Moss Vale Road North Urban Release Area Traffic Study

Internal Traffic Analysis Report

Shoalhaven City Council

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CONTENTS

Tables

Figures

Appendices

1. INTRODUCTION

1.1 Background

Bitzios Consulting (Bitzios) has been engaged by Shoalhaven City Council (Council) to undertake a traffic study for the proposed Moss Vale Road North (MVRN) Urban Release Area (URA), located in Cambewarra, New South Wales (NSW).

The proposed MVRN URA and the surrounding area is shown in Figure 1.1.

SOURCE: Nearmap

Figure 1.1: MRVN URA Location

1.2 Context

This report forms the primary document for the traffic study focusing on the internal design of the URA. Bitzios has also separately competed an external impacts report (*P4627.007R Moss Vale Road North URA Traffic Study External Analysis Report, dated 07/07/2020*).

Both studies have adopted the latest May 2020 TRACKS model for the purpose of extracting forecast traffic volumes to assess the impacts. The May 2020 TRACKS model incorporates the road layout and lot yields of the proposed development, as well as expected changes to other URAs and the local road network.

The proponents have proposed a total of 2,515 dwellings for the MVRN URA. As a result, a traffic study is undertaken for the purpose of informing and developing the Development Control Plan (DCP) for the MVRN URA. The traffic study is to be in accordance to relevant TfNSW guidelines as well as other relevant Australian Standards, Austroads and Council guidelines.

1.3 Scope

The scope for assessment is detailed below:

- Review of all documentation relevant to the traffic study and the development of the subject MVRN URA
- Review of the road typology and proposed intersection arrangement, including road typology, intersection layouts and intersection capacity for forecast traffic volumes
- Review of active transport arrangements, including pedestrian and cycle path placement and forecast volumes
- Review of public transport arrangements, including development of optimal bus routes and bus stop locations
- Extract relevant intersection volumes from the latest May 2020 Shoalhaven-Kiama TRACKS models, as updated for the purpose of these impact assessments
- Development of SIDRA intersection models for the proposed internal URA intersection layout with revised May 2020 TRACKS traffic volumes
- Summarise the findings, including year of failure, failure mechanisms and potential improvements to the layout of the concept design.

2. KEY RELEVANT GUIDELINES & STANDARDS

2.1 Shoalhaven Development Control Plan – Draft Moss Vale Road North Urban Release Area

This draft document provides detailed requirements to facilitate development of land in the MVRN URA and is heavily based on the MVRS URA DCP detailed in Section 2.1. The document mainly guides the design and typology of the development's roads, as well as demonstrate a staging plan to form the public and active transport routes within the URA. Sections 5 and 6 have been shaped by the principles outlined in the Shoalhaven DCP – Draft MVRN URA.

2.2 Shoalhaven Development Control Plan NB3 – Moss Vale Road South Urban Release Area

This document details the requirements to facilitate the development of land in the MVRS URA. The document is in accordance with the provisions stipulated in TfNSW' *Shoalhaven Local Environmental Plan* (LEP), *Part 6* (2014), detailed further in Section 2.8. The objectives of the MVRN URA also closely follow those stipulated in the MVRS DCP, as well as each relevant performance criterion and acceptable solution. Sections 5 and 6 have been shaped by the principles outlined in the Shoalhaven DCP NB3 – MVRS URA.

2.3 Nowra-Bomaderry Structure Plan (2006)

The document comprises of a strategic direction and background report of the Nowra-Bomaderry region. Particularly, it provides transport objectives and principles that apply to the development as part of this structure plan. This traffic study of the MVRN URA follows these transport objectives and outcomes stipulated in the Nowra-Bomaderry Structure Plan.

2.4 Moss Vale Road North Urban Release Area Transport Report

This document details a transportation analysis based on the MVRN Draft DCP. It outlines each strategic transport planning principle detailed within the DCP and summarises the outcomes involved. The categories are separated into principles, transport networks, width of carriageway, layout, speed management and elements of street reserve.

Importantly, the document outlines the required key traffic items to address and the elements of a development proposal within the Nowra-Bomaderry region to consider.

2.5 Shoalhaven Development Control Plan – Chapter G11: Subdivision of Land

This document outlines controls and guidelines for the subdivision of land to all developments of Shoalhaven. Sections 5 and 6 utilise guidelines stipulated in the Shoalhaven DCP – Chapter G11: Subdivision of Land.

2.6 Transport for New South Wales – Guidelines for Public Transport Capable Infrastructure in Greenfield Sites

This document outlines a guideline to delivering public transport capable road design within Greenfield sites. Particularly, the MVRN URA development follows the strategic principles, planning model and road infrastructure requirements stipulated within this document. The principles outlined in the document components shape the internal road network, internal intersections, public transport and active transport sections of the development.

2.7 Australian Standards AS2890.5 Parking Facilities Part 5: On-street Parking (2020)

This document details the minimum requirements and recommendations stipulated by Australian Standards for the provision of on-street parking. The requirements outlined in AS2890.5 provide the design requirements utilised for on-street parking within the road typology of the development. The design of on-street car parking within the cross section of each typology is detailed in Section 5.6.3.

2.8 Shoalhaven Local Environment Plan

This document provides overview of the Shoalhaven local environmental planning provisions of land in accordance with relevant standards. Importantly, *Part 6 Urban Release Areas* stipulates the satisfactory arrangements required before the subdivision of land in an URA.

2.9 Austroads Guidelines

2.9.1 Austroads Guide to Road Design

These documents provide guidance for designers to develop safe and coordinated road alignments that cater for traffic demands at the chosen speed. Traffic outcomes stipulated in these guidelines involve road cross-sections, signalised and unsignalised intersections, roundabouts and active transport considerations. The particular documents utilised for this internal study are:

- Guide to Road Design Part 3: Geometric Design
- Guide to Road Design Part 4A: Unsignalised and Signalised Intersections
- Guide to Road Design Part 4B: Roundabouts
- Guide to Road Design Part 6A: Paths for Walking and Cycling

2.9.2 Austroads Guide to Traffic Management

These documents aim to provide guidance to management traffic outcomes in accordance to typical managing, planning and design principles used nationally. Specific traffic outcomes stipulated in these guidelines involve intersections, interchanges, crossings and local streets. The particular documents utilised for this internal study are:

- Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management
- Guide to Traffic Management Part 8: Local Street Management

2.10 A National Resource Document for Residential Development (AMCORD)

This document details the planning, design assessment and implementation schemes in development residential developments. The guidelines stipulated are aimed to meet the needs of state government, local authorities and relevant housing / development industries.

2.11 TfNSW Guidelines

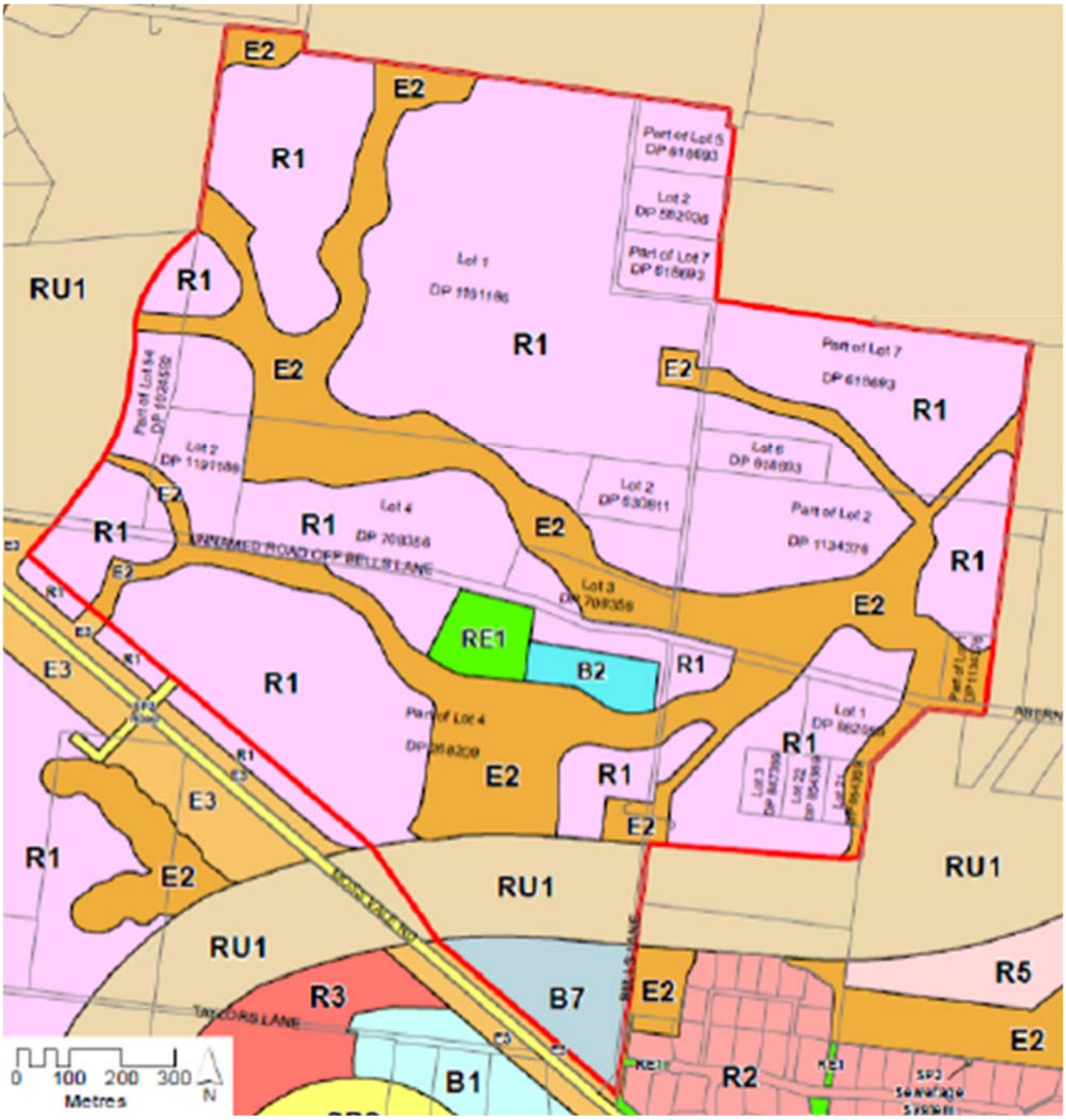
TfNSW documents provide guidance to promoting a standard framework towards proposed projects, programs and initiatives within the NSW transport portfolio. Traffic guidelines used for the purpose of this internal study are:

- TfNSW Economic Parameter Values
- Guidelines for Public Transport Capable Infrastructure in Greenfield Sites
- Traffic Modelling Guidelines

3. PROPOSED DEVELOPMENT

3.1 Development Details

The proposed development is primarily a residential subdivision consisting of residential lots, retail centre, business park and open space / environmental zones. The URA is approximately 266 hectares in area and zoned accordingly to the specific land uses within the development. Figure 3.1 and Table 3.1 outlines the proposed zones and land use of the development.



SOURCE: Shoalhaven City Council

Figure 3.1: Proposed Development Zoning

Table 3.1: Proposed Development Land Zoning

Development Component	Zone ID
Residential	R1 General Residential
Retail / Community Centre	B1 Neighbourhood Centre B2 Local Centre
Business	B7 Business Park
Open Space	RE1 Public Open Space
Environmental Zones	E2 Environmental Conservation E3 Environmental Management

Council have provided an indicative plan of staging based on the proponent's layout plan for the proposed development. The initial stages (i.e. 1 to 6) are expected to be complete by year 2026 and range to the year 2041, defined as Stage 1 to Stage 20. Council's proposed indicative staging plan is shown in Figure 3.2.

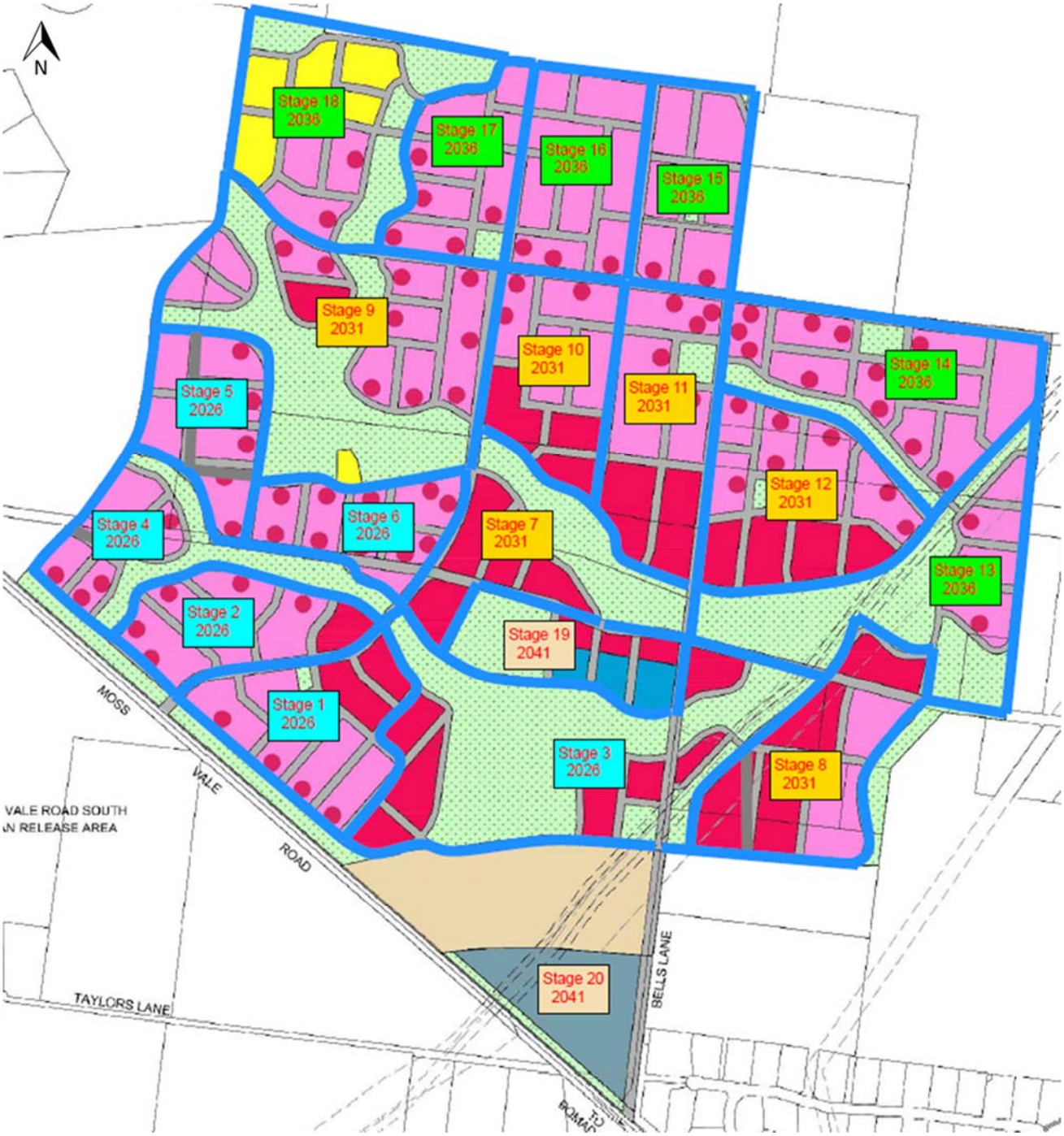


Figure 3.2: Council's Indicative Staging Plan

4. EXTERNAL TRAFFIC ANALYSIS

4.1 Introduction

Bitzios were engaged by Council to undertake an external traffic analysis for the proposed MVRN URA. The external traffic analysis forms Phase A of the MVRN URA Traffic Study undertaken by Bitzios.

4.2 SIDRA Development

Future year modelling scenarios were based on forecast traffic volumes from the Shoalhaven-Kiama TRACKS model, developed by Council and Stantec. The TRACKS model forecasts traffic conditions from 2021 to 2041 in both AAST and 100th Highest Hour (100HH) scenarios. The 2041 scenarios are not exact 2041 traffic volumes, but rather an ultimate development scenario including full occupancy of all other planned URA's including Meroo Meadow.

4.3 Moss Vale Road / Bells Lane / Far North Collector Road Intersection

The modified second iteration intersection proposed is expected to cater for forecast traffic volumes until the year 2036. The modified ultimate intersection form is expected to cater for forecast traffic volumes until the year 2041 in the AAST scenario.

The results indicate that the turn pockets associated with the MVR / Bells Lane / Far North Collector Road (FNCR) intersection (in particular the right turn out of FNCR and the left turn out of Bells Lane) will need to be extended by 20m (FNCR right turn) and 3m (Bells Lane left turn).

While the intersection saturation capacity is not exceeded in the ultimate year, intersection operations could be further improved by adding additional short lanes on approach and on exit, such as an additional right-turn short lane on MVR south eastern approach and short lane on Bells Lane exiting the intersection. Based on the results from the second iteration scenario, it is recommended that the intersection be upgraded to its ultimate form by the year 2036, including addressing the turn pocket extensions as recommended in the external impacts report. The required intersection form and associated turn pocket extensions are being addressed as part of the Far North Collector Road project and there will be no additional upgrades required as part of the planning for the MVRN URA.

4.4 Moss Vale Road / Moss Vale Road South URA Access / Central Boulevard

The intersection remains within acceptable limits of DOS, delay times and LOS outcomes for both AAST and 100HH models.

The proposed layout is evidently efficient in all scenarios proposed in the SIDRA assessment. Noting the MVR north-western approach experiences large peak hour volumes, the results shown conclude a single lane roundabout approach is sufficient for the application of this intersection. The SIDRA results highlight the short 95th percentile back of queue lengths indicating that a single lane approach is deemed sufficient on all approaches.

The required single lane roundabout intersection form and associated works are being addressed as part of the HAF project, and there will be no additional upgrades as part of the planning for the MVRN URA.

4.5 Pestells Lane Interchange & Boxsells Lane Intersection

Pestells Lane interchange remains within acceptable limits of DOS, delay times and LOS outcomes for both AAST and 100HH models. Boxsells Lane intersection remains within acceptable limits of DOS, delay times and LOS outcomes for both AAST and 100HH models until year 2031.

The occurrence of failure at the Boxsells Lane intersection is addressed in future by proposing to close the median break and deny the subject right-turn movements by physical restriction. It is noted these movements could be redirected in future to the adjacent grade separated intersections of the Pestells Lane Interchange to the south and the Devitts Lane / Morschels Lane Interchange to the north, which can adequately accommodate the reassigned traffic.

This is discussed in detail in the external impacts report. Notwithstanding, the proposed intersection treatments being constructed as part of the current Princes Highway upgrade (Berry to Bomaderry) works will be sufficient to accommodate the MVRN URA, and no additional upgrades are recommended as part of the planning for the MVRN URA.

4.6 External Analysis Summary

The key findings of the external traffic analysis for the proposed intersections are as follows:

- The results indicate that the turn pockets associated with the MVR / Bells Lane / FNCR intersection will need to be extended by 20m along the FNCR right turn and 3m along the Bells Lane left turn. These extensions are an amendment to the 'ultimate form' layout of the intersection and not necessary to the 'second iteration' form
- The modified second iteration intersection proposed is expected to cater for forecast traffic volumes until the year 2036. The strategy of building the 'second iteration' up front but with land reservation to accommodate the 'ultimate form' is still supported as the preferred approach, noting the required extension of turn pockets
- The modified ultimate intersection form is expected to cater for forecast traffic volumes until the year 2041 in the AAST scenario. While queue lengths are exceeded in the 2041 100HH scenario, DOS limits are contained at capacity
- A single circulating lane and single lane approaches are deemed sufficient for the application of the MVR / MVRS URA Access / Central Boulevard roundabout
- 95th percentile back of queue lengths extracted from the SIDRA modelling are significantly less than the distance of the MVR western and eastern approaches
- The capacity of the URA roundabout (Central Boulevard) intersection remains within limits for all capacity mechanisms in all scenarios
- The capacity of the Princes Highway / Boxsells Lane intersection remains within acceptable limits for majority of capacity mechanisms from years 2021 to 2026. The right turn from Princes Highway northern approach is noted to fail in year 2031 100HH PM peak period. The Median Storage eastern approach fails by year 2036 in both AAST and 100HH scenarios (the very final stages of the MRVN URA), and Median Storage western approach fails by 2041 100HH PM peak period. This is a result of the forecast traffic volumes on the Princes Highway and traffic turning into Boxsells Lane from the Princes Highway. Notwithstanding, this occurrence would be easily addressed in future by proposing to close the median break and deny the subject right-turn movements by physical restriction
- The proposed layout and conditions are deemed sufficient for the application of the approved Pestells Lane Interchange and the approved intersection treatment for the Princes Highway / Boxsells Lane intersection
- This external impact analysis, following refinement of the Shoalhaven-Kiama TRACKS models to reflect the proponents proposed 2,515 dwellings in MRVN URA, indicates that this level of development could be accommodated by the surrounding state road network.

- Whilst the Abernethy's Lane connection is not 'required' to accommodate the MVRN URA, its role as a possible future connection needs to be preserved with all aspects of planning of the MVRN. This includes ensuring any built works along Abernethy's Lane are at collector road standard to protect this option, which may be triggered in future by either the future Meroo Meadow URA, or as part of the local access solutions associated with the future design of the Western Bypass of Nowra / Bomaderry.

5. INTERNAL ROAD NETWORK

5.1 Overview

The MVRN Draft DCP includes the proponents proposed internal road network layout and typology plan for the development and is detailed in Figure 5.1. Collector roads are shown along Central Boulevard, Village Boulevard, Pestells Lane and Bells Lane, as well as local, green and retail streets provided throughout. A 3-5m central median is proposed along Central Boulevard and partially along Bells Lane within the carriageway.

Council provided an amended sketch based on the proponent's proposed road network layout plan, as detailed in Figure 5.2. Council proposed extensions to the collector road network and provided advice related to indicative roundabout and access locations throughout the development.

The proponent's road layout, as amended by Council was the network incorporated into the updated May 2020 TRACKS models. As part of the model development and assignment to form the May 2020 TRACKS, some further network refinements were undertaken to resolve traffic management issues within the network, as recommended by Stantec.

5.2 Proponent's Proposed Road Network Layout and Typologies

The internal road network and typology proposed by the proponent is demonstrated within the MVRN Draft DCP and provided in Figure 5.1.

SOURCE: MVRN Draft DCP

Figure 5.1: Proponent's Road Typology Plan

5.3 Council Review of Proponent's Proposed Road Network Layout

As part of the scope to develop the May 2020 TRACKS models, Council reviewed the proponent's proposed internal road network layout and typologies and identified a number of amendments. The amendments were subsequently coded into the May 2020 TRACKS models.

Again, as part of the model development and assignment to form the May 2020 TRACKS models, some further refinements were undertaken to resolve traffic management issues within the network, as recommended by Stantec.

5.4 Forecast Traffic Volumes

5.4.1 Forecast Peak Hour Traffic Volumes

The assessment of the proposed internal intersections relied upon forecast AM and PM peak hour traffic volumes extracted from the 2041 TRACKS AAST (Average Annual School Traffic) models as they represent the ultimate development scenario.

5.4.2 Forecast Daily Traffic Volumes

The assessment of the proposed road typologies in-part relied upon the analysis of forecast daily traffic volumes. The forecast traffic volumes were extracted from the 2041 TRACKS models. Given the TRACKS models only provide one-hour peak volumes, an expansion factor was required to convert the one-hour peak volumes to daily volumes.

Existing traffic volumes on collector roads and streets in the Nowra area were assessed by Council to determine an expansion factor which could be used to convert the forecast one-hour peak volumes into forecast daily traffic volumes. Council determined an expansion factor of 11.765 was found to represent roads such as Illaroo Road. This rate is generally consistent with the expansion factor of 11.5 for rural roads as specified in TfNSW's *Economic Parameter Values (September 2019).*

5.5 Cross Section Components

5.5.1 Travel Lanes

Austroads *Guide to Road Design Part 3: Geometric Design* notes that it is current Australia (and New Zealand) practice to provide standard traffic lane widths of 3.5m. This is because 3.5m allows for large vehicles to pass or overtake, without either vehicle having to move sideways towards the outer edge of the lane. However, it notes that traffic lane widths can be reduced to 3.0m – 3.4m on low speed roads with low truck volumes.

TfNSW's *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites* requires the traffic lanes widths to allow a bus service to operate safely and efficiently as follows:

- Minimum 3.5m standard traffic lane widths are desirable on all road types
- Minimum 3.5m traffic lane width for a 60km zone
- Minimum 3.2m traffic lane width for a 50km zone, provided there is no centre median.

5.5.2 Parking Lanes

Australian Standard *AS2890.5 Parking Facilities Part 5: On-street parking* (2020) specifies widths for parallel on-street parking spaces for cars and light commercial vehicles as provided in Table 5.1.

Table 5.1: Australian Standards Parallel Parking Space Width – Cars and Light Vehicles

Speed Limit (km/h)	Space Width Range (m)	Safety Buffer (m)	Total Width (m)
50 or less	2.0 to 2.3	0	2.0 to 2.3
60	2.0 to 2.3	0.5	2.5 to 2.8
70	2.0 to 2.3	1.5	3.5 to 3.8
80 or more	On-street parking not recommended		

TfNSW's *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites* requires the kerb side lanes widths to allow a bus service to operate safely and efficiently as follows:

- Minimum width of 3.5m where the kerb side lane operates as a travel lane, to allow buses to use the lane without passing over drainage structures

- Minimum width of 3.0m where the kerb side lane operates as a parking lane, to allow for bus stops and allow the bus to move out of the through traffic lane
- Minimum width of 3.5m where the kerb side lane operates as both a travel lane and a parking lane.

5.5.3 Offset

Austroads *Guide to Road Design Part 6A: Paths for Walking and Cycling* specifies a minimum horizontal clearance of 1.0m between the edge of pathways and vertical obstructions. As such, the offset should be provided at a minimum of width 1.0m from the adjacent property boundary.

5.5.4 Pathway

Austroads *Guide to Road Design Part 6A: Paths for Walking and Cycling* details the dimensions shown in Table 5.2

Table 5.2: Austroads Guide to Road Design – Shared Path Widths

	Suggested path width (m)		
	Local access path	Regional path	Recreational path
Desirable minimum width	2.5	3.0	3.5
Minimum width – typical maximum	2.0– 3.0	2.5 – 4.0	3.0 – 4.0

Council's *DCP Chapter G11: Subdivision of Land* notes the following with regards to pathways:

- A36.2 – Footpaths are provided on one side of streets with traffic volumes over 2,000 vehicles per day (vpd) as pedestrians can share the roadway with vehicles in a low speed environment with traffic volumes less than 2,000vpd
- A38.2 – Footpaths are to be 1.2m wide
- A38.3 – Footpaths are widened to a minimum of 1.4m in the vicinity of meeting points, schools, shops and other activity centres.
- A39.1 – Dedicated cycle paths are shown to have been considered and planned for where traffic volumes reach 5,000vpd

Council's *Engineering Design Specification D8 Cycleway and Pathway Design* details the dimensions provided in Table 5.3.

Table 5.3: Council Cycleway and Pathway Design – Minimum Design Standards

	Cycleway	Pathway	Dual Use Pathway
Path Width	2.0m	1.2m	2.0m

In consideration of the shared use pathway (SUP) widths specified in Austroads and Council's *Engineering Design Specification*, 2.0m wide SUP should be provided as a minimum. An increase in width to 2.5-3.0m should be considered through the riparian corridors to support recreational use.

5.5.5 Planting

From a traffic engineering and transport planning perspective, the width of the planting component within the verge is generally dictated by the width of the proposed pathway and offsets between any vegetation and adjacent carriageway/pathway.

5.5.6 Median

TfNSW's *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites* notes that medians should not be included on roads that may be used by buses as it allows for buses to continue providing services in the event of vehicle being inappropriately parking. If a median is necessary (i.e. to physically restrict turn movements), they should be designed as bus mountable. Accordingly, and to keep road reservation widths from being excessive, medians are not recommended to be provided along the URA's collector road network.

5.6 Road Typology Assessment

5.6.1 Road Typology Assessment Mechanism

In the absence of any national or state guidelines (e.g. Austroads, TfNSW) for determining daily capacity of road typologies, a review of Council's and surrounding local government area's (LGAs) road cross sections was undertaken.

The road typology of the development is defined based on the number of vehicles per day, shown in Table 5.4.

Table 5.4: Control Volumes for Road Typology

Road Type	Control volume in vehicles per day (v)
Collector Road – Tier 1	17,500 ≤ v ≤ 35,000[1]
Collector Road – Tier 2	v ≤ 17,500
Local Street	v ≤ 3,500
Riparian Street	v ≤ 3,500
Access Street – Tier 1	350 ≤ v ≤ 700
Access Street – Tier 2	v ≤ 350

Note: If collector road tier 1 is converted to a 4-lane cross section in the future, vehicle capacity is significantly increased

5.6.2 Council's Proposed Road Typology

Council's proposed road typology based on the proponent's layout is shown in Figure 5.2.

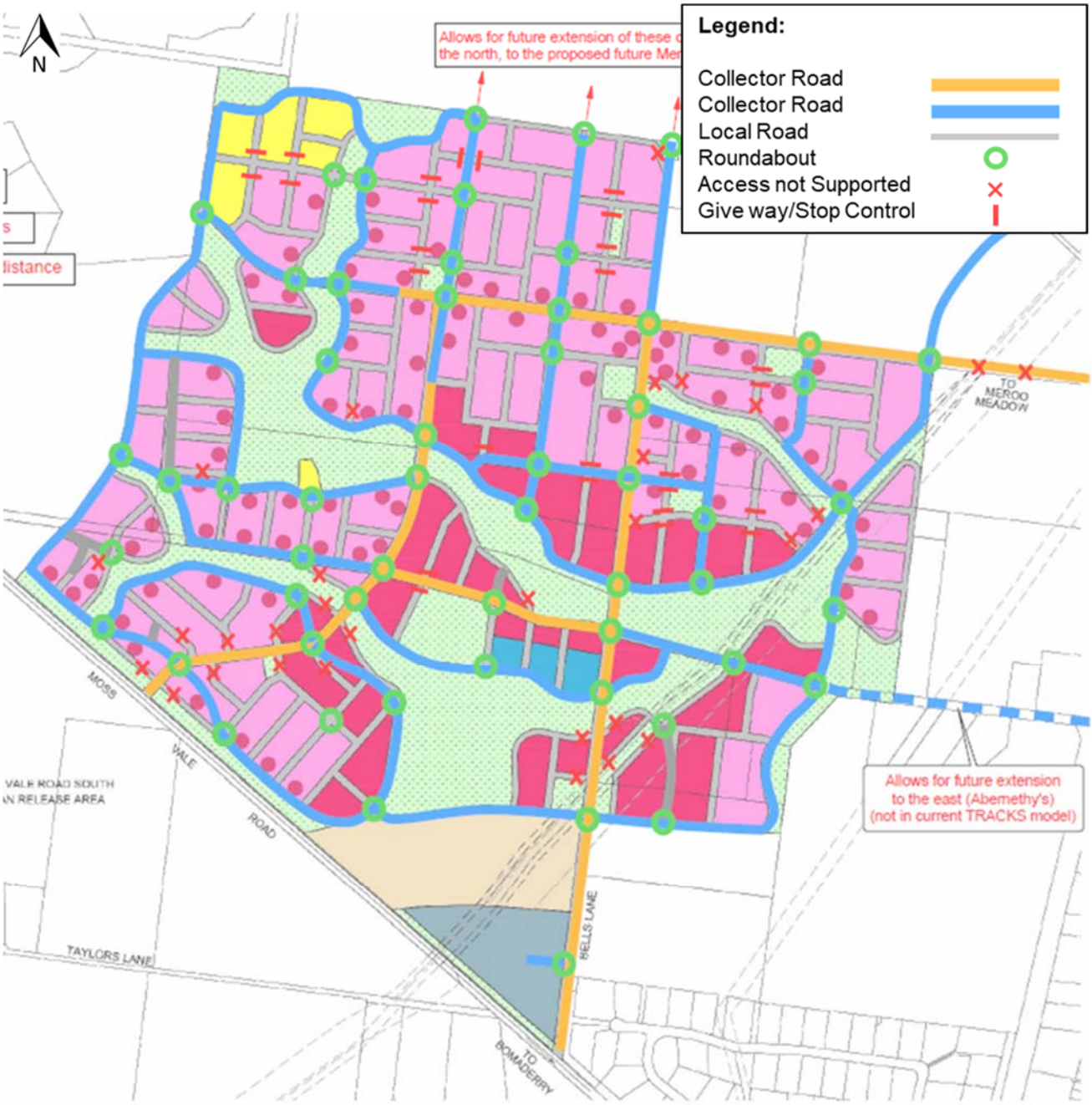


Figure 5.2: Proponent's Road Typology with Council's Original Amendments (Prior to the May 2020 TRACKS Update)

5.6.3 Proposed Road Cross Sections

While the road typology map shows two types of roads, the proponent has provided 12 potential road cross sections in the MVRN Draft DCP.

5.6.3.1 Collector Road

The proponent's cross section for a collector road with and without a median is detailed in Table 5.5 and Table 5.6.

Table 5.5: Proposed Road Cross Section – Collector Road with Median

Verge			Carriageway					Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Median	Lane	Parking	Plant	Path	Offset	
0.5	2.5	1.3	2.1	4.5	3 – 5+	4.5	2.1	2.3	1.5	0.5	24.8m+
4.3			16.2+					4.3			

Table 5.6: Proposed Road Cross Section – Collector Road without Median

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
0.5	2.5	1.3	2.1	9	2.1	2.3	1.5	0.5	21.8m
4.3			13.2			4.3			

The recommended cross sections for collector roads are detailed in Table 5.7 and Table 5.8.

Table 5.7: Recommended Road Cross Section – Collector Road – Tier 1

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
1.0 – 1.5	1.5 – 2.0	1.5	3.5	7	3.5	1.5	1.5 – 2.0	1.0 – 1.5	23.0m
4.5			14			4.5			

Table 5.8: Recommended Road Cross Section – Collector Road – Tier 2

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
1.0 – 1.5	1.5 – 2.0	1.5	3	7	3	1.5	1.5 – 2.0	1.0 – 1.5	22.0m
4.5			13			4.5			

As shown in Table 5.7 and Table 5.8, two different cross sections have been recommended for the collector road typology. The Collector Road – Tier 1 cross section provides wider parking lanes to allow for a future upgrade to a four-lane cross section with minimal to no civil works. It has been developed for use on key north-south and east-roads through the development that will have immediate or future connections to the existing road network or future URAs (e.g. Meroo Meadow). The recommended Collector Road – Tier 2 cross section includes 3m wide parking lanes in consideration of the minimum width for kerbside bus stops.

The traffic lanes for both collector road cross sections are recommended at 3.5m, which is consistent with Austroads and TfNSW guides for a road of this hierarchy and speed.

The collector road cross sections are recommended to exclude a median. Bus routes are to be located on the collector roads and therefore it is suitable to provide a wider road lane rather than a median.

A minimum offset width of 1m is recommended as per Austroads guides, which can cater for a 2.0m wide SUP. Where is 1.5m wide pathway is provided, the offset is increased to 1.5m. It is recommended that a 2.0m wide SUP is provided within at least one verge, with a 1.5m wide pathway provided on the other verge.

5.6.3.2 Local and Retail Streets

The proponent's proposed cross section for local and retail streets are detailed from Table 5.9 to Table 5.12.

Table 5.9: Proposed Road Cross Section – Local Street

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
0.5	2.5	1.3	2.1	5.5 – 7	2.1	2.3	1.5	0.5	18.3 – 19.8
4.3			9.7 – 11.2			4.3			

Table 5.10: Proposed Road Cross Section – Rural Edge – Local Street

Verge			Carriageway		Verge			Total Reserve
Offset	Path	Plant	Lane	Parking	Plant	Path	Offset	
0.5	2.5	1.3	5.5	2.1	2.3	1.5	0.5	16.2m
4.3			7.6		4.3			

Table 5.11: Proposed Road Cross Section – Retail Parking Streets

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
0.5	1.5	2	5.5	9	5.5	2	1.5	0.5	28m
4			20			4			

Table 5.12: Proposed Road Cross Section – Half Local Street (Construction Boundaries)

Carriageway			Verge			Total Reserve
Offset	Lane	Parking	Plant	Path	Offset	
1	3.5	2.1	2.3	1.5	0.5	10.9m
6.5			4.3			

The recommended cross section for the local and retail street is detailed in Table 5.13.

Table 5.13: Recommended Road Cross Section – Local and Retail Street

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
1	1.5 – 1.8	2	2.3	9	2.3	2	1.5 – 1.8	1	20.6 – 21.2m
4.5 – 4.8			11.6			4.5 – 4.8			

The proposed local and retail street cross sections are recommended as one defined cross section.

The key recommendation for the Retail Street is to consider parallel on-street parking rather than angled on-street parking. This considers the traffic volumes expected in the village centre as well as the excessive road reserve width required under AS2890.5. Noting this, the preference would be for parking demand within the village centre to be catered for by off-street (private and public) parking provisions.

The parking lane within the carriageway is provided at 2.3m for parallel parking in accordance to AS2890.5. It is recommended to line mark individual parking spaces along Retail Streets as per AS2890.5.

The total width of the cross section, particularly retail streets, considers potential higher traffic volumes (i.e. 200 – 800 veh/h) to accommodate a wider range of future commercial and retail

developments. Currently, tenancies along Village Boulevard are not confirmed as part of the central zone of the URA.

A minimum 1.8m pathway is recommended for retail streets in accordance to Council's DCP *Chapter G17 Business, Commercial and retail Activities*, however full width paving between the road and road reserve boundaries with appropriate landscaped/streetscape treatments may also be considered within and around the retail centre.

5.6.3.3 Riparian Street

The proponent's cross section for riparian streets are detailed from Table 5.14 to Table 5.18

Table 5.14: Proposed Road Cross Section – Riparian Edge – Local Street

Verge	Carriageway		Verge			Total Reserve
Plant	Lane	Parking	Plant	Path	Offset	
1	5.5	2.1	2.3	1.5	0.5	12.9m
1	7.6		4.3			

Table 5.15: Proposed Road Cross Section – Green Street Option 1

Verge			Carriageway		Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Plant	Path	Offset	
0.5	2.5	1.3	2.1	5.5	2.3	1.5	0.5	16.2m
4.3			7.6		4.3			

Table 5.16: Proposed Road Cross Section – Green Street Option 2

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
0.5	2.5	1.3	2.1	3.5	2.1	2.3	1.5	0.5	16.3m
4.3			7.7			4.3			

Table 5.17: Proposed Road Cross Section – Rural Edge – Green Street

Verge			Carriageway		Verge			Total Reserve
Offset	Path	Plant	Lane	Parking	Plant	Path	Offset	
0.5	2.5	1.3	4	2.1	2.3	1.5	0.5	14.7m
4.3			6.1		4.3			

Table 5.18: Proposed Road Cross Section – Riparian Edge – Green Street

Verge	Carriageway		Verge			Total Reserve
Plant	Lane	Parking	Plant	Path	Offset	
1	4	2.1	2.3	1.5	0.5	11.4m
1	6.1		4.3			

The recommended cross section for a Riparian Street is detailed in Table 5.19.

Table 5.19: Recommended Cross Section – Riparian Street

Verge	Carriageway		Verge			Total Reserve
Plant	Lane	Parking	Plant	Path	Offset	
2	7	2.3	2	1.5	1	15.8m
2	9.3		4.5			

A SUP is considered where the verge is 2m wide of the cross section, and wider shared user paths (2.5-3m) should be considered for the riparian zones as recommended in Section 5.5.4. This side of the verge is also proposed within the riparian zone and as a result, the SUP is to be located adjacent to the road cross section. The 4.5m verge is located along the opposing side of the cross section.

The parking lane within the carriageway is provided at 2.3m for parallel parking in accordance to AS2890.5.

5.6.3.4 Rear Laneway

The proponent's cross section for the Rear Laneway is detailed in Table 5.20.

Table 5.20: Proposed Road Cross Section – Rear Laneway

Verge	Carriageway	Verge	Total Reserve
Plant	Lane	Offset	
0.5	5	0.5	6m

The recommended cross section for the Rear Laneway is detailed in Table 5.21.

Table 5.21: Recommended Cross Section – Rear Laneway

Verge	Carriageway	Verge	Total Reserve
Plant	Lane	Offset	
2.5	6	2.5	11m

As shown in Table 5.21, verge widths within the Rear Laneway cross section include planting along one verge and a 2.5m offset from the property boundary within the other verge. The verge width has been recommended based on pedestrian sight triangle dimensions specified in Australian Standard *AS2890.1 Parking Facilities Part 1: Off-street car parking* (2004). Discussions with Council's officers identified the requirement for wider verges to avoid services being located beneath the carriageway.

A 6m wide carriageway is recommended to permit two-way traffic flow during waste collection or in case of a vehicle breakdown.

5.6.3.5 Access Street

The recommended cross sections for the access street typology is detailed in Table 5.22 and Table 5.23.

Table 5.22: Recommended Cross Section – Access Street – Tier 1

Verge			Carriageway			Verge			Total Reserve
Offset	Path	Plant	Parking	Lane	Parking	Plant	Path	Offset	
1	1.5	1	2	5.5	2	1	1.5	1	16.5m
3.5			9.5			3.5			

Table 5.23: Recommended Cross Section – Access Street – Tier 2

Verge			Carriageway	Verge			Total Reserve
Offset	Path	Plant	Lane	Plant	Path	Offset	
1	1.5 – 2.0	1.5 – 2.0	7.5	1.5 – 2.0	1.5 – 2.0	1	16.5m
4.5			7.5	4.5			

As shown in Table 5.22 and Table 5.23, two different cross sections have been recommended for the access street typology. The Access Street – Tier 1 cross section is recommended to provide a wider carriageway to support higher traffic volumes, determined by forecast daily traffic volumes. The Access Street – Tier 2 cross section is recommended for lower traffic volumes and as a result, lesser carriageway width and greater verge width.

The Access Street – Tier 1 cross section is recommended to provide 2m wide on-street car parking in accordance with AS2890.5.

5.6.4 Corner Truncations

Corner truncation (splay) requirements in Council's *Engineering Design Specifications D1 (1999)* have been considered. Based on the review, and in consideration of the proposed road typologies, the recommended corner truncations are detailed in Table 5.24.

Table 5.24: Recommended Design of Corner Truncations

Road 1	Road 2	Geometric Consideration (m)
Collector Road	Any road	4 x 4
Non-collector Road	Non-collector Road	3 x 3

The dimensions provided in Table 5.24 are specific to priority-controlled intersections within the URA. They consider safe intersection sight distance (SISD) principles outlined in Austroads *Guide to Road Design Part 4a – Unsignalised and Signalised Intersections.*

For roundabouts, the provision of corner truncations should be determined in accordance with the processes outlined in Austroads *Guide to Road Design Part 4B Roundabouts – Section 3*. This process should be undertaken for each roundabout on a separate basis, with the dimensions in Table 5.24 representing the minimum corner truncations (corner boundary splays) to be achieved, subject to roundabout design requirements which may require further boundary adjustments.

5.6.5 Kerb Returns

Kerb returns are recommended to be provided based on those specified in Council's DCP *Chapter G11: Subdivision of Land*. The recommended minimum kerb return radii are detailed in Table 5.25.

Table 5.25: Recommended Minimum Kerb Return Radium in Residential Streets

Street Type	Minimum Kerb Return Radius
Access Street	6m
Local / Retail / Riparian Street	6m
Laneway	5m
Collector Road	8m

In addition to this, vehicle swept paths should be undertaken to demonstrate compliance to the application of these kerb returns in accordance to Austroads *Guide to Road Design Part 4 – Section 5*.

5.6.6 Cul-de-sacs

The design of cul-de-sacs should be undertaken in accordance with Council's *Standard Drawing 2637-36 – Typical Geometry of Cul-de-sac*. The minimum turning head radius required for cul-de-sacs is 9.5m.

5.6.7 Recommendations

5.6.7.1 Road Typology

It is recommended the road typology provided in the MVRN Draft DCP is amended to reflect that shown in Figure 5.3.

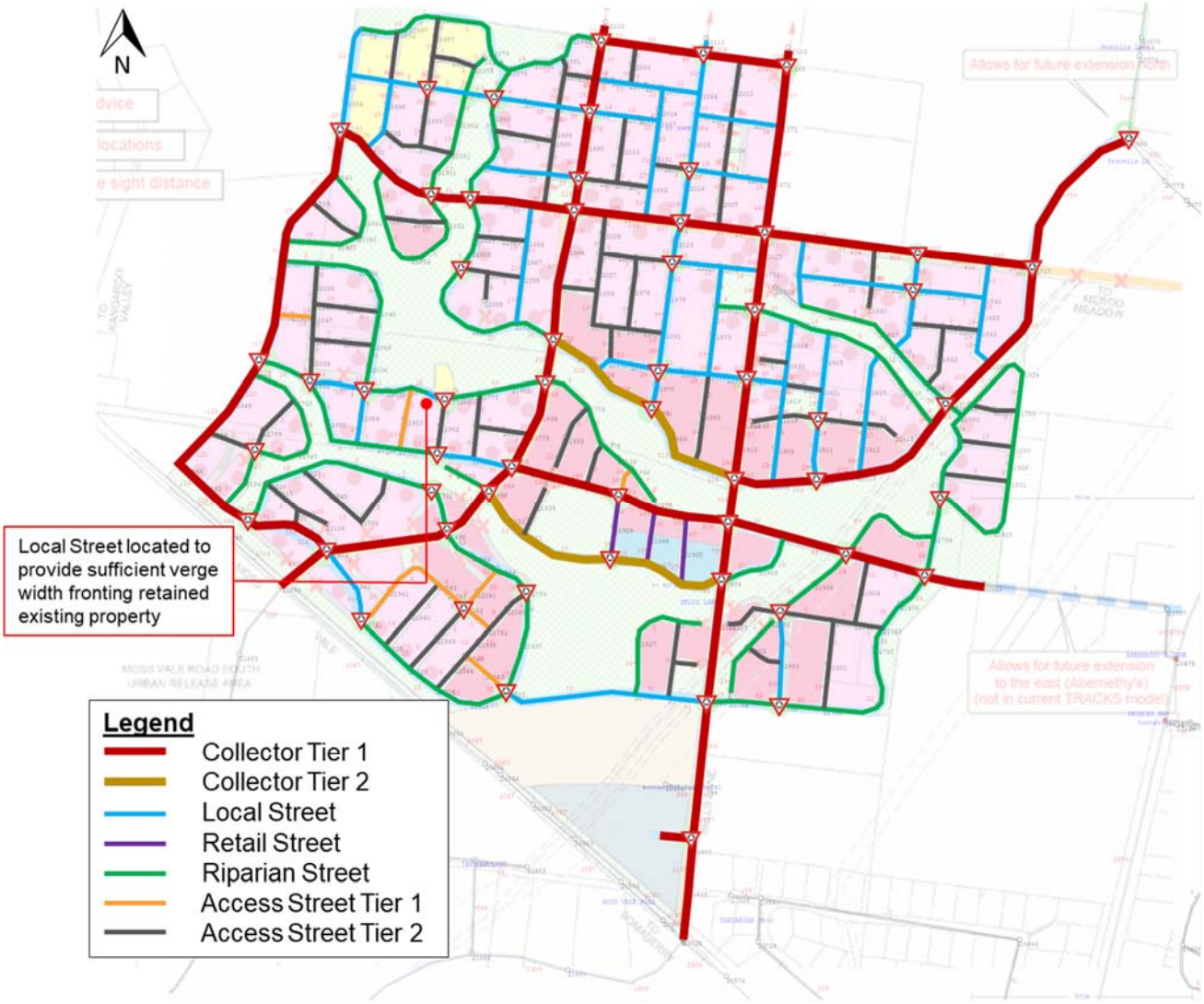


Figure 5.3: Proposed Road Network Layout and Typology

5.6.7.2 Restricted Direct Vehicular Access

Direct driveway access to and/or from collector roads within the URA is recommended to be prohibited for those locations shown on Figure 5.4, which are those primary external connections that will be carrying the most traffic. This is to reduce conflicts in those zones, ensuring adequate efficiency and road safety on these important external connections.

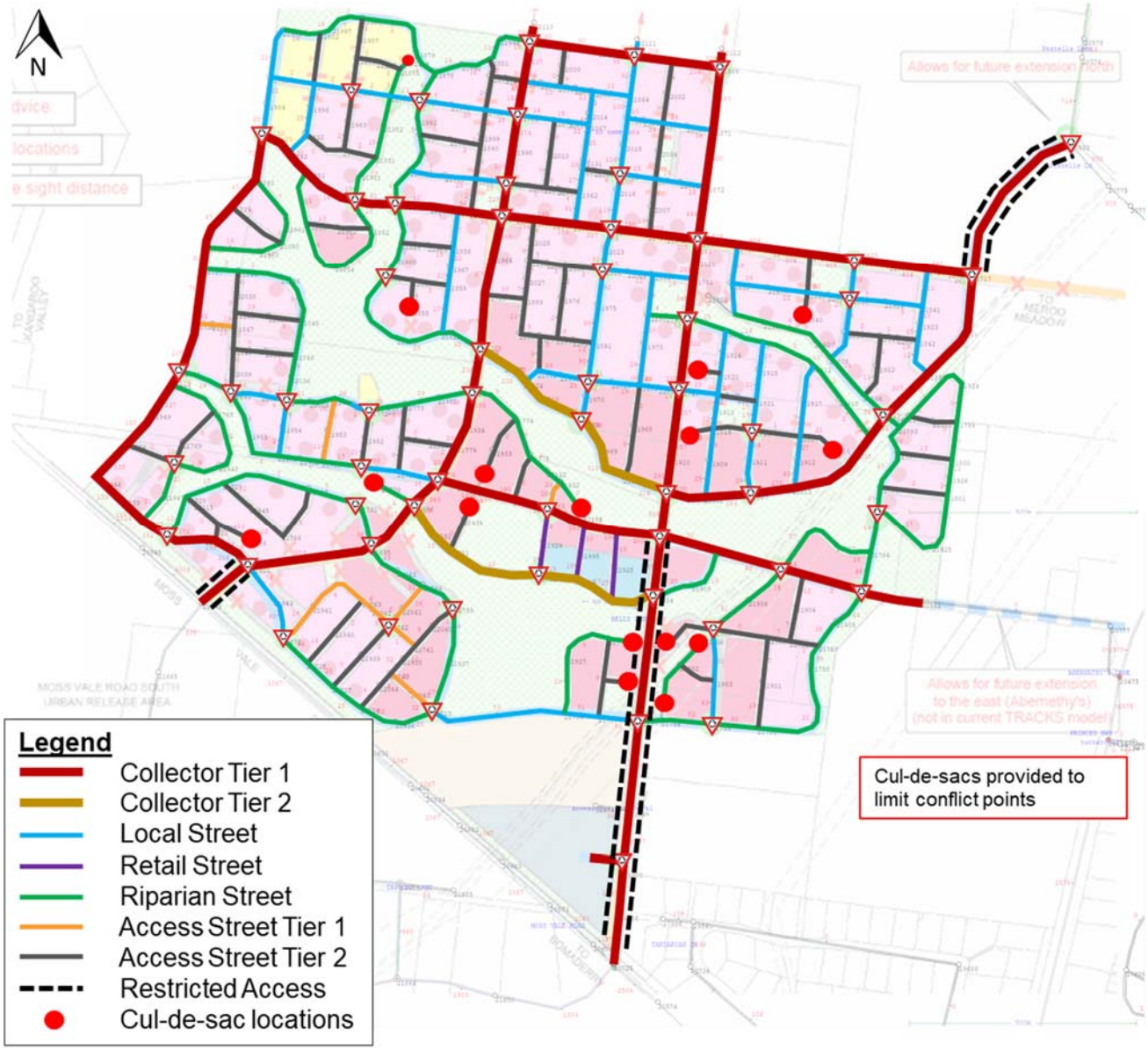


Figure 5.4: Recommended Restricted Access Treatment

As shown in Figure 5.4, a number of streets proposed by the proponent to intersection with collector roads are recommended as cul-de-sacs to reduce the number of conflicts. For corner lots with at least one frontage on a collector road, it is recommended vehicular access be provided via the lower order road to minimise conflicts.

5.7 Roundabout Assessment

5.7.1 Assessment Locations

The key roundabouts assessed are based on Council's amended road typology sketch and shown in Figure 5.5.

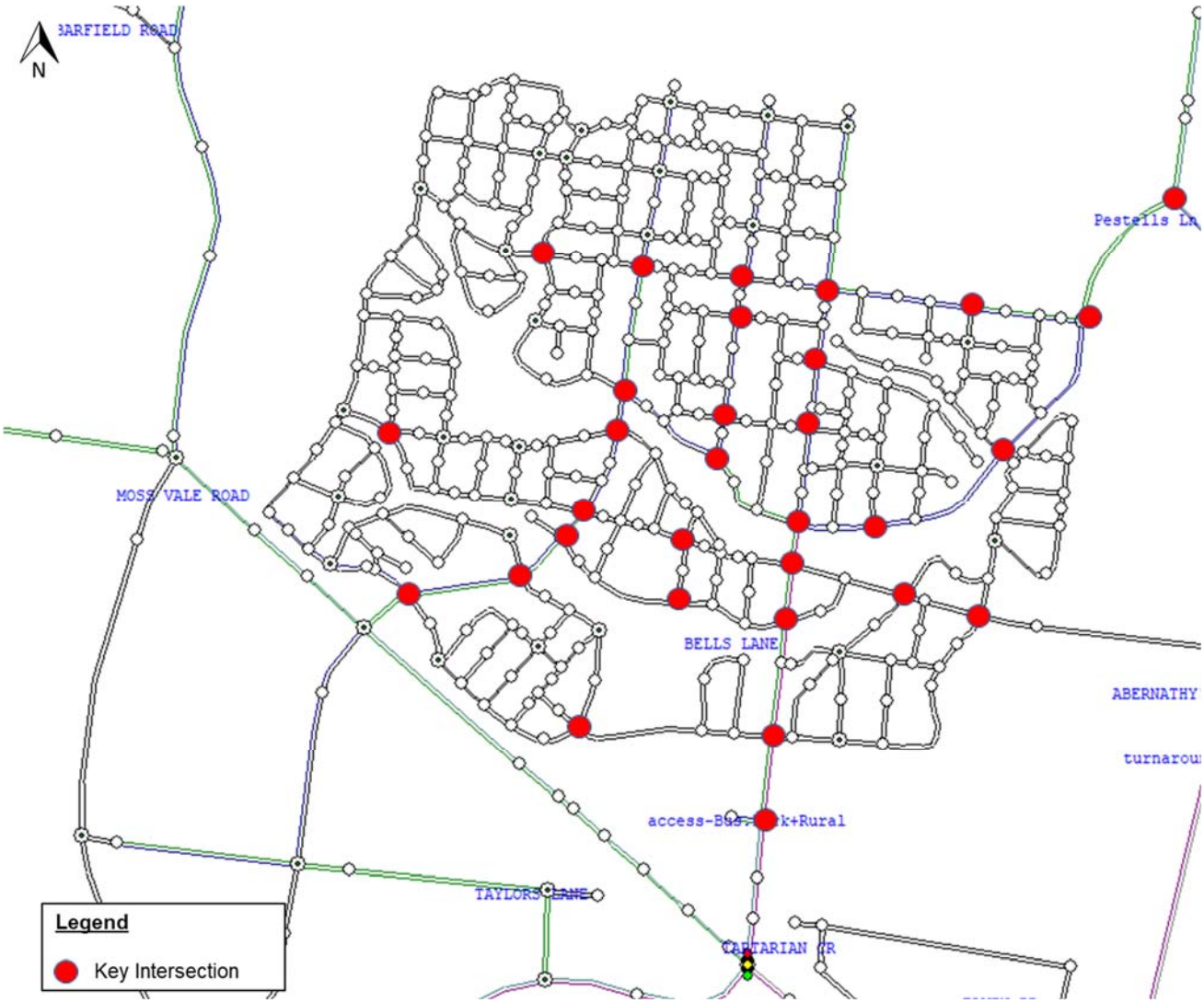


Figure 5.5: MVRN URA Key Intersections

5.7.2 Capacity Mechanisms

It is necessary to define intersection capacity and over-capacity mechanisms in order to inform the intersection upgrades required. Intersection modelling is undertaken under Transport for New South Wales' (TfNSW) *Traffic Modelling Guidelines* (2013). Intersection capacity limits are to be consistent with the following conditions:

- Roundabouts: Maximum practical Degree of Saturation (DOS) is 0.85.

Table 5.26 is sourced from TfNSW' *Traffic Modelling Guidelines* (2013) and indicates the control delay for vehicle Level of Service (LOS) calculations.

Table 5.26: Control Delay for Vehicle LOS Calculations

Level of Service	Control delay per vehicle in seconds (d) (including geometric delay)
	All Intersection Types
A	d < 14
B	d < 15 to 28
C	d < 29 to 42
D	d < 43 to 56
E	d < 57 to 70
F	d > 70

5.7.3 Intersection Parameters and Geometry

Key intersections shown in Figure 5.5 have been assessed in detail including SIDRA analysis. These include roundabouts identified on the proponent's indicative road layout, or those added in subsequent amendments by Council and Stantec. For the purpose of SIDRA modelling, local, retail, riparian and access street roundabouts are assumed to inherit identical roundabout dimensions (i.e. central radius, circulating width) and are referred to as 'Streets' throughout Section 5.7. Collector Roads Tier 1 and Tier 2 roundabouts are to inherit identical dimensions and are referred to as 'Collector Roads' throughout Section 5.7. In the process of modelling each intersection within SIDRA, each roundabout along the road network was designed to relevant standards and Council guideline requirements.

The central island radius and circulating carriageway width of each roundabout was sourced from Austroads *Guide to Road Design Part 4B Roundabouts*. The roundabout dimensions are detailed in Table 5.27.

Table 5.27: Internal Roundabout Island Radius and Circulating Width (For purposes of Traffic modelling)

Road Typology	Central Island Radius (m)	Circulating Width (m)
Collector Road	12	7.6
Streets	8	6.7

As shown, both the central island radius and circulating width differ as per the road typologies within the road network. Roundabouts along collector roads require a 12m central island radius and 7.6m circulating width to allow manoeuvrability of a 19m semi-trailer design vehicle within the URA. Roundabouts on roads with a lesser hierarchy than collector roads, streets, require an 8m central island radius and 6.7m circulating width as the minimum requirements in accordance to Austroads guides.

Roundabouts within the URA road network are required to demonstrate sufficient spacing between each intersection. Minimum spacing between intersections within residential streets are required in accordance to Council's DCP *Chapter G11: Subdivision of Land* and detailed in Table 5.28.

Table 5.28: Spacing of Intersections Along Residential Streets

Scenario	Spacing Between Intersections	
	Streets	Collector Roads
On same side of through street	60m	100m
On opposite sides of through streets	40m	60m
3 or more consecutive roundabouts	70m	70m

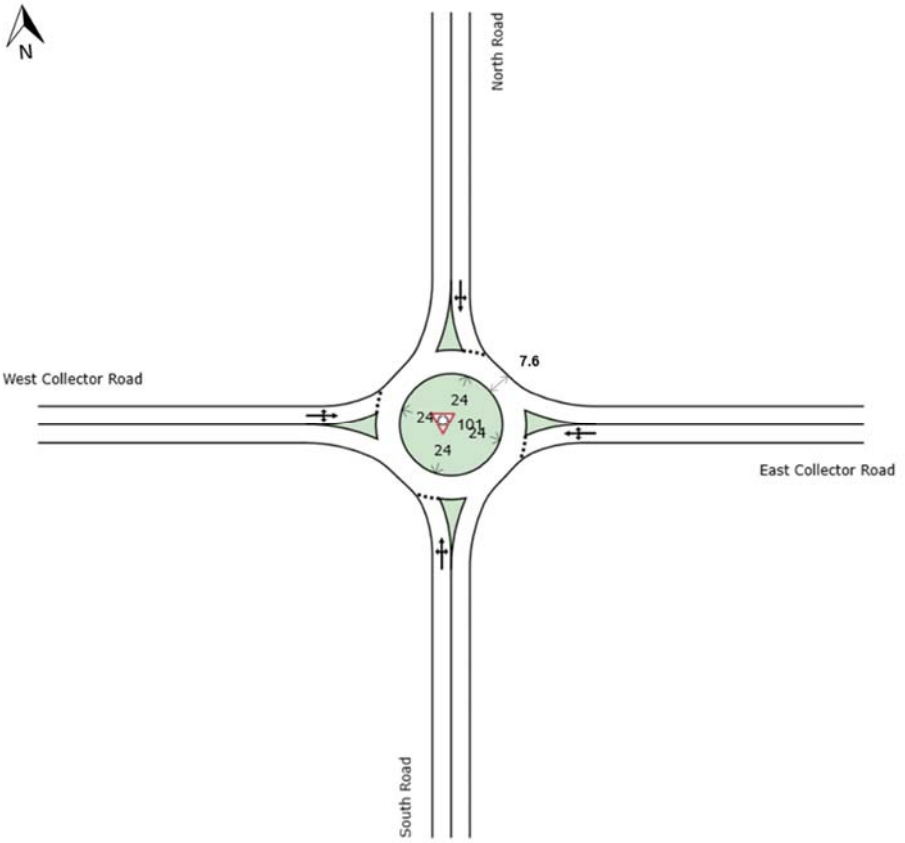
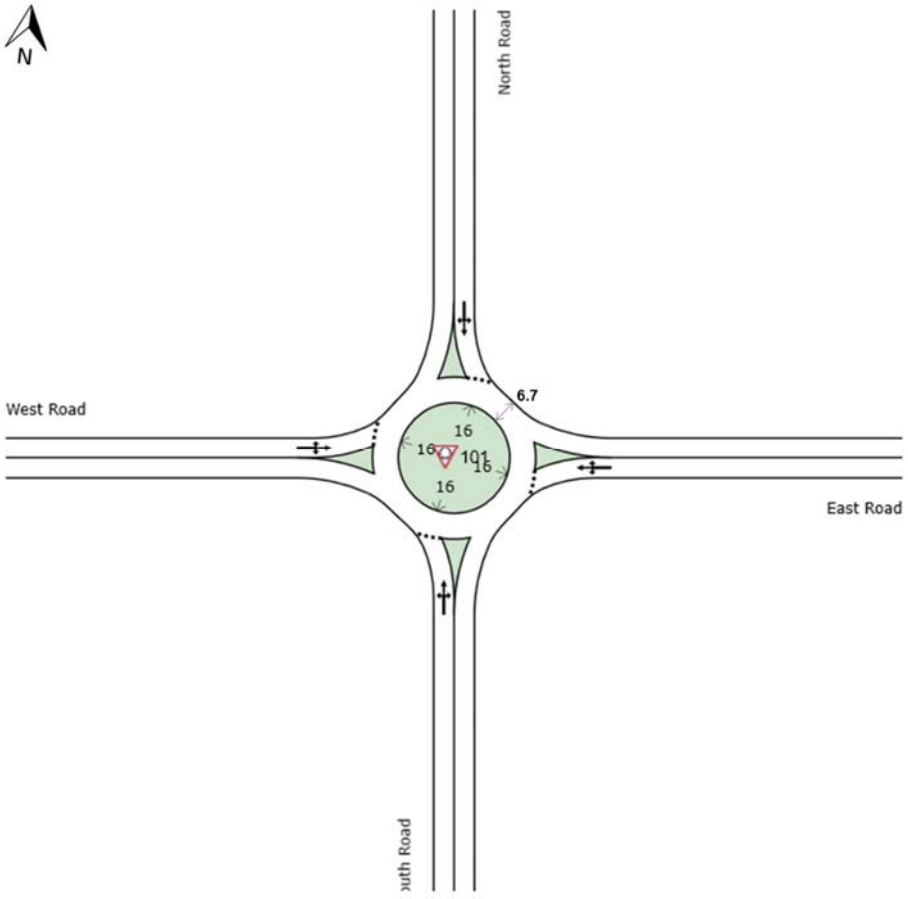
All intersections within the URA have been reviewed and the recommended intersection spacings are supported and comply with Table 5.28.

It is noted that roundabouts of smaller dimensions have been approved across the broader Council road network, however the above dimensions reflect current Austroads guidelines. Lesser dimensions may be considered by Council on a case by case basis however lesser dimensions are unlikely to be supported by technical standards, and it is recommended that greenfield developments comply with current best practice guidelines.

5.7.4 Intersection Scenarios

The intersection arrangements within the MRVN URA have been modelled as roundabouts throughout the road network. The SIDRA layouts are roundabout configurations allocated for collector roads and streets, as shown in Table 5.29.

Table 5.29: SIDRA Roundabout Layouts

Intersection Scenario	Configuration
Collector Road	
Streets	

5.7.5 Model Outputs

The SIDRA output summary sheets for each traffic and intersection scenario of the proposed internal URA road layout are provided in **Appendix A**.

The SIDRA assessment outputs for each traffic and intersection scenario of the proposed internal URA road layout are provided in **Appendix B**. An overview of the roundabout node numbers in reference to the TRACKS model is also demonstrated.

5.7.6 Collector Road Roundabouts

The intersection remains within acceptable limits of DOS, delay times and LOS outcomes for both AM and PM peak periods of 2041 AAST.

DOS values are at the lowest of 0.01 for Node 21750 in the AM peak and rise to a maximum of 0.58 for Node 21899 in the AM peak hour Bells Lane northern approach. LOS of 'A' remains consistent throughout all scenarios of the intersection. The 95th percentile queuing length reaches 42.8m for Node 21899 in the AM peak hour along the Bells Lane northern approach, however a delay time of 9.7 seconds remains consistent with the TfNSW conditions detailed in Table 5.26.

The roundabout locations are supported following a review of the traffic analysis and with regards to road safety and local area traffic management.

5.7.7 Street Roundabouts

The intersection remains within acceptable limits of DOS, delay times and LOS outcomes for both AM and PM peak periods of 2041 AAST.

DOS values are at the lowest of 0.01 for Node 21744 in the AM peak and rise to a maximum of 0.51 for Node 20592 in the AM peak hour Pestells Lane northern approach. LOS of 'A' remains consistent throughout all scenarios of the intersection. The 95th percentile queuing length reaches 29.5m for Node 20592 in the AM peak hour along the Pestells Lane northern approach, however a delay time of 9.7 seconds remains consistent with the TfNSW conditions detailed in Table 5.26.

The roundabout locations are supported following a review of the traffic analysis and with regards to road safety and local area traffic management.

5.7.8 Results Summary

A summary of the intersection assessment is provided in Table 5.30, with green boxes indicating the intersection is within capacity, yellow boxes indicating is at capacity, and red boxes indicating the intersection is over-capacity.

Table 5.30: Internal URA Intersections Results Summary

Intersection Scenario	Model Scenario	
	2041 AAST AM Peak	2041 AAST PM Peak
Collector Road	Under	Under
Streets	Under	Under

5.7.9 LATM Assessment

A local area traffic management (LATM) assessment has been undertaken in regard to the location of roundabouts within the subject URA. AMCORD's *Design Elements* (1995) states the following in terms of designing for safety,

"*Roundabouts are primarily used at junctions and intersections to reduce the number of conflict points in turns. They can also be used for speed control (they tend to keep vehicle speeds more constant than other devices, with fewer stops/starts, …*

Vertical alignments, such as speed humps and platforms, can be effective but are also unpopular with drivers and cause problems for buses, motorcyclists and emergency vehicles. Their use should therefore generally be discouraged."

AMCORD's minimum spacing of junctions along residential streets is detailed in Table 5.31.

Table 5.31: Spacing of Junctions Along Residential Streets

Road Typology	Spacing Between Intersections
Collector Road	80m
Streets	40m

As shown, the minimum spacing of intersections is lesser to the requirements of Austroads *Guide to Road Design Part 4B Roundabouts* specified in Section 5.7.3. As a result, the proposed intersection spacing within the URA is deemed sufficient.

Other LATM guidelines that apply to the development are stipulated in Austroads *Guide to Traffic Management Part 8* (2020). Treatment types such as vertical deflection types, threshold treatments and tactile surface treatments are not preferred within residential areas due to the acoustic impacts and the adverse impacts for buses, commercial vehicles and emergency vehicles. Preferred treatments for residential areas are horizontal deflection types (i.e. roundabout) due to the high volume of through traffic.

The proposed roundabout locations are supported following a review of not just the traffic analysis but best practice guidelines with regards to local area traffic management.

5.7.10 Turn Warrants Assessment

A turn warrants assessment has been undertaken for all priority-controlled intersections located on the recommended collector roads. The turn warrants assessment has been undertaken in accordance with Austroads *Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management* (2020). The following criteria was adopted for the assessment:

- All intersections assessed as two-lane, two-way road types
- Right turn types assessed without splitter island
- Major road assessed with design speed ≤70km/h.

The turn warrants assessment adopted traffic volumes extracted from the 2041 AAST AM and PM TRACKS models.

The location of the intersections assessed are shown in Figure 5.6.

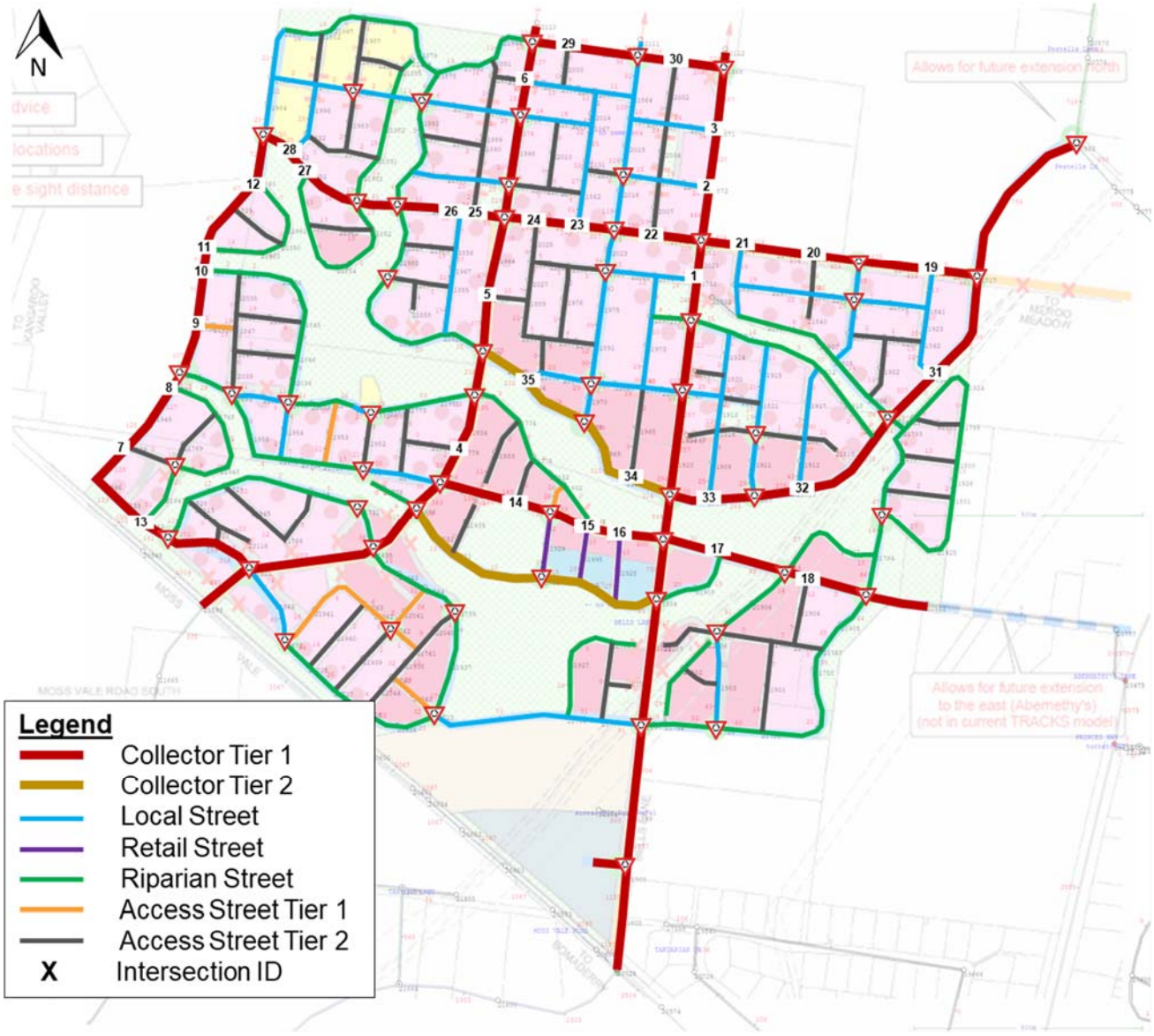


Figure 5.6: Turn Warrants Assessment Locations

Based on the TRACKS model volumes, the turn warrants assessment indicates that basic right (BAR) and basic left (BAL) turn treatments will suffice at each intersection. The recommended cross section for both tiers of collector road is expected to cater for the provision of BAR and BAL turn treatments in accordance with requirements outlined in Austroads *Guide to Road Design Part 4a: Unsignalised and Signalised Intersections* (2017). Both types of turn treatment are expected to require the installation of traffic control devices (e.g. signs, line marking) and is unlikely to require additional civil works (e.g. carriageway widening). Should higher order turn treatments (i.e. channelised right turn – short (CHR(S)) and auxiliary left turn – short (AUL(S))) be required, is expected the recommended cross sections are able to support that outcome as well.

Relevant traffic volumes and turn warrants inputs are provided in **Appendix C**.

5.7.11 Recommendations

The proposed roundabout layouts are evidently efficient in all scenarios proposed in the SIDRA assessment. The roundabout locations are supported following a review of the traffic analysis.

Further treatment measures such as vertical deflection devices are not deemed appropriate given the area is predominantly residential, and that the roundabouts have been appropriately positioned to address both traffic management and local area traffic calming

BAR and BAL turn treatments are required at each intersection of the URA. In the event of requiring higher turn treatments, the recommended cross sections are expected to cater to support this outcome, without requiring civil design amendments.

Given the guidelines and recommendations detailed in the LATM and turn warrants assessment, the locations and use of roundabouts are deemed sufficient with regards to road safety and local area traffic management.

5.8 Retail Centre Assessment

5.8.1 Car Parking Assessment

A car parking assessment was undertaken to determine and compare the amount of angled and parallel parking spaces that could be provided along the retail streets within the retail centre. Car parking dimensional requirements are in accordance with Australian Standard *AS2890.5 Parking Facilities Part 5: On-street parking* (2020). The indicative kerbside road lengths were sourced from the TRACKS model (May 2020 version). The key assumptions made are detailed by the following:

- The entire kerbside road length is available for car parking
  - Laneways, Development Access and Pedestrian Facility locations and dimensions are currently unknown, therefore the impacts of these have not been quantified at this stage
- A high turnover of on-street parking is considered as a conservative approach
- Minimising reversing into on-street parking spaces is desirable.

The parallel on-street car parking dimensions applicable to the retail streets of the development are detailed in Table 5.32.

Table 5.32: Parallel On-street Car Parking Dimensions

Parking Space	Length (m)
Intermediate Space	8
End Space	8

Further to the parking space lengths in Table 5.32, AS2890.5 also notes the length of on-street disabled car parking spaces should be a minimum length of 7.8m.

The 90º angled on-street car parking dimensions applicable to the retail streets of the development are detailed in Table 5.33.

Table 5.33: Angled (90°) On-street Car Parking Dimensions

Parking Space	Width (m)
Intermediate Space	2.6
Space Parallel to Kerb	2.6

The three retail streets within the development are defined as ‘Retail Street 1’ for the western retail street, ‘Retail Street 2’ for the middle retail street and ‘Retail Street 3’ for the eastern retail street. The maximum retail car parking requirements comparing parallel and angled car parking is detailed in Table 5.34.

Table 5.34: Maximum Retail Street On-street Car Parking Provisions

Street	Length of Road (m)	End Spaces / Parallel to Kerb	Intermediate Spaces	Total Spaces	Provision
Parallel					
Retail Street 1	149	4	34	**38**	**115 Spaces**
Retail Street 2	122	4	27	**32**	
Retail Street 3	182	4	42	**46**	
Angled (90°)					
Retail Street 1	149	4	111	**116**	**349 Spaces**
Retail Street 2	122	4	90	**94**	
Retail Street 3	182	4	136	**140**	

As shown in Table 5.34, a maximum of 115 parallel car parking spaces are available within the retail streets of the development. In comparison, a maximum 349 angled (90°) car parking spaces are available.

The provision of angled parking would require amendment to the recommended Retail Street cross section to address relevant requirements specified in AS2890.5.

The proposed gross floor area (GFA) of the retail components have been provided by Council. Council's DCP *Chapter G21: Car Parking and Traffic* was used to source car parking rates for the retail considerations of the URA. The proposed retail land use and required car parking is presented in Table 5.35.

Table 5.35: Retail Component Car Parking Requirements

Land Use	Quantity (GFA)	Rate	Parking Spaces
Supermarket	800m^2	1 per 19m^2	43
Specialty Shops	800m^2	1 per 24m^2	34
		Total	**77**

As shown in Table 5.35, a total of 77 car parking spaces are required as part of the URA retail component. As per Council's DCP, the minimum car parking provision required by the retail component yields should be provided wholly off-street (i.e. within the subject retail developments).

In comparing the maximum achievable on-street parking provisions and retail component car parking requirements in Table 5.34 and Table 5.35 respectively, a reasonable stock of on-street overflow car parking is provided as a result of parallel car parking. Given angled car parking would result in a total of 338 on-street car spaces (a significant over supply), parallel on-street parking provision is deemed sufficient for the retail streets of the development, whilst providing a reasonable overflow of on-street parking.

Development accesses and pedestrian facilities' locations and sight distance considerations will reduce the potential provision of car parking within the retail streets. As key assumptions cannot be accurately accounted for in the maximum provision of on-street car parking, a 20% reduction of on-street spaces has been applied in consideration of this. As a result, approximately 78 parallel on-street spaces can be provided as part of the on-street car parking provision within the three (3) retail streets.

When considering the types of developments proposed within the retail component, some are deemed appropriate for use of on-street parking by overflow demand while others are not.

The use of on-street parking is considered appropriate by overflow demand from land uses such as

restaurants, cafes, and hair salons as they typically do not require loading and unloading of goods to/from visitors' vehicles. Conversely, land uses such as supermarkets, liquor stores, medical centres and child care centres are intensive for the loading and unloading of goods and people, particularly those considered to be vulnerable road users (e.g. children, elderly persons, disabled persons, etc.). As such, the use of on-street parking for their overflow demand is not considered appropriate.

Following this assessment, relevant sections of Council's DCP relating to off-street car parking for all proposed developments is supported. Consideration of overflow demand (in excess of minimum DCP requirements) is best provided by way of parallel parking in / around the retail precinct.

5.8.2 Alternative Locations

In the event the retail centre is relocated to another location within the URA, principles for the selection of another location should be considered as follows:

- Locate the retail centre centrally within the URA, between the Central Boulevard and Bells Lane, where it can be efficiently accessed from the primary road network (adopted as part of the Nowra Bomaderry Structure Plan) to facilitate efficient local access, but also facilitate efficient access to/from the surrounding road network without impacting local residential amenity
- Locate retail centre adjacent to main road (Bells Lane) and local road network (Central Boulevard and Abernethy's Lane) defined in the Nowra-Bomaderry Structure Plan (2006)
- Locate retail centre with a collector road on at least two frontages
- Locate retail centre adjacent to open space to maximise active transport connectivity
- Locate the retail centre where the same high level of public transport accessibility for the centre can be provided as currently recommended (the current proposed retail location and associated public transport recommendations facilitates bus passage in either direction around the current retail centre, with road typologies that facilitate bus passage in either direction around the centre to keep options open for future serviceability)

5.9 Proponent Central Boulevard Alignment

The proponent's proposed amendments to Central Boulevard are displayed in Figure 5.7.

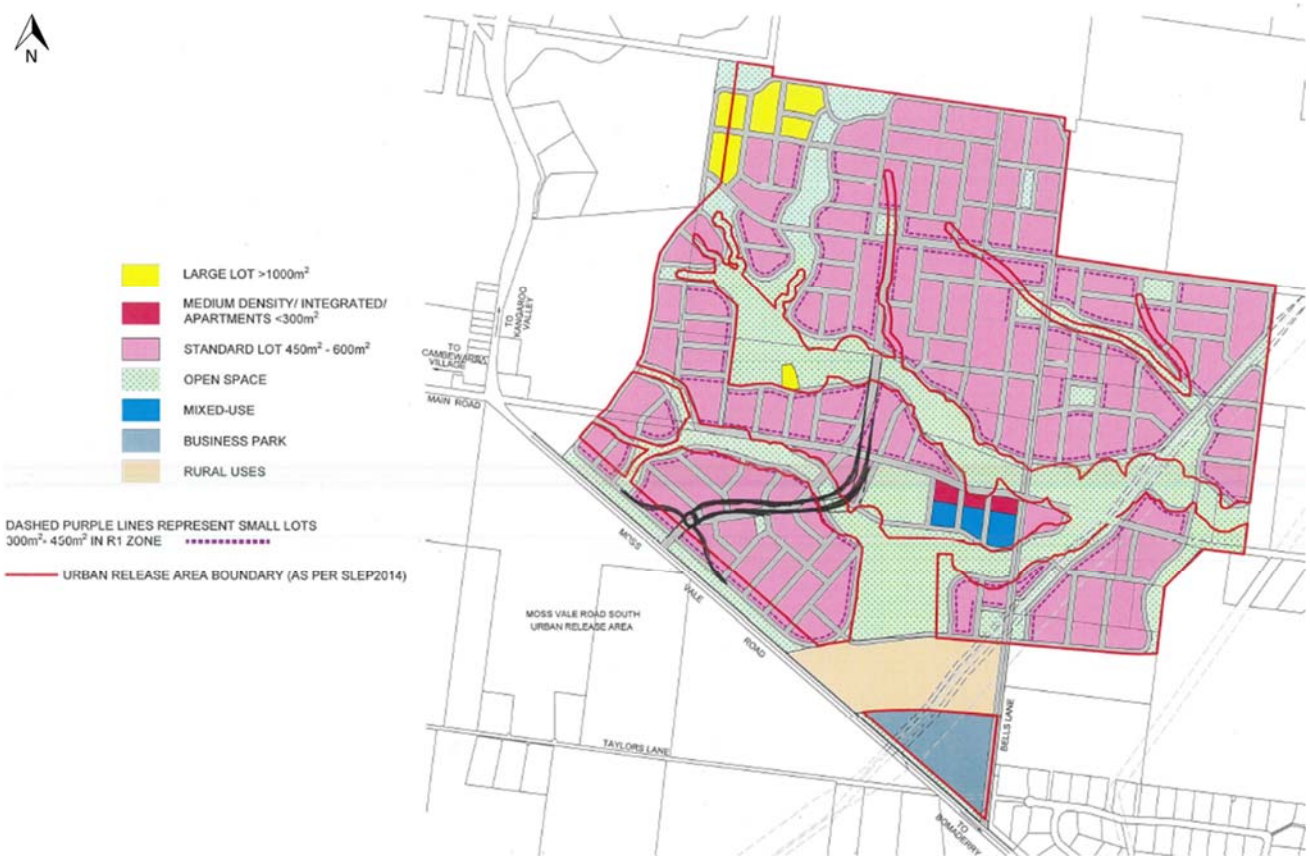


Figure 5.7: Proponent's Proposed Central Boulevard Alignment

The radius of the new proposed curves of Central Boulevard appears to be less than those previously proposed by the proponent. In the absence of detailed plans, the new proposed curves result in a less desirable outcome, particularly where side streets are located on the inside of the new proposed curves. The position of side streets on low radius curves is likely to result in insufficient safe intersection sight distance (SISD).

This revised layout has only been proposed during the final stages of this internal traffic report. Notwithstanding, subject to a more detailed engineering review of the revised road geometry, the current proposed road layout and associated roundabout locations could be augmented to suit the revised Central Boulevard road alignment, without any change to the number of intersections or roundabout locations. However, on the basis of the marginally poorer alignment, one possible mitigation measure may be to extend the 'access restrictions' from the first roundabout to the Village Boulevard, to protect the integrity of the network in response to the suggested change.

6. PUBLIC AND ACTIVE TRANSPORT

6.1 Public Transport

Public transport is a major focus for the MVRN URA throughout each stage of the development. Bus operations will occur based on the proposed staging plan, indicated by an 'interim' route and 'ultimate' route. A detailed layout of Council's staging plan is detailed in Figure 3.2. The proposed bus service operations are shown in Figure 6.1 and Figure 6.2.

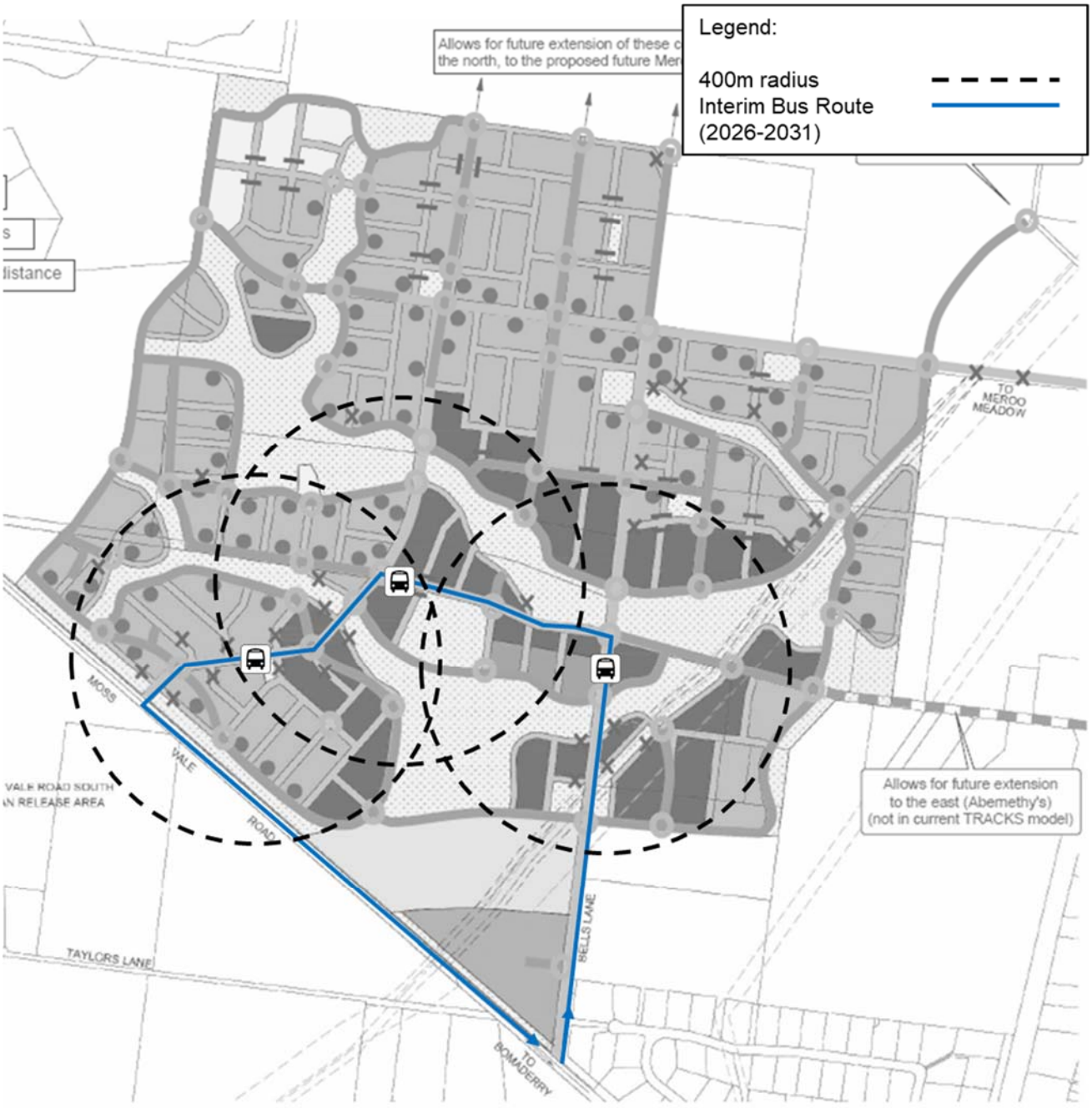


Figure 6.1: 'Interim' Route of Bus Operations

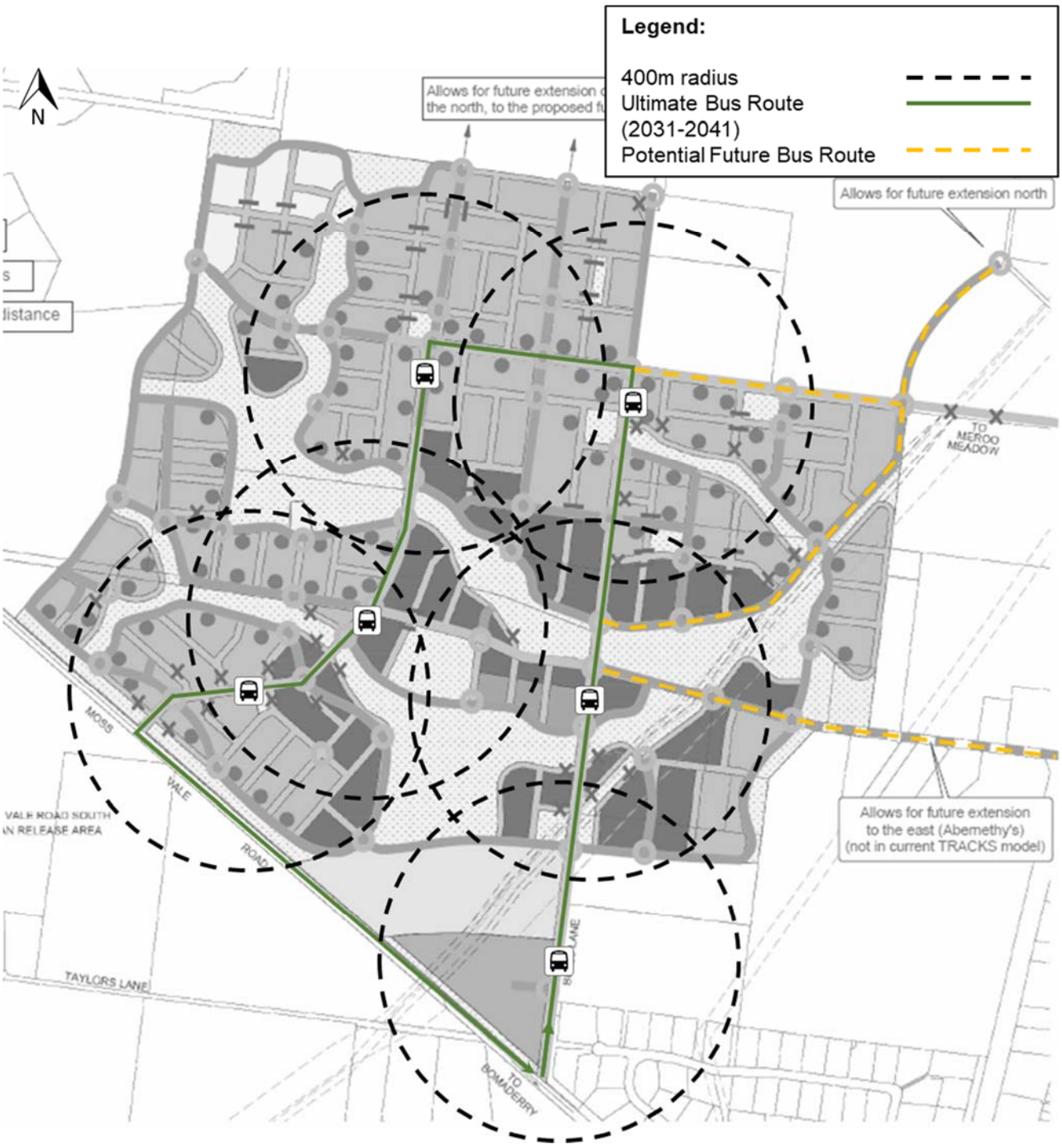


Figure 6.2: 'Ultimate' Route of Bus Operations

As shown, the bus route within the URA is proposed in accordance with the proponent's staging plan of the development. Proposed completion of Stages 1 to 12 is by 2031 and the 'interim' bus route is planned accordingly. Proposed completion of Stages 13 to 20 is by 2041 and the 'ultimate' bus route is planned accordingly.

Primary feeder roads such as Pestells Lane and Abernethy's Lane are identified as potential future bus route connections to the 'ultimate' bus route.

While only some roads are designed in accordance with TfNSW's *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites,* a number of roads within the recommended road network layout and typology are considered to be bus capable roads. The bus capable roads are shown in Figure 6.3.

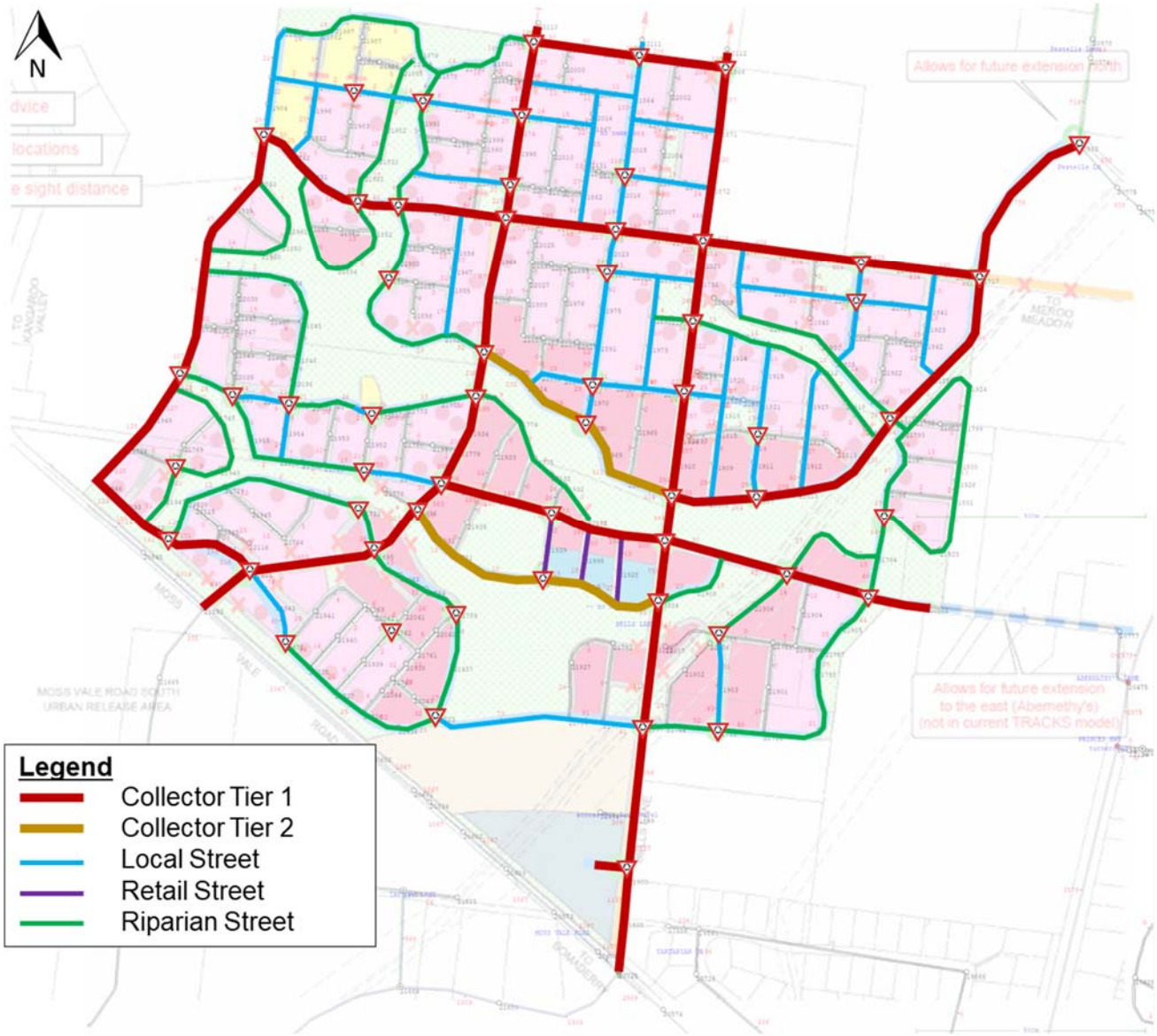


Figure 6.3: Bus Capable Roads

As shown in Figure 6.3, bus capable roads include collector roads, local streets, retail streets and riparian streets. It should be noted the provision of compliant bus stops can only be achieved on roads that include a minimum 3m wide parking lane for kerbside bus stops (i.e. collector roads). However, it is expected the 3.5m wide traffic lanes combined 2.3m wide parking lanes will allow for buses to infrequently stop along those roads without significantly impacting safety and efficiency.

The bus capable roads plan is intended to address the numerous possible sequence of staging that could occur within a very large URA (such as the MVRN URA), ensuring that adequate public transport serviceability can provided throughout the staged development of the URA as well as providing flexible options for service providers over time, and strong external connectivity and connectivity to the future Meroo Meadow URA.

TfNSW's *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites – Section 4.4,* stipulates a 'bus stop guideline' applicable to the MRVN URA. Compliance to this guideline is demonstrated in Table 6.1.

Table 6.1: Public Transport Compliance to TfNSW Guidelines

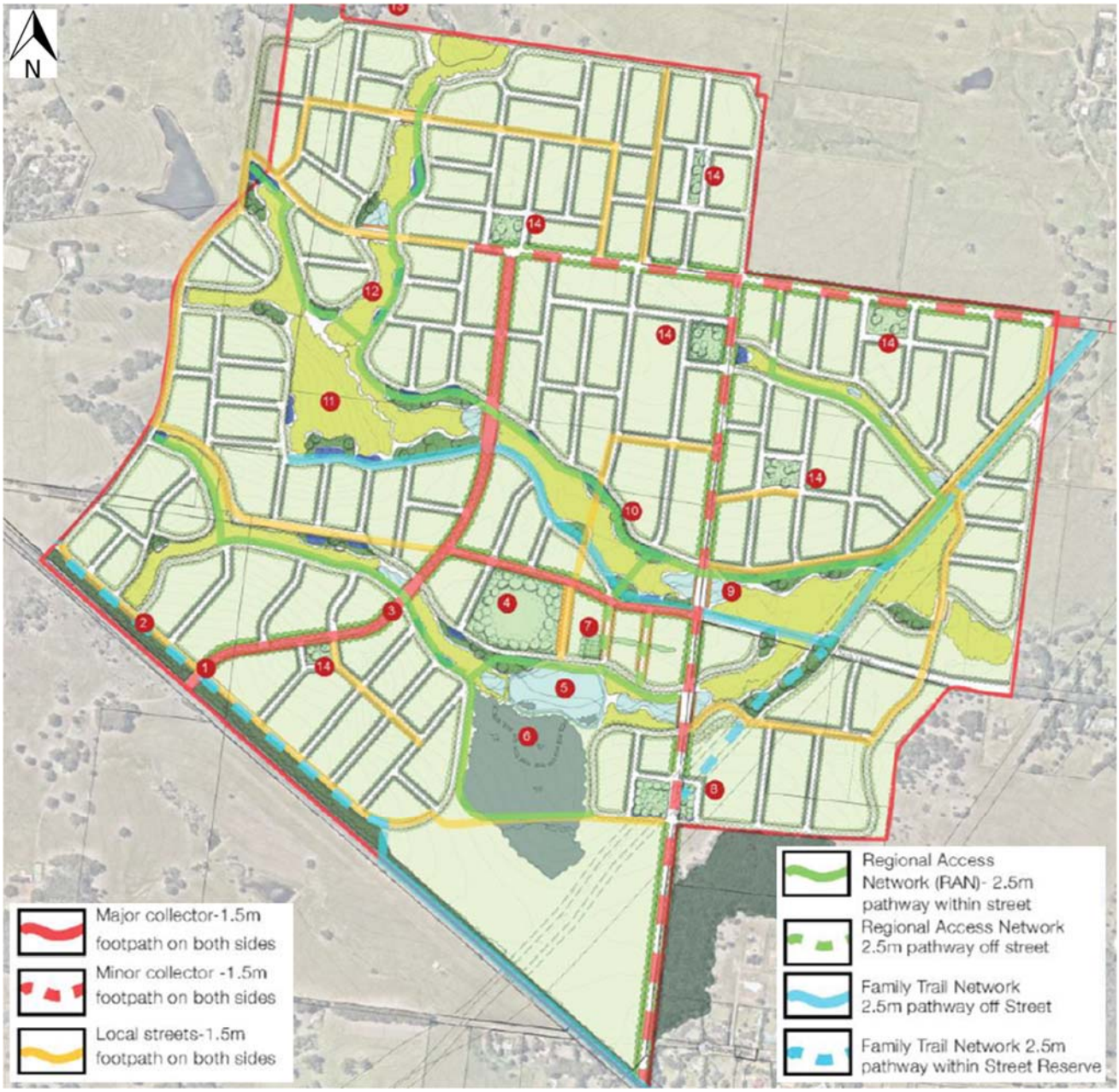
Guideline	Provided	Compliance
Spacing of around 400 metre between stops or spacing that reflects the local context and location	Bus stops are generally located 350m – 450m apart, as shown in Figure 6.1 and Figure 6.2	**Complies**
Safe pedestrian access, including road crossings	Key roundabouts along collector roads are to include the provision of pedestrian refuge islands on approach. The minimum requirement for pedestrian road crossings is demonstrated in Figure 6.5	**Complies**
Bus stops located on the departure side of a pedestrian crossing to reduce the risk of customers crossing the road in front of a stopped bus	The provision of bus stops shown in Figure 6.1 and Figure 6.2 are to be located at both sides of the road	**Complies**
Minimise walking distance between interchange stops	Bus stops are located within approximately 400m, as shown in Figure 6.1 and Figure 6.2	**Complies**
Bus stops are generally paired	The provision of bus stops shown in Figure 6.1 and Figure 6.2 are to be located at both sides of the road	**Complies**
Adequate kerb and roadway space for safe and efficient public transport operations	Cross sections of collector roads demonstrate sufficient spacing for public transport operations, shown in Section 5.6.3	**Complies**
Buses should stop in the roadway rather than in bus indent bays	Bus stops are to stop in the parking lane of the collector road carriageway	**Complies**
Locate stops on the far side of intersections to allow a bus to clear the intersection before stopping for customers	Demonstrated in Figure 6.1 and Figure 6.2	**Complies**
No part of a structure is to be within 800mm of the road edge to allow for safe bus operation	Demonstrated in Figure 6.1 and Figure 6.2	**Complies**

As shown, recommended public transport operations within the MVRN URA comply with TfNSW guidelines.

6.2 Active Transport

6.2.1 Shared Use Pathway Network

A draft open space study has been conducted by Elton Consulting, dated 1st June 2020, for the MVRN URA. The open space masterplan is analysed to provide recommendations for the indicative SUP of the URA. The open space masterplan is provided in Figure 6.4.



SOURCE: Elton Consulting

Figure 6.4: Open Space Masterplan

Recommendations for the above open space masterplan are detailed as follows:

- 2.5m shared use path is not recommended through the north-south retail streets to the south of Village Boulevard given:
  - These streets are recommended as retail streets and a shared use path cannot be provided without narrowing the recommended planting width and increasing offset width within the verge
  - Strong SUP connections are recommended to/from and around the retail centre, however wide footpaths within and throughout the retail centre (i.e. higher pedestrian concentrations within retail centres do not make these areas conducive to higher speeds typically associated with SUPs)
- Recommend connecting 2.5m shared path south of location '14' (riparian corridor) into Bells Lane
  - Preferred outcome is to continue the shared path further west into Bells Lane, and better locate the riparian crossing more central to the developments in that precinct
- Due to the uncertainty regarding whether a SUP can be provided on both sides of MVR as part of the proposed upgrade, allowance for a SUP must be made within the MVRN URA along the southern boundary with multiple connections to/from the URA from (west to east); the western

side of Stage 4, Central Boulevard, the eastern side of Stage 1, and Bells Lane. Until such time as the design for the upgrade of MVR is more advanced, the URA must provide for the SUP along its southern boundary to ensure its ultimate provision

The proposed SUP is provided in accordance with the road typology defined in Council's *Development Control Plan NB3 – Moss Vale Road South Urban Release Area* (MVRS DCP). The open space masterplan detailed in Figure 6.4 is influential to the proposed shared use network and applies the detailed recommendations. The proposed road typology for the internal layout of the URA derived from the MVRS DCP is detailed in Section 5.1 and the proposed SUP is shown in Figure 6.5.

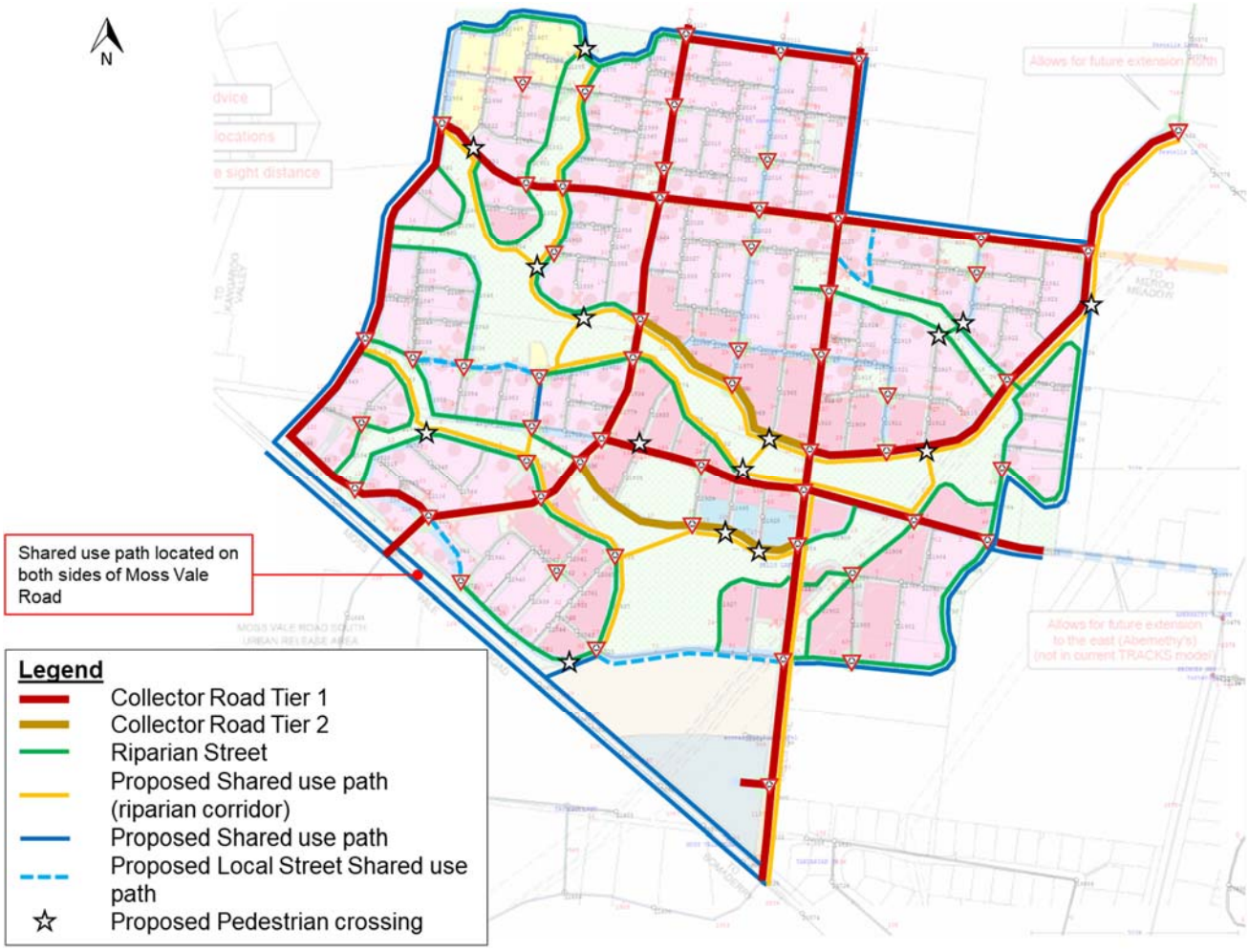


Figure 6.5: Proposed Shared Use Network

The proposed development provides a comprehensive shared use network, connecting residential lots to nearby public transport, the local centre and public open spaces. The recommended SUP is heavily connected within the riparian corridor which connects to collector and riparian roads of the URA.

A flexible provision for the SUP to the south of MVR is considered essential due to the uncertainty as to whether it can be provided within the Moss Vale Road reserve. Until this issue is clarified, it must be accommodated within the URA along the southern boundary to ensure its ultimate provision.

A separate map is provided in Figure 6.6 demonstrating the recommended SUP without the URA road typologies.

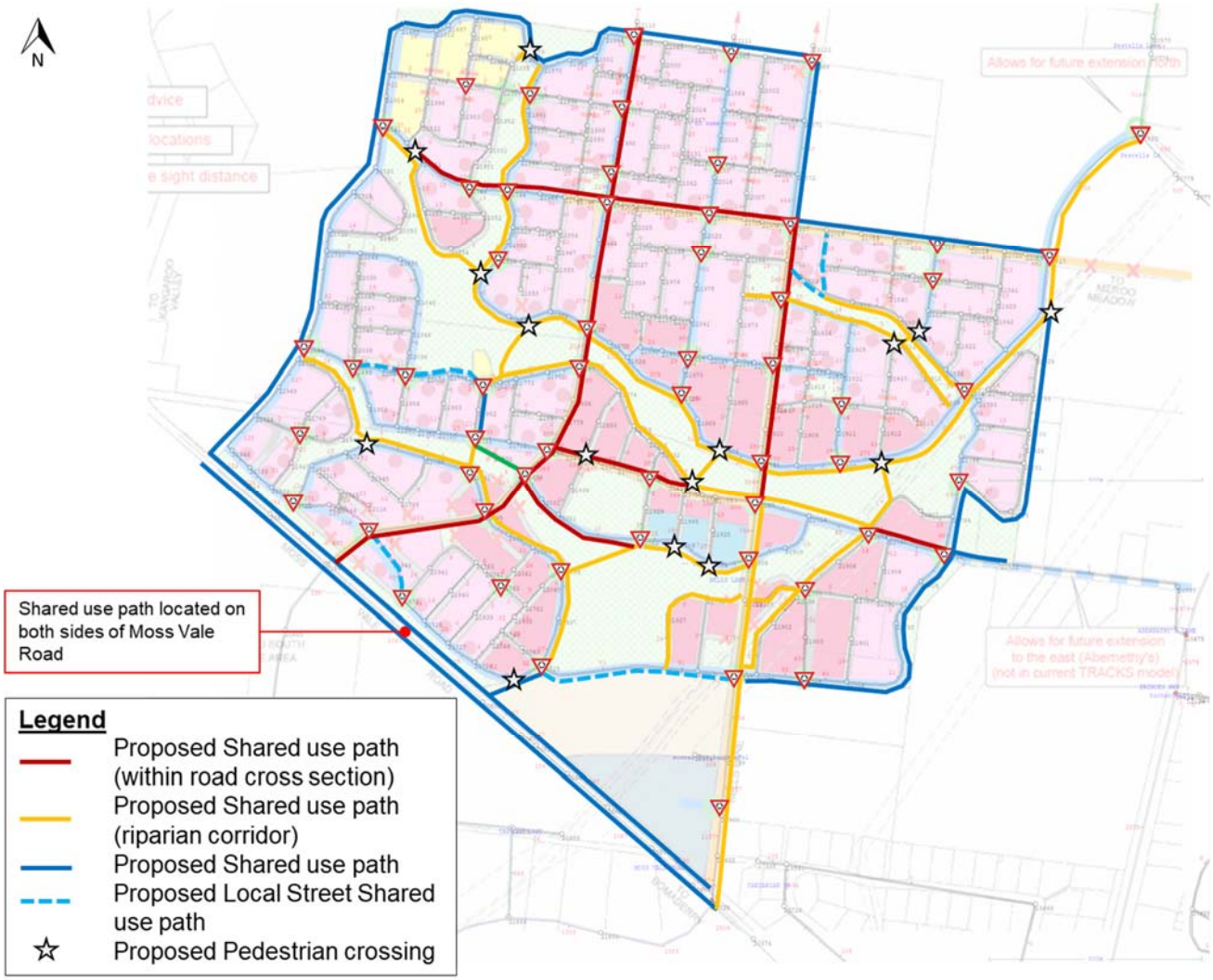


Figure 6.6: Proposed Shared Use Network Without Road Typologies

6.2.2 Pedestrian Pathway Walking

Pedestrian pathways are provided within the verge of each road typology. The dimensions of pedestrian pathways are detailed in Section 5.6.3.

Recommended pedestrian crossings are shown in Figure 6.5. Additional pedestrian crossing facilities should be identified at development application stage in accordance to relevant Australian Standards, Austroads, Council and TfNSW guidelines. The provision of refuge islands is also recommended on the approach to all roundabouts and are to be designed in accordance to Austroads *Guide to Road Design Part 4B Roundabouts* with consideration of cyclist use.

7. CONCLUSION

The key findings of the MRVN URA internal traffic study are as follows:

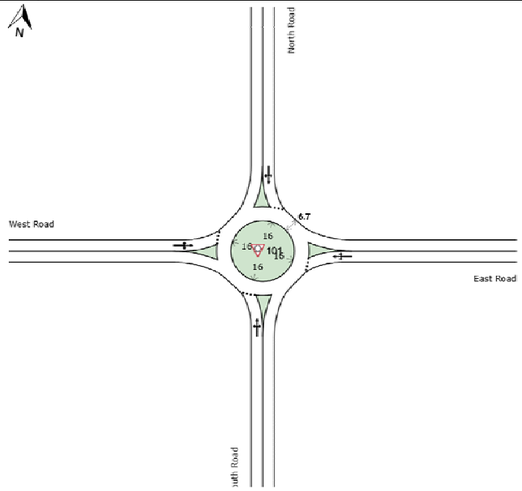
- A review was undertaken to assess the proponent's proposed and Council's amended road network layout and typologies of the MVRN URA. The modifications proposed and the associated recommended changes by Bitzios are all supported following this technical review
- As an ultimate development scenario, forecast peak hour traffic volumes were extracted from the TRACKS 2041 AAST models and were converted to daily volumes using an expansion factor sourced from council of 11.765, representing roads such as Illaroo Road
- Each cross-section component for each road typology proposed by the proponent was assessed against relevant standards and guidelines. Individual cross sections are recommended for Collector Roads, Local & Retail Streets, Riparian Street, Access Streets and Rear Laneways
- Particular considerations are outlined for corner truncations, kerb returns and cul-de-sacs in accordance to relevant Austroads and Council guidelines
- Based on the road typologies and recommended cross sections, a recommended road network layout is proposed and the locations of restricted direct vehicular access onto collector roads are identified
- A SIDRA 8 intersection assessment was undertaken to assess each roundabout within the proposed URA based on traffic volumes sourced from the Shoalhaven-Kiama TRACKS model (May 2020 version)
- The proposed intersection layout is efficient in all scenarios assessed within SIDRA
- Horizontal deflection LATM treatments (i.e. roundabouts) are recommended within the URA to minimize conflict points and reduce acoustic impacts given the residential environment of the URA. The proposed roundabout locations are supported following a review of not just the traffic analysis but best practice guidelines with regards to local area traffic management
- The turn warrants assessment indicates that BAR and BAL treatments will suffice for each intersection of the development. This can be addressed within the cross sections of the proposed road typologies without requiring any additional localised widenings or civil adjustments
- A car parking assessment was undertaken comparing the amount of parallel on-street car parking against angled (90°) on-street car parking within the retail streets of the URA in accordance to AS2890.5. A maximum of 115 parallel car parking spaces can be provided within the retail streets compared to a maximum capacity of 349 angled car parking spaces
- The retail component requires 77 on-street / off-street car parking spaces in accordance to Council's DCP. As a result, providing on-street angled car parking within the retail streets would over-compensate the retail car parking requirements and therefore providing parallel on-street car parking is deemed sufficient for the development to cater for variable demands in excess of minimum DCP requirements
- Off-street car parking provisions are to consider the commercial activities that aren't suitable for on-street car parking such as child care centres, medical centres and supermarkets, as such, parking should be provided off-street for all developments in accordance with Council's DCP
- The recommended public transport layout reflects the indicative staging plan of the development. The 'interim' layout is recommended for years 2026 to 2031 and the 'ultimate' layout is recommended for years 2031 to 2041
- The recommended public transport operations and bus capable roads comply with TfNSW's *Guidelines for Public Transport Capable Infrastructure in Greenfield Sites*
- The proposed shared use network considers the outcomes and recommendations of the open space masterplan provided by *Elton Consulting*. Shared use pathways within the active transport

layout of the are predominant within the riparian corridor and the outskirts of the URA, which connects to Collector Roads, Riparian Streets, Local Streets and the external intersections

- Pedestrian pathways are provided within the verge of each road typology.

Appendix A: SIDRA Output Summary Sheets

Proposed Layout: Distributor Roundabouts



Intersection Performance - Annual Average School Term

Node 21744 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
	Left	1	0.00	4	0.1	LOS A
South Road (S)	Through	1	0.00	4.2	0.1	LOS A
	Right	1	0.00	8.5	0.1	LOS A
	Left	1	0.01	3.4	0.5	LOS A
East Road (E)	Through	18	0.01	3.7	0.5	LOS A
	Right	1	0.01	7.8	0.5	LOS A
	Left	3	0.00	3.9	0.1	LOS A
North Road (N)	Through	1	0.00	4.2	0.1	LOS A
	Right	1	0.00	8.4	0.1	LOS A
	Left	1	0.02	4	0.6	LOS A
West Road (W)	Through	25	0.02	4.2	0.6	LOS A
	Right	1	0.02	8.4	0.6	LOS A
Intersection	**All**	**56**	**0.02**	**4.3**	**0.6**	**LOS A**

Node 21744 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
	Left	1	0.00	4	0.1	LOS A
South Road (S)	Through	1	0.00	4.2	0.1	LOS A
	Right	1	0.00	8.5	0.1	LOS A
	Left	1	0.02	3.4	0.6	LOS A
East Road (E)	Through	25	0.02	3.7	0.6	LOS A
	Right	1	0.02	7.8	0.6	LOS A
	Left	2	0.00	3.9	0.1	LOS A
North Road (N)	Through	1	0.00	4.1	0.1	LOS A
	Right	1	0.00	8.4	0.1	LOS A
	Left	1	0.01	4	0.5	LOS A
West Road (W)	Through	17	0.01	4.2	0.5	LOS A
	Right	1	0.01	8.4	0.5	LOS A
Intersection	**All**	**54**	**0.02**	**4.3**	**0.6**	**LOS A**

Node 21886 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
	Left	1	0.02	3.5	0.6	LOS A
South Road (S)	Through	21	0.02	3.8	0.6	LOS A
	Right	1	0.02	8	0.6	LOS A
	Left	8	0.01	3.3	0.3	LOS A
East Road (E)	Through	1	0.01	3.7	0.3	LOS A
	Right	1	0.01	7.6	0.3	LOS A
	Left	1	0.06	2.5	2.4	LOS A
North Road (N)	Through	102	0.06	2.9	2.4	LOS A
	Right	1	0.06	6.7	2.4	LOS A
	Left	1	0.00	3.8	0.1	LOS A
West Road (W)	Through	1	0.00	4.1	0.1	LOS A
	Right	1	0.00	8.3	0.1	LOS A
Intersection	**All**	**141**	**0.06**	**3.3**	**2.4**	**LOS A**

Node 21886 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
	Left	1	0.02	3.5	0.9	LOS A
South Road (S)	Through	35	0.02	3.8	0.9	LOS A
	Right	1	0.02	8	0.9	LOS A
	Left	12	0.01	3	0.4	LOS A
East Road (E)	Through	1	0.01	3.4	0.4	LOS A
	Right	1	0.01	7.3	0.4	LOS A
	Left	1	0.03	2.5	1.2	LOS A
North Road (N)	Through	49	0.03	2.9	1.2	LOS A
	Right	1	0.03	6.7	1.2	LOS A
	Left	1	0.00	3.9	0.1	LOS A
West Road (W)	Through	1	0.00	4.1	0.1	LOS A
	Right	1	0.00	8.3	0.1	LOS A
Intersection	**All**	**105**	**0.03**	**3.4**	**1.2**	**LOS A**

Node 21887 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
	Left	7	0.02	2.1	0.6	LOS A
South Road (S)	Through	16	0.02	2.6	0.6	LOS A
	Right	1	0.02	6.3	0.6	LOS A
	Left	1	0.00	3.3	0.2	LOS A
East Road (E)	Through	3	0.00	3.7	0.2	LOS A
	Right	1	0.00	7.5	0.2	LOS A
	Left	2	0.08	3.8	2.9	LOS A
North Road (N)	Through	111	0.08	4	2.9	LOS A
	Right	3	0.08	8.2	2.9	LOS A
	Left	3	0.01	3	0.4	LOS A
West Road (W)	Through	5	0.01	3.4	0.4	LOS A
	Right	8	0.01	7.3	0.4	LOS A
Intersection	**All**	**162**	**0.08**	**4**	**2.9**	**LOS A**

Node 21887 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
	Left	9	0.03	2.1	1.1	LOS A
South Road (S)	Through	34	0.03	2.6	1.1	LOS A
	Right	1	0.03	6.3	1.1	LOS A
	Left	1	0.00	3	0.1	LOS A
East Road (E)	Through	3	0.00	3.4	0.1	LOS A
	Right	1	0.00	7.2	0.1	LOS A
	Left	1	0.04	3.7	1.4	LOS A
North Road (N)	Through	52	0.04	4	1.4	LOS A
	Right	3	0.04	8.2	1.4	LOS A
	Left	3	0.01	3.1	0.4	LOS A
West Road (W)	Through	6	0.01	3.5	0.4	LOS A
	Right	5	0.01	7.4	0.4	LOS A
Intersection	**All**	**120**	**0.04**	**3.7**	**1.4**	**LOS A**

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21744, 21886 and 21887 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Model Description

The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with Distributor Roundabouts.

Design Years

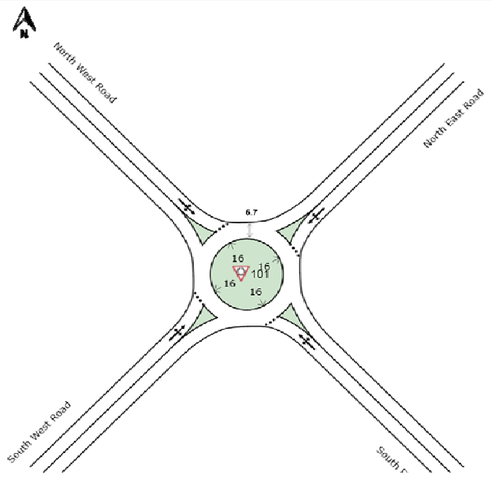
The design year is 2041.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

Level of Service (LoS) of 'A' is consistent within all scenarios.

Proposed Layout: Distributor Roundabouts



Intersection Performance - Annual Average School Term

Node 21804 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	3	0.03	3	1	LOS A
	Through	3	0.03	3.5	1	LOS A
	Right	25	0.03	7.2	1	LOS A
North East Road (NE)	Left	21	0.11	4.1	4.5	LOS A
	Through	137	0.11	4.4	4.5	LOS A
	Right	1	0.11	8.5	4.5	LOS A
North West Road (NW)	Left	1	0.02	3.8	0.6	LOS A
	Through	3	0.02	4.2	0.6	LOS A
	Right	17	0.02	8.2	0.6	LOS A
South West Road (SW)	Left	7	0.09	4.2	3.5	LOS A
	Through	114	0.09	4.5	3.5	LOS A
	Right	2	0.09	8.6	3.5	LOS A
Intersection	**All**	**335**	**0.11**	**4.8**	**4.5**	**LOS A**

Node 21804 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	2	0.03	2.9	0.9	LOS A
	Through	3	0.03	3.4	0.9	LOS A
	Right	24	0.03	7.1	0.9	LOS A
North East Road (NE)	Left	32	0.11	4.1	4.5	LOS A
	Through	132	0.11	4.4	4.5	LOS A
	Right	1	0.11	8.5	4.5	LOS A
North West Road (NW)	Left	1	0.01	3.9	0.4	LOS A
	Through	3	0.01	4.3	0.4	LOS A
	Right	9	0.01	8.3	0.4	LOS A
South West Road (SW)	Left	12	0.11	4.2	4.3	LOS A
	Through	136	0.11	4.4	4.3	LOS A
	Right	3	0.11	8.6	4.3	LOS A
Intersection	**All**	**358**	**0.11**	**4.7**	**4.5**	**LOS A**

Node 21674 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Proposed Abernethys Lane (SE)	Left	1	0.01	2.6	0.2	LOS A
	Through	4	0.01	3	0.2	LOS A
	Right	1	0.01	6.8	0.2	LOS A
North East Road (NE)	Left	1	0.01	4.1	0.4	LOS A
	Through	2	0.01	4.4	0.4	LOS A
	Right	14	0.01	8.5	0.4	LOS A
Proposed Abernethys Lane (NW)	Left	9	0.01	4.1	0.5	LOS A
	Through	9	0.01	4.3	0.5	LOS A
	Right	2	0.01	8.4	0.5	LOS A
South West Road (SW)	Left	6	0.01	4.1	0.2	LOS A
	Through	2	0.01	4.4	0.2	LOS A
	Right	1	0.01	8.5	0.2	LOS A
Intersection	**All**	**54**	**0.01**	**5.5**	**0.5**	**LOS A**

Node 21674 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Proposed Abernethys Lane (SE)	Left	1	0.01	2.5	0.2	LOS A
	Through	4	0.01	3	0.2	LOS A
	Right	1	0.01	6.8	0.2	LOS A
North East Road (NE)	Left	1	0.01	4.1	0.4	LOS A
	Through	3	0.01	4.4	0.4	LOS A
	Right	12	0.01	8.5	0.4	LOS A
Proposed Abernethys Lane (NW)	Left	12	0.02	4.1	0.5	LOS A
	Through	8	0.02	4.3	0.5	LOS A
	Right	1	0.02	8.5	0.5	LOS A
South West Road (SW)	Left	7	0.01	4.1	0.3	LOS A
	Through	3	0.01	4.4	0.3	LOS A
	Right	1	0.01	8.5	0.3	LOS A
Intersection	**All**	**55**	**0.02**	**5.2**	**0.5**	**LOS A**

Node 21724 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Proposed Abernethys Lane (SE)	Left	1	0.00	4.2	0.1	LOS A
	Through	1	0.00	4.4	0.1	LOS A
	Right	1	0.00	8.5	0.1	LOS A
North East Road (NE)	Left	1	0.02	3.9	0.6	LOS A
	Through	22	0.02	4.1	0.6	LOS A
	Right	1	0.02	8.4	0.6	LOS A
Proposed Abernethys Lane (NW)	Left	1	0.00	4.2	0.1	LOS A
	Through	1	0.00	4.4	0.1	LOS A
	Right	1	0.00	8.6	0.1	LOS A
South West Road (SW)	Left	1	0.02	3.9	0.6	LOS A
	Through	24	0.02	4.1	0.6	LOS A
	Right	1	0.02	8.4	0.6	LOS A
Intersection	**All**	**57**	**0.02**	**4.4**	**0.6**	**LOS A**

Node 21724 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Proposed Abernethys Lane (SE)	Left	1	0.00	4.2	0.1	LOS A
	Through	1	0.00	4.4	0.1	LOS A
	Right	1	0.00	8.6	0.1	LOS A
North East Road (NE)	Left	1	0.02	3.9	0.7	LOS A
	Through	26	0.02	4.1	0.7	LOS A
	Right	1	0.02	8.4	0.7	LOS A
Proposed Abernethys Lane (NW)	Left	1	0.00	4.1	0.1	LOS A
	Through	1	0.00	4.4	0.1	LOS A
	Right	1	0.00	8.5	0.1	LOS A
South West Road (SW)	Left	1	0.01	3.9	0.5	LOS A
	Through	17	0.01	4.1	0.5	LOS A
	Right	1	0.01	8.4	0.5	LOS A
Intersection	**All**	**54**	**0.02**	**4.5**	**0.7**	**LOS A**

Node 21723 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	12	0.02	4.1	0.7	LOS A
	Through	12	0.02	4.3	0.7	LOS A
	Right	6	0.02	8.4	0.7	LOS A
North East Road (NE)	Left	13	0.01	4.3	0.4	LOS A
	Through	1	0.01	4.5	0.4	LOS A
	Right	1	0.01	8.7	0.4	LOS A
North West Road (NW)	Left	1	0.03	3.1	1	LOS A
	Through	35	0.03	3.4	1	LOS A
	Right	1	0.03	7.4	1	LOS A
South West Road (SW)	Left	1	0.01	4	0.3	LOS A
	Through	1	0.01	4.2	0.3	LOS A
	Right	11	0.01	8.4	0.3	LOS A
Intersection	**All**	**94**	**0.03**	**4.8**	**1**	**LOS A**

Node 21723 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	16	0.03	4.1	1.1	LOS A
	Through	23	0.03	4.3	1.1	LOS A
	Right	9	0.03	8.4	1.1	LOS A
North East Road (NE)	Left	8	0.01	4.1	0.3	LOS A
	Through	1	0.01	4.4	0.3	LOS A
	Right	1	0.01	8.5	0.3	LOS A
North West Road (NW)	Left	1	0.01	3.1	0.3	LOS A
	Through	11	0.01	3.4	0.3	LOS A
	Right	1	0.01	7.4	0.3	LOS A
South West Road (SW)	Left	1	0.01	4	0.3	LOS A
	Through	1	0.01	4.3	0.3	LOS A
	Right	8	0.01	8.5	0.3	LOS A
Intersection	**All**	**82**	**0.03**	**5.1**	**1.1**	**LOS A**

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21804 21674, 21724 and 21723 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Model Description

The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with Distributor Roundabouts.

Design Years

The design year is 2041.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.

Proposed Layout: Distributor Roundabouts

Intersection Performance - Annual Average School Term

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 20592, 21825 and 21807 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

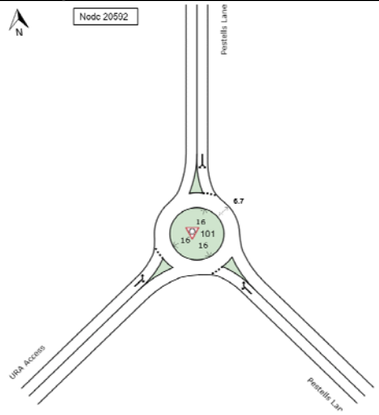
The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

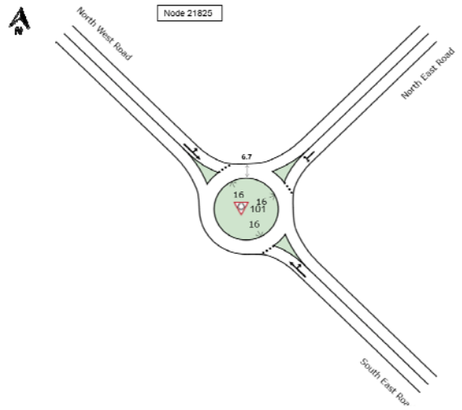
Circulating width and central island radius geometry in accordance with Distributor Roundabouts.

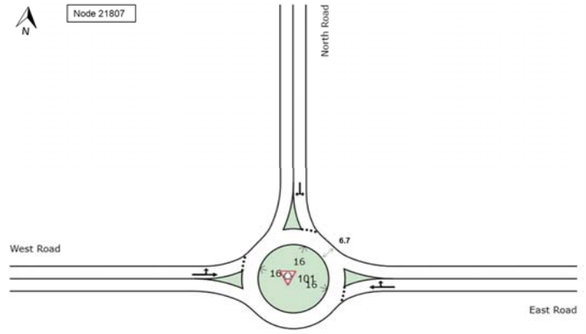
Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.







Node 20592 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Pestells Lane (SE)	Left	65	0.18	5.6	8	LOS A
	Right	120	0.18	9	8	LOS A
Pestells Lane (N)	Left	313	0.51	6.2	29.5	LOS A
	Right	241	0.51	9.7	29.5	LOS A
URA Access (SW)	Left	119	0.30	4.7	15	LOS A
	Right	254	0.30	9.2	15	LOS A
Intersection	**All**	**1112**	**0.51**	**7.7**	**29.5**	**LOS A**

Node 20592 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Pestells Lane (SE)	Left	231	0.43	5.7	23.9	LOS A
	Right	252	0.43	9.2	23.9	LOS A
Pestells Lane (N)	Left	153	0.33	5.5	16.9	LOS A
	Right	212	0.33	9	16.9	LOS A
URA Access (SW)	Left	138	0.34	5.8	17	LOS A
	Right	215	0.34	10.3	17	LOS A
Intersection	**All**	**1199**	**0.43**	**7.8**	**23.9**	**LOS A**

Node 21825 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Through	62	0.05	3.6	2	LOS A
	Right	20	0.05	7.6	2	LOS A
North East Road (NE)	Left	118	0.11	3.9	4	LOS A
	Right	1	0.11	8.1	4	LOS A
North West Road (NW)	Left	3	0.13	4.1	4.9	LOS A
	Through	185	0.13	4.4	4.9	LOS A
Intersection	**All**	**389**	**0.13**	**4.3**	**4.9**	**LOS A**

Node 21825 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Through	131	0.10	3.6	4.1	LOS A
	Right	39	0.10	7.6	4.1	LOS A
North East Road (NE)	Left	57	0.05	3.2	1.7	LOS A
	Right	1	0.05	7.5	1.7	LOS A
North West Road (NW)	Left	2	0.07	4.2	2.4	LOS A
	Through	86	0.07	4.5	2.4	LOS A
Intersection	**All**	**316**	**0.10**	**4.3**	**4.1**	**LOS A**

Node 21807 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
East Road (E)	Through	159	0.10	4.3	4.2	LOS A
	Right	3	0.10	8.5	4.2	LOS A
North Road(N)	Left	6	0.01	4.1	0.4	LOS A
	Right	8	0.01	8.5	0.4	LOS A
West Road (W)	Left	9	0.08	4.1	2.8	LOS A
	Through	114	0.08	4.3	2.8	LOS A
Intersection	**All**	**300**	**0.10**	**4.5**	**4.2**	**LOS A**

Node 21807 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
East Road (E)	Through	134	0.09	4.3	3.6	LOS A
	Right	4	0.09	8.5	3.6	LOS A
North Road(N)	Left	6	0.01	4.3	0.4	LOS A
	Right	6	0.01	8.7	0.4	LOS A
West Road (W)	Left	14	0.10	4.1	3.7	LOS A
	Through	145	0.10	4.3	3.7	LOS A
Intersection	**All**	**309**	**0.10**	**4.5**	**3.7**	**LOS A**

Proposed Layout: Distributor Roundabouts

Intersection Performance - Annual Average School Term

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21693 and 21782 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

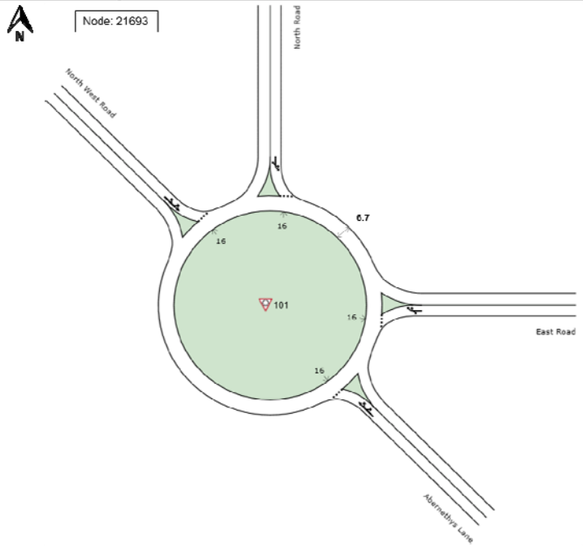
The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

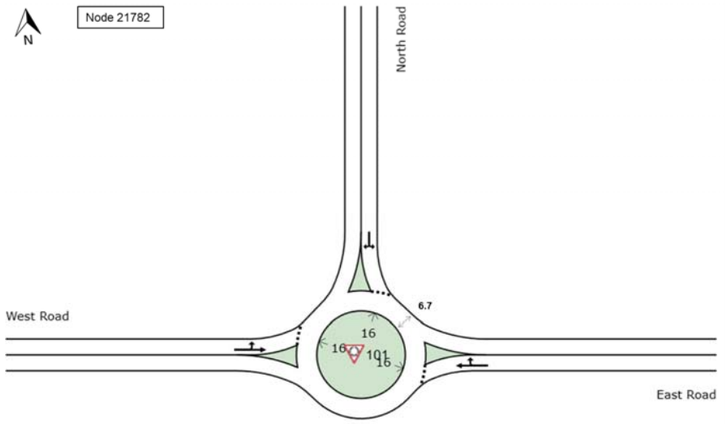
Circulating width and central island radius geometry in accordance with Distributor Roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.





Node 21693 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Abernethys Lane (SE)	Left	1	0.00	4.4	0.1	LOS A
	Through	1	0.00	7.6	0.1	LOS A
	Right	1	0.00	9.5	0.1	LOS A
East Road (E)	Left	1	0.01	3.4	0.4	LOS A
	Through	16	0.01	6.5	0.4	LOS A
	Right	1	0.01	7.4	0.4	LOS A
North Road (N)	Left	1	0.00	2.6	0.1	LOS A
	Through	1	0.00	2.7	0.1	LOS A
	Right	1	0.00	7.8	0.1	LOS A
North West Road (NW)	Left	1	0.01	4.4	0.3	LOS A
	Through	9	0.01	3.9	0.3	LOS A
	Right	1	0.01	4.3	0.3	LOS A
Intersection	**All**	**36**	**0.01**	**5.5**	**0.4**	**LOS A**

Node 21693 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Abernethys Lane (SE)	Left	1	0.00	4.3	0.1	LOS A
	Through	1	0.00	7.5	0.1	LOS A
	Right	1	0.00	9.4	0.1	LOS A
East Road (E)	Left	1	0.01	3.4	0.3	LOS A
	Through	9	0.01	6.5	0.3	LOS A
	Right	1	0.01	7.4	0.3	LOS A
North Road (N)	Left	1	0.00	2.7	0.1	LOS A
	Through	1	0.00	2.7	0.1	LOS A
	Right	1	0.00	7.9	0.1	LOS A
North West Road (NW)	Left	1	0.01	4.4	0.4	LOS A
	Through	15	0.01	3.9	0.4	LOS A
	Right	1	0.01	4.3	0.4	LOS A
Intersection	**All**	**35**	**0.01**	**5.1**	**0.4**	**LOS A**

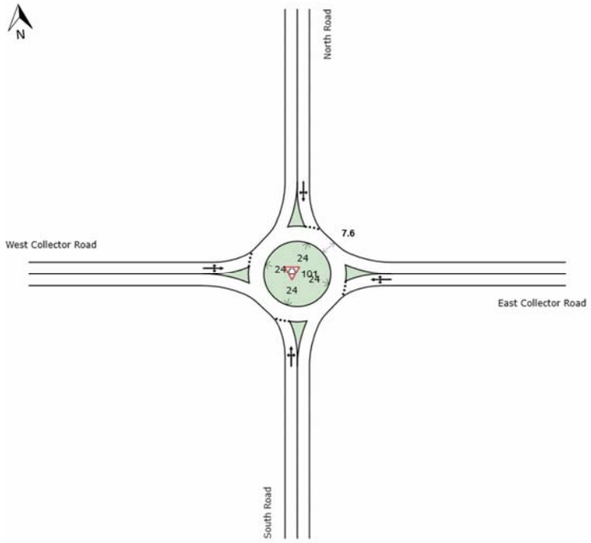
Node 21782 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
East Road (E)	Through	7	0.01	4	0.2	LOS A
	Right	1	0.01	8.2	0.2	LOS A
North Road (N)	Left	1	0.00	3.5	0.1	LOS A
	Right	1	0.00	7.9	0.1	LOS A
West Road (W)	Left	2	0.01	4	0.3	LOS A
	Through	13	0.01	4.3	0.3	LOS A
Intersection	**All**	**25**	**0.01**	**4.5**	**0.3**	**LOS A**

Node 21782 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
East Road (E)	Through	11	0.01	4	0.3	LOS A
	Right	1	0.01	8.2	0.3	LOS A
North Road (N)	Left	1	0.00	3.4	0.1	LOS A
	Right	2	0.00	7.8	0.1	LOS A
West Road (W)	Left	1	0.00	4	0.1	LOS A
	Through	4	0.00	4.3	0.1	LOS A
Intersection	**All**	**20**	**0.01**	**4.7**	**0.3**	**LOS A**

Proposed Layout: Collector Road Roundabouts



Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21699, 21588, 21587 and 21750 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.

Intersection Performance - Annual Average School Term

Node 21699 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	5	0.09	3.6	3.6	LOS A
	Through	72	0.09	3.7	3.6	LOS A
	Right	54	0.09	8.9	3.6	LOS A
East Collector Road (E)	Left	68	0.08	2.8	3	LOS A
	Through	18	0.08	3.3	3	LOS A
	Right	5	0.08	7.8	3	LOS A
North Road (N)	Left	8	0.14	3.5	5.3	LOS A
	Through	172	0.14	3.7	5.3	LOS A
	Right	1	0.14	8.7	5.3	LOS A
West Collector Road (W)	Left	1	0.03	3.4	1.1	LOS A
	Through	24	0.03	3.7	1.1	LOS A
	Right	12	0.03	8.6	1.1	LOS A
Intersection	**All**	**440**	**0.14**	**4.4**	**5.3**	**LOS A**

Node 21699 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	6	0.14	3.7	5.8	LOS A
	Through	132	0.14	3.8	5.8	LOS A
	Right	66	0.14	9	5.8	LOS A
East Collector Road (E)	Left	67	0.08	2.4	3.1	LOS A
	Through	28	0.08	2.9	3.1	LOS A
	Right	7	0.08	7.3	3.1	LOS A
North Road (N)	Left	7	0.08	3.5	2.9	LOS A
	Through	94	0.08	3.7	2.9	LOS A
	Right	1	0.08	8.7	2.9	LOS A
West Collector Road (W)	Left	1	0.02	3.8	0.8	LOS A
	Through	22	0.02	4.1	0.8	LOS A
	Right	4	0.02	9	0.8	LOS A
Intersection	**All**	**437**	**0.14**	**4.4**	**5.8**	**LOS A**

Node 21588 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	3	0.02	2.6	0.6	LOS A
	Through	8	0.02	3	0.6	LOS A
	Right	11	0.02	7.6	0.6	LOS A
East Collector Road (E)	Left	3	0.06	3.9	2.4	LOS A
	Through	71	0.06	4.1	2.4	LOS A
	Right	4	0.06	9.2	2.4	LOS A
North Road (N)	Left	13	0.10	3.9	3.9	LOS A
	Through	95	0.10	4	3.9	LOS A
	Right	28	0.10	9.2	3.9	LOS A
West Collector Road (W)	Left	19	0.07	3.4	2.6	LOS A
	Through	81	0.07	3.6	2.6	LOS A
	Right	1	0.07	8.7	2.6	LOS A
Intersection	**All**	**337**	**0.10**	**4.5**	**3.9**	**LOS A**

Node 21588 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	6	0.03	2.7	0.9	LOS A
	Through	17	0.03	3.1	0.9	LOS A
	Right	9	0.03	7.7	0.9	LOS A
East Collector Road (E)	Left	4	0.08	3.6	3.1	LOS A
	Through	96	0.08	3.8	3.1	LOS A
	Right	7	0.08	8.9	3.1	LOS A
North Road (N)	Left	6	0.06	3.8	2.1	LOS A
	Through	46	0.06	4	2.1	LOS A
	Right	23	0.06	9.2	2.1	LOS A
West Collector Road (W)	Left	26	0.07	3.5	2.8	LOS A
	Through	77	0.07	3.6	2.8	LOS A
	Right	1	0.07	8.8	2.8	LOS A
Intersection	**All**	**320**	**0.08**	**4.3**	**3.1**	**LOS A**

Node 21587 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Collector Road (S)	Left	5	0.07	2.9	2.8	LOS A
	Through	73	0.07	3.3	2.8	LOS A
	Right	11	0.07	7.8	2.8	LOS A
East Collector Road (E)	Left	32	0.13	4.1	5.4	LOS A
	Through	59	0.13	4.3	5.4	LOS A
	Right	72	0.13	9.4	5.4	LOS A
North Road (N)	Left	108	0.19	4.2	8.1	LOS A
	Through	120	0.19	4.4	8.1	LOS A
	Right	18	0.19	9.5	8.1	LOS A
West Collector Road (W)	Left	14	0.09	3.7	3.5	LOS A
	Through	93	0.09	4	3.5	LOS A
	Right	6	0.09	8.9	3.5	LOS A
Intersection	**All**	**609**	**0.19**	**5**	**8.1**	**LOS A**

Node 21587 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Collector Road (S)	Left	9	0.14	3.4	5.9	LOS A
	Through	146	0.14	3.8	5.9	LOS A
	Right	11	0.14	8.4	5.9	LOS A
East Collector Road (E)	Left	35	0.18	3.7	8	LOS A
	Through	95	0.18	3.9	8	LOS A
	Right	126	0.18	9	8	LOS A
North Road (N)	Left	103	0.13	4.1	5.7	LOS A
	Through	60	0.13	4.3	5.7	LOS A
	Right	15	0.13	9.4	5.7	LOS A
West Collector Road (W)	Left	18	0.09	4.4	3.5	LOS A
	Through	76	0.09	4.6	3.5	LOS A
	Right	3	0.09	9.6	3.5	LOS A
Intersection	**All**	**697**	**0.18**	**5.2**	**8**	**LOS A**

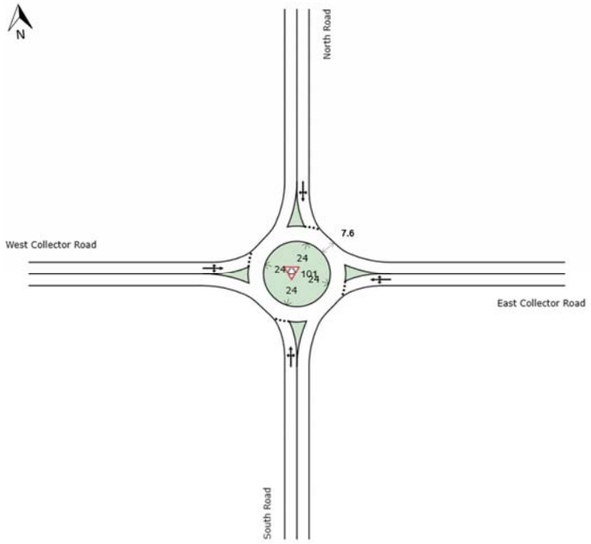
Node 21750 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	1	0.05	3.7	2	LOS A
	Through	79	0.05	3.8	2	LOS A
	Right	1	0.05	8.9	2	LOS A
East Road (E)	Left	1	0.01	4	0.2	LOS A
	Through	1	0.01	4.1	0.2	LOS A
	Right	6	0.01	9.3	0.2	LOS A
Bells Lane (N)	Left	7	0.09	3.4	3.6	LOS A
	Through	146	0.09	3.6	3.6	LOS A
	Right	2	0.09	8.7	3.6	LOS A
West Road (W)	Left	7	0.01	2.7	0.3	LOS A
	Through	1	0.01	3	0.3	LOS A
	Right	1	0.01	7.7	0.3	LOS A
Intersection	**All**	**255**	**0.09**	**3.8**	**3.6**	**LOS A**

Node 21750 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	1	0.10	3.7	4	LOS A
	Through	160	0.10	3.9	4	LOS A
	Right	1	0.10	8.9	4	LOS A
East Road (E)	Left	1	0.01	3.6	0.2	LOS A
	Through	1	0.01	3.8	0.2	LOS A
	Right	6	0.01	8.9	0.2	LOS A
North Road (N)	Left	8	0.05	3.4	2	LOS A
	Through	74	0.05	3.6	2	LOS A
	Right	3	0.05	8.7	2	LOS A
West Road (W)	Left	6	0.01	3	0.2	LOS A
	Through	1	0.01	3.4	0.2	LOS A
	Right	1	0.01	8.1	0.2	LOS A
Intersection	**All**	**264**	**0.10**	**4**	**4**	**LOS A**

Proposed Layout: Collector Road Roundabouts



Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21749, 21748, 17335 and 21597 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.

Intersection Performance - Annual Average School Term

Node 21749 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	8	0.06	3.7	2.1	LOS A
	Through	75	0.06	3.8	2.1	LOS A
	Right	4	0.06	8.9	2.1	LOS A
East Road (E)	Left	24	0.02	3.9	0.8	LOS A
	Through	2	0.02	4.1	0.8	LOS A
	Right	1	0.02	9.2	0.8	LOS A
Bells Lane (N)	Left	1	0.09	2.3	3.5	LOS A
	Through	142	0.09	2.7	3.5	LOS A
	Right	3	0.09	7.3	3.5	LOS A
West Road (W)	Left	4	0.01	2.6	0.3	LOS A
	Through	4	0.01	2.9	0.3	LOS A
	Right	1	0.01	7.6	0.3	LOS A
Intersection	**All**	**271**	**0.09**	**3.3**	**3.5**	**LOS A**

Node 21749 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	17	0.11	3.7	4.3	LOS A
	Through	156	0.11	3.8	4.3	LOS A
	Right	8	0.11	8.9	4.3	LOS A
East Road (E)	Left	14	0.01	3.6	0.5	LOS A
	Through	2	0.01	3.8	0.5	LOS A
	Right	1	0.01	8.9	0.5	LOS A
Bells Lane (N)	Left	1	0.05	2.4	1.9	LOS A
	Through	68	0.05	2.7	1.9	LOS A
	Right	4	0.05	7.4	1.9	LOS A
West Road (W)	Left	4	0.02	3	0.5	LOS A
	Through	5	0.02	3.3	0.5	LOS A
	Right	8	0.02	8	0.5	LOS A
Intersection	**All**	**289**	**0.11**	**3.9**	**4.3**	**LOS A**

Node 21748 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	86	0.18	3.7	8.8	LOS A
	Through	98	0.18	3.8	8.8	LOS A
	Right	124	0.18	8.9	8.8	LOS A
East Road (E)	Left	177	0.20	6.5	8.8	LOS A
	Through	1	0.20	6.7	8.8	LOS A
	Right	3	0.20	11.8	8.8	LOS A
Bells Lane (N)	Left	3	0.20	5.8	8.8	LOS A
	Through	185	0.20	6.1	8.8	LOS A
	Right	1	0.20	11.1	8.8	LOS A
West Road (W)	Left	1	0.28	5.1	12.5	LOS A
	Through	2	0.28	5.2	12.5	LOS A
	Right	332	0.28	10.3	12.5	LOS A
Intersection	**All**	**1014**	**0.28**	**7.5**	**12.5**	**LOS A**

Node 21748 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	176	0.31	3.7	16.7	LOS A
	Through	196	0.31	3.8	16.7	LOS A
	Right	164	0.31	8.9	16.7	LOS A
East Road (E)	Left	142	0.13	4.6	5.4	LOS A
	Through	1	0.13	4.8	5.4	LOS A
	Right	4	0.13	9.9	5.4	LOS A
Bells Lane (N)	Left	3	0.10	4.7	4	LOS A
	Through	103	0.10	5	4	LOS A
	Right	1	0.10	10	4	LOS A
West Road (W)	Left	1	0.15	5.7	5.8	LOS A
	Through	1	0.15	5.9	5.8	LOS A
	Right	152	0.15	11	5.8	LOS A
Intersection	**All**	**944**	**0.31**	**6.1**	**16.7**	**LOS A**

Node 17335 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	16	0.19	4.1	8.1	LOS A
	Through	237	0.19	4.3	8.1	LOS A
	Right	1	0.19	9.4	8.1	LOS A
Abernethys Lane (E)	Left	1	0.02	8.1	1	LOS A
	Through	8	0.02	8.3	1	LOS A
	Right	7	0.02	13.4	1	LOS A
Bells Lane (N)	Left	9	0.47	4.1	29.6	LOS A
	Through	611	0.47	4.2	29.6	LOS A
	Right	76	0.47	9.3	29.6	LOS A
Abernethys Lane (W)	Left	65	0.11	5	4.4	LOS A
	Through	6	0.11	5.1	4.4	LOS A
	Right	54	0.11	10.2	4.4	LOS A
Intersection	**All**	**1092**	**0.47**	**5**	**29.6**	**LOS A**

Node 17335 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	24	0.34	4.2	16.6	LOS A
	Through	449	0.34	4.4	16.6	LOS A
	Right	1	0.34	9.5	16.6	LOS A
Abernethys Lane (E)	Left	1	0.02	5.6	0.7	LOS A
	Through	7	0.02	5.8	0.7	LOS A
	Right	9	0.02	10.9	0.7	LOS A
Bells Lane (N)	Left	7	0.25	3.8	13	LOS A
	Through	311	0.25	3.9	13	LOS A
	Right	79	0.25	9	13	LOS A
Abernethys Lane (W)	Left	77	0.10	6.2	4.3	LOS A
	Through	7	0.10	6.4	4.3	LOS A
	Right	15	0.10	11.5	4.3	LOS A
Intersection	**All**	**988**	**0.34**	**4.9**	**16.6**	**LOS A**

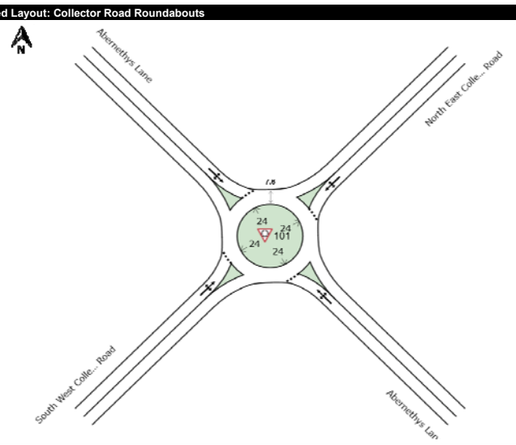
Node 21597 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	24	0.20	3.7	9.4	LOS A
	Through	271	0.20	3.9	9.4	LOS A
	Right	34	0.20	9	9.4	LOS A
East Road (E)	Left	75	0.11	7.4	5.2	LOS A
	Through	5	0.11	7.7	5.2	LOS A
	Right	1	0.11	12.4	5.2	LOS A
Bells Lane (N)	Left	1	0.50	4.4	31.1	LOS A
	Through	699	0.50	4.5	31.1	LOS A
	Right	8	0.50	9.6	31.1	LOS A
West Road (W)	Left	11	0.07	5	2.4	LOS A
	Through	5	0.07	5.2	2.4	LOS A
	Right	55	0.07	10.4	2.4	LOS A
Intersection	**All**	**1188**	**0.50**	**5**	**31.1**	**LOS A**

Node 21597 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	46	0.36	3.7	19.5	LOS A
	Through	496	0.36	3.9	19.5	LOS A
	Right	55	0.36	9	19.5	LOS A
East Road (E)	Left	42	0.05	4.2	1.9	LOS A
	Through	6	0.05	4.6	1.9	LOS A
	Right	1	0.05	9.3	1.9	LOS A
North Road (N)	Left	1	0.25	4.1	11.6	LOS A
	Through	348	0.25	4.3	11.6	LOS A
	Right	6	0.25	9.4	11.6	LOS A
West Road (W)	Left	11	0.04	6.5	1.6	LOS A
	Through	7	0.04	6.6	1.6	LOS A
	Right	19	0.04	11.8	1.6	LOS A
Intersection	**All**	**1039**	**0.36**	**4.5**	**19.5**	**LOS A**

Proposed Layout: Collector Road Roundabouts



Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21589, 21692, 21696, 21695 and 21601 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.

Intersection Performance - Annual Average School Term

Node 21589 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Abernethys Lane (SE)	Left	66	0.06	2.7	2.1	LOS A
	Through	3	0.06	3.1	2.1	LOS A
	Right	1	0.06	7.6	2.1	LOS A
Collector Road (NE)	Left	11	0.10	3.7	3.6	LOS A
	Through	115	0.10	3.9	3.6	LOS A
	Right	1	0.10	9	3.6	LOS A
Abernethys Lane (NW)	Left	1	0.02	4.3	0.8	LOS A
	Through	20	0.02	4.4	0.8	LOS A
	Right	8	0.02	9.6	0.8	LOS A
Collector Road (SW)	Left	11	0.09	3.1	3.7	LOS A
	Through	85	0.09	3.4	3.7	LOS A
	Right	56	0.09	8.4	3.7	LOS A
Intersection	**All**	**378**	**0.10**	**4.4**	**3.7**	**LOS A**

Node 21589 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Abernethys Lane (SE)	Left	68	0.06	2.6	2.3	LOS A
	Through	5	0.06	3	2.3	LOS A
	Right	2	0.06	7.6	2.3	LOS A
Collector Road (NE)	Left	1	0.08	3.7	2.9	LOS A
	Through	101	0.08	3.9	2.9	LOS A
	Right	1	0.08	9	2.9	LOS A
Abernethys Lane (NW)	Left	1	0.01	4.5	0.5	LOS A
	Through	2	0.01	4.6	0.5	LOS A
	Right	14	0.01	9.7	0.5	LOS A
Collector Road (SW)	Left	18	0.12	3.2	5	LOS A
	Through	116	0.12	3.4	5	LOS A
	Right	64	0.12	8.4	5	LOS A
Intersection	**All**	**394**	**0.12**	**4.5**	**5**	**LOS A**

Node 21692 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Abernethys Lane (SE)	Left	1	0.05	2.2	1.9	LOS A
	Through	72	0.05	2.6	1.9	LOS A
	Right	9	0.05	7.2	1.9	LOS A
North North East Road (NE)	Left	16	0.02	3.3	0.5	LOS A
	Through	2	0.02	3.5	0.5	LOS A
	Right	1	0.02	8.4	0.5	LOS A
Abernethys Lane (NW)	Left	1	0.06	3.2	2.2	LOS A
	Through	91	0.06	3.4	2.2	LOS A
	Right	1	0.06	8.5	2.2	LOS A
South South West Road (SW)	Left	1	0.00	3.4	0.1	LOS A
	Through	1	0.00	3.6	0.1	LOS A
	Right	1	0.00	8.6	0.1	LOS A
Intersection	**All**	**197**	**0.06**	**3.4**	**2.2**	**LOS A**

Node 21692 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Abernethys Lane (SE)	Left	1	0.06	2.2	2.1	LOS A
	Through	80	0.06	2.6	2.1	LOS A
	Right	14	0.06	7.2	2.1	LOS A
North North East Road (NE)	Left	12	0.01	3.2	0.4	LOS A
	Through	1	0.01	3.4	0.4	LOS A
	Right	1	0.01	8.3	0.4	LOS A
Abernethys Lane (NW)	Left	1	0.05	3.3	1.7	LOS A
	Through	67	0.05	3.5	1.7	LOS A
	Right	1	0.05	8.5	1.7	LOS A
South South West Road (SW)	Left	1	0.00	3.4	0.1	LOS A
	Through	1	0.00	3.7	0.1	LOS A
	Right	1	0.00	8.7	0.1	LOS A
Intersection	**All**	**181**	**0.06**	**3.4**	**2.1**	**LOS A**

Node 21696 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	7	0.01	3.9	0.3	LOS A
	Through	1	0.01	4.1	0.3	LOS A
	Right	1	0.01	9.1	0.3	LOS A
Collector Road (NE)	Left	1	0.12	3.2	4.6	LOS A
	Through	188	0.12	3.4	4.6	LOS A
	Right	1	0.12	8.4	4.6	LOS A
North West Road (NW)	Left	1	0.00	4	0.1	LOS A
	Through	1	0.00	4.2	0.1	LOS A
	Right	1	0.00	9.3	0.1	LOS A
Collector Road (SW)	Left	1	0.09	3.7	3.8	LOS A
	Through	151	0.09	3.8	3.8	LOS A
	Right	8	0.09	8.9	3.8	LOS A
Intersection	**All**	**363**	**0.12**	**3.8**	**4.6**	**LOS A**

Node 21696 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	13	0.01	3.8	0.4	LOS A
	Through	1	0.01	4.1	0.4	LOS A
	Right	1	0.01	9.1	0.4	LOS A
Collector Road (NE)	Left	1	0.11	3.2	4.4	LOS A
	Through	182	0.11	3.4	4.4	LOS A
	Right	1	0.11	8.4	4.4	LOS A
North West Road (NW)	Left	1	0.00	4.2	0.1	LOS A
	Through	1	0.00	4.4	0.1	LOS A
	Right	1	0.00	9.5	0.1	LOS A
Collector Road (SW)	Left	2	0.12	3.7	5	LOS A
	Through	198	0.12	3.8	5	LOS A
	Right	7	0.12	8.9	5	LOS A
Intersection	**All**	**409**	**0.12**	**3.8**	**5**	**LOS A**

Node 21695 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	7	0.02	4	0.6	LOS A
	Through	1	0.02	4.2	0.6	LOS A
	Right	11	0.02	9.3	0.6	LOS A
Collector Road (NE)	Left	13	0.13	3.7	5.3	LOS A
	Through	178	0.13	3.9	5.3	LOS A
	Right	6	0.13	9	5.3	LOS A
North West Road (NW)	Left	6	0.02	4.4	0.7	LOS A
	Through	1	0.02	4.5	0.7	LOS A
	Right	16	0.02	9.6	0.7	LOS A
Collector Road (SW)	Left	7	0.10	3.7	4	LOS A
	Through	142	0.10	3.9	4	LOS A
	Right	3	0.10	9	4	LOS A
Intersection	**All**	**392**	**0.13**	**4.4**	**5.3**	**LOS A**

Node 21695 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	14	0.02	4	0.8	LOS A
	Through	1	0.02	4.2	0.8	LOS A
	Right	13	0.02	9.2	0.8	LOS A
Collector Road (NE)	Left	13	0.12	3.7	5.1	LOS A
	Through	176	0.12	3.9	5.1	LOS A
	Right	7	0.12	9	5.1	LOS A
North West Road (NW)	Left	6	0.01	4.6	0.5	LOS A
	Through	1	0.01	4.8	0.5	LOS A
	Right	9	0.01	9.9	0.5	LOS A
Collector Road (SW)	Left	12	0.13	3.7	5.5	LOS A
	Through	188	0.13	3.9	5.5	LOS A
	Right	4	0.13	9	5.5	LOS A
Intersection	**All**	**444**	**0.13**	**4.3**	**5.5**	**LOS A**

Node 21601 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	38	0.04	5.1	1.5	LOS A
	Through	2	0.04	5.3	1.5	LOS A
	Right	1	0.04	10.5	1.5	LOS A
Collector Road (NE)	Left	1	0.17	4.6	7	LOS A
	Through	196	0.17	4.8	7	LOS A
	Right	4	0.17	9.9	7	LOS A
North West Road (NW)	Left	4	0.13	4.6	4.8	LOS A
	Through	1	0.13	4.8	4.8	LOS A
	Right	146	0.13	9.8	4.8	LOS A
Collector Road (SW)	Left	66	0.14	3.7	6.1	LOS A
	Through	147	0.14	3.8	6.1	LOS A
	Right	26	0.14	8.9	6.1	LOS A
Intersection	**All**	**634**	**0.17**	**5.9**	**7**	**LOS A**

Node 21601 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South East Road (SE)	Left	35	0.04	4.8	1.3	LOS A
	Through	3	0.04	5	1.3	LOS A
	Right	1	0.04	10.2	1.3	LOS A
Collector Road (NE)	Left	1	0.16	4.4	6.6	LOS A
	Through	194	0.16	4.5	6.6	LOS A
	Right	4	0.16	9.6	6.6	LOS A
North West Road (NW)	Left	3	0.08	4.9	3.1	LOS A
	Through	1	0.08	5.1	3.1	LOS A
	Right	92	0.08	10.1	3.1	LOS A
Collector Road (SW)	Left	124	0.22	3.7	9.8	LOS A
	Through	200	0.22	3.8	9.8	LOS A
	Right	39	0.22	8.9	9.8	LOS A
Intersection	**All**	**697**	**0.22**	**5.2**	**9.8**	**LOS A**

Proposed Layout: Collector Road Roundabouts

Intersection Performance - Annual Average School Term

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21718 and 21717 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

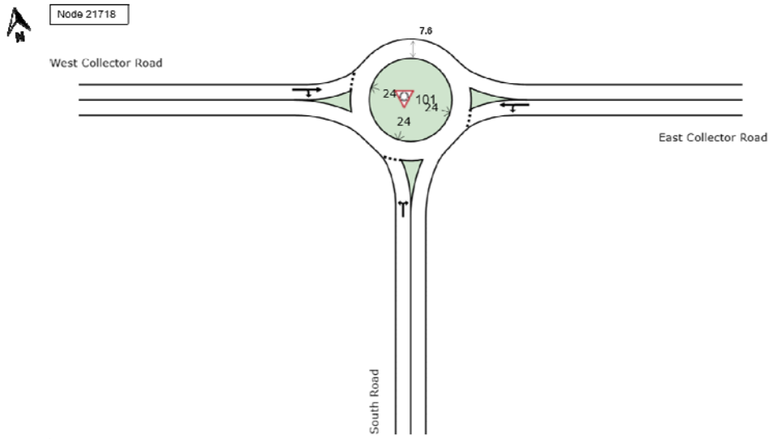
The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

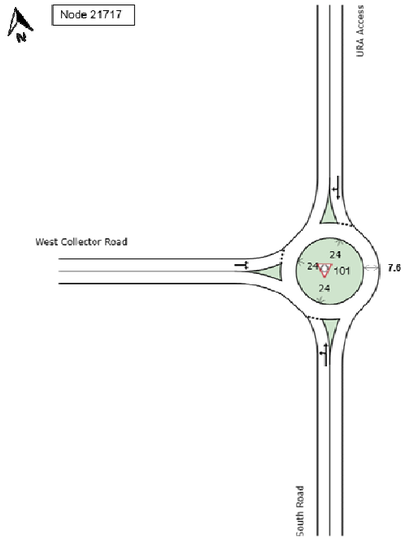
Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.





Node 21718 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	3	0.01	3.9	0.4	LOS A
	Right	12	0.01	9.2	0.4	LOS A
Collector Road (E)	Left	9	0.09	3.2	3.3	LOS A
	Through	138	0.09	3.4	3.3	LOS A
Collector Road (W)	Through	202	0.13	3.9	5.4	LOS A
	Right	3	0.13	8.9	5.4	LOS A
Intersection	**All**	**367**	**0.13**	**3.9**	**5.4**	**LOS A**

Node 21717 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	1	0.11	4.5	4.2	LOS A
	Through	135	0.11	4.6	4.2	LOS A
URA Access (N)	Through	149	0.17	3.8	7.9	LOS A
	Right	157	0.17	8.9	7.9	LOS A
Collector Road (W)	Left	238	0.19	3.1	8.2	LOS A
	Right	1	0.19	8.2	8.2	LOS A
Intersection	**All**	**681**	**0.19**	**4.9**	**8.2**	**LOS A**

Node 21718 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	3	0.01	4.4	0.4	LOS A
	Right	8	0.01	9.7	0.4	LOS A
Collector Road (E)	Left	20	0.15	3.2	6	LOS A
	Through	239	0.15	3.4	6	LOS A
Collector Road (W)	Through	180	0.11	3.8	4.8	LOS A
	Right	3	0.11	8.9	4.8	LOS A
Intersection	**All**	**454**	**0.15**	**3.7**	**6**	**LOS A**

Node 21717 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
South Road (S)	Left	1	0.14	5.2	5.4	LOS A
	Through	153	0.14	5.4	5.4	LOS A
URA Access (N)	Through	158	0.25	3.8	12.5	LOS A
	Right	284	0.25	8.9	12.5	LOS A
Collector Road (W)	Left	201	0.16	3.2	7.2	LOS A
	Right	1	0.16	8.3	7.2	LOS A
Intersection	**All**	**798**	**0.25**	**5.8**	**12.5**	**LOS A**

Proposed Layout: Collector Road Roundabouts

Intersection Performance - Annual Average School Term

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21899 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

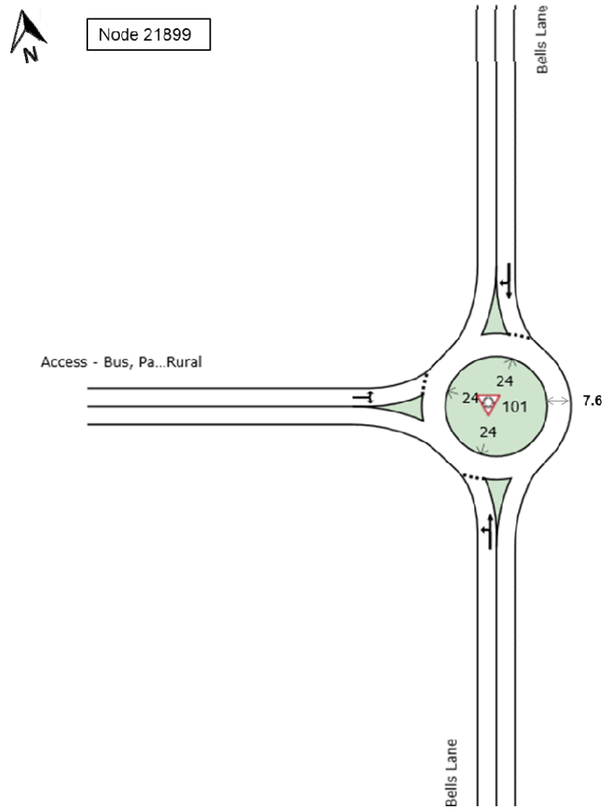
The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.



Node 21899 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	172	0.32	3.9	16.8	LOS A
	Through	305	0.32	4.1	16.8	LOS A
Bells Lane (N)	Through	778	0.58	4.7	42.8	LOS A
	Right	52	0.58	9.7	42.8	LOS A
Access - Bus / Park	Left	22	0.11	4.7	4.3	LOS A
	Right	95	0.11	10	4.3	LOS A
Intersectio	**All**	**1423**	**0.58**	**5**	**42.8**	**LOS A**

Node 21899 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	87	0.39	3.8	23.3	LOS A
	Through	548	0.39	3.9	23.3	LOS A
Bells Lane (N)	Through	392	0.33	4.9	17.7	LOS A
	Right	19	0.33	10	17.7	LOS A
Access - Bus / Park	Left	48	0.24	6.7	10.6	LOS A
	Right	169	0.24	11.9	10.6	LOS A
Intersectio	**All**	**1264**	**0.39**	**5.5**	**23.3**	**LOS A**

Proposed Layout: Collector Road Roundabouts

Intersection Performance - Annual Average School Term

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 21698 and 21697 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

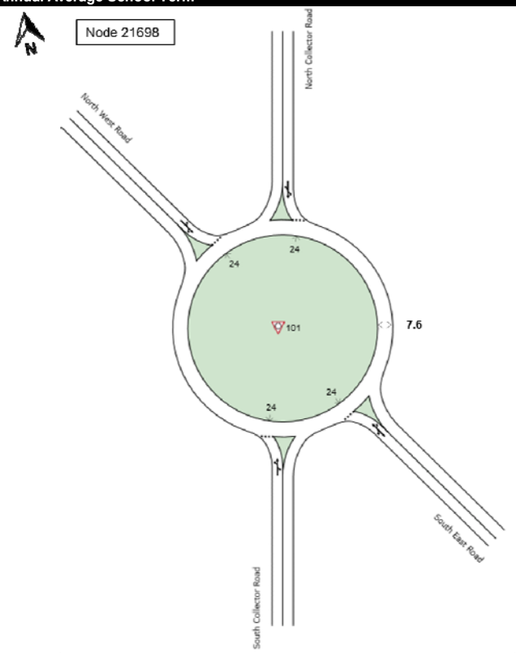
The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.

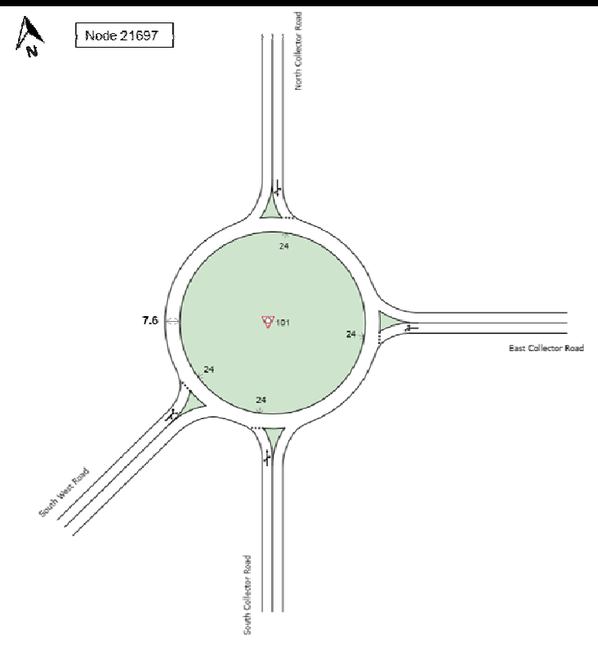


Node 21698 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Collector Road (S)	Left	4	0.08	3.6	3	LOS A
	Through	86	0.08	4	3	LOS A
	Right	15	0.08	10.3	3	LOS A
South East Road (SE)	Left	14	0.06	3.5	2.1	LOS A
	Through	7	0.06	3.7	2.1	LOS A
	Right	52	0.06	7.5	2.1	LOS A
Collector Road (N)	Left	160	0.18	3.6	7.9	LOS A
	Through	116	0.18	4	7.9	LOS A
	Right	1	0.18	10.2	7.9	LOS A
North West Road (NW)	Left	1	0.02	4.6	0.7	LOS A
	Through	19	0.02	4.4	0.7	LOS A
	Right	5	0.02	8.5	0.7	LOS A
Intersection	**All**	**480**	**0.18**	**4.5**	**7.9**	**LOS A**

Node 21698 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Collector Road (S)	Left	5	0.11	4	4.2	LOS A
	Through	112	0.11	4.3	4.2	LOS A
	Right	16	0.11	10.7	4.2	LOS A
South East Road (SE)	Left	13	0.11	3.5	4.1	LOS A
	Through	15	0.11	3.6	4.1	LOS A
	Right	111	0.11	7.4	4.1	LOS A
Collector Road (N)	Left	74	0.12	3.6	4.7	LOS A
	Through	100	0.12	3.9	4.7	LOS A
	Right	1	0.12	10.1	4.7	LOS A
North West Road (NW)	Left	1	0.01	4.9	0.5	LOS A
	Through	9	0.01	4.8	0.5	LOS A
	Right	4	0.01	8.9	0.5	LOS A
Intersection	**All**	**460**	**0.12**	**5.1**	**4.7**	**LOS A**



Node 21697 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Collector Road (S)	Left	1	0.06	3.5	2	LOS A
	Through	80	0.06	3.5	2	LOS A
	Right	1	0.06	8.6	2	LOS A
Collector Road (E)	Left	1	0.00	4.2	0.1	LOS A
	Left	1	0.00	4	0.1	LOS A
	Right	3	0.00	9.5	0.1	LOS A
Collector Road (N)	Left	6	0.08	3.5	3.1	LOS A
	Through	116	0.08	3.7	3.1	LOS A
	Right	13	0.08	7.8	3.1	LOS A
South West Road (SW)	Left	21	0.02	3.4	0.6	LOS A
	Right	1	0.02	7.8	0.6	LOS A
	Right	1	0.02	10	0.6	LOS A
Intersection	**All**	**245**	**0.08**	**3.9**	**3.1**	**LOS A**

Node 21697 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Collector Road (S)	Left	1	0.07	3.5	2.8	LOS A
	Through	108	0.07	3.5	2.8	LOS A
	Right	1	0.07	8.6	2.8	LOS A
Collector Road (E)	Left	1	0.01	4.2	0.2	LOS A
	Left	1	0.01	4	0.2	LOS A
	Right	5	0.01	9.4	0.2	LOS A
Collector Road (N)	Left	3	0.07	3.5	2.7	LOS A
	Through	96	0.07	3.7	2.7	LOS A
	Right	18	0.07	7.8	2.7	LOS A
South West Road (SW)	Left	20	0.02	3.6	0.6	LOS A
	Right	1	0.02	7.9	0.6	LOS A
	Right	1	0.02	10.1	0.6	LOS A
Intersection	**All**	**257**	**0.07**	**4.1**	**2.8**	**LOS A**

Proposed Layout: Collector Road Roundabouts

Intersection Performance - Annual Average School Term

Model Development and Assessment Criteria

The future traffic model obtained from the Shoalhaven Kiama TRACKS model (Nodes 17334 May 2020 version).

Intersection capacity mechanisms are indicated by dark grey shading, and outlined as follows:
- the degree of saturation for a particular movement is between 0.70 and 0.85; and
- the 95th percentile queue length is ±10m the length of the approach to the following intersection.

Intersection over-capacity mechanisms are indicated by dark grey shading and red font, and outlined as follows:
- the degree of saturation for any intersection movement exceeds 0.85; and
-the 95th percentile queue length exceeds 10m beyond the length of the available approach length to the following intersection, or exceeds 500m for a continuous lane.

Design Years

The design year is 2041.

Model Description

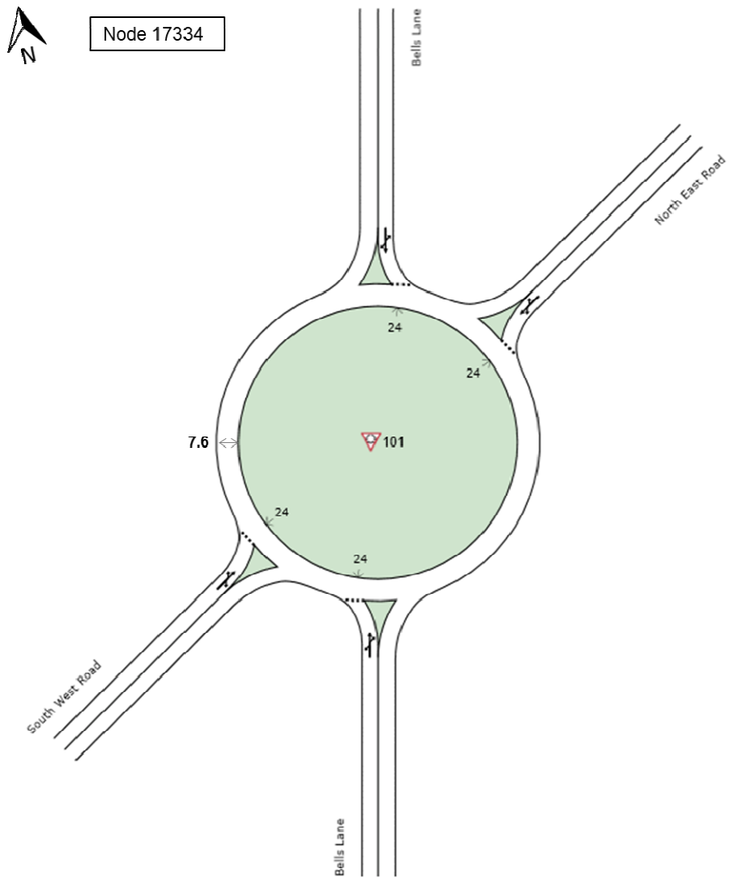
The traffic volumes represent the AM and PM peak hour for the Annual Average School Term (AAST).

Circulating width and central island radius geometry in accordance with collector road roundabouts.

Key Findings

The intersection remains within Degree of Saturation (DoS) limits in all scenarios.

A Level of Service (LoS) of 'A' is consistent within all scenarios.



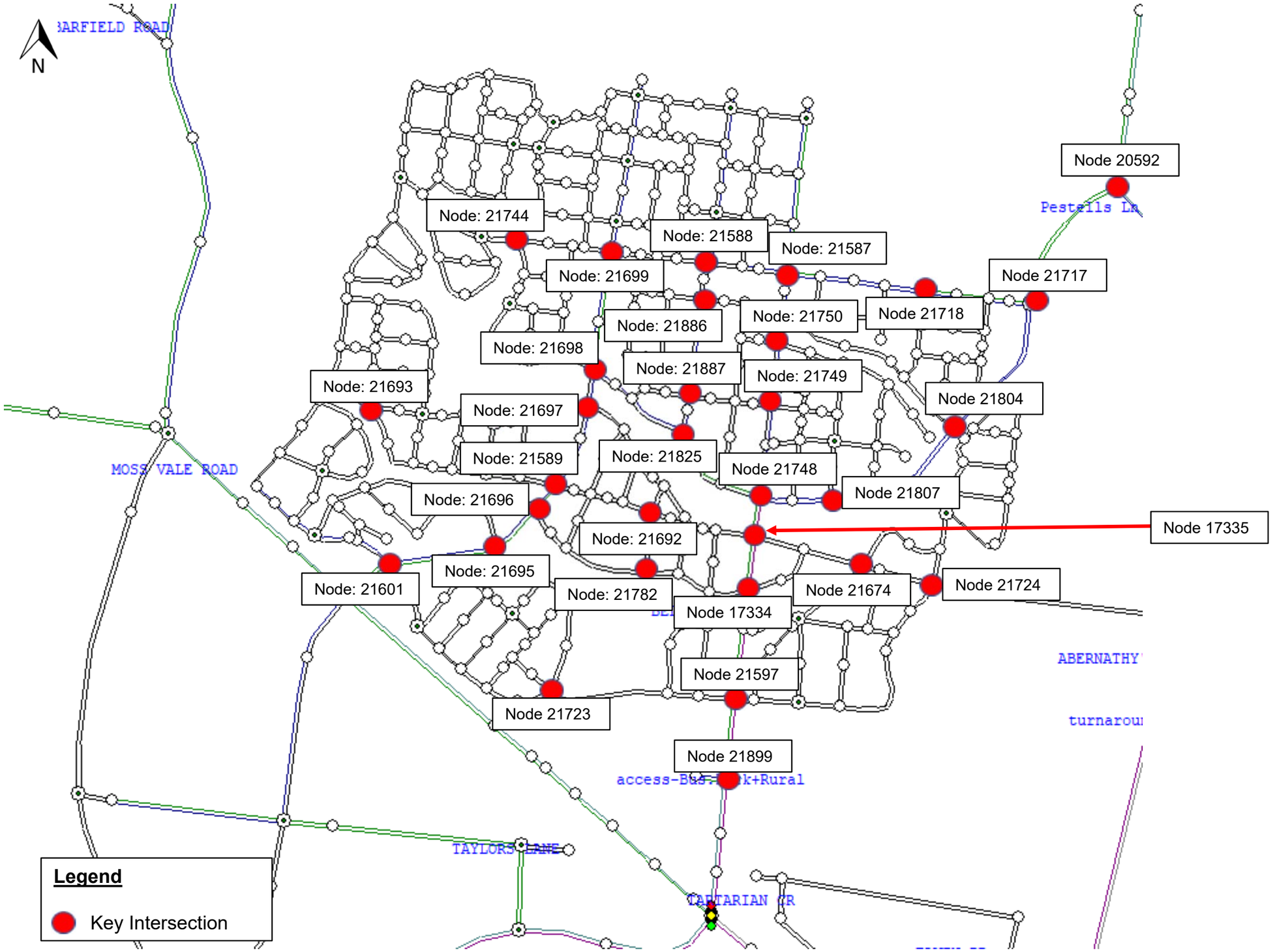
Node 17334 Year 2041 AM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	22	0.16	3.8	7.6	LOS A
	Through	252	0.16	3.8	7.6	LOS A
	Right	7	0.16	7.8	7.6	LOS A
North East Road (NE)	Left	14	0.02	7.2	0.8	LOS A
	Through	1	0.02	7.6	0.8	LOS A
	Right	1	0.02	13.8	0.8	LOS A
Bells Lane (N)	Left	1	0.43	4.1	25.4	LOS A
	Through	664	0.43	4.1	25.4	LOS A
	Right	1	0.43	8.1	25.4	LOS A
South West Road (SW)	Left	1	0.03	4.7	1	LOS A
	Through	1	0.03	5	1	LOS A
	Right	31	0.03	11.3	1	LOS A
Intersection	**All**	**996**	**0.43**	**4.3**	**25.4**	**LOS A**

Node 17334 Year 2041 PM Peak Hour

Approach	Movement	Demand (veh/h)	Degree of Saturation (v/c)	Delay (s)	95%ile Queue (m)	Level of Service
Bells Lane (S)	Left	23	0.29	3.8	14.9	LOS A
	Through	474	0.29	3.8	14.9	LOS A
	Right	9	0.29	7.8	14.9	LOS A
North East Road (NE)	Left	8	0.01	4.8	0.4	LOS A
	Through	1	0.01	5.2	0.4	LOS A
	Right	1	0.01	11.4	0.4	LOS A
Bells Lane (N)	Left	1	0.21	4	10	LOS A
	Through	324	0.21	4	10	LOS A
	Right	1	0.21	8	10	LOS A
South West Road (SW)	Left	1	0.03	5.9	0.9	LOS A
	Through	1	0.03	6.3	0.9	LOS A
	Right	22	0.03	12.5	0.9	LOS A
Intersection	**All**	**867**	**0.29**	**4.2**	**14.9**	**LOS A**

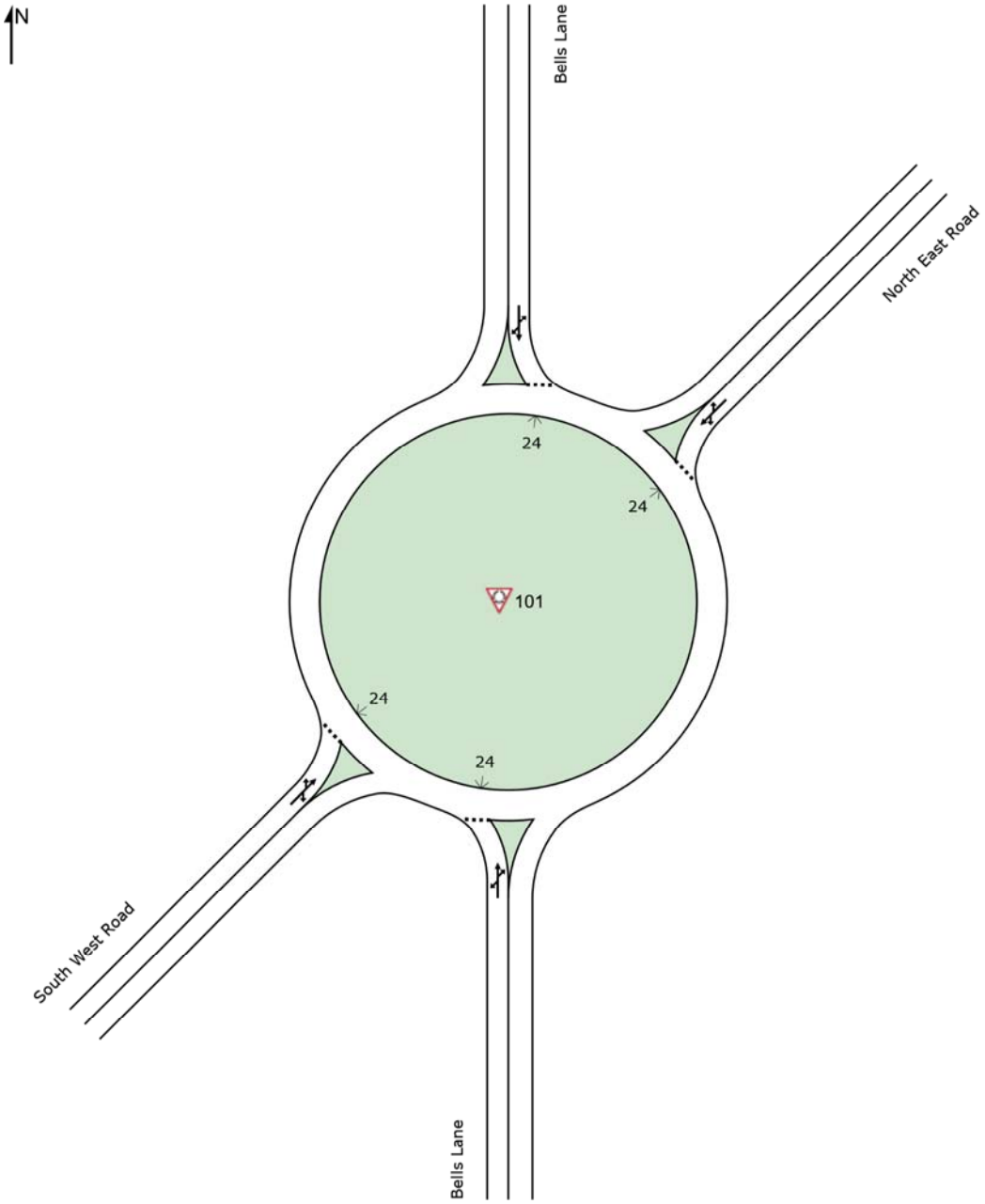
Appendix B: Detailed SIDRA Assessment Outputs


N
BARFIELD ROAD
MOSS VALE ROAD
Pestells Ln
ABERNATHY
turnarou
TAYLORS LANE
TARTARIAN CR
access-Bus+Rural
Node: 21744
Node: 21588
Node: 21587
Node: 21699
Node: 21886
Node: 21750
Node 21718
Node 21717
Node 20592
Node: 21698
Node: 21887
Node: 21749
Node: 21693
Node: 21697
Node 21804
Node: 21589
Node: 21825
Node 21748
Node 21807
Node: 21696
Node 17335
Node: 21692
Node: 21695
Node: 21601
Node: 21782
Node 21674
Node 21724
Node 17334
Node 21597
Node 21723
Node 21899
Legend
Key Intersection

SITE LAYOUT

Site: 101 [17334_2041_AAST_AM]

Node: 17334
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [17334_2041_AAST_AM]

Node: 17334
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1b	L3	22	0.0	0.163	3.8	LOS A	1.1	7.6	0.04	0.39	0.04	43.1
2	T1	252	0.0	0.163	3.8	LOS A	1.1	7.6	0.04	0.39	0.04	50.6
3a	R1	7	0.0	0.163	7.8	LOS A	1.1	7.6	0.04	0.39	0.04	40.4
Approach		281	0.0	0.163	3.9	LOS A	1.1	7.6	0.04	0.39	0.04	49.8
NorthEast: North East Road												
24a	L1	14	0.0	0.020	7.2	LOS A	0.1	0.8	0.68	0.60	0.68	35.9
5	T1	1	0.0	0.020	7.6	LOS A	0.1	0.8	0.68	0.60	0.68	35.9
26b	R3	1	0.0	0.020	13.8	LOS A	0.1	0.8	0.68	0.60	0.68	36.7
Approach		16	0.0	0.020	7.7	LOS A	0.1	0.8	0.68	0.60	0.68	36.0
North: Bells Lane												
7b	L3	1	0.0	0.426	4.1	LOS A	3.6	25.4	0.23	0.37	0.23	41.2
8	T1	664	0.0	0.426	4.1	LOS A	3.6	25.4	0.23	0.37	0.23	43.5
9a	R1	1	0.0	0.426	8.1	LOS A	3.6	25.4	0.23	0.37	0.23	41.1
Approach		666	0.0	0.426	4.1	LOS A	3.6	25.4	0.23	0.37	0.23	43.4
SouthWest: South West Road												
30a	L1	1	0.0	0.029	4.7	LOS A	0.1	1.0	0.41	0.62	0.41	37.6
11	T1	1	0.0	0.029	5.0	LOS A	0.1	1.0	0.41	0.62	0.41	32.9
32b	R3	31	0.0	0.029	11.3	LOS A	0.1	1.0	0.41	0.62	0.41	32.2
Approach		33	0.0	0.029	10.8	LOS A	0.1	1.0	0.41	0.62	0.41	32.4
All Vehicles		996	0.0	0.426	4.3	LOS A	3.6	25.4	0.19	0.39	0.19	44.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [17334_2041_AAST_PM]

Node: 17334
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

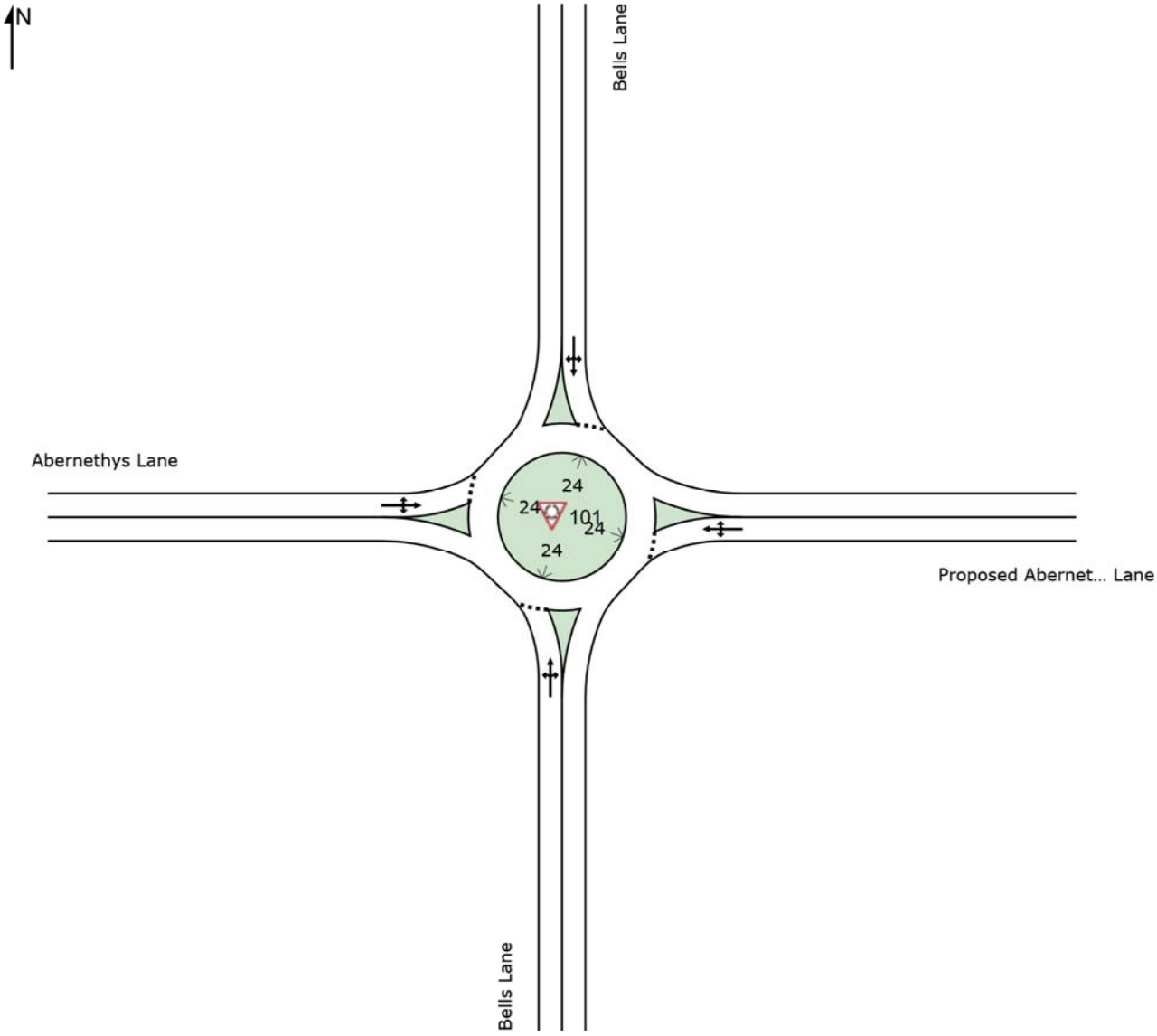
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1b	L3	23	0.0	0.291	3.8	LOS A	2.1	14.9	0.04	0.38	0.04	43.2
2	T1	474	0.0	0.291	3.8	LOS A	2.1	14.9	0.04	0.38	0.04	50.7
3a	R1	9	0.0	0.291	7.8	LOS A	2.1	14.9	0.04	0.38	0.04	40.4
Approach		506	0.0	0.291	3.9	LOS A	2.1	14.9	0.04	0.38	0.04	50.1
NorthEast: North East Road												
24a	L1	8	0.0	0.010	4.8	LOS A	0.1	0.4	0.48	0.48	0.48	38.7
5	T1	1	0.0	0.010	5.2	LOS A	0.1	0.4	0.48	0.48	0.48	38.6
26b	R3	1	0.0	0.010	11.4	LOS A	0.1	0.4	0.48	0.48	0.48	39.1
Approach		11	0.0	0.010	5.5	LOS A	0.1	0.4	0.48	0.48	0.48	38.7
North: Bells Lane												
7b	L3	1	0.0	0.212	4.0	LOS A	1.4	10.0	0.17	0.37	0.17	41.9
8	T1	324	0.0	0.212	4.0	LOS A	1.4	10.0	0.17	0.37	0.17	44.2
9a	R1	1	0.0	0.212	8.0	LOS A	1.4	10.0	0.17	0.37	0.17	41.7
Approach		326	0.0	0.212	4.0	LOS A	1.4	10.0	0.17	0.37	0.17	44.2
SouthWest: South West Road												
30a	L1	1	0.0	0.025	5.9	LOS A	0.1	0.9	0.55	0.66	0.55	36.8
11	T1	1	0.0	0.025	6.3	LOS A	0.1	0.9	0.55	0.66	0.55	32.1
32b	R3	22	0.0	0.025	12.5	LOS A	0.1	0.9	0.55	0.66	0.55	31.5
Approach		24	0.0	0.025	12.0	LOS A	0.1	0.9	0.55	0.66	0.55	31.8
All Vehicles		867	0.0	0.291	4.2	LOS A	2.1	14.9	0.11	0.39	0.11	46.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [17335_2041_AAST_AM]

Node: 17335
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [17335_2041_AAST_AM]

Node: 17335
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	16	0.0	0.187	4.1	LOS A	1.2	8.1	0.28	0.41	0.28	43.5
2	T1	237	0.0	0.187	4.3	LOS A	1.2	8.1	0.28	0.41	0.28	42.7
3	R2	1	0.0	0.187	9.4	LOS A	1.2	8.1	0.28	0.41	0.28	42.2
Approach		254	0.0	0.187	4.3	LOS A	1.2	8.1	0.28	0.41	0.28	42.7
East: Proposed Abernethys Lane												
4	L2	1	0.0	0.023	8.1	LOS A	0.1	1.0	0.72	0.65	0.72	37.5
5	T1	8	0.0	0.023	8.3	LOS A	0.1	1.0	0.72	0.65	0.72	32.2
6	R2	7	0.0	0.023	13.4	LOS A	0.1	1.0	0.72	0.65	0.72	30.8
Approach		17	0.0	0.023	10.5	LOS A	0.1	1.0	0.72	0.65	0.72	31.9
North: Bells Lane												
7	L2	9	0.0	0.465	4.1	LOS A	4.2	29.6	0.32	0.42	0.32	42.0
8	T1	611	0.0	0.465	4.2	LOS A	4.2	29.6	0.32	0.42	0.32	46.0
9	R2	76	0.0	0.465	9.3	LOS A	4.2	29.6	0.32	0.42	0.32	34.4
Approach		696	0.0	0.465	4.8	LOS A	4.2	29.6	0.32	0.42	0.32	44.5
West: Abernethys Lane												
10	L2	65	0.0	0.111	5.0	LOS A	0.6	4.4	0.44	0.59	0.44	37.4
11	T1	6	0.0	0.111	5.1	LOS A	0.6	4.4	0.44	0.59	0.44	42.3
12	R2	54	0.0	0.111	10.2	LOS A	0.6	4.4	0.44	0.59	0.44	37.5
Approach		125	0.0	0.111	7.2	LOS A	0.6	4.4	0.44	0.59	0.44	37.7
All Vehicles		1092	0.0	0.465	5.0	LOS A	4.2	29.6	0.33	0.44	0.33	43.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [17335_2041_AAST_PM]

Node: 17335
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

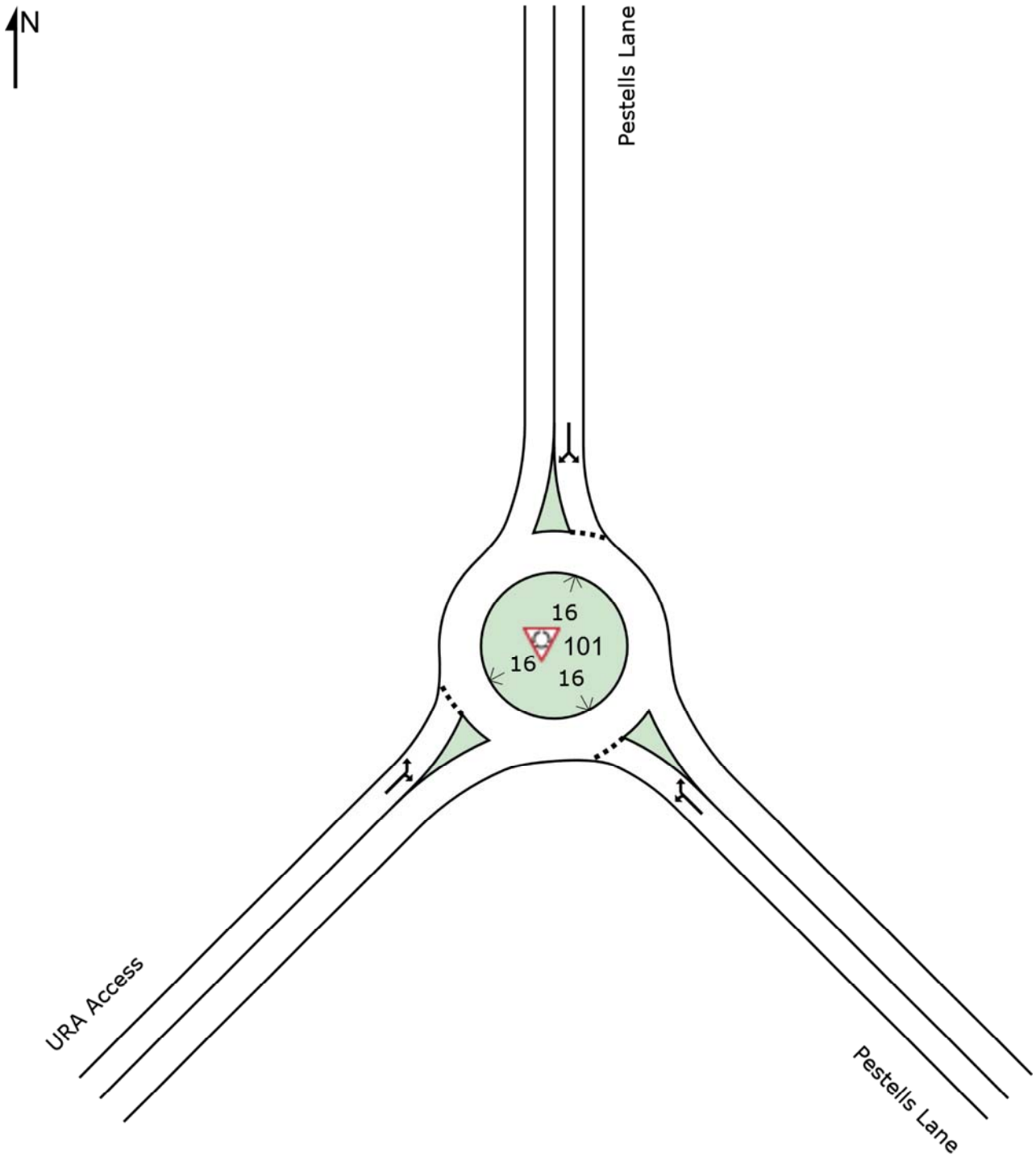
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	24	0.0	0.340	4.2	LOS A	2.4	16.6	0.32	0.42	0.32	43.1
2	T1	449	0.0	0.340	4.4	LOS A	2.4	16.6	0.32	0.42	0.32	42.2
3	R2	1	0.0	0.340	9.5	LOS A	2.4	16.6	0.32	0.42	0.32	41.8
Approach		475	0.0	0.340	4.4	LOS A	2.4	16.6	0.32	0.42	0.32	42.3
East: Proposed Abernethys Lane												
4	L2	1	0.0	0.018	5.6	LOS A	0.1	0.7	0.52	0.58	0.52	39.6
5	T1	7	0.0	0.018	5.8	LOS A	0.1	0.7	0.52	0.58	0.52	34.0
6	R2	9	0.0	0.018	10.9	LOS A	0.1	0.7	0.52	0.58	0.52	32.4
Approach		18	0.0	0.018	8.5	LOS A	0.1	0.7	0.52	0.58	0.52	33.5
North: Bells Lane												
7	L2	7	0.0	0.250	3.8	LOS A	1.9	13.0	0.15	0.43	0.15	43.2
8	T1	311	0.0	0.250	3.9	LOS A	1.9	13.0	0.15	0.43	0.15	47.2
9	R2	79	0.0	0.250	9.0	LOS A	1.9	13.0	0.15	0.43	0.15	35.3
Approach		397	0.0	0.250	4.9	LOS A	1.9	13.0	0.15	0.43	0.15	44.5
West: Abernethys Lane												
10	L2	77	0.0	0.104	6.2	LOS A	0.6	4.3	0.60	0.64	0.60	37.7
11	T1	7	0.0	0.104	6.4	LOS A	0.6	4.3	0.60	0.64	0.60	42.9
12	R2	15	0.0	0.104	11.5	LOS A	0.6	4.3	0.60	0.64	0.60	37.8
Approach		99	0.0	0.104	7.0	LOS A	0.6	4.3	0.60	0.64	0.60	38.1
All Vehicles		988	0.0	0.340	4.9	LOS A	2.4	16.6	0.28	0.45	0.28	42.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [20592_2041_AAST_AM]

Node: 20592
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [20592_2041_AAST_AM]

Node: 20592
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Pestells Lane												
21	L2	65	0.0	0.178	5.6	LOS A	1.1	8.0	0.51	0.63	0.51	46.3
23a	R1	120	0.0	0.178	9.0	LOS A	1.1	8.0	0.51	0.63	0.51	42.0
Approach		185	0.0	0.178	7.8	LOS A	1.1	8.0	0.51	0.63	0.51	43.9
North: Pestells Lane												
7a	L1	313	0.0	0.511	6.2	LOS A	4.2	29.5	0.65	0.67	0.65	42.5
9a	R1	241	0.0	0.511	9.7	LOS A	4.2	29.5	0.65	0.67	0.65	48.2
Approach		554	0.0	0.511	7.7	LOS A	4.2	29.5	0.65	0.67	0.65	45.6
SouthWest: URA Access												
30a	L1	119	0.0	0.298	4.7	LOS A	2.1	15.0	0.39	0.59	0.39	48.4
32	R2	254	0.0	0.298	9.2	LOS A	2.1	15.0	0.39	0.59	0.39	44.9
Approach		373	0.0	0.298	7.8	LOS A	2.1	15.0	0.39	0.59	0.39	46.1
All Vehicles		1112	0.0	0.511	7.7	LOS A	4.2	29.5	0.54	0.64	0.54	45.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [20592_2041_AAST_PM]

Node: 20592
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

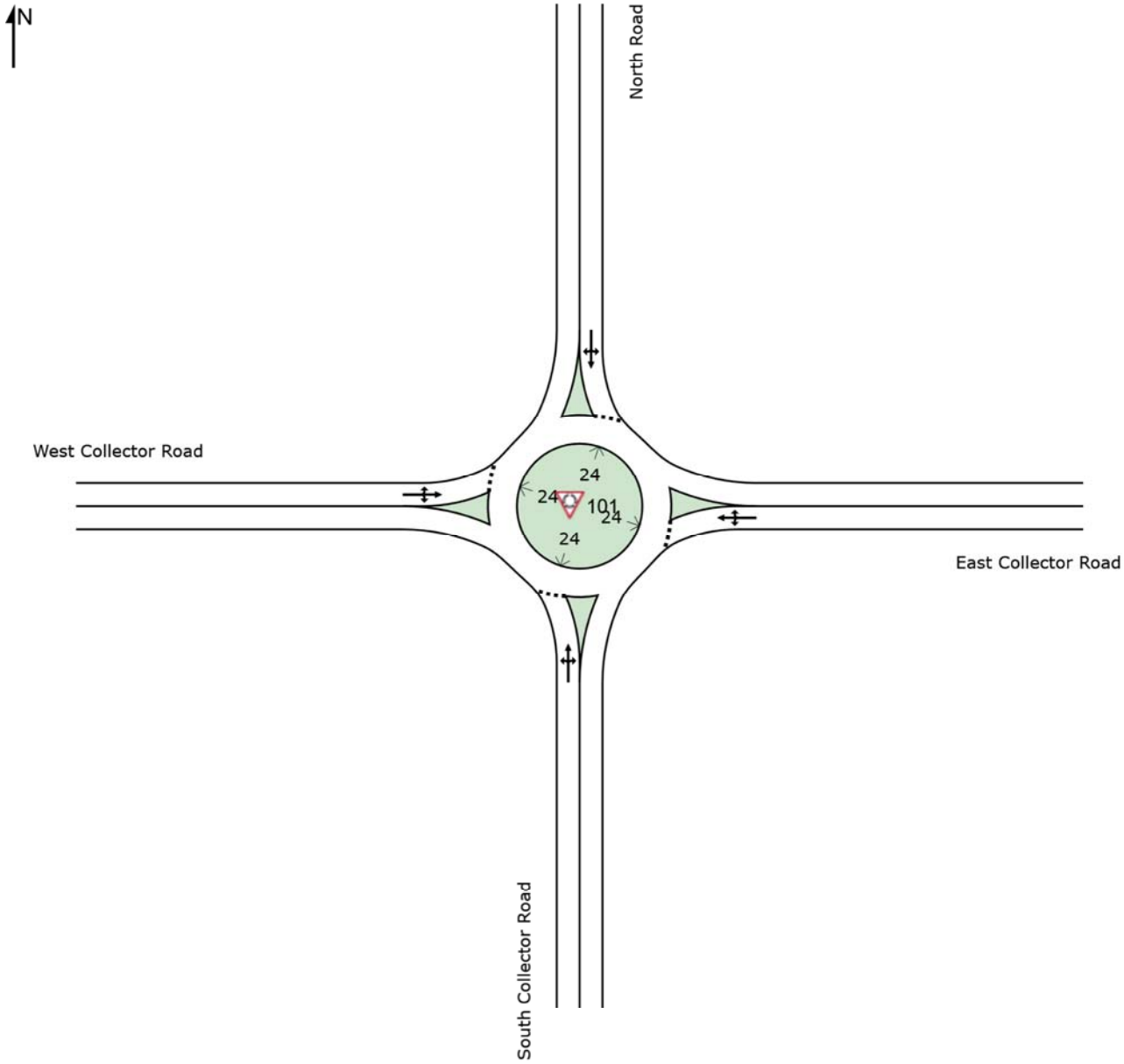
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Pestells Lane												
21	L2	231	0.0	0.430	5.7	LOS A	3.4	23.9	0.58	0.64	0.58	46.5
23a	R1	252	0.0	0.430	9.2	LOS A	3.4	23.9	0.58	0.64	0.58	42.2
Approach		482	0.0	0.430	7.5	LOS A	3.4	23.9	0.58	0.64	0.58	44.6
North: Pestells Lane												
7a	L1	153	0.0	0.332	5.5	LOS A	2.4	16.9	0.53	0.63	0.53	42.6
9a	R1	212	0.0	0.332	9.0	LOS A	2.4	16.9	0.53	0.63	0.53	48.3
Approach		364	0.0	0.332	7.5	LOS A	2.4	16.9	0.53	0.63	0.53	46.5
SouthWest: URA Access												
30a	L1	138	0.0	0.337	5.8	LOS A	2.4	17.0	0.57	0.67	0.57	47.9
32	R2	215	0.0	0.337	10.3	LOS A	2.4	17.0	0.57	0.67	0.57	44.5
Approach		353	0.0	0.337	8.5	LOS A	2.4	17.0	0.57	0.67	0.57	45.9
All Vehicles		1199	0.0	0.430	7.8	LOS A	3.4	23.9	0.56	0.65	0.56	45.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21587_2041_AAST_AM]

Node: 21587
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21587_2041_AAST_AM]

Node: 21587
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Collector Road												
1	L2	5	0.0	0.071	2.9	LOS A	0.4	2.8	0.34	0.45	0.34	34.3
2	T1	73	0.0	0.071	3.3	LOS A	0.4	2.8	0.34	0.45	0.34	47.3
3	R2	11	0.0	0.071	7.8	LOS A	0.4	2.8	0.34	0.45	0.34	35.9
Approach		88	0.0	0.071	3.8	LOS A	0.4	2.8	0.34	0.45	0.34	45.1
East: East Collector Road												
4	L2	32	0.0	0.130	4.1	LOS A	0.8	5.4	0.35	0.54	0.35	32.7
5	T1	59	0.0	0.130	4.3	LOS A	0.8	5.4	0.35	0.54	0.35	35.3
6	R2	72	0.0	0.130	9.4	LOS A	0.8	5.4	0.35	0.54	0.35	37.0
Approach		162	0.0	0.130	6.5	LOS A	0.8	5.4	0.35	0.54	0.35	35.7
North: North Road												
7	L2	108	0.0	0.186	4.2	LOS A	1.2	8.1	0.32	0.46	0.32	39.7
8	T1	120	0.0	0.186	4.4	LOS A	1.2	8.1	0.32	0.46	0.32	38.2
9	R2	18	0.0	0.186	9.5	LOS A	1.2	8.1	0.32	0.46	0.32	37.5
Approach		246	0.0	0.186	4.7	LOS A	1.2	8.1	0.32	0.46	0.32	38.8
West: West Collector Road												
10	L2	14	0.0	0.091	3.7	LOS A	0.5	3.5	0.34	0.44	0.34	42.4
11	T1	93	0.0	0.091	4.0	LOS A	0.5	3.5	0.34	0.44	0.34	39.0
12	R2	6	0.0	0.091	8.9	LOS A	0.5	3.5	0.34	0.44	0.34	33.6
Approach		113	0.0	0.091	4.2	LOS A	0.5	3.5	0.34	0.44	0.34	39.2
All Vehicles		609	0.0	0.186	5.0	LOS A	1.2	8.1	0.33	0.48	0.33	38.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21587_2041_AAST_PM]

Node: 21587
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

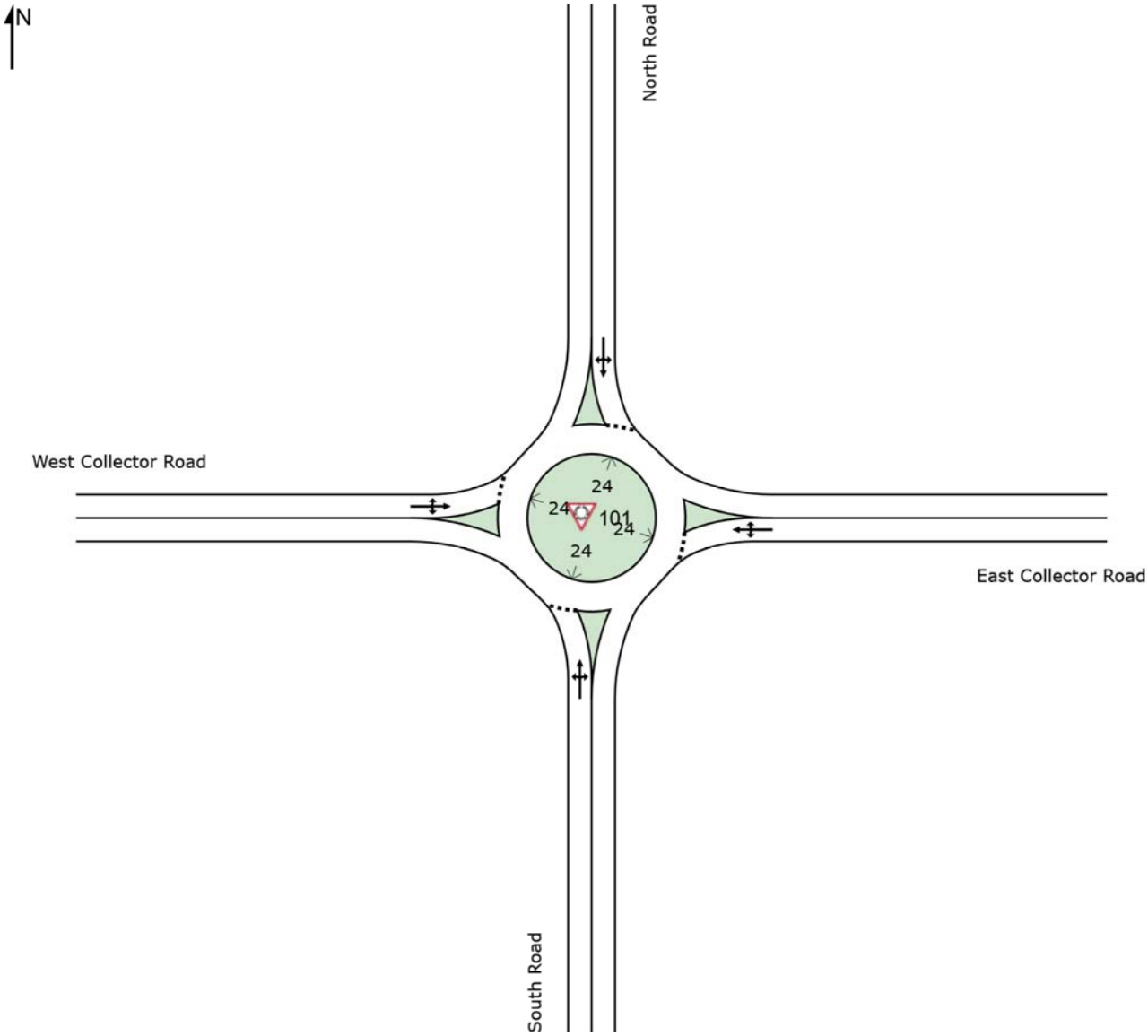
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Collector Road												
1	L2	9	0.0	0.144	3.4	LOS A	0.8	5.9	0.44	0.50	0.44	33.7
2	T1	146	0.0	0.144	3.8	LOS A	0.8	5.9	0.44	0.50	0.44	46.5
3	R2	11	0.0	0.144	8.4	LOS A	0.8	5.9	0.44	0.50	0.44	35.2
Approach		166	0.0	0.144	4.1	LOS A	0.8	5.9	0.44	0.50	0.44	45.0
East: East Collector Road												
4	L2	35	0.0	0.184	3.7	LOS A	1.1	8.0	0.26	0.53	0.26	33.1
5	T1	95	0.0	0.184	3.9	LOS A	1.1	8.0	0.26	0.53	0.26	35.7
6	R2	126	0.0	0.184	9.0	LOS A	1.1	8.0	0.26	0.53	0.26	37.3
Approach		256	0.0	0.184	6.4	LOS A	1.1	8.0	0.26	0.53	0.26	36.3
North: North Road												
7	L2	103	0.0	0.133	4.1	LOS A	0.8	5.7	0.28	0.45	0.28	40.0
8	T1	60	0.0	0.133	4.3	LOS A	0.8	5.7	0.28	0.45	0.28	38.5
9	R2	15	0.0	0.133	9.4	LOS A	0.8	5.7	0.28	0.45	0.28	37.8
Approach		178	0.0	0.133	4.6	LOS A	0.8	5.7	0.28	0.45	0.28	39.3
West: West Collector Road												
10	L2	18	0.0	0.087	4.4	LOS A	0.5	3.5	0.46	0.51	0.46	41.3
11	T1	76	0.0	0.087	4.6	LOS A	0.5	3.5	0.46	0.51	0.46	37.8
12	R2	3	0.0	0.087	9.6	LOS A	0.5	3.5	0.46	0.51	0.46	32.5
Approach		97	0.0	0.087	4.8	LOS A	0.5	3.5	0.46	0.51	0.46	38.4
All Vehicles		697	0.0	0.184	5.2	LOS A	1.1	8.0	0.34	0.50	0.34	39.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21588_2041_AAST_AM]

Node: 21588
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21588_2041_AAST_AM]

Node: 21588
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	3	0.0	0.017	2.6	LOS A	0.1	0.6	0.26	0.52	0.26	35.8
2	T1	8	0.0	0.017	3.0	LOS A	0.1	0.6	0.26	0.52	0.26	37.0
3	R2	11	0.0	0.017	7.6	LOS A	0.1	0.6	0.26	0.52	0.26	34.1
Approach		22	0.0	0.017	5.1	LOS A	0.1	0.6	0.26	0.52	0.26	35.4
East: East Collector Road												
4	L2	3	0.0	0.062	3.9	LOS A	0.3	2.4	0.30	0.42	0.30	35.7
5	T1	71	0.0	0.062	4.1	LOS A	0.3	2.4	0.30	0.42	0.30	39.4
6	R2	4	0.0	0.062	9.2	LOS A	0.3	2.4	0.30	0.42	0.30	37.2
Approach		78	0.0	0.062	4.3	LOS A	0.3	2.4	0.30	0.42	0.30	39.1
North: North Road												
7	L2	13	0.0	0.103	3.9	LOS A	0.6	3.9	0.26	0.46	0.26	37.7
8	T1	95	0.0	0.103	4.0	LOS A	0.6	3.9	0.26	0.46	0.26	35.9
9	R2	28	0.0	0.103	9.2	LOS A	0.6	3.9	0.26	0.46	0.26	36.4
Approach		136	0.0	0.103	5.1	LOS A	0.6	3.9	0.26	0.46	0.26	36.2
West: West Collector Road												
10	L2	19	0.0	0.068	3.4	LOS A	0.4	2.6	0.12	0.38	0.12	41.1
11	T1	81	0.0	0.068	3.6	LOS A	0.4	2.6	0.12	0.38	0.12	41.9
12	R2	1	0.0	0.068	8.7	LOS A	0.4	2.6	0.12	0.38	0.12	36.9
Approach		101	0.0	0.068	3.6	LOS A	0.4	2.6	0.12	0.38	0.12	41.7
All Vehicles		337	0.0	0.103	4.5	LOS A	0.6	3.9	0.23	0.43	0.23	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21588_2041_AAST_PM]

Node: 21588
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

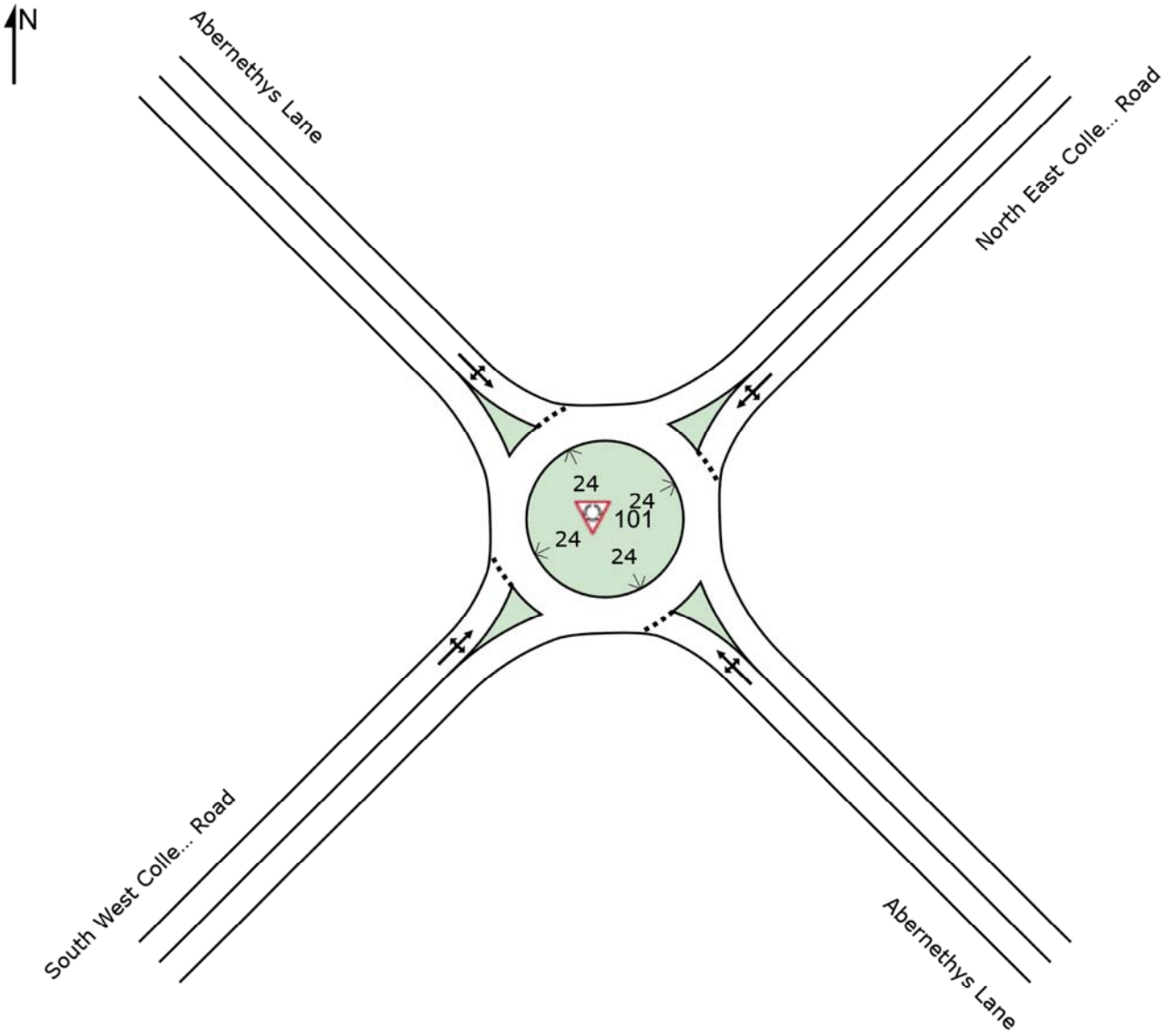
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	6	0.0	0.026	2.7	LOS A	0.1	0.9	0.29	0.48	0.29	36.8
2	T1	17	0.0	0.026	3.1	LOS A	0.1	0.9	0.29	0.48	0.29	38.2
3	R2	9	0.0	0.026	7.7	LOS A	0.1	0.9	0.29	0.48	0.29	35.0
Approach		33	0.0	0.026	4.4	LOS A	0.1	0.9	0.29	0.48	0.29	37.0
East: East Road												
4	L2	4	0.0	0.080	3.6	LOS A	0.4	3.1	0.23	0.40	0.23	36.5
5	T1	96	0.0	0.080	3.8	LOS A	0.4	3.1	0.23	0.40	0.23	40.2
6	R2	7	0.0	0.080	8.9	LOS A	0.4	3.1	0.23	0.40	0.23	37.9
Approach		107	0.0	0.080	4.1	LOS A	0.4	3.1	0.23	0.40	0.23	39.9
North: North Road												
7	L2	6	0.0	0.058	3.8	LOS A	0.3	2.1	0.24	0.48	0.24	37.1
8	T1	46	0.0	0.058	4.0	LOS A	0.3	2.1	0.24	0.48	0.24	35.3
9	R2	23	0.0	0.058	9.2	LOS A	0.3	2.1	0.24	0.48	0.24	36.0
Approach		76	0.0	0.058	5.6	LOS A	0.3	2.1	0.24	0.48	0.24	35.7
West: West Road												
10	L2	26	0.0	0.072	3.5	LOS A	0.4	2.8	0.15	0.38	0.15	40.7
11	T1	77	0.0	0.072	3.6	LOS A	0.4	2.8	0.15	0.38	0.15	41.5
12	R2	1	0.0	0.072	8.8	LOS A	0.4	2.8	0.15	0.38	0.15	36.5
Approach		104	0.0	0.072	3.6	LOS A	0.4	2.8	0.15	0.38	0.15	41.2
All Vehicles		320	0.0	0.080	4.3	LOS A	0.4	3.1	0.21	0.42	0.21	39.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21589_2041_AAST_AM]

Node: 21589
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21589_2041_AAST_AM]

Node: 21589
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Abernethys Lane												
1	L2	66	0.0	0.056	2.7	LOS A	0.3	2.1	0.30	0.44	0.30	38.7
2	T1	3	0.0	0.056	3.1	LOS A	0.3	2.1	0.30	0.44	0.30	41.8
3	R2	1	0.0	0.056	7.6	LOS A	0.3	2.1	0.30	0.44	0.30	37.1
Approach		71	0.0	0.056	2.8	LOS A	0.3	2.1	0.30	0.44	0.30	38.8
NorthEast: North East Collector Road												
4	L2	11	0.0	0.095	3.7	LOS A	0.5	3.6	0.24	0.40	0.24	36.6
5	T1	115	0.0	0.095	3.9	LOS A	0.5	3.6	0.24	0.40	0.24	40.0
6	R2	1	0.0	0.095	9.0	LOS A	0.5	3.6	0.24	0.40	0.24	38.6
Approach		126	0.0	0.095	3.9	LOS A	0.5	3.6	0.24	0.40	0.24	39.7
NorthWest: Abernethys Lane												
7	L2	1	0.0	0.024	4.3	LOS A	0.1	0.8	0.30	0.48	0.30	37.0
8	T1	20	0.0	0.024	4.4	LOS A	0.1	0.8	0.30	0.48	0.30	35.0
9	R2	8	0.0	0.024	9.6	LOS A	0.1	0.8	0.30	0.48	0.30	35.4
Approach		29	0.0	0.024	5.9	LOS A	0.1	0.8	0.30	0.48	0.30	35.2
SouthWest: South West Collector Road												
10	L2	11	0.0	0.091	3.1	LOS A	0.5	3.7	0.05	0.50	0.05	41.1
11	T1	85	0.0	0.091	3.4	LOS A	0.5	3.7	0.05	0.50	0.05	39.4
12	R2	56	0.0	0.091	8.4	LOS A	0.5	3.7	0.05	0.50	0.05	34.4
Approach		152	0.0	0.091	5.2	LOS A	0.5	3.7	0.05	0.50	0.05	37.8
All Vehicles		378	0.0	0.095	4.4	LOS A	0.5	3.7	0.18	0.45	0.18	38.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21589_2041_AAST_PM]

Node: 21589
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

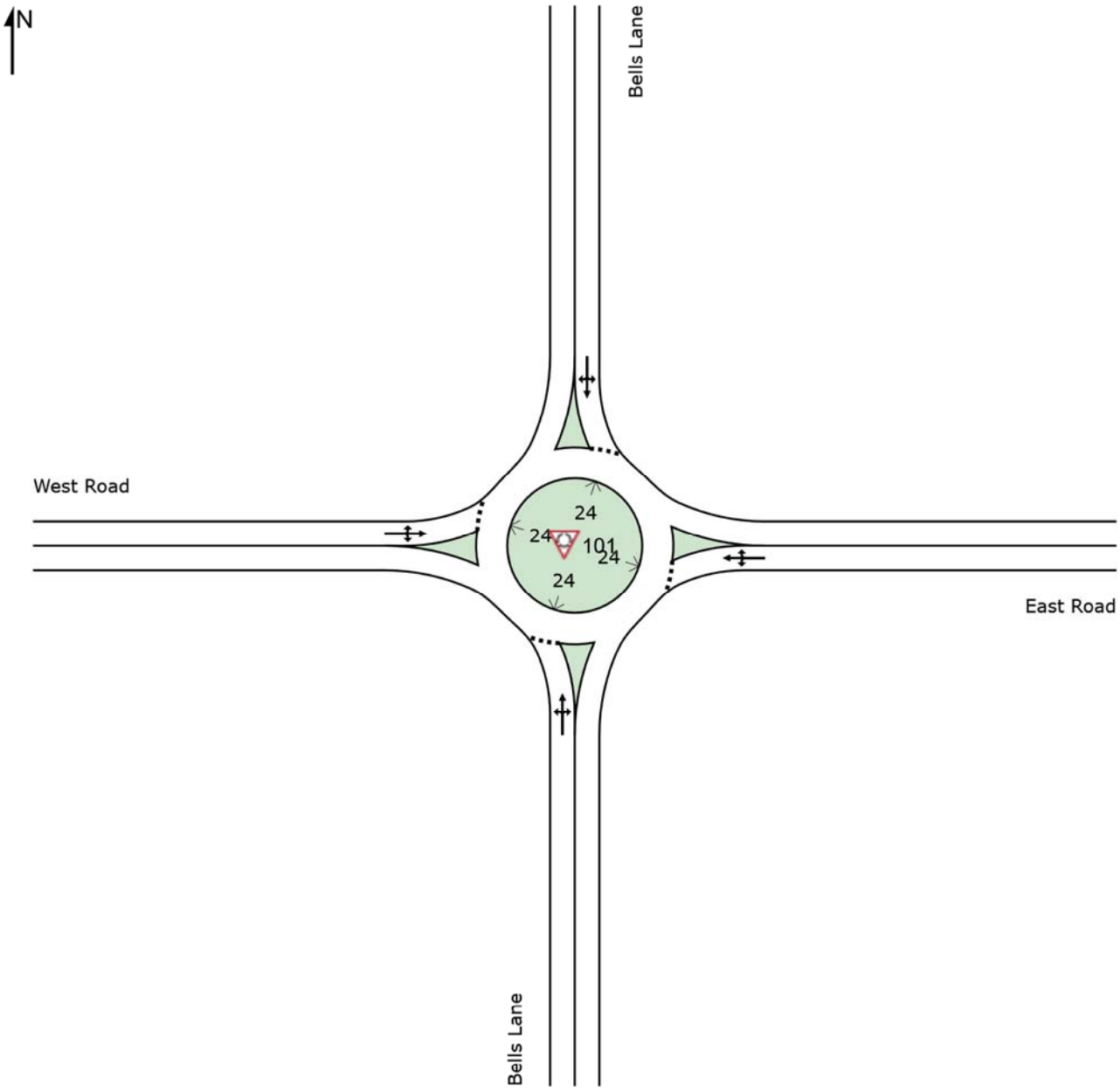
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Abernethys Lane												
1	L2	68	0.0	0.059	2.6	LOS A	0.3	2.3	0.29	0.44	0.29	38.6
2	T1	5	0.0	0.059	3.0	LOS A	0.3	2.3	0.29	0.44	0.29	41.8
3	R2	2	0.0	0.059	7.6	LOS A	0.3	2.3	0.29	0.44	0.29	37.1
Approach		76	0.0	0.059	2.8	LOS A	0.3	2.3	0.29	0.44	0.29	38.8
NorthEast: North East Collector Road												
4	L2	1	0.0	0.078	3.7	LOS A	0.4	2.9	0.23	0.39	0.23	36.8
5	T1	101	0.0	0.078	3.9	LOS A	0.4	2.9	0.23	0.39	0.23	40.1
6	R2	1	0.0	0.078	9.0	LOS A	0.4	2.9	0.23	0.39	0.23	38.8
Approach		103	0.0	0.078	3.9	LOS A	0.4	2.9	0.23	0.39	0.23	40.1
NorthWest: Abernethys Lane												
7	L2	1	0.0	0.014	4.5	LOS A	0.1	0.5	0.34	0.57	0.34	33.7
8	T1	2	0.0	0.014	4.6	LOS A	0.1	0.5	0.34	0.57	0.34	31.4
9	R2	14	0.0	0.014	9.7	LOS A	0.1	0.5	0.34	0.57	0.34	32.3
Approach		17	0.0	0.014	8.8	LOS A	0.1	0.5	0.34	0.57	0.34	32.3
SouthWest: South West Collector Road												
10	L2	18	0.0	0.121	3.2	LOS A	0.7	5.0	0.06	0.49	0.06	41.3
11	T1	116	0.0	0.121	3.4	LOS A	0.7	5.0	0.06	0.49	0.06	39.7
12	R2	64	0.0	0.121	8.4	LOS A	0.7	5.0	0.06	0.49	0.06	34.6
Approach		198	0.0	0.121	5.0	LOS A	0.7	5.0	0.06	0.49	0.06	38.3
All Vehicles		394	0.0	0.121	4.5	LOS A	0.7	5.0	0.16	0.45	0.16	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21597_2041_AAST_AM]

Node: 21597
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21597_2041_AAST_AM]

Node: 21597
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	24	0.0	0.202	3.7	LOS A	1.3	9.4	0.10	0.41	0.10	39.3
2	T1	271	0.0	0.202	3.9	LOS A	1.3	9.4	0.10	0.41	0.10	52.1
3	R2	34	0.0	0.202	9.0	LOS A	1.3	9.4	0.10	0.41	0.10	42.9
Approach		328	0.0	0.202	4.4	LOS A	1.3	9.4	0.10	0.41	0.10	50.3
East: East Road												
4	L2	75	0.0	0.114	7.4	LOS A	0.7	5.2	0.77	0.73	0.77	40.0
5	T1	5	0.0	0.114	7.7	LOS A	0.7	5.2	0.77	0.73	0.77	28.7
6	R2	1	0.0	0.114	12.4	LOS A	0.7	5.2	0.77	0.73	0.77	42.0
Approach		81	0.0	0.114	7.5	LOS A	0.7	5.2	0.77	0.73	0.77	39.4
North: Bells Lane												
7	L2	1	0.0	0.497	4.4	LOS A	4.4	31.1	0.40	0.43	0.40	32.5
8	T1	699	0.0	0.497	4.5	LOS A	4.4	31.1	0.40	0.43	0.40	49.7
9	R2	8	0.0	0.497	9.6	LOS A	4.4	31.1	0.40	0.43	0.40	33.6
Approach		708	0.0	0.497	4.6	LOS A	4.4	31.1	0.40	0.43	0.40	49.4
West: West Road												
10	L2	11	0.0	0.065	5.0	LOS A	0.3	2.4	0.46	0.63	0.46	39.0
11	T1	5	0.0	0.065	5.2	LOS A	0.3	2.4	0.46	0.63	0.46	27.0
12	R2	55	0.0	0.065	10.4	LOS A	0.3	2.4	0.46	0.63	0.46	42.8
Approach		71	0.0	0.065	9.2	LOS A	0.3	2.4	0.46	0.63	0.46	41.2
All Vehicles		1188	0.0	0.497	5.0	LOS A	4.4	31.1	0.34	0.46	0.34	48.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21597_2041_AAST_PM]

Node: 21597
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

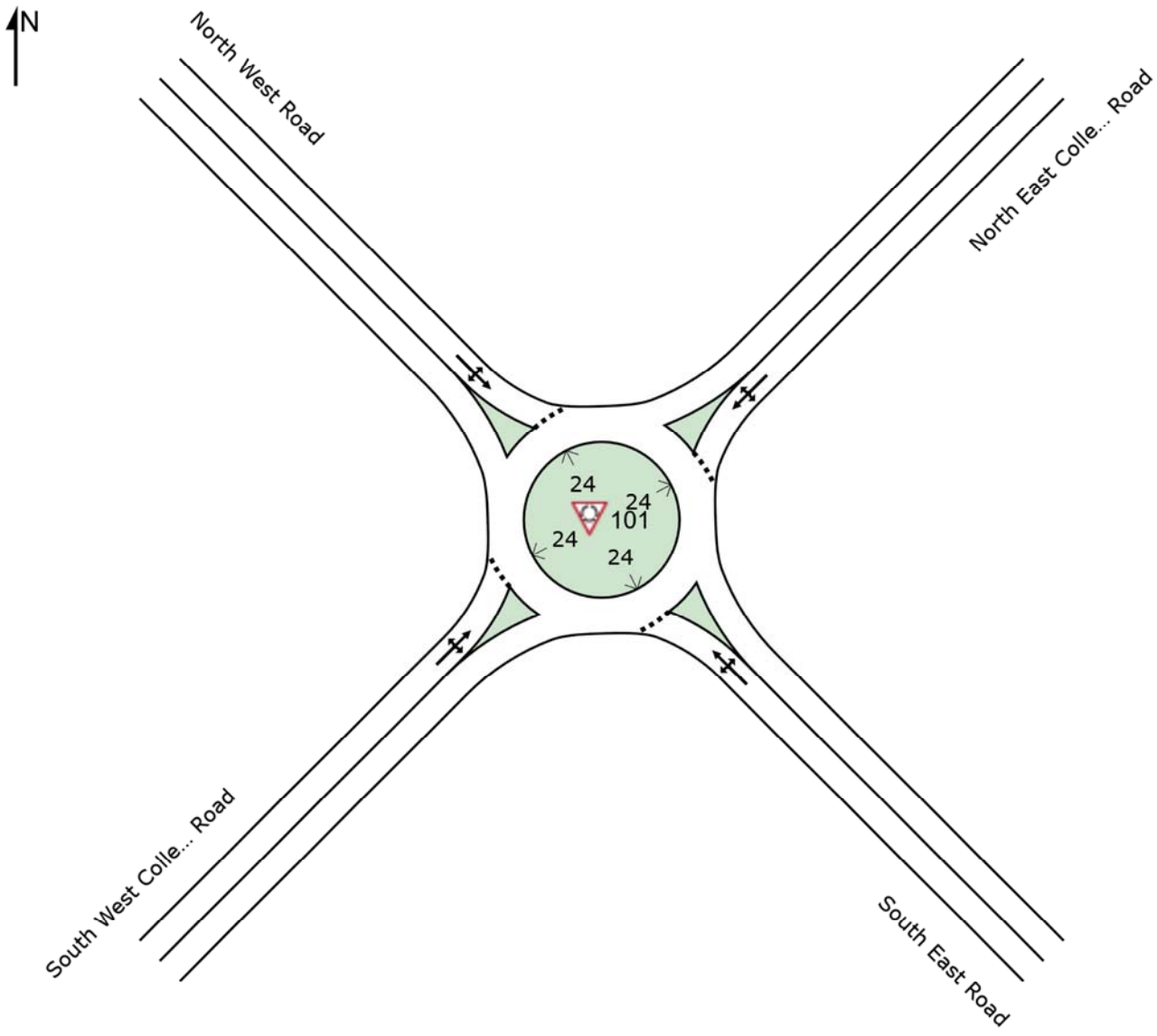
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	46	0.0	0.357	3.7	LOS A	2.8	19.5	0.11	0.40	0.11	39.3
2	T1	496	0.0	0.357	3.9	LOS A	2.8	19.5	0.11	0.40	0.11	52.1
3	R2	55	0.0	0.357	9.0	LOS A	2.8	19.5	0.11	0.40	0.11	42.9
Approach		597	0.0	0.357	4.3	LOS A	2.8	19.5	0.11	0.40	0.11	50.3
East: East Road												
4	L2	42	0.0	0.048	4.2	LOS A	0.3	1.9	0.52	0.54	0.52	45.7
5	T1	6	0.0	0.048	4.6	LOS A	0.3	1.9	0.52	0.54	0.52	34.1
6	R2	1	0.0	0.048	9.3	LOS A	0.3	1.9	0.52	0.54	0.52	49.3
Approach		49	0.0	0.048	4.4	LOS A	0.3	1.9	0.52	0.54	0.52	44.6
North: Bells Lane												
7	L2	1	0.0	0.253	4.1	LOS A	1.7	11.6	0.28	0.41	0.28	33.3
8	T1	348	0.0	0.253	4.3	LOS A	1.7	11.6	0.28	0.41	0.28	50.9
9	R2	6	0.0	0.253	9.4	LOS A	1.7	11.6	0.28	0.41	0.28	34.4
Approach		356	0.0	0.253	4.4	LOS A	1.7	11.6	0.28	0.41	0.28	50.5
West: West Road												
10	L2	11	0.0	0.041	6.5	LOS A	0.2	1.6	0.60	0.65	0.60	38.9
11	T1	7	0.0	0.041	6.6	LOS A	0.2	1.6	0.60	0.65	0.60	26.5
12	R2	19	0.0	0.041	11.8	LOS A	0.2	1.6	0.60	0.65	0.60	42.7
Approach		37	0.0	0.041	9.3	LOS A	0.2	1.6	0.60	0.65	0.60	38.7
All Vehicles		1039	0.0	0.357	4.5	LOS A	2.8	19.5	0.20	0.42	0.20	49.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21601_2041_AAST_AM]

Node: 21601
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21601_2041_AAST_AM]

Node: 21601
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	38	0.0	0.039	5.1	LOS A	0.2	1.5	0.49	0.54	0.49	42.0
2	T1	2	0.0	0.039	5.3	LOS A	0.2	1.5	0.49	0.54	0.49	28.0
3	R2	1	0.0	0.039	10.5	LOS A	0.2	1.5	0.49	0.54	0.49	50.4
Approach		41	0.0	0.039	5.3	LOS A	0.2	1.5	0.49	0.54	0.49	41.4
NorthEast: North East Collector Road												
4	L2	1	0.0	0.166	4.6	LOS A	1.0	7.0	0.40	0.46	0.40	45.0
5	T1	196	0.0	0.166	4.8	LOS A	1.0	7.0	0.40	0.46	0.40	50.2
6	R2	4	0.0	0.166	9.9	LOS A	1.0	7.0	0.40	0.46	0.40	44.4
Approach		201	0.0	0.166	4.9	LOS A	1.0	7.0	0.40	0.46	0.40	50.0
NorthWest: North West Road												
7	L2	4	0.0	0.125	4.6	LOS A	0.7	4.8	0.36	0.62	0.36	42.0
8	T1	1	0.0	0.125	4.8	LOS A	0.7	4.8	0.36	0.62	0.36	33.7
9	R2	146	0.0	0.125	9.8	LOS A	0.7	4.8	0.36	0.62	0.36	26.1
Approach		152	0.0	0.125	9.7	LOS A	0.7	4.8	0.36	0.62	0.36	26.5
SouthWest: South West Collector Road												
10	L2	66	0.0	0.144	3.7	LOS A	0.9	6.1	0.06	0.43	0.06	45.2
11	T1	147	0.0	0.144	3.8	LOS A	0.9	6.1	0.06	0.43	0.06	53.0
12	R2	26	0.0	0.144	8.9	LOS A	0.9	6.1	0.06	0.43	0.06	41.4
Approach		240	0.0	0.144	4.4	LOS A	0.9	6.1	0.06	0.43	0.06	50.2
All Vehicles		634	0.0	0.166	5.9	LOS A	1.0	7.0	0.27	0.49	0.27	42.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21601_2041_AAST_PM]

Node: 21601
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

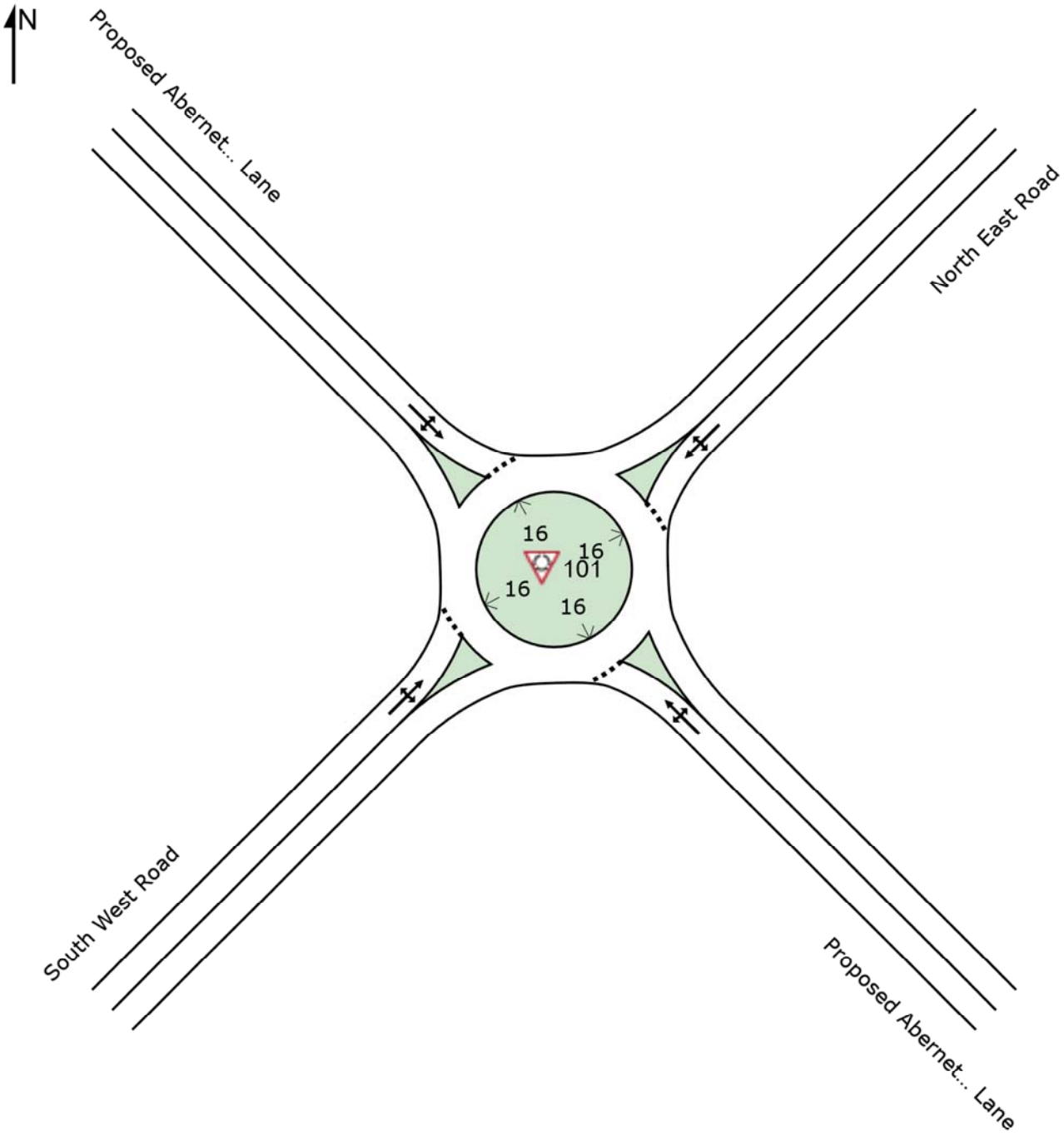
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	35	0.0	0.035	4.8	LOS A	0.2	1.3	0.45	0.51	0.45	42.3
2	T1	3	0.0	0.035	5.0	LOS A	0.2	1.3	0.45	0.51	0.45	28.2
3	R2	1	0.0	0.035	10.2	LOS A	0.2	1.3	0.45	0.51	0.45	50.6
Approach		39	0.0	0.035	5.0	LOS A	0.2	1.3	0.45	0.51	0.45	41.2
NorthEast: North East Collector Road												
4	L2	1	0.0	0.156	4.4	LOS A	0.9	6.6	0.34	0.43	0.34	45.5
5	T1	194	0.0	0.156	4.5	LOS A	0.9	6.6	0.34	0.43	0.34	50.7
6	R2	4	0.0	0.156	9.6	LOS A	0.9	6.6	0.34	0.43	0.34	44.8
Approach		199	0.0	0.156	4.6	LOS A	0.9	6.6	0.34	0.43	0.34	50.6
NorthWest: North West Road												
7	L2	3	0.0	0.083	4.9	LOS A	0.4	3.1	0.41	0.63	0.41	41.8
8	T1	1	0.0	0.083	5.1	LOS A	0.4	3.1	0.41	0.63	0.41	33.5
9	R2	92	0.0	0.083	10.1	LOS A	0.4	3.1	0.41	0.63	0.41	25.9
Approach		96	0.0	0.083	9.9	LOS A	0.4	3.1	0.41	0.63	0.41	26.5
SouthWest: South West Collector Road												
10	L2	124	0.0	0.216	3.7	LOS A	1.4	9.8	0.07	0.43	0.07	45.1
11	T1	200	0.0	0.216	3.8	LOS A	1.4	9.8	0.07	0.43	0.07	52.9
12	R2	39	0.0	0.216	8.9	LOS A	1.4	9.8	0.07	0.43	0.07	41.3
Approach		363	0.0	0.216	4.3	LOS A	1.4	9.8	0.07	0.43	0.07	49.7
All Vehicles		697	0.0	0.216	5.2	LOS A	1.4	9.8	0.22	0.46	0.22	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21674_2041_AAST_AM]

Node: 21674
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21674_2041_AAST_AM]

Node: 21674
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Proposed Abernethys Lane												
1	L2	1	0.0	0.005	2.6	LOS A	0.0	0.2	0.10	0.46	0.10	40.5
2	T1	4	0.0	0.005	3.0	LOS A	0.0	0.2	0.10	0.46	0.10	47.2
3	R2	1	0.0	0.005	6.8	LOS A	0.0	0.2	0.10	0.46	0.10	47.6
Approach		6	0.0	0.005	3.5	LOS A	0.0	0.2	0.10	0.46	0.10	46.3
NorthEast: North East Road												
4	L2	1	0.0	0.013	4.1	LOS A	0.1	0.4	0.08	0.61	0.08	37.0
5	T1	2	0.0	0.013	4.4	LOS A	0.1	0.4	0.08	0.61	0.08	38.4
6	R2	14	0.0	0.013	8.5	LOS A	0.1	0.4	0.08	0.61	0.08	43.8
Approach		17	0.0	0.013	7.7	LOS A	0.1	0.4	0.08	0.61	0.08	42.8
NorthWest: Proposed Abernethys Lane												
7	L2	9	0.0	0.014	4.1	LOS A	0.1	0.5	0.04	0.49	0.04	46.5
8	T1	9	0.0	0.014	4.3	LOS A	0.1	0.5	0.04	0.49	0.04	40.9
9	R2	2	0.0	0.014	8.4	LOS A	0.1	0.5	0.04	0.49	0.04	34.5
Approach		21	0.0	0.014	4.6	LOS A	0.1	0.5	0.04	0.49	0.04	43.0
SouthWest: South West Road												
10	L2	6	0.0	0.007	4.1	LOS A	0.0	0.2	0.10	0.49	0.10	43.3
11	T1	2	0.0	0.007	4.4	LOS A	0.0	0.2	0.10	0.49	0.10	47.1
12	R2	1	0.0	0.007	8.5	LOS A	0.0	0.2	0.10	0.49	0.10	34.8
Approach		9	0.0	0.007	4.7	LOS A	0.0	0.2	0.10	0.49	0.10	43.4
All Vehicles		54	0.0	0.014	5.5	LOS A	0.1	0.5	0.07	0.52	0.07	43.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21674_2041_AAST_PM]

Node: 21674
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

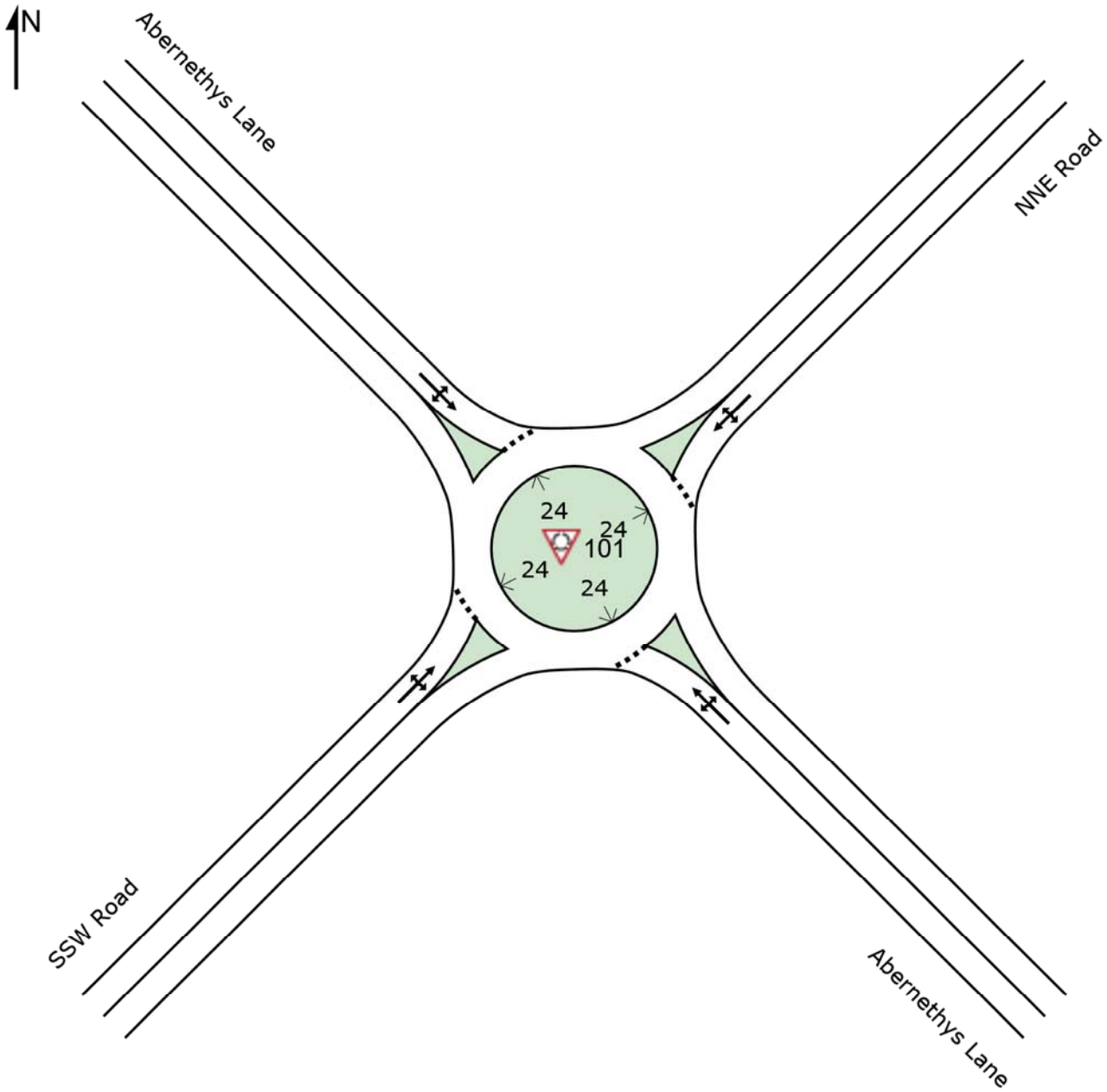
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Proposed Abernethys Lane												
1	L2	1	0.0	0.005	2.5	LOS A	0.0	0.2	0.09	0.46	0.09	40.6
2	T1	4	0.0	0.005	3.0	LOS A	0.0	0.2	0.09	0.46	0.09	47.3
3	R2	1	0.0	0.005	6.8	LOS A	0.0	0.2	0.09	0.46	0.09	47.7
Approach		6	0.0	0.005	3.5	LOS A	0.0	0.2	0.09	0.46	0.09	46.4
NorthEast: North East Road												
4	L2	1	0.0	0.012	4.1	LOS A	0.1	0.4	0.07	0.60	0.07	37.5
5	T1	3	0.0	0.012	4.4	LOS A	0.1	0.4	0.07	0.60	0.07	38.8
6	R2	12	0.0	0.012	8.5	LOS A	0.1	0.4	0.07	0.60	0.07	44.3
Approach		16	0.0	0.012	7.4	LOS A	0.1	0.4	0.07	0.60	0.07	42.8
NorthWest: Proposed Abernethys Lane												
7	L2	12	0.0	0.015	4.1	LOS A	0.1	0.5	0.05	0.48	0.05	46.8
8	T1	8	0.0	0.015	4.3	LOS A	0.1	0.5	0.05	0.48	0.05	41.3
9	R2	1	0.0	0.015	8.5	LOS A	0.1	0.5	0.05	0.48	0.05	34.6
Approach		21	0.0	0.015	4.4	LOS A	0.1	0.5	0.05	0.48	0.05	44.3
SouthWest: South West Road												
10	L2	7	0.0	0.009	4.1	LOS A	0.0	0.3	0.09	0.48	0.09	43.4
11	T1	3	0.0	0.009	4.4	LOS A	0.0	0.3	0.09	0.48	0.09	47.3
12	R2	1	0.0	0.009	8.5	LOS A	0.0	0.3	0.09	0.48	0.09	35.0
Approach		12	0.0	0.009	4.6	LOS A	0.0	0.3	0.09	0.48	0.09	43.9
All Vehicles		55	0.0	0.015	5.2	LOS A	0.1	0.5	0.07	0.51	0.07	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21692_2041_AAST_AM]

Node: 21692
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21692_2041_AAST_AM]

Node: 21692
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Abernethys Lane												
1	L2	1	0.0	0.050	2.2	LOS A	0.3	1.9	0.04	0.40	0.04	40.0
2	T1	72	0.0	0.050	2.6	LOS A	0.3	1.9	0.04	0.40	0.04	41.8
3	R2	9	0.0	0.050	7.2	LOS A	0.3	1.9	0.04	0.40	0.04	37.6
Approach		82	0.0	0.050	3.1	LOS A	0.3	1.9	0.04	0.40	0.04	41.3
NorthEast: NNE Road												
4	L2	16	0.0	0.015	3.3	LOS A	0.1	0.5	0.24	0.43	0.24	36.0
5	T1	2	0.0	0.015	3.5	LOS A	0.1	0.5	0.24	0.43	0.24	39.4
6	R2	1	0.0	0.015	8.4	LOS A	0.1	0.5	0.24	0.43	0.24	37.0
Approach		19	0.0	0.015	3.6	LOS A	0.1	0.5	0.24	0.43	0.24	36.5
NorthWest: Abernethys Lane												
7	L2	1	0.0	0.060	3.2	LOS A	0.3	2.2	0.07	0.37	0.07	40.5
8	T1	91	0.0	0.060	3.4	LOS A	0.3	2.2	0.07	0.37	0.07	40.2
9	R2	1	0.0	0.060	8.5	LOS A	0.3	2.2	0.07	0.37	0.07	39.2
Approach		93	0.0	0.060	3.5	LOS A	0.3	2.2	0.07	0.37	0.07	40.2
SouthWest: SSW Road												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.22	0.47	0.22	36.8
11	T1	1	0.0	0.002	3.6	LOS A	0.0	0.1	0.22	0.47	0.22	36.8
12	R2	1	0.0	0.002	8.6	LOS A	0.0	0.1	0.22	0.47	0.22	33.1
Approach		3	0.0	0.002	5.2	LOS A	0.0	0.1	0.22	0.47	0.22	35.6
All Vehicles		197	0.0	0.060	3.4	LOS A	0.3	2.2	0.08	0.39	0.08	40.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21692_2041_AAST_PM]

Node: 21692
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

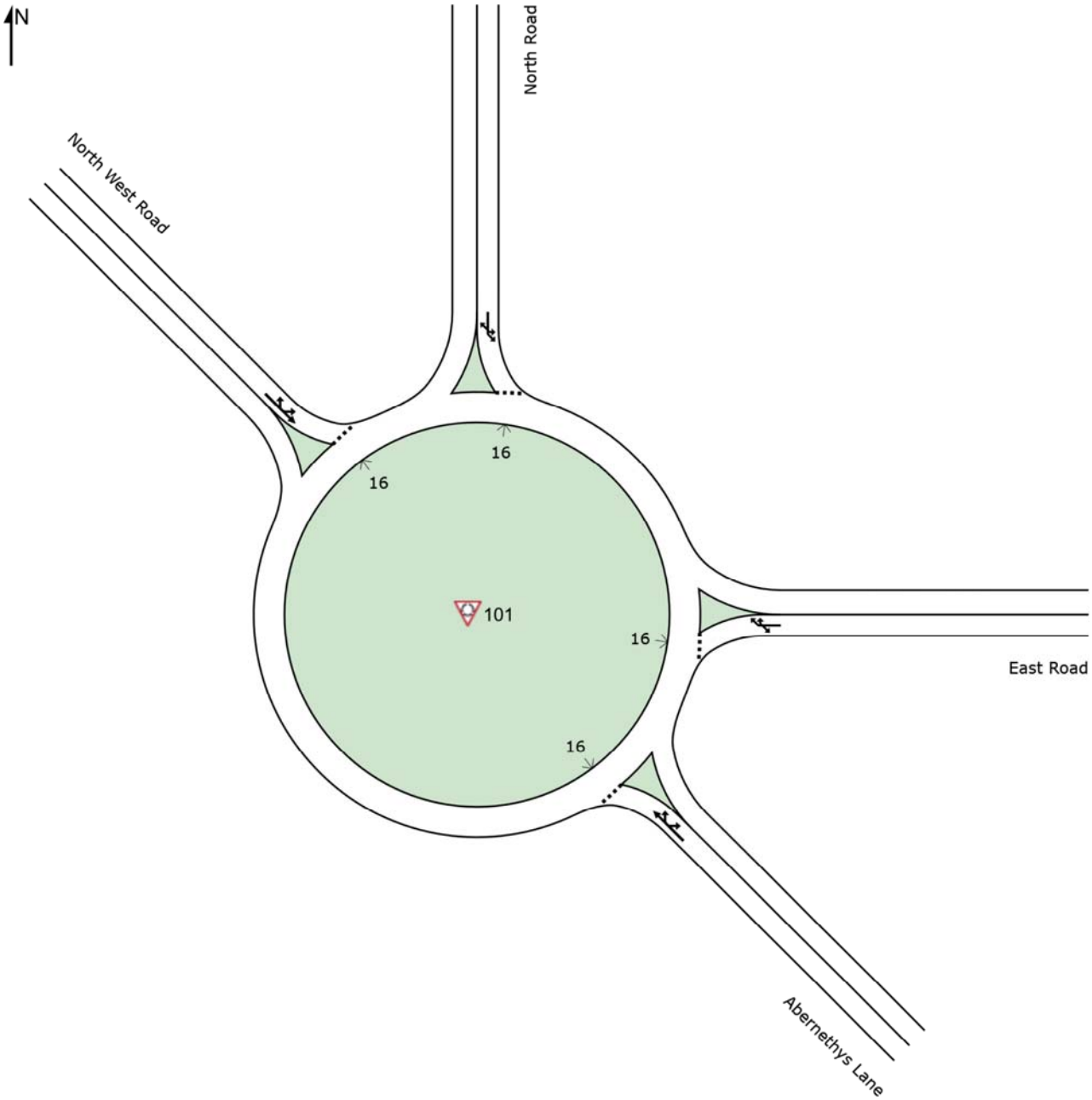
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Abernethys Lane												
1	L2	1	0.0	0.057	2.2	LOS A	0.3	2.1	0.03	0.42	0.03	39.8
2	T1	80	0.0	0.057	2.6	LOS A	0.3	2.1	0.03	0.42	0.03	41.5
3	R2	14	0.0	0.057	7.2	LOS A	0.3	2.1	0.03	0.42	0.03	37.4
Approach		95	0.0	0.057	3.3	LOS A	0.3	2.1	0.03	0.42	0.03	40.9
NorthEast: NNE Road												
4	L2	12	0.0	0.010	3.2	LOS A	0.1	0.4	0.21	0.43	0.21	36.1
5	T1	1	0.0	0.010	3.4	LOS A	0.1	0.4	0.21	0.43	0.21	39.5
6	R2	1	0.0	0.010	8.3	LOS A	0.1	0.4	0.21	0.43	0.21	37.1
Approach		14	0.0	0.010	3.6	LOS A	0.1	0.4	0.21	0.43	0.21	36.5
NorthWest: Abernethys Lane												
7	L2	1	0.0	0.046	3.3	LOS A	0.2	1.7	0.09	0.37	0.09	40.3
8	T1	67	0.0	0.046	3.5	LOS A	0.2	1.7	0.09	0.37	0.09	40.0
9	R2	1	0.0	0.046	8.5	LOS A	0.2	1.7	0.09	0.37	0.09	39.0
Approach		69	0.0	0.046	3.5	LOS A	0.2	1.7	0.09	0.37	0.09	40.0
SouthWest: SSW Road												
10	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.24	0.47	0.24	36.7
11	T1	1	0.0	0.002	3.7	LOS A	0.0	0.1	0.24	0.47	0.24	36.7
12	R2	1	0.0	0.002	8.7	LOS A	0.0	0.1	0.24	0.47	0.24	33.0
Approach		3	0.0	0.002	5.2	LOS A	0.0	0.1	0.24	0.47	0.24	35.5
All Vehicles		181	0.0	0.057	3.4	LOS A	0.3	2.1	0.07	0.40	0.07	40.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21693_2041_AAST_AM]

Node: 21693
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21693_2041_AAST_AM]

Node: 21693
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Abernethys Lane												
2	T1	1	0.0	0.002	4.4	LOS A	0.0	0.1	0.09	0.57	0.09	40.7
23a	R1	1	0.0	0.002	7.6	LOS A	0.0	0.1	0.09	0.57	0.09	31.7
23b	R3	1	0.0	0.002	9.5	LOS A	0.0	0.1	0.09	0.57	0.09	32.6
Approach		3	0.0	0.002	7.1	LOS A	0.0	0.1	0.09	0.57	0.09	35.1
East: East Road												
4b	L3	1	0.0	0.012	3.4	LOS A	0.1	0.4	0.03	0.62	0.03	34.2
6a	R1	16	0.0	0.012	6.5	LOS A	0.1	0.4	0.03	0.62	0.03	39.2
6	R2	1	0.0	0.012	7.4	LOS A	0.1	0.4	0.03	0.62	0.03	30.2
Approach		18	0.0	0.012	6.4	LOS A	0.1	0.4	0.03	0.62	0.03	38.4
North: North Road												
7	L2	1	0.0	0.002	2.6	LOS A	0.0	0.1	0.07	0.54	0.07	34.3
7a	L1	1	0.0	0.002	2.7	LOS A	0.0	0.1	0.07	0.54	0.07	38.1
9b	R3	1	0.0	0.002	7.8	LOS A	0.0	0.1	0.07	0.54	0.07	38.0
Approach		3	0.0	0.002	4.4	LOS A	0.0	0.1	0.07	0.54	0.07	36.9
NorthWest: North West Road												
27b	L3	1	0.0	0.008	4.4	LOS A	0.0	0.3	0.03	0.44	0.03	39.1
27a	L1	9	0.0	0.008	3.9	LOS A	0.0	0.3	0.03	0.44	0.03	41.4
8	T1	1	0.0	0.008	4.3	LOS A	0.0	0.3	0.03	0.44	0.03	43.1
Approach		12	0.0	0.008	4.0	LOS A	0.0	0.3	0.03	0.44	0.03	41.4
All Vehicles		36	0.0	0.012	5.5	LOS A	0.1	0.4	0.04	0.55	0.04	38.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21693_2041_AAST_PM]

Node: 21693
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

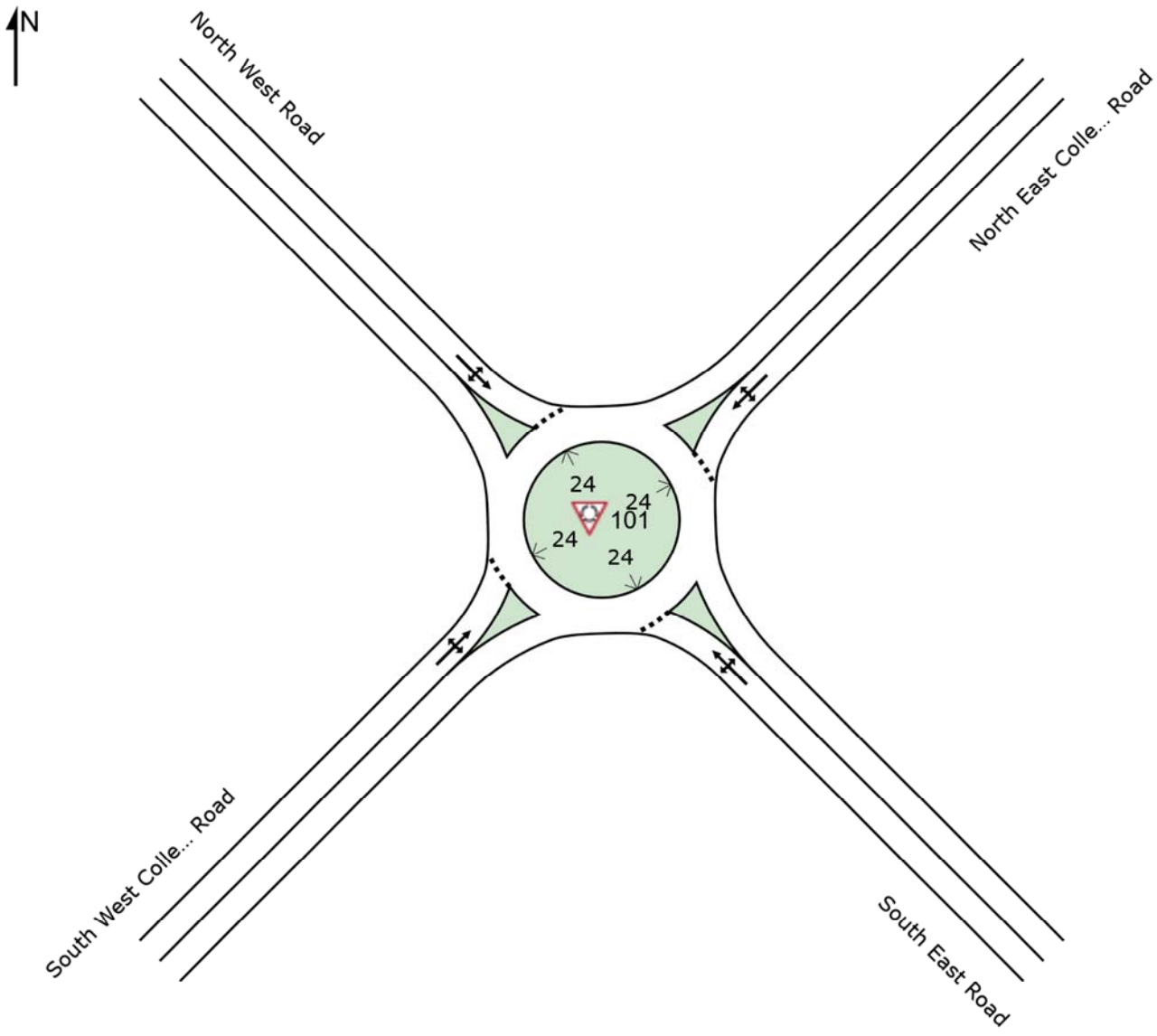
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Abernethys Lane												
2	T1	1	0.0	0.002	4.3	LOS A	0.0	0.1	0.07	0.58	0.07	40.8
23a	R1	1	0.0	0.002	7.5	LOS A	0.0	0.1	0.07	0.58	0.07	31.9
23b	R3	1	0.0	0.002	9.4	LOS A	0.0	0.1	0.07	0.58	0.07	32.8
Approach		3	0.0	0.002	7.1	LOS A	0.0	0.1	0.07	0.58	0.07	35.3
East: East Road												
4b	L3	1	0.0	0.008	3.4	LOS A	0.0	0.3	0.03	0.62	0.03	34.3
6a	R1	9	0.0	0.008	6.5	LOS A	0.0	0.3	0.03	0.62	0.03	39.3
6	R2	1	0.0	0.008	7.4	LOS A	0.0	0.3	0.03	0.62	0.03	30.2
Approach		12	0.0	0.008	6.3	LOS A	0.0	0.3	0.03	0.62	0.03	38.1
North: North Road												
7	L2	1	0.0	0.002	2.7	LOS A	0.0	0.1	0.09	0.53	0.09	34.2
7a	L1	1	0.0	0.002	2.7	LOS A	0.0	0.1	0.09	0.53	0.09	37.9
9b	R3	1	0.0	0.002	7.9	LOS A	0.0	0.1	0.09	0.53	0.09	37.9
Approach		3	0.0	0.002	4.4	LOS A	0.0	0.1	0.09	0.53	0.09	36.8
NorthWest: North West Road												
27b	L3	1	0.0	0.011	4.4	LOS A	0.1	0.4	0.03	0.44	0.03	39.2
27a	L1	15	0.0	0.011	3.9	LOS A	0.1	0.4	0.03	0.44	0.03	41.5
8	T1	1	0.0	0.011	4.3	LOS A	0.1	0.4	0.03	0.44	0.03	43.2
Approach		17	0.0	0.011	4.0	LOS A	0.1	0.4	0.03	0.44	0.03	41.4
All Vehicles		35	0.0	0.011	5.1	LOS A	0.1	0.4	0.04	0.52	0.04	39.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21695_2041_AAST_AM]

Node: 21695
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21695_2041_AAST_AM]

Node: 21695
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	7	0.0	0.016	4.0	LOS A	0.1	0.6	0.36	0.55	0.36	44.7
2	T1	1	0.0	0.016	4.2	LOS A	0.1	0.6	0.36	0.55	0.36	36.7
3	R2	11	0.0	0.016	9.3	LOS A	0.1	0.6	0.36	0.55	0.36	37.2
Approach		19	0.0	0.016	6.9	LOS A	0.1	0.6	0.36	0.55	0.36	40.5
NorthEast: North East Collector Road												
4	L2	13	0.0	0.127	3.7	LOS A	0.8	5.3	0.11	0.38	0.11	42.5
5	T1	178	0.0	0.127	3.9	LOS A	0.8	5.3	0.11	0.38	0.11	53.0
6	R2	6	0.0	0.127	9.0	LOS A	0.8	5.3	0.11	0.38	0.11	42.2
Approach		197	0.0	0.127	4.1	LOS A	0.8	5.3	0.11	0.38	0.11	52.3
NorthWest: North West Road												
7	L2	6	0.0	0.019	4.4	LOS A	0.1	0.7	0.32	0.56	0.32	38.9
8	T1	1	0.0	0.019	4.5	LOS A	0.1	0.7	0.32	0.56	0.32	34.8
9	R2	16	0.0	0.019	9.6	LOS A	0.1	0.7	0.32	0.56	0.32	46.4
Approach		23	0.0	0.019	8.0	LOS A	0.1	0.7	0.32	0.56	0.32	44.2
SouthWest: South West Collector Road												
10	L2	7	0.0	0.099	3.7	LOS A	0.6	4.0	0.10	0.38	0.10	49.6
11	T1	142	0.0	0.099	3.9	LOS A	0.6	4.0	0.10	0.38	0.10	53.2
12	R2	3	0.0	0.099	9.0	LOS A	0.6	4.0	0.10	0.38	0.10	46.3
Approach		153	0.0	0.099	4.0	LOS A	0.6	4.0	0.10	0.38	0.10	52.9
All Vehicles		392	0.0	0.127	4.4	LOS A	0.8	5.3	0.13	0.40	0.13	51.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21695_2041_AAST_PM]

Node: 21695
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

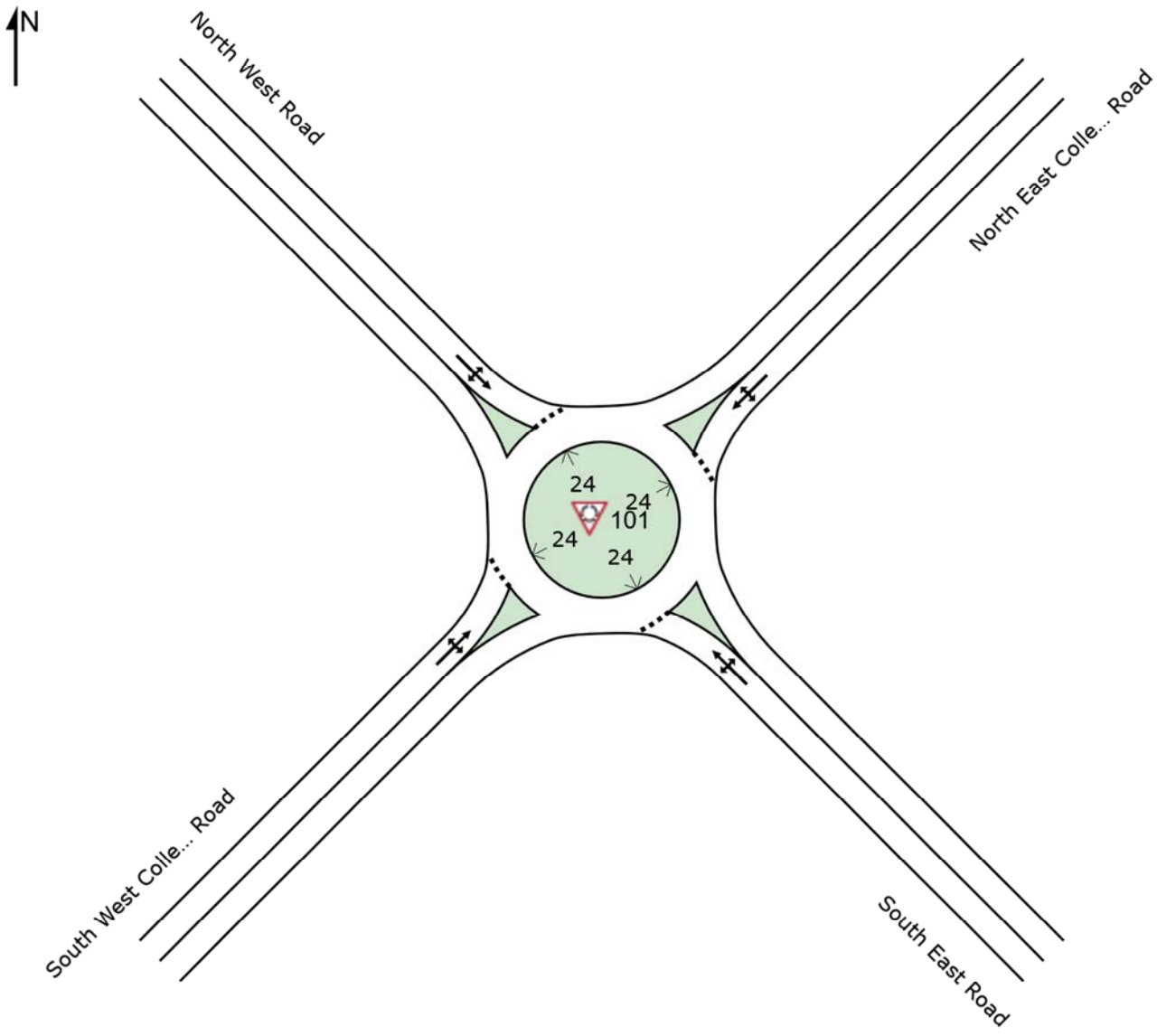
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	14	0.0	0.023	4.0	LOS A	0.1	0.8	0.36	0.54	0.36	45.4
2	T1	1	0.0	0.023	4.2	LOS A	0.1	0.8	0.36	0.54	0.36	37.3
3	R2	13	0.0	0.023	9.2	LOS A	0.1	0.8	0.36	0.54	0.36	37.8
Approach		27	0.0	0.023	6.4	LOS A	0.1	0.8	0.36	0.54	0.36	42.0
NorthEast: North East Collector Road												
4	L2	13	0.0	0.123	3.7	LOS A	0.7	5.1	0.09	0.38	0.09	42.7
5	T1	176	0.0	0.123	3.9	LOS A	0.7	5.1	0.09	0.38	0.09	53.2
6	R2	7	0.0	0.123	9.0	LOS A	0.7	5.1	0.09	0.38	0.09	42.4
Approach		196	0.0	0.123	4.1	LOS A	0.7	5.1	0.09	0.38	0.09	52.4
NorthWest: North West Road												
7	L2	6	0.0	0.014	4.6	LOS A	0.1	0.5	0.37	0.55	0.37	39.3
8	T1	1	0.0	0.014	4.8	LOS A	0.1	0.5	0.37	0.55	0.37	35.2
9	R2	9	0.0	0.014	9.9	LOS A	0.1	0.5	0.37	0.55	0.37	47.0
Approach		17	0.0	0.014	7.6	LOS A	0.1	0.5	0.37	0.55	0.37	43.8
SouthWest: South West Collector Road												
10	L2	12	0.0	0.132	3.7	LOS A	0.8	5.5	0.11	0.38	0.11	49.4
11	T1	188	0.0	0.132	3.9	LOS A	0.8	5.5	0.11	0.38	0.11	53.1
12	R2	4	0.0	0.132	9.0	LOS A	0.8	5.5	0.11	0.38	0.11	46.2
Approach		204	0.0	0.132	4.0	LOS A	0.8	5.5	0.11	0.38	0.11	52.7
All Vehicles		444	0.0	0.132	4.3	LOS A	0.8	5.5	0.13	0.40	0.13	51.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21696_2041_AAST_AM]

Node: 21696
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21696_2041_AAST_AM]

Node: 21696
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	7	0.0	0.008	3.9	LOS A	0.0	0.3	0.35	0.46	0.35	43.0
2	T1	1	0.0	0.008	4.1	LOS A	0.0	0.3	0.35	0.46	0.35	38.6
3	R2	1	0.0	0.008	9.1	LOS A	0.0	0.3	0.35	0.46	0.35	35.6
Approach		9	0.0	0.008	4.5	LOS A	0.0	0.3	0.35	0.46	0.35	41.8
NorthEast: North East Collector Road												
4	L2	1	0.0	0.118	3.2	LOS A	0.7	4.6	0.07	0.36	0.07	40.9
5	T1	188	0.0	0.118	3.4	LOS A	0.7	4.6	0.07	0.36	0.07	51.2
6	R2	1	0.0	0.118	8.4	LOS A	0.7	4.6	0.07	0.36	0.07	39.9
Approach		191	0.0	0.118	3.4	LOS A	0.7	4.6	0.07	0.36	0.07	51.0
NorthWest: North West Road												
7	L2	1	0.0	0.003	4.0	LOS A	0.0	0.1	0.32	0.48	0.32	36.0
8	T1	1	0.0	0.003	4.2	LOS A	0.0	0.1	0.32	0.48	0.32	36.4
9	R2	1	0.0	0.003	9.3	LOS A	0.0	0.1	0.32	0.48	0.32	38.7
Approach		3	0.0	0.003	5.8	LOS A	0.0	0.1	0.32	0.48	0.32	37.2
SouthWest: South West Collector Road												
10	L2	1	0.0	0.094	3.7	LOS A	0.5	3.8	0.03	0.39	0.03	43.6
11	T1	151	0.0	0.094	3.8	LOS A	0.5	3.8	0.03	0.39	0.03	44.3
12	R2	8	0.0	0.094	8.9	LOS A	0.5	3.8	0.03	0.39	0.03	41.6
Approach		160	0.0	0.094	4.1	LOS A	0.5	3.8	0.03	0.39	0.03	44.1
All Vehicles		363	0.0	0.118	3.8	LOS A	0.7	4.6	0.06	0.38	0.06	47.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21696_2041_AAST_PM]

Node: 21696
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

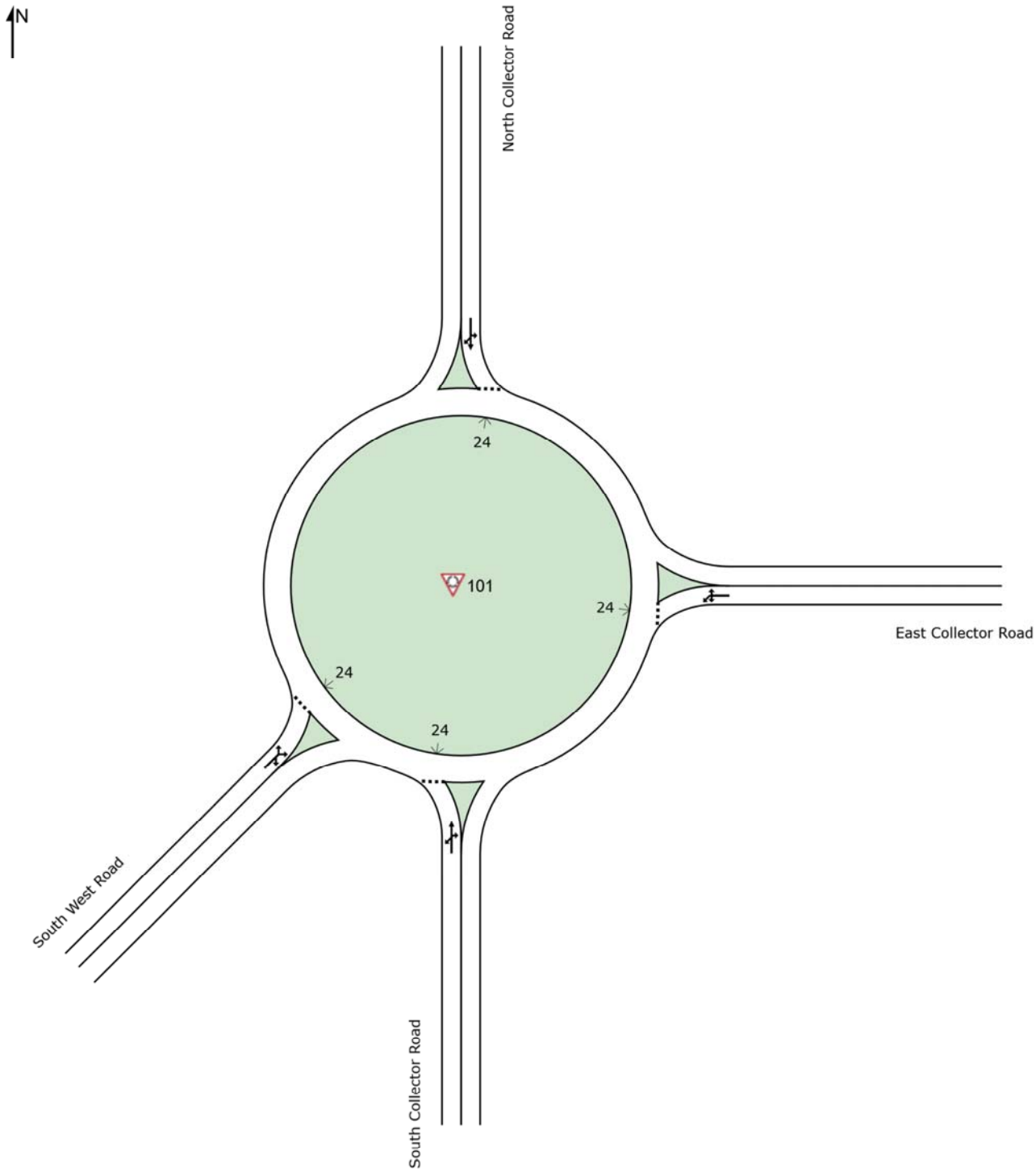
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	13	0.0	0.012	3.8	LOS A	0.1	0.4	0.34	0.46	0.34	43.4
2	T1	1	0.0	0.012	4.1	LOS A	0.1	0.4	0.34	0.46	0.34	39.0
3	R2	1	0.0	0.012	9.1	LOS A	0.1	0.4	0.34	0.46	0.34	35.9
Approach		15	0.0	0.012	4.2	LOS A	0.1	0.4	0.34	0.46	0.34	42.6
NorthEast: North East Collector Road												
4	L2	1	0.0	0.113	3.2	LOS A	0.6	4.4	0.07	0.36	0.07	41.0
5	T1	182	0.0	0.113	3.4	LOS A	0.6	4.4	0.07	0.36	0.07	51.2
6	R2	1	0.0	0.113	8.4	LOS A	0.6	4.4	0.07	0.36	0.07	39.9
Approach		184	0.0	0.113	3.4	LOS A	0.6	4.4	0.07	0.36	0.07	51.1
NorthWest: North West Road												
7	L2	1	0.0	0.003	4.2	LOS A	0.0	0.1	0.36	0.48	0.36	35.6
8	T1	1	0.0	0.003	4.4	LOS A	0.0	0.1	0.36	0.48	0.36	36.1
9	R2	1	0.0	0.003	9.5	LOS A	0.0	0.1	0.36	0.48	0.36	38.4
Approach		3	0.0	0.003	6.0	LOS A	0.0	0.1	0.36	0.48	0.36	36.8
SouthWest: South West Collector Road												
10	L2	2	0.0	0.121	3.7	LOS A	0.7	5.0	0.04	0.39	0.04	43.7
11	T1	198	0.0	0.121	3.8	LOS A	0.7	5.0	0.04	0.39	0.04	44.5
12	R2	7	0.0	0.121	8.9	LOS A	0.7	5.0	0.04	0.39	0.04	41.8
Approach		207	0.0	0.121	4.0	LOS A	0.7	5.0	0.04	0.39	0.04	44.3
All Vehicles		409	0.0	0.121	3.8	LOS A	0.7	5.0	0.06	0.38	0.06	47.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21697_2041_AAST_AM]

Node: 21697
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout


N
North Collector Road
24
101
24
East Collector Road
24
24
South West Road
South Collector Road

MOVEMENT SUMMARY

Site: 101 [21697_2041_AAST_AM]

Node: 21697
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Collector Road												
1b	L3	1	0.0	0.055	3.5	LOS A	0.3	2.0	0.09	0.37	0.09	40.3
2	T1	80	0.0	0.055	3.5	LOS A	0.3	2.0	0.09	0.37	0.09	43.0
3	R2	1	0.0	0.055	8.6	LOS A	0.3	2.0	0.09	0.37	0.09	41.3
Approach		82	0.0	0.055	3.5	LOS A	0.3	2.0	0.09	0.37	0.09	42.9
East: East Collector Road												
4	L2	1	0.0	0.004	4.2	LOS A	0.0	0.1	0.28	0.53	0.28	35.9
4a	L1	1	0.0	0.004	4.0	LOS A	0.0	0.1	0.28	0.53	0.28	36.6
6	R2	3	0.0	0.004	9.5	LOS A	0.0	0.1	0.28	0.53	0.28	35.5
Approach		5	0.0	0.004	7.3	LOS A	0.0	0.1	0.28	0.53	0.28	35.8
North: North Collector Road												
7	L2	6	0.0	0.080	3.5	LOS A	0.4	3.1	0.03	0.40	0.03	44.8
8	T1	116	0.0	0.080	3.7	LOS A	0.4	3.1	0.03	0.40	0.03	42.3
9a	R1	13	0.0	0.080	7.8	LOS A	0.4	3.1	0.03	0.40	0.03	37.8
Approach		135	0.0	0.080	4.1	LOS A	0.4	3.1	0.03	0.40	0.03	41.9
SouthWest: South West Road												
30a	L1	21	0.0	0.018	3.4	LOS A	0.1	0.6	0.23	0.41	0.23	41.1
32a	R1	1	0.0	0.018	7.8	LOS A	0.1	0.6	0.23	0.41	0.23	39.7
32b	R3	1	0.0	0.018	10.0	LOS A	0.1	0.6	0.23	0.41	0.23	37.7
Approach		23	0.0	0.018	3.9	LOS A	0.1	0.6	0.23	0.41	0.23	40.9
All Vehicles		245	0.0	0.080	3.9	LOS A	0.4	3.1	0.08	0.40	0.08	42.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21697_2041_AAST_PM]

Node: 21697
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

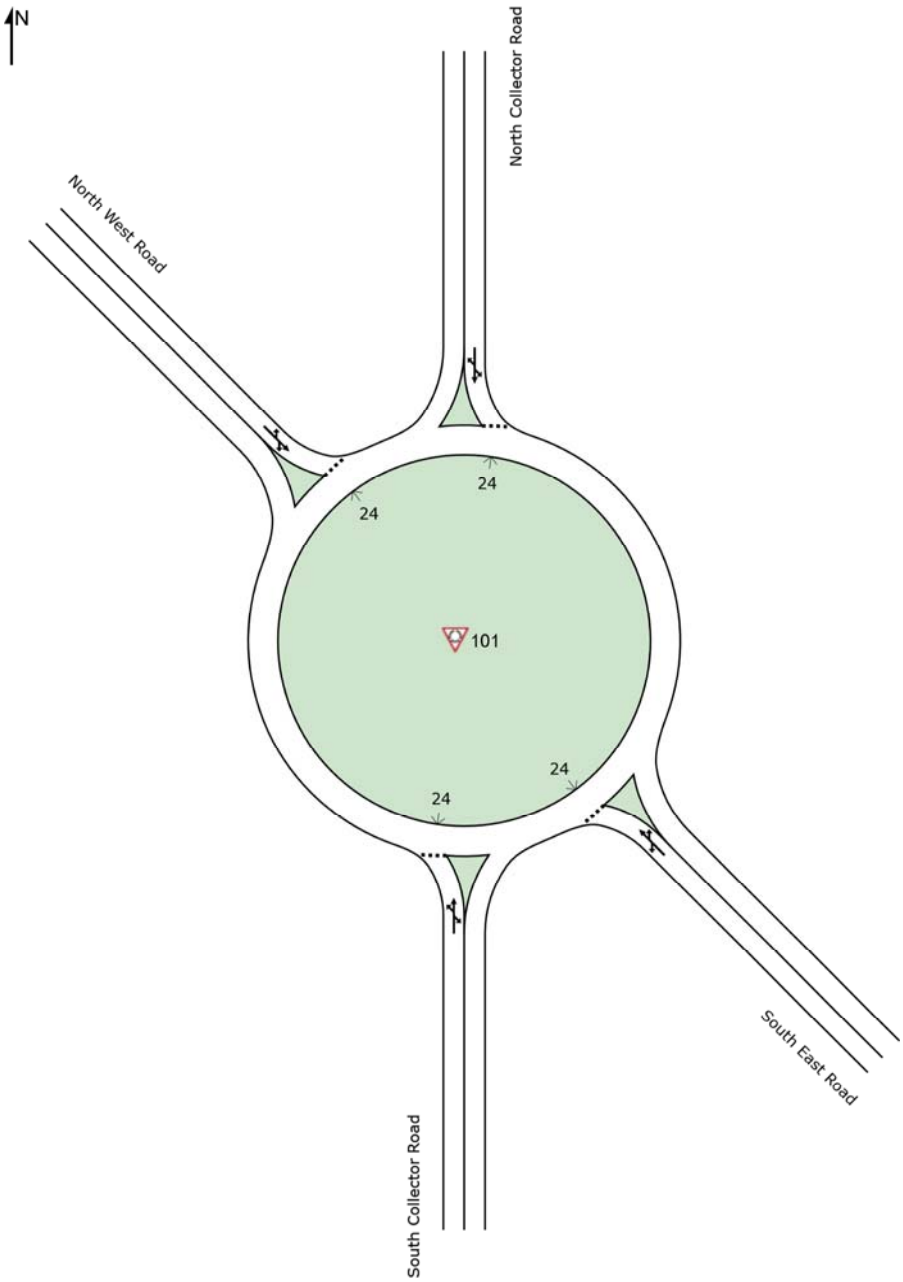
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Collector Road												
1b	L3	1	0.0	0.074	3.5	LOS A	0.4	2.8	0.11	0.37	0.11	40.0
2	T1	108	0.0	0.074	3.5	LOS A	0.4	2.8	0.11	0.37	0.11	42.7
3	R2	1	0.0	0.074	8.6	LOS A	0.4	2.8	0.11	0.37	0.11	41.1
Approach		111	0.0	0.074	3.6	LOS A	0.4	2.8	0.11	0.37	0.11	42.7
East: East Collector Road												
4	L2	1	0.0	0.006	4.2	LOS A	0.0	0.2	0.27	0.55	0.27	35.3
4a	L1	1	0.0	0.006	4.0	LOS A	0.0	0.2	0.27	0.55	0.27	36.0
6	R2	5	0.0	0.006	9.4	LOS A	0.0	0.2	0.27	0.55	0.27	35.0
Approach		7	0.0	0.006	7.9	LOS A	0.0	0.2	0.27	0.55	0.27	35.1
North: North Collector Road												
7	L2	3	0.0	0.070	3.5	LOS A	0.4	2.7	0.03	0.42	0.03	44.3
8	T1	96	0.0	0.070	3.7	LOS A	0.4	2.7	0.03	0.42	0.03	41.8
9a	R1	18	0.0	0.070	7.8	LOS A	0.4	2.7	0.03	0.42	0.03	37.4
Approach		117	0.0	0.070	4.3	LOS A	0.4	2.7	0.03	0.42	0.03	41.1
SouthWest: South West Road												
30a	L1	20	0.0	0.017	3.6	LOS A	0.1	0.6	0.27	0.42	0.27	40.6
32a	R1	1	0.0	0.017	7.9	LOS A	0.1	0.6	0.27	0.42	0.27	39.2
32b	R3	1	0.0	0.017	10.1	LOS A	0.1	0.6	0.27	0.42	0.27	37.2
Approach		22	0.0	0.017	4.1	LOS A	0.1	0.6	0.27	0.42	0.27	40.4
All Vehicles		257	0.0	0.074	4.1	LOS A	0.4	2.8	0.10	0.40	0.10	41.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21698_2041_AAST_AM]

Node: 21698
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21698_2041_AAST_AM]

Node: 21698
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Collector Road												
1a	L1	4	0.0	0.077	3.6	LOS A	0.4	3.0	0.21	0.43	0.21	38.9
2	T1	86	0.0	0.077	4.0	LOS A	0.4	3.0	0.21	0.43	0.21	46.3
3b	R3	15	0.0	0.077	10.3	LOS A	0.4	3.0	0.21	0.43	0.21	36.2
Approach		105	0.0	0.077	4.8	LOS A	0.4	3.0	0.21	0.43	0.21	44.5
SouthEast: South East Road												
21b	L3	14	0.0	0.057	3.5	LOS A	0.3	2.1	0.29	0.56	0.29	34.7
22	T1	7	0.0	0.057	3.7	LOS A	0.3	2.1	0.29	0.56	0.29	36.3
23a	R1	52	0.0	0.057	7.5	LOS A	0.3	2.1	0.29	0.56	0.29	36.2
Approach		73	0.0	0.057	6.3	LOS A	0.3	2.1	0.29	0.56	0.29	35.9
North: North Collector Road												
7a	L1	160	0.0	0.184	3.6	LOS A	1.1	7.9	0.17	0.38	0.17	41.9
8	T1	116	0.0	0.184	4.0	LOS A	1.1	7.9	0.17	0.38	0.17	43.4
9b	R3	1	0.0	0.184	10.2	LOS A	1.1	7.9	0.17	0.38	0.17	41.0
Approach		277	0.0	0.184	3.8	LOS A	1.1	7.9	0.17	0.38	0.17	42.5
NorthWest: North West Road												
27b	L3	1	0.0	0.020	4.6	LOS A	0.1	0.7	0.32	0.45	0.32	40.0
28	T1	19	0.0	0.020	4.4	LOS A	0.1	0.7	0.32	0.45	0.32	37.1
29a	R1	5	0.0	0.020	8.5	LOS A	0.1	0.7	0.32	0.45	0.32	36.7
Approach		25	0.0	0.020	5.3	LOS A	0.1	0.7	0.32	0.45	0.32	37.1
All Vehicles		480	0.0	0.184	4.5	LOS A	1.1	7.9	0.21	0.42	0.21	41.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21698_2041_AAST_PM]

Node: 21698
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

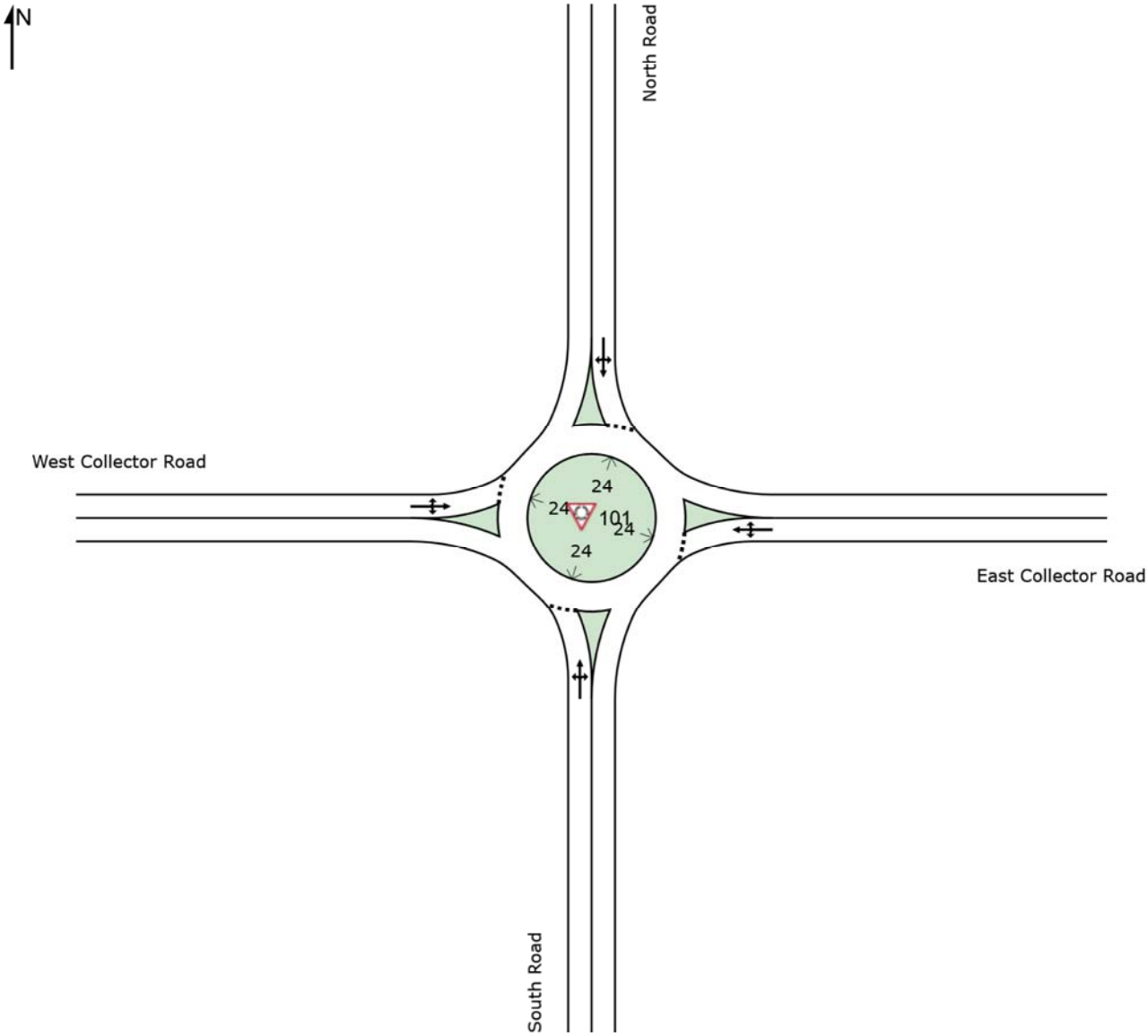
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Collector Road												
1a	L1	5	0.0	0.105	4.0	LOS A	0.6	4.2	0.32	0.45	0.32	38.0
2	T1	112	0.0	0.105	4.3	LOS A	0.6	4.2	0.32	0.45	0.32	45.1
3b	R3	16	0.0	0.105	10.7	LOS A	0.6	4.2	0.32	0.45	0.32	35.3
Approach		133	0.0	0.105	5.1	LOS A	0.6	4.2	0.32	0.45	0.32	43.6
SouthEast: South East Road												
21b	L3	13	0.0	0.106	3.5	LOS A	0.6	4.1	0.28	0.57	0.28	34.4
22	T1	15	0.0	0.106	3.6	LOS A	0.6	4.1	0.28	0.57	0.28	36.0
23a	R1	111	0.0	0.106	7.4	LOS A	0.6	4.1	0.28	0.57	0.28	35.9
Approach		138	0.0	0.106	6.6	LOS A	0.6	4.1	0.28	0.57	0.28	35.7
North: North Collector Road												
7a	L1	74	0.0	0.116	3.6	LOS A	0.7	4.7	0.14	0.37	0.14	42.2
8	T1	100	0.0	0.116	3.9	LOS A	0.7	4.7	0.14	0.37	0.14	43.7
9b	R3	1	0.0	0.116	10.1	LOS A	0.7	4.7	0.14	0.37	0.14	41.3
Approach		175	0.0	0.116	3.8	LOS A	0.7	4.7	0.14	0.37	0.14	43.1
NorthWest: North West Road												
27b	L3	1	0.0	0.013	4.9	LOS A	0.1	0.5	0.40	0.48	0.40	38.9
28	T1	9	0.0	0.013	4.8	LOS A	0.1	0.5	0.40	0.48	0.40	35.9
29a	R1	4	0.0	0.013	8.9	LOS A	0.1	0.5	0.40	0.48	0.40	35.6
Approach		15	0.0	0.013	6.0	LOS A	0.1	0.5	0.40	0.48	0.40	36.0
All Vehicles		460	0.0	0.116	5.1	LOS A	0.7	4.7	0.24	0.46	0.24	40.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21699_2041_AAST_AM]

Node: 21699
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Organisation: BITZIOS CONSULTING | Created: Monday, 13 July 2020 2:43:39 PM
Project: P:\P4627 Moss Vale Road North URA Traffic Study\Technical Work\Models\Phase B - URA Intersection Modelling\P4627 URA Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21699_2041_AAST_AM]

Node: 21699
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	5	0.0	0.087	3.6	LOS A	0.5	3.6	0.12	0.50	0.12	36.5
2	T1	72	0.0	0.087	3.7	LOS A	0.5	3.6	0.12	0.50	0.12	37.7
3	R2	54	0.0	0.087	8.9	LOS A	0.5	3.6	0.12	0.50	0.12	33.6
Approach		131	0.0	0.087	5.9	LOS A	0.5	3.6	0.12	0.50	0.12	36.0
East: East Collector Road												
4	L2	68	0.0	0.076	2.8	LOS A	0.4	3.0	0.37	0.47	0.37	38.8
5	T1	18	0.0	0.076	3.3	LOS A	0.4	3.0	0.37	0.47	0.37	37.7
6	R2	5	0.0	0.076	7.8	LOS A	0.4	3.0	0.37	0.47	0.37	35.1
Approach		92	0.0	0.076	3.2	LOS A	0.4	3.0	0.37	0.47	0.37	38.4
North: North Road												
7	L2	8	0.0	0.135	3.5	LOS A	0.8	5.3	0.26	0.40	0.26	36.0
8	T1	172	0.0	0.135	3.7	LOS A	0.8	5.3	0.26	0.40	0.26	40.8
9	R2	1	0.0	0.135	8.7	LOS A	0.8	5.3	0.26	0.40	0.26	36.5
Approach		181	0.0	0.135	3.7	LOS A	0.8	5.3	0.26	0.40	0.26	40.6
West: West Collector Road												
10	L2	1	0.0	0.029	3.4	LOS A	0.2	1.1	0.29	0.48	0.29	36.0
11	T1	24	0.0	0.029	3.7	LOS A	0.2	1.1	0.29	0.48	0.29	34.0
12	R2	12	0.0	0.029	8.6	LOS A	0.2	1.1	0.29	0.48	0.29	35.8
Approach		37	0.0	0.029	5.2	LOS A	0.2	1.1	0.29	0.48	0.29	34.7
All Vehicles		440	0.0	0.135	4.4	LOS A	0.8	5.3	0.25	0.45	0.25	38.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21699_2041_AAST_PM]

Node: 21699
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

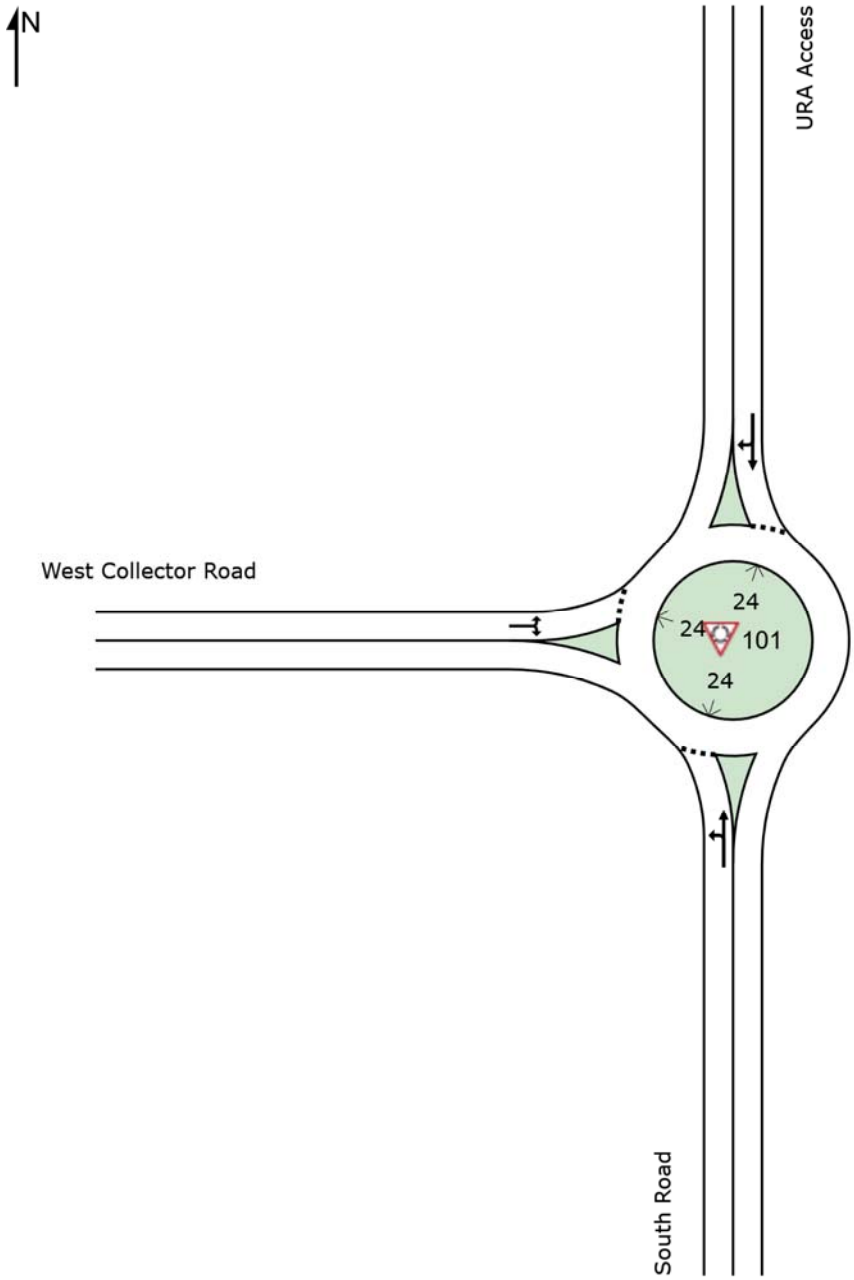
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	6	0.0	0.137	3.7	LOS A	0.8	5.8	0.16	0.47	0.16	36.8
2	T1	132	0.0	0.137	3.8	LOS A	0.8	5.8	0.16	0.47	0.16	38.1
3	R2	66	0.0	0.137	9.0	LOS A	0.8	5.8	0.16	0.47	0.16	33.9
Approach		204	0.0	0.137	5.5	LOS A	0.8	5.8	0.16	0.47	0.16	36.8
East: East Collector Road												
4	L2	67	0.0	0.080	2.4	LOS A	0.4	3.1	0.27	0.43	0.27	39.5
5	T1	28	0.0	0.080	2.9	LOS A	0.4	3.1	0.27	0.43	0.27	38.5
6	R2	7	0.0	0.080	7.3	LOS A	0.4	3.1	0.27	0.43	0.27	35.8
Approach		103	0.0	0.080	2.9	LOS A	0.4	3.1	0.27	0.43	0.27	39.0
North: North Road												
7	L2	7	0.0	0.078	3.5	LOS A	0.4	2.9	0.26	0.39	0.26	36.0
8	T1	94	0.0	0.078	3.7	LOS A	0.4	2.9	0.26	0.39	0.26	40.8
9	R2	1	0.0	0.078	8.7	LOS A	0.4	2.9	0.26	0.39	0.26	36.5
Approach		102	0.0	0.078	3.8	LOS A	0.4	2.9	0.26	0.39	0.26	40.5
West: West Collector Road												
10	L2	1	0.0	0.023	3.8	LOS A	0.1	0.8	0.37	0.46	0.37	36.2
11	T1	22	0.0	0.023	4.1	LOS A	0.1	0.8	0.37	0.46	0.37	34.2
12	R2	4	0.0	0.023	9.0	LOS A	0.1	0.8	0.37	0.46	0.37	36.0
Approach		27	0.0	0.023	4.8	LOS A	0.1	0.8	0.37	0.46	0.37	34.6
All Vehicles		437	0.0	0.137	4.4	LOS A	0.8	5.8	0.22	0.44	0.22	37.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21717_2041_AAST_AM]

Node: 21717
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21717_2041_AAST_AM]

Node: 21717
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	1	0.0	0.110	4.5	LOS A	0.6	4.2	0.34	0.43	0.34	27.7
2	T1	135	0.0	0.110	4.6	LOS A	0.6	4.2	0.34	0.43	0.34	53.7
Approach		136	0.0	0.110	4.6	LOS A	0.6	4.2	0.34	0.43	0.34	53.5
North: URA Access												
8	T1	149	0.0	0.174	3.8	LOS A	1.1	7.9	0.02	0.55	0.02	53.0
9	R2	157	0.0	0.174	8.9	LOS A	1.1	7.9	0.02	0.55	0.02	37.7
Approach		306	0.0	0.174	6.4	LOS A	1.1	7.9	0.02	0.55	0.02	45.2
West: West Collector Road												
10	L2	238	0.0	0.187	3.1	LOS A	1.2	8.2	0.36	0.47	0.36	52.1
12	R2	1	0.0	0.187	8.2	LOS A	1.2	8.2	0.36	0.47	0.36	53.8
Approach		239	0.0	0.187	3.2	LOS A	1.2	8.2	0.36	0.47	0.36	52.1
All Vehicles		681	0.0	0.187	4.9	LOS A	1.2	8.2	0.20	0.50	0.20	48.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21717_2041_AAST_PM]

Node: 21717
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

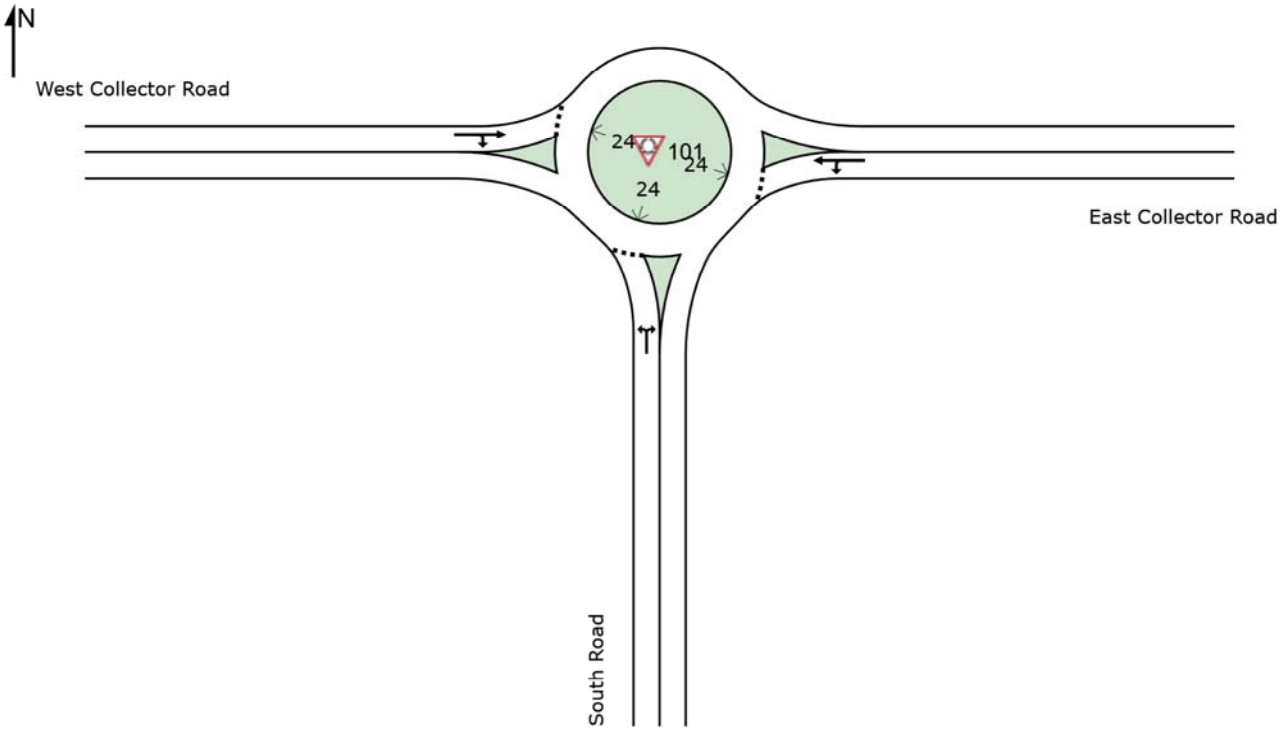
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	1	0.0	0.138	5.2	LOS A	0.8	5.4	0.46	0.51	0.46	27.2
2	T1	153	0.0	0.138	5.4	LOS A	0.8	5.4	0.46	0.51	0.46	52.8
Approach		154	0.0	0.138	5.4	LOS A	0.8	5.4	0.46	0.51	0.46	52.6
North: URA Access												
8	T1	158	0.0	0.251	3.8	LOS A	1.8	12.5	0.02	0.58	0.02	52.3
9	R2	284	0.0	0.251	8.9	LOS A	1.8	12.5	0.02	0.58	0.02	37.3
Approach		442	0.0	0.251	7.1	LOS A	1.8	12.5	0.02	0.58	0.02	42.7
West: West Collector Road												
10	L2	201	0.0	0.163	3.2	LOS A	1.0	7.2	0.38	0.48	0.38	52.0
12	R2	1	0.0	0.163	8.3	LOS A	1.0	7.2	0.38	0.48	0.38	53.6
Approach		202	0.0	0.163	3.3	LOS A	1.0	7.2	0.38	0.48	0.38	52.0
All Vehicles		798	0.0	0.251	5.8	LOS A	1.8	12.5	0.20	0.54	0.20	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21718_2041_AAST_AM]

Node: 21718
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Organisation: BITZIOS CONSULTING | Created: Monday, 13 July 2020 2:44:31 PM
Project: P:\P4627 Moss Vale Road North URA Traffic Study\Technical Work\Models\Phase B - URA Intersection Modelling\P4627 URA Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21718_2041_AAST_AM]

Node: 21718
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	3	0.0	0.012	3.9	LOS A	0.1	0.4	0.29	0.57	0.29	36.1
3	R2	12	0.0	0.012	9.2	LOS A	0.1	0.4	0.29	0.57	0.29	32.4
Approach		15	0.0	0.012	8.1	LOS A	0.1	0.4	0.29	0.57	0.29	33.2
East: East Collector Road												
4	L2	9	0.0	0.087	3.2	LOS A	0.5	3.3	0.03	0.37	0.03	42.2
5	T1	138	0.0	0.087	3.4	LOS A	0.5	3.3	0.03	0.37	0.03	44.4
Approach		147	0.0	0.087	3.4	LOS A	0.5	3.3	0.03	0.37	0.03	44.3
West: West Collector Road												
11	T1	202	0.0	0.127	3.9	LOS A	0.8	5.4	0.08	0.37	0.08	42.3
12	R2	3	0.0	0.127	8.9	LOS A	0.8	5.4	0.08	0.37	0.08	40.0
Approach		205	0.0	0.127	3.9	LOS A	0.8	5.4	0.08	0.37	0.08	42.3
All Vehicles		367	0.0	0.127	3.9	LOS A	0.8	5.4	0.07	0.38	0.07	42.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21718_2041_AAST_PM]

Node: 21718
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

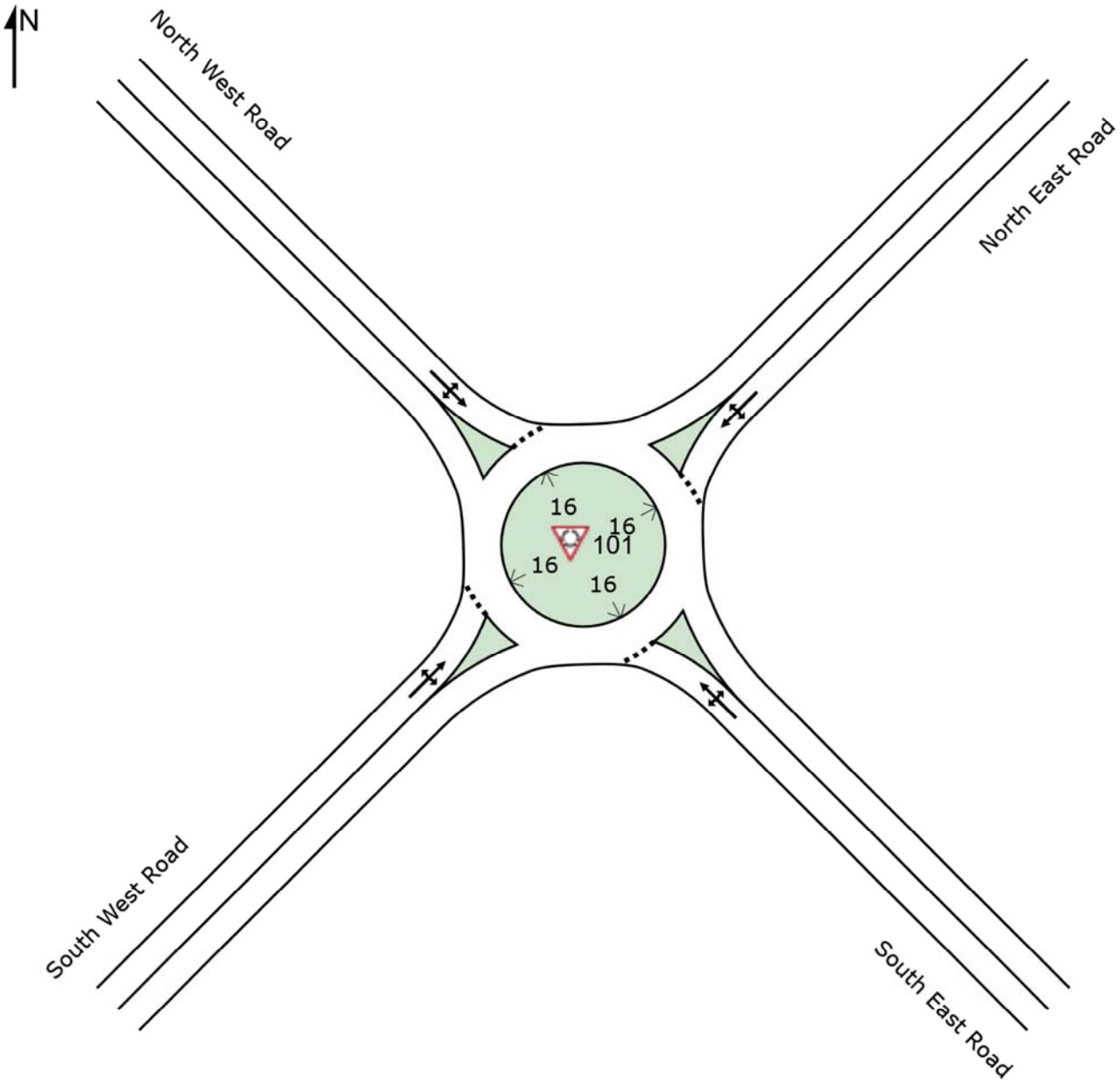
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	3	0.0	0.010	4.4	LOS A	0.1	0.4	0.39	0.57	0.39	35.9
3	R2	8	0.0	0.010	9.7	LOS A	0.1	0.4	0.39	0.57	0.39	32.2
Approach		12	0.0	0.010	8.3	LOS A	0.1	0.4	0.39	0.57	0.39	33.2
East: East Road												
4	L2	20	0.0	0.150	3.2	LOS A	0.9	6.0	0.03	0.37	0.03	42.2
5	T1	239	0.0	0.150	3.4	LOS A	0.9	6.0	0.03	0.37	0.03	44.4
Approach		259	0.0	0.150	3.4	LOS A	0.9	6.0	0.03	0.37	0.03	44.2
West: West Road												
11	T1	180	0.0	0.112	3.8	LOS A	0.7	4.8	0.07	0.37	0.07	42.5
12	R2	3	0.0	0.112	8.9	LOS A	0.7	4.8	0.07	0.37	0.07	40.1
Approach		183	0.0	0.112	3.9	LOS A	0.7	4.8	0.07	0.37	0.07	42.4
All Vehicles		454	0.0	0.150	3.7	LOS A	0.9	6.0	0.06	0.38	0.06	43.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21723_2041_AAST_AM]

Node: 21723
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21723_2041_AAST_AM]

Node: 21723
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	12	0.0	0.019	4.1	LOS A	0.1	0.7	0.03	0.52	0.03	46.5
2	T1	12	0.0	0.019	4.3	LOS A	0.1	0.7	0.03	0.52	0.03	46.5
3	R2	6	0.0	0.019	8.4	LOS A	0.1	0.7	0.03	0.52	0.03	46.4
Approach		29	0.0	0.019	5.1	LOS A	0.1	0.7	0.03	0.52	0.03	46.5
NorthEast: North East Road												
4	L2	13	0.0	0.011	4.3	LOS A	0.1	0.4	0.17	0.48	0.17	48.2
5	T1	1	0.0	0.011	4.5	LOS A	0.1	0.4	0.17	0.48	0.17	24.7
6	R2	1	0.0	0.011	8.7	LOS A	0.1	0.4	0.17	0.48	0.17	22.2
Approach		15	0.0	0.011	4.6	LOS A	0.1	0.4	0.17	0.48	0.17	44.7
NorthWest: North West Road												
7	L2	1	0.0	0.027	3.1	LOS A	0.1	1.0	0.10	0.41	0.10	42.4
8	T1	35	0.0	0.027	3.4	LOS A	0.1	1.0	0.10	0.41	0.10	51.8
9	R2	1	0.0	0.027	7.4	LOS A	0.1	1.0	0.10	0.41	0.10	34.8
Approach		37	0.0	0.027	3.5	LOS A	0.1	1.0	0.10	0.41	0.10	51.2
SouthWest: South West Road												
10	L2	1	0.0	0.010	4.0	LOS A	0.0	0.3	0.10	0.61	0.10	31.1
11	T1	1	0.0	0.010	4.2	LOS A	0.0	0.3	0.10	0.61	0.10	39.0
12	R2	11	0.0	0.010	8.4	LOS A	0.0	0.3	0.10	0.61	0.10	45.6
Approach		13	0.0	0.010	7.7	LOS A	0.0	0.3	0.10	0.61	0.10	44.3
All Vehicles		94	0.0	0.027	4.8	LOS A	0.1	1.0	0.09	0.48	0.09	47.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21723_2041_AAST_PM]

Node: 21723
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

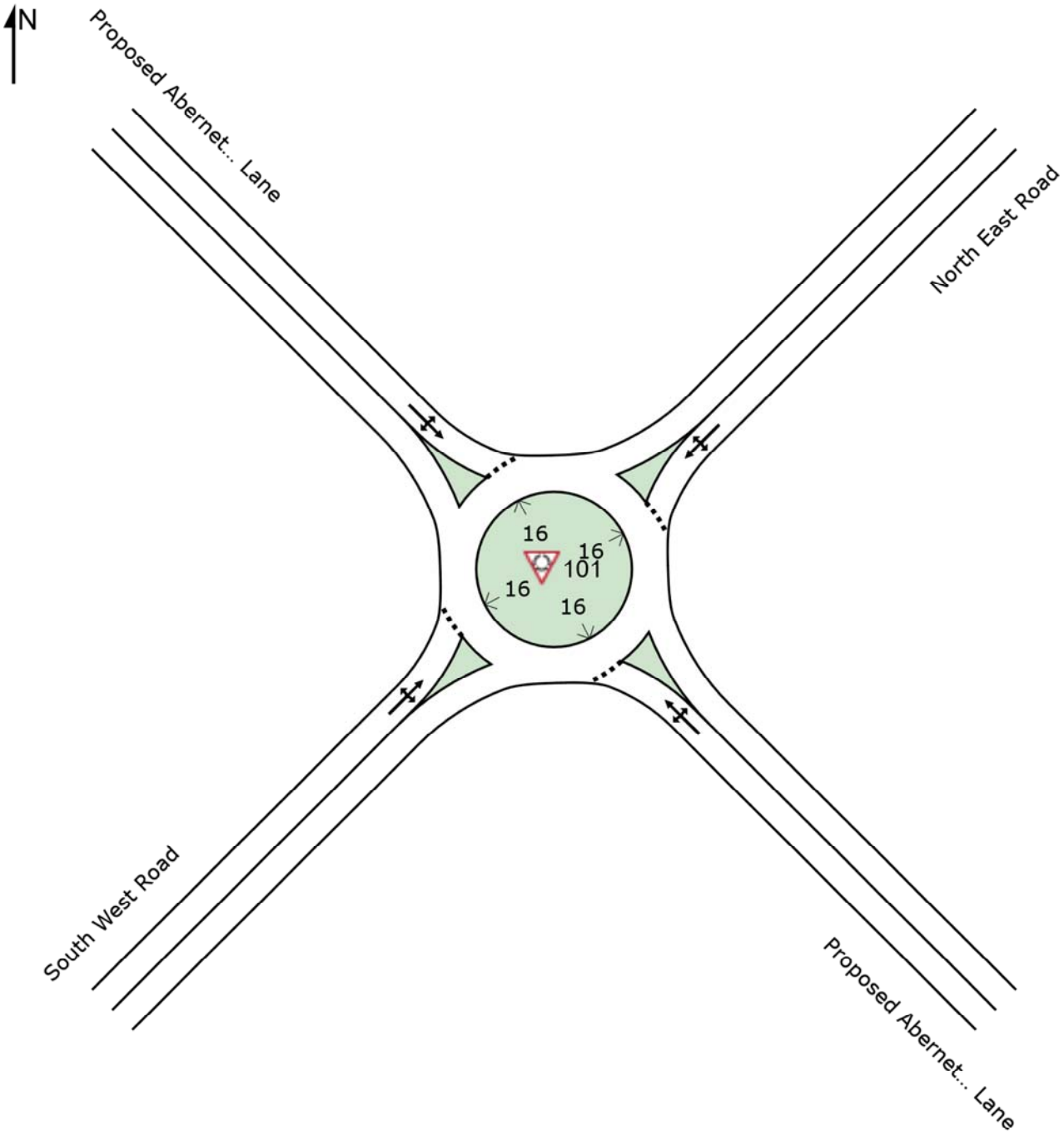
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	16	0.0	0.031	4.1	LOS A	0.2	1.1	0.03	0.51	0.03	46.6
2	T1	23	0.0	0.031	4.3	LOS A	0.2	1.1	0.03	0.51	0.03	46.6
3	R2	9	0.0	0.031	8.4	LOS A	0.2	1.1	0.03	0.51	0.03	46.5
Approach		48	0.0	0.031	5.0	LOS A	0.2	1.1	0.03	0.51	0.03	46.6
NorthEast: North East Road												
4	L2	8	0.0	0.008	4.1	LOS A	0.0	0.3	0.10	0.49	0.10	48.4
5	T1	1	0.0	0.008	4.4	LOS A	0.0	0.3	0.10	0.49	0.10	24.9
6	R2	1	0.0	0.008	8.5	LOS A	0.0	0.3	0.10	0.49	0.10	22.4
Approach		11	0.0	0.008	4.6	LOS A	0.0	0.3	0.10	0.49	0.10	43.5
NorthWest: North West Road												
7	L2	1	0.0	0.010	3.1	LOS A	0.0	0.3	0.10	0.43	0.10	41.9
8	T1	11	0.0	0.010	3.4	LOS A	0.0	0.3	0.10	0.43	0.10	51.4
9	R2	1	0.0	0.010	7.4	LOS A	0.0	0.3	0.10	0.43	0.10	34.4
Approach		13	0.0	0.010	3.7	LOS A	0.0	0.3	0.10	0.43	0.10	49.8
SouthWest: South West Road												
10	L2	1	0.0	0.008	4.0	LOS A	0.0	0.3	0.14	0.59	0.14	31.0
11	T1	1	0.0	0.008	4.3	LOS A	0.0	0.3	0.14	0.59	0.14	38.9
12	R2	8	0.0	0.008	8.5	LOS A	0.0	0.3	0.14	0.59	0.14	45.5
Approach		11	0.0	0.008	7.6	LOS A	0.0	0.3	0.14	0.59	0.14	44.0
All Vehicles		82	0.0	0.031	5.1	LOS A	0.2	1.1	0.07	0.50	0.07	46.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21724_2041_AAST_AM]

Node: 21724
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Organisation: BITZIOS CONSULTING | Created: Monday, 13 July 2020 2:56:07 PM
Project: P:\P4627 Moss Vale Road North URA Traffic Study\Technical Work\Models\Phase B - URA Intersection Modelling\P4627 URA Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21724_2041_AAST_AM]

Node: 21724
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Proposed Abernethys Lane												
1	L2	1	0.0	0.002	4.2	LOS A	0.0	0.1	0.12	0.51	0.12	36.1
2	T1	1	0.0	0.002	4.4	LOS A	0.0	0.1	0.12	0.51	0.12	44.9
3	R2	1	0.0	0.002	8.6	LOS A	0.0	0.1	0.12	0.51	0.12	37.9
Approach		3	0.0	0.002	5.7	LOS A	0.0	0.1	0.12	0.51	0.12	39.6
NorthEast: North East Road												
4	L2	1	0.0	0.019	3.9	LOS A	0.1	0.7	0.03	0.44	0.03	43.5
5	T1	26	0.0	0.019	4.1	LOS A	0.1	0.7	0.03	0.44	0.03	39.8
6	R2	1	0.0	0.019	8.4	LOS A	0.1	0.7	0.03	0.44	0.03	46.3
Approach		28	0.0	0.019	4.2	LOS A	0.1	0.7	0.03	0.44	0.03	40.2
NorthWest: Proposed Abernethys Lane												
7	L2	1	0.0	0.002	4.1	LOS A	0.0	0.1	0.10	0.52	0.10	36.6
8	T1	1	0.0	0.002	4.4	LOS A	0.0	0.1	0.10	0.52	0.10	45.1
9	R2	1	0.0	0.002	8.5	LOS A	0.0	0.1	0.10	0.52	0.10	35.8
Approach		3	0.0	0.002	5.7	LOS A	0.0	0.1	0.10	0.52	0.10	39.1
SouthWest: South West Road												
10	L2	1	0.0	0.013	3.9	LOS A	0.1	0.5	0.03	0.44	0.03	43.5
11	T1	17	0.0	0.013	4.1	LOS A	0.1	0.5	0.03	0.44	0.03	40.0
12	R2	1	0.0	0.013	8.4	LOS A	0.1	0.5	0.03	0.44	0.03	46.0
Approach		19	0.0	0.013	4.3	LOS A	0.1	0.5	0.03	0.44	0.03	40.5
All Vehicles		54	0.0	0.019	4.5	LOS A	0.1	0.7	0.04	0.45	0.04	40.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21724_2041_AAST_PM]

Node: 21724
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

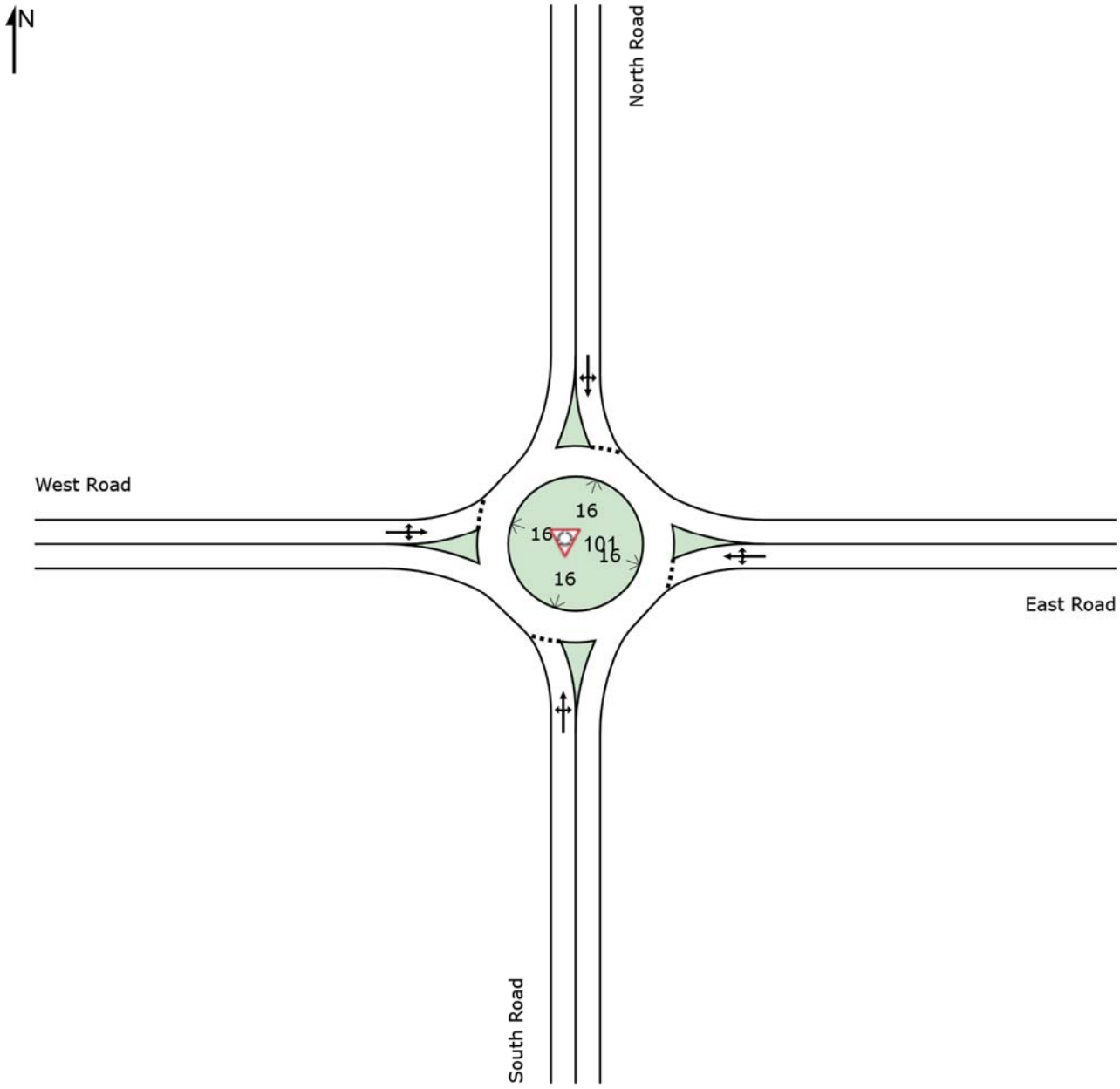
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Proposed Abernethys Lane												
1	L2	1	0.0	0.002	4.2	LOS A	0.0	0.1	0.11	0.52	0.11	36.2
2	T1	1	0.0	0.002	4.4	LOS A	0.0	0.1	0.11	0.52	0.11	45.0
3	R2	1	0.0	0.002	8.5	LOS A	0.0	0.1	0.11	0.52	0.11	37.9
Approach		3	0.0	0.002	5.7	LOS A	0.0	0.1	0.11	0.52	0.11	39.7
NorthEast: North East Road												
4	L2	1	0.0	0.016	3.9	LOS A	0.1	0.6	0.03	0.44	0.03	43.4
5	T1	22	0.0	0.016	4.1	LOS A	0.1	0.6	0.03	0.44	0.03	39.8
6	R2	1	0.0	0.016	8.4	LOS A	0.1	0.6	0.03	0.44	0.03	46.2
Approach		24	0.0	0.016	4.3	LOS A	0.1	0.6	0.03	0.44	0.03	40.2
NorthWest: Proposed Abernethys Lane												
7	L2	1	0.0	0.002	4.2	LOS A	0.0	0.1	0.12	0.52	0.12	36.5
8	T1	1	0.0	0.002	4.4	LOS A	0.0	0.1	0.12	0.52	0.12	45.0
9	R2	1	0.0	0.002	8.6	LOS A	0.0	0.1	0.12	0.52	0.12	35.7
Approach		3	0.0	0.002	5.7	LOS A	0.0	0.1	0.12	0.52	0.12	38.9
SouthWest: South West Road												
10	L2	1	0.0	0.017	3.9	LOS A	0.1	0.6	0.03	0.44	0.03	43.6
11	T1	24	0.0	0.017	4.1	LOS A	0.1	0.6	0.03	0.44	0.03	40.1
12	R2	1	0.0	0.017	8.4	LOS A	0.1	0.6	0.03	0.44	0.03	46.1
Approach		26	0.0	0.017	4.3	LOS A	0.1	0.6	0.03	0.44	0.03	40.5
All Vehicles		57	0.0	0.017	4.4	LOS A	0.1	0.6	0.04	0.45	0.04	40.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21744_2041_AAST_AM]

Node: 21744
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21744_2041_AAST_AM]

Node: 21744
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	1	0.0	0.002	4.0	LOS A	0.0	0.1	0.10	0.52	0.10	37.0
2	T1	1	0.0	0.002	4.2	LOS A	0.0	0.1	0.10	0.52	0.10	37.3
3	R2	1	0.0	0.002	8.5	LOS A	0.0	0.1	0.10	0.52	0.10	34.6
Approach		3	0.0	0.002	5.6	LOS A	0.0	0.1	0.10	0.52	0.10	36.3
East: East Road												
4	L2	1	0.0	0.013	3.4	LOS A	0.1	0.5	0.03	0.44	0.03	39.4
5	T1	18	0.0	0.013	3.7	LOS A	0.1	0.5	0.03	0.44	0.03	40.8
6	R2	1	0.0	0.013	7.8	LOS A	0.1	0.5	0.03	0.44	0.03	37.8
Approach		20	0.0	0.013	3.9	LOS A	0.1	0.5	0.03	0.44	0.03	40.6
North: North Road												
7	L2	3	0.0	0.004	3.9	LOS A	0.0	0.1	0.12	0.50	0.12	36.3
8	T1	1	0.0	0.004	4.2	LOS A	0.0	0.1	0.12	0.50	0.12	38.3
9	R2	1	0.0	0.004	8.4	LOS A	0.0	0.1	0.12	0.50	0.12	36.4
Approach		5	0.0	0.004	4.9	LOS A	0.0	0.1	0.12	0.50	0.12	36.7
West: West Road												
10	L2	1	0.0	0.018	4.0	LOS A	0.1	0.6	0.03	0.44	0.03	39.4
11	T1	25	0.0	0.018	4.2	LOS A	0.1	0.6	0.03	0.44	0.03	39.6
12	R2	1	0.0	0.018	8.4	LOS A	0.1	0.6	0.03	0.44	0.03	38.3
Approach		27	0.0	0.018	4.4	LOS A	0.1	0.6	0.03	0.44	0.03	39.5
All Vehicles		56	0.0	0.018	4.3	LOS A	0.1	0.6	0.04	0.45	0.04	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21744_2041_AAST_PM]

Node: 21744
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

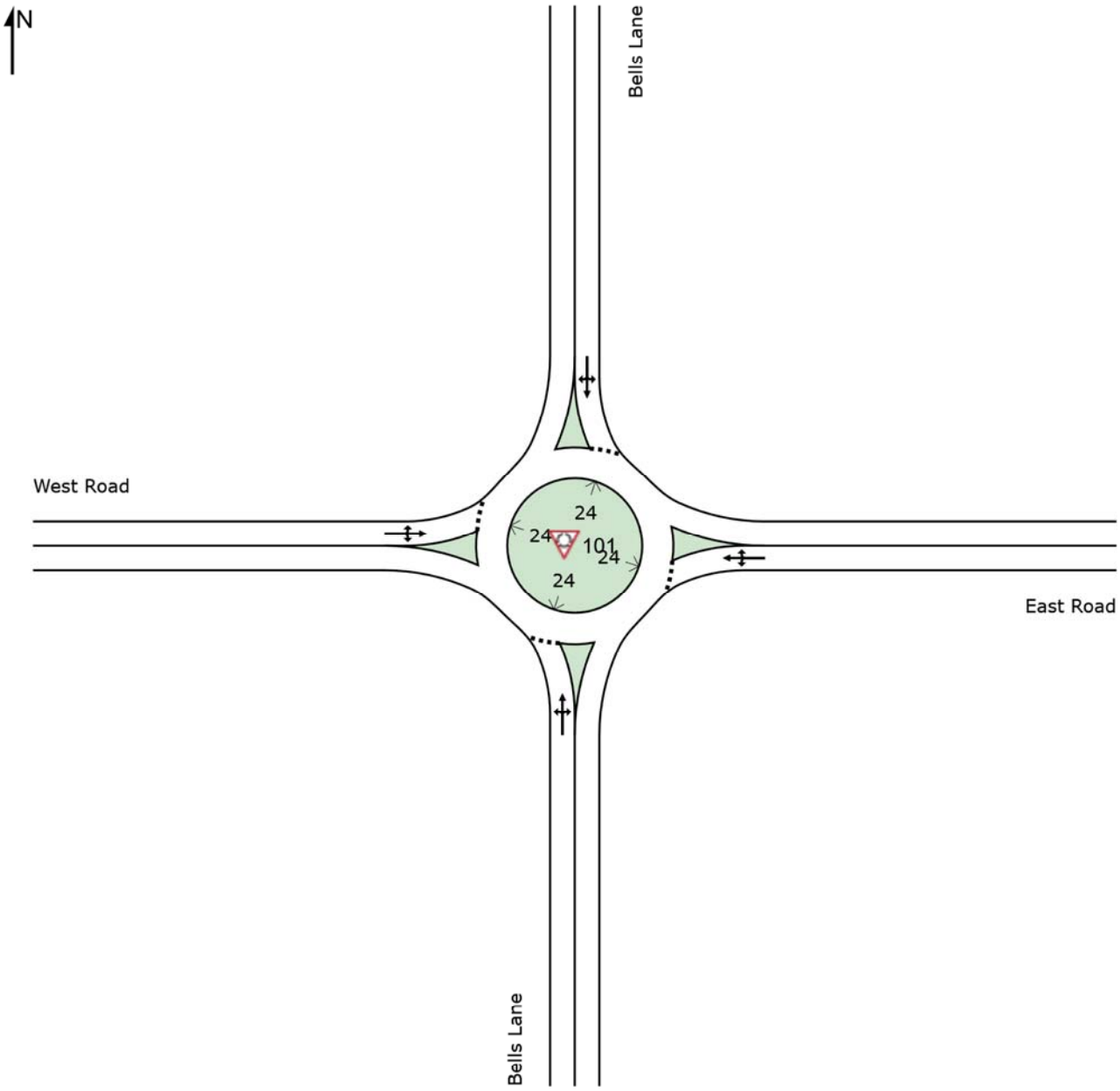
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	1	0.0	0.002	4.0	LOS A	0.0	0.1	0.12	0.51	0.12	36.8
2	T1	1	0.0	0.002	4.2	LOS A	0.0	0.1	0.12	0.51	0.12	37.2
3	R2	1	0.0	0.002	8.5	LOS A	0.0	0.1	0.12	0.51	0.12	34.4
Approach		3	0.0	0.002	5.6	LOS A	0.0	0.1	0.12	0.51	0.12	36.1
East: East Road												
4	L2	1	0.0	0.018	3.4	LOS A	0.1	0.6	0.03	0.43	0.03	39.5
5	T1	25	0.0	0.018	3.7	LOS A	0.1	0.6	0.03	0.43	0.03	40.9
6	R2	1	0.0	0.018	7.8	LOS A	0.1	0.6	0.03	0.43	0.03	37.9
Approach		27	0.0	0.018	3.9	LOS A	0.1	0.6	0.03	0.43	0.03	40.7
North: North Road												
7	L2	2	0.0	0.003	3.9	LOS A	0.0	0.1	0.10	0.51	0.10	36.1
8	T1	1	0.0	0.003	4.1	LOS A	0.0	0.1	0.10	0.51	0.10	38.1
9	R2	1	0.0	0.003	8.4	LOS A	0.0	0.1	0.10	0.51	0.10	36.3
Approach		4	0.0	0.003	5.1	LOS A	0.0	0.1	0.10	0.51	0.10	36.7
West: West Road												
10	L2	1	0.0	0.013	4.0	LOS A	0.1	0.5	0.03	0.45	0.03	39.2
11	T1	17	0.0	0.013	4.2	LOS A	0.1	0.5	0.03	0.45	0.03	39.4
12	R2	1	0.0	0.013	8.4	LOS A	0.1	0.5	0.03	0.45	0.03	38.1
Approach		19	0.0	0.013	4.5	LOS A	0.1	0.5	0.03	0.45	0.03	39.4
All Vehicles		54	0.0	0.018	4.3	LOS A	0.1	0.6	0.04	0.45	0.04	39.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21748_2041_AAST_AM]

Node: 21748
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21748_2041_AAST_AM]

Node: 21748
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	86	0.0	0.181	3.7	LOS A	1.3	8.8	0.06	0.52	0.06	40.9
2	T1	98	0.0	0.181	3.8	LOS A	1.3	8.8	0.06	0.52	0.06	38.4
3	R2	124	0.0	0.181	8.9	LOS A	1.3	8.8	0.06	0.52	0.06	36.7
Approach		308	0.0	0.181	5.8	LOS A	1.3	8.8	0.06	0.52	0.06	38.4
East: East Road												
4	L2	177	0.0	0.200	6.5	LOS A	1.3	8.8	0.66	0.69	0.66	37.1
5	T1	1	0.0	0.200	6.7	LOS A	1.3	8.8	0.66	0.69	0.66	36.6
6	R2	3	0.0	0.200	11.8	LOS A	1.3	8.8	0.66	0.69	0.66	32.2
Approach		181	0.0	0.200	6.6	LOS A	1.3	8.8	0.66	0.69	0.66	37.1
North: Bells Lane												
7	L2	3	0.0	0.200	5.8	LOS A	1.3	8.8	0.63	0.63	0.63	35.1
8	T1	185	0.0	0.200	6.1	LOS A	1.3	8.8	0.63	0.63	0.63	37.1
9	R2	1	0.0	0.200	11.1	LOS A	1.3	8.8	0.63	0.63	0.63	35.3
Approach		189	0.0	0.200	6.1	LOS A	1.3	8.8	0.63	0.63	0.63	37.0
West: West Road												
10	L2	1	0.0	0.284	5.1	LOS A	1.8	12.5	0.47	0.66	0.47	31.9
11	T1	2	0.0	0.284	5.2	LOS A	1.8	12.5	0.47	0.66	0.47	32.9
12	R2	332	0.0	0.284	10.3	LOS A	1.8	12.5	0.47	0.66	0.47	32.3
Approach		335	0.0	0.284	10.3	LOS A	1.8	12.5	0.47	0.66	0.47	32.3
All Vehicles		1014	0.0	0.284	7.5	LOS A	1.8	12.5	0.41	0.62	0.41	35.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21748_2041_AAST_PM]

Node: 21748
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

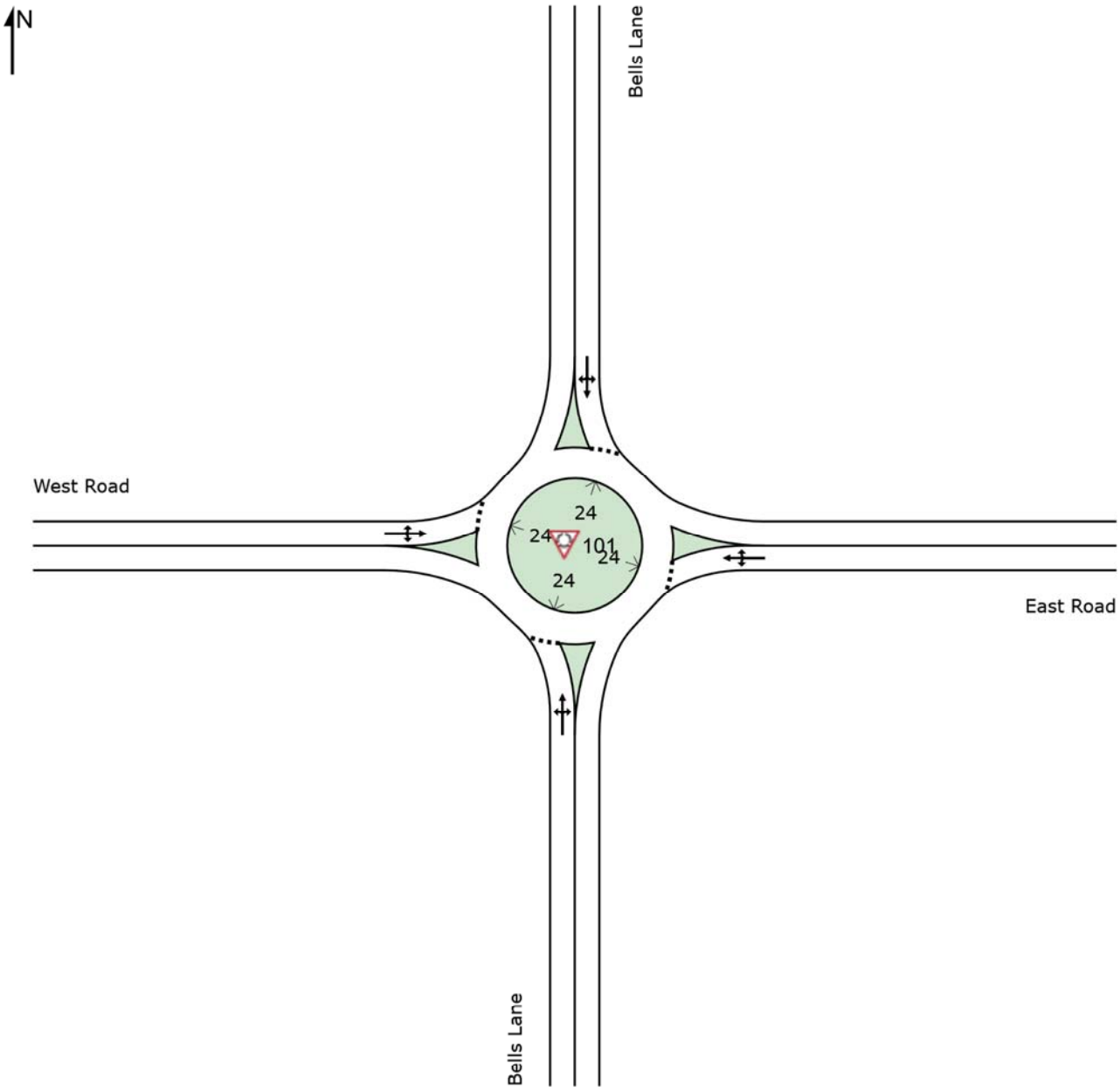
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	176	0.0	0.312	3.7	LOS A	2.4	16.7	0.07	0.49	0.07	41.6
2	T1	196	0.0	0.312	3.8	LOS A	2.4	16.7	0.07	0.49	0.07	39.1
3	R2	164	0.0	0.312	8.9	LOS A	2.4	16.7	0.07	0.49	0.07	37.3
Approach		536	0.0	0.312	5.3	LOS A	2.4	16.7	0.07	0.49	0.07	39.4
East: East Road												
4	L2	142	0.0	0.130	4.6	LOS A	0.8	5.4	0.46	0.54	0.46	40.1
5	T1	1	0.0	0.130	4.8	LOS A	0.8	5.4	0.46	0.54	0.46	39.4
6	R2	4	0.0	0.130	9.9	LOS A	0.8	5.4	0.46	0.54	0.46	34.7
Approach		147	0.0	0.130	4.8	LOS A	0.8	5.4	0.46	0.54	0.46	39.9
North: Bells Lane												
7	L2	3	0.0	0.100	4.7	LOS A	0.6	4.0	0.49	0.52	0.49	36.5
8	T1	103	0.0	0.100	5.0	LOS A	0.6	4.0	0.49	0.52	0.49	38.5
9	R2	1	0.0	0.100	10.0	LOS A	0.6	4.0	0.49	0.52	0.49	36.6
Approach		107	0.0	0.100	5.0	LOS A	0.6	4.0	0.49	0.52	0.49	38.4
West: West Road												
10	L2	1	0.0	0.147	5.7	LOS A	0.8	5.8	0.52	0.69	0.52	31.6
11	T1	1	0.0	0.147	5.9	LOS A	0.8	5.8	0.52	0.69	0.52	32.6
12	R2	152	0.0	0.147	11.0	LOS A	0.8	5.8	0.52	0.69	0.52	32.0
Approach		154	0.0	0.147	10.9	LOS A	0.8	5.8	0.52	0.69	0.52	32.0
All Vehicles		944	0.0	0.312	6.1	LOS A	2.4	16.7	0.25	0.53	0.25	37.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21749_2041_AAST_AM]

Node: 21749
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21749_2041_AAST_AM]

Node: 21749
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	8	0.0	0.055	3.7	LOS A	0.3	2.1	0.05	0.39	0.05	39.4
2	T1	75	0.0	0.055	3.8	LOS A	0.3	2.1	0.05	0.39	0.05	40.4
3	R2	4	0.0	0.055	8.9	LOS A	0.3	2.1	0.05	0.39	0.05	39.8
Approach		87	0.0	0.055	4.1	LOS A	0.3	2.1	0.05	0.39	0.05	40.3
East: East Road												
4	L2	24	0.0	0.022	3.9	LOS A	0.1	0.8	0.31	0.45	0.31	41.6
5	T1	2	0.0	0.022	4.1	LOS A	0.1	0.8	0.31	0.45	0.31	35.7
6	R2	1	0.0	0.022	9.2	LOS A	0.1	0.8	0.31	0.45	0.31	33.5
Approach		27	0.0	0.022	4.1	LOS A	0.1	0.8	0.31	0.45	0.31	41.0
North: Bells Lane												
7	L2	1	0.0	0.091	2.3	LOS A	0.5	3.5	0.07	0.36	0.07	41.3
8	T1	142	0.0	0.091	2.7	LOS A	0.5	3.5	0.07	0.36	0.07	44.1
9	R2	3	0.0	0.091	7.3	LOS A	0.5	3.5	0.07	0.36	0.07	36.8
Approach		146	0.0	0.091	2.8	LOS A	0.5	3.5	0.07	0.36	0.07	43.9
West: West Road												
10	L2	4	0.0	0.007	2.6	LOS A	0.0	0.3	0.22	0.42	0.22	35.7
11	T1	4	0.0	0.007	2.9	LOS A	0.0	0.3	0.22	0.42	0.22	39.9
12	R2	1	0.0	0.007	7.6	LOS A	0.0	0.3	0.22	0.42	0.22	38.3
Approach		9	0.0	0.007	3.3	LOS A	0.0	0.3	0.22	0.42	0.22	38.0
All Vehicles		271	0.0	0.091	3.3	LOS A	0.5	3.5	0.09	0.38	0.09	42.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21749_2041_AAST_PM]

Node: 21749
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

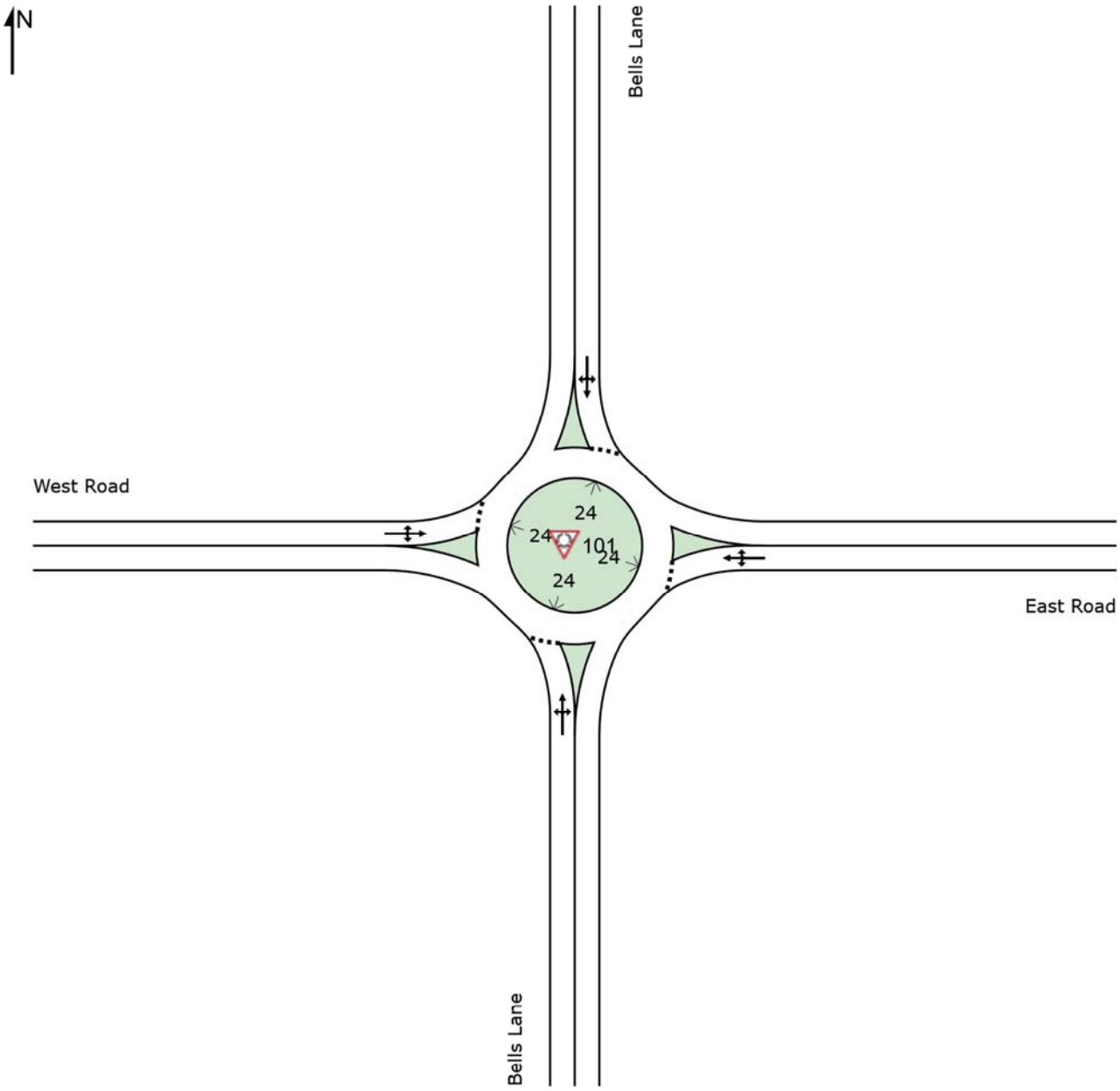
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	17	0.0	0.110	3.7	LOS A	0.6	4.3	0.06	0.39	0.06	39.4
2	T1	156	0.0	0.110	3.8	LOS A	0.6	4.3	0.06	0.39	0.06	40.4
3	R2	8	0.0	0.110	8.9	LOS A	0.6	4.3	0.06	0.39	0.06	39.7
Approach		181	0.0	0.110	4.1	LOS A	0.6	4.3	0.06	0.39	0.06	40.2
East: East Road												
4	L2	14	0.0	0.013	3.6	LOS A	0.1	0.5	0.22	0.44	0.22	42.2
5	T1	2	0.0	0.013	3.8	LOS A	0.1	0.5	0.22	0.44	0.22	36.3
6	R2	1	0.0	0.013	8.9	LOS A	0.1	0.5	0.22	0.44	0.22	34.1
Approach		17	0.0	0.013	3.9	LOS A	0.1	0.5	0.22	0.44	0.22	41.1
North: Bells Lane												
7	L2	1	0.0	0.050	2.4	LOS A	0.3	1.9	0.11	0.37	0.11	40.3
8	T1	68	0.0	0.050	2.7	LOS A	0.3	1.9	0.11	0.37	0.11	43.1
9	R2	4	0.0	0.050	7.4	LOS A	0.3	1.9	0.11	0.37	0.11	35.9
Approach		74	0.0	0.050	3.0	LOS A	0.3	1.9	0.11	0.37	0.11	42.7
West: West Road												
10	L2	4	0.0	0.015	3.0	LOS A	0.1	0.5	0.33	0.53	0.33	32.2
11	T1	5	0.0	0.015	3.3	LOS A	0.1	0.5	0.33	0.53	0.33	36.1
12	R2	8	0.0	0.015	8.0	LOS A	0.1	0.5	0.33	0.53	0.33	35.2
Approach		18	0.0	0.015	5.4	LOS A	0.1	0.5	0.33	0.53	0.33	34.8
All Vehicles		289	0.0	0.110	3.9	LOS A	0.6	4.3	0.10	0.40	0.10	40.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21750_2041_AAST_AM]

Node: 21750
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21750_2041_AAST_AM]

Node: 21750
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	1	0.0	0.052	3.7	LOS A	0.3	2.0	0.07	0.37	0.07	40.5
2	T1	79	0.0	0.052	3.8	LOS A	0.3	2.0	0.07	0.37	0.07	43.5
3	R2	1	0.0	0.052	8.9	LOS A	0.3	2.0	0.07	0.37	0.07	40.7
Approach		81	0.0	0.052	3.9	LOS A	0.3	2.0	0.07	0.37	0.07	43.5
East: East Road												
4	L2	1	0.0	0.007	4.0	LOS A	0.0	0.2	0.31	0.56	0.31	37.0
5	T1	1	0.0	0.007	4.1	LOS A	0.0	0.2	0.31	0.56	0.31	30.7
6	R2	6	0.0	0.007	9.3	LOS A	0.0	0.2	0.31	0.56	0.31	31.8
Approach		8	0.0	0.007	8.0	LOS A	0.0	0.2	0.31	0.56	0.31	32.3
North: Bells Lane												
7	L2	7	0.0	0.092	3.4	LOS A	0.5	3.6	0.03	0.38	0.03	41.7
8	T1	146	0.0	0.092	3.6	LOS A	0.5	3.6	0.03	0.38	0.03	50.5
9	R2	2	0.0	0.092	8.7	LOS A	0.5	3.6	0.03	0.38	0.03	38.1
Approach		156	0.0	0.092	3.6	LOS A	0.5	3.6	0.03	0.38	0.03	49.9
West: West Road												
10	L2	7	0.0	0.007	2.7	LOS A	0.0	0.3	0.23	0.43	0.23	39.1
11	T1	1	0.0	0.007	3.0	LOS A	0.0	0.3	0.23	0.43	0.23	40.0
12	R2	1	0.0	0.007	7.7	LOS A	0.0	0.3	0.23	0.43	0.23	39.2
Approach		9	0.0	0.007	3.3	LOS A	0.0	0.3	0.23	0.43	0.23	39.2
All Vehicles		255	0.0	0.092	3.8	LOS A	0.5	3.6	0.06	0.38	0.06	46.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21750_2041_AAST_PM]

Node: 21750
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

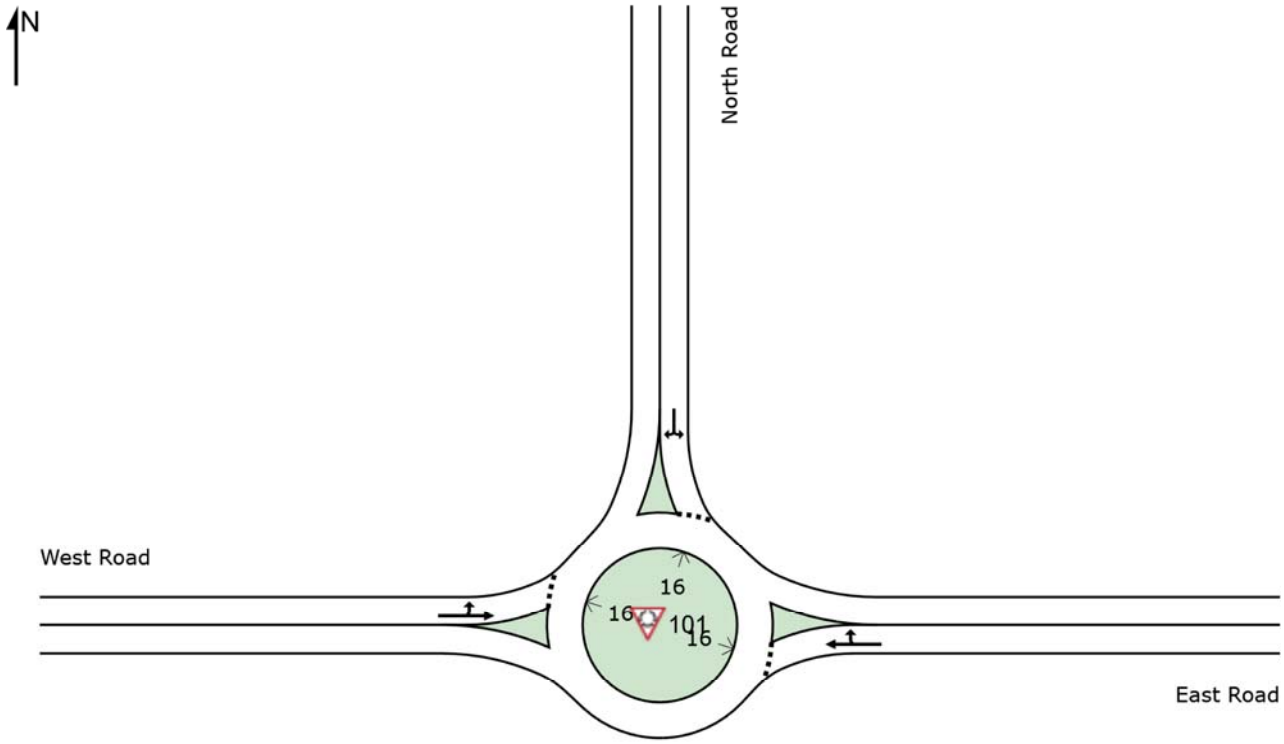
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
1	L2	1	0.0	0.101	3.7	LOS A	0.6	4.0	0.07	0.37	0.07	40.6
2	T1	160	0.0	0.101	3.9	LOS A	0.6	4.0	0.07	0.37	0.07	43.5
3	R2	1	0.0	0.101	8.9	LOS A	0.6	4.0	0.07	0.37	0.07	40.7
Approach		162	0.0	0.101	3.9	LOS A	0.6	4.0	0.07	0.37	0.07	43.5
East: East Road												
4	L2	1	0.0	0.006	3.6	LOS A	0.0	0.2	0.21	0.56	0.21	37.6
5	T1	1	0.0	0.006	3.8	LOS A	0.0	0.2	0.21	0.56	0.21	31.2
6	R2	6	0.0	0.006	8.9	LOS A	0.0	0.2	0.21	0.56	0.21	32.3
Approach		8	0.0	0.006	7.6	LOS A	0.0	0.2	0.21	0.56	0.21	32.8
North: Bells Lane												
7	L2	8	0.0	0.051	3.4	LOS A	0.3	2.0	0.03	0.39	0.03	41.4
8	T1	74	0.0	0.051	3.6	LOS A	0.3	2.0	0.03	0.39	0.03	50.1
9	R2	3	0.0	0.051	8.7	LOS A	0.3	2.0	0.03	0.39	0.03	37.8
Approach		85	0.0	0.051	3.7	LOS A	0.3	2.0	0.03	0.39	0.03	48.8
West: West Road												
10	L2	6	0.0	0.007	3.0	LOS A	0.0	0.2	0.33	0.45	0.33	38.2
11	T1	1	0.0	0.007	3.4	LOS A	0.0	0.2	0.33	0.45	0.33	39.0
12	R2	1	0.0	0.007	8.1	LOS A	0.0	0.2	0.33	0.45	0.33	38.4
Approach		8	0.0	0.007	3.7	LOS A	0.0	0.2	0.33	0.45	0.33	38.3
All Vehicles		264	0.0	0.101	4.0	LOS A	0.6	4.0	0.07	0.39	0.07	44.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21782_2041_AAST_AM]

Node: 21782
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Organisation: BITZIOS CONSULTING | Created: Monday, 13 July 2020 2:58:37 PM
Project: P:\P4627 Moss Vale Road North URA Traffic Study\Technical Work\Models\Phase B - URA Intersection Modelling\P4627 URA Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21782_2041_AAST_AM]

Node: 21782
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: East Road												
2	T1	7	0.0	0.006	4.0	LOS A	0.0	0.2	0.02	0.47	0.02	48.8
3	R2	1	0.0	0.006	8.2	LOS A	0.0	0.2	0.02	0.47	0.02	36.8
Approach		8	0.0	0.006	4.5	LOS A	0.0	0.2	0.02	0.47	0.02	47.6
North: North Road												
4	L2	1	0.0	0.002	3.5	LOS A	0.0	0.1	0.08	0.57	0.08	35.3
6	R2	1	0.0	0.002	7.9	LOS A	0.0	0.1	0.08	0.57	0.08	45.4
Approach		2	0.0	0.002	5.7	LOS A	0.0	0.1	0.08	0.57	0.08	41.0
West: West Road												
7	L2	2	0.0	0.009	4.0	LOS A	0.0	0.3	0.02	0.44	0.02	44.7
8	T1	13	0.0	0.009	4.3	LOS A	0.0	0.3	0.02	0.44	0.02	45.9
Approach		15	0.0	0.009	4.3	LOS A	0.0	0.3	0.02	0.44	0.02	45.8
All Vehicles		25	0.0	0.009	4.5	LOS A	0.0	0.3	0.02	0.46	0.02	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21782_2041_AAST_PM]

Node: 21782
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: East Road												
2	T1	11	0.0	0.008	4.0	LOS A	0.0	0.3	0.03	0.45	0.03	48.9
3	R2	1	0.0	0.008	8.2	LOS A	0.0	0.3	0.03	0.45	0.03	37.0
Approach		12	0.0	0.008	4.4	LOS A	0.0	0.3	0.03	0.45	0.03	48.1
North: North Road												
4	L2	1	0.0	0.002	3.4	LOS A	0.0	0.1	0.04	0.61	0.04	34.6
6	R2	2	0.0	0.002	7.8	LOS A	0.0	0.1	0.04	0.61	0.04	44.5
Approach		3	0.0	0.002	6.4	LOS A	0.0	0.1	0.04	0.61	0.04	41.7
West: West Road												
7	L2	1	0.0	0.004	4.0	LOS A	0.0	0.1	0.02	0.44	0.02	44.7
8	T1	4	0.0	0.004	4.3	LOS A	0.0	0.1	0.02	0.44	0.02	45.9
Approach		5	0.0	0.004	4.3	LOS A	0.0	0.1	0.02	0.44	0.02	45.7
All Vehicles		20	0.0	0.008	4.7	LOS A	0.0	0.3	0.03	0.48	0.03	46.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21804_2041_AAST_AM]

Node: 21804
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

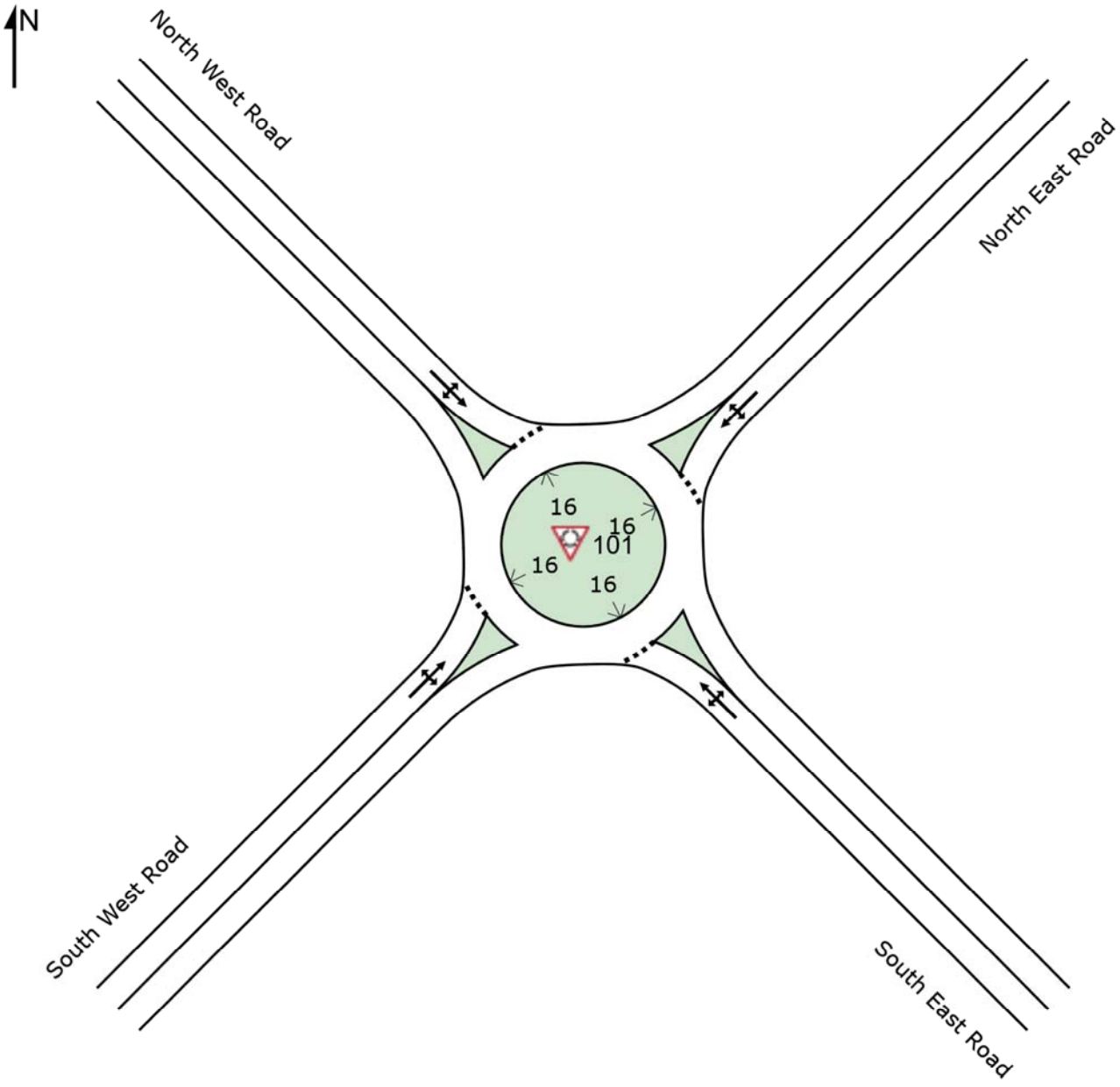
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	3	0.0	0.027	3.0	LOS A	0.1	1.0	0.33	0.59	0.33	43.7
2	T1	3	0.0	0.027	3.5	LOS A	0.1	1.0	0.33	0.59	0.33	31.1
3	R2	25	0.0	0.027	7.2	LOS A	0.1	1.0	0.33	0.59	0.33	35.0
Approach		32	0.0	0.027	6.4	LOS A	0.1	1.0	0.33	0.59	0.33	35.8
NorthEast: North East Road												
4	L2	21	0.0	0.109	4.1	LOS A	0.6	4.5	0.12	0.43	0.12	38.5
5	T1	137	0.0	0.109	4.4	LOS A	0.6	4.5	0.12	0.43	0.12	50.5
6	R2	1	0.0	0.109	8.5	LOS A	0.6	4.5	0.12	0.43	0.12	38.5
Approach		159	0.0	0.109	4.4	LOS A	0.6	4.5	0.12	0.43	0.12	49.5
NorthWest: North West Road												
7	L2	1	0.0	0.018	3.8	LOS A	0.1	0.6	0.31	0.58	0.31	36.6
8	T1	3	0.0	0.018	4.2	LOS A	0.1	0.6	0.31	0.58	0.31	29.4
9	R2	17	0.0	0.018	8.2	LOS A	0.1	0.6	0.31	0.58	0.31	44.5
Approach		21	0.0	0.018	7.4	LOS A	0.1	0.6	0.31	0.58	0.31	42.8
SouthWest: South West Road												
10	L2	7	0.0	0.088	4.2	LOS A	0.5	3.5	0.14	0.42	0.14	43.1
11	T1	114	0.0	0.088	4.5	LOS A	0.5	3.5	0.14	0.42	0.14	50.2
12	R2	2	0.0	0.088	8.6	LOS A	0.5	3.5	0.14	0.42	0.14	44.1
Approach		123	0.0	0.088	4.5	LOS A	0.5	3.5	0.14	0.42	0.14	49.7
All Vehicles		335	0.0	0.109	4.8	LOS A	0.6	4.5	0.16	0.45	0.16	48.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21804_2041_AAST_PM]

Node: 21804
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21804_2041_AAST_PM]

Node: 21804
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

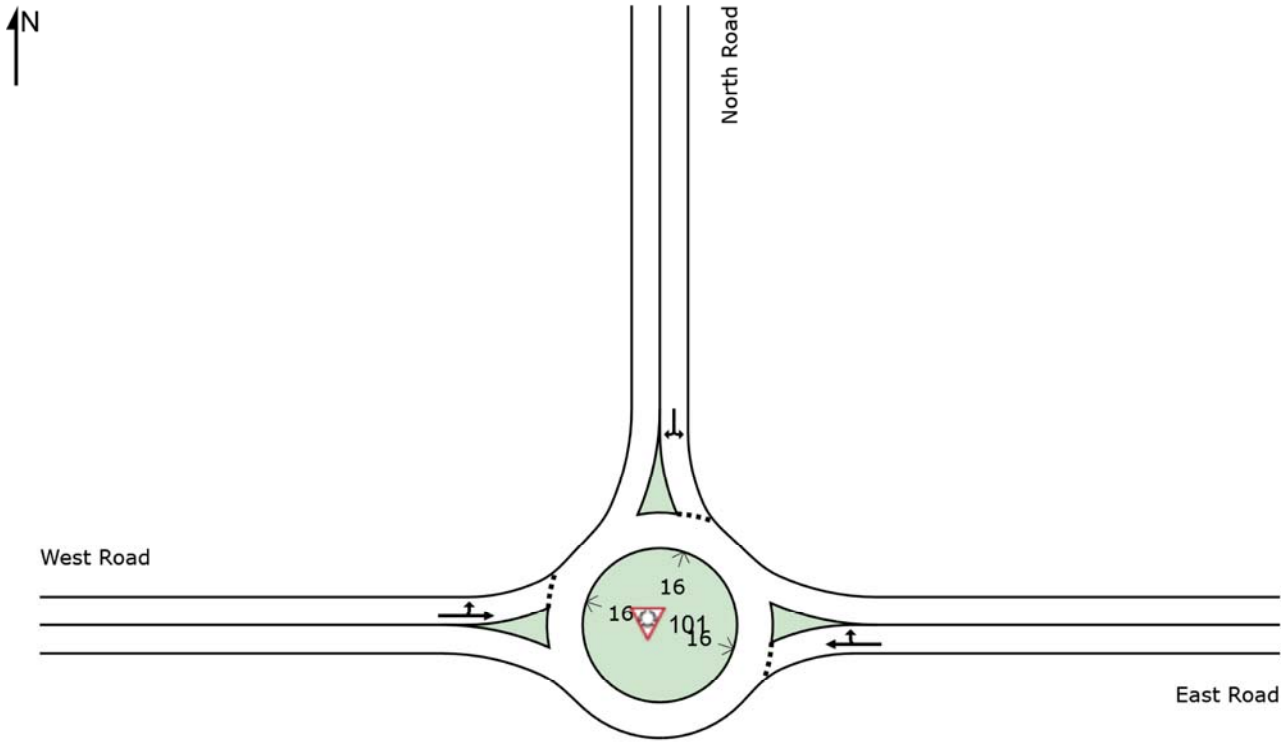
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
1	L2	2	0.0	0.025	2.9	LOS A	0.1	0.9	0.31	0.59	0.31	43.6
2	T1	3	0.0	0.025	3.4	LOS A	0.1	0.9	0.31	0.59	0.31	31.1
3	R2	24	0.0	0.025	7.1	LOS A	0.1	0.9	0.31	0.59	0.31	35.0
Approach		29	0.0	0.025	6.4	LOS A	0.1	0.9	0.31	0.59	0.31	35.5
NorthEast: North East Road												
4	L2	32	0.0	0.109	4.1	LOS A	0.6	4.5	0.10	0.43	0.10	38.8
5	T1	132	0.0	0.109	4.4	LOS A	0.6	4.5	0.10	0.43	0.10	50.8
6	R2	1	0.0	0.109	8.5	LOS A	0.6	4.5	0.10	0.43	0.10	38.7
Approach		164	0.0	0.109	4.4	LOS A	0.6	4.5	0.10	0.43	0.10	49.2
NorthWest: North West Road												
7	L2	1	0.0	0.012	3.9	LOS A	0.1	0.4	0.34	0.57	0.34	37.1
8	T1	3	0.0	0.012	4.3	LOS A	0.1	0.4	0.34	0.57	0.34	29.8
9	R2	9	0.0	0.012	8.3	LOS A	0.1	0.4	0.34	0.57	0.34	45.0
Approach		14	0.0	0.012	7.0	LOS A	0.1	0.4	0.34	0.57	0.34	42.2
SouthWest: South West Road												
10	L2	12	0.0	0.105	4.2	LOS A	0.6	4.3	0.14	0.43	0.14	43.1
11	T1	136	0.0	0.105	4.4	LOS A	0.6	4.3	0.14	0.43	0.14	50.2
12	R2	3	0.0	0.105	8.6	LOS A	0.6	4.3	0.14	0.43	0.14	44.1
Approach		151	0.0	0.105	4.5	LOS A	0.6	4.3	0.14	0.43	0.14	49.6
All Vehicles		358	0.0	0.109	4.7	LOS A	0.6	4.5	0.14	0.45	0.14	48.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21807_2041_AAST_AM]

Node: 21807
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Organisation: BITZIOS CONSULTING | Created: Monday, 13 July 2020 2:55:39 PM
Project: P:\P4627 Moss Vale Road North URA Traffic Study\Technical Work\Models\Phase B - URA Intersection Modelling\P4627 URA Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21807_2041_AAST_AM]

Node: 21807
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: East Road												
2	T1	159	0.0	0.103	4.3	LOS A	0.6	4.2	0.07	0.43	0.07	41.1
3	R2	3	0.0	0.103	8.5	LOS A	0.6	4.2	0.07	0.43	0.07	37.5
Approach		162	0.0	0.103	4.4	LOS A	0.6	4.2	0.07	0.43	0.07	41.0
North: North Road												
4	L2	6	0.0	0.012	4.1	LOS A	0.1	0.4	0.27	0.56	0.27	35.9
6	R2	8	0.0	0.012	8.5	LOS A	0.1	0.4	0.27	0.56	0.27	33.6
Approach		15	0.0	0.012	6.6	LOS A	0.1	0.4	0.27	0.56	0.27	34.6
West: West Road												
7	L2	9	0.0	0.075	4.1	LOS A	0.4	2.8	0.03	0.43	0.03	39.3
8	T1	114	0.0	0.075	4.3	LOS A	0.4	2.8	0.03	0.43	0.03	41.6
Approach		123	0.0	0.075	4.3	LOS A	0.4	2.8	0.03	0.43	0.03	41.4
All Vehicles		300	0.0	0.103	4.5	LOS A	0.6	4.2	0.06	0.43	0.06	40.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21807_2041_AAST_PM]

Node: 21807
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

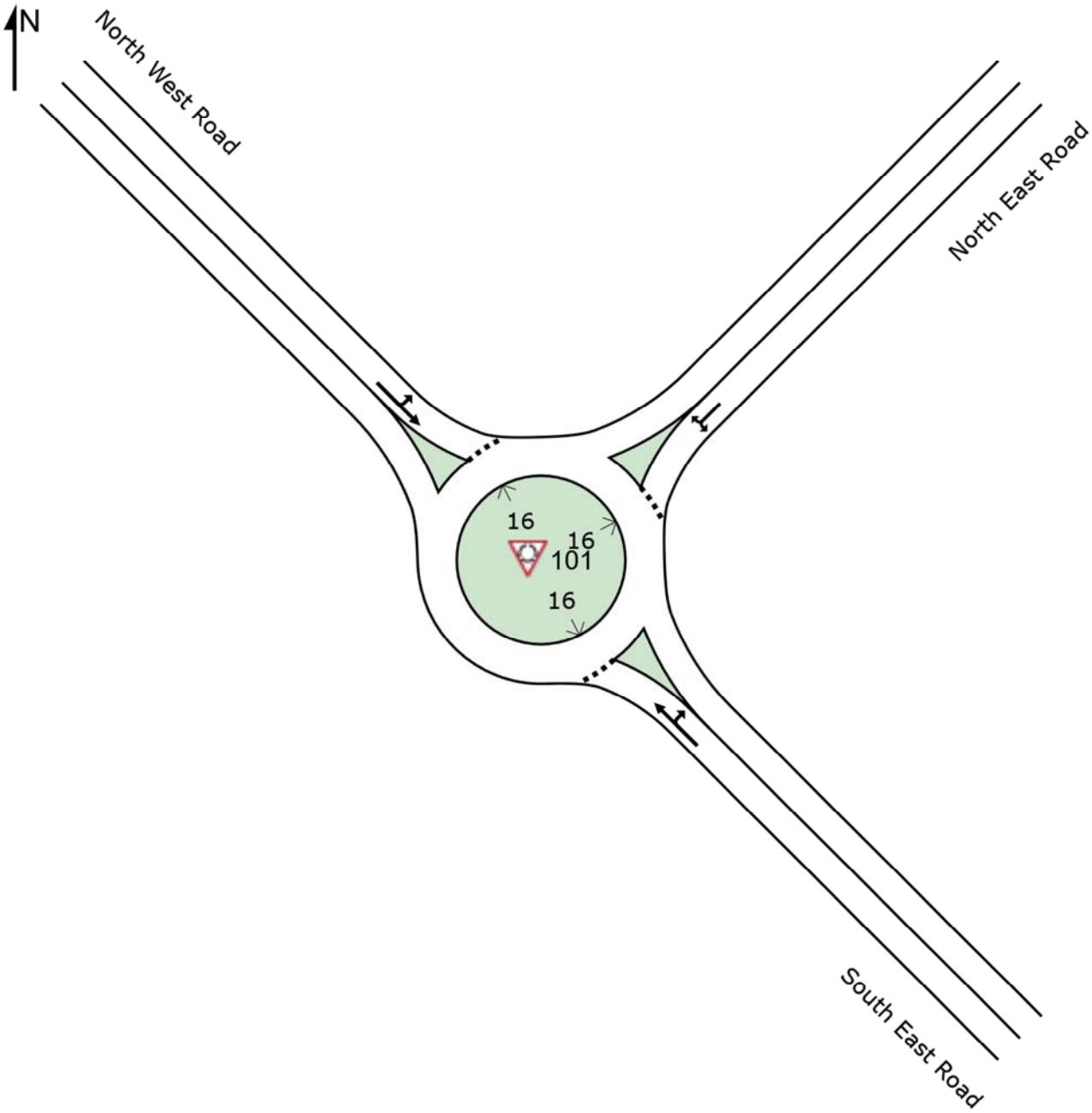
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: East Road												
2	T1	134	0.0	0.087	4.3	LOS A	0.5	3.6	0.06	0.43	0.06	41.1
3	R2	4	0.0	0.087	8.5	LOS A	0.5	3.6	0.06	0.43	0.06	37.5
Approach		138	0.0	0.087	4.5	LOS A	0.5	3.6	0.06	0.43	0.06	41.0
North: North Road												
4	L2	6	0.0	0.011	4.3	LOS A	0.1	0.4	0.31	0.55	0.31	36.1
6	R2	6	0.0	0.011	8.7	LOS A	0.1	0.4	0.31	0.55	0.31	33.8
Approach		13	0.0	0.011	6.5	LOS A	0.1	0.4	0.31	0.55	0.31	34.9
West: West Road												
7	L2	14	0.0	0.098	4.1	LOS A	0.5	3.7	0.04	0.43	0.04	39.3
8	T1	145	0.0	0.098	4.3	LOS A	0.5	3.7	0.04	0.43	0.04	41.5
Approach		159	0.0	0.098	4.3	LOS A	0.5	3.7	0.04	0.43	0.04	41.3
All Vehicles		309	0.0	0.098	4.5	LOS A	0.5	3.7	0.06	0.44	0.06	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21825_2041_AAST_AM]

Node: 21825
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



Intersection Modelling_AAST_2041.sip8

MOVEMENT SUMMARY

Site: 101 [21825_2041_AAST_AM]

Node: 21825
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
2	T1	62	0.0	0.049	3.6	LOS A	0.3	2.0	0.02	0.50	0.02	46.5
3	R2	20	0.0	0.049	7.6	LOS A	0.3	2.0	0.02	0.50	0.02	34.4
Approach		82	0.0	0.049	4.6	LOS A	0.3	2.0	0.02	0.50	0.02	43.9
NorthEast: North East Road												
4	L2	118	0.0	0.105	3.9	LOS A	0.6	4.0	0.38	0.52	0.38	35.2
6	R2	1	0.0	0.105	8.1	LOS A	0.6	4.0	0.38	0.52	0.38	46.2
Approach		119	0.0	0.105	3.9	LOS A	0.6	4.0	0.38	0.52	0.38	35.3
NorthWest: North West Road												
7	L2	3	0.0	0.126	4.1	LOS A	0.7	4.9	0.11	0.42	0.11	40.9
8	T1	185	0.0	0.126	4.4	LOS A	0.7	4.9	0.11	0.42	0.11	42.2
Approach		188	0.0	0.126	4.4	LOS A	0.7	4.9	0.11	0.42	0.11	42.2
All Vehicles		389	0.0	0.126	4.3	LOS A	0.7	4.9	0.17	0.47	0.17	41.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21825_2041_AAST_PM]

Node: 21825
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

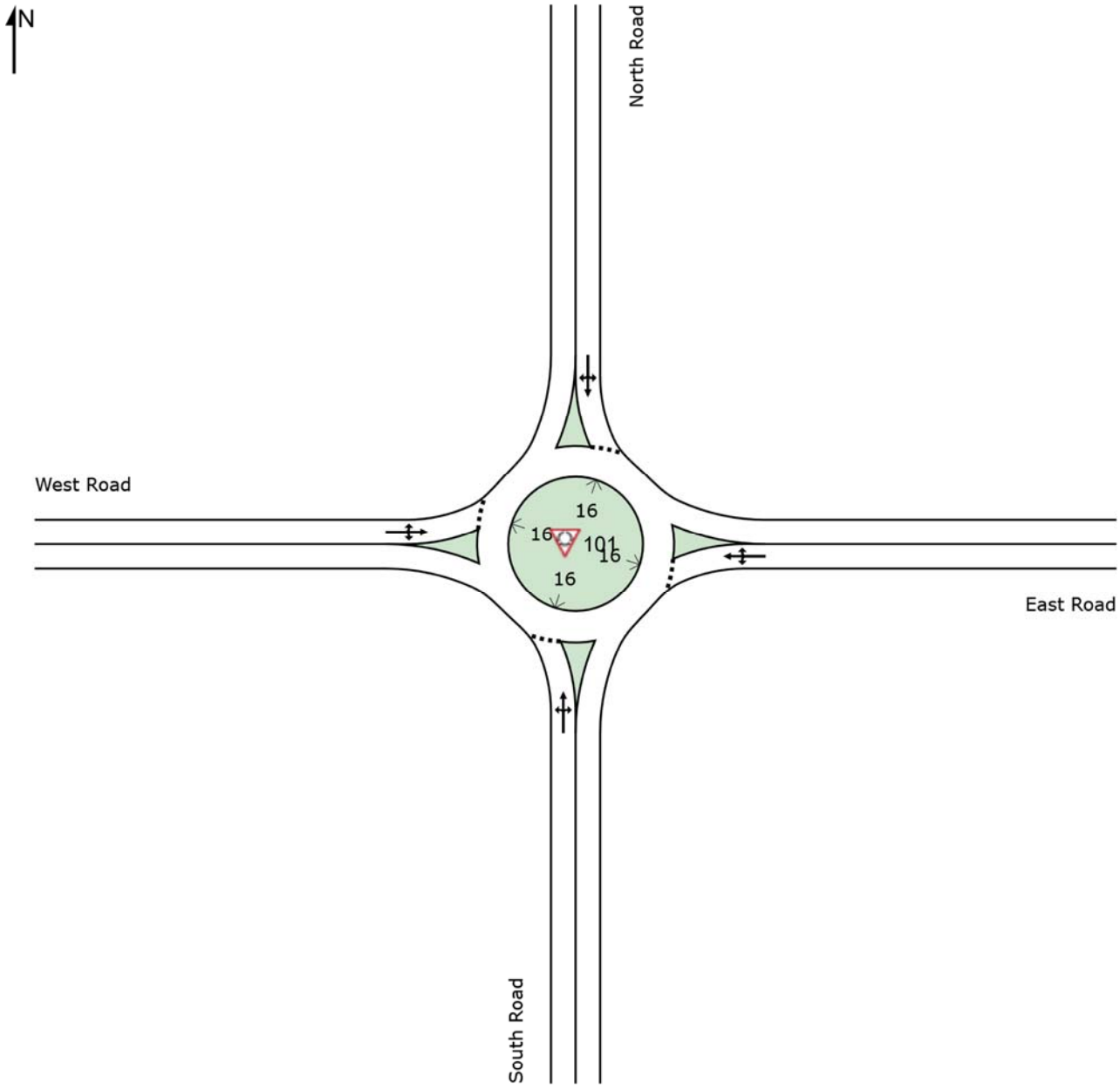
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: South East Road												
2	T1	131	0.0	0.099	3.6	LOS A	0.6	4.1	0.02	0.50	0.02	46.6
3	R2	39	0.0	0.099	7.6	LOS A	0.6	4.1	0.02	0.50	0.02	34.5
Approach		169	0.0	0.099	4.5	LOS A	0.6	4.1	0.02	0.50	0.02	44.2
NorthEast: North East Road												
4	L2	57	0.0	0.047	3.2	LOS A	0.2	1.7	0.25	0.47	0.25	36.1
6	R2	1	0.0	0.047	7.5	LOS A	0.2	1.7	0.25	0.47	0.25	47.2
Approach		58	0.0	0.047	3.3	LOS A	0.2	1.7	0.25	0.47	0.25	36.3
NorthWest: North West Road												
7	L2	2	0.0	0.066	4.2	LOS A	0.3	2.4	0.15	0.42	0.15	40.3
8	T1	86	0.0	0.066	4.5	LOS A	0.3	2.4	0.15	0.42	0.15	41.7
Approach		88	0.0	0.066	4.5	LOS A	0.3	2.4	0.15	0.42	0.15	41.7
All Vehicles		316	0.0	0.099	4.3	LOS A	0.6	4.1	0.10	0.47	0.10	42.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21886_2041_AAST_AM]

Node: 21886
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21886_2041_AAST_AM]

Node: 21886
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	1	0.0	0.015	3.5	LOS A	0.1	0.6	0.03	0.44	0.03	39.0
2	T1	21	0.0	0.015	3.8	LOS A	0.1	0.6	0.03	0.44	0.03	37.6
3	R2	1	0.0	0.015	8.0	LOS A	0.1	0.6	0.03	0.44	0.03	35.8
Approach		23	0.0	0.015	4.0	LOS A	0.1	0.6	0.03	0.44	0.03	37.6
East: East Road												
4	L2	8	0.0	0.009	3.3	LOS A	0.0	0.3	0.26	0.47	0.26	36.1
5	T1	1	0.0	0.009	3.7	LOS A	0.0	0.3	0.26	0.47	0.26	37.7
6	R2	1	0.0	0.009	7.6	LOS A	0.0	0.3	0.26	0.47	0.26	32.0
Approach		11	0.0	0.009	3.8	LOS A	0.0	0.3	0.26	0.47	0.26	35.9
North: North Road												
7	L2	1	0.0	0.064	2.5	LOS A	0.3	2.4	0.03	0.41	0.03	37.0
8	T1	102	0.0	0.064	2.9	LOS A	0.3	2.4	0.03	0.41	0.03	40.1
9	R2	1	0.0	0.064	6.7	LOS A	0.3	2.4	0.03	0.41	0.03	37.6
Approach		104	0.0	0.064	3.0	LOS A	0.3	2.4	0.03	0.41	0.03	40.0
West: West Road												
10	L2	1	0.0	0.002	3.8	LOS A	0.0	0.1	0.11	0.52	0.11	33.7
11	T1	1	0.0	0.002	4.1	LOS A	0.0	0.1	0.11	0.52	0.11	35.0
12	R2	1	0.0	0.002	8.3	LOS A	0.0	0.1	0.11	0.52	0.11	34.6
Approach		3	0.0	0.002	5.4	LOS A	0.0	0.1	0.11	0.52	0.11	34.5
All Vehicles		141	0.0	0.064	3.3	LOS A	0.3	2.4	0.05	0.42	0.05	39.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21886_2041_AAST_PM]

Node: 21886
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

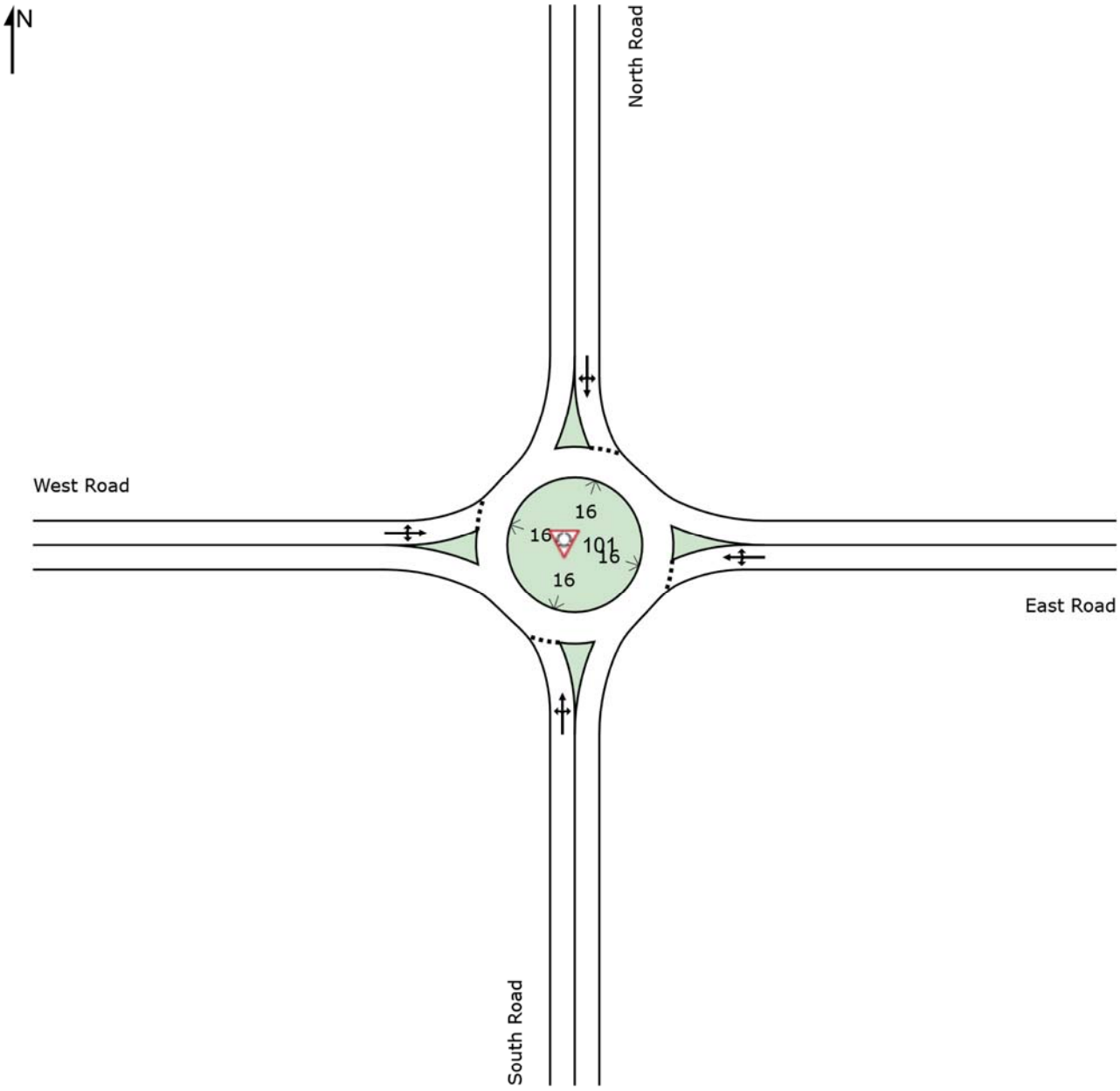
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	1	0.0	0.024	3.5	LOS A	0.1	0.9	0.03	0.43	0.03	39.2
2	T1	35	0.0	0.024	3.8	LOS A	0.1	0.9	0.03	0.43	0.03	37.8
3	R2	1	0.0	0.024	8.0	LOS A	0.1	0.9	0.03	0.43	0.03	36.0
Approach		37	0.0	0.024	3.9	LOS A	0.1	0.9	0.03	0.43	0.03	37.8
East: East Road												
4	L2	12	0.0	0.011	3.0	LOS A	0.1	0.4	0.18	0.47	0.18	36.9
5	T1	1	0.0	0.011	3.4	LOS A	0.1	0.4	0.18	0.47	0.18	38.6
6	R2	1	0.0	0.011	7.3	LOS A	0.1	0.4	0.18	0.47	0.18	32.8
Approach		14	0.0	0.011	3.4	LOS A	0.1	0.4	0.18	0.47	0.18	36.7
North: North Road												
7	L2	1	0.0	0.033	2.5	LOS A	0.2	1.2	0.03	0.41	0.03	36.9
8	T1	49	0.0	0.033	2.9	LOS A	0.2	1.2	0.03	0.41	0.03	40.0
9	R2	1	0.0	0.033	6.7	LOS A	0.2	1.2	0.03	0.41	0.03	37.5
Approach		52	0.0	0.033	3.0	LOS A	0.2	1.2	0.03	0.41	0.03	39.8
West: West Road												
10	L2	1	0.0	0.002	3.9	LOS A	0.0	0.1	0.14	0.51	0.14	33.4
11	T1	1	0.0	0.002	4.1	LOS A	0.0	0.1	0.14	0.51	0.14	34.7
12	R2	1	0.0	0.002	8.3	LOS A	0.0	0.1	0.14	0.51	0.14	34.4
Approach		3	0.0	0.002	5.4	LOS A	0.0	0.1	0.14	0.51	0.14	34.2
All Vehicles		105	0.0	0.033	3.4	LOS A	0.2	1.2	0.05	0.43	0.05	38.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21887_2041_AAST_AM]

Node: 21887
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21887_2041_AAST_AM]

Node: 21887
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	7	0.0	0.017	2.1	LOS A	0.1	0.6	0.06	0.42	0.06	36.4
2	T1	16	0.0	0.017	2.6	LOS A	0.1	0.6	0.06	0.42	0.06	40.0
3	R2	1	0.0	0.017	6.3	LOS A	0.1	0.6	0.06	0.42	0.06	34.0
Approach		24	0.0	0.017	2.6	LOS A	0.1	0.6	0.06	0.42	0.06	38.7
East: East Road												
4	L2	1	0.0	0.004	3.3	LOS A	0.0	0.2	0.28	0.46	0.28	31.5
5	T1	3	0.0	0.004	3.7	LOS A	0.0	0.2	0.28	0.46	0.28	34.5
6	R2	1	0.0	0.004	7.5	LOS A	0.0	0.2	0.28	0.46	0.28	34.2
Approach		5	0.0	0.004	4.4	LOS A	0.0	0.2	0.28	0.46	0.28	33.9
North: North Road												
7	L2	2	0.0	0.078	3.8	LOS A	0.4	2.9	0.09	0.42	0.09	36.6
8	T1	111	0.0	0.078	4.0	LOS A	0.4	2.9	0.09	0.42	0.09	36.5
9	R2	3	0.0	0.078	8.2	LOS A	0.4	2.9	0.09	0.42	0.09	35.8
Approach		116	0.0	0.078	4.1	LOS A	0.4	2.9	0.09	0.42	0.09	36.5
West: West Road												
10	L2	3	0.0	0.013	3.0	LOS A	0.1	0.4	0.10	0.55	0.10	35.1
11	T1	5	0.0	0.013	3.4	LOS A	0.1	0.4	0.10	0.55	0.10	33.5
12	R2	8	0.0	0.013	7.3	LOS A	0.1	0.4	0.10	0.55	0.10	30.3
Approach		17	0.0	0.013	5.3	LOS A	0.1	0.4	0.10	0.55	0.10	32.3
All Vehicles		162	0.0	0.078	4.0	LOS A	0.4	2.9	0.09	0.44	0.09	36.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21887_2041_AAST_PM]

Node: 21887
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

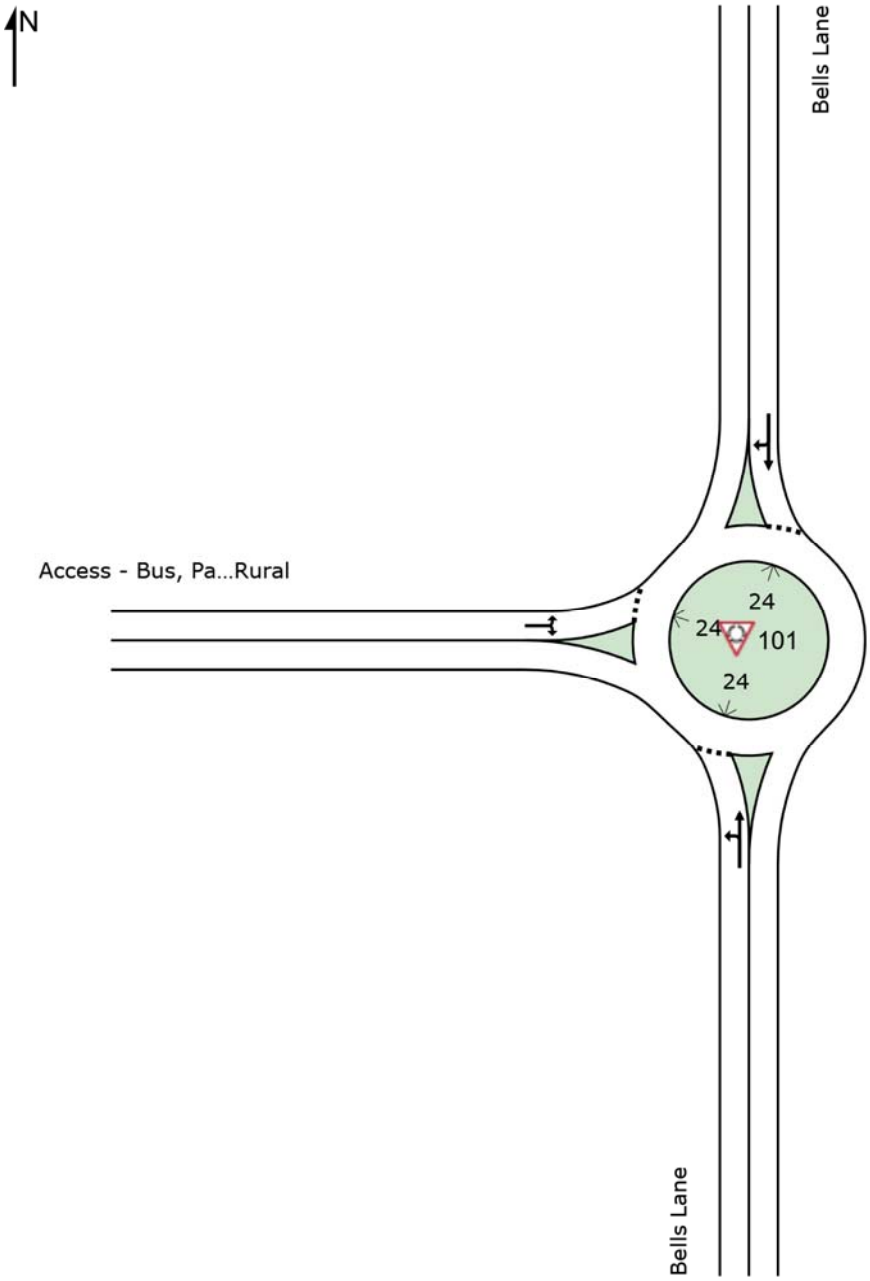
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: South Road												
1	L2	9	0.0	0.030	2.1	LOS A	0.2	1.1	0.06	0.41	0.06	36.6
2	T1	34	0.0	0.030	2.6	LOS A	0.2	1.1	0.06	0.41	0.06	40.2
3	R2	1	0.0	0.030	6.3	LOS A	0.2	1.1	0.06	0.41	0.06	34.3
Approach		44	0.0	0.030	2.6	LOS A	0.2	1.1	0.06	0.41	0.06	39.3
East: East Road												
4	L2	1	0.0	0.004	3.0	LOS A	0.0	0.1	0.19	0.46	0.19	32.3
5	T1	3	0.0	0.004	3.4	LOS A	0.0	0.1	0.19	0.46	0.19	35.3
6	R2	1	0.0	0.004	7.2	LOS A	0.0	0.1	0.19	0.46	0.19	34.9
Approach		5	0.0	0.004	4.1	LOS A	0.0	0.1	0.19	0.46	0.19	34.7
North: North Road												
7	L2	1	0.0	0.039	3.7	LOS A	0.2	1.4	0.08	0.43	0.08	36.5
8	T1	52	0.0	0.039	4.0	LOS A	0.2	1.4	0.08	0.43	0.08	36.3
9	R2	3	0.0	0.039	8.2	LOS A	0.2	1.4	0.08	0.43	0.08	35.7
Approach		56	0.0	0.039	4.2	LOS A	0.2	1.4	0.08	0.43	0.08	36.3
West: West Road												
10	L2	3	0.0	0.011	3.1	LOS A	0.1	0.4	0.14	0.51	0.14	35.7
11	T1	6	0.0	0.011	3.5	LOS A	0.1	0.4	0.14	0.51	0.14	34.1
12	R2	5	0.0	0.011	7.4	LOS A	0.1	0.4	0.14	0.51	0.14	30.8
Approach		15	0.0	0.011	4.8	LOS A	0.1	0.4	0.14	0.51	0.14	33.4
All Vehicles		120	0.0	0.039	3.7	LOS A	0.2	1.4	0.08	0.43	0.08	36.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [21899_2041_AAST_AM]

Node: 21899
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [21899_2041_AAST_AM]

Node: 21899
2041 AAST
AM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
4	L2	172	0.0	0.318	3.9	LOS A	2.4	16.8	0.24	0.40	0.24	32.9
5	T1	305	0.0	0.318	4.1	LOS A	2.4	16.8	0.24	0.40	0.24	50.8
Approach		477	0.0	0.318	4.1	LOS A	2.4	16.8	0.24	0.40	0.24	44.2
North: Bells Lane												
11	T1	778	0.0	0.578	4.7	LOS A	6.1	42.8	0.47	0.45	0.47	47.7
12	R2	52	0.0	0.578	9.7	LOS A	6.1	42.8	0.47	0.45	0.47	38.7
Approach		829	0.0	0.578	5.0	LOS A	6.1	42.8	0.47	0.45	0.47	47.1
West: Access - Bus, Park & Rural												
1	L2	22	0.0	0.107	4.7	LOS A	0.6	4.3	0.49	0.65	0.49	40.1
3	R2	95	0.0	0.107	10.0	LOS A	0.6	4.3	0.49	0.65	0.49	35.0
Approach		117	0.0	0.107	9.0	LOS A	0.6	4.3	0.49	0.65	0.49	36.0
All Vehicles		1423	0.0	0.578	5.0	LOS A	6.1	42.8	0.39	0.45	0.39	45.3

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [21899_2041_AAST_PM]

Node: 21899
2041 AAST
PM Peak Period
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Bells Lane												
4	L2	87	0.0	0.387	3.8	LOS A	3.3	23.3	0.15	0.37	0.15	33.7
5	T1	548	0.0	0.387	3.9	LOS A	3.3	23.3	0.15	0.37	0.15	51.8
Approach		636	0.0	0.387	3.9	LOS A	3.3	23.3	0.15	0.37	0.15	49.2
North: Bells Lane												
11	T1	392	0.0	0.331	4.9	LOS A	2.5	17.7	0.48	0.50	0.48	47.7
12	R2	19	0.0	0.331	10.0	LOS A	2.5	17.7	0.48	0.50	0.48	38.6
Approach		411	0.0	0.331	5.1	LOS A	2.5	17.7	0.48	0.50	0.48	47.2
West: Access - Bus, Park & Rural												
1	L2	48	0.0	0.241	6.7	LOS A	1.5	10.6	0.67	0.76	0.67	38.0
3	R2	169	0.0	0.241	11.9	LOS A	1.5	10.6	0.67	0.76	0.67	32.9
Approach		218	0.0	0.241	10.7	LOS A	1.5	10.6	0.67	0.76	0.67	34.2
All Vehicles		1264	0.0	0.387	5.5	LOS A	3.3	23.3	0.35	0.48	0.35	45.8

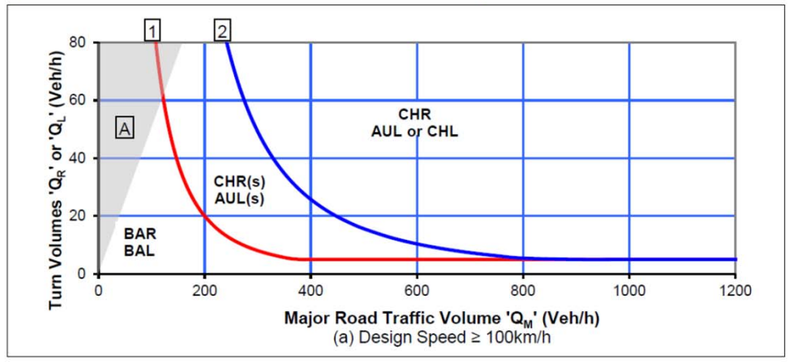
Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

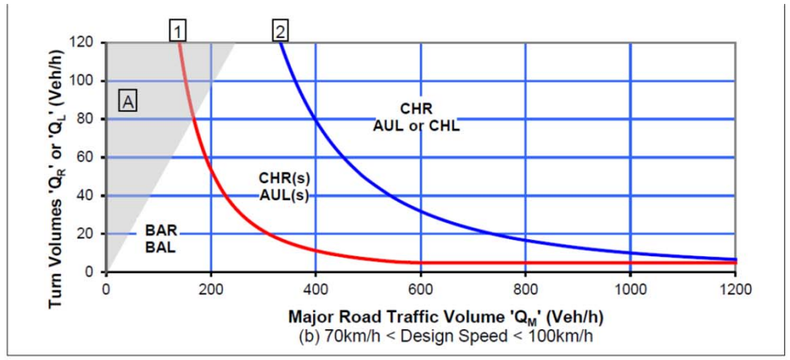
Appendix C: Turn Warrants Assessment

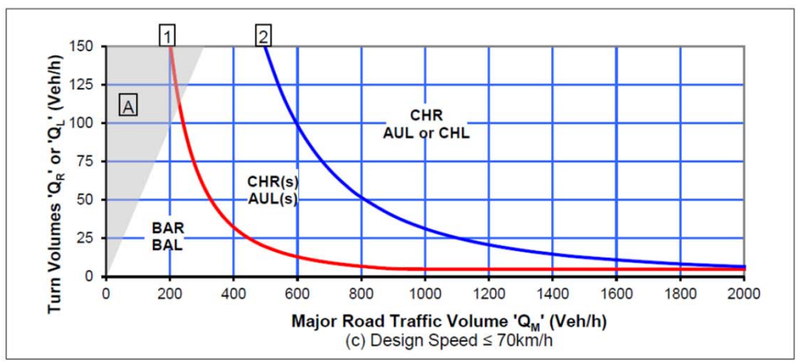
Notes:

Turn Warrants Assessment undertaken in accordance with Austroads Guide to Traffic Management Part 6 Intersections Interchanges and Crossings Management (2020).
All intersections assessed as two-lane two-way road types (AGTM Part 6 Figure 3.26).
Right turn types assessed without splitter island (AGTM Part 6 Figure 3.26).
Major road assessed as (c) Design Speed ≤ 70km/h.
Turn movement volumes extracted from 2041 AAST AM & PM TRACKS Models (May 2020 version).

Figure 3.25: Warrants for turn treatments on major roads at unsignalised intersections







Note: the minimum right-turn treatment for multilane roads is a CHR(s).

Source: TMR (2016a).

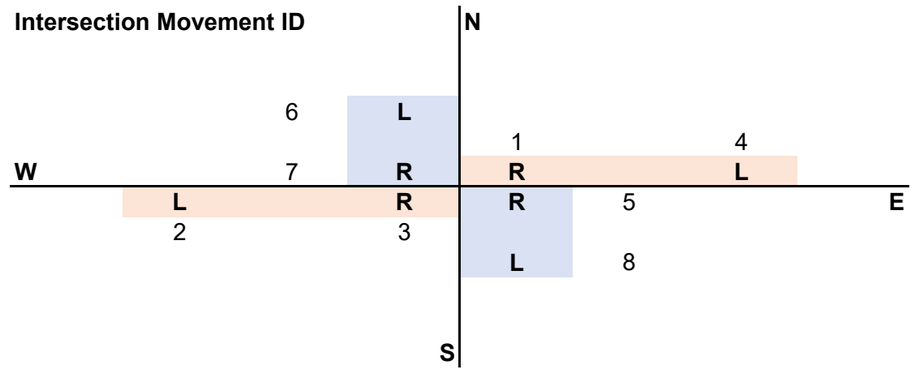
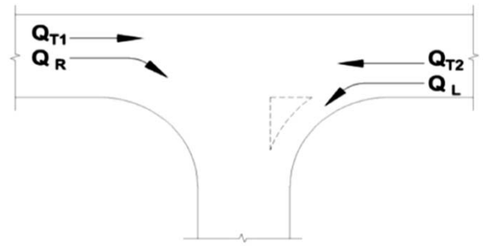


Figure 3.26: Calculation of the major road traffic volume Q_M



Road type	Turn type	Splitter island	Q_M (veh/h)
Two-lane two-way	Right	No	= Q_{T1} + Q_{T2} + Q_L
		Yes	= Q_{T1} + Q_{T2}
	Left	Yes or no	= Q_{T2}
Four-lane two-way	Right	No	= 50% x Q_{T1} + Q_{T2} + Q_L
		Yes	= 50% x Q_{T1} + Q_{T2}
	Left	Yes or no	= 50% x Q_{T2}
Six-lane two-way	Right	No	= 33% x Q_{T1} + Q_{T2} + Q_L
		Yes	= 33% x Q_{T1} + Q_{T2}
	Left	Yes or no	= 33% x Q_{T2}

Source: TMR (2016a).

Major Road	Intersection Node	Intersection ID	2041 AM AAST Volumes												Turn Warrants Inputs											
			North Approach			East Approach			South Approach			West Approach			Movement 1		Movement 2		Movement 3		Movement 4		Movement 5		Movement 6		Movement 7		Movement 8	
			L	T	R	L	T	R	L	T	R	L	T	R	Qm_1	Qr_1	Qm_2	Ql_2	Qm_3	Qr_3	Qm_4	Ql_4	Qm_5	Qr_5	Qm_6	Ql_6	Qm_7	Qr_7	Qm_8	Ql_8
Bells Lane	21751	1		147	11					88					235	11	88	0												
Bells Lane	21872	2		220					4	146					370	0	146	4												
Bells Lane	21871	3		199					11	135					345	0	135	11												
Central Boulevard	21779	4		118						81					199	0	81	0												
Central Boulevard	21709	5		258						128	3								386	3	258	0								
Central Boulevard	21833	6		101					3	44	3				148	0	44	3	145	3	101	0								
West N-S	21734	7		94						43									137	0	94	0								
West N-S	21735	8	1	86						41									128	0	86	1								
West N-S	21736	9	3	47						22	11								72	11	47	3								
West N-S	21737	10	1	50						25									76	0	50	1								
West N-S	21738	11		41						22	5								63	5	41	0								
West N-S	21739	12		41						22									63	0	41	0								
South E-W	21732	13					41	8					102										143	8	102	0				
Abernethy's Lane	21777	14					68						87										155	0	87	0				
Abernethy's Lane	21713	15				3	78						103	3									181	0	103	0				
Abernethy's Lane	21785	16				9	85						113										198	0	113	0				
Abernethy's Lane	21714	17				9	14						14	1													37	1	14	9
Abernethy's Lane	21790	18					1						1	8													2	8	1	0
Central E-W	21721	19				5	141						211														357	0	141	5
Central E-W	21720	20					134						195														329	0	134	0
Central E-W	21719	21					135						195	6													330	6	135	0
Central E-W	21715	22					72	6				1	98										171	6	98	1				
Central E-W	21834	23					85	12				1	84										170	12	84	1				
Central E-W	21823	24					89	1					83	2													172	2	89	0
Central E-W	21746	25					22	1					34										56	1	34	0				
Central E-W	21745	26				2	20						31														53	0	20	2
Central E-W	21851	27					7						6	4									13	0	6	0	13	4	7	0
Central E-W	21742	28					11	1				10	7										28	1	7	10	18	0	11	0
North E-W	21869	29					35						44										79	0	44	0	79	0	35	0
North E-W	21870	30					79						75	1									154	0	75	0				
Pestells Connection	21835	31		142					4	128					274	0	128	4												
Pestells Connection	21813	32					140	9				7	107										254	9	107	7				
Pestells Connection	21808	33					158	2				8	115										281	2	115	8				
Pestells Connection	21826	34					83						297										380	0	297	0				
Pestells Connection	21824	35					59					10	178										247	0	178	10				

Road	Intersection Node	Intersection ID	2041 PM AAST Volumes												Turn Warrants Inputs											
			North Approach			East Approach			South Approach			West Approach			Movement 1		Movement 2		Movement 3		Movement 4		Movement 5		Movement 6		Movement 7		Movement 8	
			L	T	R	L	T	R	L	T	R	L	T	R	Qm_1	Qr_1	Qm_2	Ql_2	Qm_3	Qr_3	Qm_4	Ql_4	Qm_5	Qr_5	Qm_6	Ql_6	Qm_7	Qr_7	Qm_8	Ql_8
Bells Lane	21751	1		165					16	80					261	0	80	16												
Bells Lane	21872	2		152					7	268					427	0	268	7												
Bells Lane	21871	3		139					21	247					407	0	247	21												
Central Boulevard	21779	4		97					1	112					210	0	112	1												
Central Boulevard	21709	5		163						206	6								369	6	163	0								
Central Boulevard	21833	6		55					6	80	4				141	0	80	6	135	4	55	0								
West N-S	21734	7		59						69									128	0	59	0								
West N-S	21735	8	1	55						72									128	0	55	1								
West N-S	21736	9	4	32						40	20								76	20	32	4								
West N-S	21737	10	1	35						43									79	0	35	1								
West N-S	21738	11		31						36	8								67	8	31	0								
West N-S	21739	12		31						36									67	0	31	0								
South E-W	21732	13					68	24					61										129	24	61	0				
Abernethy's Lane	21777	14					68						87										155	0	87	0				
Abernethy's Lane	21713	15				3	90						76	2									166	0	76	0				
Abernethy's Lane	21785	16				8	99						85										184	0	85	0				
Abernethy's Lane	21714	17				7	15						13	1													35	1	15	7
Abernethy's Lane	21790	18					1						1	8													2	8	1	0
Central E-W	21721	19				9	252						182														443	0	252	9
Central E-W	21720	20					230						173														403	0	230	0
Central E-W	21719	21					231						173	7													404	7	231	0
Central E-W	21715	22					101	12				2	88										191	12	88	2				
Central E-W	21834	23					98	21				2	92										192	21	92	2				
Central E-W	21823	24					100	1					92	1													192	1	100	0
Central E-W	21746	25					32	1					24										56	1	24	0				
Central E-W	21745	26				3	29						21														53	0	29	3
Central E-W	21851	27					10						6	7									16	0	6	0	16	7	10	0
Central E-W	21742	28					14	1				13	13										40	1	13	13	27	0	14	0
North E-W	21869	29					49						41										90	0	41	0	90	0	49	0
North E-W	21870	30					139						65	1									204	0	65	0				
Pestells Connection	21835	31		150					7	145					302	0	145	7												
Pestells Connection	21813	32					123	13				12	143										278	13	143	12				
Pestells Connection	21808	33					131	2				11	149										291	2	149	11				
Pestells Connection	21826	34					169						143										312	0	143	0				
Pestells Connection	21824	35					124					12	85										221	0	85	12				