TRAFFWISE CONSULTANTS

2021–7 (26) Traffic Impact Assessment

Planning Proposal – Kamira Avenue, Villawood

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1. Introduction

1.1 Overview

Traders in Purple (TIP) has commissioned Traffwise Consultants Pty Ltd (Traffwise) to undertake a modelling-based traffic impact assessment (TIA) study for the proposed modifications in Fairfield Local Environmental Plan (LEP) for Villawood, NSW.

Figure 1 shows the location and existing condition of the Kamira Court Precinct site. The figure below also provides a look at the surrounding land use.

Figure 1 Project Site – Location, Existing Condition and Surrounding Land-Use

1.2 Background

The planning consultant has provided the below background information related to proposed modifications in the LEP:

This proposal seeks consent to permit additional permitted uses by making 'retail premises' and 'business premises' *permissible with consent on this site only within the R4 High Density Residential zone. The proposed additional permitted use is driven by the desire to ultimately be able to propose a supermarket and relevant complementary uses (e.g., bank or post office) on land zoned R4 High Density Residential. Considering the zone, the subject site is disadvantaged in terms of development potential as the site can only accommodate several forms of development with consent. As a result, the proposal seeks consent for the additional permitted use on site within the R4 High Density Residential zone within Lot 37 DP 202006.*

Also in terms of the floor area, there is to be allowance for 4,521m² of GFA as this allows for the retail floor area plus back of house and circulation space which would all be included as GFA.

The additional permitted use clause in the LEP then should permit a GFA of up to 4,521m², this accounts for the total identified on the plan plus 20% buffer. This allows for the back of house and circulation areas and is within the scope identified by the Hill PDA report.

1.3 Proposal

As shown in **Figure 2**, the project site is zoned R4 ***(High-Density Residential)*** in the Fairfield Local Environmental Plan 2013 (LEP).

TIP is proposing modification in the LEP to develop a supermarket and retail area in Building A as part of the Kamira Court Precinct development.

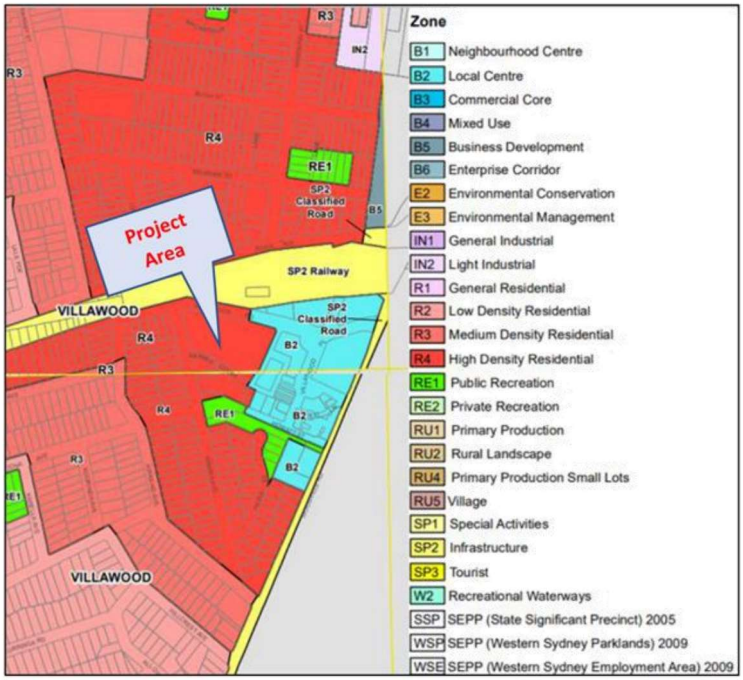


Figure 2 Project Site – Existing Zoning

Source: https://pp.planningportal.nsw.gov.au/publications/environmental-planning-instruments/fairfield-local-environmental-plan-2013

1.4 Reference Documents/Websites

- Google Map and Google Traffic Map
- Google Earth Pro
- Information and Development Plans provided by the Architect/Client
- RMS Guide to Traffic Generating Developments (2002)
- RMS Guide to Traffic Generating Developments Updated Traffic Surveys (TDT 2013/04a)
- Land and Housing Corporation Website
- RMS Traffic Modelling Guidelines (2013)

1.5 Report Structure

- Section 1: **Introduction**
- Section 2: **Fairfield Mesoscopic Model**
- Section 3: **Proposed Kamira Court Precinct Development**
- Section 4: **Trip Generation**
- Section 5: **Traffic Assessment – SIDRA Modelling**
- Section 6: **Public Transport Accessibility**
- Section 7: **Findings**

2. Fairfield Mesoscopic Model

2.1 Mesoscopic Model Coverage – Project Site

Fairfield City Council (Council) has recently completed a mesoscopic modelling study for a broader area. **Figure 3** illustrates the study area of the mesoscopic model, which includes the project site.

Figure 3 Project Site – Mesoscopic Model Coverage
Source: Stantec/Council

As per the provided information, the mesoscopic model does not include any traffic generators associated with the projects site.

Which indicate that, in Council's mesoscopic model, traffic demand has not been assigned to Kamira Court Precinct.

2.2 Mesoscopic Model – Land Use Assumptions

Figure 4 shows the travel zone number 1215 of the mesoscopic model. This zone includes the Kamira Court Precinct site and covers an area bounded by River Avenue, Woodville Road, Kamira Avenue and a small section of Kirrang Avenue.

Figure 4 Travel Zone Number 1215
Source: Stantec/Council

As per the provided information, **Table 1** and **Table 2** summarises the employment and population forecast for the next twenty years (up to 2041).

Table 1 Employment Forecast

TZ16_CODE	TZ16_name	EMP_2021	EMP_2026	EMP_2031	EMP_2036	EMP_2041
1215	Villawood_Bunnings	122	141	151	157	166

Table 2 Population Forecast

TZ16_CODE	TZ16_name	ERP_2021	ERP_2026	ERP_2031	ERP_2036	ERP_2041
1215	Villawood_Bunnings	267	782	1022	1161	1474

It is evident that a significant increase (280%) in population is expected from 2021 to 2031, with a moderate rise in employment.

As described in **Section 2.1**, the above forecast doesn't include development yield of Kamira Court Precinct.

2.3 Existing Traffic Demand – Mesoscopic Model Based

Council's traffic consultant has provided Link Volume Plots (LVP) for both 2021 and 2031 scenarios. The provided plots show one-hour traffic demand on the road network under AM and PM peak hours.

2.3.1 AM peak Demand

Figure 5 and **Figure 6** shows the AM peak LVP under 2021 and 2031 scenario respectively. It is noted that the traffic demand on key roads is expected to increase moderately in 2031, with evident high traffic flow on Woodville Road. The 2031 mesoscopic model for AM Peak period also indicates a significant increase in southbound traffic on Woodville Road.

Figure 5 2020 AM Peak – Link Volume Plot
Source: Mesoscopic Model developed by Stantec/Council

Figure 6 2031 AM Peak – Link Volume Plot
Source: Mesoscopic Model developed by Stantec/Council

2.3.2 PM peak Demand

Figure 7 and **Figure 8** shows the PM peak LVP under 2021 and 2031 scenario respectively. Like the traffic trends in the AM peak period, a moderate increase in the traffic demand on key roads is expected in the 2031 PM peak period.

Figure 7 2020 PM Peak – Link Volume Plot
Source: Mesoscopic Model developed by Stantec/Council

Figure 8 2031 PM Peak – Link Volume Plot
Source: Mesoscopic Model developed by Stantec/Council

2.4 Trip Distribution Trend – Mesoscopic Model Based

Figure 9 to **Figure 12** show AM and PM peak trip distribution to and from travel zone number 1215. The trip distribution is based on provided Select Link Plots (SLP) extracted from the Council's mesoscopic model.

The available data for both peak periods indicate similar trip distribution trends in the 2021 and 2031 scenarios.

Figure 9 2020 AM Peak – Select Link Plots – Trip Distribution
Source: Mesoscopic Model developed by Stantec/Council

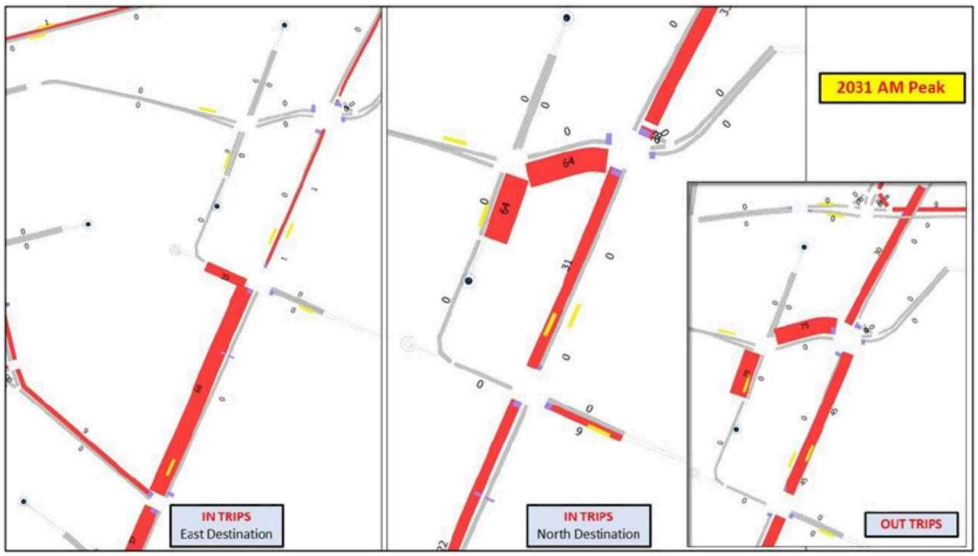


Figure 10 2031 AM Peak – Select Link Plots – Trip Distribution
Source: Mesoscopic Model developed by Stantec/Council

Figure 11 2020 PM Peak – Select Link Plots – Trip Distribution
Source: Mesoscopic Model developed by Stantec/Council

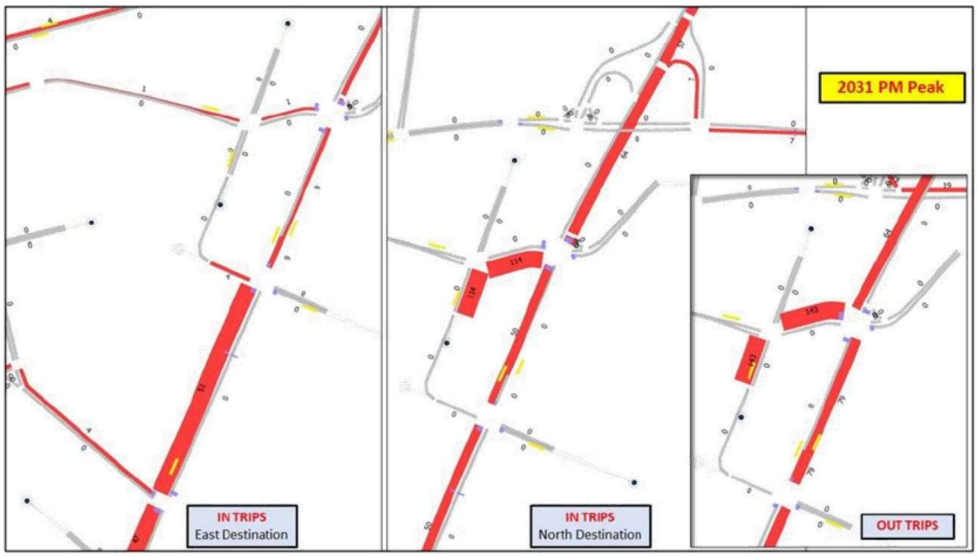


Figure 12 2031 PM Peak – Select Link Plots – Trip Distribution
Source: Mesoscopic Model developed by Stantec/Council

The analysis of the Council's model-based trip distribution trends in all peak periods shows a typical trip distribution from travel zone number 1215. **Figure 13** shows the typical trip distribution trends noting the following key points:

- **Two-third** of the IN trips coming from the south, with **50%** of those trips turning left on Howatt Street and **50%** on Villawood Road
- Around **60%** of OUT trips turn right on Woodville Road, travelling south

Figure 13 Typical Trip Distribution Trend

It is important to note that the Council's mesoscopic model doesn't include the following critical points related to Kamira Court Precinct:

- Howatt Street extension to the west and connection with Kamira Court and Kamira Avenue
- Access points of three buildings planned as part of the Kamira Court Precinct

The above points are expected to influence the distribution of trips generated by the developments in the Kamira Court Precinct. **Therefore, Traffwise has considered these points in the adopted trip distribution for all three buildings in Kamira Court Precinct.**

2.5 Key Intersection Demand Flow – Mesoscopic Model Based

Figure 14 to **Figure 21** show the provided traffic flow demand at the following key intersections:

- Woodville Road/Kirrang Avenue
- Woodville Road/Howatt Street/Binna Burra Street
- Villawood Road/Villawood Place
- Woodville Road / Villawood Road / Llewellyn Avenue
- The Horsley Drive/River Avenue

The below figures reflect the model-based demand flow of cars and trucks *(heavy vehicles)* in the AM and PM peak periods, ***7:15 am – 8:15 am*** and ***3:15 pm – 4:15 pm,*** respectively.

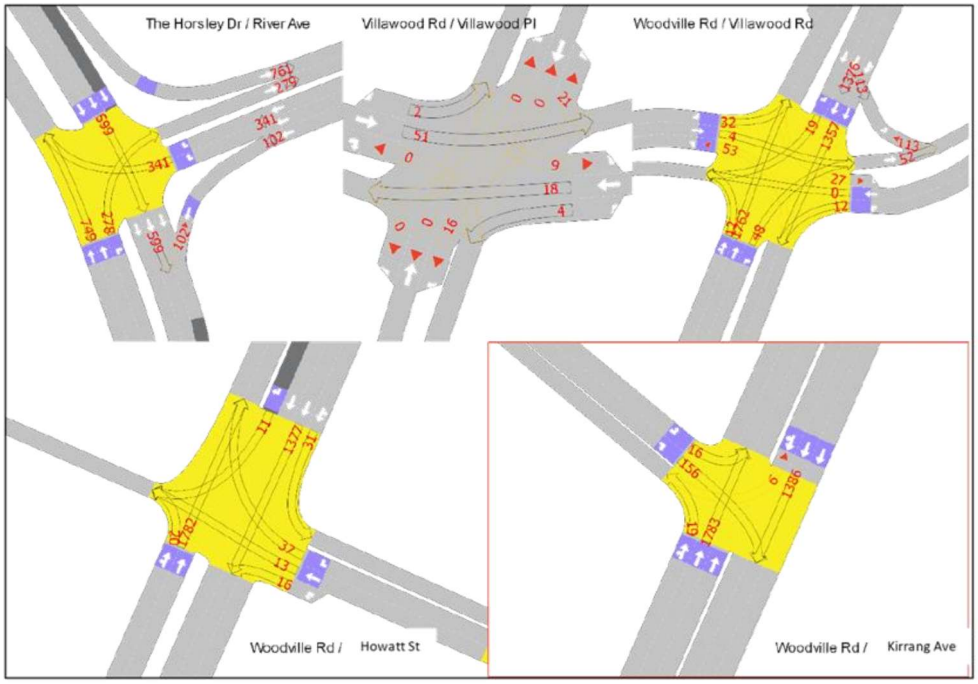


Figure 14 2020 AM Peak – Demand Flow at Key Intersections ***(Cars)***
Source: Mesoscopic Model developed by Stantec/Council

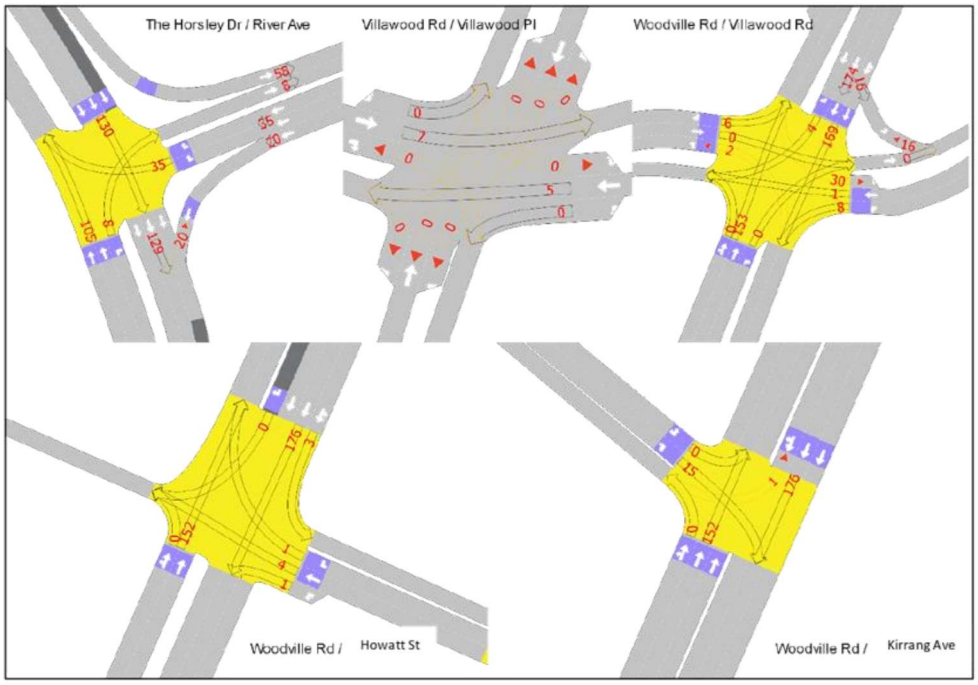


Figure 15 2020 AM Peak – Demand Flow at Key Intersections ***(Heavy Vehicles/Trucks)***
Source: Mesoscopic Model developed by Stantec/Council

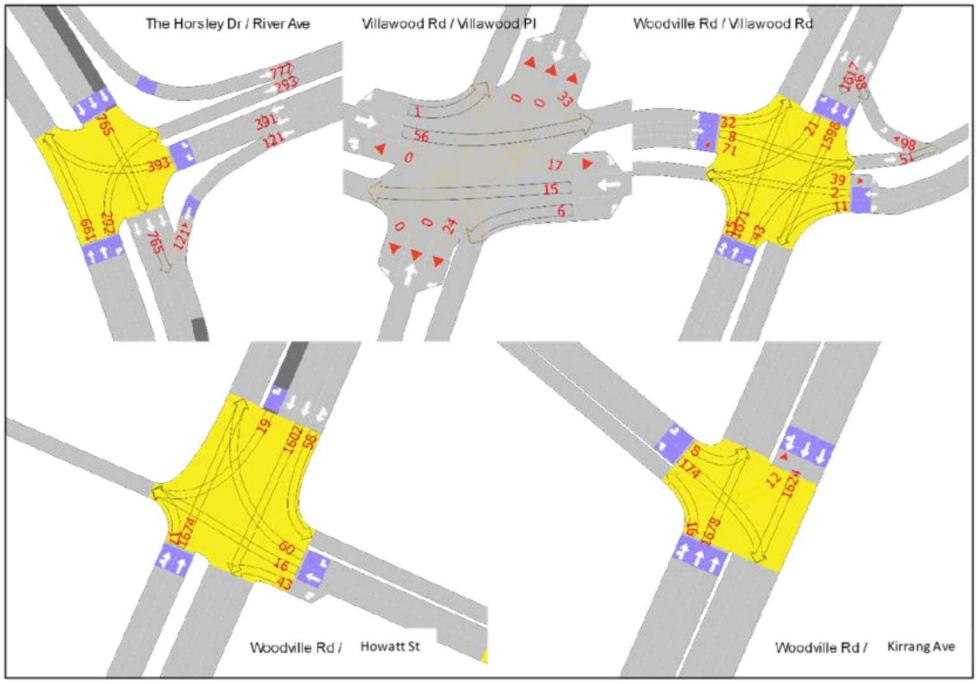


Figure 16 2031 AM Peak – Demand Flow at Key Intersections ***(Cars)***
Source: Mesoscopic Model developed by Stantec/Council

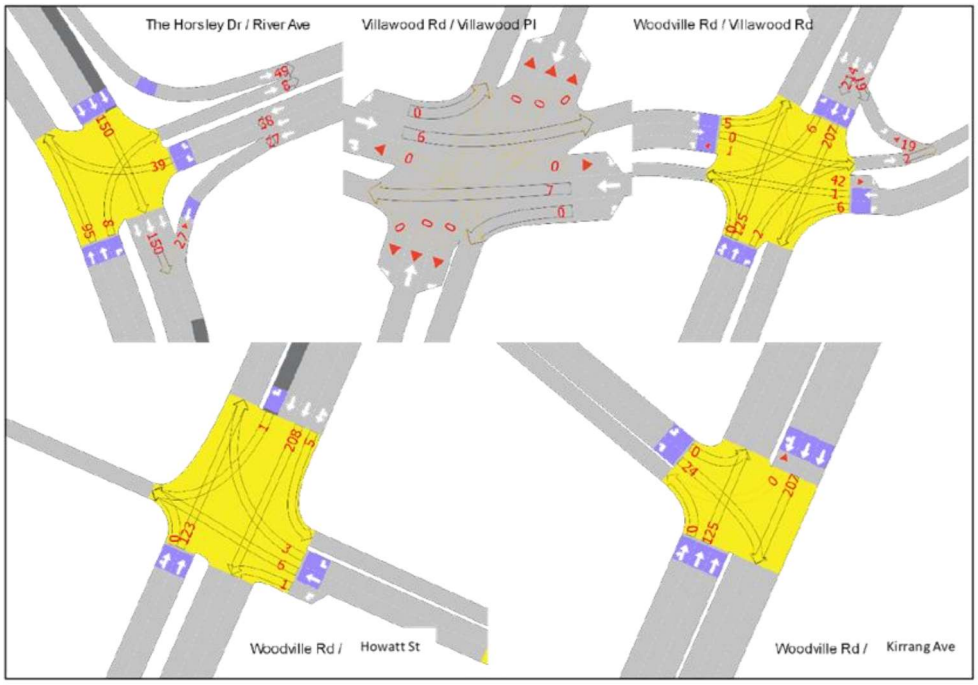


Figure 17 2031 AM Peak – Demand Flow at Key Intersections ***(Heavy Vehicles/Trucks)***
Source: Mesoscopic Model developed by Stantec/Council

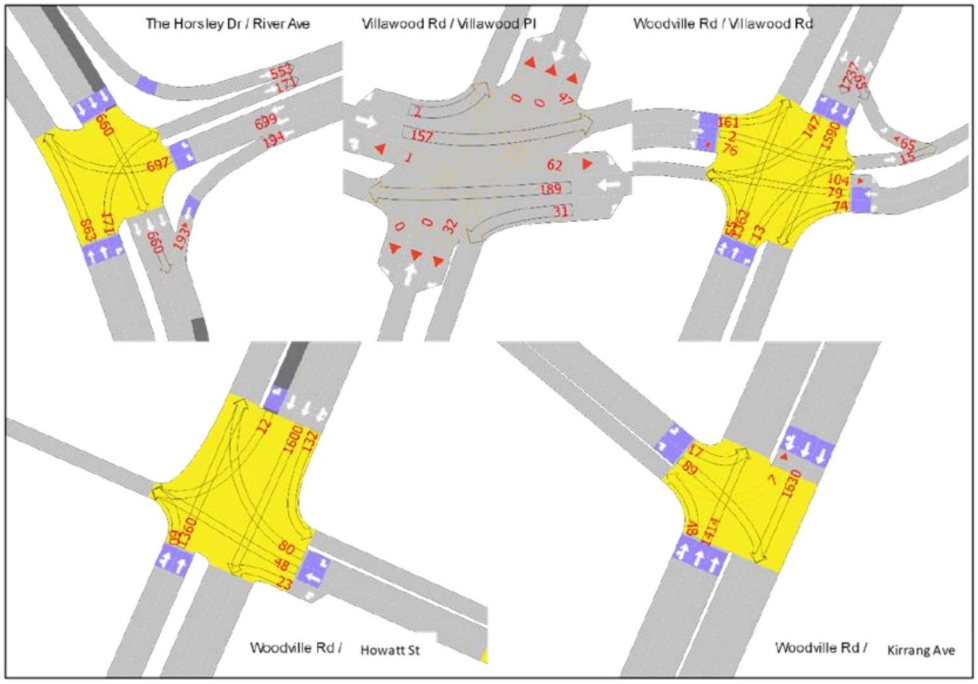


Figure 18 2020 PM Peak – Demand Flow at Key Intersections ***(Cars)***
Source: Mesoscopic Model developed by Stantec/Council

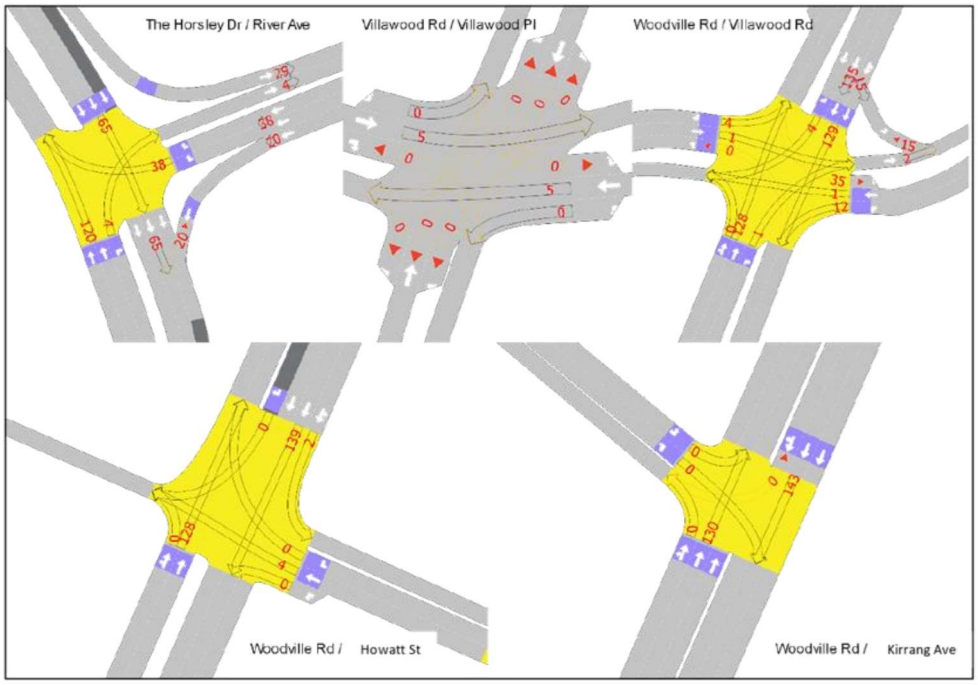


Figure 19 2020 PM Peak – Demand Flow at Key Intersections ***(Heavy Vehicles/Trucks)***
Source: Mesoscopic Model developed by Stantec/Council

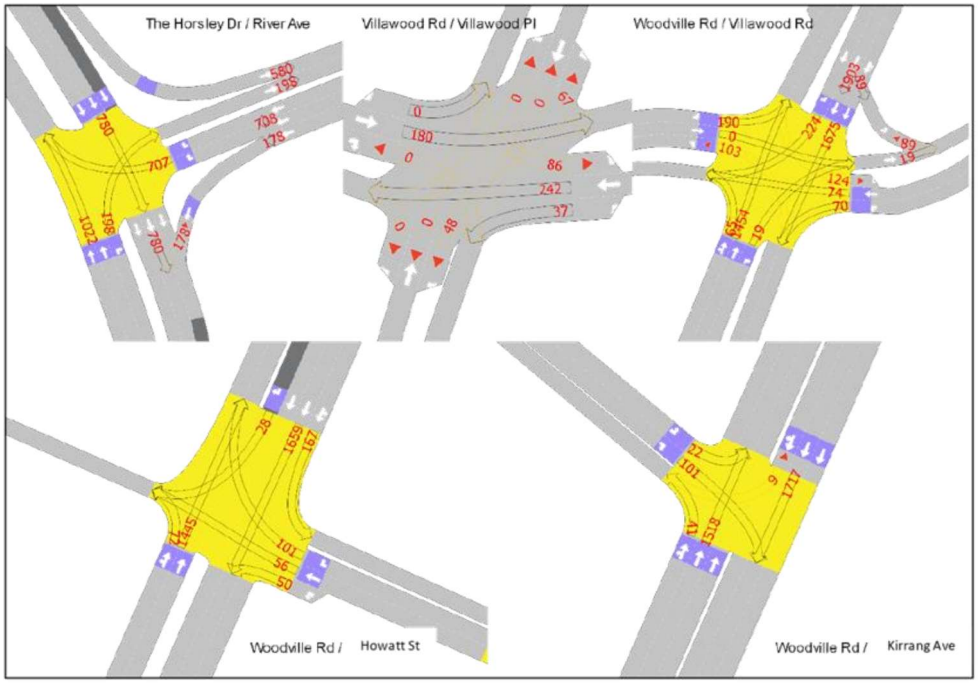


Figure 20 2031 PM Peak – Demand Flow at Key Intersections ***(Cars)***
Source: Mesoscopic Model developed by Stantec/Council

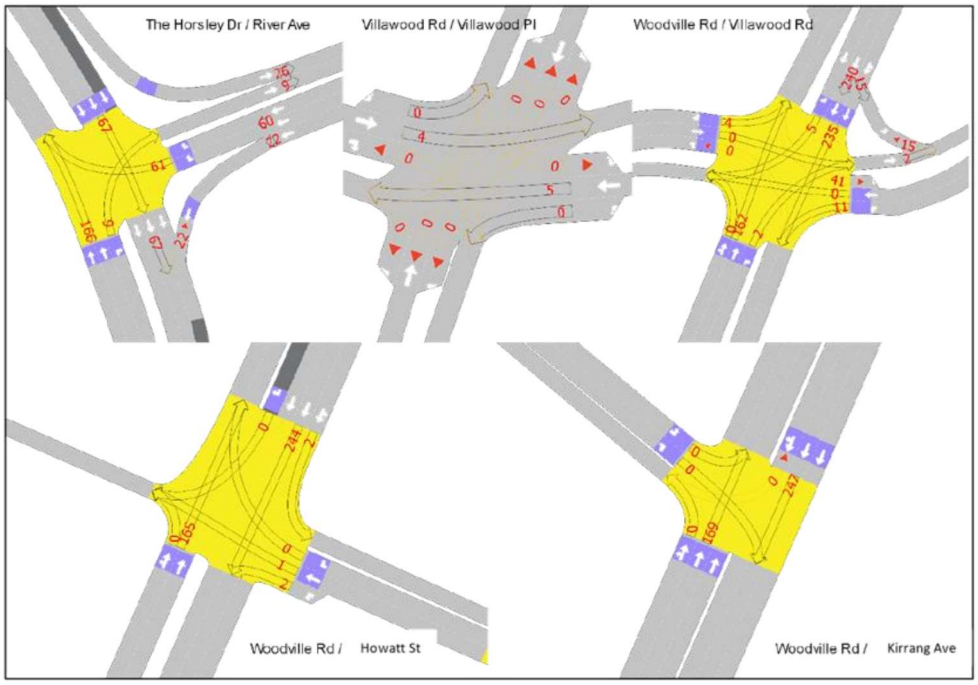


Figure 21 2031 PM Peak – Demand Flow at Key Intersections ***(Heavy Vehicles/Trucks)***
Source: Mesoscopic Model developed by Stantec/Council

3. Proposed Kamira Court Precinct Development

The overall Kamira Court Precinct area comprises three buildings (see **Figure 22**) and is planned to be developed in stages.

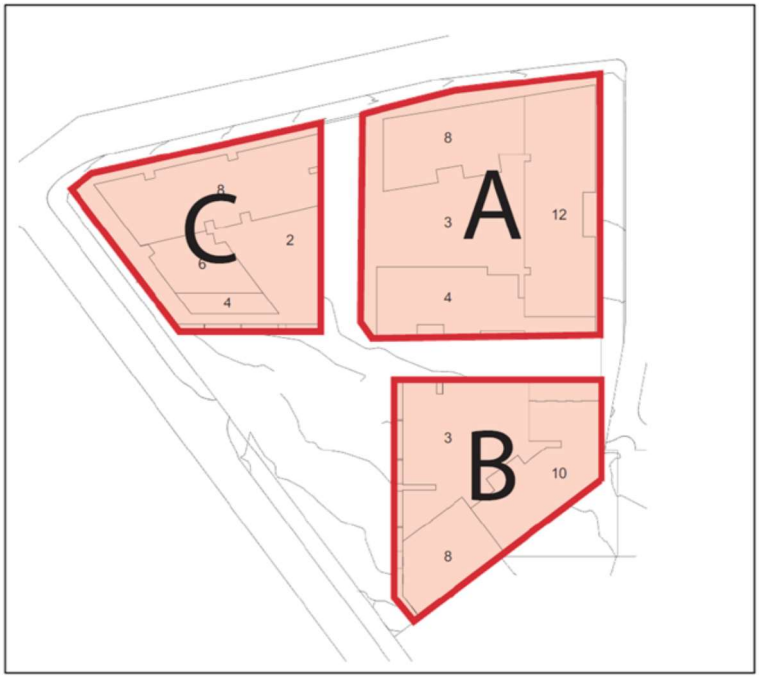


Figure 22 Kamira Court Precinct – Development Plan
Source: DKO Architect

As described in **Section 1.3**, TIP is proposing modification in the LEP to develop a supermarket and retail area in Building A as part of the Kamira Court Precinct development.

Table 3 summarises the proposed land use for all three buildings with relevance to the current Fairfield LEP zoning, which is R4 ***(High-Density Residential)***.

Table 3 Proposed Land-Use and Relevance with LEP Zoning

Kamira Court Precinct Development		
Building/Stage	**Proposed Land-Use**	**Relevance with LEP Zoning**
Building A ***Stage 3***	High-Density Residential Units	Yes
	Supermarket	Part of the Proposed Modification
	Other Retail	Part of the Proposed Modification
Building B ***Stage 1***	High-Density Residential Units	Yes
	Library	Yes
	Ancillary Café	Yes
Building C ***Stage 2***	High-Density Residential Units	Yes
	Child Care Centre	Yes
	Medical Centre	Yes

Source: Information provided by TIP and Planning Consultant

4. Trip Generation

4.1 Trip Generation Rates

High-Density Residential Development

The traffic generation for high-density residential units is specified in the Roads and Maritime (RMS) Guide to Traffic Generating Developments Updated Traffic Surveys (TDT 2013/04a), Link.

The trip generation rates in the guide are based on per unit, per car space and per bedroom. For the purposes of trip generation, average trip rates based on per bedroom were adopted to ensure conservative assessment. **Table 4** summarises the adopted trip rates to assess the trip generation from the proposed high-density residential units.

Table 4 Trip Generation Rates (Sydney Average) – High-Density Developments

AM Peak (1 Hour) Per Bedroom	0.09
PM Peak (1 Hour) Per Bedroom	0.07
Daily Vehicle Trips Per Bedroom	0.72

Source: Guide to Traffic Generating Developments Updated Traffic Surveys (TDT 2013/04a, Link)

Supermarket

The RMS Guide to Traffic Generating Developments (2002) specifies Shopping Centre's trip generation rates average trip rates in the peak hours on a weekday evening and Saturday morning/afternoon.

The trip generation models for shopping centres consider the following land-uses:

- ***A(S):*** *Slow Trade gross leasable floor area (Gross Leasable Floor Area in square metres) includes major department stores such as David Jones and Grace Bros., furniture, electrical and white goods stores.*
- ***A(F):*** *Faster Trade GLFA - includes discount department stores such as K-Mart and Target, together with larger specialist stores such as Fosseys.*
- ***A(SM):*** *Supermarket GLFA - includes stores such as Franklins and large fruit markets. A(SS): Specialty shops, secondary retail GLFA - includes specialty shops and take-away stores such as McDonalds. These stores are grouped as they tend to not be primary attractors to the centre.*
- ***A(OM):*** *Office, medical GLFA: includes medical centres and general business offices.*

Table 5 summarises the specified average trip rates for supermarkets.

Table 5 Trip Generation Rates – Supermarket

Thursday PM Peak (1 Hour) per 100 m^2 of GLFA	15.5
Friday PM Peak (1 Hour) per 100 m^2 of GLFA	13.8
Saturday Peak (1 Hour) per 100 m^2 of GLFA	14.7
Daily Trips per 100 m^2 of GLFA	121

Source: RMS Guide to Traffic Generating Developments (2002)

- The highest peak hour trip rate (15.5 per 100 m^2 of GLFA) has been adopted
- The RMS guide does not specify the trip rate for the weekday AM peak period. Therefore, it is assumed that trip generation in a typical weekday AM peak will be 25% of the PM peak period for this assessment. This will ensure conservative assessment.
- It is assumed that the daily trips from the proposed retail area would be ten (10) times the peak hour trip generation on a typical weekday.

Specialty Shops

The RMS Guide to Traffic Generating Developments (2002) specifies Specialty Shops' average trip rates. To ensure consistency with the adopted supermarket trip rates, **Table 6** summarises the adopted average trip rates for Specialty Shops on a typical Thursday evening peak.

Table 6 Trip Generation Rates – Speciality Shops

Thursday PM Peak (1 Hour) per 100 m^2 of GLFA	4.6

Source: RMS Guide to Traffic Generating Developments (2002)

To ensure robust and conservative assessment:

- The RMS guide does not specify the trip rate for the weekday AM peak period. Therefore, it is assumed that trip generation in a typical weekday AM peak will be 25% of the PM peak period for this assessment.
- It is assumed that the daily trips from the proposed retail area would be ten (10) times the peak hour trip generation on a typical weekday.

Child Care Centre

The trip generation rates for a Child Care Centre are specified in the RMS Guide to Traffic Generating Developments (2002).

The RMS guide specifies different trip rates for Pre-School, Long-Day Care and Before/After Care childcare facilities. The proposed child care centre's exact use is not clear. Therefore, for the purposes of this assessment, the maximum trip generation rates have been adopted.

RMS guide specifies a maximum rate of 1.4 trips and 0.8 trips per child in a **two-hour** AM and **one-and-a-half-hour** PM peak period. However, to assess one-hour peak trip generation and to ensure conservative assessment, 75% of the specified trip rates have been adopted for one-hour peak period trip generation. The adopted trip rates are summarised in **Table 7**:

Table 7 Peak Hour Trip Generation Rates – Child Care Centre

Peak Period	Rates – RMS Guide	Rates Adopted
AM Peak	1.4 per child *(two-hour based)*	1 per child *(one-hour based)*
PM Peak	0.8 per child *(one and a half-hour based)*	0.6 per child *(one-hour based)*

*The daily trip generation of a maximum of four (04) trips per child was assumed, considering two drop-off trips **(one IN and one OUT)** and two pick-up trips **(one IN and one OUT)** on a typical day.*

Medical Centre

For medical centre, the traffic generation rates adopted for this analysis are sourced from RMS Trip Generation Surveys, Medical Centres Analysis Report ***(TEF Consulting, 2015)***. The medical centre trip rates adopted for this study are described in **Table 8**.

Table 8 Trip Generation Rates (Sydney Average) – Medical Centre

AM Peak (1 Hour) per Consulting Room	2.8
PM Peak (1 Hour) per Consulting Room	3.2
Daily Trips per Consulting Room	23.2

*Source: RMS Trip Generation Surveys, Medical Centres Analysis Report **(Table 3.2 (page 11), TEF Consulting, 2015)***

Library

The RMS Guide to Traffic Generating Developments (2002) and Updated Traffic Surveys (TDT 2013/04a) do not provide trip rates for a library. Therefore, for this assessment, trip rates for commercial use have been adopted for the library. **Table 9** summarises the adopted trip rates to assess the trip generation from the proposed small library.

Table 9 Trip Generation Rates – Library

PM Peak (1 Hour) per 100 m²	2
Daily Trips per 100 m²	10

Source: RMS Guide to Traffic Generating Developments (2002)

The RMS guide does not specify the trip rate for the weekday AM peak period. Therefore, it is assumed that trip generation in a typical weekday AM peak will be 10% of the PM peak period for this assessment.

Ancillary Café

Considering the small size ***(57 m²)*** and the locality within the Villawood Town Centre area, it is envisaged that the ancillary café would be primarily used by the residents and visitors in the area. Therefore, it is assumed that the development of an ancillary café would not generate any additional vehicular trips.

4.2 Trip Generation and Distribution

4.2.1 Building A – Stage 3

Table 10 summarises the different land-uses proposed in Building A with likely trip generation in the peak hours and in a typical weekday. The development yield is based on information provided by TIP and the architect.

Table 10 Trip Generation – Different Land-Use *(Building A | Stage 3)*

Trip Generation - Building A | Stage 3					
Residential Component - High Density					
Unit Type	***Quantity***	***Number of Bedrooms***	***Trip Generation***		
1-Bed Unit	24	24	***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
2-Bed Unit	110	220			
3-Bed Unit	24	72			
Total Number of Bedrooms		316			
		TOTAL TRIPS	28	22	227.5
		IN	6	18	114
		OUT	23	4	114
Supermarket					
Type	***GLFA (m²)***		***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
Supermarket	1216				
		TOTAL TRIPS	47	188	1885
		IN	24	94	942
		OUT	24	94	942
Other Retail					
Type	***GLFA (m²)***		***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
Other Retail	1273				
		TOTAL TRIPS	15	59	586
		IN	7	29	293
		OUT	7	29	293

Table 11 summarises the total trip generation from Building A. The assessment indicates that the proposed land-use mix in Building A is expected to generate a total of 90 and 269 trips in the AM and PM peak hours, respectively.

Table 11 Total Trip Generation – Building A | Stage 3

Total Peak Hour Trips			
Peak Period	**IN**	**Out**	**Total**
Weekday AM Peak	37	54	90
Weekday PM Peak	141	128	269

Trip Distribution Assumption

Based on the following, **Figure *23*** illustrates the adopted trip generation for Building A:

- Mesoscopic model-based trip distribution trends (**Section 2.4)**
- Typical trip distribution is shown in **Figure 13**
- Location of potential access points of Building A
- Extension of Howatt Street and Kamira Court
- Existing and planned movement patterns on surrounding streets.

Figure 23 Adopted Trip Distribution – Building A | Stage 3

4.2.2 Building B – Stage 1

Table 12 summarises the different land-uses proposed in Building B with likely trip generation in the peak hours and on a typical weekday. The development yield is based on information provided by TIP and the architect.

Table 12 Trip Generation – Different Land-Use *(Building B | Stage 1)*

Trip Generation - Building B | Stage 1					
Residential Component - High Density					
Unit Type	***Quantity***	***Number of Bedrooms***	***Trip Generation***		
1-Bed Unit	25	25	***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
2-Bed Unit	64	128			
3-Bed Unit	23	69			
Total Number of Bedrooms		222			
		TOTAL TRIPS	20	16	159.8
		IN	4	12	80
		OUT	16	3	80
Library					
Type	***GFA m2***	***GLFA m2***	***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
Library	328	246			
		TOTAL TRIPS	1	7	33
		IN	1	3	16
		OUT	0	3	16
Ancillary Café					
Type	***GFA m2***	***GLFA m2***	***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
Ancillary Café	57	43			
		TOTAL TRIPS	It is assumed that the ancillary café would be mostly used by the residents and visitors in the area. Therefore, no additional vehicular trips are expected,		
		IN			
		OUT			

Table 13 summarises the total trip generation from Building B. The assessment indicates that the proposed land-use mix in Building B is expected to generate only 21 and 22 trips in the AM and PM peak hours, respectively.

Table 13 Total Trip Generation – Building B | Stage 1

Total Peak Hour Trips			
Peak Period	**IN**	**Out**	**Total**
Weekday AM Peak	5	16	21
Weekday PM Peak	16	6	22

Trip Distribution Assumption

Based on the following, **Figure 24** illustrates the adopted trip generation for Building B:

- Mesoscopic model-based trip distribution trends (**Section 2.4)**
- Typical trip distribution is shown in **Figure 13**
- Proposed access point on Howatt Street extension near the intersection with Kamira Avenue
- Extension of Howatt Street and Kamira Court
- Existing and planned movement patterns on surrounding streets.

Figure 24 Adopted Trip Distribution – Building B | Stage 1

4.2.3 Building C – Stage 2

Table 14 summarises the different land-uses proposed in Building C with likely trip generation in the peak hours and in a typical weekday. The development yield is based on information provided by TIP and the architect.

As per the provided, Building C comprises the following land-uses:

- High-Density Residential Units
- Child Care Centre
- Medical Centre

Table 15 summarises the total trip generation from Building C. The assessment indicates that the proposed land-use mix in Building C is expected to generate 126 and 90 trips in the AM and PM peak hours, respectively.

Table 14 Trip Generation – Different Land-Use *(Building C | Stage 2)*

Trip Generation - Building C | Stage 2					
Residential Component - High Density					
Unit Type	***Quantity***	***Number of Bedrooms***	***Trip Generation***		
1-Bed Unit	14	14	***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
2-Bed Unit	57	114			
3-Bed Unit	9	27			
Total Number of Bedrooms		155			
		TOTAL TRIPS	14	11	111.6
		IN	3	9	56
		OUT	11	2	56
Child Care Centre					
Type	***Number of Students***		***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
Child Care Centre	90				
		TOTAL TRIPS	90	54	360
		IN	45	27	180
		OUT	45	27	180
Medical Centre					
Type	***Consulting Rooms***		***Weekday AM Peak***	***Weekday PM Peak***	***Daily Trips***
Medical Centre	8				
		TOTAL TRIPS	22	26	186
		IN	11	13	93
		OUT	11	13	93

Table 15 Total Trip Generation – Building C | Stage 2

Total Peak Hour Trips			
Peak Period	**IN**	**Out**	**Total**
Weekday AM Peak	59	67	126
Weekday PM Peak	48	42	90

Trip Distribution Assumption

Based on the following, **Figure 25** illustrates the adopted trip generation for Building C:

- Mesoscopic model-based trip distribution trends (**Section 2.4)**
- Typical trip distribution is shown in **Figure 13**
- Proposed access point on Howatt Street extension near the intersection with Kamira Avenue
- Extension of Howatt Street and Kamira Court
- Existing and planned movement patterns on surrounding streets.

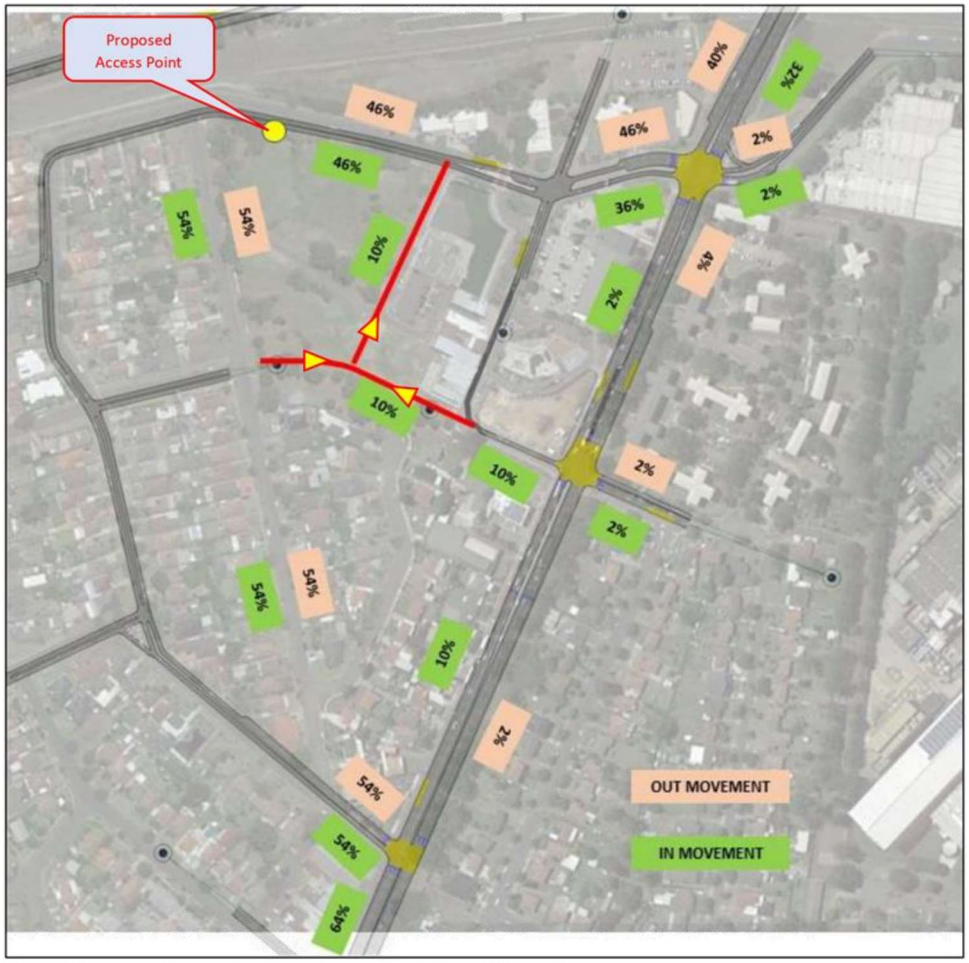


Figure 25 Adopted Trip Distribution – Building C | Stage 2

It is important to note that trip rates described in **Section 4.1** include both In and Out trips. The following typical IN and OUT trip ratios were adopted for this assessment:

For Residential Development: 20% IN and 80% OUT in AM Peak and opposite IN and OUT ratios in the PM Peak.

For All Other Developments: 50% IN and 50% OUT in both AM and PM peaks

5. Traffic Assessment – SIDRA Modelling

5.1 Council's Mesoscopic Model

As described in earlier sections, Fairfield City Council has recently completed a mesoscopic modelling study for a broader area, including Kamira Court Precinct site. However, the mesoscopic model does not assign any traffic demand to the Precinct in existing and future scenarios. ***(See Section 2.1 for details)***

Section 2 describes all the model data and outputs that Council's Traffic Consultant (Stantec) has provided for this study. The provided includes modelling-based traffic demand at the following key intersection:

- Woodville Road / Kirrang Avenue
- Woodville Road/ Howatt Street/ Binna Burra Street
- Villawood Road/ Villawood Place
- Woodville Road / Villawood Road / Llewellyn Avenue
- The Horsley Drive/ River Avenue

The intersection traffic demand (***Cars and Trucks)*** has been provided for the following scenarios:

- ***Modelled Years***
  - Base: 2020
  - Future Base: 2031
- ***Peak Periods***
  - AM peak: 7:15am – 8:15am
  - PM peak: 3:15pm – 4:15pm

It is understood that the mesoscopic model was calibrated and validated as part of the broader area modelling study.

5.2 Traffic Assessment – Modelling Approach

The following points highlighted the adopted approach for traffic assessment as part of this study:

- All the key intersections were modelled using SIDRA software for 2020 (base) and 2031 (future) scenarios
- Each modelled intersection was assessed for both the AM and PM peak periods under the base and future scenarios
- In all scenarios and peak periods, each modelled intersection was assessed with and without expected traffic generation from the Kamira Court Precinct
- The mesoscopic modelling-based traffic demand was considered to model without development traffic scenarios in both base and future years
- For with development scenario modelling, expected trip generation from all buildings included in the Precinct was added on top of the mesoscopic model-based demand
- The trip generated by the Precinct was distributed on the network in line with the typical trip distribution. (See **Section 4.2**)

The above modelling approach will inform the performance of each study intersection with development traffic. This approach will also inform the proportion of traffic demand associated with the Precinct and additional traffic impacts (if any).

5.3 SIDRA Modelling Assumptions

- Level of Service (LoS) method was set to NSW RMS (RTA)
- SIDRA default peak Flow Factor of 95 per cent was adopted
- Intersection geometry was based on the latest available imagery
- Turn movement restrictions at Woodville Road/Howatt Street and Woodville Road/Kirrang Avenue intersections were considered
- Howatt Street will be extended up to Kamira Court and further west to connect Kamira Avenue
- Only one-way movement (east to west) would be permitted on Howatt Street from Woodville Road to Kamira Court
- Howatt Street from Kamira Avenue to Kamira Court will have a one-way traffic flow (west to east)
- Adopted trip generation for each building included in the Precinct is as per **Section 4.1** and **Section 4.2**
- Adopted trip distribution is as per **Section 2.4** and **Section 4.2**.

5.4 Modelling Scenarios

All of the key intersections (listed in **Section 5.1**) were modelled for the following existing and future scenarios:

- 2020 Weekday AM Peak *(with and without proposed development traffic)*
- 2020 Weekday PM Peak *(with and without proposed development traffic)*
- 2031 Weekday AM Peak *(with and without proposed development traffic)*
- 2031 Weekday PM Peak *(with and without proposed development traffic)*

5.5 Intersection Performance Criteria

The intersection performance criteria are based on the RMS Traffic Modelling Guidelines (2013). The capacity of the controlling intersections can largely determine the capacity of a road network. The key indicator of intersection performance Level of Service (LoS) is a delay, where results are placed on a continuum from 'A' to 'F' as summarised in **Table 16**.

Table 16 RMS Level of Service Criteria

LoS	Control delay per vehicle in seconds (d) (including geometric delay)
	All intersection types
A	d < 14
B	d < 15 to 28
C	d < 29 to 42
D	d < 43 to 56
E	d ≤ 57 to 70
F	d > 70

Source: RMS Traffic Modelling Guidelines (2013)

RMS Traffic Modelling Guidelines (2013) also states that the average movement delay and level of service over all movements should be taken for traffic signals. For roundabouts and priority control signals intersection (with Stop and Give Way signs or operating under the T-junction rule), the critical movement for the level of service assessment should be that with the worst movement delay.

5.6 Intersection Performance Assessment

5.6.1 Woodville Road/Kirrang Avenue

Layout

Figure 26 illustrate the modelled layout of Woodville Road and Kirrang Avenue Intersection.

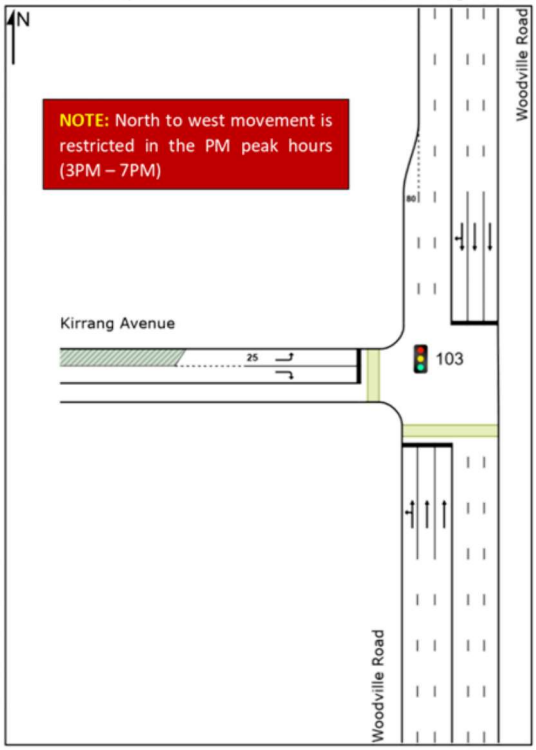


Figure 26 Intersection Layout – Woodville Road and Kirrang Avenue
Source: SIDRA Model

Traffic Demand Proportion

Table 17 summarises the total expected traffic demand at Woodville Road and Kirrang Avenue intersection. The table also highlights the proportion of traffic generated by the Kamira Court Precinct.

Table 17 Traffic Demand Proportion – Woodville Road and Kirrang Avenue

Woodville Road and Kirrang Avenue			
2020 AM Peak With Dev		4054	
2020 AM Peak Without Dev		3905	
	Development Traffic Proportion	***149***	***3.68%***
2020 PM Peak With Dev		3902	
2020 PM Peak Without Dev		3661	
	Development Traffic Proportion	***241***	***6.18%***
2031 AM Peak With Dev		4220	
2031 AM Peak Without Dev		4072	
	Development Traffic Proportion	***148***	***3.51%***
2031 PM Peak With Dev		4266	
2031 PM Peak Without Dev		4025	
	Development Traffic Proportion	***241***	***5.65%***

Modelling Results

Figure 27 shows the performance of Woodville Road and Kirrang Avenue intersection in 2020 and 2031 scenarios.

Site Performance - Hourly Values							
Site ID	Site Name	Dem. Flow (Tot) veh/h	Deg of Satn	Del (Ctrl) sec	LOS	Back Que veh	Back Que m
Site Category: 2020 AM Peak Without Dev							
103	Woodville Road and Kirrang Avenue	3905	0.801	14.3	LOS A	30.3	226.0
Site Category: 2020 AM Peak With Dev							
103	Woodville Road and Kirrang Avenue	4054	0.824	18.1	LOS B	38.2	285.0
Site Category: 2031 AM Peak Without Dev							
103	Woodville Road and Kirrang Avenue	4072	0.787	15.4	LOS B	28.3	209.6
Site Category: 2031 AM Peak With Dev							
103	Woodville Road and Kirrang Avenue	4220	0.800	19.1	LOS B	34.8	258.3
Site Category: 2020 PM Peak Without Dev							
103	Woodville Road and Kirrang Avenue	3661	0.688	10.3	LOS A	19.5	146.0
Site Category: 2020 PM Peak With Dev							
103	Woodville Road and Kirrang Avenue	3902	0.743	13.5	LOS A	22.2	166.0
Site Category: 2031 PM Peak Without Dev							
103	Woodville Road and Kirrang Avenue	4025	0.619	10.3	LOS A	26.2	199.5
Site Category: 2031 PM Peak With Dev							
103	Woodville Road and Kirrang Avenue	4266	0.774	12.3	LOS A	26.8	203.4

Figure 27 Intersection Performance Results – Woodville Road and Kirrang Avenue
Source: SIDRA Model

Potential Impacts

The modelling results presented in **Figure 27** show that the Woodville Road and Kirrang Avenue intersection is currently operating at a satisfactory level.

It is also evident from **Figure 27** that the proposed Kamira Court Precinct development yield will not have any significant impact on the performance of the Woodville Road and Kirrang Avenue intersection. The modelling results indicate that the subject intersection is expected to operate at a satisfactory level in 2031 and beyond.

Detailed movement summaries and adopted phasing is shown in Appendix A

5.6.2 Woodville Road / Howatt Street / Binna Burra Street

Layout

Figure 28 illustrate the modelled layout of Woodville Road and Howatt Street and Binna Burra Street Intersection.

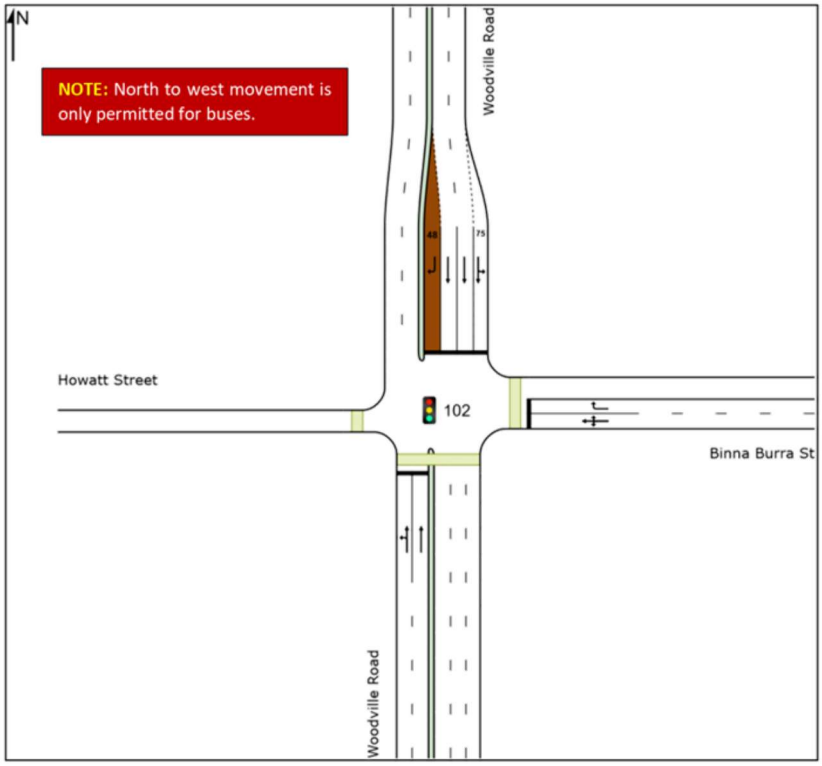


Figure 28 Intersection Layout – Woodville Road/Howatt Street/Binna Burra Street
Source: SIDRA Model

Traffic Demand Proportion

Table 18 summarises the total expected traffic demand and proportion of development traffic at Woodville Road and Howatt Street and Binna Burra Street intersection.

Table 18 Traffic Demand Proportion – Woodville Road/Howatt Street/Binna Burra Street

Woodville Road and Howatt Street and Binna Burra Street		
2020 AM Peak With Dev	3857	
2020 AM Peak Without Dev	3815	
Development Traffic Proportion	***42***	***1.09%***
2020 PM Peak With Dev	3851	
2020 PM Peak Without Dev	3777	
Development Traffic Proportion	***74***	***1.92%***
2031 AM Peak With Dev	4080	
2031 AM Peak Without Dev	4038	
Development Traffic Proportion	***42***	***1.03%***
2031 PM Peak With Dev	4276	
2031 PM Peak Without Dev	4202	
Development Traffic Proportion	***74***	***1.73%***

Modelling Results

Figure 29 shows the performance of Woodville Road and Howatt Street and Binna Burra Street intersection in 2020 and 2031 scenarios.

Site Performance - Hourly Values							
Site ID	Site Name	Dem. Flow (Tot) veh/h	Deg of Satn	Del (Ctrl) sec	LOS	Back Que veh	Back Que m
Site Category: 2020 AM Peak Without Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	3815	0.930	19.0	LOS B	50.7	378.9
Site Category: 2020 AM Peak With Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	3857	0.937	19.9	LOS B	52.6	392.9
Site Category: 2031 AM Peak Without Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	4038	0.907	13.6	LOS A	36.2	268.4
Site Category: 2031 AM Peak With Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	4080	0.907	13.9	LOS A	37.2	276.0
Site Category: 2020 PM Peak Without Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	3777	0.740	11.9	LOS A	26.0	195.5
Site Category: 2020 PM Peak With Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	3851	0.758	12.1	LOS A	27.2	204.3
Site Category: 2031 PM Peak Without Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	4202	1.270	14.8	LOS B	30.7	233.9
Site Category: 2031 PM Peak With Dev							
102	Woodville Road and Howatt Street and Binna Burra Street	4276	1.270	15.0	LOS B	32.1	244.4

Figure 29 Intersection Performance Results – Woodville Road/Howatt Street/Binna Burra Street
Source: SIDRA Model

Potential Impacts

The modelling results presented in **Figure 29** show that the Woodville Road and Howatt Street and Binna Burra Street intersection is currently operating at a satisfactory level. The results also highlight that the intersection is expected to keep operating at the same level of service in 2031.

It is also evident from **Figure 29** that the proposed Kamira Court Precinct development yield will not have any significant impact on the performance of the Woodville Road and Howatt Street and Binna Burra Street intersection. The modelling results indicate that the subject intersection is expected to operate at a satisfactory level, with development traffic, in 2031 and beyond.

Detailed movement summaries and adopted phasing is shown in Appendix A

5.6.3 Villawood Road and Villawood Place

Layout

Figure 30 illustrate the modelled layout of Villawood Road and Villawood Place Intersection.

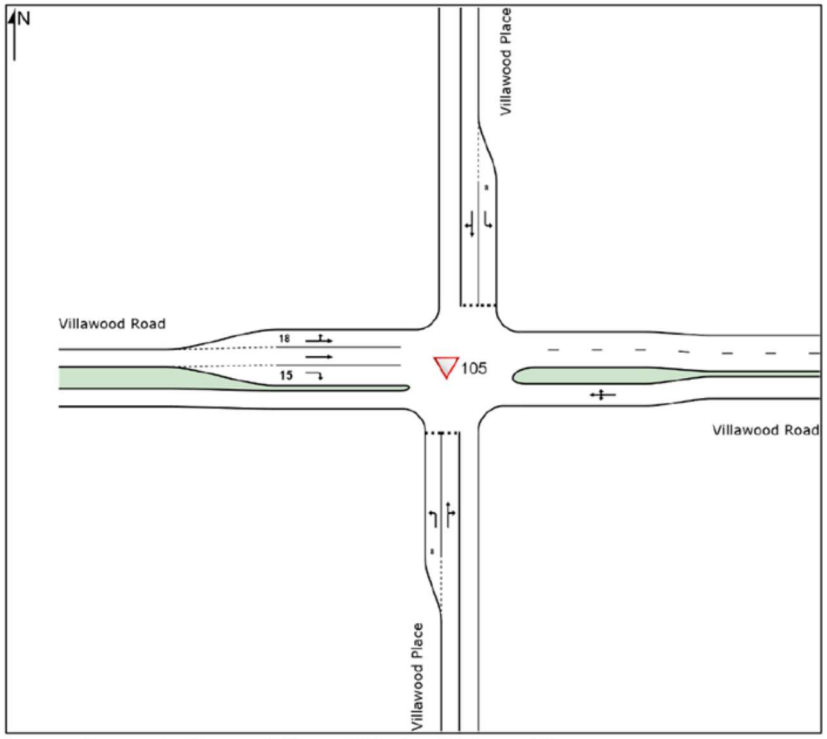


Figure 30 Intersection Layout – Villawood Road and Villawood Place
Source: SIDRA Model

Traffic Demand Proportion

Table 19 summarises the expected traffic demand and proportion of development traffic at the Villawood Road and Villawood Place intersection.

Table 19 Traffic Demand Proportion – Villawood Road and Villawood Place

Villawood Road and Villawood Place		
2020 AM Peak With Dev	268	
2020 AM Peak Without Dev	145	
Development Traffic Proportion	***123***	***45.90%***
2020 PM Peak With Dev	754	
2020 PM Peak Without Dev	563	
Development Traffic Proportion	***191***	***25.33%***
2031 AM Peak With Dev	302	
2031 AM Peak Without Dev	179	
Development Traffic Proportion	***123***	***40.73%***
2031 PM Peak With Dev	901	
2031 PM Peak Without Dev	711	
Development Traffic Proportion	***190***	***21.09%***

Modelling Results

Figure 31 shows the performance of Villawood Road and Villawood Place intersection in 2020 and 2031 scenario.

Site Performance - Hourly Values								
Site ID	Site Name	Dem. Flow (Tot) veh/h	Deg of Satn	Del (Wr. Mv.) sec	Del (Ctrl) sec	LOS	Back Que veh	Back Que m
Site Category: 2020 AM Peak Without Dev								
105	Villawood Road and Villawood Place	145	0.027	5.1	2.1	NA	0.1	0.9
Site Category: 2020 AM Peak With Dev								
105	Villawood Road and Villawood Place	268	0.049	6.0	1.3	NA	0.2	1.2
Site Category: 2031 AM Peak Without Dev								
105	Villawood Road and Villawood Place	179	0.038	5.2	2.6	NA	0.2	1.5
Site Category: 2031 AM Peak With Dev								
105	Villawood Road and Villawood Place	302	0.061	6.0	1.8	NA	0.3	2.1
Site Category: 2020 PM Peak Without Dev								
105	Villawood Road and Villawood Place	563	0.214	7.5	2.4	NA	1.2	8.9
Site Category: 2020 PM Peak With Dev								
105	Villawood Road and Villawood Place	754	0.272	10.2	2.5	NA	1.7	12.1
Site Category: 2031 PM Peak Without Dev								
105	Villawood Road and Villawood Place	711	0.285	9.0	2.9	NA	1.9	13.2
Site Category: 2031 PM Peak With Dev								
105	Villawood Road and Villawood Place	901	0.352	12.3	3.4	NA	2.9	20.7

Figure 31 Intersection Performance Results – Villawood Road and Villawood Place
Source: SIDRA Model

Potential Impacts

The modelling results presented in **Figure 31** show that the Villawood Road and Villawood Place intersection is currently operating at a satisfactory level. The results also highlight that the intersection is expected to keep operating at the same level of service in 2031.

It is also evident from **Figure 31** that the proposed Kamira Court Precinct development yield will not have any significant impact on the performance of the Villawood Road and Villawood Place intersection. The modelling results indicate that the subject intersection is expected to operate at a satisfactory level, with development traffic, in 2031 and beyond.

Detailed movement summaries and adopted phasing is shown in Appendix A

5.6.4 The Horsley Drive and River Avenue

Layout

Figure 32 illustrate the modelled layout of The Horsley Drive and River Avenue Intersection.

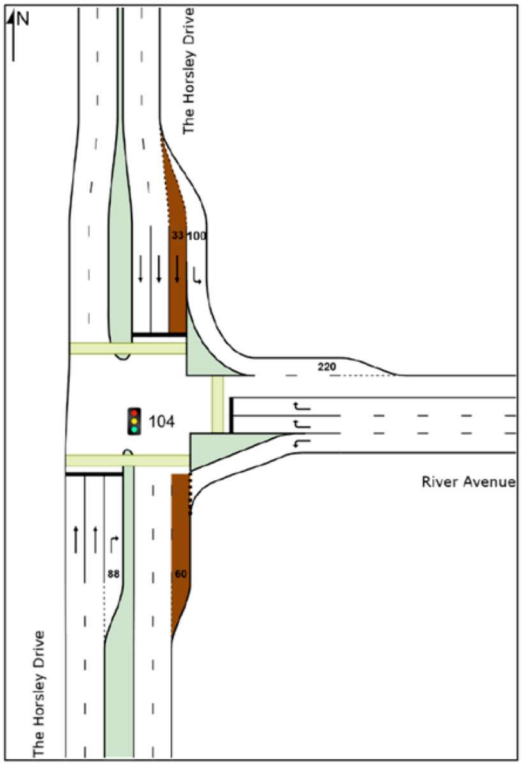


Figure 32 Intersection Layout – The Horsley Drive and River Avenue
Source: SIDRA Model

Traffic Demand Proportion

Table 20 summarises the expected traffic demand and proportion of development traffic at The Horsley Drive and River Avenue intersection.

Table 20 Traffic Demand Proportion – The Horsley Drive and River Avenue

The Horsley Drive and River Avenue			
2020 AM Peak With Dev		3358	
2020 AM Peak Without Dev		3354	
	Development Traffic Proportion	***4***	***0.12%***
2020 PM Peak With Dev		3604	
2020 PM Peak Without Dev		3596	
	Development Traffic Proportion	***8***	***0.22%***
2031 AM Peak With Dev		3556	
2031 AM Peak Without Dev		3552	
	Development Traffic Proportion	***4***	***0.11%***
2031 PM Peak With Dev		4025	
2031 PM Peak Without Dev		4017	
	Development Traffic Proportion	***8***	***0.20%***

Modelling Results

Figure 33 shows the performance of The Horsley Drive and River Avenue intersection in the 2020 and 2031 scenarios.

Site Performance - Hourly Values							
Site ID	Site Name	Dem. Flow (Tot) veh/h	Deg of Satn	Del (Ctrl) sec	LOS	Back Que veh	Back Que m
Site Category: 2020 AM Peak Without Dev							
104	The Horsley Drive and River Avenue	3354	0.712	10.4	LOS A	6.8	49.1
Site Category: 2020 AM Peak With Dev							
104	The Horsley Drive and River Avenue	3358	0.713	10.4	LOS A	6.9	49.2
Site Category: 2031 AM Peak Without Dev							
104	The Horsley Drive and River Avenue	3552	0.894	12.7	LOS A	11.6	83.3
Site Category: 2031 AM Peak With Dev							
104	The Horsley Drive and River Avenue	3556	0.896	12.7	LOS A	11.7	83.8
Site Category: 2020 PM Peak Without Dev							
104	The Horsley Drive and River Avenue	3596	0.673	13.6	LOS A	10.7	83.0
Site Category: 2020 PM Peak With Dev							
104	The Horsley Drive and River Avenue	3604	0.676	13.7	LOS A	10.8	83.5
Site Category: 2031 PM Peak Without Dev							
104	The Horsley Drive and River Avenue	4017	0.767	14.8	LOS B	14.0	110.1
Site Category: 2031 PM Peak With Dev							
104	The Horsley Drive and River Avenue	4025	0.767	14.9	LOS B	14.1	110.9

Figure 33 Intersection Performance Results – The Horsley Drive and River Avenue
Source: SIDRA Model

Potential Impacts

The modelling results presented in **Figure 33** show that The Horsley Drive and River Avenue intersection is currently operating at a satisfactory level. The results also highlight that the intersection is expected to keep operating at the same level of service in 2031.

It is also evident from **Figure 33** that the proposed Kamira Court Precinct development yield will not have any significant impact on the performance of The Horsley Drive and River Avenue intersection. The modelling results indicate that the subject intersection is expected to operate at a satisfactory level, with development traffic, in 2031 and beyond.

Detailed movement summaries and adopted phasing is shown in Appendix A

5.6.5 Woodville Road and Villawood Road and Llewellyn Avenue

Layout

Figure 34 illustrate the modelled layout of Woodville Road and Villawood Road and Llewellyn Avenue Intersection.

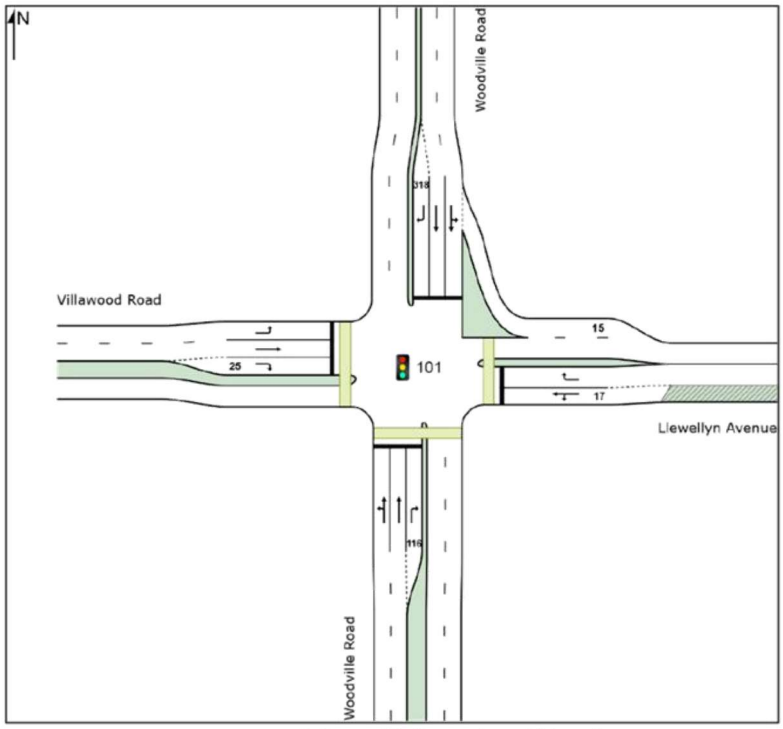


Figure 34 Intersection Layout – Woodville Road/Villawood Road/Llewellyn Avenue
Source: SIDRA Model

Traffic Demand Proportion

Table 21 summarises the expected traffic demand and proportion of development traffic at Woodville Road and Villawood Road and Llewellyn Avenue intersection.

Table 21 Traffic Demand Proportion – Woodville Road/ Villawood Road/Llewellyn Avenue

Woodville Road and Villawood Road and Llewellyn Avenue		
2020 AM Peak With Dev	4154	
2020 AM Peak Without Dev	4031	
Development Traffic Proportion	***123***	***2.96%***
2020 PM Peak With Dev	4463	
2020 PM Peak Without Dev	4272	
Development Traffic Proportion	***191***	***4.28%***
2031 AM Peak With Dev	4358	
2031 AM Peak Without Dev	4235	
Development Traffic Proportion	***123***	***2.82%***
2031 PM Peak With Dev	4995	
2031 PM Peak Without Dev	4803	
Development Traffic Proportion	***192***	***3.84%***

Modelling Results

Figure 35 shows the performance of Woodville Road and Villawood Road and Llewellyn Avenue intersection in 2020 and 2031 scenarios.

Site Performance - Hourly Values							
Site ID	Site Name	Dem. Flow (Tot) veh/h	Deg of Satn	Del (Ctrl) sec	LOS	Back Que veh	Back Que m
Site Category: 2020 AM Peak Without Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4031	0.871	10.1	LOS A	22.8	170.4
Site Category: 2020 AM Peak With Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4154	0.831	10.1	LOS A	23.6	176.0
Site Category: 2031 AM Peak Without Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4235	0.870	11.3	LOS A	25.2	194.6
Site Category: 2031 AM Peak With Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4358	0.861	11.8	LOS A	25.9	199.7
Site Category: 2020 PM Peak Without Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4272	1.196	26.3	LOS B	35.2	264.3
Site Category: 2020 PM Peak With Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4463	1.546	42.4	LOS C	44.9	319.6
Site Category: 2031 PM Peak Without Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4803	1.301	115.1	LOS F	133.3	1033.3
Site Category: 2031 PM Peak With Dev							
101	Woodville Road and Villawood Road and Llewellyn Avenue	4995	1.677	137.6	LOS F	133.3	1033.3

Figure 35 Intersection Performance Results – Woodville Road/Villawood Road/Llewellyn Avenue
Source: SIDRA Model

Potential Impacts

The modelling results presented in **Figure 35** show that:

- The Woodville Road and Villawood Road and Llewellyn Avenue intersection is currently operating at a satisfactory level in the AM and PM peak hours under base (2020) scenario
- The development traffic would not have any impact on the intersection, and it is expected to keep operating at a satisfactory level in the base scenario even with the Kamira Court Precinct's traffic.
- In the 2031 future AM peak scenario, the subject intersection is expected to operate at a maximum LOS "C" even with the development traffic
- In the 2031 future PM peak ***(without development)*** scenario, the subject intersection is expected to operate at an unsatisfactory LOS "F" without additional traffic from the Kamira Court Precinct. The average delay would be 115.1 seconds, with significant queuing of vehicles on the north approach.
- It is understood, and as evident from the results, there will be a slight increase in delay and DoS in the 2031 future PM peak ***(with development)*** scenario. However, the queueing on the north approach is expected to remain the same regardless of the Precinct traffic.

It is important to note the following key points:

The proportion of traffic demand associated with the Kamira Court Precinct is **only 3.84%** in the 2031 PM peak scenario. This includes trips from all three buildings to be developed in the Precinct, with most of the proposed land-use is in line with the current LEP zoning. The traffic demand associated with the proposed modifications to the LEP would be lesser than 3.84%.

The trip generation rates for supermarket and retail land-use specified in the RMS Guide to Traffic Generating Developments (2002) are based on old survey data. The guide specifies a typical rate regardless of the proximity to public transport services and surrounding residential density. Therefore, the adopted trip rates for supermarket and retail land use are very conservative.

Figure 36 illustrate the movement summary results for Woodville Road and Villawood Road and Llewellyn Avenue intersection. The results are for the 2031 Future PM peak scenario without any traffic from the Kamira Court Precinct.

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	65	0	68	0.0	0.944	50.5	LOS D	61.1	461.4	1.00	1.03	1.14	10.2
31	T1	1616	162	1701	10.0	0.944	44.8	LOS D	61.1	461.4	1.00	1.03	1.14	29.8
32	R2	21	2	22	9.5	0.199	69.0	LOS E	1.3	10.0	0.96	0.71	0.96	20.2
Approach		1702	164	1792	9.6	0.944	45.3	LOS D	61.1	461.4	1.00	1.03	1.14	28.8
East: Llewellyn Avenue														
21	L2	81	11	85	13.6	0.902	59.4	LOS E	9.4	69.8	0.93	0.82	1.01	22.0
5	T1	74	0	78	0.0	* 0.902	54.8	LOS D	9.4	69.8	0.93	0.82	1.01	20.0
23	R2	165	41	174	24.8	* 0.631	50.9	LOS D	9.0	76.5	0.91	0.87	0.91	30.2
Approach		320	52	337	16.3	0.902	54.0	LOS D	9.4	76.5	0.92	0.84	0.96	26.2
North: Woodville Road														
24	L2	104	15	109	14.4	1.137	178.9	LOS F	133.3	1033.3	1.00	1.74	2.04	14.8
25	T1	1910	235	2011	12.3	* 1.137	173.3	LOS F	133.3	1033.3	1.00	1.75	2.04	12.0
9	R2	229	5	241	2.2	* 1.301	306.1	LOS F	32.7	233.3	1.00	1.50	2.82	5.9
Approach		2243	255	2361	11.4	1.301	187.1	LOS F	133.3	1033.3	1.00	1.72	2.12	11.1
West: Villawood Road														
10	L2	194	4	204	2.1	0.322	32.9	LOS C	9.0	63.9	0.76	0.76	0.76	30.8
11	T1	1	0	1	0.0	0.003	47.7	LOS D	0.1	0.4	0.85	0.51	0.85	22.2
12	R2	103	0	108	0.0	0.454	47.2	LOS D	5.4	37.7	0.93	0.76	0.93	14.8
Approach		298	4	314	1.3	0.454	37.9	LOS C	9.0	63.9	0.82	0.76	0.82	25.6
All Vehicles		4563	475	4803	10.4	1.301	115.1	LOS F	133.3	1033.3	0.98	1.34	1.59	15.9

Figure 36 Movement Summary Results – Woodville Road/Villawood Road/Llewellyn Avenue
Source: SIDRA Model

It is evident from the modelling results that all approaches, ***except Woodville Road (North)***, would be operating at an acceptable average LOS of "D" or better. Significant delays and queuing on the north approach is the main contributing factor to the expected performance of the overall intersection. It is important to note that Woodville Road is a state road carrying a high volume of traffic.

Noting that the subject intersection is expected to reach an unsatisfactory LOS without Kamira Court Precinct's traffic, the Council should plan to assess this intersection in the coming years to inform potential upgrades/measures to ensure satisfactory operation.

However, considering the low proportion of development traffic (only 3.84%), it should not be associated with the proposed modifications to the LEP. It is also evident that the subject intersection would require upgrade/measures even if there would be no traffic from the Kamira Court Precinct.

6. Public Transport Accessibility

The broader area of the Villawood Town Centre ***(including the project site)*** is well serviced by train and bus services providing access to Fairfield City Centre and other larger service and employment centres such as Liverpool, Parramatta CBD and the Sydney CBD.

2.4.1 Kamira Court Precinct – Existing Train Services

Figure 37 illustrates that the Villawood Station is in close proximity, i.e., within 350 metres of walking distance from the Precinct area. The average walking time to the station would be only four minutes promoting active travel and less reliance on private vehicles.

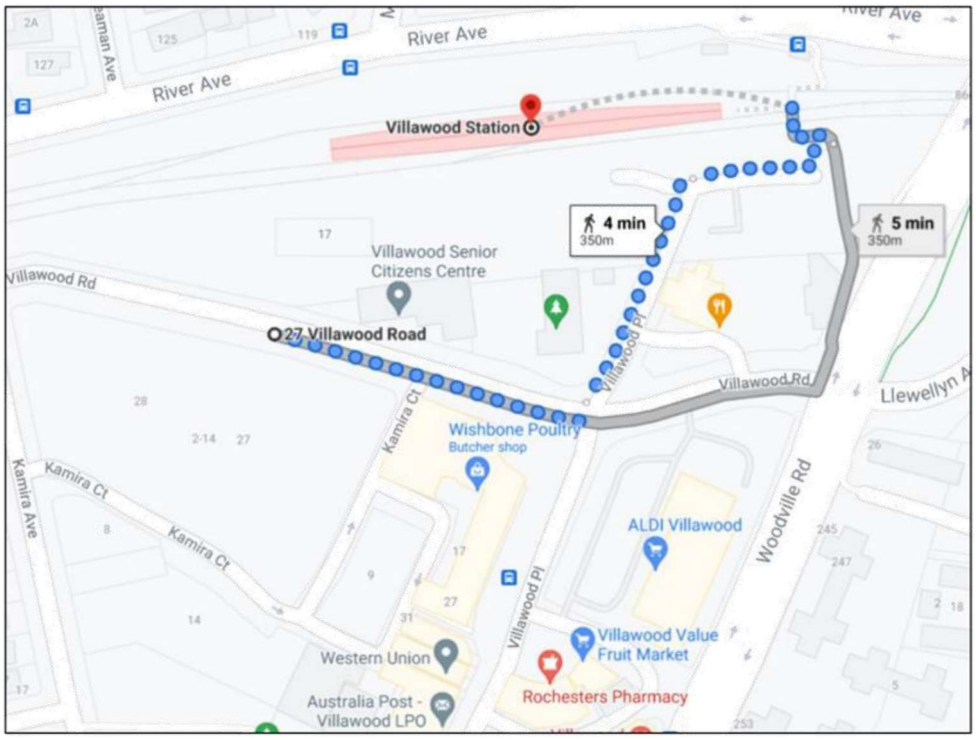


Figure 37 Kamira Court Precinct – Nearest Train Station
Source: Google Maps ***(Accessed online on the 8th September 2021)***

Villawood Station is serviced by the following three lines:

- Parramatta or Leppington to City **(T2)**
- City to Liverpool or Lidcombe via Bankstown **(T3)**
- Liverpool or Lidcombe to City via Bankstown **(T3)**

2.4.2 Kamira Court Precinct – Existing Bus Services

The Precinct area is well serviced by the existing bus routes with bus stops concentrated on River Avenue to the north of the Railway, Woodville Road and Villawood Place.

As evident from **Figure 38** that the nearest bus stop ***(Name:** Villawood Place Shops**, No:**2163165)*** is located at a distance of only 210 metres from the Precinct area with an average waking time of two minutes.

Table 22 summarises the key routes operating in the vicinity of the Precinct area.

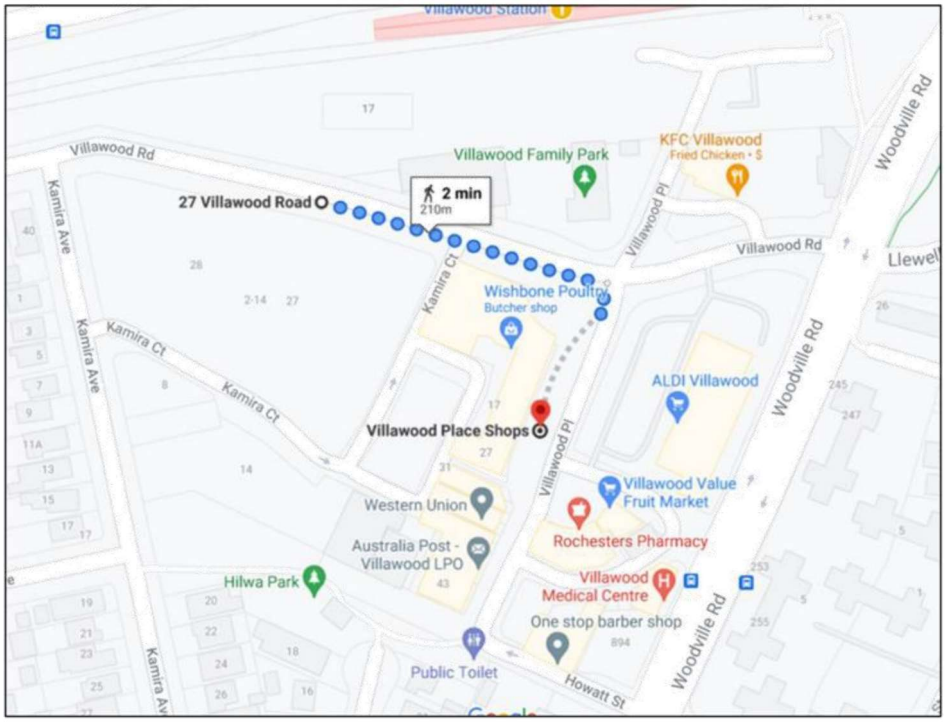


Figure 38 Kamira Court Precinct – Bus Stops and Walking Distance to the Nearest Stop
Source: Google Maps ***(Accessed online on 8th September 2021)***

Table 22 Bus Route Summary

Road Name	Bus Routes Number	Route Description
Villawood Place	905 and S4	**905:** Bankstown to Fairfield **S4:** Chester Hill to Fairfield **907:** Bankstown to Parramatta **N50:** Liverpool to City Town Hall (Night Service) **4T3:** Liverpool to Bankstown (Train Replacement Bus Services)
Woodville Road	907, 905 and S4	
River Avenue	4T3, N50, S4	

7. Findings

Traffwise Consultants Pty Ltd has been engaged by Traders in Purple to undertake a modelling-based traffic impact assessment (TIA) study for the proposed modifications in Fairfield Local Environmental Plan for Villawood, NSW.

Based on the provided plans/information and the assessment/discussions presented within this report:

- Fairfield City Council has recently completed a mesoscopic modelling study for a broader area which include Kamira Court Precinct site as well. However, the mesoscopic model does not assign any traffic demand to the Precinct in existing and future scenarios. ***(See Section 2.1 for details)***

- The Kamira Court Precinct area is zoned R4 (High-Density Residential) in the Fairfield Local Environmental Plan 2013 (LEP). TIP is proposing modification in the LEP to develop a supermarket and retail area in Building A as part of the Kamira Court Precinct development.

- The overall precinct area comprises three Buildings (see **Section 3** and **Table 3**) and is planned to be developed in stages. As per the available information:
  - **Building A | Stage 3** will comprise residential units, supermarket and retail area
  - **Building B | Stage 1** will comprise residential units, a small library and an ancillary café
  - **Building C | Stage 2** will comprise residential units, child care centre and medical centre.

- The proposed development is expected to generate:
  - **238** trips in the Weekday AM peak
  - **382** trips in the Weekday PM peak
  - **3,548** trips on a typical weekday.

- The predominant trip generation would be from Building A comprising supermarket and retail area. It is expected that Building A would generate:
  - **90** trips in the Weekday AM peak
  - **269** trips in the Weekday PM peak
  - **2,698** trips on a typical weekday.

- The modelling results indicate that the Precinct development is not expected to have any substantial impact on the following key intersections in the base (2020) and future (2031) scenario:
  - Woodville Road / Kirrang Avenue
  - Woodville Road/ Howatt Street/ Binna Burra Street
  - Villawood Road/ Villawood Place
  - The Horsley Drive/ River Avenue

- The modelling results of Woodville Road/Villawood Road/Llewellyn Avenue intersection indicates that:
  - The intersection is currently operating at a satisfactory level in the AM and PM peak hours under the base (2020) scenario. The development traffic would not impact the intersection, and it is expected to keep operating at a satisfactory level in the base scenario.

- In the 2031 future AM peak scenario, the intersection is expected to operate at a maximum LOS "C" even with the development traffic
- In the 2031 future PM peak ***(without development)*** scenario, the subject intersection is expected to operate at an unsatisfactory LOS "F" without additional traffic from the Kamira Court Precinct.

- The proportion of traffic demand associated with the Kamira Court Precinct is **only 3.84%** in the 2031 PM peak scenario. This includes trips from all three buildings to be developed in the Precinct, with most of the proposed land-use is in line with the current LEP zoning. The traffic demand associated with the proposed modifications to the LEP would be lesser than 3.84%.

- It is evident from the provided data and modelling study that the Woodville Road/Villawood Road/Llewellyn Avenue intersection would require upgrade/measures even if there would be no traffic from the Kamira Court Precinct. **Therefore, considering the low proportion of development traffic (only 3.84%), it should not be associated with the proposed modifications to the LEP.**

- The broader area of the Villawood Town Centre, including the Kamira Court Precinct area, is well serviced by train and bus services providing access to Fairfield City Centre and other larger service and employment centres such as Liverpool, Parramatta CBD and the Sydney CBD.

- The overall precinct area is located within 500 metres walking distance to the Villawood Station and the nearest bus stop on Villawood Place.

The provided data, modelling results, and discussion presented in this report indicate that the proposed Kamira Court Precinct and proposed modifications to the LEP are not expected to substantially impact the transport network.

The proposed development will add trips to the transport network. However, the proportion of the proposed development's traffic demand at the key intersection would be small, and the impact on performance would be insignificant. The key intersections are expected to operate at a similar level as without Precinct's traffic.

Appendix A

MODELLING RESULTS

September 20, 2021

USER REPORT FOR SITE

All Movement Classes

Project: Modelling of Intersections **Template: Default Site User Report**

Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2020 Scenario - AM Peak | Without Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2020 AM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	19	0	20	0.0	0.353	16.3	LOS B	8.5	63.1	0.57	0.51	0.57	45.3
31	T1	1935	152	2037	7.9	* 0.801	17.0	LOS B	30.3	226.0	0.80	0.75	0.83	42.8
Approach		1954	152	2057	7.8	0.801	17.0	LOS B	30.3	226.0	0.80	0.75	0.82	42.8
North: Woodville Road														
25	T1	1562	176	1644	11.3	0.453	6.5	LOS A	11.4	87.5	0.47	0.43	0.47	51.7
26	R2	7	1	7	14.3	* 0.453	15.8	LOS B	11.4	87.5	0.58	0.52	0.58	43.9
Approach		1569	177	1652	11.3	0.453	6.6	LOS A	11.4	87.5	0.47	0.43	0.47	51.7
West: Kirrang Avenue														
27	L2	16	0	17	0.0	0.069	45.8	LOS D	0.7	4.6	0.90	0.69	0.90	29.1
29	R2	171	15	180	8.8	* 0.801	51.4	LOS D	8.6	64.6	1.00	0.93	1.26	28.7
Approach		187	15	197	8.0	0.801	50.9	LOS D	8.6	64.6	0.99	0.91	1.23	28.7
All Vehicles		3710	344	3905	9.3	0.801	14.3	LOS A	30.3	226.0	0.67	0.62	0.70	44.6

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

* Critical Movement (Signal Timing)

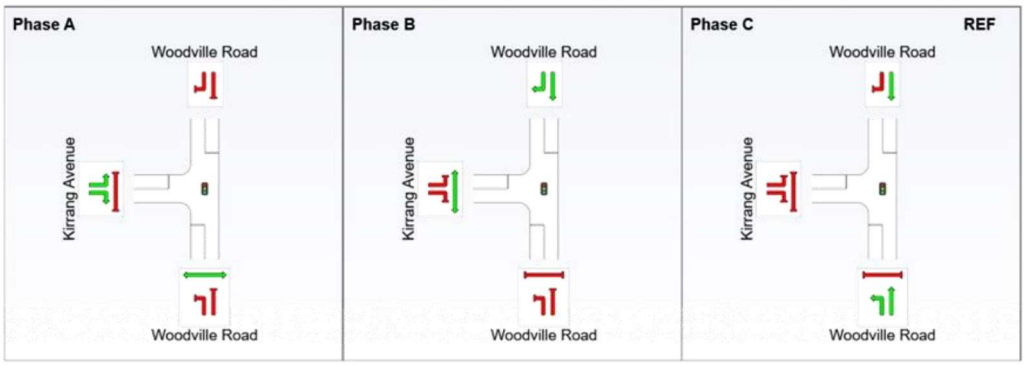
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	58	76	0
Green Time (sec)	12	8	52
Phase Time (sec)	18	14	58
Phase Split	20%	16%	64%

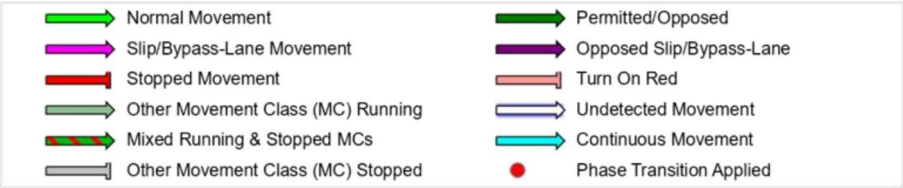
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2020 Scenario - AM Peak | Without Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2020 AM Peak Without Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	4.6	LOS A	0.0	0.0	0.08	0.50	0.08	45.3
2	T1	1	0	1	0.0	0.012	4.3	LOS A	0.0	0.3	0.21	0.51	0.21	40.7
3	R2	16	0	17	0.0	0.012	4.9	LOS A	0.0	0.3	0.21	0.51	0.21	38.8
Approach		18	0	19	0.0	0.012	4.9	LOS A	0.0	0.3	0.20	0.51	0.20	39.5
East: Villawood Road														
4	L2	4	0	4	0.0	0.027	5.1	LOS A	0.1	0.9	0.13	0.19	0.13	43.9
5	T1	23	5	24	21.7	0.027	0.3	LOS A	0.1	0.9	0.13	0.19	0.13	47.3
6	R2	9	0	9	0.0	0.027	5.1	LOS A	0.1	0.9	0.13	0.19	0.13	40.2
Approach		36	5	38	13.9	0.027	2.0	NA	0.1	0.9	0.13	0.19	0.13	46.2
North: Villawood Place														
7	L2	21	0	22	0.0	0.018	4.8	LOS A	0.1	0.4	0.14	0.50	0.14	32.5
8	T1	1	0	1	0.0	0.002	4.3	LOS A	0.0	0.0	0.22	0.45	0.22	41.2
9	R2	1	0	1	0.0	0.002	4.8	LOS A	0.0	0.0	0.22	0.45	0.22	44.3
Approach		23	0	24	0.0	0.018	4.8	LOS A	0.1	0.4	0.15	0.49	0.15	34.2
West: Villawood Road														
10	L2	2	0	2	0.0	0.017	4.6	LOS A	0.0	0.0	0.00	0.04	0.00	48.8
11	T1	58	7	61	12.1	0.017	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.8
12	R2	1	0	1	0.0	0.001	4.8	LOS A	0.0	0.0	0.12	0.50	0.12	44.9
Approach		61	7	64	11.5	0.017	0.2	NA	0.0	0.0	0.00	0.03	0.00	49.7
All Vehicles		138	12	145	8.7	0.027	2.1	NA	0.1	0.9	0.09	0.21	0.09	46.1

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2020 Scenario - AM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 AM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 52 seconds (Site Practical Cycle Time)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	12	0	13	0.0	0.871	15.8	LOS B	22.8	170.4	0.87	0.83	0.91	16.0
31	T1	1915	153	2016	8.0	* 0.871	10.2	LOS A	22.8	170.4	0.87	0.83	0.91	48.7
32	R2	48	0	51	0.0	0.277	22.2	LOS B	1.1	7.5	0.77	0.74	0.77	34.5
Approach		1975	153	2079	7.7	0.871	10.5	LOS A	22.8	170.4	0.87	0.83	0.91	48.1
East: Llewellyn Avenue														
21	L2	20	8	21	40.0	0.119	28.4	LOS B	0.6	5.3	0.89	0.69	0.89	29.6
5	T1	2	1	2	50.0	0.119	23.4	LOS B	0.6	5.3	0.89	0.69	0.89	28.9
23	R2	57	30	60	52.6	* 0.283	29.2	LOS C	1.5	15.1	0.91	0.73	0.91	36.5
Approach		79	39	83	49.4	0.283	28.8	LOS C	1.5	15.1	0.91	0.72	0.91	34.9
North: Woodville Road														
24	L2	129	16	136	12.4	0.755	12.7	LOS A	15.5	119.3	0.73	0.69	0.73	49.8
25	T1	1526	169	1606	11.1	0.755	7.3	LOS A	15.5	119.3	0.74	0.68	0.74	51.1
9	R2	23	4	24	17.4	0.160	27.0	LOS B	0.6	4.6	0.84	0.71	0.84	33.6
Approach		1678	189	1766	11.3	0.755	8.0	LOS A	15.5	119.3	0.74	0.68	0.74	50.7
West: Villawood Road														
10	L2	38	6	40	15.8	0.101	15.3	LOS B	0.7	5.2	0.71	0.69	0.71	39.9
11	T1	4	0	4	0.0	0.016	22.2	LOS B	0.1	0.7	0.87	0.56	0.87	31.6
12	R2	55	2	58	3.6	0.248	28.5	LOS B	1.4	10.2	0.91	0.73	0.91	20.5
Approach		97	8	102	8.2	0.248	23.1	LOS B	1.4	10.2	0.83	0.71	0.83	29.4
All Vehicles		3829	389	4031	10.2	0.871	10.1	LOS A	22.8	170.4	0.81	0.76	0.83	48.3

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

* Critical Movement (Signal Timing)

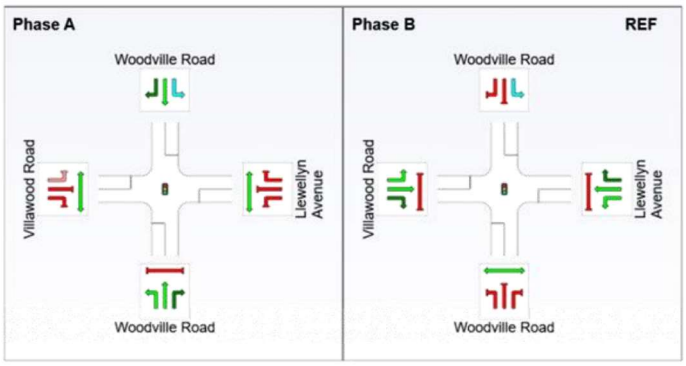
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	13	0
Green Time (sec)	33	7
Phase Time (sec)	39	13
Phase Split	75%	25%

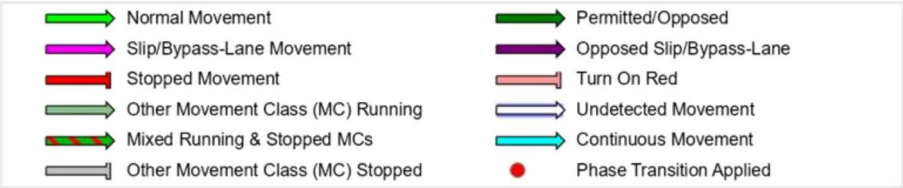
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase B
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2020 Scenario - AM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 AM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	20	0	21	0.0	0.930	33.4	LOS C	50.2	374.6	0.97	1.00	1.09	20.3
31	T1	1934	152	2036	7.9	* 0.930	27.9	LOS B	50.7	378.9	0.97	1.00	1.09	29.9
Approach		1954	152	2057	7.8	0.930	27.9	LOS B	50.7	378.9	0.97	1.00	1.09	29.8
East: Binna Burra St														
21	L2	17	1	18	5.9	0.106	37.2	LOS C	1.4	10.8	0.82	0.66	0.82	20.5
5	T1	17	4	18	23.5	0.106	33.4	LOS C	1.4	10.8	0.82	0.66	0.82	10.9
23	R2	38	1	40	2.6	0.106	37.2	LOS C	1.4	10.2	0.82	0.70	0.82	16.5
Approach		72	6	76	8.3	0.106	36.3	LOS C	1.4	10.8	0.82	0.68	0.82	16.4
North: Woodville Road														
24	L2	34	3	36	8.8	* 0.454	12.1	LOS A	10.5	80.8	0.46	0.44	0.46	21.8
25	T1	1553	176	1635	11.3	0.454	6.7	LOS A	11.1	85.4	0.47	0.43	0.47	48.1
9	R2	11	11	12	100.0	* 0.499	64.6	LOS E	0.6	8.3	1.00	0.68	1.00	11.2
Approach		1598	190	1682	11.9	0.499	7.2	LOS A	11.1	85.4	0.47	0.43	0.47	46.9
All Vehicles		3624	348	3815	9.6	0.930	19.0	LOS B	50.7	378.9	0.75	0.74	0.81	35.2

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

* Critical Movement (Signal Timing)

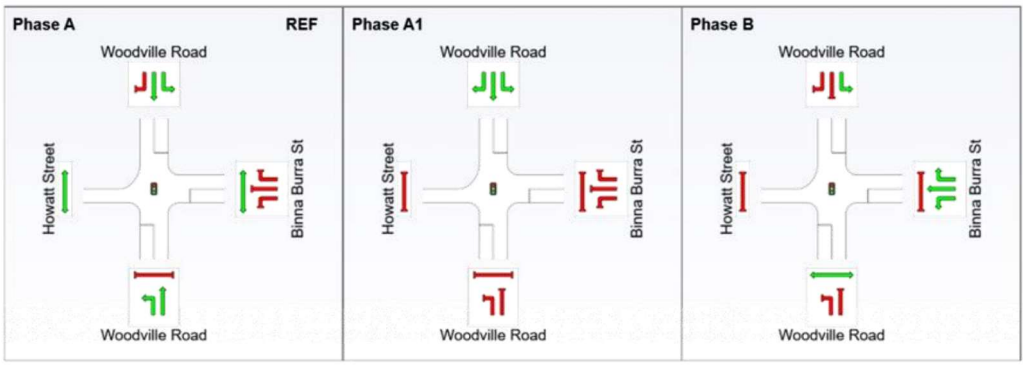
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

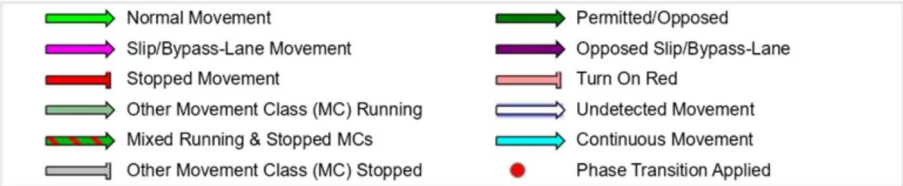
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2020 Scenario - AM Peak | Without Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2020 AM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	854	105	899	12.3	0.424	6.4	LOS A	6.2	48.0	0.60	0.52	0.60	51.8
3	R2	286	8	301	2.8	* 0.712	19.8	LOS B	6.8	49.1	0.83	0.89	0.99	44.1
Approach		1140	113	1200	9.9	0.712	9.8	LOS A	6.8	49.1	0.65	0.61	0.69	49.0
East: River Avenue														
4	L2	122	20	128	16.4	0.170	8.3	LOS A	0.8	6.1	0.38	0.65	0.38	51.8
26	R2	376	35	396	9.3	* 0.632	28.2	LOS B	4.9	37.1	0.97	0.85	1.06	35.5
Approach		498	55	524	11.0	0.632	23.3	LOS B	4.9	37.1	0.83	0.80	0.90	39.2
North: The Horsley Drive														
27	L2	819	58	862	7.1	0.480	7.3	LOS A	0.0	0.0	0.00	0.52	0.00	52.6
8	T1	729	130	767	17.8	0.316	5.9	LOS A	4.1	33.2	0.54	0.46	0.54	52.5
Approach		1548	188	1629	12.1	0.480	6.7	LOS A	4.1	33.2	0.25	0.49	0.25	52.6
All Vehicles		3186	356	3354	11.2	0.712	10.4	LOS A	6.8	49.1	0.49	0.58	0.51	48.5

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

* Critical Movement (Signal Timing)

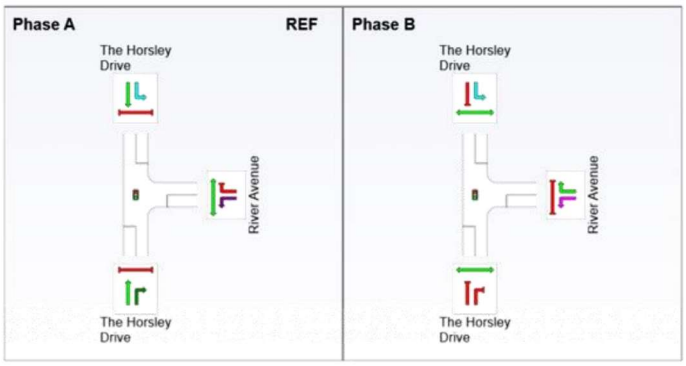
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	35
Green Time (sec)	29	9
Phase Time (sec)	35	15
Phase Split	70%	30%

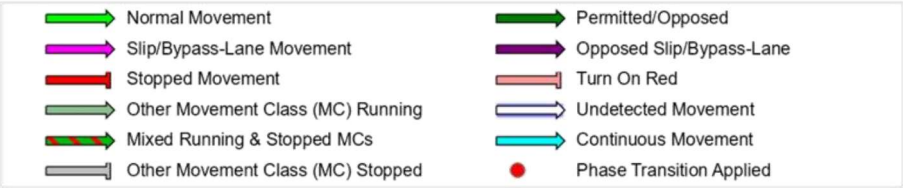
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2020 Scenario - AM Peak | With Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2020 AM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	69	0	73	0.0	0.362	18.5	LOS B	10.6	78.4	0.57	0.55	0.57	45.8
31	T1	1950	152	2053	7.8	* 0.821	20.2	LOS B	38.2	285.0	0.82	0.78	0.84	40.4
Approach		2019	152	2125	7.5	0.821	20.2	LOS B	38.2	285.0	0.82	0.77	0.83	40.6
North: Woodville Road														
25	T1	1581	176	1664	11.1	0.473	9.2	LOS A	14.9	113.9	0.51	0.46	0.51	49.0
26	R2	7	1	7	14.3	* 0.473	20.3	LOS B	14.9	113.9	0.63	0.57	0.63	41.0
Approach		1588	177	1672	11.1	0.473	9.2	LOS A	14.9	113.9	0.51	0.46	0.51	49.0
West: Kirrang Avenue														
27	L2	16	0	17	0.0	0.053	49.3	LOS D	0.8	5.3	0.86	0.69	0.86	28.1
29	R2	228	15	240	6.6	* 0.824	58.8	LOS E	13.7	101.5	1.00	0.93	1.21	27.4
Approach		244	15	257	6.1	0.824	58.2	LOS E	13.7	101.5	0.99	0.91	1.19	27.4
All Vehicles		3851	344	4054	8.9	0.824	18.1	LOS B	38.2	285.0	0.70	0.65	0.72	41.8

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

* Critical Movement (Signal Timing)

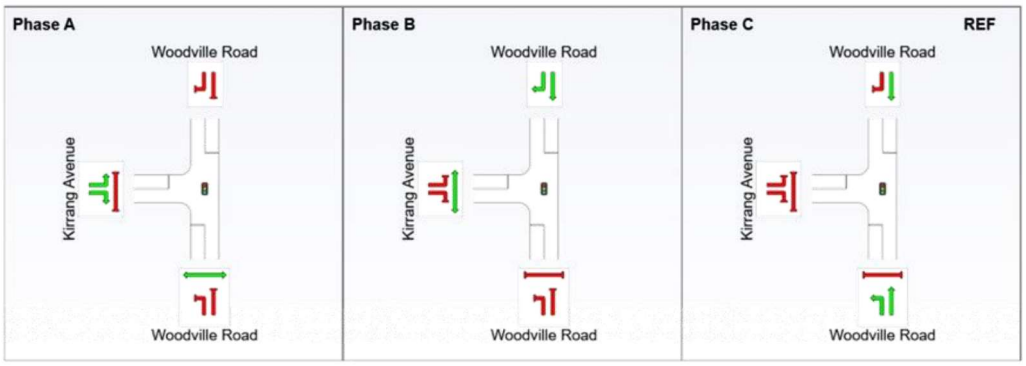
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	70	95	0
Green Time (sec)	19	9	64
Phase Time (sec)	25	15	70
Phase Split	23%	14%	64%

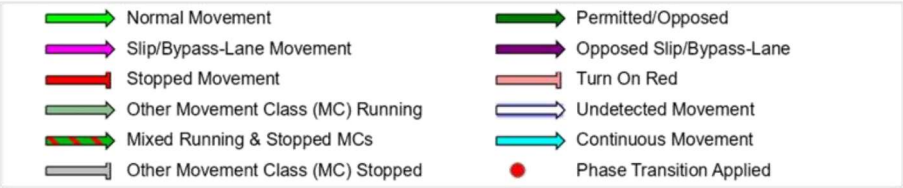
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2020 Scenario - AM Peak | With Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2020 AM Peak With Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	4.8	LOS A	0.0	0.0	0.14	0.49	0.14	45.1
2	T1	1	0	1	0.0	0.014	5.2	LOS A	0.1	0.4	0.31	0.53	0.31	40.2
3	R2	16	0	17	0.0	0.014	5.3	LOS A	0.1	0.4	0.31	0.53	0.31	38.3
Approach		18	0	19	0.0	0.014	5.2	LOS A	0.1	0.4	0.30	0.53	0.30	39.1
East: Villawood Road														
4	L2	4	0	4	0.0	0.049	5.8	LOS A	0.2	1.2	0.12	0.10	0.12	46.8
5	T1	61	5	64	8.2	0.049	0.4	LOS A	0.2	1.2	0.12	0.10	0.12	54.0
6	R2	9	0	9	0.0	0.049	6.0	LOS A	0.2	1.2	0.12	0.10	0.12	44.7
Approach		74	5	78	6.8	0.049	1.4	NA	0.2	1.2	0.12	0.10	0.12	53.2
North: Villawood Place														
7	L2	21	0	22	0.0	0.019	5.1	LOS A	0.1	0.5	0.23	0.51	0.23	31.9
8	T1	1	0	1	0.0	0.002	5.1	LOS A	0.0	0.1	0.34	0.46	0.34	40.4
9	R2	1	0	1	0.0	0.002	5.2	LOS A	0.0	0.1	0.34	0.46	0.34	43.9
Approach		23	0	24	0.0	0.019	5.1	LOS A	0.1	0.5	0.24	0.51	0.24	33.6
West: Villawood Road														
10	L2	2	0	2	0.0	0.039	5.1	LOS A	0.0	0.0	0.00	0.02	0.00	51.8
11	T1	137	7	144	5.1	0.039	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	55.2
12	R2	1	0	1	0.0	0.001	5.0	LOS A	0.0	0.0	0.20	0.49	0.20	44.7
Approach		140	7	147	5.0	0.039	0.2	NA	0.0	0.0	0.00	0.02	0.00	55.0
All Vehicles		255	12	268	4.7	0.049	1.3	NA	0.2	1.2	0.08	0.12	0.08	52.3

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2020 Scenario - AM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 AM Peak With Dev
Signals - Actuated Isolated Cycle Time = 63 seconds (Site Practical Cycle Time)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	15	0	16	0.0	0.831	14.4	LOS A	23.6	176.0	0.80	0.74	0.80	16.3
31	T1	1915	153	2016	8.0	0.831	8.9	LOS A	23.6	176.0	0.80	0.74	0.80	50.0
32	R2	48	0	51	0.0	0.307	23.0	LOS B	1.2	8.6	0.73	0.74	0.73	34.1
Approach		1978	153	2082	7.7	0.831	9.2	LOS A	23.6	176.0	0.80	0.74	0.80	49.2
East: Llewellyn Avenue														
21	L2	20	8	21	40.0	0.120	32.4	LOS C	0.7	6.6	0.88	0.69	0.88	28.5
5	T1	4	1	4	25.0	0.120	27.7	LOS B	0.7	6.6	0.88	0.69	0.88	27.9
23	R2	57	30	60	52.6	0.297	33.7	LOS C	1.8	18.0	0.91	0.74	0.91	34.9
Approach		81	39	85	48.1	0.297	33.1	LOS C	1.8	18.0	0.90	0.72	0.90	33.3
North: Woodville Road														
24	L2	129	16	136	12.4	0.720	12.8	LOS A	17.0	130.5	0.67	0.64	0.67	49.8
25	T1	1526	169	1606	11.1	0.720	7.3	LOS A	17.0	130.5	0.68	0.63	0.68	51.1
9	R2	56	4	59	7.1	* 0.429	30.0	LOS C	1.7	12.6	0.86	0.77	0.86	32.3
Approach		1711	189	1801	11.0	0.720	8.5	LOS A	17.0	130.5	0.68	0.64	0.68	50.2
West: Villawood Road														
10	L2	93	6	98	6.5	* 0.242	17.4	LOS B	2.1	15.2	0.73	0.75	0.73	39.3
11	T1	6	0	6	0.0	0.023	26.2	LOS B	0.2	1.2	0.86	0.57	0.86	30.8
12	R2	77	2	81	2.6	0.350	33.6	LOS C	2.4	17.1	0.92	0.75	0.92	18.6
Approach		176	8	185	4.5	0.350	24.8	LOS B	2.4	17.1	0.82	0.74	0.82	30.4
All Vehicles		3946	389	4154	9.9	0.831	10.1	LOS A	23.6	176.0	0.75	0.69	0.75	48.2

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

* Critical Movement (Signal Timing)

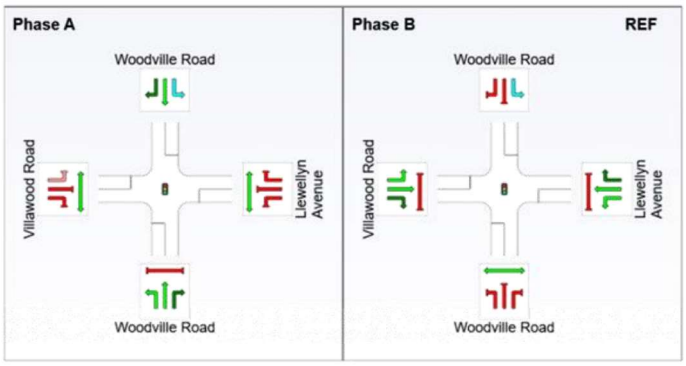
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	15	0
Green Time (sec)	42	9
Phase Time (sec)	48	15
Phase Split	76%	24%

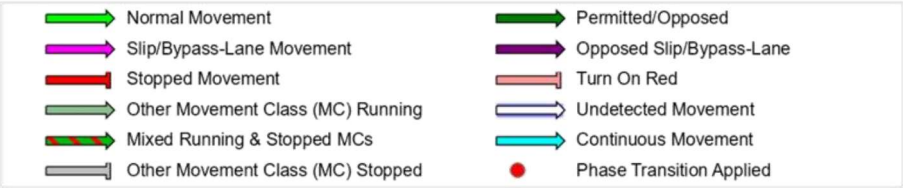
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase B
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2020 Scenario - AM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 AM Peak With Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	32	0	34	0.0	0.937	35.1	LOS C	52.1	388.2	0.98	1.02	1.12	19.7
31	T1	1936	152	2038	7.9	* 0.937	29.5	LOS C	52.6	392.9	0.98	1.02	1.12	29.1
Approach		1968	152	2072	7.7	0.937	29.6	LOS C	52.6	392.9	0.98	1.02	1.12	28.9
East: Binna Burra St														
21	L2	17	1	18	5.9	0.111	37.3	LOS C	1.4	11.2	0.82	0.66	0.82	20.5
5	T1	18	4	19	22.2	0.111	33.4	LOS C	1.4	11.2	0.82	0.66	0.82	11.0
23	R2	40	1	42	2.5	0.111	37.2	LOS C	1.5	10.6	0.82	0.70	0.82	16.5
Approach		75	6	79	8.0	0.111	36.3	LOS C	1.5	11.2	0.82	0.69	0.82	16.4
North: Woodville Road														
24	L2	36	3	38	8.3	* 0.460	12.1	LOS A	10.8	82.4	0.47	0.45	0.47	21.8
25	T1	1574	176	1657	11.2	0.460	6.8	LOS A	11.4	87.2	0.47	0.43	0.47	48.1
9	R2	11	11	12	100.0	* 0.499	64.6	LOS E	0.6	8.3	1.00	0.68	1.00	11.2
Approach		1621	190	1706	11.7	0.499	7.3	LOS A	11.4	87.2	0.47	0.43	0.47	46.8
All Vehicles		3664	348	3857	9.5	0.937	19.9	LOS B	52.6	392.9	0.75	0.75	0.83	34.5

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

* Critical Movement (Signal Timing)

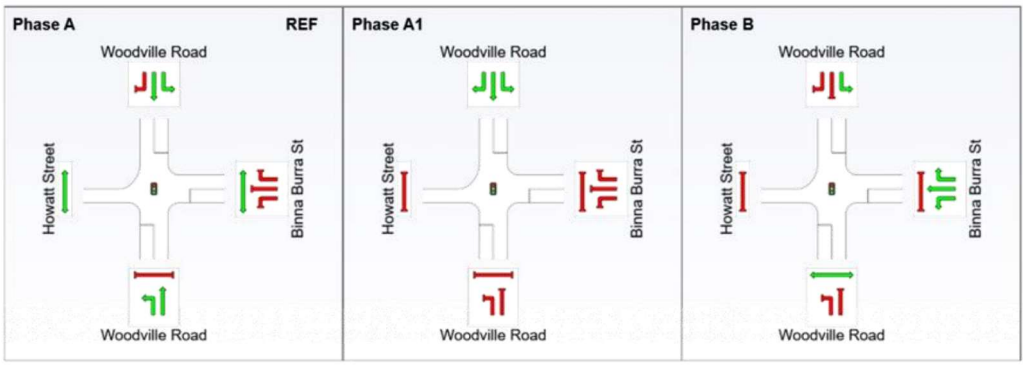
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

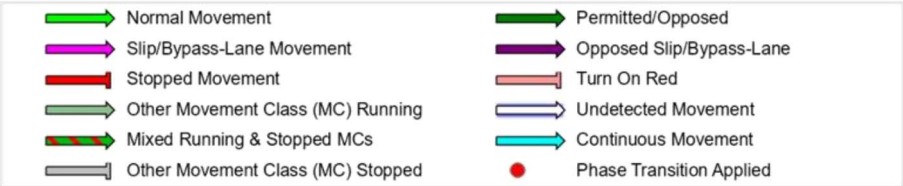
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2020 Scenario - AM Peak | With Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2020 AM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	856	105	901	12.3	0.425	6.4	LOS A	6.2	48.1	0.60	0.52	0.60	51.8
3	R2	286	8	301	2.8	* 0.713	19.9	LOS B	6.9	49.2	0.83	0.90	0.99	44.1
Approach		1142	113	1202	9.9	0.713	9.8	LOS A	6.9	49.2	0.65	0.61	0.70	49.0
East: River Avenue														
4	L2	122	20	128	16.4	0.170	8.3	LOS A	0.8	6.1	0.38	0.65	0.38	51.8
26	R2	376	35	396	9.3	* 0.632	28.2	LOS B	4.9	37.1	0.97	0.85	1.06	35.5
Approach		498	55	524	11.0	0.632	23.3	LOS B	4.9	37.1	0.83	0.80	0.90	39.2
North: The Horsley Drive														
27	L2	819	58	862	7.1	0.480	7.3	LOS A	0.0	0.0	0.00	0.52	0.00	52.6
8	T1	731	130	769	17.8	0.317	5.9	LOS A	4.1	33.3	0.54	0.46	0.54	52.5
Approach		1550	188	1632	12.1	0.480	6.7	LOS A	4.1	33.3	0.25	0.49	0.25	52.6
All Vehicles		3190	356	3358	11.2	0.713	10.4	LOS A	6.9	49.2	0.49	0.58	0.51	48.5

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

* Critical Movement (Signal Timing)

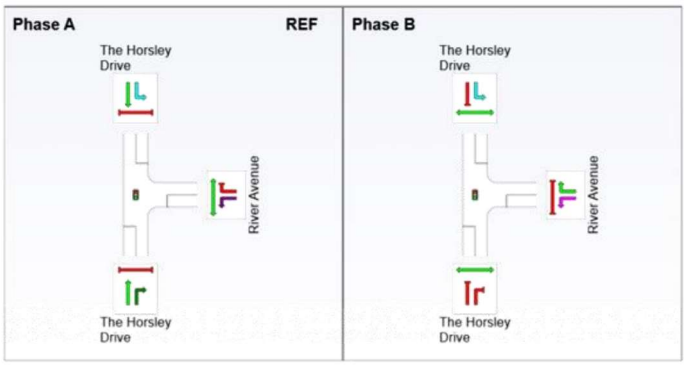
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	35
Green Time (sec)	29	9
Phase Time (sec)	35	15
Phase Split	70%	30%

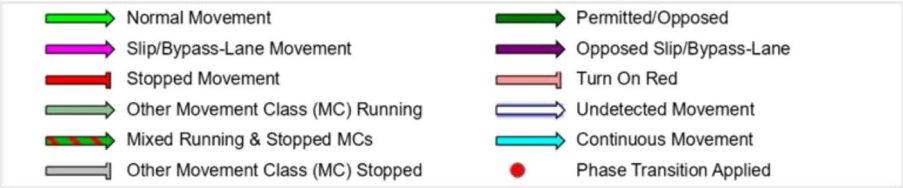
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2031 Scenario - AM Peak | Without Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2031 AM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	16	0	17	0.0	0.347	17.8	LOS B	8.4	61.8	0.60	0.53	0.60	44.4
31	T1	1803	125	1898	6.9	* 0.787	18.1	LOS B	28.3	209.6	0.82	0.76	0.83	42.0
Approach		1819	125	1915	6.9	0.787	18.1	LOS B	28.3	209.6	0.82	0.75	0.83	42.0
North: Woodville Road														
25	T1	1831	207	1927	11.3	0.570	9.2	LOS A	15.6	119.5	0.59	0.53	0.59	49.0
26	R2	12	0	13	0.0	* 0.570	20.1	LOS B	15.6	119.5	0.71	0.64	0.71	41.2
Approach		1843	207	1940	11.2	0.570	9.3	LOS A	15.6	119.5	0.59	0.53	0.59	48.9
West: Kirrang Avenue														
27	L2	8	0	8	0.0	0.028	41.6	LOS C	0.3	2.2	0.86	0.66	0.86	30.2
29	R2	198	24	208	12.1	* 0.753	47.2	LOS D	9.5	73.4	1.00	0.90	1.15	29.7
Approach		206	24	217	11.7	0.753	47.0	LOS D	9.5	73.4	0.99	0.89	1.14	29.8
All Vehicles		3868	356	4072	9.2	0.787	15.4	LOS B	28.3	209.6	0.72	0.66	0.73	43.6

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

* Critical Movement (Signal Timing)

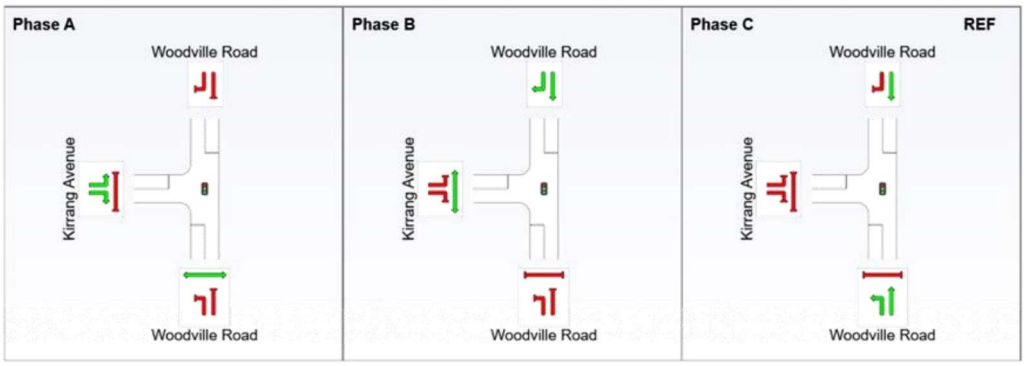
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	55	76	0
Green Time (sec)	15	8	49
Phase Time (sec)	21	14	55
Phase Split	23%	16%	61%

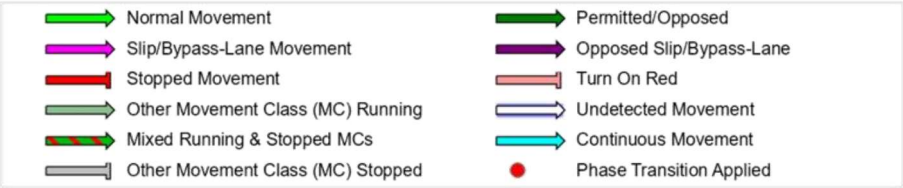
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2031 Scenario - AM Peak | Without Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2031 AM Peak Without Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	4.6	LOS A	0.0	0.0	0.08	0.50	0.08	45.3
2	T1	1	0	1	0.0	0.019	4.4	LOS A	0.1	0.5	0.23	0.52	0.23	40.6
3	R2	24	0	25	0.0	0.019	5.0	LOS A	0.1	0.5	0.23	0.52	0.23	38.6
Approach		26	0	27	0.0	0.019	4.9	LOS A	0.1	0.5	0.23	0.52	0.23	39.2
East: Villawood Road														
4	L2	6	0	6	0.0	0.038	5.1	LOS A	0.2	1.5	0.17	0.26	0.17	42.3
5	T1	22	7	23	31.8	0.038	0.4	LOS A	0.2	1.5	0.17	0.26	0.17	46.2
6	R2	17	0	18	0.0	0.038	5.2	LOS A	0.2	1.5	0.17	0.26	0.17	37.8
Approach		45	7	47	15.6	0.038	2.8	NA	0.2	1.5	0.17	0.26	0.17	44.1
North: Villawood Place														
7	L2	33	0	35	0.0	0.028	4.8	LOS A	0.1	0.7	0.15	0.50	0.15	32.4
8	T1	1	0	1	0.0	0.002	4.4	LOS A	0.0	0.1	0.23	0.45	0.23	41.1
9	R2	1	0	1	0.0	0.002	4.9	LOS A	0.0	0.1	0.23	0.45	0.23	44.3
Approach		35	0	37	0.0	0.028	4.8	LOS A	0.1	0.7	0.15	0.50	0.15	33.6
West: Villawood Road														
10	L2	1	0	1	0.0	0.018	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	49.0
11	T1	62	6	65	9.7	0.018	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
12	R2	1	0	1	0.0	0.001	4.8	LOS A	0.0	0.0	0.13	0.50	0.13	44.9
Approach		64	6	67	9.4	0.018	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.8
All Vehicles		170	13	179	7.6	0.038	2.6	NA	0.2	1.5	0.11	0.26	0.11	44.8

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2031 Scenario - AM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 AM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 59 seconds (Site Practical Cycle Time)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	15	0	16	0.0	0.802	14.3	LOS A	20.5	151.6	0.79	0.72	0.79	16.3
31	T1	1796	125	1891	7.0	0.802	8.7	LOS A	20.5	151.6	0.79	0.72	0.79	50.1
32	R2	45	2	47	4.4	0.340	30.3	LOS C	1.3	9.5	0.87	0.75	0.87	30.7
Approach		1856	127	1954	6.8	0.802	9.3	LOS A	20.5	151.6	0.79	0.72	0.79	49.1
East: Llewellyn Avenue														
21	L2	17	6	18	35.3	0.092	29.9	LOS C	0.5	5.0	0.87	0.68	0.87	29.3
5	T1	3	1	3	33.3	0.092	25.0	LOS B	0.5	5.0	0.87	0.68	0.87	28.4
23	R2	81	42	85	51.9	* 0.383	31.8	LOS C	2.4	24.0	0.92	0.76	0.92	35.6
Approach		101	49	106	48.5	0.383	31.3	LOS C	2.4	24.0	0.91	0.74	0.91	34.6
North: Woodville Road														
24	L2	117	19	123	16.2	0.870	16.3	LOS B	25.2	194.6	0.85	0.82	0.89	47.6
25	T1	1805	207	1900	11.5	* 0.870	10.8	LOS A	25.2	194.6	0.86	0.82	0.89	48.0
9	R2	27	6	28	22.2	0.202	26.1	LOS B	0.7	5.8	0.78	0.72	0.78	34.1
Approach		1949	232	2052	11.9	0.870	11.4	LOS A	25.2	194.6	0.86	0.82	0.89	47.7
West: Villawood Road														
10	L2	37	5	39	13.5	0.093	13.7	LOS A	0.6	4.9	0.62	0.68	0.62	41.3
11	T1	8	0	8	0.0	0.028	24.1	LOS B	0.2	1.5	0.86	0.57	0.86	30.6
12	R2	72	1	76	1.4	0.298	30.7	LOS C	2.1	14.6	0.90	0.75	0.90	19.6
Approach		117	6	123	5.1	0.298	24.9	LOS B	2.1	14.6	0.81	0.71	0.81	27.7
All Vehicles		4023	414	4235	10.3	0.870	11.3	LOS A	25.2	194.6	0.83	0.77	0.84	47.2

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

* Critical Movement (Signal Timing)

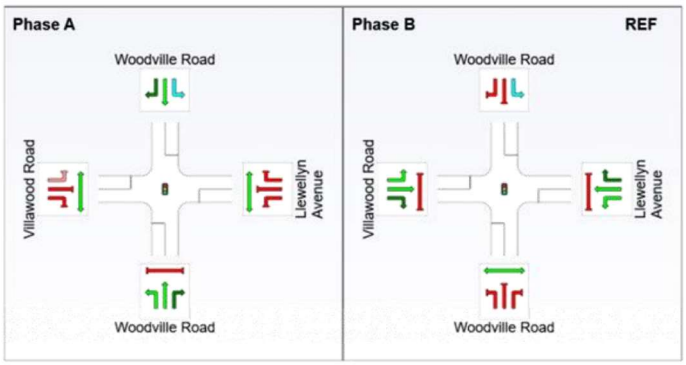
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	15	0
Green Time (sec)	38	9
Phase Time (sec)	44	15
Phase Split	75%	25%

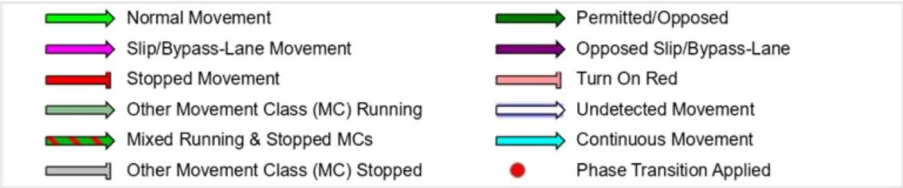
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase B
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2031 Scenario - AM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 AM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	17	0	18	0.0	0.858	23.1	LOS B	35.8	265.4	0.88	0.83	0.89	24.3
31	T1	1797	123	1892	6.8	* 0.858	17.5	LOS B	36.2	268.4	0.88	0.83	0.89	36.8
Approach		1814	123	1909	6.8	0.858	17.6	LOS B	36.2	268.4	0.88	0.83	0.89	36.6
East: Binna Burra St														
21	L2	44	1	46	2.3	0.195	38.1	LOS C	2.6	20.1	0.84	0.71	0.84	20.2
5	T1	22	6	23	27.3	0.195	34.2	LOS C	2.6	20.1	0.84	0.71	0.84	10.5
23	R2	63	3	66	4.8	0.186	38.0	LOS C	2.5	18.2	0.84	0.73	0.84	16.2
Approach		129	10	136	7.8	0.195	37.4	LOS C	2.6	20.1	0.84	0.72	0.84	16.8
North: Woodville Road														
24	L2	63	5	66	7.9	* 0.539	12.6	LOS A	13.6	104.3	0.51	0.50	0.51	21.5
25	T1	1810	208	1905	11.5	0.539	7.3	LOS A	14.5	111.4	0.51	0.47	0.51	47.3
9	R2	20	20	21	100.0	* 0.907	66.4	LOS E	1.2	15.5	1.00	0.73	1.10	10.9
Approach		1893	233	1993	12.3	0.907	8.1	LOS A	14.5	111.4	0.51	0.48	0.52	45.4
All Vehicles		3836	366	4038	9.5	0.907	13.6	LOS A	36.2	268.4	0.70	0.65	0.71	39.5

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

* Critical Movement (Signal Timing)

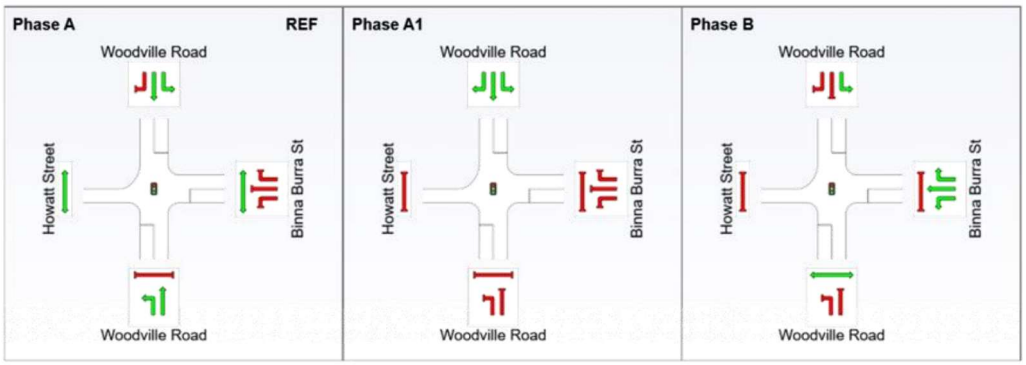
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

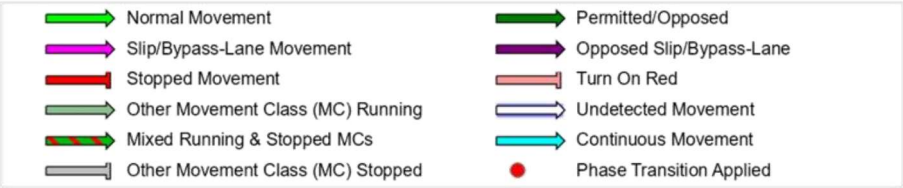
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2031 Scenario - AM Peak | Without Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2031 AM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	756	95	796	12.6	0.376	6.1	LOS A	5.3	41.0	0.57	0.50	0.57	52.1
3	R2	300	8	316	2.7	* 0.894	40.5	LOS C	11.6	83.3	0.98	1.20	1.70	35.0
Approach		1056	103	1112	9.8	0.894	15.9	LOS B	11.6	83.3	0.69	0.70	0.89	44.2
East: River Avenue														
4	L2	148	27	156	18.2	0.230	9.3	LOS A	1.2	9.7	0.45	0.67	0.45	51.2
26	R2	429	38	452	8.9	* 0.719	29.6	LOS C	5.9	44.2	0.99	0.90	1.19	34.8
Approach		577	65	607	11.3	0.719	24.4	LOS B	5.9	44.2	0.85	0.84	1.00	38.7
North: The Horsley Drive														
27	L2	826	49	869	5.9	0.480	7.4	LOS A	0.0	0.0	0.00	0.52	0.00	52.7
8	T1	915	150	963	16.4	0.393	6.2	LOS A	5.5	43.7	0.57	0.49	0.57	52.2
Approach		1741	199	1833	11.4	0.480	6.8	LOS A	5.5	43.7	0.30	0.50	0.30	52.4
All Vehicles		3374	367	3552	10.9	0.894	12.7	LOS A	11.6	83.3	0.52	0.62	0.60	46.6

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

* Critical Movement (Signal Timing)

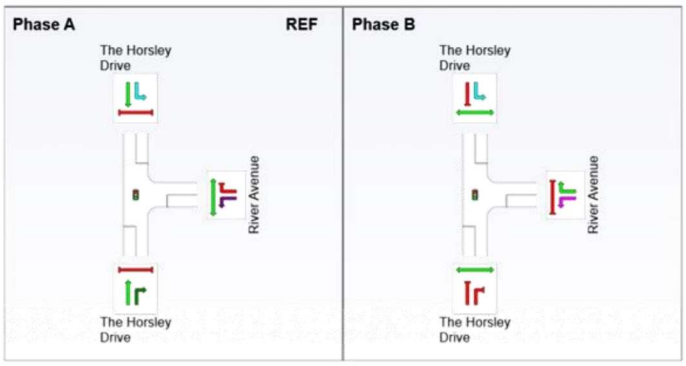
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	35
Green Time (sec)	29	9
Phase Time (sec)	35	15
Phase Split	70%	30%

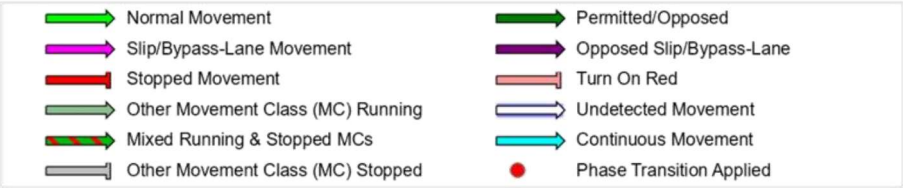
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2031 Scenario - AM Peak | With Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2031 AM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	66	0	69	0.0	0.353	19.9	LOS B	10.4	76.0	0.59	0.57	0.59	45.0
31	T1	1818	125	1914	6.9	* 0.800	20.6	LOS B	34.8	258.3	0.83	0.76	0.83	40.1
Approach		1884	125	1983	6.6	0.800	20.6	LOS B	34.8	258.3	0.82	0.76	0.82	40.3
North: Woodville Road														
25	T1	1850	207	1947	11.2	0.594	12.4	LOS A	20.1	154.3	0.62	0.56	0.62	46.0
26	R2	12	0	13	0.0	* 0.594	26.4	LOS B	19.7	150.6	0.77	0.69	0.77	37.7
Approach		1862	207	1960	11.1	0.594	12.5	LOS A	20.1	154.3	0.62	0.57	0.62	45.9
West: Kirrang Avenue														
27	L2	8	0	8	0.0	0.023	45.4	LOS D	0.4	2.5	0.83	0.66	0.83	29.0
29	R2	255	24	268	9.4	* 0.797	55.0	LOS D	14.9	112.6	1.00	0.91	1.15	28.2
Approach		263	24	277	9.1	0.797	54.7	LOS D	14.9	112.6	0.99	0.90	1.14	28.2
All Vehicles		4009	356	4220	8.9	0.800	19.1	LOS B	34.8	258.3	0.74	0.68	0.75	41.1

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

* Critical Movement (Signal Timing)

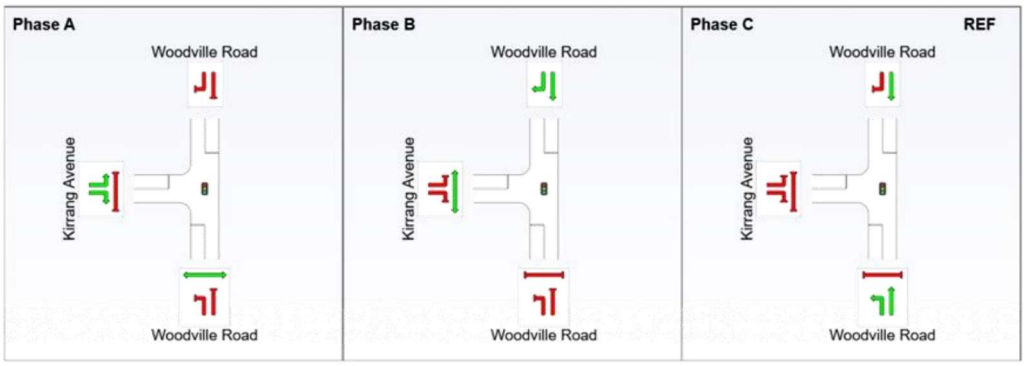
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	67	95	0
Green Time (sec)	22	9	61
Phase Time (sec)	28	15	67
Phase Split	25%	14%	61%

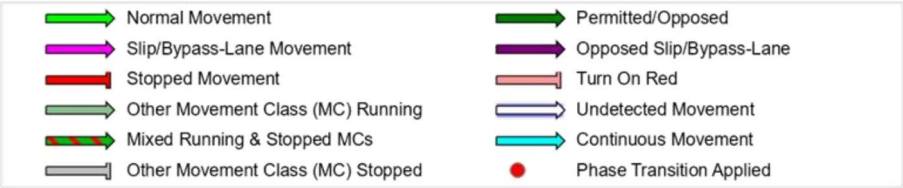
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2031 Scenario - AM Peak | With Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2031 AM Peak With Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	4.8	LOS A	0.0	0.0	0.14	0.49	0.14	45.1
2	T1	1	0	1	0.0	0.021	5.3	LOS A	0.1	0.6	0.33	0.55	0.33	40.1
3	R2	24	0	25	0.0	0.021	5.4	LOS A	0.1	0.6	0.33	0.55	0.33	38.2
Approach		26	0	27	0.0	0.021	5.3	LOS A	0.1	0.6	0.32	0.54	0.32	38.7
East: Villawood Road														
4	L2	6	0	6	0.0	0.061	5.9	LOS A	0.3	2.1	0.19	0.16	0.19	45.2
5	T1	60	7	63	11.7	0.061	0.7	LOS A	0.3	2.1	0.19	0.16	0.19	52.8
6	R2	17	0	18	0.0	0.061	6.0	LOS A	0.3	2.1	0.19	0.16	0.19	42.1
Approach		83	7	87	8.4	0.061	2.2	NA	0.3	2.1	0.19	0.16	0.19	51.4
North: Villawood Place														
7	L2	33	0	35	0.0	0.030	5.1	LOS A	0.1	0.7	0.24	0.52	0.24	31.8
8	T1	1	0	1	0.0	0.002	5.2	LOS A	0.0	0.1	0.35	0.47	0.35	40.4
9	R2	1	0	1	0.0	0.002	5.2	LOS A	0.0	0.1	0.35	0.47	0.35	43.8
Approach		35	0	37	0.0	0.030	5.1	LOS A	0.1	0.7	0.24	0.51	0.24	33.0
West: Villawood Road														
10	L2	1	0	1	0.0	0.039	5.1	LOS A	0.0	0.0	0.00	0.01	0.00	51.7
11	T1	141	6	148	4.3	0.039	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	55.1
12	R2	1	0	1	0.0	0.001	5.1	LOS A	0.0	0.0	0.21	0.49	0.21	44.6
Approach		143	6	151	4.2	0.039	0.1	NA	0.0	0.0	0.00	0.01	0.00	55.0
All Vehicles		287	13	302	4.5	0.061	1.8	NA	0.3	2.1	0.12	0.16	0.12	51.0

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2031 Scenario - AM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 AM Peak With Dev
Signals - Actuated Isolated Cycle Time = 63 seconds (Site Practical Cycle Time)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	18	0	19	0.0	0.795	14.5	LOS B	21.4	158.8	0.77	0.71	0.77	16.3
31	T1	1796	125	1891	7.0	0.795	9.0	LOS A	21.4	158.8	0.77	0.71	0.77	49.8
32	R2	45	2	47	4.4	* 0.359	32.0	LOS C	1.4	10.1	0.87	0.76	0.87	30.0
Approach		1859	127	1957	6.8	0.795	9.6	LOS A	21.4	158.8	0.78	0.71	0.78	48.8
East: Llewellyn Avenue														
21	L2	17	6	18	35.3	0.096	31.1	LOS C	0.6	5.7	0.86	0.68	0.86	29.3
5	T1	5	1	5	20.0	0.096	26.3	LOS B	0.6	5.7	0.86	0.68	0.86	28.5
23	R2	81	42	85	51.9	* 0.391	33.3	LOS C	2.5	25.5	0.91	0.76	0.91	35.1
Approach		103	49	108	47.6	0.391	32.6	LOS C	2.5	25.5	0.90	0.74	0.90	34.1
North: Woodville Road														
24	L2	117	19	123	16.2	0.861	16.1	LOS B	25.9	199.7	0.84	0.80	0.86	47.7
25	T1	1805	207	1900	11.5	0.861	10.7	LOS A	25.9	199.7	0.85	0.80	0.87	48.1
9	R2	60	6	63	10.0	0.443	28.4	LOS B	1.8	13.5	0.84	0.77	0.84	33.0
Approach		1982	232	2086	11.7	0.861	11.5	LOS A	25.9	199.7	0.84	0.80	0.87	47.5
West: Villawood Road														
10	L2	92	5	97	5.4	0.219	15.3	LOS B	1.9	13.6	0.68	0.74	0.68	40.8
11	T1	10	0	11	0.0	0.034	25.4	LOS B	0.3	2.0	0.85	0.58	0.85	30.7
12	R2	94	1	99	1.1	0.385	32.8	LOS C	2.9	20.4	0.91	0.76	0.91	19.0
Approach		196	6	206	3.1	0.385	24.2	LOS B	2.9	20.4	0.80	0.74	0.80	30.2
All Vehicles		4140	414	4358	10.0	0.861	11.8	LOS A	25.9	199.7	0.81	0.76	0.82	46.7

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

* Critical Movement (Signal Timing)

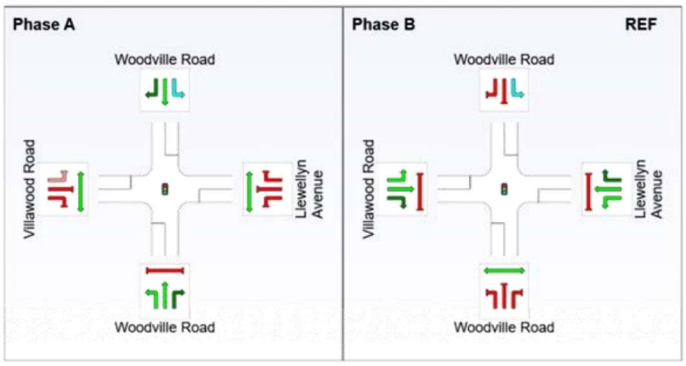
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	16	0
Green Time (sec)	41	10
Phase Time (sec)	47	16
Phase Split	75%	25%

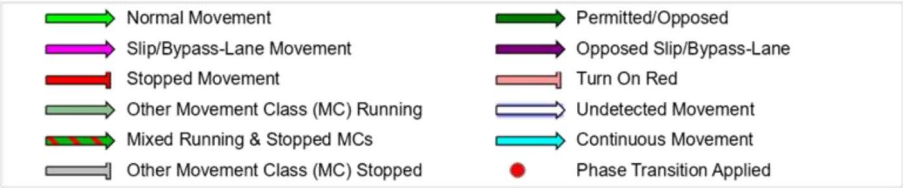
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase B
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2031 Scenario - AM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 AM Peak With Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	29	0	31	0.0	0.865	23.7	LOS B	36.9	272.6	0.88	0.84	0.91	24.0
31	T1	1799	123	1894	6.8	* 0.865	18.1	LOS B	37.2	276.0	0.88	0.84	0.91	36.3
Approach		1828	123	1924	6.7	0.865	18.2	LOS B	37.2	276.0	0.88	0.84	0.91	36.0
East: Binna Burra St														
21	L2	44	1	46	2.3	0.198	38.1	LOS C	2.7	20.3	0.84	0.71	0.84	20.2
5	T1	23	6	24	26.1	0.198	34.3	LOS C	2.7	20.3	0.84	0.71	0.84	10.5
23	R2	65	3	68	4.6	0.191	38.0	LOS C	2.6	18.8	0.84	0.73	0.84	16.1
Approach		132	10	139	7.6	0.198	37.4	LOS C	2.7	20.3	0.84	0.72	0.84	16.8
North: Woodville Road														
24	L2	65	5	68	7.7	* 0.545	12.6	LOS A	13.9	106.2	0.51	0.50	0.51	21.5
25	T1	1831	208	1927	11.4	0.545	7.3	LOS A	14.8	113.4	0.51	0.48	0.51	47.2
9	R2	20	20	21	100.0	* 0.907	66.4	LOS E	1.2	15.5	1.00	0.73	1.10	10.9
Approach		1916	233	2017	12.2	0.907	8.1	LOS A	14.8	113.4	0.52	0.48	0.52	45.3
All Vehicles		3876	366	4080	9.4	0.907	13.9	LOS A	37.2	276.0	0.70	0.66	0.71	39.1

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

* Critical Movement (Signal Timing)

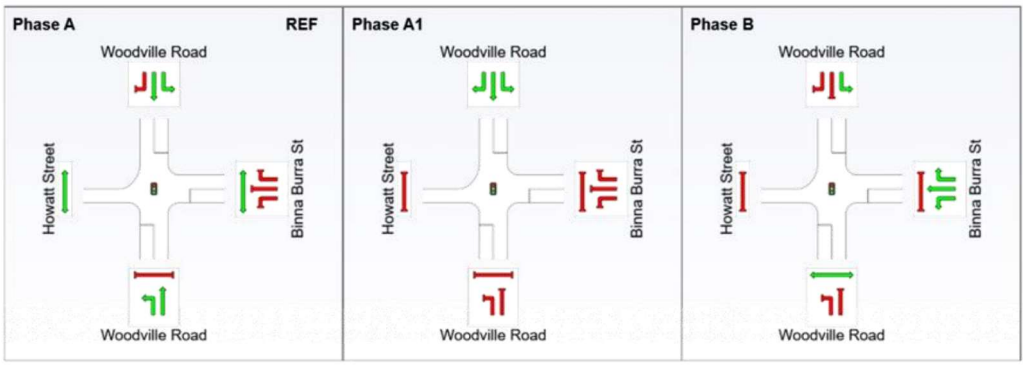
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

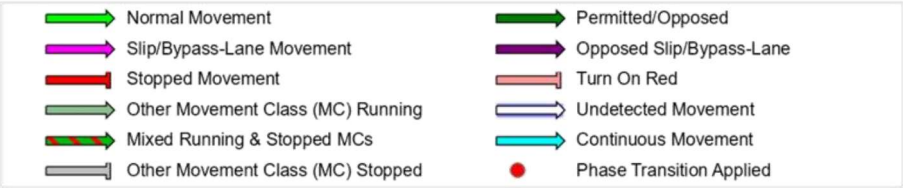
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2031 Scenario - AM Peak | With Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2031 AM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	758	95	798	12.5	0.377	6.1	LOS A	5.3	41.1	0.57	0.50	0.57	52.1
3	R2	300	8	316	2.7	* 0.896	40.8	LOS C	11.7	83.8	0.98	1.20	1.71	34.9
Approach		1058	103	1114	9.7	0.896	16.0	LOS B	11.7	83.8	0.69	0.70	0.90	44.2
East: River Avenue														
4	L2	148	27	156	18.2	0.230	9.3	LOS A	1.2	9.7	0.45	0.67	0.45	51.2
26	R2	429	38	452	8.9	* 0.719	29.6	LOS C	5.9	44.2	0.99	0.90	1.19	34.8
Approach		577	65	607	11.3	0.719	24.4	LOS B	5.9	44.2	0.85	0.84	1.00	38.7
North: The Horsley Drive														
27	L2	826	49	869	5.9	0.480	7.4	LOS A	0.0	0.0	0.00	0.52	0.00	52.7
8	T1	917	150	965	16.4	0.394	6.2	LOS A	5.5	43.8	0.57	0.49	0.57	52.2
Approach		1743	199	1835	11.4	0.480	6.8	LOS A	5.5	43.8	0.30	0.50	0.30	52.4
All Vehicles		3378	367	3556	10.9	0.896	12.7	LOS A	11.7	83.8	0.52	0.62	0.61	46.6

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

* Critical Movement (Signal Timing)

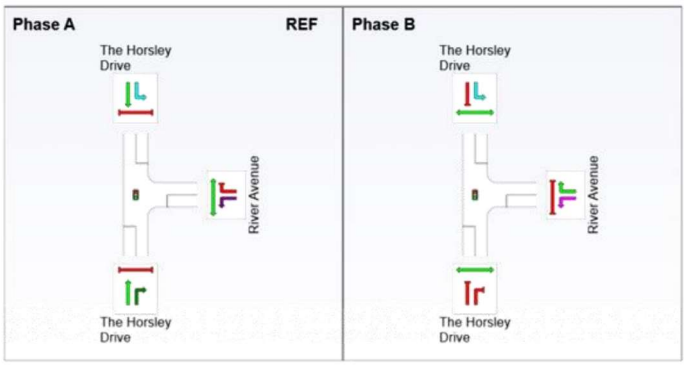
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	35
Green Time (sec)	29	9
Phase Time (sec)	35	15
Phase Split	70%	30%

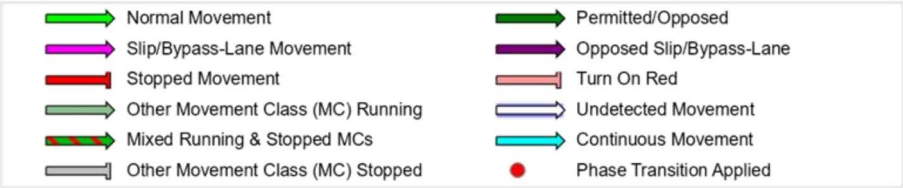
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2020 Scenario - PM Peak | Without Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2020 PM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	48	0	51	0.0	0.303	16.0	LOS B	6.3	46.6	0.58	0.54	0.58	45.1
31	T1	1544	130	1625	8.4	* 0.688	13.8	LOS A	19.5	146.0	0.75	0.68	0.75	45.0
Approach		1592	130	1676	8.2	0.688	13.9	LOS A	19.5	146.0	0.74	0.68	0.74	45.0
North: Woodville Road														
25	T1	1780	143	1874	8.0	0.488	5.4	LOS A	10.7	80.2	0.48	0.43	0.48	53.0
Approach		1780	143	1874	8.0	0.488	5.4	LOS A	10.7	80.2	0.48	0.43	0.48	53.0
West: Kirrang Avenue														
27	L2	17	0	18	0.0	0.071	39.9	LOS C	0.6	4.4	0.90	0.69	0.90	30.5
29	R2	89	0	94	0.0	* 0.373	39.9	LOS C	3.5	24.3	0.95	0.77	0.95	32.0
Approach		106	0	112	0.0	0.373	39.9	LOS C	3.5	24.3	0.94	0.75	0.94	31.8
All Vehicles		3478	273	3661	7.8	0.688	10.3	LOS A	19.5	146.0	0.61	0.55	0.61	47.9

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

* Critical Movement (Signal Timing)

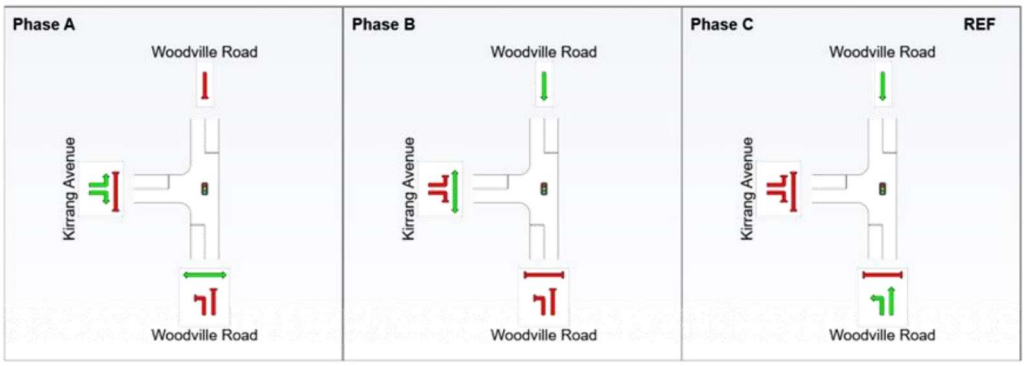
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	50	67	0
Green Time (sec)	11	7	44
Phase Time (sec)	17	13	50
Phase Split	21%	16%	63%

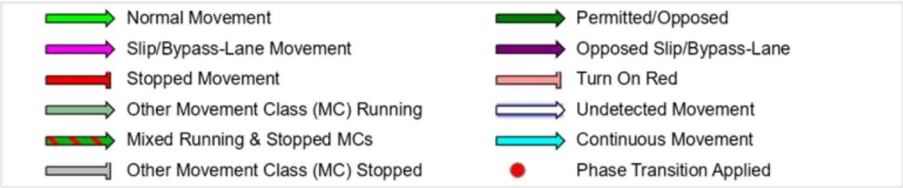
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2020 Scenario - PM Peak | Without Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2020 PM Peak Without Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	5.3	LOS A	0.0	0.0	0.28	0.49	0.28	44.6
2	T1	1	0	1	0.0	0.034	7.4	LOS A	0.1	0.9	0.46	0.63	0.46	39.3
3	R2	32	0	34	0.0	0.034	6.3	LOS A	0.1	0.9	0.46	0.63	0.46	37.4
Approach		34	0	36	0.0	0.034	6.3	LOS A	0.1	0.9	0.45	0.62	0.45	37.9
East: Villawood Road														
4	L2	31	0	33	0.0	0.214	6.4	LOS A	1.2	8.9	0.26	0.17	0.26	43.3
5	T1	194	5	204	2.6	0.214	1.0	LOS A	1.2	8.9	0.26	0.17	0.26	46.8
6	R2	62	0	65	0.0	0.214	6.7	LOS A	1.2	8.9	0.26	0.17	0.26	39.2
Approach		287	5	302	1.7	0.214	2.8	NA	1.2	8.9	0.26	0.17	0.26	45.8
North: Villawood Place														
7	L2	47	0	49	0.0	0.043	5.2	LOS A	0.2	1.1	0.26	0.53	0.26	31.7
8	T1	1	0	1	0.0	0.003	7.5	LOS A	0.0	0.1	0.50	0.53	0.50	38.9
9	R2	1	0	1	0.0	0.003	6.0	LOS A	0.0	0.1	0.50	0.53	0.50	42.9
Approach		49	0	52	0.0	0.043	5.3	LOS A	0.2	1.1	0.27	0.53	0.27	32.5
West: Villawood Road														
10	L2	2	0	2	0.0	0.045	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.0
11	T1	162	5	171	3.1	0.045	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.9
12	R2	1	0	1	0.0	0.001	6.5	LOS A	0.0	0.0	0.40	0.51	0.40	43.8
Approach		165	5	174	3.0	0.045	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		535	10	563	1.9	0.214	2.4	NA	1.2	8.9	0.19	0.18	0.19	46.1

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2020 Scenario - PM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 PM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 85 seconds (Site Practical Cycle Time)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	55	0	58	0.0	0.756	20.1	LOS B	25.1	187.5	0.79	0.73	0.79	14.8
31	T1	1490	128	1568	8.6	0.756	14.5	LOS B	25.1	187.5	0.79	0.73	0.79	45.0
32	R2	14	1	15	7.1	0.148	43.2	LOS D	0.6	4.3	0.88	0.71	0.88	26.1
Approach		1559	129	1641	8.3	0.756	15.0	LOS B	25.1	187.5	0.79	0.73	0.79	43.6
East: Llewellyn Avenue														
21	L2	86	12	91	14.0	0.515	33.1	LOS C	6.0	44.5	0.83	0.72	0.83	29.5
5	T1	80	1	84	1.3	0.515	28.4	LOS B	6.0	44.5	0.83	0.72	0.83	27.7
23	R2	139	35	146	25.2	* 0.559	34.5	LOS C	5.2	44.3	0.85	0.78	0.85	35.1
Approach		305	48	321	15.7	0.559	32.5	LOS C	6.0	44.5	0.84	0.75	0.84	32.1
North: Woodville Road														
24	L2	80	15	84	18.8	0.874	23.9	LOS B	35.2	264.3	0.90	0.86	0.93	43.3
25	T1	1719	129	1809	7.5	0.874	18.4	LOS B	35.2	264.3	0.90	0.86	0.94	42.3
9	R2	151	4	159	2.6	* 1.196	226.7	LOS F	19.0	136.1	1.00	1.61	3.00	8.3
Approach		1950	148	2053	7.6	1.196	34.7	LOS C	35.2	264.3	0.91	0.92	1.10	33.4
West: Villawood Road														
10	L2	165	4	174	2.4	0.275	17.4	LOS B	4.8	34.3	0.70	0.76	0.70	39.0
11	T1	3	1	3	33.3	0.007	24.8	LOS B	0.1	0.9	0.73	0.48	0.73	30.3
12	R2	76	0	80	0.0	0.289	37.9	LOS C	2.9	20.5	0.87	0.75	0.87	17.2
Approach		244	5	257	2.0	0.289	23.9	LOS B	4.8	34.3	0.76	0.75	0.76	32.2
All Vehicles		4058	330	4272	8.1	1.196	26.3	LOS B	35.2	264.3	0.85	0.82	0.94	36.5

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

* Critical Movement (Signal Timing)

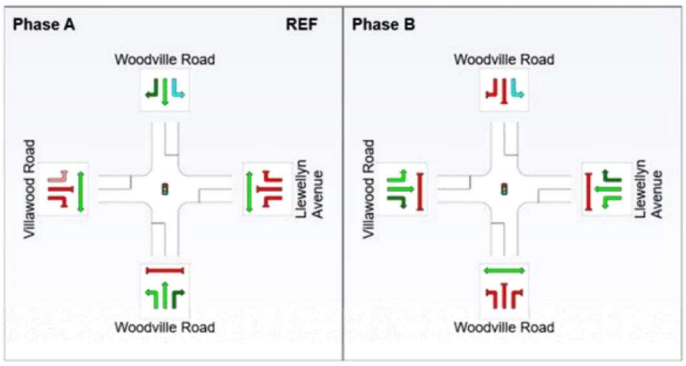
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	56
Green Time (sec)	50	23
Phase Time (sec)	56	29
Phase Split	66%	34%

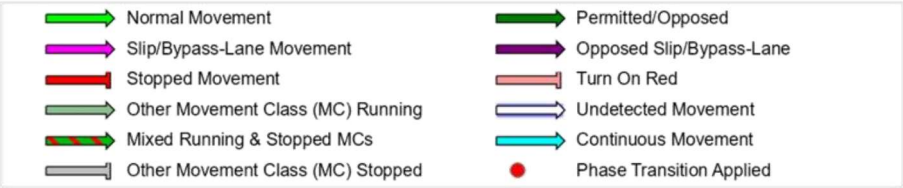
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2020 Scenario - PM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 PM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	60	0	63	0.0	0.740	19.8	LOS B	25.8	192.5	0.76	0.71	0.76	25.7
31	T1	1488	128	1566	8.6	* 0.740	14.3	LOS A	26.0	195.5	0.76	0.70	0.76	39.4
Approach		1548	128	1629	8.3	0.740	14.5	LOS B	26.0	195.5	0.76	0.70	0.76	38.8
East: Binna Burra St														
21	L2	23	0	24	0.0	0.220	38.2	LOS C	3.1	22.8	0.85	0.69	0.85	20.8
5	T1	52	4	55	7.7	0.220	34.4	LOS C	3.1	22.8	0.85	0.69	0.85	11.0
23	R2	80	0	84	0.0	0.220	38.2	LOS C	3.1	22.8	0.85	0.74	0.85	16.2
Approach		155	4	163	2.6	0.220	36.9	LOS C	3.1	22.8	0.85	0.71	0.85	15.5
North: Woodville Road														
24	L2	134	2	141	1.5	* 0.523	11.4	LOS A	12.4	92.0	0.49	0.51	0.49	21.7
25	T1	1739	139	1831	8.0	0.523	6.9	LOS A	14.1	105.3	0.50	0.47	0.50	47.5
9	R2	12	12	13	100.0	* 0.544	64.8	LOS E	0.7	9.0	1.00	0.68	1.00	11.1
Approach		1885	153	1984	8.1	0.544	7.6	LOS A	14.1	105.3	0.50	0.47	0.50	44.9
All Vehicles		3588	285	3777	7.9	0.740	11.9	LOS A	26.0	195.5	0.63	0.58	0.63	40.4

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

* Critical Movement (Signal Timing)

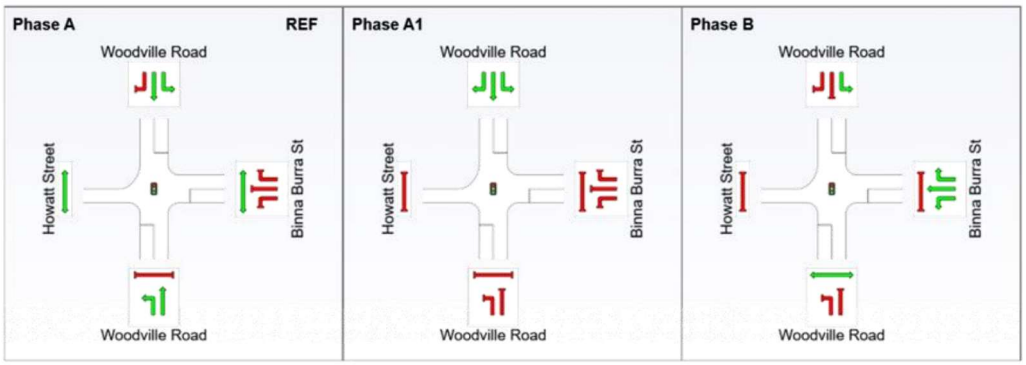
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

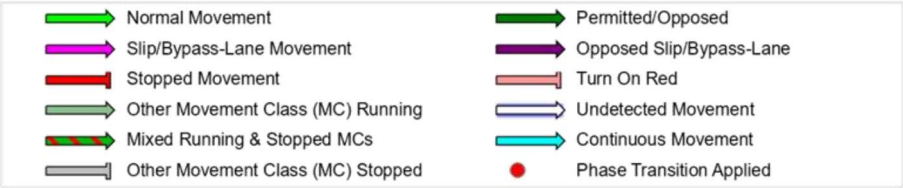
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2020 Scenario - PM Peak | Without Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2020 PM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	983	120	1035	12.2	0.673	13.4	LOS A	10.7	83.0	0.86	0.77	0.89	45.1
3	R2	175	4	184	2.3	* 0.588	23.3	LOS B	4.2	29.9	0.90	0.83	0.95	42.3
Approach		1158	124	1219	10.7	0.673	14.9	LOS B	10.7	83.0	0.87	0.78	0.90	44.5
East: River Avenue														
4	L2	214	20	225	9.3	0.237	9.0	LOS A	1.8	13.3	0.46	0.68	0.46	51.5
26	R2	737	38	776	5.2	* 0.638	21.4	LOS B	8.4	61.4	0.90	0.83	0.92	39.3
Approach		951	58	1001	6.1	0.638	18.6	LOS B	8.4	61.4	0.80	0.80	0.81	42.1
North: The Horsley Drive														
27	L2	582	29	613	5.0	0.336	6.2	LOS A	0.0	0.0	0.00	0.53	0.00	52.8
8	T1	725	65	763	9.0	0.412	11.1	LOS A	5.6	42.5	0.73	0.62	0.73	47.2
Approach		1307	94	1376	7.2	0.412	8.9	LOS A	5.6	42.5	0.41	0.58	0.41	49.7
All Vehicles		3416	276	3596	8.1	0.673	13.6	LOS A	10.7	83.0	0.67	0.71	0.69	45.5

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

* Critical Movement (Signal Timing)

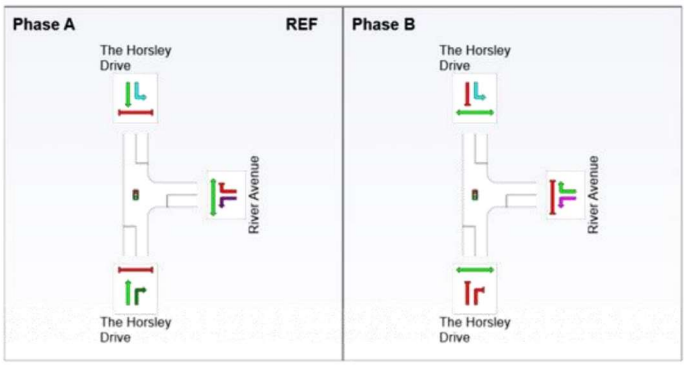
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	27
Green Time (sec)	21	17
Phase Time (sec)	27	23
Phase Split	54%	46%

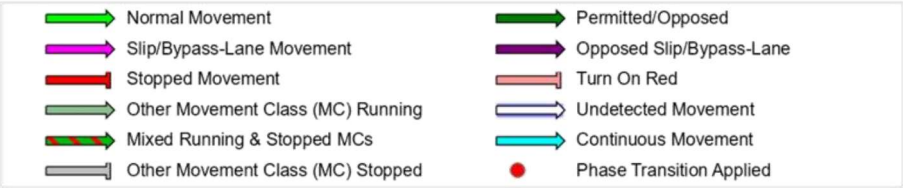
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2020 Scenario - PM Peak | With Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2020 PM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	140	0	147	0.0	0.328	16.1	LOS B	6.9	50.3	0.59	0.62	0.59	46.2
31	T1	1583	130	1666	8.2	* 0.743	14.5	LOS B	22.2	166.0	0.80	0.73	0.80	44.2
Approach		1723	130	1814	7.5	0.743	14.7	LOS B	22.2	166.0	0.78	0.72	0.78	44.4
North: Woodville Road														
25	T1	1804	143	1899	7.9	* 0.573	9.4	LOS A	14.5	108.0	0.63	0.57	0.63	48.8
Approach		1804	143	1899	7.9	0.573	9.4	LOS A	14.5	108.0	0.63	0.57	0.63	48.8
West: Kirrang Avenue														
27	L2	17	0	18	0.0	0.071	40.0	LOS C	0.6	4.4	0.90	0.69	0.90	30.5
29	R2	163	0	172	0.0	* 0.684	43.3	LOS D	6.9	48.0	1.00	0.85	1.10	31.9
Approach		180	0	189	0.0	0.684	42.9	LOS D	6.9	48.0	0.99	0.84	1.08	31.8
All Vehicles		3707	273	3902	7.4	0.743	13.5	LOS A	22.2	166.0	0.72	0.65	0.72	45.2

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

* Critical Movement (Signal Timing)

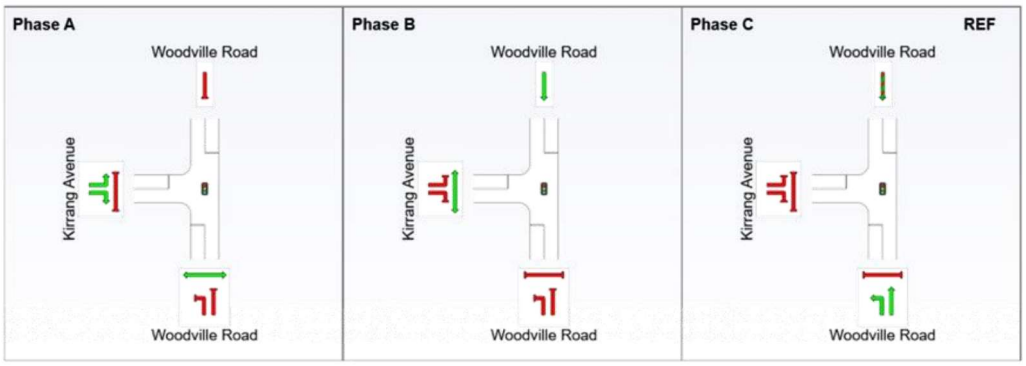
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	50	67	0
Green Time (sec)	11	7	44
Phase Time (sec)	17	13	50
Phase Split	21%	16%	63%

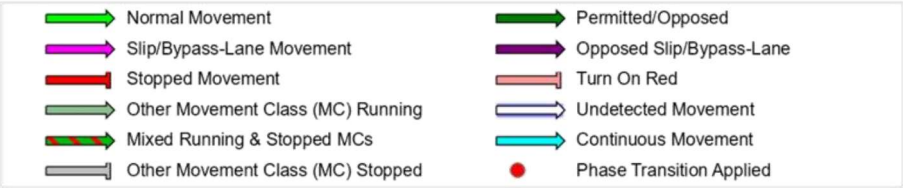
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2020 Scenario - PM Peak | With Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2020 PM Peak With Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	5.7	LOS A	0.0	0.0	0.34	0.50	0.34	44.5
2	T1	1	0	1	0.0	0.042	10.1	LOS A	0.2	1.1	0.54	0.70	0.54	38.0
3	R2	32	0	34	0.0	0.042	7.3	LOS A	0.2	1.1	0.54	0.70	0.54	36.2
Approach		34	0	36	0.0	0.042	7.3	LOS A	0.2	1.1	0.53	0.69	0.53	36.7
East: Villawood Road														
4	L2	31	0	33	0.0	0.272	8.1	LOS A	1.7	12.1	0.30	0.14	0.30	42.8
5	T1	273	5	287	1.8	0.272	1.7	LOS A	1.7	12.1	0.30	0.14	0.30	48.6
6	R2	62	0	65	0.0	0.272	8.5	LOS A	1.7	12.1	0.30	0.14	0.30	38.4
Approach		366	5	385	1.4	0.272	3.4	NA	1.7	12.1	0.30	0.14	0.30	47.5
North: Villawood Place														
7	L2	47	0	49	0.0	0.048	5.7	LOS A	0.2	1.2	0.34	0.57	0.34	31.2
8	T1	1	0	1	0.0	0.004	10.2	LOS A	0.0	0.1	0.58	0.59	0.58	36.9
9	R2	1	0	1	0.0	0.004	6.8	LOS A	0.0	0.1	0.58	0.59	0.58	41.5
Approach		49	0	52	0.0	0.048	5.8	LOS A	0.2	1.2	0.35	0.57	0.35	31.9
West: Villawood Road														
10	L2	2	0	2	0.0	0.073	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	51.9
11	T1	264	5	278	1.9	0.073	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	53.4
12	R2	1	0	1	0.0	0.002	7.4	LOS A	0.0	0.0	0.47	0.54	0.47	43.2
Approach		267	5	281	1.9	0.073	0.1	NA	0.0	0.0	0.00	0.01	0.00	53.3
All Vehicles		716	10	754	1.4	0.272	2.5	NA	1.7	12.1	0.21	0.15	0.21	48.8

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2020 Scenario - PM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 PM Peak With Dev
Signals - Actuated Isolated Cycle Time = 85 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B
Output Phase Sequence: A, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	64	0	67	0.0	0.704	17.0	LOS B	22.4	167.3	0.70	0.66	0.70	15.5
31	T1	1490	128	1568	8.6	0.704	11.4	LOS A	22.4	167.3	0.70	0.65	0.70	47.5
32	R2	14	1	15	7.1	0.139	34.9	LOS C	0.5	3.8	0.78	0.71	0.78	28.9
Approach		1568	129	1651	8.2	0.704	11.9	LOS A	22.4	167.3	0.70	0.65	0.70	45.8
East: Llewellyn Avenue														
21	L2	86	12	91	14.0	0.671	37.3	LOS C	6.6	48.9	0.89	0.75	0.89	28.1
5	T1	84	1	88	1.2	0.671	32.6	LOS C	6.6	48.9	0.89	0.75	0.89	26.2
23	R2	139	35	146	25.2	* 0.807	41.2	LOS C	5.8	49.6	0.94	0.80	0.94	32.9
Approach		309	48	325	15.5	0.807	37.8	LOS C	6.6	49.6	0.91	0.77	0.91	30.3
North: Woodville Road														
24	L2	80	15	84	18.8	0.809	18.2	LOS B	29.1	218.8	0.79	0.74	0.79	46.5
25	T1	1719	129	1809	7.5	0.809	12.7	LOS A	29.2	217.3	0.80	0.74	0.80	46.5
9	R2	217	4	228	1.8	* 1.546	534.8	LOS F	44.9	319.6	1.00	2.43	4.93	3.9
Approach		2016	148	2122	7.3	1.546	69.1	LOS E	44.9	319.6	0.82	0.92	1.24	23.1
West: Villawood Road														
10	L2	236	4	248	1.7	0.443	21.7	LOS B	8.1	57.7	0.85	0.87	0.85	36.6
11	T1	7	1	7	14.3	0.018	28.5	LOS C	0.2	1.9	0.78	0.53	0.78	30.4
12	R2	104	0	109	0.0	0.515	44.6	LOS D	4.4	31.1	0.95	0.78	0.95	15.5
Approach		347	5	365	1.4	0.515	28.7	LOS C	8.1	57.7	0.88	0.84	0.88	30.1
All Vehicles		4240	330	4463	7.8	1.546	42.4	LOS C	44.9	319.6	0.79	0.81	0.99	29.5

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

* Critical Movement (Signal Timing)

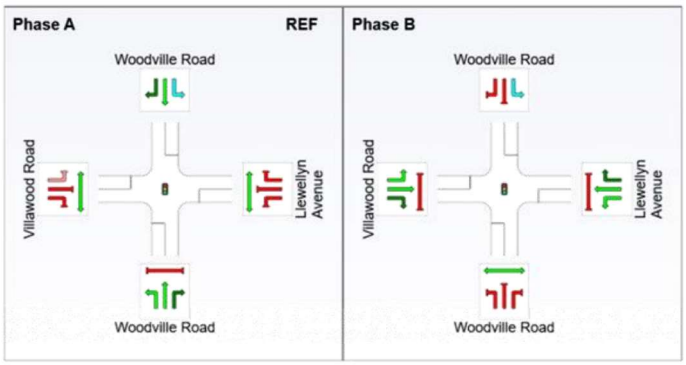
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	60
Green Time (sec)	54	19
Phase Time (sec)	60	25
Phase Split	71%	29%

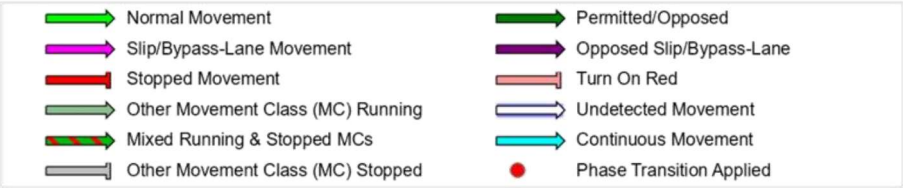
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2020 Scenario - PM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2020 PM Peak With Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	92	0	97	0.0	0.758	20.1	LOS B	26.9	200.7	0.77	0.73	0.77	25.4
31	T1	1494	128	1573	8.6	* 0.758	14.6	LOS B	27.2	204.3	0.77	0.72	0.77	39.1
Approach		1586	128	1669	8.1	0.758	14.9	LOS B	27.2	204.3	0.77	0.72	0.77	38.2
East: Binna Burra St														
21	L2	23	0	24	0.0	0.224	38.3	LOS C	3.2	23.2	0.85	0.69	0.85	20.8
5	T1	52	4	55	7.7	0.224	34.4	LOS C	3.2	23.2	0.85	0.69	0.85	10.9
23	R2	83	0	87	0.0	0.224	38.3	LOS C	3.2	23.2	0.85	0.74	0.85	16.3
Approach		158	4	166	2.5	0.224	37.0	LOS C	3.2	23.2	0.85	0.72	0.85	15.5
North: Woodville Road														
24	L2	138	2	145	1.4	* 0.530	11.5	LOS A	12.7	94.1	0.49	0.51	0.49	21.7
25	T1	1764	139	1857	7.9	0.530	7.0	LOS A	14.4	107.7	0.50	0.48	0.50	47.4
9	R2	12	12	13	100.0	* 0.544	64.8	LOS E	0.7	9.0	1.00	0.68	1.00	11.1
Approach		1914	153	2015	8.0	0.544	7.7	LOS A	14.4	107.7	0.51	0.48	0.51	44.8
All Vehicles		3658	285	3851	7.8	0.758	12.1	LOS A	27.2	204.3	0.64	0.59	0.64	40.0

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

* Critical Movement (Signal Timing)

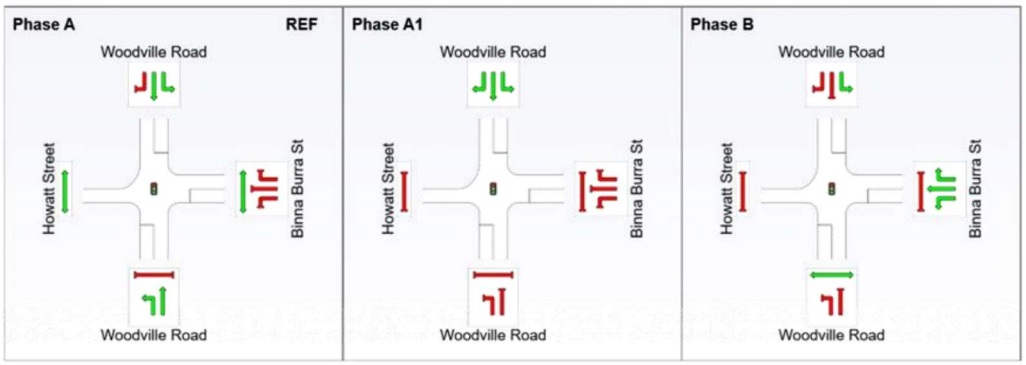
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

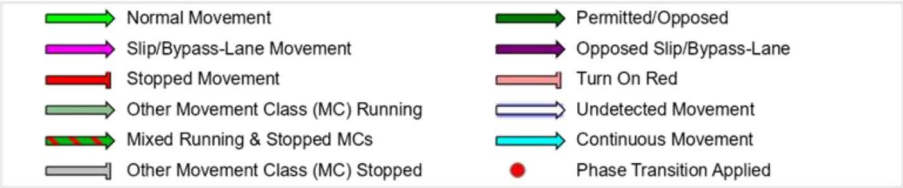
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2020 Scenario - PM Peak | With Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2020 PM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	987	120	1039	12.2	0.676	13.5	LOS A	10.8	83.5	0.87	0.78	0.89	45.1
3	R2	175	4	184	2.3	* 0.590	23.4	LOS B	4.2	30.0	0.90	0.83	0.95	42.2
Approach		1162	124	1223	10.7	0.676	14.9	LOS B	10.8	83.5	0.87	0.78	0.90	44.5
East: River Avenue														
4	L2	214	20	225	9.3	0.237	9.0	LOS A	1.8	13.3	0.46	0.68	0.46	51.5
26	R2	737	38	776	5.2	* 0.638	21.4	LOS B	8.4	61.4	0.90	0.83	0.92	39.3
Approach		951	58	1001	6.1	0.638	18.6	LOS B	8.4	61.4	0.80	0.80	0.81	42.1
North: The Horsley Drive														
27	L2	582	29	613	5.0	0.336	6.2	LOS A	0.0	0.0	0.00	0.53	0.00	52.8
8	T1	729	65	767	8.9	0.414	11.1	LOS A	5.7	42.8	0.73	0.62	0.73	47.2
Approach		1311	94	1380	7.2	0.414	8.9	LOS A	5.7	42.8	0.41	0.58	0.41	49.6
All Vehicles		3424	276	3604	8.1	0.676	13.7	LOS A	10.8	83.5	0.67	0.71	0.69	45.4

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

* Critical Movement (Signal Timing)

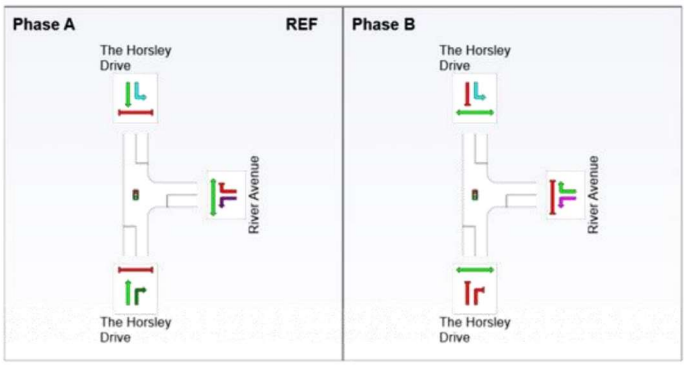
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	27
Green Time (sec)	21	17
Phase Time (sec)	27	23
Phase Split	54%	46%

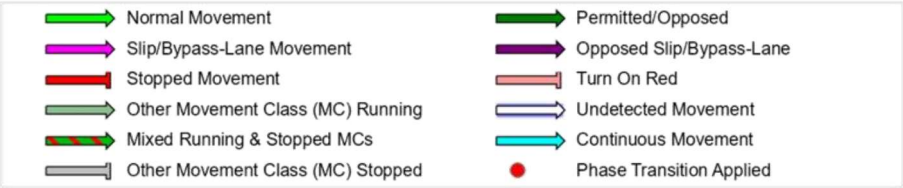
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2031 Scenario - PM Peak | Without Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2031 PM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	41	0	43	0.0	0.273	14.7	LOS B	8.2	61.3	0.43	0.43	0.43	46.0
31	T1	1687	169	1776	10.0	* 0.619	12.7	LOS A	26.2	199.5	0.58	0.54	0.58	46.1
Approach		1728	169	1819	9.8	0.619	12.7	LOS A	26.2	199.5	0.58	0.54	0.58	46.1
North: Woodville Road														
25	T1	1973	247	2077	12.5	0.500	4.9	LOS A	14.8	115.0	0.37	0.34	0.37	53.6
Approach		1973	247	2077	12.5	0.500	4.9	LOS A	14.8	115.0	0.37	0.34	0.37	53.6
West: Kirrang Avenue														
27	L2	22	0	23	0.0	0.110	63.5	LOS E	1.3	9.4	0.93	0.71	0.93	24.4
29	R2	101	0	106	0.0	* 0.505	64.5	LOS E	6.5	45.7	0.98	0.79	0.98	25.8
Approach		123	0	129	0.0	0.505	64.3	LOS E	6.5	45.7	0.97	0.77	0.97	25.6
All Vehicles		3824	416	4025	10.9	0.619	10.3	LOS A	26.2	199.5	0.49	0.45	0.49	47.9

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

* Critical Movement (Signal Timing)

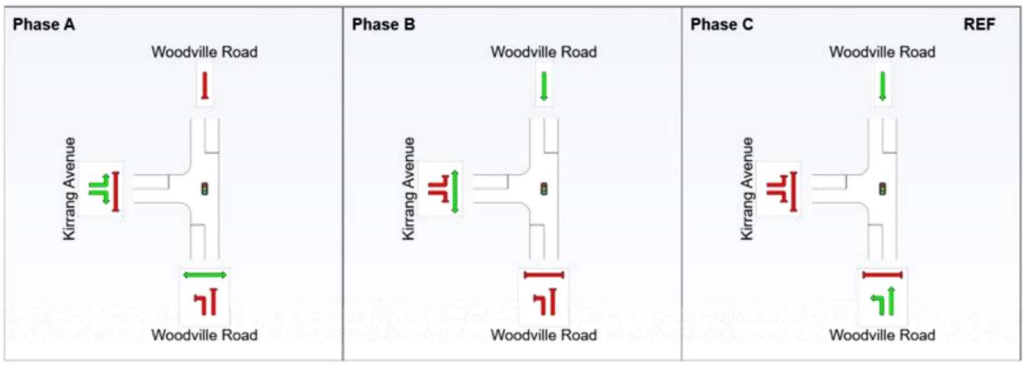
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	93	114	0
Green Time (sec)	15	10	87
Phase Time (sec)	21	16	93
Phase Split	16%	12%	72%

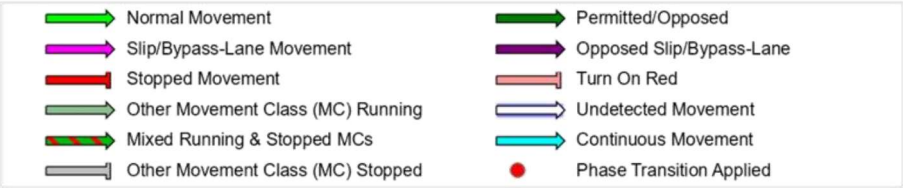
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2031 Scenario - PM Peak | Without Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2031 PM Peak Without Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	5.5	LOS A	0.0	0.0	0.32	0.50	0.32	44.5
2	T1	1	0	1	0.0	0.057	8.9	LOS A	0.2	1.5	0.52	0.69	0.52	38.4
3	R2	48	0	51	0.0	0.057	7.0	LOS A	0.2	1.5	0.52	0.69	0.52	36.6
Approach		50	0	53	0.0	0.057	7.0	LOS A	0.2	1.5	0.51	0.69	0.51	36.9
East: Villawood Road														
4	L2	37	0	39	0.0	0.285	6.9	LOS A	1.9	13.2	0.31	0.18	0.31	42.5
5	T1	247	5	260	2.0	0.285	1.4	LOS A	1.9	13.2	0.31	0.18	0.31	46.4
6	R2	86	0	91	0.0	0.285	7.2	LOS A	1.9	13.2	0.31	0.18	0.31	38.1
Approach		370	5	389	1.4	0.285	3.3	NA	1.9	13.2	0.31	0.18	0.31	45.2
North: Villawood Place														
7	L2	67	0	71	0.0	0.063	5.3	LOS A	0.2	1.6	0.28	0.54	0.28	31.6
8	T1	1	0	1	0.0	0.003	9.0	LOS A	0.0	0.1	0.55	0.57	0.55	37.7
9	R2	1	0	1	0.0	0.003	6.4	LOS A	0.0	0.1	0.55	0.57	0.55	42.1
Approach		69	0	73	0.0	0.063	5.4	LOS A	0.2	1.6	0.29	0.54	0.29	32.1
West: Villawood Road														
10	L2	1	0	1	0.0	0.051	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	49.1
11	T1	184	4	194	2.2	0.051	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
12	R2	1	0	1	0.0	0.002	7.2	LOS A	0.0	0.0	0.45	0.53	0.45	43.3
Approach		186	4	196	2.2	0.051	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.9
All Vehicles		675	9	711	1.3	0.285	2.9	NA	1.9	13.2	0.24	0.21	0.24	45.4

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2031 Scenario - PM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 PM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default - Import
Reference Phase: Phase A
Input Phase Sequence: A1, A, B1, B
Output Phase Sequence: A1, A, B1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	65	0	68	0.0	0.944	50.5	LOS D	61.1	461.4	1.00	1.03	1.14	10.2
31	T1	1616	162	1701	10.0	0.944	44.8	LOS D	61.1	461.4	1.00	1.03	1.14	29.8
32	R2	21	2	22	9.5	0.199	69.0	LOS E	1.3	10.0	0.96	0.71	0.96	20.2
Approach		1702	164	1792	9.6	0.944	45.3	LOS D	61.1	461.4	1.00	1.03	1.14	28.8
East: Llewellyn Avenue														
21	L2	81	11	85	13.6	0.902	59.4	LOS E	9.4	69.8	0.93	0.82	1.01	22.0
5	T1	74	0	78	0.0	* 0.902	54.8	LOS D	9.4	69.8	0.93	0.82	1.01	20.0
23	R2	165	41	174	24.8	* 0.631	50.9	LOS D	9.0	76.5	0.91	0.87	0.91	30.2
Approach		320	52	337	16.3	0.902	54.0	LOS D	9.4	76.5	0.92	0.84	0.96	26.2
North: Woodville Road														
24	L2	104	15	109	14.4	1.137	178.9	LOS F	133.3	1033.3	1.00	1.74	2.04	14.8
25	T1	1910	235	2011	12.3	* 1.137	173.3	LOS F	133.3	1033.3	1.00	1.75	2.04	12.0
9	R2	229	5	241	2.2	* 1.301	306.1	LOS F	32.7	233.3	1.00	1.50	2.82	5.9
Approach		2243	255	2361	11.4	1.301	187.1	LOS F	133.3	1033.3	1.00	1.72	2.12	11.1
West: Villawood Road														
10	L2	194	4	204	2.1	0.322	32.9	LOS C	9.0	63.9	0.76	0.76	0.76	30.8
11	T1	1	0	1	0.0	0.003	47.7	LOS D	0.1	0.4	0.85	0.51	0.85	22.2
12	R2	103	0	108	0.0	0.454	47.2	LOS D	5.4	37.7	0.93	0.76	0.93	14.8
Approach		298	4	314	1.3	0.454	37.9	LOS C	9.0	63.9	0.82	0.76	0.82	25.6
All Vehicles		4563	475	4803	10.4	1.301	115.1	LOS F	133.3	1033.3	0.98	1.34	1.59	15.9

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

* Critical Movement (Signal Timing)

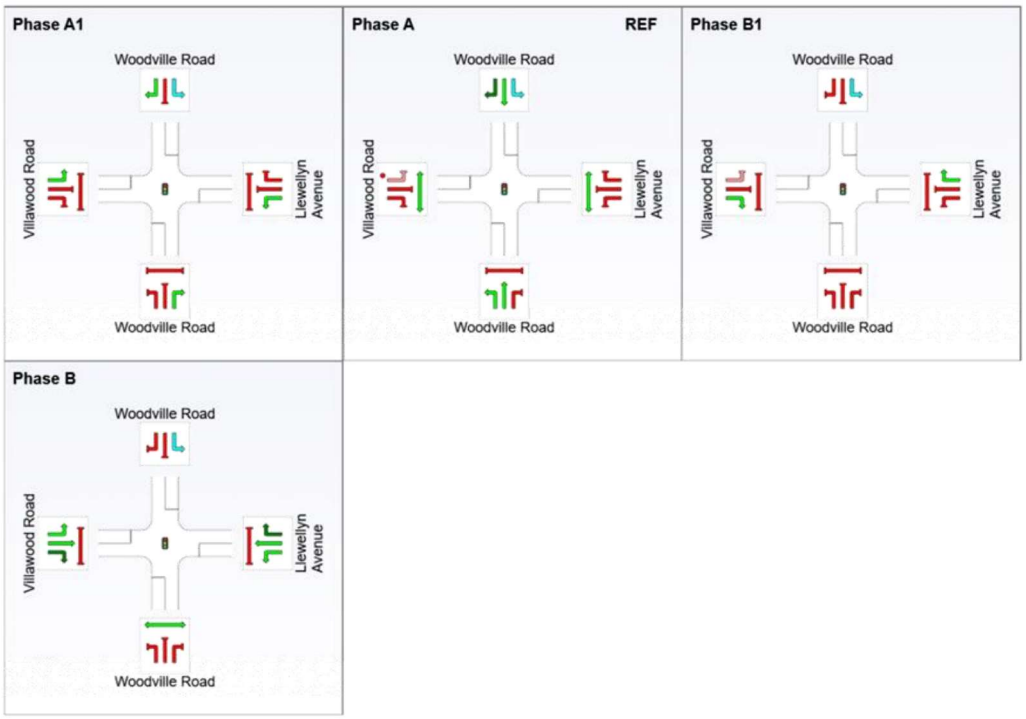
Phase Timing Summary

Phase	A1	A	B1	B
Phase Change Time (sec)	109	0	70	84
Green Time (sec)	8	64	8	19
Phase Time (sec)	14	70	14	25
Phase Split	11%	57%	11%	20%

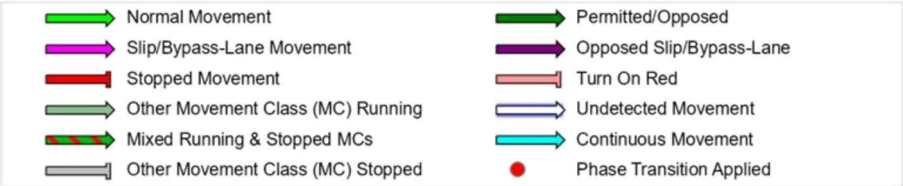
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default - Import
Reference Phase: Phase A
Input Phase Sequence: A1, A, B1, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2031 Scenario - PM Peak | Without Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 PM Peak Without Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	72	0	76	0.0	0.812	21.1	LOS B	30.4	230.2	0.83	0.77	0.83	25.0
31	T1	1610	165	1695	10.2	* 0.812	15.5	LOS B	30.7	233.9	0.83	0.77	0.83	38.3
Approach		1682	165	1771	9.8	0.812	15.8	LOS B	30.7	233.9	0.83	0.77	0.83	37.6
East: Binna Burra St														
21	L2	52	2	55	3.8	0.305	39.0	LOS C	4.4	31.9	0.87	0.72	0.87	20.2
5	T1	57	1	60	1.8	0.305	35.2	LOS C	4.4	31.9	0.87	0.72	0.87	10.6
23	R2	101	0	106	0.0	0.288	38.9	LOS C	4.1	28.8	0.86	0.75	0.86	16.0
Approach		210	3	221	1.4	0.305	37.9	LOS C	4.4	31.9	0.86	0.74	0.86	15.9
North: Woodville Road														
24	L2	169	2	178	1.2	* 0.602	12.0	LOS A	15.5	117.7	0.54	0.55	0.54	21.3
25	T1	1903	244	2003	12.8	0.602	7.5	LOS A	16.8	130.5	0.54	0.51	0.54	46.7
9	R2	28	28	29	100.0	* 1.270	298.0	LOS F	4.2	55.1	1.00	1.25	3.25	2.9
Approach		2100	274	2211	13.0	1.270	11.8	LOS A	16.8	130.5	0.55	0.53	0.58	39.8
All Vehicles		3992	442	4202	11.1	1.270	14.8	LOS B	30.7	233.9	0.68	0.64	0.70	37.2

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

* Critical Movement (Signal Timing)

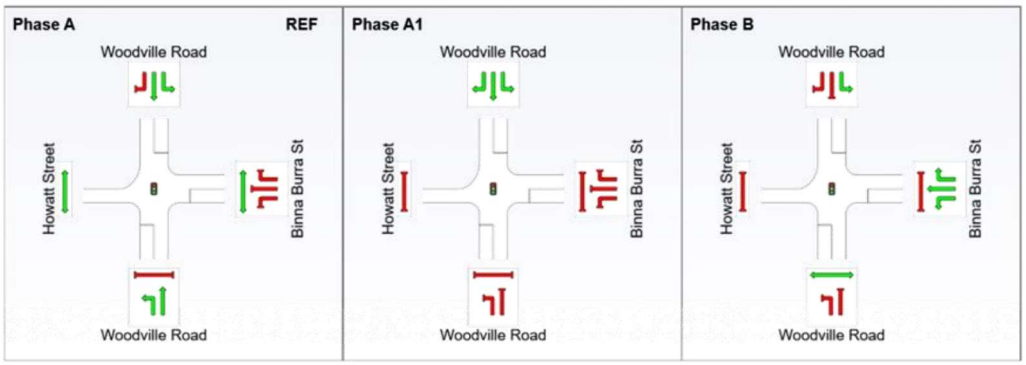
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

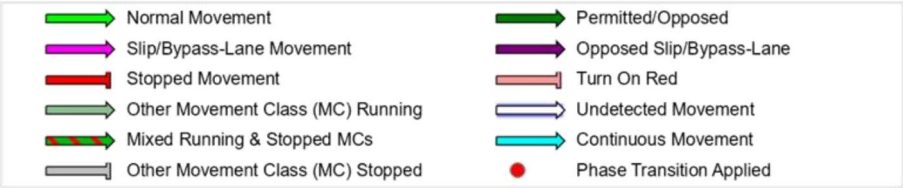
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2031 Scenario - PM Peak | Without Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2031 PM Peak Without Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	1188	166	1251	14.0	0.751	14.3	LOS A	14.0	110.1	0.88	0.85	0.98	44.3
3	R2	207	9	218	4.3	* 0.718	25.5	LOS B	5.6	40.4	0.93	0.93	1.15	41.1
Approach		1395	175	1468	12.5	0.751	16.0	LOS B	14.0	110.1	0.89	0.86	1.00	43.7
East: River Avenue														
4	L2	200	22	211	11.0	0.243	9.2	LOS A	1.7	12.9	0.47	0.68	0.47	51.4
26	R2	768	60	808	7.8	* 0.767	26.4	LOS B	10.3	77.1	0.97	0.93	1.15	36.4
Approach		968	82	1019	8.5	0.767	22.9	LOS B	10.3	77.1	0.86	0.88	1.01	39.4
North: The Horsley Drive														
27	L2	606	26	638	4.3	0.349	6.3	LOS A	0.0	0.0	0.00	0.53	0.00	52.8
8	T1	847	67	892	7.9	0.436	9.9	LOS A	6.3	47.3	0.70	0.60	0.70	48.3
Approach		1453	93	1529	6.4	0.436	8.4	LOS A	6.3	47.3	0.41	0.57	0.41	50.2
All Vehicles		3816	350	4017	9.2	0.767	14.8	LOS B	14.0	110.1	0.70	0.75	0.78	44.5

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

* Critical Movement (Signal Timing)

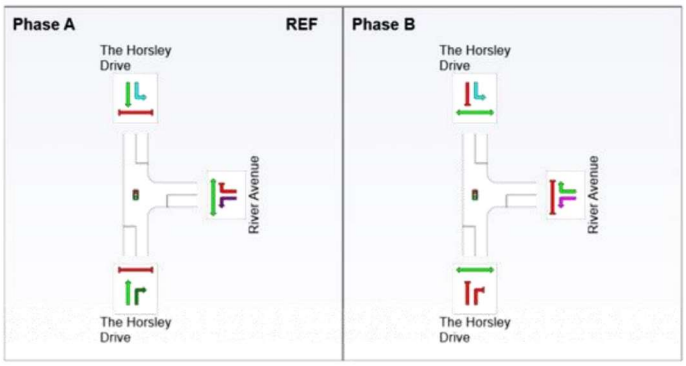
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	29
Green Time (sec)	23	15
Phase Time (sec)	29	21
Phase Split	58%	42%

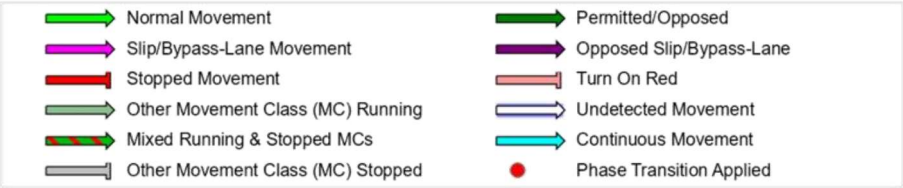
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



Site: 103 [Woodville Road and Kirrang Avenue (Site Folder: 2031 Scenario - PM Peak | With Kamira Ave Traffic)]

Woodville Road and Kirrang Avenue
Site Category: 2031 PM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
30	L2	133	0	140	0.0	0.340	16.2	LOS B	8.0	58.9	0.56	0.59	0.56	46.4
31	T1	1726	169	1817	9.8	* 0.770	15.3	LOS B	26.8	203.4	0.79	0.74	0.79	43.7
Approach		1859	169	1957	9.1	0.770	15.4	LOS B	26.8	203.4	0.78	0.73	0.78	43.9
North: Woodville Road														
25	T1	1997	247	2102	12.4	0.546	5.7	LOS A	13.6	105.4	0.48	0.44	0.48	52.7
Approach		1997	247	2102	12.4	0.546	5.7	LOS A	13.6	105.4	0.48	0.44	0.48	52.7
West: Kirrang Avenue														
27	L2	22	0	23	0.0	0.095	45.1	LOS D	0.9	6.4	0.91	0.70	0.91	29.0
29	R2	175	0	184	0.0	* 0.774	50.3	LOS D	8.6	60.1	1.00	0.90	1.20	29.8
Approach		197	0	207	0.0	0.774	49.7	LOS D	8.6	60.1	0.99	0.88	1.17	29.8
All Vehicles		4053	416	4266	10.3	0.774	12.3	LOS A	26.8	203.4	0.64	0.59	0.65	46.2

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

* Critical Movement (Signal Timing)

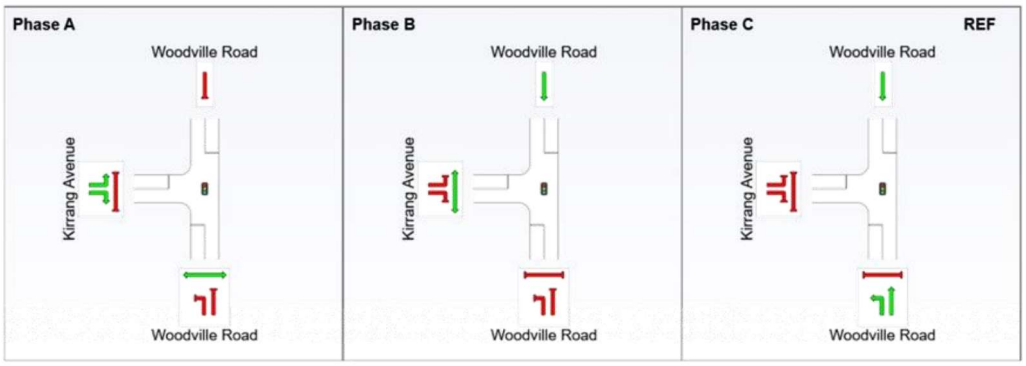
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	58	76	0
Green Time (sec)	12	8	52
Phase Time (sec)	18	14	58
Phase Split	20%	16%	64%

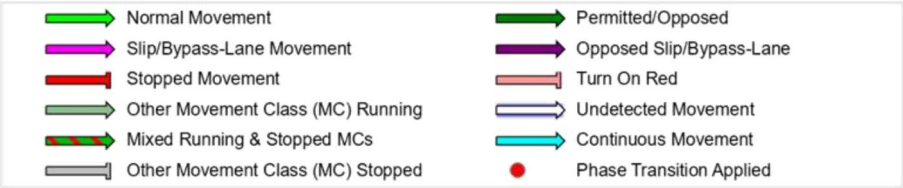
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase C
Input Phase Sequence: A, B, C



REF: Reference Phase
VAR: Variable Phase



Site: 105 [Villawood Road and Villawood Place (Site Folder: 2031 Scenario - PM Peak | With Kamira Ave Traffic)]

Villawood Road and Villawood Place
Site Category: 2031 PM Peak With Dev
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Villawood Place														
1	L2	1	0	1	0.0	0.001	5.9	LOS A	0.0	0.0	0.38	0.51	0.38	44.4
2	T1	1	0	1	0.0	0.071	12.2	LOS A	0.3	1.8	0.58	0.77	0.58	37.0
3	R2	48	0	51	0.0	0.071	8.2	LOS A	0.3	1.8	0.58	0.77	0.58	35.2
Approach		50	0	53	0.0	0.071	8.2	LOS A	0.3	1.8	0.58	0.76	0.58	35.6
East: Villawood Road														
4	L2	37	0	39	0.0	0.352	9.2	LOS A	2.9	20.7	0.37	0.17	0.43	41.0
5	T1	326	5	343	1.5	0.352	2.6	LOS A	2.9	20.7	0.37	0.17	0.43	47.1
6	R2	86	0	91	0.0	0.352	9.6	LOS A	2.9	20.7	0.37	0.17	0.43	36.0
Approach		449	5	473	1.1	0.352	4.5	NA	2.9	20.7	0.37	0.17	0.43	45.7
North: Villawood Place														
7	L2	67	0	71	0.0	0.071	5.8	LOS A	0.3	1.8	0.36	0.59	0.36	31.1
8	T1	1	0	1	0.0	0.004	12.3	LOS A	0.0	0.1	0.62	0.63	0.62	35.4
9	R2	1	0	1	0.0	0.004	7.4	LOS A	0.0	0.1	0.62	0.63	0.62	40.4
Approach		69	0	73	0.0	0.071	6.0	LOS A	0.3	1.8	0.37	0.59	0.37	31.5
West: Villawood Road														
10	L2	1	0	1	0.0	0.078	4.9	LOS A	0.0	0.0	0.00	0.01	0.00	51.8
11	T1	286	4	301	1.4	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	53.1
12	R2	1	0	1	0.0	0.002	8.3	LOS A	0.0	0.0	0.51	0.56	0.51	42.6
Approach		288	4	303	1.4	0.078	0.1	NA	0.0	0.0	0.00	0.01	0.00	53.1
All Vehicles		856	9	901	1.1	0.352	3.4	NA	2.9	20.7	0.26	0.18	0.29	47.2

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

Site: 101 [Woodville Road and Villawood Road and Llewellyn Avenue (Site Folder: 2031 Scenario - PM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 PM Peak With Dev
Signals - Actuated Isolated Cycle Time = 123 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A1, A, B1, B
Output Phase Sequence: A1, A, B1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	74	0	78	0.0	0.949	52.2	LOS D	62.5	472.1	1.00	1.04	1.16	10.0
31	T1	1616	162	1701	10.0	0.949	46.4	LOS D	62.5	472.1	1.00	1.05	1.16	29.2
32	R2	21	2	22	9.5	0.199	69.0	LOS E	1.3	10.0	0.96	0.71	0.96	20.2
Approach		1711	164	1801	9.6	0.949	47.0	LOS D	62.5	472.1	1.00	1.04	1.15	28.2
East: Llewellyn Avenue														
21	L2	81	11	85	13.6	0.918	61.0	LOS E	9.8	73.0	0.93	0.84	1.04	21.7
5	T1	78	0	82	0.0	* 0.918	56.3	LOS D	9.8	73.0	0.93	0.84	1.04	19.7
23	R2	165	41	174	24.8	* 0.770	52.7	LOS D	9.0	76.5	0.96	0.88	0.96	29.8
Approach		324	52	341	16.0	0.918	55.6	LOS D	9.8	76.5	0.95	0.86	1.00	25.7
North: Woodville Road														
24	L2	104	15	109	14.4	1.137	178.9	LOS F	133.3	1033.3	1.00	1.74	2.04	14.8
25	T1	1910	235	2011	12.3	* 1.137	173.3	LOS F	133.3	1033.3	1.00	1.75	2.04	12.0
9	R2	295	5	311	1.7	* 1.677	640.0	LOS F	63.9	453.5	1.00	1.96	4.04	3.1
Approach		2309	255	2431	11.0	1.677	233.2	LOS F	133.3	1033.3	1.00	1.78	2.30	9.2
West: Villawood Road														
10	L2	265	4	279	1.5	0.440	37.0	LOS C	12.3	87.3	0.80	0.87	0.80	29.2
11	T1	5	0	5	0.0	0.017	48.4	LOS D	0.3	1.9	0.85	0.56	0.85	22.0
12	R2	131	0	138	0.0	0.587	48.1	LOS D	7.0	49.0	0.95	0.78	0.95	14.6
Approach		401	4	422	1.0	0.587	40.7	LOS C	12.3	87.3	0.85	0.84	0.85	24.8
All Vehicles		4745	475	4995	10.0	1.677	137.6	LOS F	133.3	1033.3	0.98	1.37	1.68	13.8

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

* Critical Movement (Signal Timing)

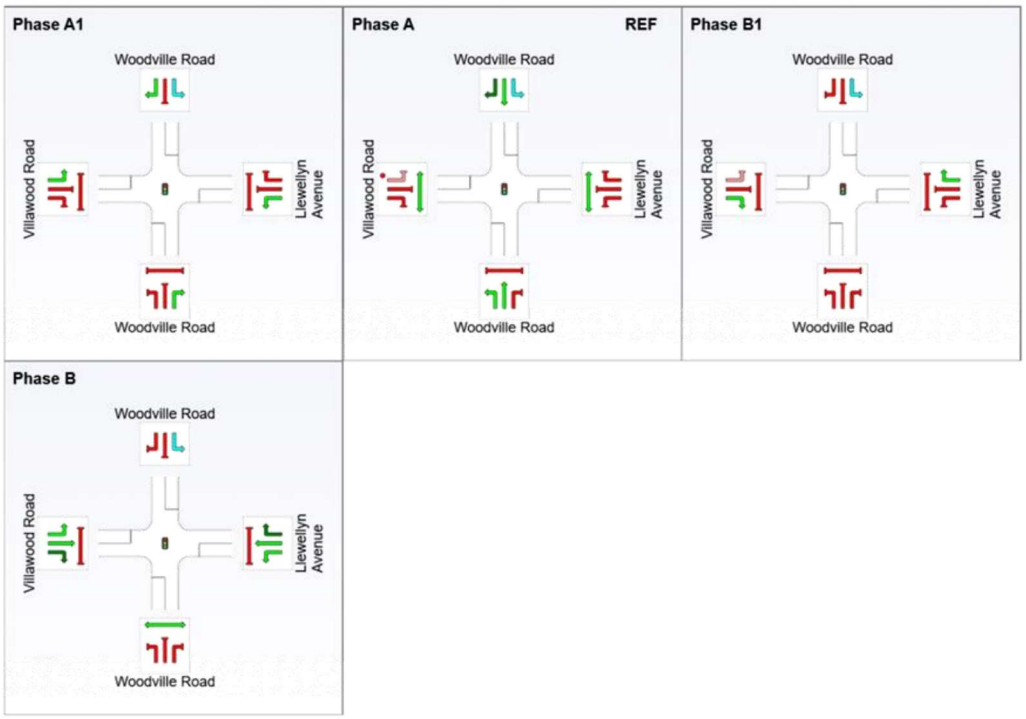
Phase Timing Summary

Phase	A1	A	B1	B
Phase Change Time (sec)	109	0	70	84
Green Time (sec)	8	64	8	19
Phase Time (sec)	14	70	14	25
Phase Split	11%	57%	11%	20%

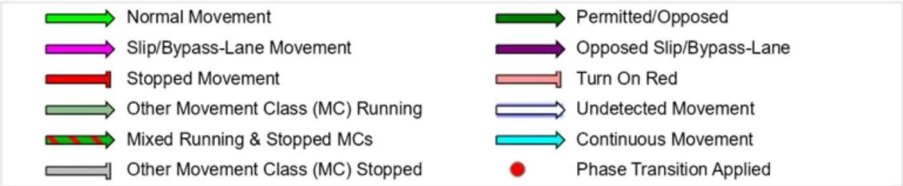
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A1, A, B1, B



REF: Reference Phase
VAR: Variable Phase



Site: 102 [Woodville Road and Howatt Street and Binna Burra Street (Site Folder: 2031 Scenario - PM Peak | With Kamira Ave Traffic)]

Woodville Road and Villawood Road and Llewellyn Avenue
Site Category: 2031 PM Peak With Dev
Signals - Actuated Isolated Cycle Time = 92 seconds (Site User-Given Phase Times)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times specified by the user
Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B
Output Phase Sequence: A, A1, B

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Woodville Road														
1	L2	104	0	109	0.0	0.830	21.4	LOS B	31.8	239.9	0.85	0.79	0.85	24.8
31	T1	1616	165	1701	10.2	* 0.830	15.9	LOS B	32.1	244.4	0.85	0.79	0.85	37.9
Approach		1720	165	1811	9.6	0.830	16.2	LOS B	32.1	244.4	0.85	0.79	0.85	37.0
East: Binna Burra St														
21	L2	52	2	55	3.8	0.305	39.0	LOS C	4.4	31.9	0.87	0.72	0.87	20.2
5	T1	57	1	60	1.8	0.305	35.2	LOS C	4.4	31.9	0.87	0.72	0.87	10.6
23	R2	104	0	109	0.0	0.296	39.0	LOS C	4.2	29.7	0.86	0.76	0.86	16.0
Approach		213	3	224	1.4	0.305	38.0	LOS C	4.4	31.9	0.86	0.74	0.86	15.9
North: Woodville Road														
24	L2	173	2	182	1.2	* 0.610	12.1	LOS A	15.9	120.6	0.54	0.56	0.54	21.3
25	T1	1928	244	2029	12.7	0.610	7.6	LOS A	17.1	132.9	0.55	0.52	0.55	46.6
9	R2	28	28	29	100.0	* 1.270	298.0	LOS F	4.2	55.1	1.00	1.25	3.25	2.9
Approach		2129	274	2241	12.9	1.270	11.8	LOS A	17.1	132.9	0.55	0.53	0.58	39.7
All Vehicles		4062	442	4276	10.9	1.270	15.0	LOS B	32.1	244.4	0.69	0.65	0.71	36.9

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

* Critical Movement (Signal Timing)

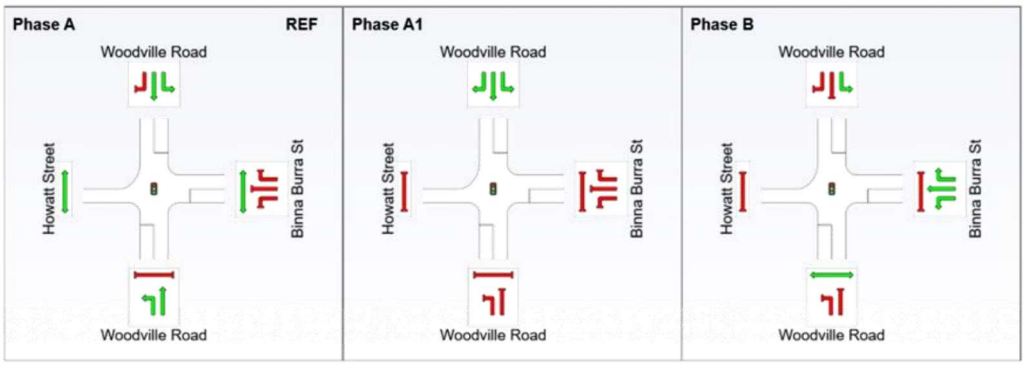
Phase Timing Summary

Phase	A	A1	B
Phase Change Time (sec)	0	62	70
Green Time (sec)	56	2	19
Phase Time (sec)	62	5	25
Phase Split	67%	5%	27%

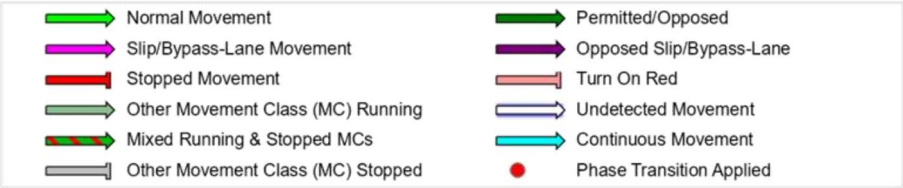
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, A1, B



REF: Reference Phase
VAR: Variable Phase



Site: 104 [The Horsley Drive and River Avenue (Site Folder: 2031 Scenario - PM Peak | With Kamira Ave Traffic)]

The Horsley Drive and River Avenue
Site Category: 2031 PM Peak With Dev
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 50 seconds (Site Optimum Cycle Time - Minimum Delay)

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

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] veh/h	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: The Horsley Drive														
2	T1	1192	166	1255	13.9	0.753	14.4	LOS A	14.1	110.9	0.89	0.85	0.98	44.3
3	R2	207	9	218	4.3	* 0.721	25.7	LOS B	5.6	40.5	0.93	0.93	1.16	41.0
Approach		1399	175	1473	12.5	0.753	16.1	LOS B	14.1	110.9	0.89	0.86	1.01	43.6
East: River Avenue														
4	L2	200	22	211	11.0	0.244	9.2	LOS A	1.7	12.9	0.47	0.68	0.47	51.4
26	R2	768	60	808	7.8	* 0.767	26.4	LOS B	10.3	77.1	0.97	0.93	1.15	36.4
Approach		968	82	1019	8.5	0.767	22.9	LOS B	10.3	77.1	0.86	0.88	1.01	39.4
North: The Horsley Drive														
27	L2	606	26	638	4.3	0.349	6.3	LOS A	0.0	0.0	0.00	0.53	0.00	52.8
8	T1	851	67	896	7.9	0.438	10.0	LOS A	6.4	47.5	0.70	0.60	0.70	48.3
Approach		1457	93	1534	6.4	0.438	8.4	LOS A	6.4	47.5	0.41	0.57	0.41	50.2
All Vehicles		3824	350	4025	9.2	0.767	14.9	LOS B	14.1	110.9	0.70	0.76	0.78	44.5

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

* Critical Movement (Signal Timing)

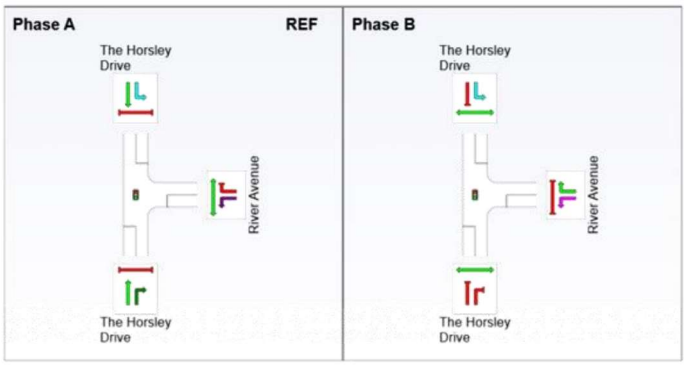
Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	29
Green Time (sec)	23	15
Phase Time (sec)	29	21
Phase Split	58%	42%

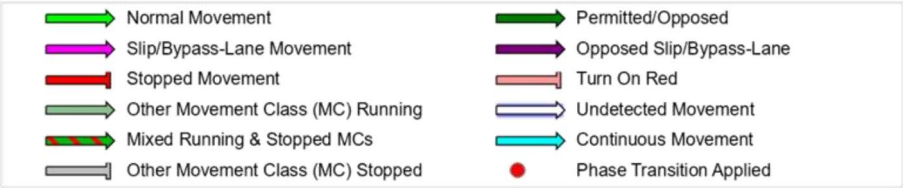
See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified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

Input Phase Sequence

Phase Sequence: Map Extract Default
Reference Phase: Phase A
Input Phase Sequence: A, B



REF: Reference Phase
VAR: Variable Phase



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A Traffic Engineering and Road Safety Consultancy

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September 20, 2021