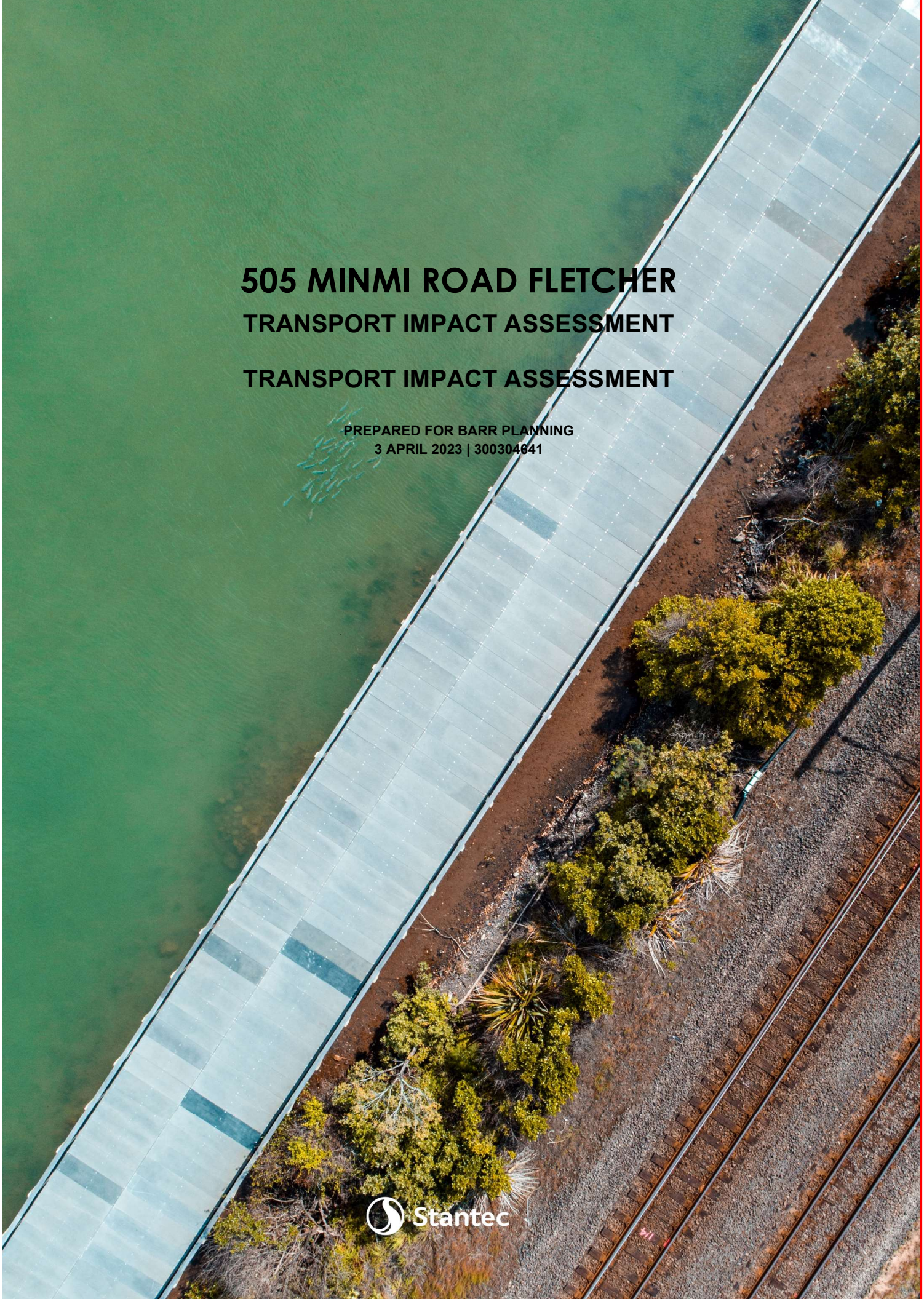

505 MINMI ROAD FLETCHER

TRANSPORT IMPACT ASSESSMENT

TRANSPORT IMPACT ASSESSMENT

PREPARED FOR BARR PLANNING
3 APRIL 2023 | 300304641

Stantec

Revision	Date	Description	Author	Quality Check	Approver
A	03/04/2023	Final	Bernadette Chuan, Bayzid Khan	Bayzid Khan	Rhys Hazell

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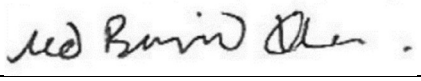
Reviewed by: 

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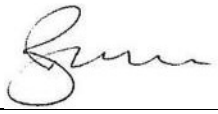
Approved by: 

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Rhys Hazell

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1 Introduction

1.1 Background

A planning proposal is to be lodged with the City of Newcastle (Council) for the rezoning and subdivision of vacant land into 139 residential lots at 505 Minmi Road, Fletcher. The submission seeks to incorporate a mixture of R2 Low Density Residential and E2 Environmental Conservation land uses.

Barr Planning engaged Stantec in March 2023 to complete a Transport Impact Assessment as part of the planning proposal.

1.2 Purpose of this Report

This report sets out an assessment of the anticipated transport implications of the proposed development, including consideration of the following:

- existing traffic conditions surrounding the site
- strategic context at a local and regional level
- the traffic generating characteristics of the proposed development
- suitability of the proposed access arrangements for the site
- the transport impact of the development proposal on the surrounding road network.

1.3 References

In preparing this report, reference has been made to the following:

- Urban Design Study prepared by Moir Landscape Architect (December 2021)
- Traffic surveys completed on 14 March 2023 at key study intersections
- Transport for NSW Guide to Traffic Generating Developments (October 2002)
- Transport for NSW Technical Direction: Updated Traffic Surveys (TDT 2013/ 04a) (August 2013)
- Newcastle Development Control Plan (DCP) 2012
- Newcastle Local Environmental Plan (NLEP) 2012
- other documents and data as referenced in this report.

2 Strategic Context

2.1 Greater Newcastle Metropolitan Plan 2036

In 2018, the first-ever Metropolitan Plan for Greater Newcastle was endorsed, the first for a non-capital city in Australia. As Australia's seventh largest city and global gateway for northern NSW, Greater Newcastle faces a new future with investment in aviation, transport, education, health and tourism.

This Metropolitan Plan for Greater Newcastle, and first for a non-capital city in Australia, aims to capitalise on this investment through a collaborative approach. The Plan sets out strategies and actions that will drive sustainable growth across Cessnock City, Lake Macquarie City, Maitland City, Newcastle City and Port Stephens communities, which together make up Greater Newcastle. The Plan also helps to achieve the vision set in the Hunter Regional Plan 2036 - for the Hunter to be the leading regional economy in Australia with a vibrant new metropolitan city at its heart.

Australia's newest and emerging economic and lifestyle city, connected with northern NSW and acknowledged globally as:

- dynamic and entrepreneurial, with a globally competitive economy and the excitement of the inner city and green suburban communities
- offering great lifestyles minutes from beaches or bushland, the airport or universities, and from the port to the lake
- a national leader in the new economy, with smarter cities and carbon neutral initiatives, and with collaborative governance that makes it a model to others in creating and adapting to change.

The Hunter metropolitan area is shown in Figure 1.

Figure 1: Newcastle metropolitan area

Source: Greater Newcastle Metropolitan Plan 2036

2.2 Hunter Regional Plan 2036

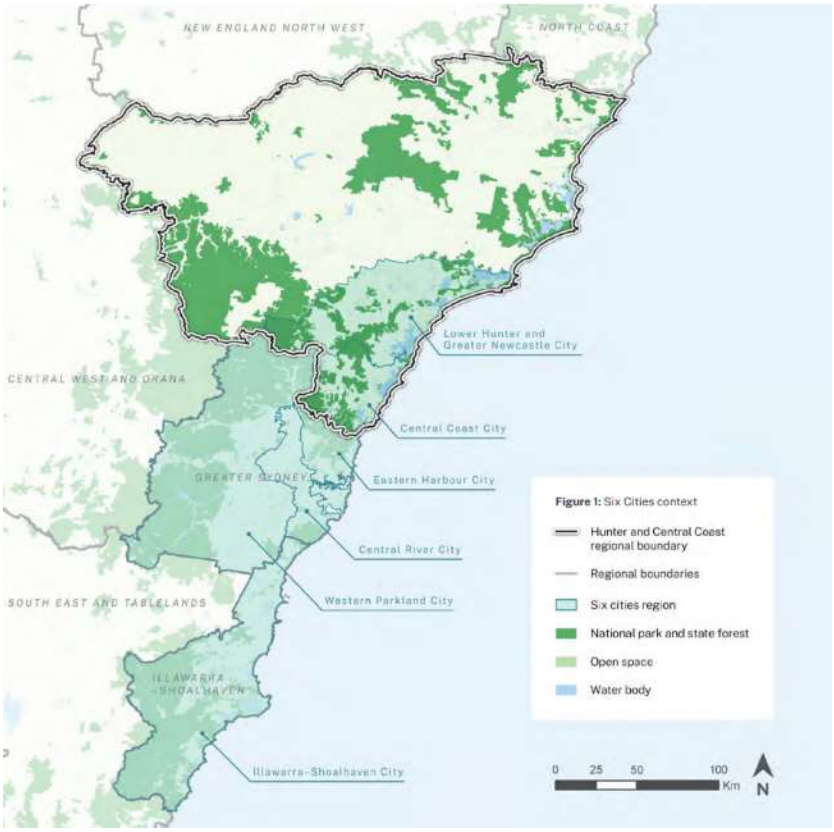
The Hunter Region includes the Local Government Areas (LGAs) of Cessnock, Dungog, Lake Macquarie, Maitland, Mid Coast, Muswellbrook, Newcastle, Port Stephens, Singleton and Upper Hunter.

The Hunter is the leading regional economy in Australia, accommodating 427,000 jobs. It is home to one of Australia's most productive wine regions and a significant equine industry around Scone. The traditional mining, energy, and manufacturing sectors present opportunities to transform to cleaner, renewable energy sources.

The Hunter Region is considered part of the 'Six Cities' Region. This includes Lower Hunter and Greater Newcastle City, Central Coast City, Illawarra-Shoalhaven City and the Sydney regions. It is expected that the Hunter's population will continue to grow to 2041 with more than 100,000 dwellings required across the region. The Six Cities is shown in Figure 2.

The Hunter Regional Plan 2041 recognises the region is changing. It draws on the concepts of logical planning and infrastructure, creating great places and enriching the community over time. The plan focuses on sustainable growth with housing choice and lifestyle opportunities aiming to cement the Hunter as a leading regional economy.

Figure 2: Context of 'six cities'



Source: Hunter Regional Plan 2036

2.3 Newcastle Transport Strategy

The Newcastle Transport Strategy was prepared by a group of Council officers from across the organisation, with roles covering the spectrum of Council's transport operations. Over recent years, Council has prepared a wide range of reports and studies on aspects of transport.

It does not however, have an overarching transport strategy. Development of this strategy has been largely a task of consolidation of information from a wide range of adopted documents and supporting studies, confirming the status and relevancy of those documents, and determining how best to respond to current issues, challenges and community expectations, within the bounds of Council's role and responsibility.

A series of working papers were produced to consolidate background information. The working papers are mode or theme based, covering:

- planning and policy context
- public transport
- walking and cycling

- parking
- roads and freight
- travel demand management.

2.4 Urban Design for Regional NSW 2020

Good urban design has a crucial role to play in regional NSW to ensure quality of life in all regional centres and to help create healthy communities.

The Urban Design Guide for Regional NSW has been prepared specifically for regional NSW and provides guidance for creating healthy built environments. The Guide recognises and celebrates the diversity of urban environments, natural landscapes, climates and communities that exist across the area.

It also acknowledges that the unique conditions are being challenged by external factors such as climate which impacts the communities and natural environment. The Guide plays a role to assist in developing sustainable approaches to mitigate these impacts.

The guide plays an important role in implementing the nine Regional Plans for NSW by responding to actions to prepare regional urban design guidelines for planning, designing and developing healthy built environments.

The preparation of the guide has been a collaboration between the Government Architect NSW and the Department of Planning, Industry, and Environment, and has been informed by a survey of councils in regional NSW issued in late 2017.

3 Existing Conditions

3.1 Subject Site

The subject site has an area of 260,000 square metres and is located at 505 Minmi Road, Fletcher. It has a frontage of approximately 715 metres to Minmi Road along the northern part of the boundary and its current land use classification is C4 Environmental Living.

The proposed site situates approximately 15 kilometres west of the Newcastle CBD and two kilometres away from the Minmi Town Centre. Its surrounding properties predominantly include low density residential and native bushland areas.

The location of the subject site and its surrounding environs is shown in Figure 3,

Figure 3: Subject site and its environs

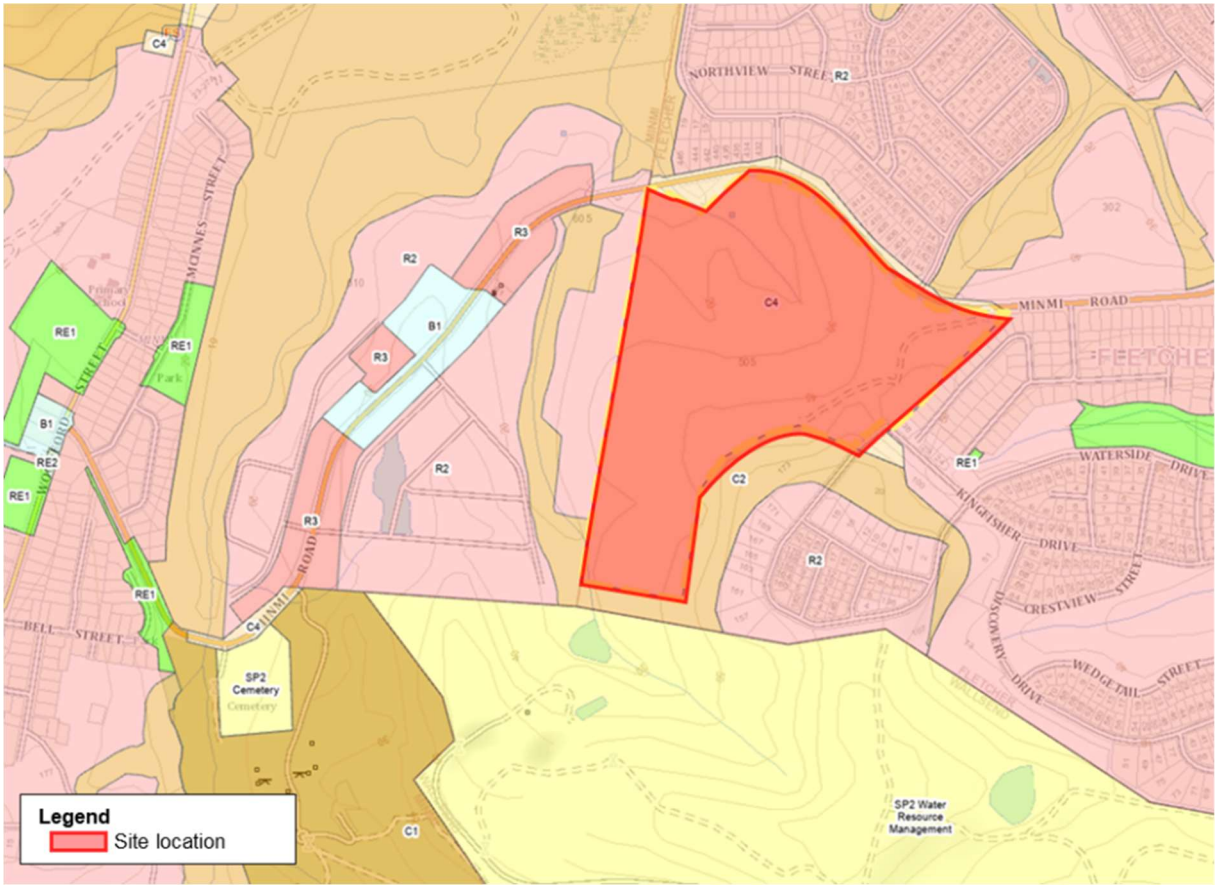
Base image source: Nearmap

3.2 Land Use

The site is currently zoned as E4/C4 – Environmental Living (updated prefix as 'C4-Environmental Living' as per Clause 2.1 Land Use Zones of the Standard Instrument – Principal Local Environmental Plan) in the Newcastle Local Environmental Plan (NLEP) 2012.

The extents of the site in the NSW Planning Viewer are shown in Figure 4 .

Figure 4: Land Zoning Map



3.3 Transport Network

3.3.1 ROAD HIERARCHY

Roads are classified according to the functions they perform. The main purpose of defining a road's functional class is to provide a basis for establishing the policies which guide the management of the road according to their intended service or qualities.

In terms of functional road classification, State roads are strategically important as they form the primary network used for the movement of people and goods between regions, and throughout the State. Transport for NSW (TfNSW) is responsible for funding, prioritising and carrying out works on State roads. State roads generally include roads classified as freeways, state highways, and main roads under the Roads Act 1993, and the regulation to manage the road system is stated in the Australian Road Rules.

TfNSW defines four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- Arterial Roads – Controlled by TfNSW, typically no limit in flow and designed to carry vehicles long distance between regional centres.

- Sub-Arterial Roads – Managed by either Council or TfNSW under a joint agreement. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region or provide connectivity from arterial road routes (regional links).
- Collector Roads – Provide connectivity between local sites and the sub-arterial road network, and typically carry between 2,000 and 10,000 vehicles per day.
- Local Roads – Provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

3.3.2 SURROUNDING ROAD NETWORK

Minmi Road

Minmi Road is a local road configured with one traffic lane in each direction, set within an approximate 15-metre-wide carriageway. Kerbside parking lanes are provided adjacent to residential areas. The currently road has a posted speed limit of 60 kilometres per hour for road segments in proximity of residential areas and 70 kilometres per hour for sections fronting environmental conservation areas.

Minmi Road provides a local road connection between the major arterial roads west of Newcastle and links Minmi with Fletcher and other key local and regional centres further to the east. Minmi Road at Brookfield Street (the western intersection) is shown in Figure 5.

Figure 5: Minmi Road/ Brookfield Avenue (west) (looking east)

Brookfield Avenue

Brookfield Avenue is a two-way road configured with one lane in each direction, set within an 8.5-metre-wide carriageway. It is a local road providing access to residential dwellings on the northern side of Minmi Road adjacent to the northern site boundary. Unrestricted kerbside parking is permitted on both sides of

the road within a 50 kilometre per hour speed environment. Brookfield Avenue (east and west) intersects with Minmi Road at priority-controlled intersections, with channelised right turn bays, as required.

Woodford Street

Woodford Street is a local road aligned in the north-south direction west of the site and travels through Minmi. It is a two-way road configured with one lane in each direction, set within an approximate 12-metre-wide carriageway. Unrestricted kerbside parking is generally permitted on each side of the road, particularly within areas of high pedestrian activity. It has a posted speed limit of 50 kilometres per hour and is shown in Figure 6 and Figure 7 at the signalised intersection with Minmi Road.

Figure 6: Woodford Street (looking north)

Figure 7: Woodford Street (looking south)

Britannia Boulevard

Britannia Boulevard is a local two-way road set within a 10-metre-wide carriageway east of the site. It intersects with Minmi Road at a roundabout controlled intersection, with raised central medians preventing right turns close to Aldi.

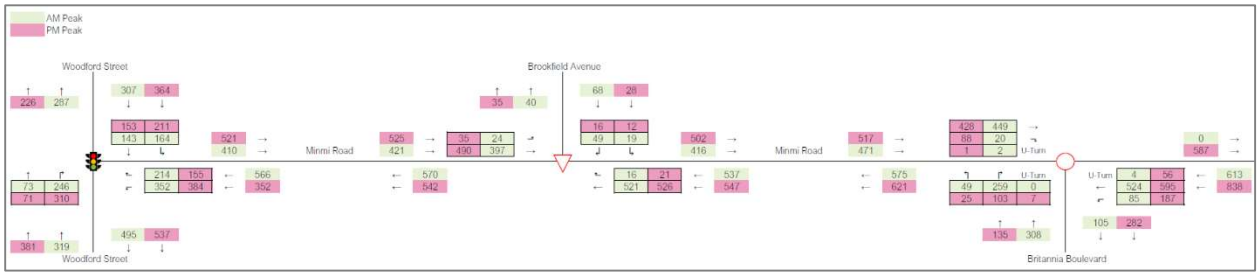
Figure 8: Minmi Road at Britannia Boulevard (looking west)

3.4 Traffic Volumes

Traffic surveys have been completed at the key intersections in the vicinity of the site on 14 March 2023. The surveys covered the peak weekday AM and PM periods between 7:00am and 10:00am, and 4:00pm and 7:00pm.

The AM and PM peak hours were found to occur from 8:45am to 9:45am and 5:30pm to 6:30pm with the existing traffic volumes summarised in Figure 9. The average heavy vehicle percentages for AM and PM peaks on the network are found to be five per cent and two per cent respectively. Full survey results are contained in Appendix A.

Figure 9: Existing AM and PM peak hour traffic volumes



3.5 Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service.

Table 1 shows the criteria that SIDRA adopts in assessing the level of service.

Table 1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Table 2 presents a summary of the existing operation of the intersection, with full results presented in Appendix B of this report.

Table 2: Existing intersection operating conditions

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Minmi Road/ Woodford Street	AM	0.89	29.4	160	LOS C
	PM	0.88	33.1	183	LOS C
Minmi Road/ Brookfield Avenue	AM	0.24	16.1	5	LOS C
	PM	0.29	19.7	-	LOS C
Minmi Road/ Britannia Boulevard	AM	0.50	11.4	26	LOS B
	PM	0.67	12.4	49	LOS B

On the basis of the above assessment, it is clear that all intersections are performing at LOS C or better during both AM and PM peak hours. Queues can at times form on the Minmi Road east approach to the intersection during peak hours mostly as a result of relatively high traffic volumes for this approach and associated existing signal phasing.

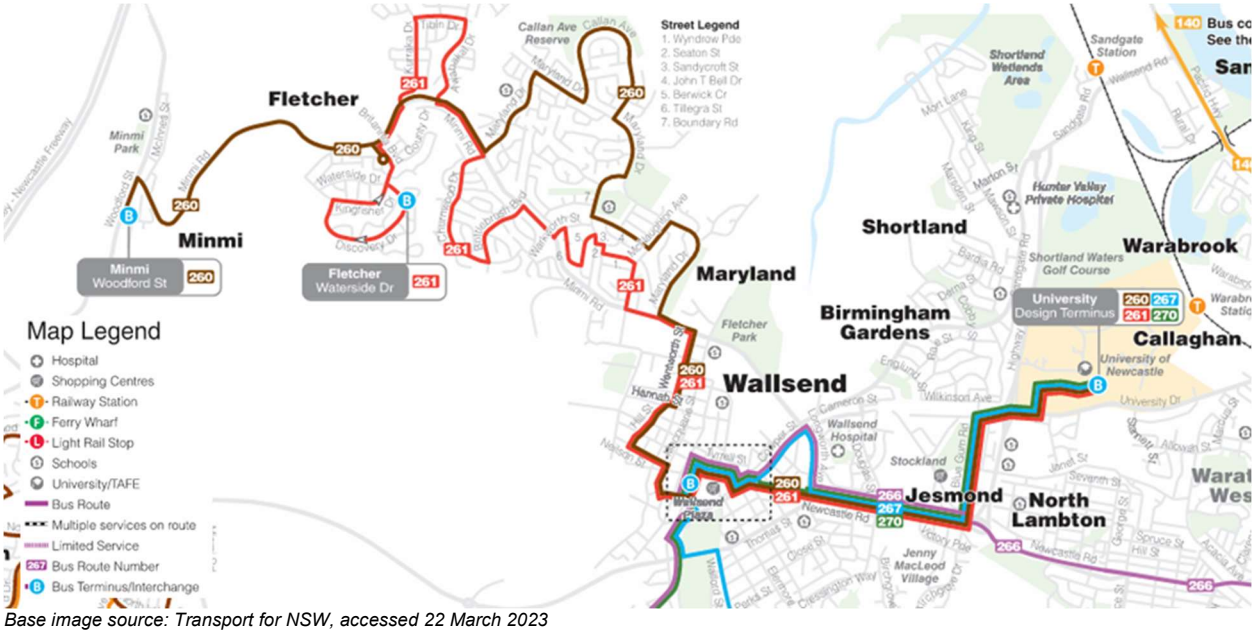
3.6 Public Transport

There are two bus routes currently operating near the site, namely routes 260 and 261. A review of the public transport available near the site is summarised in Table 3 and shown in Figure 10.

Table 3: Public transport provision

Service	Route number	Route description	Location of stop	Distance to nearest stop
Bus	260	Woodford Street, Minmi to University of Newcastle	Minmi Road near	approx. 1 km
Bus	261	Waterside Drive, Fletcher to University of Newcastle	Britannia Boulevard near Scobie Street	approx. 1.3 km

Figure 10: Surrounding public transport network



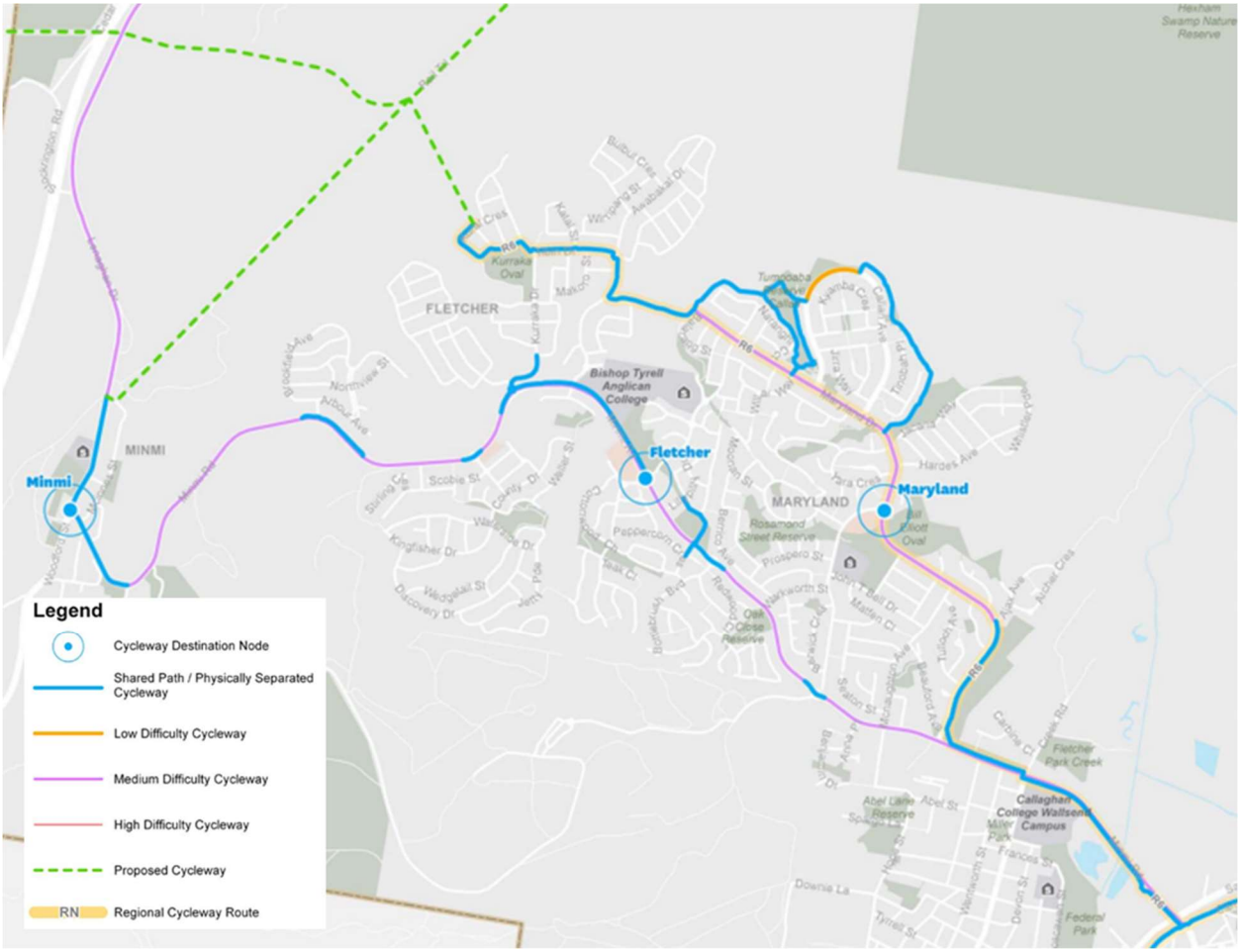
Base image source: Transport for NSW, accessed 22 March 2023

3.7 Walking and Cycling Infrastructure

The site is well serviced by walking and cycling infrastructure. The surrounding area typically includes a range of shared paths throughout Fletcher providing connectivity between regional and suburban areas.

In addition to the existing cycle network, Council has identified and proposed key cycle routes to promote further connectivity within regional areas. The surrounding cycling infrastructure is shown in Figure 11.

Figure 11: Surrounding cycling network

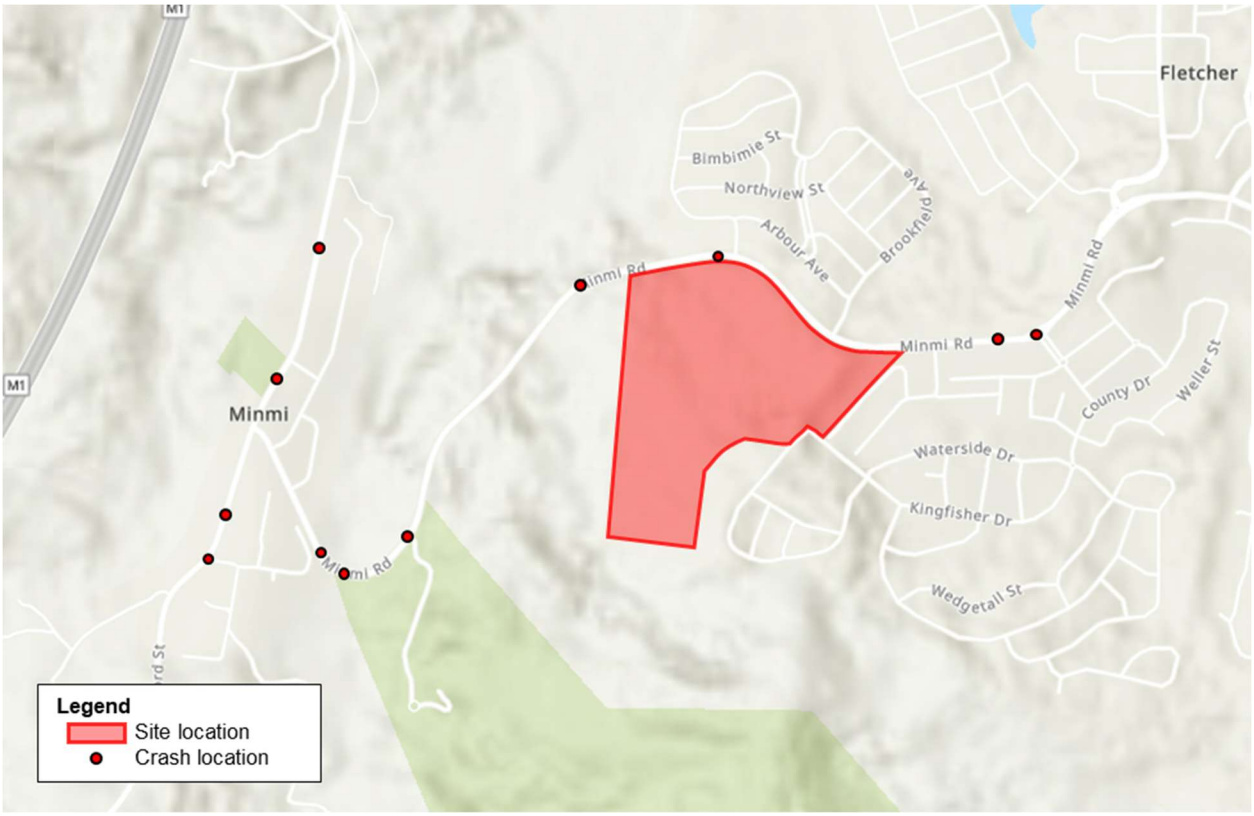


Base image source: Newcastle Cycleways Map, City of Newcastle accessed 20 March 2023

3.8 Crash History

An analysis the most recent five-year period of available crash data 2017 to 2021 has been completed based on crash data provided by TfNSW for the roads surrounding the site. The location and severity of the crash data for the five-year period is shown in Figure 12 and detailed in Table 4.

Figure 12: Crash data near the site (2017 to 2021)



Base Image Source: Transport for NSW, accessed March 2023.

Table 4: Crash incidents between 2017 and 2021

Road	Number of Crashes	People Injured
Minmi Road	7	6
Woodford Street	5	6
Britannia Boulevard	3	3
Total	**15**	**15**

A review of the crash data indicates that Minmi Road accounts for almost half the total recorded road incidents (47 per cent) in the vicinity. Most of these crashes are characterised by ‘off road to the side’ at night. No fatalities occurred in the most recent 5-year period.

4 Planning Proposal

4.1 Land Uses

The Planning Proposal seeks to amend the current NLEP 2012 to rezone the land from C4-Environmental Living to R2-Low Density Residential (covering 13.24 ha) and C2-Environmetal Conservation (covering 12.99 ha).

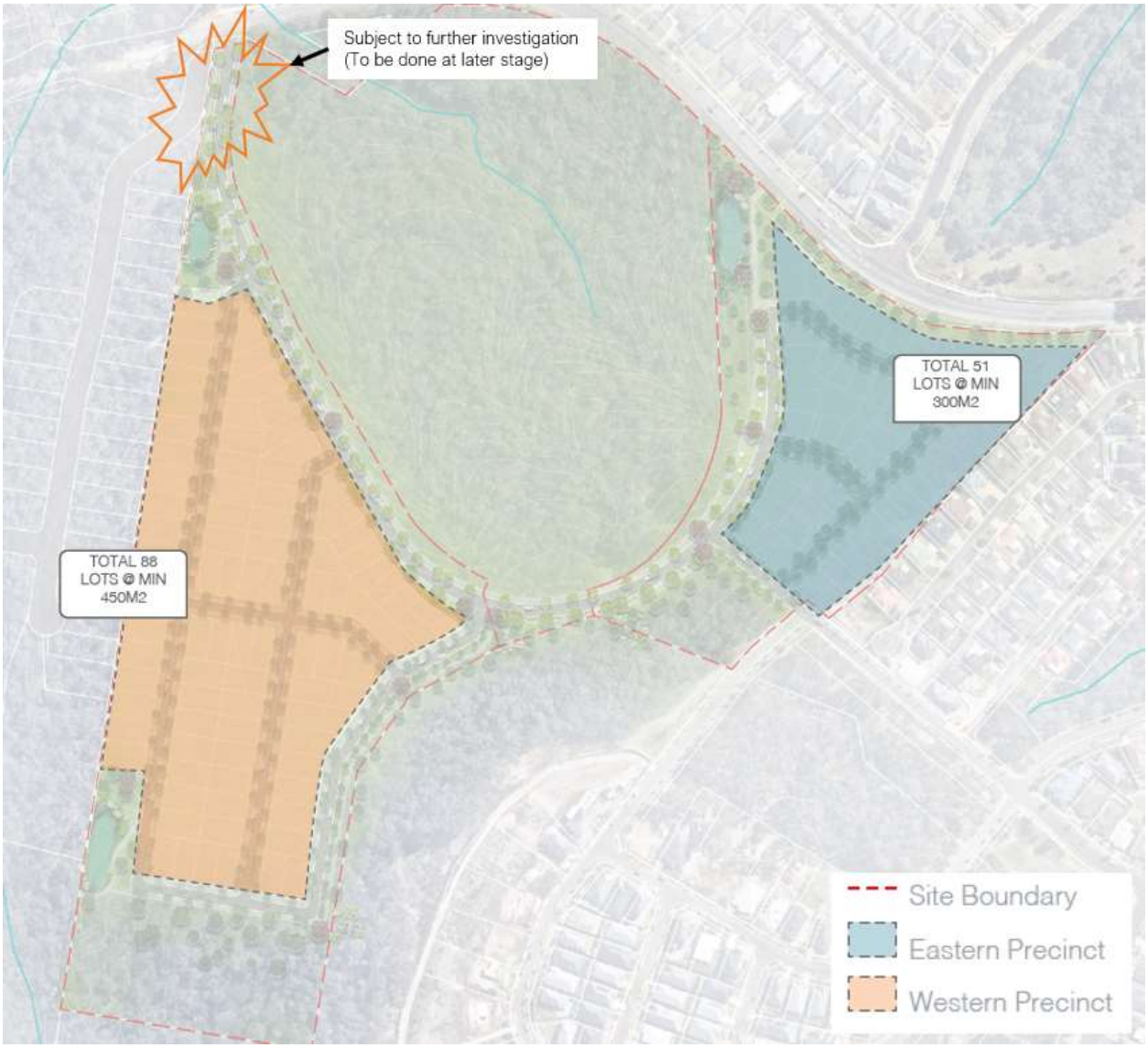
A preliminary concept plan has been developed for the site and is shown in Figure 13. The proposal seeks to provide 139 residential lots and an environmental conservation area.

Figure 13: Preliminary concept plan

Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

Figure 14 shows the proposed distribution of the lots and lot sizes within the site.

Figure 14: Distribution of lots and size



Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

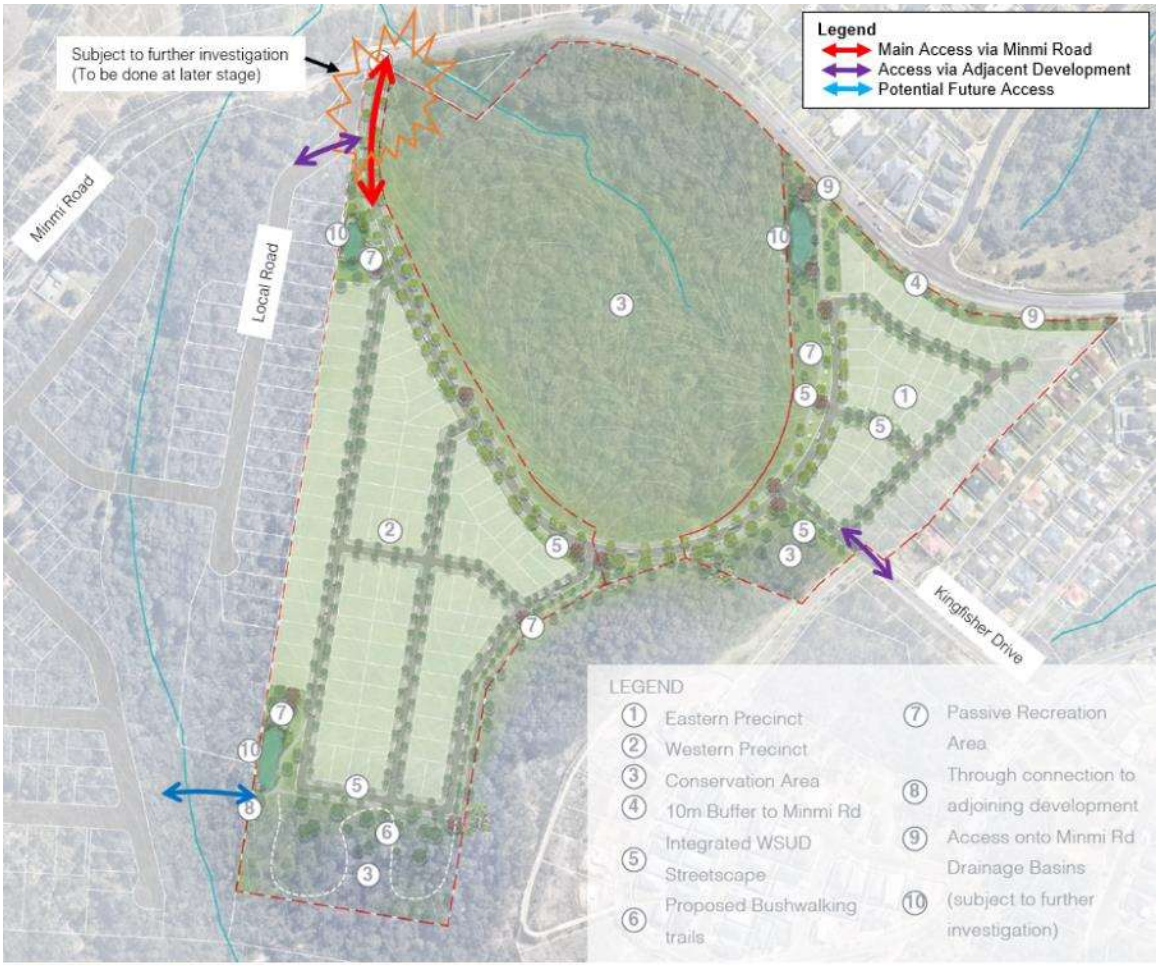
4.2 Road Network and Site Access

The main access road in and out of the subdivision is proposed via Minmi Road in the north-west corner of the site. It is understood that this access will be shared with the adjacent development to the west with an internal priority-controlled intersection to ensure appropriate turning movements can be accommodated for all users.

The type and layout of the new intersections are yet to be finalised and would include stakeholder engagement and applicant agreement. For the purpose of this assessment, priority-controlled intersections with all turns permitted have been assumed with the modelling results detailed in Section 6 of this report.

There is also potential to connect with Kingfisher Drive to the east via local road connections internal to the site with further future connections planned at the southern end of the site. The site access opportunities and internal connections are shown in Figure 15.

Figure 15: Site access and connectivity



Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

The internal road network and street hierarchy has been defined to ensure a logical layout and circulation for both residents and visitors. Wayfinding would further reinforce this. It is based on Council's Street Tree Masterplan and Development Control Plan (DCP).

Figure 16 shows the proposed internal road network. A 19.3-metre road reserve is proposed for the main road corridor/ Boulevard and a 17-metre road reserve for all other internal roads.

Figure 16: Site access and connectivity

Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

The Boulevard horseshoe road is designed as the main internal connecting road and fronts onto the open space adjoining the bushland (Environmental Conservation). It is shown in Figure 17. The proposed layouts of the Boulevard and local internal roads align with Newcastle Development Control Plan 2012 (DCP 2012) requirements for a new residential subdivision. This features a wider road verge width to allow for parking and planting area for large native trees. There will be minimum 1.2-metre-wide footpaths on each side of the road.

The remaining internal roads are designed as residential streets within the subdivision with the cross-section shown in Figure 18. It includes a 17-metre-wide road reserve with 4.5 metre verges to allow for street tree planting and footpaths on each side.

While residential subdivisions allow for vehicles to park on driveways and garages as part of each residential lot, the internal road cross-section does allow for on-street parking with low demand and driveways ensuring appropriate two-way movements throughout.

Figure 17: Schematic layout of the Boulevard

Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

Figure 18: Schematic layout of minor internal roads

Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

4.3 Active Transport Facilities and Connectivity

The proposal has considered potential linkages to the wider community and existing active transport links and facilities. To the north there is potential to create links to the existing cycleway along Minmi Road and allow future residents convenient and safe access the wider trail network around Minmi, local schools and commercial and residential areas.

It is also intended to link the proposal with Kingfisher estate to the south and east, directly accessing proposed and existing parks and open space, as shown in Figure 19.

Figure 19: Proposed pedestrian walkway and connectivity

Source: 505 Minmi Road, Fletcher Urban Design Study – Site Analysis & Final Master Plan, Moir Landscape Architecture (Dated: December 2021)

5 Preliminary Parking Considerations

5.1 Car Parking Requirements

The car parking requirements for the proposed development type is set out in DCP 2012. A summary of the car parking requirements for the expected low density residential uses is shown in Table 5.

Table 5: DCP 2012 car parking requirements

Use	Description	Parking Rate
Dwelling House	< 125 m^2	1 space per dwelling
	> 125 m^2	2 spaces per dwelling

Considering the proposed 139 residential lots and intended lot sizes of 300m^2 and 450m^2, the proposal is expected to generate a parking requirement of 278 on-site residential spaces.

6 Traffic Impact Assessment

6.1 Traffic Generation

6.1.1 DESIGN RATES

Traffic generation rates for the proposed uses have been sourced from the Technical Direction: Updated Traffic Surveys (TDT 2013/ 04a).

TDT 2013/ 04a provides trip generation rates per low density residential dwellings for the Sydney region as well as regional areas in the weekday AM and PM peak hours. Given that the site located west of Newcastle, the regional area trip generation rate has been adopted to estimate the total trip generation associated with the proposal, as summarised in Table 6.

Table 6: Traffic generation estimates

Use	Size	Traffic generation rate (vehicle trips / hour)		Traffic generation estimate (vehicle trips / hour)	
		AM	PM	AM	PM
Low Density Residential	139 dwellings/ lots	0.71 trips per dwelling	0.78 trips per dwelling	99	108

Table 6 indicates that the proposal is likely to generate between 100 and 110 vehicle trips in any peak hour.

6.1.2 BACKGROUND TRAFFIC GROWTH

To estimate the traffic growth and to assess the future condition of the intersection performance, the population projection data of the Fletcher and Minmi areas has been analysed. It is to be noted that the traffic growth typically corelates with the population and employment growth of an area. Given that Fletcher and Minmi are predominantly residential, the population data has been analysed to understand potential future traffic growth.

The population statistical data of Fletcher and Minmi shows that they would experience a small negative growth rate (of about -0.29 per cent) in the future[1]. However, for the purposes of the future 10-year scenario traffic assessment, an annual traffic growth rate of one per cent has been assumed. This annual growth rate has been applied to the existing traffic survey data over a 10-year period to understand the likely future traffic volume through the study intersections.

[1] Population summary, City of Newcastle, Population forecast (home | .id (informed decisions))

6.2 Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposal will be influenced by a number of factors, including the:

- configuration of the arterial road network in the immediate vicinity of the site
- existing operation of intersections providing access between the local and arterial road network
- surrounding employment centres, retail centres and schools in relation to the site
- configuration of access points to the site.

Considering above and to understand trip distribution of the proposal, the Journey-to-work (JTW) data for SA2 level from Australian Bureau of Statistics 2016 Census has been analysed. Analysis of the JTW data shows that the distribution of traffic is split almost equally in the east-west direction and would use Minmi Road to access Newcastle area to the east and Minmi Road (and Woodford Street) to access Minmi and the M1 Pacific Motorway to the west.

Having consideration to the above, for the purposes of estimating vehicle movements, the directional distributions shown in Figure 20 and Figure 21 have been assumed. As discussed in Section 4 of this report, two new intersections have been assessed, with the key main site access on Minmi Road in the north-west corner of the site.

It is noted that five per cent of development traffic travelling to and from the east is assumed to use the access on Kingfisher Drive in the south-east corner of the site. This traffic is assumed to pass through the Minmi Road/ Britannia Boulevard intersection to access Britannia Boulevard and then onto Kingfisher Drive. Figure 20 and Figure 21 show the estimated traffic distribution through the key intersections surrounding the site.

The directional split of traffic (i.e., the ratio between the inbound and outbound traffic movements) for the proposal has also been estimated. The split ratio has been assumed to be 20 per cent inbound and 80 per cent outbound in the AM peak, reversed in the PM peak. This generally corresponds with residents travelling to work and school in the morning and returning home in the evening.

Figure 20: Estimated traffic distribution (site access and west)

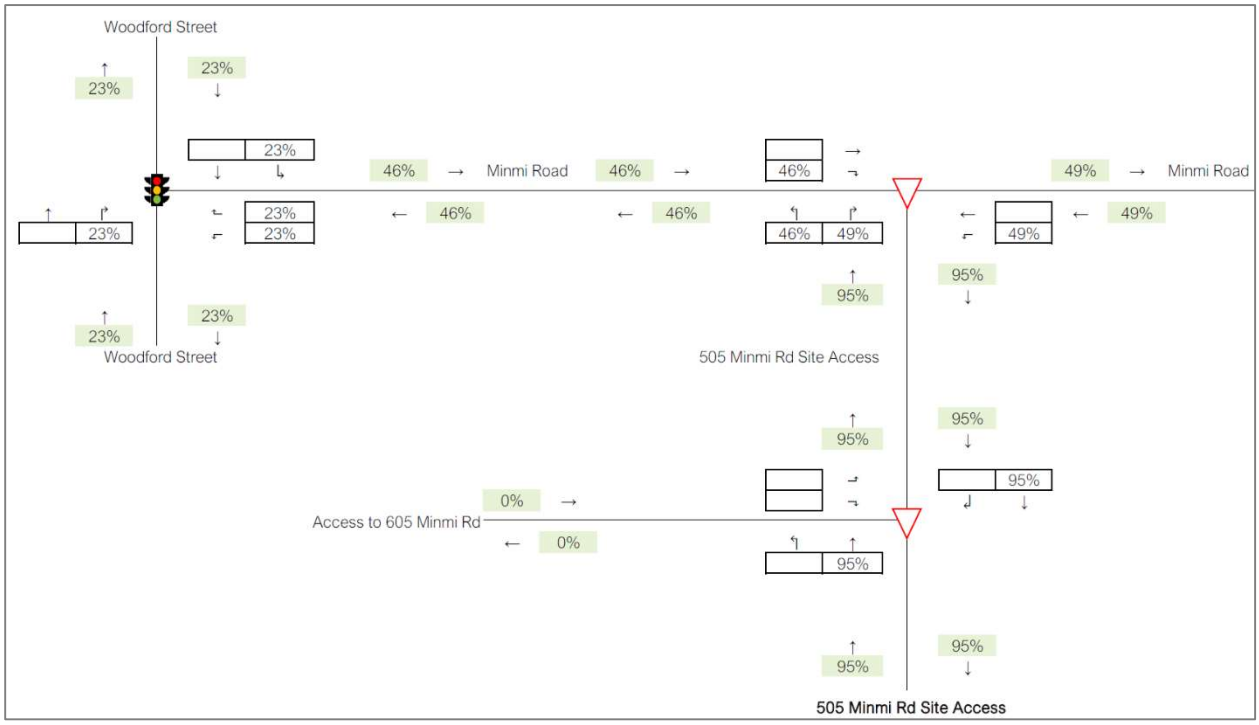
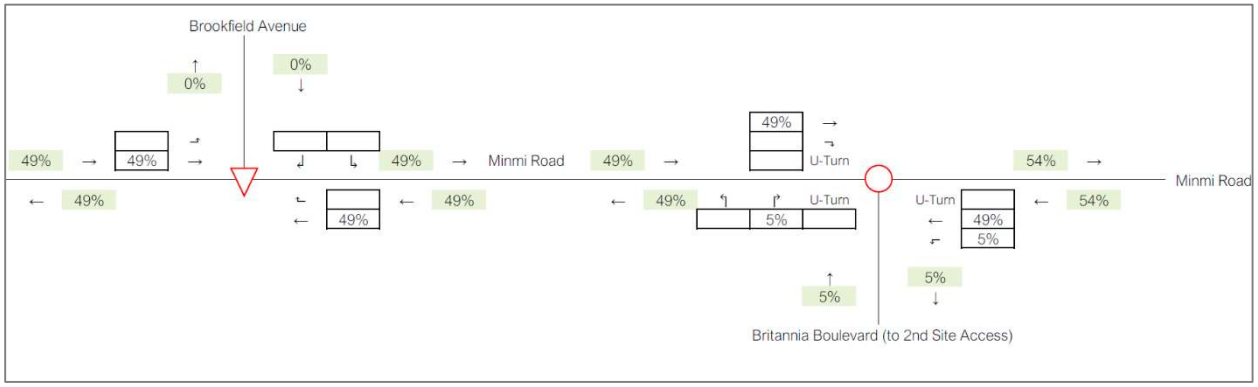


Figure 21: Estimated traffic distribution (east of the site)



Based on the above, Figure 22 and Figure 23 have been prepared to show the estimated site generated turning movements near the site following full development.

Figure 22: AM peak hour site generated traffic volumes

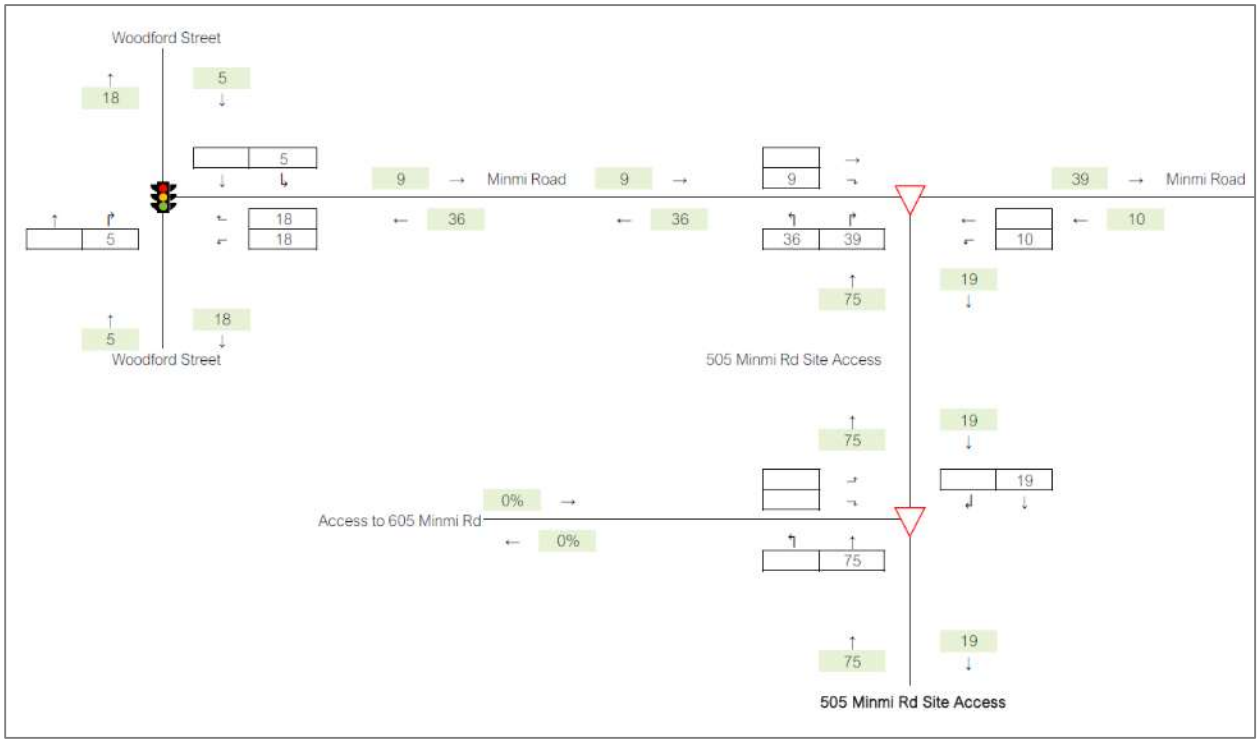
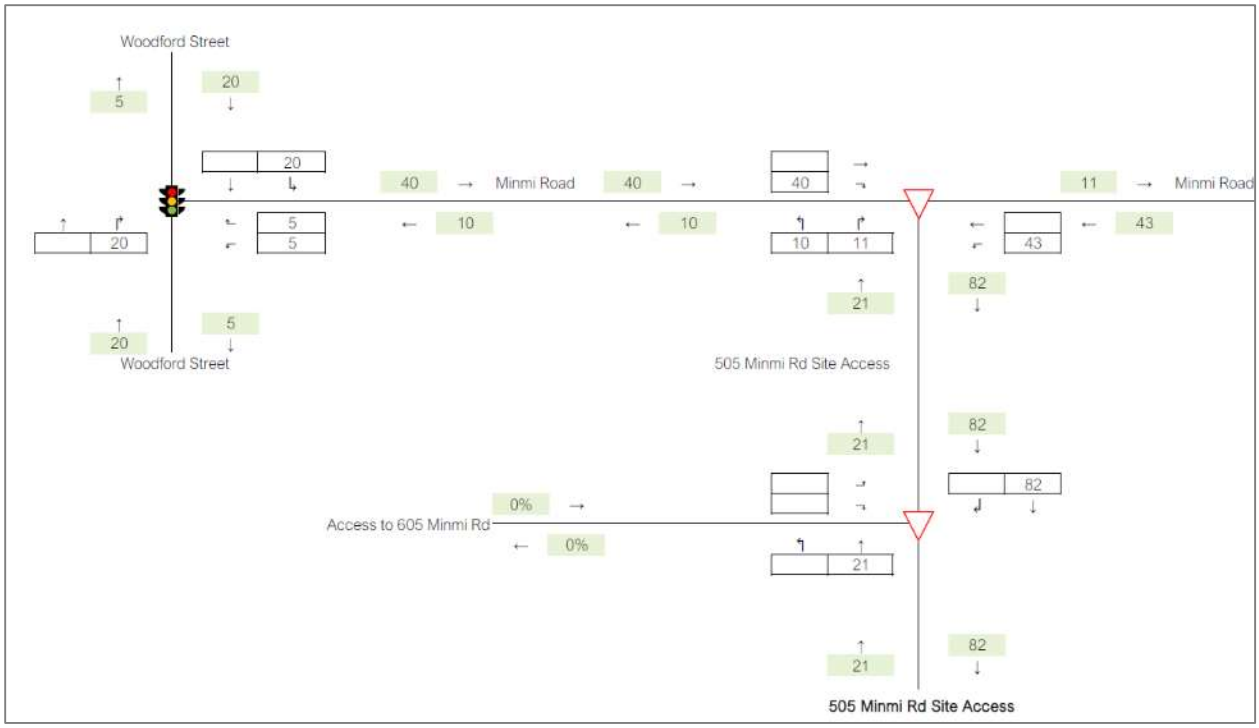


Figure 23: PM peak hour site generated traffic volumes



6.3 Layout of New Intersections

As discussed, two new intersections are being considered to provide logical and convenient access to the proposal. The key site access is proposed via a new intersection on Minmi Road with a secondary access to the east to connect with the existing local roads.

Detailed design, including the likely future intersection type and layout are yet to be confirmed at this stage and will be finalised as part of ongoing stakeholder engagement. For the purposes of this traffic assessment, the intersection layouts as shown in Figure 24 and Figure 25 have been modelled.

Figure 24: Indicative intersection layout of Minmi Road/ The Boulevard

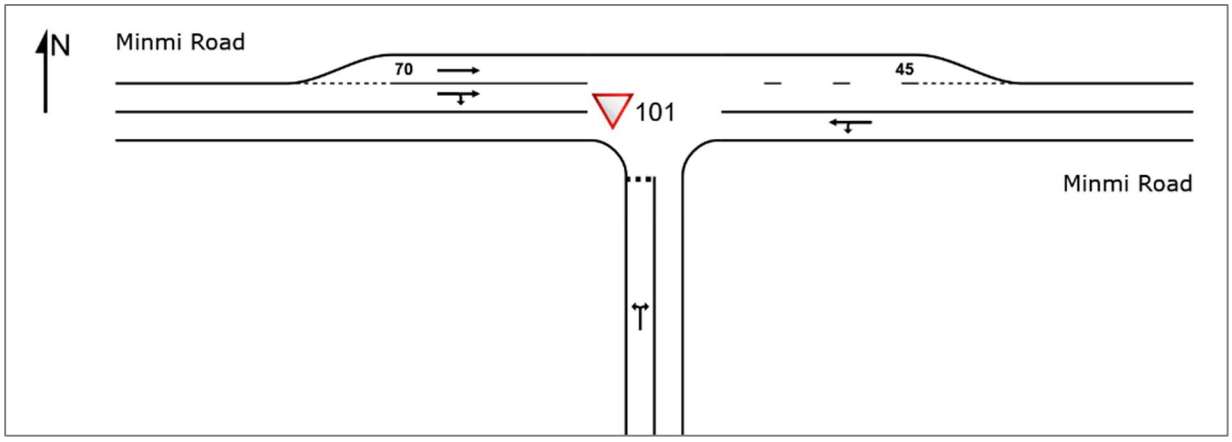
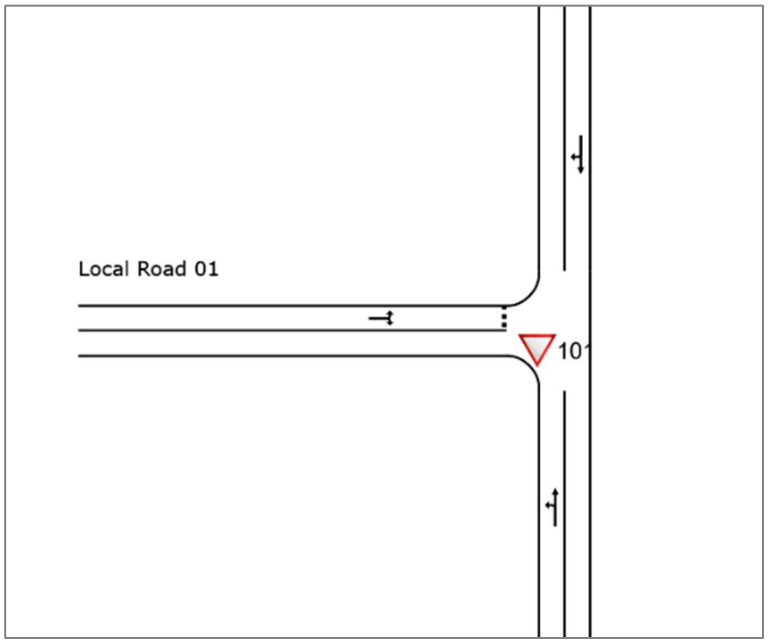


Figure 25: Indicative intersection layout of The Boulevard/ Local Road



6.4 Traffic Impact

6.4.1 INTERSECTION PERFORMANCE

Table 7 presents a summary of the anticipated operation of the key study intersections following development of the site, with full results presented in Appendix B of this report.

Table 7: Intersection operating conditions with proposed development

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Minmi Road/ Woodford Street	AM	0.89	38	273	LOS D
	PM	1.0	74	405	LOS E
Minmi Road/ Brookfield Avenue	AM	0.25	20	7	LOS C
	PM	0.11	23	3	
Minmi Road/ Britannia Boulevard	AM	0.46	14	22	LOS B
	PM	0.27	14	12	
Minmi Road/ The Boulevard (site access)	AM	0.23	22	6	LOS C
	PM	0.01	25	2	
The Boulevard/ Local Road	AM	0.01	6	0	LOS A
	PM	0.05	6	0	

On the basis of the above assessment, it is clear that all intersections are operating at LOS C or better during the weekday AM and PM peak hours. The only exception to this is at the Minmi Road/ Woodford Street intersection with a LOS E (and growing queues on the east approach with and without the proposal) in the PM peak hour.

As discussed earlier in this report, the Minmi Road/ Woodford Street intersection is currently operating with two traffic signal phases. To improve the operation of this intersection, select minor mitigation measures have been considered, primarily with the addition of one signal phase to better cater for both existing and anticipated future traffic volumes. The operation of the intersection is shown in Table 8 with these minor signal phasing measures in place.

Table 8: Potential future Minmi Road/ Woodford Street intersection with modified signal phasing

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Minmi Road/ Woodford Street	AM	0.89	40	244	LOS D
	PM	0.89	47	267	

With the inclusion of an additional signal phase, the operation of the Minmi Road/ Woodford Street intersection would improve overall. The intersection would operate at LOS D with corresponding reduction

in queues on the east approach, particularly during the PM peak. As such, no physical intersection works are considered necessary as a result of the proposal.

6.5 School Access Considerations

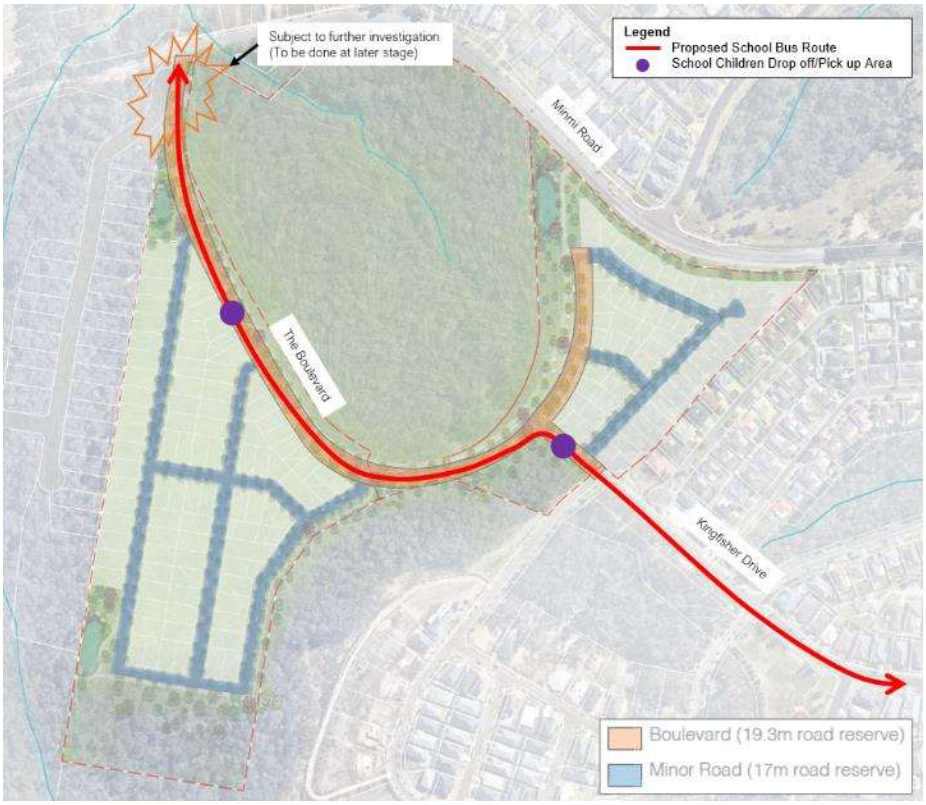
School Infrastructure NSW (SINSW) has provided comments regarding consideration of future demand and access requirements to local area schools from the site. A copy of the letter is included in Appendix C2 of this report.

Minmi Primary School and Glendore Primary School are each located within about two and three kilometres of the site, as indicatively shown in Figure 26. Such walking distances are not ideal, particularly for primary school students and when combined with missing links in the available footpath network along Minmi Road (together with minimal pedestrian crossing facilities).

Figure 26: Location of existing schools

Provision of school bus services and regular route bus routes are key to ensuring appropriate access to these schools for future residents. With the nearest bus stop currently located on Minmi Road about one kilometre to the east, there is potential to include either a new school bus route through the site or new bus stop facilities along Minmi Road close to the proposed site access. The potential bus route (and bus stops) internal to the site is shown in Figure 27.

Figure 27: Proposed school bus route



Existing bus route 261 already uses Britannia Boulevard and Kingfisher Drive/ Country Drive to provide public bus services to the local area. As such, no infrastructure upgrade would be required on these roads to facilitate a new school bus service in the area. Moreover, a 19.3-metre-wide road reserve is proposed for the Boulevard within the site, which in line with DCP 2012 requirements for a road with bus services.

Two bus stops are possible within the site; one near the eastern precinct and another near the western precinct to facilitate safe and equitable stops for school children (and other passengers). The exact location and facilities of these bus stops can be confirmed as part of future assessments and in consultation with key stakeholders.

Bus stop facilities on Minmi Road near the proposed access have not been formally considered as part of this assessment given the existing 70 km/h posted speed limit is likely to present safety concerns for school children. Facilities such as a mid-block crossing could be considered should the speed limit be reduced to 60km/h and consistent with existing arrangements through the residential areas along Minmi Road further to the east.

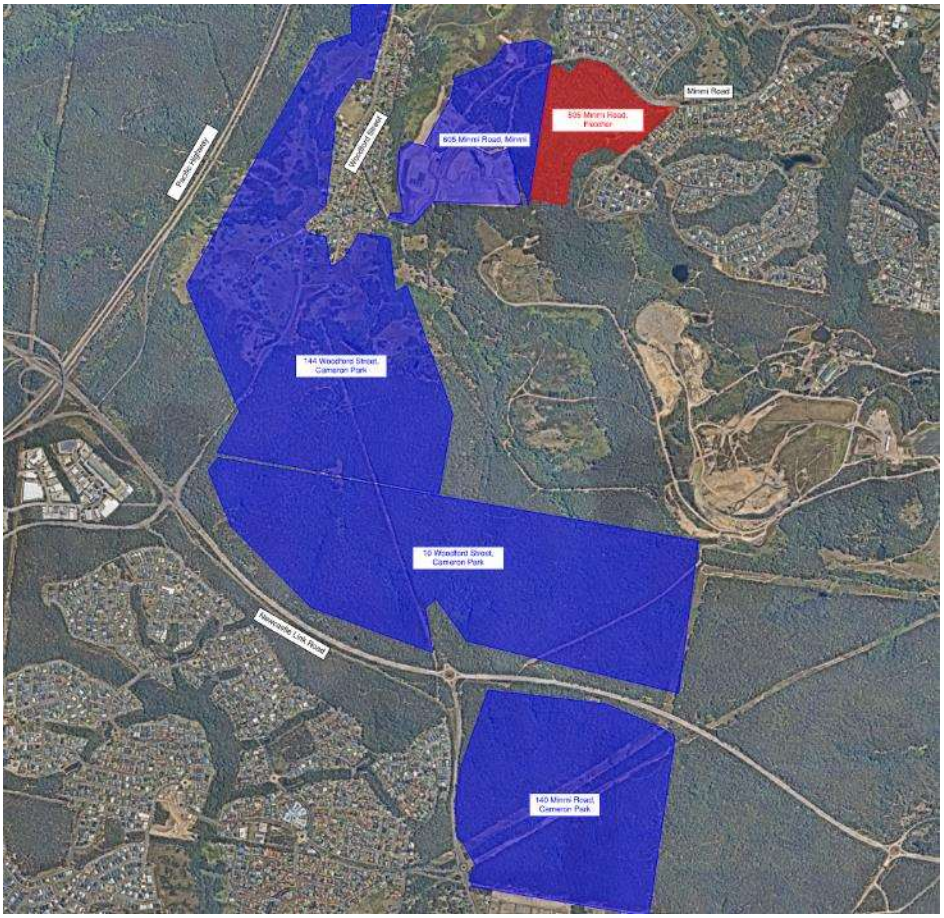
6.6 Cumulative Impacts

It is important to consider any such pending and under assessment developments in the surrounding local and regional area as part of any traffic assessment. In this regard, TfNSW has provided information

as it relates to other developments which are currently under assessment. The TfNSW letter is included in Appendix C2 and references the following adjacent developments, as illustrated in Figure 28.

- 67 (605) Minmi Road, Minmi – 314 lot subdivision (DA2015/10393, City of Newcastle LGA)
- 144 Woodford Street, Minmi – 876 lot subdivision (DA2018/01351, City of Newcastle LGA)
- 10 Woodford Street, Cameron Park – 1078 lot subdivision (DA/2087/2018, Lake Macquarie LGA)
- 140 Minmi Road, Cameron Park – 594 lot subdivision (DA/1936/2016/A, Lake Macquarie LGA).

Figure 28: Location of adjacent developments



The details of access points of these future developments are not yet known however, given the location of these developments, it is anticipated that the development at 140 Minmi Road and 10 Woodford Street, Cameron Park would primarily be accessed via Newcastle Link Road and would have minimal to no impact on Minmi Road and the study intersections.

It is understood that the development at 144 Woodford Street, Minmi would be accessed via Woodford Street and the associated traffic would have a minor impact on Woodford Street, including the operation of the Minmi Road/ Woodford Street intersection. It is also noted that this site is elongated and likely to have several access points along Woodford Street, both north and south the Minmi Road/ Woodford

Street intersection. Most of the traffic generated by that site would also tend to travel to and from the south via Newcastle Link Road rather than along Woodford Street and/ or Minmi Road. As such, for the purposes of this traffic assessment, it has been conservatively assumed that up to 50 per cent of traffic associated with the 144 Woodford Street development would travel through the Minmi Road/ Woodford Street intersection, with this included as part of this cumulative impact assessment.

The proposed development at 67 (605) Minmi Road, Minmi is adjacent to the proposed site and is anticipated to have similar level of impact on the study intersections, with the same distribution east and west on Minmi Road.

In addition, large sites with neighbourhood and/ or town centres are also identified as having an internal trip component. In this regard, the TfNSW Guide suggests that internal trips comprise around 25 per cent of all traffic generation estimates. On this basis, the estimated traffic generation from the adjacent developments are shown in Table 9.

Table 9: Traffic generation estimates for adjacent developments

Development Location	Type	Size	Traffic generation rate (vehicle trips/ hour)		Traffic generation estimate (vehicle trips/ hour) [2]	
			AM	PM	AM	PM
67 (605) Minmi Road	Low Density Residential	314 lots	0.71 trips per dwelling	0.78 trips per dwelling	184	167
144 Woodford Street		876 lots [1]	0.71 trips per dwelling	0.78 trips per dwelling	257	233

[1] 50% of the proposal (438 lots) has been assumed to estimate trip generation, as discussed above.
[2] 25 per cent reduction factor applied to account for internal trips.

The operation of the Woodford Road/ Minmi Road intersection with the additional traffic generated by the adjacent proposed developments is presented in Table 10.

Table 10: Cumulative traffic impacts – intersection operation

Intersection	Peak	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
Minmi Road/ Woodford Street	AM	0.98	72	411	LOS E
	PM	1.07	106	452	LOS F
Minmi Road/ Brookfield Avenue	AM	0.34	29	9	LOS D
	PM	0.15	30	3	
Minmi Road/ Britannia Boulevard	AM	0.47	14	23	LOS B
	PM	0.28	15	13	
Minmi Road/ The Boulevard (site access)	AM	0.44	31	13	LOS D
	PM	0.1	30	2	
The Boulevard/ Local Road	AM	0.02	6	0.6	LOS A
	PM	0.02	6	0.5	

As shown, most of the study intersections decline in their overall operation, with some level of delay and decline in level of service. The Minmi Road/ Woodford Street intersection would decline to a LOS E and LOS F in the AM and PM peak hours and due to the large surrounding residential developments and the associated traffic generation. The modified signal phasing as detailed above has also been included as part of this cumulative assessment.

The proposed number of lots at these developments are significantly higher when compared with the proposed subdivision of the subject site and would likely require the need for a broader network based strategic traffic model to understand the impacts of these developments on the surrounding road network and to determine mitigation measures to upgrade a range of intersections. Such impacts do not form part of this assessment though are key to the future road network and intersection configurations in the local and regional area.

7 Conclusion

Based on the analysis and discussions presented within this report, the following conclusions are made:

1. The proposal seeks to amend Newcastle Local Environmental Plan (NLEP) 2012 and rezone of 505 Minmi Road, Fletcher from the current C4 – Environmental Living to R2 – Low Density Residential and C2 – Environmental Conservation and aligns with the strategic growth of the area.
2. The proposal would provide 139 subdivision lots and is anticipated to generate up to 110 vehicle trips in any weekday peak hour.
3. Access to the site is proposed via Minmi Road with detailed design and stakeholder engagement key to confirming the most appropriate intersection layout. The site is also proposed to include connections with Kingfisher Drive via the Boulevard in the south-east corner.
4. The internal road cross-sections align with Newcastle Development Control Plan (DCP) 2012 requirements with respect to road widths and provision of footpaths on both sides of the road.
5. The traffic assessment and SIDRA modelling indicates that all study intersections currently operate satisfactorily.
6. An analysis of Fletcher and Minmi population data shows a negative growth rate of -0.29 per cent for the area. A conservative approach has been taken to future traffic conditions, with an annual growth rate of one per cent adopted as part of a conservative assessment.
7. The future modelling assessment indicates that all study intersection would operate satisfactorily, except for the Minmi Road/ Woodford Street intersection where the level of service declines to LOS E in the weekday PM peak hour. Much of this can also be attributed to the one per cent background traffic growth.
8. To alleviate such constraints at this intersection in the future, minor modifications to signal phasing could be implemented without the need for any such infrastructure works. This includes adding a single signal phase to the existing two-phase arrangement to better accommodate traffic volumes.
9. An assessment of accessibility associated with the nearby schools indicates some constraint with respect to walking facilities however opportunity to deliver an additional or rerouted bus route with two locations internal to the site identified as appropriate for future bus stops.
10. The cumulative impact assessment considers additional traffic generated by adjacent developments as identified by Transport for NSW. Most study intersections show some decline, with the Minmi Road/ Woodford Street intersection showing further constraint. The number of lots associated with the adjacent developments is significantly higher compared to the 139 lots that make up the proposal.
11. A network wide traffic assessment would be required to fully understand the impacts of these adjacent large developments and to determine the necessary mitigation measures on surrounding road network, including at the Minmi Road/ Woodford Street intersection.

APPENDICES

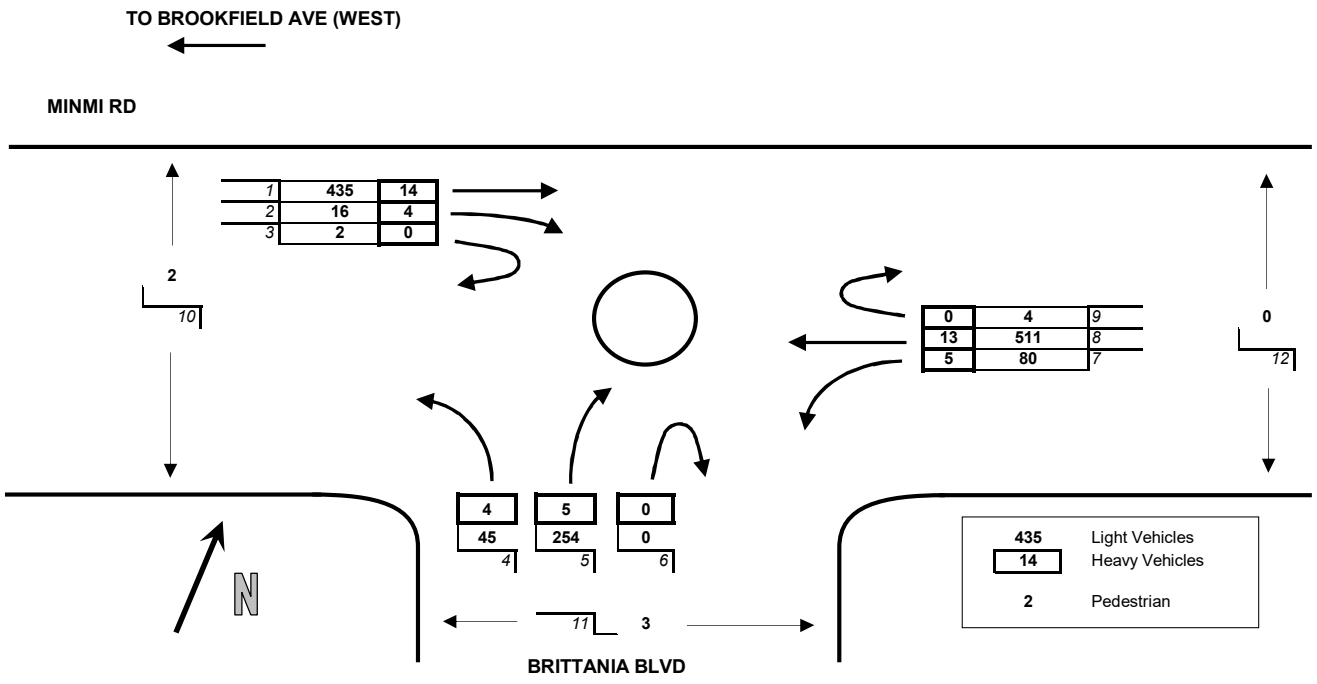
Appendix A Survey Results

14/3/2023 - MINMI RD / BRITTANIA BLVD, FLETCHER

8:45 <<< HOUR ENDING **Tuesday**

Summary:	MINMI RD / BRITTANIA BLVD
1347	Total Light Vehicles
45	Total Heavy Vehicles
5	Total Pedestrians

Quality Surveys
233667
Site # 1



14/3/2023 - MINMI RD / BRITTANIA BLVD, FLETCHER

Light Vehicles

	1	2	3	4	5	6	7	8	9	Total Vehicles 15 MIN HOUR		Pedestrians 10	11	12
07:15	75	7	3	14	31	0	11	80	4	225		0	0	0
07:30	92	12	2	17	60	1	17	114	3	318		0	1	0
07:45	123	5	1	17	67	3	9	109	1	335		0	0	0
08:00	97	5 <	1 <	10 <	77	0 <	10	134	0	334	1212	0	0	0
08:15	99	4	0	13	67	0 <	16	127	0	326	1313	1	1	0
08:30	92	2	0	9	74 <	0	21	122	2	322	1317	1 <	2 <	0
08:45	147	5	1	13	36	0	33	128 <	2	365	1347 <	0 <	0 <	0
09:00	109 <	6	0	7	23	0	25	90	4	264	1277	0 <	0 <	0
09:15	85	5	0	6	15	0	22 <	59	1	193	1144	0	0	0
09:30	72	5	0	12	15	0	17	62	4	187	1009	0	0	0
09:45	54	6	0	3	20	0	14	48	5	150	794	0	0	0
10:00	51	8	0	4	14	1	13	57	6 <	154	684	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	Total Vehicles 15 MIN HOUR	
07:15	1	2	0	0	1	0	0	1	0	5	
07:30	8	2	0	0	1	0	2	5	0	18	
07:45	4	2	0	0	4	0	1	4	0	15	
08:00	3	0 <	0	2	0	0	2 <	3	0	10	48
08:15	3 <	2 <	0	0	1	0	0 <	7 <	0	13	56 <
08:30	3	0	0	1	2	0	2 <	2	0	10	48
08:45	5	2	0	1 <	2	0	1 <	1	0	12	45
09:00	2	1	0	0	2	0	1	2	0	8	43
09:15	1	0	0	0	2 <	0	1 <	3	1	8	38
09:30	4	1	0	0	1	0	1	2	0	9	37
09:45	2	0	0	1	0	0	1	5	2 <	11	36
10:00	3	0	0	1	1	0	2 <	1	0 <	8	36

All Vehicles

	1	2	3	4	5	6	7	8	9	Total Vehicles 15 MIN HOUR	
07:15	76	9	3	14	32	0	11	81	4	230	
07:30	100	14	2	17	61	1	19	119	3	336	
07:45	127	7	1	17	71	3	10	113	1	350	
08:00	100	5 <	1 <	12 <	77	0 <	12	137	0	344	1260
08:15	102	6	0	13	68	0 <	16	134	0	339	1369
08:30	95	2	0	10	76 <	0	23	124	2	332	1365
08:45	152	7	1	14	38	0	34	129 <	2	377	1392 <
09:00	111 <	7	0	7	25	0	26	92	4	272	1320
09:15	86	5	0	6	17	0	23 <	62	2	201	1182
09:30	76	6	0	12	16	0	18	64	4	196	1046
09:45	56	6	0	4	20	0	15	53	7	161	830
10:00	54	8	0	5	15	1	15	58	6 <	162	720

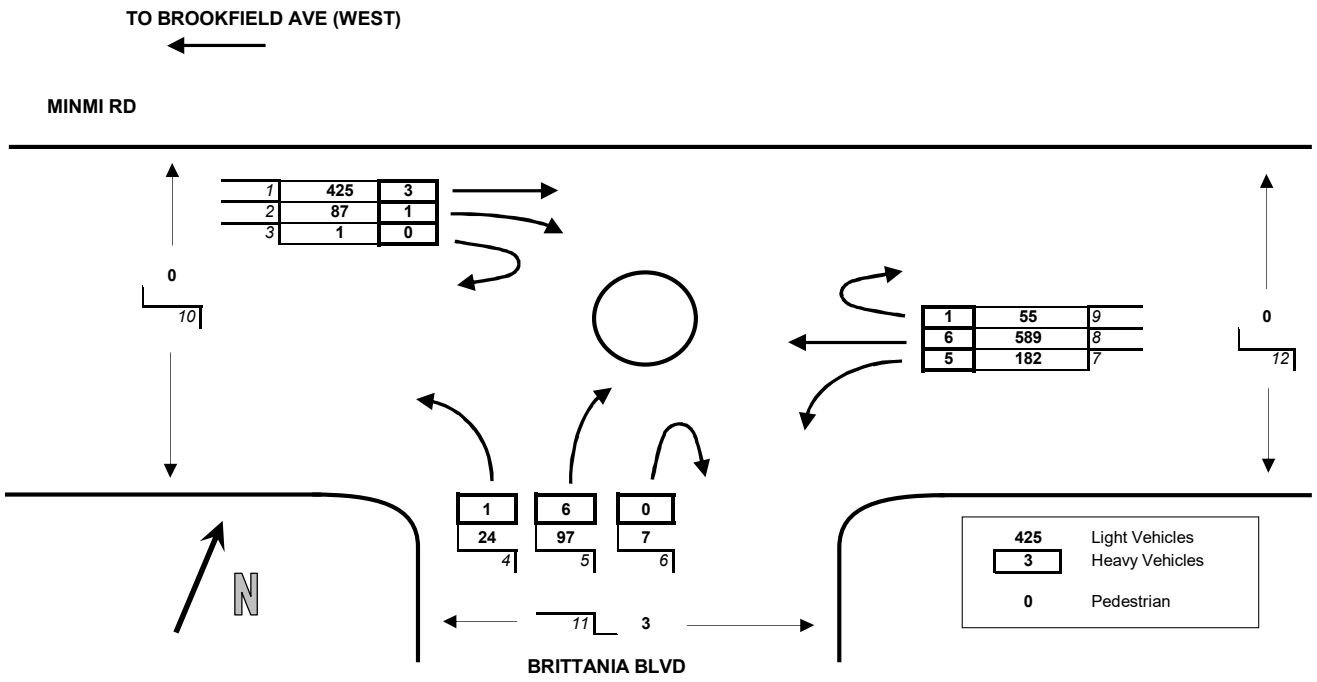
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

14/3/2023 - MINMI RD / BRITTANIA BLVD, FLETCHER

17:30 <<< HOUR ENDING **Tuesday**

Summary:	MINMI RD / BRITTANIA BLVD
1467	Total Light Vehicles
23	Total Heavy Vehicles
3	Total Pedestrians

Quality Surveys
233667
Site # 1



14/3/2023 - MINMI RD / BRITTANIA BLVD, FLETCHER

Light Vehicles

	1	2	3	4	5	6	7	8	9	Total Vehicles 15 MIN HOUR		Pedestrians 10	11	12
16:15	95	15	1	6	25	1	44	135	11	333		0	3	0
16:30	119	12	2	13	20	0	37	137	8	348		0	1	0
16:45	79	26	0	9	24	2	39	157	11	347		0	0	0
17:00	121	17	0 <	3	18	1	36	137	19	352	1380	0	2	0
17:15	108	20	0	8 <	24	1	59	162 <	9	391	1438	0	1	0
17:30	117	24	1	4	31	3	48	133	16 <	377	1467 <	0	0	0
17:45	102 <	28	1	7	20	4	56	119	10	347	1467 <	0	0	0
18:00	98	18 <	0	4	24 <	1	47 <	90	10	292	1407	0	1	0
18:15	66	9	0	7	9	2 <	44	78	12	227	1243	0	3	0
18:30	65	9	0	6	16	2	30	70	10	208	1074	0	6	0
18:45	60	9	0	2	19	3	28	50	7	178	905	0	2	0
19:00	53	16	0	6	10	2	20	43	8	158	771	0	4 <	0

Heavy Vehicles

	1	2	3	4	5	6	7	8	9	Total Vehicles 15 MIN HOUR	
16:15	2	0	0	0	1	0	0	3	0	6	
16:30	2	2	0	1	1	0	1	2	0	9	
16:45	2	1	0	0	2	0	2	3	0	10	
17:00	1 <	0 <	0	0	2 <	0	1	2 <	0	6	31 <
17:15	0	0 <	0	1 <	1 <	0	1	1	0	4	29
17:30	0	0	0	0	1 <	0	1	0	1 <	3	23
17:45	2	0	0	0	2 <	0	2	2	0 <	8	21
18:00	1	0	0	1 <	0	0	1	1	0 <	4	19
18:15	0	1	0	1 <	2	0	2 <	2	0 <	8	23
18:30	0	0	0	0 <	1	0	1 <	0	0	2	22
18:45	0	0	0	0 <	0	1 <	1	1	0	3	17
19:00	2	0	0	0	1	0 <	2 <	1	0	6	19

All Vehicles

	1	2	3	4	5	6	7	8	9	Total Vehicles 15 MIN HOUR	
16:15	97	15	1	6	26	1	44	138	11	339	
16:30	121	14	2	14	21	0	38	139	8	357	
16:45	81	27	0	9	26	2	41	160	11	357	
17:00	122	17	0 <	3	20	1	37	139	19	358	1411
17:15	108	20	0	9 <	25	1	60	163 <	9	395	1467
17:30	117	24	1	4	32 <	3	49	133	17 <	380	1490 <
17:45	104 <	28	1	7	22	4	58	121	10	355	1488
18:00	99	18 <	0	5	24 <	1	48 <	91	10	296	1426
18:15	66	10	0	8	11	2 <	46	80	12	235	1266
18:30	65	9	0	6	17	2	31	70	10	210	1096
18:45	60	9	0	2	19	4	29	51	7	181	922
19:00	55	16	0	6	11	2 <	22	44	8	164	790

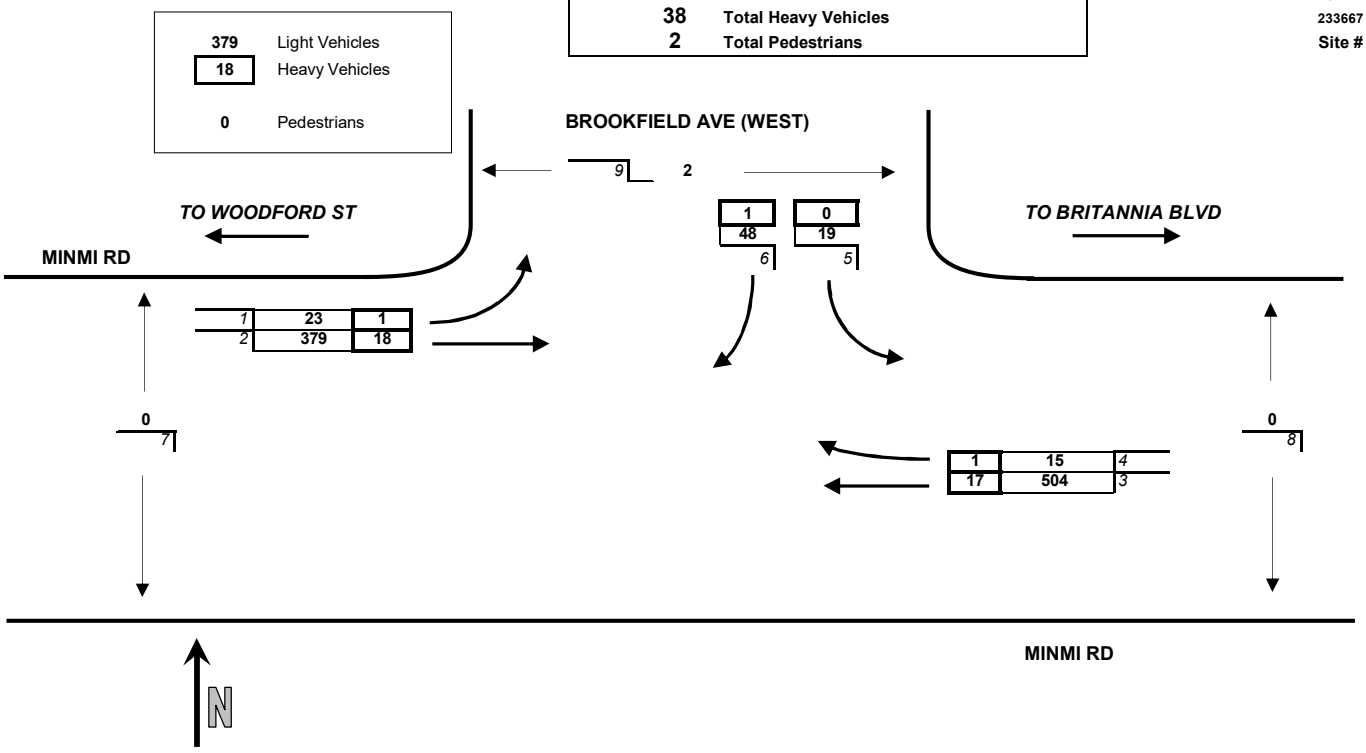
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

14/3/2023 - MINMI RD / BROOKFIELD AVE (WEST), FLETCHER

8:45 <<< HOUR ENDING **Tuesday**

Summary: MINMI RD / BROOKFIELD AVE (WEST)	
988	Total Light Vehicles
38	Total Heavy Vehicles
2	Total Pedestrians

Quality Surveys
233667
Site # 2



14/3/2023 - MINMI RD / BROOKFIELD AVE (WEST), FLETCHER

Light Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
07:15	1	50	88	2	7	10	158		0	0	0
07:30	2	66	126	6	10	5	215		0	0	0
07:45	1	94	119	4	5	6	229		0	0	0
08:00	4	110	123	3	8 <	14	262	864	0	0	0
08:15	8	93	134	4 <	6	13	258	964	0	0	1
08:30	5	72	108	2	2	12	201	950	0	0	1 <
08:45	6	104 <	139 <	6	3	9 <	267	988 <	0	0	0 <
09:00	6 <	90	97	3	5	12	213	939	0	0	0 <
09:15	7	79	56	2	3	3	150	831	0	0	0
09:30	0	65	67	2	2	3	139	769	0	0	0
09:45	1	44	44	1	0	2	92	594	0	0	0
10:00	2	55	52	1	0	3	113	494	0	0	0

Heavy Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
07:15	0	3	2	0	0	1	6	
07:30	2	7	4	0	0	0	13	
07:45	0	6	4	0	0	1	11	
08:00	1 <	7 <	4	0	0	0 <	12	42
08:15	0 <	3 <	7 <	0	0	0	10	46 <
08:30	0	3	4 <	1	0	0	8	41
08:45	0	5	2	0	0	1	8	38
09:00	0	3	1	1 <	0	0	5	31
09:15	1	3	3	0 <	0	1 <	8	29
09:30	0	4	1	0	1 <	0 <	6	27
09:45	0	3	7	0	0 <	0	10	29
10:00	0	3	2	0	0 <	0	5	29

All Vehicles

	1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
07:15	1	53	90	2	7	11	164	
07:30	4	73	130	6	10	5	228	
07:45	1	100	123	4	5	7	240	
08:00	5	117	127	3	8 <	14	274	906
08:15	8	96	141 <	4 <	6	13	268	1010
08:30	5	75	112	3	2	12	209	991
08:45	6	109 <	141 <	6	3	10 <	275	1026 <
09:00	6 <	93	98	4 <	5	12	218	970
09:15	8 <	82	59	2	3	4	158	860
09:30	0	69	68	2	3	3	145	796
09:45	1	47	51	1	0	2	102	623
10:00	2	58	54	1	0	3	118	523

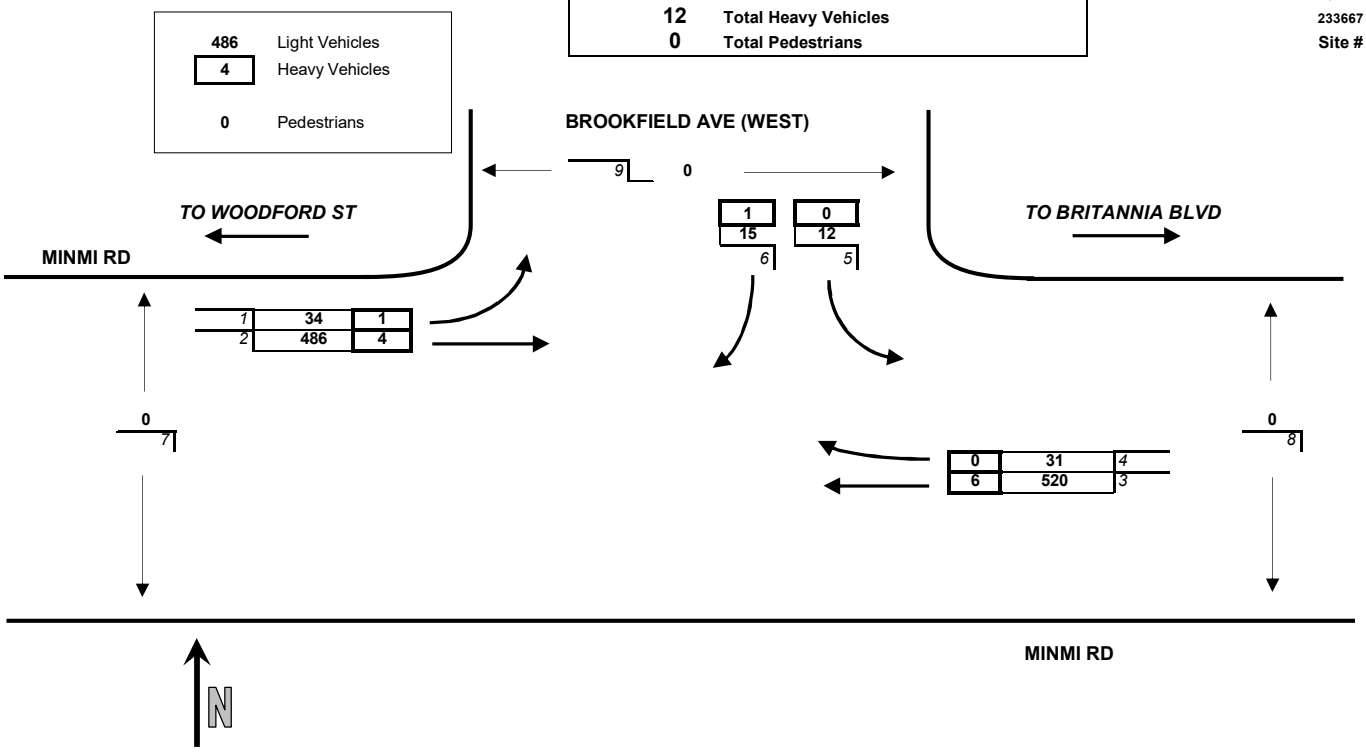
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

14/3/2023 - MINMI RD / BROOKFIELD AVE (WEST), FLETCHER

17:30 <<< HOUR ENDING **Tuesday**

Summary: MINMI RD / BROOKFIELD AVE (WEST)	
1098	Total Light Vehicles
12	Total Heavy Vehicles
0	Total Pedestrians

Quality Surveys
233667
Site # 2



14/3/2023 - MINMI RD / BROOKFIELD AVE (WEST), FLETCHER

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
16:15	2	102	109	6	4	4	227		0	0	0
16:30	11	113	130	6	3	2	265		0	0	0
16:45	12	104	143	5	2	3	269		0	0	0
17:00	4	123	113	8	5 <	3	256	1017	0	0	0
17:15	7 <	119	134 <	12	4 <	5	281	1071	0	0	0
17:30	11 <	140	130 <	6	1	4 <	292	1098 <	0	0	0
17:45	7	122 <	94	7	3	1	234	1063	0	0	0
18:00	8	96	63	10 <	6 <	4	187	994	0	0	0
18:15	7	76	62	4	0	3	152	865	0	0	0
18:30	5	62	56	6	3	2	134	707	0	0	0
18:45	5	57	39	2	1	4	108	581	0	0	0
19:00	9	60	39	6	0	0	114	508	0	0	0

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
16:15	0	1	3	0	0	1	5	
16:30	0	5	1	0	0	2	8	
16:45	0	3	1	0	0	1	5	
17:00	0	1 <	3 <	0	0	0 <	4	22 <
17:15	1 <	0	2	0	0	0	3	20
17:30	0 <	0	0	0	0	0	0	12
17:45	0 <	2	1	0	0	0	3	10
18:00	0 <	1	2	0	0	0	3	9
18:15	0	0	3	1 <	0	0	4	10
18:30	0	1	0	0 <	0	0	1	11
18:45	0	1	0	0 <	0	0	1	9
19:00	0	2	2	0 <	0	0	4	10

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
16:15	2	103	112	6	4	5	232	
16:30	11	118	131	6	3	4	273	
16:45	12	107	144	5	2	4	274	
17:00	4	124	116	8	5 <	3 <	260	1039
17:15	8 <	119	136 <	12	4 <	5 <	284	1091
17:30	11 <	140	130	6	1	4 <	292	1110 <
17:45	7	124 <	95	7	3	1	237	1073
18:00	8	97	65	10 <	6 <	4	190	1003
18:15	7	76	65	5	0	3	156	875
18:30	5	63	56	6	3	2	135	718
18:45	5	58	39	2	1	4	109	590
19:00	9	62	41	6	0	0	118	518

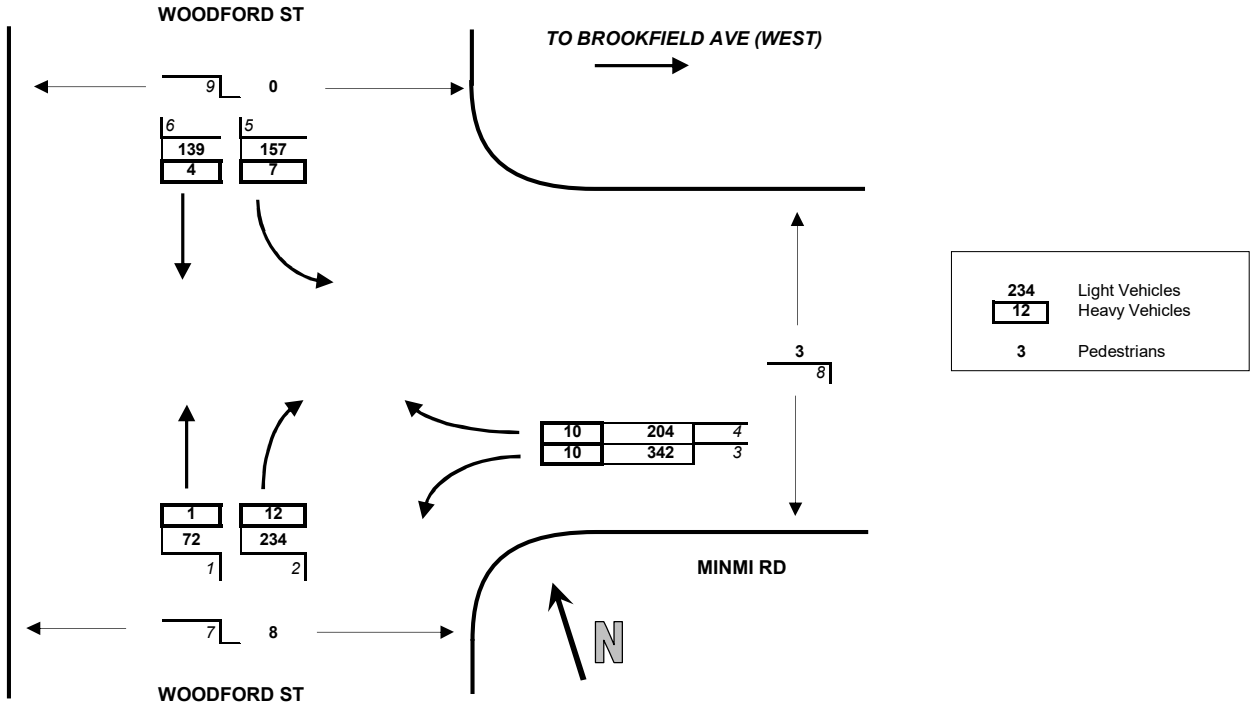
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

14/3/2023 - WOODFORD ST / MINMI RD, FLETCHER

8:45 <<< HOUR ENDING **Tuesday**

Summary: WOODFORD ST / MINMI RD	
1148	Total Light Vehicles
44	Total Heavy Vehicles
11	Total Pedestrians

Quality Surveys
233667
Site # 3



14/3/2023 - WOODFORD ST / MINMI RD, FLETCHER

Light Vehicles — **Total Vehicles** — **Pedestrians**

	1	2	3	4	5	6	15 MIN HOUR	HOUR	7	8	9
07:15	10	24	58	33	19	13	157		0	0	0
07:30	7	49	77	55	21	17	226		0	0	0
07:45	12	67	57	59	31	31	257		0	2	0
08:00	14	64	78	61	53	42	312	952	0	2 <	0
08:15	11	63	93	45 <	44	31	287	1082	2	0 <	0
08:30	21	55 <	86	42	26	25	255	1111	4	0 <	0
08:45	26	52	85 <	56	34 <	41 <	294	1148 <	2	1	0
09:00	16 <	58	74	43	43	25	259	1095	3 <	0	2
09:15	9	50	27	38	28	18	170	978	0	0	0
09:30	5	38	39	30	24	12	148	871	0	0	0
09:45	6	31	35	15	15	12	114	691	0	1	1 <
10:00	4	33	30	21	22	13	123	555	2	0	0

Heavy Vehicles — **Total Vehicles**

	1	2	3	4	5	6	15 MIN HOUR	HOUR
07:15	3	5	2	1	1	1	13	
07:30	0	3	1	2	5	1	12	
07:45	3	2	3	3	5	1	17	
08:00	0	4 <	3	2	3 <	2 <	14	56 <
08:15	0	3	6 <	3	0	1 <	13	56 <
08:30	0	3	0	3 <	4	0	10	54
08:45	1	2	1	2	0	1	7	44
09:00	0	1	1	0	1	0	3	33
09:15	3	2	3	1	4	1	14	34
09:30	1	2	0	1	1	1	6	30
09:45	2	3	4	3	0	1	13	36
10:00	2 <	1	1	0	1	0	5	38

All Vehicles — **Total Vehicles**

	1	2	3	4	5	6	15 MIN HOUR	HOUR
07:15	13	29	60	34	20	14	170	
07:30	7	52	78	57	26	18	238	
07:45	15	69	60	62	36	32	274	
08:00	14	68	81	63	56	44	326	1008
08:15	11	66	99	48 <	44	32	300	1138
08:30	21	58 <	86	45	30 <	25	265	1165
08:45	27	54	86 <	58	34	42 <	301	1192 <
09:00	16	59	75	43	44	25	262	1128
09:15	12 <	52	30	39	32	19	184	1012
09:30	6	40	39	31	25	13	154	901
09:45	8	34	39	18	15	13	127	727
10:00	6	34	31	21	23	13	128	593

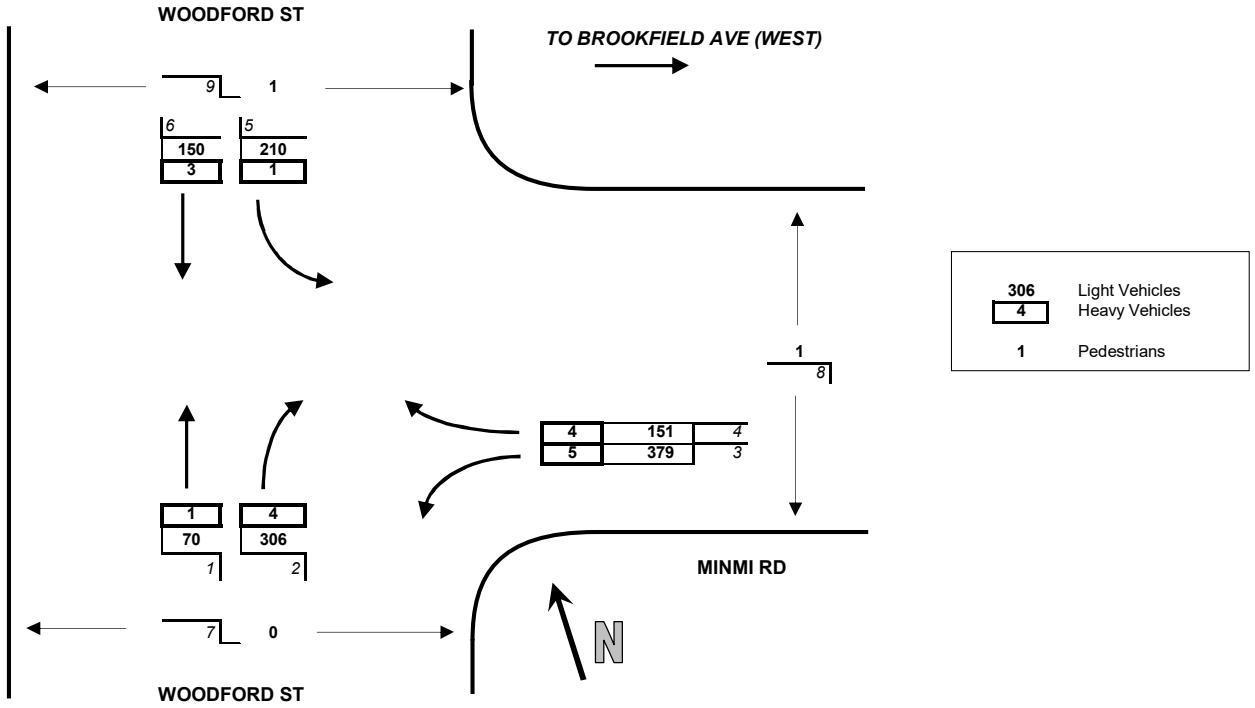
Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

14/3/2023 - WOODFORD ST / MINMI RD, FLETCHER

17:30 <<< HOUR ENDING **Tuesday**

Summary: WOODFORD ST / MINMI RD	
1266	Total Light Vehicles
18	Total Heavy Vehicles
2	Total Pedestrians

Quality Surveys
233667
Site # 3



14/3/2023 - WOODFORD ST / MINMI RD, FLETCHER

	Light Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR		Pedestrians 7	8	9
16:15	8	59	75	29	46	43	260		0	3	0
16:30	21	61	92	42	56	41	313		2	3	0
16:45	10	79	108	31	51	32	311		0	1	0
17:00	15	79	88	40	47	31	300	1184	0 <	0 <	0
17:15	21	63	96 <	39 <	55	51 <	325	1249	0 <	0	1
17:30	24	85	87	41	57 <	36	330	1266 <	0	0	0
17:45	12 <	89 <	53	31	48	21	254	1209	0	0	0
18:00	8	58	60	16	37	18	197	1106	0	0	0
18:15	11	60	34	26	26	13	170	951	0	0	0
18:30	10	54	33	22	14	14	147	768	0	0	0
18:45	7	43	38	11	20	9	128	642	0	0	8 <
19:00	13	54	26	9	14	9	125	570	0	1	0 <

	Heavy Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
16:15	1	2	4	2	0	0	9	
16:30	1	2	2	0	3	3	11	
16:45	1	2	2	3	0	1	9	
17:00	0 <	1 <	1 <	1 <	0 <	1 <	4	33 <
17:15	0	1	2	0	0 <	0 <	3	27
17:30	0	0	0	0	1	1	2	18
17:45	0	0	0	1	1	0	2	11
18:00	0	1	1	0	0	0	2	9
18:15	0	0	4	0	0	0	4	10
18:30	1	1	0	0	1	0	3	11
18:45	1	1	0	0	0	0	2	11
19:00	0	1	2	0	0	0	3	12

	All Vehicles 1	2	3	4	5	6	Total Vehicles 15 MIN HOUR	
16:15	9	61	79	31	46	43	269	
16:30	22	63	94	42	59	44	324	
16:45	11	81	110	34	51	33	320	
17:00	15	80	89	41	47	32	304	1217
17:15	21	64	98 <	39 <	55 <	51 <	328	1276
17:30	24	85	87	41	58	37	332	1284 <
17:45	12 <	89 <	53	32	49	21	256	1220
18:00	8	59	61	16	37	18	199	1115
18:15	11	60	38	26	26	13	174	961
18:30	11	55	33	22	15	14	150	779
18:45	8	44	38	11	20	9	130	653
19:00	13	55	28	9	14	9	128	582

Note : Arrows "<" indicate the end time for the peak hour for each turning movement.

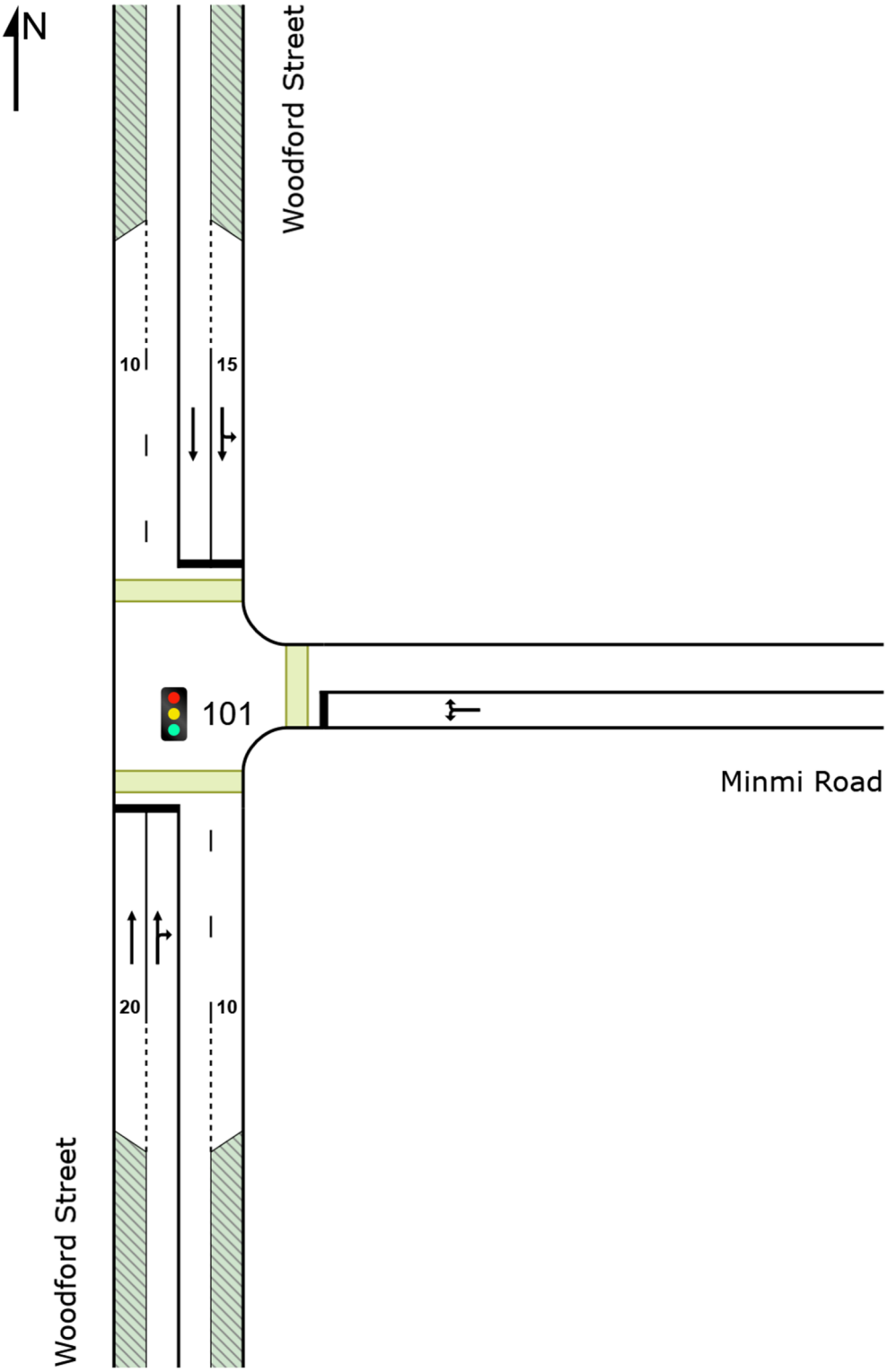
Appendix B SIDRA Outputs

SITE LAYOUT

Site: 101 [Minmi Road/Woodford Street_existing_AM (Site Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_existing_AM (Site Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street														
2	T1	73	1	77	1.4	0.115	14.8	LOS B	1.5	10.9	0.71	0.55	0.71	36.9
3	R2	246	12	259	4.9	* 0.861	38.7	LOS D	9.3	67.5	1.00	1.06	1.49	21.7
Approach		319	13	336	4.1	0.861	33.2	LOS C	9.3	67.5	0.93	0.95	1.31	24.5
East: Minmi Road														
4	L2	352	10	371	2.8	0.897	37.5	LOS D	22.2	160.0	1.00	1.03	1.40	23.2
6	R2	214	10	225	4.7	* 0.897	37.1	LOS D	22.2	160.0	1.00	1.03	1.40	18.0
Approach		566	20	596	3.5	0.897	37.3	LOS D	22.2	160.0	1.00	1.03	1.40	21.4
North: Woodford Street														
7	L2	164	7	173	4.3	0.154	7.1	LOS A	1.1	7.7	0.43	0.65	0.43	35.0
8	T1	143	4	151	2.8	0.228	15.1	LOS B	3.2	22.7	0.74	0.60	0.74	36.4
Approach		307	11	323	3.6	0.228	10.8	LOS B	3.2	22.7	0.58	0.63	0.58	35.9
All Vehicles		1192	44	1255	3.7	0.897	29.4	LOS C	22.2	160.0	0.87	0.90	1.17	25.0

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	24.4	LOS C	0.1	0.1	0.90	0.90	189.0	214.0	1.13
East: Minmi Road												
P2	Full	50	53	24.4	LOS C	0.1	0.1	0.90	0.90	185.7	209.8	1.13
North: Woodford Street												
P3	Full	50	53	24.4	LOS C	0.1	0.1	0.90	0.90	189.0	214.0	1.13
All Pedestrians		150	158	24.4	LOS C	0.1	0.1	0.90	0.90	187.9	212.6	1.13

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_existing_AM (Site Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 60 seconds (Site Practical Cycle Time)

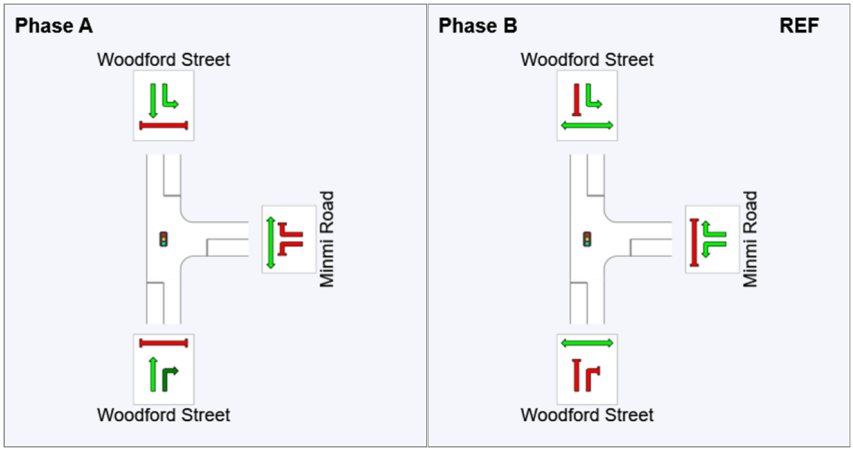
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	33	0
Green Time (sec)	21	27
Phase Time (sec)	27	33
Phase Split	45%	55%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_existing_PM (Site Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street														
2	T1	71	1	75	1.4	0.090	14.3	LOS B	1.7	12.0	0.61	0.48	0.61	37.1
3	R2	310	4	326	1.3	* 0.886	47.8	LOS D	15.8	112.0	0.97	1.06	1.40	19.3
Approach		381	5	401	1.3	0.886	41.6	LOS D	15.8	112.0	0.90	0.95	1.26	21.7
East: Minmi Road														
4	L2	384	5	404	1.3	0.883	42.7	LOS D	25.8	182.9	1.00	0.98	1.27	21.6
6	R2	155	4	163	2.6	* 0.883	42.3	LOS D	25.8	182.9	1.00	0.98	1.27	16.5
Approach		539	9	567	1.7	0.883	42.6	LOS D	25.8	182.9	1.00	0.98	1.27	20.3
North: Woodford Street														
7	L2	211	1	222	0.5	0.168	6.4	LOS A	1.4	9.6	0.33	0.63	0.33	35.9
8	T1	153	3	161	2.0	0.209	14.8	LOS B	3.9	27.4	0.65	0.53	0.65	36.6
Approach		364	4	383	1.1	0.209	10.0	LOS A	3.9	27.4	0.47	0.59	0.47	36.3
All Vehicles		1284	18	1352	1.4	0.886	33.1	LOS C	25.8	182.9	0.82	0.86	1.04	23.6

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	198.9	214.0	1.08
East: Minmi Road												
P2	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	195.7	209.8	1.07
North: Woodford Street												
P3	Full	50	53	34.3	LOS D	0.1	0.1	0.93	0.93	198.9	214.0	1.08
All Pedestrians		150	158	34.3	LOS D	0.1	0.1	0.93	0.93	197.8	212.6	1.07

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_existing_PM (Site Folder: Existing)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)

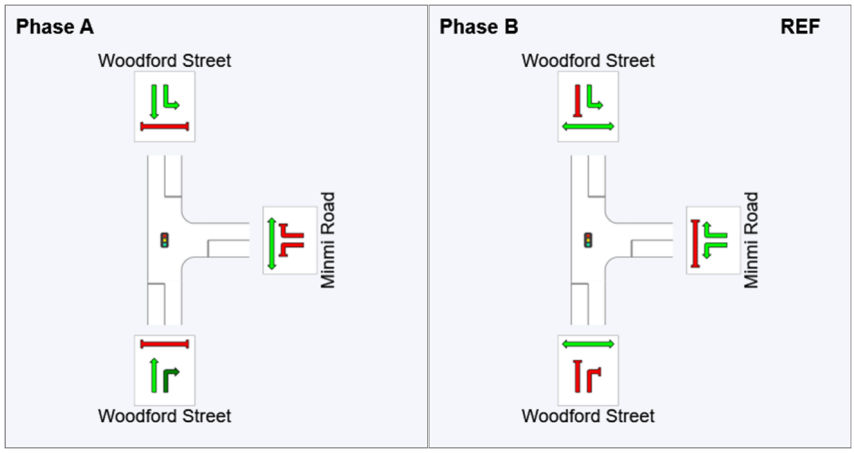
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	39	0
Green Time (sec)	35	33
Phase Time (sec)	41	39
Phase Split	51%	49%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

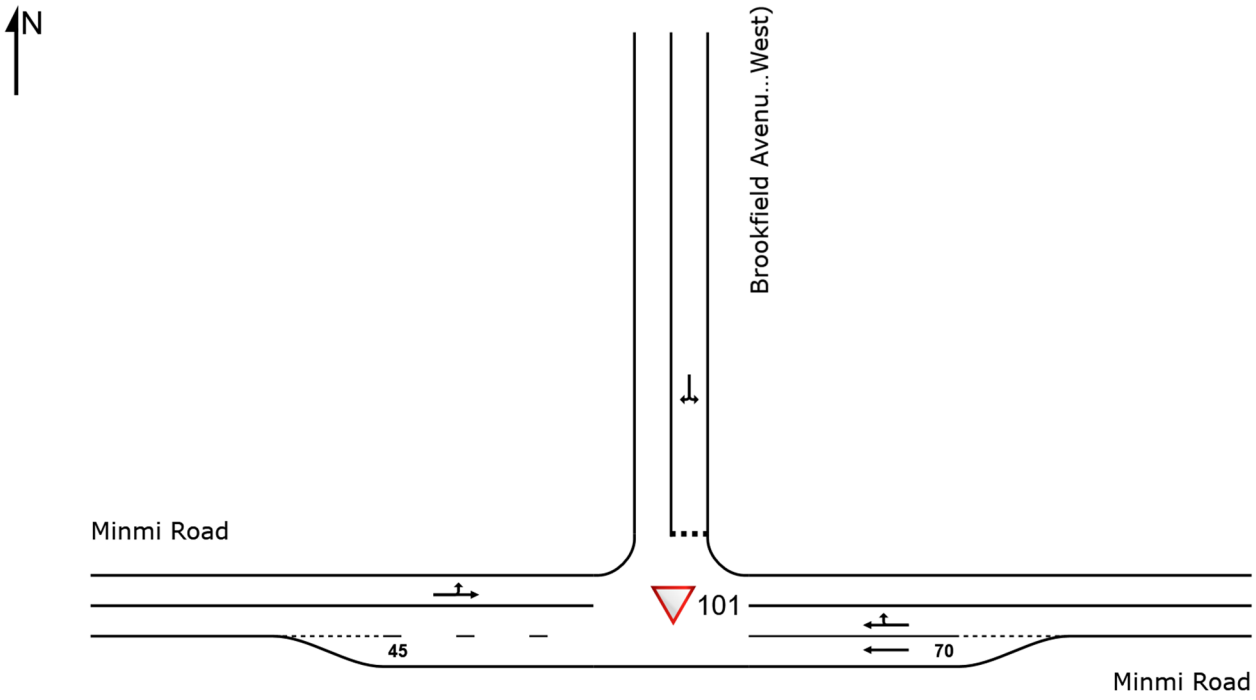
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement

SITE LAYOUT

Site: 101 [Minmi Road/Brookfield Avenue_existing_AM (Site Folder: Existing)]

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

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Brookfield Avenue_existing_AM (Site Folder: Existing)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Minmi Road														
5	T1	521	17	548	3.3	0.236	0.4	LOS A	0.2	1.5	0.05	0.02	0.05	59.8
6	R2	16	1	17	6.3	0.236	8.0	LOS A	0.2	1.5	0.06	0.02	0.06	53.3
Approach		537	18	565	3.4	0.236	0.6	NA	0.2	1.5	0.05	0.02	0.05	59.8
North: Brookfield Avenue (West)														
7	L2	19	0	20	0.0	0.188	6.2	LOS A	0.7	4.7	0.70	0.83	0.70	37.0
9	R2	49	1	52	2.0	0.188	16.1	LOS C	0.7	4.7	0.70	0.83	0.70	52.5
Approach		68	1	72	1.5	0.188	13.3	LOS B	0.7	4.7	0.70	0.83	0.70	50.8
West: Minmi Road														
10	L2	24	1	25	4.2	0.235	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	37.1
11	T1	397	18	418	4.5	0.235	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.5
Approach		421	19	443	4.5	0.235	0.4	NA	0.0	0.0	0.00	0.03	0.00	58.0
All Vehicles		1026	38	1080	3.7	0.236	1.3	NA	0.7	4.7	0.07	0.08	0.07	58.7

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Brookfield Avenue_existing_PM (Site Folder: Existing)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Minmi Road														
5	T1	537	17	565	3.2	0.249	0.5	LOS A	0.3	2.3	0.07	0.02	0.07	59.7
6	R2	22	1	23	4.5	0.249	8.8	LOS A	0.3	2.3	0.09	0.03	0.09	53.0
Approach		559	18	588	3.2	0.249	0.8	NA	0.3	2.3	0.07	0.03	0.07	59.7
North: Brookfield Avenue (West)														
7	L2	12	0	13	0.0	0.086	6.6	LOS A	0.3	2.1	0.70	0.81	0.70	36.4
9	R2	16	1	17	6.3	0.086	19.7	LOS C	0.3	2.1	0.70	0.81	0.70	52.1
Approach		28	1	29	3.6	0.086	14.0	LOS B	0.3	2.1	0.70	0.81	0.70	49.1
West: Minmi Road														
10	L2	35	1	37	2.9	0.286	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	37.1
11	T1	490	4	516	0.8	0.286	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.4
Approach		525	5	553	1.0	0.286	0.5	NA	0.0	0.0	0.00	0.04	0.00	57.7
All Vehicles		1112	24	1171	2.2	0.286	1.0	NA	0.3	2.3	0.05	0.05	0.05	58.9

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

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

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

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

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

Queue Model: SIDRA Standard.

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

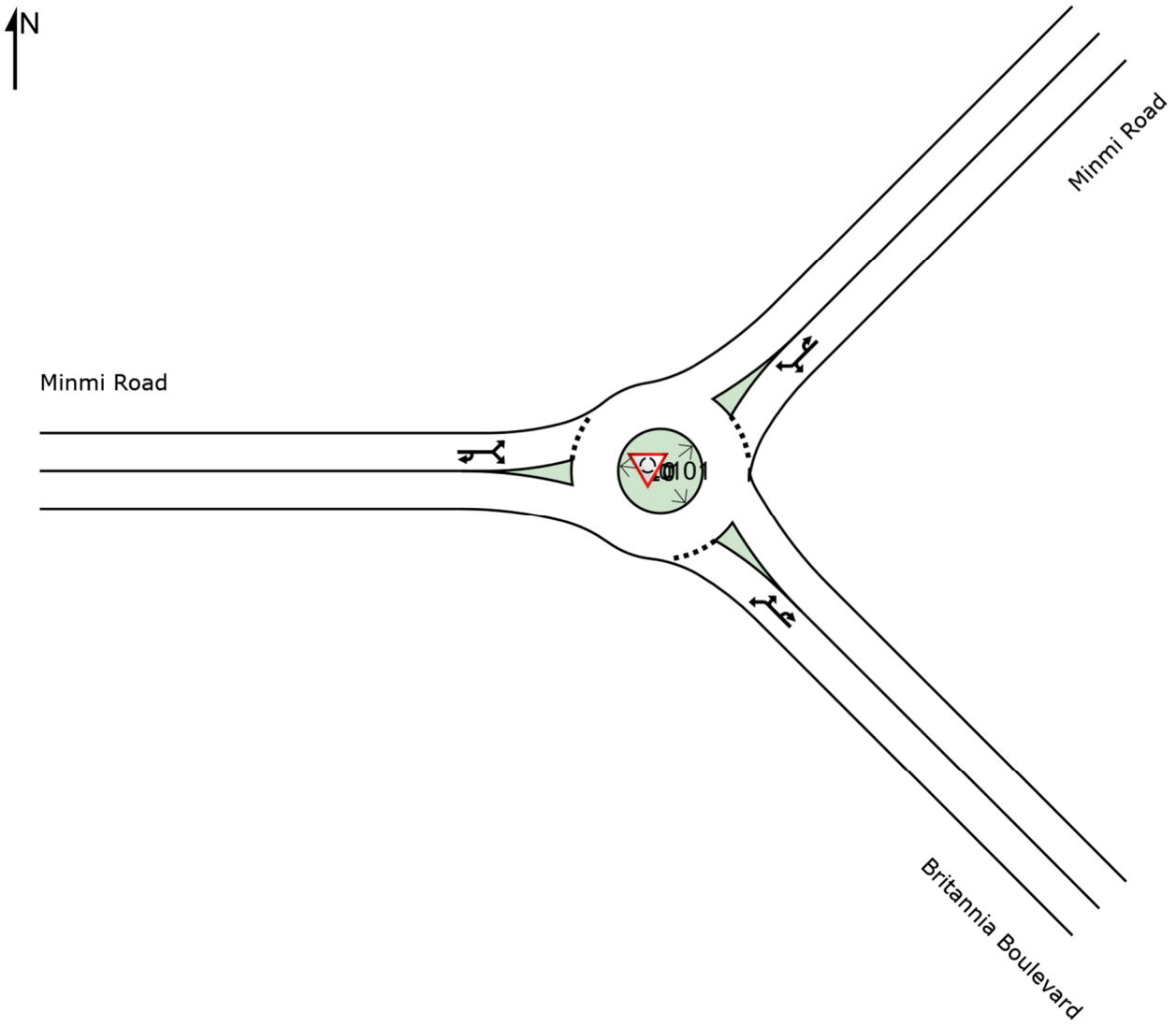
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Minmi Road/Britannia Boulevard_existing_AM (Site Folder: Existing)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Britannia Boulevard_existing_AM (Site Folder: Existing)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Britannia Boulevard														
21a	L1	49	4	52	8.2	0.400	7.3	LOS A	2.4	17.0	0.68	0.83	0.68	49.0
3	R2	259	5	273	1.9	0.400	10.6	LOS B	2.4	17.0	0.68	0.83	0.68	41.1
3u	U	1	0	1	0.0	0.400	12.0	LOS B	2.4	17.0	0.68	0.83	0.68	24.6
Approach		309	9	325	2.9	0.400	10.1	LOS B	2.4	17.0	0.68	0.83	0.68	43.0
NorthEast: Minmi Road														
4	L2	85	5	89	5.9	0.433	5.0	LOS A	3.4	24.2	0.17	0.59	0.17	44.6
26a	R1	524	13	552	2.5	0.433	7.2	LOS A	3.4	24.2	0.17	0.59	0.17	53.4
6u	U	4	0	4	0.0	0.433	9.6	LOS A	3.4	24.2	0.17	0.59	0.17	50.9
Approach		613	18	645	2.9	0.433	6.9	LOS A	3.4	24.2	0.17	0.59	0.17	52.8
West: Minmi Road														
10a	L1	449	14	473	3.1	0.499	6.3	LOS A	3.6	26.2	0.63	0.68	0.63	49.4
12a	R1	20	4	21	20.0	0.499	9.6	LOS A	3.6	26.2	0.63	0.68	0.63	40.0
12u	U	2	0	2	0.0	0.499	11.4	LOS B	3.6	26.2	0.63	0.68	0.63	53.9
Approach		471	18	496	3.8	0.499	6.5	LOS A	3.6	26.2	0.63	0.68	0.63	49.1
All Vehicles		1393	45	1466	3.2	0.499	7.5	LOS A	3.6	26.2	0.44	0.67	0.44	50.2

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Britannia Boulevard_existing_PM (Site Folder: Existing)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Britannia Boulevard														
21a	L1	25	1	26	4.0	0.211	7.6	LOS A	1.2	8.9	0.72	0.82	0.72	48.9
3	R2	103	6	108	5.8	0.211	11.1	LOS B	1.2	8.9	0.72	0.82	0.72	40.5
3u	U	7	0	7	0.0	0.211	12.4	LOS B	1.2	8.9	0.72	0.82	0.72	24.2
Approach		135	7	142	5.2	0.211	10.5	LOS B	1.2	8.9	0.72	0.82	0.72	42.4
NorthEast: Minmi Road														
4	L2	187	5	197	2.7	0.671	5.7	LOS A	6.9	48.8	0.50	0.60	0.50	43.4
26a	R1	595	6	626	1.0	0.671	8.0	LOS A	6.9	48.8	0.50	0.60	0.50	52.8
6u	U	56	1	59	1.8	0.671	10.4	LOS B	6.9	48.8	0.50	0.60	0.50	49.8
Approach		838	12	882	1.4	0.671	7.6	LOS A	6.9	48.8	0.50	0.60	0.50	51.5
West: Minmi Road														
10a	L1	428	3	451	0.7	0.472	5.5	LOS A	3.3	23.6	0.48	0.60	0.48	49.9
12a	R1	88	1	93	1.1	0.472	8.3	LOS A	3.3	23.6	0.48	0.60	0.48	40.9
12u	U	1	0	1	0.0	0.472	10.6	LOS B	3.3	23.6	0.48	0.60	0.48	54.2
Approach		517	4	544	0.8	0.472	6.0	LOS A	3.3	23.6	0.48	0.60	0.48	48.8
All Vehicles		1490	23	1568	1.5	0.671	7.3	LOS A	6.9	48.8	0.51	0.62	0.51	50.2

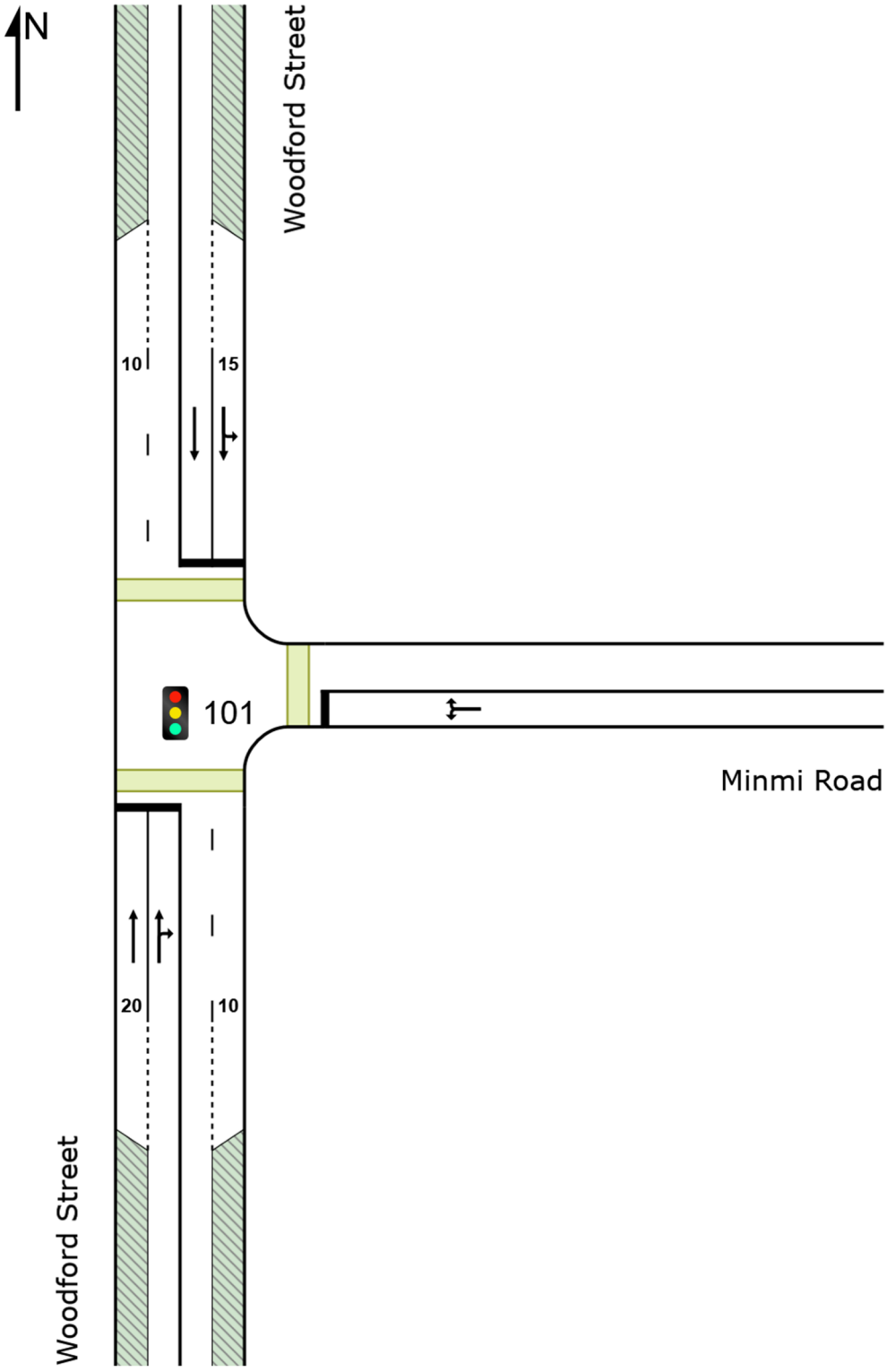
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay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

SITE LAYOUT

Site: 101 [Minmi Road/Woodford Street_future_AM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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


N
Woodford Street
10
15
101
Minmi Road
20
10
Woodford Street

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_AM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street															
2	T1	82	1	86	1.2		0.113	20.5	LOS C	2.6	18.5	0.66	0.52	0.66	33.4
3	R2	280	4	295	1.4	*	0.878	54.5	LOS D	16.8	119.2	0.97	1.02	1.32	17.8
Approach		362	5	381	1.4		0.878	46.8	LOS D	16.8	119.2	0.90	0.90	1.17	20.4
East: Minmi Road															
4	L2	412	5	434	1.2		0.893	45.6	LOS D	38.5	272.6	1.00	0.97	1.19	20.7
6	R2	259	4	273	1.5	*	0.893	45.2	LOS D	38.5	272.6	1.00	0.97	1.19	15.8
Approach		671	9	706	1.3		0.893	45.4	LOS D	38.5	272.6	1.00	0.97	1.19	19.0
North: Woodford Street															
7	L2	187	1	197	0.5		0.139	6.0	LOS A	1.2	8.3	0.26	0.61	0.26	36.4
8	T1	161	3	169	1.9		0.317	21.1	LOS C	5.4	38.5	0.70	0.57	0.70	32.8
Approach		348	4	366	1.1		0.317	13.0	LOS B	5.4	38.5	0.46	0.59	0.46	34.1
All Vehicles		1381	18	1454	1.3		0.893	37.6	LOS D	38.5	272.6	0.84	0.86	1.00	21.9

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	208.9	214.0	1.02
East: Minmi Road												
P2	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	205.7	209.8	1.02
North: Woodford Street												
P3	Full	50	53	44.3	LOS E	0.1	0.1	0.94	0.94	208.9	214.0	1.02
All Pedestrians		150	158	44.3	LOS E	0.1	0.1	0.94	0.94	207.8	212.6	1.02

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_AM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 100 seconds (Site Practical Cycle Time)

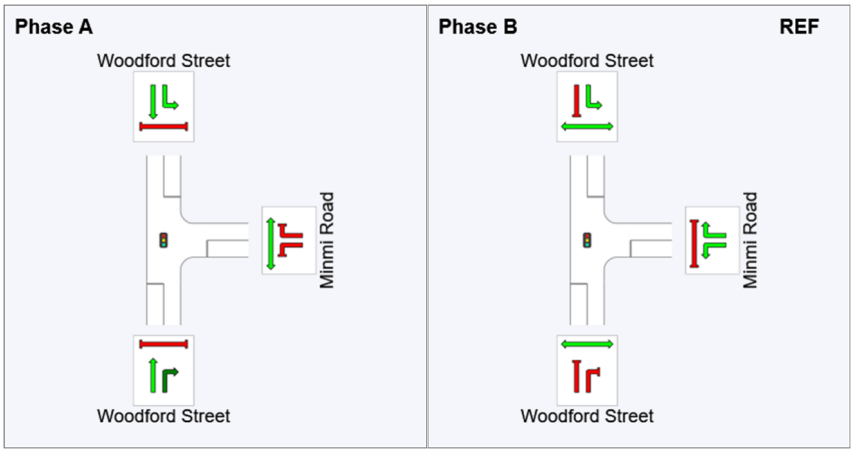
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	54	0
Green Time (sec)	40	48
Phase Time (sec)	46	54
Phase Split	46%	54%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_PM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street															
2	T1	79	1	83	1.3		0.086	16.3	LOS B	2.4	17.3	0.54	0.43	0.54	35.8
3	R2	366	4	385	1.1	*	1.004	111.8	LOS F	37.7	266.2	1.00	1.21	1.70	10.8
Approach		445	5	468	1.1		1.004	94.8	LOS F	37.7	266.2	0.92	1.07	1.49	12.7
East: Minmi Road															
4	L2	434	5	457	1.2		1.005	100.1	LOS F	57.2	405.3	1.00	1.10	1.55	12.1
6	R2	180	4	189	2.2	*	1.005	99.4	LOS F	57.2	405.3	1.00	1.10	1.55	8.6
Approach		614	9	646	1.5		1.005	99.9	LOS F	57.2	405.3	1.00	1.10	1.55	11.1
North: Woodford Street															
7	L2	170	1	179	0.6		0.120	5.8	LOS A	1.1	7.4	0.22	0.59	0.22	36.7
8	T1	256	3	269	1.2		0.397	17.9	LOS B	8.9	62.8	0.61	0.52	0.61	34.7
Approach		426	4	448	0.9		0.397	13.0	LOS B	8.9	62.8	0.45	0.55	0.45	35.2
All Vehicles		1485	18	1563	1.2		1.005	73.5	LOS E	57.2	405.3	0.82	0.93	1.22	14.7

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	218.9	214.0	0.98
East: Minmi Road												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	215.7	209.8	0.97
North: Woodford Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	218.9	214.0	0.98
All Pedestrians		150	158	54.3	LOS E	0.2	0.2	0.95	0.95	217.8	212.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_PM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Practical Cycle Time)

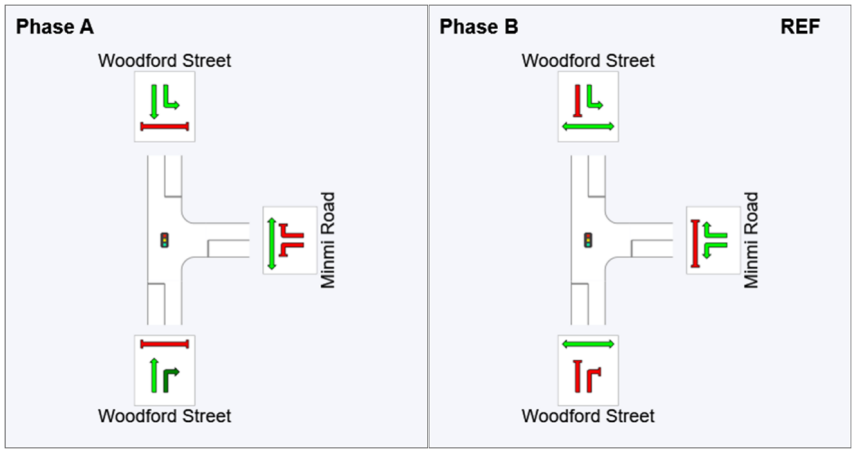
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	53	0
Green Time (sec)	61	47
Phase Time (sec)	67	53
Phase Split	56%	44%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



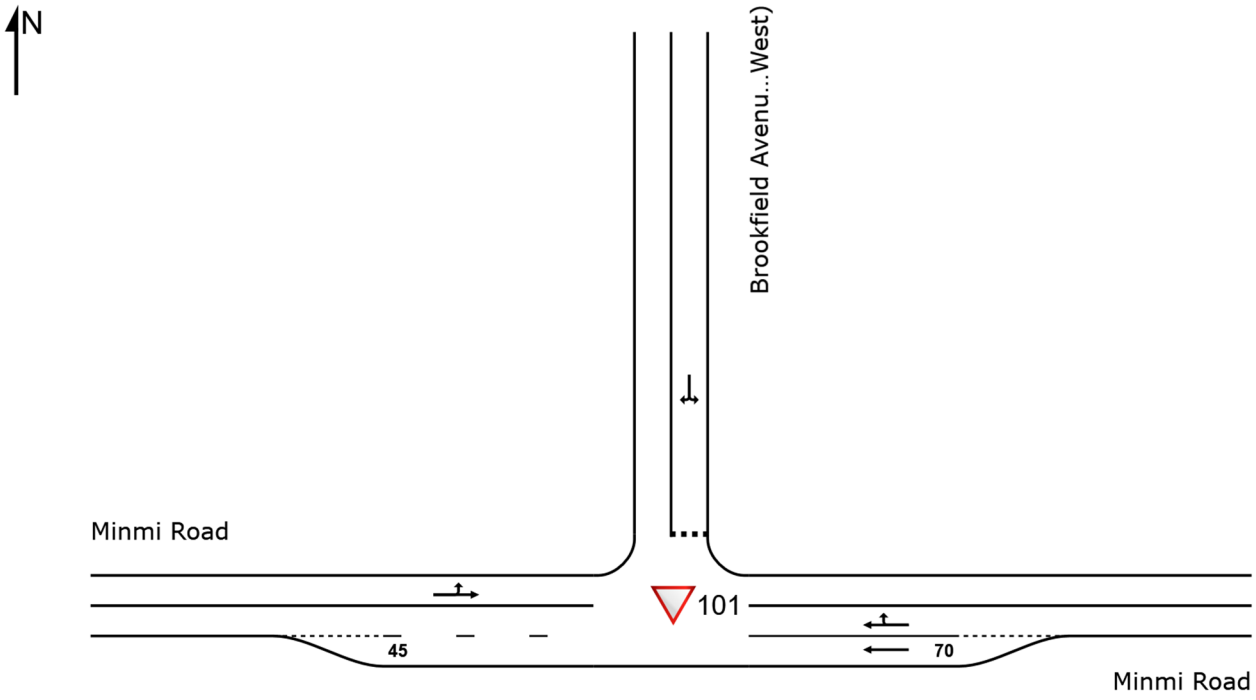
REF: Reference Phase
VAR: Variable Phase

SITE LAYOUT

Site: 101 [Minmi Road/Brookfield Avenue_future_AM (Site Folder: Future Scenario-with DEV)]

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

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Brookfield Avenue_future_AM (Site Folder: Future Scenario-with DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Minmi Road														
5	T1	585	0	616	0.0	0.260	0.4	LOS A	0.2	1.7	0.05	0.02	0.05	49.9
6	R2	18	0	19	0.0	0.260	7.5	LOS A	0.2	1.7	0.07	0.02	0.07	47.3
Approach		603	0	635	0.0	0.260	0.6	NA	0.2	1.7	0.05	0.02	0.05	49.9
North: Brookfield Avenue (West)														
7	L2	21	0	22	0.0	0.253	7.5	LOS A	0.9	6.5	0.77	0.91	0.86	32.1
9	R2	54	0	57	0.0	0.253	20.4	LOS C	0.9	6.5	0.77	0.91	0.86	44.4
Approach		75	0	79	0.0	0.253	16.8	LOS C	0.9	6.5	0.77	0.91	0.86	43.1
West: Minmi Road														
10	L2	27	0	28	0.0	0.273	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	48.1
11	T1	477	0	502	0.0	0.273	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	49.6
Approach		504	0	531	0.0	0.273	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.5
All Vehicles		1182	0	1244	0.0	0.273	1.5	NA	0.9	6.5	0.07	0.08	0.08	49.3

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Brookfield Avenue_future_PM (Site Folder: Future Scenario-with DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Minmi Road														
5	T1	624	0	657	0.0	0.283	0.5	LOS A	0.4	2.8	0.07	0.02	0.08	49.8
6	R2	23	0	24	0.0	0.283	8.4	LOS A	0.4	2.8	0.09	0.03	0.10	47.0
Approach		647	0	681	0.0	0.283	0.8	NA	0.4	2.8	0.07	0.02	0.08	49.8
North: Brookfield Avenue (West)														
7	L2	13	0	14	0.0	0.114	7.0	LOS A	0.4	2.6	0.76	0.86	0.76	32.4
9	R2	18	0	19	0.0	0.114	23.2	LOS C	0.4	2.6	0.76	0.86	0.76	44.5
Approach		31	0	33	0.0	0.114	16.4	LOS C	0.4	2.6	0.76	0.86	0.76	42.3
West: Minmi Road														
10	L2	39	0	41	0.0	0.320	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	48.0
11	T1	552	0	581	0.0	0.320	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	49.5
Approach		591	0	622	0.0	0.320	0.4	NA	0.0	0.0	0.00	0.04	0.00	49.4
All Vehicles		1269	0	1336	0.0	0.320	1.0	NA	0.4	2.8	0.05	0.05	0.06	49.5

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

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

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

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

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

Queue Model: SIDRA Standard.

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

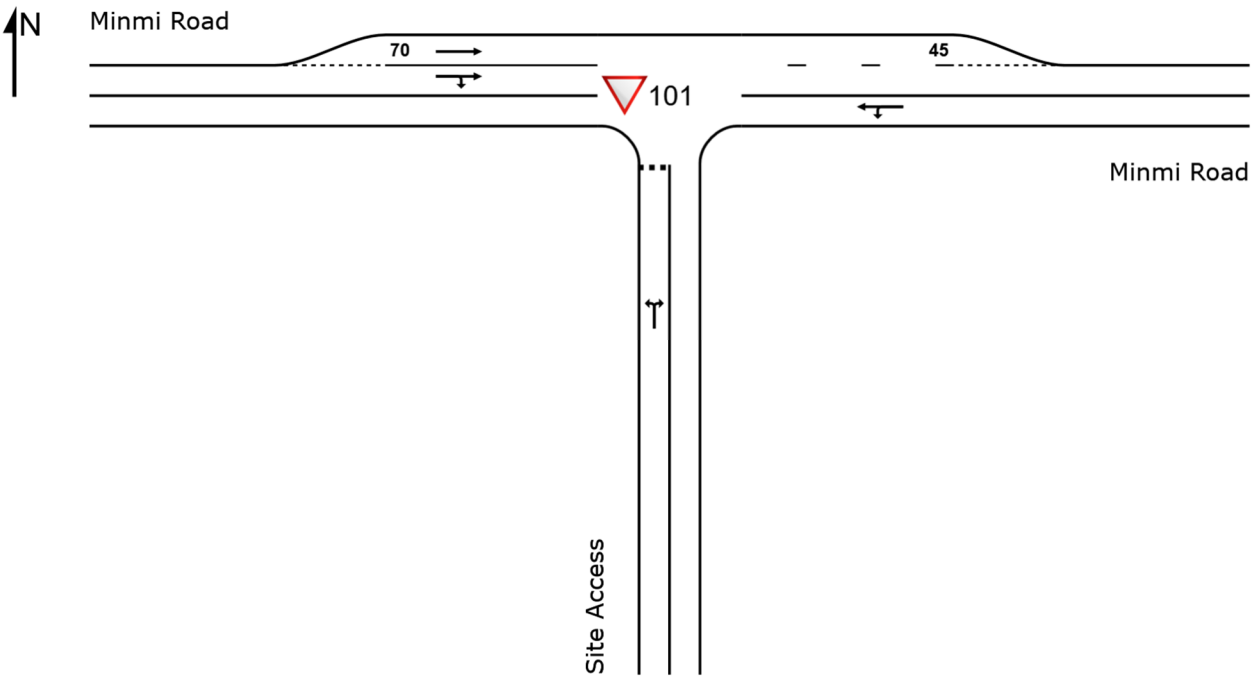
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Minmi Road/Site Access_future_AM (Site Folder: Future Scenario-with DEV)]

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

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Site Access_future_AM (Site Folder: Future Scenario-with DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Access														
1	L2	36	0	38	0.0	0.227	9.2	LOS A	0.8	5.7	0.76	0.92	0.81	52.4
3	R2	39	0	41	0.0	0.227	22.1	LOS C	0.8	5.7	0.76	0.92	0.81	34.5
Approach		75	0	79	0.0	0.227	15.9	LOS C	0.8	5.7	0.76	0.92	0.81	47.9
East: Minmi Road														
4	L2	10	0	11	0.0	0.346	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.7
5	T1	630	0	663	0.0	0.346	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
Approach		640	0	674	0.0	0.346	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
West: Minmi Road														
11	T1	453	0	477	0.0	0.200	0.3	LOS A	0.1	1.0	0.04	0.01	0.04	49.8
12	R2	9	0	9	0.0	0.200	9.4	LOS A	0.1	1.0	0.05	0.02	0.05	49.1
Approach		462	0	486	0.0	0.200	0.5	NA	0.1	1.0	0.04	0.01	0.04	49.8
All Vehicles		1177	0	1239	0.0	0.346	1.3	NA	0.8	5.7	0.06	0.07	0.07	49.8

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Site Access_future_PM (Site Folder: Future Scenario-with DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Access														
1	L2	10	0	11	0.0	0.077	8.2	LOS A	0.2	1.7	0.76	0.86	0.76	52.0
3	R2	11	0	12	0.0	0.077	24.9	LOS C	0.2	1.7	0.76	0.86	0.76	33.7
Approach		21	0	22	0.0	0.077	17.0	LOS C	0.2	1.7	0.76	0.86	0.76	47.3
East: Minmi Road														
4	L2	43	0	45	0.0	0.348	4.7	LOS A	0.0	0.0	0.00	0.05	0.00	48.6
5	T1	599	0	631	0.0	0.348	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	50.5
Approach		642	0	676	0.0	0.348	0.4	NA	0.0	0.0	0.00	0.05	0.00	50.5
West: Minmi Road														
11	T1	576	0	606	0.0	0.282	0.8	LOS A	0.7	5.2	0.13	0.04	0.14	49.3
12	R2	40	0	42	0.0	0.282	9.8	LOS A	0.7	5.2	0.17	0.06	0.19	48.4
Approach		616	0	648	0.0	0.282	1.4	NA	0.7	5.2	0.13	0.04	0.15	49.2
All Vehicles		1279	0	1346	0.0	0.348	1.2	NA	0.7	5.2	0.08	0.06	0.08	50.1

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

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

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

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

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

Queue Model: SIDRA Standard.

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

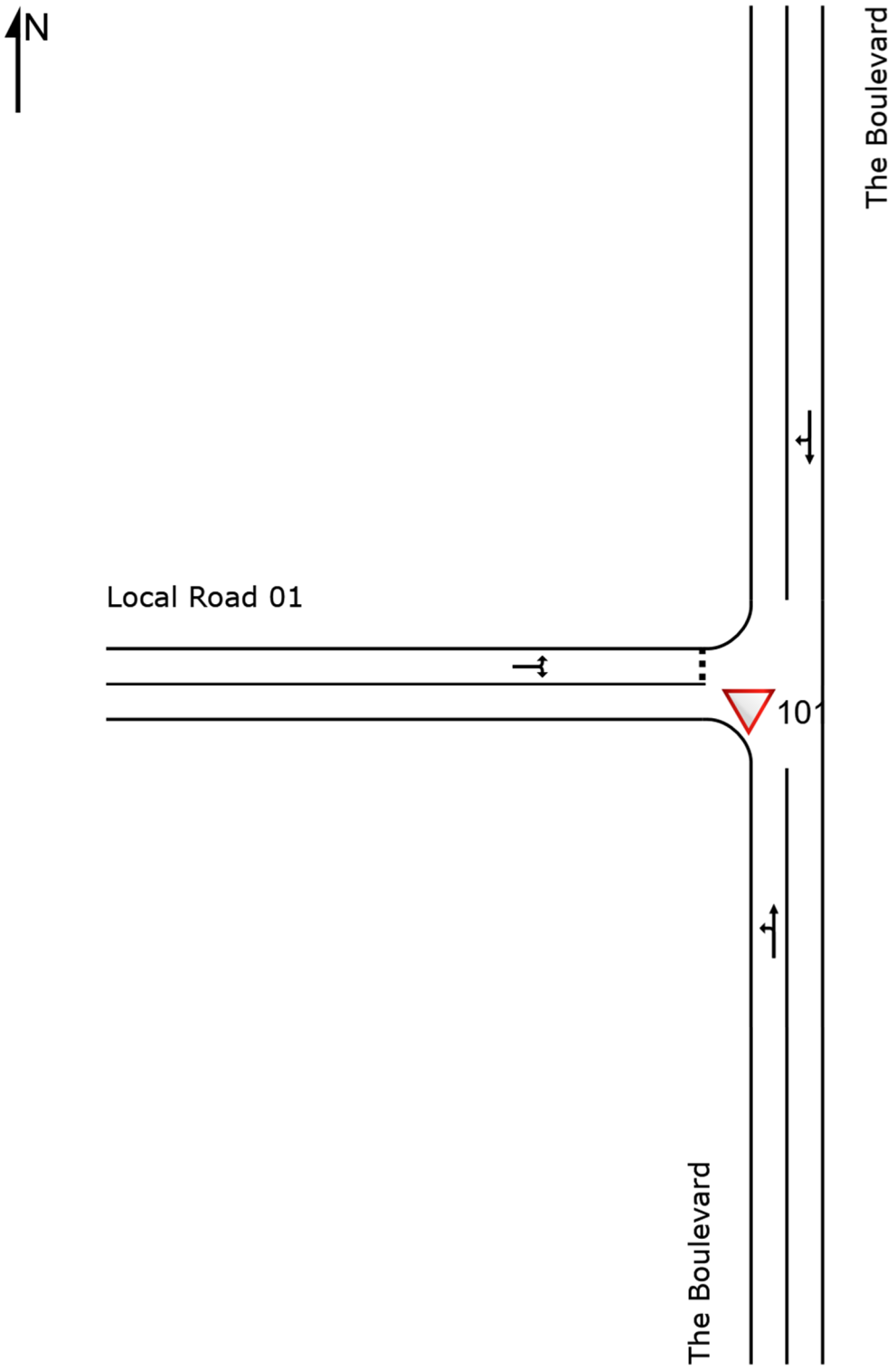
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [The Boulevard/Local Road 01_future_AM (Site Folder: Future Scenario-with DEV)]

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

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



MOVEMENT SUMMARY

Site: 101 [The Boulevard/Local Road 01_future_AM (Site Folder: Future Scenario-with DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Boulevard														
1	L2	1	0	1	0.0	0.041	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	59.1
2	T1	75	0	79	0.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach		76	0	80	0.0	0.041	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: The Boulevard														
8	T1	19	0	20	0.0	0.011	0.0	LOS A	0.0	0.0	0.02	0.03	0.02	58.6
9	R2	1	0	1	0.0	0.011	5.7	LOS A	0.0	0.0	0.02	0.03	0.02	58.7
Approach		20	0	21	0.0	0.011	0.3	NA	0.0	0.0	0.02	0.03	0.02	58.7
West: Local Road 01														
10	L2	1	0	1	0.0	0.002	5.7	LOS A	0.0	0.0	0.16	0.54	0.16	40.1
12	R2	1	0	1	0.0	0.002	5.7	LOS A	0.0	0.0	0.16	0.54	0.16	35.0
Approach		2	0	2	0.0	0.002	5.7	LOS A	0.0	0.0	0.16	0.54	0.16	37.7
All Vehicles		98	0	103	0.0	0.041	0.2	NA	0.0	0.0	0.01	0.02	0.01	58.8

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [The Boulevard/Local Road 01_future_PM (Site Folder: Future Scenario-with DEV)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Boulevard														
1	L2	1	0	1	0.0	0.012	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	59.0
2	T1	21	0	22	0.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.0
Approach		22	0	23	0.0	0.012	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.0
North: The Boulevard														
8	T1	82	0	86	0.0	0.045	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
9	R2	1	0	1	0.0	0.045	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	58.8
Approach		83	0	87	0.0	0.045	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.6
West: Local Road 01														
10	L2	1	0	1	0.0	0.002	5.6	LOS A	0.0	0.0	0.08	0.56	0.08	40.7
12	R2	1	0	1	0.0	0.002	5.8	LOS A	0.0	0.0	0.08	0.56	0.08	35.6
Approach		2	0	2	0.0	0.002	5.7	LOS A	0.0	0.0	0.08	0.56	0.08	38.2
All Vehicles		107	0	113	0.0	0.045	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.0

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

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

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

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

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

Queue Model: SIDRA Standard.

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

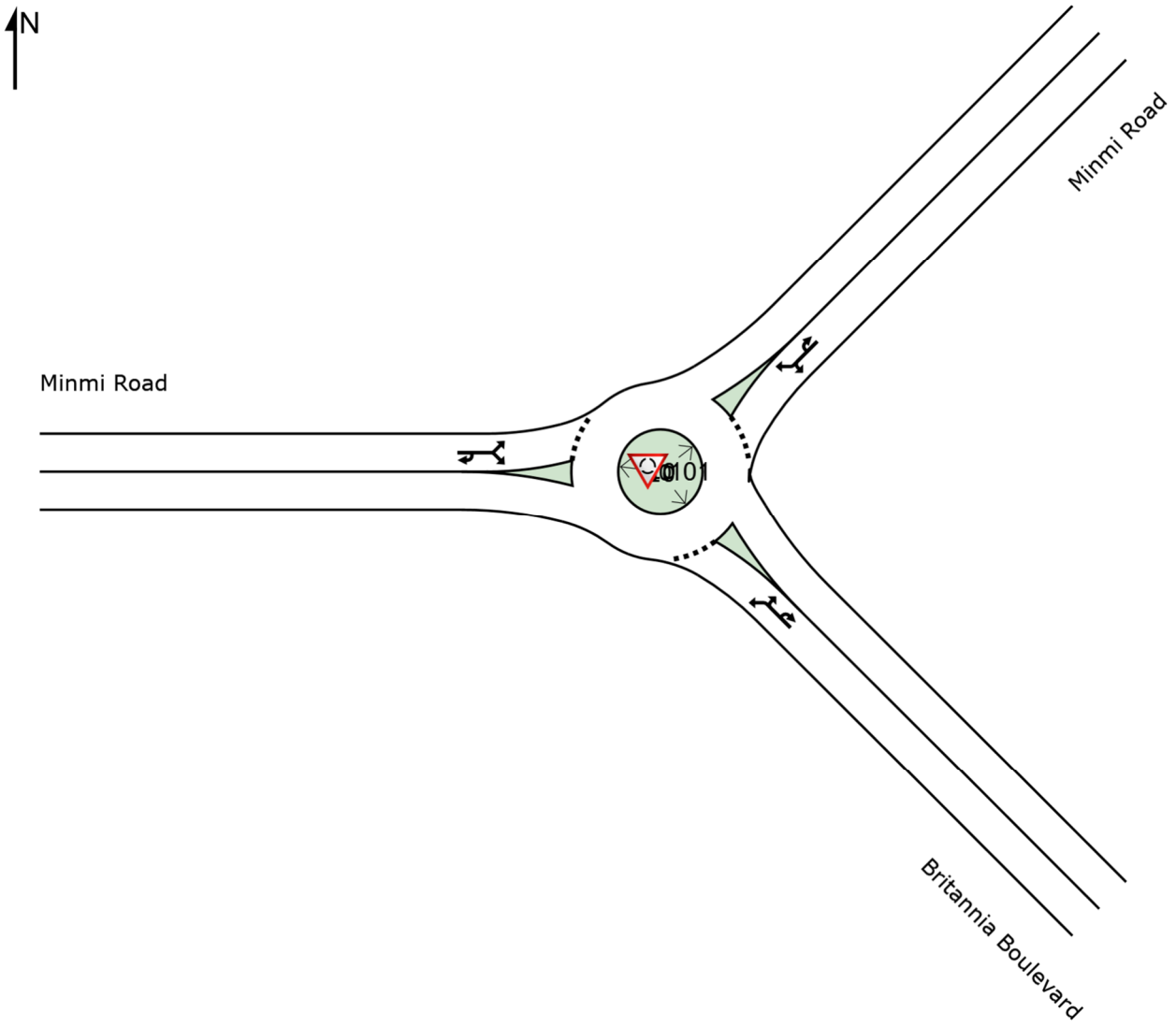
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Minmi Road/Britannia Boulevard_future_AM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Britannia Boulevard_future_AM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Britannia Boulevard														
21a	L1	54	0	57	0.0	0.460	8.4	LOS A	3.1	21.9	0.74	0.90	0.82	42.8
3	R2	290	0	305	0.0	0.460	11.9	LOS B	3.1	21.9	0.74	0.90	0.82	37.1
3u	U	1	0	1	0.0	0.460	13.8	LOS B	3.1	21.9	0.74	0.90	0.82	23.5
Approach		345	0	363	0.0	0.460	11.4	LOS B	3.1	21.9	0.74	0.90	0.82	38.5
NorthEast: Minmi Road														
4	L2	95	0	100	0.0	0.476	4.0	LOS A	4.1	28.6	0.19	0.55	0.19	40.8
26a	R1	588	0	619	0.0	0.476	6.2	LOS A	4.1	28.6	0.19	0.55	0.19	46.4
6u	U	4	0	4	0.0	0.476	9.6	LOS A	4.1	28.6	0.19	0.55	0.19	47.7
Approach		687	0	723	0.0	0.476	5.9	LOS A	4.1	28.6	0.19	0.55	0.19	46.0
West: Minmi Road														
10a	L1	535	0	563	0.0	0.597	6.2	LOS A	5.3	36.8	0.72	0.73	0.77	43.7
12a	R1	22	0	23	0.0	0.597	9.0	LOS A	5.3	36.8	0.72	0.73	0.77	37.2
12u	U	2	0	2	0.0	0.597	12.4	LOS B	5.3	36.8	0.72	0.73	0.77	52.1
Approach		559	0	588	0.0	0.597	6.4	LOS A	5.3	36.8	0.72	0.73	0.77	43.6
All Vehicles		1591	0	1675	0.0	0.597	7.2	LOS A	5.3	36.8	0.49	0.69	0.53	44.2

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Britannia Boulevard_future_PM (Site Folder: Future Scenario-with DEV)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Britannia Boulevard														
21a	L1	28	0	29	0.0	0.271	8.7	LOS A	1.7	12.2	0.82	0.89	0.82	42.6
3	R2	115	0	121	0.0	0.271	12.2	LOS B	1.7	12.2	0.82	0.89	0.82	36.9
3u	U	8	0	8	0.0	0.271	14.1	LOS B	1.7	12.2	0.82	0.89	0.82	23.3
Approach		151	0	159	0.0	0.271	11.7	LOS B	1.7	12.2	0.82	0.89	0.82	38.2
NorthEast: Minmi Road														
4	L2	211	0	222	0.0	0.779	5.1	LOS A	10.2	71.4	0.66	0.59	0.66	39.4
26a	R1	700	0	737	0.0	0.779	7.3	LOS A	10.2	71.4	0.66	0.59	0.66	45.7
6u	U	62	0	65	0.0	0.779	10.8	LOS B	10.2	71.4	0.66	0.59	0.66	46.5
Approach		973	0	1024	0.0	0.779	7.1	LOS A	10.2	71.4	0.66	0.59	0.66	45.1
West: Minmi Road														
10a	L1	483	0	508	0.0	0.537	4.7	LOS A	4.2	29.1	0.55	0.59	0.55	44.2
12a	R1	97	0	102	0.0	0.537	7.4	LOS A	4.2	29.1	0.55	0.59	0.55	37.8
12u	U	1	0	1	0.0	0.537	10.8	LOS B	4.2	29.1	0.55	0.59	0.55	52.4
Approach		581	0	612	0.0	0.537	5.1	LOS A	4.2	29.1	0.55	0.59	0.55	43.5
All Vehicles		1705	0	1795	0.0	0.779	6.8	LOS A	10.2	71.4	0.63	0.61	0.63	44.2

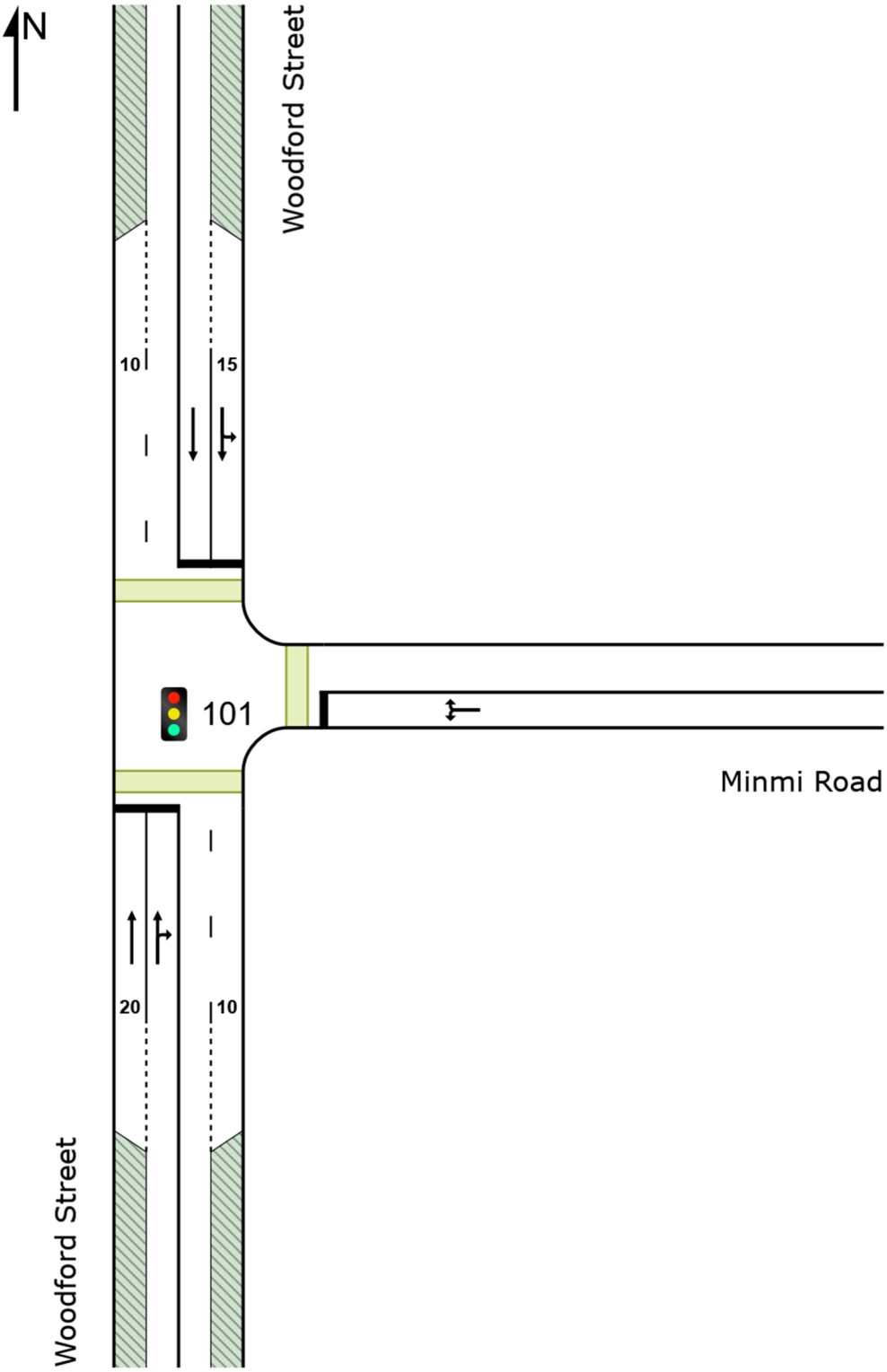
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay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

SITE LAYOUT

Site: 101 [Minmi Road/Woodford Street_future_AM - Mit (Site Folder: Mitigation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_AM - Mit (Site Folder: Mitigation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street														
2	T1	82	1	86	1.2	0.102	16.0	LOS B	2.2	15.4	0.61	0.49	0.61	36.2
3	R2	280	4	295	1.4	* 0.657	36.9	LOS D	10.8	76.8	0.95	0.96	0.95	22.3
Approach		362	5	381	1.4	0.657	32.1	LOS C	10.8	76.8	0.87	0.85	0.88	24.9
East: Minmi Road														
4	L2	412	5	434	1.2	0.884	40.8	LOS D	34.5	244.5	0.99	0.97	1.18	22.1
6	R2	259	4	273	1.5	* 0.884	40.4	LOS D	34.5	244.5	0.99	0.97	1.18	17.1
Approach		671	9	706	1.3	0.884	40.7	LOS D	34.5	244.5	0.99	0.97	1.18	20.4
North: Woodford Street														
7	L2	187	1	197	0.5	* 0.889	55.7	LOS E	9.9	69.6	0.97	1.04	1.47	13.2
8	T1	161	3	169	1.9	0.699	36.7	LOS D	7.0	49.5	0.93	0.81	1.04	26.2
Approach		348	4	366	1.1	0.889	46.9	LOS D	9.9	69.6	0.95	0.94	1.27	19.2
All Vehicles		1381	18	1454	1.3	0.889	40.0	LOS D	34.5	244.5	0.95	0.93	1.13	21.2

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	203.9	214.0	1.05
East: Minmi Road												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	200.7	209.8	1.05
North: Woodford Street												
P3	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	203.9	214.0	1.05

All Pedestrians	150	158	39.3	LOS D	0.1	0.1	0.94	0.94	202.8	212.6	1.05

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_AM - Mit (Site Folder: Mitigation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

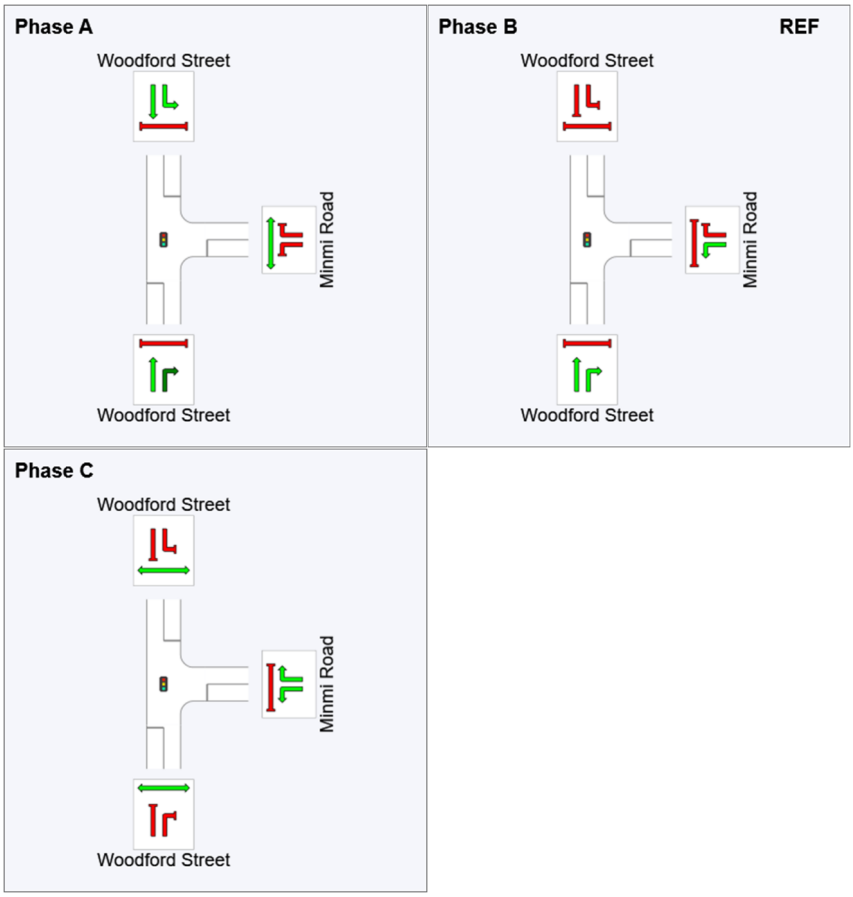
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	66	0	22
Green Time (sec)	18	16	38
Phase Time (sec)	24	22	44
Phase Split	27%	24%	49%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_PM - Mit (Site Folder: Mitigation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street															
2	T1	79	1	83	1.3		0.086	14.9	LOS B	2.2	15.9	0.54	0.43	0.54	36.7
3	R2	366	4	385	1.1	*	0.733	42.0	LOS D	16.8	119.0	0.96	1.01	0.98	20.8
Approach		445	5	468	1.1		0.733	37.2	LOS D	16.8	119.0	0.88	0.91	0.90	23.0
East: Minmi Road															
4	L2	434	5	457	1.2		0.885	49.2	LOS D	37.7	267.2	1.00	0.96	1.17	19.9
6	R2	180	4	189	2.2	*	0.885	48.4	LOS D	37.7	267.2	1.00	0.96	1.17	15.0
Approach		614	9	646	1.5		0.885	48.9	LOS D	37.7	267.2	1.00	0.96	1.17	18.6
North: Woodford Street															
7	L2	170	1	179	0.6		0.836	55.3	LOS E	9.7	68.3	0.92	0.94	1.23	13.3
8	T1	256	3	269	1.2	*	0.870	52.1	LOS D	15.2	107.5	0.93	0.99	1.24	21.8
Approach		426	4	448	0.9		0.870	53.3	LOS D	15.2	107.5	0.93	0.97	1.24	18.8
All Vehicles		1485	18	1563	1.2		0.885	46.7	LOS D	37.7	267.2	0.94	0.95	1.11	19.9

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	213.9	214.0	1.00
East: Minmi Road												
P2	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	210.7	209.8	1.00
North: Woodford Street												
P3	Full	50	53	49.3	LOS E	0.2	0.2	0.95	0.95	213.9	214.0	1.00
All Pedestrians		150	158	49.3	LOS E	0.2	0.2	0.95	0.95	212.8	212.6	1.00

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_future_PM - Mit (Site Folder: Mitigation)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

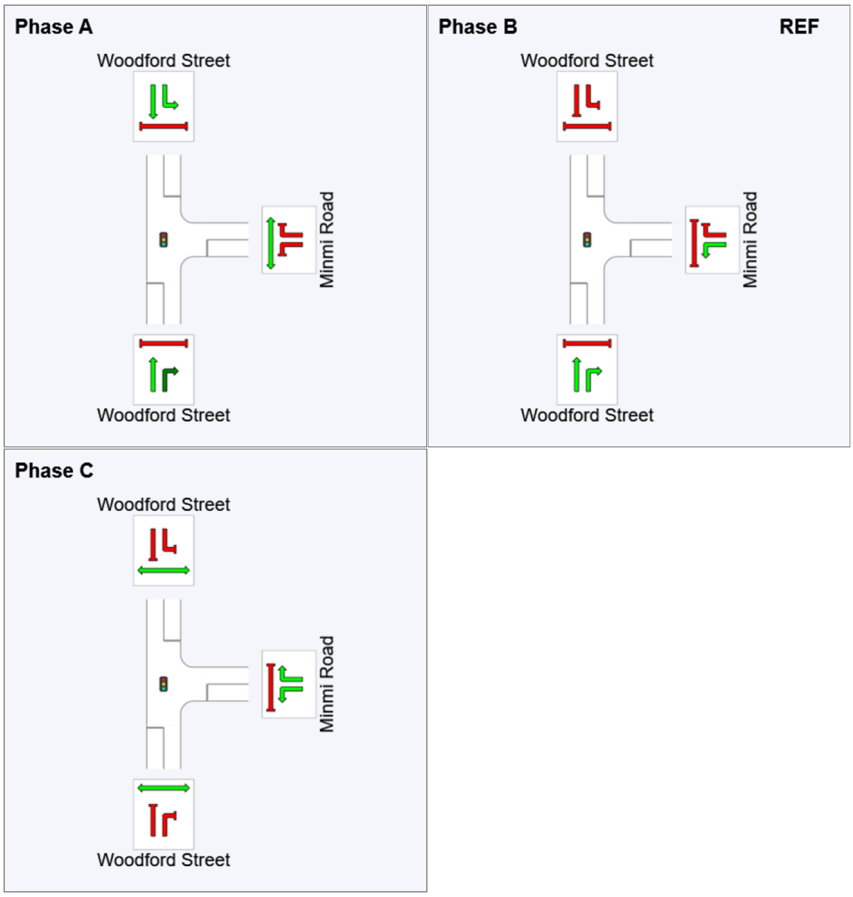
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	77	0	29
Green Time (sec)	27	23	42
Phase Time (sec)	33	29	48
Phase Split	30%	26%	44%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

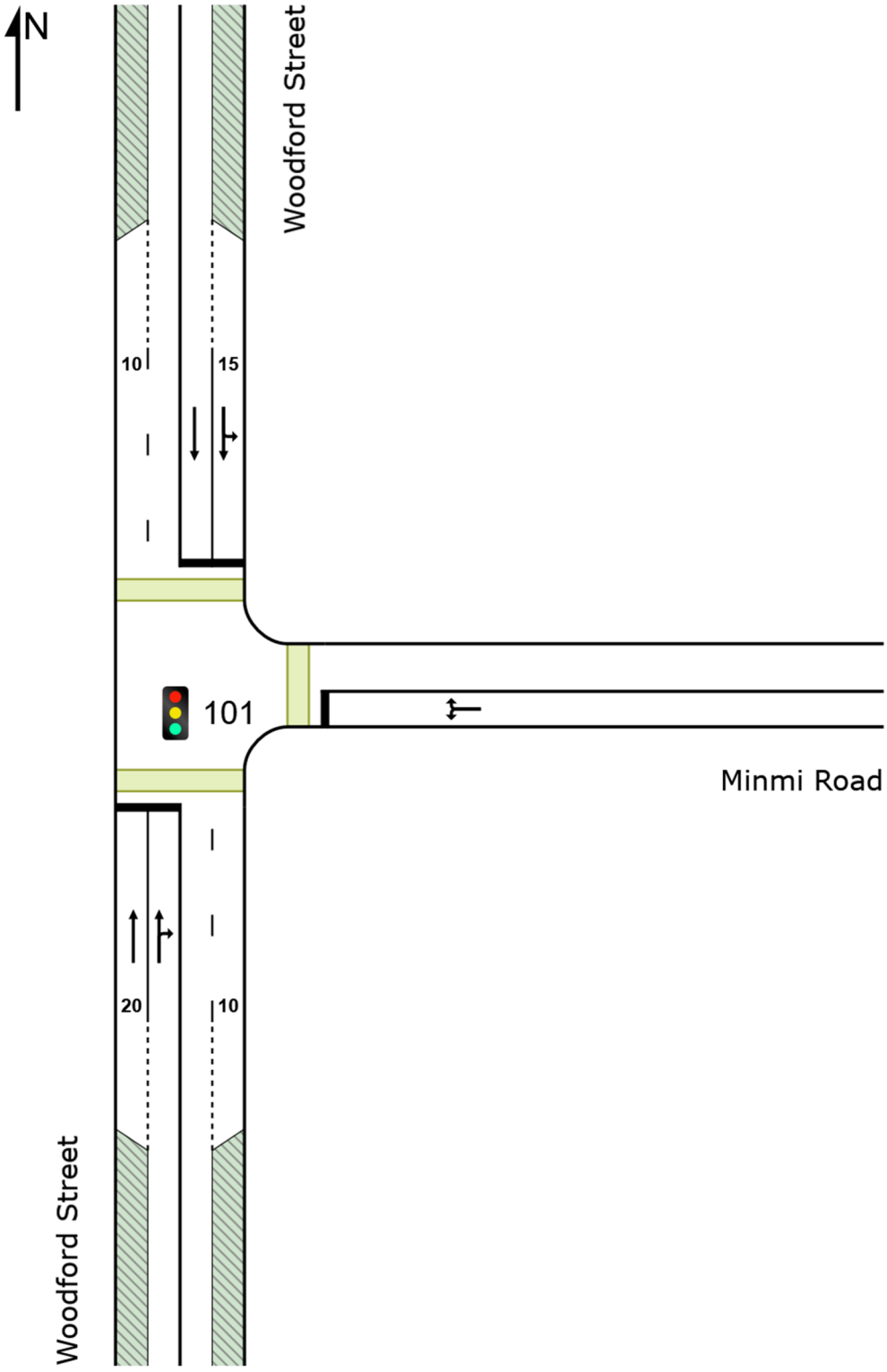
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

SITE LAYOUT

Site: 101 [Minmi Road/Woodford Street_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

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


N
Woodford Street
10
15
101
Minmi Road
20
10
Woodford Street

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street															
2	T1	123	1	129	0.8		0.133	16.8	LOS B	3.9	27.6	0.56	0.46	0.56	35.6
3	R2	289	4	304	1.4	*	0.710	47.0	LOS D	15.4	108.7	0.97	0.98	0.99	19.5
Approach		412	5	434	1.2		0.710	38.0	LOS D	15.4	108.7	0.84	0.82	0.86	23.2
East: Minmi Road															
4	L2	446	5	469	1.1		0.977	82.0	LOS F	58.1	411.1	1.00	1.05	1.41	14.1
6	R2	233	4	245	1.7	*	0.977	81.0	LOS F	58.1	411.1	1.00	1.05	1.41	10.2
Approach		679	9	715	1.3		0.977	81.6	LOS F	58.1	411.1	1.00	1.05	1.41	12.8
North: Woodford Street															
7	L2	236	1	248	0.4	*	0.979	94.0	LOS F	19.2	134.6	0.89	1.12	1.57	8.8
8	T1	325	3	342	0.9		0.967	79.4	LOS E	25.3	178.8	0.91	1.19	1.45	16.9
Approach		561	4	591	0.7		0.979	85.6	LOS F	25.3	178.8	0.90	1.16	1.50	13.5
All Vehicles		1652	18	1739	1.1		0.979	72.1	LOS E	58.1	411.1	0.93	1.03	1.30	14.9

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	218.9	214.0	0.98
East: Minmi Road												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	215.7	209.8	0.97
North: Woodford Street												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	218.9	214.0	0.98
All Pedestrians		150	158	54.3	LOS E	0.2	0.2	0.95	0.95	217.8	212.6	0.98

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

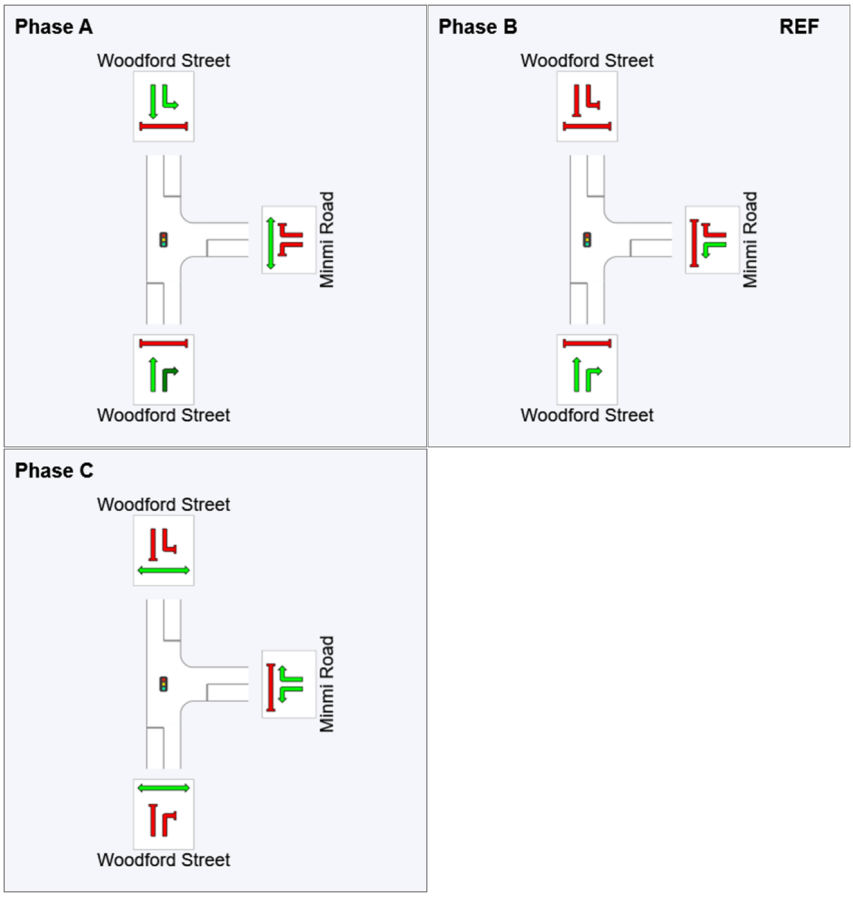
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	78	0	25
Green Time (sec)	36	19	47
Phase Time (sec)	42	25	53
Phase Split	35%	21%	44%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

Normal Movement Permitted/Opposed

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Woodford Street_future - Cummulative Impact_PM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodford Street															
2	T1	117	1	123	0.9		0.121	11.5	LOS B	2.7	18.7	0.53	0.43	0.53	39.2
3	R2	374	4	394	1.1	*	1.009	64.2	LOS E	24.7	174.2	1.00	1.16	1.85	12.1
Approach		491	5	517	1.0		1.009	51.6	LOS D	24.7	174.2	0.89	0.98	1.54	15.1
East: Minmi Road															
4	L2	446	5	469	1.1		1.074	133.7	LOS F	63.8	452.0	1.00	1.31	2.15	9.5
6	R2	220	4	232	1.8	*	1.074	132.8	LOS F	63.8	452.0	1.00	1.31	2.15	6.6
Approach		666	9	701	1.4		1.074	133.4	LOS F	63.8	452.0	1.00	1.31	2.15	8.6
North: Woodford Street															
7	L2	299	1	315	0.3	*	1.073	140.8	LOS F	28.9	203.2	1.00	1.47	2.34	6.2
8	T1	321	3	338	0.9		1.018	99.6	LOS F	26.4	186.2	1.00	1.49	1.99	14.4
Approach		620	4	653	0.6		1.073	119.4	LOS F	28.9	203.2	1.00	1.48	2.16	10.1
All Vehicles		1777	18	1871	1.0		1.074	105.9	LOS F	63.8	452.0	0.97	1.28	1.98	10.5

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

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Woodford Street												
P1	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	203.9	214.0	1.05
East: Minmi Road												
P2	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	200.7	209.8	1.05
North: Woodford Street												
P3	Full	50	53	39.3	LOS D	0.1	0.1	0.94	0.94	203.9	214.0	1.05
All Pedestrians		150	158	39.3	LOS D	0.1	0.1	0.94	0.94	202.8	212.6	1.05

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

PHASING SUMMARY

Site: 101 [Minmi Road/Woodford Street_future - Cummulative Impact_PM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

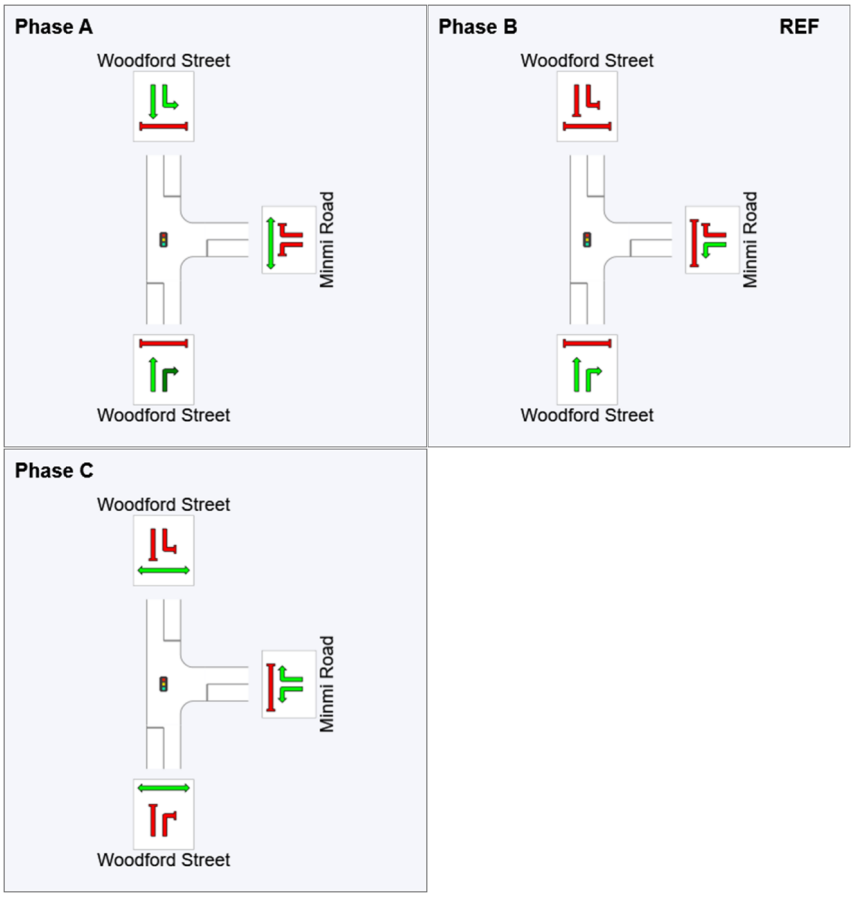
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase B
Input Phase Sequence: A, B, C
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	57	0	21
Green Time (sec)	27	15	30
Phase Time (sec)	33	21	36
Phase Split	37%	23%	40%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

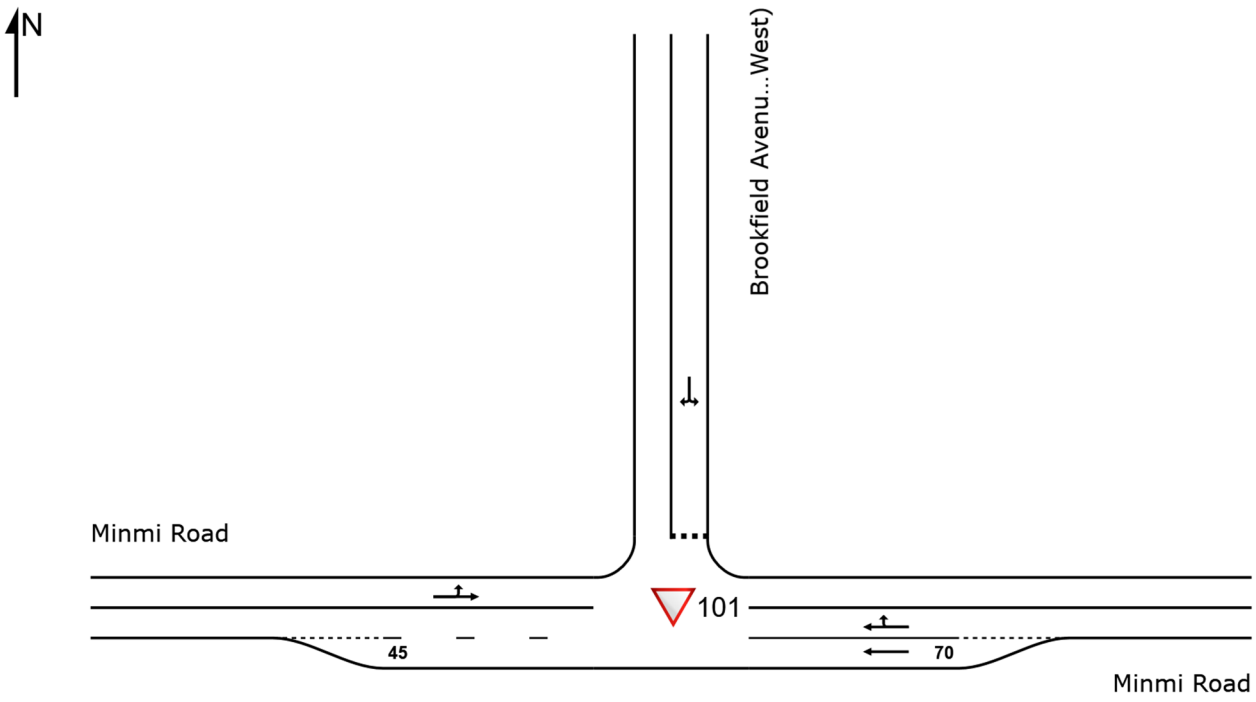
Normal Movement	Permitted/Opposed
Slip/Bypass-Lane Movement	Opposed Slip/Bypass-Lane
Stopped Movement	Turn On Red
Other Movement Class (MC) Running	Undetected Movement
Mixed Running & Stopped MCs	Continuous Movement
Other Movement Class (MC) Stopped	Phase Transition Applied

SITE LAYOUT

Site: 101 [Minmi Road/Brookfield Avenue_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

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

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Brookfield Avenue_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Minmi Road														
5	T1	615	0	647	0.0	0.276	0.5	LOS A	0.3	2.3	0.06	0.02	0.06	49.8
6	R2	18	0	19	0.0	0.276	8.8	LOS A	0.3	2.3	0.08	0.02	0.08	47.1
Approach		633	0	666	0.0	0.276	0.8	NA	0.3	2.3	0.06	0.02	0.06	49.8
North: Brookfield Avenue (West)														
7	L2	21	0	22	0.0	0.344	10.4	LOS B	1.3	9.0	0.85	0.99	1.04	28.2
9	R2	54	0	57	0.0	0.344	28.8	LOS D	1.3	9.0	0.85	0.99	1.04	42.5
Approach		75	0	79	0.0	0.344	23.6	LOS C	1.3	9.0	0.85	0.99	1.04	40.9
West: Minmi Road														
10	L2	27	0	28	0.0	0.338	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	48.2
11	T1	598	0	629	0.0	0.338	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		625	0	658	0.0	0.338	0.3	NA	0.0	0.0	0.00	0.02	0.00	49.6
All Vehicles		1333	0	1403	0.0	0.344	1.8	NA	1.3	9.0	0.08	0.08	0.09	49.1

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Brookfield Avenue_future - Cummulative Impact_PM (Site Folder: Future Scenario - Cummulative Impact)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
East: Minmi Road														
5	T1	651	0	685	0.0	0.298	0.7	LOS A	0.5	3.7	0.08	0.02	0.10	49.8
6	R2	23	0	24	0.0	0.298	9.9	LOS A	0.5	3.7	0.11	0.03	0.13	46.7
Approach		674	0	709	0.0	0.298	1.0	NA	0.5	3.7	0.08	0.02	0.10	49.7
North: Brookfield Avenue (West)														
7	L2	13	0	14	0.0	0.153	7.8	LOS A	0.5	3.3	0.83	0.92	0.83	29.7
9	R2	18	0	19	0.0	0.153	30.4	LOS D	0.5	3.3	0.83	0.92	0.83	43.2
Approach		31	0	33	0.0	0.153	20.9	LOS C	0.5	3.3	0.83	0.92	0.83	40.7
West: Minmi Road														
10	L2	39	0	41	0.0	0.379	4.6	LOS A	0.0	0.0	0.00	0.03	0.00	48.1
11	T1	661	0	696	0.0	0.379	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	49.5
Approach		700	0	737	0.0	0.379	0.3	NA	0.0	0.0	0.00	0.03	0.00	49.5
All Vehicles		1405	0	1479	0.0	0.379	1.1	NA	0.5	3.7	0.06	0.05	0.06	49.4

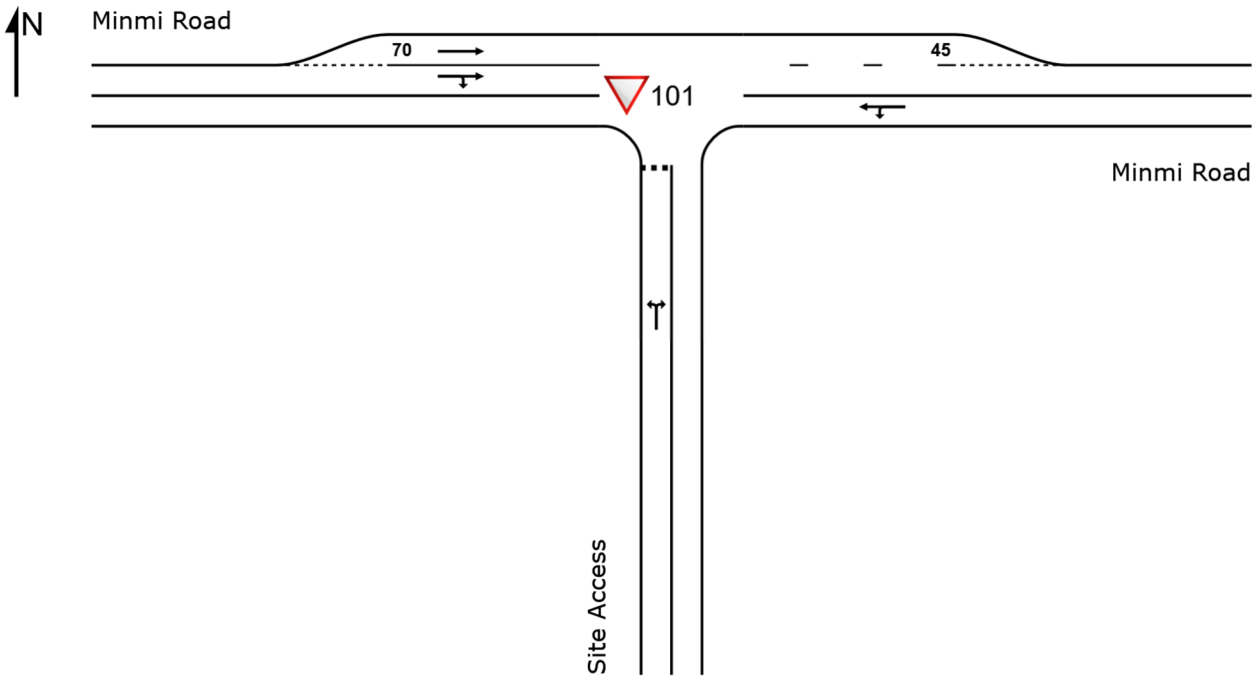
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Minmi Road/Site Access_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

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

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Site Access_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Access														
1	L2	36	0	38	0.0	0.438	13.3	LOS B	1.8	12.5	0.86	1.03	1.17	49.2
3	R2	68	0	72	0.0	0.438	31.2	LOS D	1.8	12.5	0.86	1.03	1.17	28.5
Approach		104	0	109	0.0	0.438	25.0	LOS C	1.8	12.5	0.86	1.03	1.17	40.9
East: Minmi Road														
4	L2	17	0	18	0.0	0.362	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	48.6
5	T1	652	0	686	0.0	0.362	0.1	LOS A	0.0	0.0	0.00	0.01	0.00	50.0
Approach		669	0	704	0.0	0.362	0.2	NA	0.0	0.0	0.00	0.01	0.00	50.0
West: Minmi Road														
11	T1	544	0	573	0.0	0.239	0.4	LOS A	0.2	1.2	0.03	0.01	0.04	49.8
12	R2	9	0	9	0.0	0.239	10.0	LOS A	0.2	1.2	0.04	0.01	0.05	49.1
Approach		553	0	582	0.0	0.239	0.6	NA	0.2	1.2	0.03	0.01	0.04	49.8
All Vehicles		1326	0	1396	0.0	0.438	2.3	NA	1.8	12.5	0.08	0.09	0.11	49.4

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Site Access_future - Cummulative Impact _PM (Site Folder: Future Scenario - Cummulative Impact)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Site Access														
1	L2	10	0	11	0.0	0.091	8.4	LOS A	0.3	2.0	0.80	0.89	0.80	51.1
3	R2	11	0	12	0.0	0.091	29.6	LOS D	0.3	2.0	0.80	0.89	0.80	31.9
Approach		21	0	22	0.0	0.091	19.5	LOS C	0.3	2.0	0.80	0.89	0.80	46.0
East: Minmi Road														
4	L2	49	0	52	0.0	0.362	4.7	LOS A	0.0	0.0	0.00	0.05	0.00	48.5
5	T1	619	0	652	0.0	0.362	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	50.5
Approach		668	0	703	0.0	0.362	0.4	NA	0.0	0.0	0.00	0.05	0.00	50.5
West: Minmi Road														
11	T1	658	0	693	0.0	0.318	0.9	LOS A	0.9	6.0	0.12	0.04	0.15	49.3
12	R2	40	0	42	0.0	0.318	10.4	LOS B	0.9	6.0	0.17	0.05	0.20	48.3
Approach		698	0	735	0.0	0.318	1.5	NA	0.9	6.0	0.13	0.04	0.15	49.2
All Vehicles		1387	0	1460	0.0	0.362	1.2	NA	0.9	6.0	0.08	0.06	0.09	50.1

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

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

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

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

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

Queue Model: SIDRA Standard.

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

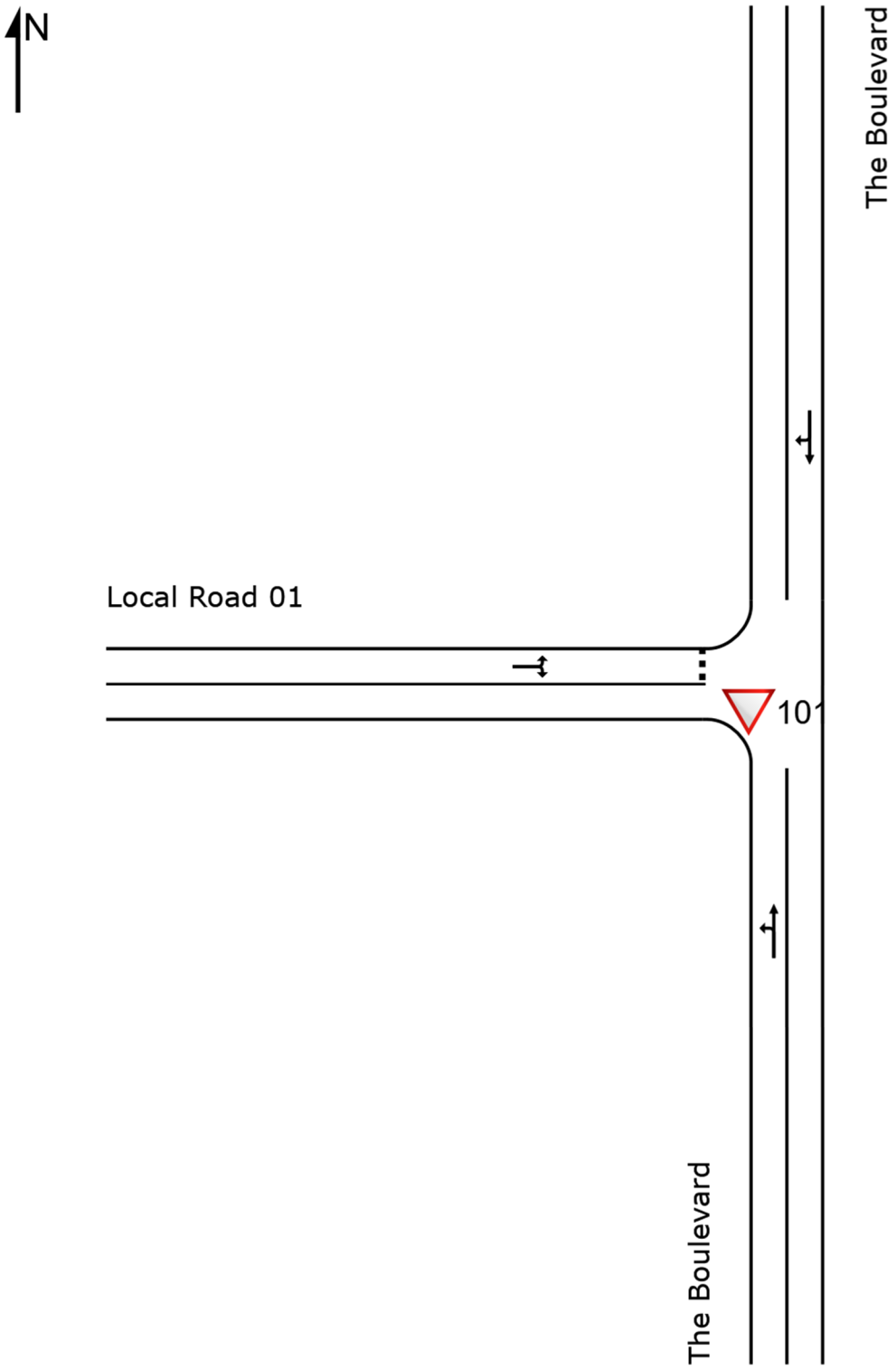
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [The Boulevard/Local Road 01_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

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

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



MOVEMENT SUMMARY

Site: 101 [The Boulevard/Local Road 01_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Boulevard														
1	L2	1	0	1	0.0	0.041	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	59.1
2	T1	75	0	79	0.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.7
Approach		76	0	80	0.0	0.041	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.6
North: The Boulevard														
8	T1	19	0	20	0.0	0.015	0.1	LOS A	0.0	0.3	0.10	0.16	0.10	53.6
9	R2	7	0	7	0.0	0.015	5.7	LOS A	0.0	0.3	0.10	0.16	0.10	58.0
Approach		26	0	27	0.0	0.015	1.6	NA	0.0	0.3	0.10	0.16	0.10	56.8
West: Local Road 01														
10	L2	29	0	31	0.0	0.021	5.8	LOS A	0.1	0.6	0.16	0.54	0.16	40.1
12	R2	1	0	1	0.0	0.021	5.8	LOS A	0.1	0.6	0.16	0.54	0.16	35.1
Approach		30	0	32	0.0	0.021	5.8	LOS A	0.1	0.6	0.16	0.54	0.16	40.0
All Vehicles		132	0	139	0.0	0.041	1.7	NA	0.1	0.6	0.06	0.16	0.06	54.2

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

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

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

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

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

Queue Model: SIDRA Standard.

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

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

MOVEMENT SUMMARY

Site: 101 [The Boulevard/Local Road 01_future - Cummulative Impact_PM (Site Folder: Future Scenario - Cummulative Impact)]

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Boulevard														
1	L2	1	0	1	0.0	0.012	5.5	LOS A	0.0	0.0	0.00	0.03	0.00	59.0
2	T1	21	0	22	0.0	0.012	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.0
Approach		22	0	23	0.0	0.012	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.0
North: The Boulevard														
8	T1	82	0	86	0.0	0.049	0.0	LOS A	0.0	0.3	0.02	0.05	0.02	58.2
9	R2	7	0	7	0.0	0.049	5.5	LOS A	0.0	0.3	0.02	0.05	0.02	58.6
Approach		89	0	94	0.0	0.049	0.4	NA	0.0	0.3	0.02	0.05	0.02	58.3
West: Local Road 01														
10	L2	27	0	28	0.0	0.019	5.6	LOS A	0.1	0.5	0.07	0.55	0.07	40.7
12	R2	1	0	1	0.0	0.019	5.8	LOS A	0.1	0.5	0.07	0.55	0.07	35.7
Approach		28	0	29	0.0	0.019	5.6	LOS A	0.1	0.5	0.07	0.55	0.07	40.6
All Vehicles		139	0	146	0.0	0.049	1.5	NA	0.1	0.5	0.02	0.15	0.02	54.9

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

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

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

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

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

Queue Model: SIDRA Standard.

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

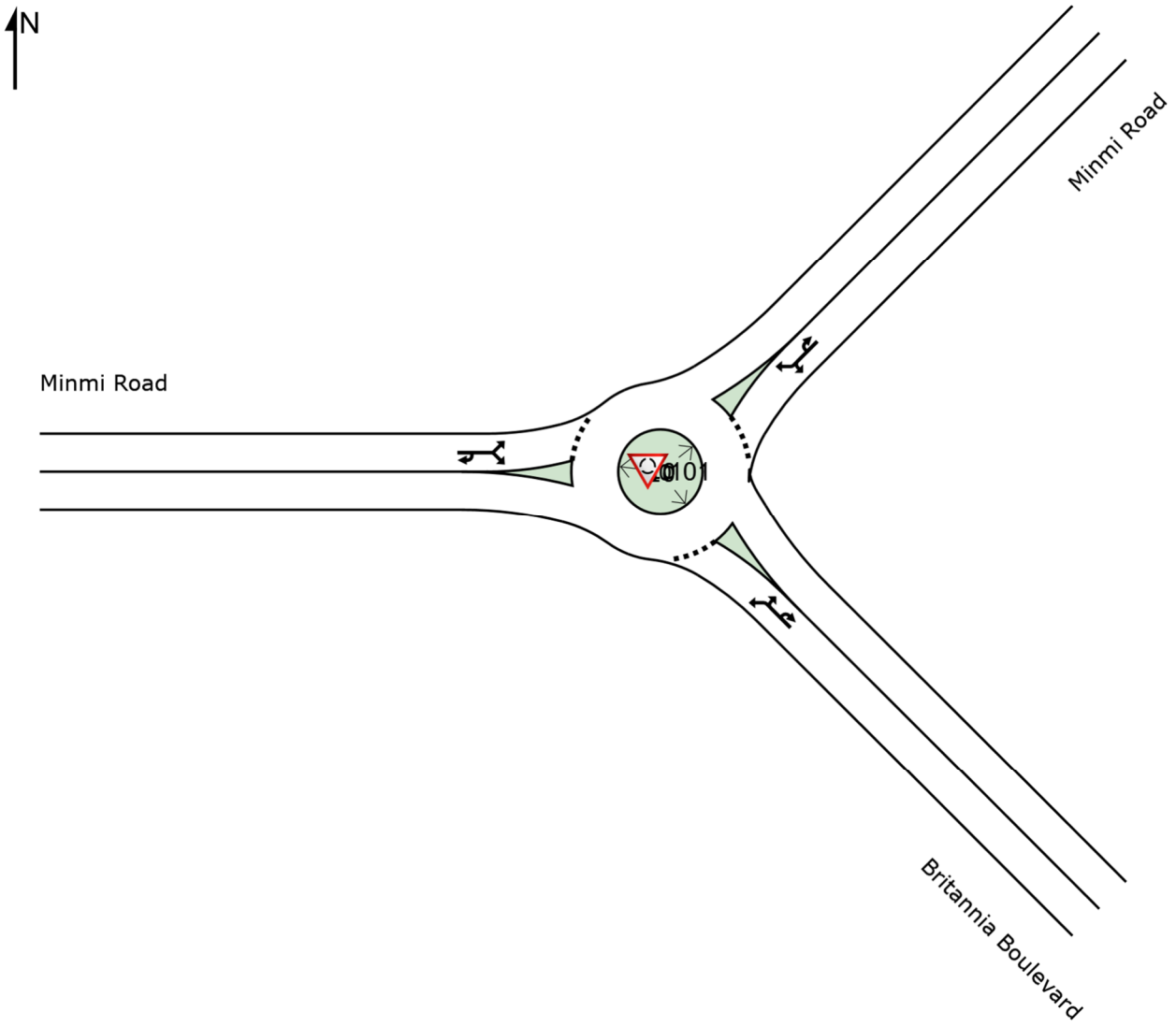
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Minmi Road/Britannia Boulevard_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Roundabout

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



MOVEMENT SUMMARY

Site: 101 [Minmi Road/Britannia Boulevard_future - Cummulative Impact_AM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Britannia Boulevard														
21a	L1	54	0	57	0.0	0.472	9.0	LOS A	3.3	23.4	0.76	0.93	0.86	42.5
3	R2	290	0	305	0.0	0.472	12.5	LOS B	3.3	23.4	0.76	0.93	0.86	36.6
3u	U	1	0	1	0.0	0.472	14.4	LOS B	3.3	23.4	0.76	0.93	0.86	23.0
Approach		345	0	363	0.0	0.472	11.9	LOS B	3.3	23.4	0.76	0.93	0.86	38.1
NorthEast: Minmi Road														
4	L2	95	0	100	0.0	0.496	4.0	LOS A	4.6	31.9	0.20	0.55	0.20	40.7
26a	R1	619	0	652	0.0	0.496	6.2	LOS A	4.6	31.9	0.20	0.55	0.20	46.4
6u	U	4	0	4	0.0	0.496	9.6	LOS A	4.6	31.9	0.20	0.55	0.20	47.6
Approach		718	0	756	0.0	0.496	5.9	LOS A	4.6	31.9	0.20	0.55	0.20	46.0
West: Minmi Road														
10a	L1	655	0	689	0.0	0.712	7.7	LOS A	8.4	58.5	0.83	0.83	0.96	42.5
12a	R1	22	0	23	0.0	0.712	10.5	LOS B	8.4	58.5	0.83	0.83	0.96	35.7
12u	U	2	0	2	0.0	0.712	13.9	LOS B	8.4	58.5	0.83	0.83	0.96	51.1
Approach		679	0	715	0.0	0.712	7.9	LOS A	8.4	58.5	0.83	0.83	0.96	42.4
All Vehicles		1742	0	1834	0.0	0.712	7.9	LOS A	8.4	58.5	0.56	0.73	0.63	43.7

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

MOVEMENT SUMMARY

Site: 101 [Minmi Road/Britannia Boulevard_future - Cummulative Impact_PM (Site Folder: Future Scenario - Cummulative Impact)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
SouthEast: Britannia Boulevard														
21a	L1	28	0	29	0.0	0.284	9.1	LOS A	1.9	13.0	0.84	0.90	0.84	42.5
3	R2	115	0	121	0.0	0.284	12.6	LOS B	1.9	13.0	0.84	0.90	0.84	36.6
3u	U	8	0	8	0.0	0.284	14.5	LOS B	1.9	13.0	0.84	0.90	0.84	23.0
Approach		151	0	159	0.0	0.284	12.0	LOS B	1.9	13.0	0.84	0.90	0.84	38.0
NorthEast: Minmi Road														
4	L2	211	0	222	0.0	0.799	5.2	LOS A	11.0	77.3	0.69	0.58	0.69	39.2
26a	R1	727	0	765	0.0	0.799	7.4	LOS A	11.0	77.3	0.69	0.58	0.69	45.6
6u	U	62	0	65	0.0	0.799	10.8	LOS B	11.0	77.3	0.69	0.58	0.69	46.4
Approach		1000	0	1053	0.0	0.799	7.2	LOS A	11.0	77.3	0.69	0.58	0.69	45.0
West: Minmi Road														
10a	L1	483	0	508	0.0	0.537	4.7	LOS A	4.2	29.2	0.55	0.59	0.55	44.1
12a	R1	97	0	102	0.0	0.537	7.4	LOS A	4.2	29.2	0.55	0.59	0.55	37.8
12u	U	1	0	1	0.0	0.537	10.8	LOS B	4.2	29.2	0.55	0.59	0.55	52.4
Approach		581	0	612	0.0	0.537	5.1	LOS A	4.2	29.2	0.55	0.59	0.55	43.5
All Vehicles		1732	0	1823	0.0	0.799	6.9	LOS A	11.0	77.3	0.66	0.61	0.66	44.2

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

Appendix C CORRESPONDENCE

C.1 SINSW Letter

NSW GOVERNMENT | Education

9 February 2023

Strategic Planning Team
City of Newcastle
PO Box 489
Newcastle NSW 2300

Attn: Peter Milles, pmilles@ncc.nsw.gov.au

RE: SINSW SUBMISSION – PLANNING PROPOSAL FOR 505 MINMI ROAD, FLETCHER

Dear Mr. Milles,

School Infrastructure NSW (SINSW), as part of Department of Education (DoE), welcomes City of Newcastle Council's (Council) invitation to provide comments on the Planning Proposal for 505 Minmi Road, Fletcher (the draft Proposal).

SINSW understand that the draft Proposal seeks to amend the *Newcastle Local Environmental Plan 2012* (NLEP 2012) to rezone the site from C4 Environmental Living to a mixture of R2 Low Density Residential and C2 Environmental Conservation to facilitate residential and conservation outcomes. The proposal will result in approximately 140 additional residential dwellings.

SINSW has reviewed the draft Proposal and have provide detailed feedback in the attachment below. Should you require further information about this submission, please contact the SINSW Strategic Planning Team on StrategicPlanning@det.nsw.edu.au.

Yours Sincerely,

Lincoln Lawler
Director, Statutory Planning and Sustainability, SINSW

NSW GOVERNMENT | Education

ATTACHMENT – SINSW SUBMISSION –
PLANNING PROPOSAL FOR 505 MINMI ROAD, FLETCHER

Educational Facilities

While is likely that the enrolment demand stemming from the draft proposal can be accommodated within the schools surrounding the site (Minmi Public School and Glendore Public School), the draft proposal must be considered in the context of the growth proposed for the wider LGA, as part of the surrounding Urban Release Areas (URAs) and other development projects, which will likely need to be supported by additional educational infrastructure. Noting the above schools already rely on demountable teaching spaces to meet demand. SINSW is in the process of reviewing this growth in order to identify appropriate solutions to accommodate future projected enrolment demand. This will ensure that existing schools are fully utilised before new schools are considered.

SINSW is committed to working with Council to ensure schools are supporting community needs and continue to be appropriately resourced to respond to student population changes. As a result, SINSW request ongoing engagement with Council regarding any future growth and change identified for the locality.

Transport and Access

SINSW requests that transport planning for the study area be guided by the NSW Governments Movement and Place Framework (MAPF) and its Built Environment Performance Indicators. These indicators are based on qualities that contribute to a well-designed built environment and should be used by proponents in the formulation of transport concepts.

The MAPF's core 'Amenity and Use' and 'Primary Schools' Built Environment Indicators are of particular importance to SINSW, as these encourage urban designers to consider the impact on adjacent places/uses, as well as emphasising movement that supports place. The 'Primary Schools' indicator provides two specific metrics to judge the effect of infrastructure on the accessibility of public schools in an area; these being walkability and public transport access. These metrics require designers to assess whether proposed infrastructure facilitates access to primary school facilities (or public transport connections to schools) or whether it exacerbates gaps in the network.

The primary school-focused MAPF amenity indicator can be accessed via the link below:

https://www.movementandplace.nsw.gov.au/place-and-network/built-environment-indicators/primary-schools

It is also requested that active transport links to existing schools within the neighbourhood be investigated and delivered as part of the proposal or future development approvals.

C.2 TfNSW Letter

Transport for NSW

9 February 2023

File No: NTH23/00029/01
Your Ref: PP-2021-2262 - Ref-1928

The Director
Department of Planning and Environment
NSW Major Projects Portal

Attention: Trent Wink - trent.wink@planning.nsw.gov.au

RE: PP-2021-2262 - Rezone land to R2 Low Density Residential and E2 Environmental Conservation - 505 Minmi Road Fletcher

I refer to your email dated 18 January 2023 requesting input from Transport for NSW for the abovementioned development rezoning proposal.

Roles and Responsibilities

Our key interests are the safety and efficiency of the transport network, the needs of our customers and the integration of land use and transport in accordance with the *Future Transport Strategy*.

Newcastle Link Road (MR82) is a classified State road and Minmi Road is a local road. Council is the roads authority for both roads and all other public roads in the area (excluding the M1 Pacific Motorway), in accordance with Section 7 of the *Roads Act 1993*.

Transport for NSW Response

TfNSW has significant interest in any development related traffic impacts affecting the M1 Pacific Motorway and Newcastle Link Road. Relevant developments, both determined and currently under assessment, are as follows:

- 67 Minmi Road Minmi – 314 lot subdivision - DA2015/10393 – City of Newcastle LGA
- 144 Woodford Road Minmi – 876 Lot Subdivision – DA2018/01351 – City of Newcastle LGA – Likely S8.2 Review application
- 10 Woodford Road Cameron Park – 1078 Lot Subdivision – DA/2087/2018 - Lake Macquarie City Council LGA – Recently submitted S8.2 Review application.
- 140 Minmi Road Cameron Park - 594 Lot Subdivision - DA/1936/2016/A – Lake Macquarie City Council LGA

There is also an overarching conceptual approval for this precinct approved by the Planning Assessment Commission in August 2013 under MP10_0090.

TfNSW has recommended the preparation of a wholistic regional traffic and transportation analysis for each of the above developments to fully appreciate the impacts upon the State

6 Stewart Avenue (Locked Bag 2030) Newcastle West NSW 2302
76 Victoria Street (PO Box 576) Grafton NSW 2460
1300 207 783
transport.nsw.gov.au

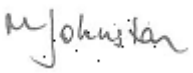
Road network. Regional context can only be understood via a Microsimulation analysis as this is not available through SIDRA modelling.

Therefore, TfNSW requests that a consistent approach be followed for this Planning Proposal, with a Microsimulation model prepared by suitably qualified person/s to determine the impacts of the development upon the State Road network, including cumulative traffic from surrounding proposals.

TfNSW highlights that in determining the application under the *Environmental Planning and Assessment Act 1979*, it is the Consent Authority's responsibility to consider the environmental impacts of any roadworks which are ancillary to the development. This includes any works which form part of the proposal and/or any works which are deemed necessary to include as requirements in the conditions of project approval.

If you have any further enquiries regarding the above comments, please do not hesitate to contact Masa Kimura, Development Services Case Officer or the undersigned on 1300 207 783 or via email at: development.north@transport.nsw.gov.au

Yours faithfully,



Marg Johnston
Team Leader, Development Services
Community and Place | Region North
Regional & Outer Metropolitan
Transport for NSW