Brandon Park Shopping Centre

Residential Application
Transport Impact Assessment

Prepared by: Stantec Australia Pty Ltd for Newmark Capital
on 05/10/2021
Reference: V154442
Issue #: C

GTAconsultants now Stantec

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A	22/12/2020	Final	Jordan Smith	Andrew Farran	Andrew Farran	Andrew Farran
B	22/09/2021	Final (Updated Plans)	Jordan Smith	Andrew Farran	Andrew Farran	
C	05/10/2021	Final (Updated Conclusion)	Jordan Smith	Andrew Farran	Andrew Farran	

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1. INTRODUCTION

1.1. Background

Planning approval is currently being sought for a proposed residential development on the north eastern corner of Brandon Park Shopping Centre ('the Centre'), located on the southeast corner of the Springvale Road / Ferntree Gully Road intersection in Wheelers Hill.

The proposed land uses and transport components are summarised in Table 1.1.

Table 1.1: Development Summary – This Application

Item		Proposed
Residential	1-bedroom	19 dwellings
	2-bedroom	124 dwellings
	3-bedroom	6 dwellings
	Total	149 dwellings
Car Parking		155 spaces
Bicycle Parking		91 spaces (including 75 resident and 16 visitor)

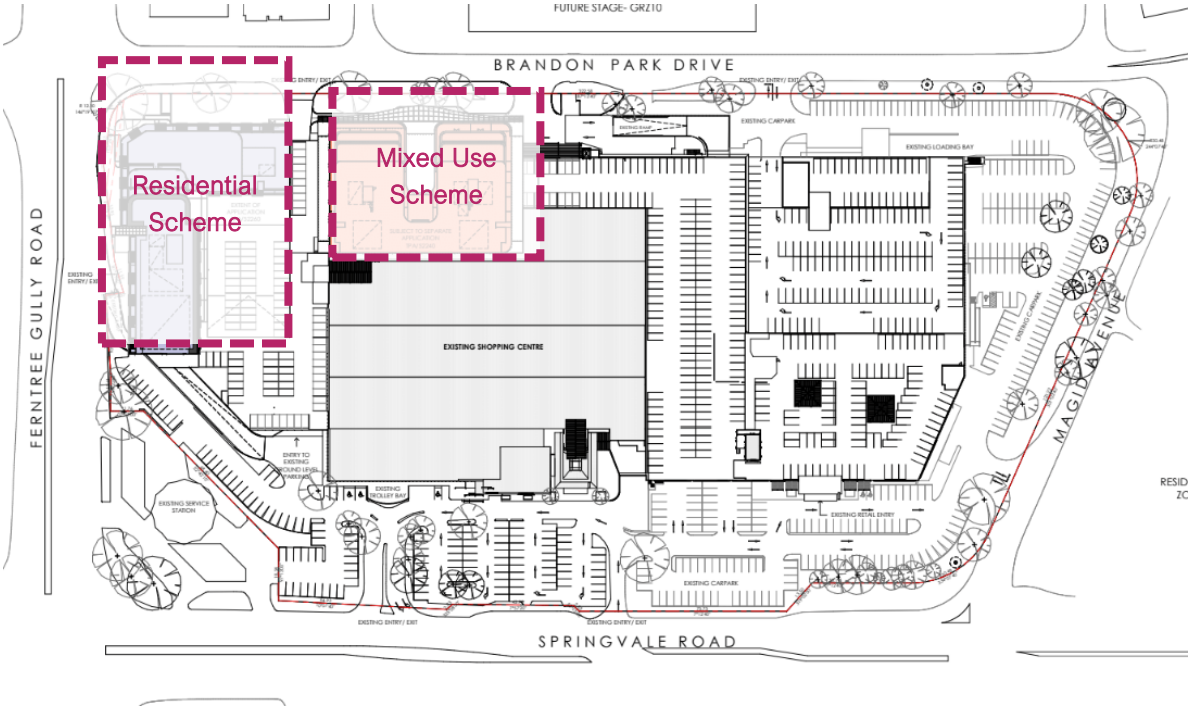
It is noted that concurrent with this residential development (this application) there is a mixed use planning permit application being sought.

The cumulative post-development land uses following all three development applications is presented in Table 1.2, with the indicative location of each of the separate planning permit applications also shown in Figure 1.1.

Table 1.2: Development Summary - Overall

Item	Existing	Proposed	Change
Shop	17,865sqm	16,925sqm	-940sqm
Supermarket	4,878sqm	4,878sqm	-
Retail Total	22,743sqm	21,803sqm	-940sqm
Office	-	5,132sqm	+5,132sqm
Medical Centre	-	677sqm	+677sqm
Serviced Apartments	-	102 apartments	+102 apartments
Residential	-	149 dwellings	+149 dwellings
Car Parking	1,361 spaces	1,451 spaces	+90 spaces

Figure 1.1: Overview of Separate Planning Permit Applications



The sequence of development is unknown and will be determined by market forces and as such, this report includes an assessment of the transport impacts (traffic and car parking) of the residential development only (i.e. assessed in isolation) as well as the cumulative impact of the overall development.

GTA Consultants was commissioned by the Applicant in July 2018 to undertake a transport impact assessment for the proposed development.

1.2. Purpose & Structure of this Report

The report sets out an assessment of the transport impacts of the proposed development and how they are being addressed, including consideration of:

1. The existing conditions pursuant the transport network in the vicinity of the site and any relevant transport or planning policy relevant to the site – *refer to Section 2 of this report (and Appendix A and B)*
2. The expected trip generation of the proposed development and the proposed transport response to best accommodate these trips on the surrounding transport network – *refer to Section 3 of this report*
3. The sustainable transport travel response – *refer to Section 4 of this report.*
4. The loading and waste collection arrangements – *refer to Section 5 of this report.*
5. The private vehicle response (car parking and traffic) – *refer to Section 6 of this report (and Appendix C, D and E).*

1.3. Authority Consultation

In preparing the transport access strategy for the site, GTA and the project team has undertaken various meetings with Monash Council and the Department of Transport. A summary of the meetings and key transport outcomes are presented in Table 1.3.

Table 1.3: Development Summary

Date	Authority	Meeting Objective and Outcome
28 May & 21 June 2019	Monash City Council	Present and seek feedback on the development scheme and high-level transport access strategy (note a substantially more intensive development scheme was presented compared to the current proposal). The following general feedback was provided: • Preference to try and consolidate the number of proposed crossovers on Brandon Park Drive • Sensitive to non-residential rat-running along Brandon Park Drive • Ensure vehicle capacity corresponds to where additional parking is provided • Supportive of strong east-west pedestrian link though the Centre • Rat-running of circa 200 vehicles through the shopping centre in each of the peak hours.
1 July 2019	Department of Transport	Present and seek feedback on the development scheme and high-level transport access strategy (note a substantially more intensive development scheme was presented compared to the current proposal). The following general feedback was provided: • Bus stops highly patronaged with opportunity to improve existing bus facilities on Springvale Road • Recommend that improved pedestrian connections to the Centre be provided from the surrounding signalised intersections • DoT support SIDRA analysis for post development assessment.
23 January 2020	Monash City Council	An updated (reduced intensity) development scheme was presented. Council generally satisfied with the proposed transport access strategy, including a minor reduction to the overall shopping centre car parking rate.
20 October 2020	Monash City Council	An updated development scheme was presented to Council with the following feedback received: • Preference to reduce the number of proposed vehicle crossovers to Brandon Park Drive. • Confirmation of the proposed treatment for the ALDI loading dock.
22 March 2021	Monash City Council	Another updated development scheme was presented to Council, with the following feedback received: • Further analysis requested to confirm the adopted car parking rate. • Request to remove the porte-cochere access points to Brandon Park Drive.

Following the submission of the initial application in December 2020, the City of Monash provided a Request for Further Information (dated 18 January 2021). The correspondence also outlined preliminary concerns relating to the application, with those related to transport reproduced in Table 1.4. A response to each of the matters raised is also provided within the table, including how the updated plans have been revised to address the identified concerns.

Table 1.4: Council Preliminary Concerns (dated 18 January 2021)

Item	Response	Section of Report
The proposal relies on works and car parking associated with TPA/52241 & TPA/52240. The method of applying for three separate applications results in a disjointed approach for the centre. It is strongly recommended that the applications be combined, improving the centre as a whole and providing a cohesive design approach. Whilst this application has been lodged separately, Council will be reviewing the three applications as a holistic approach on the site.	A holistic assessment of future car parking supply and demand for the mixed use and residential applications is presented in this updated report, noting that the retail application is not currently being pursued by the Applicant.	Section 6.2.1
The proposed porte cochere will result in an additional access point to Brandon Park Drive, will require the removal of an existing canopy tree and will result in additional hard paving within the front setback of the site. It is recommended that this element be deleted, and short term parking spaces be provided within the car parking area to the west.	Consistent with the Council recommendation, the porte-cochere to Brandon Park Drive design has been removed from the updated scheme.	NA
Residents are provided poor access to parking, requiring vehicles to travel through the general car parking area to access the levels. The location of the proposed boom gate is also likely to result in queuing into the accessway of the car parking area.	In order to minimise the number of crossovers to the site, vehicle access to the residential car parking has been provided from the internal shopping centre accessway. The updated plans minimise the travel distance where resident vehicles mix with shopping centre traffic.	NA
An external vehicle accessway is proposed within the Ferntree Gully Road frontage of the site which is contrary to the provisions of the Design and Development Overlay.	No additional vehicle access points are proposed to Ferntree Gully Road as part of the residential (or mixed use) application. The existing vehicle access point to Ferntree Gully Road servicing the retail rooftop car park is maintained.	NA

In addition to the Council RFI, the Department of Transport (DOT) provided the following further information request regarding each of the applications:

- *"Revised SIDRA analysis to include a network SIDRA model of nearby intersections particularly the intersection of Ferntree Gully Road /Brandon Park Drive, Ferntree Gully Road/ Springvale Road and Springvale Road/ Magid Avenue.*
- *Associated electronic SIDRA files."*

The SIDRA traffic modelling provided in Appendix E has been updated to reflect the DOT feedback.

The transport access strategy and analysis has been completed having regard to the findings and recommendations provided from the authority liaison (including SIDRA Network Modelling requested by DOT).

The transport access strategy and analysis has been completed having regard to the findings and recommendations provided from the authority liaison.

1.4. References

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

- Monash Planning Scheme
- plans for the proposed development prepared by Leffler Simes Architects, Job No. 4976, Rev A
- Australian Standard / New Zealand Standard, Parking Facilities (AS2890)
- traffic and car parking surveys undertaken by GTA Consultants as referenced in the context of this report
- an inspection of the site and its surrounds
- other documents as nominated.

2. EXISTING CONDITIONS

2.1. Location

The subject site (the site) is located at 580 Springvale Road in Wheelers Hill.

The broader shopping centre site of approximately 58,000m^2 has frontages of 270m to Springvale Road to the west, 180m to Ferntree Gully Road to the north, 370m to Brandon Park Drive to the east and 190m to Magid Avenue to the south. Springvale Road and Ferntree Gully Road are both located within a Road Zone 1.

The site is located within a Commercial Zone 1 and is currently occupied by the Brandon Park Shopping Centre. The surrounding properties include a mix of residential, retail, office land uses. Notable exception include the Monash Special Development School located to the east of the site, Brandon Park Reserve located to the north-east of the site and a new retirement village currently under construction to the immediate east of the site.

The location of the subject site and the surrounding environs is shown in Figure 2.1, and the land zoning is shown in Figure 2.2.

Figure 2.1: Subject Site and its Environs

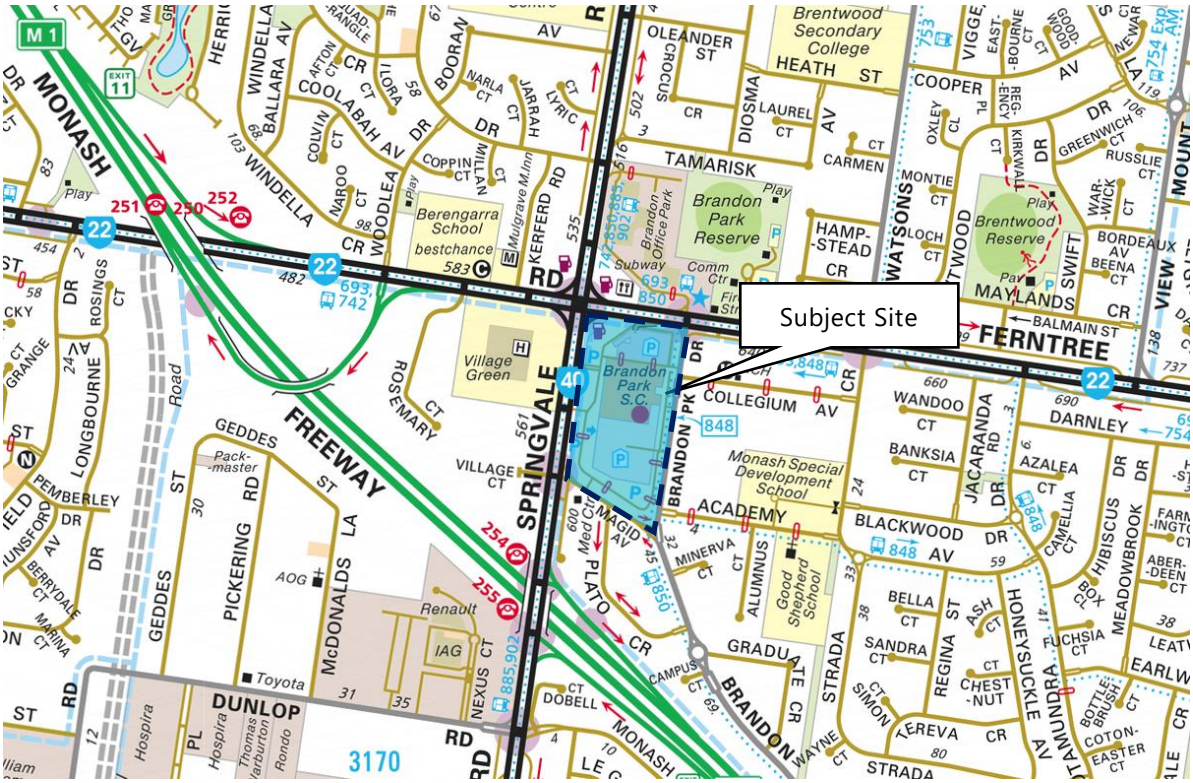


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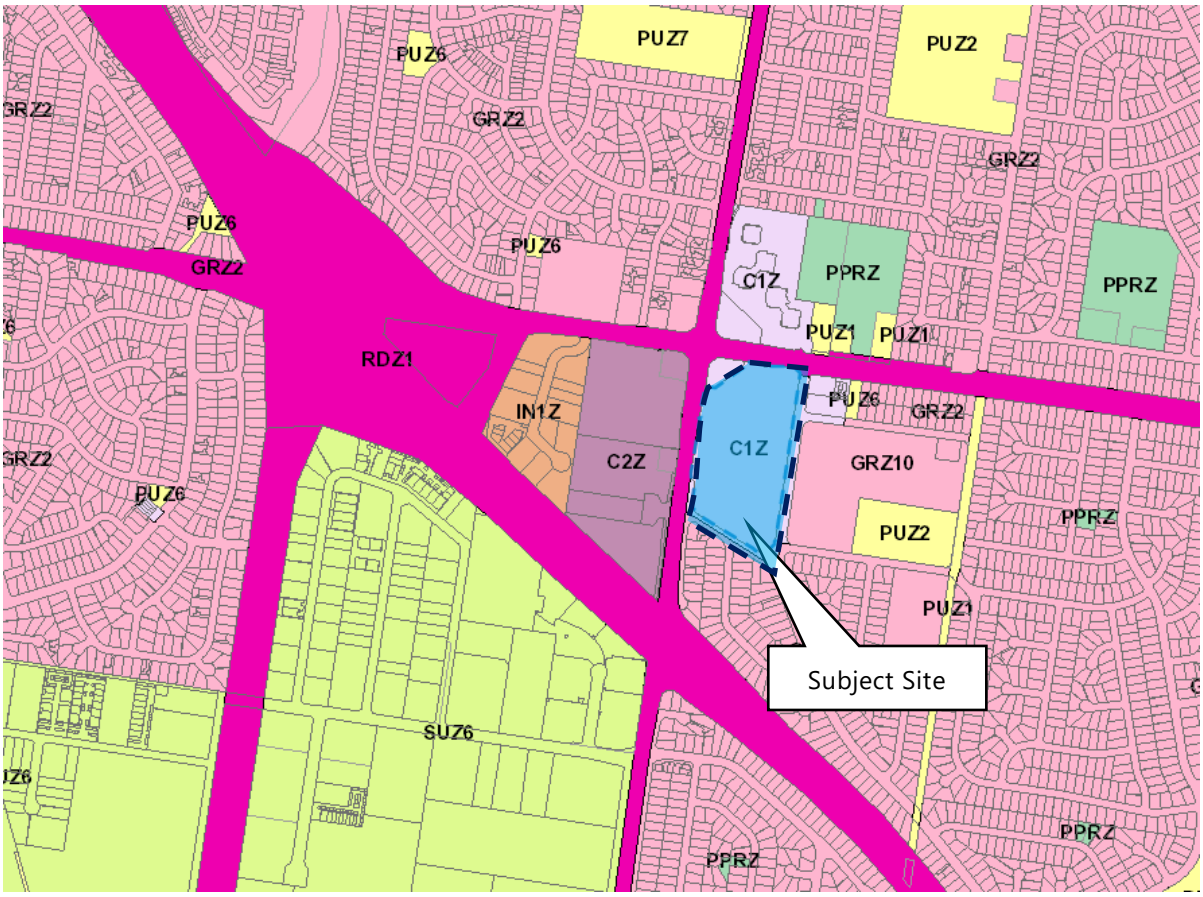
Figure 2.2: Land Zoning Map



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2.2. Site Operation

The Centre comprises of approximately 22,743sqm NLA of retail uses, including major retailers, specialty stores, restaurants and food court uses, set across two levels. These land uses are supported by 1,361 car spaces provided across various car parking levels and at an overall rate of 6.0 spaces per 100sqm NLA.

To determine existing traffic and car parking characteristics of the Centre, GTA commissioned car parking demand surveys of the existing centre, as well as traffic movement surveys at each of the vehicle access points to the Centre.

2.2.1. Car Parking Surveys

Car parking demand surveys of the Centre (1,361 spaces) were undertaken at the following times:

- Thursday 9 August 2018 10:00am to 4:00pm
- Saturday 11 August 2018 10:00am to 4:00pm.

The results of the carparking demand surveys, which recorded the demand of the carpark across the day at hourly intervals on a Thursday and Saturday, are shown below in Figure 2.3.

Figure 2.3: Brandon Parking SC Carpark Demand

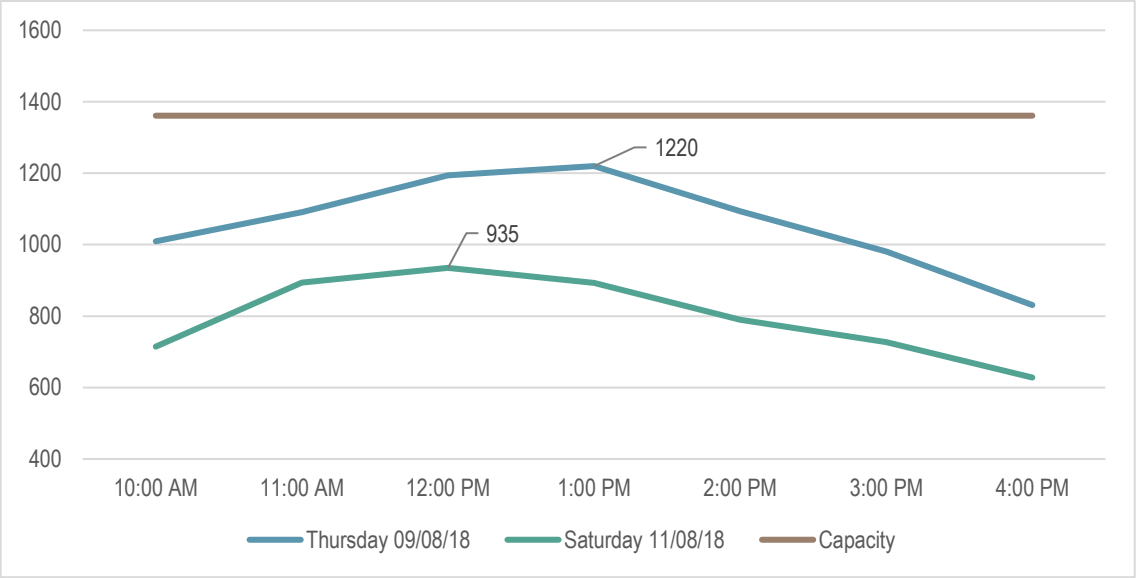


Figure 2.3 indicates a peak car parking demand of 1,220 spaces (5.4 spaces per 100sqm) for the weekday and 935 spaces (4.1 spaces per 100sqm) for the Saturday survey periods. Typically, car parking demands for shopping centres are greater on a Saturday compared to a weekday. Reference to traffic surveys of 7 shopping centres presented in the RMS Guide indicate that Saturday demands are typically 20% greater than weekday demands.

This indicates that there is likely third parties (associated with nearby land uses) using the Brandon Centre car park. In this respect, reference to Nearmap aerial imagery identifies that when there is no construction activity at the neighbouring Nellie Melba Retirement Village site that car parking demands within the Centre are markedly lower (in the order of 10 to 20%). This is consistent with subsequent site inspections by GTA in late 2018 which observed workers parking in the Centre and then crossing Brandon Park Road and Ferntree Gully Road rather than entering the Centre itself.

Previously it was assumed that the actual car parking demand associated with the centre was between 976 and 1,098 spaces or 10 to 20% less than the surveyed demands. Previously GTA conservatively adopted a peak car parking demand of 1,098 spaces at a rate of 4.8 spaces per 100sqm (i.e. a 10% reduction). It is noted that the resultant demand and associated rate is still higher than the surveyed Saturday car parking demand which is still atypical for a shopping centre.

Following the Council meeting in March 2021 updated car parking demand surveys were undertaken on Thursday 25 March 2021 to determine the Centre car parking demands. These surveys were undertaken outside of Covid-19 lockdown restrictions and whilst no construction activity was occurring at the neighbouring retirement village site. The updated car parking demand surveys identified a peak car parking demand of 1,021 spaces (4.5 spaces per 100sqm). This car parking rate has been adopted for assessment purposes. It is noted that the surveyed weekday demand and associated rate is still higher than the surveyed Saturday car parking demand which is still atypical for a shopping centre.

2.2.2. Traffic Generation

GTA undertook traffic movement counts at the vehicle accesses to the Centre and key surrounding intersections during the following peak periods:

- Thursday 9 August 2018 (7:00am - 9:00am and 4:00pm - 6:00pm)
- Saturday 11 August 2018 (11:00am – 1:00pm)

A summary of the observed traffic generation to the Centre is provided in Table 2.1.

Table 2.1: Traffic Generation Rates

Time Period	Existing Floor Area	Overall Peak Hour Movements	Traffic Generation Rate
Weekday AM peak hour	22,743sqm	1,208	5.3 movements per 100sqm
Weekday PM peak hour		1,902	8.4 movements per 100sqm
Saturday peak hour		2,085	9.2 movements per 100sqm

It is noted that the above traffic generation rates include 200 vehicles that use the Centre to "rat run" (avoid the Springvale Road / Ferntree Gully Road intersection) during the road network peak hours[1]. Additionally, the surveyed traffic generation includes vehicle movements associated with third party demands to the Centre. As such, the above traffic generation is conservative on the high side.

2.3. Transport Network

The site is located in on the southeast corner of the Springvale Road / Ferntree Gully Road intersection (the site does not include the petrol station on the corner). The broader road network is approaching capacity during peak periods, with moderate public transport accessibility provided. A summary of the transport network is provided in Table 2.2. Further details of the existing conditions are in Appendix A

Table 2.2: Summary of Surrounding Transport Network

Mode	Summary of Existing Situation
	• The site has a walk score of 78 out of a 100 or a 'Very Walkable' indicating that the site has reasonable pedestrian connectivity (https://www.walkscore.com/). Brandon Park and surrounds enjoys a reasonably connected pedestrian network, with all streets in the local area having sealed footpaths and street lighting. • Pedestrian footpaths are generally provided on both sides of each of the roads in the vicinity of the site and provide connections to surrounding bus stops. • Springvale Road and Ferntree Gully Road act as barriers for pedestrian movements, noting that safe crossing points are generally only located at signalised intersections.
	• There are minimal on or off-road cycling facilities in the immediate vicinity of the site. • Limited informal bicycle parking opportunities are currently provide at the Centre. • Strada Crescent, approximately 400m to the east of the site, is listed as a part of a VicRoads Strategic Cycling Corridor, which provides a north-south link between Wellington Road and Waverley Road.

[1] Based on origin destination surveys commissioned by Monash City Council in November 2017.

Mode	Summary of Existing Situation
	• The site is serviced by multiple bus routes that operate along Springvale Road (2 routes), Ferntree Gully Road (4 routes) and Brandon Park Drive (1 route). • The site has a transit score of 48 out of a 100 or 'some transit' indicating that the site has moderate public transport accessibility (https://www.walkscore.com/).
	• The site has excellent access to the surrounding arterial road network, with direct vehicle access provided to Springvale Road and Ferntree Gully Road. These roads both provide connections to the Monash Freeway. • The Ferntree Gully Road / Springvale Road intersection experiences moderate congestion during road network peak hours (consistent with the broader network). As a result some "rat running" is understood to occur through the Centre itself. • The Ferntree Gully Road / Brandon Park Drive and Springvale Road / Magid Avenue intersections operate in the shadow of the Ferntree Gully Road / Springvale Road intersection.

2.4. Relevant Planning Policy

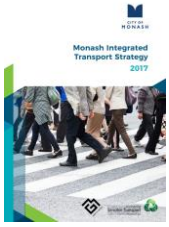
There are numerous State and Local Government policy documents applicable to the site and surrounds which provide guidance on appropriate land use and development.

Encouraging the use of public transport, walking and cycling as modes of transport, and reducing the reliance on private car use, are central to achieving the aims of the various policy documents affecting the area and directing how it develops into the future.

An overview of the key policy documents is provided in Table 2.3, with further details of specific relevant policy documents provided in Appendix B.

Table 2.3: Relevant Transport Policy

Document		Key Messages
Plan Melbourne (Refresh)		• Delivering a pipeline of large scale, city shaping infrastructure and urban renewal projects • Delivering a new 'integrated economic triangle', connecting key employment clusters, industrial precincts and economic gateways. • Integrating active transport development into existing and future land use to support a productive city. • Supporting 20-minute neighbourhoods by promoting local active transport choices and improving active/public transport infrastructure for the local area.
Transport Integration Act		• Victoria's principal transport statute • Establishes a framework for the provision of an integrated and sustainable transport system in Victoria • Six transport system objectives and eight decision-making principles • Establishes a triple bottom line approach – economic prosperity, social and economic inclusion, and being resource efficient and environmentally responsible

Document		Key Messages
Clause 18 of Planning Scheme		• Contains a range of guidelines for transport planning • Develop integrated transport networks to connect people to jobs and services and goods to market • Promote walking and cycling when planning for new suburbs, urban renewal precincts, greyfield redevelopment areas and transit-oriented development areas (such as railway stations). • Integrate public transport services and infrastructure into new development.
Monash National Employment Cluster		• There are seven National Employment and Innovation Clusters (NEIC) identified in Plan Melbourne, the development of the clusters will seek to expand employment opportunities. • The Monash cluster caters for approximately 75,000 jobs and is the largest employment centre in Melbourne outside of the CBD. • It is envisaged that the number of jobs in the Monash NEIC will increase to 150,000 jobs over the next 30 years. • Brandon Park is identified as one of three major activity centre in the Monash NEIC.
Clause 21.17-3 (Brandon Park Major Activity Centre Structure Plan)		• Brandon Park is identified as a Major Activity Centre that will: • Be highly accessible by all travel modes. • Encourage people to the catchment area to walk and cycle to the various facilities within the Major Activity Centre. • Create opportunities for improved local permeability through provision of new pedestrian/cycle pathways or new local street networks.
Monash Integrated Transport Strategy		• The Monash ITS identifies 5 directions to encourage best practive integrated transport and land use planning within Monash, each with their own set of Council Actions, as follows: • 1. A safer network • 2. A more accessible Monash • 3. Promote sustainable transport • 4. Support productivity • 5. Manage car parking

3. TRIP GENERATION/ MODAL HIERARCHY

3.1. Preamble

The proposed development(s) at the Centre have been designed adopting a multi-modal transport approach which prioritises walking, cycling and public transport ahead of cars as a strategic means to limit traffic generation.

3.2. Mode Share Targets

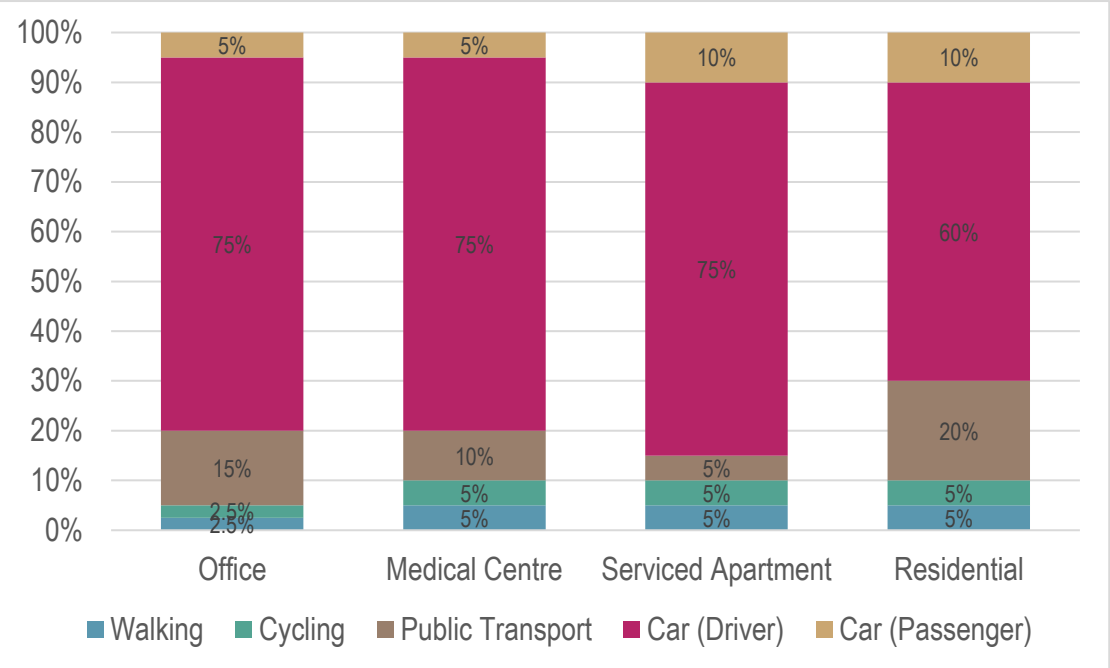
For the purposes of the assessment in this report, mode splits for additional trips to/from the proposed mixed use, residential and retail land uses have been assumed.

The target mode splits have been assumed based on the site context (including the existing travel behaviour data) and our experience on other projects but remain indicative only and for use only to estimate peak hour trips. The assumed peak hour mode shares for the residential use are:

- Active Travel: 10%
- Public Transport: 20%
- Private Vehicle: 70%

The assumed mode shares for all land uses are shown in Figure 3.1.

Figure 3.1: Assumed Transport Mode Share Targets



3.3. Trip Generation

The forecast trip generation (for all transport modes) for the overall cumulative development is presented in Table 3.1. The table assumes trip generation estimates based on the sources quoted.

It is further noted that given the mixed-use nature of the development the overall forecast trips for the site have been reduced by a factor of 25% to take into account multi-purpose trips (i.e. a hotel guest, resident or visitor using the medical centre also accessing the shopping centre, etc.)[2].

Table 3.1: Trips Generated by Use – Weekday PM Peak Hour (Cumulative Development)

Land Use	Size	PM Peak Hour Trip Generation Rate	PM Peak Hour Trip Generation Estimate	External Trips Reduction Factor
Residential Application				
Residential	149 dwellings	0.65 trips per dwelling [1]	97	73
Mixed Use Application				
Office	5,160sqm	2 trips per 100sqm [1]	103	77
Medical Centre	730sqm	6 trips per 100sqm [2]	41	30
Serviced Apartments	102 apartments	0.65 trips per room	66	50
Sub Total			**210**	**157**
Total			**307**	**230**

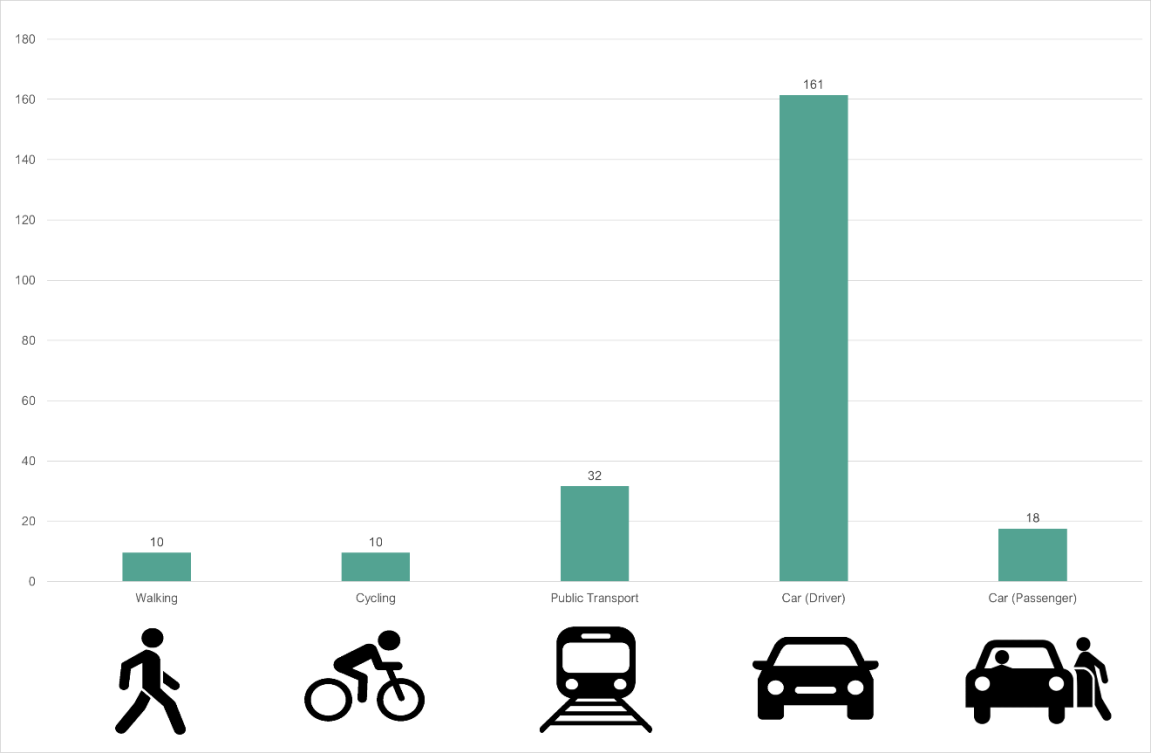
[1] RMS Trip Generation Rate.
[2] First principles assessment assuming a number of practitioners, number of patients per practitioner, and number of active practitioners during peak periods.

Table 3.1 indicates that the proposed cumulative development could be expected to generate in the order of approximately 230 person trips via all modes of transport in the weekday PM peak hour or approximately 70 external trips when considering the residential development in isolation.

Figure 3.2 provides a summary of the forecast trips by mode (calculated by multiplying the forecast trip generation by the assumed mode share). These trip estimates are in addition to the existing demands generated by the existing shopping centre.

[2] The 25% value has been sourced from the RMS Guide to Traffic Generating Developments document from (1) multi-purpose vehicle trips to shopping centres and (2) residential subdivision vehicle trip reductions.

Figure 3.2: Trip Generation by Mode – PM Peak Hour (Cumulative Assessment)



[it is noted that the forecast car driver trips broadly aligns with the forecast traffic generation presented in Section 6]

4. BICYCLE PARKING REQUIREMENTS

4.1. Statutory Bicycle Parking Requirement

The statutory requirements for the provision of bicycle parking are set out in Clause 52.34 of the Melbourne Planning Scheme. For the proposed development, the statutory requirement for the provision of bicycle facilities are set out in Table 4.1

Table 4.1: Statutory Requirement for Bicycle Parking

Use	Size/No.	Statutory Rate		Statutory Requirement	
		Resident	Visitor	Resident	Visitor
Residential	149 dwellings	In developments of four or more storeys, 1 to each 5 dwellings	In developments of four or more storeys, 1 to each 10 dwellings	30	15
Total				**30 spaces**	**15 spaces**

Table 4.1 shows that the proposed development has a statutory requirement to provide 45 bicycle parking spaces, including 30 long-term spaces and 15 short-term spaces.

4.2. Adequacy of Bicycle Parking Provision

The current plans indicate bicycle parking, as follows:

- 16 visitor spaces provided on the ground floor (in the form of 8 hoops)
- 75 resident spaces in a secure area at ground level.

Bicycle parking for the proposed development meets the statutory minimum requirement, noting that resident parking is provided at approximately one space per two dwellings (or 2.5 times the statutory requirement).

4.3. Bicycle Parking Layout & Access

The visitor bicycle parking will be provided in horizontal hoops spaced 1.0m apart in accordance with the requirements of AS2890.3. The resident bicycle parking will be provided as vertical hoops at 500mm spacings accessed by a minimum 1500mm wide aisle in accordance with the requirements of AS2890.3.

The bicycle parking should be designed in accordance with the requirements of AS2890.3. This requirement should be stipulated in any Condition of permit.

5. LOADING RESPONSE

5.1. Overview

Clause 65 of the Monash Planning Scheme indicates that *"Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate: … The adequacy of loading and unloading facilities and any associated amenity, traffic flow and road safety impacts…"*. In this regard, the following presents an assessment of the proposed loading response.

5.2. Development Responses

5.2.1. Loading Response #1 – New Loading Bays

A dedicated residential loading area is provided on the western side of the residential lift core on the ground level. Loading vehicle access is through the existing retail car park.

The loading area has been designed to cater for loading vehicles up to 8.8m MRVs.

The adequacy of the design has been checked using AutoTURN (a computer package designed to simulate vehicle swept paths in a CAD environment). The results of this swept path assessment, indicate that the design vehicle (up to 8.8m MRV) is able to enter and exit the site in a forward direction.

The proposed arrangement is considered satisfactory given the infrequent nature of residential loading events.

5.2.2. Loading Response #2 – Waste Management Plan

A waste management plan detailing the storage and collection of on-site waste has been prepared by WSP. Residential waste is proposed to be collected by either a 6.4m SRV or 8.8m MRV. These vehicles require 3.5m and 4.0m operational height clearance, respectively.

Waste will be collected outside of core shopping centre hours (i.e. prior to 7:00am) to ensure that any potential conflict with the waste collection vehicle in the accessway is minimised.

5.2.3. Loading Response #3 – Loading Management Plan

Access to each of the on-site loading bays (including residential loading and waste collection) will be managed through the creation and implementation of a Loading Management Plan on-site. It is recommended that this be prescribed as part of a permit condition for the application, and subsequently prepared by a suitably qualified traffic engineer.

The plan will detail any necessary traffic management measures required as part of the residential loading and waste collection areas to ensure its safe and efficient operation.

6. PRIVATE VEHICLE RESPONSE

6.1. Overview

The redevelopment of Brandon Park Shopping Centre is seeking to promote the use of alternate modes of transport to the site, whilst also providing car parking and traffic access infrastructure that is appropriate to accommodate the future demands for the site.

The car parking strategy for the residential application is to provide car parking in accordance with the requirements of Clause 52.06.

In respect to the existing retail uses, the proposed development is seeking a reduction to the overall supply of car parking that is allocated to the shopping centre use. Despite this reduction, the supply of car parking that is provided in the centre is still a generous supply, that is expected to meet the demands experienced by the centre.

As detailed earlier in this report, the road network within the vicinity of the site is relatively congested during peak periods, with major arterial roads bordering the site on both the northern and western frontages, converging at a major intersection. Access to the site occurs primarily through restricted left-in / left-out access points, and minor signalised intersections that operate in the shadow of the Springvale Road / Ferntree Gully Road intersection.

The residential development is forecast to generate only modest traffic generation during the road network peak hours.

6.2. Car Parking Responses

6.2.1. Car Parking Response #1 – Provide Minimum Statutory Car Parking Requirement

Residential Development (This Application)

Statutory requirements for the provision of car parking are set out in Clause 52.06 of the Monash Planning Scheme, with parking rates specified in Table 1 to Clause 52.06-5. An assessment of the statutory parking requirements associated with the residential application is presented in Table 6.1.

Table 6.1: Statutory Car Parking Requirements – Residential Application

Land Uses		Size	Statutory Car Parking Rates	Statutory Requirement	Proposed Provision
Residential Apartments	Resident	149 dwellings (19 x one-bedroom + 124 x two-bedroom + 6 x three-bedroom)	1 space per one or two bedroom dwelling 2 spaces per three+ bedroom dwelling	155 spaces	155 spaces
	Visitor	149 dwellings	No requirement	0 spaces	-
Total				**155 spaces**	**155 spaces**

The above assessment anticipates the development proposal has statutory requirement of 155 spaces.

In this instance, the proposed on-site parking provision of 155 car spaces (provided on the ground and future mezzanine car parking levels) meets the statutory parking requirement.

Any visitor car parking demands generated by the proposal would be accommodated within the publicly accessible shopping centre car park (typically peaking in the evening when existing shopping centre demands are low).

Finally, it is noted that each of the tandem car parking spaces will be allocated to the 3-bedroom dwellings which have a statutory requirement to provide 2 spaces each.

Based on the above, the proposed resident car parking provision is considered satisfactory.

Cumulative Development

For completeness, a cumulative assessment of the statutory car parking requirements for the overall development has also been calculated, with the results presented in Table 6.2.

Table 6.2: Statutory Car Parking Requirements – Overall Development

Land Uses		Size	Statutory Car Parking Rates	Statutory Requirement	Proposed Provision
Mixed-Use Development					
Office		5,132sqm	3.0 spaces per 100sqm	153 spaces	237 spaces
Medical Centre		677sqm	3.5 spaces per 100sqm	23 spaces	
Serviced Apartments		102 apartments	0.6 spaces per apartment [1]	61 spaces	
Sub Total				**237 spaces**	
Retail Development					
Retail		16,925sqm	3.5 spaces per 100sqm	592 spaces	1,059 spaces
Supermarket		4,878sqm	5.0 spaces per 100sqm	243 spaces	
Sub Total				**835 spaces**	
Residential Development					
Residential	1-bedroom	19 dwellings	1 space per dwelling	19 spaces	155 spaces
	2-bedroom	124 dwellings	1 spaces per dwelling	124 spaces	
	3-bedroom	6 dwellings	2 spaces per dwelling	12 spaces	
	Visitors	149 dwellings	None	0 spaces	
Sub Total				**155 spaces**	
Total				**1,245 spaces**	**1,451 spaces**

[3] Car parking rate from GTA's survey database

Table 6.2 indicates that the cumulative development car parking supply exceeds the statutory car parking requirements (by approximately 15%). The overall car parking provision comfortably exceeds the statutory car parking requirement and is therefore considered acceptable.

Resultant Shopping Centre Provision

The proposed car parking supply for the retail land uses will result in a reduction in the provision of car parking. A summary of the existing and proposed car parking supplies and associated per 100sqm car parking rate is presented in Table 6.3.

Table 6.3: Existing and Future Retail Car Parking Supply

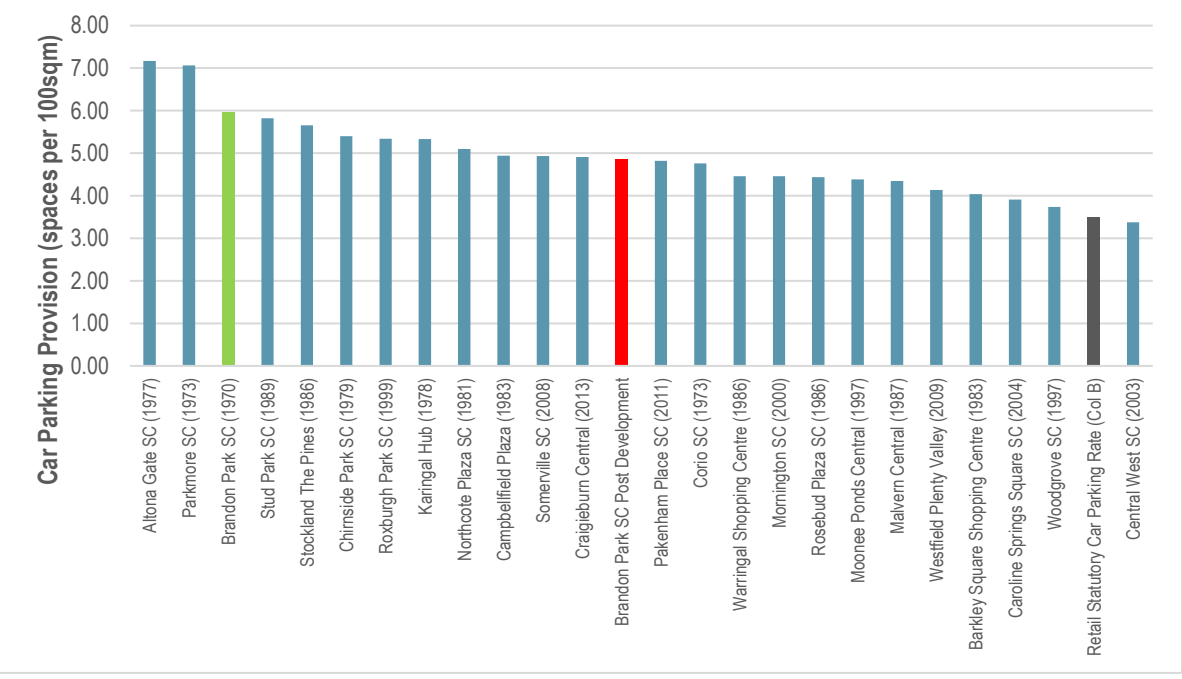
Metric	Existing	Proposed (Residential Only)	Proposed (Residential + Mixed Use)
Combined retail floor space	22,743sqm	22,743sqm	21,803sqm
Total car parking supply	1,361 spaces	1,203 spaces	1,059 spaces
Car parking rate	6.0 spaces / 100sqm	5.3 spaces / 100sqm	4.9 spaces / 100sqm

Table 6.3 indicates that the retail car parking rate is proposed to be reduced from 6.0 to 4.9 spaces per 100sqm as a result of the cumulative development (or 5.3 spaces per 100sqm as a result of just the residential development). Car parking surveys of the existing car park indicate a current peak car parking demand of 4.5 spaces per 100sqm. It is evident that the existing peak car parking rate will continue to be accommodated by the proposed car parking provision (under both scenarios).

Figure 6.1 illustrates the rate of car parking provision for comparable shopping centres in Victoria (20,000sqm to 50,000sqm). It is noted that in comparison to other shopping centres in Victoria the current rate of car parking at the Centre is high (refer green bar in below chart).

The data shows that the proposed future retail car parking rate at the Centre is average when compared to other centres. All centres developed after the year 2000 have lower car parking rates than proposed for the retail component at the Centre.

Figure 6.1: Rate of Car Parking Supply Benchmarking



Note: Assumes cumulative development of both the residential and mixed use sites.

The proposed retail car parking is considered appropriate, noting the following:

- The proposed car parking provision for the retail component of the development exceeds the minimum statutory car parking requirement for the retail uses at the Centre.
- The resultant retail car parking rate exceeds the existing car parking demand rate.
- The proposed car parking rate is consistent (or higher) than comparable sized retail Centres in Victoria.

6.2.2. Car Park Layout Review

The proposed parking layout has been assessed in respect to the relevant Design Standards set out in Clause 52.06-09 of the Planning Scheme. A summary of compliance is set out below:

Design Standard 1: Accessways

- Complies. Minimum accessway widths of 6.4m are provided for the new car parking areas and the impacted existing car parking areas.

Design Standard 2: Car Parking Spaces

- Complies. The future residential car spaces are configured with minimum 2.6m by 4.9m dimensions. The existing retail car parking are configured with minimum 2.6m by 5.4m dimensions accessed by a 6.5m aisle.

Design Standard 3: Gradients

- Complies. A maximum ramp grade of 1 in 5 is proposed between the residential levels with 2m long 1 in 8 transitions provided.

Design Standard 4: Mechanical Parking

- Not applicable.

Design Standard 5: Urban Design

- Urban design is outside the scope of this report.

Design Standard 6: Safety

- Lighting and signage is not shown but should be incorporated at the detailed design stage.

Design Standard 7: Landscaping

- Landscaping is outside the scope of this report.

6.3. Traffic Impact Assessment

6.3.1. Traffic Generation

Traffic generation estimates for the proposed development have been sourced from the RMS Guide to Traffic Generating Developments document and the GTA database. The AM and PM peak hour traffic generation estimates resulting from the proposal are set out in Table 6.4.

Table 6.4: Peak Hour Traffic Generation Assessment

Land Use	Size/No.	Traffic Generation Rate		Traffic Generation	
		AM	PM	AM	PM
Residential Development					
Residential	149 dwellings	0.3 movements per dwelling [3]		45	45
Sub Total				***45***	***45***
Mixed Use Development					
Office	5,132sqm	1.6 movements per 100sqm [1]	1.2 movements per 100sqm [1]	82	62
Medical Centre	677sqm (23 parking spaces)	1 movement per parking space [2]		23	23
Serviced Apartments	102 apartments	0.3 movements per dwelling [3]	0.4 movements per dwelling [3]	31	41
Sub Total				***136***	***126***
Total				**181**	**171**

[1] RMS Guide to Traffic Generating Developments (2013)
[2] First principles assessment.
[3] Sourced from GTA's survey database of similar land uses. This is consistent with approved traffic generation rates for developments in a similar context.

Table 6.4 indicates that the proposed residential development could be expected to generate in the order of 45 vehicle movements during each road network peak hour. Overall, the proposed cumulative development could be expected to generate in the order of 180 vehicle movements during each road network peak hour.

6.3.2. Traffic Impact

A quantitative assessment of the existing and forecast additional traffic movements through the Brandon Park Drive / Ferntree Gully Road intersection is presented at Table 6.5. The assessment also identifies the proportional increase in traffic volumes and the number of additional movements per minute through the intersection.

Table 6.5: Additional Intersection Demands (Residential Development Only)

Intersection	Peak Hour	Existing [1]	Additional	Percentage Increase	Additional Movements Per Minute
Ferntree Gully Road / Brandon Park Drive	AM	3,953	+45	1.1%	2 movement every 3 minutes (approx.)
	PM	4,616	+45	<1%	2 movement every 3 minutes (approx.)

[4] Sourced from peak hour traffic surveys commissioned for Thursday 9 August 2018.

Table 6.5 indicates that the additional traffic generated by the residential development represents approximately one percent of existing traffic at the adjacent intersection or 2 additional movement every 3 minutes through the intersection (approximately 1 movement per signal cycle).

On this basis, the additional traffic generation from the residential development through the intersection would have a minor impact on its operation.

A cumulative assessment of the traffic generation from the mixed use and residential development applications is provided in Appendix D.

6.3.3. Summary

Against existing traffic volumes in the vicinity of the Centre, the additional traffic generated by the proposed development could not be expected to compromise the safety or function of the surrounding road network.

7. CONCLUSION

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

- This application proposes a residential development within Brandon Park Shopping Centre, consisting of 149 dwellings. A concurrent application has been prepared to deliver a mixed use building on the shopping centre site.
- The proposed development generates a statutory car parking requirement of 155 spaces. The proposed residential car parking provision of 155 spaces meets the statutory car parking requirement.
- The resultant shopping centre car parking rate (4.9 spaces per 100sqm) exceeds the peak car parking rate generated by the existing Centre (4.5 spaces per 100sqm).
- Bicycle parking is proposed to be provided in excess of the minimum statutory requirements, with resident bicycle parking provided at 2.5 times the statutory requirement.
- The site is forecast to generate in the order of 45 vehicle movements during the morning and afternoon peak hours.
- There is adequate capacity in the surrounding road network to cater for the traffic generated by the residential development in isolation.
- The combined traffic generation of this application as well as the mixed use application will result in a minor increase in traffic to the site. This is not expected to have a detrimental impact on the surrounding road network.
-

A. EXISTING CONDITIONS

A

A.1. Transport Network

A.1.1. Road Network

The subject site in bound by Ferntree Gully Road to the north, Springvale Road to the west, Magid Avenue to the south and Brandon Park Drive to the east. Ferntree Gully Road and Springvale Road are both configured with dual carriageways and are zoned as Road Zone 1 (VicRoads controlled roads). Magid Avenue and Brandon Park Drive are configured with single carriageways and are zoned as Local Roads (council controlled roads).

Vehicle access to the site is currently provided via one access point on Ferntree Gully Road, two access points on Springvale Road, one access point on Magid Avenue and three access points on Brandon Park Drive. A description of the frontage roads is provided in Table A.1.

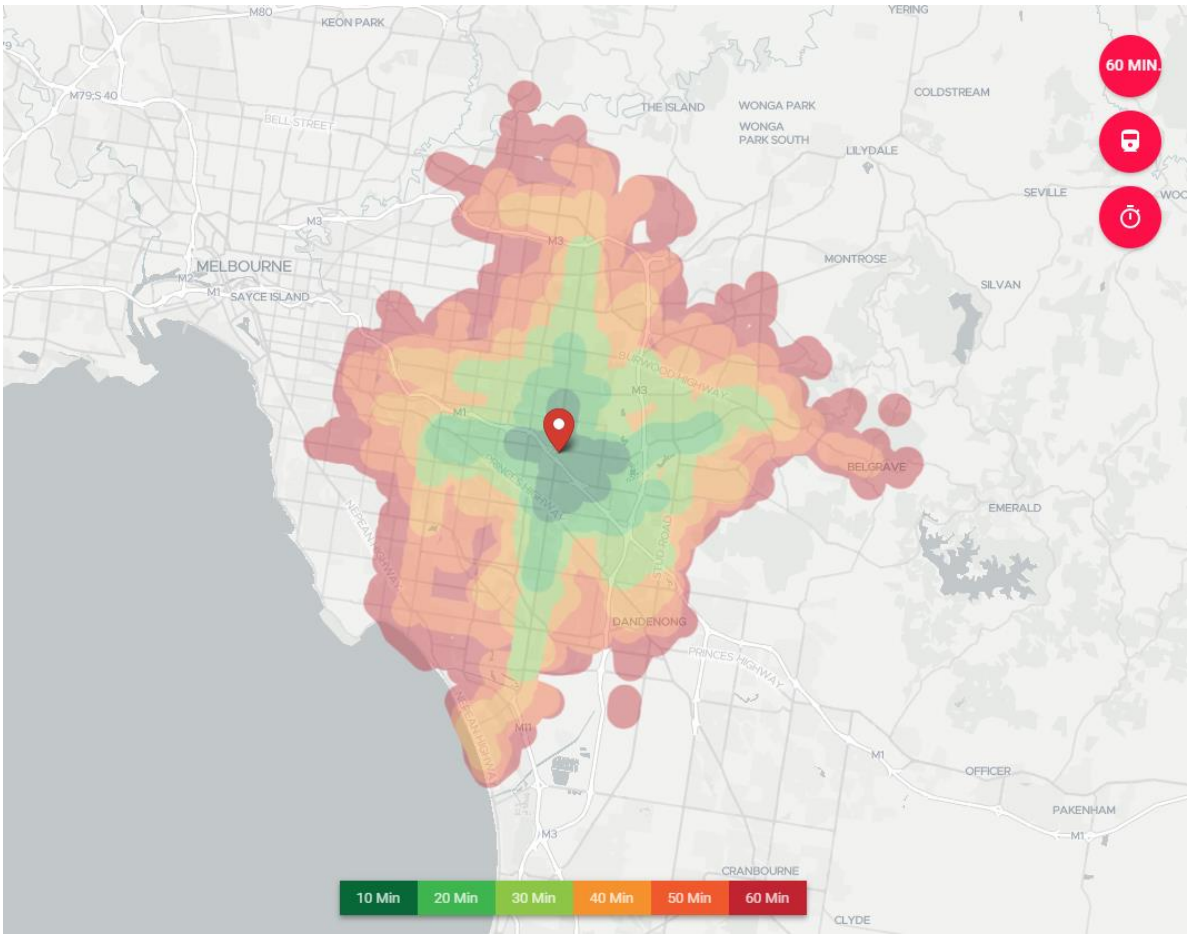
Table A.1: Road Network Description

Road	Classification	Description	Approximate Volume	Photo
Ferntree Gully Road	Primary State Arterial Road (VicRoads)	• Aligned in an east-west direction • Duel three-lane carriageways set within a 35 metre wide road reserve (approx.) • No bike lanes • No kerbside parking is permitted	52,000vpd	
Springvale Road	Primary State Arterial Road (VicRoads)	• Aligned in a north-south direction • Duel three-lane carriageways set within a 30 metre wide road reserve (approx.) • No bike lanes • No kerbside parking is permitted	54,000vpd	
Brandon Park Drive	Collector Road (Council)	• Aligned in a north-south direction • Single one-lane carriageways set within a 20 metre wide road reserve (approx.) • No bike lanes • No kerbside parking is permitted	9,400vpd	
Magid Avenue	Local Road (Council)	• Aligned in an east-west direction • Single one-lane carriageways set within a 15 metre wide road reserve (approx.) • No bike lanes • No kerbside parking is permitted	5,500vpd	

A.1.2. Public Transport Network

The available public transport catchment within 60 minutes of Ormond Station, at ten-minute intervals, is presented in the isochrone drawing set out at Figure A.1 (noting that this dataset includes the walk time between the public transport service and the site and origin).

Figure A.1: Public Transport Catchment Departing Brandon Park SC



The site is serviced by various bus routes, which provide access both to key destinations in the local area (e.g. shopping areas), as well as an interchange to other modes of transport enabling travel to the Melbourne CBD and other destinations.

The bus services which are most relevant to the site is shown in Table A.2.

Table A.2: Existing Public Transport Services

Route No.	Route Description	Major Destinations on Route	Service Span First/Last Service		Frequency (mins) Peak/Off Peak	
			Weekday	Weekend	Weekday	Weekend
693	Belgrave - Oakleigh	Oakleigh Station, Mountain Gate SC, Ferntree Gully Station, Belgrave Station	6:30am/ 9:30pm	8:50am/ 10:00pm	15/30 minutes	60 minutes
742	Eastland - Chadstone	Eastland SC, Heatherdale Station, Vermont South SC, Glen Waverley Station, Monash University, Oakleigh Station, Chadstone SC	6:00am/ 9:00pm	7:00am/ 9:00pm	20/30 minutes	40 minutes
753	Glen Waverley - Bayswater	Glen Waverley Station, Brentwood Secondary College, Boronia Station, Bayswater Station	6:20am/ 9:20pm	7:50am/ 9:30pm	15/30 minutes	60 minutes
848	Dandenong – Brandon Park SC	Dandenong Station, Waverley Gardens SC, Brandon Park SC	6:00am/ 9:00pm	8:00am/ 9:00pm	60 minutes	60 minutes
850	Dandenong – Glen Waverley	Dandenong Station, Waverley Gardens SC, Brandon Park SC, The Glen, Glen Waverley Station	6:00am/ 9:00pm	7:00am / 9:00pm	30 minutes	60 minutes
885	Glen Waverley - Springvale	Glen Waverley Station, The Glen, Brandon Park SC, Springvale Station	7:00am/ 6:40pm	9:00am/ 5:00pm	30 minutes	60 minutes
902	Chelsea – Airport West	Chelsea Station, Springvale Station, Glen Waverley Station, Nunawading Station, Doncaster SC, Eltham Station, Greensborough Station, St Damian's PS, Keon park Station, Campbellfield Plaza, Broadmeadows SC, Airport West SC	5:00am/ 11:30pm	5:50am/ 12:30am	15 minutes	30 minutes
969	City – Ringwood (Night Bus)	Melbourne CBD, Richmond Station, Alfred Hospital, Caufield Station, Chadstone SC, Waverley Park, Stud Park SC, Scoresby Village SC, Knox SC, Ringwood Station	-	12.30am/ 4:30am	-	30 minutes

A.1.3. Active Travel Network

Walking

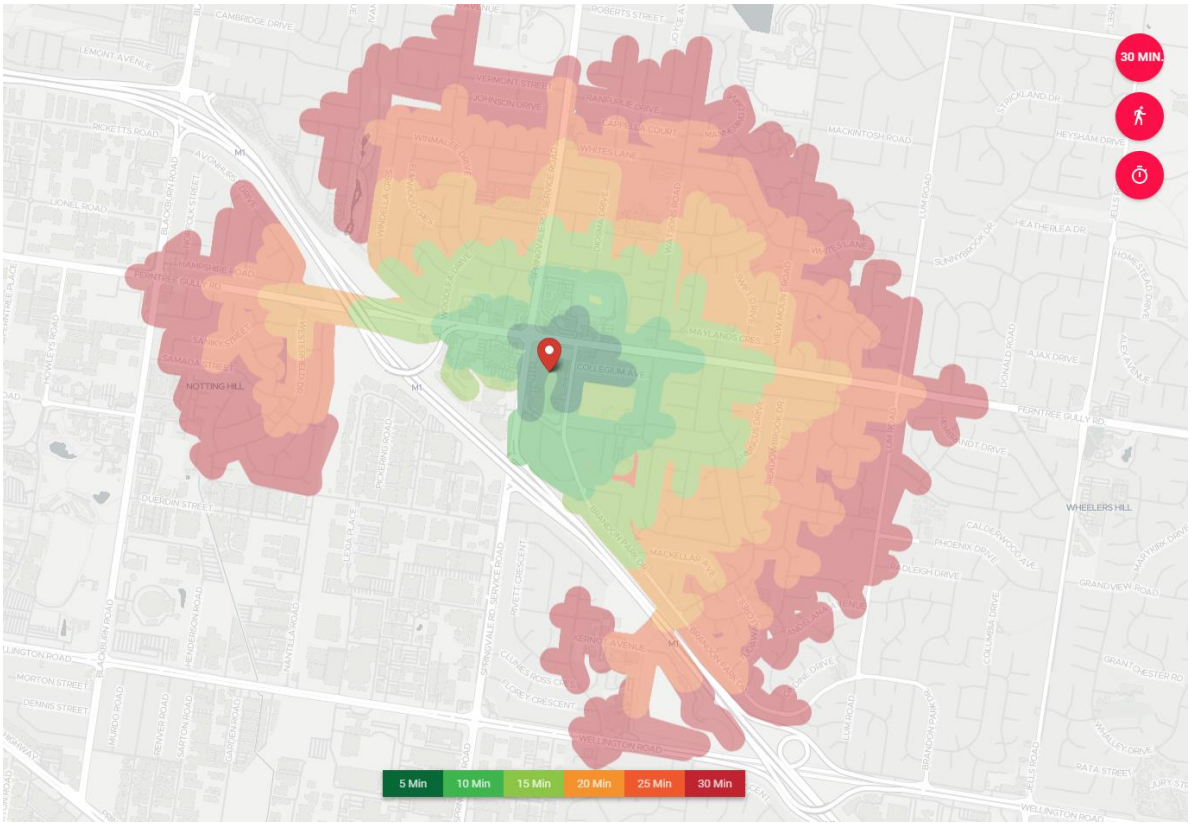
Brandon Park Shopping Centre enjoys a well-connected pedestrian network, with all streets in the local area having sealed footpaths and street lighting. Pedestrian paths are provided on both sides of each of the surrounding roads, with signalised pedestrian crossings provided at each of the surrounding signalised intersections.

The Centre has a 'walk score' of 78 out of 100. It is noted that the Walk Score of an area is calculated by determining the distance required to walk from an origin to nearby amenities. It also assesses block sizes and intersection density to determine the permeability of an area. The most walkable areas are characterised by daily errands being within a 5-minute walk of the origin location. The score of 78 infers that the site and the area is a "very walkable", with most errands accomplishable on foot.

The available walking catchment within 30 minutes of the Centre, at five-minute intervals, is provided in the isochrone drawing presented in Figure A.2.

This figure indicates a walking catchment of 1.5km to 2km to the north, east and west based on the urban structure around the site at present, with accessibility to the south of the site limited.

Figure A.2: Walking Catchment Surrounding the Site



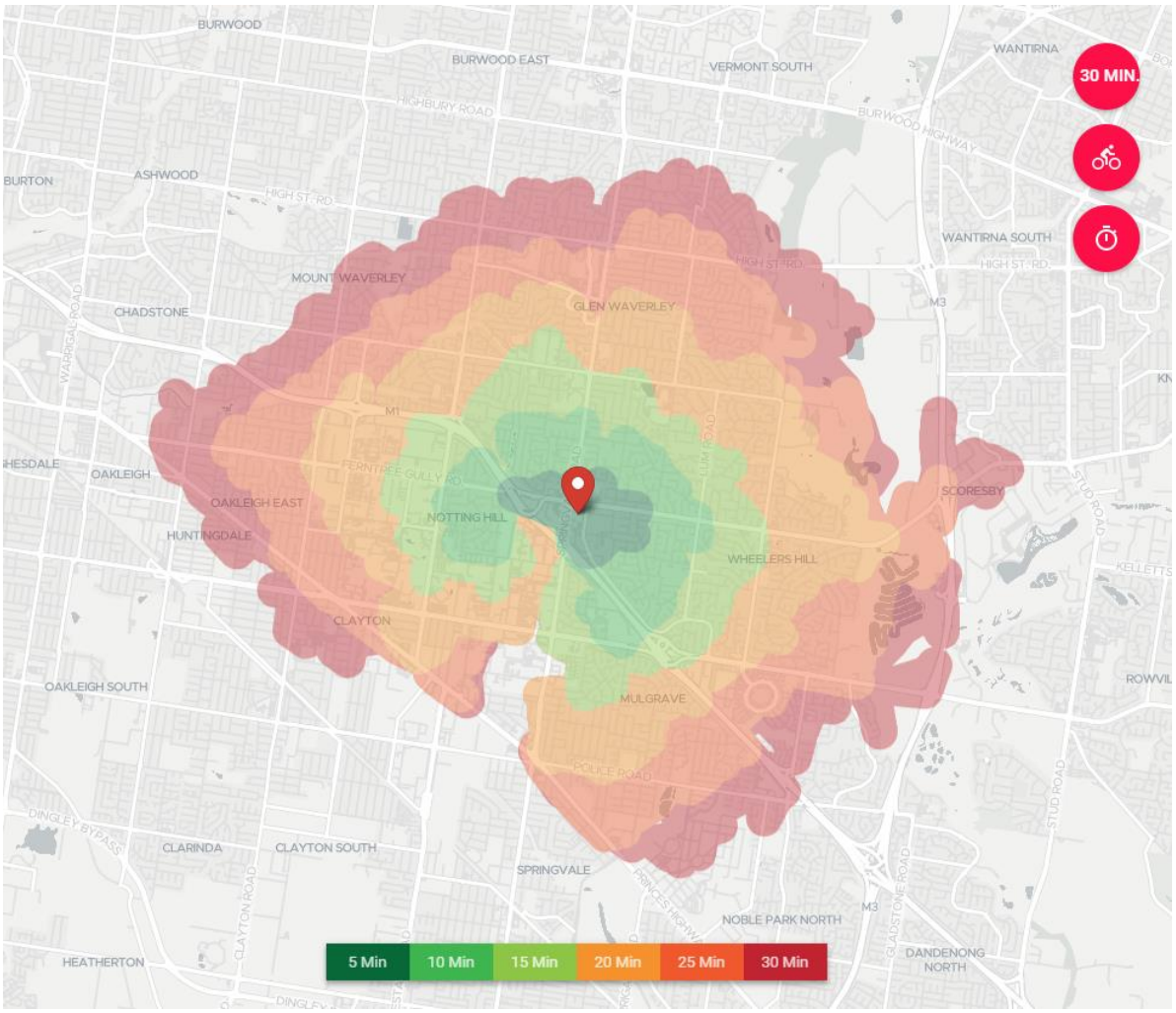
Cycling

Cycling infrastructure in the vicinity of Brandon Park Shopping Centre is limited, with none of the adjacent roads featuring on or off street bicycle lanes or shared paths.

Strada Crescent, approximately 400m to the east of the site, is listed as a part of a VicRoads Strategic Cycling Corridor, which provides a north-south link between Wellington Road and Waverley Road.

The available cycling catchment within 30 minutes of the Centre at five-minute intervals, is provided in the isochrone drawing set out at Figure A.3. This figure indicates a cycling catchment of approximately 5km in all compass directions based on the urban structure around the site. It is noted that the below catchment mapping assumes a relatively slow riding speed by an inexperienced rider, noting that a more experienced rider would likely be able to travel up to 9km from the site in 30 minutes.

Figure A.3: Cycling Catchment Surrounding the Site



B.STRATEGIC POLICY REVIEW

B

B.1. City of Monash Planning Scheme

B.1.1. Victorian Planning Policy Provisions

Clause 18 of the Planning Scheme (Victorian Planning Policy) is designed to reflect the intent of State Government guidance and contains objectives in relation to Transport which are relevant to this development. This includes the following (listed in the table below).

- Create a safe and sustainable transport system by integrating land-use and transport.
- Coordinate development of all transport modes to provide a comprehensive transport system.
- Promote the use of sustainable personal transport.
- Facilitate greater use of public transport and promote increased development close to high-quality public transport routes.
- Manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure.
- Ensure an adequate supply of car parking that is appropriately designed and located.

B.1.2. Local Planning Policy Provisions

Clause 21.01-3 of the Monash local planning policy provisions introduces the Monash Strategic Framework plan, entitled *Monash 2021: A Thriving Community*.

The Plan identifies locations where specific land use outcomes are encouraged, including redevelopment, higher densities and mixed-use developments. Areas of significance for natural and cultural elements that may limit development opportunities are also highlighted on the plan. The major strategic directions include:

- Identifying activity centres and promoting development and expansion of retail, entertainment, community and related facilities appropriate to the centre's role.
- To direct residential growth to neighbourhood and activity centres, the Monash National Employment and Innovation Cluster and the boulevards (Springvale Road and Princes Highway).
- Conserving locally significant residential, commercial and industrial heritage buildings, places, streetscapes and natural environments.
- Developing sustainable employment opportunities to maintain Monash as a predominant business location in Melbourne's eastern region.
- Identifying areas for revitalisation of older industrial premises.
- Retaining key regional assets that contribute to the economic, business, educational, medical, sporting, recreational, cultural and social life of the community and maximising their benefit to the community.
- Integrating land use and transport planning of arterial roads, public transport routes, and pedestrian and bicycle paths around major trip generators in commercial, residential and industrial areas.

Clause 21.17 notes that Brandon Park is identified as a Major Activity Centre in Metropolitan Policy, and include a vision and a series of planning principles to "support its development as a vibrant and prosperous activity centre." These principles include the following:

- Continue to develop the activity centre as a mixed-use activity centre incorporating retail, commercial, cultural, civic, residential, office and industrial uses.
- Maintain the activity centre with an appropriate retail mix in the context of competition from larger centres and new forms of retailing.
- Continue the growth of employment in the centre.
- Promote the Activity Centre as a key focus for convenience shopping and community services, primarily serving the local catchment.
- Continue the fostering of social and cultural development within the activity centre.
- Increase residential accommodation, including affordable housing, within the centre.
- Provide diversity in choice of housing types and opportunities for new housing to meet the needs of existing and future households.
- Provide for increased intensity and scale of development within the Major Activity Centre while respecting the existing character of adjoining areas.
- A key influence on any future development within the activity centre is the Garden City Character.
- Improvement of vehicle access, circulation, parking, and pedestrian and bicycle movement and safety.

In terms of accessibility, clause 21.17-3 states that that Brandon Park activity centre will:

- Provide vibrant, attractive pedestrian environments that are safe and accessible for people with all levels of mobility.
- Be highly accessible by all travel modes.
- Encourage people to the catchment area to walk and cycle to the various facilities within the Major Activity Centre.
- Create opportunities for improved local permeability through provision of new pedestrian/cycle pathways or new local street networks.
- Be conveniently linked to major public open space and other recreation facilities in the region.

B.2. City of Monash Planning Scheme: Municipal Economic and Transport Policy Documents

In 2018 the City of Monash released an **Economic Development Strategy**, whose stated purpose is "to build on the strengths of the municipality to assist, attract, promote and connect businesses enabling growth and economic development and driving investment into Monash." This plan seeks to provide a renewed focus on:

- Victorian Government Priority industries and sectors that will drive Victoria's economic growth and jobs
- Creating an attractive environment for innovative start-ups and small business

- Attracting investment in infrastructure, especially transport and digital
- infrastructure
- Promoting the Monash National Employment and Innovation Cluster (Monash NEIC) as the preeminent business and employment destination in Victoria
- Prioritising development and investment in the Technology, Health, Education and Research Precincts of the Monash NEIC
- Facilitating relationships and connections between businesses, government agencies, education and research institutions, and peak bodies to create collaborative partnerships
- Supporting vibrant and attractive Activity Centres where people shop, work, meet, and relax
- Encouraging economic, environmental, and socially sustainable businesses practices
- Connect business with business and information, support, learning and training opportunities.

In 2017 Council released the Monash Integrated Transport Strategy, whose vision is that "By 2037 Monash will have a highly accessible and sustainable transport network that supports the safety, health and prosperity of all members of the community."

The Monash ITS identified five directions to encourage best practice integrated transport and land use planning within Monash, each with their own set of council actions. The five directions are the following:

A. A safer network
B. A more accessible Monash
C. Promote sustainable transport
D. Support productivity
E. Manage car parking

To support Direction C – more sustainable transport – the ITS states that "the Monash community should be encouraged to understand and adopt sustainable transport behaviour. A shift towards greater public transport, walking and cycling mode share will be important to meet future demand for travel and maintain Monash's liveability." It states, further, that there "is a continual need to evaluate the role of the car in Monash and how limited street space can be most effectively used. It is becoming apparent that as roads reach capacity and demand for trips continues to rise, the number of additional journeys able to be made by cars will be limited."

Accordingly, the Strategy argues that other transport modes, such as walking, cycling and public transport, will need to take a larger share of this increasing trip demand. While citing a number of best-practice design principles that can encourage walking, the Strategy also notes

- the role of car-sharing in reducing overall car ownership.
- he importance, in promoting sustainability, to encourage a move from petrol and diesel to low-emission fuels through promoting the establishment of infrastructure such as charging stations within new developments, or as part of existing fuel station businesses.

In terms of **Direction E – managing car parking** – Monash Council declares its intent to:

- Review car parking requirements for new developments in locations with good access to public transport, recognising the impact generous car parking provision has on reducing the competitiveness of sustainable mobility
- Minimise the impact of vehicle congestion and improve the efficiency of kerbside road space
- Creating a balance between provision of sufficient parking capacity at activity centres and transport hubs, and providing a safe and accessible street environment for pedestrians and cyclists
- Ensure that parking solutions accommodate people with disabilities so that they can participate in day-to-day activities across the city
- Encourage residents to reduce reliance on private vehicle use
- Support innovation and new technologies in parking management
- Consider alternative future uses for road space currently occupied by car parking.

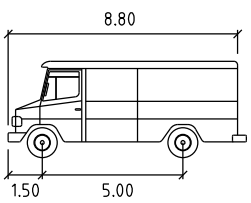
C. SWEPT PATH ASSESSMENT

C

SWEPT PATH KEY

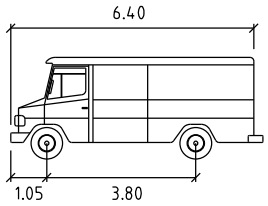
- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



MRV AS2890.2 metres

Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 34.0



SRV metres

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Track	: 2.30
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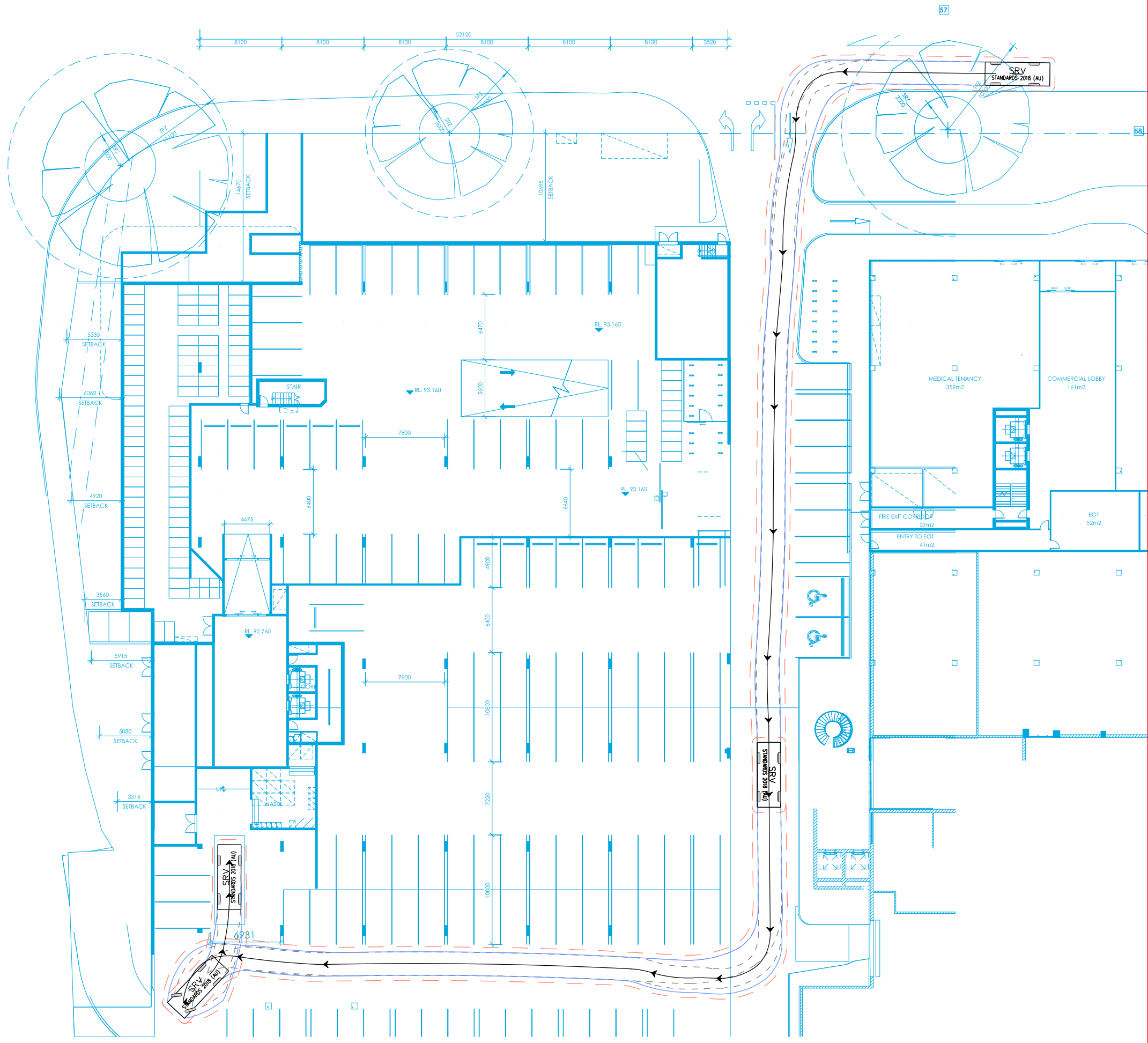
Steering Angle	: 38.0



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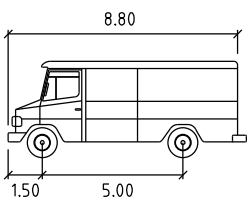

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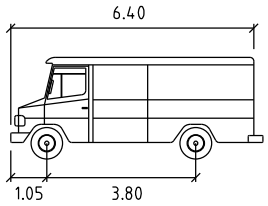

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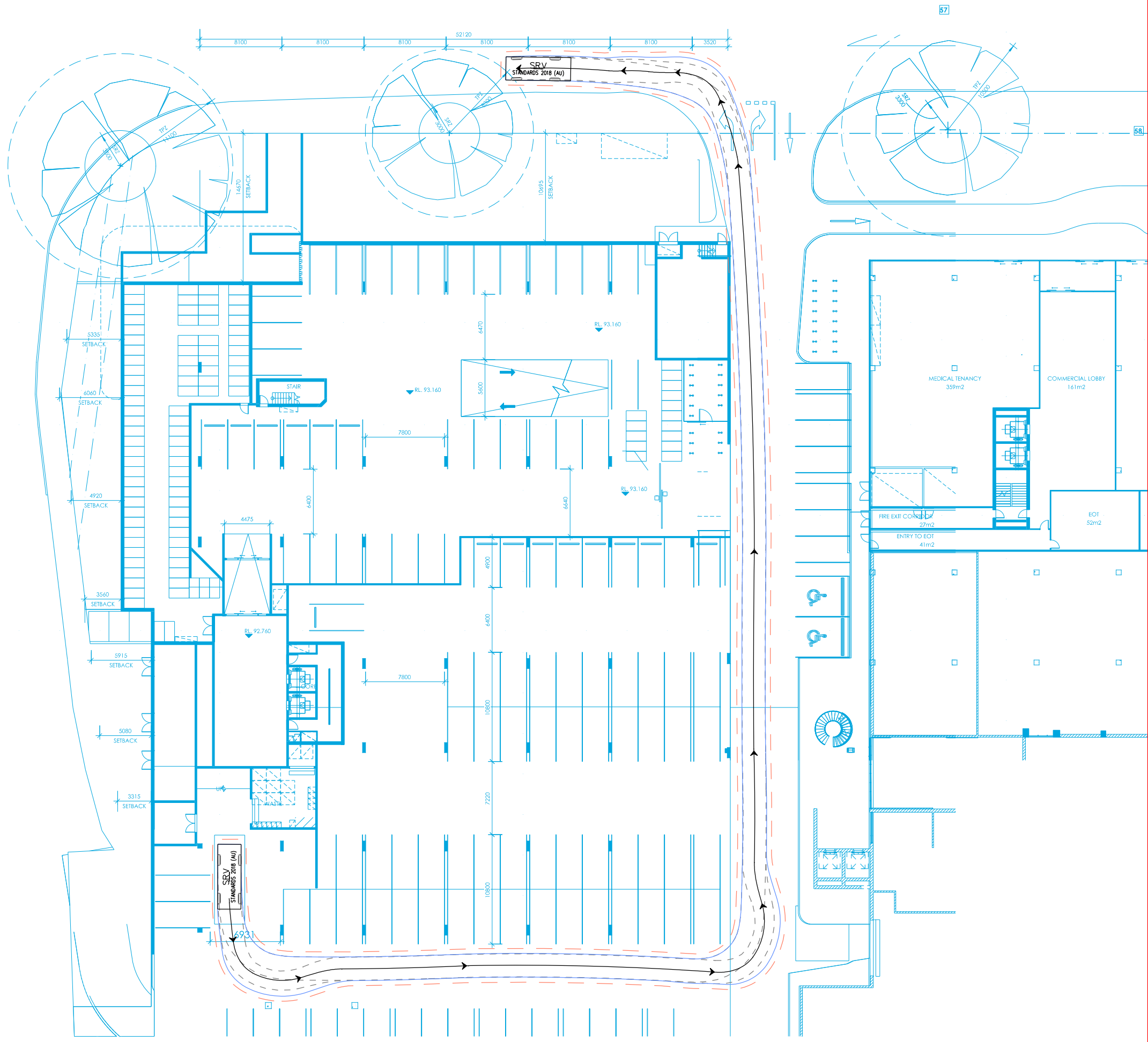

SWEPT PATH KEY

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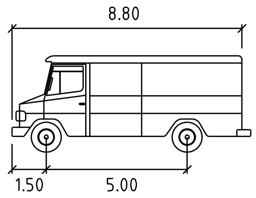
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 5km/h



MRV AS2890.2 metres

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Track	: 2.50
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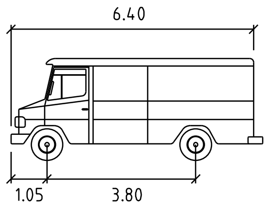
Steering Angle	: 34.0



SRV metres

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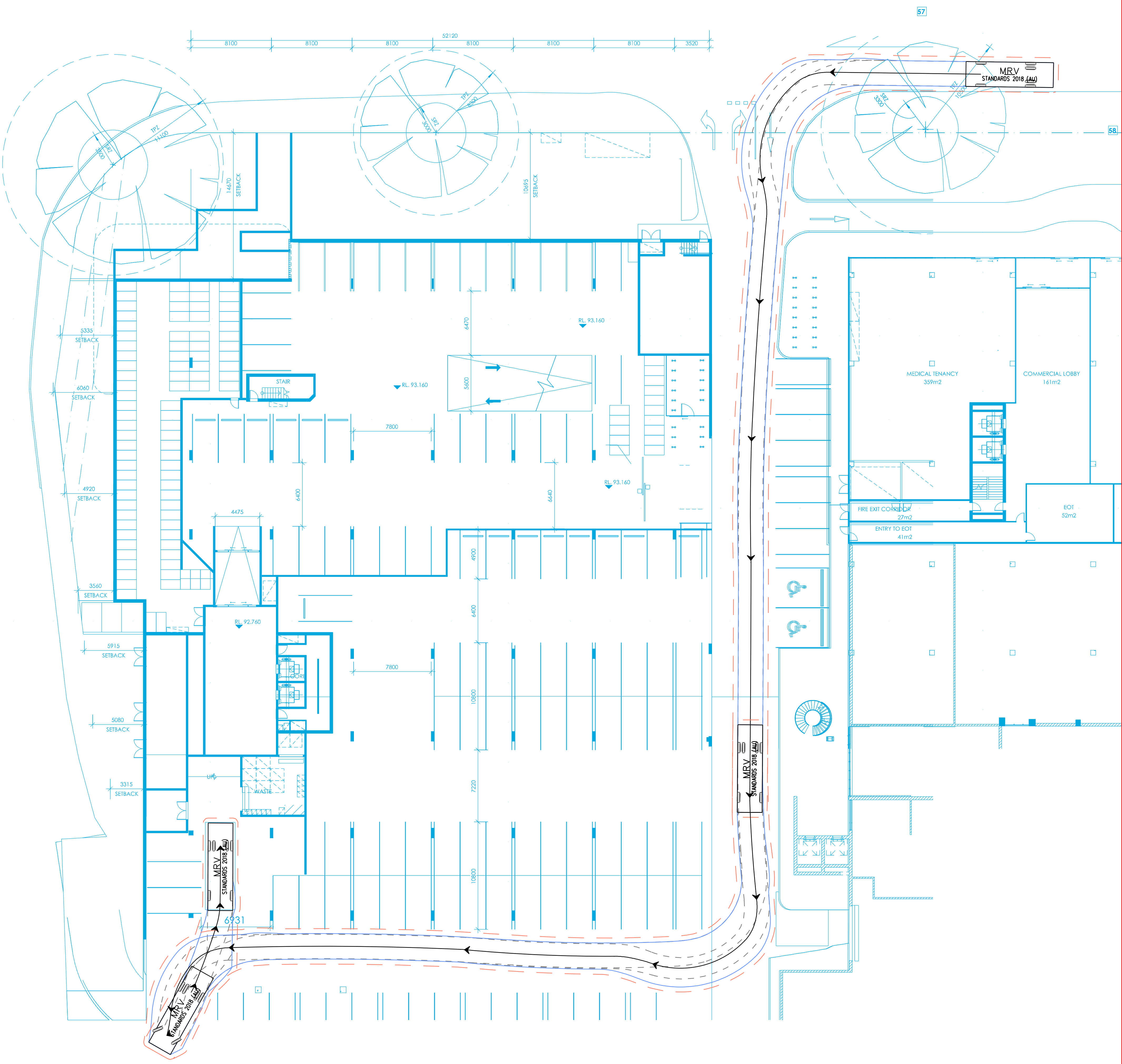

SWEPT PATH KEY

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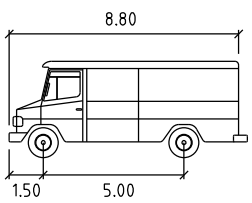

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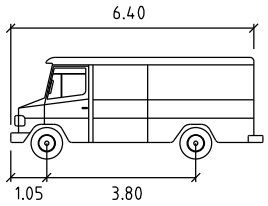

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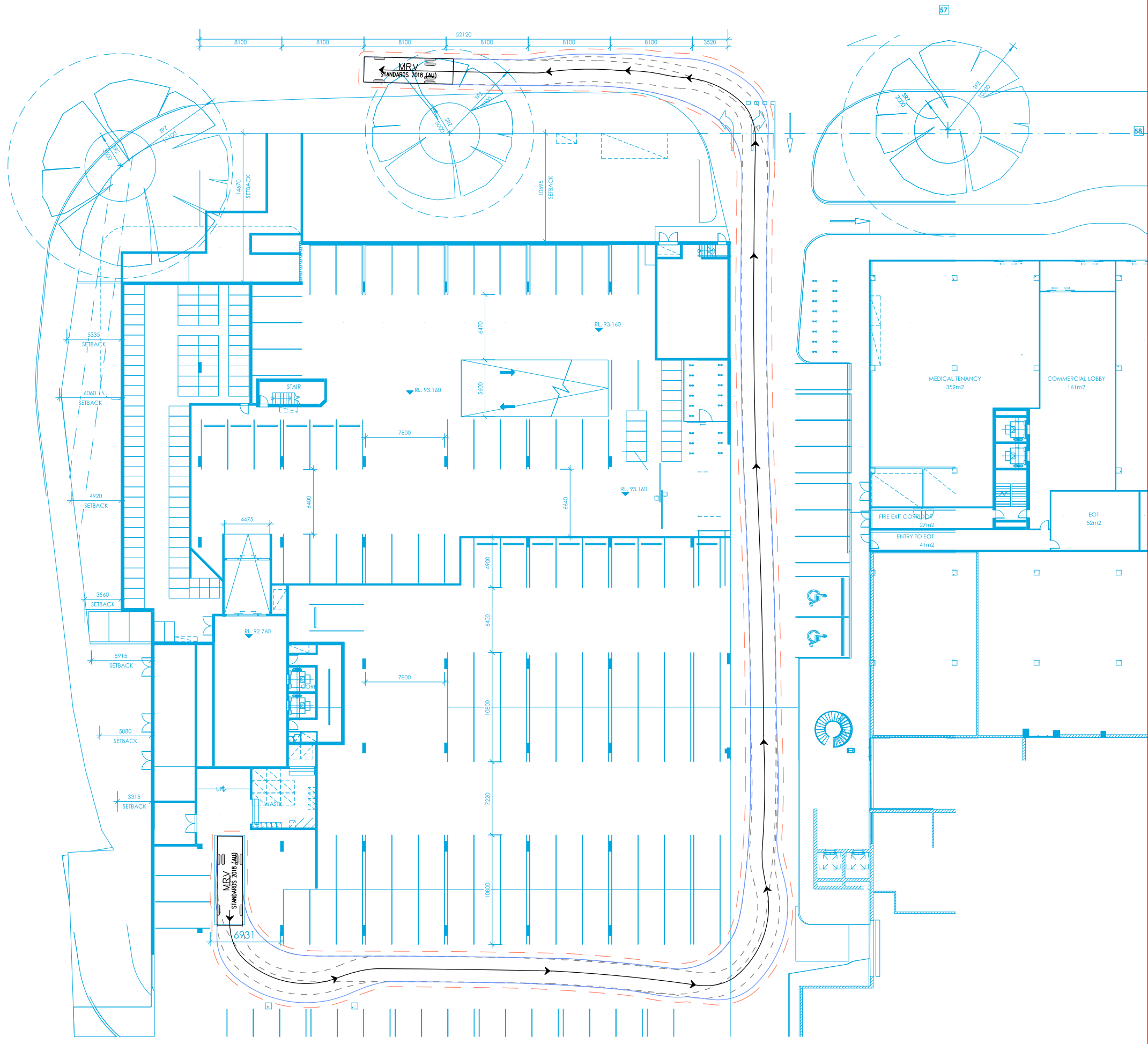
Steering Angle	: 38.0



D. CUMULATIVE TRAFFIC IMPACT ASSESSMENT

D

D.1. Traffic Distribution and Assignment

The directional distribution and assignment of traffic generated by the proposed development 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
- the proposed site access locations
- the accessibility of each developments car park in relation to the broader shopping centres access points.

Having consideration to the above, for the purposes of estimating vehicle movements, the following has been assumed with respect to traffic distributions:

- Multiple access points will be utilised by the mixed-use development, including the left-in access on Ferntree Gully Road, the two access points to Brandon Park Drive and the left-in left-out access points to Springvale Road.
- For the residential development, all vehicles will utilise the north-eastern access point to Brandon Park Drive.

In addition, the directional split of traffic (i.e. the ratio between the inbound and outbound traffic movements) has been assumed as follows:

Table D.1: Directional Traffic Split

Land Use	AM Peak Hour		PM Peak Hour	
	In	Out	In	Out
Office	90%	10%	10%	90%
Medical Centre	80%	20%	20%	80%
Serviced Apartments	40%	60%	60%	40%
Residential	20%	80%	60%	40%

The traffic distribution on to the external road network, alongside the Existing Conditions surveys and post development traffic volumes are presented on the following pages.

Figure D.1: AM Peak Hour Traffic Volumes Existing

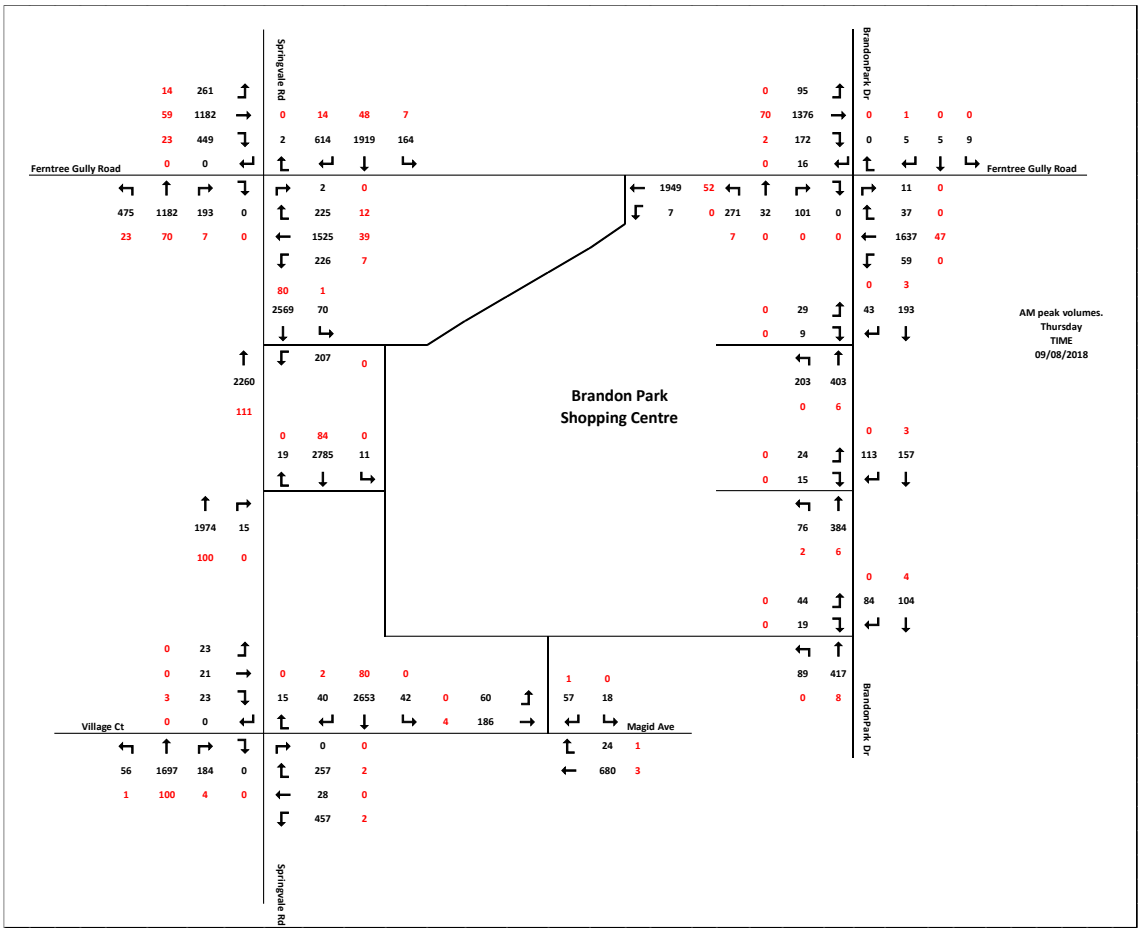


Figure D.2: PM Peak Hour Traffic Volumes Existing

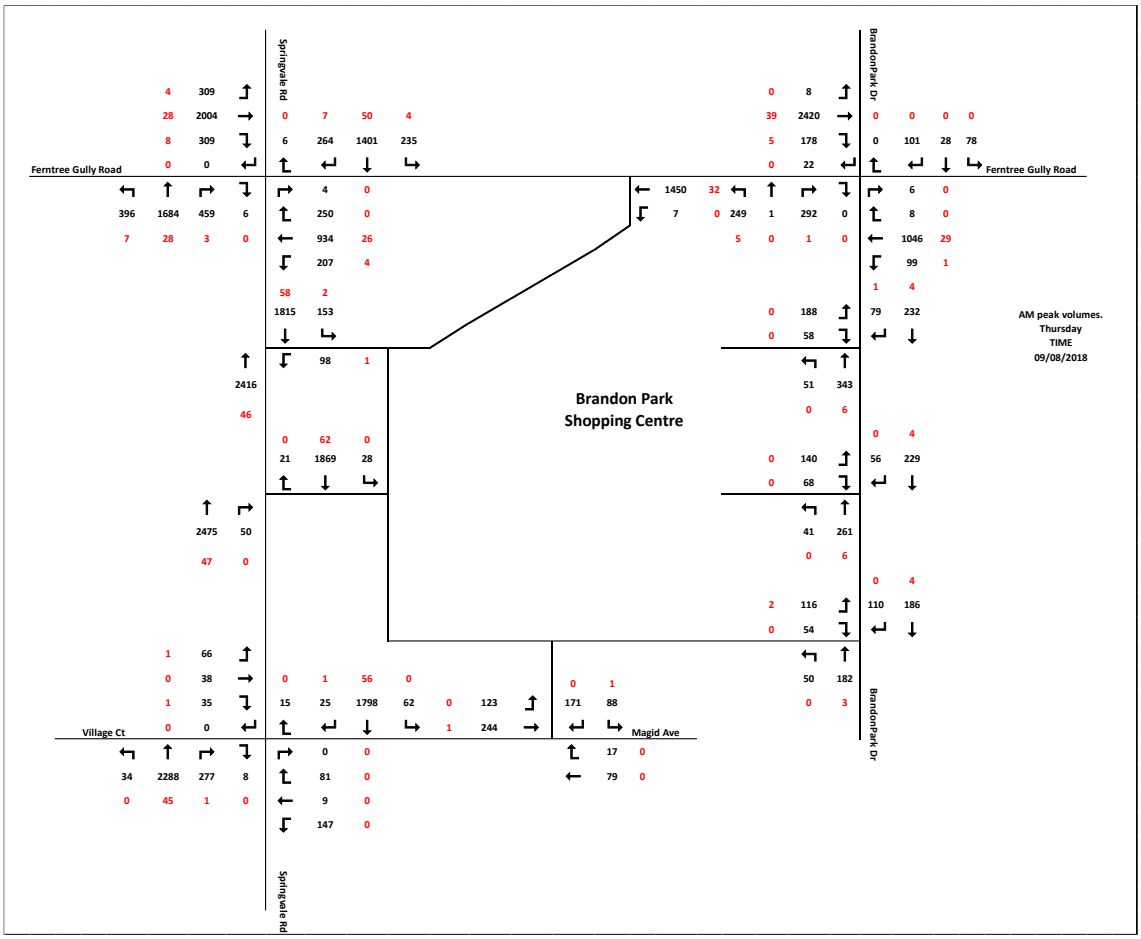


Figure D.3: AM Peak Hour Traffic Generation

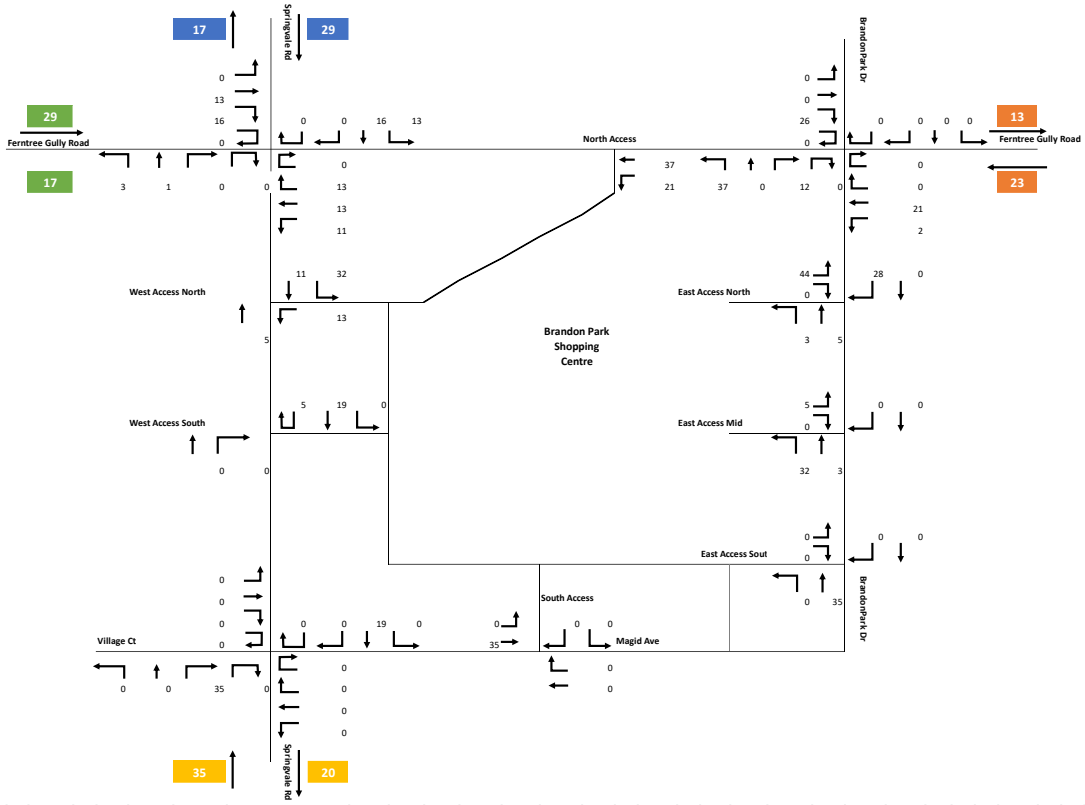


Figure D.4: PM Peak Hour Traffic Generation

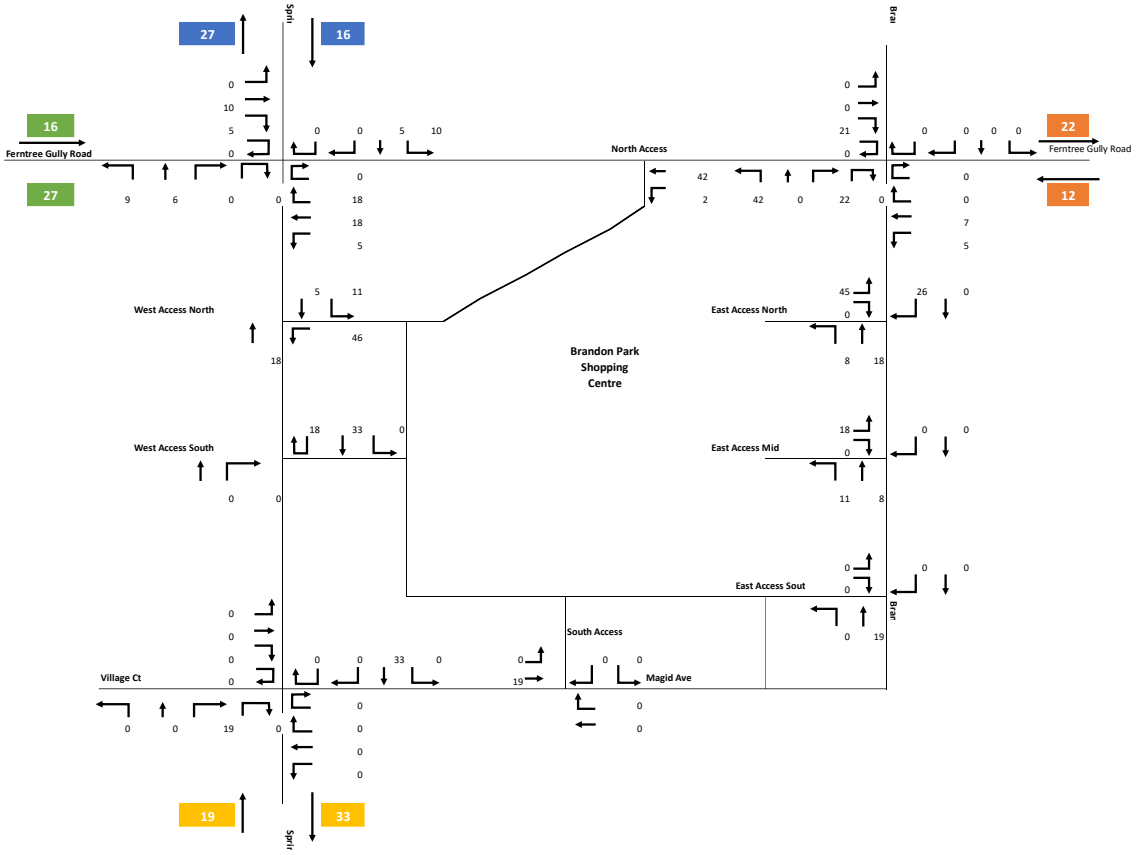


Figure D.5: AM Peak Hour Post Development Traffic Volumes

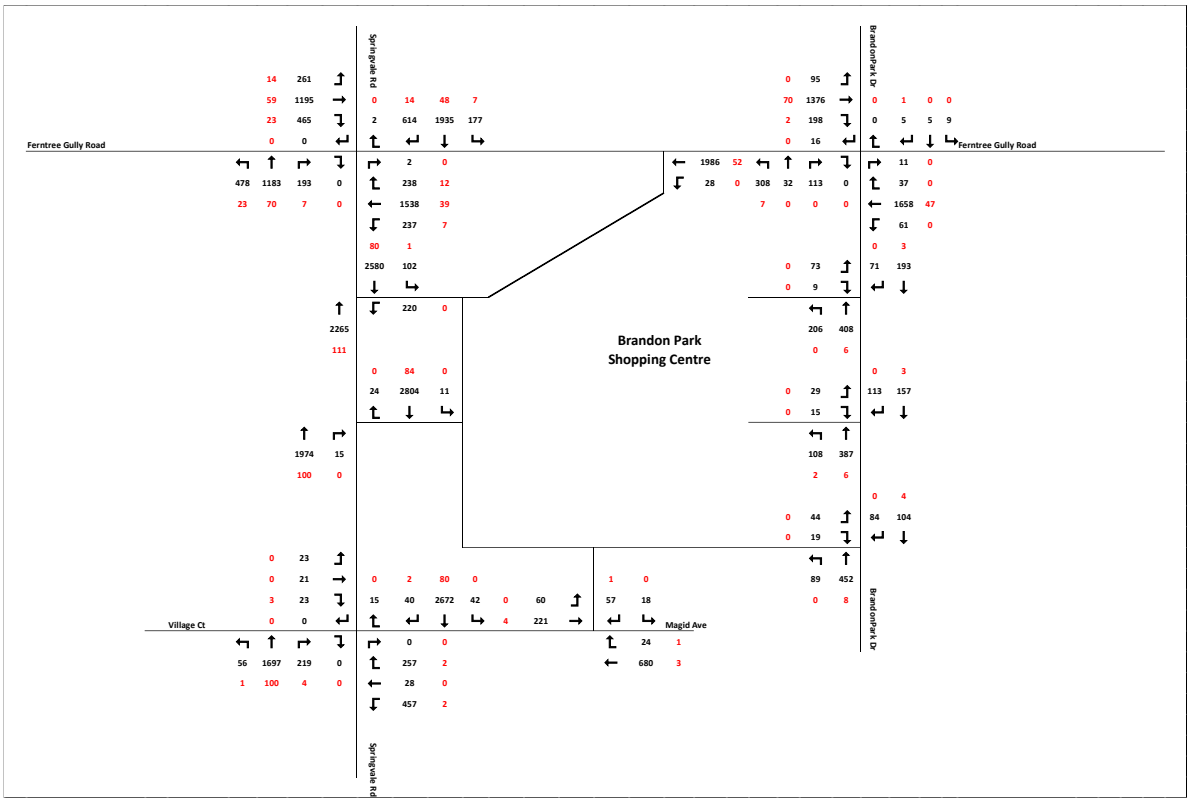
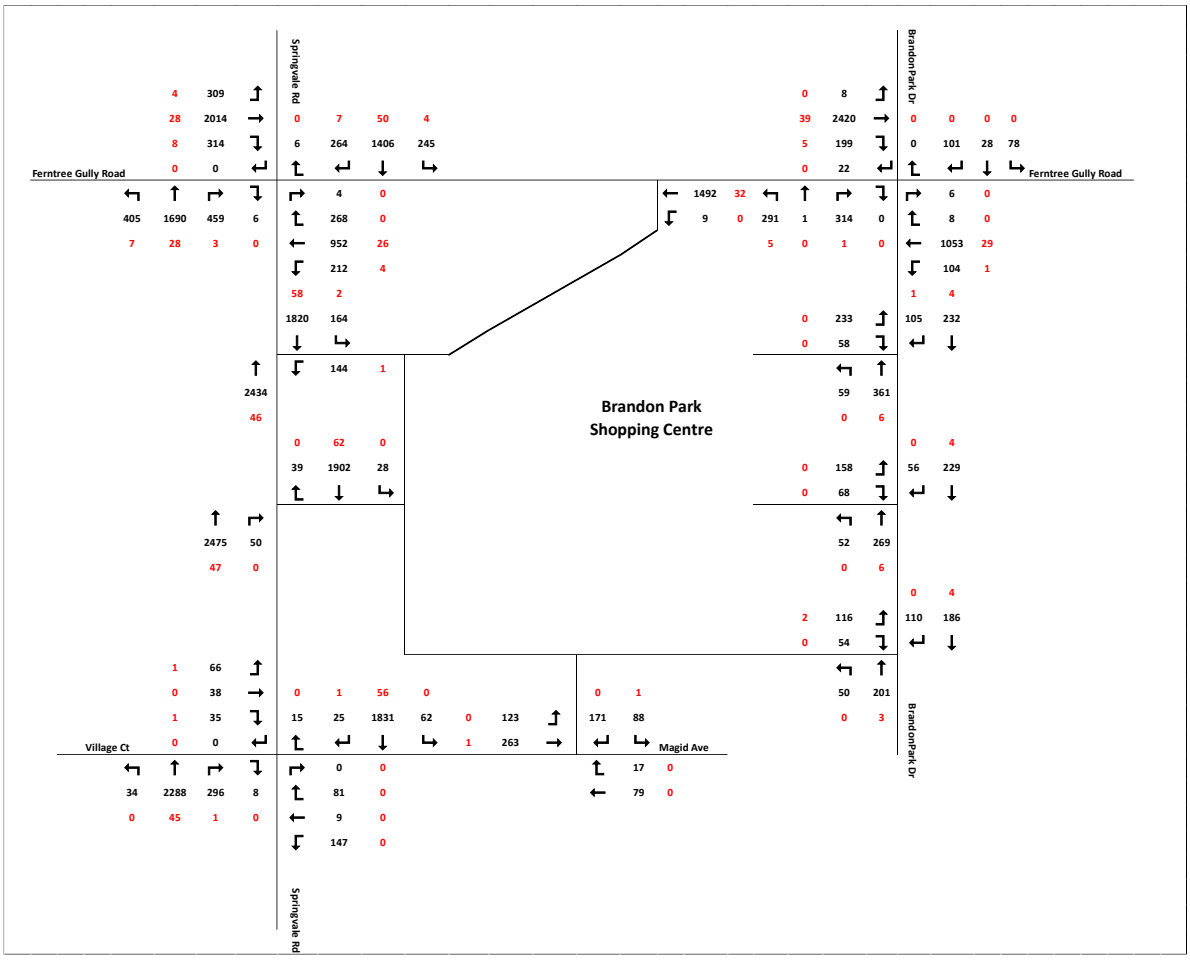


Figure D.6: PM Peak Hour Post Development Traffic Volumes



D.2. Intersection Operation

The existing and proposed operation of the key intersections servicing the site has been assessed using a SIDRA Network Model (inclusive of Ferntree Gully Road / Springvale Road, Ferntree Gully Road / Brandon Park Drive and Springvale Road / Magid Avenue / Village Court intersections) [3].

Table 7.2 presents a summary of the existing and proposed post development (cumulative development) operation of the key intersections, with full results presented in Appendix E of this report.

Table 7.2: SIDRA INTERSECTION Network Operation

Intersection	Peak Hour	Existing Conditions			Post Development (Cumulative)		
		Level of Service	Ave. Delay (s)	Average Queue (m)	Level of Service	Ave. Delay (s)	Average Queue (m)
Springvale Road / Ferntree Gully Road	AM	E	57s	253m	E	61s	264m
	PM	E	73s	277m	E	69s	285m
Ferntree Gully Road / Brandon Park Drive	AM	C	25s	180m	D	52s	270m
	PM	C	21s	117m	C	24s	109m
Springvale Road / Magid Avenue / Village Court	AM	C	26s	209m	C	29s	215m
	PM	C	22s	230m	C	21s	220m

With the exception of the Ferntree Gully Road / Brandon Park Drive intersection during the AM peak hour (which is forecast to change from LOS C to LOS D), Table 7.2 indicates that each of the intersections are expected to operate with a similar level of service. Otherwise only modest increases to forecast average queues and delays are anticipated as a result of the application.

The Ferntree Gully Road / Brandon Park Drive and Springvale Road / Magid Avenue intersections operate in the shadow of the Springvale Road / Ferntree Gully Road intersection. Accordingly, the capacity of the through movements on the arterial corridors is constrained by the Springvale Road / Ferntree Gully Road intersection and not the minor intersections themselves.

D.3. Site Access Points

The Brandon Park Shopping Centre currently generates approximately 1,200 and 1,900 vehicle movements during the AM and PM peak hours, respectively. The proposed development is forecast to generate approximately 180 peak hour movements.

[3] SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DOS)		
		Unsignalised Intersection	Signalised Intersection	Roundabout
A	Excellent	<=0.60	<=0.60	<=0.60
B	Very Good	0.60-0.70	0.60-0.70	0.60-0.70
C	Good	0.70-0.80	0.70-0.90	0.70-0.85
D	Acceptable	0.80-0.90	0.90-0.95	0.85-0.95
E	Poor	0.90-1.00	0.95-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0	>=1.0

It is anticipated that this level of additional vehicle activity could be accommodated at each of the vehicle access points, noting the following:

- The additional peak hour traffic generation (approximately 180vph) equates to only 15% and 9% uplift compared to the existing traffic generated during the AM and PM peak hours, respectively.
- Information provided by Council indicates that there are already approximately 200vph “rat running” through the centre to avoid the Springvale Road / Ferntree Gully Road intersection.
- The additional vehicle demands will be distributed across the 7 existing access points to the shopping centre (approximately 25 to 30vph at each access point or one additional movement every 2 minutes).

E. SIDRA RESULTS

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210916sid-V154442-Wkday-SIDRA-Network **Template: Site Report**

Site: 429 [429 EX AM - Springvale Rd/ Ferntree Gully Rd (Site Folder: Existing - AM)] **Network: 1 [Existing - AM (Network Folder: Existing)]**

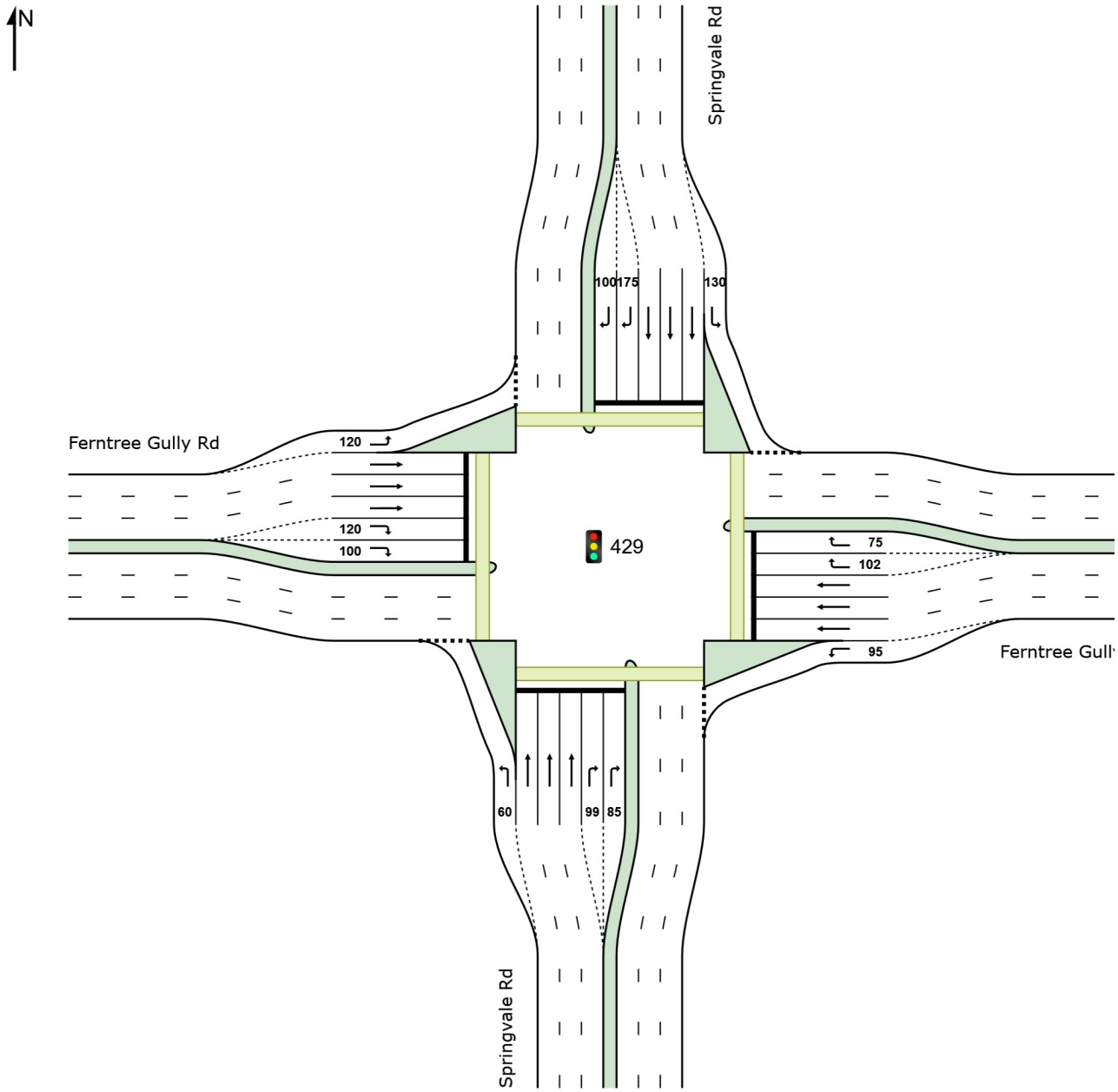
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B1, B3, C, D1, D3
Output Phase Sequence: A, B1, B3, C, D1, D3

Site Layout

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

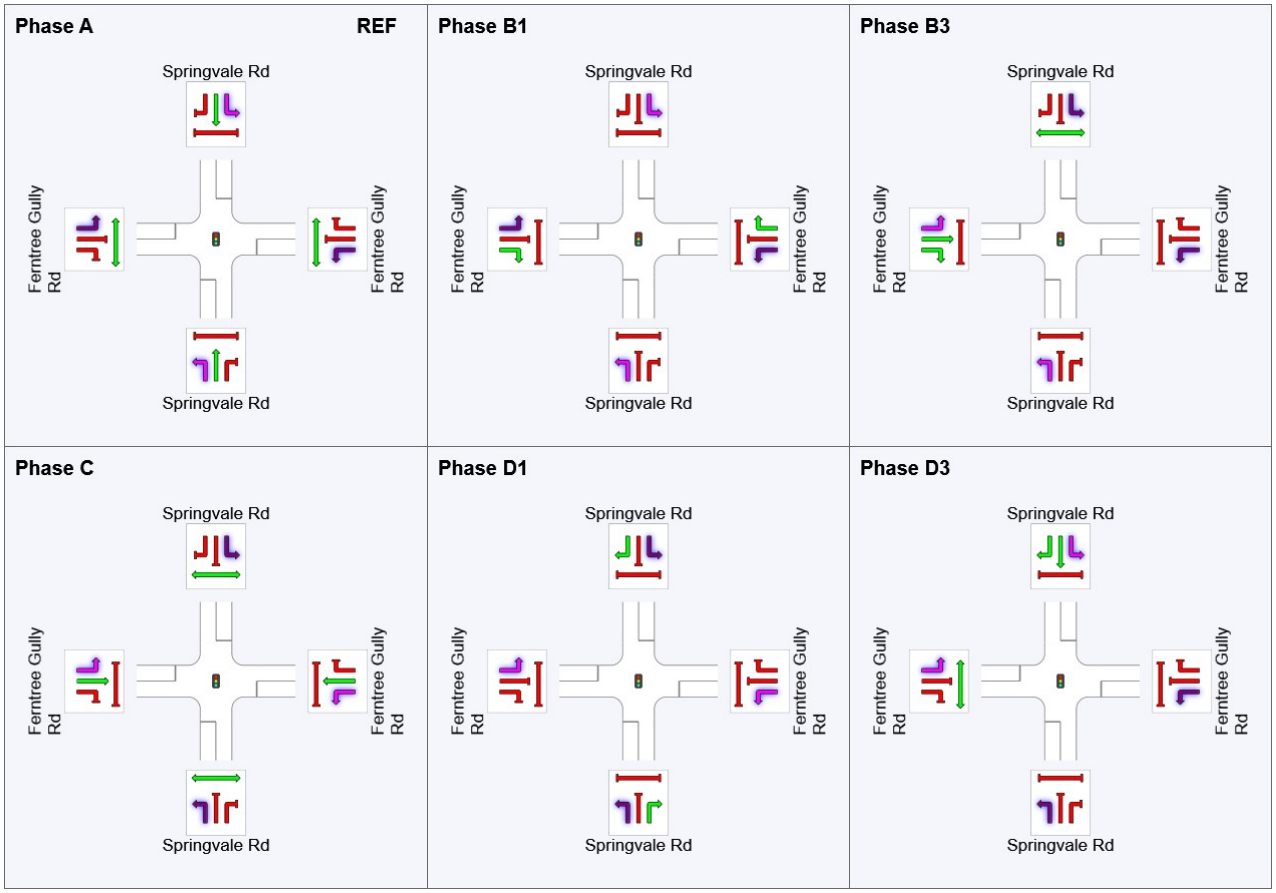

N
Springvale Rd
100
175
130
Ferntree Gully Rd
120
120
100
429
75
102
95
Ferntree Gull
60
99
85
Springvale Rd

Phase Timing Summary

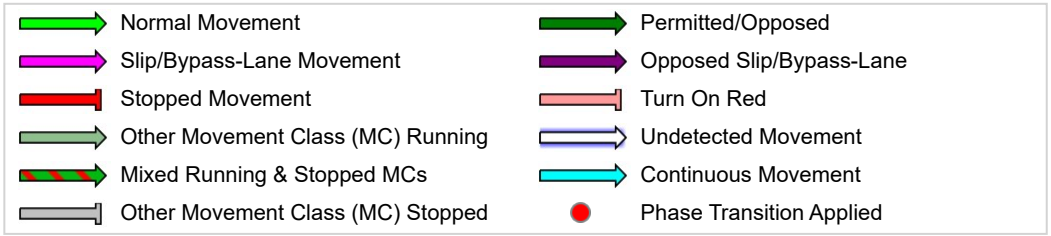
Phase	A	B1	B3	C	D1	D3
Phase Change Time (sec)	0	41	58	66	111	126
Green Time (sec)	35	10	2	39	9	8
Phase Time (sec)	42	16	8	45	15	14
Phase Split	30%	11%	6%	32%	11%	10%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	498	4.6	498	4.6	1008	0.494	100	24.4	LOS C	8.5	61.7	Short	60	0.0	NA
Lane 2	302	5.6	302	5.6	326[1]	0.925	100	68.4	LOS E	12.6	92.4	Full	280	0.0	0.0
Lane 3	491	5.6	491	5.6	531	0.925	100	68.5	LOS E	22.7	166.2	Full	280	0.0	2.1
Lane 4	459	5.6	459	5.6	496[1]	0.925	100	68.3	LOS E	20.8	152.7	Full	280	0.0	0.0
Lane 5	100	3.5	100	3.5	128	0.779	100	82.6	LOS F	4.5	32.1	Short	99	0.0	NA
Lane 6	100	3.5	100	3.5	128	0.779	100	82.6	LOS F	4.5	32.1	Short	85	0.0	NA
Approach	1950	5.1	1950	5.1		0.925		58.6	LOS E	22.7	166.2				
East: Ferntree Gully Rd															
Lane 1	233	3.0	233	3.0	659	0.354	100	13.7	LOS B	1.8	12.8	Short	95	-22.7[N3]	NA
Lane 2	473	2.5	473	2.5	502[1]	0.942	100	38.6	LOS D	17.1	122.3	Full	175	0.0	16.9
Lane 3	568	2.5	568	2.5	603	0.942	100	40.1	LOS D	23.8	170.3	Full	175	0.0	47.5
Lane 4	524	2.5	524	2.5	556[1]	0.942	100	41.2	LOS D	20.7	148.1	Full	175	0.0	34.5
Lane 5	119	5.1	119	5.1	141	0.839	100	86.5	LOS F	5.4	39.2	Short	102	0.0	NA
Lane 6	119	5.1	119	5.1	141	0.839	100	86.5	LOS F	5.4	39.2	Short	75	0.0	NA
Approach	2034	2.9	2034	2.9		0.942		42.4	LOS D	23.8	170.3				
North: Springvale Rd															
Lane 1	171	4.1	171	4.1	1144	0.149	100	13.6	LOS B	2.3	16.8	Short	130	0.0	NA
Lane 2	556	2.4	556	2.4	589[1]	0.944	100	73.2	LOS E	28.2	201.8	Full	500	-22.7[N3]	0.0
Lane 3	714	2.4	714	2.4	756	0.944	100	68.7	LOS E	35.4	252.8	Full	500	-4.5[N3]	0.0
Lane 4	697	2.4	697	2.4	738[1]	0.944	100	67.6	LOS E	33.6	240.5	Full	500	0.0	0.0
Lane 5	314	2.2	314	2.2	331	0.948	100	93.9	LOS F	16.0	114.2	Short	175	0.0	NA
Lane 6	314	2.2	314	2.2	331	0.948	100	93.9	LOS F	16.0	114.2	Short	100	0.0	NA
Approach	2766	2.5	2766	2.5		0.948		71.6	LOS E	35.4	252.8				
West: Ferntree Gully Rd															
Lane 1	275	5.1	275	5.1	1245	0.221	100	16.4	LOS B	4.5	33.2	Short	120	0.0	NA
Lane 2	414	4.8	414	4.8	700	0.591	100	41.0	LOS D	14.2	103.4	Full	500	0.0	0.0
Lane 3	414	4.8	414	4.8	700	0.591	100	41.0	LOS D	14.2	103.4	Full	500	0.0	0.0
Lane 4	414	4.8	414	4.8	700	0.591	100	41.0	LOS D	14.2	103.4	Full	500	0.0	0.0
Lane 5	231	4.9	231	4.9	249	0.928	100	90.3	LOS F	11.3	82.7	Short	120	-4.5[N3]	NA
Lane 6	241	4.9	241	4.9	260	0.928	100	89.7	LOS F	11.8	86.2	Short	100	0.0	NA
Approach	1988	4.8	1988	4.8		0.928		49.3	LOS D	14.2	103.4				
Intersection	8738	3.7	8738	3.7		0.948		56.8	LOS E	35.4	252.8				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Site: 450 [450 EX AM - Brandon Park Dr/ Ferntree Gully Rd (Site Folder: Existing - AM)]

Network: 1 [Existing - AM (Network Folder: Existing)]

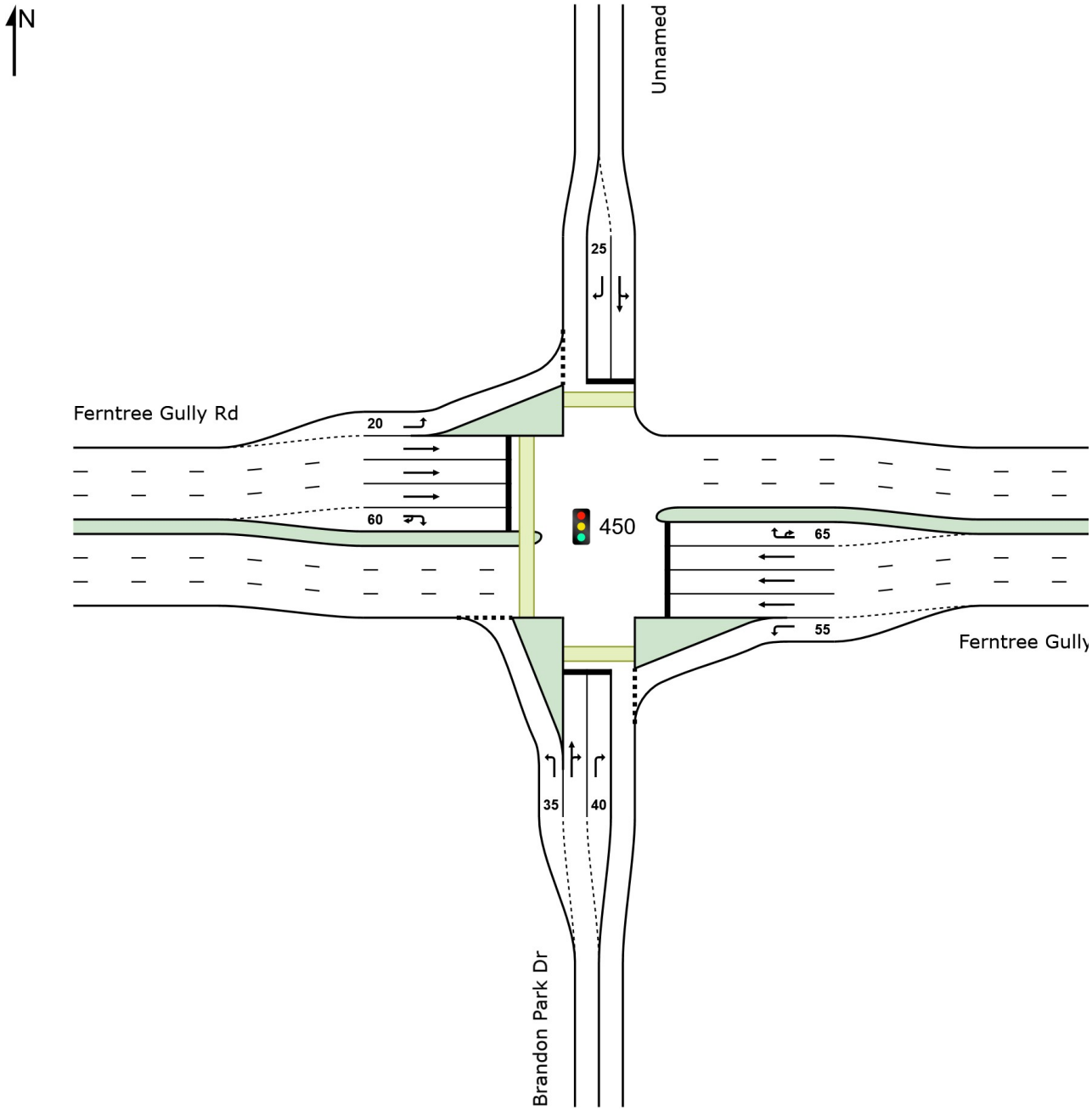
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D3
Output Phase Sequence: A, B, C, D1, D3

Site Layout

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

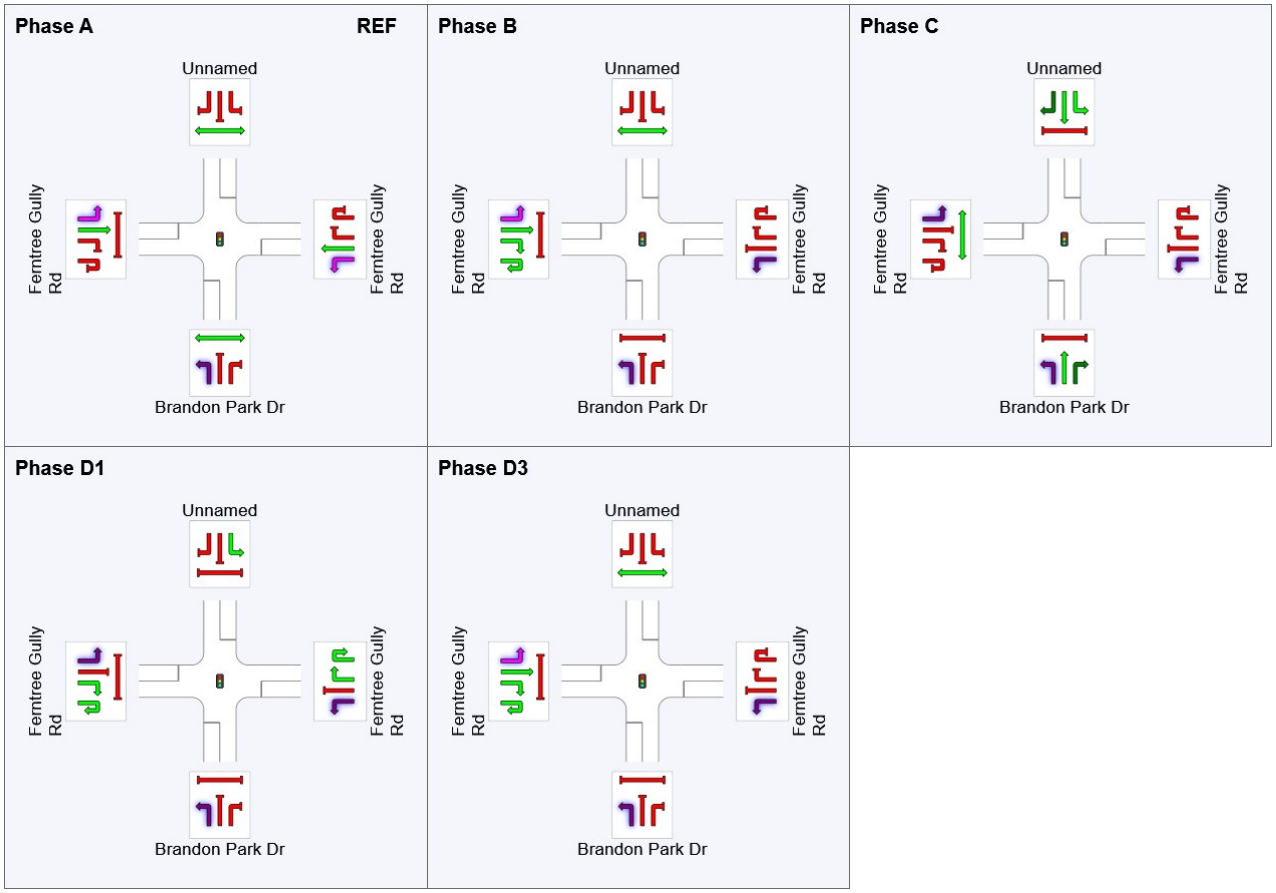

N
Unnamed
25
Ferntree Gully Rd
20
60
450
65
55
Ferntree Gully
35
40
Brandon Park Dr

Phase Timing Summary

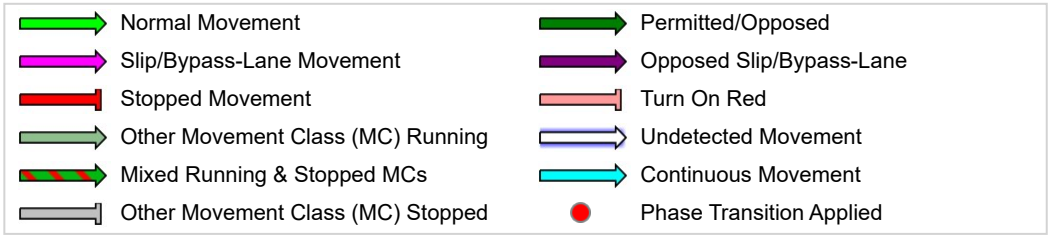
Phase	A	B	C	D1	D3
Phase Change Time (sec)	40	120	137	23	34
Green Time (sec)	74	11	20	6	1
Phase Time (sec)	80	17	25	11	7
Phase Split	57%	12%	18%	8%	5%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Brandon Park Dr															
Lane 1	278	1.1	278	1.1	393	0.707	100	34.2	LOS C	9.7	68.5	Short	35 [1 16]	-34.7 N3	NA
Lane 2	69	0.5	69	0.5	229	0.301	100	61.4	LOS E	2.6	18.5	Full	500	0.0	0.0
Lane 3	64	1.0	64	1.0	213	0.301	100	63.7	LOS E	2.5	17.3	Short	40	0.0	NA
Approach	411	1.0	411	1.0		0.707		43.4	LOS D	9.7	68.5				
East: Ferntree Gully Rd															
Lane 1	59	1.7	59	1.7	1441	0.041	100	8.0	LOS A	0.3	2.3	Short	55	0.0	NA
Lane 2	678	2.8	678	2.8	797 [1]	0.851	100	34.3	LOS C	25.1	179.8	Full	500	-17.4 N3	0.0
Lane 3	458	2.8	458	2.8	538	0.851	100	42.2	LOS D	19.1	137.2	Full	500	-46.8 N3	0.0
Lane 4	548	2.8	548	2.8	643 [1]	0.851	100	38.1	LOS D	21.4	153.4	Full	500	-33.8 N3	0.0
Lane 5	48	0.0	48	0.0	74	0.649	100	84.3	LOS F	2.2	15.1	Short	65	0.0	NA
Approach	1791	2.7	1791	2.7		0.851		38.0	LOS D	25.1	179.8				
North: Unnamed															
Lane 1	14	0.0	14	0.0	312	0.045	100	53.9	LOS D	0.5	3.4	Full	35	0.0	0.0
Lane 2	6	0.0	6	0.0	132	0.045	100	62.3	LOS E	0.2	1.6	Short	25	-33.8 N3	NA
Approach	20	0.0	20	0.0		0.045		56.4	LOS E	0.5	3.4				
West: Ferntree Gully Rd															
Lane 1	95	0.0	95	0.0	1623	0.059	100	6.7	LOS A	0.1	0.6	Short	20	0.0	NA
Lane 2	459	5.1	459	5.1	1321	0.347	100	3.0	LOS A	2.4	17.8	Full	175	0.0	0.0
Lane 3	459	5.1	459	5.1	1321	0.347	100	0.7	LOS A	0.6	4.1	Full	175	0.0	0.0
Lane 4	459	5.1	459	5.1	1321	0.347	100	0.7	LOS A	0.6	4.1	Full	175	0.0	0.0
Lane 5	188	1.1	188	1.1	282	0.666	100	45.0	LOS D	5.7	40.2	Short	60	-4.2 N3	NA
Approach	1659	4.3	1659	4.3		0.666		6.7	LOS A	5.7	40.2				
Intersection	3881	3.2	3881	3.2		0.851		25.3	LOS C	25.1	179.8				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
16 Short Lane Calibration: “Do Not Apply” specified.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Site: 431 [431 EX AM - Springvale Rd/ Magid Ave (Site Folder: Existing - AM)]

Network: 1 [Existing - AM (Network Folder: Existing)]

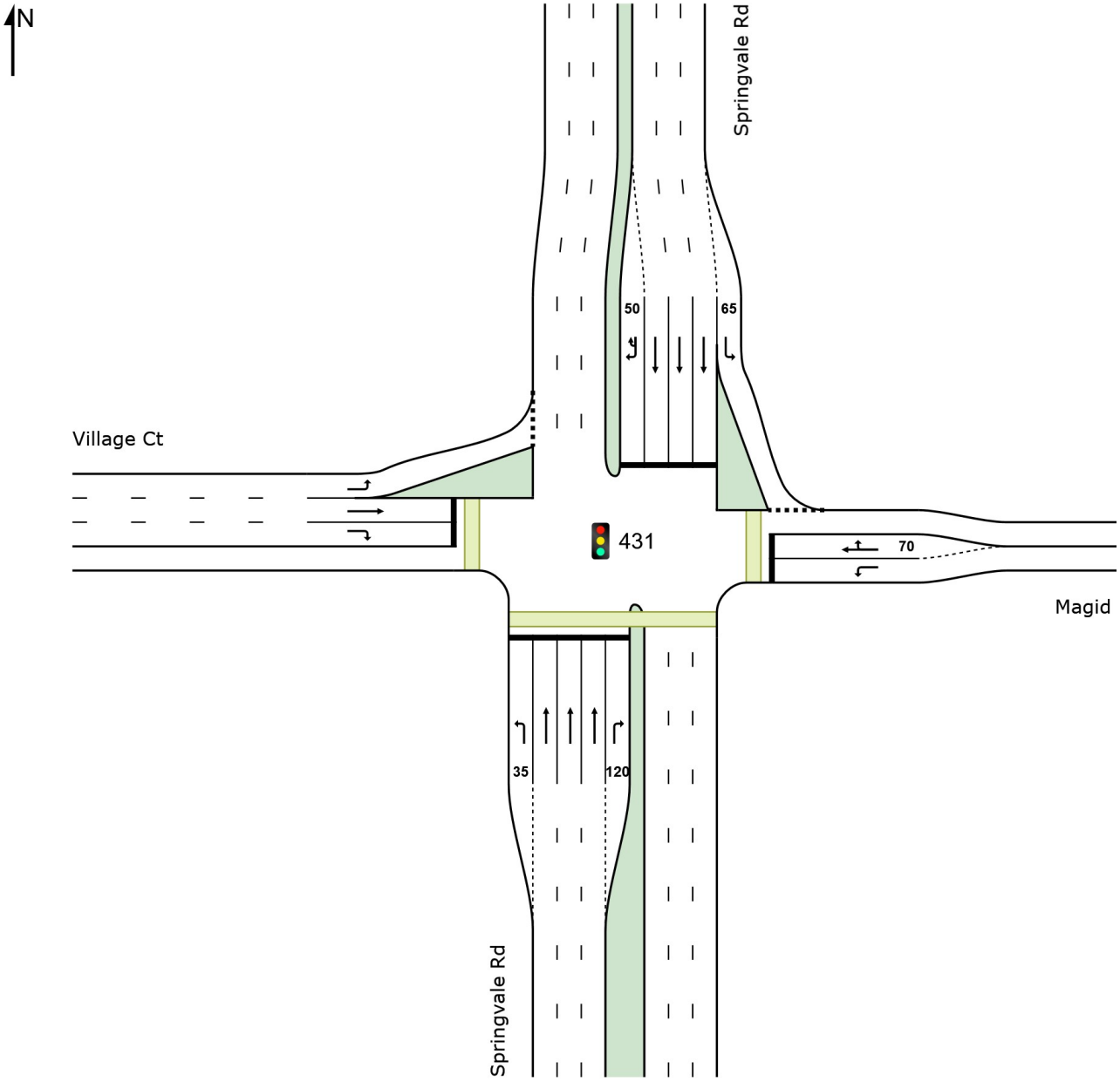
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2
Output Phase Sequence: A, B, C1, C2

Site Layout

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

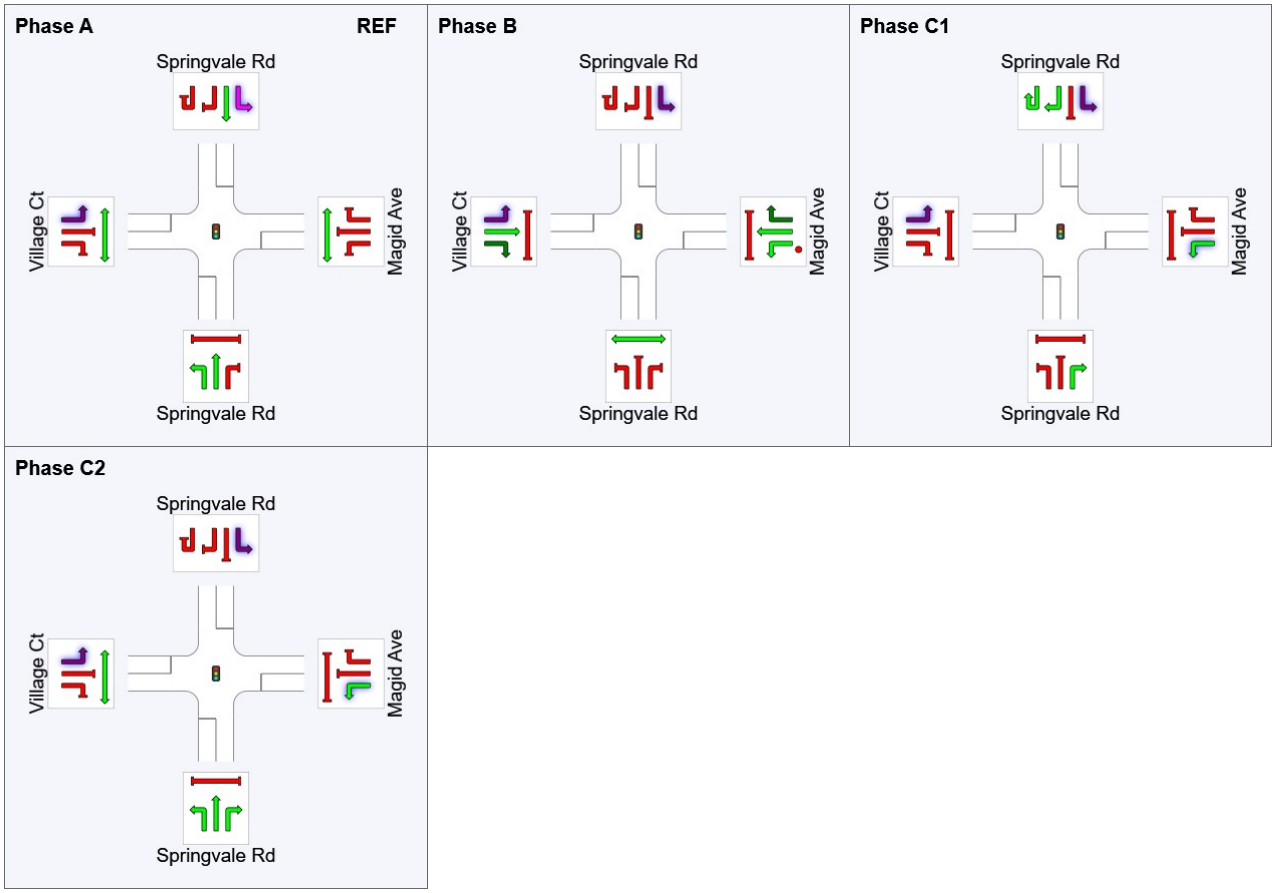


Phase Timing Summary

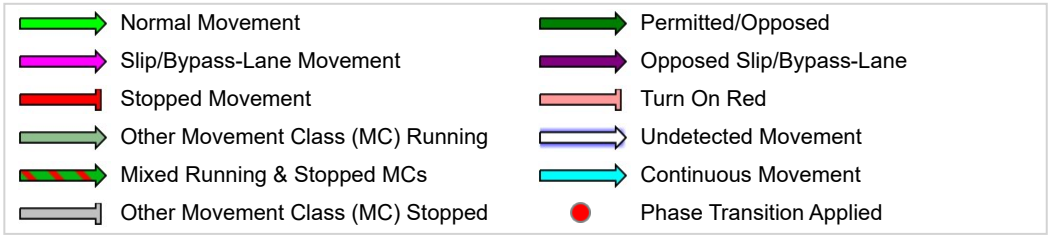
Phase	A	B	C1	C2
Phase Change Time (sec)	10	89	128	1
Green Time (sec)	73	33	7	3
Phase Time (sec)	79	39	13	9
Phase Split	56%	28%	9%	6%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	57	1.8	57	1.8	1074	0.053	100	19.9	LOS B	1.0	7.0	Short	35	0.0	NA
Lane 2	578	5.6	578	5.6	1034[1]	0.559	100	18.3	LOS B	14.2	103.9	Full	500	0.0	0.0
Lane 3	603	5.6	603	5.6	1079	0.559	100	18.8	LOS B	15.2	111.8	Full	500	-2.1 N3	0.0
Lane 4	616	5.6	616	5.6	1102	0.559	100	18.8	LOS B	15.6	114.2	Full	500	0.0	0.0
Lane 5	188	2.1	188	2.1	209	0.899	100	87.1	LOS F	8.9	63.7	Short	120	0.0	NA
Approach	2042	5.1	2042	5.1		0.899		25.0	LOS C	15.6	114.2				
East: Magid Ave															
Lane 1	459	0.4	459	0.4	568[1]	0.808	100	45.3	LOS D	16.5	115.7	Full	500	0.0	0.0
Lane 2	287	0.7	287	0.7	306[1]	0.939	100	88.0	LOS F	14.8	104.0	Short	70	-0.5 N3	NA
Approach	746	0.5	746	0.5		0.939		61.8	LOS E	16.5	115.7				
North: Springvale Rd															
Lane 1	42	0.0	42	0.0	1385	0.030	100	8.8	LOS A	0.2	1.5	Short	65	0.0	NA
Lane 2	909	2.9	909	2.9	1039[1]	0.875	100	25.1	LOS C	29.1	208.5	Full	280	0.0	22.7
Lane 3	941	2.9	941	2.9	1075	0.875	100	11.7	LOS B	23.8	170.7	Full	280	0.0	4.5
Lane 4	883	2.9	883	2.9	1008[1]	0.875	100	11.7	LOS B	19.2	138.0	Full	280	0.0	0.0
Lane 5	57	3.5	57	3.5	83	0.683	100	86.3	LOS F	2.6	18.5	Short	50	0.0	NA
Approach	2832	2.9	2832	2.9		0.875		17.4	LOS B	29.1	208.5				
West: Village Ct															
Lane 1	23	0.0	23	0.0	360	0.064	100	11.5	LOS B	0.3	1.8	Full	30	0.0	0.0
Lane 2	21	0.0	21	0.0	460	0.046	100	43.8	LOS D	0.7	4.7	Full	30	0.0	0.0
Lane 3	26	11.5	26	11.5	65	0.400	100	79.9	LOS E	1.2	8.9	Full	30	0.0	0.0
Approach	70	4.3	70	4.3		0.400		46.6	LOS D	1.2	8.9				
Intersection	5690	3.4	5690	3.4		0.939		26.3	LOS C	29.1	208.5				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210916sid-V154442-Wkday-SIDRA-Network **Template: Site Report**

Site: 429 [429 EX PM - Springvale Rd/ Ferntree Gully Rd (Site Folder: Existing - PM)] **Network: 2 [Existing - PM (Network Folder: Existing)]**

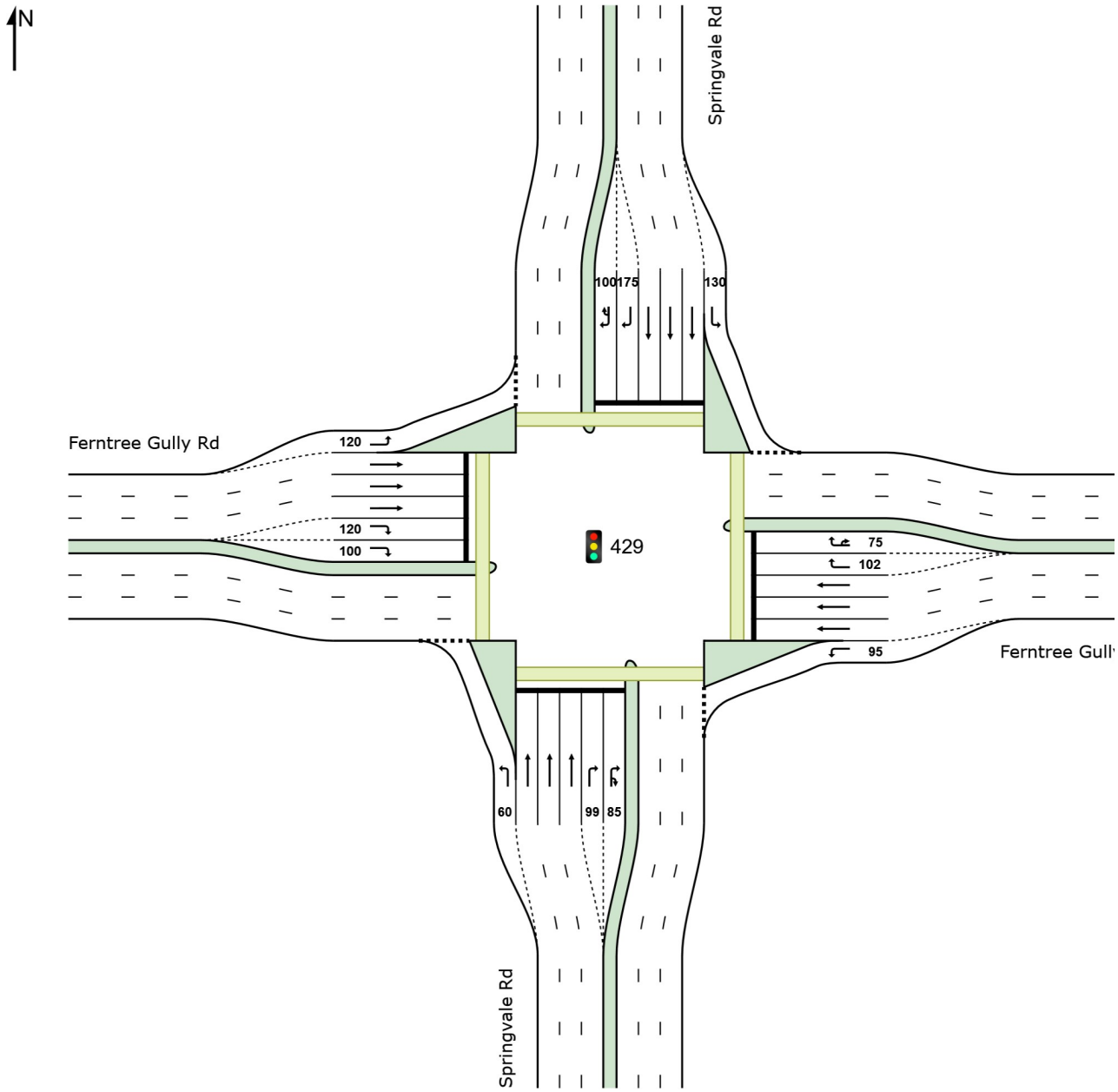
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B1, B3, C, D1, D2
Output Phase Sequence: A, B1, B3, C, D1, D2

Site Layout

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

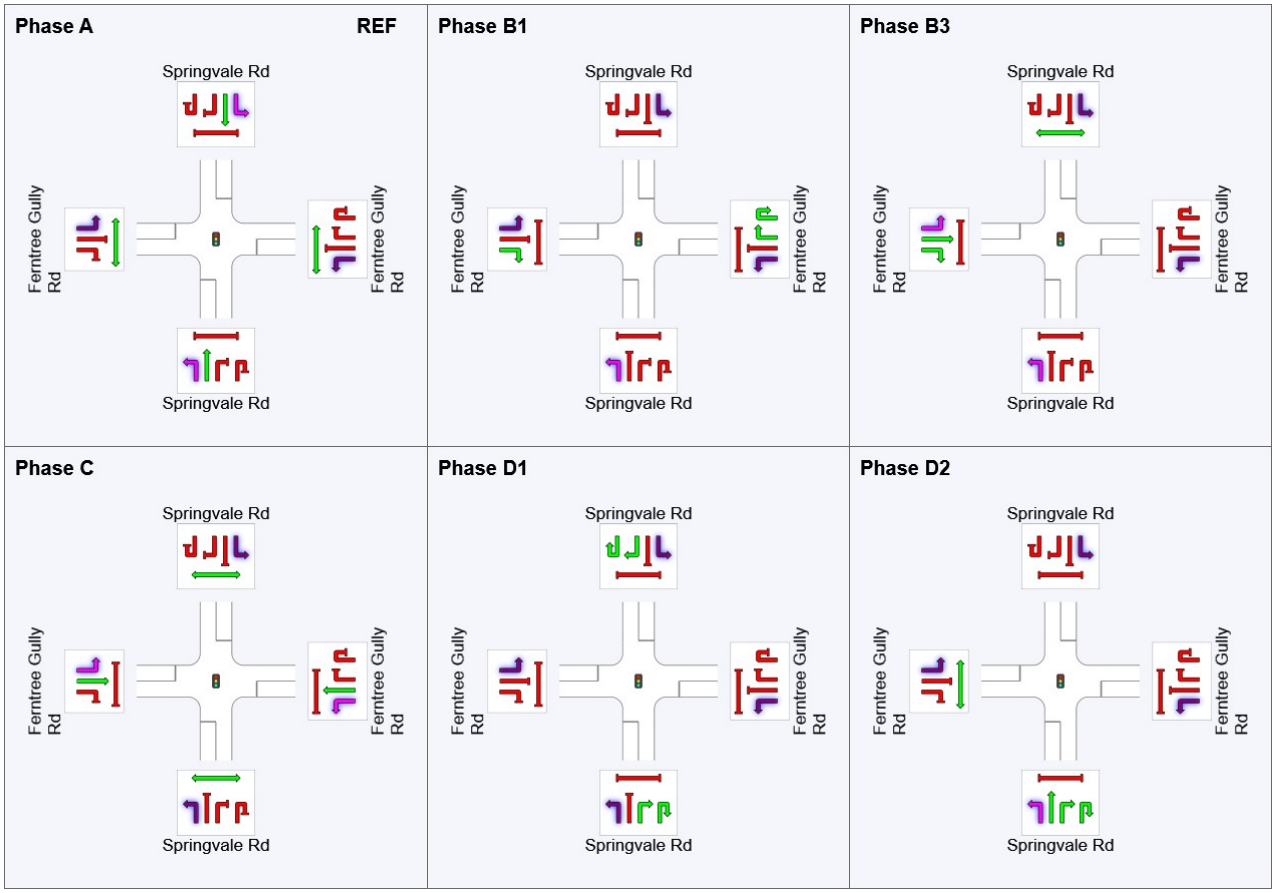

N
Springvale Rd
100
175
130
Ferntree Gully Rd
120
120
100
429
75
102
95
Ferntree Gull
60
99
85
Springvale Rd

Phase Timing Summary

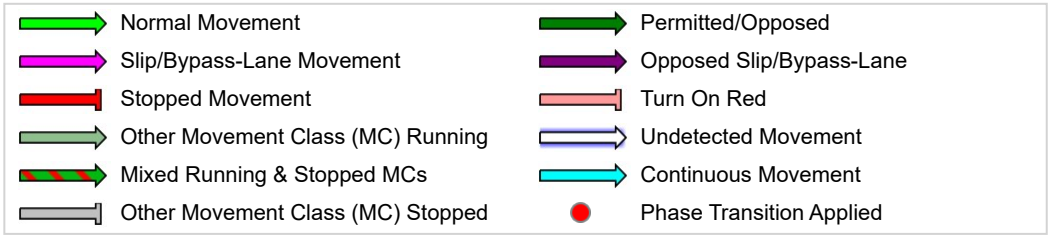
Phase	A	B1	B3	C	D1	D2
Phase Change Time (sec)	0	42	58	70	115	131
Green Time (sec)	36	9	6	39	10	3
Phase Time (sec)	43	15	12	45	16	9
Phase Split	31%	11%	9%	32%	11%	6%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	403	1.7	403	1.7	1344	0.300	100	13.1	LOS B	5.4	38.3	Short	60	0.0	NA
Lane 2	452	1.6	452	1.6	464[1]	0.976	100	86.2	LOS F	23.4	165.9	Full	280	0.0	2.0
Lane 3	683	1.6	683	1.6	700	0.976	100	84.0	LOS F	37.0	262.7	Full	280	0.0	44.0
Lane 4	577	1.6	577	1.6	591[1]	0.976	100	84.5	LOS F	30.3	215.3	Full	280	0.0	25.6
Lane 5	219	0.6	219	0.6	240	0.910	100	89.4	LOS F	10.1	71.0	Short	99	-13.1[N3]	NA
Lane 6	250	0.6	250	0.6	274	0.910	100	88.3	LOS F	11.4	80.2	Short	85	0.0	NA
Approach	2583	1.5	2583	1.5		0.976		74.3	LOS E	37.0	262.7				
East: Ferntree Gully Rd															
Lane 1	211	1.9	211	1.9	992	0.213	100	16.2	LOS B	2.5	18.1	Short	95	0.0	NA
Lane 2	320	2.7	320	2.7	602	0.531	100	45.7	LOS D	11.3	80.6	Full	175	0.0	0.0
Lane 3	320	2.7	320	2.7	602	0.531	100	45.7	LOS D	11.3	80.6	Full	175	0.0	0.0
Lane 4	320	2.7	320	2.7	602	0.531	100	45.9	LOS D	11.7	84.1	Full	175	0.0	0.0
Lane 5	128	0.0	128	0.0	132	0.971	100	103.9	LOS F	6.5	45.4	Short	102	0.0	NA
Lane 6	126	0.0	126	0.0	130	0.971	100	104.1	LOS F	6.4	44.9	Short	75	0.0	NA
Approach	1425	2.1	1425	2.1		0.971		51.8	LOS D	11.7	84.1				
North: Springvale Rd															
Lane 1	239	1.7	239	1.7	827	0.289	100	32.2	LOS C	6.2	44.1	Short	130	0.0	NA
Lane 2	506	3.2	506	3.2	537[1]	0.943	100	76.5	LOS E	25.2	181.2	Full	500	0.0	0.0
Lane 3	522	3.2	522	3.2	554	0.943	100	76.5	LOS E	26.1	188.0	Full	500	0.0	0.0
Lane 4	522	3.2	522	3.2	554	0.943	100	76.5	LOS E	26.1	188.0	Full	500	0.0	0.0
Lane 5	140	2.6	140	2.6	144	0.972	100	106.2	LOS F	7.3	52.4	Short	175	0.0	NA
Lane 6	138	2.5	138	2.5	142	0.972	100	106.4	LOS F	7.2	51.7	Short	100	0.0	NA
Approach	2067	3.0	2067	3.0		0.972		75.4	LOS E	26.1	188.0				
West: Ferntree Gully Rd															
Lane 1	313	1.3	313	1.3	928	0.337	100	28.3	LOS C	8.1	57.2	Short	120	0.0	NA
Lane 2	659	1.4	659	1.4	665[1]	0.990	100	89.3	LOS F	36.1	255.5	Full	500	0.0	0.0
Lane 3	668	1.4	668	1.4	675	0.990	100	92.8	LOS F	38.7	274.3	Full	500	-13.1[N3]	0.0
Lane 4	705	1.4	705	1.4	712[1]	0.990	100	89.2	LOS F	39.2	277.4	Full	500	0.0	0.0
Lane 5	159	2.5	159	2.5	309	0.513	100	66.4	LOS E	6.2	44.2	Short	120	0.0	NA
Lane 6	159	2.5	159	2.5	309	0.513	100	66.4	LOS E	6.2	44.2	Short	100	0.0	NA
Approach	2662	1.5	2662	1.5		0.990		80.2	LOS F	39.2	277.4				
Intersection	8738	1.9	8738	1.9		0.990		72.7	LOS E	39.2	277.4				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Site: 450 [450 EX PM - Brandon Park Dr/ Ferntree Gully Rd (Site Folder: Existing - PM)]

Network: 2 [Existing - PM (Network Folder: Existing)]

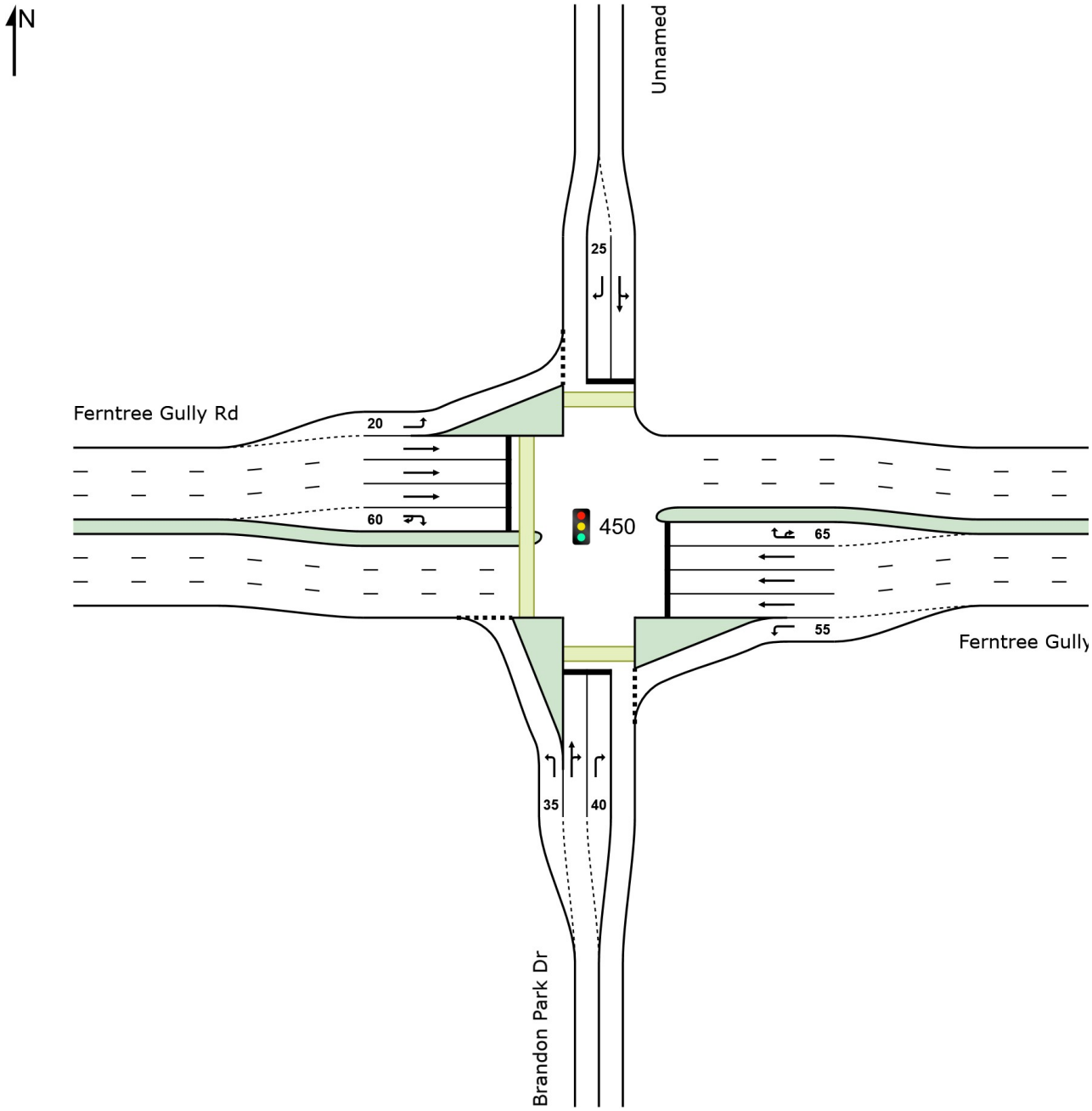
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D3
Output Phase Sequence: A, B, C, D1, D3

Site Layout

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

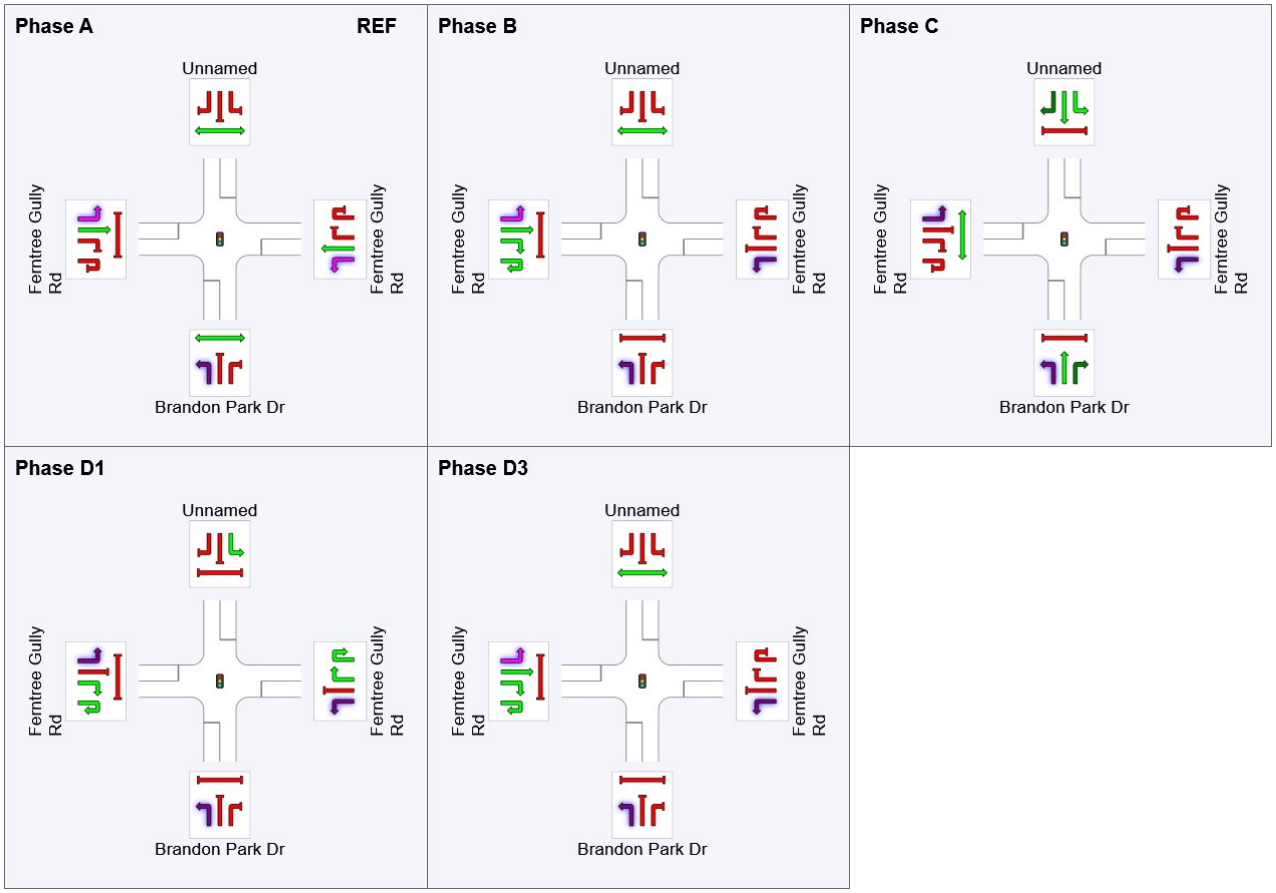

N
Unnamed
25
Ferntree Gully Rd
20
60
450
65
55
Ferntree Gully
35
40
Brandon Park Dr

Phase Timing Summary

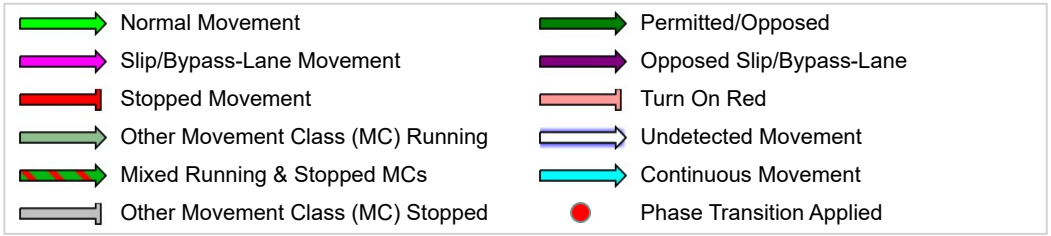
Phase	A	B	C	D1	D3
Phase Change Time (sec)	40	118	135	23	34
Green Time (sec)	72	11	22	6	1
Phase Time (sec)	78	17	27	11	7
Phase Split	56%	12%	19%	8%	5%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Brandon Park Dr															
Lane 1	254	2.0	254	2.0	790	0.322	100	9.0	LOS A	2.7	19.4	Short	35 [1 6]	0.0	NA
Lane 2	147	0.3	147	0.3	165	0.892	100	86.1	LOS F	7.1	50.1	Full	500	0.0	0.0
Lane 3	147	0.3	147	0.3	165	0.892	100	86.0	LOS F	7.1	49.7	Short	40	0.0	NA
Approach	548	1.1	548	1.1		0.892		50.3	LOS D	7.1	50.1				
East: Ferntree Gully Rd															
Lane 1	100	1.0	100	1.0	1417	0.071	100	8.5	LOS A	0.7	4.7	Short	55	0.0	NA
Lane 2	354	2.7	354	2.7	967[1]	0.366	100	21.4	LOS C	8.6	61.9	Full	500	0.0	0.0
Lane 3	361	2.7	361	2.7	986	0.366	100	21.5	LOS C	8.9	63.4	Full	500	0.0	0.0
Lane 4	361	2.7	361	2.7	986	0.366	100	21.5	LOS C	8.9	63.4	Full	500	0.0	0.0
Lane 5	14	0.0	14	0.0	70	0.201	100	81.5	LOS F	0.6	4.2	Short	65	0.0	NA
Approach	1189	2.5	1189	2.5		0.366		21.0	LOS C	8.9	63.4				
North: Unnamed															
Lane 1	106	0.0	106	0.0	355	0.299	100	54.7	LOS D	3.8	26.7	Full	35	0.0	26.1[8]
Lane 2	101	0.0	101	0.0	258	0.391	100	61.3	LOS E	3.9	27.0	Short	25	0.0	NA
Approach	207	0.0	207	0.0		0.391		57.9	LOS E	3.9	27.0				
West: Ferntree Gully Rd															
Lane 1	8	0.0	8	0.0	1675	0.005	100	6.8	LOS A	0.0	0.1	Short	20	0.0	NA
Lane 2	875	1.6	875	1.6	1314[1]	0.666	100	7.0	LOS A	11.8	83.8	Full	175	0.0	0.0
Lane 3	881	1.6	881	1.6	1323	0.666	100	10.8	LOS B	16.5	117.3	Full	175	0.0	13.1
Lane 4	703	1.6	703	1.6	1056[1]	0.666	100	9.5	LOS A	11.1	78.8	Full	175	0.0	0.0
Lane 5	205	2.4	205	2.4	290	0.708	100	45.2	LOS D	6.3	44.8	Short	60	0.0	NA
Approach	2672	1.6	2672	1.6		0.708		11.8	LOS B	16.5	117.3				
Intersection	4616	1.7	4616	1.7		0.892		20.9	LOS C	16.5	117.3				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
8 Probability of Blockage has been set on the basis of a queue that overflows from a short lane.
16 Short Lane Calibration: “Do Not Apply” specified.

Site: 431 [431 EX PM - Springvale Rd/ Magid Ave (Site Folder: Existing - PM)]

Network: 2 [Existing - PM (Network Folder: Existing)]

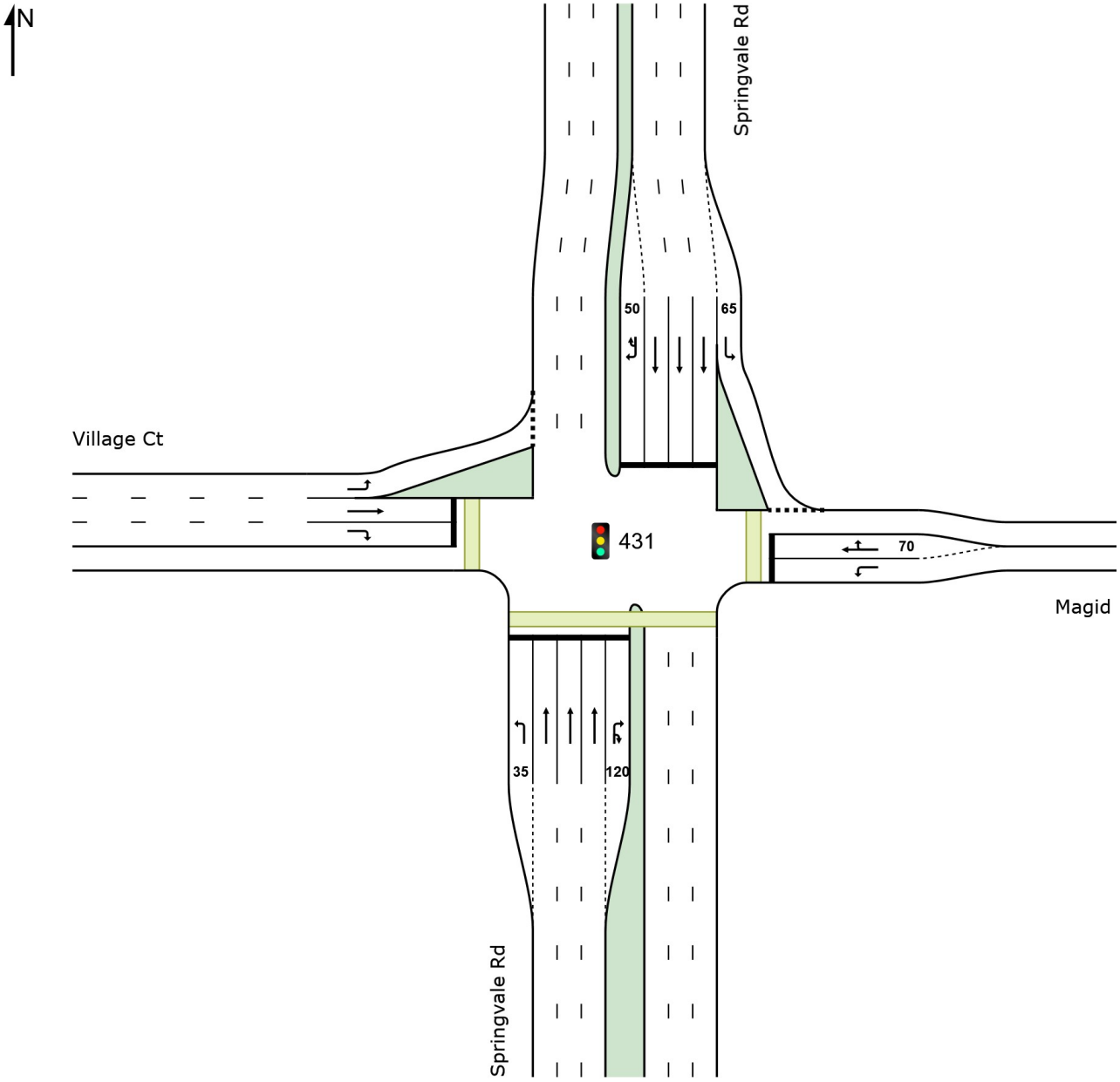
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2
Output Phase Sequence: A, B, C1, C2

Site Layout

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

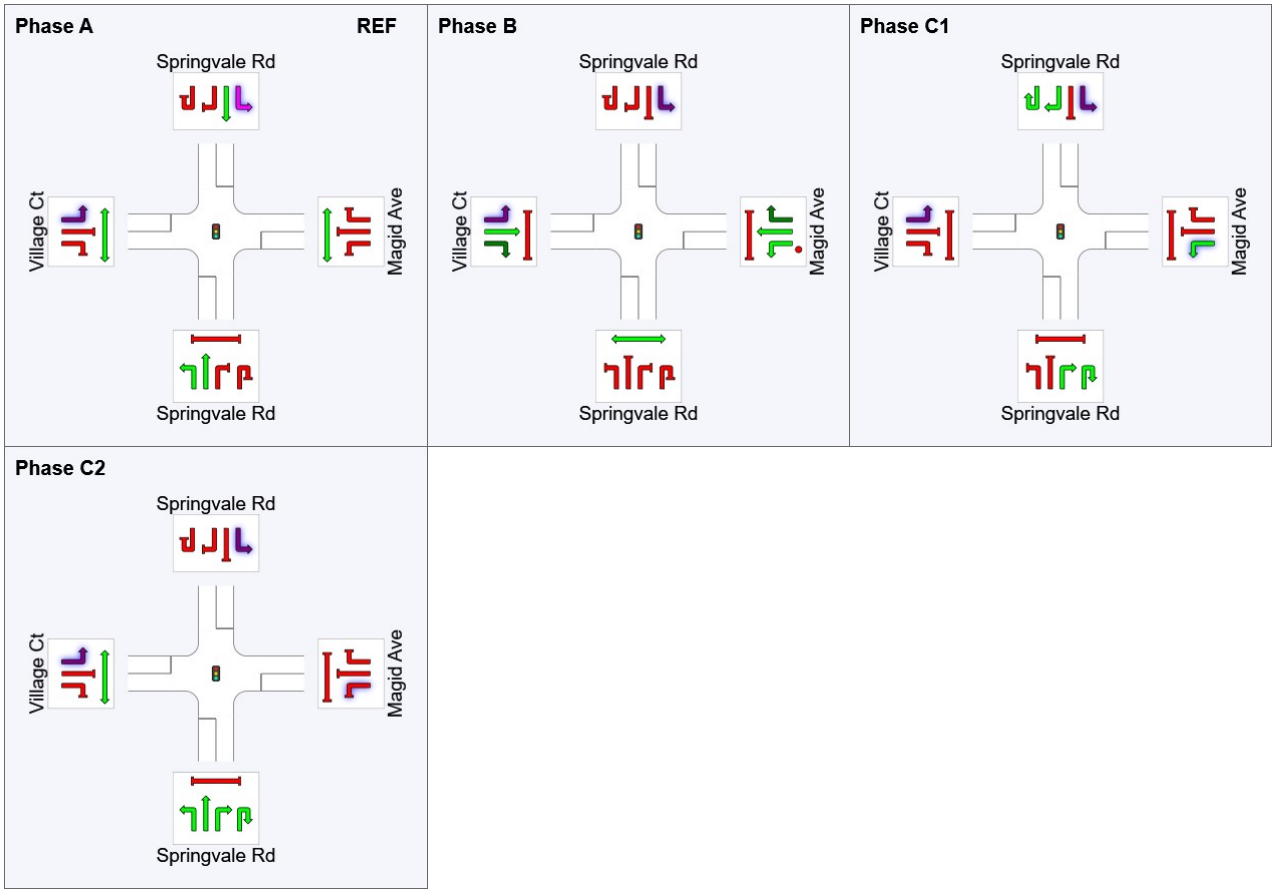


Phase Timing Summary

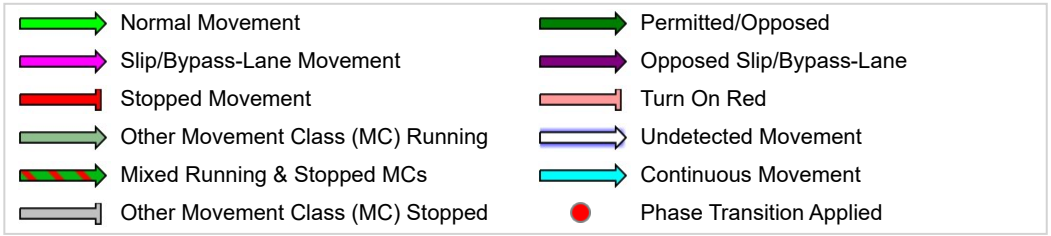
Phase	A	B	C1	C2
Phase Change Time (sec)	10	94	120	137
Green Time (sec)	78	20	13	7
Phase Time (sec)	84	24	19	13
Phase Split	60%	17%	14%	9%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	34	0.0	34	0.0	1207	0.028	100	16.0	LOS B	0.5	3.4	Short	35	0.0	NA
Lane 2	1033	1.9	1033	1.9	1205[1]	0.857	100	19.7	LOS B	32.3	230.2	Full	500	-1.0 N3	0.0
Lane 3	603	1.9	603	1.9	704	0.857	100	30.8	LOS C	23.0	163.5	Full	500	-43.8 N3	0.0
Lane 4	697	1.9	697	1.9	813[1]	0.857	100	24.8	LOS C	22.2	157.7	Full	500	-25.3 N3	0.0
Lane 5	286	0.3	286	0.3	341	0.841	100	73.6	LOS E	12.6	88.5	Short	120	0.0	NA
Approach	2653	1.7	2653	1.7		0.857		29.3	LOS C	32.3	230.2				
East: Magid Ave															
Lane 1	147	0.0	147	0.0	438	0.336	100	49.8	LOS D	5.0	35.1	Full	500	0.0	0.0
Lane 2	90	0.0	90	0.0	151	0.598	100	68.6	LOS E	3.7	26.1	Short	70	-24.8 N3	NA
Approach	237	0.0	237	0.0		0.598		56.9	LOS E	5.0	35.1				
North: Springvale Rd															
Lane 1	62	0.0	62	0.0	1316	0.047	100	8.3	LOS A	0.1	1.0	Short	65	0.0	NA
Lane 2	600	0.1	600	0.1	1170	0.513	100	4.0	LOS A	4.0	28.0	Full	280	0.0	0.0
Lane 3	600	0.1	600	0.1	1170	0.513	100	0.9	LOS A	1.0	6.9	Full	280	0.0	0.0
Lane 4	600	0.1	600	0.1	1170	0.513	100	0.9	LOS A	1.0	6.9	Full	280	0.0	0.0
Lane 5	96	58.3	96	58.3	112	0.860	100	90.9	LOS F	4.5	46.8	Short	50	-5.0 N3	NA
Approach	1957	2.9	1957	2.9		0.860		6.5	LOS A	4.5	46.8				
West: Village Ct															
Lane 1	67	1.5	67	1.5	339	0.198	100	24.1	LOS C	1.6	11.1	Full	30	-1.0 N3	0.0
Lane 2	38	0.0	38	0.0	279	0.136	100	56.8	LOS E	1.4	9.8	Full	30	0.0	0.0
Lane 3	56	1.8	56	1.8	125	0.448	100	71.9	LOS E	2.3	16.6	Full	30	0.0	0.0
Approach	161	1.2	161	1.2		0.448		48.4	LOS D	2.3	16.6				
Intersection	5008	2.1	5008	2.1		0.860		22.3	LOS C	32.3	230.2				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

USER REPORT FOR NETWORK

All Movement Classes

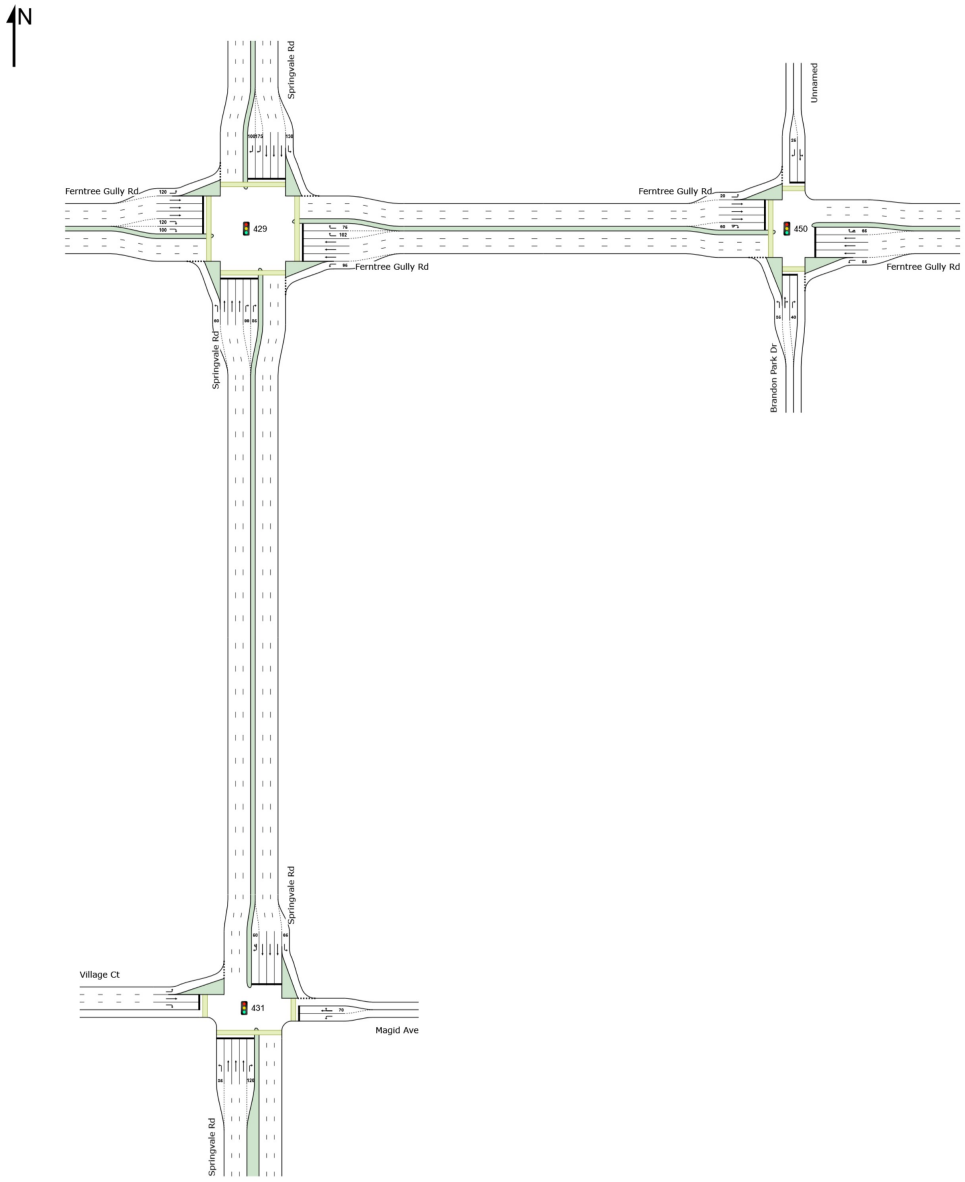
Project: 210916sid-V154442-Wkday-SIDRA-Network **Template: Network Report**

Network: N101 [Existing - AM (Network Folder: Existing)]

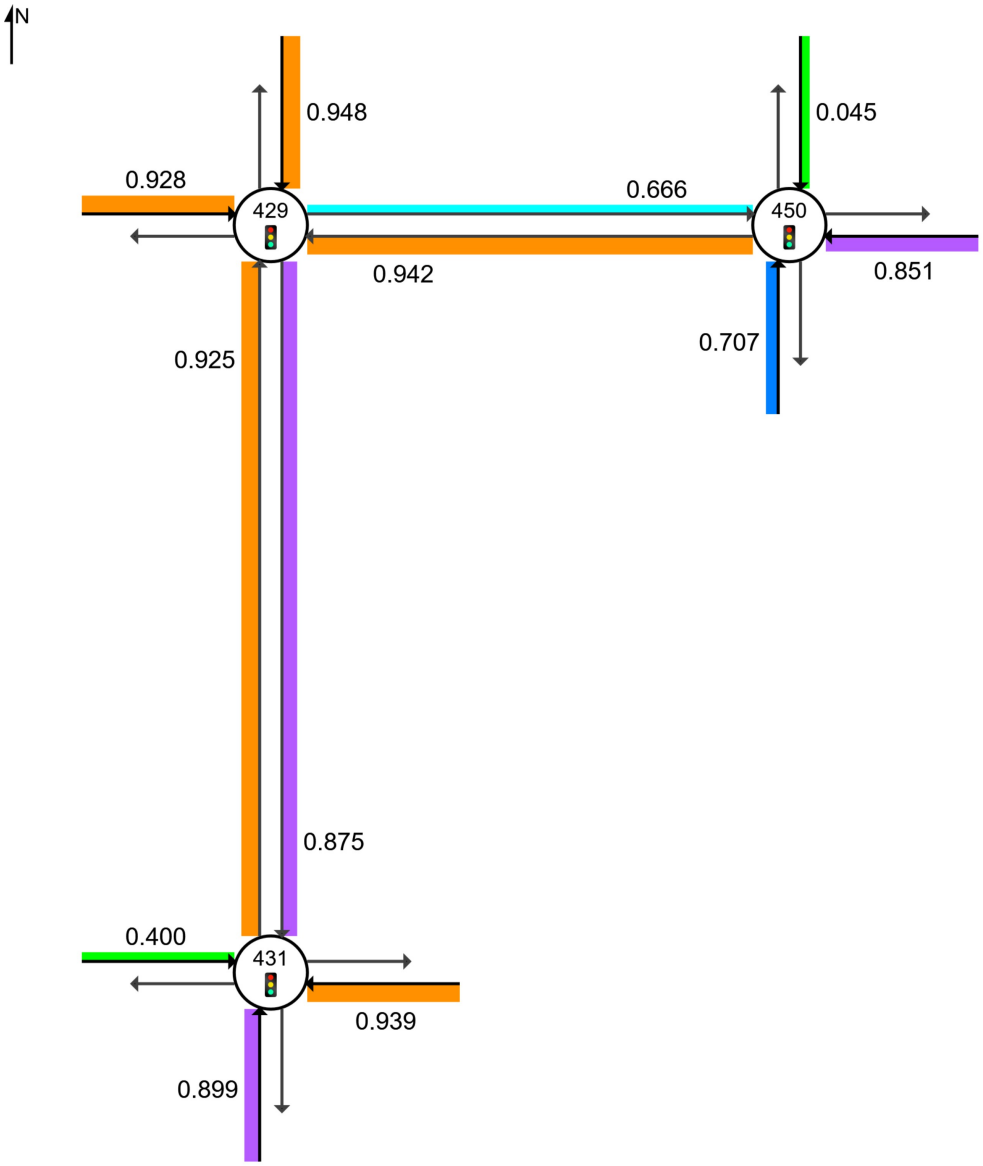
New Network
Network Category: (None)
Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Network Layout

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



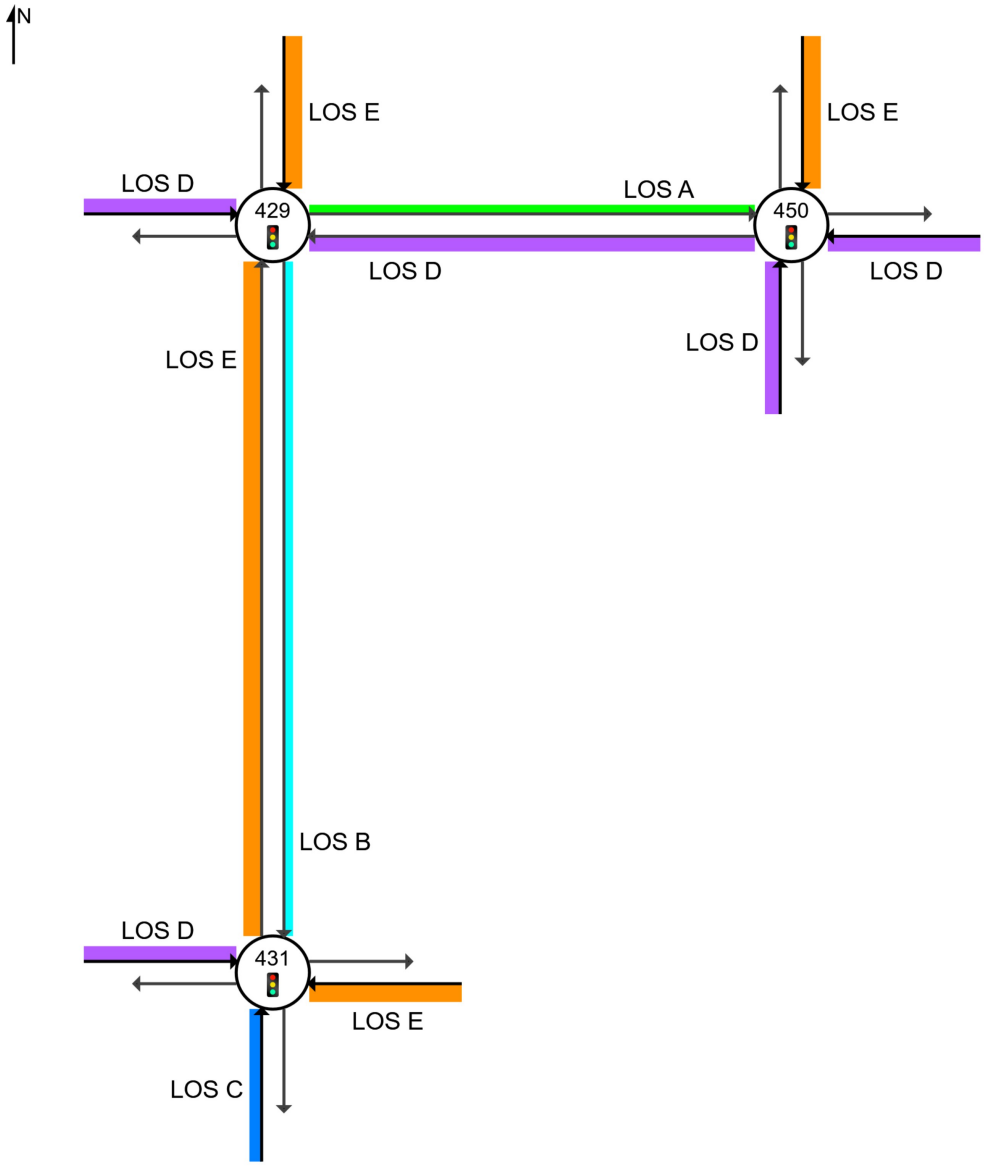
Degree of Saturation



Colour code based on Degree of Saturation

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

Approach Level of Service

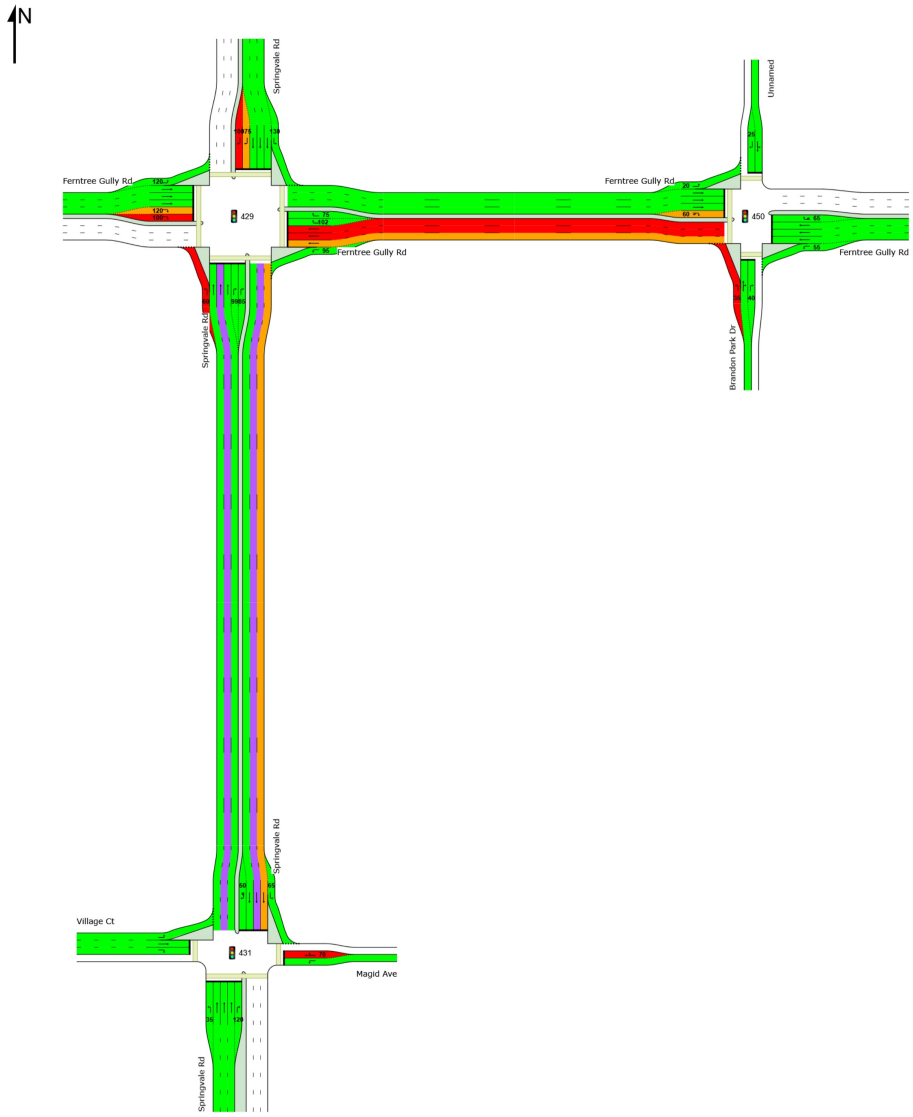


Colour code based on Level of Service

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

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Delay Model: SIDRA Standard (Geometric Delay is included).

Lane Blockage Probability



Colour code based on Lane Blockage Probability

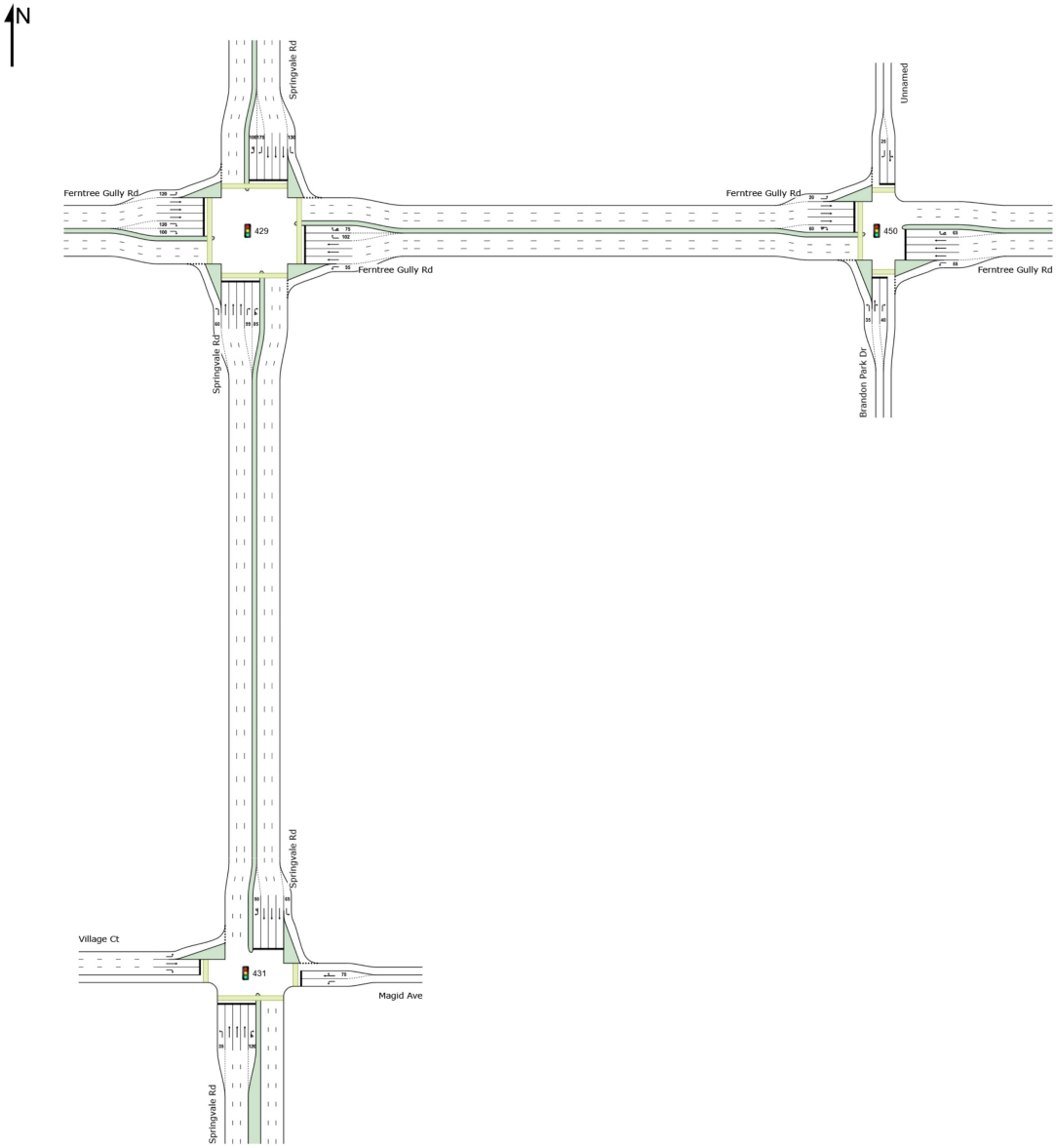
[= 0%] [0 – 10%] [10 – 30%] [> 30%]

Network: N101 [Existing - PM (Network Folder: Existing)]

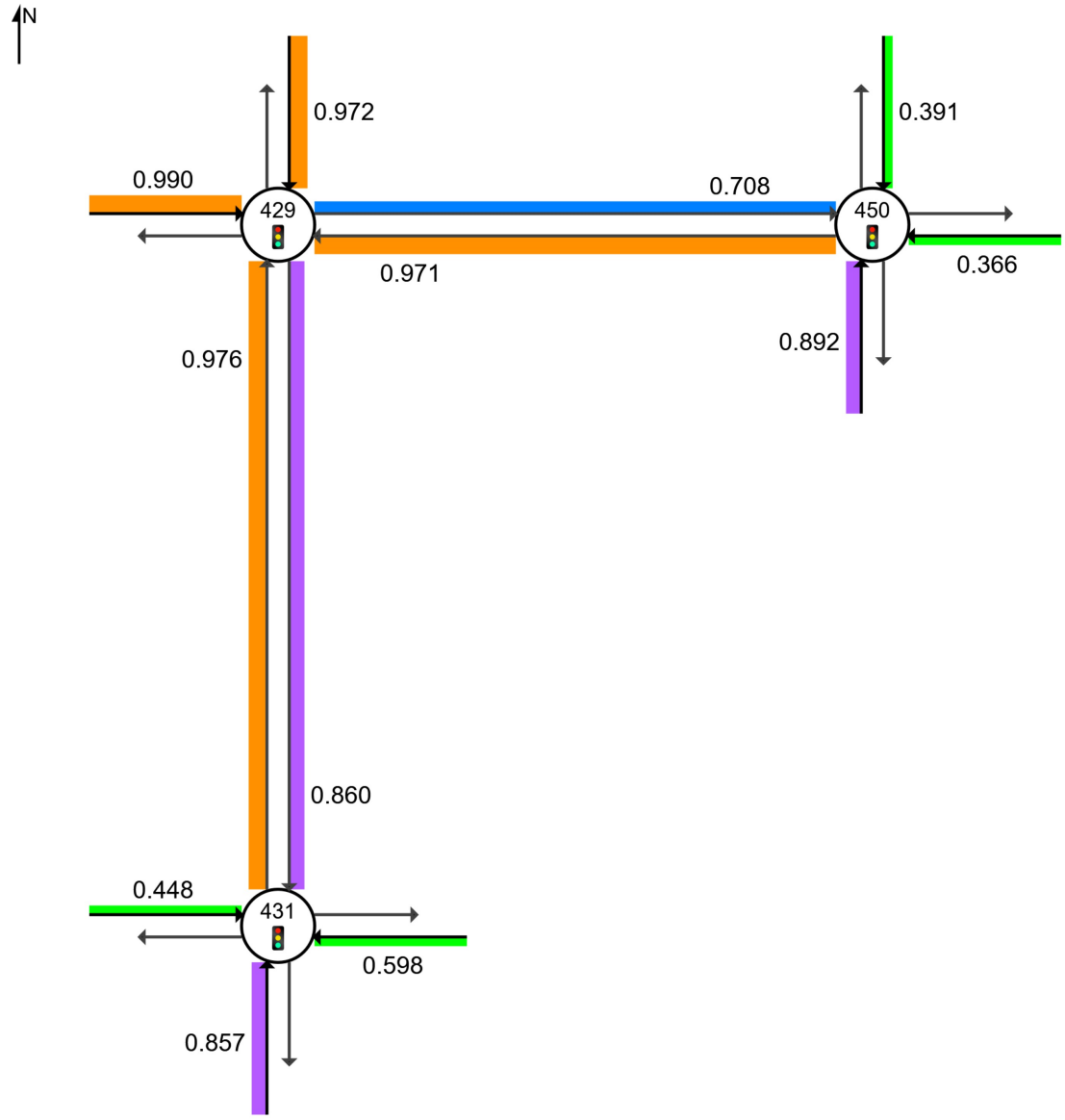
New Network
Network Category: (None)
Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Network Layout

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



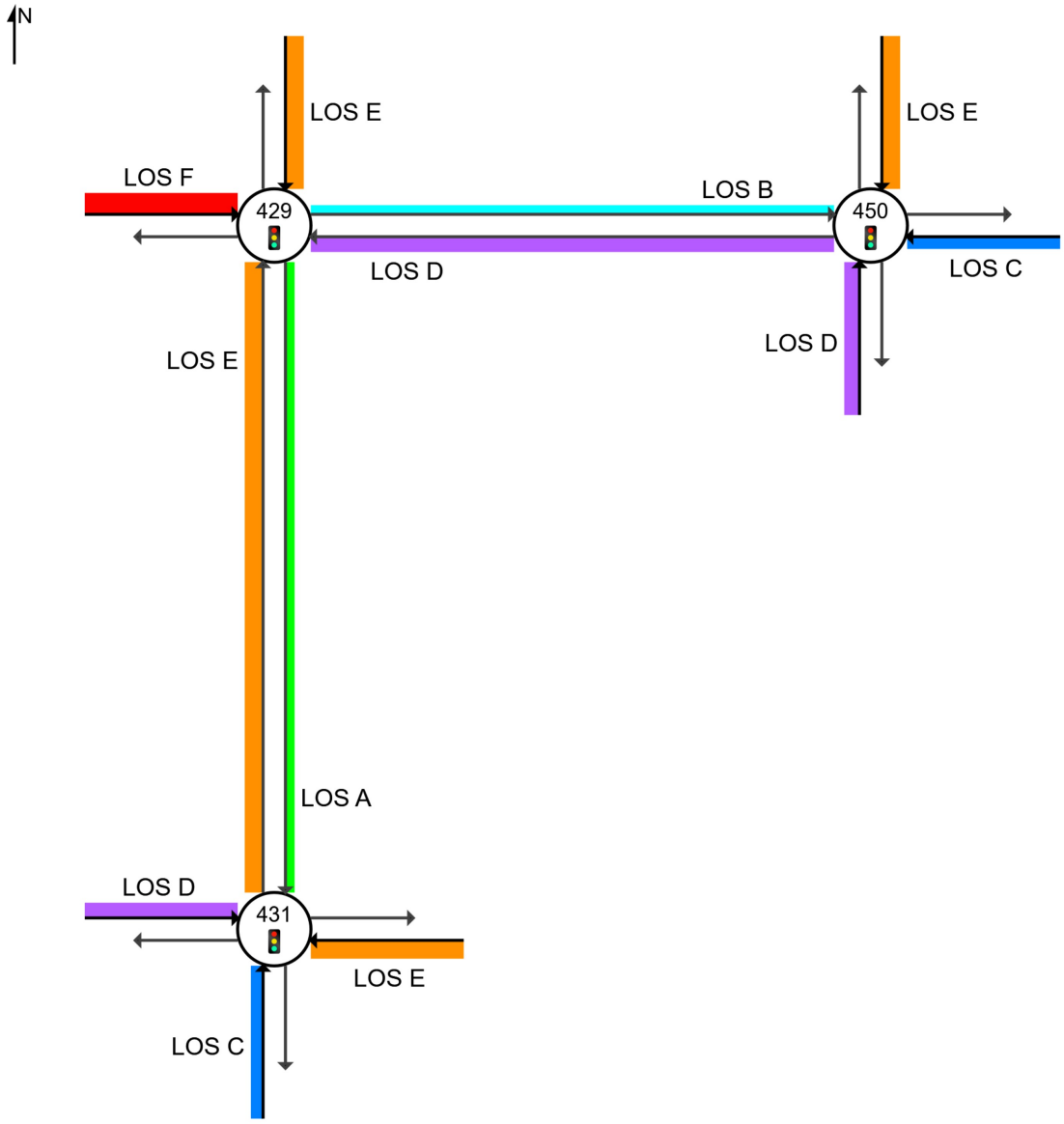
Degree of Saturation



Colour code based on Degree of Saturation

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

Approach Level of Service

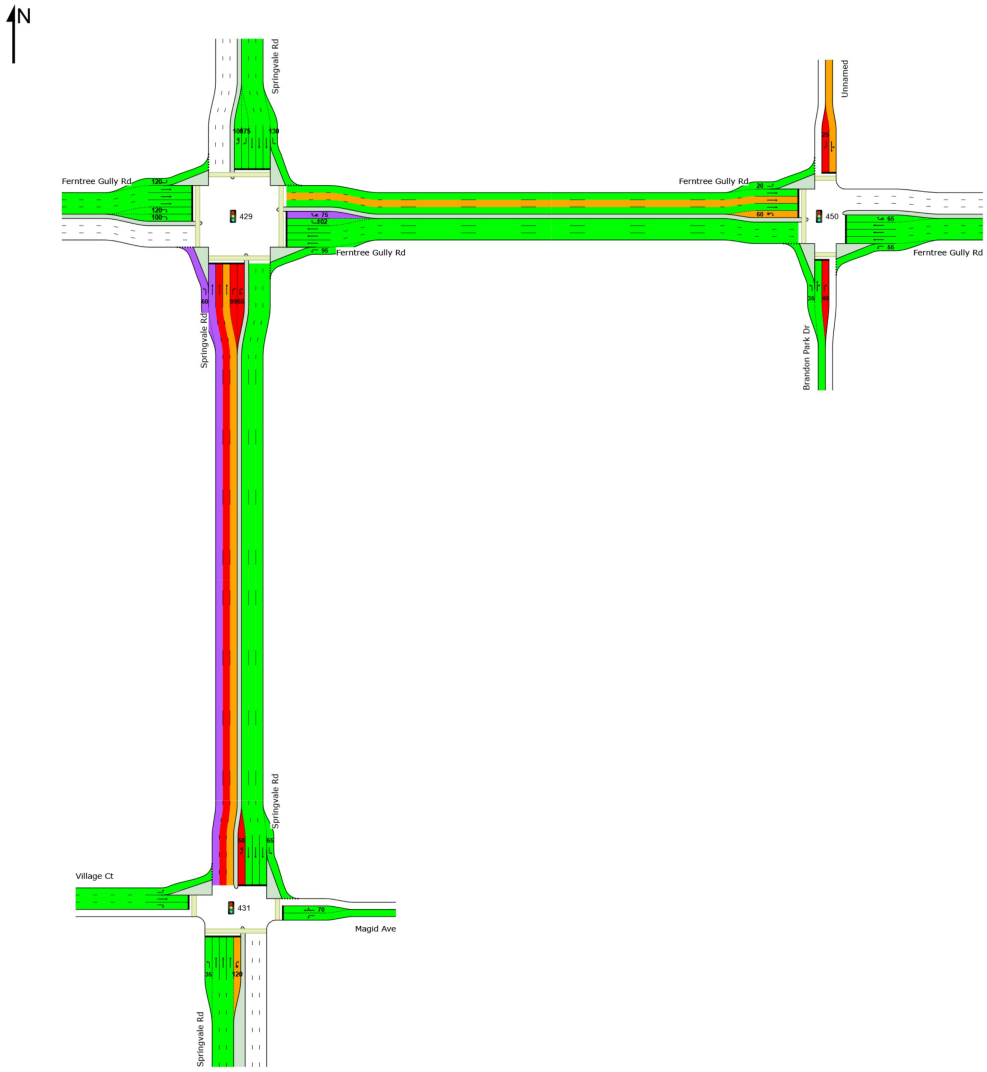


Colour code based on Level of Service

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

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Delay Model: SIDRA Standard (Geometric Delay is included).

Lane Blockage Probability



Colour code based on Lane Blockage Probability

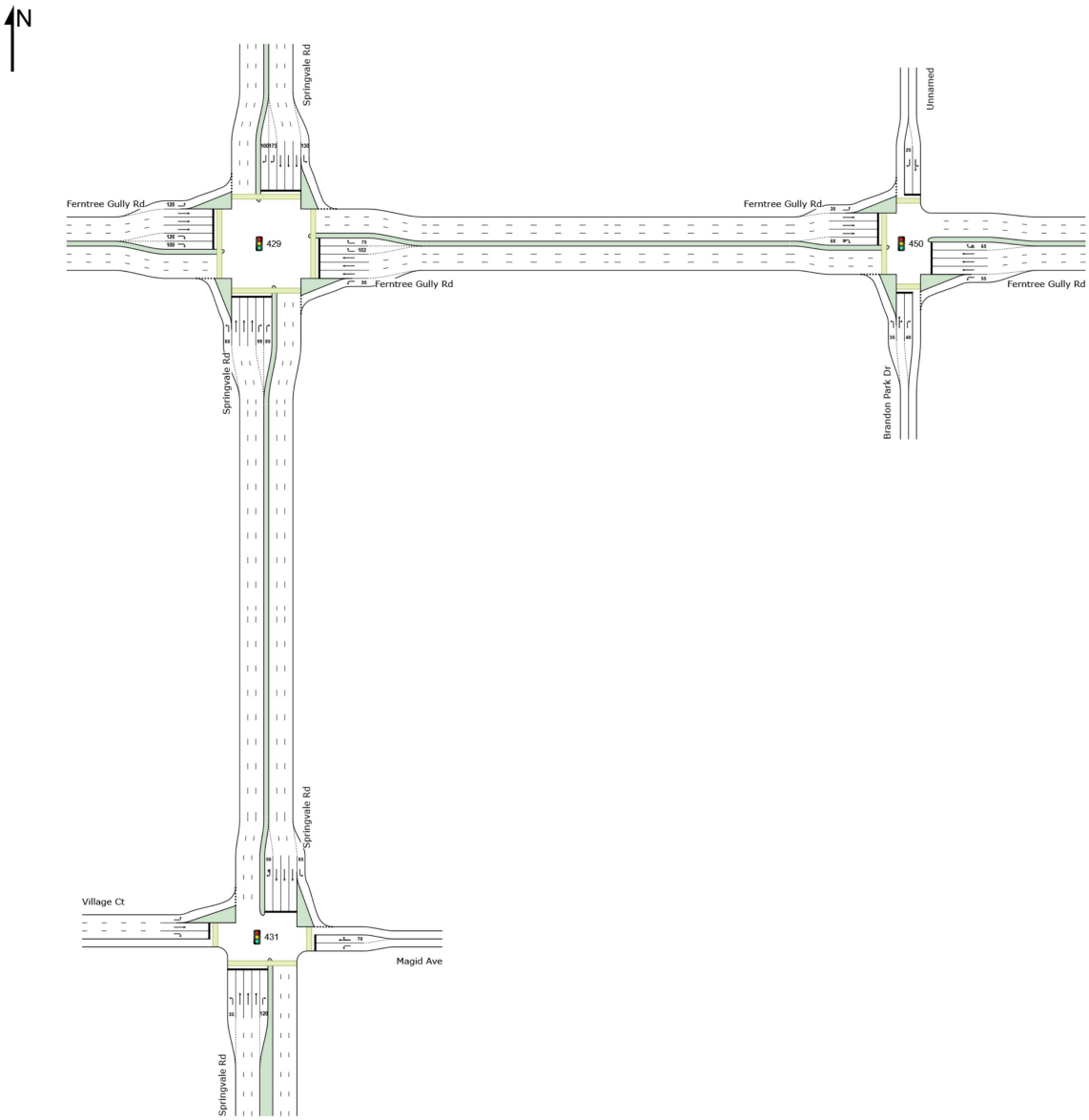
[= 0%] [0 – 10%] [10 – 30%] [> 30%]

Network: N101 [Post Dev - AM (Network Folder: Post Development)]

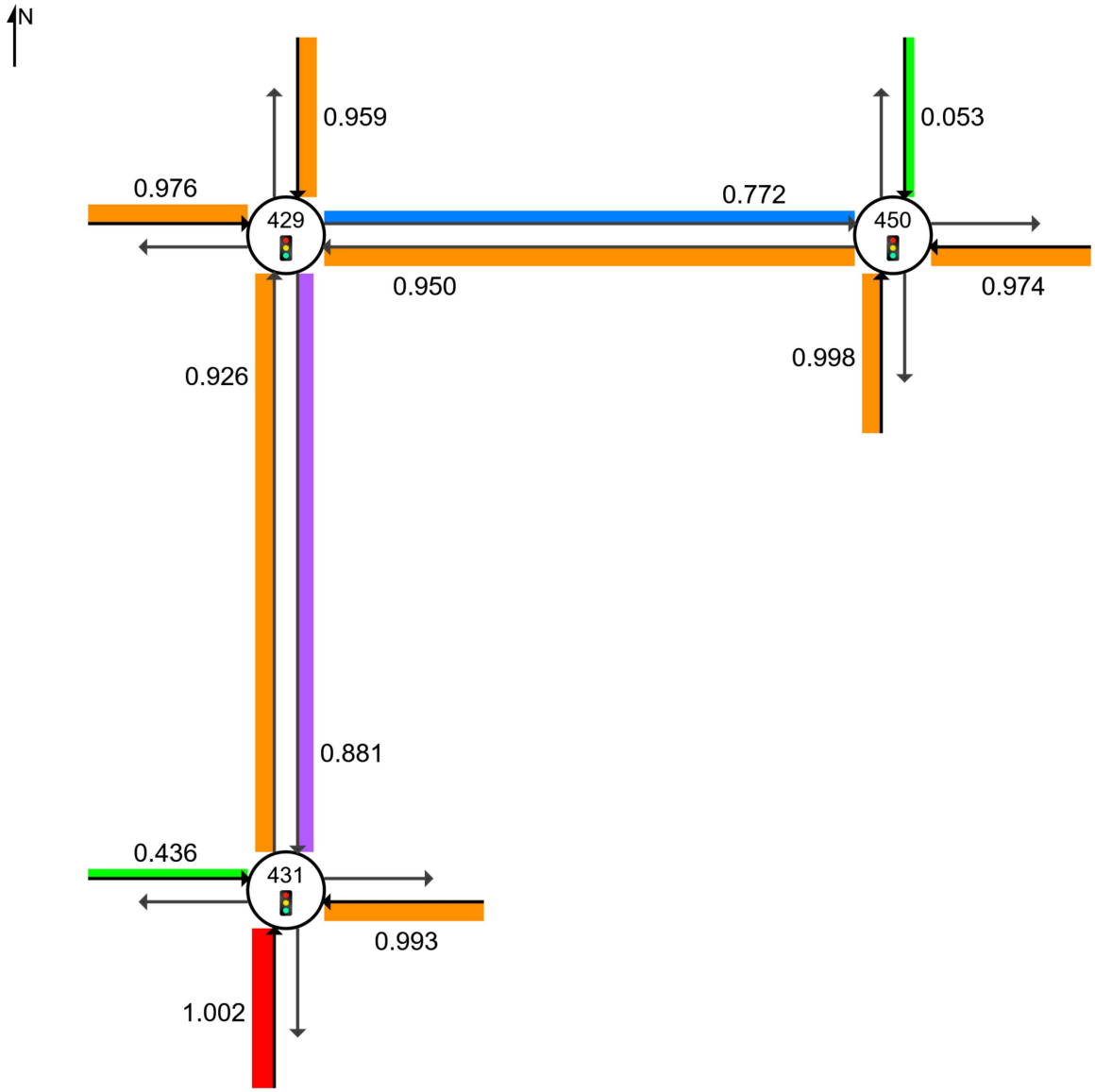
New Network
Network Category: (None)
Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Network Layout

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



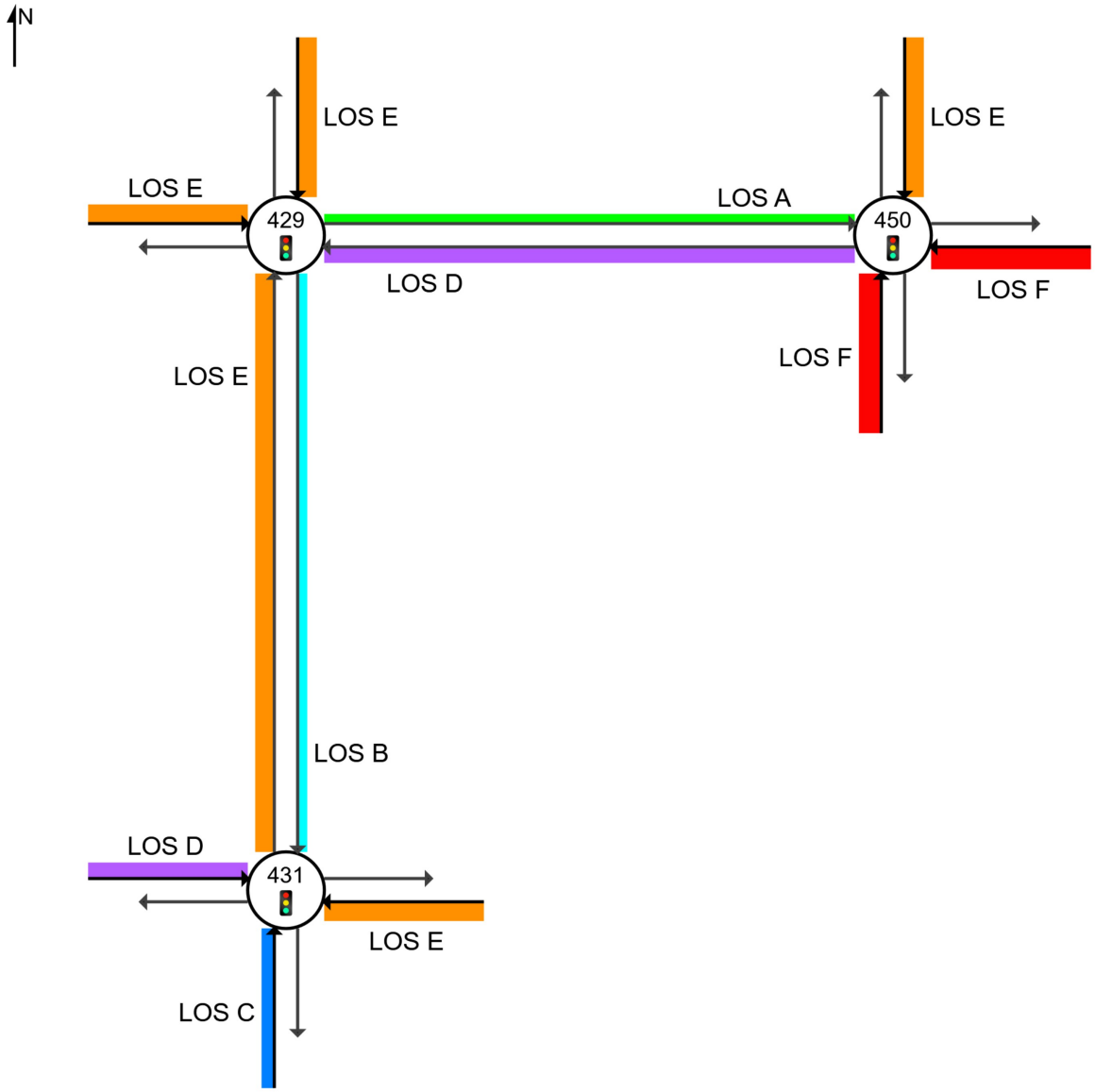
Degree of Saturation



Colour code based on Degree of Saturation

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

Approach Level of Service

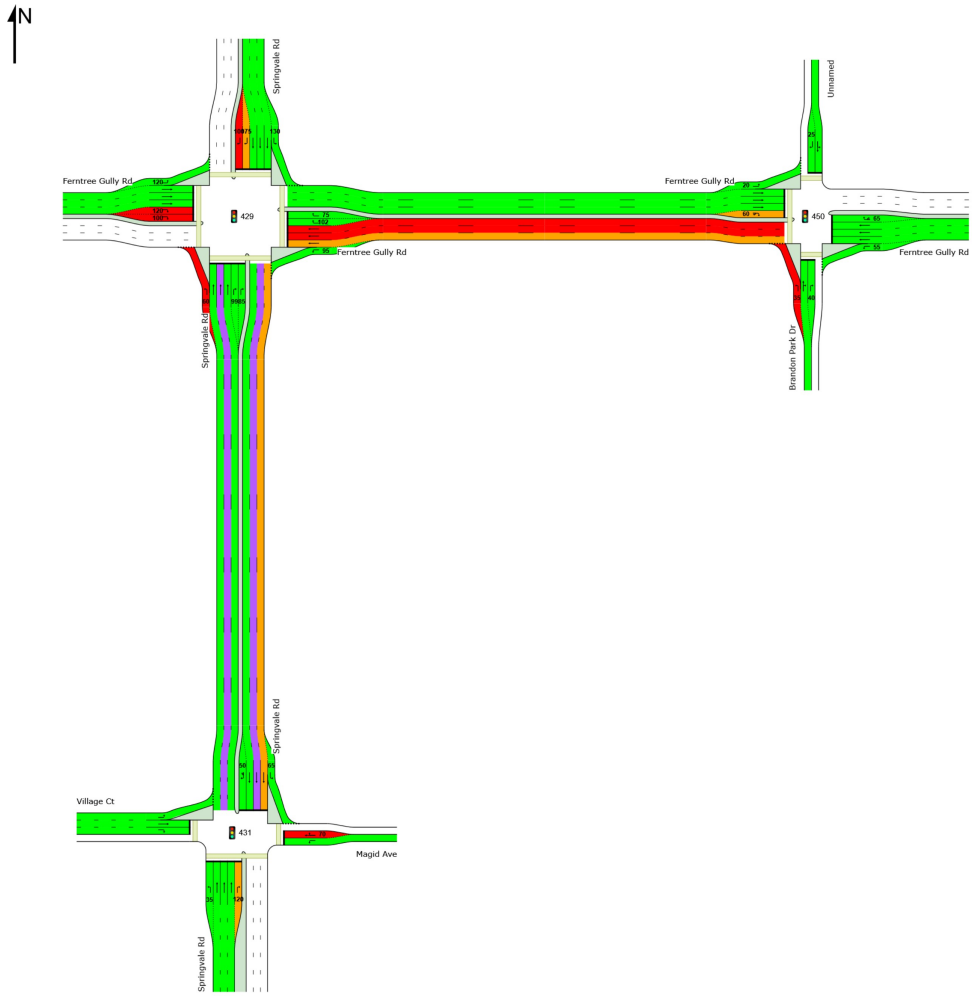


Colour code based on Level of Service

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

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Delay Model: SIDRA Standard (Geometric Delay is included).

Lane Blockage Probability



Colour code based on Lane Blockage Probability

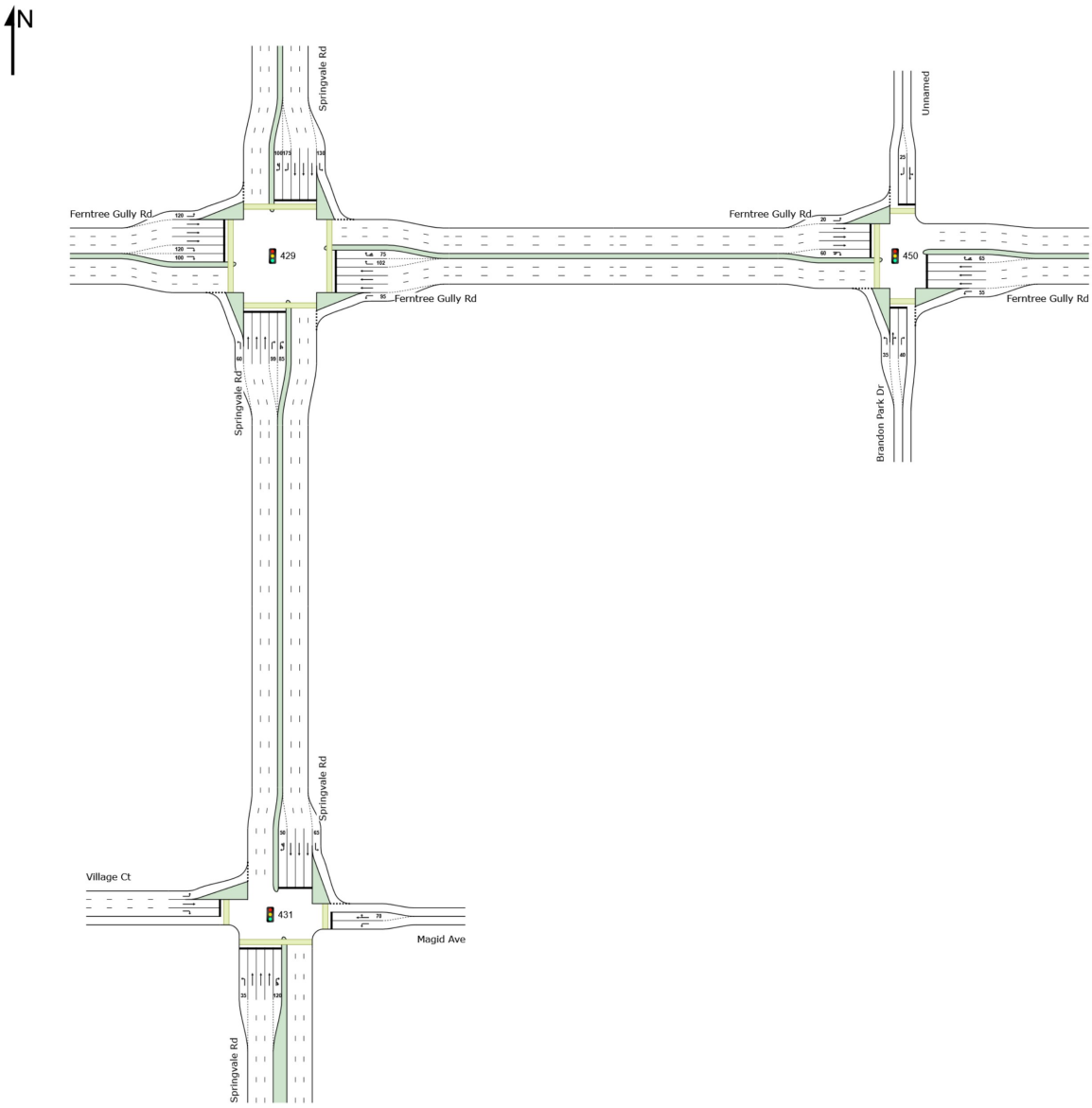
[= 0%] [0 – 10%] [10 – 30%] [> 30%]

Network: N101 [Post Dev - PM (Network Folder: Post Development)]

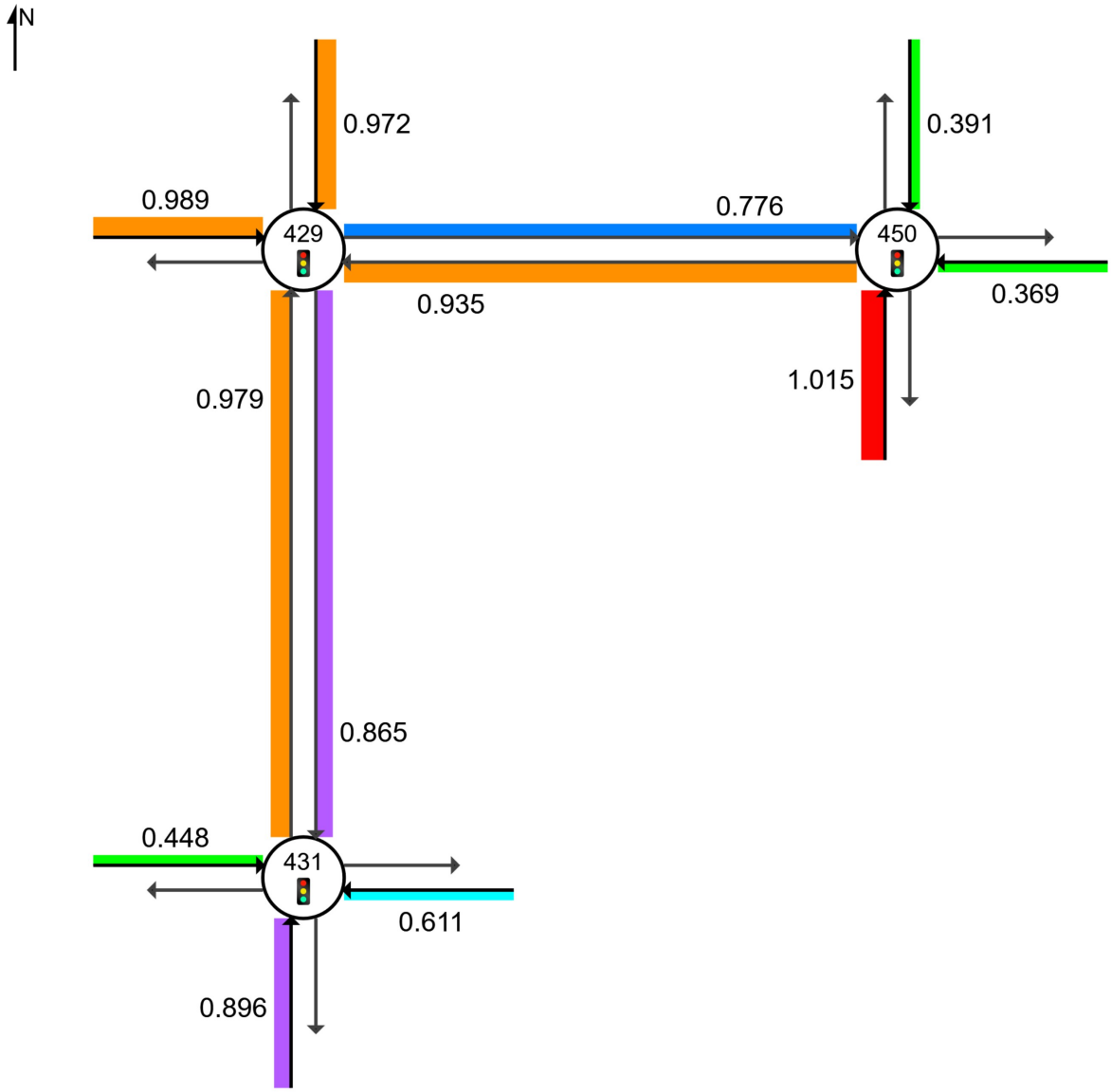
New Network
Network Category: (None)
Network Cycle Time = 140 seconds (Network User-Given Cycle Time)

Network Layout

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



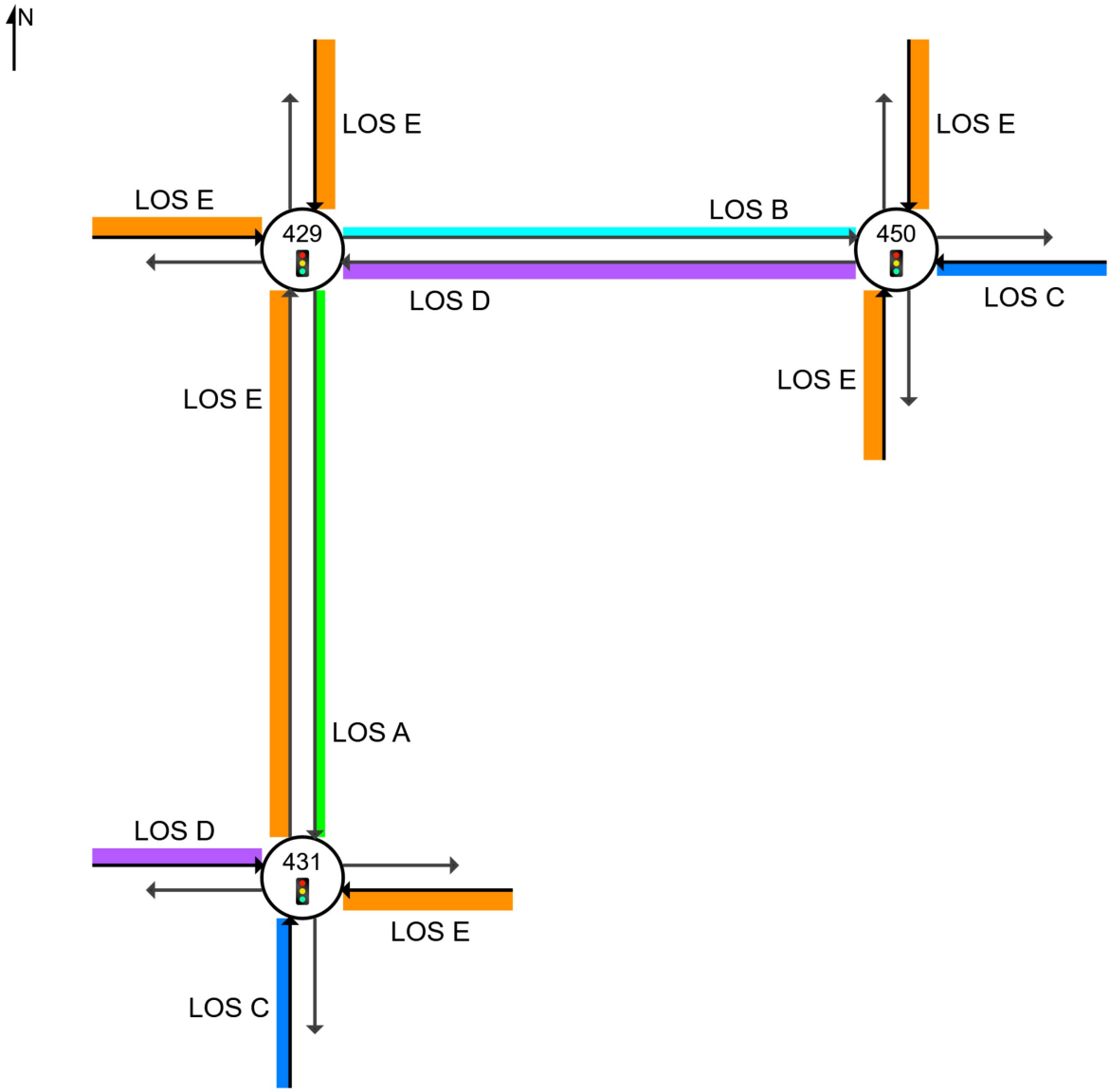
Degree of Saturation



Colour code based on Degree of Saturation

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

Approach Level of Service

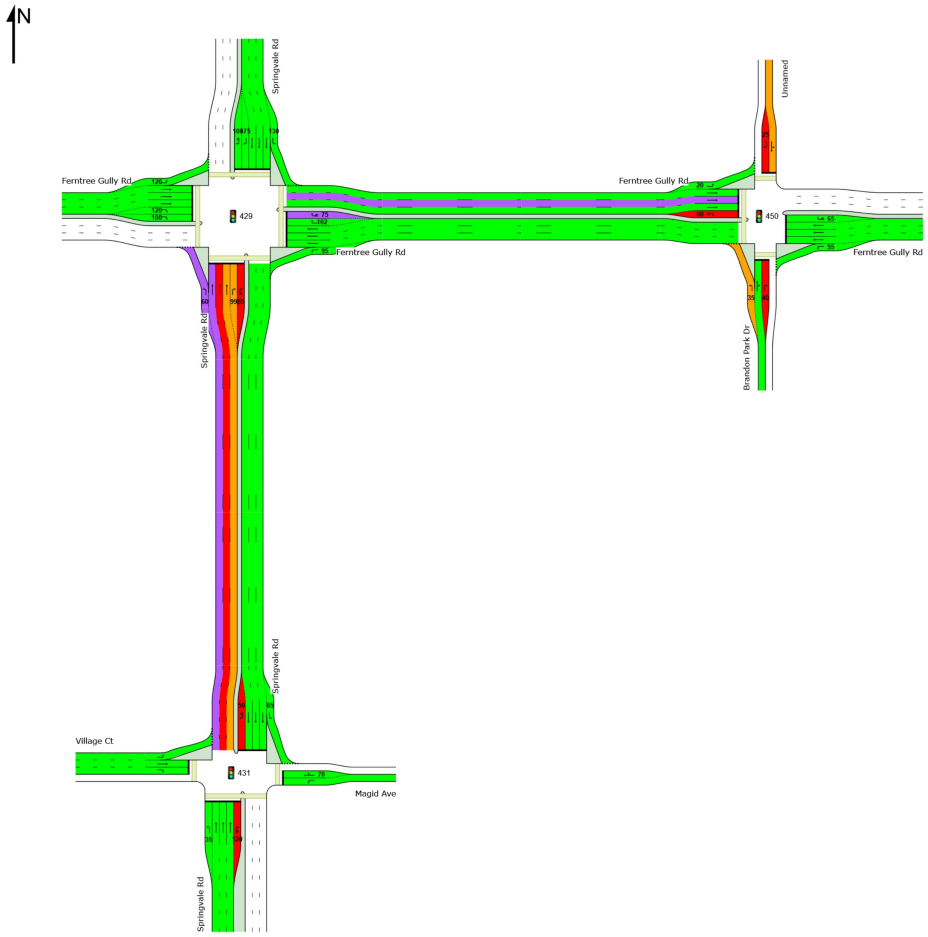


Colour code based on Level of Service

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

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Delay Model: SIDRA Standard (Geometric Delay is included).

Lane Blockage Probability



Colour code based on Lane Blockage Probability

[= 0%] [0 – 10%] [10 – 30%] [> 30%]

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210916sid-V154442-Wkday-SIDRA-Network **Template: Site Report**

Site: 429 [429 PD AM - Springvale Rd/ Ferntree Gully Rd (Site Folder: Post Dev - AM)] **Network: 3 [Post Dev - AM (Network Folder: Post Development)]**

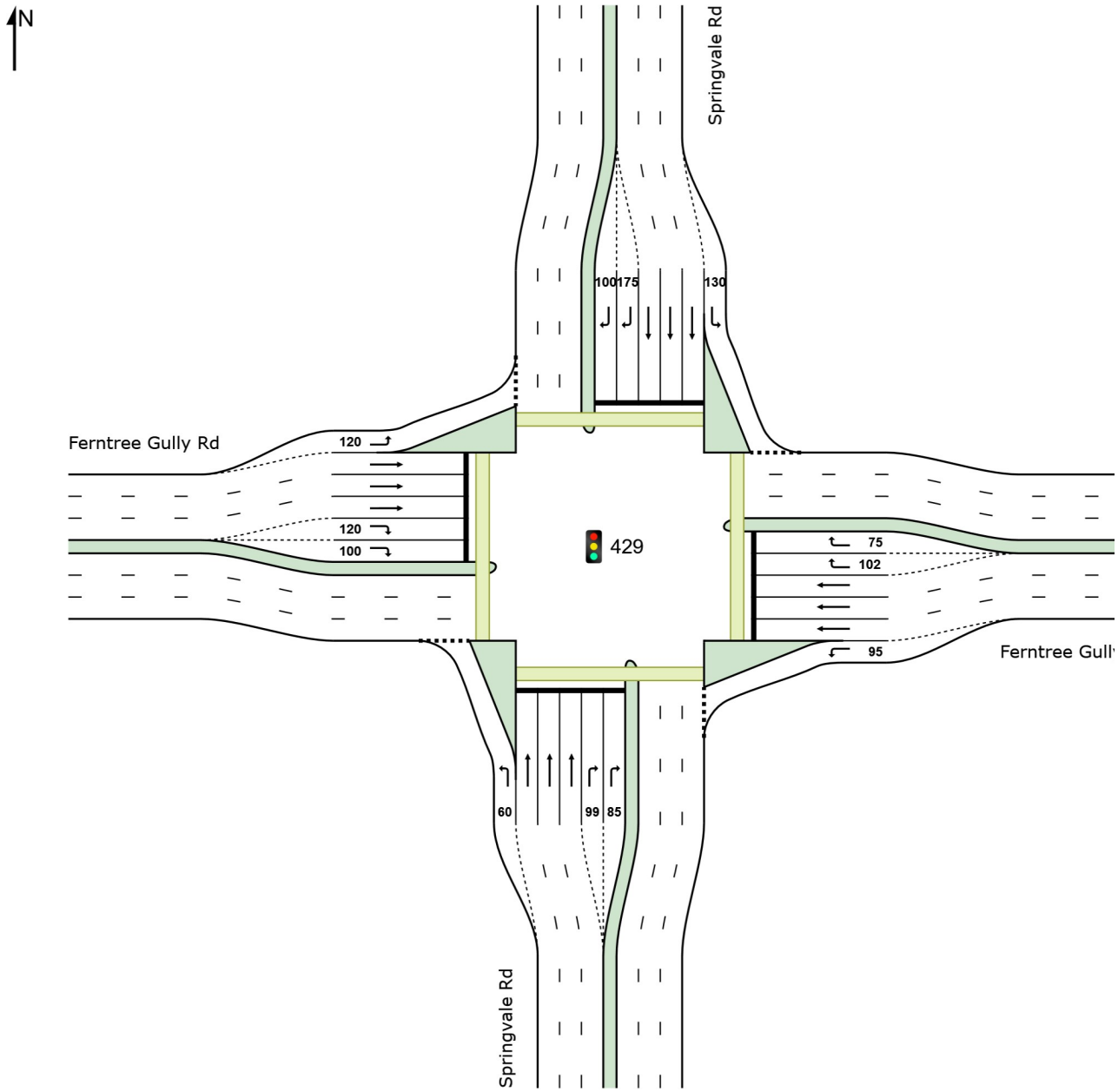
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B1, B3*, C, D1, D3*
Output Phase Sequence: A, B1, B3*, C, D1, D3*
(* Variable Phase)

Site Layout

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


N
Springvale Rd
100
175
130
Ferntree Gully Rd
120
120
100
429
75
102
95
Ferntree Gull
60
99
85
Springvale Rd

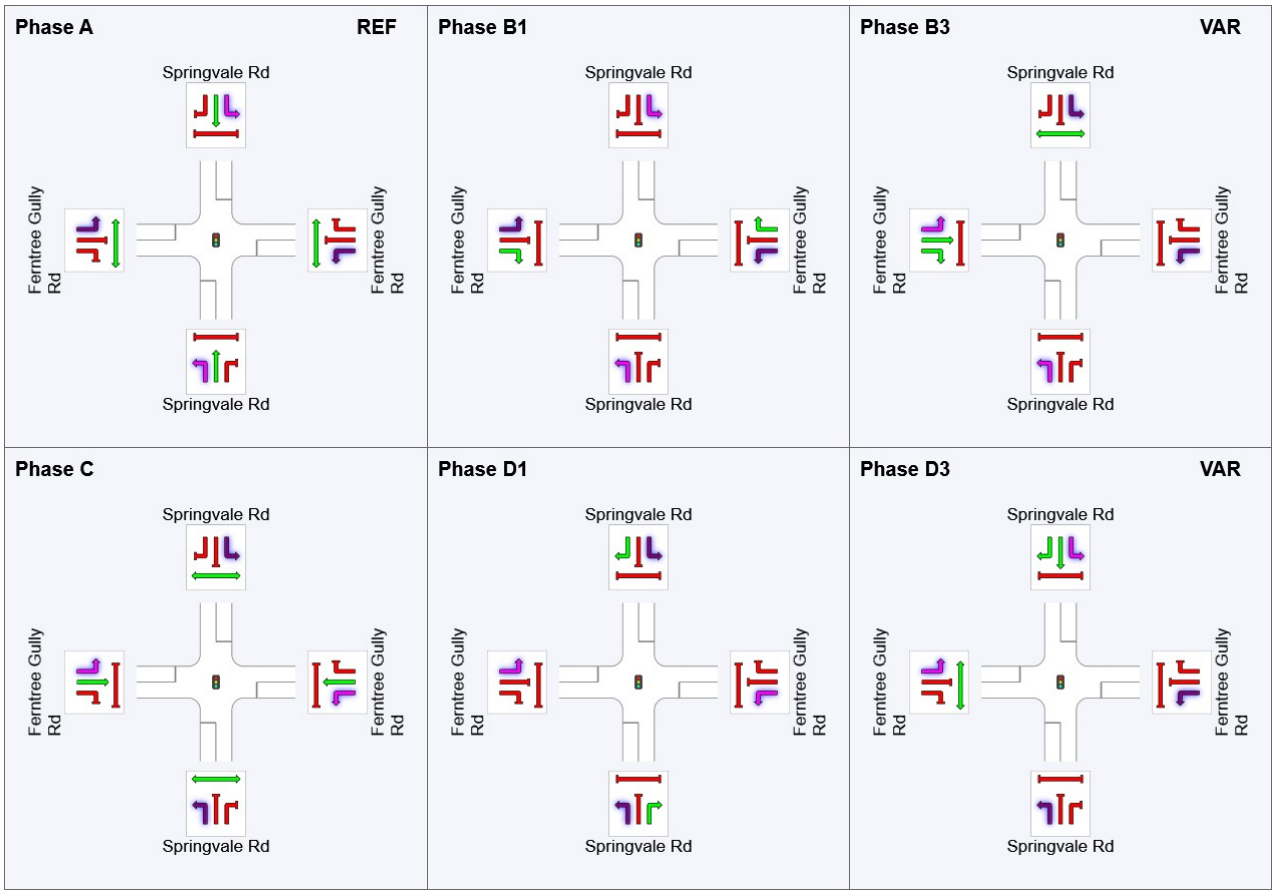
Phase Timing Summary

Phase	A	B1	B3	C	D1	D3
Phase Change Time (sec)	0	41	62	66	111	125
Green Time (sec)	35	14	***	39	8	9
Phase Time (sec)	42	20	4	45	14	15
Phase Split	30%	14%	3%	32%	10%	11%

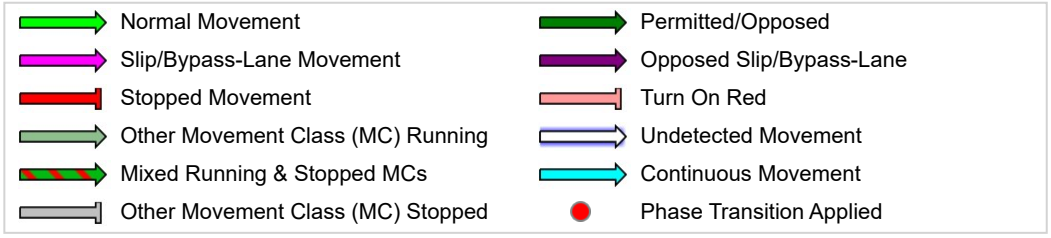
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified.
If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	501	4.6	501	4.6	999	0.501	100	24.8	LOS C	8.5	61.9	Short	60	0.0	NA
Lane 2	302	5.6	302	5.6	326[1]	0.926	100	67.7	LOS E	12.5	91.7	Full	280	0.0	0.0
Lane 3	492	5.6	492	5.6	531	0.926	100	67.6	LOS E	22.7	166.4	Full	280	0.0	2.3
Lane 4	460	5.6	460	5.6	496[1]	0.926	100	68.2	LOS E	20.8	152.6	Full	280	0.0	0.0
Lane 5	100	3.5	100	3.5	114	0.876	100	87.5	LOS F	4.6	33.3	Short	99	0.0	NA
Lane 6	100	3.5	100	3.5	114	0.876	100	87.5	LOS F	4.6	33.3	Short	85	0.0	NA
Approach	1954	5.1	1954	5.1		0.926		58.8	LOS E	22.7	166.4				
East: Ferntree Gully Rd															
Lane 1	244	2.9	244	2.9	615	0.397	100	14.2	LOS B	2.0	14.1	Short	95	-25.6[N3]	NA
Lane 2	477	2.5	477	2.5	502[1]	0.950	100	49.8	LOS D	19.4	138.9	Full	175	0.0	28.6
Lane 3	573	2.5	573	2.5	603	0.950	100	50.7	LOS D	24.5[N4]	175.0[N4]	Full	175	0.0	50.0
Lane 4	527	2.5	527	2.5	554[1]	0.950	100	52.3	LOS D	23.0	164.2	Full	175	0.0	44.1
Lane 5	125	4.8	125	4.8	198	0.631	100	74.1	LOS E	5.3	38.4	Short	102	0.0	NA
Lane 6	125	4.8	125	4.8	198	0.631	100	74.1	LOS E	5.3	38.4	Short	75	0.0	NA
Approach	2071	2.8	2071	2.8		0.950		49.4	LOS D	24.5	175.0				
North: Springvale Rd															
Lane 1	184	3.8	184	3.8	1195	0.154	100	14.3	LOS B	2.6	18.9	Short	130	0.0	NA
Lane 2	553	2.4	553	2.4	577[1]	0.959	100	79.3	LOS E	29.3	209.4	Full	500	-25.6[N3]	0.0
Lane 3	712	2.4	712	2.4	742	0.959	100	74.5	LOS E	36.9	263.5	Full	500	-8.2[N3]	0.0
Lane 4	719	2.4	719	2.4	750[1]	0.959	100	72.4	LOS E	36.0	257.6	Full	500	0.0	0.0
Lane 5	314	2.2	314	2.2	331	0.948	100	93.9	LOS F	16.0	114.2	Short	175	0.0	NA
Lane 6	314	2.2	314	2.2	331	0.948	100	93.9	LOS F	16.0	114.2	Short	100	0.0	NA
Approach	2795	2.5	2795	2.5		0.959		75.3	LOS E	36.9	263.5				
West: Ferntree Gully Rd															
Lane 1	275	5.1	275	5.1	1223	0.225	100	16.4	LOS B	4.6	33.5	Short	120	0.0	NA
Lane 2	418	4.7	418	4.7	641	0.652	100	44.9	LOS D	15.0	109.6	Full	500	0.0	0.0
Lane 3	418	4.7	418	4.7	641	0.652	100	44.9	LOS D	15.0	109.6	Full	500	0.0	0.0
Lane 4	418	4.7	418	4.7	641	0.652	100	44.9	LOS D	15.0	109.6	Full	500	0.0	0.0
Lane 5	234	4.7	234	4.7	239	0.976	100	106.5	LOS F	12.7	92.3	Short	120	-8.2[N3]	NA
Lane 6	254	4.7	254	4.7	261	0.976	100	105.1	LOS F	13.7	99.7	Short	100	0.0	NA
Approach	2017	4.8	2017	4.8		0.976		55.7	LOS E	15.0	109.6				
Intersection	8837	3.7	8837	3.7		0.976		61.1	LOS E	36.9	263.5				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

Site: 450 [450 PD AM - Brandon Park Dr/ Ferntree Gully Rd (Site Folder: Post Dev - AM)]

Network: 3 [Post Dev - AM (Network Folder: Post Development)]

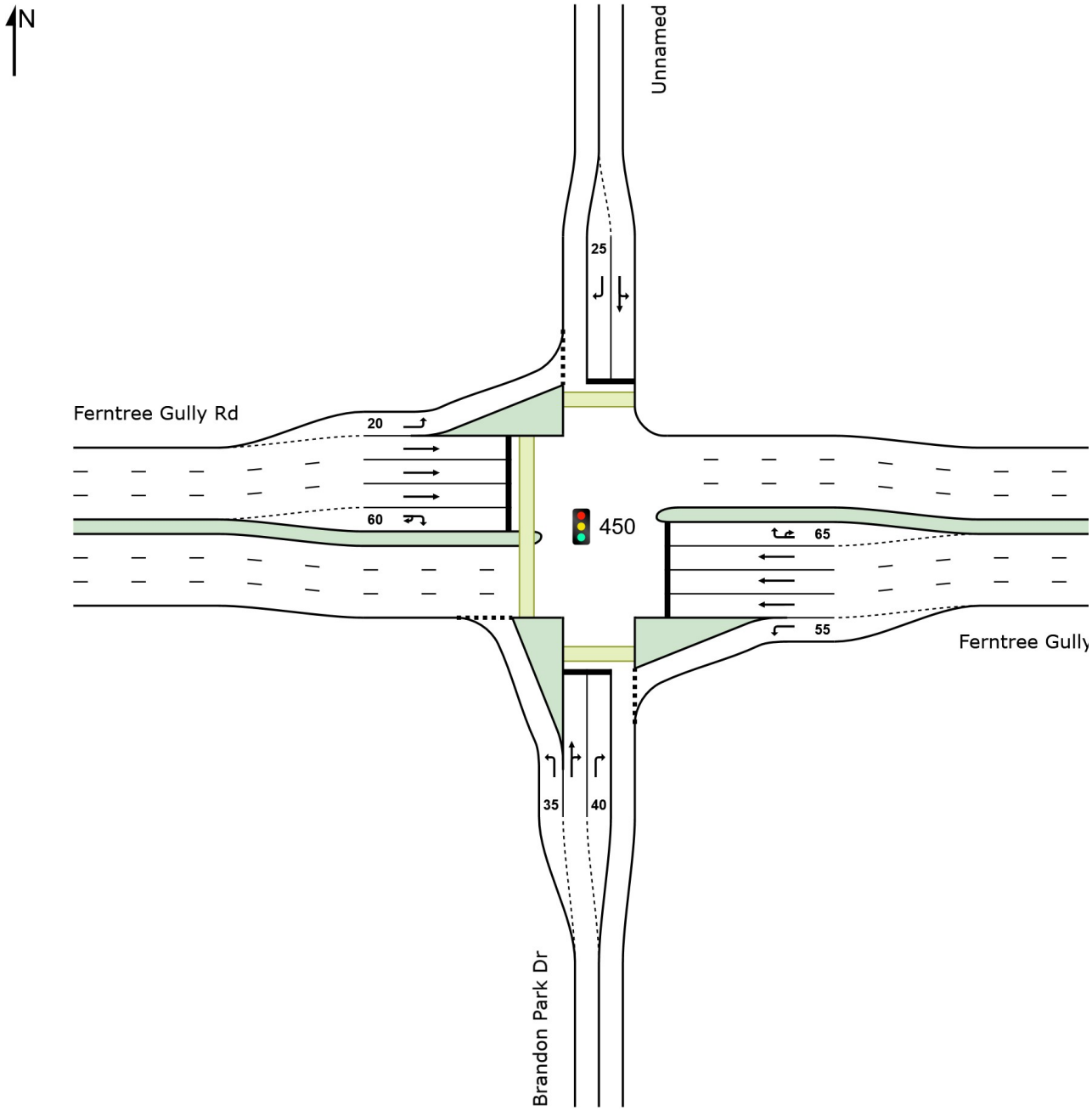
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D3
Output Phase Sequence: A, B, C, D1, D3

Site Layout

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

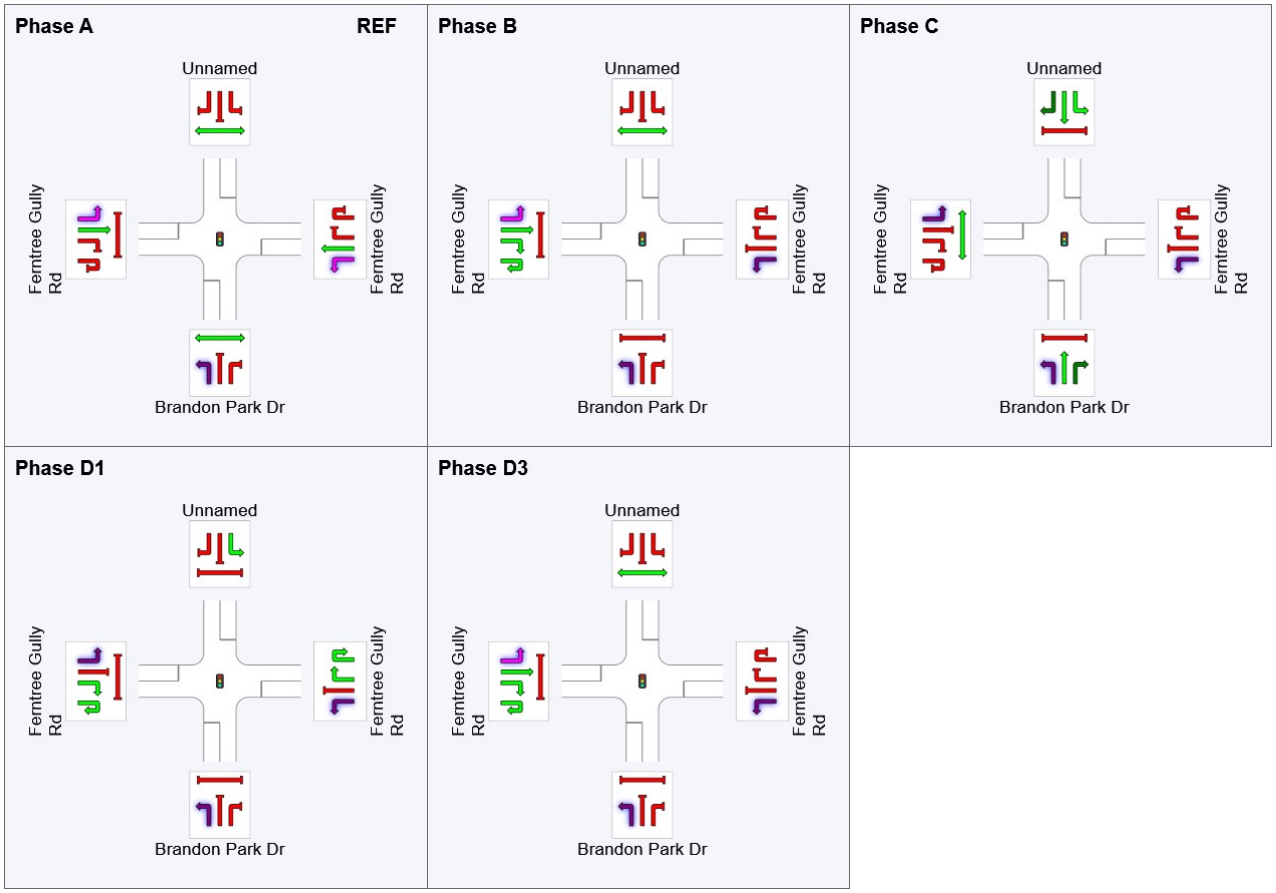

N
Unnamed
25
Ferntree Gully Rd
20
60
450
65
55
Ferntree Gully
35
40
Brandon Park Dr

Phase Timing Summary

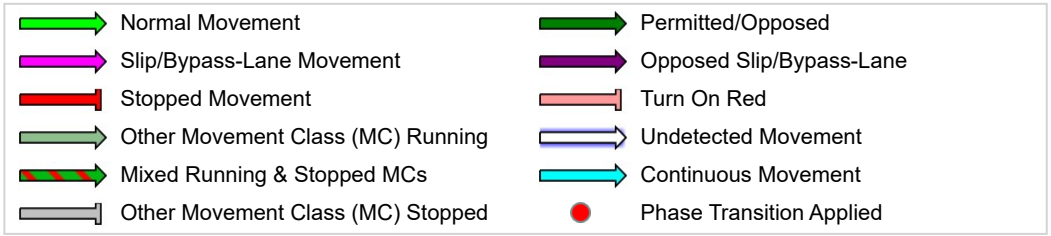
Phase	A	B	C	D1	D3
Phase Change Time (sec)	40	120	137	23	34
Green Time (sec)	74	11	20	6	1
Phase Time (sec)	80	17	25	11	7
Phase Split	57%	12%	18%	8%	5%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Brandon Park Dr															
Lane 1	315	2.2	315	2.2	316	0.998	100	119.7	LOS F	18.5	132.3	Short	35 [1 6]	-42.2 [N3]	NA
Lane 2	75	0.0	75	0.0	228	0.328	100	61.9	LOS E	2.9	20.1	Full	500	0.0	0.0
Lane 3	70	0.0	70	0.0	214	0.328	100	64.0	LOS E	2.7	18.9	Short	40	0.0	NA
Approach	460	1.5	460	1.5		0.998		101.8	LOS F	18.5	132.3				
East: Ferntree Gully Rd															
Lane 1	61	0.0	61	0.0	1430	0.043	100	8.5	LOS A	0.4	2.8	Short	55	0.0	NA
Lane 2	671	2.8	671	2.8	689 [1]	0.974	100	78.8	LOS E	37.7	270.2	Full	500	-28.8 [N3]	0.0
Lane 3	493	2.8	493	2.8	506	0.974	100	89.2	LOS F	30.1	215.9	Full	500	-50.0 [N3]	0.0
Lane 4	540	2.8	540	2.8	555 [1]	0.974	100	85.5	LOS F	31.8	227.8	Full	500	-43.5 [N3]	0.0
Lane 5	48	0.0	48	0.0	74	0.649	100	84.3	LOS F	2.2	15.1	Short	65	0.0	NA
Approach	1814	2.6	1814	2.6		0.974		81.4	LOS F	37.7	270.2				
North: Unnamed															
Lane 1	14	0.0	14	0.0	312	0.045	100	53.9	LOS D	0.5	3.4	Full	35	0.0	0.0
Lane 2	6	0.0	6	0.0	113	0.053	100	63.0	LOS E	0.2	1.6	Short	25	-43.5 [N3]	NA
Approach	20	0.0	20	0.0		0.053		56.6	LOS E	0.5	3.4				
West: Ferntree Gully Rd															
Lane 1	95	0.0	95	0.0	1623	0.059	100	6.7	LOS A	0.1	0.7	Short	20	0.0	NA
Lane 2	481	4.8	481	4.8	1321 [1]	0.364	100	3.4	LOS A	2.9	21.2	Full	175	0.0	0.0
Lane 3	482	4.8	482	4.8	1323	0.364	100	1.1	LOS A	0.9	6.9	Full	175	0.0	0.0
Lane 4	482	4.8	482	4.8	1323	0.364	100	0.7	LOS A	0.6	4.5	Full	175	0.0	0.0
Lane 5	216	0.9	216	0.9	280	0.772	100	50.8	LOS D	6.8	48.2	Short	60	-5.4 [N3]	NA
Approach	1757	4.1	1757	4.1		0.772		8.0	LOS A	6.8	48.2				
Intersection	4051	3.1	4051	3.1		0.998		51.8	LOS D	37.7	270.2				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
16 Short Lane Calibration: “Do Not Apply” specified.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Site: 431 [431 PD AM - Springvale Rd/ Magid Ave (Site Folder: Post Dev - AM)]

Network: 3 [Post Dev - AM (Network Folder: Post Development)]

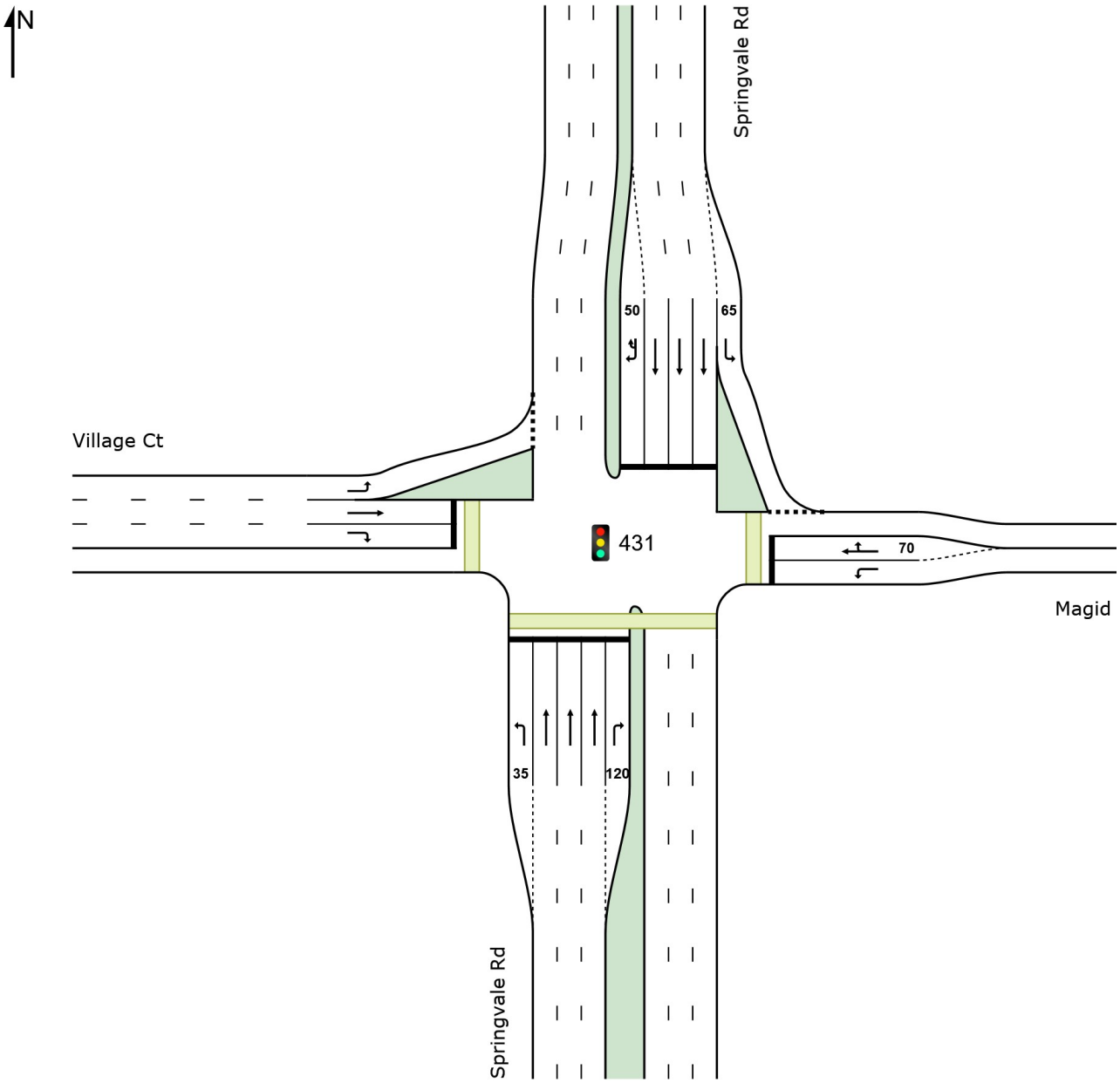
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2
Output Phase Sequence: A, B, C1, C2

Site Layout

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

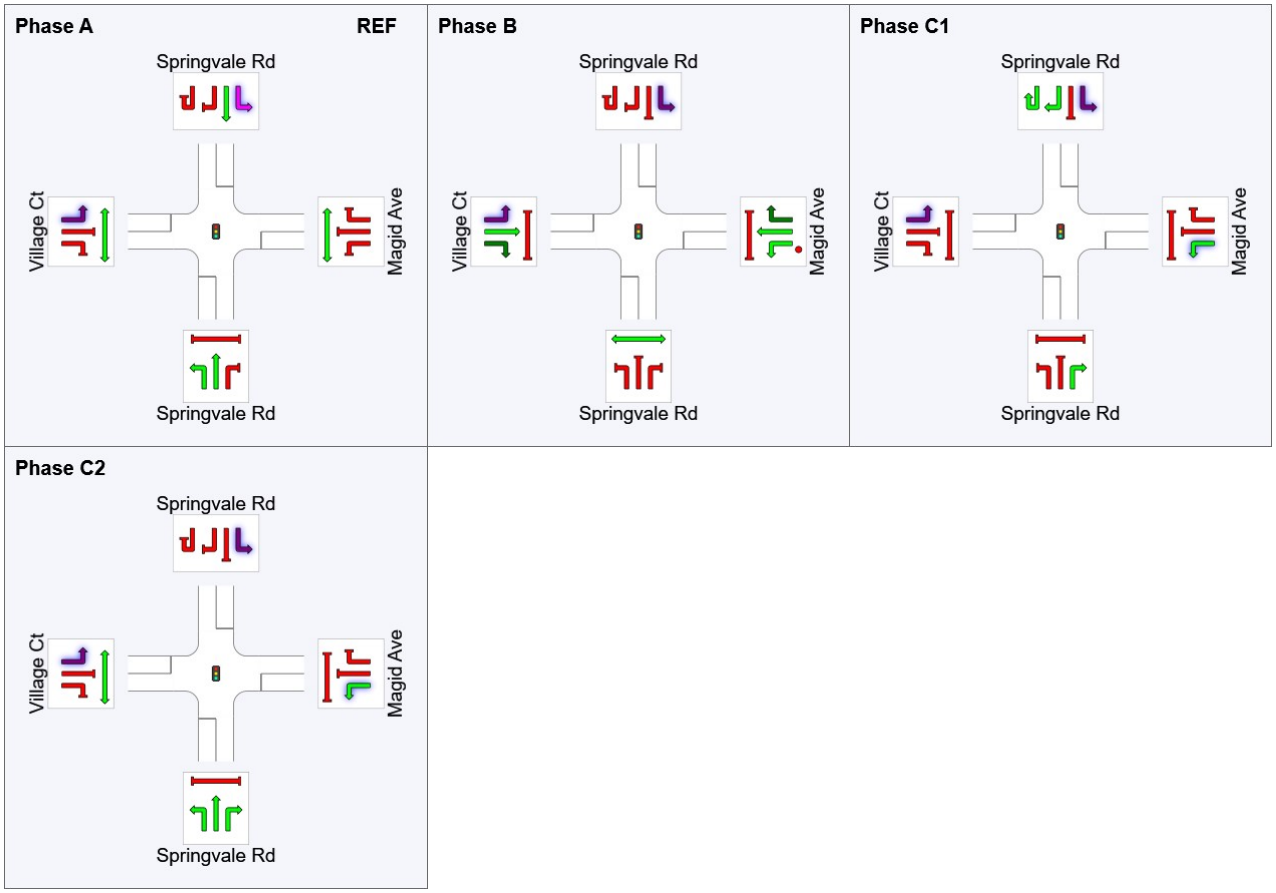


Phase Timing Summary

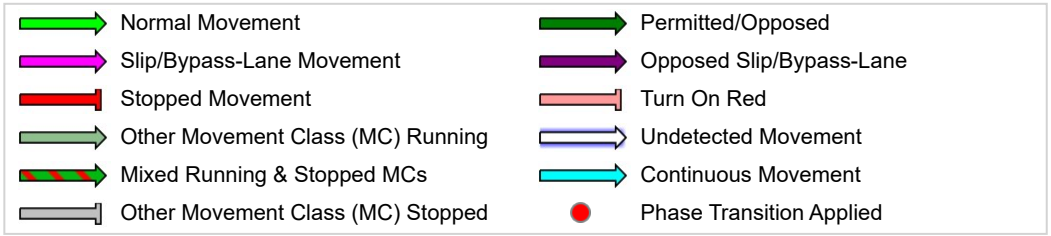
Phase	A	B	C1	C2
Phase Change Time (sec)	10	89	127	140
Green Time (sec)	73	32	7	4
Phase Time (sec)	79	38	13	10
Phase Split	56%	27%	9%	7%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	57	1.8	57	1.8	1087	0.052	100	19.5	LOS B	1.0	6.9	Short	35	0.0	NA
Lane 2	587	5.6	587	5.6	1047[1]	0.561	100	17.8	LOS B	14.2	104.4	Full	500	0.0	0.0
Lane 3	584	5.6	584	5.6	1042	0.561	100	18.4	LOS B	14.6	107.4	Full	500	-6.6[N3]	0.0
Lane 4	626	5.6	626	5.6	1116	0.561	100	18.3	LOS B	15.6	114.7	Full	500	0.0	0.0
Lane 5	223	1.8	223	1.8	223	1.002	100	119.5	LOS F	12.8	91.2	Short	120	0.0	NA
Approach	2077	5.1	2077	5.1		1.002		29.1	LOS C	15.6	114.7				
East: Magid Ave															
Lane 1	459	0.4	459	0.4	573[1]	0.801	100	44.8	LOS D	16.3	114.8	Full	500	0.0	0.0
Lane 2	287	0.7	287	0.7	289[1]	0.993	100	112.6	LOS F	16.8	118.3	Short	70	-1.6[N3]	NA
Approach	746	0.5	746	0.5		0.993		70.9	LOS E	16.8	118.3				
North: Springvale Rd															
Lane 1	42	0.0	42	0.0	1351	0.031	100	9.4	LOS A	0.2	1.7	Short	65	0.0	NA
Lane 2	915	2.9	915	2.9	1039[1]	0.881	100	26.3	LOS C	30.0	215.3	Full	280	0.0	25.6
Lane 3	947	2.9	947	2.9	1075	0.881	100	12.3	LOS B	24.8	177.8	Full	280	0.0	8.2
Lane 4	889	2.9	889	2.9	1009[1]	0.881	100	12.3	LOS B	20.0	143.6	Full	280	0.0	0.0
Lane 5	57	3.5	57	3.5	83	0.683	100	86.3	LOS F	2.6	18.5	Short	50	0.0	NA
Approach	2851	2.9	2851	2.9		0.881		18.2	LOS B	30.0	215.3				
West: Village Ct															
Lane 1	23	0.0	23	0.0	348	0.066	100	11.8	LOS B	0.3	1.8	Full	30	0.0	0.0
Lane 2	21	0.0	21	0.0	446	0.047	100	44.7	LOS D	0.7	4.7	Full	30	0.0	0.0
Lane 3	26	11.5	26	11.5	60	0.436	100	81.3	LOS F	1.2	8.9	Full	30	0.0	0.0
Approach	70	4.3	70	4.3		0.436		47.5	LOS D	1.2	8.9				
Intersection	5744	3.4	5744	3.4		1.002		29.4	LOS C	30.0	215.3				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

USER REPORT FOR NETWORK SITE

All Movement Classes

Project: 210916sid-V154442-Wkday-SIDRA-Network **Template: Site Report**

Site: 429 [429 PD PM - Springvale Rd/ Ferntree Gully Rd (Site Folder: Post Dev - PM)] **Network: 4 [Post Dev - PM (Network Folder: Post Development)]**

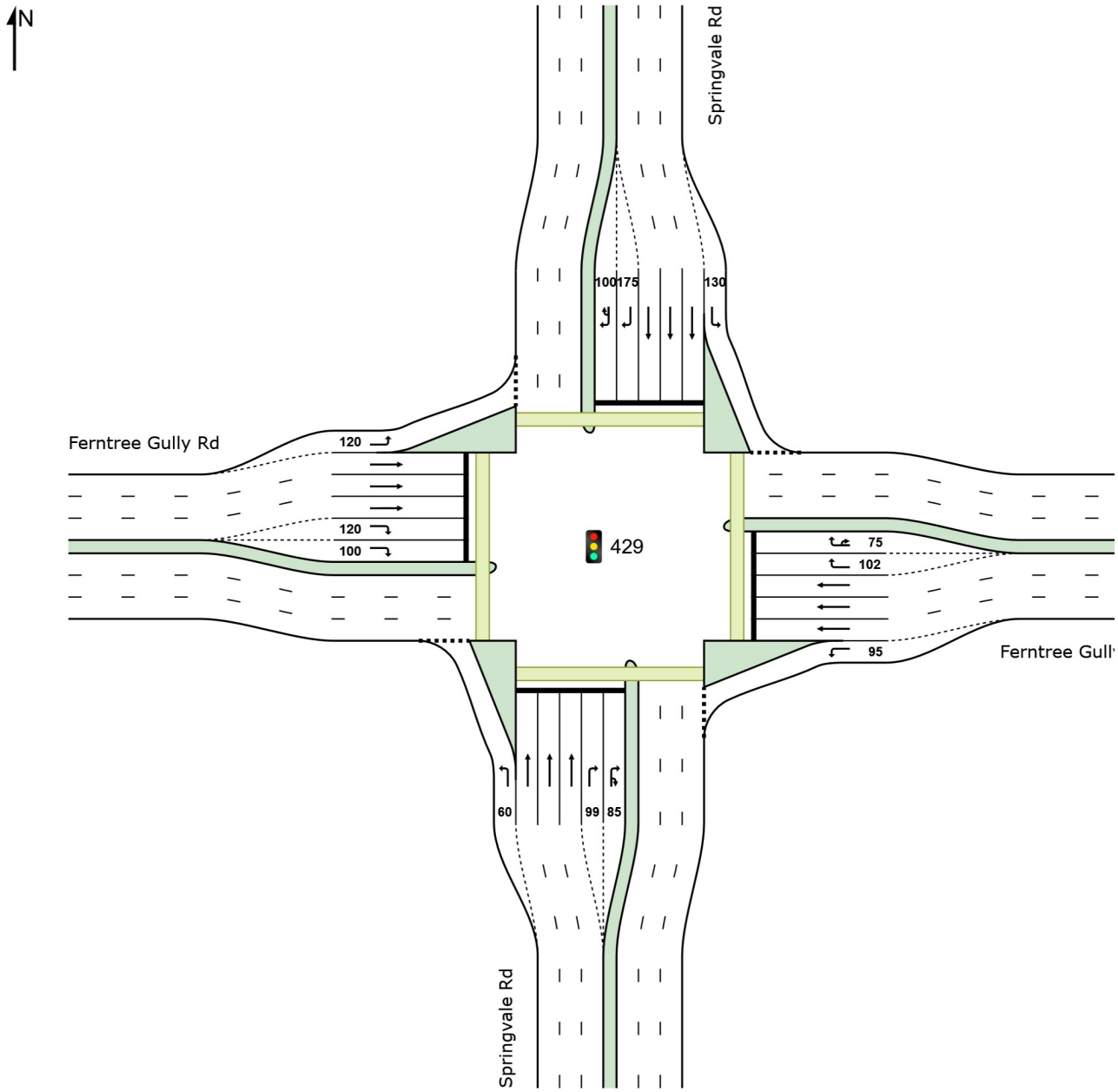
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network User-Given Cycle Time)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B1, B3, C, D1, D2
Output Phase Sequence: A, B1, B3, C, D1, D2

Site Layout

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

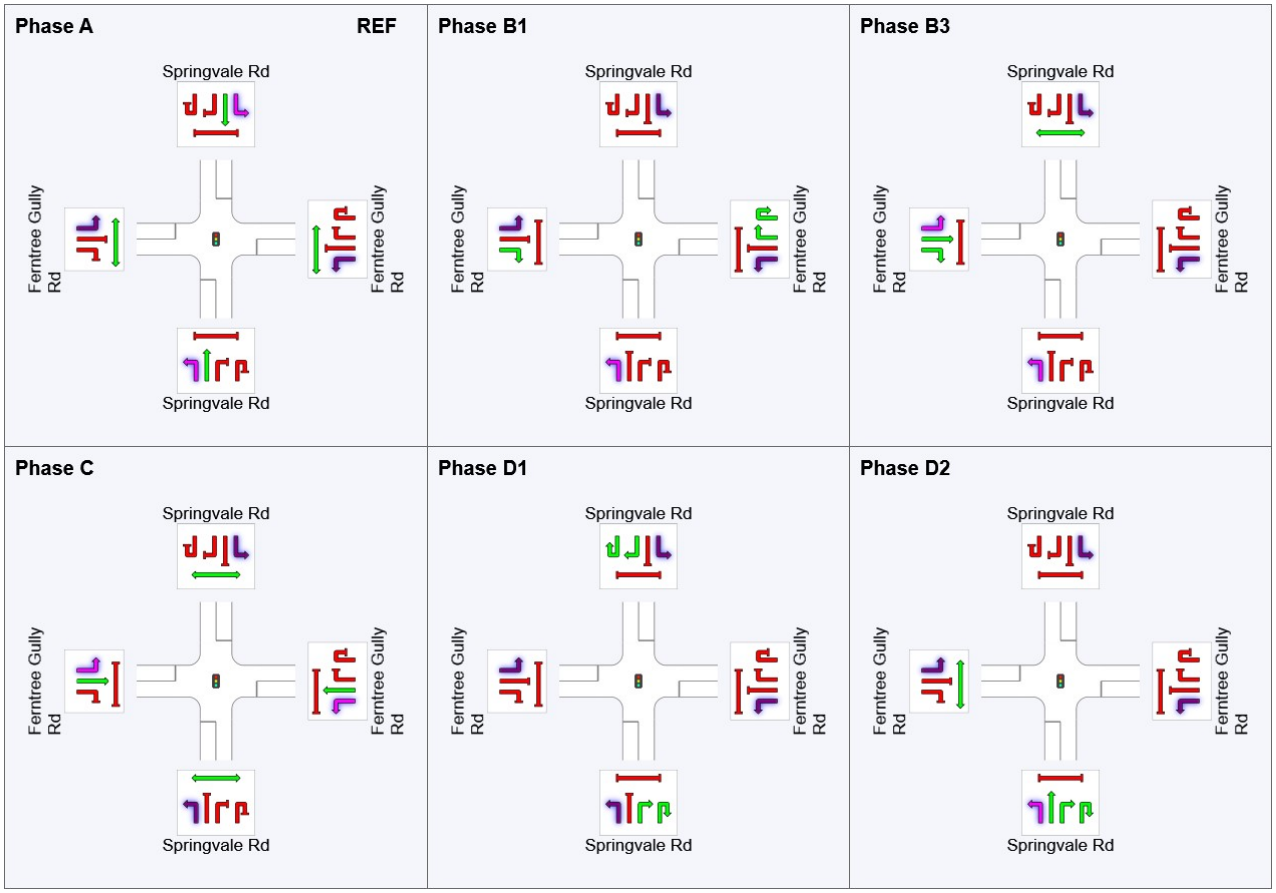

N
Springvale Rd
100
175
130
Ferntree Gully Rd
120
120
100
429
75
102
95
Ferntree Gull
60
99
85
Springvale Rd

Phase Timing Summary

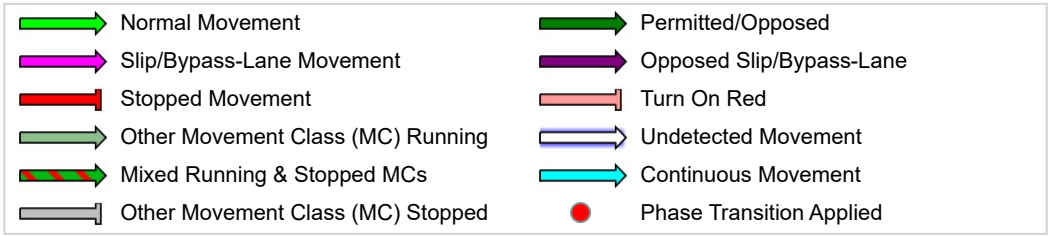
Phase	A	B1	B3	C	D1	D2
Phase Change Time (sec)	0	41	58	68	114	130
Green Time (sec)	35	10	4	40	10	4
Phase Time (sec)	42	16	10	46	16	10
Phase Split	30%	11%	7%	33%	11%	7%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	412	1.7	412	1.7	1339	0.308	100	13.0	LOS B	5.4	38.5	Short	60	0.0	NA
Lane 2	451	1.6	451	1.6	461[1]	0.979	100	87.8	LOS F	23.5	166.9	Full	280	0.0	2.5
Lane 3	685	1.6	685	1.6	700	0.979	100	85.9	LOS F	37.5	266.0	Full	280	0.0	45.2
Lane 4	582	1.6	582	1.6	595[1]	0.979	100	86.1	LOS F	30.9	219.3	Full	280	0.0	27.3
Lane 5	227	0.6	227	0.6	273	0.834	100	82.7	LOS F	10.0	70.2	Short	99	-6.3[N3]	NA
Lane 6	241	0.6	241	0.6	289	0.834	100	82.4	LOS F	10.5	74.1	Short	85	0.0	NA
Approach	2598	1.5	2598	1.5		0.979		74.1	LOS E	37.5	266.0				
East: Ferntree Gully Rd															
Lane 1	216	1.9	216	1.9	1030	0.210	100	16.8	LOS B	2.9	20.7	Short	95	0.0	NA
Lane 2	326	2.7	326	2.7	618	0.528	100	44.9	LOS D	11.2	80.2	Full	175	0.0	0.0
Lane 3	326	2.7	326	2.7	618	0.528	100	44.9	LOS D	11.2	80.2	Full	175	0.0	0.0
Lane 4	326	2.7	326	2.7	618	0.528	100	44.9	LOS D	11.6	83.0	Full	175	0.0	0.0
Lane 5	137	0.0	137	0.0	146	0.935	100	95.5	LOS F	6.6	46.2	Short	102	0.0	NA
Lane 6	135	0.0	135	0.0	145	0.935	100	95.6	LOS F	6.5	45.7	Short	75	0.0	NA
Approach	1466	2.0	1466	2.0		0.935		50.2	LOS D	11.6	83.0				
North: Springvale Rd															
Lane 1	249	1.6	249	1.6	837	0.298	100	31.6	LOS C	6.4	45.5	Short	130	0.0	NA
Lane 2	485	3.4	485	3.4	562[1]	0.863	100	60.4	LOS E	20.9	150.9	Full	500	0.0	0.0
Lane 3	485	3.4	485	3.4	562	0.863	100	60.4	LOS E	20.9	150.9	Full	500	0.0	0.0
Lane 4	485	3.4	485	3.4	562	0.863	100	60.4	LOS E	20.9	150.9	Full	500	0.0	0.0
Lane 5	140	2.6	140	2.6	144	0.972	100	106.2	LOS F	7.3	52.4	Short	175	0.0	NA
Lane 6	138	2.5	138	2.5	142	0.972	100	106.4	LOS F	7.2	51.7	Short	100	0.0	NA
Approach	1982	3.1	1982	3.1		0.972		63.2	LOS E	20.9	150.9				
West: Ferntree Gully Rd															
Lane 1	313	1.3	313	1.3	915	0.342	100	28.6	LOS C	8.2	58.0	Short	120	0.0	NA
Lane 2	647	1.4	647	1.4	654[1]	0.989	100	89.1	LOS F	35.3	250.3	Full	500	0.0	0.0
Lane 3	705	1.4	705	1.4	713	0.989	100	90.6	LOS F	40.2	285.0	Full	500	-6.3[N3]	0.0
Lane 4	690	1.4	690	1.4	698[1]	0.989	100	88.9	LOS F	38.2	270.5	Full	500	0.0	0.0
Lane 5	161	2.5	161	2.5	294	0.547	100	67.6	LOS E	6.4	45.4	Short	120	0.0	NA
Lane 6	161	2.5	161	2.5	294	0.547	100	67.6	LOS E	6.4	45.4	Short	100	0.0	NA
Approach	2677	1.5	2677	1.5		0.989		79.8	LOS E	40.2	285.0				
Intersection	8724	1.9	8724	1.9		0.989		69.3	LOS E	40.2	285.0				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.

Site: 450 [450 PD PM - Brandon Park Dr/ Ferntree Gully Rd (Site Folder: Post Dev - PM)]

Network: 4 [Post Dev - PM (Network Folder: Post Development)]

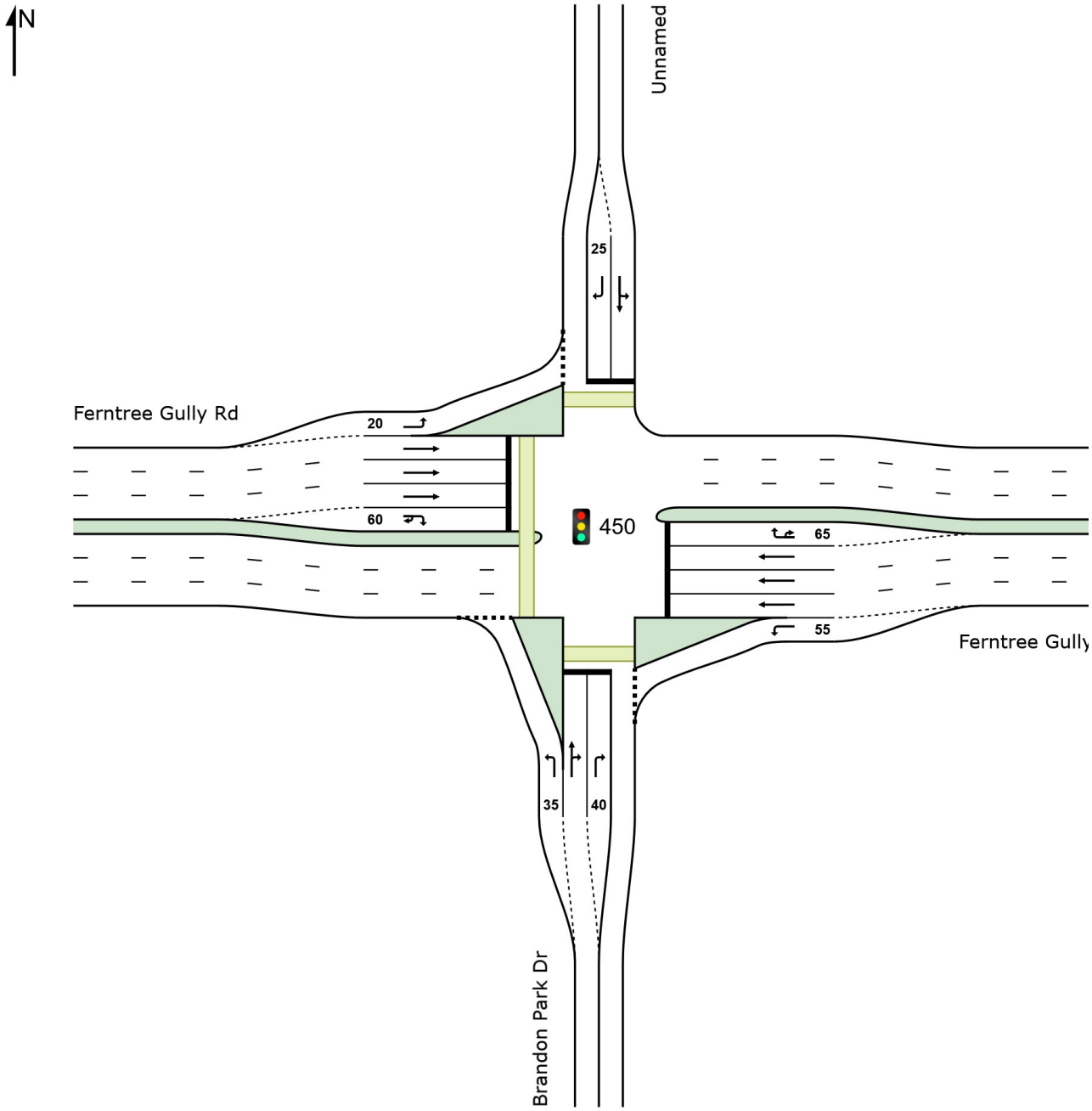
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D1, D3
Output Phase Sequence: A, B, C, D1, D3

Site Layout

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

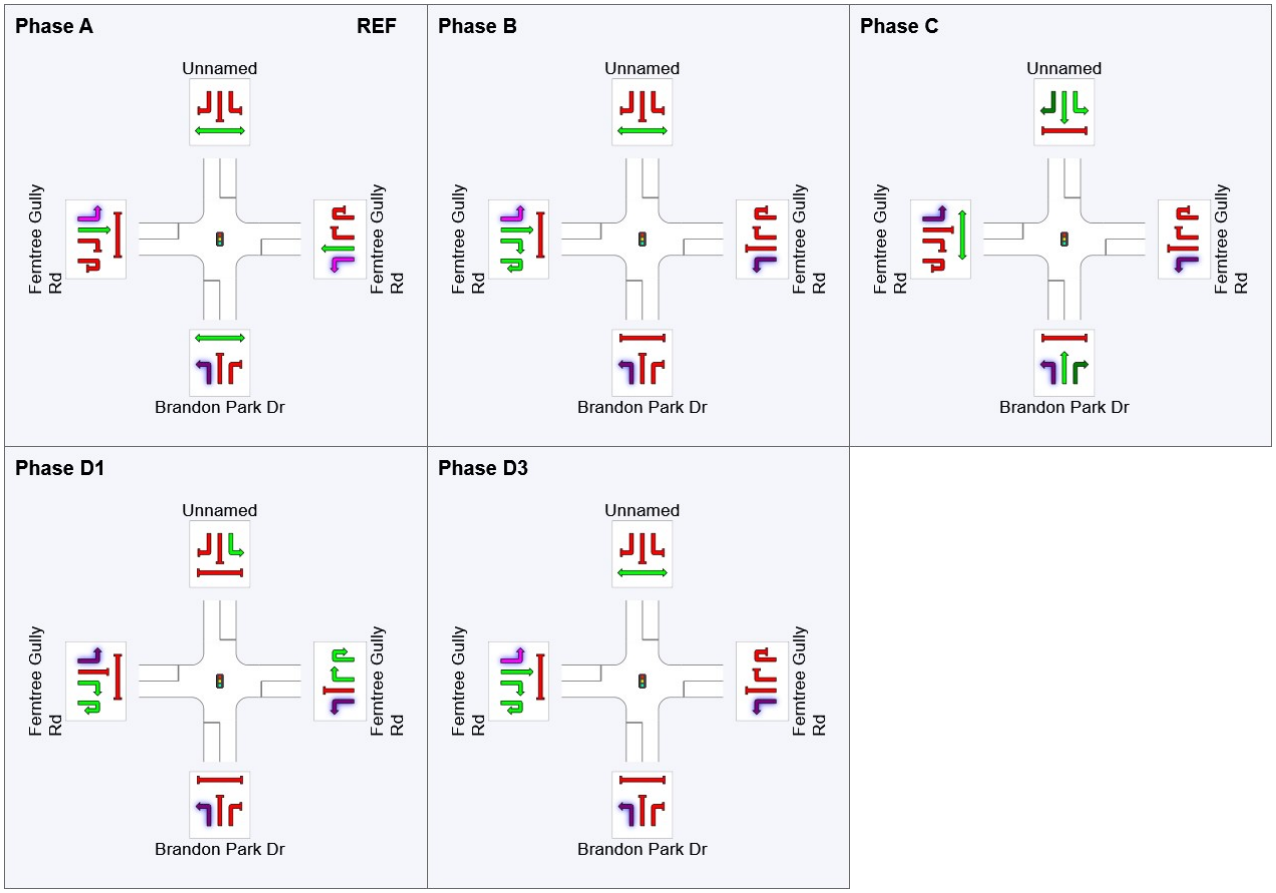

N
Unnamed
25
Ferntree Gully Rd
20
60
450
65
55
Ferntree Gully
35
40
Brandon Park Dr

Phase Timing Summary

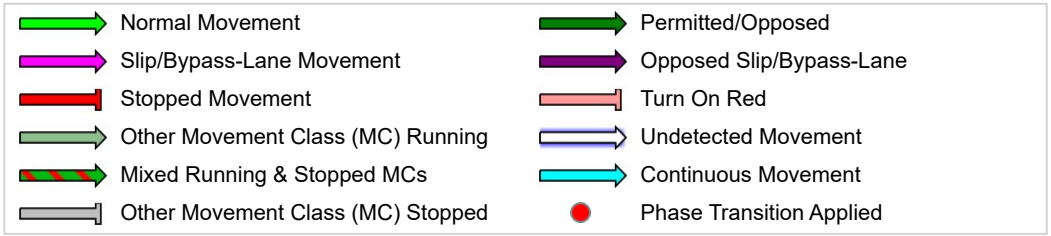
Phase	A	B	C	D1	D3
Phase Change Time (sec)	40	118	135	23	34
Green Time (sec)	72	11	22	6	1
Phase Time (sec)	78	17	27	11	7
Phase Split	56%	12%	19%	8%	5%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Brandon Park Dr															
Lane 1	296	1.7	296	1.7	790	0.375	100	9.3	LOS A	3.4	23.9	Short	35	0.0	NA
Lane 2	158	0.3	158	0.3	156[1]	1.015	100	129.0	LOS F	9.7	68.0	Full	500	0.0	0.0
Lane 3	158	0.3	158	0.3	155[1]	1.015	100	128.1	LOS F	9.6	67.1	Short	40	0.0	NA
Approach	612	1.0	612	1.0		1.015		70.9	LOS E	9.7	68.0				
East: Ferntree Gully Rd															
Lane 1	105	1.0	105	1.0	1401	0.075	100	8.7	LOS A	0.7	5.2	Short	55	0.0	NA
Lane 2	355	2.7	355	2.7	964[1]	0.369	100	21.4	LOS C	8.7	62.2	Full	500	0.0	0.0
Lane 3	363	2.7	363	2.7	986	0.369	100	21.5	LOS C	8.9	64.0	Full	500	0.0	0.0
Lane 4	363	2.7	363	2.7	986	0.369	100	21.5	LOS C	8.9	64.0	Full	500	0.0	0.0
Lane 5	14	0.0	14	0.0	70	0.201	100	81.5	LOS F	0.6	4.2	Short	65	0.0	NA
Approach	1201	2.5	1201	2.5		0.369		21.0	LOS C	8.9	64.0				
North: Unnamed															
Lane 1	106	0.0	106	0.0	355	0.299	100	54.7	LOS D	3.8	26.7	Full	35	0.0	26.1[8]
Lane 2	101	0.0	101	0.0	258	0.391	100	61.3	LOS E	3.9	27.1	Short	25	0.0	NA
Approach	207	0.0	207	0.0		0.391		57.9	LOS E	3.9	27.1				
West: Ferntree Gully Rd															
Lane 1	8	0.0	8	0.0	1675	0.005	100	6.8	LOS A	0.0	0.1	Short	20	0.0	NA
Lane 2	880	1.6	880	1.6	1314[1]	0.670	100	6.8	LOS A	11.8	83.5	Full	175	0.0	0.0
Lane 3	887	1.6	887	1.6	1323	0.670	100	9.6	LOS A	15.3	108.8	Full	175	0.0	6.3
Lane 4	692	1.6	692	1.6	1033[1]	0.670	100	8.4	LOS A	9.8	69.4	Full	175	0.0	0.0
Lane 5	226	2.2	226	2.2	291	0.776	100	50.3	LOS D	7.1	50.8	Short	60	0.0	NA
Approach	2693	1.6	2693	1.6		0.776		11.8	LOS B	15.3	108.8				
Intersection	4713	1.7	4713	1.7		1.015		23.8	LOS C	15.3	108.8				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

8 Probability of Blockage has been set on the basis of a queue that overflows from a short lane.

Site: 431 [431 PD PM - Springvale Rd/ Magid Ave (Site Folder: Post Dev - PM)]

Network: 4 [Post Dev - PM (Network Folder: Post Development)]

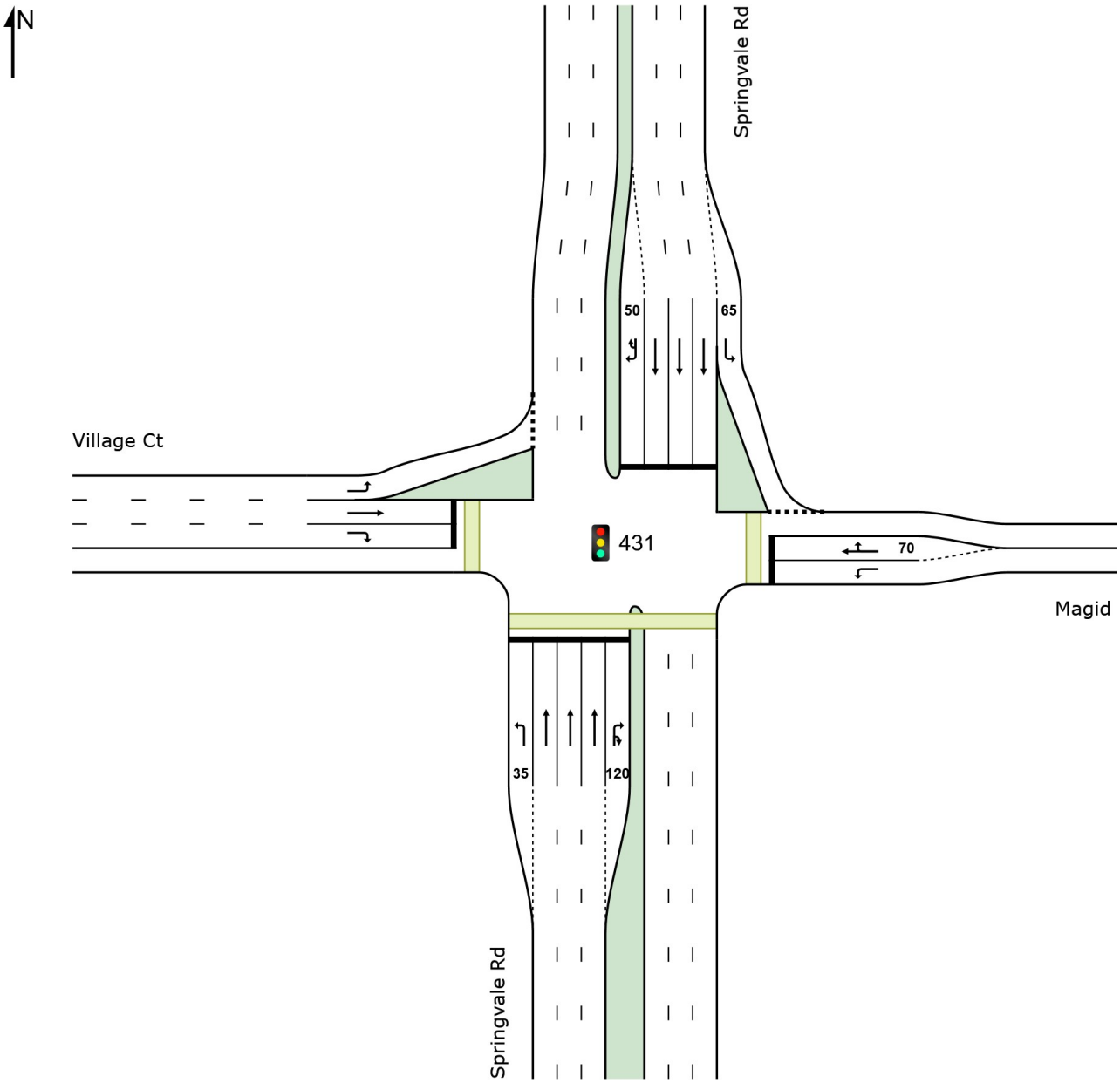
Four-way intersection with 2-lane approaches (Signals)

Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Coordinated Cycle Time = 140 seconds (Network Site User-Given Phase Times)

Timings based on settings in the Network Timing dialog
Phase Times specified by the user
Phase Sequence: Two-Phase
Reference Phase: Phase A
Input Phase Sequence: A, B, C1, C2
Output Phase Sequence: A, B, C1, C2

Site Layout

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

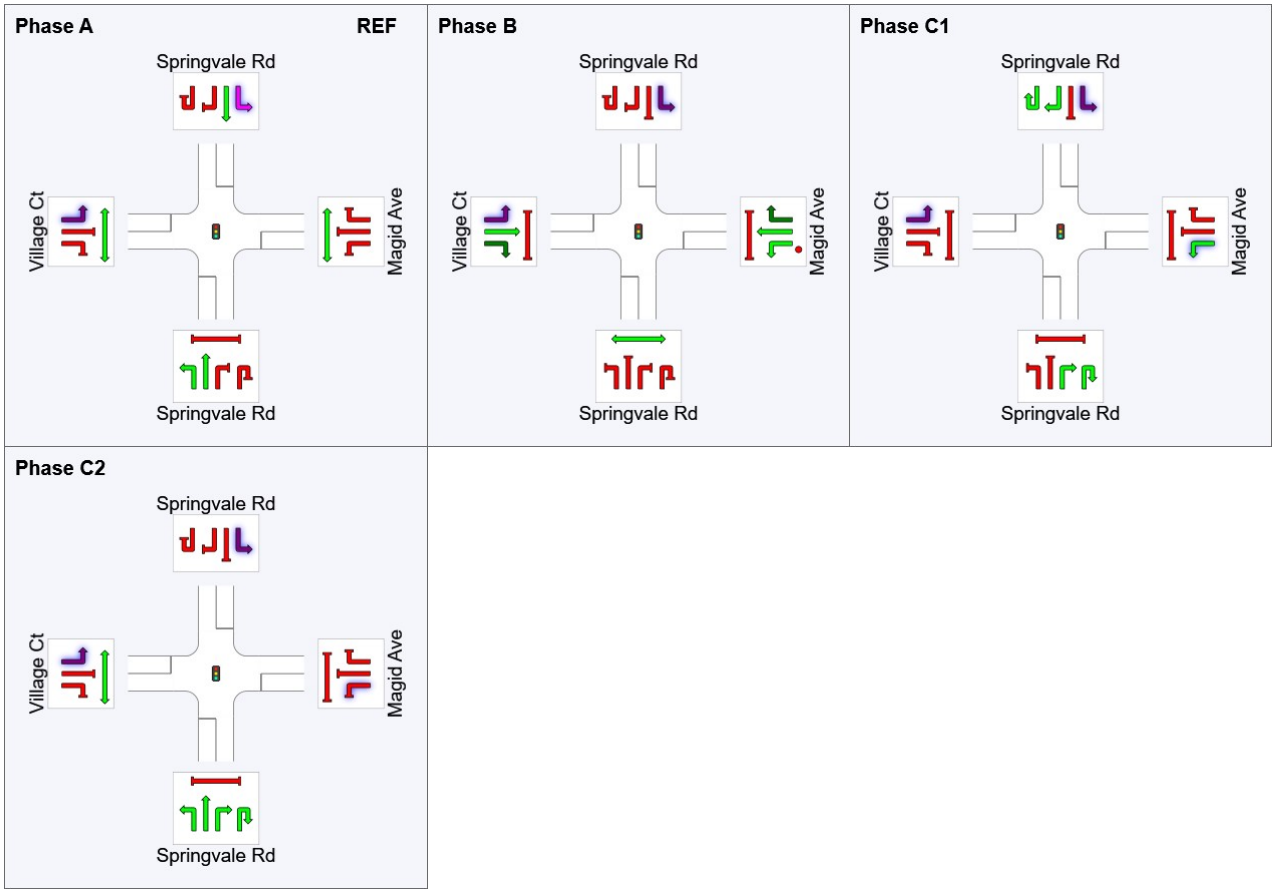


Phase Timing Summary

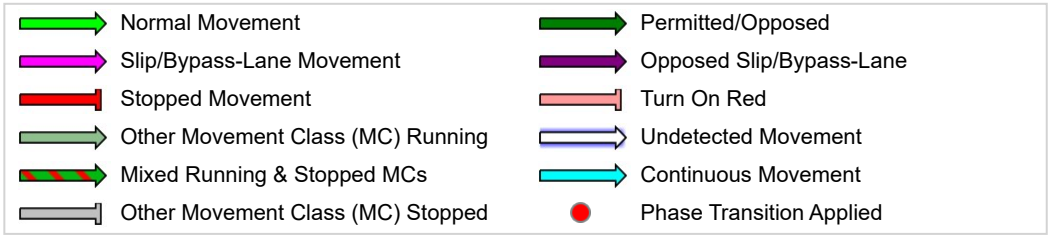
Phase	A	B	C1	C2
Phase Change Time (sec)	10	94	120	137
Green Time (sec)	78	20	13	7
Phase Time (sec)	84	24	19	13
Phase Split	60%	17%	14%	9%

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



Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Veh	Dist] m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
South: Springvale Rd															
Lane 1	34	0.0	34	0.0	1207	0.028	100	16.0	LOS B	0.5	3.4	Short	35	0.0	NA
Lane 2	1044	1.9	1044	1.9	1276[1]	0.818	100	18.7	LOS B	30.9	220.2	Full	500	-2.5 N3	0.0
Lane 3	605	1.9	605	1.9	739	0.818	100	23.0	LOS C	20.0	142.0	Full	500	-45.2 N3	0.0
Lane 4	684	1.9	684	1.9	836[1]	0.818	100	18.1	LOS B	18.7	132.7	Full	500	-27.3 N3	0.0
Lane 5	305	0.3	305	0.3	341	0.896	100	80.7	LOS F	14.4	100.8	Short	120	0.0	NA
Approach	2672	1.7	2672	1.7		0.896		26.6	LOS C	30.9	220.2				
East: Magid Ave															
Lane 1	147	0.0	147	0.0	438	0.336	100	49.8	LOS D	5.0	35.1	Full	500	0.0	0.0
Lane 2	90	0.0	90	0.0	147	0.611	100	69.0	LOS E	3.8	26.3	Short	70	-26.5 N3	NA
Approach	237	0.0	237	0.0		0.611		57.1	LOS E	5.0	35.1				
North: Springvale Rd															
Lane 1	62	0.0	62	0.0	1299	0.048	100	8.4	LOS A	0.2	1.1	Short	65	0.0	NA
Lane 2	611	0.1	611	0.1	1086	0.562	100	3.8	LOS A	4.2	29.1	Full	280	0.0	0.0
Lane 3	611	0.1	611	0.1	1086	0.562	100	1.0	LOS A	1.1	7.8	Full	280	0.0	0.0
Lane 4	611	0.1	611	0.1	1086	0.562	100	1.0	LOS A	1.1	7.8	Full	280	0.0	0.0
Lane 5	96	58.3	96	58.3	111	0.865	100	91.2	LOS F	4.5	47.0	Short	50	-5.5 N3	NA
Approach	1990	2.9	1990	2.9		0.865		6.4	LOS A	4.5	47.0				
West: Village Ct															
Lane 1	67	1.5	67	1.5	336	0.200	100	20.5	LOS C	1.4	10.1	Full	30	-2.5 N3	0.0
Lane 2	38	0.0	38	0.0	279	0.136	100	56.8	LOS E	1.4	9.8	Full	30	0.0	0.0
Lane 3	56	1.8	56	1.8	125	0.448	100	71.9	LOS E	2.3	16.6	Full	30	0.0	0.0
Approach	161	1.2	161	1.2		0.448		46.9	LOS D	2.3	16.6				
Intersection	5060	2.1	5060	2.1		0.896		20.7	LOS C	30.9	220.2				

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

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

N3 Capacity Adjustment due to downstream lane blockage determined by the program.

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