/ Radovick Street intersection and the Bena Road/ Whitelaw Road intersection between 1 January 2014 and 1 January 2019.

Based on the recorded casualty accident history, it can be concluded that there are no serious safety concerns with the existing road network adjacent to the site.

2.5 Public Transport

The Korumburra Town Service – Carinya Lodge bus route runs along Swanson Street, Melville Road, Jumbunna Road and Radovick Street to the south and east of the site. The nearest bus stop is located adjacent to Carinya Crescent approximately a 420 metre walk distance from the site's eastern boundary. Buses service this stops every Thursday at 10:15am (depart) and 11:55am (return).

Korumburra is serviced by a regional V/Line coach service connecting residents to Melbourne and Yarram via Leongatha, Koo Wee Rup and Dandenong. The nearest coach stop is located in the Korumburra town centre on King Street/ Commercial Street, approximately 1.2km north-east of the site.

2.6 Path Network

A sealed footpath is provided on the north side of Bena Road between George Street and the western boundary of the Botanica development site and on the south side of Bena Road between George Street and 45 Bena Road.

Jumbunna Road and Guys Road to the east of the site form part of the Principal Bicycle Network (Main Route (C2)). This route provides a bicycle connection to the Korumburra Secondary College via Jumbunna Road (shared path), the Korumburra Town Centre via Radovick Street, and the local Primary Schools via Guys Road. Refer Figure 2.9.

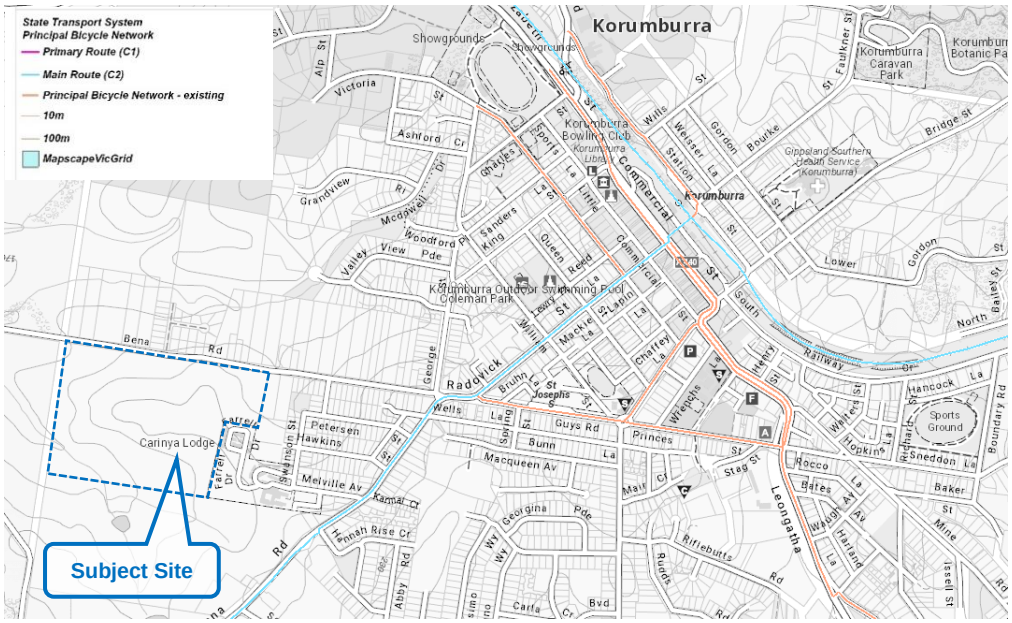


Figure 2.9: Principal Bicycle Network[3]

[3] VicPlan Version 2.3.1, Department of Environment, Land, Water and Planning, State Government of Victoria, May 2022

3 BACKGROUND TRANSPORT REVIEW

3.1 Schedule 6 to Clause 43.04 Development Plan Overlay

Schedule 6 to Clause 43.04 Development Plan Overlay (DPO6) of the South Gippsland Planning Scheme applies to the site. DP06 details the requirements a development plan must address before a permit may be granted by the Responsible Authority. The requirements related to the subject site from a transport perspective are detailed below:

Land use and subdivision layout

- Street network that:
  - Limits the creation of new road access points onto Jumbunna Road and support building frontages with two way surveillance.
  - The overall pattern of development of the area, including any proposed re-zoning of land and proposed land uses.
- A staging plan that demonstrates an efficient and orderly provision of infrastructure and services
- An accessible and integrated network of walking and cycling routes for safe and convenient travel to adjoining communities (including existing and future areas included in the DPO), local destinations or points of local interest, activity centres, community hubs, open spaces and public transport

Infrastructure Services

- A comprehensive Traffic Impact Assessment prepared to the satisfaction of the Responsible Authority in consultation with the Roads Corporation that identifies existing and post development traffic generation, distribution and associated analysis and the pattern and location of the major arterial road network of the area including existing roads and the location and details of any required:
  - road widening
  - signalised/unsignalised intersections
  - access points
  - pedestrian crossings or safe refuges
  - cycle lanes
  - bus lanes and stops
- The pattern and location of any internal road system based on a safe and practical hierarchy of roads including safe pedestrian and bicycle connections and crossing points in accordance with background documents South Gippsland Paths and Trails Strategy 2010 (as amended) and South Gippsland Open Space Strategy 2007 (as amended). The internal road network must specifically provide for the potential for internal road connectivity to the existing dwelling lots that have potential for further subdivision.
- In consultation with relevant agencies and authorities, provision of public transport stops where appropriate within easy walking distance to residential dwellings and key destinations. Stops should also be located near active areas where possible.

3.2 Korumburra Structure Plan

South Gippsland Shire Council prepared the Korumburra Structure Plan July 2010 amended June 2014 (KSP) to provide a strategic framework for the future physical development of Korumburra over a 20 year time frame.

The KSP identifies:

- *Areas in and around Korumburra that are considered suitable for future residential, industrial and commercial development.*

- *Existing areas of Korumburra where opportunity exists to change or intensify development.*
- *Current and future pedestrian, cycle, traffic and transport links.*
- *Areas of environmental importance.*
- *Korumburra's Town Centre and the specific issues and opportunities it faces, recognising the critical and ongoing social, economic and environmental roles that the Town Centre will have in the future of Korumburra.*
- *Redevelopment opportunities at the former Korumburra Saleyards site.*

The KSP details the objectives and strategies that new development within the KSP area is to achieve. The objectives and strategies of the KSP related to the subject site from a transport perspective are detailed below:

Pedestrian and cyclists

Objective

To establish Korumburra as a "walkable community" with all key activities being accessible from all residential areas by foot or non motorised transport by providing safe secure and attractive walking and cycling paths that link all parts of the town and will enable and encourage walking and cycling as an alternative to motor vehicles.

Strategies

1. *Identify locations for safe, secure and attractive pedestrian and cycle paths through the town that will link key features, facilities, schools, sporting and recreation facilities and the Town Centre with all residential areas, hence establishing a Pedestrian and Cycle network for the town.*
2. *Require all new residential subdivisions to be connected to the pedestrian and cycling network.*

Refer Figure 3.1 for the Korumburra Local Level Structure Plan as taken from South Gippsland Shire Council's website.

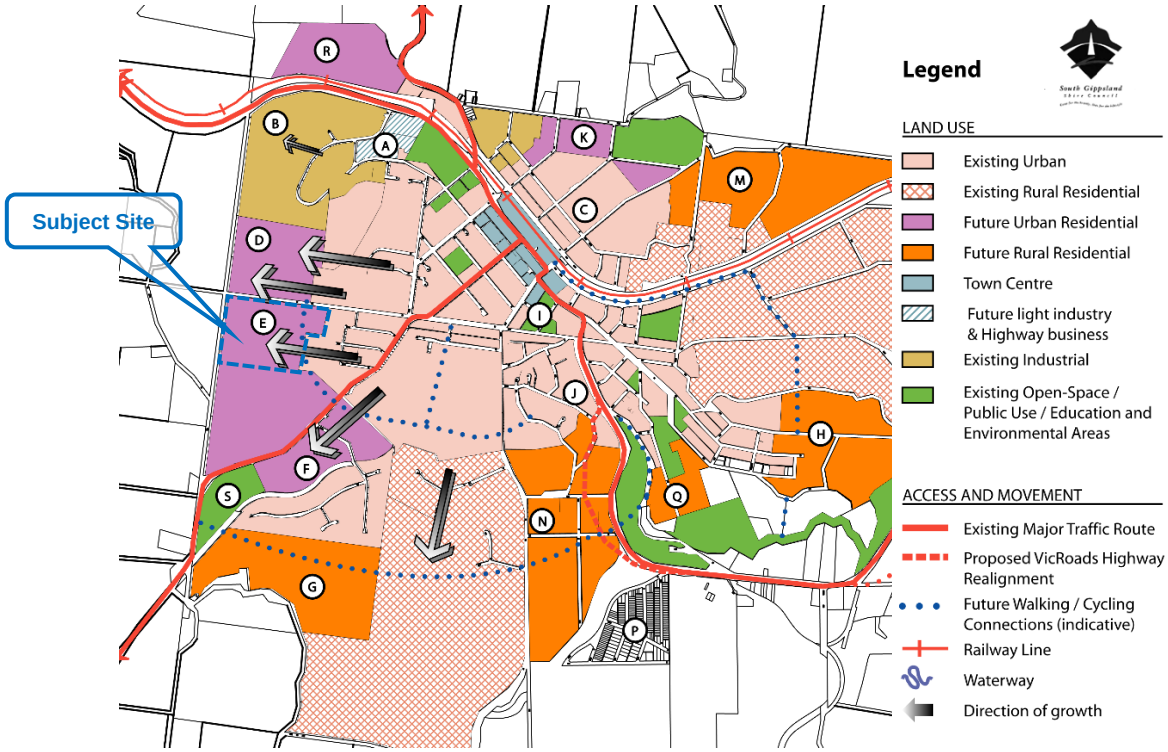


Figure 3.1: Korumburra Local Level Structure Plan

As illustrated in Figure 3.1, a north-south aligned walking/ cycling connection (indicative) is proposed through the east of the site.

4 PROPOSED DEVELOPMENT PLAN

The proposed development consists of subdividing approximately 19.1 hectares of land into 127 residential lots, a 1.45 hectare superlot with capacity for up to 17 medium density lots[4], and 2.66 hectares of reserve over 5 stages.

Access to the site is provided from Bena Road for all vehicles via two new unsignalised T-intersections located in the north-east (eastern access point) and north-west (western access point) of the site. The eastern access point connects to a north-south aligned Access Street (16 metre wide road reserve) and the western access point connects to a north-south aligned Connector Street (20 metre wide road reserve which widens to 24 metres wide). Both roads run to the south of the site and connect to the site's southern boundary.

The remaining internal road network consists of 16.0 metre wide access streets.

The Connector Street and north-south Access Street provide two future road connection points to the adjoining land parcel to the south of the site.

Access to the superlot is expected to be provided by a separate access point to/ from Bena Road.

Refer Figure 4.1 and Appendix B for the "Plan of Proposed Subdivision".

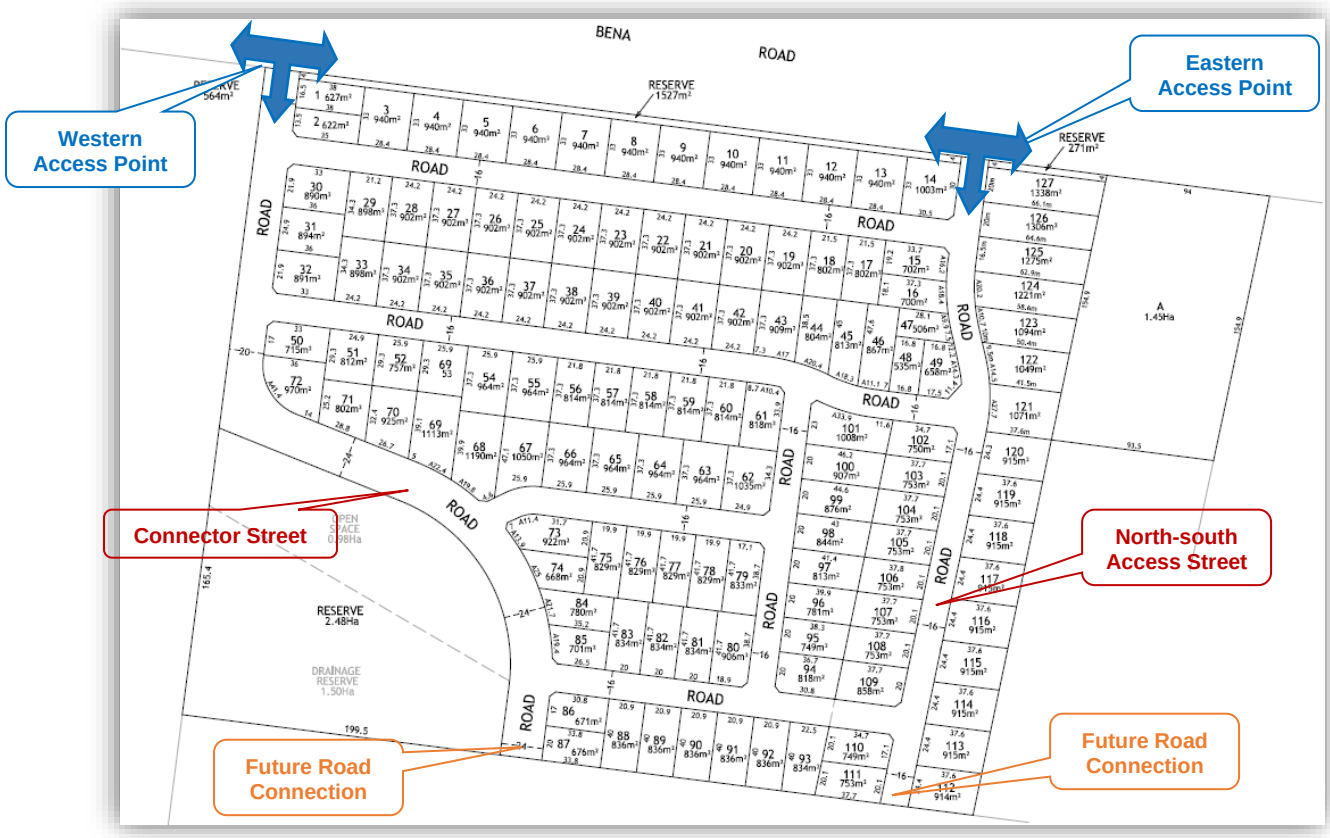


Figure 4.1: Plan of Proposed Subdivision

[4] Based on an estimated rate of 10-12 lots per hectare for the superlot.

5 TRAFFIC IMPACT ASSESSMENT

This section of the report will review what impact traffic generated from the proposed development of the site will have on the existing Bena Road/ George Street/ Radovick Street intersection and the Bena Road/ Whitelaw Road intersection and on Bena Road. Further, an assessment of the site access points with Bena Road will be completed to determine what intersection layouts are required to provide safe and efficient access to the site.

5.1 Traffic Generation

Section 12.3.1 of the Infrastructure Design Manual (IDM), states that traffic volumes for undeveloped residential allotments should normally be based upon a daily traffic generation rate equivalent to at least 10 vehicle movements per day per lot.

Based on the Bena Road AM and PM peak hour to daily traffic volume ratio of 9.0% and 9.5% respectively[5], it is estimated that during the AM and PM peak periods a residential allotment will generate approximately 1 vehicle movement per hour per lot during the peak periods.

The RTA Guide to Traffic Generating Developments, Version 2.2, October 2002 states that a unit/ town house (three or more bedrooms) within a medium density site will generate 6.5 daily vehicle trips and 0.65 weekday peak hour vehicle trips.

Therefore, for modelling purposes, a traffic generation rate equivalent to 10 vehicle movements per day per lot and 1 vehicle movement per hour per lot will be used for the standard residential lots, and 6.5 vehicle movements per day per lot and 0.65 vehicle movement per hour per lot will be used for the medium density dwellings within the superlot.

5.1.1 99 Bena Road Development Site

Applying the above traffic generation rate to the proposed 127 standard residential dwellings and 17 medium density dwellings within the development site, it is expected that the site will generate approximately 1,380 daily vehicle trips and 138 peak hour vehicle trips when fully developed.

5.1.2 Botanica Development Site

The existing Botanica development site which consists of 81 residential dwelling is located directly opposite the site on the north side of Bena Road and is currently under construction. As per Section 4.1 of the Botanica TIAR, it is expected that this development will generate approximately 810 daily vehicle trips and 81 peak hour vehicle trips.

5.2 Traffic Distribution

It is expected that the majority of vehicle trips generated by the residential development along Bena Road will travel east along Bena Road and use the existing George Street/ Radovick Street intersection. Therefore, the peak hour traffic volumes generated from the proposed development site will be distributed to Bena Road as follows; 95% to the east, and 5% to the west.

Of the trips heading west down Bena Road, it is expected that approximately 50% of these trips will head north and 50% of these trips will head south at the Bena Road/ Whitelaw Road intersection.

Based on the 2016 existing intersection turning movement count data, the proposed development traffic entering / exiting Bena Road at its intersection with George Street and Radovick Street will be distributed from / to the surrounding road network as detailed in Table 5.1.

[5] Refer Section 2.3.2 2.3.1of this report.

Table 5.1: Distribution of traffic to/ from Bena Road

Period	AM Peak			PM Peak		
Direction	North (George St)	North-East (Radovick St)	South-West (Radovick St)	North (George St)	North-East (Radovick St)	South-West (Radovick St)
From Bena Road	20%	75%	5%	25%	60%	15%
To Bena Road	20%	70%	10%	20%	55%	25%

The following peak hour directional split of traffic has been adopted for modelling purposes. It is noted that these values are based on the existing 2016 intersection turning movement count volumes, for the existing traffic entering / exiting Bena Road at its intersection with George Street and Radovick Street.

- AM Peak Hour - 30% inbound and 70% outbound; and
- PM Peak Hour - 55% inbound and 45% outbound.

5.3 External Traffic Growth

South Gippsland population forecasts for the Korumburra area states that for the period 2016 to 2036, the average annual percentage change in population is expected to be 1.89% per annum.

Therefore, for assessment purposes, an average annual percentage change of 1.89% will be added to the 2016 traffic volumes recorded at the Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection, refer Figure 2.7 to obtain the future year (2032) traffic volume over a 10 year period.

The existing traffic volume on Bena Road and at the Bena Road/ Whitelaw Road intersection will not be grown to the future year due to Bena Road not experiencing any growth in traffic between 2013 and 2021, refer Section 2.3.1 and 2.3.2.

5.4 Intersection Turning Movement Volumes

In order to determine the proposed intersection turning movement volumes at the proposed Eastern and Western Site Access Points, the existing Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection, and the Bena Road/ Whitelaw Road intersection, a spreadsheet Transport Model was created to assign traffic generated from the site to the proposed and existing intersections. The Transport Model was developed using the traffic generation, traffic distribution, peak hour directional split assumptions, and external traffic growth rate as outlined in Sections 5.1 to 5.3.

Refer Figure 5.1 to Figure 5.4 for the future year 2032 AM & PM peak hour intersection turning movement volumes at the proposed Eastern and Western Site Access Points, the existing Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection, and the Bena Road/ Whitelaw Road intersection over a 10 year forecast period.

It is noted that these peak hour traffic volumes include the traffic generated by the Botanica Development to the north of the site (81 residential dwellings) which is expected to be fully developed within the same 10 year forecast period.

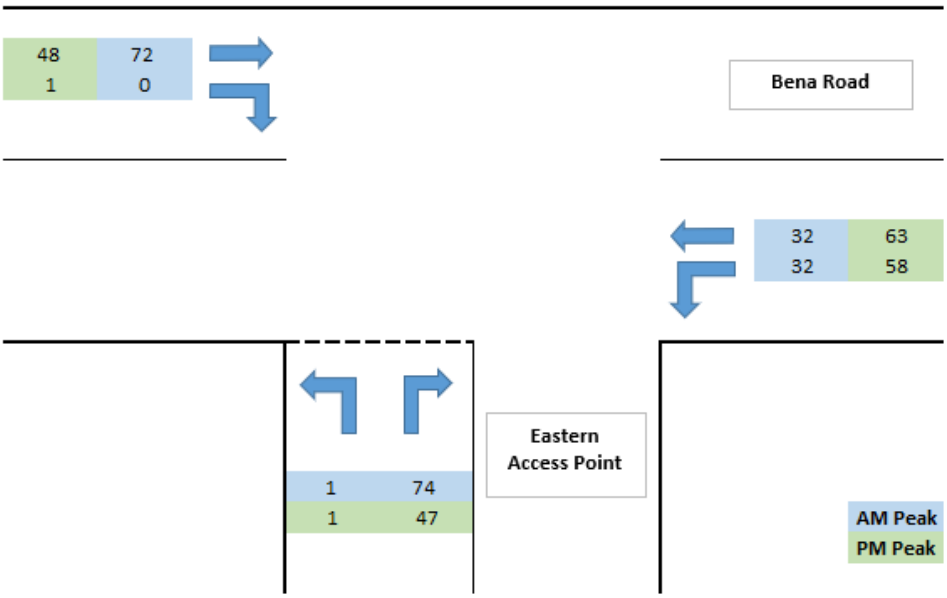


Figure 5.1: Bena Road/ Eastern Access Point intersection – Future Year 2032 AM & PM Peak Hour Turning Movement Volumes

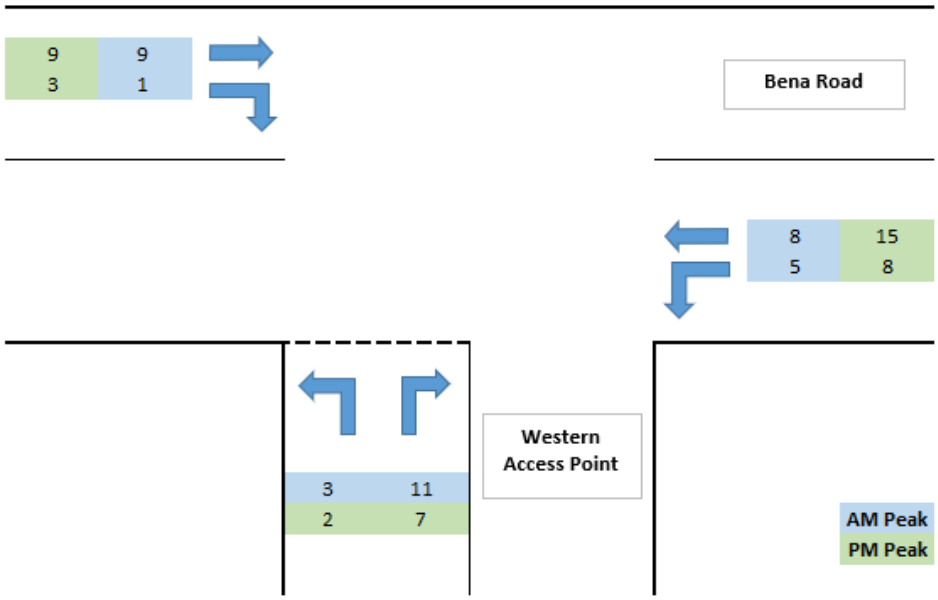


Figure 5.2: Bena Road/ Eastern Access Point intersection – Future Year 2032 AM & PM Peak Hour Turning Movement Volumes

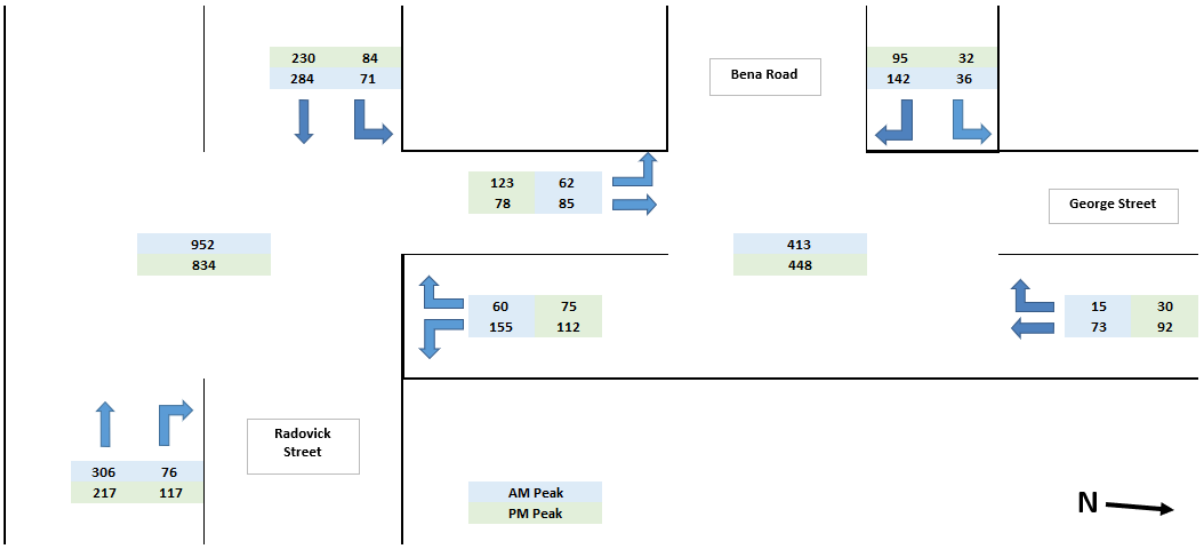


Figure 5.3: Bena Rd / George St / Radovick St/ Jumbunna Rd intersection – Future Year 2032 AM & PM Peak Hour Turning Movement Volumes

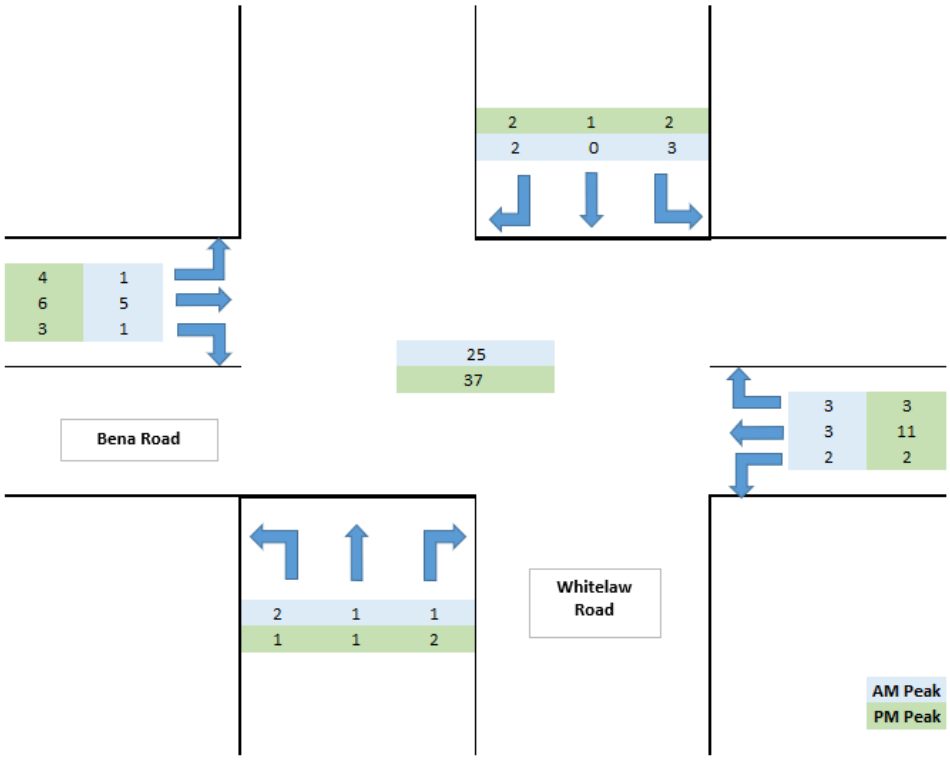


Figure 5.4: Bena Rd / Whitelaw Road intersection – Future Year 2032 AM & PM Peak Hour Turning Movement Volumes

5.5 Intersection Performance Assessment

SIDRA Intersection 9.0 was used to analyse the operational performance of proposed Eastern and Western Site Access Points as standard T-intersections, the existing Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection, and the existing Bena Road/ Whitelaw Road intersection with the future year 2032 AM & PM peak hour turning movement volumes as indicated in Figure 5.1 to Figure 5.4. Degree of Saturation, Average Delay, Level of Service, and 95% Back of Queue Distance results of the analysis for the "total approach" of the intersections are provided in Table 5.2. Full results can be found in Appendix C.

Table 5.2: SIDRA Summary Results – Proposed Bena Road/ Eastern Access Point intersection with future year 2032 traffic volumes

Approach Leg	Eastern Access Point (South)	Bena Road (East)	Bena Road (West)
AM Peak			
Degree of Saturation	0.065	0.035	0.039
Average Delay (sec)	5.9	2.8	0.1
Level of Service	A	-	-
95% Queue Distance (m)	1.5	0	0
PM Peak			
Degree of Saturation	0.042	0.065	0.026
Average Delay (sec)	6.0	2.7	0.1
Level of Service	A	-	-
95% Queue Distance (m)	1.0	0	0

As detailed in Table 5.2, the Eastern Access Point approach has a Level of Service A, Degree of Saturation 0.07, Average Delay less than 6 seconds, and a 95% Queue distance of less than 2 metres long during both the AM & PM peak periods.

The Bena Road approach legs have a Degree of Saturation below 0.07, Average Delay less than 3 seconds, and no queues during both the AM & PM peak periods.

These results indicate that the proposed intersection is expected to operate well below its expected capacity in the future.

Table 5.3: SIDRA Summary Results – Proposed Bena Road/ Western Access Point intersection with future year 2032 traffic volumes

Approach Leg	Western Access Point (South)	Bena Road (East)	Bena Road (West)
AM Peak			
Degree of Saturation	0.011	0.007	0.005
Average Delay (sec)	5.5	2.1	0.6
Level of Service	A	-	-
95% Queue Distance (m)	0.2	0	0
PM Peak			
Degree of Saturation	0.007	0.012	0.007
Average Delay (sec)	5.6	1.9	1.4
Level of Service	A	-	-
95% Queue Distance (m)	0.2	0	0.1

As illustrated in Table 5.3, the Western Access Point approach leg has a Level of Service A, Degree of Saturation 0.02, Average Delay less than 6 seconds, and a 95% Queue Distance of less than 1 metre long during both the AM & PM peak periods.

The Bena Road approach legs have a Degree of Saturation below 0.02, Average Delay less than 3 seconds, and 95% Queue Distance of less than 1 metre long during both the AM & PM peak periods.

These results indicate that the proposed intersection is expected to operate well below its expected capacity in the future.

Table 5.4: SIDRA Summary Results – Existing Bena Rd / George St / Radovick St/ Jumbunna Rd Intersection with future year 2032 traffic volumes

Period	Bena Rd / George St Intersection			George St / Radovick St Intersection		
Approach Leg	**George St (East)**	**Bena Rd (North)**	**George St (West)**	**Radovick St (South)**	**George St (East)**	**Radovick St (North)**
AM Peak						
Degree of Saturation	0.048	0.134	0.078	0.163	0.171	0.190
Average Delay (sec)	1.1	8.2	1.0	1.3	3.9	1.2
Level of Service	-	A	-	-	A	-
95% Queue Distance (m)	0.7	2.9	0	1.6	5.2	0
PM Peak						
Degree of Saturation	0.068	0.097	0.107	0.116	0.152	0.168
Average Delay (sec)	1.6	8.3	1.5	2.2	3.7	1.5
Level of Service	-	A	-	-	A	-
95% Queue Distance (m)	1.4	2.1	0	2.4	4.4	0

As detailed in Table 5.4, at the Bena Road/ George Street intersection, the Bena Road approach has a Level of Service A, Degree of Saturation below 0.14, Average Delay less than 9 seconds, and a 95% Queue Distance of less than 3 metres during both the AM and PM Peak periods. Where-as the George Street approach legs have a Degree of Saturation below 0.11, Average Delay less than 2 seconds, and queues less than 2 metres long during both the AM and PM peak periods.

At the George Street/ Radovick Street Intersection, the George Street approach has a Level of Service A, Degree of Saturation below 0.18, Average Delay less than 4 seconds, and Queues less than 6 metres long during both the AM and PM Peak periods. Where-as the Radovick Street approach legs have a Degree of Saturation below 0.2, Average Delay less than 3 seconds, and a 95% Queue Distance of less than 3 metres long during both the AM and PM peak periods.

These results indicate that the existing intersection will continue to operate well below its expected capacity in the future.

Table 5.5: SIDRA Summary Results – Existing Bena Road/ Whitelaw Road intersection with future year 2032 traffic volumes

Approach Leg	Whitelaw Road (South)	Bena Road (East)	Whitelaw Road (North)	Bena Road (West)
AM Peak				
Degree of Saturation	0.003	0.004	0.005	0.004
Average Delay (sec)	9.3	4.8	9.3	2.2

Level of Service	A	-	A	-
95% Queue Distance (m)	0.1	0.1	0.1	0
PM Peak				
Degree of Saturation	0.004	0.009	0.004	0.007
Average Delay (sec)	9.2	2.4	9.2	4.2
Level of Service	A	-	A	-
95% Queue Distance (m)	0.1	0.1	0.1	0.1

As detailed in Table 5.5, the Bena Road approach legs have a Degree of Saturation 0.01, Average Delay less than 5 seconds, and a 95% Queue Distance of less than 1 metre long during both the AM & PM peak periods. Where-as the Whitelaw Road approach legs have a Level of Service A, Degree of Saturation below 0.01, Average Delay less than 10 seconds, and a 95% Queue Distance of less than 1 metre long during both the AM & PM peak periods.

These results indicate that the existing intersection will continue to operate well below its expected capacity in the future.

5.6 Mid-block Assessment

As detailed in Section 2.2.1, Bena Road is classified as an access street and access road with a capacity of up to 2,500 vpd.

As the development of both the subject site and the Botanica development site will generate approximately 2,080 daily vehicle trips and considering that 95% of these trips will head east along Bena Road, it is expected that after development of both sites, Bena Road adjacent to its intersection with George Street will carry approximately 2,360[6] vehicles per day and Bena Road adjacent to the site will carry approximately 2,090[7] vehicles per day. This volume of traffic is below the capacity of 2,500 vehicles per day for an access street and access road.

As Bena Road adjacent to the site has a carriageway width approximately 5.5 metres wide, it is recommended that carriageway be widened by 0.5 metres and kerb and channel including footpath be constructed on the south side for the length of the site's frontage.

5.7 Sight Distance Requirement

The Safe Intersection Sight Distance (SISD) is the "*minimum distance, which should be provided on the major road at any intersection so as to provide sufficient distance for a driver of a vehicle on the major road to observe a vehicle on a minor road approach moving into a collision situation and to decelerate to a stop before reaching the collision point.*"[8]. Section 3.2.2 of the Austroads Guide Part 4a sets out the SISD requirements of the major road.

5.7.1 Eastern Access Point SISD

Based on a posted speed limit equivalent to 60km/h on Bena Road and an approximate average downgrade equivalent to 3.8% for westbound and an upgrade equivalent to 6.6% for eastbound vehicles, the SISD required to the east and west of the Eastern Access Point is 135 metres and 125 metres respectively.

Based on on-site observations, the available site distance to the east and west of the Eastern Access Point is approximately 80 metres and 130 metres respectively. Refer Figure 5.5 and Figure 5.6.

Therefore, the available sight distance to the east of the Eastern Access Point is 50 metres less than the Austroads Guide SISD requirement, where-as the available sight distance to the west of the Eastern Access Point exceeds the Austroads Guide SISD requirement.

[6] The future year 2032 two way daily traffic volume on Bena Road is 380 vehicles.
[7] The future year 2032 two-way daily traffic volume on Bena Road adjacent to the site is 110 vehicles.
[8] Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections.

Therefore, to increase the available sight distance to/ from the east of the Eastern Access Point, it is recommended that the existing embankment be cut back to the road reserve boundary and the existing vegetation be trimmed back.

If the embankment cannot be cut back, then it is recommended that a “Stop” sign be implemented at the Eastern Access Point approach to the intersection and a “Side Road Intersection” warning sign installed prior to the intersection on Bena Road.

Figure 5.5: Available SISD looking east from the proposed Eastern Access Point

Figure 5.6: Available SISD looking west from the proposed Eastern Access Point

5.7.2 Western Access Point SISD

Based on a posted speed limit equivalent to 60km/h on Bena Road and an approximate downgrade equivalent to 7.6% for westbound vehicles and upgrade equivalent to 6.6% for eastbound vehicles, the SISD required to the east and west of the proposed Western Access Point is 140 metres and 125 metres respectively.

Based on on-site observations, the available sight distance to the east and west of the Western Access Point is approximately 145-150 metres and over 250 metres respectively. Refer Figure 5.7 and Figure 5.8.

Therefore, the available sight distance to the east and west of the proposed Western Access Point exceeds the Austroads Guide SISD requirement.

As per AS1742.2-2009 Manual of Uniform Traffic Control Devices, Part 2: Traffic Control Devices for General Use, a Give Way sign is not required at the proposed Western Access Point intersection.

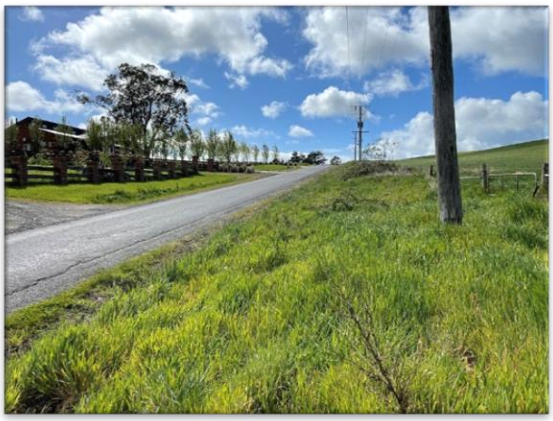


Figure 5.7: Available SISD looking east from proposed Western Access Point

Figure 5.8: Available SISD looking west from the proposed Western Access Point

6 INTERNAL STREET NETWORK REVIEW

6.1 Proposed Road Network Layout & Hierarchy

The site consists of a Connector Street in the west of the site which has a road reservation width of 20 metres from its connection with Bena Road and widens to 24 metres wide adjacent to the reserve. As per Table 2 of the IDM, a connector street has a capacity of 2,500-6,000 vehicles per day. The remaining internal road network consists of Access Streets (16 metre wide road reserve) which have capacity for up to 2,500 vehicles per day.

As per Section 5.1.1, the development is expected to generate approximately 1,270 vehicle movements per day. Therefore, the internal road network will adequately cater for the traffic generated by the development.

The proposed Connector Street and Access Streets within the site are to be designed and constructed in accordance with Table 2 of the IDM. Refer Figure 6.1 and Figure 6.2 for the proposed Connector Street and Access Street cross sections respectively.

Two future road connection points are provided at the site's southern boundary via the Connector Street and north-south Access Street.

The carriageway widths within the site allow for emergency vehicle access.

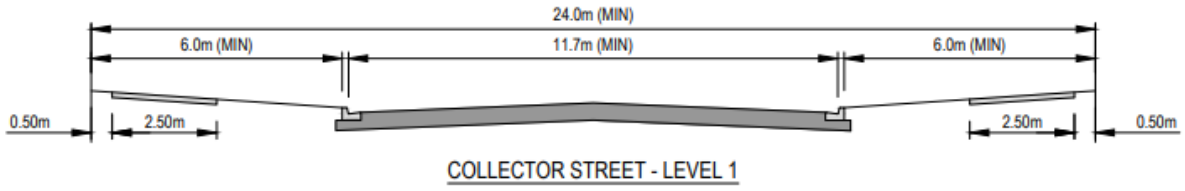


Figure 6.1: Connector Street Level 1 Cross Section[9]

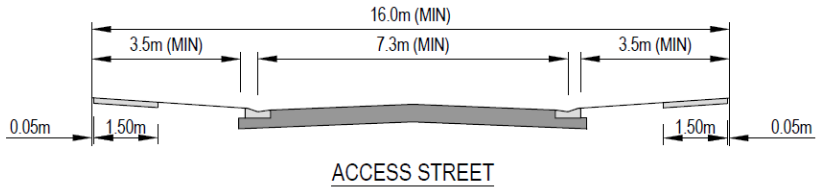


Figure 6.2: Access Street Cross Section[9]

Further, it is recommended that the longitudinal gradient of all streets do not exceed the maximum grade limits as set out in "Table 4: Limiting Longitudinal Gradients" of the IDM. In accordance with the IDM, a minimum of one (1) car parking space for every two (2) allotments must be provided on the internal carriageway within the subject site.

6.2 Traffic Control

Clause 56.06-7 of the South Gippsland Planning Scheme states that street blocks should generally be "*between 120 metres and 240 metres in length and generally between 60 metres to 120 metres in width to facilitate pedestrian movement and control traffic speeds*".

Referring to the proposed subdivision concept plan, it is noted that some roads within the site have street block lengths and street lengths greater than 240 metres. Therefore, in order to control traffic speeds, it is recommended that a speed management device in the form of a flat top road hump *or* raised intersection threshold be provided on the internal road network as shown in Figure 6.3.

[9]Infrastructure Design Manual, Standard Drawing SD 605.

Figure 6.3: Proposed Traffic Management Measures

6.3 Path Network Review

As per the proposed Connector Street and Access Street cross sections, a 2.5 metre wide shared path is to be provided on both side of the Connector Street and a 1.5 metre wide footpath is to be provided on both sides of the access streets. Further a 1.5 metre wide footpath is to be constructed on the south side of Bena Road along the site's frontage.

As per Section 3.2, the Korumburra Structure Plan proposes a north-south aligned walking/ cycling connection through the east of the site. However, due to the topography of the site (steep areas in the east), this shared path will run along the Connector Street and continue to the south/ south-east beyond the site's southern boundary as per the Korumburra Structure Plan.

7 RECOMMENDATIONS & CONCLUSION

Based on the key findings of this TIAR, it is recommended that:

- The Bena Road carriageway width adjacent to the site be widened by 0.5 metres to achieve a 6.0 metre wide carriageway width and kerb and channel including footpath be constructed on the south side for the length of the site's frontage.
- The Eastern and Western Access Point intersections be constructed as standard T-intersections.
- The existing embankment on either side of the Eastern Access Point be cut back to the road reserve boundary and the existing vegetation be trimmed back to increase the available sight distance.

  If the embankment cannot be cut back, then it is recommended that a "Stop" sign be implemented at the Eastern Access Point approach to the intersection and a "Side Road Intersection" warning sign installed prior to the intersection on Bena Road.
- The proposed Connector Street and Access Streets within the site to be designed and constructed in accordance with Table 2 of the IDM.
- The longitudinal gradient of all streets do not exceed the maximum grade limits as set out in "Table 4: Limiting Longitudinal Gradients" of the IDM.
- In accordance with the IDM, a minimum of one car parking space for every two allotments be provided on the internal street network.
- One car parking space for every two allotments be provided on the internal street network.
- A speed management device in the form of a flat top road hump *or* raised intersection threshold be provided on the internal road network as shown in Figure 6.3.
- A 2.5 metre wide shared path be provided on both side of the Connector Street and a 1.5 metre wide footpath be provided on both sides of the Access Streets.

Based on the key findings and recommendations of this TIAR, it can be concluded that the proposed development of the site into 127 residential lots, a 1.45 hectare Superlot and 2.66 hectares of reserve will not have a detrimental impact on the existing road network adjacent to the site.

Therefore, provided that the recommendations as detailed above are made conditions of the planning permit and implemented into the Proposed Site Plan, there are no traffic engineering reasons as to why the responsible authority should not grant a planning permit to develop the site.

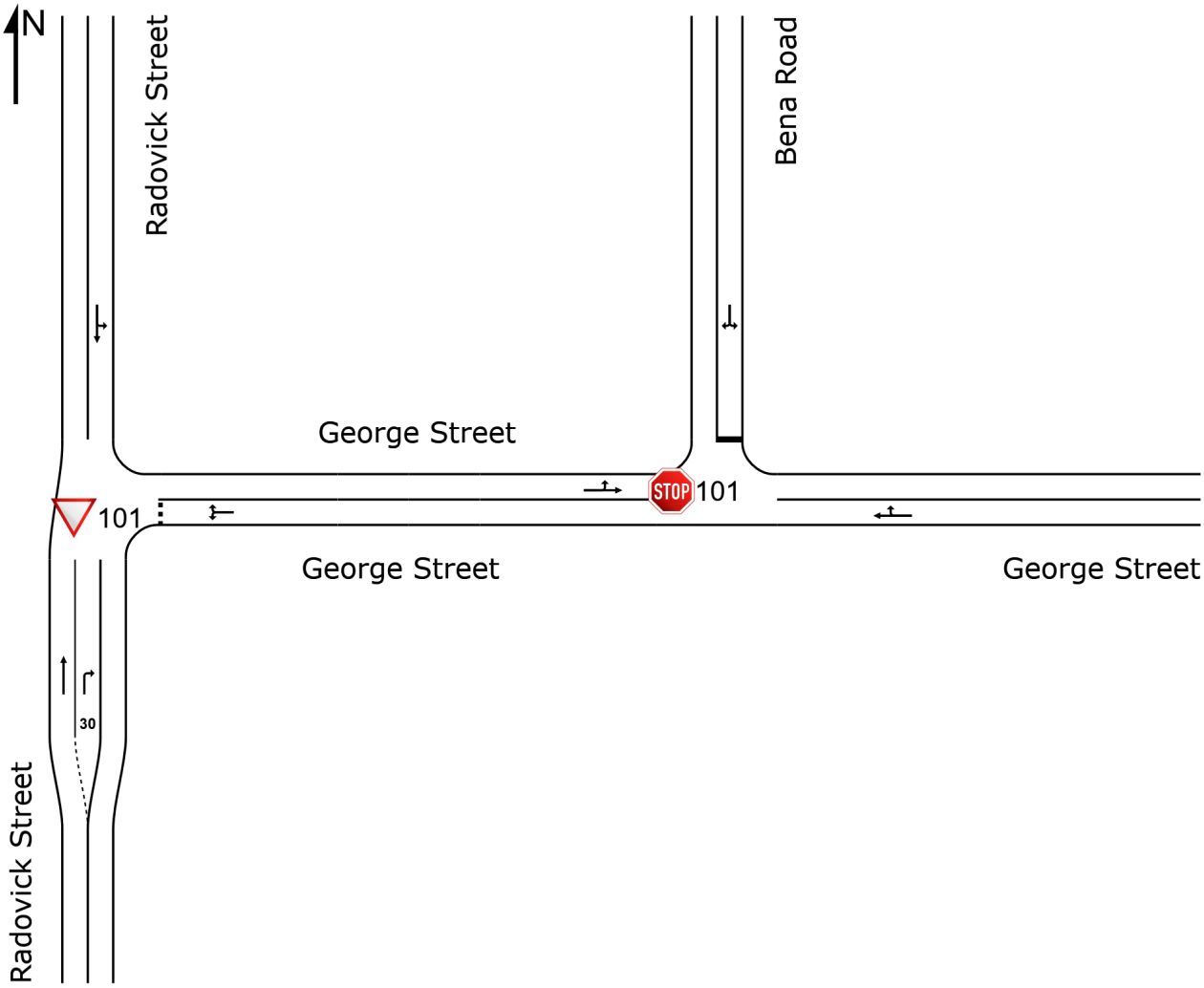
APPENDIX A – EXISTING SIDRA ANALYSIS RESULTS

NETWORK LAYOUT

Network: 1 [Bena Rd/ George St/ Radovick St - AM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Bena Rd / George St / Radovick St Ex. Intersection
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Radovick St/ George St - AM peak (2016)
101	NA	George St/ Bena Rd - AM peak (2016)

LANE SUMMARY

Site: 101 [George St/ Bena Rd - AM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - AM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: George Street															
Lane 1	56	5.0	56	5.0	1875	0.030	100	0.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	56	5.0	56	5.0		0.030		0.2	NA	0.0	0.1				
North: Bena Road															
Lane 1	24	5.0	24	5.0	1321	0.018	100	8.0	LOS A	0.0	0.4	Full	500	0.0	0.0
Approach	24	5.0	24	5.0		0.018		8.0	LOS A	0.0	0.4				
West: George Street															
Lane 1	72	5.0	72	5.0	1876	0.038	100	0.3	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	72	5.0	72	5.0		0.038		0.3	NA	0.0	0.0				
Intersection	152	5.0	152	5.0		0.038		1.5	NA	0.0	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [George St/ Bena Rd - AM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - AM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
Stop (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: George Street														
5	T1	54	5.0	54	5.0	0.030	0.0	LOS A	0.0	0.1	0.01	0.02	0.01	59.5
6	R2	2	5.0	2	5.0	0.030	5.7	LOS A	0.0	0.1	0.01	0.02	0.01	57.2
Approach		56	5.0	56	5.0	0.030	0.2	NA	0.0	0.1	0.01	0.02	0.01	59.3
North: Bena Road														
7	L2	5	5.0	5	5.0	0.018	8.4	LOS A	0.0	0.4	0.14	0.92	0.14	51.8
9	R2	19	5.0	19	5.0	0.018	7.9	LOS A	0.0	0.4	0.14	0.92	0.14	48.1
Approach		24	5.0	24	5.0	0.018	8.0	LOS A	0.0	0.4	0.14	0.92	0.14	49.3
West: George Street														
10	L2	9	5.0	9	5.0	0.038	2.5	LOS A	0.0	0.0	0.00	0.07	0.00	55.9
11	T1	63	5.0	63	5.0	0.038	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.4
Approach		72	5.0	72	5.0	0.038	0.3	NA	0.0	0.0	0.00	0.07	0.00	58.9
All Vehicles		152	5.0	152	5.0	0.038	1.5	NA	0.0	0.4	0.03	0.19	0.03	57.1

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [Radovick St/ George St - AM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - AM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Radovick Street															
Lane 1	227	5.0	227	5.0	1876	0.121	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	24	5.0	24	5.0	1865	0.013	100	6.1	LOS A	0.1	0.5	Short	30	0.0	NA
Approach	251	5.0	251	5.0		0.121		0.6	NA	0.1	0.5				
East: George Street															
Lane 1	73	5.0	73	5.0	1191	0.061	100	3.5	LOS A	0.2	1.6	Full	15	0.0	0.0
Approach	73	5.0	73	5.0		0.061		3.5	LOS A	0.2	1.6				
North: Radovick Street															
Lane 1	258	5.0	258	5.0	1870	0.138	100	1.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	258	5.0	258	5.0		0.138		1.1	NA	0.0	0.0				
Intersection	582	5.0	582	5.0		0.138		1.2	NA	0.2	1.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Radovick St/ George St - AM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - AM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
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: Radovick Street														
2	T1	227	5.0	227	5.0	0.121	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	24	5.0	24	5.0	0.013	6.1	LOS A	0.1	0.5	0.36	0.55	0.36	49.2
Approach		251	5.0	251	5.0	0.121	0.6	NA	0.1	0.5	0.03	0.05	0.03	59.3
East: George Street														
4	L2	34	5.0	34	5.0	0.061	3.0	LOS A	0.2	1.6	0.33	0.56	0.33	51.2
6	R2	39	5.0	39	5.0	0.061	3.9	LOS A	0.2	1.6	0.33	0.56	0.33	50.2
Approach		73	5.0	73	5.0	0.061	3.5	LOS A	0.2	1.6	0.33	0.56	0.33	50.7
North: Radovick Street														
7	L2	48	5.0	48	5.0	0.138	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	58.0
8	T1	210	5.0	210	5.0	0.138	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	58.9
Approach		258	5.0	258	5.0	0.138	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.8
All Vehicles		582	5.0	582	5.0	0.138	1.2	NA	0.2	1.6	0.06	0.14	0.06	58.3

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [George St/ Bena Rd - PM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - PM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: George Street															
Lane 1	73	5.0	73	5.0	1862	0.039	100	0.4	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	73	5.0	73	5.0		0.039		0.4	NA	0.0	0.2				
North: Bena Road															
Lane 1	25	5.0	25	5.0	1320	0.019	100	8.0	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	25	5.0	25	5.0		0.019		8.0	LOS A	0.1	0.4				
West: George Street															
Lane 1	81	5.0	81	5.0	1861	0.044	100	0.7	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	81	5.0	81	5.0		0.044		0.7	NA	0.0	0.0				
Intersection	179	5.0	179	5.0		0.044		1.6	NA	0.1	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [George St/ Bena Rd - PM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - PM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
Stop (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: George Street														
5	T1	68	5.0	68	5.0	0.039	0.0	LOS A	0.0	0.2	0.03	0.04	0.03	59.0
6	R2	5	5.0	5	5.0	0.039	5.8	LOS A	0.0	0.2	0.03	0.04	0.03	57.0
Approach		73	5.0	73	5.0	0.039	0.4	NA	0.0	0.2	0.03	0.04	0.03	58.8
North: Bena Road														
7	L2	6	5.0	6	5.0	0.019	8.4	LOS A	0.1	0.4	0.14	0.93	0.14	51.8
9	R2	19	5.0	19	5.0	0.019	7.9	LOS A	0.1	0.4	0.14	0.93	0.14	48.1
Approach		25	5.0	25	5.0	0.019	8.0	LOS A	0.1	0.4	0.14	0.93	0.14	49.5
West: George Street														
10	L2	23	5.0	23	5.0	0.044	2.5	LOS A	0.0	0.0	0.00	0.15	0.00	55.3
11	T1	58	5.0	58	5.0	0.044	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.7
Approach		81	5.0	81	5.0	0.044	0.7	NA	0.0	0.0	0.00	0.15	0.00	57.7
All Vehicles		179	5.0	179	5.0	0.044	1.6	NA	0.1	0.4	0.03	0.22	0.03	56.6

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [Radovick St/ George St - PM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - PM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Radovick Street															
Lane 1	161	5.0	161	5.0	1879	0.086	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	40	5.0	40	5.0	1951	0.021	100	6.0	LOS A	0.1	0.8	Short	30	0.0	NA
Approach	201	5.0	201	5.0		0.086		1.2	NA	0.1	0.8				
East: George Street															
Lane 1	86	5.0	86	5.0	1284	0.067	100	3.2	LOS A	0.2	1.8	Full	15	0.0	0.0
Approach	86	5.0	86	5.0		0.067		3.2	LOS A	0.2	1.8				
North: Radovick Street															
Lane 1	211	5.0	211	5.0	1869	0.113	100	1.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	211	5.0	211	5.0		0.113		1.1	NA	0.0	0.0				
Intersection	498	5.0	498	5.0		0.113		1.5	NA	0.2	1.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Radovick St/ George St - PM peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - PM peak (2016) (Network Folder: 99 Bena Road, Korumburra)]

Existing
Site Category: (None)
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: Radovick Street														
2	T1	161	5.0	161	5.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
3	R2	40	5.0	40	5.0	0.021	6.0	LOS A	0.1	0.8	0.32	0.55	0.32	49.3
Approach		201	5.0	201	5.0	0.086	1.2	NA	0.1	0.8	0.06	0.11	0.06	58.6
East: George Street														
4	L2	41	5.0	41	5.0	0.067	2.9	LOS A	0.2	1.8	0.29	0.54	0.29	51.5
6	R2	45	5.0	45	5.0	0.067	3.5	LOS A	0.2	1.8	0.29	0.54	0.29	50.6
Approach		86	5.0	86	5.0	0.067	3.2	LOS A	0.2	1.8	0.29	0.54	0.29	51.0
North: Radovick Street														
7	L2	41	5.0	41	5.0	0.113	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	57.9
8	T1	170	5.0	170	5.0	0.113	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.9
Approach		211	5.0	211	5.0	0.113	1.1	NA	0.0	0.0	0.00	0.12	0.00	58.8
All Vehicles		498	5.0	498	5.0	0.113	1.5	NA	0.2	1.8	0.08	0.19	0.08	57.7

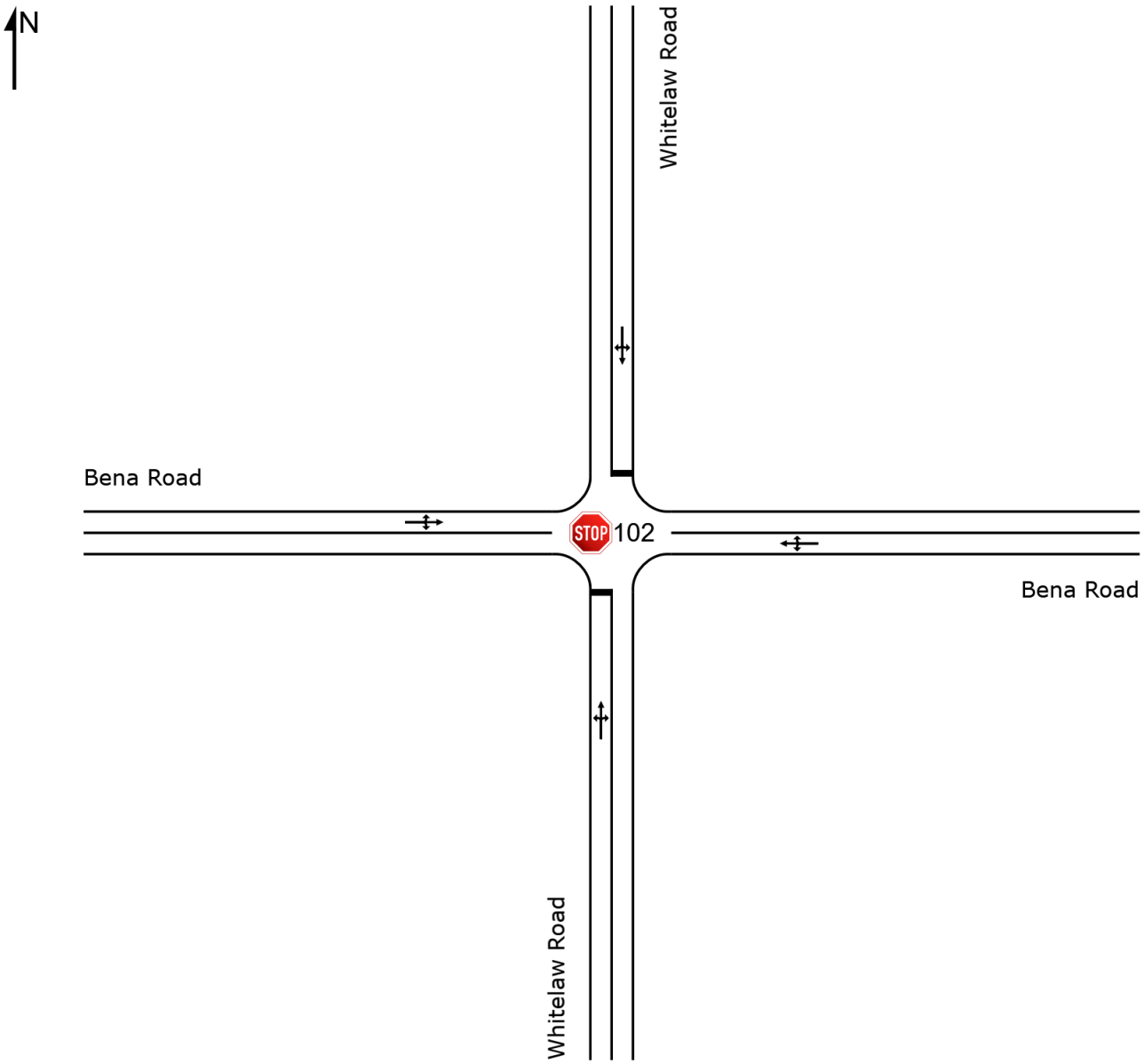
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

SITE LAYOUT

Site: 102 [Bena Rd/ Whitelaw Rd - AM Peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



LANE SUMMARY

Site: 102 [Bena Rd/ Whitelaw Rd - AM Peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Whitelaw Road													
Lane 1	4	0.0	1242	0.003	100	9.3	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0		0.003		9.3	LOS A	0.0	0.1				
East: Bena Road													
Lane 1	5	0.0	1824	0.003	100	3.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	5	0.0		0.003		3.1	NA	0.0	0.0				
North: Whitelaw Road													
Lane 1	5	0.0	1188	0.004	100	9.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	5	0.0		0.004		9.2	LOS A	0.0	0.1				
West: Bena Road													
Lane 1	7	0.0	1835	0.004	100	2.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	7	0.0		0.004		2.2	NA	0.0	0.0				
Intersection	21	0.0		0.004		5.4	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 102 [Bena Rd/ Whitelaw Rd - AM Peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (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: Whitelaw Road														
1	L2	2	0.0	2	0.0	0.003	9.5	LOS A	0.0	0.1	0.03	1.00	0.03	73.2
2	T1	1	0.0	1	0.0	0.003	9.1	LOS A	0.0	0.1	0.03	1.00	0.03	72.8
3	R2	1	0.0	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.03	1.00	0.03	72.5
Approach		4	0.0	4	0.0	0.003	9.3	LOS A	0.0	0.1	0.03	1.00	0.03	72.9
East: Bena Road														
4	L2	1	0.0	1	0.0	0.003	7.8	LOS A	0.0	0.0	0.02	0.28	0.02	83.3
5	T1	3	0.0	3	0.0	0.003	0.0	LOS A	0.0	0.0	0.02	0.28	0.02	92.0
6	R2	1	0.0	1	0.0	0.003	7.6	LOS A	0.0	0.0	0.02	0.28	0.02	82.5
Approach		5	0.0	5	0.0	0.003	3.1	NA	0.0	0.0	0.02	0.28	0.02	88.1
North: Whitelaw Road														
7	L2	2	0.0	2	0.0	0.004	9.5	LOS A	0.0	0.1	0.04	0.98	0.04	73.3
8	T1	1	0.0	1	0.0	0.004	9.1	LOS A	0.0	0.1	0.04	0.98	0.04	72.9
9	R2	2	0.0	2	0.0	0.004	8.9	LOS A	0.0	0.1	0.04	0.98	0.04	72.7
Approach		5	0.0	5	0.0	0.004	9.2	LOS A	0.0	0.1	0.04	0.98	0.04	73.0
West: Bena Road														
10	L2	1	0.0	1	0.0	0.004	7.8	LOS A	0.0	0.0	0.01	0.20	0.01	85.0
11	T1	5	0.0	5	0.0	0.004	0.0	LOS A	0.0	0.0	0.01	0.20	0.01	94.2
12	R2	1	0.0	1	0.0	0.004	7.6	LOS A	0.0	0.0	0.01	0.20	0.01	84.2
Approach		7	0.0	7	0.0	0.004	2.2	NA	0.0	0.0	0.01	0.20	0.01	91.2
All Vehicles		21	0.0	21	0.0	0.004	5.4	NA	0.0	0.1	0.02	0.56	0.02	81.7

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 102 [Bena Rd/ Whitelaw Rd - PM Peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Whitelaw Road													
Lane 1	3	0.0	1175	0.003	100	9.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	3	0.0		0.003		9.2	LOS A	0.0	0.1				
East: Bena Road													
Lane 1	13	0.0	1849	0.007	100	1.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	13	0.0		0.007		1.2	NA	0.0	0.0				
North: Whitelaw Road													
Lane 1	4	0.0	1128	0.004	100	9.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0		0.004		9.1	LOS A	0.0	0.1				
West: Bena Road													
Lane 1	13	0.0	1811	0.007	100	4.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	13	0.0		0.007		4.2	NA	0.0	0.1				
Intersection	33	0.0		0.007		4.1	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 102 [Bena Rd/ Whitelaw Rd - PM Peak (2016) (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

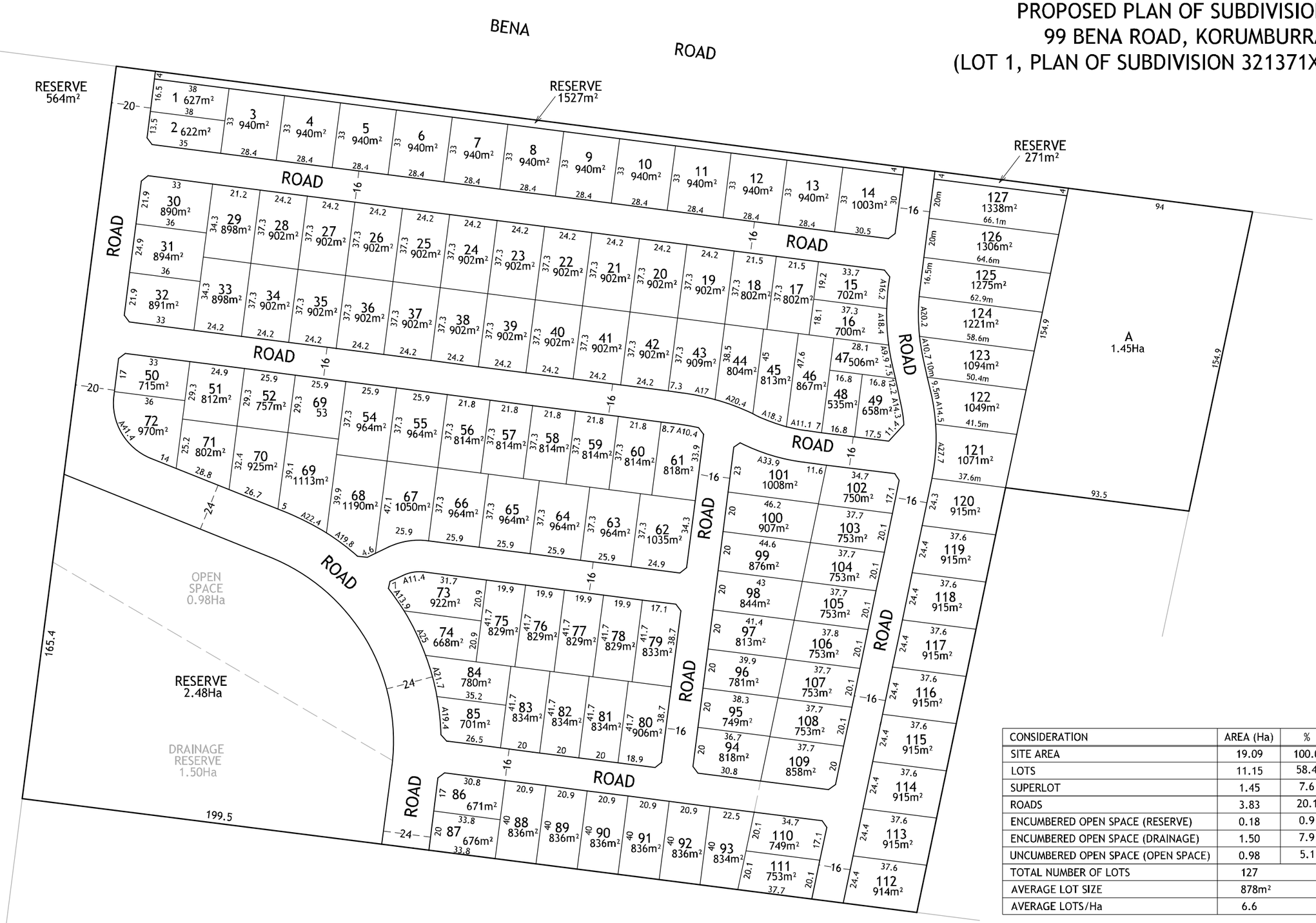
Vehicle Movement Performance

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: Whitelaw Road														
1	L2	1	0.0	1	0.0	0.003	9.6	LOS A	0.0	0.1	0.06	0.97	0.06	73.3
2	T1	1	0.0	1	0.0	0.003	9.1	LOS A	0.0	0.1	0.06	0.97	0.06	73.0
3	R2	1	0.0	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.06	0.97	0.06	72.7
Approach		3	0.0	3	0.0	0.003	9.2	LOS A	0.0	0.1	0.06	0.97	0.06	73.0
East: Bena Road														
4	L2	1	0.0	1	0.0	0.007	7.8	LOS A	0.0	0.0	0.01	0.11	0.01	87.1
5	T1	11	0.0	11	0.0	0.007	0.0	LOS A	0.0	0.0	0.01	0.11	0.01	96.7
6	R2	1	0.0	1	0.0	0.007	7.6	LOS A	0.0	0.0	0.01	0.11	0.01	86.2
Approach		13	0.0	13	0.0	0.007	1.2	NA	0.0	0.0	0.01	0.11	0.01	95.0
North: Whitelaw Road														
7	L2	1	0.0	1	0.0	0.004	9.5	LOS A	0.0	0.1	0.05	0.98	0.05	73.4
8	T1	1	0.0	1	0.0	0.004	9.1	LOS A	0.0	0.1	0.05	0.98	0.05	73.1
9	R2	2	0.0	2	0.0	0.004	9.0	LOS A	0.0	0.1	0.05	0.98	0.05	72.8
Approach		4	0.0	4	0.0	0.004	9.1	LOS A	0.0	0.1	0.05	0.98	0.05	73.0
West: Bena Road														
10	L2	4	0.0	4	0.0	0.007	7.9	LOS A	0.0	0.1	0.03	0.36	0.03	81.2
11	T1	6	0.0	6	0.0	0.007	0.0	LOS A	0.0	0.1	0.03	0.36	0.03	89.4
12	R2	3	0.0	3	0.0	0.007	7.6	LOS A	0.0	0.1	0.03	0.36	0.03	80.4
Approach		13	0.0	13	0.0	0.007	4.2	NA	0.0	0.1	0.03	0.36	0.03	84.6
All Vehicles		33	0.0	33	0.0	0.007	4.1	NA	0.0	0.1	0.03	0.39	0.03	85.4

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

APPENDIX B – PLAN OF PROPOSED SUBDIVISION

PROPOSED PLAN OF SUBDIVISION
99 BENA ROAD, KORUMBURRA
(LOT 1, PLAN OF SUBDIVISION 321371X)



CONSIDERATION	AREA (Ha)	%
SITE AREA	19.09	100.0
LOTS	11.15	58.4
SUPERLOT	1.45	7.6
ROADS	3.83	20.1
ENCUMBERED OPEN SPACE (RESERVE)	0.18	0.9
ENCUMBERED OPEN SPACE (DRAINAGE)	1.50	7.9
UNCUMBERED OPEN SPACE (OPEN SPACE)	0.98	5.1
TOTAL NUMBER OF LOTS	127	
AVERAGE LOT SIZE	878m²	
AVERAGE LOTS/Ha	6.6	

N

NOTE:
ALL DIMENSIONS ARE PRELIMINARY
AND SUBJECT TO FINAL SURVEY

SCALE 1:2000 (A3)
REV E (17/11/2021)

99 BENA ROAD, KORUMBURRA
HILL VIEW RISE PTY LTD

BROSNAN ENGINEERING SOLUTIONS

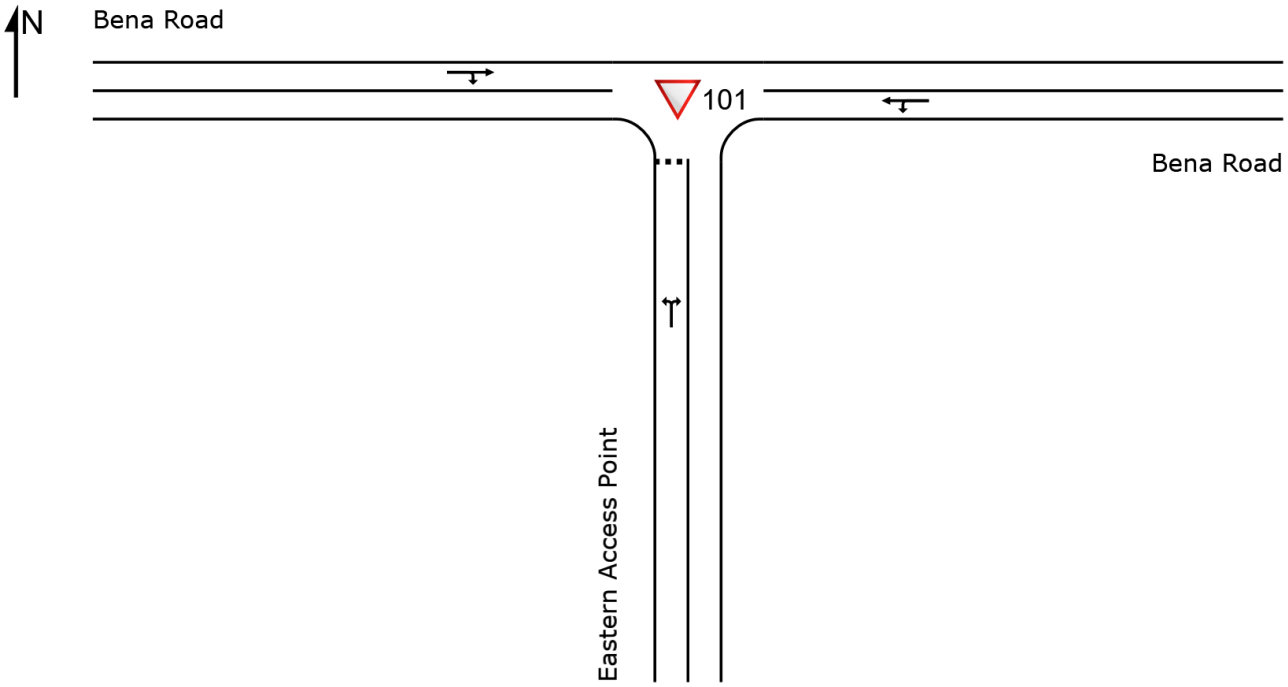
APPENDIX C – FUTURE SIDRA ANALYSIS RESULTS

SITE LAYOUT

Site: 101 [Bena Road/ Eastern Access Point - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



LANE SUMMARY

Site: 101 [Bena Road/ Eastern Access Point - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Eastern Access Point													
Lane 1	75	2.0	1152	0.065	100	5.9	LOS A	0.2	1.5	Full	500	0.0	0.0
Approach	75	2.0		0.065		5.9	LOS A	0.2	1.5				
East: Bena Road													
Lane 1	64	2.0	1848	0.035	100	2.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	64	2.0		0.035		2.8	NA	0.0	0.0				
West: Bena Road													
Lane 1	73	2.0	1890	0.039	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	73	2.0		0.039		0.1	NA	0.0	0.0				
Intersection	212	2.0		0.065		3.0	NA	0.2	1.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Bena Road/ Eastern Access Point - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
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: Eastern Access Point														
1	L2	1	2.0	1	2.0	0.065	5.7	LOS A	0.2	1.5	0.19	0.58	0.19	53.0
3	R2	74	2.0	74	2.0	0.065	5.9	LOS A	0.2	1.5	0.19	0.58	0.19	52.5
Approach		75	2.0	75	2.0	0.065	5.9	LOS A	0.2	1.5	0.19	0.58	0.19	52.5
East: Bena Road														
4	L2	32	2.0	32	2.0	0.035	5.6	LOS A	0.0	0.0	0.00	0.30	0.00	55.8
5	T1	32	2.0	32	2.0	0.035	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	57.4
Approach		64	2.0	64	2.0	0.035	2.8	NA	0.0	0.0	0.00	0.30	0.00	56.6
West: Bena Road														
11	T1	72	2.0	72	2.0	0.039	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.9
12	R2	1	2.0	1	2.0	0.039	5.7	LOS A	0.0	0.0	0.01	0.01	0.01	57.5
Approach		73	2.0	73	2.0	0.039	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.9
All Vehicles		212	2.0	212	2.0	0.065	3.0	NA	0.2	1.5	0.07	0.30	0.07	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [Bena Road/ Eastern Access Point - Future PM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Eastern Access Point													
Lane 1	48	2.0	1134	0.042	100	6.0	LOS A	0.1	1.0	Full	500	0.0	0.0
Approach	48	2.0		0.042		6.0	LOS A	0.1	1.0				
East: Bena Road													
Lane 1	121	2.0	1849	0.065	100	2.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	121	2.0		0.065		2.7	NA	0.0	0.0				
West: Bena Road													
Lane 1	49	2.0	1886	0.026	100	0.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	49	2.0		0.026		0.1	NA	0.0	0.0				
Intersection	218	2.0		0.065		2.8	NA	0.1	1.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Bena Road/ Eastern Access Point - Future PM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
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: Eastern Access Point														
1	L2	1	2.0	1	2.0	0.042	5.7	LOS A	0.1	1.0	0.21	0.58	0.21	53.0
3	R2	47	2.0	47	2.0	0.042	6.0	LOS A	0.1	1.0	0.21	0.58	0.21	52.5
Approach		48	2.0	48	2.0	0.042	6.0	LOS A	0.1	1.0	0.21	0.58	0.21	52.5
East: Bena Road														
4	L2	58	2.0	58	2.0	0.065	5.6	LOS A	0.0	0.0	0.00	0.28	0.00	55.9
5	T1	63	2.0	63	2.0	0.065	0.0	LOS A	0.0	0.0	0.00	0.28	0.00	57.5
Approach		121	2.0	121	2.0	0.065	2.7	NA	0.0	0.0	0.00	0.28	0.00	56.7
West: Bena Road														
11	T1	48	2.0	48	2.0	0.026	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	59.8
12	R2	1	2.0	1	2.0	0.026	5.8	LOS A	0.0	0.0	0.01	0.01	0.01	57.5
Approach		49	2.0	49	2.0	0.026	0.1	NA	0.0	0.0	0.01	0.01	0.01	59.8
All Vehicles		218	2.0	218	2.0	0.065	2.8	NA	0.1	1.0	0.05	0.29	0.05	56.3

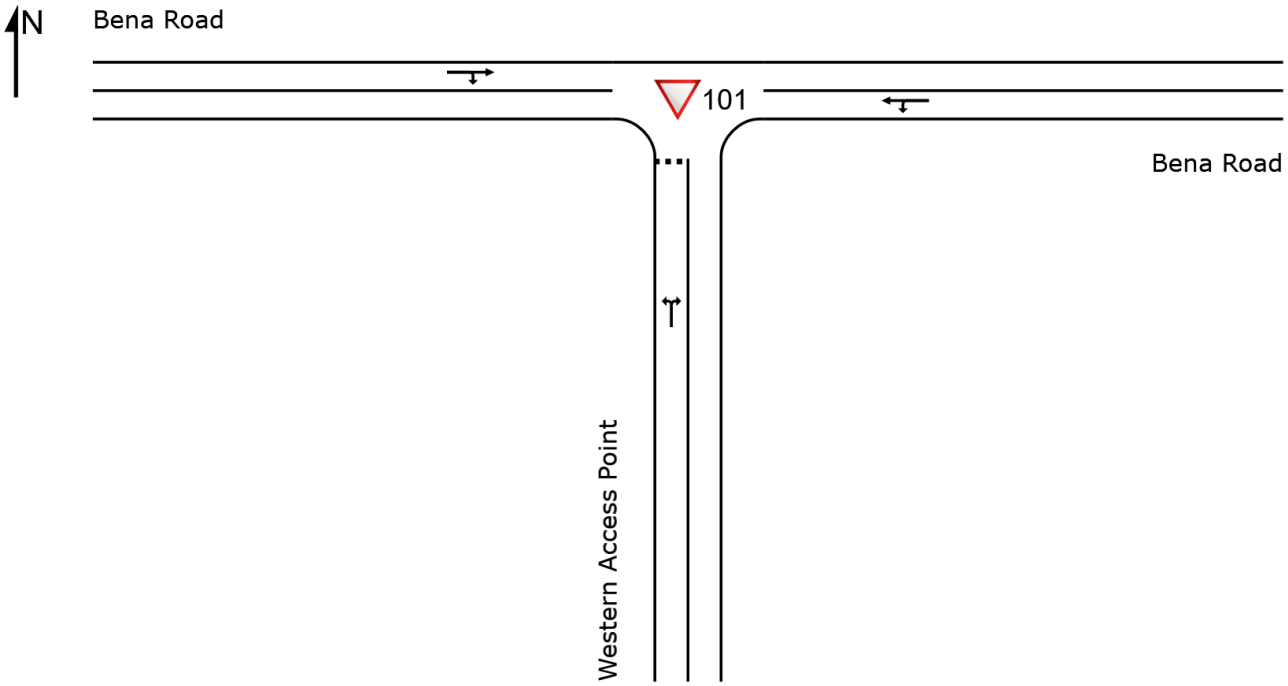
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

SITE LAYOUT

Site: 101 [Bena Road/ Western Access Point - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



LANE SUMMARY

Site: 101 [Bena Road/ Western Access Point - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Western Access Point													
Lane 1	14	2.0	1314	0.011	100	5.5	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	14	2.0		0.011		5.5	LOS A	0.0	0.2				
East: Bena Road													
Lane 1	13	2.0	1858	0.007	100	2.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	13	2.0		0.007		2.1	NA	0.0	0.0				
West: Bena Road													
Lane 1	10	2.0	1872	0.005	100	0.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	10	2.0		0.005		0.6	NA	0.0	0.0				
Intersection	37	2.0		0.011		3.0	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Bena Road/ Western Access Point - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
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: Western Access Point														
1	L2	3	2.0	3	2.0	0.011	5.6	LOS A	0.0	0.2	0.05	0.57	0.05	53.4
3	R2	11	2.0	11	2.0	0.011	5.5	LOS A	0.0	0.2	0.05	0.57	0.05	52.9
Approach		14	2.0	14	2.0	0.011	5.5	LOS A	0.0	0.2	0.05	0.57	0.05	53.0
East: Bena Road														
4	L2	5	2.0	5	2.0	0.007	5.6	LOS A	0.0	0.0	0.00	0.23	0.00	56.3
5	T1	8	2.0	8	2.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.23	0.00	58.0
Approach		13	2.0	13	2.0	0.007	2.1	NA	0.0	0.0	0.00	0.23	0.00	57.3
West: Bena Road														
11	T1	9	2.0	9	2.0	0.005	0.0	LOS A	0.0	0.0	0.01	0.06	0.01	59.4
12	R2	1	2.0	1	2.0	0.005	5.5	LOS A	0.0	0.0	0.01	0.06	0.01	57.1
Approach		10	2.0	10	2.0	0.005	0.6	NA	0.0	0.0	0.01	0.06	0.01	59.2
All Vehicles		37	2.0	37	2.0	0.011	3.0	NA	0.0	0.2	0.02	0.31	0.02	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [Bena Road/ Western Access Point - Future PM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Western Access Point													
Lane 1	9	2.0	1306	0.007	100	5.6	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	9	2.0		0.007		5.6	LOS A	0.0	0.2				
East: Bena Road													
Lane 1	23	2.0	1862	0.012	100	1.9	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	23	2.0		0.012		1.9	NA	0.0	0.0				
West: Bena Road													
Lane 1	12	2.0	1838	0.007	100	1.4	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	12	2.0		0.007		1.4	NA	0.0	0.1				
Intersection	44	2.0		0.012		2.5	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Bena Road/ Western Access Point - Future PM Peak (Site Folder: 99 Bena Road, Korumburra)]

New Site
Site Category: (None)
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: Western Access Point														
1	L2	2	2.0	2	2.0	0.007	5.6	LOS A	0.0	0.2	0.07	0.57	0.07	53.4
3	R2	7	2.0	7	2.0	0.007	5.6	LOS A	0.0	0.2	0.07	0.57	0.07	52.8
Approach		9	2.0	9	2.0	0.007	5.6	LOS A	0.0	0.2	0.07	0.57	0.07	52.9
East: Bena Road														
4	L2	8	2.0	8	2.0	0.012	5.6	LOS A	0.0	0.0	0.00	0.21	0.00	56.5
5	T1	15	2.0	15	2.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	58.1
Approach		23	2.0	23	2.0	0.012	1.9	NA	0.0	0.0	0.00	0.21	0.00	57.6
West: Bena Road														
11	T1	9	2.0	9	2.0	0.007	0.0	LOS A	0.0	0.1	0.04	0.15	0.04	58.5
12	R2	3	2.0	3	2.0	0.007	5.5	LOS A	0.0	0.1	0.04	0.15	0.04	56.2
Approach		12	2.0	12	2.0	0.007	1.4	NA	0.0	0.1	0.04	0.15	0.04	57.9
All Vehicles		44	2.0	44	2.0	0.012	2.5	NA	0.0	0.2	0.03	0.26	0.03	56.7

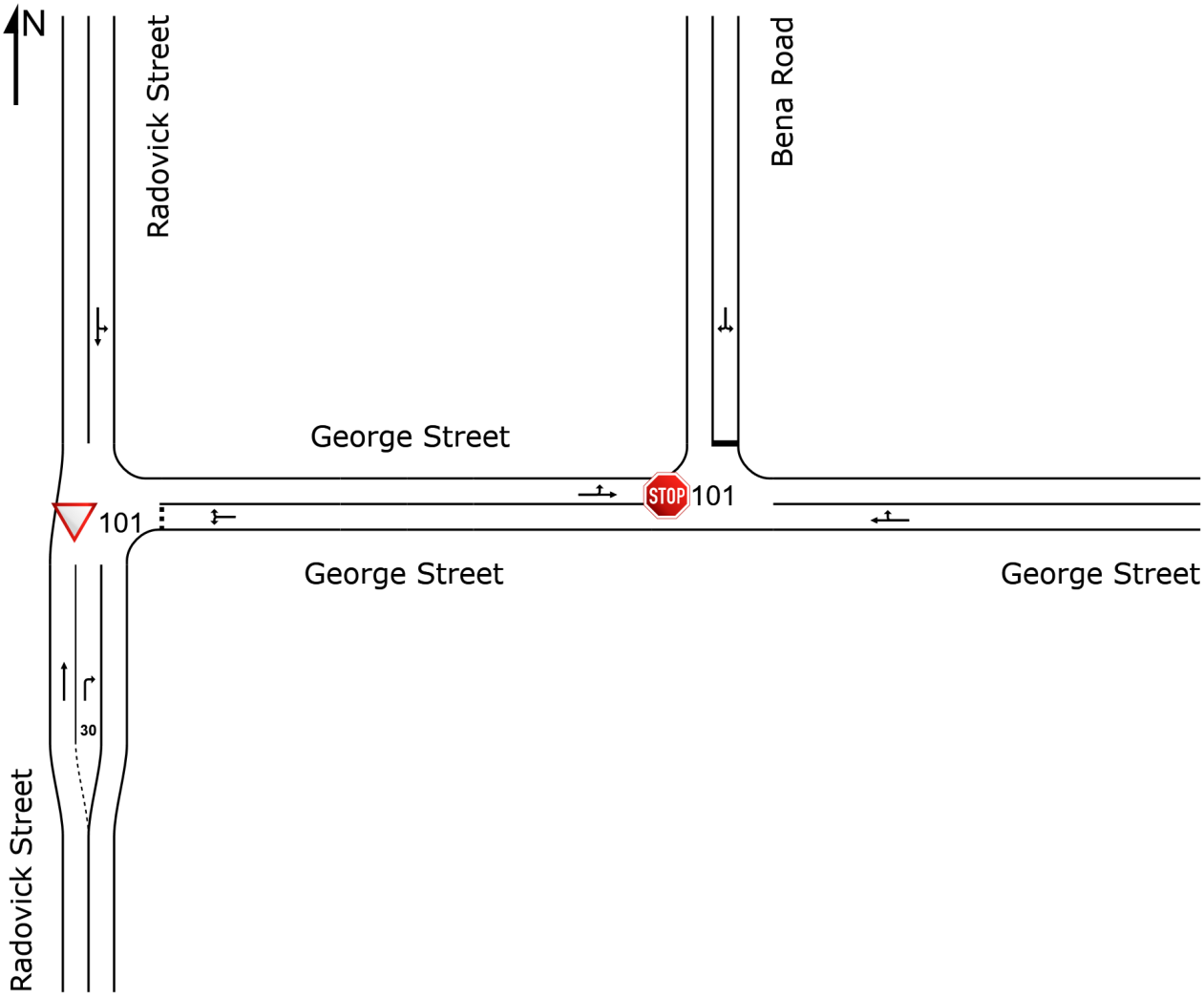
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

NETWORK LAYOUT

Network: 1 [Bena Rd/ George St/ Radovick St - Future AM peak (Network Folder: 99 Bena Road, Korumburra)]

Bena Rd / George St / Radovick St Ex. Intersection
Network Category: (None)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



SITES IN NETWORK		
Site ID	**CCG ID**	**Site Name**
101	NA	Radovick St/ George St - Future AM peak
101	NA	George St/ Bena Rd - Future AM peak

LANE SUMMARY

Site: 101 [George St/ Bena Rd - Future AM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future AM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: George Street															
Lane 1	87	5.0	87	5.0	1809	0.048	100	1.1	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	87	5.0	87	5.0		0.048		1.1	NA	0.1	0.7				
North: Bena Road															
Lane 1	169	5.0	169	5.0	1260	0.134	100	8.2	LOS A	0.4	2.9	Full	500	0.0	0.0
Approach	169	5.0	169	5.0		0.134		8.2	LOS A	0.4	2.9				
West: George Street															
Lane 1	144	5.0	144	5.0	1848	0.078	100	1.0	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	144	5.0	144	5.0		0.078		1.0	NA	0.0	0.0				
Intersection	400	5.0	400	5.0		0.134		4.1	NA	0.4	2.9				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [George St/ Bena Rd - Future AM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future AM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
Stop (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: George Street														
5	T1	73	5.0	73	5.0	0.048	0.1	LOS A	0.1	0.7	0.09	0.10	0.09	57.6
6	R2	14	5.0	14	5.0	0.048	6.0	LOS A	0.1	0.7	0.09	0.10	0.09	56.3
Approach		87	5.0	87	5.0	0.048	1.1	NA	0.1	0.7	0.09	0.10	0.09	57.2
North: Bena Road														
7	L2	34	5.0	34	5.0	0.134	8.5	LOS A	0.4	2.9	0.19	0.93	0.19	51.8
9	R2	135	5.0	135	5.0	0.134	8.1	LOS A	0.4	2.9	0.19	0.93	0.19	48.0
Approach		169	5.0	169	5.0	0.134	8.2	LOS A	0.4	2.9	0.19	0.93	0.19	49.2
West: George Street														
10	L2	59	5.0	59	5.0	0.078	2.5	LOS A	0.0	0.0	0.00	0.22	0.00	54.8
11	T1	85	5.0	85	5.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	58.1
Approach		144	5.0	144	5.0	0.078	1.0	NA	0.0	0.0	0.00	0.22	0.00	56.7
All Vehicles		400	5.0	400	5.0	0.134	4.1	NA	0.4	2.9	0.10	0.49	0.10	53.2

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [Radovick St/ George St - Future AM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future AM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Radovick Street															
Lane 1	306	5.0	306	5.0	1872	0.163	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	73	5.0	73	5.0	1691	0.043	100	6.5	LOS A	0.2	1.6	Short	30	0.0	NA
Approach	379	5.0	379	5.0		0.163		1.3	NA	0.2	1.6				
East: George Street															
Lane 1	209	5.0	209	5.0	1222	0.171	100	3.9	LOS A	0.7	5.2	Full	15	0.0	0.0
Approach	209	5.0	209	5.0		0.171		3.9	LOS A	0.7	5.2				
North: Radovick Street															
Lane 1	355	5.0	355	5.0	1869	0.190	100	1.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	355	5.0	355	5.0		0.190		1.2	NA	0.0	0.0				
Intersection	943	5.0	943	5.0		0.190		1.8	NA	0.7	5.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Radovick St/ George St - Future AM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future AM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
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: Radovick Street														
2	T1	306	5.0	306	5.0	0.163	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	73	5.0	73	5.0	0.043	6.5	LOS A	0.2	1.6	0.44	0.60	0.44	48.8
Approach		379	5.0	379	5.0	0.163	1.3	NA	0.2	1.6	0.08	0.11	0.08	58.5
East: George Street														
4	L2	149	5.0	149	5.0	0.171	3.3	LOS A	0.7	5.2	0.40	0.60	0.40	50.6
6	R2	60	5.0	60	5.0	0.171	5.3	LOS A	0.7	5.2	0.40	0.60	0.40	49.7
Approach		209	5.0	209	5.0	0.171	3.9	LOS A	0.7	5.2	0.40	0.60	0.40	50.4
North: Radovick Street														
7	L2	71	5.0	71	5.0	0.190	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	57.8
8	T1	284	5.0	284	5.0	0.190	0.1	LOS A	0.0	0.0	0.00	0.12	0.00	58.8
Approach		355	5.0	355	5.0	0.190	1.2	NA	0.0	0.0	0.00	0.12	0.00	58.7
All Vehicles		943	5.0	943	5.0	0.190	1.8	NA	0.7	5.2	0.12	0.22	0.12	57.3

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [George St/ Bena Rd - Future PM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future PM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: George Street															
Lane 1	120	5.0	120	5.0	1752	0.068	100	1.6	LOS A	0.2	1.4	Full	500	0.0	0.0
Approach	120	5.0	120	5.0		0.068		1.6	NA	0.2	1.4				
North: Bena Road															
Lane 1	120	5.0	120	5.0	1241	0.097	100	8.3	LOS A	0.3	2.1	Full	500	0.0	0.0
Approach	120	5.0	120	5.0		0.097		8.3	LOS A	0.3	2.1				
West: George Street															
Lane 1	195	5.0	195	5.0	1830	0.107	100	1.5	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	195	5.0	195	5.0		0.107		1.5	NA	0.0	0.0				
Intersection	435	5.0	435	5.0		0.107		3.4	NA	0.3	2.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [George St/ Bena Rd - Future PM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future PM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
Stop (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: George Street														
5	T1	92	5.0	92	5.0	0.068	0.2	LOS A	0.2	1.4	0.16	0.14	0.16	56.4
6	R2	28	5.0	28	5.0	0.068	6.2	LOS A	0.2	1.4	0.16	0.14	0.16	55.7
Approach		120	5.0	120	5.0	0.068	1.6	NA	0.2	1.4	0.16	0.14	0.16	56.2
North: Bena Road														
7	L2	30	5.0	30	5.0	0.097	8.5	LOS A	0.3	2.1	0.19	0.93	0.19	51.7
9	R2	90	5.0	90	5.0	0.097	8.3	LOS A	0.3	2.1	0.19	0.93	0.19	47.9
Approach		120	5.0	120	5.0	0.097	8.3	LOS A	0.3	2.1	0.19	0.93	0.19	49.3
West: George Street														
10	L2	117	5.0	117	5.0	0.107	2.5	LOS A	0.0	0.0	0.00	0.32	0.00	54.1
11	T1	78	5.0	78	5.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.32	0.00	57.3
Approach		195	5.0	195	5.0	0.107	1.5	NA	0.0	0.0	0.00	0.32	0.00	55.3
All Vehicles		435	5.0	435	5.0	0.107	3.4	NA	0.3	2.1	0.10	0.44	0.10	53.6

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 101 [Radovick St/ George St - Future PM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future PM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
Give-Way (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Radovick Street															
Lane 1	217	5.0	217	5.0	1876	0.116	100	0.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	113	5.0	113	5.0	1768	0.064	100	6.4	LOS A	0.3	2.4	Short	30	0.0	NA
Approach	330	5.0	330	5.0		0.116		2.2	NA	0.3	2.4				
East: George Street															
Lane 1	182	5.0	182	5.0	1201	0.152	100	3.7	LOS A	0.6	4.4	Full	15	0.0	0.0
Approach	182	5.0	182	5.0		0.152		3.7	LOS A	0.6	4.4				
North: Radovick Street															
Lane 1	312	5.0	312	5.0	1863	0.168	100	1.5	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	312	5.0	312	5.0		0.168		1.5	NA	0.0	0.0				
Intersection	824	5.0	824	5.0		0.168		2.3	NA	0.6	4.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 101 [Radovick St/ George St - Future PM peak (Site Folder: 99 Bena Road, Korumburra)]

Network: 1 [Bena Rd/ George St/ Radovick St - Future PM peak (Network Folder: 99 Bena Road, Korumburra)]

Future
Site Category: (None)
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: Radovick Street														
2	T1	217	5.0	217	5.0	0.116	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
3	R2	113	5.0	113	5.0	0.064	6.4	LOS A	0.3	2.4	0.41	0.59	0.41	48.9
Approach		330	5.0	330	5.0	0.116	2.2	NA	0.3	2.4	0.14	0.20	0.14	57.3
East: George Street														
4	L2	108	5.0	108	5.0	0.152	3.1	LOS A	0.6	4.4	0.36	0.58	0.36	50.8
6	R2	74	5.0	74	5.0	0.152	4.7	LOS A	0.6	4.4	0.36	0.58	0.36	49.9
Approach		182	5.0	182	5.0	0.152	3.7	LOS A	0.6	4.4	0.36	0.58	0.36	50.4
North: Radovick Street														
7	L2	82	5.0	82	5.0	0.168	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	57.2
8	T1	230	5.0	230	5.0	0.168	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
Approach		312	5.0	312	5.0	0.168	1.5	NA	0.0	0.0	0.00	0.16	0.00	58.3
All Vehicles		824	5.0	824	5.0	0.168	2.3	NA	0.6	4.4	0.14	0.27	0.14	56.6

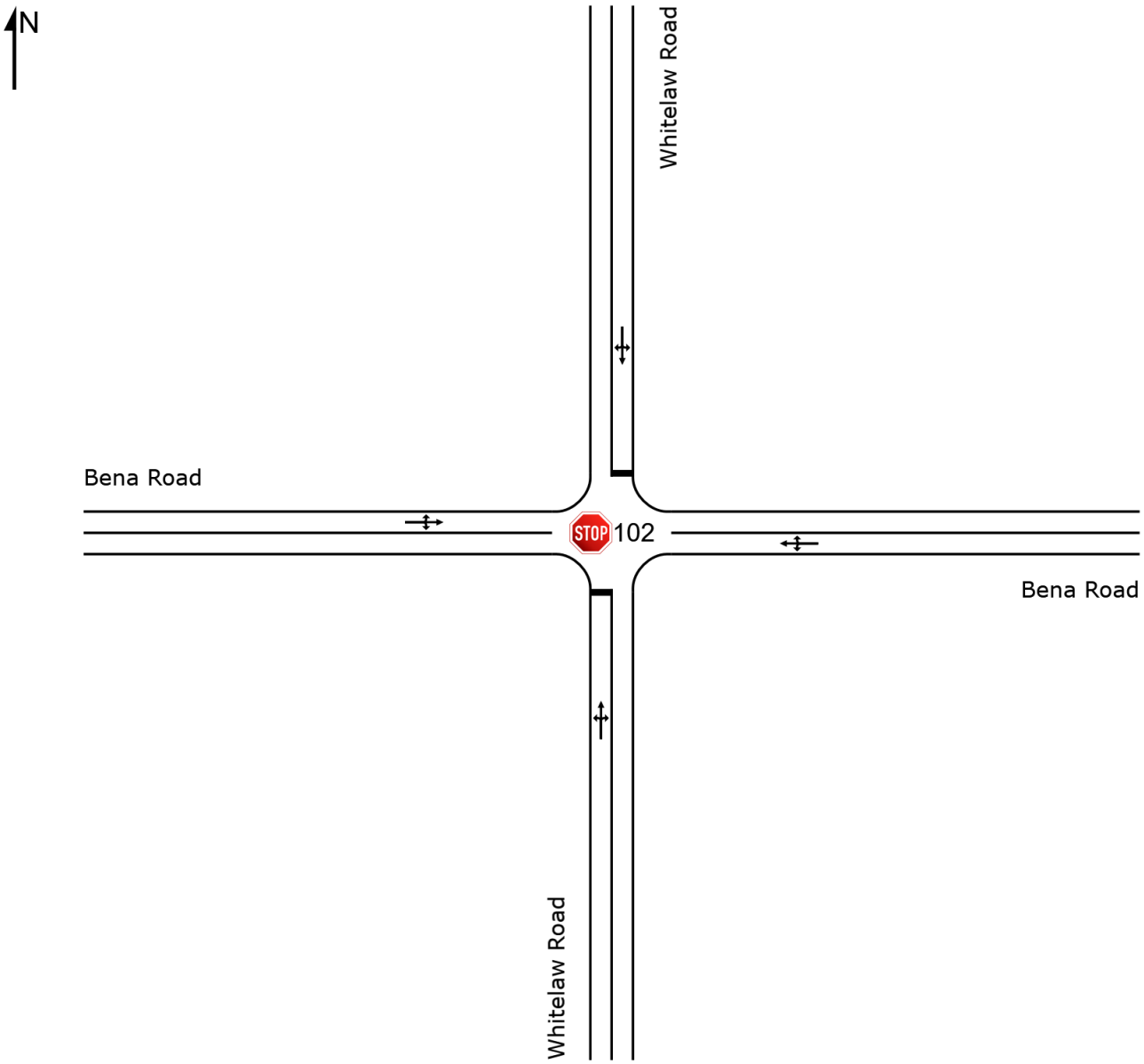
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

SITE LAYOUT

Site: 102 [Bena Rd/ Whitelaw Rd - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



LANE SUMMARY

Site: 102 [Bena Rd/ Whitelaw Rd - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Whitelaw Road													
Lane 1	4	0.0	1239	0.003	100	9.3	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0		0.003		9.3	LOS A	0.0	0.1				
East: Bena Road													
Lane 1	8	0.0	1804	0.004	100	4.8	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	8	0.0		0.004		4.8	NA	0.0	0.1				
North: Whitelaw Road													
Lane 1	6	0.0	1221	0.005	100	9.3	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	6	0.0		0.005		9.3	LOS A	0.0	0.1				
West: Bena Road													
Lane 1	7	0.0	1835	0.004	100	2.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	7	0.0		0.004		2.2	NA	0.0	0.0				
Intersection	25	0.0		0.005		5.9	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 102 [Bena Rd/ Whitelaw Rd - Future AM Peak (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (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: Whitelaw Road														
1	L2	2	0.0	2	0.0	0.003	9.5	LOS A	0.0	0.1	0.02	1.00	0.02	73.2
2	T1	1	0.0	1	0.0	0.003	9.1	LOS A	0.0	0.1	0.02	1.00	0.02	72.8
3	R2	1	0.0	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.02	1.00	0.02	72.5
Approach		4	0.0	4	0.0	0.003	9.3	LOS A	0.0	0.1	0.02	1.00	0.02	72.9
East: Bena Road														
4	L2	2	0.0	2	0.0	0.004	7.8	LOS A	0.0	0.1	0.03	0.43	0.03	80.1
5	T1	3	0.0	3	0.0	0.004	0.0	LOS A	0.0	0.1	0.03	0.43	0.03	88.1
6	R2	3	0.0	3	0.0	0.004	7.6	LOS A	0.0	0.1	0.03	0.43	0.03	79.3
Approach		8	0.0	8	0.0	0.004	4.8	NA	0.0	0.1	0.03	0.43	0.03	82.6
North: Whitelaw Road														
7	L2	3	0.0	3	0.0	0.005	9.5	LOS A	0.0	0.1	0.04	0.98	0.04	73.2
8	T1	1	0.0	1	0.0	0.005	9.1	LOS A	0.0	0.1	0.04	0.98	0.04	72.9
9	R2	2	0.0	2	0.0	0.005	8.9	LOS A	0.0	0.1	0.04	0.98	0.04	72.6
Approach		6	0.0	6	0.0	0.005	9.3	LOS A	0.0	0.1	0.04	0.98	0.04	72.9
West: Bena Road														
10	L2	1	0.0	1	0.0	0.004	7.8	LOS A	0.0	0.0	0.01	0.20	0.01	85.0
11	T1	5	0.0	5	0.0	0.004	0.0	LOS A	0.0	0.0	0.01	0.20	0.01	94.2
12	R2	1	0.0	1	0.0	0.004	7.6	LOS A	0.0	0.0	0.01	0.20	0.01	84.2
Approach		7	0.0	7	0.0	0.004	2.2	NA	0.0	0.0	0.01	0.20	0.01	91.2
All Vehicles		25	0.0	25	0.0	0.005	5.9	NA	0.0	0.1	0.03	0.59	0.03	80.4

Site Level of Service (LOS) Method: Delay (SIDRA). 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.

LANE SUMMARY

Site: 102 [Bena Rd/ Whitelaw Rd - Future PM Peak (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (Two-Way)

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Whitelaw Road													
Lane 1	4	0.0	1124	0.004	100	9.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0		0.004		9.2	LOS A	0.0	0.1				
East: Bena Road													
Lane 1	16	0.0	1830	0.009	100	2.4	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	16	0.0		0.009		2.4	NA	0.0	0.1				
North: Whitelaw Road													
Lane 1	5	0.0	1176	0.004	100	9.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	5	0.0		0.004		9.2	LOS A	0.0	0.1				
West: Bena Road													
Lane 1	13	0.0	1811	0.007	100	4.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	13	0.0		0.007		4.2	NA	0.0	0.1				
Intersection	38	0.0		0.009		4.6	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Minor Road Approach LOS values are based on average delay for all lanes.
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 lanes.
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: 102 [Bena Rd/ Whitelaw Rd - Future PM Peak (Site Folder: 99 Bena Road, Korumburra)]

Existing Site
Site Category: (None)
Stop (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: Whitelaw Road														
1	L2	1	0.0	1	0.0	0.004	9.6	LOS A	0.0	0.1	0.07	0.96	0.07	73.4
2	T1	1	0.0	1	0.0	0.004	9.1	LOS A	0.0	0.1	0.07	0.96	0.07	73.1
3	R2	2	0.0	2	0.0	0.004	9.0	LOS A	0.0	0.1	0.07	0.96	0.07	72.8
Approach		4	0.0	4	0.0	0.004	9.2	LOS A	0.0	0.1	0.07	0.96	0.07	73.0
East: Bena Road														
4	L2	2	0.0	2	0.0	0.009	7.9	LOS A	0.0	0.1	0.02	0.22	0.02	84.5
5	T1	11	0.0	11	0.0	0.009	0.0	LOS A	0.0	0.1	0.02	0.22	0.02	93.6
6	R2	3	0.0	3	0.0	0.009	7.6	LOS A	0.0	0.1	0.02	0.22	0.02	83.7
Approach		16	0.0	16	0.0	0.009	2.4	NA	0.0	0.1	0.02	0.22	0.02	90.4
North: Whitelaw Road														
7	L2	2	0.0	2	0.0	0.004	9.5	LOS A	0.0	0.1	0.04	0.98	0.04	73.3
8	T1	1	0.0	1	0.0	0.004	9.1	LOS A	0.0	0.1	0.04	0.98	0.04	72.9
9	R2	2	0.0	2	0.0	0.004	9.0	LOS A	0.0	0.1	0.04	0.98	0.04	72.6
Approach		5	0.0	5	0.0	0.004	9.2	LOS A	0.0	0.1	0.04	0.98	0.04	72.9
West: Bena Road														
10	L2	4	0.0	4	0.0	0.007	7.9	LOS A	0.0	0.1	0.03	0.36	0.03	81.2
11	T1	6	0.0	6	0.0	0.007	0.0	LOS A	0.0	0.1	0.03	0.36	0.03	89.4
12	R2	3	0.0	3	0.0	0.007	7.6	LOS A	0.0	0.1	0.03	0.36	0.03	80.4
Approach		13	0.0	13	0.0	0.007	4.2	NA	0.0	0.1	0.03	0.36	0.03	84.6
All Vehicles		38	0.0	38	0.0	0.009	4.6	NA	0.0	0.1	0.03	0.45	0.03	83.7

Site Level of Service (LOS) Method: Delay (SIDRA). 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.