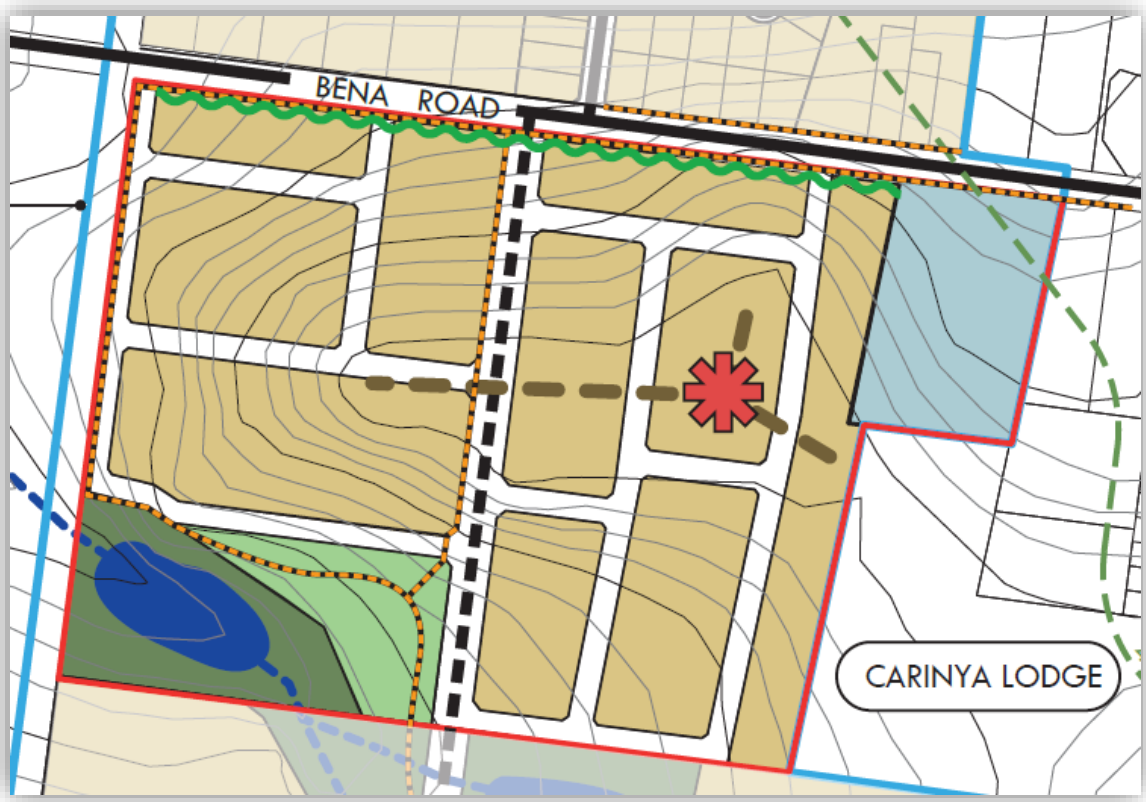
Traffic Impact Assessment Report

Proposed Residential Development

99 Bena Road, Korumburra



Hill Rise View Pty Ltd

April 2024

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_Rev C.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		
B	06/02/24	Michael Marsicovetere	Tony Dinh	Michael Marsicovetere
Description:		Development plan updated to respond to Council's comments.		
B	04/04/24	Michael Marsicovetere	Tony Dinh	Michael Marsicovetere
Description:		Development plan updated to respond to Council's letter response to the VCAT order 29/2/24 dated 8 March 2024.		

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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) in support of a planning permit application to develop 99 Bena Road, Korumburra (*the site*) into 170 residential lots, a 1.54 hectare superlot, a 0.95 hectare public open space and a 1.49 hectare drainage reserve over seven (7) stages. Access to the site is proposed from Bena Road via two new road intersections.

The 1.54 hectare superlot (Superlot A) is currently designated as an Aged Care/ Retirement Village use (extension of Carinya Lodge) and will be subject to a separate planning permit application.

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 on the adjacent road network.
- Site access and internal road network.
- Path & public transport network.

1.3 References

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

- Department of Transport and Planning, VicPlan and Planning Schemes Online, State Government of Victoria, Accessed January 2024;
- Austroads Guide to Road Design, Austroads Guide to Traffic Management, Australian Standards, and the Department of Transport & Planning (DTP) 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 2022, 16 February 2022 and Public Road Register, 9 October 2019;
- Infrastructure Design Manual V5.40 (IDM), Local Government Infrastructure Design Association, 1 September 2022;
- Draft Subdivision Layout Plan Rev 8, 1 April 2024 and Concept Plan Rev 4, 4 April 2024, 99 Bena Road, Korumburra, Weir & Co., (Appendix B); 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 and 1.1 kilometres south-west of the Korumburra Town Centre. It is bounded by Bena Road to the north (580 metre frontage), existing residential dwellings and Carinya Lodge (aged care and retirement village) to the east, vacant land to the south, and an unmade road to the west.

The site is currently vacant with a total site area of approximately 19.1 hectares. Refer Figure 2.1 for the site location.

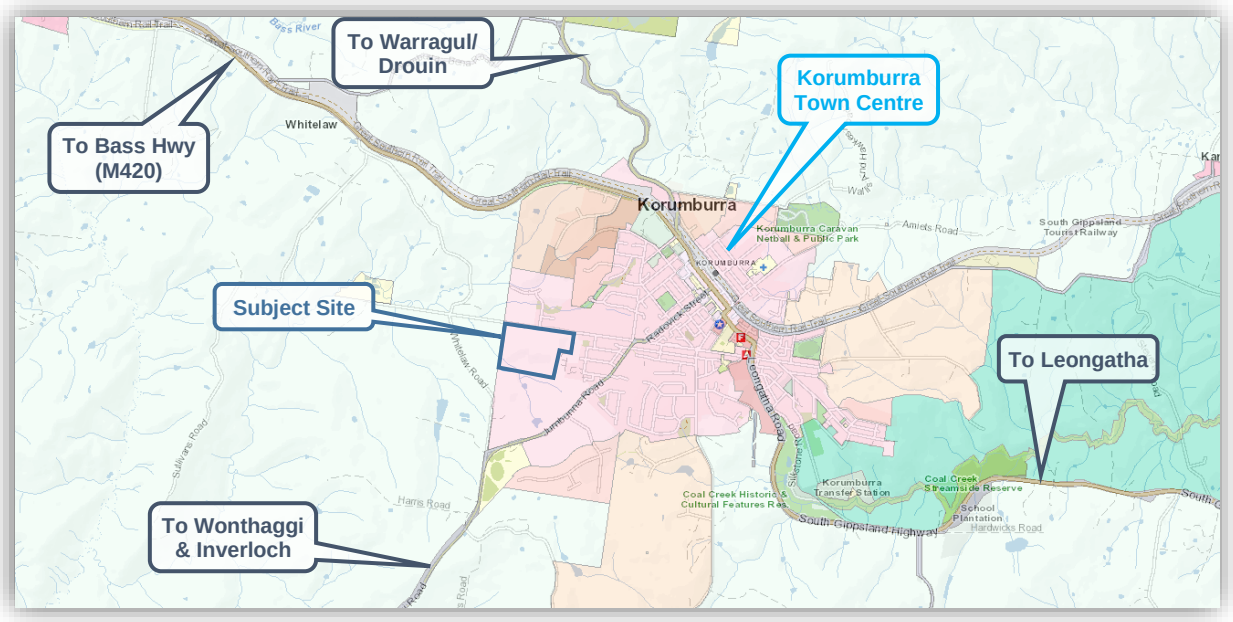


Figure 2.1: Locality Plan[1]

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

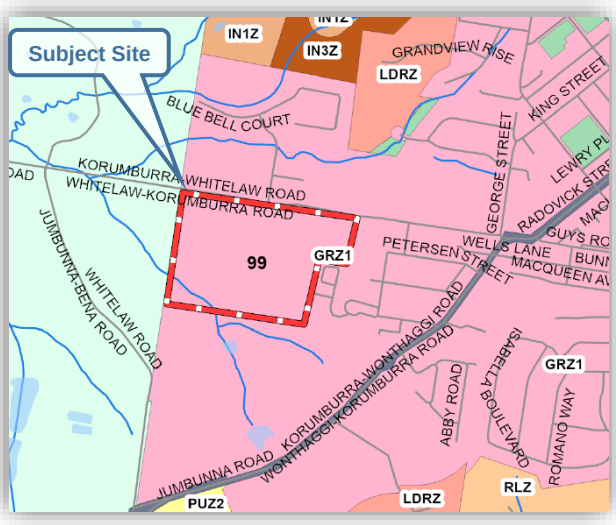


Figure 2.2: Land Use Plan[1]

[1] VicPlan Version 2.3.1, Department of Environment, Land, Water and Planning, State Government of Victoria, February 2024

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 and on Thursday 25 January 2023, between the hours of 1:00pm and 2:30pm. 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" and between CH720 and its end is classified as an "Access Road".

Adjacent to the site, Bena Road has a road reservation approximately 20 metres wide and consists of a varying cross sectional profile as follows:

- Eastern boundary of the site to 50 metres west of Mountain Ash Drive – A 5.5 metre wide carriageway, bounded by kerb & channel, varying width nature strip, and 1.5 metre side footpath on the north side and a 0.6 metre wide gravel shoulder, open drain, and grass verge on the south side.
- Western boundary of the site to 50 metres west of Mountain Ash Drive – A 4.0 metre wide carriageway, bounded by a 0.6 metre wide gravel shoulder, open drain, and grass verge on both sides.

Refer Figure 2.3Figure 2.3 and Figure 2.4Figure 2.4 for the Bena Road cross sectional profile.

The road alignment adjacent to the site is generally straight with a reverse curve located between the site's east boundary and Mountain Ash Drive. The reverse curve is located on a crest and avoids a steep embankment on the south side of the carriageway.

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 to the site's eastern boundary

Figure 2.4: Bena Road, looking east from the site's western boundary towards Mountain Ash Drive

2.2.2 Bena Rd/ George St/ Radovick St (C437)/ Jumbunna Rd (C437) Intersection

The Bena Road/ George Street/ Radovick Street (C437)/ Jumbunna Road (C437) intersection comprises two closely spaced T-intersections. Details as follows:

- Bena Road/ George Street T-intersection – George Street forms the major road leg where-as Bena Road forms the minor road leg controlled by a Stop sign. The George Street approaches

to Bena Road are approximately 7 metres wide allowing a through vehicle to overtake a turning vehicle.

- George Street/ Radovick Street/ Jumbunna Road T-intersection - Radovick Street and Jumbunna Road form the major road legs where-as George Street forms the minor road leg controlled by a Give Way sign. A channelised right-turn lane (CHR) treatment (~55 metre long turn lane including taper[2]) is provided on the Radovick Street approach to George Street, where-as a basic left turn lane treatment (BAL) is provided on Jumbunna Road approach to George Street.

Refer Figure 2.5 and Figure 2.6 for the intersection layout.

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

Figure 2.5: George St/ Radovick St/ Jumbunna Rd Intersection looking south-west towards Jumbunna Rd

Figure 2.6: Bena Rd/ George St Intersection looking east towards Radovick St

2.2.3 Bena Road/ Whitelaw Road Intersection

The Bena Road/ Whitelaw Road intersection is a priority controlled four-leg 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 2.7 for the intersection layout.

Figure 2.7: Bena Road/ Whitelaw Road Intersection, looking south

[2] Measured on an aerial image.

2.3 Existing Road Network Traffic Volumes

2.3.1 2024 Bena Road Traffic Volumes

An automatic traffic volume survey was conducted on Bena Road at No. 5 George Street by Nationwide Traffic Surveys Pty Ltd for the period between Wednesday, 21 February 2024 to Wednesday, 28 February 2024. A summary of the traffic volumes for all vehicles is detailed in Table 2.1. The traffic survey was completed during South Gippsland Water's upgrade of the Korumburra sewer system along Bena Road.

Table 2.1: 2024 Bena Road Traffic Volume Survey Results

	Direction		Combined	Average Speed	85th Percentile Speed
	East	West			
Bena Road					
Weekday Average Daily (Mon-Fri)	431vpd	421vpd	853vpd	38.4km/h	47km/h
Weekday Avg. AM Peak (8:00 to 9:00)	44vph	26vph	70vph		
Weekday Avg. PM Peak (15:00 to 16:00)	37vph	37vph	74vph		

A summary of the 2021 traffic volumes as detailed in Table 2.1follows:

- The weekday average two-way daily traffic volume is 853 vehicles per day (vpd), with 431 vpd (51%) travelling eastbound and 421 vpd (49%) travelling westbound.
- The weekday average two-way AM peak hour traffic volume is 70 vehicles per hour (vph) (8.2% of the daily traffic volume), with 44 vph (63%) travelling eastbound and 26 vph (37%) travelling westbound.
- The weekday average two-way PM peak hour traffic volume is 74 vehicles per hour (8.6% of the daily traffic volume), with 37 vph (50%) travelling eastbound and 37 vph (50%) travelling westbound.
- The combined weekday average speed is 38.4 km/h.
- The combined weekday 85th percentile speed is 47 km/h.

Further to the above, approximately 220 (25.8%) vehicles recorded on Bena Road were commercial vehicles. The high number of commercial vehicles is attributed to the Bena Road sewer upgrade works[3].

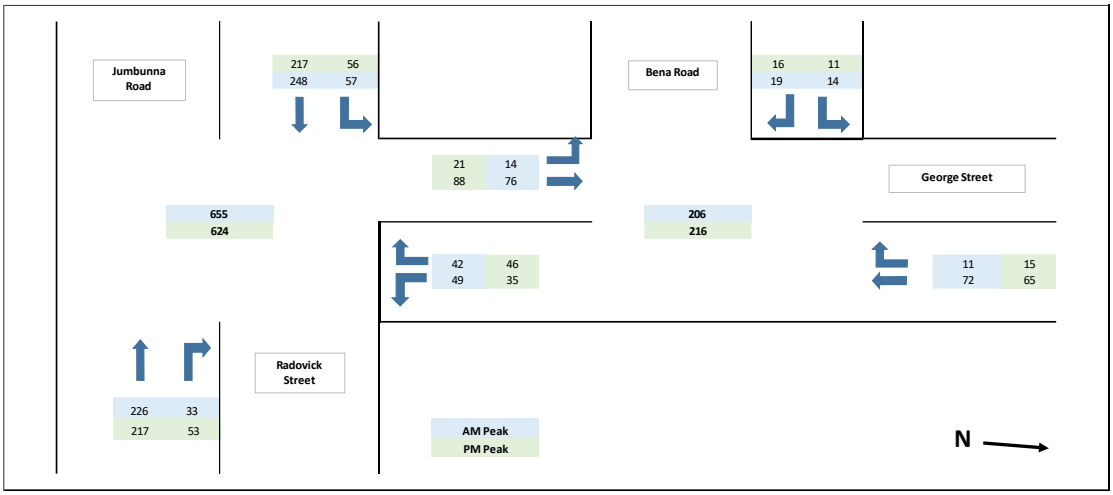
As detailed in Section 2.2.1, Bena Road is classified as an access street and access road. Referring to the IDM and Clause 52.06-8 of the South Gippsland Planning Scheme, an Access Street with a carriageway width up to 7.3 metres wide is designed to carry between 2,500 vpd to 3,000 vpd. Therefore, the recorded traffic volume on Bena Road is well below its expected traffic volume range[4].

2.3.2 Intersection Turning Movement Volume (2024)

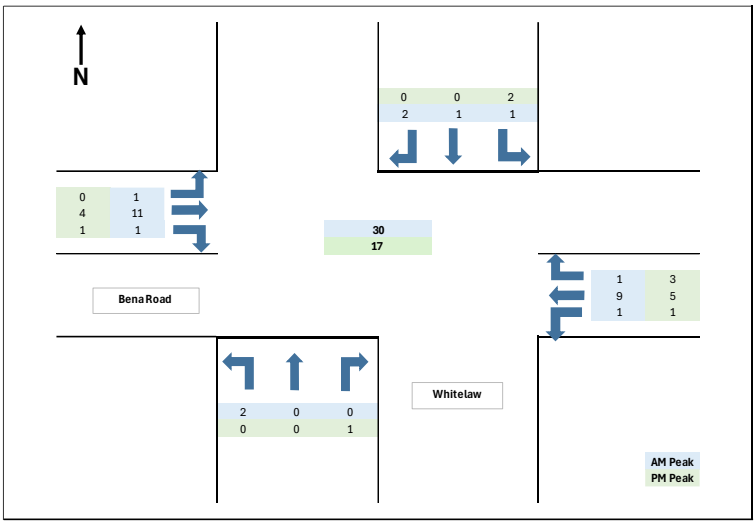
An intersection turning movement volume survey of the Bena Road/ George Street/ Radovick Street (C437)/ Jumbunna Road (C437) intersection and the Bena Road/ Whitelaw Road intersection was conducted by Nationwide Traffic Surveys Pty Ltd on Wednesday, 21 February 2024.

Figure 2.8 provides a summary of the 2024 AM Peak (8-9am) and PM Peak (3:15-4:15pm) intersection turning movement volumes at both intersections.

[3] The 2021 Bena Road traffic volume data provided by Council recorded approximately 7.4% commercial vehicles.
[4] The weekday average daily traffic volume equivalent to 853 vpd, includes all vehicles associated with the Bena Road sewer upgrade works (estimated to be between 150-200 vpd).



Bena Road/ George Street/ Radovick Street/ Jumbunna Road



Bena Road/ Whitelaw Road

Figure 2.8: 2024 AM & PM Peak Hour Intersection Turning Movement Volume

To understand what impact the proposed development traffic will have on the Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection and the Bena Road/ Whitelaw Road Intersection, a check of the operational performance of the existing intersections was undertaken using SIDRA Intersection 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: 2024 SIDRA Summary Results – Bena Rd/ George St/ Radovick St/ Jumbunna Rd Intersection

Period	Bena Rd/ George St			George St/ Radovick St/ Jumbunna Rd		
Approach Leg	**George St (South)**	**George St (North)**	**Bena Rd (West)**	**Radovick St (East)**	**George St (North)**	**Jumbunna Rd (South-West)**
AM Peak						
Degree of Saturation	0.048	0.045	0.024	0.122	0.101	0.165
Average Delay (sec)	0.4	0.8	8.2	5.5	4.6	4.9
Level of Service	-	-	A	-	A	-
95% Queue Distance (m)	0	0.5	0.6	0.7	3.0	0
PM Peak						
Degree of Saturation	0.058	0.044	0.020	0.117	0.096	0.148
Average Delay (sec)	0.5	1.2	8.2	5.6	4.7	4.9
Level of Service	-	-	A	-	A	-
95% Queue Distance (m)	0	0.7	0.5	1.1	2.8	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 0.03, Average Delay less than 9 seconds, and a 95% Queue Distance of less than 1 metre during both the AM and PM peak periods. The George Street approach legs have a Degree of Saturation below 0.06, Average Delay less than 1.5 seconds, 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/ Jumbunna Road Intersection, the George Street approach has a Level of Service A, Degree of Saturation below 0.15, Average Delay less than 5 seconds, and a 95% Queue Distance of less than 3 metres long during both the AM and PM peak periods. The Radovick Street and Jumbunna Road approach legs have a Degree of Saturation below 0.2, Average Delay less than 6 seconds, and a 95% Queue Distance of less than 1.5 metres long during both the AM and PM peak periods.

Table 2.3: 2024 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	0.006	0.004	0.007
Average Delay (sec)	9.3	1.4	9.1	1.2
Level of Service	A	-	A	-
95% Queue Distance (m)	0.1	0	0.1	0
PM Peak				
Degree of Saturation	0.003	0.005	0.003	0.003

Average Delay (sec)	9.2	3.4	9.2	2.6
Level of Service	A	-	A	-
95% Queue Distance (m)	0.1	0.1	0.1	0

As detailed in Table 2.3, the Bena Road approach legs have a Degree of Saturation below 0.01, Average Delay less than 4 seconds, and a 95% Queue Distance of less than 0.5 metres long during both the AM & PM peak periods. 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 0.5 metres 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 are operating well below their expected capacity.

2.4 Casualty Crash Statistics

The casualty crash history of Bena Road, the existing Bena Road / George Street / Radovick Street/ Jumbunna Road intersection and the Bena Road/ Whitelaw Road intersection was sourced from the Victorian Government Open Data website (Data VIC) for the period between 27 November 2018 and 27 November 2023. The database indicates that one casualty crash was recorded on Radovick Street, approximately 65 metres east of George Street. The crash occurred on Thursday, 27 January 2022 at 10:40am (daylight) where a vehicle lost control on a bend and struck an object/ parked vehicle (DCA 183). The accident resulted in an “other injury” accident. The road conditions were wet.

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 520 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 (Yarram to Melbourne) connecting residents to Melbourne and Yarram via Leongatha, Koo Wee Rup and Dandenong. The nearest coach stop is located within 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 3 Bena Road and 45 Bena Road.

A sealed footpath is also provided on the east side of George Street, both sides of Radovick Street, and the west side of Jumbunna Road between George Street and Melville Avenue.

A shared path is provided on the east side of Jumbunna Road between Guy’s Road and Korumburra Secondary College.

Jumbunna Road/ Radovick Street and Guys Road to the east of the site form part of the Principal Bicycle Network (PBN). The Jumbunna Road/ Radovick Street network (Main Route (C2) forms part of the Strategic Cycling Corridor[5]. Both bicycle networks provide a connection to Korumburra Secondary College via Jumbunna Road (shared path), the Korumburra Town Centre via Radovick Street, and local Primary Schools via Guys Road. Refer Figure 2.9 for the existing PBN.

[5] The Strategic Cycling Corridor (SCC) network supports the needs of commuter trips (to work or education). It includes important trips, such as stations, shops, or school trips. The SCC network links up important destinations including destinations of metropolitan and regional significance.

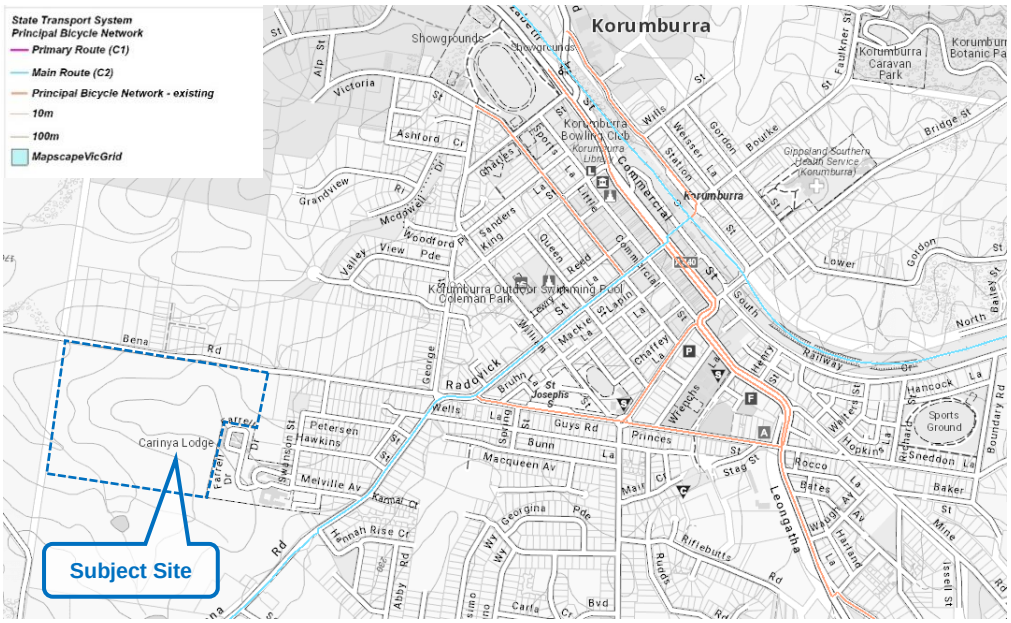


Figure 2.9: Principal Bicycle Network[6]

[6] Department of Transport and Planning, VicPlan, January 2024.

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. DPO6 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.

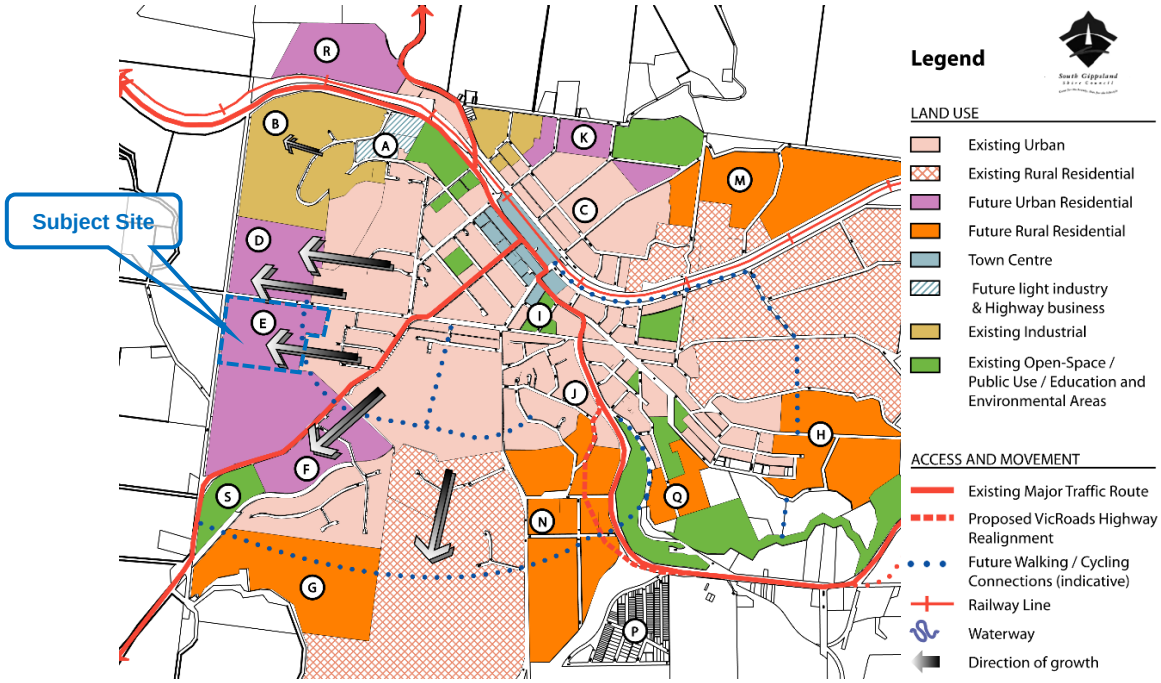


Figure 3.1: Korumburra Local Level Structure Plan

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

4 PROPOSED DEVELOPMENT

The proposed development consists of subdividing the 19.1 hectare site into 170 residential lots, a 1.54 hectare superlot, a 0.95 hectare public open space, and a 1.49 hectare drainage reserve over seven (7) stages. Refer Figure 4.1 and Appendix B for the "Draft Subdivision Layout Plan".

Access to the site is provided from Bena Road via two new unsignalised T-intersections. The first access point (primary) is located approximately 40 metres west of Mountain Ash Drive and connects a north-south aligned connector street (24 metres wide) to Bena Road. The second access point (secondary) is located adjacent to the site's western boundary and connects a north-south aligned Access Street (14 metres wide) to Bena Road.

The north-south aligned connector street ends at the site's southern boundary providing a primary road connection to 46 Jumbunna Road, Korumburra (future southern development site by others). The north-south aligned access street turns 90 degrees to an east-west alignment at the proposed drainage reserve and connects to the connector street to the north-east of the public open space.

An east-west aligned access street (16 metres wide) that runs parallel to the site's southern boundary provides a secondary road connection to the future southern development site.

The remaining internal road network consists of 16.0 metre wide access streets and one 14.0 metre wide access lane.

Access to Superlot A will be provided by a separate access point to/ from Bena Road. As detailed earlier, the development of Superlot A will be subject to a separate planning permit application.

A 2.5 metre wide shared path is proposed on the south side of Bena Road within the landscape buffer, on both sides of the connector street, west side of the western north-south aligned access street, and within the public open space reserve where it will end at the site's southern boundary. The Bena Road shared path connects the existing footpath located at 45 Bena Road to the site's southern boundary via the connector street network.

Stage 2, 5 and 6 of the development will include the construction of the connector street.

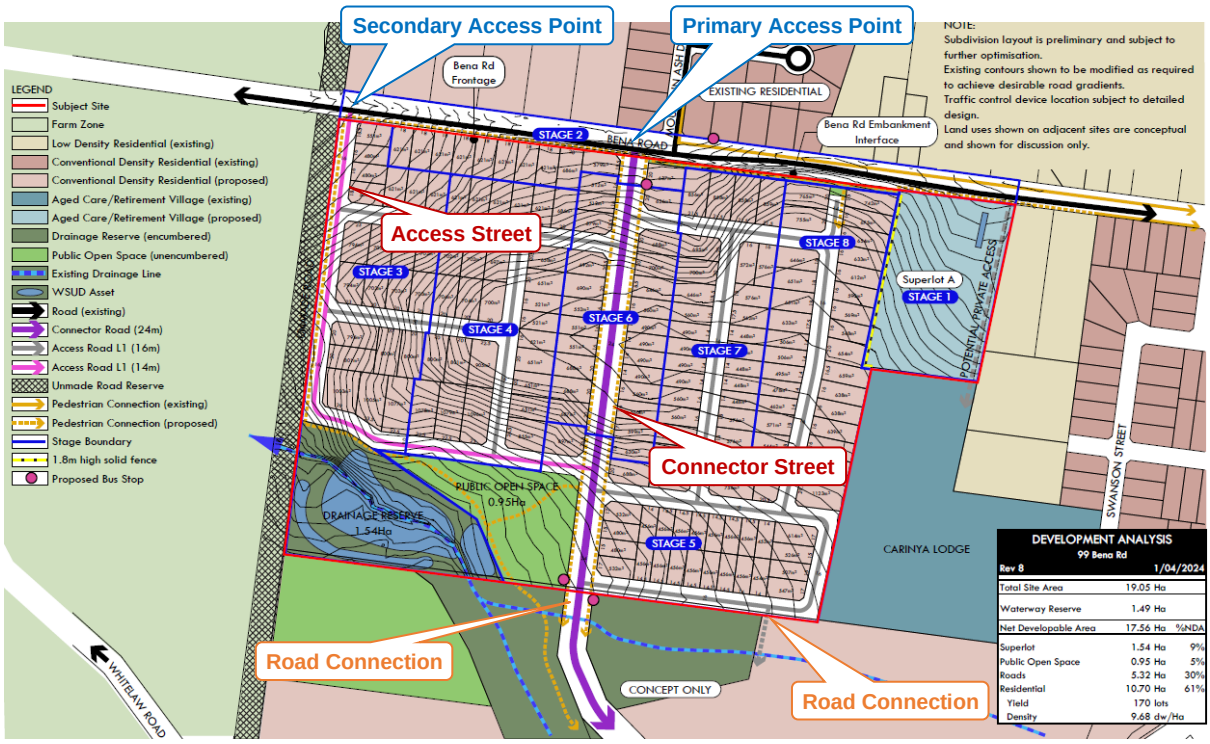


Figure 4.1: Draft Subdivision Layout Plan

5 TRAFFIC IMPACT ASSESSMENT

This section of the report will review what impact traffic generated from the site will have on the existing Bena Road/ George Street/ Radovick Street/ Jumbunna Road and Bena Road/ Whitelaw Road intersections, at the Bena Road primary and secondary access points, and on Bena Road mid-block adjacent to George Street.

5.1 Traffic Generation

5.1.1 99 Bena Road Development Site

Section 12.3.1 of the Infrastructure Design Manual (IDM), states that traffic volumes for undeveloped residential allotments should be based on 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[7], it is estimated that during the AM and PM peak periods a residential allotment will generate approximately 1 vehicle movement per peak hour per lot.

Therefore, for modelling purposes, a traffic generation rate equivalent to 10 vehicle movements per day per lot and 1 vehicle movement per peak hour per lot will be adopted.

Applying the above traffic generation rate to the proposed 170 residential lots within the development site, it is expected that the site will generate approximately 1,700 daily vehicle trips and 170 peak hour vehicle trips when fully developed.

5.1.2 Superlot A

As detailed in Section 1.1, Superlot A is currently designated to be an Aged Care/ Retirement Village use. As instructed by the client it is estimated that approximately 26 dwellings will be developed within the superlot.

The RTA Guide to Traffic Generating Developments, Version 2.2, October 2002 states that housing for “aged and disabled persons” will generate 1 to 2 daily vehicle trips and 0.1 to 0.2 evening peak hour vehicle trips per dwelling.

Therefore, for modelling purposes, a traffic generation rate equivalent to 2 vehicle movements per day per lot and 0.1 and 0.2 vehicle movements per the AM and PM peak hour respectively per lot will be adopted.

Applying the above traffic generation rate to the proposed 26 dwellings within the development site, it is expected that the site will generate approximately 52 daily vehicle trips and three (3) AM and five (5) PM peak hour vehicle trips when fully developed.

5.1.3 Botanica Development Site

The existing Botanica development site which consists of 90 residential dwellings is located directly opposite the site on the north side of Bena Road and is currently under construction. Based on on-site observations, approximately 23 lots within the Botanica development site contain an occupied dwelling. Therefore, the remaining 67 lots are expected to generate approximately 670 daily vehicle trips and 67 peak hour vehicle trips.

5.2 Traffic Distribution

It is expected that most vehicle trips generated by the site will travel east along Bena Road and use the existing George Street/ Radovick Street/ Jumbunna Road intersection. Therefore, the traffic volumes generated from the 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.

[7] Refer Section **Error! Reference source not found.**.

Based on the 2024 existing intersection turning movement count data, the development traffic entering / exiting Bena Road at its intersection with George Street/ Radovick Street/ Jumbunna Road will be distributed from / to the surrounding road network as detailed in Table 5.1.

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 (Jumbunna Rd)	North (George St)	North-East (Radovick St)	South-West (Jumbunna Rd)
From Bena Road	40%	50%	10%	40%	55%	5%
To Bena Road	40%	55%	5%	40%	40%	20%

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 2024 intersection turning movement count volumes, for the existing traffic entering/ exiting Bena Road at its intersection with George Street/ Radovick Street/ Jumbunna Road.

- AM Peak Hour - 40% inbound and 60% outbound; and
- PM Peak Hour - 60% inbound and 40% 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 1.9% per annum.

Therefore, for assessment purposes, an average annual percentage change equivalent to 1.9% will be added to the 2024 through traffic volumes recorded on George Street, Radovick Street, and Jumbunna Road to obtain the future year (2034) through traffic volume. The existing traffic volume on Bena Road and at the Bena Road/ Whitelaw Road intersection will not be grown to the future year as the expected growth in traffic will be attributed to the residential development occurring along the Bena Road precinct.

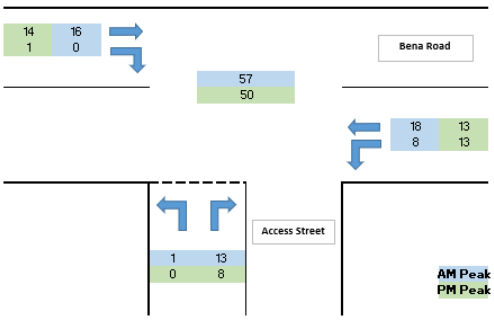
5.4 Intersection Turning Movement Volumes (2034)

To determine the future year (2034) intersection turning movement volumes at the proposed primary and secondary site access points, the existing Bena Road/ George Street/ Radovick Street/ Jumbunna Road intersection, and the existing Bena Road/ Whitelaw Road intersection, a spreadsheet Transport Model was created to assign traffic generated from the site to these 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.

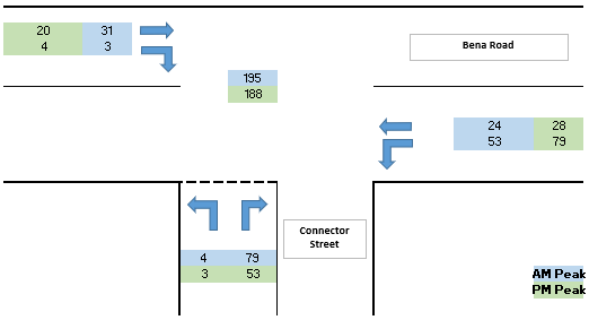
Refer Figure 5.1 for the future year (2034) AM & PM peak hour intersection turning movement volumes at the proposed site access points and existing intersections.

The peak hour traffic volumes include traffic generated by the remaining Botanica Development to the north of the site (67 residential dwellings) and Superlot A which are both expected to be fully developed within the same 10 year forecast period. It also includes 13 residential units from the existing Carinya Lodge retirement village site which utilise the internal road connection through Superlot A.

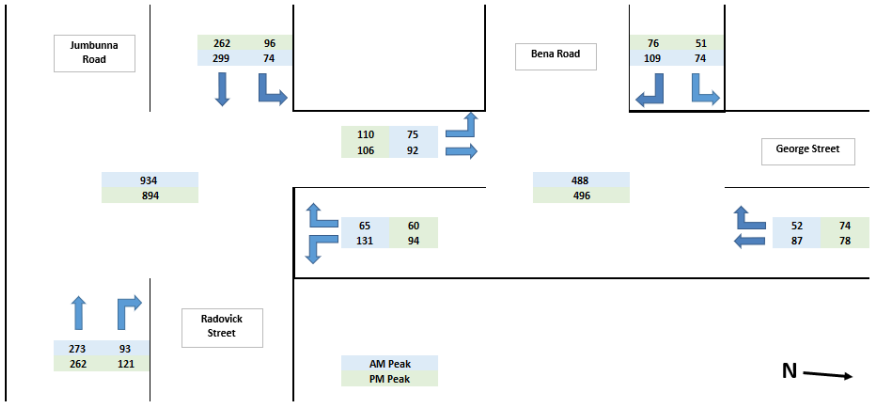
To ensure the traffic volumes on Bena Road do not exceed its expected traffic volume range of 2,500 vpd to 3,000 vehicles per day, refer Section 5.7, development of the southern site will need to commence from the south with access provided from Jumbunna Road.



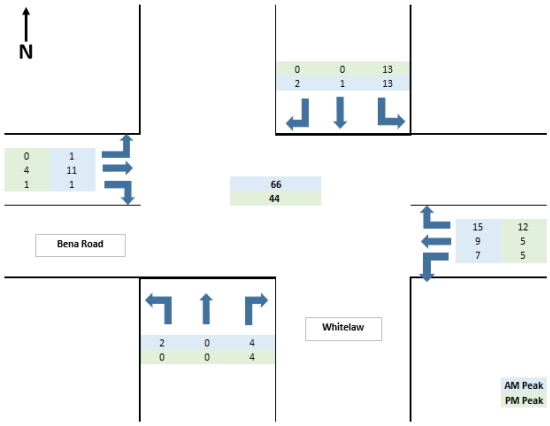
Secondary Access Point



Primary Access Point



Bena Road / George Street / Radovick Street/ Jumbunna Road



Bena Road / Whitelaw Road

Figure 5.1: Future Year 2034 AM & PM Peak Hour Intersection Turning Movement Volumes

5.5 Intersection Performance Assessment

SIDRA Intersection was used to analyse the operational performance of the proposed primary and secondary 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 2034 AM & PM peak hour turning movement volumes as illustrated in Figure 5.1. 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 to Table 5.5. Full results can be found in Appendix C.

Table 5.2: SIDRA Summary Results – Proposed Primary Access Point intersection with future year 2034 traffic volumes

Approach Leg	Connector Street (South)	Bena Road (East)	Bena Road (West)
AM Peak			
Degree of Saturation	0.069	0.042	0.018
Average Delay (sec)	5.8	3.8	0.5
Level of Service	A	-	-
95% Queue Distance (m)	1.6	0	0.1
PM Peak			
Degree of Saturation	0.047	0.059	0.013
Average Delay (sec)	5.8	4.1	1.0
Level of Service	A	-	-
95% Queue Distance (m)	1.1	0	0.2

As detailed in Table 5.2, the Connector Street approach has a Level of Service A, Degree of Saturation less than 0.1, 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 0.1, Average Delay less than 5 seconds, and a 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.

Table 5.3: SIDRA Summary Results – Proposed Secondary Access Point intersection with future year 2034 traffic volumes

Approach Leg	Access Street (South)	Bena Road (East)	Bena Road (West)
AM Peak			
Degree of Saturation	0.011	0.014	0.009
Average Delay (sec)	5.6	1.7	0.3
Level of Service	A	-	-
95% Queue Distance (m)	0.3	0	0
PM Peak			
Degree of Saturation	0.007	0.014	0.008
Average Delay (sec)	5.6	2.8	0.4
Level of Service	A	-	-
95% Queue Distance (m)	0.2	0	0

As illustrated in Table 5.3, the Access Street approach leg has a Level of Service A, Degree of Saturation less than 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 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.

Table 5.4: SIDRA Summary Results – Existing Bena Rd / George St / Radovick St/ Jumbunna Rd Intersection with future year 2034 traffic volumes

Period	Bena Rd / George St Intersection			George St / Radovick St/ Jumbunna Rd Intersection		
Approach Leg	**George St (South)**	**George St (North)**	**Bena Road (West)**	**Radovick Street (East)**	**George Street (North)**	**Jumbunna Road (South)**
AM Peak						
Degree of Saturation	0.091	0.082	0.142	0.148	0.225	0.202
Average Delay (sec)	1.1	2.5	8.4	5.7	5.4	4.9
Level of Service	-	-	A	-	A	-
95% Queue Distance (m)	0	2.3	3.5	2.1	7.1	0
PM Peak						
Degree of Saturation	0.117	0.094	0.101	0.142	0.186	0.194
Average Delay (sec)	1.3	3.4	8.5	5.8	5.4	5.0
Level of Service	-	-	A	-	A	-
95% Queue Distance (m)	0	3.1	2.4	2.7	5.7	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 0.2, Average Delay less than 9 seconds, and a 95% Queue Distance of less than 4 metres during both the AM and PM Peak periods. The George Street approach legs have a Degree of Saturation below 0.12, Average Delay less than 4 seconds, and 95% Queue Distances less than 4 metres long during both the AM and PM peak periods.

At the George Street/ Radovick Street/ Jumbunna Road Intersection, the George Street approach has a Level of Service A, Degree of Saturation below 0.23, Average Delay equivalent to 6 seconds, and 95% Queues Distances less than 8 metres long during both the AM and PM Peak periods. The Radovick Street and Jumbunna Road approach legs have a Degree of Saturation below 0.21, Average Delay less than 6 seconds, and a 95% Queue Distance of less than 3 metres long during both the AM and PM peak periods.

These results are similar to the existing 2016 results and indicate that the existing intersection will continue to operate well below its expected capacity in the future year once the site is fully developed.

Table 5.5: SIDRA Summary Results – Existing Bena Road/ Whitelaw Road intersection with future year 2034 traffic volumes

Approach Leg	Whitelaw Road (South)	Bena Road (East)	Whitelaw Road (North)	Bena Road (West)
AM Peak				
Degree of Saturation	0.006	0.017	0.012	0.007
Average Delay (sec)	9.2	5.4	9.4	1.2
Level of Service	A	-	A	-
95% Queue Distance (m)	0.2	0.5	0.3	0
PM Peak				
Degree of Saturation	0.006	0.012	0.011	0.003
Average Delay (sec)	9.1	5.9	9.5	2.6
Level of Service	A	-	A	-
95% Queue Distance (m)	0.1	0.4	0.3	0

As detailed in Table 5.5, the Bena Road approach legs have a Degree of Saturation below 0.1, 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 Whitelaw Road approach legs have a Level of Service A, Degree of Saturation below 0.1, 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 are similar to the existing 2016 results and indicate that the existing intersection will continue to operate well below its expected capacity in the future year once the site is fully developed.

The above intersection performance results are in accordance with requirements of the DTP supplement to the Austroads Guide to Traffic Management Part 3, which states that when evaluating intersection performance during capacity analysis and design, the target maximum degree of saturation of the critical (maximum) movement for an unsignalised intersection, is 0.8 (desirable) and 0.85 (maximum). The above results show that the proposed and existing intersections have a degree of saturation well below the 0.8 (desirable) value.

5.6 Turn Warrants Assessment

The Austroads Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings, Section 2.3.6 provides warrants for a Basic Turn Treatment, Auxiliary Lane Turn Treatment, and a Channelised Turn Treatment. The future year (2034) AM and PM peak hour intersection turning movement volumes at the George Street/ Radovick Street/ Jumbunna Road intersection as illustrated in Figure 5.1 have been used to determine what turn treatment is required at the existing intersection to cater for the traffic generated from the development of the site and surrounding areas.

Details of the turning and through movement volumes at the intersection are detailed in Table 5.6.

Table 5.6: Major Road Traffic Volumes for Determining Intersection Turn Treatments (≤70km/h)

Intersection	Peak Period	Major Road Movement (vehicles/hour)				Treatment	
		Right (Q_R)	Through (Q_M)	Left (Q_L)	Through (Q_M)	Right Turn	Left Turn
George Street/ Radovick Street/ Jumbunna Road	AM Peak	93	646	74	299	CHR	AUL(S)
	PM Peak	121	619	96	262	CHR	AUL(S)

Referring to Table 5.6, a channelised right turn treatment (CHR) and Auxiliary Left Turn Lane (Short) (AUL(S)) treatment are required on the Radovick Street and Jumbunna Road approaches to George Street respectively.

Referring to Section 2.2.2, the existing Radovick Street and Jumbunna Road approaches to George Street include a CHR and BAL treatment respectively. Therefore, the Jumbunna Road approach to George Street should be upgraded to include an AUL(S) treatment to cater for the future development traffic and growth in existing traffic volumes.

A turn warrants assessment of the primary and secondary site access points has not been completed due to the recommendation that the Bena Road carriageway fronting the site will be widened to accommodate the development traffic. Refer Section 5.7 for further details.

5.7 Mid-block Assessment

As detailed in Section 2.2.1 and Section 2.3.1, Bena Road is classified as an access street and access road with a capacity between 2,500 vpd to 3,000 vpd.

The development of the subject site, Superlot A, and the remaining lots within the Botanica site will generate approximately 2,448 daily vehicle trips. Considering that 95% of these trips will head east along Bena Road, it is expected that after development, Bena Road adjacent to its intersection with George Street will carry approximately 3,004[8] vehicles per day and Bena Road adjacent to the site will carry approximately 2,581[9] vehicles per day. This volume of traffic is acceptable for an access street.

As Bena Road adjacent to the site has a carriageway width that varies from 4.0 metres (west) to 5.5 metres wide east), it is recommended that the carriageway be widened to achieve an overall width equivalent to 7.3 metres. The upgraded carriageway is to include kerb and channel (south side only) for the length of the site frontage.

5.8 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.*"[10]. Section 3.2.2 of the Austroads Guide Part 4a sets out the SISD requirements of the major road.

A SISD check of the primary and secondary access points in accordance with the Austroads Guide is detailed below. As Superlot A is subject to a separate planning permit application, a SISD check of its proposed access point will not be completed. However, based on site observations, the proposed Superlot A access point location, refer Figure 4.1: Draft Subdivision Layout Plan is acceptable.

It is recommended that all internal road intersections and residential vehicle crossings located on either side of a crest meet the SISD requirements as set out in the Austroads Guide and the AS/NZ Standard Parking Facilities Part 1: Off-street car parking respectively.

[8] The future year 2034 two way daily traffic volume on Bena Road adjacent to George Street is estimated to be 678 vehicles (allows for an estimated 175 vehicles associated the Bena Road sewer upgrade works.

[9] The future year 2034 two-way daily traffic volume on Bena Road adjacent to the site is estimated to be 256 vehicles.

[10] Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections.

5.8.1 Primary Access Point SISD

Based on a posted speed limit equivalent to 60km/h on Bena Road and an approximate average downgrade equivalent to 4.6% for westbound vehicles and an upgrade equivalent to 2.3% for eastbound vehicles, the SISD required to the east and west of the primary access point is 130 metres and 120 metres respectively.

Based on on-site observations, the available site distance to the east and west of the primary access point is approximately 170 metres and 124 metres respectively. Refer Figure 5.2 and Figure 5.3.

Therefore, the available sight distance to the east and west of the primary access point exceeds the Austroads Guide SISD requirement.

Figure 5.2: Available SISD looking east from the Primary Access Point

Figure 5.3: Available SISD looking west from the Primary Access Point

5.8.2 Secondary Access Point SISD

Based on a posted speed limit equivalent to 60km/h on Bena Road and an approximate downgrade equivalent to 8.5% for westbound vehicles and a posted speed limit equivalent to 100km/hr and an approximate upgrade equivalent to 6.6% for eastbound vehicles, the SISD required to the east and west of the proposed secondary access point is 135 metres and 235 metres respectively.

Based on on-site observations, the available sight distance to the east and west of the secondary access point is approximately 160 metres and over 250 metres respectively. Refer Figure 5.4 and Figure 5.5.

Therefore, the available sight distance to the east and west of the Secondary 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 primary and secondary access point intersections.

Figure 5.4: Available SISD looking east from Secondary Access Point

Figure 5.5: Available SISD looking west from the Secondary Access Point

6 STREET NETWORK REVIEW

6.1 Proposed Road Network Layout & Hierarchy

A north-south aligned connector street (24 metres wide) is located centrally within the site. The remaining road network consists of access streets (16 metre wide) and one access lane. As per Table 2 of the IDM, a connector street is designed to carry 2,500-6,000 vehicles per day, an access street is designed to carry up to 2,500 vehicles per day, and an access lane is designed to carry up to 300 vehicles per day.

As detailed in Section 5.1.1, the development of the site is expected to generate approximately 1,700 vehicle movements per day. Considering that 85% of the development traffic will enter an exit the site via the primary access point, it is estimated that approximately 1,445 vehicles per day will use the north-south aligned connector street south of Bena Road. Therefore, the proposed internal road network will adequately cater for the traffic generated by the development and any future development to the south of the site.

Refer Figure 6.1 for the proposed road hierarchy within the development site and Figure 6.2 to Figure 6.4 for the proposed Connector Street, Access Street and Access Lane cross sections. The access lane is expected to carry up to 30 vehicle movements per day.

All cross sections are in accordance with Table 2 of the IDM.

Two future road connection points are provided at the site's southern boundary via the Connector Street and east-west aligned Access Street. Referring to the 99 Bena Road Concept Plan (Appendix B) the north-south aligned connector street is expected to extend south through the southern development site and connect into Jumbunna Road. The location of the Jumbunna Road connection is subject to development of the southern site and approval of the Responsible Authority.

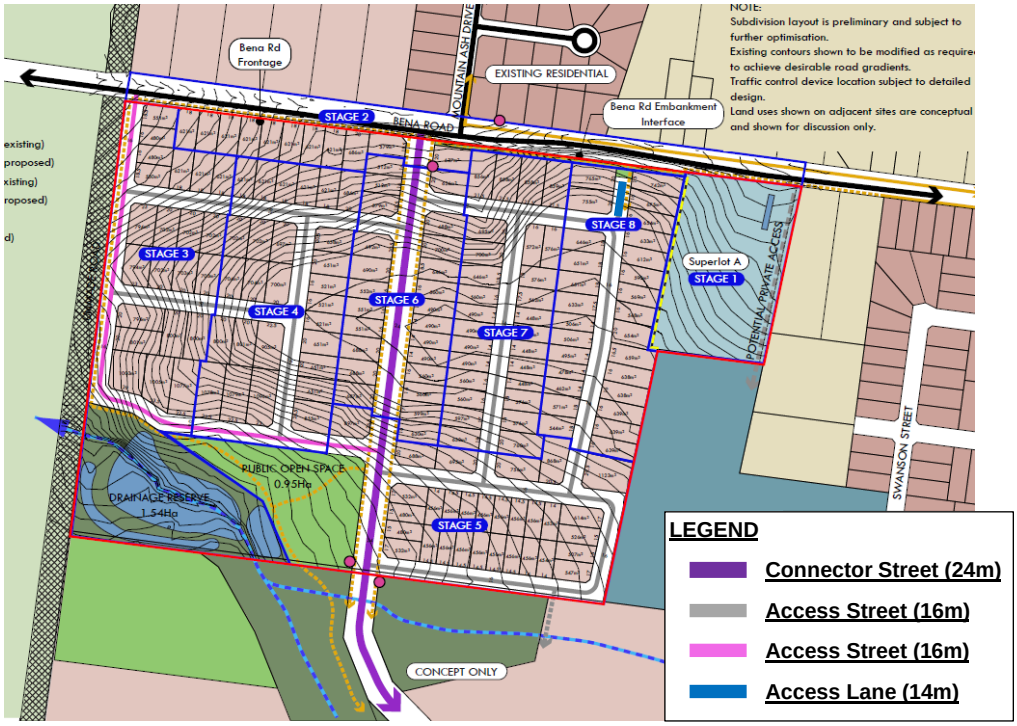


Figure 6.1: Proposed Road Hierarchy

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.

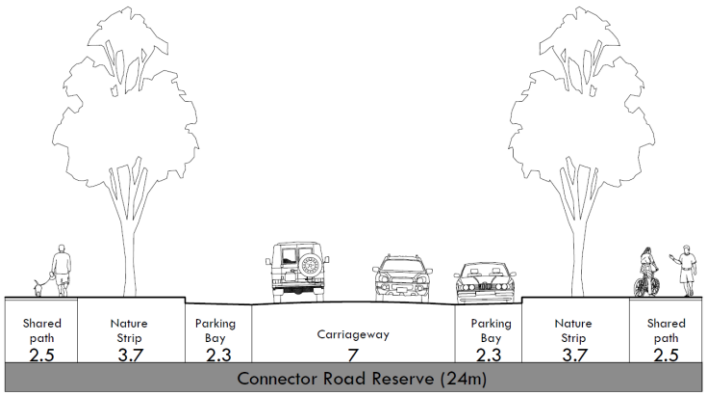


Figure 6.2: Connector Street (24m) Cross Section

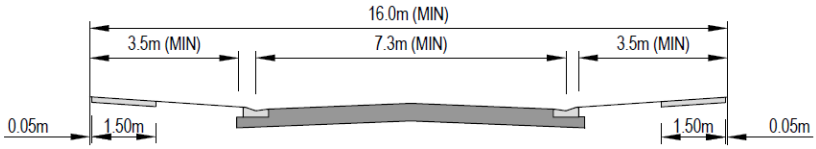


Figure 6.3: Access Street (16m) Cross Section[11]

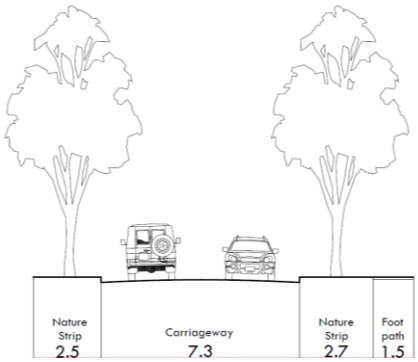


Figure 6.4: Access Lane (14m) Cross Section

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, all access streets have a street block length and width in accordance with the requirements of the planning scheme.

6.3 Path Network

A 2.5 metre wide shared path is proposed on the south side of Bena Road within the landscape buffer, on both sides of the connector street, west side of the western north-south aligned access street, and within the public open space reserve where it will end at the site's southern boundary. The Bena Road shared path connects the existing footpath located at 45 Bena Road to the site's southern boundary via the connector street network.

The 2.5 metre shared path is expected to extend south through the southern development site and connect into Jumbunna Road. At this location the shared path will connect into the existing shared path network located on the south side of Jumbunna Road (Main Route (C2) – Strategic Cycling Corridor) via a road crossing.

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

A 1.5 metre wide footpath will be provided on both sides of the access street network and on the east side of the access lane. The 1.5 metre wide footpath within the access lane will connect to the Bena Road shared path providing residents in this area with convenient access to Bena Road.

Refer Figure 4.1: Draft Subdivision Layout Plan for details of the proposed path network within and adjacent to the site.

To ensure a connected and safe path network, it is recommended that the following existing footpath network upgrades along Bena Road and at the Bena Road/ George Street intersection be completed with the development proposal:

- A mid-block footpath crossing be constructed at:
  - 49 Bena Road and be designed to allow a cyclist traveling on the proposed shared path to enter an exit the Bena Road carriageway safely.
  - Approximately 40 metres west of George Street where the existing southern footpath ends at the road carriageway.
- A pedestrian refuge be constructed on George Street north of Bena Road. Subject to design vehicle turning movement requirements, a kerb outstand should also be constructed on the north-west corner of the Bena Road/ George Street intersection.

Further, all walking and cycling path crossing points of the connector street and adjacent access street network should be detailed during the functional layout plan approval's phase of the development proposal and be designed and constructed to the satisfaction of the Responsible Authority.

The proposed, future and upgraded existing path network provides residents with:

- An accessible, safe, and connected path network that will link residents to the open space reserve, future bus stops and to the town centre, and
- An alternative travel mode to the motor vehicle when travelling to/ from the Korumburra Secondary College, Korumburra Primary School, and town centre.

It also address's the Korumburra Structure Plan requirement for a shared path network through the site connecting Bena Road to Jumbunna Road.

6.4 Public Transport

The proposed widening of Bena Road adjacent to the site and the provision of a connector street within the site and the future southern site connecting Bena Road to Jumbunna Road provides an opportunity for a future loop bus service along Bena Road, the connector street and Jumbunna Road.

Refer to the Concept Plan (Appendix B) for an illustration of the potential locations for future bus stops and the associated 400 metre walkable catchment from the bus route. As can be seen from the Concept Plan all proposed residential dwellings within the development site are located within a 400 metre walk distance of the potential future bus route.

7 CONCLUSION & RECOMMENDATION

Based on the above review, the proposal to develop 99 Bena Road, Korumburra into a residential development site as detailed in Section 4 of this report is adequate from a traffic engineering perspective due to it meeting the requirements of the South Gippsland Planning Scheme. Details on how these requirements have been met follows:

1. The proposal does not have a detrimental impact on the existing road network adjacent to the site, provided the Bena Road carriageway fronting the site is widened to accommodate the development traffic.
2. The development of the subject site and southern development site provides:
    - An alternative road and walking and cycling path network between Bena Road and Jumbunna Road.
    - A safe, secure, attractive, and connected walking and cycling path network that:
        - links residents to the open space reserve, future bus stops and to the town centre including other essential services, and
        - Enable and encourages walking and cycling as an alternative to the motor vehicle.
    - An opportunity for a future loop bus service along Bena Road, the connector street and Jumbunna Road.
    - Future residents an opportunity to be located within a 400 metre walk distance of the potential future bus service.
3. The development of the subject site:
    - Provides a road network layout that facilitates safe and convenient pedestrian movements and controls traffic speeds.
    - Contributes to establishing Korumburra as a “walkable community” with key activities being accessible from the proposed and future residential areas by foot or non-motorised transport.
    - Allows for a development pattern that commences from Bena Road and proceeds south to its southern boundary.
    - Allows for the early delivery and completion of the connector street.
    - Provides an internal road network based on a safe and practical hierarchy of roads including safe pedestrian and bicycle connections.

Further, the provision of this TIAR meets the requirements of the South Gippsland Planning Scheme as it identifies existing and post development traffic generation and 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, site access points, pedestrian and cycle path network, and potential future bus route.

Therefore, if the subject site is delivered in accordance with the Subdivision Layout Plan as illustrated in Figure 4.1 and the following recommendations as detailed in this Traffic Impact Assessment Report, then it is of our opinion that there are no transport and traffic engineering reasons as to why a permit should not be granted by the responsible authority to develop the site as detailed in Section 4 of this report.

Recommendations:

- The Bena Road carriageway adjacent to the site be upgraded to
    - Achieve an overall width equivalent to 7.3 metres.
    - Include kerb and channel (south side only) for the length of the site frontage.
- The Jumbunna Road approach to George Street be upgraded to include an Auxiliary Left Turn Treatment AUL(S) treatment.
- All internal road intersections and residential vehicle crossings located on either side of a crest meet the SISD requirements as set out in the Austroads Guide and the AS/NZ Standard Parking Facilities Part 1: Off-street car parking respectively.

- The primary and secondary access points are constructed as standard T-intersections.
- The proposed connector street, access street and access lanes be designed and constructed in accordance with Table 2 of the IDM and Figure 6.2 to Figure 6.4.
- 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.
- A 2.5 shared path and footpath network be constructed as per the details outlined in Section 6.3 and constructed to the satisfaction of the Responsible Authority.
- The existing footpath network be upgraded along Bena Road and at the Bena Road/ George Street intersection as follows:
    - A mid-block footpath crossing be constructed at:
        - 49 Bena Road and designed to allow a cyclist traveling on the proposed shared path to enter an exit the Bena Road carriageway safely.
        - Approximately 40 metres west of George Street where the existing southern footpath ends at the road carriageway.
    - A pedestrian refuge be constructed on George Street north of Bena Road.
    - Subject to design vehicle turning movement requirements, a kerb outstand be constructed on the north-west corner of the Bena Road/ George Street intersection.
- All walking and cycling path crossing points of the connector street and adjacent access street network be detailed during the functional layout plan approval's phase of the development proposal and be designed and constructed to the satisfaction of the Responsible Authority.

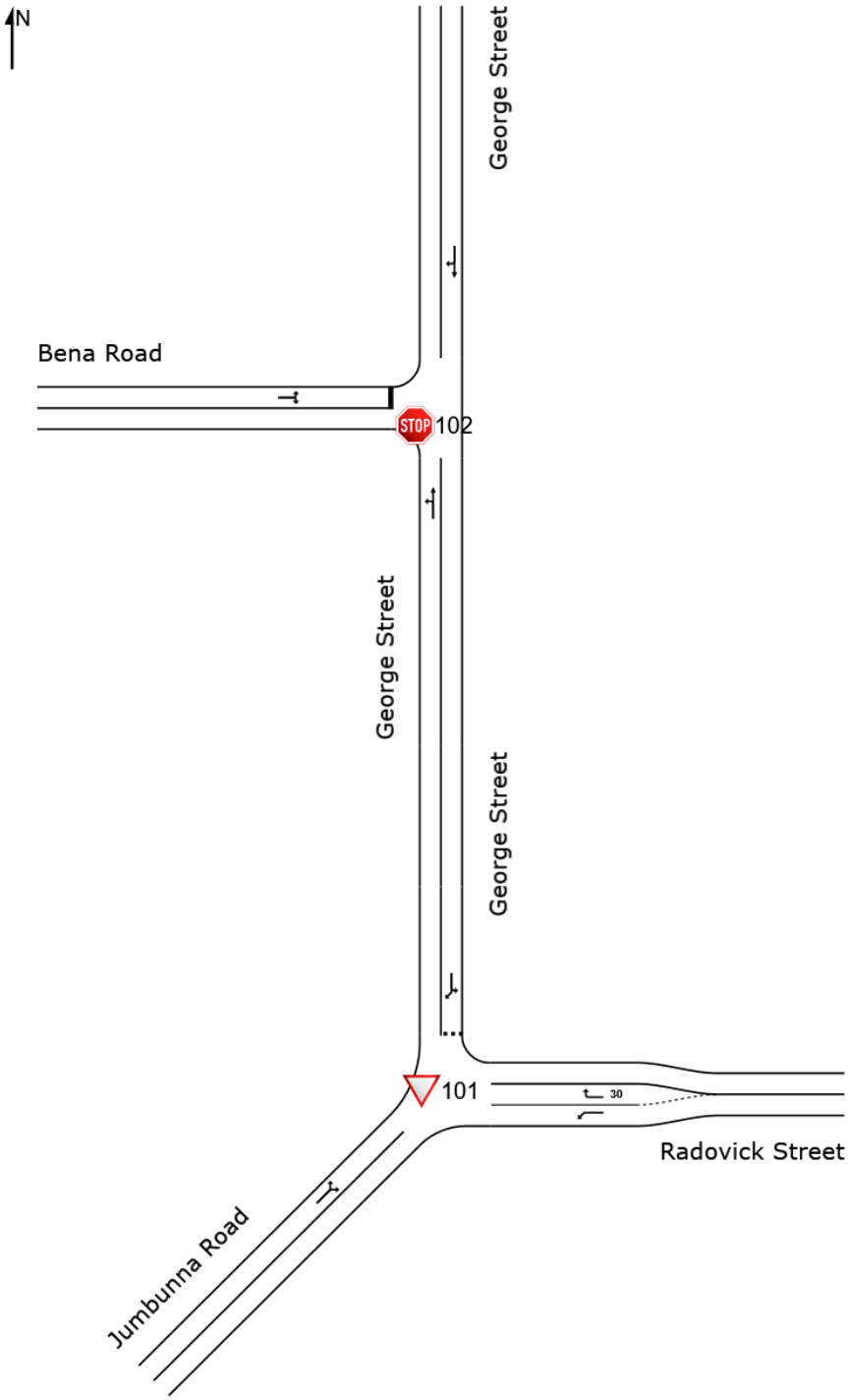
APPENDIX A – EXISTING SIDRA ANALYSIS RESULTS

NETWORK LAYOUT

Network: N102 [Bena Rd/ George St/ Radovick St - Existing AM peak (Network Folder: 99 Bena Road, Korumburra)]

New Network
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 - Existing AM peak
102	NA	George St/ Bena Rd - Existing AM peak

LANE SUMMARY

Site: 102 [George St/ Bena Rd - Existing AM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing 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. %
South: George Street															
Lane 1	90	5.0	90	5.0	1873	0.048	100	0.4	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	90	5.0	90	5.0		0.048		0.4	NA	0.0	0.0				
North: George Street															
Lane 1	83	5.0	83	5.0	1837	0.045	100	0.8	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	83	5.0	83	5.0		0.045		0.8	NA	0.1	0.5				
West: Bena Road															
Lane 1	33	5.0	33	5.0	1367	0.024	100	8.2	LOS A	0.1	0.6	Full	500	0.0	0.0
Approach	33	5.0	33	5.0		0.024		8.2	LOS A	0.1	0.6				
All Vehicles	206	5.0	206	5.0		0.048		1.8	NA	0.1	0.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 [George St/ Bena Rd - Existing AM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing AM peak (Network Folder: 99 Bena Road, Korumburra)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: George Street															
10	L2	All MCs	14	5.0	14	5.0	0.048	2.5	LOS A	0.0	0.0	0.00	0.08	0.00	54.3
11	T1	All MCs	76	5.0	76	5.0	0.048	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	59.3
Approach			90	5.0	90	5.0	0.048	0.4	NA	0.0	0.0	0.00	0.08	0.00	58.4
North: George Street															
5	T1	All MCs	72	5.0	72	5.0	0.045	0.1	LOS A	0.1	0.5	0.06	0.10	0.06	58.1
6	R2	All MCs	11	5.0	11	5.0	0.045	5.8	LOS A	0.1	0.5	0.06	0.10	0.06	56.0
Approach			83	5.0	83	5.0	0.045	0.8	NA	0.1	0.5	0.06	0.10	0.06	57.6
West: Bena Road															
7	L2	All MCs	14	5.0	14	5.0	0.024	8.5	LOS A	0.1	0.6	0.17	0.91	0.17	51.1
9	R2	All MCs	19	5.0	19	5.0	0.024	8.0	LOS A	0.1	0.6	0.17	0.91	0.17	48.0
Approach			33	5.0	33	5.0	0.024	8.2	LOS A	0.1	0.6	0.17	0.91	0.17	49.8
All Vehicles			206	5.0	206	5.0	0.048	1.8	NA	0.1	0.6	0.05	0.22	0.05	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing 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. %
East: Radovick Street															
Lane 1	226	5.0	226	5.0	1847	0.122	100	5.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	33	5.0	33	5.0	1774	0.019	100	6.3	LOS A	0.1	0.7	Short	30	0.0	NA
Approach	259	5.0	259	5.0		0.122		5.5	NA	0.1	0.7				
North: George Street															
Lane 1	91	5.0	91	5.0	900	0.101	100	4.6	LOS A	0.4	3.0	Full	15	0.0	0.0
Approach	91	5.0	91	5.0		0.101		4.6	LOS A	0.4	3.0				
SouthWest: Jumbunna Road															
Lane 1	305	5.0	305	5.0	1847	0.165	100	4.9	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	305	5.0	305	5.0		0.165		4.9	NA	0.0	0.0				
All Vehicles	655	5.0	655	5.0		0.165		5.1	NA	0.4	3.0				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing AM peak (Network Folder: 99 Bena Road, Korumburra)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Radovick Street															
4a	L1	All MCs	226	5.0	226	5.0	0.122	5.4	LOS A	0.0	0.0	0.00	0.59	0.00	52.5
3	R2	All MCs	33	5.0	33	5.0	0.019	6.3	LOS A	0.1	0.7	0.40	0.56	0.40	49.0
Approach			259	5.0	259	5.0	0.122	5.5	NA	0.1	0.7	0.05	0.59	0.05	52.3
North: George Street															
4	L2	All MCs	49	5.0	49	5.0	0.101	3.2	LOS A	0.4	3.0	0.47	0.59	0.47	48.5
9a	R1	All MCs	42	5.0	42	5.0	0.101	6.3	LOS A	0.4	3.0	0.47	0.59	0.47	48.4
Approach			91	5.0	91	5.0	0.101	4.6	LOS A	0.4	3.0	0.47	0.59	0.47	48.5
SouthWest: Jumbunna Road															
30a	L1	All MCs	57	5.0	57	5.0	0.165	5.4	LOS A	0.0	0.0	0.00	0.57	0.00	51.8
32a	R1	All MCs	248	5.0	248	5.0	0.165	4.8	LOS A	0.0	0.0	0.00	0.57	0.00	53.2
Approach			305	5.0	305	5.0	0.165	4.9	NA	0.0	0.0	0.00	0.57	0.00	53.1
All Vehicles			655	5.0	655	5.0	0.165	5.1	NA	0.4	3.0	0.09	0.58	0.09	52.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

LANE SUMMARY

Site: 102 [George St/ Bena Rd - Existing PM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing 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. %
South: George Street															
Lane 1	109	5.0	109	5.0	1869	0.058	100	0.5	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	109	5.0	109	5.0		0.058		0.5	NA	0.0	0.0				
North: George Street															
Lane 1	80	5.0	80	5.0	1810	0.044	100	1.2	LOS A	0.1	0.7	Full	500	0.0	0.0
Approach	80	5.0	80	5.0		0.044		1.2	NA	0.1	0.7				
West: Bena Road															
Lane 1	27	5.0	27	5.0	1348	0.020	100	8.2	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	27	5.0	27	5.0		0.020		8.2	LOS A	0.1	0.5				
All Vehicles	216	5.0	216	5.0		0.058		1.7	NA	0.1	0.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 [George St/ Bena Rd - Existing PM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing PM Peak (Network Folder: 99 Bena Road, Korumburra)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: George Street															
10	L2	All MCs	21	5.0	21	5.0	0.058	2.5	LOS A	0.0	0.0	0.00	0.10	0.00	54.2
11	T1	All MCs	88	5.0	88	5.0	0.058	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	59.1
Approach			109	5.0	109	5.0	0.058	0.5	NA	0.0	0.0	0.00	0.10	0.00	58.1
North: George Street															
5	T1	All MCs	65	5.0	65	5.0	0.044	0.1	LOS A	0.1	0.7	0.09	0.14	0.09	57.3
6	R2	All MCs	15	5.0	15	5.0	0.044	5.9	LOS A	0.1	0.7	0.09	0.14	0.09	55.7
Approach			80	5.0	80	5.0	0.044	1.2	NA	0.1	0.7	0.09	0.14	0.09	56.8
West: Bena Road															
7	L2	All MCs	11	5.0	11	5.0	0.020	8.5	LOS A	0.1	0.5	0.18	0.90	0.18	51.1
9	R2	All MCs	16	5.0	16	5.0	0.020	8.0	LOS A	0.1	0.5	0.18	0.90	0.18	48.0
Approach			27	5.0	27	5.0	0.020	8.2	LOS A	0.1	0.5	0.18	0.90	0.18	49.7
All Vehicles			216	5.0	216	5.0	0.058	1.7	NA	0.1	0.7	0.06	0.22	0.06	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing 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. %
East: Radovick Street															
Lane 1	217	5.0	217	5.0	1847	0.117	100	5.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	53	5.0	53	5.0	1832	0.029	100	6.2	LOS A	0.1	1.1	Short	30	0.0	NA
Approach	270	5.0	270	5.0		0.117		5.6	NA	0.1	1.1				
North: George Street															
Lane 1	81	5.0	81	5.0	841	0.096	100	4.7	LOS A	0.4	2.8	Full	15	0.0	0.0
Approach	81	5.0	81	5.0		0.096		4.7	LOS A	0.4	2.8				
SouthWest: Jumbunna Road															
Lane 1	273	5.0	273	5.0	1847	0.148	100	4.9	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	273	5.0	273	5.0		0.148		4.9	NA	0.0	0.0				
All Vehicles	624	5.0	624	5.0		0.148		5.2	NA	0.4	2.8				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N102 [Bena Rd/ George St/ Radovick St - Existing PM Peak (Network Folder: 99 Bena Road, Korumburra)]

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Radovick Street															
4a	L1	All MCs	217	5.0	217	5.0	0.117	5.4	LOS A	0.0	0.0	0.00	0.59	0.00	52.5
3	R2	All MCs	53	5.0	53	5.0	0.029	6.2	LOS A	0.1	1.1	0.38	0.57	0.38	49.1
Approach			270	5.0	270	5.0	0.117	5.6	NA	0.1	1.1	0.07	0.59	0.07	52.1
North: George Street															
4	L2	All MCs	35	5.0	35	5.0	0.096	3.1	LOS A	0.4	2.8	0.47	0.59	0.47	48.4
9a	R1	All MCs	46	5.0	46	5.0	0.096	6.0	LOS A	0.4	2.8	0.47	0.59	0.47	48.3
Approach			81	5.0	81	5.0	0.096	4.7	LOS A	0.4	2.8	0.47	0.59	0.47	48.3
SouthWest: Jumbunna Road															
30a	L1	All MCs	56	5.0	56	5.0	0.148	5.4	LOS A	0.0	0.0	0.00	0.57	0.00	51.7
32a	R1	All MCs	217	5.0	217	5.0	0.148	4.8	LOS A	0.0	0.0	0.00	0.57	0.00	53.2
Approach			273	5.0	273	5.0	0.148	4.9	NA	0.0	0.0	0.00	0.57	0.00	53.0
All Vehicles			624	5.0	624	5.0	0.148	5.2	NA	0.4	2.8	0.09	0.58	0.09	52.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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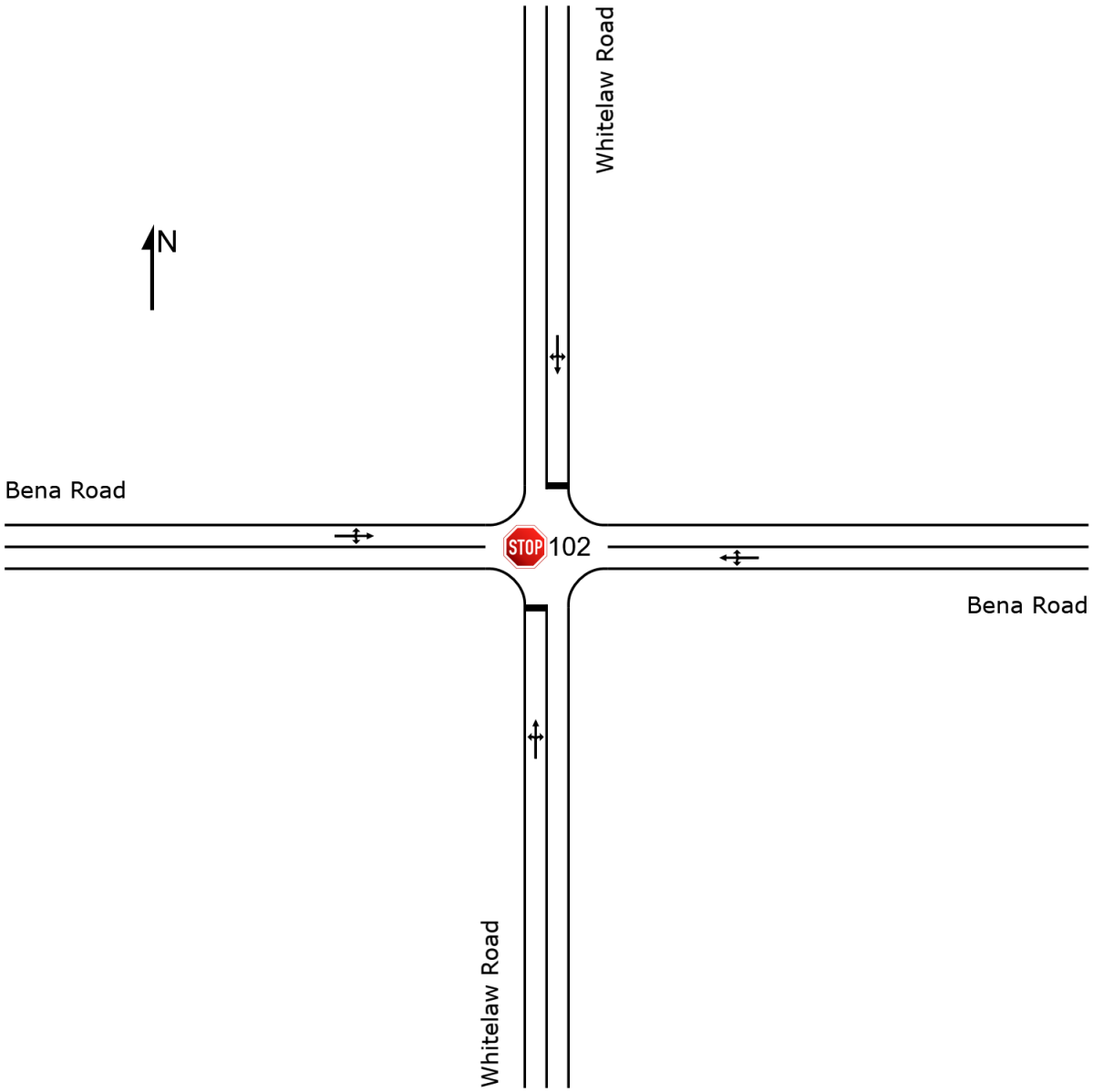
SITE LAYOUT

Site: 102 [Bena Rd/ Whitelaw Rd - Existing 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.



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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing Site
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. %
South: Whitelaw Road															
Lane 1	4	0.0	4	0.0	1231	0.003	100	9.3	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0	4	0.0		0.003		9.3	LOS A	0.0	0.1				
East: Bena Road															
Lane 1	11	0.0	11	0.0	1845	0.006	100	1.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	11	0.0	11	0.0		0.006		1.4	NA	0.0	0.0				
North: Whitelaw Road															
Lane 1	4	0.0	4	0.0	1126	0.004	100	9.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0	4	0.0		0.004		9.1	LOS A	0.0	0.1				
West: Bena Road															
Lane 1	13	0.0	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	13	0.0		0.007		1.2	NA	0.0	0.0				
All Vehicles	32	0.0	32	0.0		0.007		3.3	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Whitelaw Road															
1	L2	All MCs	2	0.0	2	0.0	0.003	9.5	LOS A	0.0	0.1	0.06	0.97	0.06	72.3
2	T1	All MCs	1	0.0	1	0.0	0.003	9.1	LOS A	0.0	0.1	0.06	0.97	0.06	72.3
3	R2	All MCs	1	0.0	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.06	0.97	0.06	72.0
Approach			4	0.0	4	0.0	0.003	9.3	LOS A	0.0	0.1	0.06	0.97	0.06	72.3
East: Bena Road															
4	L2	All MCs	1	0.0	1	0.0	0.006	7.8	LOS A	0.0	0.0	0.01	0.13	0.01	85.5
5	T1	All MCs	9	0.0	9	0.0	0.006	0.0	LOS A	0.0	0.0	0.01	0.13	0.01	96.1
6	R2	All MCs	1	0.0	1	0.0	0.006	7.6	LOS A	0.0	0.0	0.01	0.13	0.01	85.0
Approach			11	0.0	11	0.0	0.006	1.4	NA	0.0	0.0	0.01	0.13	0.01	93.9
North: Whitelaw Road															
7	L2	All MCs	1	0.0	1	0.0	0.004	9.6	LOS A	0.0	0.1	0.07	0.96	0.07	72.6
8	T1	All MCs	1	0.0	1	0.0	0.004	9.1	LOS A	0.0	0.1	0.07	0.96	0.07	72.6
9	R2	All MCs	2	0.0	2	0.0	0.004	8.9	LOS A	0.0	0.1	0.07	0.96	0.07	72.3
Approach			4	0.0	4	0.0	0.004	9.1	LOS A	0.0	0.1	0.07	0.96	0.07	72.4
West: Bena Road															
10	L2	All MCs	1	0.0	1	0.0	0.007	7.8	LOS A	0.0	0.0	0.01	0.11	0.01	85.9
11	T1	All MCs	11	0.0	11	0.0	0.007	0.0	LOS A	0.0	0.0	0.01	0.11	0.01	96.7
12	R2	All MCs	1	0.0	1	0.0	0.007	7.6	LOS A	0.0	0.0	0.01	0.11	0.01	85.5
Approach			13	0.0	13	0.0	0.007	1.2	NA	0.0	0.0	0.01	0.11	0.01	94.8
All Vehicles			32	0.0	32	0.0	0.007	3.3	NA	0.0	0.1	0.03	0.33	0.03	87.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing Site
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. %
South: Whitelaw Road															
Lane 1	3	0.0	3	0.0	1185	0.003	100	9.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	3	0.0	3	0.0		0.003		9.2	LOS A	0.0	0.1				
East: Bena Road															
Lane 1	9	0.0	9	0.0	1816	0.005	100	3.4	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	9	0.0	9	0.0		0.005		3.4	NA	0.0	0.1				
North: Whitelaw Road															
Lane 1	4	0.0	4	0.0	1239	0.003	100	9.2	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	4	0.0	4	0.0		0.003		9.2	LOS A	0.0	0.1				
West: Bena Road															
Lane 1	6	0.0	6	0.0	1830	0.003	100	2.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	6	0.0	6	0.0		0.003		2.6	NA	0.0	0.0				
All Vehicles	22	0.0	22	0.0		0.005		5.0	NA	0.0	0.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

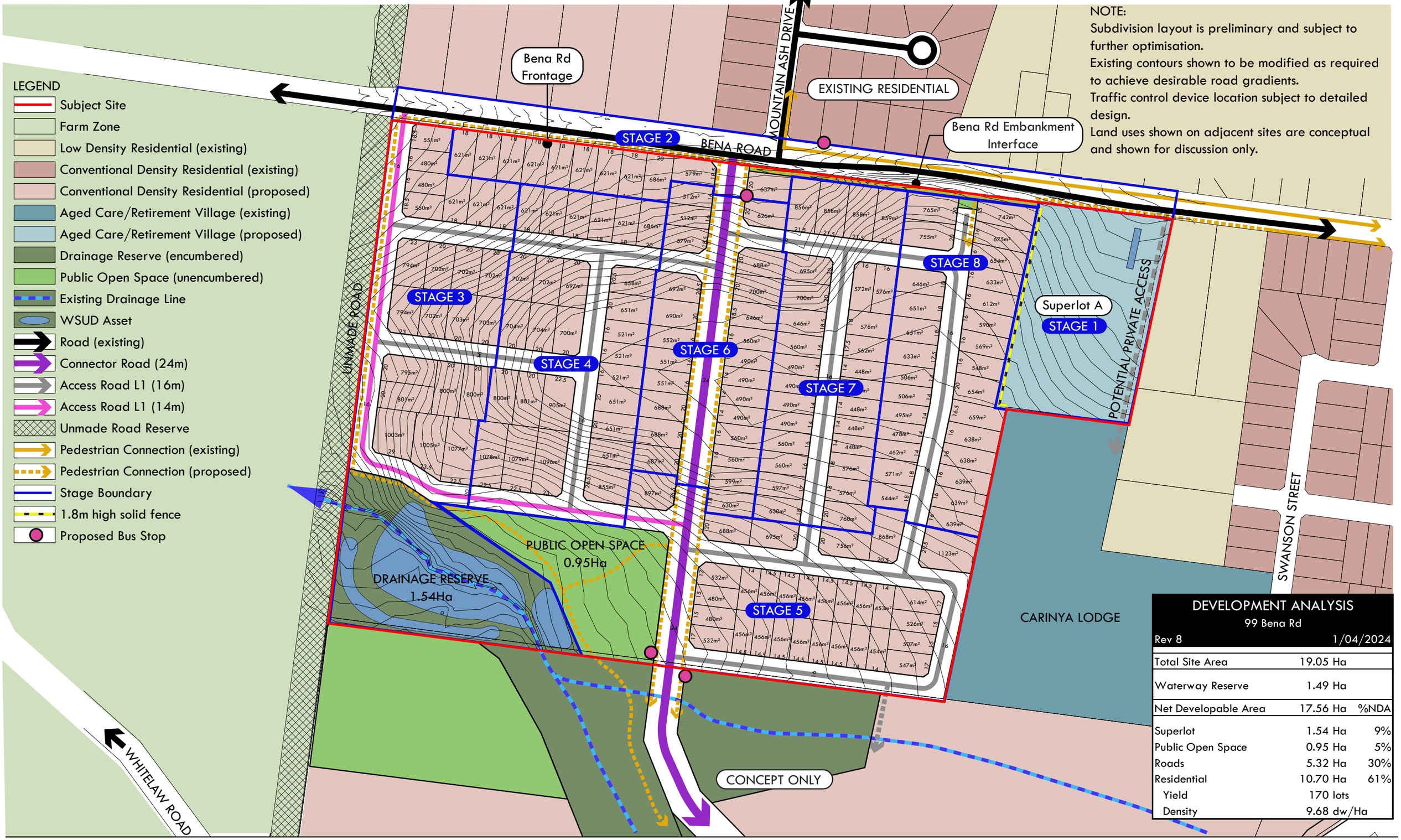
Existing Site
Site Category: (None)
Stop (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Whitelaw Road															
1	L2	All MCs	1	0.0	1	0.0	0.003	9.5	LOS A	0.0	0.1	0.05	0.99	0.05	72.5
2	T1	All MCs	1	0.0	1	0.0	0.003	9.1	LOS A	0.0	0.1	0.05	0.99	0.05	72.5
3	R2	All MCs	1	0.0	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.05	0.99	0.05	72.2
Approach			3	0.0	3	0.0	0.003	9.2	LOS A	0.0	0.1	0.05	0.99	0.05	72.4
East: Bena Road															
4	L2	All MCs	1	0.0	1	0.0	0.005	7.8	LOS A	0.0	0.1	0.02	0.31	0.02	81.6
5	T1	All MCs	5	0.0	5	0.0	0.005	0.0	LOS A	0.0	0.1	0.02	0.31	0.02	91.2
6	R2	All MCs	3	0.0	3	0.0	0.005	7.6	LOS A	0.0	0.1	0.02	0.31	0.02	81.2
Approach			9	0.0	9	0.0	0.005	3.4	NA	0.0	0.1	0.02	0.31	0.02	86.5
North: Whitelaw Road															
7	L2	All MCs	2	0.0	2	0.0	0.003	9.5	LOS A	0.0	0.1	0.04	0.99	0.04	72.3
8	T1	All MCs	1	0.0	1	0.0	0.003	9.1	LOS A	0.0	0.1	0.04	0.99	0.04	72.3
9	R2	All MCs	1	0.0	1	0.0	0.003	8.9	LOS A	0.0	0.1	0.04	0.99	0.04	72.0
Approach			4	0.0	4	0.0	0.003	9.2	LOS A	0.0	0.1	0.04	0.99	0.04	72.3
West: Bena Road															
10	L2	All MCs	1	0.0	1	0.0	0.003	7.8	LOS A	0.0	0.0	0.02	0.23	0.02	83.2
11	T1	All MCs	4	0.0	4	0.0	0.003	0.0	LOS A	0.0	0.0	0.02	0.23	0.02	93.2
12	R2	All MCs	1	0.0	1	0.0	0.003	7.6	LOS A	0.0	0.0	0.02	0.23	0.02	82.8
Approach			6	0.0	6	0.0	0.003	2.6	NA	0.0	0.0	0.02	0.23	0.02	89.5
All Vehicles			22	0.0	22	0.0	0.005	5.0	NA	0.0	0.1	0.03	0.50	0.03	82.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

APPENDIX B – DRAFT SUBDIVISION LAYOUT PLAN & CONCEPT PLAN



DEVELOPMENT ANALYSIS

99 Bena Rd

Rev 8 — 1/04/2024

Total Site Area	19.05 Ha	
Waterway Reserve	1.49 Ha	
Net Developable Area	17.56 Ha	%NDA
Superlot	1.54 Ha	9%
Public Open Space	0.95 Ha	5%
Roads	5.32 Ha	30%
Residential	10.70 Ha	61%
Yield	170 lots	
Density	9.68 dw/Ha	

DRAFT Subdivision Layout Plan

Bena Rd, Korumburra

ref: WC202316
date: 1 April 2024
rev: 8
drawn: HW

drawing no. L00
sheet no. 1 of 1

PRELIMINARY PLANS FOR DISCUSSION

REV	DESCRIPTION	DATE	INIT
2	For Discussion	Jan 24	HW
3	For Discussion	Jan 24	HW
4	For Discussion	Jan 24	HW
5	Amended connector road layout	Feb 24	HW
6	Amended for defendable space setbacks	Feb 24	HW
7	Revised layout	Mar 24	HW
8	Revised layout	Apr 24	HW

1:2500 @ A3

0 25 50 75m

LANDSCAPE & URBAN DESIGN
abn: 22 634 500 351

please note:
This plan is based on preliminary information only and may be subject to change as a result of formal Council/Authority advice, detailed site instigations and confirmation by survey.

Weir & Co.
design | construct | grow

NOTE:
Potential road layout is indicative only and subject to further investigation
Potential waterway/drainage layout is indicative only and subject to further investigation.
Public Open Space as shown comprises 5% contribution.
Bena Road interface treatment as detailed on the Draft Subdivision Layout Plan sections.

EXISTING INDUSTRIAL ESTATE

EXISTING RESIDENTIAL

400m walkable catchment

400m walkable catchment

400m walkable catchment

400m walkable catchment

400m walkable catchment

400m walkable catchment

BENA ROAD

UNMADE ROAD

WHITELAW ROAD

CARINYA LODGE

CONCEPT ONLY

Intersection subject to detailed design

SOMMERS CRESCENT

JUMBUNNA ROAD

KORUMBURRA SECONDARY COLLEGE

LEGEND

- DPO6 Boundary
- Ridgeline
- Existing Drainage Line
- Existing Road Network
- Potential Connector Road (24m)
- Potential Bena Rd Access
- Hilltop
- Subject Site
- Proposed Residential
- Proposed Aged Care
- Drainage Reserve
- Public Open Space
- Potential Wetland
- Potential Pedestrian Connection
- Walkable POS Catchment (400m)
- Bena Road Interface Treatment
- Potential Future Bus Stop (subject to authority approval)

Concept Plan

99 Bena Road, Korumburra

ref: WC202316
rev: 4
date: 4 April 2024
drawn: HW

PRELIMINARY PLANS FOR DISCUSSION

1:5000 @ A3

0 50 100 150m

LANDSCAPE & URBAN DESIGN
abn: 22 634 500 351

please note:
This plan is based on preliminary information only and may be subject to change as a result of formal Council/Authority advice, detailed site investigations and confirmation by survey

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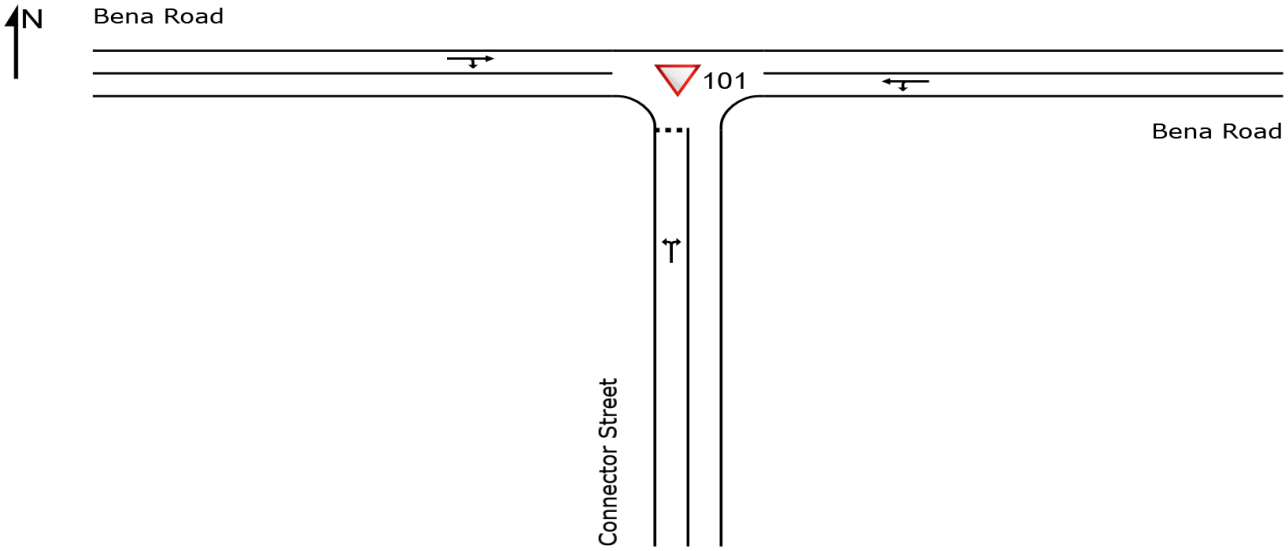
APPENDIX C – FUTURE SIDRA ANALYSIS RESULTS

SITE LAYOUT

Site: 101 [Primary 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.



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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
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: Connector Street															
Lane 1	83	2.0	83	2.0	1200	0.069	100	5.8	LOS A	0.2	1.6	Full	500	0.0	0.0
Approach	83	2.0	83	2.0		0.069		5.8	LOS A	0.2	1.6				
East: Bena Road															
Lane 1	77	2.0	77	2.0	1830	0.042	100	3.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	77	2.0	77	2.0		0.042		3.8	NA	0.0	0.0				
West: Bena Road															
Lane 1	34	2.0	34	2.0	1865	0.018	100	0.5	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	34	2.0	34	2.0		0.018		0.5	NA	0.0	0.1				
All Vehicles	194	2.0	194	2.0		0.069		4.1	NA	0.2	1.6				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Connector Street															
1	L2	All MCs	4	2.0	4	2.0	0.069	5.6	LOS A	0.2	1.6	0.15	0.57	0.15	52.4
3	R2	All MCs	79	2.0	79	2.0	0.069	5.8	LOS A	0.2	1.6	0.15	0.57	0.15	52.1
Approach			83	2.0	83	2.0	0.069	5.8	LOS A	0.2	1.6	0.15	0.57	0.15	52.2
East: Bena Road															
4	L2	All MCs	53	2.0	53	2.0	0.042	5.6	LOS A	0.0	0.0	0.00	0.40	0.00	54.1
5	T1	All MCs	24	2.0	24	2.0	0.042	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	56.4
Approach			77	2.0	77	2.0	0.042	3.8	NA	0.0	0.0	0.00	0.40	0.00	54.8
West: Bena Road															
11	T1	All MCs	31	2.0	31	2.0	0.018	0.0	LOS A	0.0	0.1	0.04	0.06	0.04	59.4
12	R2	All MCs	3	2.0	3	2.0	0.018	5.6	LOS A	0.0	0.1	0.04	0.06	0.04	56.5
Approach			34	2.0	34	2.0	0.018	0.5	NA	0.0	0.1	0.04	0.06	0.04	59.1
All Vehicles			194	2.0	194	2.0	0.069	4.1	NA	0.2	1.6	0.07	0.42	0.07	54.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
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: Connector Street															
Lane 1	56	2.0	56	2.0	1194	0.047	100	5.8	LOS A	0.2	1.1	Full	500	0.0	0.0
Approach	56	2.0	56	2.0		0.047		5.8	LOS A	0.2	1.1				
East: Bena Road															
Lane 1	107	2.0	107	2.0	1826	0.059	100	4.1	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	107	2.0	107	2.0		0.059		4.1	NA	0.0	0.0				
West: Bena Road															
Lane 1	24	2.0	24	2.0	1830	0.013	100	1.0	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	24	2.0	24	2.0		0.013		1.0	NA	0.0	0.2				
All Vehicles	187	2.0	187	2.0		0.059		4.2	NA	0.2	1.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Connector Street															
1	L2	All MCs	3	2.0	3	2.0	0.047	5.6	LOS A	0.2	1.1	0.16	0.57	0.16	52.4
3	R2	All MCs	53	2.0	53	2.0	0.047	5.8	LOS A	0.2	1.1	0.16	0.57	0.16	52.1
Approach			56	2.0	56	2.0	0.047	5.8	LOS A	0.2	1.1	0.16	0.57	0.16	52.2
East: Bena Road															
4	L2	All MCs	79	2.0	79	2.0	0.059	5.6	LOS A	0.0	0.0	0.00	0.43	0.00	53.9
5	T1	All MCs	28	2.0	28	2.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.43	0.00	56.2
Approach			107	2.0	107	2.0	0.059	4.1	NA	0.0	0.0	0.00	0.43	0.00	54.5
West: Bena Road															
11	T1	All MCs	20	2.0	20	2.0	0.013	0.1	LOS A	0.0	0.2	0.08	0.12	0.08	58.8
12	R2	All MCs	4	2.0	4	2.0	0.013	5.8	LOS A	0.0	0.2	0.08	0.12	0.08	56.0
Approach			24	2.0	24	2.0	0.013	1.0	NA	0.0	0.2	0.08	0.12	0.08	58.3
All Vehicles			187	2.0	187	2.0	0.059	4.2	NA	0.2	1.1	0.06	0.43	0.06	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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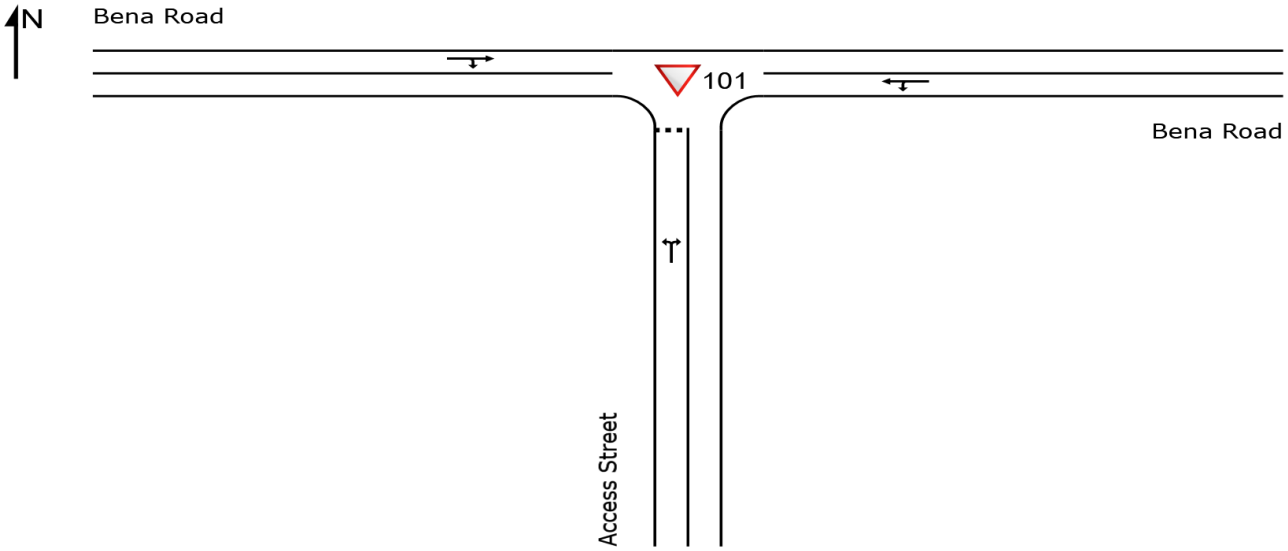
SITE LAYOUT

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
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: Access Street															
Lane 1	14	2.0	14	2.0	1253	0.011	100	5.6	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	14	2.0	14	2.0		0.011		5.6	LOS A	0.0	0.3				
East: Bena Road															
Lane 1	26	2.0	26	2.0	1865	0.014	100	1.7	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	26	2.0	26	2.0		0.014		1.7	NA	0.0	0.0				
West: Bena Road															
Lane 1	17	2.0	17	2.0	1880	0.009	100	0.3	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	17	2.0	17	2.0		0.009		0.3	NA	0.0	0.0				
All Vehicles	57	2.0	57	2.0		0.014		2.3	NA	0.0	0.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access Street															
1	L2	All MCs	1	2.0	1	2.0	0.011	5.6	LOS A	0.0	0.3	0.09	0.57	0.09	52.6
3	R2	All MCs	13	2.0	13	2.0	0.011	5.6	LOS A	0.0	0.3	0.09	0.57	0.09	52.3
Approach			14	2.0	14	2.0	0.011	5.6	LOS A	0.0	0.3	0.09	0.57	0.09	52.3
East: Bena Road															
4	L2	All MCs	8	2.0	8	2.0	0.014	5.6	LOS A	0.0	0.0	0.00	0.18	0.00	55.9
5	T1	All MCs	18	2.0	18	2.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.18	0.00	58.4
Approach			26	2.0	26	2.0	0.014	1.7	NA	0.0	0.0	0.00	0.18	0.00	57.6
West: Bena Road															
11	T1	All MCs	16	2.0	16	2.0	0.009	0.0	LOS A	0.0	0.0	0.01	0.04	0.01	59.6
12	R2	All MCs	1	2.0	1	2.0	0.009	5.5	LOS A	0.0	0.0	0.01	0.04	0.01	56.7
Approach			17	2.0	17	2.0	0.009	0.3	NA	0.0	0.0	0.01	0.04	0.01	59.5
All Vehicles			57	2.0	57	2.0	0.014	2.3	NA	0.0	0.3	0.03	0.23	0.03	56.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

New Site
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: Access Street															
Lane 1	9	2.0	9	2.0	1269	0.007	100	5.6	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	9	2.0	9	2.0		0.007		5.6	LOS A	0.0	0.2				
East: Bena Road															
Lane 1	26	2.0	26	2.0	1848	0.014	100	2.8	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	26	2.0	26	2.0		0.014		2.8	NA	0.0	0.0				
West: Bena Road															
Lane 1	15	2.0	15	2.0	1878	0.008	100	0.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	15	2.0	15	2.0		0.008		0.4	NA	0.0	0.0				
All Vehicles	50	2.0	50	2.0		0.014		2.6	NA	0.0	0.2				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Access Street															
1	L2	All MCs	1	2.0	1	2.0	0.007	5.6	LOS A	0.0	0.2	0.08	0.57	0.08	52.6
3	R2	All MCs	8	2.0	8	2.0	0.007	5.6	LOS A	0.0	0.2	0.08	0.57	0.08	52.3
Approach			9	2.0	9	2.0	0.007	5.6	LOS A	0.0	0.2	0.08	0.57	0.08	52.4
East: Bena Road															
4	L2	All MCs	13	2.0	13	2.0	0.014	5.6	LOS A	0.0	0.0	0.00	0.30	0.00	55.0
5	T1	All MCs	13	2.0	13	2.0	0.014	0.0	LOS A	0.0	0.0	0.00	0.30	0.00	57.4
Approach			26	2.0	26	2.0	0.014	2.8	NA	0.0	0.0	0.00	0.30	0.00	56.2
West: Bena Road															
11	T1	All MCs	14	2.0	14	2.0	0.008	0.0	LOS A	0.0	0.0	0.01	0.04	0.01	59.6
12	R2	All MCs	1	2.0	1	2.0	0.008	5.5	LOS A	0.0	0.0	0.01	0.04	0.01	56.7
Approach			15	2.0	15	2.0	0.008	0.4	NA	0.0	0.0	0.01	0.04	0.01	59.4
All Vehicles			50	2.0	50	2.0	0.014	2.6	NA	0.0	0.2	0.02	0.27	0.02	56.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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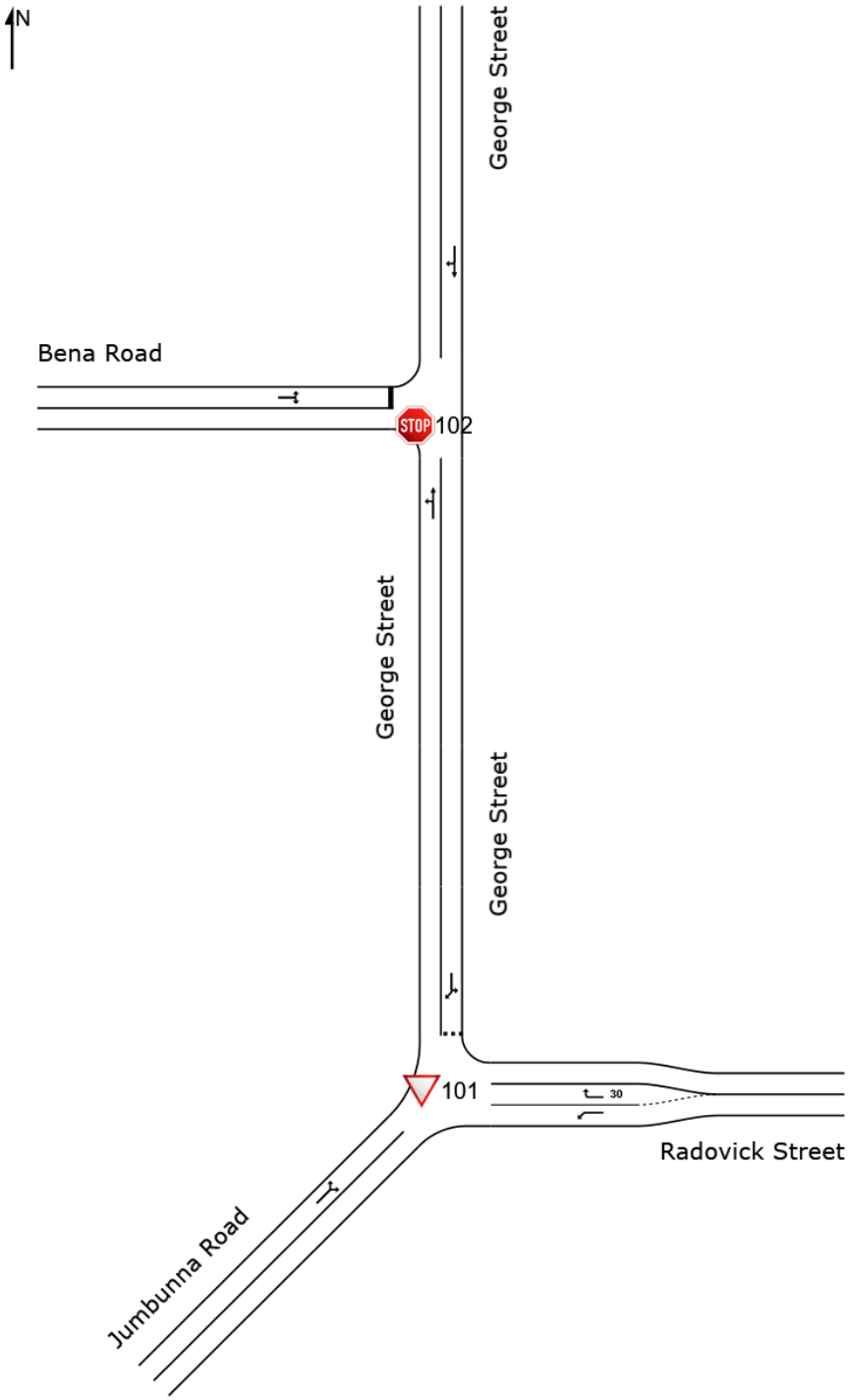
NETWORK LAYOUT

Network: N101 [Bena Rd/ George St/ Radovick St - Future AM peak (Network Folder: 99 Bena Road, Korumburra)]

New Network
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
102	NA	George St/ Bena Rd - Future AM peak

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LANE SUMMARY

Site: 102 [George St/ Bena Rd - Future AM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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. %
South: George Street															
Lane 1	167	5.0	167	5.0	1845	0.091	100	1.1	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	167	5.0	167	5.0		0.091		1.1	NA	0.0	0.0				
North: George Street															
Lane 1	139	5.0	139	5.0	1702	0.082	100	2.5	LOS A	0.3	2.3	Full	500	0.0	0.0
Approach	139	5.0	139	5.0		0.082		2.5	NA	0.3	2.3				
West: Bena Road															
Lane 1	183	5.0	183	5.0	1291	0.142	100	8.4	LOS A	0.5	3.5	Full	500	0.0	0.0
Approach	183	5.0	183	5.0		0.142		8.4	LOS A	0.5	3.5				
All Vehicles	489	5.0	489	5.0		0.142		4.2	NA	0.5	3.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 [George St/ Bena Rd - Future AM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: George Street															
10	L2	All MCs	75	5.0	75	5.0	0.091	2.5	LOS A	0.0	0.0	0.00	0.24	0.00	53.2
11	T1	All MCs	92	5.0	92	5.0	0.091	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	57.9
Approach			167	5.0	167	5.0	0.091	1.1	NA	0.0	0.0	0.00	0.24	0.00	55.7
North: George Street															
5	T1	All MCs	87	5.0	87	5.0	0.082	0.3	LOS A	0.3	2.3	0.21	0.28	0.21	54.8
6	R2	All MCs	52	5.0	52	5.0	0.082	6.1	LOS A	0.3	2.3	0.21	0.28	0.21	54.4
Approach			139	5.0	139	5.0	0.082	2.5	NA	0.3	2.3	0.21	0.28	0.21	54.6
West: Bena Road															
7	L2	All MCs	74	5.0	74	5.0	0.142	8.6	LOS A	0.5	3.5	0.23	0.90	0.23	51.0
9	R2	All MCs	109	5.0	109	5.0	0.142	8.3	LOS A	0.5	3.5	0.23	0.90	0.23	47.9
Approach			183	5.0	183	5.0	0.142	8.4	LOS A	0.5	3.5	0.23	0.90	0.23	49.6
All Vehicles			489	5.0	489	5.0	0.142	4.2	NA	0.5	3.5	0.15	0.50	0.15	52.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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. %
East: Radovick Street															
Lane 1	273	5.0	273	5.0	1847	0.148	100	5.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	93	5.0	93	5.0	1651	0.056	100	6.6	LOS A	0.3	2.1	Short	30	0.0	NA
Approach	366	5.0	366	5.0		0.148		5.7	NA	0.3	2.1				
North: George Street															
Lane 1	196	5.0	196	5.0	871	0.225	100	5.4	LOS A	1.0	7.1	Full	15	0.0	0.0
Approach	196	5.0	196	5.0		0.225		5.4	LOS A	1.0	7.1				
SouthWest: Jumbunna Road															
Lane 1	373	5.0	373	5.0	1847	0.202	100	4.9	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	373	5.0	373	5.0		0.202		4.9	NA	0.0	0.0				
All Vehicles	935	5.0	935	5.0		0.225		5.3	NA	1.0	7.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Radovick Street															
4a	L1	All MCs	273	5.0	273	5.0	0.148	5.4	LOS A	0.0	0.0	0.00	0.59	0.00	52.5
3	R2	All MCs	93	5.0	93	5.0	0.056	6.6	LOS A	0.3	2.1	0.45	0.61	0.45	48.7
Approach			366	5.0	366	5.0	0.148	5.7	NA	0.3	2.1	0.11	0.60	0.11	51.9
North: George Street															
4	L2	All MCs	131	5.0	131	5.0	0.225	3.4	LOS A	1.0	7.1	0.55	0.64	0.55	47.6
9a	R1	All MCs	65	5.0	65	5.0	0.225	9.3	LOS A	1.0	7.1	0.55	0.64	0.55	47.5
Approach			196	5.0	196	5.0	0.225	5.4	LOS A	1.0	7.1	0.55	0.64	0.55	47.5
SouthWest: Jumbunna Road															
30a	L1	All MCs	74	5.0	74	5.0	0.202	5.4	LOS A	0.0	0.0	0.00	0.57	0.00	51.7
32a	R1	All MCs	299	5.0	299	5.0	0.202	4.8	LOS A	0.0	0.0	0.00	0.57	0.00	53.2
Approach			373	5.0	373	5.0	0.202	4.9	NA	0.0	0.0	0.00	0.57	0.00	53.0
All Vehicles			935	5.0	935	5.0	0.225	5.3	NA	1.0	7.1	0.16	0.59	0.16	51.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

LANE SUMMARY

Site: 102 [George St/ Bena Rd - Future PM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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. %
South: George Street															
Lane 1	216	5.0	216	5.0	1839	0.117	100	1.3	LOS A	0.0	0.0	Full	15	0.0	0.0
Approach	216	5.0	216	5.0		0.117		1.3	NA	0.0	0.0				
North: George Street															
Lane 1	152	5.0	152	5.0	1612	0.094	100	3.4	LOS A	0.4	3.1	Full	500	0.0	0.0
Approach	152	5.0	152	5.0		0.094		3.4	NA	0.4	3.1				
West: Bena Road															
Lane 1	127	5.0	127	5.0	1258	0.101	100	8.5	LOS A	0.3	2.4	Full	500	0.0	0.0
Approach	127	5.0	127	5.0		0.101		8.5	LOS A	0.3	2.4				
All Vehicles	495	5.0	495	5.0		0.117		3.8	NA	0.4	3.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

Site: 102 [George St/ Bena Rd - Future PM peak (Site Folder: 99 Bena Road, Korumburra)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: George Street															
10	L2	All MCs	110	5.0	110	5.0	0.117	2.5	LOS A	0.0	0.0	0.00	0.27	0.00	53.0
11	T1	All MCs	106	5.0	106	5.0	0.117	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	57.6
Approach			216	5.0	216	5.0	0.117	1.3	NA	0.0	0.0	0.00	0.27	0.00	55.2
North: George Street															
5	T1	All MCs	78	5.0	78	5.0	0.094	0.6	LOS A	0.4	3.1	0.29	0.37	0.29	53.3
6	R2	All MCs	74	5.0	74	5.0	0.094	6.3	LOS A	0.4	3.1	0.29	0.37	0.29	53.7
Approach			152	5.0	152	5.0	0.094	3.4	NA	0.4	3.1	0.29	0.37	0.29	53.6
West: Bena Road															
7	L2	All MCs	51	5.0	51	5.0	0.101	8.6	LOS A	0.3	2.4	0.24	0.90	0.24	51.0
9	R2	All MCs	76	5.0	76	5.0	0.101	8.4	LOS A	0.3	2.4	0.24	0.90	0.24	47.8
Approach			127	5.0	127	5.0	0.101	8.5	LOS A	0.3	2.4	0.24	0.90	0.24	49.6
All Vehicles			495	5.0	495	5.0	0.117	3.8	NA	0.4	3.1	0.15	0.46	0.15	52.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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. %
East: Radovick Street															
Lane 1	262	5.0	262	5.0	1847	0.142	100	5.4	LOS A	0.0	0.0	Full	500	0.0	0.0
Lane 2	121	5.0	121	5.0	1678	0.072	100	6.5	LOS A	0.4	2.7	Short	30	0.0	NA
Approach	383	5.0	383	5.0		0.142		5.8	NA	0.4	2.7				
North: George Street															
Lane 1	154	5.0	154	5.0	828	0.186	100	5.4	LOS A	0.8	5.7	Full	15	0.0	0.0
Approach	154	5.0	154	5.0		0.186		5.4	LOS A	0.8	5.7				
SouthWest: Jumbunna Road															
Lane 1	358	5.0	358	5.0	1847	0.194	100	5.0	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	358	5.0	358	5.0		0.194		5.0	NA	0.0	0.0				
All Vehicles	895	5.0	895	5.0		0.194		5.4	NA	0.8	5.7				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Network: N101 [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	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Radovick Street															
4a	L1	All MCs	262	5.0	262	5.0	0.142	5.4	LOS A	0.0	0.0	0.00	0.59	0.00	52.5
3	R2	All MCs	121	5.0	121	5.0	0.072	6.5	LOS A	0.4	2.7	0.45	0.61	0.45	48.8
Approach			383	5.0	383	5.0	0.142	5.8	NA	0.4	2.7	0.14	0.60	0.14	51.8
North: George Street															
4	L2	All MCs	94	5.0	94	5.0	0.186	3.3	LOS A	0.8	5.7	0.53	0.62	0.53	47.5
9a	R1	All MCs	60	5.0	60	5.0	0.186	8.8	LOS A	0.8	5.7	0.53	0.62	0.53	47.4
Approach			154	5.0	154	5.0	0.186	5.4	LOS A	0.8	5.7	0.53	0.62	0.53	47.5
SouthWest: Jumbunna Road															
30a	L1	All MCs	96	5.0	96	5.0	0.194	5.4	LOS A	0.0	0.0	0.00	0.57	0.00	51.7
32a	R1	All MCs	262	5.0	262	5.0	0.194	4.8	LOS A	0.0	0.0	0.00	0.57	0.00	53.2
Approach			358	5.0	358	5.0	0.194	5.0	NA	0.0	0.0	0.00	0.57	0.00	52.9
All Vehicles			895	5.0	895	5.0	0.194	5.4	NA	0.8	5.7	0.15	0.59	0.15	51.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Override Site Data 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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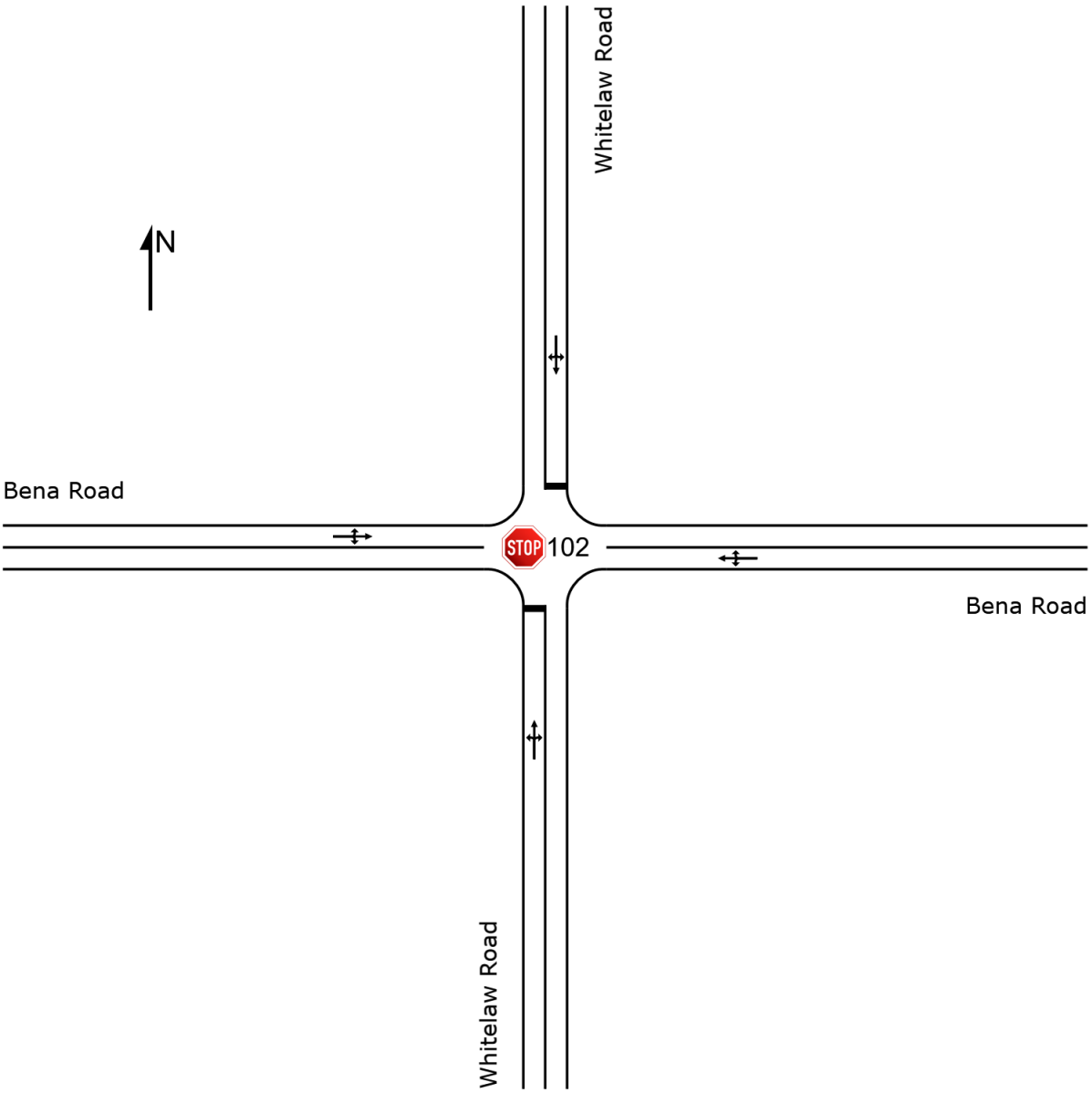
SITE LAYOUT

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.



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LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing Site
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. %
South: Whitelaw Road															
Lane 1	7	0.0	7	0.0	1097	0.006	100	9.2	LOS A	0.0	0.2	Full	500	0.0	0.0
Approach	7	0.0	7	0.0		0.006		9.2	LOS A	0.0	0.2				
East: Bena Road															
Lane 1	31	0.0	31	0.0	1794	0.017	100	5.4	LOS A	0.1	0.5	Full	500	0.0	0.0
Approach	31	0.0	31	0.0		0.017		5.4	NA	0.1	0.5				
North: Whitelaw Road															
Lane 1	16	0.0	16	0.0	1332	0.012	100	9.4	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	16	0.0	16	0.0		0.012		9.4	LOS A	0.0	0.3				
West: Bena Road															
Lane 1	13	0.0	13	0.0	1848	0.007	100	1.2	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	13	0.0	13	0.0		0.007		1.2	NA	0.0	0.0				
All Vehicles	67	0.0	67	0.0		0.017		6.0	NA	0.1	0.5				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Whitelaw Road															
1	L2	All MCs	2	0.0	2	0.0	0.006	9.6	LOS A	0.0	0.2	0.08	0.95	0.08	72.5
2	T1	All MCs	1	0.0	1	0.0	0.006	9.2	LOS A	0.0	0.2	0.08	0.95	0.08	72.5
3	R2	All MCs	4	0.0	4	0.0	0.006	9.1	LOS A	0.0	0.2	0.08	0.95	0.08	72.2
Approach			7	0.0	7	0.0	0.006	9.2	LOS A	0.0	0.2	0.08	0.95	0.08	72.3
East: Bena Road															
4	L2	All MCs	7	0.0	7	0.0	0.017	7.8	LOS A	0.1	0.5	0.05	0.48	0.05	77.9
5	T1	All MCs	9	0.0	9	0.0	0.017	0.0	LOS A	0.1	0.5	0.05	0.48	0.05	86.6
6	R2	All MCs	15	0.0	15	0.0	0.017	7.6	LOS A	0.1	0.5	0.05	0.48	0.05	77.5
Approach			31	0.0	31	0.0	0.017	5.4	NA	0.1	0.5	0.05	0.48	0.05	80.0
North: Whitelaw Road															
7	L2	All MCs	13	0.0	13	0.0	0.012	9.5	LOS A	0.0	0.3	0.06	0.96	0.06	72.1
8	T1	All MCs	1	0.0	1	0.0	0.012	9.1	LOS A	0.0	0.3	0.06	0.96	0.06	72.1
9	R2	All MCs	2	0.0	2	0.0	0.012	8.9	LOS A	0.0	0.3	0.06	0.96	0.06	71.8
Approach			16	0.0	16	0.0	0.012	9.4	LOS A	0.0	0.3	0.06	0.96	0.06	72.1
West: Bena Road															
10	L2	All MCs	1	0.0	1	0.0	0.007	7.8	LOS A	0.0	0.0	0.01	0.11	0.01	85.9
11	T1	All MCs	11	0.0	11	0.0	0.007	0.0	LOS A	0.0	0.0	0.01	0.11	0.01	96.7
12	R2	All MCs	1	0.0	1	0.0	0.007	7.6	LOS A	0.0	0.0	0.01	0.11	0.01	85.5
Approach			13	0.0	13	0.0	0.007	1.2	NA	0.0	0.0	0.01	0.11	0.01	94.8
All Vehicles			67	0.0	67	0.0	0.017	6.0	NA	0.1	0.5	0.05	0.57	0.05	79.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

LANE SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Existing Site
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. %
South: Whitelaw Road															
Lane 1	6	0.0	6	0.0	1071	0.006	100	9.1	LOS A	0.0	0.1	Full	500	0.0	0.0
Approach	6	0.0	6	0.0		0.006		9.1	LOS A	0.0	0.1				
East: Bena Road															
Lane 1	22	0.0	22	0.0	1796	0.012	100	5.9	LOS A	0.1	0.4	Full	500	0.0	0.0
Approach	22	0.0	22	0.0		0.012		5.9	NA	0.1	0.4				
North: Whitelaw Road															
Lane 1	15	0.0	15	0.0	1374	0.011	100	9.5	LOS A	0.0	0.3	Full	500	0.0	0.0
Approach	15	0.0	15	0.0		0.011		9.5	LOS A	0.0	0.3				
West: Bena Road															
Lane 1	6	0.0	6	0.0	1829	0.003	100	2.6	LOS A	0.0	0.0	Full	500	0.0	0.0
Approach	6	0.0	6	0.0		0.003		2.6	NA	0.0	0.0				
All Vehicles	49	0.0	49	0.0		0.012		7.0	NA	0.1	0.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

MOVEMENT SUMMARY

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

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

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

Vehicle Movement Performance

Mov ID	Turn	Mov Class	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	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Whitelaw Road															
1	L2	All MCs	1	0.0	1	0.0	0.006	9.5	LOS A	0.0	0.1	0.07	0.96	0.07	72.6
2	T1	All MCs	1	0.0	1	0.0	0.006	9.1	LOS A	0.0	0.1	0.07	0.96	0.07	72.6
3	R2	All MCs	4	0.0	4	0.0	0.006	9.0	LOS A	0.0	0.1	0.07	0.96	0.07	72.3
Approach			6	0.0	6	0.0	0.006	9.1	LOS A	0.0	0.1	0.07	0.96	0.07	72.4
East: Bena Road															
4	L2	All MCs	5	0.0	5	0.0	0.012	7.8	LOS A	0.1	0.4	0.03	0.53	0.03	77.2
5	T1	All MCs	5	0.0	5	0.0	0.012	0.0	LOS A	0.1	0.4	0.03	0.53	0.03	85.8
6	R2	All MCs	12	0.0	12	0.0	0.012	7.6	LOS A	0.1	0.4	0.03	0.53	0.03	76.9
Approach			22	0.0	22	0.0	0.012	5.9	NA	0.1	0.4	0.03	0.53	0.03	78.8
North: Whitelaw Road															
7	L2	All MCs	13	0.0	13	0.0	0.011	9.5	LOS A	0.0	0.3	0.03	0.98	0.03	72.1
8	T1	All MCs	1	0.0	1	0.0	0.011	9.1	LOS A	0.0	0.3	0.03	0.98	0.03	72.1
9	R2	All MCs	1	0.0	1	0.0	0.011	8.9	LOS A	0.0	0.3	0.03	0.98	0.03	71.8
Approach			15	0.0	15	0.0	0.011	9.5	LOS A	0.0	0.3	0.03	0.98	0.03	72.0
West: Bena Road															
10	L2	All MCs	1	0.0	1	0.0	0.003	7.8	LOS A	0.0	0.0	0.02	0.23	0.02	83.1
11	T1	All MCs	4	0.0	4	0.0	0.003	0.0	LOS A	0.0	0.0	0.02	0.23	0.02	93.2
12	R2	All MCs	1	0.0	1	0.0	0.003	7.6	LOS A	0.0	0.0	0.02	0.23	0.02	82.7
Approach			6	0.0	6	0.0	0.003	2.6	NA	0.0	0.0	0.02	0.23	0.02	89.5
All Vehicles			49	0.0	49	0.0	0.012	7.0	NA	0.1	0.4	0.03	0.68	0.03	76.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.