

# Wahroonga Estate Development

## Reassessment of Road Upgrade Requirements

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Issue: G

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## 1.0 Introduction

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Assessment and Consent Conditioning in relation to the proposed road and intersection upgrades associated with development of the ACA Wahroonga Estate has taken many “twists and turns” over the years. Although development and occupation of most of the elements is nearing completion there is still some significant uncertainty in regard to the need and design details of the envisaged road and intersection upgrades.

Two previous reviews<sup>1</sup> in relation to the nature and timing of these upgrade works have been undertaken and Consent Conditions were established and agreements reached (or attempted) in relation to the findings of these assessments. However, due to the events which have occurred, the landholder has now voluntarily commissioned a new comprehensive assessment due to the recent impasse on the design and timing of the roadworks with TfNSW and Ku-ring-gai Council.

It is noted that the previous assessments were undertaken on the basis of:

- ❖ Traffic volume data which is now outdated
- ❖ Assumed peak traffic generation characteristics
- ❖ Development yield as understood at the time

This revised assessment has served to reveal that there are a number of issues that need to be addressed and corrected from the previous assessments including:

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<sup>1</sup> Wahroonga Estate  
Traffic Report – Timing of Upgrade Works  
Halcrow November 2011

Wahroonga Estate  
Update Report on Sequencing of Road Upgrade  
Works  
GTA October 2016

## Transport and Traffic Planning Associates

- ❖ It is stated that the Hospital Stage 3 traffic generation came from a Transport and Traffic Planning Associates (TTPA) study, however this is not correct and the adopted rates in the GTA October 2016 report:
  - varied between AM, PM and stages which is not considered logical
  - related only to additional staff and did not take account of visitors which need to be included
- ❖ it assumed that the afternoon peak traffic occurred after the school departure time (and therefore did not include school generated traffic) whereas the highest afternoon volumes in fact occur at the school departure time as confirmed by the results of recent traffic surveys
- ❖ traffic generation rates attributed to Hospital staff and student accommodation reflect normal residential generation characteristics rather than those where work and study occur on-site
- ❖ the generation factors for the school did not reflect the normal peak characteristics where the AM is significantly higher than the PM
- ❖ there was no consideration of the proposed additional floor area for the Church Admin. Office, the Central Office and Retail elements

An important factor in relation to the existing Consent Conditions is the need to reassess the conditioned roadworks in relation to the need and ability to achieve of any real benefit.

The impending completion and occupation of the major development elements now provides a more pragmatic basis for reassessing the traffic implications and the need/nature of the required upgrade works. It also happens that the Northconnex Project, not foreseen at the time of development consents, is now in operation although are not fully realized yet traffic implications for the subject road network.

## 2.0 Development Elements and Current Status

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The current development circumstances are as follows:

### HOSPITAL

Stages 1A and 1B are completed and functioning

Stage 3 has not commenced construction and it is not known when it will be completed.

### SCHOOL

The former school had 235 students. Stages 1 to 4 of the new school are completed and occupied with a current enrolment of 553 (+ 318) students. The proposed Stages 5 and 6 will increase the enrolment to a total of 800 students and these are envisaged to be completed by about 2025 although it is expected that an application will be made to increase the permitted enrolment before then to a total of 647 students.

### RESIDENTIAL

#### Precinct A: Mount Pleasant

Not relevant as accessed via Pennant Hills Road

#### Precinct B: Central Church

##### Existing

19 dwellings to be reduced to 9 dwellings

##### Proposed

200 apartments (private)

#### Precinct C: Central Hospital

##### Existing

240 Student beds – to be deleted

30 Lodge beds – to be retained (staff)

17 Mission rooms – to be reduced to 12 rooms (staff)

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6 dwellings – to be reduced to 3 dwellings

3,500m<sup>2</sup> Faculty of Nursing completed and functioning

### Proposed

Students 200 rooms, 90 studios and 11 x One Bed (301)

30 Lodge Beds (staff)

12 Mission Rooms (staff)

105 apartments (private)

**Precinct D:** Fox Valley East

### Existing

8 dwellings – to be reduced to 4 dwellings

### Proposed

88 apartments (private)

## COMMERCIAL

7,000m<sup>2</sup> Medical office element is completed and functioning.

2,000m<sup>2</sup> Church admin. office element is not completed.

1,000m<sup>2</sup> Central office element is not completed.

2,000m<sup>2</sup> Central retail element is not completed.

## OTHER

**Precinct B:** Place of Public Worship

1,600m<sup>2</sup> is not completed

## 3.0 Identified Road and Intersection Upgrades

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### 3.1 Identified Upgrades

The works which have been identified in the past as being required (not including the monetary issues of Pacific Highway / Fox Valley Road and The Comenarra Parkway / Kissing Point road) are as follows:

- ❖ Modification of the intersection of Fox Valley Road and Main Hospital Access
- ❖ Modification of the intersection of The Comenarra Parkway and Fox Valley Road
- ❖ Provision of a roundabout or traffic signals (with or without a right turn bay) at the intersection of Fox Valley Road and School Access Road
- ❖ Provision of 2 southbound lanes along Fox Valley Road between the Pacific Highway and the site including the upgrading of the existing roundabouts (or the provision of traffic signals) at the Ada Avenue and Lucinda Avenue intersections
- ❖ Widening of The Comenarra Parkway to provide 2 traffic lanes in each direction between Fox Valley Road and Browns Road.

### 3.2 Status and Design Details

The current circumstances are as follows:

- ❖ **Fox Valley Road and Main Hospital Access**

Works completed

- ❖ **The Comenarra Parkway and Fox Valley Road**

Services have been diverted and roadworks have commenced. Details of the road and traffic signal design plans provided in Appendix A and these works are programmed for completion in December 2020. However Council have responded to the concerns of residents on the western departure side of the intersection and have agreed to reduce the extent of the merge to 1 lane and this is now shown on

the plan provided in Appendix A. This plan also depicts the extent of the left turn lane western approach as confirmed by the assessment contained in this report.

❖ **Fox Valley Road and School Access Road**

The intersection outcome is unresolved. The Development Application was approved on the basis of the provision of traffic signals and a copy of the resultant traffic signal design is provided in Appendix B. TfNSW have stated that road widening would be required to provide a right turn bay for the signals and a concept design for this outcome along with a concept design for an optional roundabout are also provided in Appendix B.

❖ **Provision of two Southbound Lanes on Fox Valley Road**

The origin of the assessed need for 2 southbound lanes is not known. Details of the alternative roundabout and traffic signal intersection treatments at Ada Avenue and Lucinda Avenue to accommodate the 2 lanes are provided on the concept plans in Appendix C.

❖ **Widening of The Comenarra Parkway to Browns Road**

The origin of the assessed need for 2 lanes each way between Fox Valley Road and Browns Road is not known. The Appendix A road design provides 2 eastbound lanes almost to Browns Road with some minor roadmarking adjustment to the approved design. However the 2 westbound lanes are now proposed to merge somewhat before Browns Road (as approved by Council).

### 3.3 Resolutions Required

It is apparent that assessments and resolutions are required in relation to the following:

❖ **Two Southbound Lanes on Fox Valley Road**

2 lanes required throughout or not (or in part)

❖ **Fox Valley Road and Ada Avenue**

Traffic signals or roundabout (1 lane or 2 lane)



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- ❖ **Fox Valley Road and Lucinda Avenue**  
Traffic Signals or roundabout (1 lane or 2 lane)
  
- ❖ **Fox Valley Road and School Access Road**  
Roundabout or traffic signals with or without right turn bay
  
- ❖ **Widening of The Comenarra Parkway**  
2 lanes each way to Browns Road or not

## 4.0 Existing Traffic Circumstances

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The existing peak traffic circumstances have been established by:

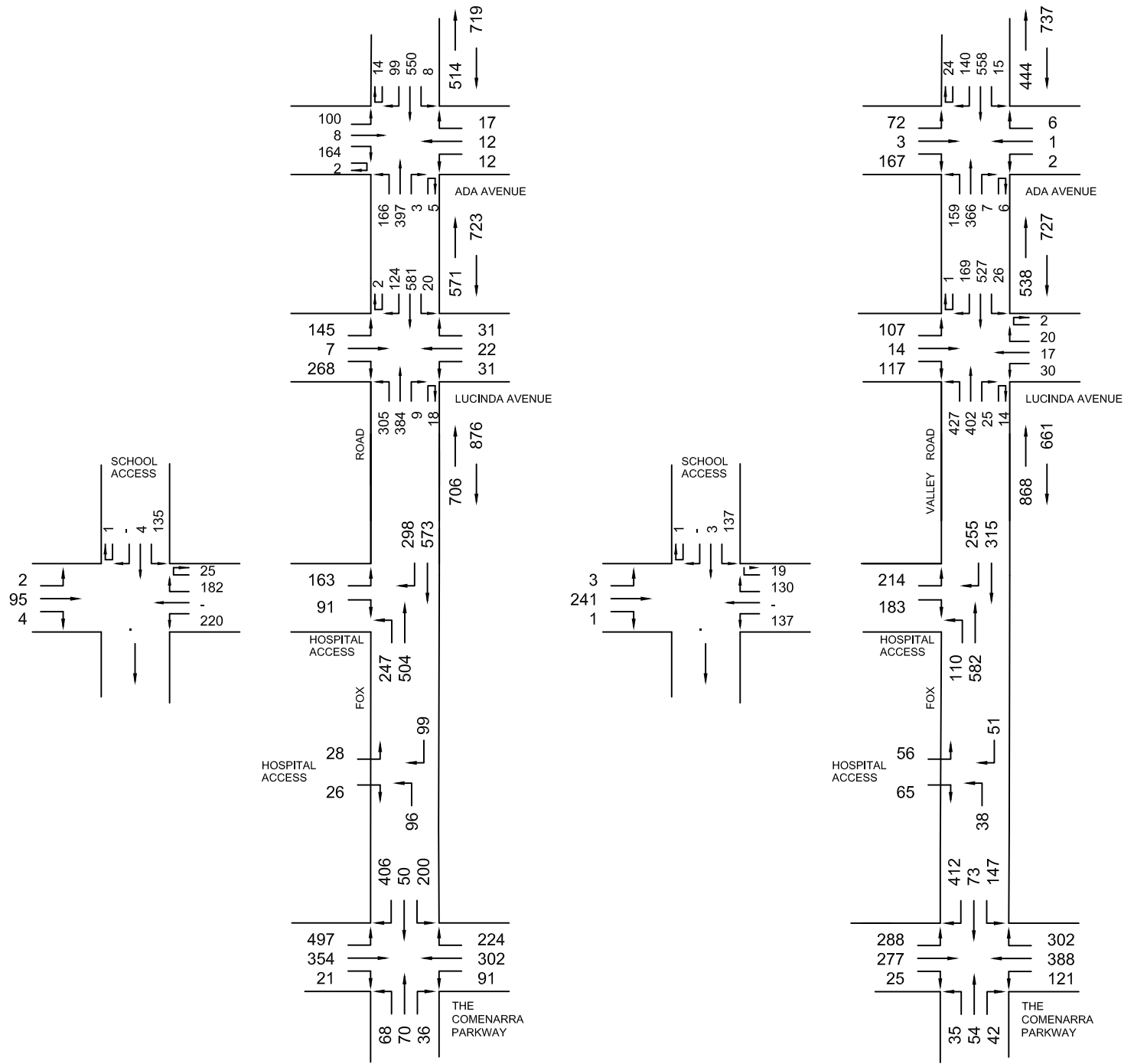
- ❖ Initial SCATS volume data obtained from TfNSW for the intersections of The Comenarra Parkway / Fox Valley Road and Fox Valley Road / Hospital Access for November 2019 (i.e. pre Covid-19). Although subsequent surveys in August have revealed that the traffic volumes have returned to the normal pre Covid levels.
- ❖ Manual traffic surveys on Fox Valley Road at the Ada Avenue & Lucinda Avenue intersections and the School access connection to the Hospital access road.

The results of these surveys in terms of AM and PM peaks are provided in Appendix E and summarised on Figure 1. A feature of the survey results is the recorded mid block volumes on Fox Valley Road as follows:

	Northbound		Southbound	
	AM	PM	AM	PM
Hospital – Lucinda	706	868	876	661
Lucinda – Ada	571	538	723	727
Ada – Pacific Hwy	514	444	719	737

The traffic volumes along Fox Valley Road between the Lucinda Avenue intersection and the Hospital access do not “balance” because:

- ❖ of the significant uses in between including Retaval School, the ACA Admin. Offices, the residential dwellings including those in Cyrus Avenue, Strone Avenue and Elizabeth Street
- ❖ the surveys were undertaken on different days (e.g. Hospital access from SCATS data for November 2019)



AM PEAK

7:45-8:45

PM PEAK

3:00-4:00

LEGEND



EXISTING PEAK  
TRAFFIC VOLUMES

FIG 1

The criteria for Level of Service for Peak Hour Flow on Urban roads is reproduced from the TfNSW Guide To Traffic Generating Developments (GTTGD) in the following:

**Table 4.4**  
**Urban road peak hour flows per direction**

<b>Level of Service</b>	<b>One Lane (veh/hr)</b>	<b>Two Lanes (veh/hr)</b>
<i>A</i>	200	900
<i>B</i>	380	1400
<i>C</i>	600	1800
<i>D</i>	900	2200
<i>E</i>	1400	2800

*The figures in Table 4.4 are provided for strategic planning purposes only and are not intended as a substitute for basic exercises in intersection analysis.*

*In summary, when assessing a development application (and road works that may be required as a result of that application) the intersection upgrading requirements must be determined. If additional capacity is required then additional works which are needed to maintain appropriate levels of traffic flow must be identified.*

It is apparent that on the basis of the GTTGD criteria that the existing mid block Levels of Service during the peak periods range from B to C.

The operational performance of the intersections along Fox Valley Road under the existing peak traffic demand and intersection geometry circumstances (The Comenarra Parkway prior to commencement of roadworks) has been assessed with SIDRA. The results of that assessment are provided in Appendix F and summarised in the following while the criteria for interpreting SIDRA output is reproduced overleaf.

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	AM		PM	
	LOS	AVD	LOS	AVD
Ada Avenue	A	5.5	A	5.7
Lucinda Avenue	A	7.9	A	7.4
Hospital Access	B	23.4	B	22.8
The Comenarra Parkway	C	42.0	D	47.0

It is apparent that the existing Levels of Service during the peak traffic periods at these intersections is satisfactory although The Comenarra Parkway intersection (as it was) is shown to be “nearing capacity”.

# Criteria for Interpreting Results of SIDRA Analysis

## 1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good	Good
'B'	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
'C'	Satisfactory	Satisfactory but accident study required
'D'	Operating near capacity	Near capacity and Accident Study required
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode
'F'	Unsatisfactory and requires additional capacity	Unsatisfactory and requires other control mode

## 2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below, which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (ie inner city conditions) and on some roads (ie minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabouts	Give Way and Stop Signs
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory but accident study required
D	43 to 56	Operating near capacity	Near capacity and accident study required
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode	At capacity and requires other control mode

## 3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**<sup>1</sup> both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

<sup>1</sup> the values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs

## 5.0 Future Traffic Circumstances

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TfNSW has undertaken network traffic modelling of the potential changes to peak traffic movements on the road network resultant to the opening of Northconnex. An extract of the TfNSW traffic modelling data provided in Appendix F shows the predicted changes on Fox Valley Road and The Comenarra Parkway between the years 2017 and 2026 (i.e. with Northconnex). These are 2-hour volumes and the changes are summarised in the following:

	AM		PM	
	NB	SB	NB	SB
<u>Fox Valley Road</u>				
Highway – Ada	-54	-77	-195	-13
Ada – Lucinda	-3	41	-139	53
Lucinda – Site	13	50	-141	72
<u>The Comenarra P'way</u>	EB	WB	EB	WB
Fox Valley – Browns	27	88	-55	103

These predictions cannot be utilised in relation to this detailed assessment in relation to the Wahroonga Estate development as they only reflect a broad strategic assessment, however, they do predict a general reduction in traffic movements on Fox Valley Road, particularly northbound, as a result of Northconnex. It is not known how the traffic growth resultant to development in the Wahroonga Estate is factored into the TfNSW model or whether this is reflected in the traffic movements.

The projected additional traffic movements (i.e. to the current recorded volumes) resultant to completion of the Estate development works are as follows:

## Hospital

### Stage 3

The previous GTA assessment states that their adopted traffic generation rates for the hospital development were derived from the 2010 TTPA assessment<sup>2</sup> for the MP (now SSD) Application. However, that is not the case and it is noted that the GTA adopted traffic generation rates:

- ❖ varied between AM, PM and stages which is not considered to be logical
- ❖ related only to additional staff and did not take account of visitor movements

The 2010 TTPA study involved a very complex and comprehensive assessment of projected Staff, Doctors, Nurses, Patients and Visitor movements in terms of both “person” and “vehicle” movements. The assessment noted that the travel mode would change over time as the residential element took place (ie more hospital staff walking to work) however as a “worst case” the projected additional traffic movements (vtph) for the Hospital Stage 3 was as follows:

AM		PM	
IN	OUT	IN	OUT
101	30	21	45

## School

The current enrolment is 553 and the proposed enrolment for next year is 647 student while the proposed enrolment for Stage 5 and 6 is 800 students. The GTA report stated that it adopted traffic generation criteria from previous assessment without being specific.

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<sup>2</sup> Sydney Adventist Hospital  
Proposed Staged Alterations & Additions  
Assessment of Transport, Traffic & Parking Indications  
TTPA July 2010



The GTA adopted traffic generation per student was as follows:

Yrs 7-10	0.38 vtpH/student
Yrs 11-12	0.44 vtpH/student

In retrospect this is not considered appropriate because:

- ❖ it does not capture K – Yr 6
- ❖ it is now universally accepted that the traffic generation rate for schools is higher in the AM than the PM because less parents/carers can pick their children up in the afternoon due to work commitments. Also, the PM factor was not applied in the GTA assessment because it was deemed to occur outside of the “Network Peak” period.

The former RMS study of Schools undertaken by GTA (see Appendix G extract) surveyed a wide range of schools (public, private, primary, secondary, Metropolitan & Regional) the results contain data for one comparable school to the Wahroonga Adventist School. That is the Glenaeon School at Middle Cove which is private, primary & secondary with similar demographics and access to public transport services. The traffic generation characteristics for this school recorded in the GTA report for RMS are as follows:

<b>AM Peak</b>	<b>PM Peak</b>
0.42 vtpH/student	0.20 vtpH/student

Analysis of the traffic survey results indicates that the recorded current traffic generation rate of the Adventist School is 0.57 vtpH/student in the AM and 0.48 vtpH/student in the PM. The GTA study for RMS established the following aggregated traffic generation characteristics for the 14 schools surveyed in the Metropolitan Area.

	<b>Primary</b>		<b>Secondary</b>	
	<b>Av.</b>	<b>Min.</b>	<b>Av.</b>	<b>Min.</b>
AM	0.67	0.43	0.51	0.16
PM	0.53	0.14	0.28	0.15

*Note: A few of the schools surveyed had extremely high generation rates which skewed the averages.*

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It is considered that the current generation rate for the Adventist School will reduce in the future as a result of:

- ❖ the proposed 450 new “private” residential dwellings which will be built on the Estate (i.e. more walk/cycle to school mode)
- ❖ the increased enrolment resulting in an increased sibling factor (i.e. travelling together)

The projected ‘worst case’ future traffic generation rate for the school is 0.50 vtpH/student in the AM and 0.40 vtpH/student in the PM. Application of these peak traffic generation rates to the proposed additional 247 students indicates an additional 124 vtpH in the AM peak period and 99 vtpH in the PM peak. Contrary to the previous GTA assessment, the 3.0 to 4.0pm peak (school departure) is in fact the afternoon peak traffic period on Fox Valley between the Pacific Highway and The Comenarra Parkway.

## Residential

The traffic generation rates adopted for the GTA study were as follows:

House/townhouse (Staff Accommodation)	0.85 vtpH/dwelling
Studio/1 Bed unit (Staff Accommodation)	0.28 vtpH/dwelling
Studio/1 Bed unit (Student Accommodation)	0.21 vtpH/dwelling
Studio/1 Bed unit (Private Use)	0.36 vtpH/dwelling
2/3 Bed unit (Private Use)	0.52 vtpH/dwelling

The housing provided for staff and student accommodation is not considered to equate to normal private residential traffic generation when the occupants are not travelling away from the site for work or study. Certainly, there would be some shopping and recreational trips (depending on the shift worked/class time) and even some work trips by a partner who might be sharing the accommodation. But the great majority (200) of the 301 persons is Student accommodation and will be “hostel type rooms” with very low car ownership.

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It is assessed that the peak traffic generation rates will be as follows:

House/townhouse (Staff)	0.20 vtp/dwelling
Room/Studio/1 Bed (Student/Staff)	0.05 vtp/dwelling
Apartments (Private)	0.29 vtp/dwelling (as per the former RTA Guideline rate including locations away from railway stations)

Application of these factors would indicate the following:

House/townhouse (Staff) -15	- 3 vtp
Room/Studio/1 Bed (Student) +56*	3 vtp
393 Apartments (Private)	114 vtp

$$* 343 - 287 = 56$$

## Commercial

The proposed commercial provision comprises:

2,000m <sup>2</sup>	Church Admin. Office
1,000m <sup>2</sup>	Central Hospital Precinct Office
<b>Total: 3,000m<sup>2</sup></b>	

The TfNSW Development Guidelines specify the peak traffic generation for office use as follows:

AM	1.6 vtp per 100m <sup>2</sup>
PM	1.2 vtp per 100m <sup>2</sup>

Application to the proposed office space indicate the following:

AM	48 vtp
PM	36 vtp

The proposed retail element will be ancillary specialty shops (e.g. convenience store, café, etc) for the whole Wahroonga Estate precinct and this will not be “destination” retail and is very likely to include relocation of some of the existing hospital retail facilities. Accordingly, any traffic movements to/from the retail will essentially be internal, vehicle movements already travelling on the road system or dual purpose (i.e. visitors to be precinct).

The proposed additional 1,600m<sup>2</sup> of Place of Worship floorspace will not have any traffic implications for the weekday AM and PM network peak periods.

The existing peak traffic movements along Fox Valley Road (7.45 – 8.45am and 3.00 – 4.00pm) reflect the peak traffic movements of the School and the Hospital. However, it would not be appropriate to compound the peak traffic generation of the proposed private residential apartments and the office space onto these periods.

This is because the peak traffic generation of office use and residential apartments do not occur during these periods. This is confirmed by the extracts from the studies commissioned by the former RMS for Office and Residential Apartment uses (Appendix G) which reveal that:

### **Office**

- ❖ The peak AM traffic generation occur between 7.00 and 8.00am and is some 25% lower than between 8.00am and 9.00am
- ❖ The peak PM traffic generation occurs between 4.00 and 5.00pm and is some 50% lower between 3.00 and 4.00pm

### **Apartments**

- ❖ The peak AM traffic generation occurs between 7.00 and 8.00am and is some 25% lower than between 8.00 and 9.00am
- ❖ The peak PM traffic generation occurs between 5.00 and 6.00pm and is some 40% lower between 3.00 and 4.00pm

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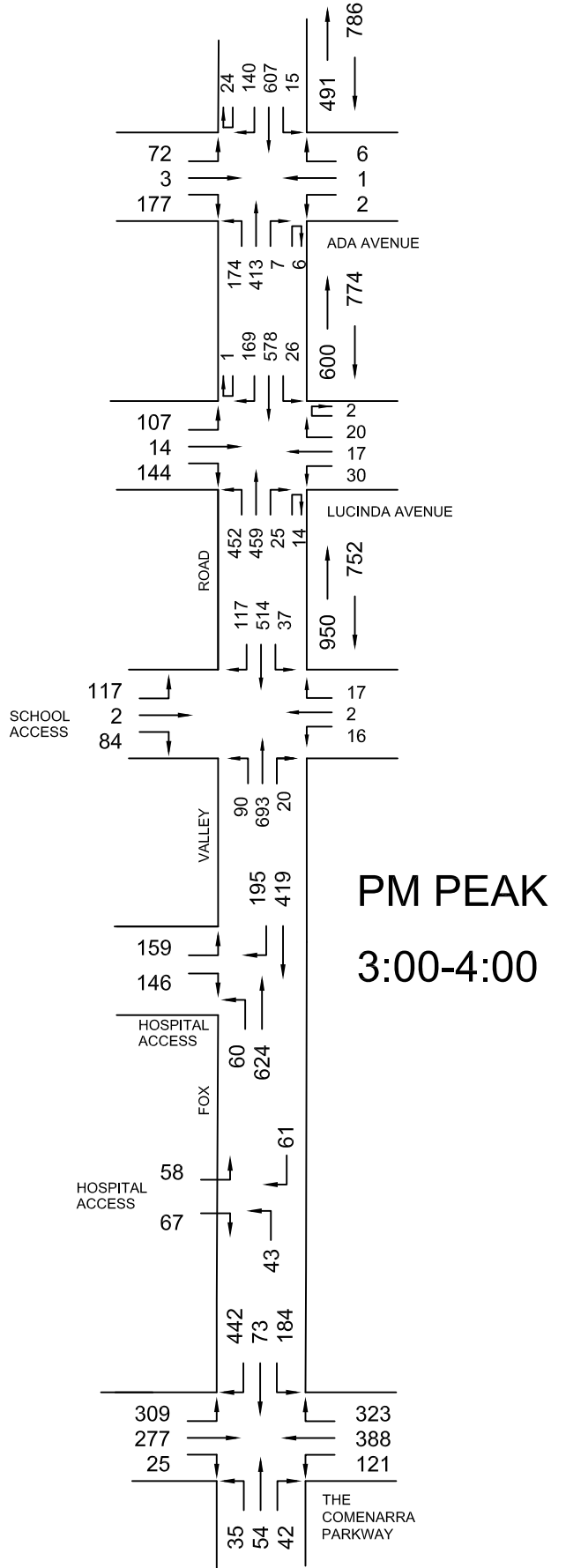
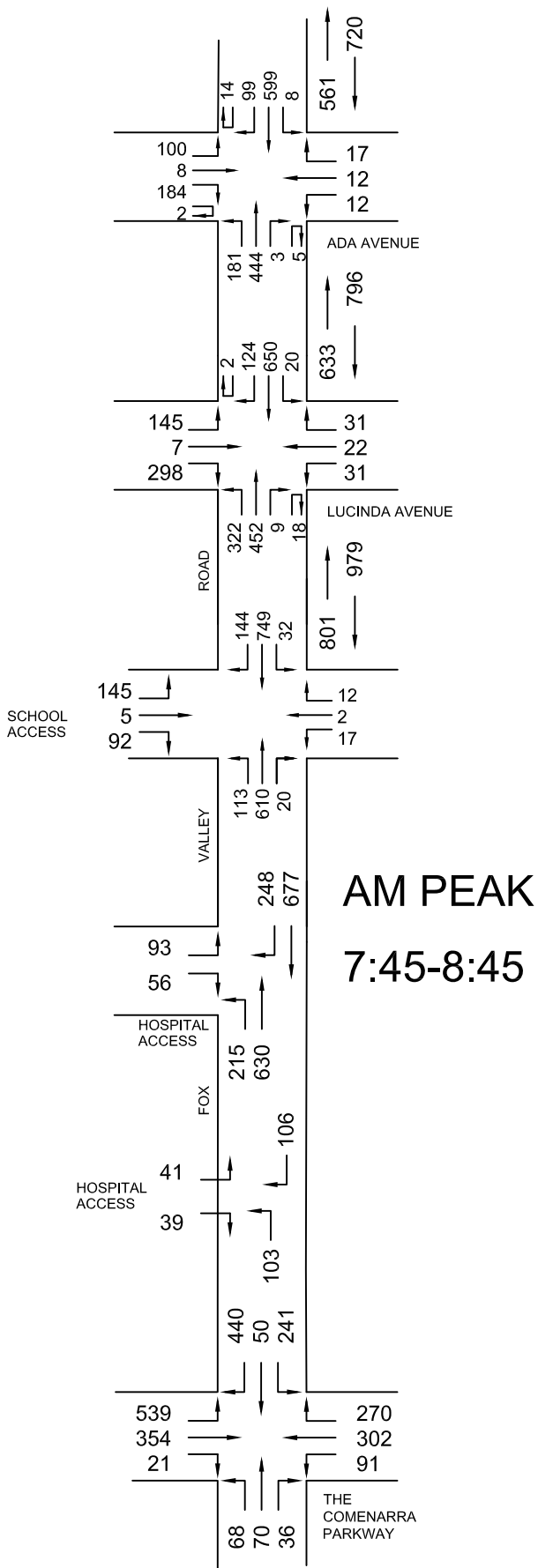
Thus, the total projected additional future traffic generation of the development elements is summarised in the following:

	AM		PM	
	IN	OUT	IN	OUT
Hospital Stage 3	101	30	21	45
School Stages 5 & 6	62	62	50	50
Residential	16	70	54	14
Commercial	30	6	3	15
<b>Total</b>	<b>209</b>	<b>168</b>	<b>128</b>	<b>124</b>

The projected distribution of these traffic movements was undertaken as follows:

- ❖ The existing approach and departure movements of school were deducted from the Hospital access intersection and added to the School access intersection
- ❖ The additional school generated movements were added with distribution to/from the 5 principal directions being:
  - ❖ East (Pacific Highway)
  - ❖ North (Ada Avenue)
  - ❖ North (Lucinda Avenue)
  - ❖ West (Comenarra Parkway)
  - ❖ South (Comenarra Parkway)
- ❖ The additional hospital movements were added with distribution to/from the 5 directions
- ❖ The additional residential movements were added to the 3 access points (Zone B School access intersection, Zone C the secondary Hospital access and Zone D the southern side of the School access intersection) and distributed to/from the 5 directions
- ❖ The additional commercial (office) movements were split between Zone C (1,000m<sup>2</sup>) and Zone D (2,000m<sup>2</sup>) and distributed to/from the 5 directions

The resultant “post development” traffic movements at the intersections along Fox Valley Road during the AM and PM peak periods are shown on Figure 2.



**LEGEND**



**FUTURE PEAK  
TRAFFIC VOLUMES**

**FIG 2**

## 6.0 Assessment

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The operational performance of the intersections has been assessed with SIDRA for the following circumstances:

### **The Comenarra Parkway**

As per the lane arrangement shown in Appendix A.

### **The Hospital Access**

As existing

### **The School Access**

- ❖ Single lane roundabout as per Appendix B
- ❖ Traffic signals as per Appendix B with or without right turn bay

### **Lucinda Avenue**

- ❖ Single lane roundabout as existing
- ❖ Traffic signals as per Appendix C
- ❖ Two lane roundabout as per Appendix C

### **Ada Avenue**

- ❖ Single lane roundabout as existing
- ❖ Traffic signals as per Appendix C
- ❖ Two lane roundabout as per Appendix C

The results of the SIDRA assessment are provided in Appendix E and summarised in the following:

	AM		PM	
	LOS	AVD	LOS	AVD
The Comenarra Parkway	C	33.9	C	34.0
E.B. Max. Queue	129.2m		82.6m	
N.B. Max. Queue	65.8m		92.5m	
Hospital Intersection	B	15.0	B	17.3
School Intersection				
Roundabout	A	7.4	A	7.2
Traffic Signals (No RT Bays)	B	17.9	B	15.5
Traffic Signals (RT Bays)	B	15.1	B	14.9
Lucinda Avenue				
Existing RAB	A	8.9	A	8.3
Traffic Signals	B	27.1	B	19.7
2 Lane RAB	A	6.2	A	5.4
Ada Avenue				
Existing RAB	A	5.7	A	5.7
Traffic Signals	B	21.7	B	19.4
2 Lane RAB	A	4.8	A	4.9

These results indicate that:

- ❖ The intersection of The Comenarra Parkway and Fox Valley Road will operate quite satisfactorily with an eastbound kerbside approach lane of 210m and a northbound kerbside departure lane of 85m (note SIDRA adopts a length which includes 50% of the merge)
- ❖ The Hospital access intersection will operate quite satisfactorily with the existing geometry and traffic signal control
- ❖ The School access intersection will operate satisfactorily (“operationally”) with a single lane roundabout or with traffic signal control (without a separate right turn bay). The traffic signals will require some minor road widening, however the provision of traffic signals will provide a significantly better outcome in relation to pedestrian (school children) safety. The operational difference with and without a right turn bay would be entirely imperceptible.



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- ❖ The Lucinda Avenue intersection will operate quite satisfactorily with the existing single lane roundabout as well as with a 2 lane roundabout or traffic signals (which would require road widening)
- ❖ The Ada Avenue intersection will operate quite satisfactorily with the existing single lane roundabout as well as a 2 lane roundabout or traffic signals (which would require road widening)
- ❖ There is no need at all to provide 2 southbound lanes between the Pacific Highway and the site

The other factors which are relevant to the considerations particularly in relation to the provision of 2 southbound lanes on Fox Valley Road between the Pacific Highway and the site are as follows:

- ❖ Fox Valley Road is 11.1m wide which adequately provides for one lane in each direction with kerbside parking
- ❖ The distance from Pacific Highway to the site is some 2 kms and there are many mature trees and services which would be affected by road widening
- ❖ There is an existing marked footcrossing at Strone Avenue and there is a TfNSW direction that there should only be one lane in each direction at a marked footcrossing
- ❖ The provision of 2 lane roundabouts at the Lucinda & Ada Avenue intersections would require significant property acquisitions & services relocation
- ❖ The provision of a roundabout or a right turn bay at the School access intersection will require significant property dedication and services relocation
- ❖ The provision of traffic signals at the School access intersection will provide a far safer circumstance for school children (pedestrians and cyclists) crossing Fox Valley Road and the access road particularly for school children arriving by the bus service

## 7.0 Conclusion

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A comprehensive reassessment has been undertaken in relation to the need and nature of various road upgrades to accommodate the traffic generation of all of the elements in the ACA Wahroonga Estate development. The reassessment has provided the opportunity to correct previous misconceptions and assessments and has been benefited by clearer understanding of the development elements and their traffic generating characteristics.

Whilst not included in the assessment, research into the envisaged traffic implications of the soon to open Northconnex have indicated that this will generally result in a reduction of traffic movements on Fox Valley Road. The recommendations of this reassessment are as follows:

- ❖ Abandon the requirement to provide 2 southbound lanes along Fox Valley Road and the site
- ❖ Retain the Ada Avenue roundabout as it is
- ❖ Retain the Lucinda Avenue roundabout as it is
- ❖ Provide traffic signals at the School access intersection without a right turn bay with this work to be completed prior to occupation of stage 6 (Senior School) of SSD5535. This is on the basis that the existing temporary access provision through the Hospital access road has no operational shortcomings.
- ❖ Provide 2 lanes each way on The Comenarra Parkway between Fox Valley Road 210m long on the northern approach and 85m long on the northern departure

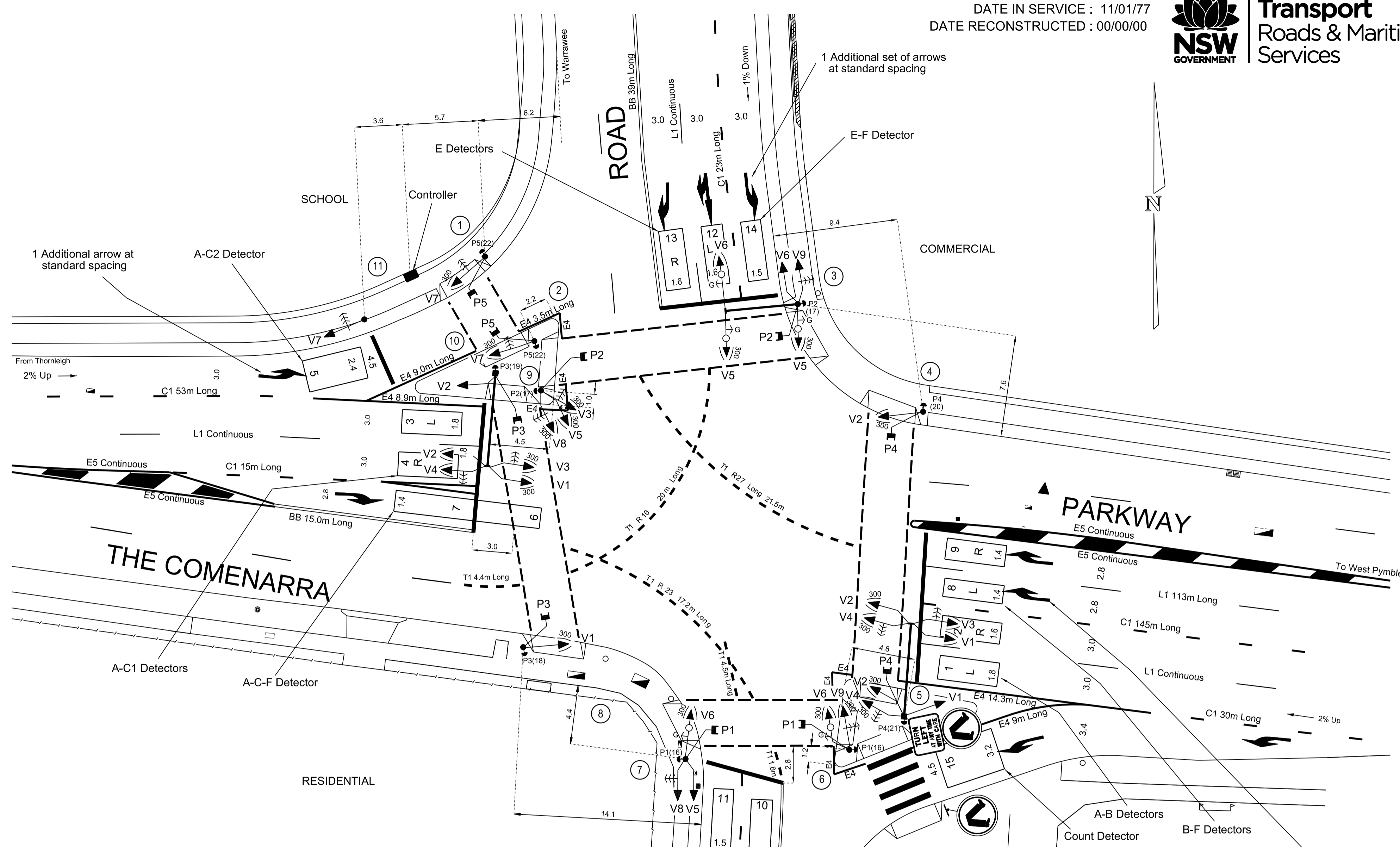
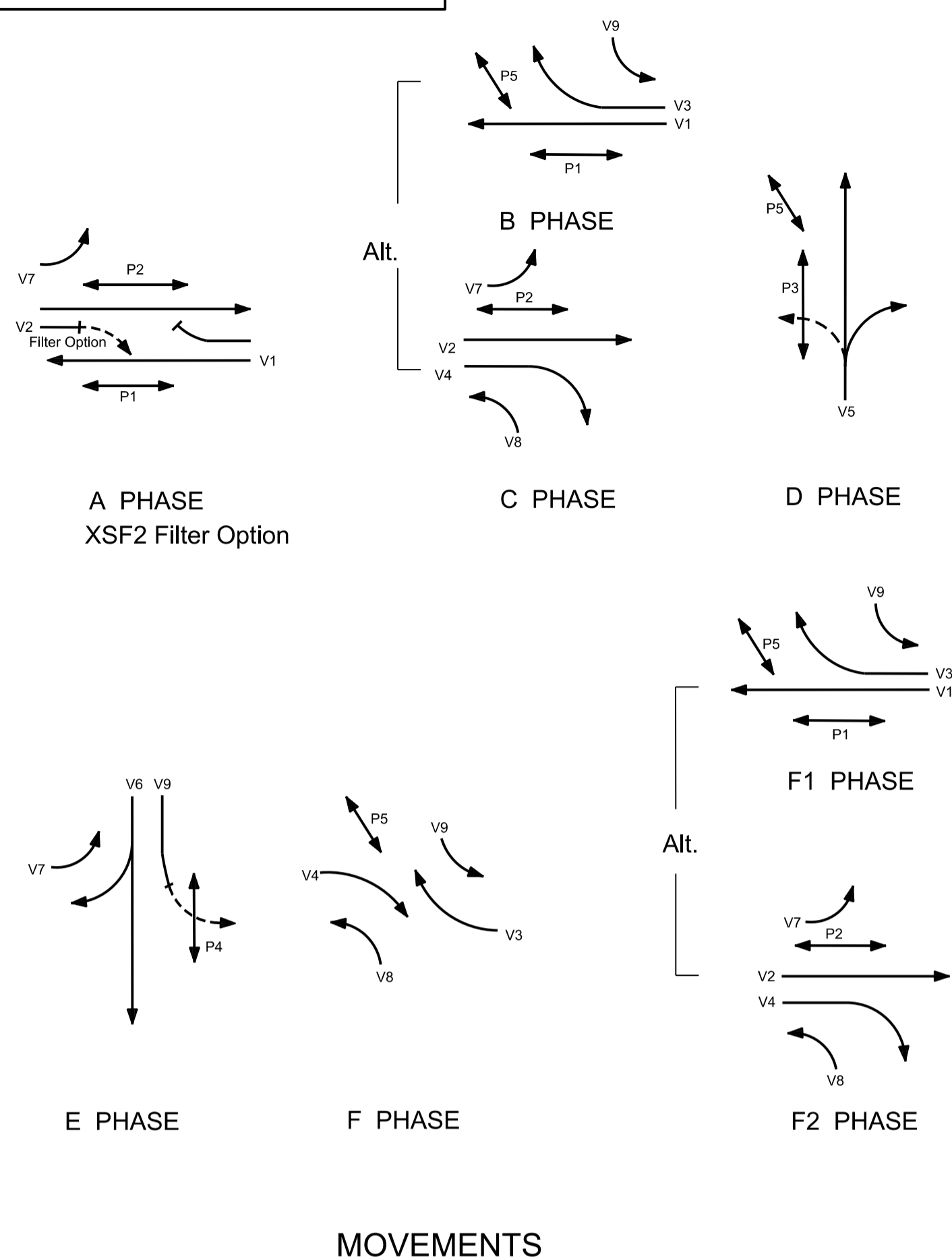
## Appendix A

# The Comenarra Parkway & Fox Valley Road Plans

7000.238.VV.1310

DRAWN BY CADD  
DO NOT AMEND MANUALLY

DATE IN SERVICE : 11/01/77  
DATE RECONSTRUCTED : 00/00/00



**SIGNAL GROUP PHASE CHART**

SIGNAL GROUP	PHASE DURING WHICH GREEN DISPLAYED								OVERLAPS PERMITTED	TABLE
	A	B	C	D	E	F	F1	F2		
V1	X	X						X	F1/A/B, B/A, A/F1	TS-TN-026
V2	X		X					X	F2/A/C, C/A, A/F2	TS-TN-026
V3		X				X	X	X	F/F1, B/F	TS-TN-026
V4			X			X	X	X	F/F2, C/F	TS-TN-026
V5				X						1
V6					X					1
V7	X		X		X			X	F2/A/C, C/A, A/F2	160
V8			X			X	X	X	F/F2, C/F	145 *
V9		X			C	X	X	X	F/F1, B/F	146 #
P1	X	X						X	F1/A/B	109
P2	X		X					X	F2/A/C	107
P3				X						2
P4					X					2
P5		X	X			X	X		Automatic introduction with V3 and V5 in the presence of XSF11	-

\* PB on post 10 extends RA.  
# PB on post 5 extends RA.

**DETECTOR SPECIFICATION SCHEDULE**

Detector	Specifications		
	FN	F1(NL)	E(E1)
E-F	SG/PS	V6.V9	E
	DS	E	RED(NEXT)
			RED(NEXT)

**POSTS**

POST	TYPE	LENGTH	OFFSET	REMARKS
1	2	4.1	1.0	New
2	2	4.1	1.0	New
3	5XL	-	1.0	New
4	2	4.1	1.0	New
5	9	-	2.0	New 7.0m Outreach
6	2	4.1	1.0	New
7	2	4.1	1.0	New
8	2	4.1	1.0	New
9	2	4.1	1.0	New
10	9	-	2.0	New 7.0m Outreach
11	2	4.1	1.0	New

WAHROONGAH SPECIALIST CENTRE

**NOTES:**

- This site is SCATS linked.
- Audio tactile push buttons are provided on posts 1,2,3,4,5,6,7,8,9 & 10.
- Special regulatory STOP sign (R1-4) placed on Posts 3 and 7.
- Kerb ramps to be constructed at all pedestrian crossings in accordance with Model Drawing MD.R173.B01.A.1.
- Roadworks in accordance with Taylor Thomson Whitting road construction drawing number D-C502 10.
- Supply to be determined at site by level 2/3 service provider.
- Standard Single Diamond Overlap phasing in accordance with Model Drawing TS-TN-026.
- Barrier kerb to be provided on islands housing mast arms.

**A ORIGINAL ISSUE**  
OFFICE INSTRUCTION  
UPDATED TURN LINES.  
RELOCATED V7 TO POST 2.  
LENGTH OF POST 2, 4.1m.  
S.M.F.P.Q. 01/02/2016

PUBLIC UTILITY LEGEND		REFERENCE PLANS		U.B.D. Ref. Map 153 H15	
HYDRANT	□	SYMBOLS/ABBS.	VD003-6	I.S.G.	E: 309 182
STOP VALVE	▲	STD POSIT	VD001-5	CO-ORDS	N: 1 265 671
GAS VALVE	#	PRES. DETECT	VC005-17	DESIGNED	CT
SEWER MANHOLE	⊕	VEH. GROUP OP	TS-TN-019	CHECKED	JS
TELECOM PIT	⊗	DET. LOGIC OP	TS-TN-020	DATE	28.03.2012
ELECT LIGHT POLE	○	PED. MOVEMENT OP	TS-TN-021	SITE CHECKED	CT
POWER POLE	○			DESIGN PREPARED BY	TRANSPORT AND TRAFFIC PLANNING ASSOCIATES
STAY POLE	○			POSITION	R. NETTLE
TELEPHONE BOX	⊞	SURVEYOR: INSITES		DATE	15.08.2013
TELECOM PILLAR	⊞	DATE	28.03.2012	RECOMMENDED	JS

DESIGN APPROVAL	RMS ACCEPTANCE
APPROVED	RECOMMENDED
DESIGNED BY: R. NETTLE	ACCEPTED
DIRECTOR	DATE: 03/09/13
DATE: 15.08.2013	

**ROADS AND MARITIME SERVICES**

KU-RING-GAI COUNCIL AREA  
TRAFFIC SIGNALS AT THE INTERSECTION OF  
THE COMENARRA PARKWAY  
AND FOX VALLEY ROAD  
WAHROONGA

DESIGN LAYOUT TCS No 1310

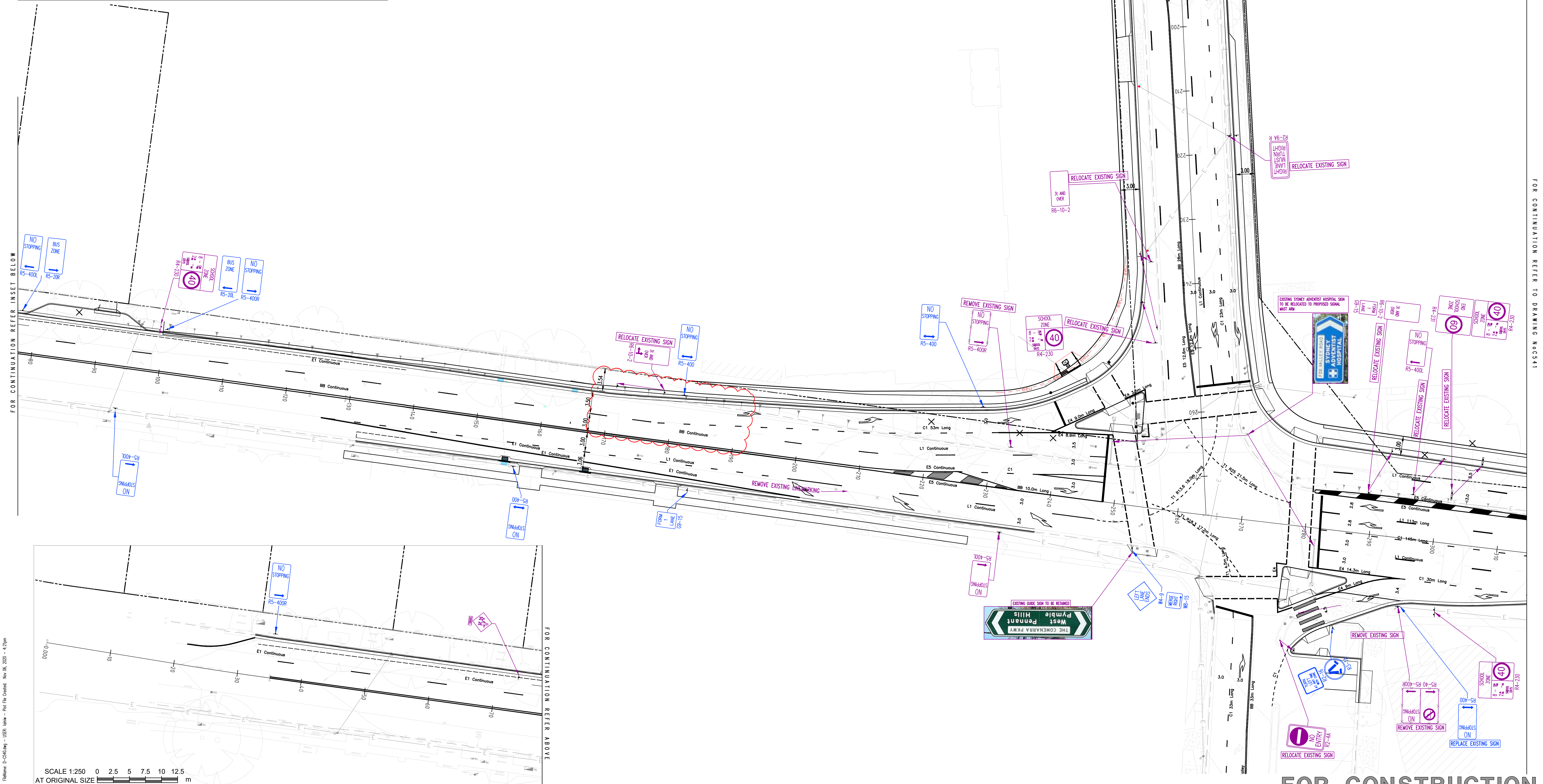
EXISTING	PROPOSED
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SCALE: 1:200	ISSUE: B
FILE: 238 TS 265	SUPERSEDES SHEET/ISSUE: 12A
REGN. 7000.238.VV.1310	SHEET: 12

**LEGEND**

- PROPOSED SIGNAGE
- EXISTING SIGNAGE TO BE RELOCATED
- EXISTING SIGNAGE TO BE REMOVED
- SIGNPOST

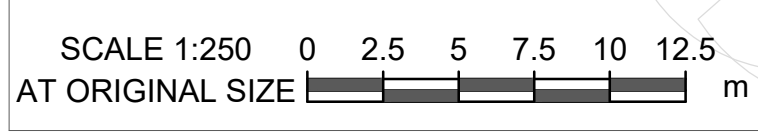
**NOTE:**

- ALLOW TO RELOCATE ALL SIGNAGE AND LIGHTING AS REQUIRED
- ALLOW TO ADJUST ALL SERVICES AND SERVICE PITS AS REQUIRED BY THE WORKS



FOR CONTINUATION REFER INSET BELOW

FOR CONTINUATION REFER ABOVE



FOR CONTINUATION REFER TO DRAWING N05341

**FOR CONSTRUCTION**

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
01	ISSUE FOR TENDER	SB	GG	25.08.17	12	LINE MARKING AMENDED	SB	EH	15.10.20
02	ISSUE FOR APPROVAL	SB	AS	30.07.13	11	REVISED WHERE CLOUDED	SB	EH	31.03.20
03	ISSUE FOR APPROVAL	SB	MS	20.06.13	10	ISSUE FOR CONSTRUCTION	EH	GG	30.01.20
04	ISSUE FOR APPROVAL	SB	MS	10.04.13	09	ISSUE FOR CONSTRUCTION REVIEW	AS	GG	16.12.19
05	ISSUE FOR INFORMATION	SB	MS	20.12.12	08	ISSUE FOR CONSTRUCTION	SB	GG	13.03.18
06	ISSUE FOR APPROVAL	SB	MS	29.10.12	07	ISSUE FOR CONSTRUCTION	SB	GG	02.02.18
07	ISSUE FOR APPROVAL	SB	GG	25.08.17	12	LINE MARKING AMENDED	SB	EH	06.11.20
08	ISSUE FOR APPROVAL	SB	GG	25.08.17	11	LINE MARKING AMENDED	SB	EH	19.10.20

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING C500

**MBMO**  
MORRIS BRAY MARTIN OLLMANN  
186 - 188 WILLOUGHBY RD CROWS NEST NSW 2067  
(T) 02 9439 6622 (F) 02 9436 4873

**TTW** TaylorThomsonWhitting  
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46 Chandos Street St Leonards NSW 2065  
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Taylor Thomson Whitting (NSW) Pty Ltd A.C.N. 113 578 377

Project  
**SYDNEY ADVENTIST HOSPITAL**  
FOX VALLEY ROAD WAHROONGA

Sheet Subject  
**SIGNAGE AND LINEMARKING PLAN SHEET 1**

Job No	Part Code	Drawing No	Revision
111110	D	C540	14

Scale: B1 1:250  
Drawn: GG  
Authorised: [Signature]  
Plot File Created: Nov 06, 2020 - 4:21pm

## Appendix B

# Fox Valley Road & School Access Plans

DRAWN BY CADD  
DO NOT AMEND MANUALLY

DATE IN SERVICE: 06/01/20



TCS 0000



A PHASE  
B & D PHASES  
(Z+ Introduces D Phase)  
C PHASE  
MOVEMENTS

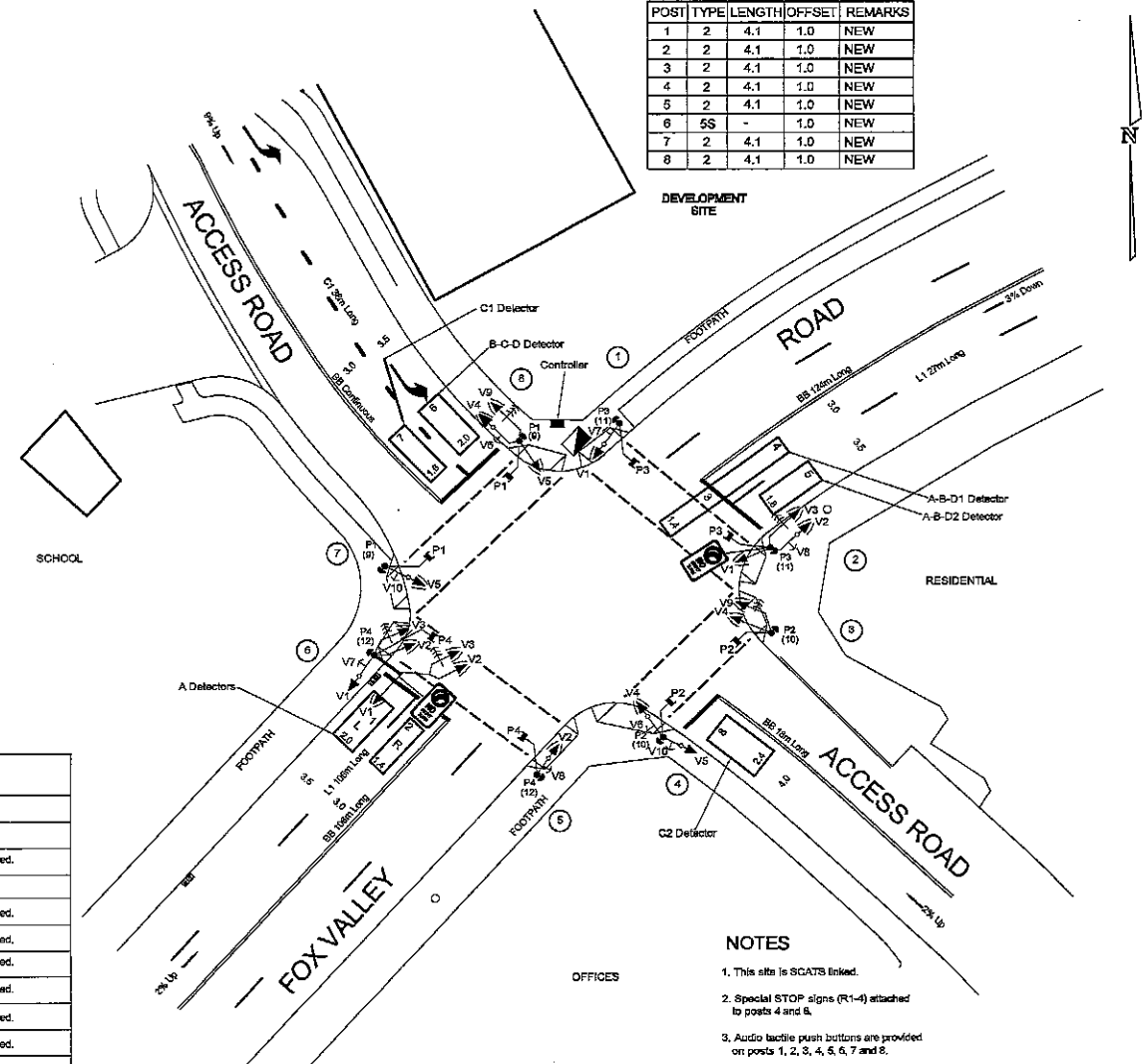
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POST	TYPE	LENGTH	OFFSET	REMARKS
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2	2	4.1	1.0	NEW
3	2	4.1	1.0	NEW
4	2	4.1	1.0	NEW
5	2	4.1	1.0	NEW
6	5S	-	1.0	NEW
7	2	4.1	1.0	NEW
8	2	4.1	1.0	NEW

DETECTOR SPECIFICATION

Detector	Specifications			
A	FN	A(L)	A(E1)	
	SG/PS	A	A	
	DS	-	-	
A-B-D1	FN	B(PR)	D(PR)	B(E4) D(E4)
Depart. & Approach	SG/PS	A	A	B D
	DS	-	Z+	A(NEXT) A(NEXT)
A-B-D1	FN	A(L),B(L)	D(L)	A(E3)
Approach	SG/PS	V2	V2	A
	DS	-	Z+	A-B-D1(PR),B(NEXT),D(NEXT)
A-B-D1	FN	B(E3)	D(E3)	
Approach	SG/PS	B	D	
	DS	A(NEXT),D(NEXT)	A(NEXT),B(NEXT)	
A-B-D2	FN	A(L)	A(E2)	B(E2)
	SG/PS	V2	A	B
	DS	B,D	B(NEXT),D(NEXT)	A(NEXT),D(NEXT)
	FN	D(E2)		
A-B-D2	SG/PS	D		
	DS	A(NEXT),B(NEXT)		
B-C-D	FN	B(PR)	D(PR)	B(E1)
	SG/PS	B,C,D	B,C,D	B
	DS	C	Z+,C	C(NEXT),D(NEXT)
	FN	C(E1)	D(E1)	
B-C-D	SG/PS	C	D	
	DS	B(NEXT),D(NEXT)	B(NEXT),C(NEXT)	
C1	FN	C(L)	C(E2)	
	SG/PS	C	C	
	DS	-	-	
C2	FN	C(L)	C(E3)	
	SG/PS	C	C	
	DS	-	-	
P1 P.B.	FN	A(PB)	C(L)	
	SG/PS	P1(WALK)	A,P1(WALK)	
	DS	-	B,C,D	
P2 P.B.	FN	A(PB)	C(L)	
	SG/PS	V2,P2(WALK)	V2,P2(WALK)	
	DS	B,D	C	
P3 P.B.	FN	C(PB)	A(L)	
	SG/PS	P3(WALK)	C,P3(WALK)	
	DS	-	A,B,D	
P4 P.B.	FN	C(PB)	A(L)	
	SG/PS	P4(WALK)	C,P4(WALK)	
	DS	-	A,B,D	

SIGNAL GROUP/PHASE CHART

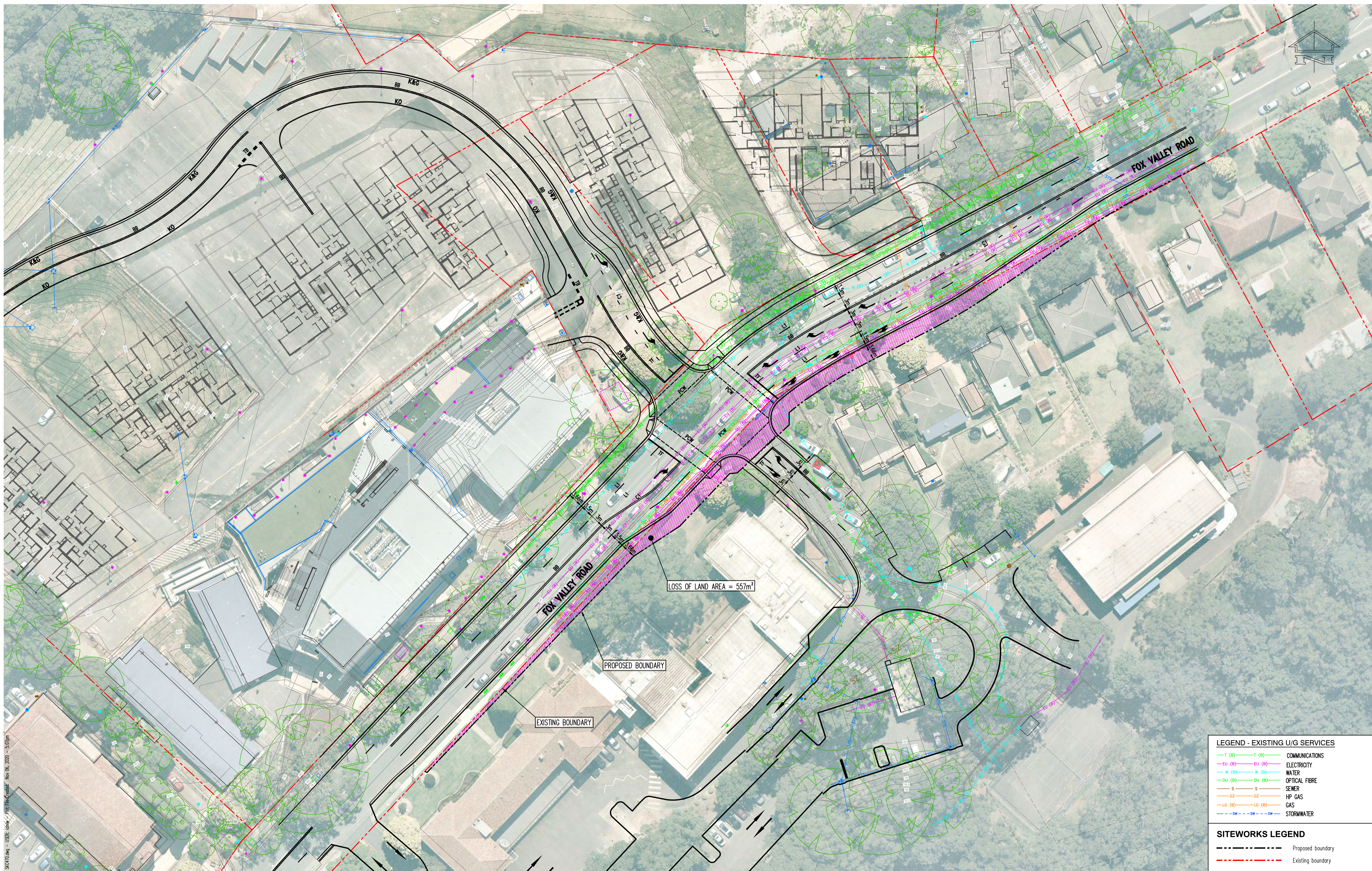
SIGNAL GROUP	PHASES WHEN GREEN				STANDARD TABLE	REMARKS
	A	B	C	D		
V1	X				1	
V2	X	X		X	3	
V3		X		X	38	Timed RA protection for P1 ped.
V4			X		1	
V5			X		73	Timed RA protection for P3 ped.
V6				X	29	Timed RA protection for P4 ped.
V7				X	30	Timed RA protection for P1 ped.
V8				X	30	Timed RA protection for P2 ped.
V9	X	X	X	X	14	Timed RA protection for P3 ped.
V10				X	30	Timed RA protection for P4 ped.
P1	X				1	
P2	X	X		X	1	
P3			X		2	
P4			X		1	



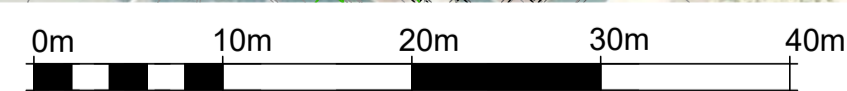
NOTES

- This site is SCATS linked.
- Special STOP signs (R1-4) attached to posts 4 and 6.
- Audio tactile push buttons are provided on posts 1, 2, 3, 4, 5, 6, 7 and 8.
- Kerb ramps are to be constructed at all crossings in accordance with Standard (Road) Drawing R0300-11.
- Roadworks in accordance with Taylor Thompson Whiting drawing No. SKC-103.
- Supply to be determined on site by a Level 2/3 service provider.

A. ORIGINAL ISSUE	PUBLIC UTILITY LEGEND		REFERENCE PLANS		LIBR. No. 153.113		DESIGN APPROVAL		RMS RECOMMENDATION		RMS ACCEPTANCE		ROADS AND MARITIME SERVICES		EXISTING <input type="checkbox"/> PROPOSED <input checked="" type="checkbox"/>		
	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	SYMBOL	
	STOP VALVE	STP STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	
	GAS VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	INST. STOP VALVE	
WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE	WATER MAIN VALVE		
COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER	COVER		
ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE	ELECT. LIGHT POLE		
POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE	POWER POLE		
STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE	STAY POLE		
TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE	TELEPHONE POLE		
POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR	POWER PILLAR		
DESIGNED: J. SINR		CHECKED: C. TONG		DATE: 07.04.2019		SITE CHECKED: B. O.		RECOMMENDED: B. O.		NAME: R. NETTLE		POSITION: DIRECTOR		DATE: 07.04.2019		NAME: R. NETTLE	
DESIGN APPROVED BY: TRANSPORT AND MARITIME PLANNING ASSOCIATES		RMS RECOMMENDATION: ROAD DESIGN ENGINEERING		RMS ACCEPTANCE: ACCEPTED		DESIGN APPROVED BY: TRANSPORT AND MARITIME PLANNING ASSOCIATES		RMS RECOMMENDATION: ROAD DESIGN ENGINEERING		RMS ACCEPTANCE: ACCEPTED		DESIGN APPROVED BY: TRANSPORT AND MARITIME PLANNING ASSOCIATES		RMS RECOMMENDATION: ROAD DESIGN ENGINEERING		RMS ACCEPTANCE: ACCEPTED	
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KU RING GAI COUNCIL AREA												CADD FILE: VVFR_ACCESS.DWG					
TRAFFIC SIGNALS AT												SCALE: 1:500 (1:200)					
FOX VALLEY ROAD AND												FILE: SF0000/000000					
ACCESS ROAD												SUPERSEDES SHEET NO. 4					
WAHROONGA												REG No: DS0000/000000					
DESIGN LAYOUT												TCS No: 0000					
												ISSUE: A					
												SHEET: 1					
												DATE: 06/01/20					
												COPYRIGHT: ROADS AND MARITIME SERVICES					



Reference: SKC474.dwg - USES: Issue - Plot File Created: Nov 06, 2020 - 5:07pm



SCALE 1:400 @ A1

LEGEND - EXISTING U/G SERVICES	
— T (B)	COMMUNICATIONS
— E (B)	ELECTRICITY
— W (B)	WATER
— O (B)	OPTICAL FIBRE
— S (B)	SEWER
— GZ (B)	HP GAS
— LG (B)	GAS
— SW (B)	STORMWATER

SITWORKS LEGEND	
— — — — —	Proposed boundary
— — — — —	Existing boundary

**PRELIMINARY**

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P1	PRELIMINARY	SB	WW	06.11.20					

Client

Civil Engineer

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

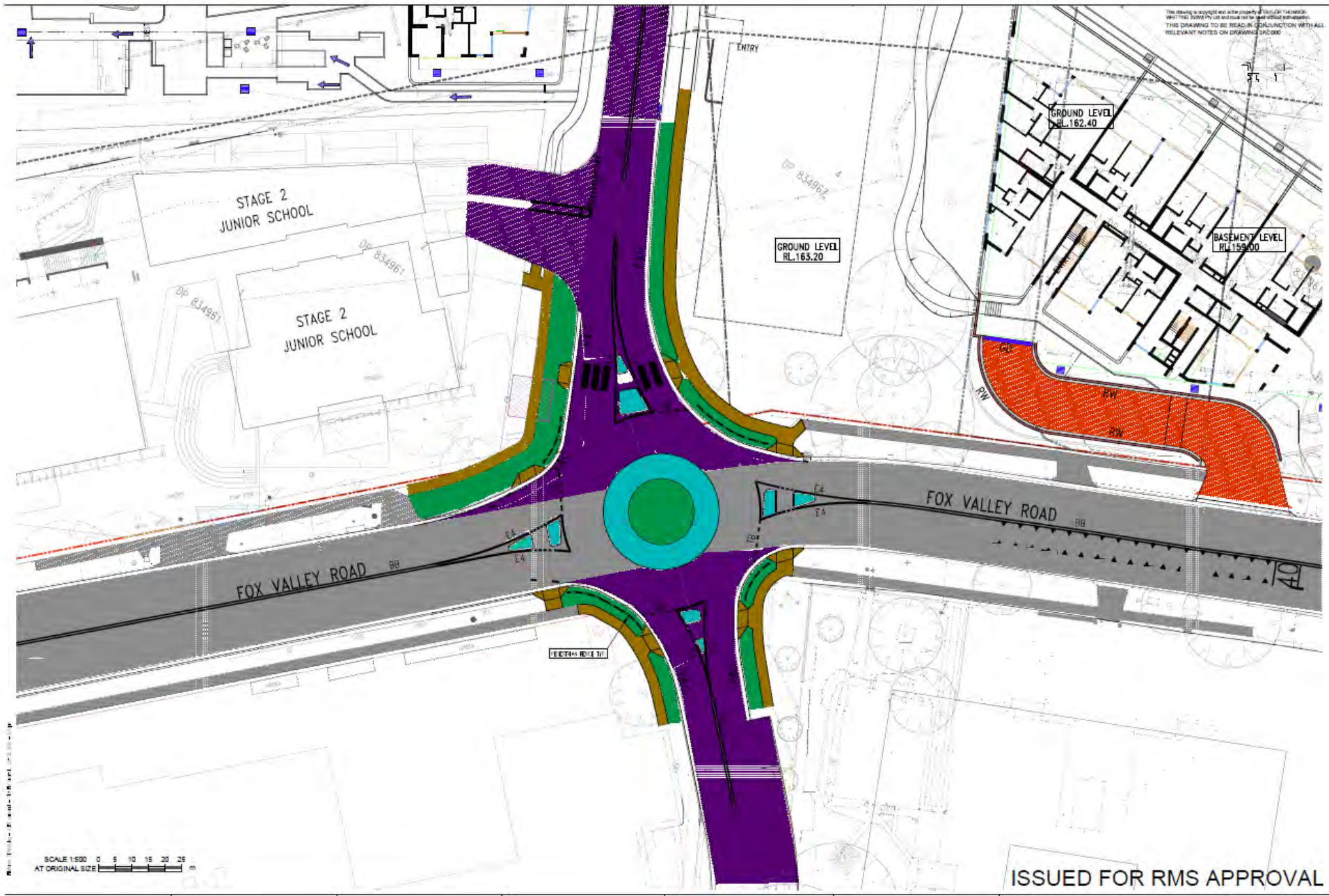
Project  
**WAHROONGA DISPLAY SUITE**

Sheet Subject  
**WAHROONGA ADVENTIST SCHOOL INTERSECTION SITE PLAN - NORTHERN KERB STAY**

Scale: A1 1:400	Drawn WW	Authorised SB
Job No 171590	Drawing No SKC470	Revision P1
Plot File Created: Nov 06, 2020 - 5:07pm		



This drawing is copyright and the property of TAYLOR THOMSON WHITTING (TTW) and shall not be used without permission. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING SKC600.



ISSUED FOR RMS APPROVAL

Rev	Description	By	CHK	Date	Rev	Description	By	CHK	Date
01	Issue for RMS Approval	PM	PM	12/11/2020					
02	Issue for RMS Approval	PM	PM	12/11/2020					
03	Issue for RMS Approval	PM	PM	12/11/2020					
04	Issue for RMS Approval	PM	PM	12/11/2020					

**TTW** Taylor Thomson Whitting  
 8/120 DUNDAS STREET | 40 CRENSHAW STREET | LAUNCESTON TAS 5223

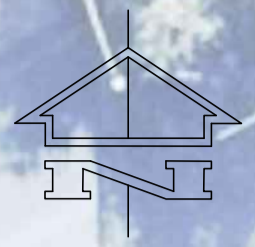
Project: WAHROONGA DISPLAY SUITE  
 Drawing No: 171590

Issue Subject: INTERSECTION SITE PLAN SINGLE LANE ROUNDABOUT

Scale: A1 1:200  
 Date: 12/11/2020  
 Author: PM  
 Checker: SB  
 Drawing No: SKC600  
 Project No: P4

## Appendix C

# Fox Valley Road 2 Lane Plans



File Name: SKC011.dwg | User: jwh | Plot File Created: Nov 06, 2020 - 10:12am

SCALE 1:250 0 2.5 5 7.5 10 12.5  
AT ORIGINAL SIZE m

**PRELIMINARY**

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P5	PRELIMINARY	EH	EH	06.11.20										
P4	PRELIMINARY	EH	EH	19.10.20										
P3	PRELIMINARY	EH	EH	15.10.20										
P2	PRELIMINARY	EH	EH	01.10.20										
P1	PRELIMINARY	EH	EH	20.08.20										

Client	

Civil Engineer

812 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project  
**FOX VALLEY ROAD INTERSECTIONS**

Sheet Subject  
**LUCINDA AVE INTERSECTION SIGNALISED**

Scale: A1  
1:250

Drawn: EH

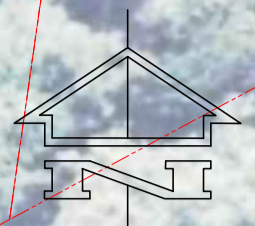
Authorised: EH

Job No: 171590

Drawing No: SKC11

Revision: P5

Plot File Created: Nov 06, 2020 - 10:12am



Reference: SKC12.dwg - USER: jwh - P&I File Created: Oct 15, 2020 - 4:23pm

SCALE 1:250 0 2.5 5 7.5 10 12.5  
AT ORIGINAL SIZE m

**PRELIMINARY**

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P3	PRELIMINARY	EH	EH	15.10.20										
P2	PRELIMINARY	EH	EH	01.10.20										
P1	PRELIMINARY	EH	EH	20.08.20										

Client	

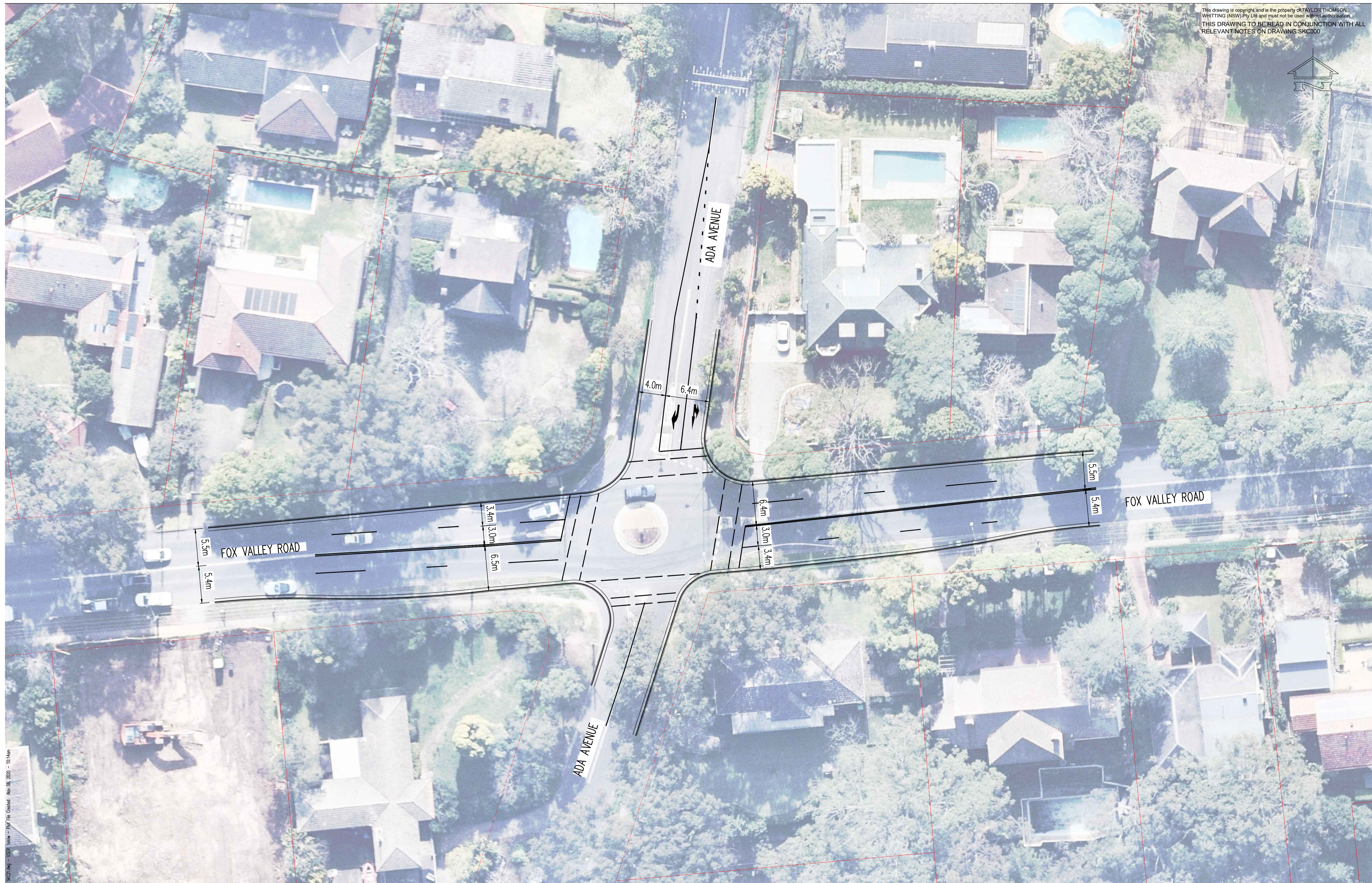
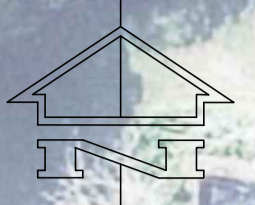
Civil Engineer

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project  
**FOX VALLEY ROAD INTERSECTIONS**

Sheet Subject  
**LUCINDA AVE INTERSECTION ROUNDABOUT**

Scale	Drawn	Authorised
1:250	EH	
Job No	Drawing No	Revision
171590	SKC12	P3
Plot File Created: Oct 15, 2020 - 4:23pm		



File Name: SKC21.dwg - User: John - Plot File Created: Nov 06, 2020 - 10:14am

SCALE 1:250 0 2.5 5 7.5 10 12.5  
AT ORIGINAL SIZE

**PRELIMINARY**

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P5	PRELIMINARY	EH	EH	06.11.20										
P4	PRELIMINARY	EH	EH	19.10.20										
P3	PRELIMINARY	EH	EH	15.10.20										
P2	PRELIMINARY	EH	EH	01.10.20										
P1	PRELIMINARY	EH	EH	20.08.20										

Client	

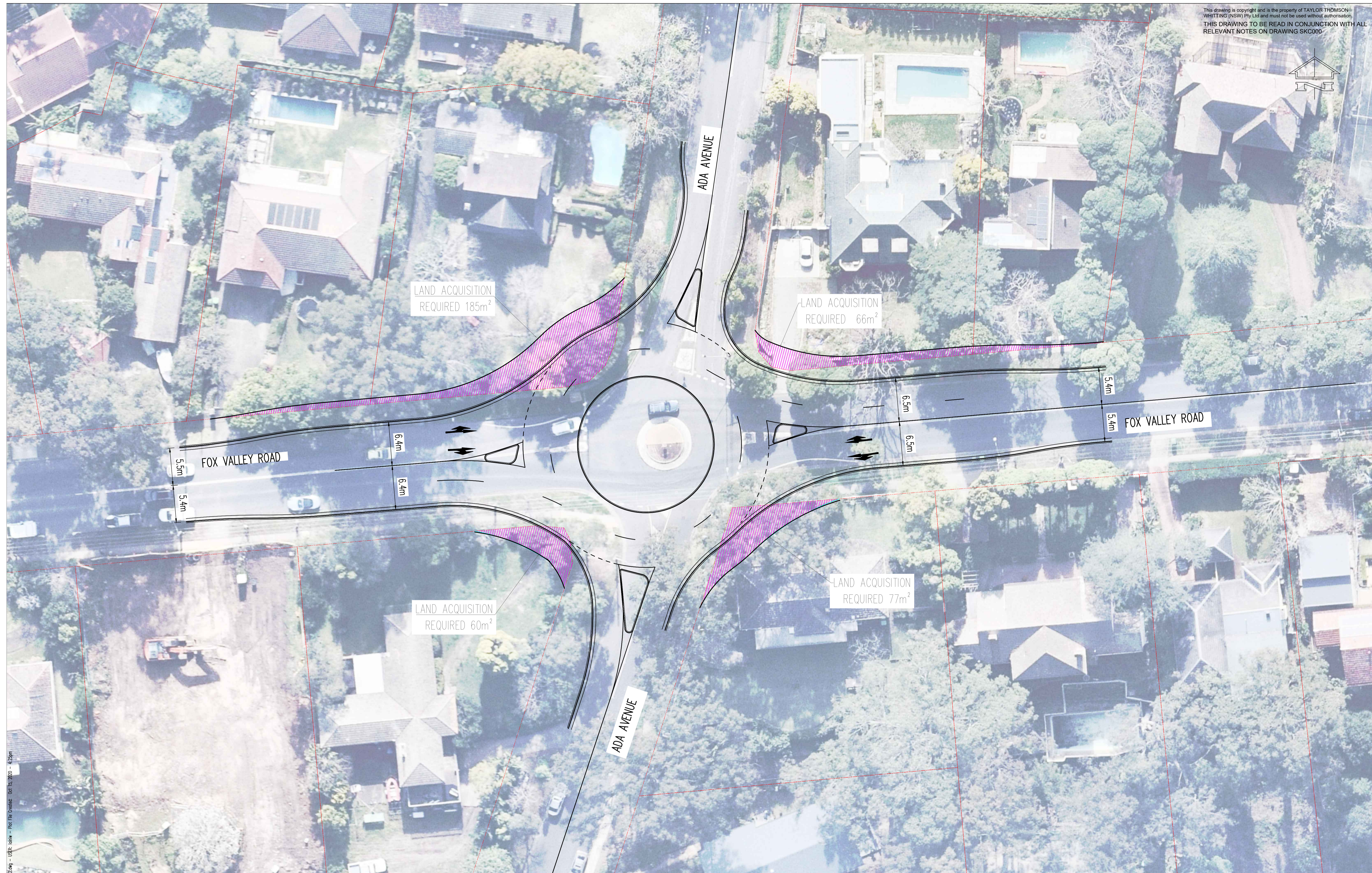
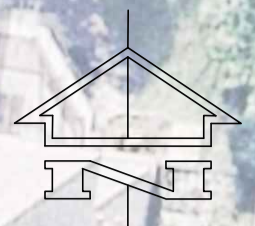
Civil Engineer

612 9439 7288 | 48 Chandos Street, St Leonards NSW 2065

Project  
**FOX VALLEY ROAD INTERSECTIONS**

Sheet Subject  
**ADA AVE INTERSECTION SIGNALISED**

Scale	Drawn	Authorised
1:250	EH	
Job No	Drawing No	Revision
171590	SKC21	P5
Plot File Created: Nov 06, 2020 - 10:14am		



SCALE 1:250 0 2.5 5 7.5 10 12.5  
AT ORIGINAL SIZE

**PRELIMINARY**

Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date	Rev	Description	Eng	Draft	Date
P3	PRELIMINARY	EH	EH	15.10.20										
P2	PRELIMINARY	EH	EH	01.10.20										
P1	PRELIMINARY	EH	EH	20.08.20										

Client

Civil Engineer

812 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Project  
**FOX VALLEY ROAD INTERSECTIONS**

Sheet Subject  
**ADA AVE INTERSECTION ROUNDABOUT**

Scale : A1 1:250	Drawn EH	Authorised
Job No <b>171590</b>	Drawing No <b>SKC22</b>	Revision <b>P3</b>
Plot File Created: Oct 15, 2020 - 4:25pm		

## Appendix D

### Traffic Survey Data

# TCS 1310

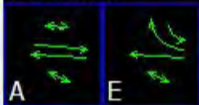
WAHRDONGA

153H15

HOR

SS=19

## 5 PHASES





Site	Date	Interval start	Interval end	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	Total
1310	Monday, 4 November 2019	12:00:00 AM AEDT	1:00:00 AM AEDT	24	7	6	16	7	1	1	5	0	10	77
1310	Monday, 4 November 2019	12:15:00 AM AEDT	1:15:00 AM AEDT	21	7	7	13	3	1	1	4	0	7	64
1310	Monday, 4 November 2019	12:30:00 AM AEDT	1:30:00 AM AEDT	13	5	6	8	3	1	1	3	0	5	45
1310	Monday, 4 November 2019	12:45:00 AM AEDT	1:45:00 AM AEDT	10	4	7	7	3	1	1	3	0	4	40
1310	Monday, 4 November 2019	1:00:00 AM AEDT	2:00:00 AM AEDT	8	5	7	4	4	1	1	2	0	3	35
1310	Monday, 4 November 2019	1:15:00 AM AEDT	2:15:00 AM AEDT	6	4	8	3	4	1	1	2	0	4	33
1310	Monday, 4 November 2019	1:30:00 AM AEDT	2:30:00 AM AEDT	12	8	7	4	6	2	2	3	0	8	52
1310	Monday, 4 November 2019	1:45:00 AM AEDT	2:45:00 AM AEDT	15	11	8	3	4	1	1	2	0	6	51
1310	Monday, 4 November 2019	2:00:00 AM AEDT	3:00:00 AM AEDT	17	12	9	4	5	2	1	2	0	5	57
1310	Monday, 4 November 2019	2:15:00 AM AEDT	3:15:00 AM AEDT	17	13	6	4	5	2	1	1	0	5	54
1310	Monday, 4 November 2019	2:30:00 AM AEDT	3:30:00 AM AEDT	9	8	5	2	4	2	0	0	0	1	31
1310	Monday, 4 November 2019	2:45:00 AM AEDT	3:45:00 AM AEDT	6	4	6	6	4	2	0	1	0	1	30
1310	Monday, 4 November 2019	3:00:00 AM AEDT	4:00:00 AM AEDT	6	5	8	5	2	2	1	4	0	2	35
1310	Monday, 4 November 2019	3:15:00 AM AEDT	4:15:00 AM AEDT	8	6	10	5	3	2	1	4	0	3	42
1310	Monday, 4 November 2019	3:30:00 AM AEDT	4:30:00 AM AEDT	13	7	17	8	3	2	2	6	0	4	62
1310	Monday, 4 November 2019	3:45:00 AM AEDT	4:45:00 AM AEDT	17	8	17	8	3	2	3	5	0	5	68
1310	Monday, 4 November 2019	4:00:00 AM AEDT	5:00:00 AM AEDT	25	11	31	13	7	3	3	2	0	6	101
1310	Monday, 4 November 2019	4:15:00 AM AEDT	5:15:00 AM AEDT	49	23	43	24	9	6	5	4	0	10	173
1310	Monday, 4 November 2019	4:30:00 AM AEDT	5:30:00 AM AEDT	77	40	61	35	17	7	5	5	1	15	263
1310	Monday, 4 November 2019	4:45:00 AM AEDT	5:45:00 AM AEDT	120	73	98	53	25	13	8	10	1	26	427
1310	Monday, 4 November 2019	5:00:00 AM AEDT	6:00:00 AM AEDT	152	105	142	71	38	13	10	14	2	37	584
1310	Monday, 4 November 2019	5:15:00 AM AEDT	6:15:00 AM AEDT	179	145	194	90	57	16	12	26	4	44	767
1310	Monday, 4 November 2019	5:30:00 AM AEDT	6:30:00 AM AEDT	217	208	270	124	83	22	18	32	6	67	1047
1310	Monday, 4 November 2019	5:45:00 AM AEDT	6:45:00 AM AEDT	244	273	327	148	113	35	26	50	9	94	1319
1310	Monday, 4 November 2019	6:00:00 AM AEDT	7:00:00 AM AEDT	293	353	401	190	149	53	31	74	20	124	1688
1310	Monday, 4 November 2019	6:15:00 AM AEDT	7:15:00 AM AEDT	336	415	447	232	178	65	36	88	33	175	2005
1310	Monday, 4 November 2019	6:30:00 AM AEDT	7:30:00 AM AEDT	334	440	466	283	212	78	44	120	41	206	2224
1310	Monday, 4 November 2019	6:45:00 AM AEDT	7:45:00 AM AEDT	309	434	480	354	254	85	51	152	54	224	2397
1310	Monday, 4 November 2019	7:00:00 AM AEDT	8:00:00 AM AEDT	286	422	459	403	269	94	52	178	61	260	2484
1310	Monday, 4 November 2019	7:15:00 AM AEDT	8:15:00 AM AEDT	260	406	483	429	284	113	50	204	64	272	2565
1310	Monday, 4 November 2019	7:30:00 AM AEDT	8:30:00 AM AEDT	228	374	470	419	265	133	41	237	78	290	2535
1310	Monday, 4 November 2019	7:45:00 AM AEDT	8:45:00 AM AEDT	245	375	497	406	250	138	36	224	91	302	2564
1310	Monday, 4 November 2019	8:00:00 AM AEDT	9:00:00 AM AEDT	236	382	516	404	248	135	34	210	105	301	2571
1310	Monday, 4 November 2019	8:15:00 AM AEDT	9:15:00 AM AEDT	230	364	499	403	225	116	36	197	109	288	2467
1310	Monday, 4 November 2019	8:30:00 AM AEDT	9:30:00 AM AEDT	277	351	482	406	222	105	35	159	106	263	2406
1310	Monday, 4 November 2019	8:45:00 AM AEDT	9:45:00 AM AEDT	283	317	434	377	196	106	28	146	96	240	2223
1310	Monday, 4 November 2019	9:00:00 AM AEDT	10:00:00 AM AEDT	283	256	409	331	171	99	33	137	79	208	2006
1310	Monday, 4 November 2019	9:15:00 AM AEDT	10:15:00 AM AEDT	297	231	371	303	169	100	28	130	82	192	1903
1310	Monday, 4 November 2019	9:30:00 AM AEDT	10:30:00 AM AEDT	290	216	347	271	166	93	32	132	84	195	1826
1310	Monday, 4 November 2019	9:45:00 AM AEDT	10:45:00 AM AEDT	283	201	323	259	175	88	29	139	88	206	1791
1310	Monday, 4 November 2019	10:00:00 AM AEDT	11:00:00 AM AEDT	290	201	289	263	179	92	23	144	96	210	1787
1310	Monday, 4 November 2019	10:15:00 AM AEDT	11:15:00 AM AEDT	265	197	277	250	177	97	26	140	82	204	1715
1310	Monday, 4 November 2019	10:30:00 AM AEDT	11:30:00 AM AEDT	256	205	280	263	176	97	24	130	88	204	1723
1310	Monday, 4 November 2019	10:45:00 AM AEDT	11:45:00 AM AEDT	258	217	281	267	169	91	27	135	93	193	1731
1310	Monday, 4 November 2019	11:00:00 AM AEDT	12:00:00 PM AEDT	238	221	270	273	170	84	27	138	87	196	1704
1310	Monday, 4 November 2019	11:15:00 AM AEDT	12:15:00 PM AEDT	242	212	266	286	182	82	31	157	104	217	1779
1310	Monday, 4 November 2019	11:30:00 AM AEDT	12:30:00 PM AEDT	240	203	279	297	174	72	28	160	101	229	1783
1310	Monday, 4 November 2019	11:45:00 AM AEDT	12:45:00 PM AEDT	221	191	270	309	174	80	30	153	105	239	1772
1310	Monday, 4 November 2019	12:00:00 PM AEDT	1:00:00 PM AEDT	223	188	272	290	168	82	32	149	115	248	1767

Site	Date	Interval start	Interval end	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	Total
1310	Monday, 4 November 2019	12:15:00 PM AEDT	1:15:00 PM AEDT	206	189	269	296	152	84	28	138	111	250	1723
1310	Monday, 4 November 2019	12:30:00 PM AEDT	1:30:00 PM AEDT	238	200	251	298	151	98	31	135	106	260	1768
1310	Monday, 4 November 2019	12:45:00 PM AEDT	1:45:00 PM AEDT	251	204	271	285	142	88	28	142	90	273	1774
1310	Monday, 4 November 2019	1:00:00 PM AEDT	2:00:00 PM AEDT	271	200	285	312	131	86	28	151	84	271	1819
1310	Monday, 4 November 2019	1:15:00 PM AEDT	2:15:00 PM AEDT	289	207	296	317	139	81	32	143	77	263	1844
1310	Monday, 4 November 2019	1:30:00 PM AEDT	2:30:00 PM AEDT	239	203	311	315	140	72	31	172	76	242	1801
1310	Monday, 4 November 2019	1:45:00 PM AEDT	2:45:00 PM AEDT	233	208	304	326	161	72	32	182	76	237	1831
1310	Monday, 4 November 2019	2:00:00 PM AEDT	3:00:00 PM AEDT	197	214	323	346	175	80	28	191	84	239	1877
1310	Monday, 4 November 2019	2:15:00 PM AEDT	3:15:00 PM AEDT	226	215	328	355	186	84	24	225	112	271	2026
1310	Monday, 4 November 2019	2:30:00 PM AEDT	3:30:00 PM AEDT	257	214	318	388	201	86	28	239	120	327	2178
1310	Monday, 4 November 2019	2:45:00 PM AEDT	3:45:00 PM AEDT	259	211	313	425	208	95	35	263	130	352	2291
1310	Monday, 4 November 2019	3:00:00 PM AEDT	4:00:00 PM AEDT	302	211	288	412	220	89	42	302	121	388	2375
1310	Monday, 4 November 2019	3:15:00 PM AEDT	4:15:00 PM AEDT	262	220	296	422	204	91	46	336	110	415	2402
1310	Monday, 4 November 2019	3:30:00 PM AEDT	4:30:00 PM AEDT	272	214	292	387	209	93	41	346	118	411	2383
1310	Monday, 4 November 2019	3:45:00 PM AEDT	4:45:00 PM AEDT	270	222	304	343	191	89	30	340	130	455	2374
1310	Monday, 4 November 2019	4:00:00 PM AEDT	5:00:00 PM AEDT	250	217	305	337	186	94	23	320	138	487	2357
1310	Monday, 4 November 2019	4:15:00 PM AEDT	5:15:00 PM AEDT	266	217	302	341	204	101	19	281	123	503	2357
1310	Monday, 4 November 2019	4:30:00 PM AEDT	5:30:00 PM AEDT	206	222	313	366	193	94	23	262	110	526	2315
1310	Monday, 4 November 2019	4:45:00 PM AEDT	5:45:00 PM AEDT	193	232	317	398	204	88	27	266	97	520	2342
1310	Monday, 4 November 2019	5:00:00 PM AEDT	6:00:00 PM AEDT	210	240	333	394	196	87	27	259	83	509	2338
1310	Monday, 4 November 2019	5:15:00 PM AEDT	6:15:00 PM AEDT	196	228	335	404	192	69	30	252	75	488	2269
1310	Monday, 4 November 2019	5:30:00 PM AEDT	6:30:00 PM AEDT	251	224	329	387	187	64	32	240	70	492	2276
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1310	Monday, 4 November 2019	6:00:00 PM AEDT	7:00:00 PM AEDT	278	194	320	374	152	51	30	191	61	419	2070
1310	Monday, 4 November 2019	6:15:00 PM AEDT	7:15:00 PM AEDT	301	169	287	345	120	50	26	163	67	372	1900
1310	Monday, 4 November 2019	6:30:00 PM AEDT	7:30:00 PM AEDT	280	164	277	334	101	49	20	146	52	297	1720
1310	Monday, 4 November 2019	6:45:00 PM AEDT	7:45:00 PM AEDT	272	145	244	308	91	46	20	114	43	230	1513
1310	Monday, 4 November 2019	7:00:00 PM AEDT	8:00:00 PM AEDT	272	131	186	274	83	39	20	92	32	200	1329
1310	Monday, 4 November 2019	7:15:00 PM AEDT	8:15:00 PM AEDT	268	132	174	252	83	34	16	80	24	170	1233
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1310	Monday, 4 November 2019	9:00:00 PM AEDT	10:00:00 PM AEDT	226	96	108	166	48	19	2	41	19	90	815
1310	Monday, 4 November 2019	9:15:00 PM AEDT	10:15:00 PM AEDT	191	77	103	141	41	20	5	36	16	77	707
1310	Monday, 4 November 2019	9:30:00 PM AEDT	10:30:00 PM AEDT	188	69	96	135	40	11	5	30	12	70	656
1310	Monday, 4 November 2019	9:45:00 PM AEDT	10:45:00 PM AEDT	147	52	87	112	31	5	5	24	9	59	531
1310	Monday, 4 November 2019	10:00:00 PM AEDT	11:00:00 PM AEDT	126	39	78	94	26	6	5	19	4	51	448
1310	Monday, 4 November 2019	10:15:00 PM AEDT	11:15:00 PM AEDT	123	37	67	87	23	10	2	17	3	39	408
1310	Monday, 4 November 2019	10:30:00 PM AEDT	11:30:00 PM AEDT	99	30	51	69	19	11	2	16	3	28	328
1310	Monday, 4 November 2019	10:45:00 PM AEDT	11:45:00 PM AEDT	101	32	36	63	14	13	2	12	3	18	294
1310	Monday, 4 November 2019	11:00:00 PM AEDT	12:00:00 AM AEDT	88	29	22	52	13	12	1	10	3	10	240

Location School Access  
White Road  
-  
Hospital Access  
Suburb WAHROONGA

Duration 7:30 - 9:30  
14:30 - 16:30  
-  
Day/Date Wednesday, 12 August 2020  
Weather Dry

All Vehicles Time Per Hour	NORTH EAST School Access												SOUTH EAST White Road												TOTAL		TOTAL			
	L			I			R			U			TOTAL	L			I			R			U			TOTAL		LIGHT	HEAVY	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ					
7:30 - 8:30	89	0	89	2	0	2	0	0	0	1	0	1	92	131	0	131	0	0	0	161	0	161	16	0	16	308	494	1	495	
7:45 - 8:45	135	0	135	4	0	4	0	0	0	1	0	1	140	120	0	120	0	0	0	182	0	182	25	0	25	327	568	1	569	
8:00 - 9:00	139	0	139	4	0	4	0	0	0	1	0	1	144	109	0	109	0	0	0	161	0	161	29	0	29	299	539	2	541	
8:15 - 9:15	108	0	108	5	0	5	0	0	0	1	0	1	114	95	0	95	0	0	0	110	0	110	23	0	23	228	437	3	440	
8:30 - 9:30	57	0	57	4	0	4	0	0	0	0	0	0	61	89	0	89	0	0	0	42	0	42	17	0	17	148	304	3	307	
Period End																														
14:30 - 15:30	137	0	137	3	0	3	0	0	0	1	0	1	141	37	0	37	0	0	0	130	0	130	17	2	19	186	570	3	573	
14:45 - 15:45	144	0	144	2	0	2	0	0	0	1	0	1	147	39	0	39	0	0	0	109	0	109	16	0	16	164	565	1	566	
15:00 - 16:00	122	0	122	2	0	2	0	0	0	1	0	1	125	34	0	34	0	0	0	66	0	66	13	0	13	113	493	1	494	
15:15 - 16:15	92	0	92	2	0	2	0	0	0	1	0	1	95	35	0	35	0	0	0	18	0	18	11	0	11	64	423	1	424	
15:30 - 16:30	23	0	23	0	0	0	0	0	0	0	0	0	23	31	0	31	0	0	0	2	0	2	7	0	7	40	319	1	320	
Period End																														

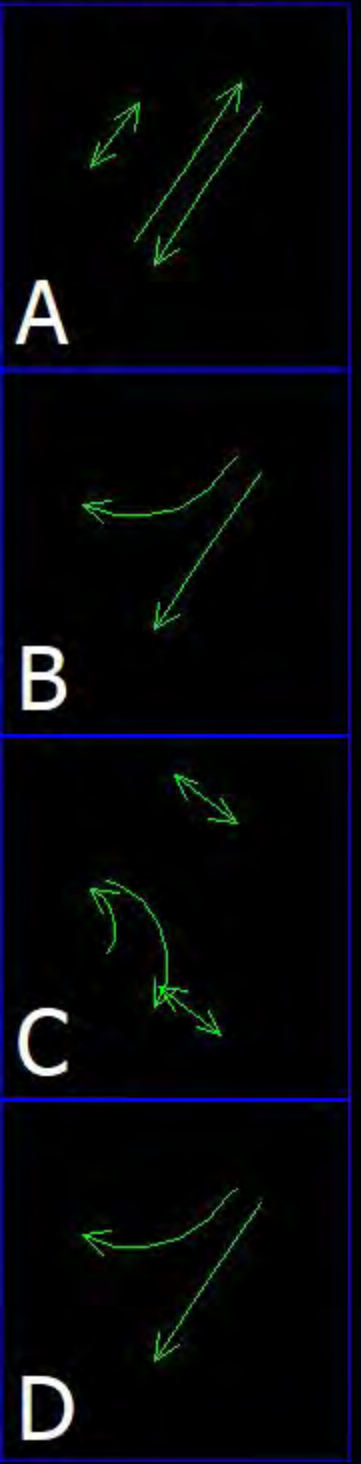
All Vehicles Time Per Hour	SOUTH WEST -												NORTH WEST Hospital Access												TOTAL		TOTAL			
	L			I			R			U			TOTAL	L			I			R			U			TOTAL		LIGHT	HEAVY	
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ					
7:30 - 8:30														2	0	2	89	1	90	3	0	3	0	0	0	95	494	1	495	
7:45 - 8:45														2	0	2	95	1	96	4	0	4	0	0	0	102	568	1	569	
8:00 - 9:00														2	0	2	91	2	93	3	0	3	0	0	0	98	539	2	541	
8:15 - 9:15														3	0	3	87	3	90	5	0	5	0	0	0	98	437	3	440	
8:30 - 9:30														1	0	1	89	3	92	5	0	5	0	0	0	98	304	3	307	
Period End																														
14:30 - 15:30														3	0	3	241	1	242	1	0	1	0	0	0	246	570	3	573	
14:45 - 15:45														2	0	2	251	1	252	1	0	1	0	0	0	255	565	1	566	
15:00 - 16:00														3	0	3	251	1	252	1	0	1	0	0	0	256	493	1	494	
15:15 - 16:15														2	0	2	262	1	263	0	0	0	0	0	0	265	423	1	424	
15:30 - 16:30														1	0	1	255	1	256	0	0	0	0	0	0	257	319	1	320	
Period End																														

# TCS 3210

WAHROONGA  
HOR

153H14  
SS=22

## 4 PHASES



Site	Date	Interval start	Interval end	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	Total
3210	Monday, 4 November 2019	12:00:00 AM AEDT	1:00:00 AM AEDT	3	15	19	19	4	1	1	0	0	0	62
3210	Monday, 4 November 2019	12:15:00 AM AEDT	1:15:00 AM AEDT	3	16	13	13	2	1	0	0	0	0	48
3210	Monday, 4 November 2019	12:30:00 AM AEDT	1:30:00 AM AEDT	4	14	11	11	3	0	0	0	0	0	43
3210	Monday, 4 November 2019	12:45:00 AM AEDT	1:45:00 AM AEDT	3	13	10	10	2	0	0	0	0	0	38
3210	Monday, 4 November 2019	1:00:00 AM AEDT	2:00:00 AM AEDT	2	13	8	8	2	0	0	0	0	0	33
3210	Monday, 4 November 2019	1:15:00 AM AEDT	2:15:00 AM AEDT	4	12	8	8	2	0	0	0	0	0	34
3210	Monday, 4 November 2019	1:30:00 AM AEDT	2:30:00 AM AEDT	3	11	8	8	2	0	1	0	0	0	33
3210	Monday, 4 November 2019	1:45:00 AM AEDT	2:45:00 AM AEDT	2	7	7	7	2	0	1	0	0	0	26
3210	Monday, 4 November 2019	2:00:00 AM AEDT	3:00:00 AM AEDT	2	5	5	5	3	1	1	0	0	0	22
3210	Monday, 4 November 2019	2:15:00 AM AEDT	3:15:00 AM AEDT	0	2	5	5	3	1	1	0	0	0	17
3210	Monday, 4 November 2019	2:30:00 AM AEDT	3:30:00 AM AEDT	0	1	5	5	3	3	1	0	0	0	18
3210	Monday, 4 November 2019	2:45:00 AM AEDT	3:45:00 AM AEDT	0	5	4	4	2	3	1	0	0	0	19
3210	Monday, 4 November 2019	3:00:00 AM AEDT	4:00:00 AM AEDT	0	15	5	5	1	2	1	0	0	0	29
3210	Monday, 4 November 2019	3:15:00 AM AEDT	4:15:00 AM AEDT	0	16	6	6	2	2	1	0	0	0	33
3210	Monday, 4 November 2019	3:30:00 AM AEDT	4:30:00 AM AEDT	3	22	9	8	2	0	0	0	0	0	44
3210	Monday, 4 November 2019	3:45:00 AM AEDT	4:45:00 AM AEDT	4	21	15	14	3	0	0	0	0	0	57
3210	Monday, 4 November 2019	4:00:00 AM AEDT	5:00:00 AM AEDT	7	30	20	18	7	0	0	0	0	0	82
3210	Monday, 4 November 2019	4:15:00 AM AEDT	5:15:00 AM AEDT	9	46	33	30	9	0	0	0	0	0	127
3210	Monday, 4 November 2019	4:30:00 AM AEDT	5:30:00 AM AEDT	7	65	49	47	17	1	0	0	0	0	186
3210	Monday, 4 November 2019	4:45:00 AM AEDT	5:45:00 AM AEDT	11	106	79	74	26	3	1	0	0	0	300
3210	Monday, 4 November 2019	5:00:00 AM AEDT	6:00:00 AM AEDT	19	138	115	105	43	3	1	0	0	0	424
3210	Monday, 4 November 2019	5:15:00 AM AEDT	6:15:00 AM AEDT	30	195	152	143	63	4	1	0	0	0	588
3210	Monday, 4 November 2019	5:30:00 AM AEDT	6:30:00 AM AEDT	42	260	205	194	97	4	1	0	0	0	803
3210	Monday, 4 November 2019	5:45:00 AM AEDT	6:45:00 AM AEDT	70	310	248	240	140	4	0	0	0	0	1012
3210	Monday, 4 November 2019	6:00:00 AM AEDT	7:00:00 AM AEDT	96	380	301	298	207	6	4	0	0	0	1292
3210	Monday, 4 November 2019	6:15:00 AM AEDT	7:15:00 AM AEDT	118	421	322	330	267	11	6	0	0	0	1475
3210	Monday, 4 November 2019	6:30:00 AM AEDT	7:30:00 AM AEDT	139	465	354	366	339	10	12	0	0	0	1685
3210	Monday, 4 November 2019	6:45:00 AM AEDT	7:45:00 AM AEDT	146	500	373	399	438	11	16	0	0	0	1883
3210	Monday, 4 November 2019	7:00:00 AM AEDT	8:00:00 AM AEDT	164	499	348	405	515	16	21	0	0	0	1968
3210	Monday, 4 November 2019	7:15:00 AM AEDT	8:15:00 AM AEDT	198	528	298	385	573	20	35	0	0	0	2037
3210	Monday, 4 November 2019	7:30:00 AM AEDT	8:30:00 AM AEDT	225	508	241	368	580	28	40	0	0	0	1990
3210	Monday, 4 November 2019	7:45:00 AM AEDT	8:45:00 AM AEDT	247	504	169	333	590	37	54	0	0	0	1934
3210	Monday, 4 November 2019	8:00:00 AM AEDT	9:00:00 AM AEDT	252	517	140	309	581	36	60	0	0	0	1895
3210	Monday, 4 November 2019	8:15:00 AM AEDT	9:15:00 AM AEDT	226	488	189	330	550	33	52	0	0	0	1868
3210	Monday, 4 November 2019	8:30:00 AM AEDT	9:30:00 AM AEDT	202	487	190	302	515	28	56	0	0	0	1780
3210	Monday, 4 November 2019	8:45:00 AM AEDT	9:45:00 AM AEDT	177	468	231	298	430	21	48	0	0	0	1673
3210	Monday, 4 November 2019	9:00:00 AM AEDT	10:00:00 AM AEDT	165	438	245	286	334	21	44	0	0	0	1533
3210	Monday, 4 November 2019	9:15:00 AM AEDT	10:15:00 AM AEDT	156	428	200	248	297	19	54	0	0	0	1402
3210	Monday, 4 November 2019	9:30:00 AM AEDT	10:30:00 AM AEDT	152	398	206	250	266	32	49	0	0	0	1353
3210	Monday, 4 November 2019	9:45:00 AM AEDT	10:45:00 AM AEDT	137	388	192	241	245	35	53	0	0	0	1291
3210	Monday, 4 November 2019	10:00:00 AM AEDT	11:00:00 AM AEDT	124	377	179	226	249	37	57	0	0	0	1249
3210	Monday, 4 November 2019	10:15:00 AM AEDT	11:15:00 AM AEDT	128	349	203	235	226	38	51	0	0	0	1230
3210	Monday, 4 November 2019	10:30:00 AM AEDT	11:30:00 AM AEDT	119	356	198	228	231	33	59	0	0	0	1224
3210	Monday, 4 November 2019	10:45:00 AM AEDT	11:45:00 AM AEDT	126	356	182	216	226	36	63	0	0	0	1205
3210	Monday, 4 November 2019	11:00:00 AM AEDT	12:00:00 PM AEDT	117	345	187	233	227	41	69	0	0	0	1219
3210	Monday, 4 November 2019	11:15:00 AM AEDT	12:15:00 PM AEDT	111	369	179	224	242	43	74	0	0	0	1242
3210	Monday, 4 November 2019	11:30:00 AM AEDT	12:30:00 PM AEDT	117	370	198	245	228	39	77	0	0	0	1274
3210	Monday, 4 November 2019	11:45:00 AM AEDT	12:45:00 PM AEDT	120	358	202	245	230	41	80	0	0	0	1276
3210	Monday, 4 November 2019	12:00:00 PM AEDT	1:00:00 PM AEDT	130	355	202	238	219	41	68	0	0	0	1253

Site	Date	Interval start	Interval end	D 1	D 2	D 3	D 4	D 5	D 6	D 7	D 8	D 9	D 10	Total
3210	Monday, 4 November 2019	12:15:00 PM AEDT	1:15:00 PM AEDT	124	338	204	250	213	46	68	0	0	0	1243
3210	Monday, 4 November 2019	12:30:00 PM AEDT	1:30:00 PM AEDT	122	330	181	230	222	47	63	0	0	0	1195
3210	Monday, 4 November 2019	12:45:00 PM AEDT	1:45:00 PM AEDT	131	350	181	224	214	43	63	0	0	0	1206
3210	Monday, 4 November 2019	1:00:00 PM AEDT	2:00:00 PM AEDT	127	380	196	238	206	41	71	0	0	0	1259
3210	Monday, 4 November 2019	1:15:00 PM AEDT	2:15:00 PM AEDT	127	382	194	240	225	40	80	0	0	0	1288
3210	Monday, 4 November 2019	1:30:00 PM AEDT	2:30:00 PM AEDT	136	397	207	249	235	39	82	0	0	0	1345
3210	Monday, 4 November 2019	1:45:00 PM AEDT	2:45:00 PM AEDT	129	398	221	267	259	36	76	0	0	0	1386
3210	Monday, 4 November 2019	2:00:00 PM AEDT	3:00:00 PM AEDT	139	408	209	266	284	38	86	0	0	0	1430
3210	Monday, 4 November 2019	2:15:00 PM AEDT	3:15:00 PM AEDT	157	449	210	268	298	45	90	0	0	0	1517
3210	Monday, 4 November 2019	2:30:00 PM AEDT	3:30:00 PM AEDT	147	479	199	275	313	53	98	0	0	0	1564
3210	Monday, 4 November 2019	2:45:00 PM AEDT	3:45:00 PM AEDT	146	508	195	262	325	62	125	0	0	0	1623
3210	Monday, 4 November 2019	3:00:00 PM AEDT	4:00:00 PM AEDT	134	542	203	255	315	61	122	0	0	0	1632
3210	Monday, 4 November 2019	3:15:00 PM AEDT	4:15:00 PM AEDT	123	571	223	271	280	53	115	0	0	0	1636
3210	Monday, 4 November 2019	3:30:00 PM AEDT	4:30:00 PM AEDT	119	604	228	253	265	53	106	0	0	0	1628
3210	Monday, 4 November 2019	3:45:00 PM AEDT	4:45:00 PM AEDT	112	618	221	253	230	51	87	0	0	0	1572
3210	Monday, 4 November 2019	4:00:00 PM AEDT	5:00:00 PM AEDT	100	616	224	249	223	48	83	0	0	0	1543
3210	Monday, 4 November 2019	4:15:00 PM AEDT	5:15:00 PM AEDT	85	605	228	247	233	54	81	0	0	0	1533
3210	Monday, 4 November 2019	4:30:00 PM AEDT	5:30:00 PM AEDT	78	575	253	272	228	44	85	0	0	0	1535
3210	Monday, 4 November 2019	4:45:00 PM AEDT	5:45:00 PM AEDT	70	583	283	301	230	45	82	0	0	0	1594
3210	Monday, 4 November 2019	5:00:00 PM AEDT	6:00:00 PM AEDT	72	588	285	315	252	44	75	0	0	0	1631
3210	Monday, 4 November 2019	5:15:00 PM AEDT	6:15:00 PM AEDT	70	595	291	314	235	43	73	0	0	0	1621
3210	Monday, 4 November 2019	5:30:00 PM AEDT	6:30:00 PM AEDT	65	572	293	324	224	46	66	0	0	0	1590
3210	Monday, 4 November 2019	5:45:00 PM AEDT	6:45:00 PM AEDT	75	528	280	309	211	40	59	0	0	0	1502
3210	Monday, 4 November 2019	6:00:00 PM AEDT	7:00:00 PM AEDT	74	495	298	316	164	39	61	0	0	0	1447
3210	Monday, 4 November 2019	6:15:00 PM AEDT	7:15:00 PM AEDT	71	408	300	319	137	27	58	0	0	0	1320
3210	Monday, 4 November 2019	6:30:00 PM AEDT	7:30:00 PM AEDT	81	384	274	288	116	24	56	0	0	0	1223
3210	Monday, 4 November 2019	6:45:00 PM AEDT	7:45:00 PM AEDT	64	331	248	260	104	21	52	0	0	0	1080
3210	Monday, 4 November 2019	7:00:00 PM AEDT	8:00:00 PM AEDT	55	251	215	227	90	21	53	0	0	0	912
3210	Monday, 4 November 2019	7:15:00 PM AEDT	8:15:00 PM AEDT	52	236	190	198	86	21	52	0	0	0	835
3210	Monday, 4 November 2019	7:30:00 PM AEDT	8:30:00 PM AEDT	39	194	165	171	75	21	54	0	0	0	719
3210	Monday, 4 November 2019	7:45:00 PM AEDT	8:45:00 PM AEDT	37	172	155	157	65	20	53	0	0	0	659
3210	Monday, 4 November 2019	8:00:00 PM AEDT	9:00:00 PM AEDT	34	164	140	141	62	17	45	0	0	0	603
3210	Monday, 4 November 2019	8:15:00 PM AEDT	9:15:00 PM AEDT	27	147	116	118	54	21	40	0	0	0	523
3210	Monday, 4 November 2019	8:30:00 PM AEDT	9:30:00 PM AEDT	22	142	110	112	45	17	40	0	0	0	488
3210	Monday, 4 November 2019	8:45:00 PM AEDT	9:45:00 PM AEDT	23	144	133	140	46	15	43	0	0	0	544
3210	Monday, 4 November 2019	9:00:00 PM AEDT	10:00:00 PM AEDT	24	141	137	145	44	12	41	0	0	0	544
3210	Monday, 4 November 2019	9:15:00 PM AEDT	10:15:00 PM AEDT	23	136	132	138	39	5	34	0	0	0	507
3210	Monday, 4 November 2019	9:30:00 PM AEDT	10:30:00 PM AEDT	26	122	127	129	36	6	31	0	0	0	477
3210	Monday, 4 November 2019	9:45:00 PM AEDT	10:45:00 PM AEDT	21	107	100	99	29	7	23	0	0	0	386
3210	Monday, 4 November 2019	10:00:00 PM AEDT	11:00:00 PM AEDT	17	98	79	77	22	6	22	0	0	0	321
3210	Monday, 4 November 2019	10:15:00 PM AEDT	11:15:00 PM AEDT	16	82	67	67	16	6	22	0	0	0	276
3210	Monday, 4 November 2019	10:30:00 PM AEDT	11:30:00 PM AEDT	12	71	60	59	14	7	13	0	0	0	236
3210	Monday, 4 November 2019	10:45:00 PM AEDT	11:45:00 PM AEDT	10	56	49	47	10	5	16	0	0	0	193
3210	Monday, 4 November 2019	11:00:00 PM AEDT	12:00:00 PM AEDT	6	43	40	38	7	6	14	0	0	0	154

Location: School Access - White Road  
 Duration: 7:30 - 9:30  
 14:30 - 16:30  
 Hospital Access - WAHROONGA  
 Day/Date: Wednesday, 12 August 2020  
 Weather: Dry  
 Suburb: WAHROONGA

All Vehicles Time Per Hour	NORTH EAST School Access												SOUTH EAST White Road													
	L			I			R			U			L			I			R			U				
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ		
7:30 - 8:30	89	0	89	2	0	2	0	0	0	0	0	0	1	0	1	92	131	0	131	0	0	161	16	0	16	308
7:45 - 8:45	135	0	135	4	0	4	0	0	0	0	0	1	0	1	140	120	0	120	0	0	182	25	0	25	327	
8:00 - 9:00	139	0	139	4	0	4	0	0	0	0	0	1	0	1	144	109	0	109	0	0	161	29	0	29	299	
8:15 - 9:15	108	0	108	5	0	5	0	0	0	0	0	1	0	1	114	95	0	95	0	0	110	23	0	23	228	
8:30 - 9:30	57	0	57	4	0	4	0	0	0	0	0	0	0	0	61	89	0	89	0	0	42	17	0	17	148	
Period End	137	0	137	3	0	3	0	0	0	0	0	1	0	1	141	37	0	37	0	0	130	17	2	19	186	
14:45 - 15:45	144	0	144	2	0	2	0	0	0	0	0	1	0	1	147	39	0	39	0	0	109	16	0	16	164	
15:00 - 16:00	122	0	122	2	0	2	0	0	0	0	0	1	0	1	125	34	0	34	0	0	66	13	0	13	113	
15:15 - 16:15	92	0	92	2	0	2	0	0	0	0	0	1	0	1	95	35	0	35	0	0	18	11	0	11	64	
15:30 - 16:30	23	0	23	0	0	0	0	0	0	0	0	0	0	0	23	31	0	31	0	0	2	7	0	7	40	
Period End	388	0	388	8	0	8	0	0	0	0	0	4	0	4	393	145	0	145	0	0	216	47	3	50	320	

All Vehicles Time Per Hour	SOUTH WEST												NORTH WEST Hospital Access											
	L			I			R			U			L			I			R			U		
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ
7:30 - 8:30	2	0	2	89	1	90	3	0	3	0	0	0	0	0	95	494	1	495						
7:45 - 8:45	2	0	2	95	1	96	4	0	4	0	0	0	0	102	568	1	569							
8:00 - 9:00	2	0	2	91	2	93	3	0	3	0	0	0	0	98	539	2	541							
8:15 - 9:15	3	0	3	87	3	90	5	0	5	0	0	0	0	98	437	3	440							
8:30 - 9:30	1	0	1	89	3	92	5	0	5	0	0	0	0	98	304	3	307							
Period End	3	0	3	241	1	242	1	0	1	0	0	0	0	246	570	3	573							
14:45 - 15:45	2	0	2	251	1	252	1	0	1	0	0	0	0	255	565	1	566							
15:00 - 16:00	3	0	3	251	1	252	1	0	1	0	0	0	0	256	493	1	494							
15:15 - 16:15	2	0	2	262	1	263	0	0	0	0	0	0	0	265	423	1	424							
15:30 - 16:30	1	0	1	255	1	256	0	0	0	0	0	0	0	257	319	1	320							
Period End	11	0	11	879	6	885	7	0	7	0	0	0	0	896	2145	6	2151							

Location: School Access  
 White Road

Duration: 7:30 - 9:30  
 14:30 - 16:30

Day/Date: Wednesday, 12 August 2020

Suburb: WAHROONGA

Weather: Dry

TIME RANGE	PEAK	AM
7:45 - 8:45	PEAK	

DATA SELECTION  
 Select Time: PEAK

School Access

185	1	0	4	135	TOTAL
0	0	0	0	0	
185	1	0	4	135	

Hospital Access

0	0	0	0	0	TOTAL
2	0	2	0	25	
96	1	95	0	182	
4	0	4	0	0	
0	0	0	0	120	

White Road

255	1	256	TOTAL
128	0	128	





Location: School Access, White Road, Hospital Access, WAHROONGA

Duration: 7:30 - 9:30, 14:30 - 16:30

Day/Date: Wednesday, 12 August 2020

Weather: Dry

TIME RANGE	
PEAK	PM
14:30	15:30

DATA SELECTION  
Select Time: PEAK

School Access

134	1	0	3	137	TOTAL
0	0	0	0	0	
134	1	0	3	137	

Hospital Access

0	0	0	0	0	TOTAL
3	0	3	0	19	
242	1	241	0	130	
1	0	1	0	0	
0	0	0	37	37	

White Road

395	3	398	TOTAL
41	2	43	



Location: Ada Avenue  
 Fox Valley Road  
 Ada Avenue  
 Fox Valley Road  
 WAHROONGA

Suburb: WAHROONGA

Duration: 7:30 - 9:30  
 15:00 - 18:00

Day/Date: Wednesday, 12 August 2020

Weather: Dry

All Vehicles Time Per Hour	NORTH Ada Avenue										EAST Fox Valley Road										TOTAL									
	L	I	R	L	I	R	L	I	R	U	L	I	R	L	I	R	U													
7:30 - 8:30	87	1	88	9	0	9	158	0	158	7	0	2	257	8	0	8	544	6	550	101	1	102	18	0	18	678	1551	14	1565	
7:45 - 8:45	99	1	100	8	0	8	163	1	164	2	0	2	274	8	0	8	543	7	550	98	1	99	14	0	14	671	1542	15	1557	
8:00 - 9:00	92	1	93	6	0	6	156	2	158	2	0	2	259	9	0	9	550	8	558	82	1	83	18	0	18	668	1474	19	1493	
8:15 - 9:15	67	1	68	2	0	2	123	2	125	2	0	2	197	8	1	9	501	12	513	56	0	56	19	0	19	597	1291	24	1315	
8:30 - 9:30	52	0	52	2	0	2	87	2	89	1	0	1	144	6	1	7	452	16	468	48	0	48	17	0	17	540	1152	28	1180	
Period End																														
15:00 - 16:00	72	0	72	3	0	3	165	2	167	0	0	0	242	15	0	15	549	9	558	140	1	141	24	0	24	738	1504	23	1527	
15:15 - 16:15	75	0	75	1	0	1	176	2	178	1	0	1	255	15	0	15	482	10	492	145	1	146	26	0	26	679	1449	23	1472	
15:30 - 16:30	77	1	78	2	0	2	181	2	183	1	0	1	264	12	0	12	453	10	463	121	1	122	22	0	22	619	1414	22	1436	
15:45 - 16:45	55	1	56	5	0	5	158	2	160	2	0	2	223	9	0	9	448	9	457	92	0	92	24	0	24	582	1316	19	1335	
16:00 - 17:00	59	1	60	5	0	5	144	1	145	2	0	2	212	11	0	11	466	9	475	91	0	91	20	0	20	597	1322	16	1338	
16:15 - 17:15	64	1	65	5	0	5	159	0	159	1	0	1	230	8	0	8	471	9	480	76	0	76	14	0	14	578	1309	13	1322	
16:30 - 17:30	68	0	68	6	0	6	157	0	157	1	0	1	232	12	0	12	495	8	503	69	0	69	18	0	18	602	1342	11	1353	
16:45 - 17:45	69	0	69	4	0	4	147	0	147	0	0	0	220	13	0	13	508	8	516	71	0	71	14	0	14	614	1310	10	1320	
17:00 - 18:00	62	0	62	4	0	4	145	0	145	0	0	0	211	15	0	15	471	7	478	61	0	61	19	0	19	573	1267	9	1276	
Period End																														

All Vehicles Time Per Hour	SOUTH Ada Avenue										WEST Fox Valley Road										TOTAL									
	L	I	R	L	I	R	L	I	R	U	L	I	R	L	I	R	U													
7:30 - 8:30	11	0	11	10	0	10	16	0	16	0	0	0	37	185	1	186	394	5	399	4	0	4	4	0	4	593	1553	14	1567	
7:45 - 8:45	12	0	12	12	0	12	17	0	17	0	0	0	41	166	0	166	392	5	397	3	0	3	5	0	5	571	1542	15	1557	
8:00 - 9:00	9	0	9	8	0	8	10	0	10	0	0	0	27	136	1	137	387	6	393	5	0	5	4	0	4	539	1474	19	1493	
8:15 - 9:15	7	1	8	6	0	6	8	0	8	0	0	0	22	103	1	104	380	6	386	6	0	6	3	0	3	499	1291	24	1315	
8:30 - 9:30	5	1	6	5	1	6	8	0	8	0	0	0	20	95	1	96	366	6	372	6	0	6	2	0	2	476	1152	28	1180	
Period End																														
15:00 - 16:00	2	0	2	1	0	1	6	0	6	0	0	0	9	158	1	159	356	10	366	7	0	7	6	0	6	538	1504	23	1527	
15:15 - 16:15	2	0	2	3	0	3	8	0	8	0	0	0	13	156	1	157	349	9	358	6	0	6	4	0	4	525	1449	23	1472	
15:30 - 16:30	4	0	4	2	0	2	6	0	6	0	0	0	12	155	1	156	370	7	377	5	0	5	3	0	3	541	1414	22	1436	
15:45 - 16:45	4	0	4	4	0	4	4	0	4	0	0	0	12	153	1	154	351	6	357	3	0	3	4	0	4	518	1316	19	1335	
16:00 - 17:00	4	0	4	5	0	5	6	0	6	0	0	0	15	158	1	159	347	4	351	2	0	2	2	0	2	514	1322	16	1338	
16:15 - 17:15	4	0	4	5	0	5	6	0	6	0	0	0	15	147	0	147	345	3	348	2	0	2	2	0	2	499	1309	13	1322	
16:30 - 17:30	3	0	3	7	0	7	8	0	8	0	0	0	18	142	0	142	351	3	354	3	0	3	2	0	2	501	1342	11	1353	
16:45 - 17:45	5	0	5	6	0	6	7	0	7	0	0	0	18	128	0	128	329	2	331	6	0	6	3	0	3	468	1310	10	1320	
17:00 - 18:00	5	0	5	7	0	7	7	0	7	0	0	0	19	120	0	120	339	2	341	8	0	8	4	0	4	473	1267	9	1276	
Period End																														

Location: Ada Avenue, Fox Valley Road, Ada Avenue, Fox Valley Road, WAHROONGA

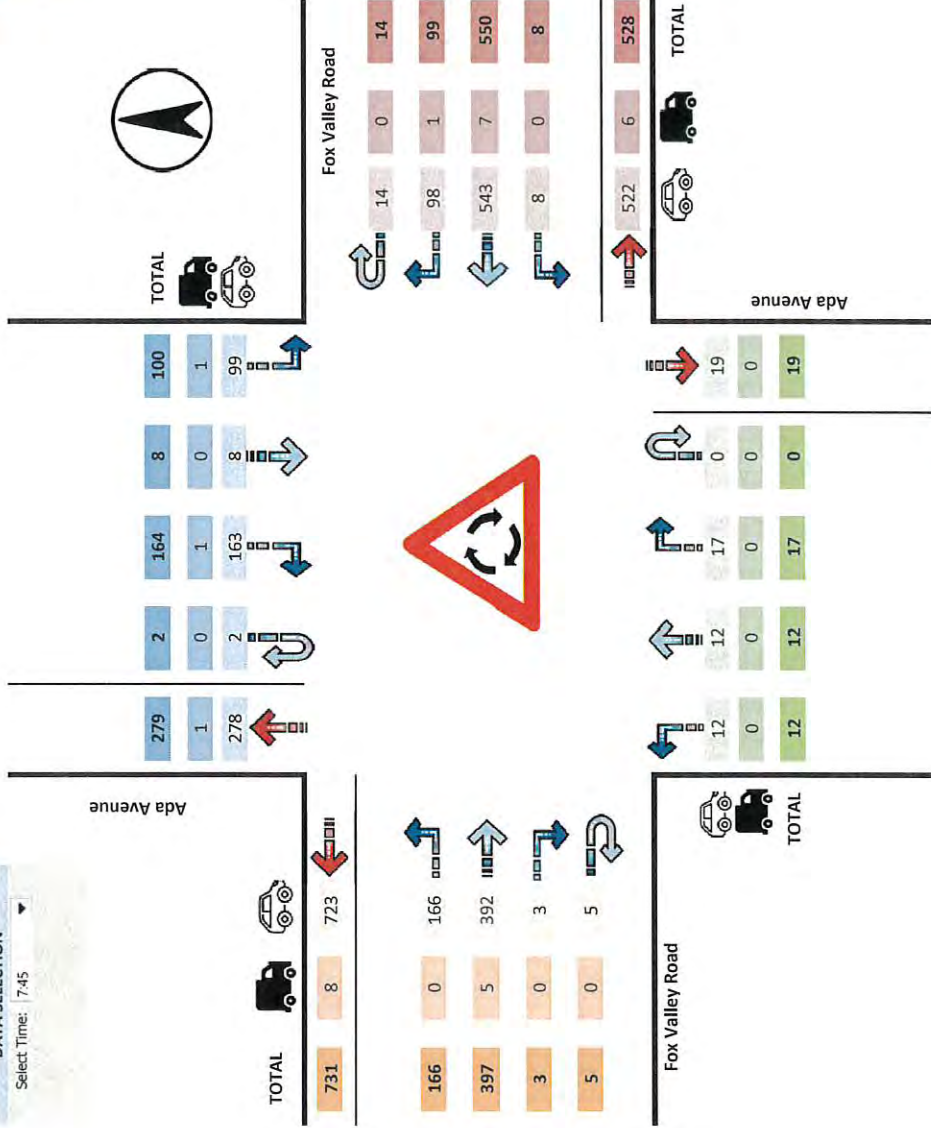
Duration: 7:30 - 9:30, 15:00 - 18:00

Day/Date: Wednesday, 12 August 2020

Weather: Dry

TIME RANGE
7:45 - 8:45
PEAK
7:30 - 8:30

DATA SELECTION  
Select Time: 7:45



Location: Ada Avenue, Fox Valley Road, Ada Avenue, Fox Valley Road, WAHROONGA

Duration: 7:30 - 9:30, 15:00 - 18:00

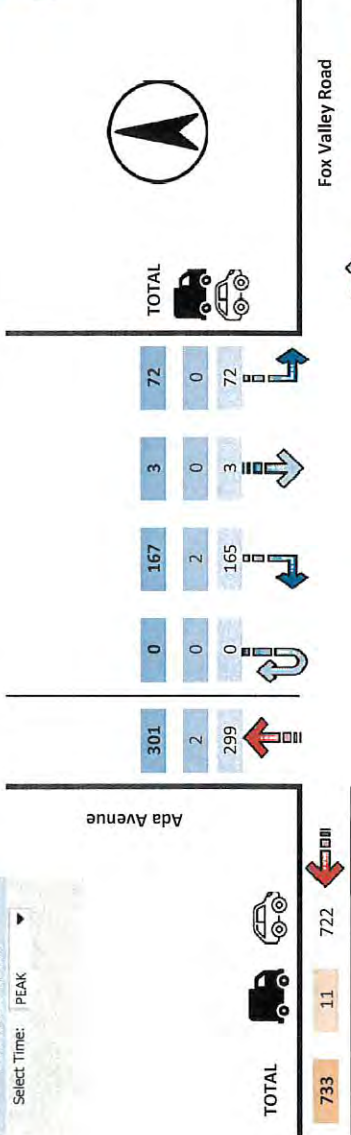
Day/Date: Wednesday, 12 August 2020

Weather: Dry

DATA SELECTION

Select Time: PEAK

TIME RANGE
PEAK - PM
15:00 - 16:00



Direction	Car	Truck	Total
TOTAL	733	11	722
Fox Valley Road	159	1	158
Ada Avenue	366	10	356
U-turn	7	0	7
Other	6	0	6

Direction	Car	Truck	Total
TOTAL	458	10	468
Fox Valley Road	24	0	24
Ada Avenue	140	1	141
U-turn	549	9	558
Other	15	0	15

Location Lucinda Avenue  
 Fox Valley Road  
 Lucinda Avenue  
 Fox Valley Road  
 WAHROONGA

Suburb WAHROONGA

Duration 7:30 - 9:30  
 15:00 - 18:00

Day/Date Wednesday, 12 August 2020

Weather Dry

All Vehicles Time Per Hour	NORTH Lucinda Avenue										EAST Fox Valley Road																
	L		I		R		U		TOTAL		L		I		R		U		TOTAL								
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ						
7:30 - 8:30	139	0	139	7	0	7	294	1	295	0	0	0	441	13	0	13	582	6	588	115	1	116	1	718	1831	16	1947
7:45 - 8:45	145	1	146	7	0	7	268	1	269	0	0	0	422	18	2	20	576	5	581	123	1	124	2	727	1933	16	1949
8:00 - 9:00	116	2	118	8	1	9	218	1	219	1	0	1	347	22	2	24	558	9	567	126	0	126	0	719	1805	22	1827
8:15 - 9:15	92	2	94	5	1	6	137	1	138	1	0	1	239	23	2	25	520	13	533	106	1	107	2	667	1563	30	1593
8:30 - 9:30	74	2	76	4	1	5	77	1	78	1	0	1	160	21	2	23	440	15	456	87	2	89	2	570	1337	33	1370
Period End	107	3	110	14	0	14	115	2	117	1	0	1	242	26	0	26	518	9	527	167	2	169	1	723	1875	27	1902
15:00 - 16:00	109	3	112	15	0	15	85	2	87	2	0	2	216	30	0	30	471	9	480	162	3	165	1	676	1815	31	1846
15:15 - 16:15	105	2	107	13	0	13	80	1	81	2	0	2	203	34	0	34	444	9	453	159	3	162	2	651	1733	25	1758
15:30 - 16:30	81	1	82	10	0	10	60	0	60	2	0	2	154	33	0	33	424	8	432	163	3	166	3	634	1649	21	1670
15:45 - 16:45	74	1	75	14	0	14	55	0	55	2	0	2	146	35	0	35	435	8	443	139	2	141	3	622	1597	17	1614
16:00 - 17:00	72	0	72	14	0	14	60	0	60	1	0	1	147	35	0	35	451	10	461	144	1	145	4	645	1590	14	1604
16:15 - 17:15	71	0	71	16	0	16	60	0	60	0	0	0	147	30	0	30	477	9	486	142	0	142	5	663	1590	14	1604
16:30 - 17:30	72	0	72	18	0	18	52	0	52	0	0	0	142	34	0	34	455	8	463	148	0	148	4	649	1556	12	1567
16:45 - 17:45	67	0	67	16	0	16	49	1	50	0	0	0	133	36	0	36	437	7	444	144	0	144	4	628	1513	14	1527
Period End	67	0	67	16	0	16	49	1	50	0	0	0	133	36	0	36	437	7	444	144	0	144	4	628	1513	14	1527

All Vehicles Time Per Hour	SOUTH Lucinda Avenue										WEST Fox Valley Road																		
	L		I		R		U		TOTAL		L		I		R		U		TOTAL										
	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ	LIGHT	HEAVY	Σ								
7:30 - 8:30	29	1	30	18	0	18	31	0	31	0	0	0	79	280	1	281	404	6	410	5	0	5	13	0	13	709	1931	16	1947
7:45 - 8:45	31	0	31	22	0	22	31	0	31	0	0	0	84	304	1	305	379	5	384	9	0	9	18	0	18	716	1933	16	1949
8:00 - 9:00	33	0	33	17	2	19	26	0	26	0	0	0	78	268	1	269	380	4	384	11	0	11	19	0	19	683	1805	22	1827
8:15 - 9:15	23	0	23	13	2	15	23	0	23	0	0	0	61	221	2	223	367	6	373	12	0	12	18	0	18	626	1563	30	1593
8:30 - 9:30	18	0	18	11	2	13	20	0	20	0	0	0	51	183	3	186	374	4	378	15	0	15	10	0	10	589	1337	33	1370
Period End	117	0	117	19	1	20	2	0	2	0	0	0	69	425	2	427	396	6	402	24	1	25	14	0	14	868	1875	27	1902
15:00 - 16:00	25	1	26	21	0	21	23	1	24	1	0	1	72	426	3	429	410	7	417	23	2	25	11	0	11	882	1815	31	1846
15:15 - 16:15	22	1	23	16	0	16	28	1	29	0	0	0	68	396	2	398	399	4	403	23	2	25	10	0	10	836	1733	25	1758
15:30 - 16:30	19	1	20	13	0	13	26	1	27	0	0	0	60	373	2	375	416	4	420	23	1	24	3	0	3	822	1649	21	1670
15:45 - 16:45	13	0	13	16	0	16	21	0	21	0	0	0	50	350	1	351	414	4	418	21	1	22	5	0	5	796	1597	17	1614
16:00 - 17:00	11	0	11	17	0	17	17	0	17	0	0	0	45	337	1	338	407	2	409	15	0	15	5	0	5	767	1590	14	1604
16:15 - 17:15	13	0	13	17	0	17	10	0	10	0	0	0	40	323	1	324	407	3	410	14	0	14	5	0	5	754	1590	14	1604
16:30 - 17:30	12	0	12	17	0	17	13	0	13	0	0	0	42	309	2	311	391	2	393	22	0	22	8	0	8	734	1555	12	1567
16:45 - 17:45	14	0	14	13	0	13	12	0	12	0	0	0	39	296	2	298	393	4	397	26	0	26	6	0	6	727	1513	14	1527
Period End	117	0	117	19	1	20	2	0	2	0	0	0	69	425	2	427	396	6	402	24	1	25	14	0	14	868	1875	27	1902

Location: Lucinda Avenue, Fox Valley Road, Lucinda Avenue, Fox Valley Road, WAHROONGA

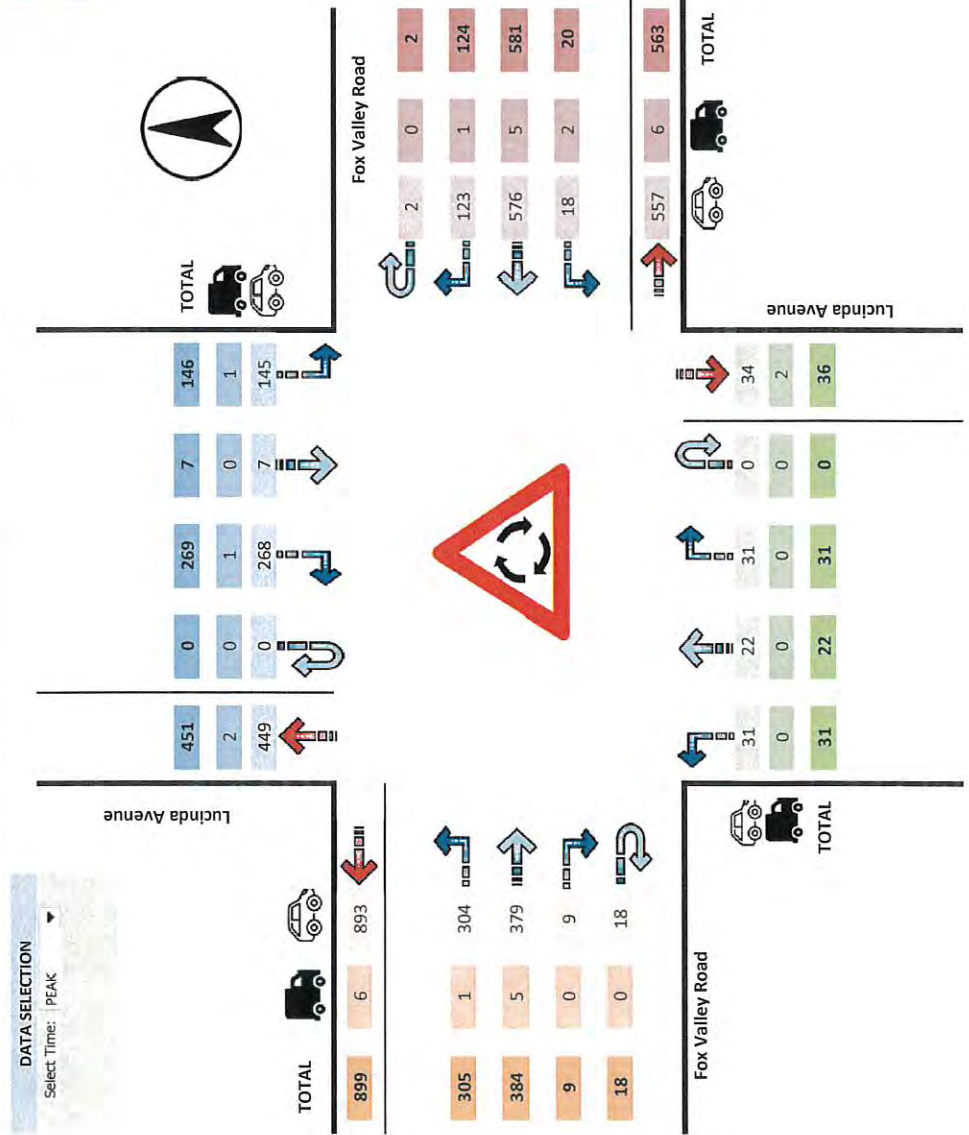
Suburb: WAHROONGA

Duration: 7:30 - 9:30, 15:00 - 18:00

Day/Date: Wednesday, 12 August 2020

Weather: Dry

TIME RANGE	
PEAK	AM
7:45	- 8:45



Location  
 Lucinda Avenue  
 Fox Valley Road  
 Lucinda Avenue  
 Fox Valley Road  
 WAHROONGA

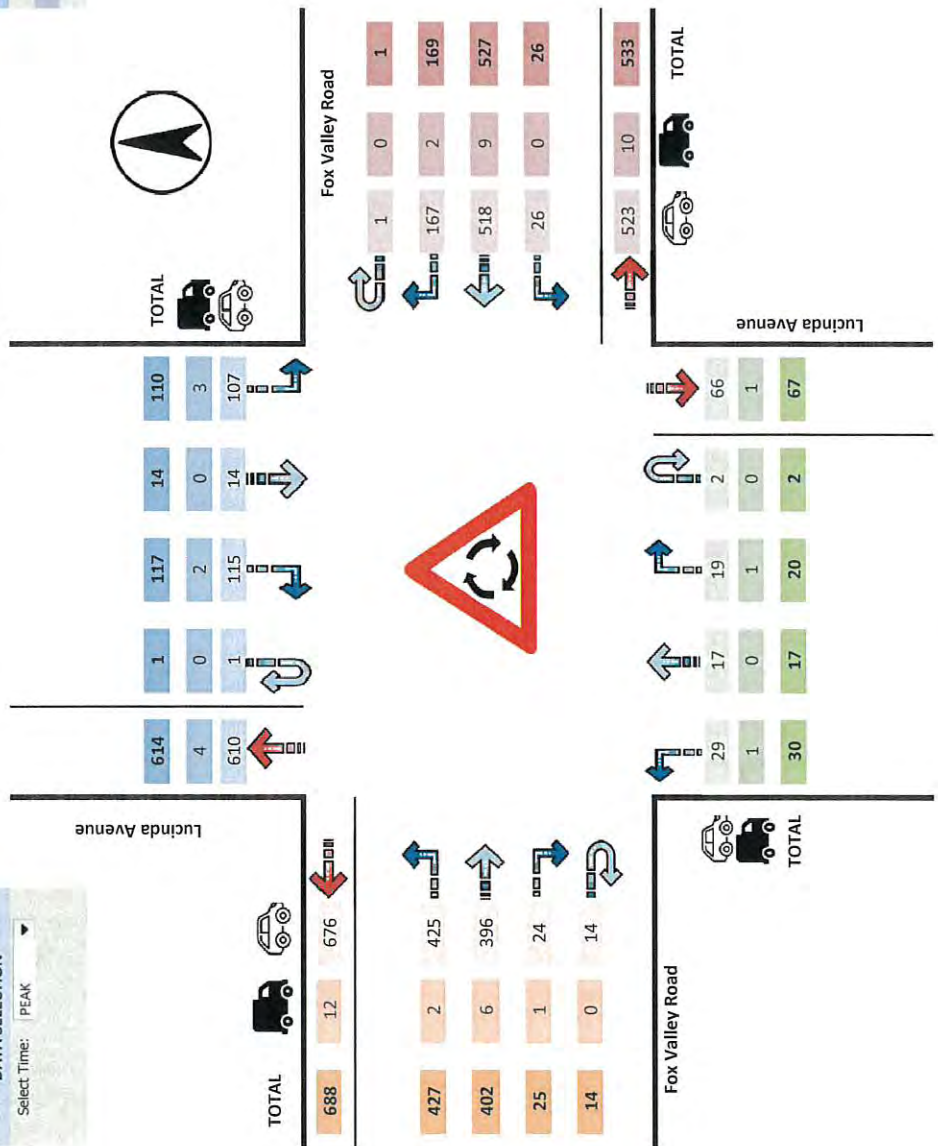
Duration  
 7:30 - 9:30  
 15:00 - 18:00

Day/Date  
 Wednesday, 12 August 2020

Weather  
 Dry

DATA SELECTION  
 Select Time: PEAK

TIME RANGE	
PEAK	- PM
15:00	- 16:00



# Appendix E

## SIDRA Results



# Existing Intersections Existing Volumes

# MOVEMENT SUMMARY

Site: 1 [Ada Ave Existing AM Peak]

## Network: 1 [Existing AM PEAK]

Ada Avenue and Fox Valley Road  
Site Category: Wairoonga  
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	Aver. Queue	Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	HV %	Total	HV %	v/c	sec		veh	Distance				km/h
South: Ada Avenue South														
1	L2	13	0.0	13	0.0	0.062	8.9	LOS A	0.2	1.2	0.80	0.73	0.80	37.7
2	T1	13	0.0	13	0.0	0.062	8.3	LOS A	0.2	1.2	0.80	0.73	0.80	44.4
3	R2	18	0.0	18	0.0	0.062	12.4	LOS A	0.2	1.2	0.80	0.73	0.80	44.4
Approach		43	0.0	43	0.0	0.062	10.2	LOS A	0.2	1.2	0.80	0.73	0.80	43.2
East: Fox Valley Road														
4	L2	8	0.0	8	0.0	0.540	4.9	LOS A	1.9	13.5	0.57	0.53	0.57	45.6
5	T1	579	1.3	579	1.3	0.540	4.4	LOS A	1.9	13.5	0.57	0.53	0.57	42.6
6	R2	104	1.0	104	1.0	0.540	8.5	LOS A	1.9	13.5	0.57	0.53	0.57	46.8
6u	U	15	0.0	15	0.0	0.540	11.9	LOS A	1.9	13.5	0.57	0.53	0.57	50.5
Approach		706	1.2	706	1.2	0.540	5.2	LOS A	1.9	13.5	0.57	0.53	0.57	43.9
North: Ada Avenue														
7	L2	105	1.0	105	1.0	0.281	6.1	LOS A	0.7	5.1	0.63	0.71	0.63	45.0
8	T1	8	0.0	8	0.0	0.281	5.5	LOS A	0.7	5.1	0.63	0.71	0.63	45.4
9	R2	173	0.6	173	0.6	0.281	9.7	LOS A	0.7	5.1	0.63	0.71	0.63	41.0
9u	U	2	0.0	2	0.0	0.281	13.0	LOS A	0.7	5.1	0.63	0.71	0.63	49.3
Approach		288	0.7	288	0.7	0.281	8.3	LOS A	0.7	5.1	0.63	0.71	0.63	43.2
West: Fox Valley Road														
10	L2	175	0.0	175	0.0	0.439	4.5	LOS A	1.4	9.5	0.44	0.47	0.44	46.5
11	T1	418	1.3	418	1.3	0.439	4.0	LOS A	1.4	9.5	0.44	0.47	0.44	47.4
12	R2	3	0.0	3	0.0	0.439	8.1	LOS A	1.4	9.5	0.44	0.47	0.44	47.2
12u	U	5	0.0	5	0.0	0.439	11.5	LOS A	1.4	9.5	0.44	0.47	0.44	43.5
Approach		601	0.9	601	0.9	0.439	4.2	LOS A	1.4	9.5	0.44	0.47	0.44	47.1
All Vehicles		1639	1.0	1639	1.0	0.540	5.5	LOS A	1.9	13.5	0.54	0.54	0.54	45.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# MOVEMENT SUMMARY

Site: 1 [Ada Ave Existing PM Peak]

Network: 2 [Existing PM PEAK]

Ada Avenue and Fox Valley Road  
Site Category: Wairoonga  
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles	Distance m				
South: Ada Avenue South														
1	L2	2	0.0	2	0.0	0.015	9.4	LOSA	0.0	0.3	0.83	0.67	0.83	36.5
2	T1	1	0.0	1	0.0	0.015	8.9	LOSA	0.0	0.3	0.83	0.67	0.83	43.5
3	R2	6	0.0	6	0.0	0.015	13.0	LOSA	0.0	0.3	0.83	0.67	0.83	43.5
Approach		9	0.0	9	0.0	0.015	11.7	LOSA	0.0	0.3	0.83	0.67	0.83	42.6
East: Fox Valley Road														
4	L2	16	0.0	16	0.0	0.593	5.1	LOSA	2.2	15.8	0.61	0.55	0.61	45.4
5	T1	587	1.6	587	1.6	0.593	4.5	LOSA	2.2	15.8	0.61	0.55	0.61	42.3
6	R2	148	0.7	148	0.7	0.593	8.6	LOSA	2.2	15.8	0.61	0.55	0.61	46.7
6u	U	25	0.0	25	0.0	0.593	12.0	LOSA	2.2	15.8	0.61	0.55	0.61	50.3
Approach		777	1.4	777	1.4	0.593	5.6	LOSA	2.2	15.8	0.61	0.55	0.61	44.0
North: Ada Avenue														
7	L2	77	1.4	77	1.4	0.248	5.9	LOSA	0.6	4.5	0.61	0.70	0.61	44.9
8	T1	3	0.0	3	0.0	0.248	5.3	LOSA	0.6	4.5	0.61	0.70	0.61	45.3
9	R2	176	1.2	176	1.2	0.248	9.5	LOSA	0.6	4.5	0.61	0.70	0.61	40.9
9u	U	2	0.0	2	0.0	0.248	12.8	LOSA	0.6	4.5	0.61	0.70	0.61	49.2
Approach		258	1.2	258	1.2	0.248	8.4	LOSA	0.6	4.5	0.61	0.70	0.61	42.7
West: Fox Valley Road														
10	L2	167	0.6	167	0.6	0.434	4.7	LOSA	1.4	9.6	0.50	0.49	0.50	46.3
11	T1	385	2.7	385	2.7	0.434	4.2	LOSA	1.4	9.6	0.50	0.49	0.50	47.2
12	R2	7	0.0	7	0.0	0.434	8.3	LOSA	1.4	9.6	0.50	0.49	0.50	47.0
12u	U	6	0.0	6	0.0	0.434	11.7	LOSA	1.4	9.6	0.50	0.49	0.50	43.2
Approach		566	2.0	566	2.0	0.434	4.5	LOSA	1.4	9.6	0.50	0.49	0.50	46.9
All Vehicles		1611	1.6	1611	1.6	0.593	5.7	LOSA	2.2	15.8	0.57	0.55	0.57	45.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# MOVEMENT SUMMARY

Site: 2 [Lucinda Ave Existing AM Peak]

Network: 1 [Existing AM PEAK]

Lucinda Avenue and Fox Valley Road  
Site Category: Wairoonga  
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total	HV %				Vehicles	Distance m				
South: Lucinda Avenue South														
1b	L3	33	0.0	33	0.0	0.187	9.8	LOS A	0.5	3.7	0.91	0.88	0.91	37.5
2	T1	23	0.0	23	0.0	0.187	12.3	LOS A	0.5	3.7	0.91	0.88	0.91	43.4
3a	R1	33	0.0	33	0.0	0.187	15.4	LOS B	0.5	3.7	0.91	0.88	0.91	37.5
Approach		88	0.0	88	0.0	0.187	12.5	LOS A	0.5	3.7	0.91	0.88	0.91	39.7
North East: Fox Valley Road														
24a	L1	21	10.0	21	10.0	0.741	8.7	LOS A	4.0	28.3	0.89	0.87	1.06	44.7
25	T1	612	0.9	612	0.9	0.741	8.7	LOS A	4.0	28.3	0.89	0.87	1.06	40.1
26b	R3	131	0.8	131	0.8	0.741	13.5	LOS A	4.0	28.3	0.89	0.87	1.06	45.3
26u	U	2	0.0	2	0.0	0.741	15.8	LOS B	4.0	28.3	0.89	0.87	1.06	40.1
Approach		765	1.1	765	1.1	0.741	9.5	LOS A	4.0	28.3	0.89	0.87	1.06	41.6
North: Lucinda Avenue														
7b	L3	154	0.7	154	0.7	0.501	7.4	LOS A	1.6	11.5	0.78	0.82	0.82	40.2
8	T1	7	0.0	7	0.0	0.501	7.1	LOS A	1.6	11.5	0.78	0.82	0.82	45.1
9a	R1	283	0.4	283	0.4	0.501	10.2	LOS A	1.6	11.5	0.78	0.82	0.82	40.2
Approach		444	0.5	444	0.5	0.501	9.2	LOS A	1.6	11.5	0.78	0.82	0.82	40.3
South West: Fox Valley Road														
30a	L1	321	0.3	321	0.3	0.626	4.5	LOS A	2.3	16.3	0.61	0.56	0.61	47.5
31	T1	404	1.3	404	1.3	0.626	4.9	LOS A	2.3	16.3	0.61	0.56	0.61	45.8
32b	R3	9	0.0	9	0.0	0.626	9.6	LOS A	2.3	16.3	0.61	0.56	0.61	48.0
32u	U	19	0.0	19	0.0	0.626	12.0	LOS A	2.3	16.3	0.61	0.56	0.61	45.8
Approach		754	0.8	754	0.8	0.626	5.0	LOS A	2.3	16.3	0.61	0.56	0.61	46.7
All Vehicles		2052	0.8	2052	0.8	0.741	7.9	LOS A	4.0	28.3	0.76	0.74	0.84	43.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# MOVEMENT SUMMARY

Site: 2 [Lucinda Ave Existing PM Peak]

Network: 2 [Existing PM PEAK]

Lucinda Avenue and Fox Valley Road  
Site Category: Wairoonga  
Roundabout

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
		Total veh/h	HV % veh/h	Total	HV %				Vehicles	Distance m				
South: Lucinda Avenue South														
1b	L3	34	3.1	34	3.1	0.151	7.4	LOS A	0.4	2.8	0.80	0.80	0.80	39.7
2	T1	23	0.0	23	0.0	0.151	9.4	LOS A	0.4	2.8	0.80	0.80	0.80	44.8
3a	R1	34	3.1	34	3.1	0.151	12.7	LOS A	0.4	2.8	0.80	0.80	0.80	39.7
3u	U	2	0.0	2	0.0	0.151	16.6	LOS B	0.4	2.8	0.80	0.80	0.80	48.1
Approach		93	2.3	93	2.3	0.151	10.0	LOS A	0.4	2.8	0.80	0.80	0.80	41.8
NorthEast: Fox Valley Road														
24a	L1	27	0.0	27	0.0	0.626	4.5	LOS A	2.4	17.3	0.64	0.58	0.64	45.9
25	T1	555	1.7	555	1.7	0.626	4.8	LOS A	2.4	17.3	0.64	0.58	0.64	41.9
26b	R3	178	1.2	178	1.2	0.626	9.6	LOS A	2.4	17.3	0.64	0.58	0.64	46.5
26u	U	1	0.0	1	0.0	0.626	11.9	LOS A	2.4	17.3	0.64	0.58	0.64	41.9
Approach		761	1.5	761	1.5	0.626	5.9	LOS A	2.4	17.3	0.64	0.58	0.64	43.7
North: Lucinda Avenue														
7b	L3	116	2.7	116	2.7	0.308	6.7	LOS A	0.8	6.0	0.72	0.76	0.72	41.1
8	T1	15	0.0	15	0.0	0.308	6.4	LOS A	0.8	6.0	0.72	0.76	0.72	45.7
9a	R1	123	1.7	123	1.7	0.308	9.5	LOS A	0.8	6.0	0.72	0.76	0.72	41.1
Approach		254	2.1	254	2.1	0.308	8.1	LOS A	0.8	6.0	0.72	0.76	0.72	41.6
SouthWest: Fox Valley Road														
30a	L1	449	0.5	449	0.5	0.789	7.6	LOS A	4.6	32.3	0.82	0.76	0.94	46.8
31	T1	423	1.5	423	1.5	0.789	7.9	LOS A	4.6	32.3	0.82	0.76	0.94	44.8
32b	R3	26	4.0	26	4.0	0.789	12.8	LOS A	4.6	32.3	0.82	0.76	0.94	47.2
32u	U	15	0.0	15	0.0	0.789	15.0	LOS B	4.6	32.3	0.82	0.76	0.94	44.8
Approach		914	1.0	914	1.0	0.789	8.0	LOS A	4.6	32.3	0.82	0.76	0.94	46.0
All Vehicles		2021	1.4	2021	1.4	0.789	7.3	LOS A	4.6	32.3	0.74	0.69	0.79	44.8

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

# MOVEMENT SUMMARY

Site: 3 [Hospital Rd Existing AM Peak]

Network: 1 [Existing AM PEAK]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total	HV %				Vehicles	Distance m				
South: Fox Valley Road														
1	L2	187	0.3	187	0.3	0.231	23.0	LOS B	3.3	22.9	0.55	0.69	0.55	19.7
2	T1	556	1.5	556	1.5	0.625	28.1	LOS B	15.2	107.8	0.91	0.81	0.91	17.3
Approach		743	1.2	743	1.2	0.625	26.9	LOS B	15.2	107.8	0.82	0.78	0.82	17.8
North: Fox Valley Road														
8	T1	603	1.5	603	1.5	0.399	4.0	LOS A	6.2	43.6	0.34	0.31	0.34	47.1
9	R2	314	0.3	314	0.3	0.457	26.3	LOS B	7.4	52.2	0.81	0.85	0.90	35.8
Approach		917	1.1	917	1.1	0.457	11.6	LOS A	7.4	52.2	0.50	0.50	0.53	42.5
West: Hospital Access														
10	L2	172	0.3	172	0.3	0.185	10.4	LOS A	1.9	13.1	0.42	0.64	0.42	26.4
12	R2	96	0.3	96	0.3	0.237	54.4	LOS D	1.5	10.4	0.95	0.74	0.95	8.4
Approach		267	0.3	267	0.3	0.237	26.2	LOS B	1.9	13.1	0.61	0.68	0.61	15.3
All Vehicles		1927	1.0	1927	1.0	0.625	19.5	LOS B	15.2	107.8	0.64	0.63	0.65	33.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	Pedestrian Distance	
								ped/h	sec
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		158	49.3	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# PHASING SUMMARY

Site: 3 [Hospital Rd Existing AM Peak]

Network: 1 [Existing AM PEAK]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wairoanga

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C, D\*

Output Phase Sequence: A, B, C

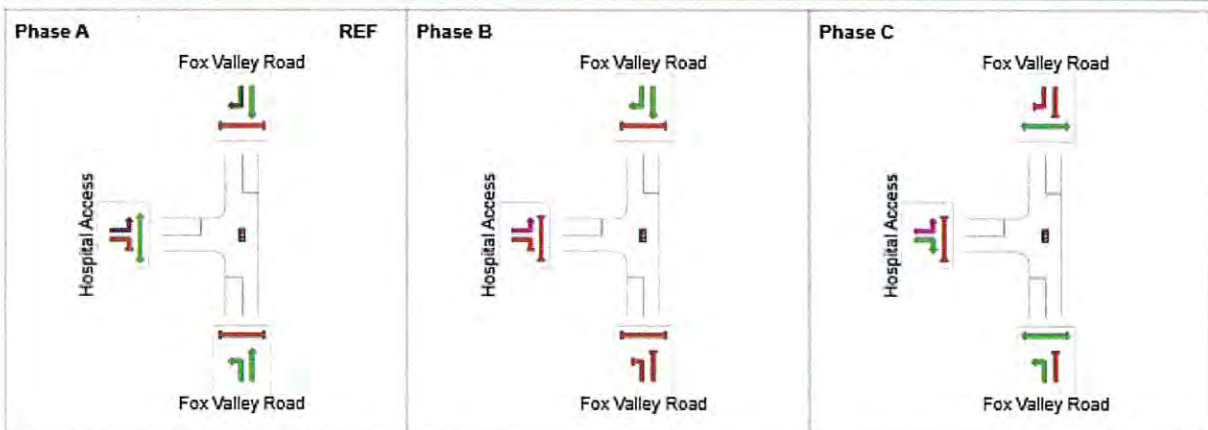
(\* Variable Phase)

## Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	56	92
Green Time (sec)	50	30	12
Phase Time (sec)	56	36	18
Phase Split	51%	33%	16%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

## Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# MOVEMENT SUMMARY

Site: 3 [Hospital Rd Existing PM Peak]

Network: 2 [Existing PM PEAK]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
		Total veh/h	HV % veh/h	Total	HV %				Vehicles	Distance m				
South: Fox Valley Road														
1	L2	141	0.3	141	0.3	0.191	20.4	LOS B	3.5	24.3	0.56	0.65	0.56	21.8
2	T1	571	1.5	571	1.5	0.517	31.4	LOS C	16.4	116.4	0.92	0.84	0.92	16.0
Approach		712	1.3	712	1.3	0.517	29.2	LOS C	16.4	116.4	0.85	0.80	0.85	16.9
North: Fox Valley Road														
8	T1	332	1.5	332	1.5	0.215	3.0	LOS A	2.8	19.8	0.26	0.23	0.26	47.8
9	R2	214	0.3	214	0.3	0.332	22.3	LOS B	4.8	33.7	0.70	0.76	0.70	37.4
Approach		545	1.0	545	1.0	0.332	10.6	LOS A	4.8	33.7	0.43	0.44	0.43	43.1
West: Hospital Access														
10	L2	264	0.3	264	0.3	0.298	11.3	LOS A	3.4	23.8	0.45	0.66	0.45	25.5
12	R2	193	0.3	193	0.3	0.520	62.0	LOS E	3.4	23.9	0.99	0.78	0.99	7.6
Approach		457	0.3	457	0.3	0.520	32.6	LOS C	3.4	23.9	0.68	0.71	0.68	13.0
All Vehicles		1714	0.9	1714	0.9	0.520	24.2	LOS B	16.4	116.4	0.67	0.66	0.67	27.8

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate	
					Pedestrian	Distance m			
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		158	54.3	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



# PHASING SUMMARY

Site: 3 [Hospital Rd Existing PM Peak]

Network: 2 [Existing PM PEAK]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wairoanga

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C, D\*

Output Phase Sequence: A, B, C

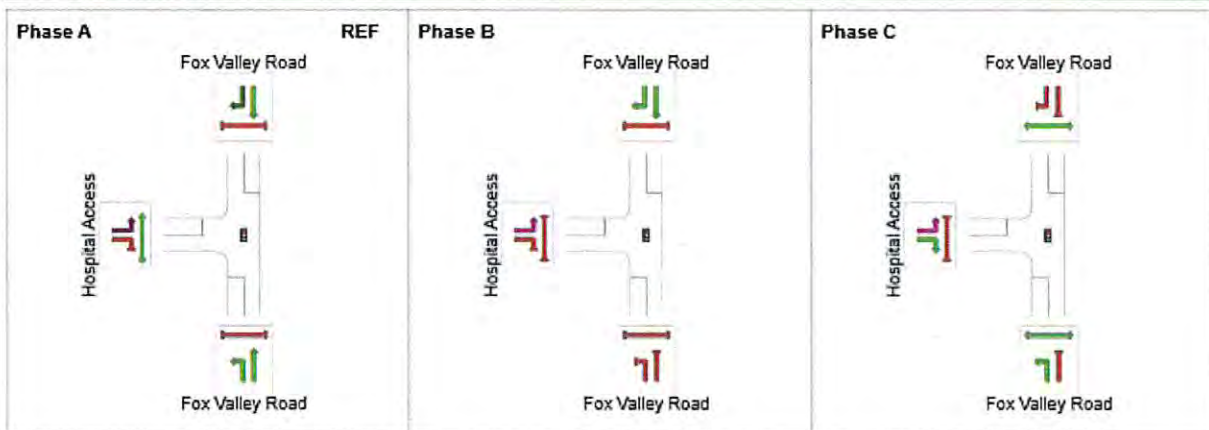
(\* Variable Phase)

## Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	69	102
Green Time (sec)	63	27	12
Phase Time (sec)	69	33	18
Phase Split	58%	28%	15%

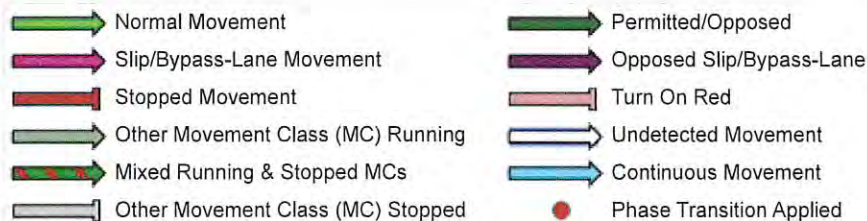
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

## Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# MOVEMENT SUMMARY

Site: 4 [Ludowici Way Existing AM Peak]

Network: 1 [Existing AM PEAK]

Ludowici Way (Hospital Access 2) and Fox Valley Road  
 Site Category: Wahroonga  
 Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
		Total veh/h	HV %	Total veh/h	HV %				Vehicles	Distance m				
South: Fox Valley Road														
1	L2	101	0.0	101	0.0	0.210	4.6	LOS A	0.0	0.0	0.00	0.14	0.00	44.8
2	T1	714	0.0	714	0.0	0.210	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	47.4
Approach		815	0.0	815	0.0	0.210	0.6	NA	0.0	0.0	0.00	0.07	0.00	46.8
North: Fox Valley Road														
8	T1	699	0.0	699	0.0	0.301	0.7	LOS A	0.5	3.6	0.09	0.06	0.10	46.6
9	R2	104	0.0	104	0.0	0.301	9.3	LOS A	0.5	3.6	0.55	0.40	0.62	37.4
Approach		803	0.0	803	0.0	0.301	1.8	NA	0.5	3.6	0.15	0.11	0.17	44.6
West: Ludowici Way														
10	L2	29	0.0	29	0.0	0.033	8.9	LOS A	0.1	0.4	0.37	0.85	0.37	25.3
12	R2	27	0.0	27	0.0	0.520	64.2	LOS E	0.4	2.7	0.93	1.07	1.16	5.8
Approach		57	0.0	57	0.0	0.520	35.5	LOS C	0.4	2.7	0.64	0.95	0.75	9.7
All Vehicles		1675	0.0	1675	0.0	0.520	2.3	NA	0.5	3.6	0.09	0.12	0.11	42.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# MOVEMENT SUMMARY

Site: 4 [Ludowici Way Existing PM Peak]

Network: 2 [Existing PM PEAK]

Ludowici Way (Hospital Access 2) and Fox Valley Road  
 Site Category: Wairoonga  
 Stop (Two-Way)

Movement Performance - Vehicles														
Mov ID	Turn	Demand		Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV %	Total veh/h	HV %				Vehicles	Distance m				
South: Fox Valley Road														
1	L2	40	0.0	40	0.0	0.183	4.6	LOS A	0.0	0.0	0.00	0.06	0.00	46.4
2	T1	653	0.0	653	0.0	0.183	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	48.6
Approach		693	0.0	693	0.0	0.183	0.3	NA	0.0	0.0	0.00	0.03	0.00	48.4
North: Fox Valley Road														
8	T1	471	0.0	471	0.0	0.154	0.6	LOS A	0.6	4.3	0.11	0.06	0.11	46.3
9	R2	54	0.0	54	0.0	0.154	8.0	LOS A	0.6	4.3	0.31	0.16	0.31	42.4
Approach		524	0.0	524	0.0	0.154	1.4	NA	0.6	4.3	0.13	0.07	0.13	45.7
West: Ludowici Way														
10	L2	59	0.0	59	0.0	0.066	9.1	LOS A	0.1	0.8	0.39	0.87	0.39	25.1
12	R2	68	0.0	68	0.0	0.629	37.4	LOS C	0.6	4.1	0.84	1.14	1.31	9.3
Approach		127	0.0	127	0.0	0.629	24.3	LOS B	0.6	4.1	0.63	1.01	0.88	13.2
All Vehicles		1344	0.0	1344	0.0	0.629	3.0	NA	0.6	4.3	0.11	0.14	0.14	40.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY

Site: 5 [The Comenarra Pkwy Existing AM Peak]

Network: 1 [Existing AM PEAK]

The Comenarra Parkway and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles														
Mov ID	Turn	Demand Flows		Arrival Flows		Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue		Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		Total veh/h	HV % veh/h	Total	HV %				v/c	sec				
South: Fox Valley Road														
1	L2	72	0.5	72	0.5	0.702	58.9	LOS E	4.9	34.4	1.00	0.86	1.10	25.8
2	T1	74	0.3	74	0.3	0.702	54.3	LOS D	4.9	34.4	1.00	0.86	1.10	15.3
3	R2	38	0.5	38	0.5	0.188	54.0	LOS D	1.2	8.2	0.94	0.73	0.94	26.4
Approach		183	0.4	183	0.4	0.702	56.0	LOS D	4.9	34.4	0.99	0.83	1.07	22.6
East: The Comenarra Parkway														
4	L2	96	0.5	96	0.5	0.237	43.0	LOS D	2.6	18.4	0.87	0.76	0.87	29.1
5	T1	318	2.0	318	2.0	0.851	51.8	LOS D	11.1	78.9	1.00	1.01	1.22	29.3
6	R2	236	1.5	236	1.5	0.830	60.2	LOS E	8.4	59.2	1.00	0.94	1.22	19.1
Approach		649	1.6	649	1.6	0.851	53.5	LOS D	11.1	78.9	0.98	0.95	1.17	26.0
North: Fox Valley Road														
7	L2	211	1.5	211	1.5	0.424	22.0	LOS B	4.7	33.4	0.86	0.78	0.86	33.7
8	T1	53	0.3	53	0.3	0.424	17.4	LOS B	4.7	33.4	0.86	0.78	0.86	30.5
9	R2	427	1.5	427	1.5	0.853	53.3	LOS D	15.1	106.9	1.00	0.95	1.17	22.7
Approach		691	1.4	691	1.4	0.853	41.0	LOS C	15.1	106.9	0.95	0.89	1.05	25.7
West: The Comenarra Parkway														
10	L2	523	1.5	523	1.5	0.497	19.5	LOS B	10.1	71.9	0.64	0.76	0.64	32.8
11	T1	373	2.0	373	2.0	0.865	52.0	LOS D	14.2	101.0	1.00	1.03	1.21	29.2
12	R2	22	0.5	22	0.5	0.865	56.6	LOS E	14.2	101.0	1.00	1.03	1.21	26.7
Approach		918	1.7	918	1.7	0.865	33.6	LOS C	14.2	101.0	0.80	0.88	0.89	30.4
All Vehicles		2441	1.5	2441	1.5	0.865	42.7	LOS D	15.1	106.9	0.90	0.89	1.02	27.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate	Pedestrian Distance	
								ped/h	sec
P1	South Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
P2	East Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	49.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		211	49.3	LOS E			0.95	0.95	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



# PHASING SUMMARY

Site: 5 [The Comenarra Pkwy Existing AM Peak]

Network: 1 [Existing AM PEAK]

The Comenarra Parkway and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Coordinated Cycle Time = 110 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B\*, C, D, E

Output Phase Sequence: A, B\*, C, D, E

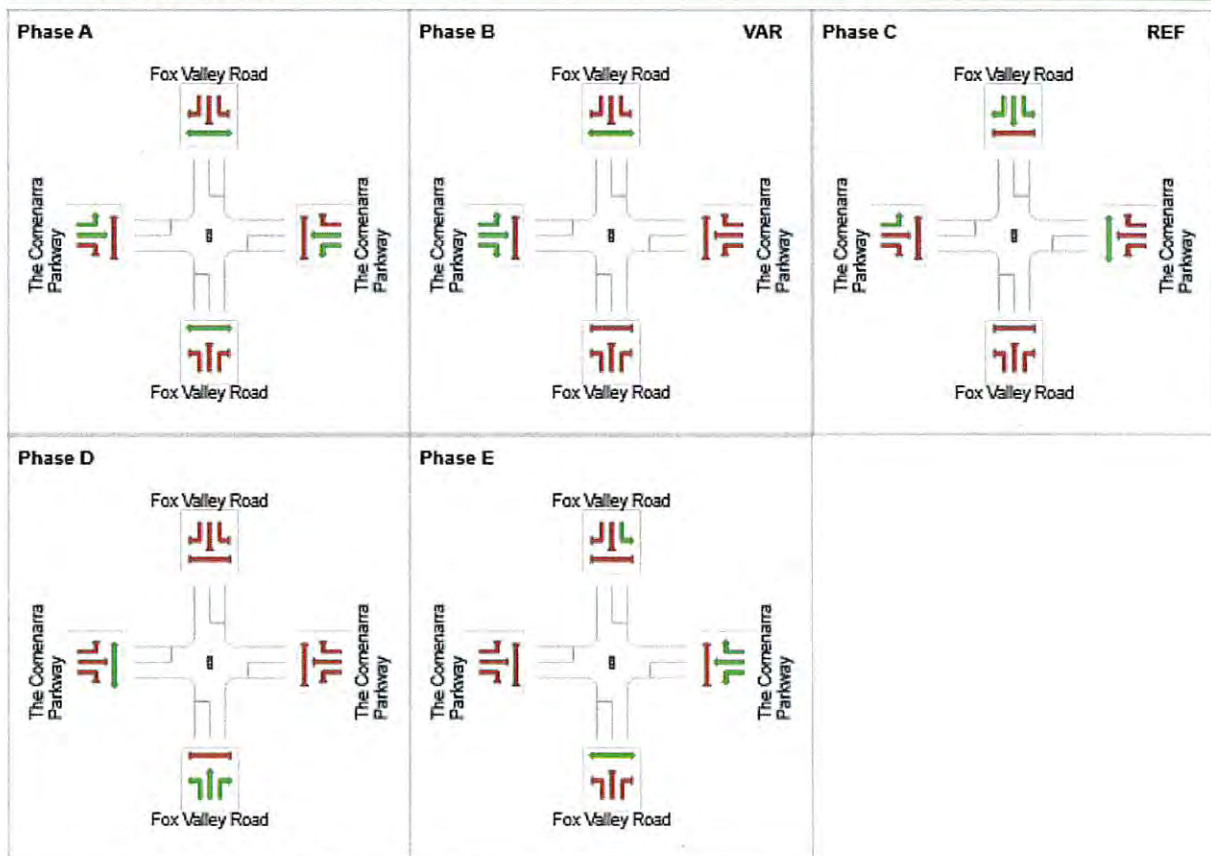
(\* Variable Phase)

## Phase Timing Summary

Phase	A	B	C	D	E
Phase Change Time (sec)	77	84	0	36	54
Green Time (sec)	1	20	30	12	17
Phase Time (sec)	7	26	36	18	23
Phase Split	6%	24%	33%	16%	21%

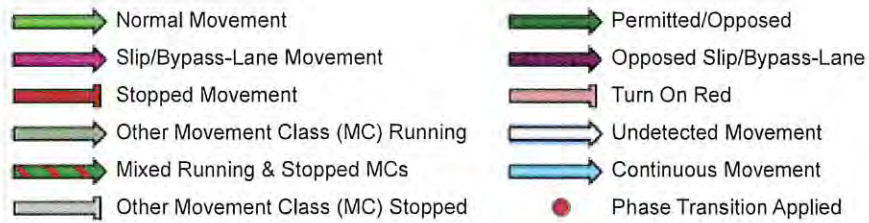
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

## Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# MOVEMENT SUMMARY

Site: 5 [The Comenarra Pkwy Existing PM Peak]

Network: 2 [Existing PM PEAK]

The Comenarra Parkway and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Movement Performance - Vehicles													
Mov ID	Turn	Demand	Flows	Arrival	Flows	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	HV %	Total veh/h	HV %	v/c	sec		veh	m			km/h
South: Fox Valley Road													
1	L2	37	0.5	37	0.5	0.491	61.7	LOS E	3.3	23.2	0.99	0.77	25.3
2	T1	57	0.3	57	0.3	0.491	57.1	LOS E	3.3	23.2	0.99	0.77	14.9
3	R2	44	0.5	44	0.5	0.239	59.9	LOS E	1.5	10.6	0.96	0.74	25.1
Approach		138	0.4	138	0.4	0.491	59.2	LOS E	3.3	23.2	0.98	0.76	21.8
East: The Comenarra Parkway													
4	L2	127	0.5	127	0.5	0.236	39.2	LOS C	3.5	24.3	0.80	0.76	30.2
5	T1	408	2.0	408	2.0	0.860	50.4	LOS D	15.0	106.7	0.96	0.98	29.6
6	R2	318	1.5	318	1.5	0.830	60.0	LOS E	12.0	84.8	1.00	0.93	19.1
Approach		854	1.6	854	1.6	0.860	52.3	LOS D	15.0	106.7	0.95	0.93	26.2
North: Fox Valley Road													
7	L2	155	1.5	155	1.5	0.448	28.2	LOS B	4.9	34.9	0.75	0.73	31.2
8	T1	98	0.3	98	0.3	0.448	23.7	LOS B	4.9	34.9	0.75	0.73	27.7
9	R2	434	1.5	434	1.5	0.858	57.2	LOS E	15.5	110.0	1.00	0.95	21.9
Approach		686	1.3	686	1.3	0.858	45.9	LOS D	15.5	110.0	0.91	0.87	24.1
West: The Comenarra Parkway													
10	L2	303	1.5	303	1.5	0.305	20.5	LOS B	5.9	41.6	0.59	0.73	32.2
11	T1	292	2.0	292	2.0	0.839	56.6	LOS E	12.1	85.9	1.00	0.99	28.1
12	R2	26	0.5	26	0.5	0.839	61.2	LOS E	12.1	85.9	1.00	0.99	25.7
Approach		621	1.7	621	1.7	0.839	39.2	LOS C	12.1	85.9	0.80	0.86	29.2
All Vehicles		2299	1.5	2299	1.5	0.860	47.3	LOS D	15.5	110.0	0.90	0.88	26.1

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow	Average Delay	Level of Service	Average Back of Queue	Prop. Queued	Effective Stop Rate		
		ped/h	sec		Pedestrian				
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
All Pedestrians		211	54.3	LOS E			0.95	0.95	

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





# PHASING SUMMARY

Site: 5 [The Comenarra Pkwy Existing PM Peak]

Network: 2 [Existing PM PEAK]

The Comenarra Parkway and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Practical Cycle Time)

Timings based on settings in the Network Timing dialog

Phase Times determined by the program

Downstream lane blockage effects included in determining phase times

Phase Sequence: Variable Phasing

Reference Phase: Phase C

Input Phase Sequence: A, B\*, C, D, E

Output Phase Sequence: A, B\*, C, D, E

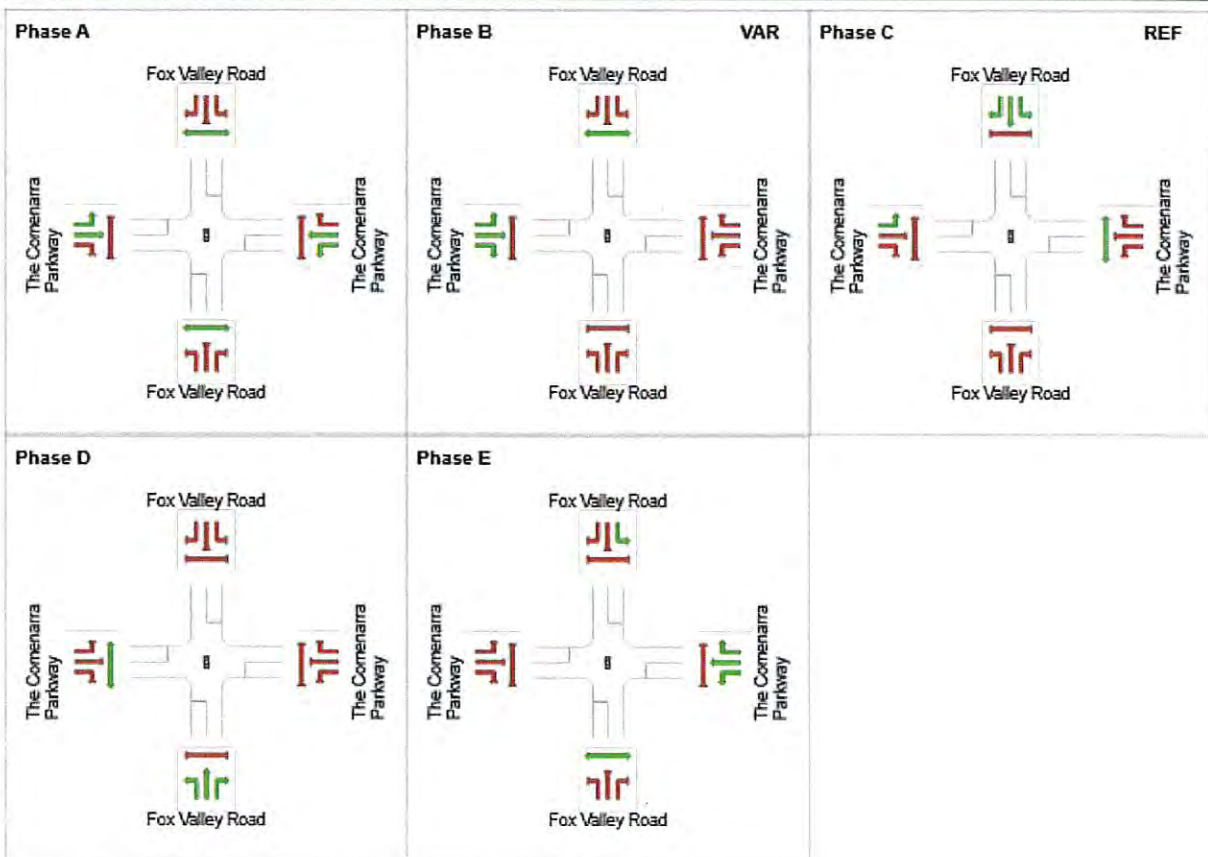
(\* Variable Phase)

## Phase Timing Summary

Phase	A	B	C	D	E
Phase Change Time (sec)	88	98	0	39	57
Green Time (sec)	4	16	33	12	25
Phase Time (sec)	10	22	39	18	31
Phase Split	8%	18%	33%	15%	26%

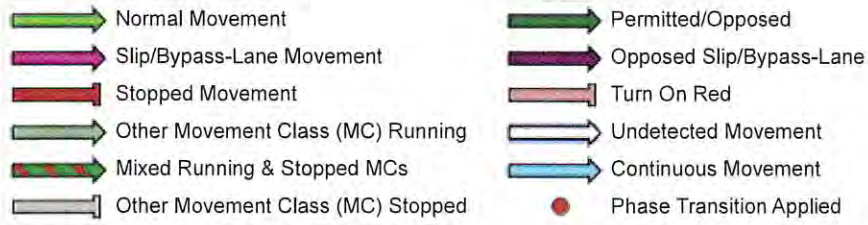
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

## Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# Future Intersections Future Volumes

# MOVEMENT SUMMARY

## Site: 1 [Ada Ave Existing Layout Future Volumes AM Peak]

Ada Avenue and Fox Valley Road

Site Category: Wairoonga

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ada Avenue South												
1	L2	13	0.0	0.069	9.8	LOS A	0.5	3.4	0.85	0.76	0.85	43.0
2	T1	13	0.0	0.069	9.2	LOS A	0.5	3.4	0.85	0.76	0.85	43.8
3	R2	18	0.0	0.069	13.4	LOS A	0.5	3.4	0.85	0.76	0.85	43.9
Approach		43	0.0	0.069	11.1	LOS A	0.5	3.4	0.85	0.76	0.85	43.6
East: Fox Valley Road												
4	L2	8	0.0	0.592	5.2	LOS A	5.5	39.2	0.64	0.55	0.64	45.3
5	T1	631	1.3	0.592	4.6	LOS A	5.5	39.2	0.64	0.55	0.64	46.6
6	R2	104	1.0	0.592	8.8	LOS A	5.5	39.2	0.64	0.55	0.64	46.6
6u	U	15	0.0	0.592	12.1	LOS A	5.5	39.2	0.64	0.55	0.64	50.3
Approach		758	1.2	0.592	5.3	LOS A	5.5	39.2	0.64	0.55	0.64	46.7
North: Ada Avenue												
7	L2	105	1.0	0.315	6.5	LOS A	2.1	14.8	0.68	0.74	0.68	44.7
8	T1	8	0.0	0.315	5.9	LOS A	2.1	14.8	0.68	0.74	0.68	45.1
9	R2	194	0.6	0.315	10.1	LOS A	2.1	14.8	0.68	0.74	0.68	45.6
9u	U	2	0.0	0.315	13.4	LOS A	2.1	14.8	0.68	0.74	0.68	49.1
Approach		309	0.7	0.315	8.8	LOS A	2.1	14.8	0.68	0.74	0.68	45.3
West: Fox Valley Road												
10	L2	191	0.0	0.486	4.6	LOS A	4.0	28.2	0.47	0.47	0.47	46.4
11	T1	467	1.3	0.486	4.0	LOS A	4.0	28.2	0.47	0.47	0.47	47.3
12	R2	3	0.0	0.486	8.2	LOS A	4.0	28.2	0.47	0.47	0.47	47.1
12u	U	5	0.0	0.486	11.5	LOS A	4.0	28.2	0.47	0.47	0.47	51.1
Approach		666	0.9	0.486	4.3	LOS A	4.0	28.2	0.47	0.47	0.47	47.1
All Vehicles		1777	1.0	0.592	5.7	LOS A	5.5	39.2	0.59	0.56	0.59	46.5

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# MOVEMENT SUMMARY

## Site: 1 [Ada Ave Exisitng Layout Future Volumes PM Peak]

Ada Avenue and Fox Valley Road  
 Site Category: Wahroonga  
 Roundabout

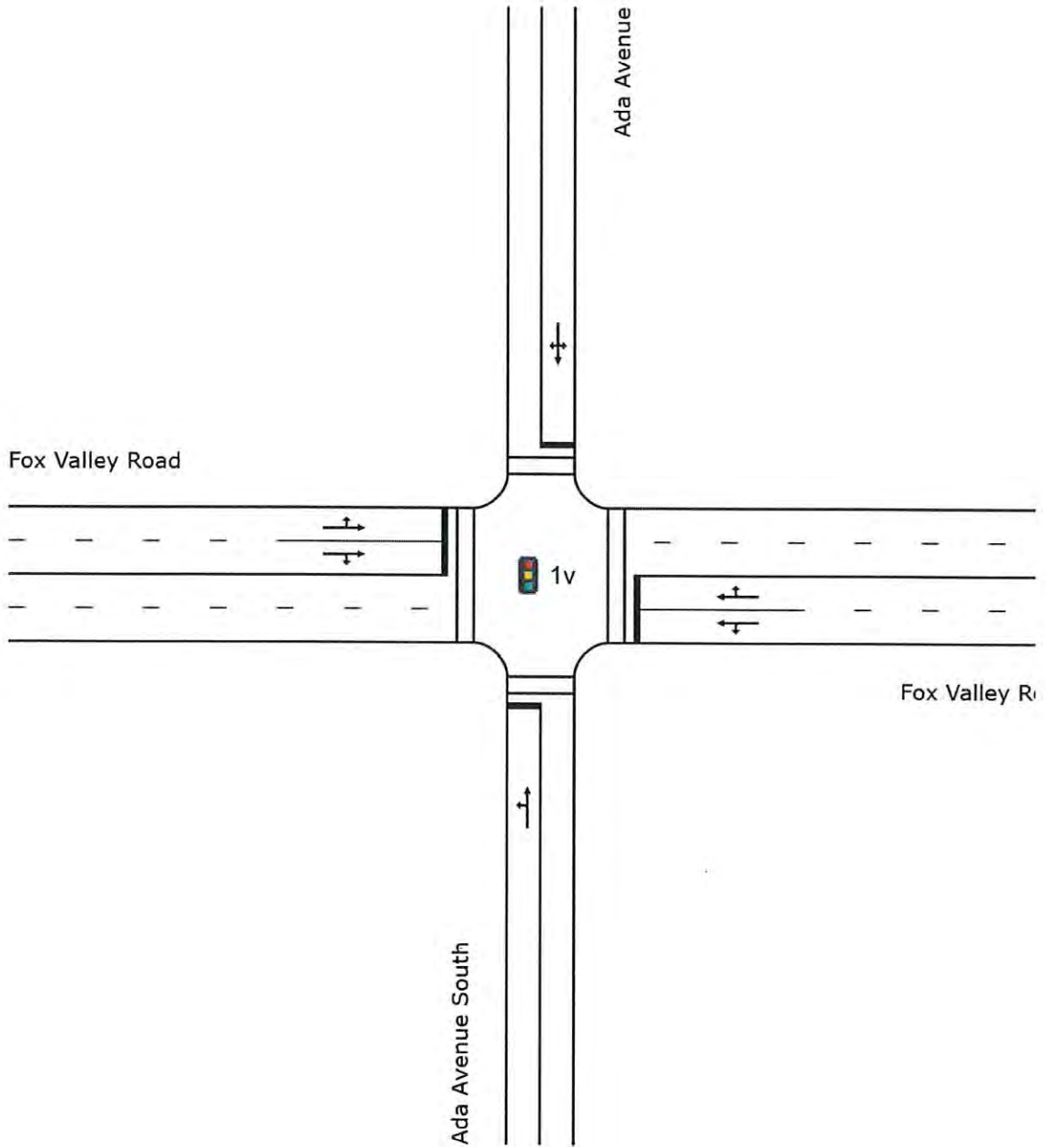
Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ada Avenue South												
1	L2	2	0.0	0.016	10.3	LOS A	0.1	0.8	0.87	0.68	0.87	42.2
2	T1	1	0.0	0.016	9.7	LOS A	0.1	0.8	0.87	0.68	0.87	43.0
3	R2	6	0.0	0.016	13.8	LOS A	0.1	0.8	0.87	0.68	0.87	43.1
Approach		9	0.0	0.016	12.6	LOS A	0.1	0.8	0.87	0.68	0.87	42.9
East: Fox Valley Road												
4	L2	16	0.0	0.636	5.2	LOS A	6.3	44.5	0.66	0.56	0.66	45.2
5	T1	639	1.1	0.636	4.7	LOS A	6.3	44.5	0.66	0.56	0.66	46.5
6	R2	147	0.7	0.636	8.8	LOS A	6.3	44.5	0.66	0.56	0.66	46.5
6u	U	25	0.0	0.636	12.2	LOS A	6.3	44.5	0.66	0.56	0.66	50.2
Approach		827	1.0	0.636	5.7	LOS A	6.3	44.5	0.66	0.56	0.66	46.6
North: Ada Avenue												
7	L2	75	1.0	0.265	6.2	LOS A	1.7	12.1	0.65	0.72	0.65	44.7
8	T1	3	0.0	0.265	5.6	LOS A	1.7	12.1	0.65	0.72	0.65	45.1
9	R2	186	0.6	0.265	9.8	LOS A	1.7	12.1	0.65	0.72	0.65	45.6
9u	U	1	0.0	0.265	13.1	LOS A	1.7	12.1	0.65	0.72	0.65	49.1
Approach		265	0.7	0.265	8.7	LOS A	1.7	12.1	0.65	0.72	0.65	45.4
West: Fox Valley Road												
10	L2	183	0.0	0.479	4.8	LOS A	4.0	27.9	0.52	0.50	0.52	46.2
11	T1	435	1.3	0.479	4.2	LOS A	4.0	27.9	0.52	0.50	0.52	47.1
12	R2	7	0.0	0.479	8.3	LOS A	4.0	27.9	0.52	0.50	0.52	46.9
12u	U	6	0.0	0.479	11.7	LOS A	4.0	27.9	0.52	0.50	0.52	50.9
Approach		632	0.9	0.479	4.5	LOS A	4.0	27.9	0.52	0.50	0.52	46.9
All Vehicles		1734	0.9	0.636	5.7	LOS A	6.3	44.5	0.61	0.56	0.61	46.5

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

# SITE LAYOUT

 Site: 1v [Ada Ave TCS Future]

Ada Avenue and Fox Valley Road  
Site Category: Wairoonga  
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 1v [Ada Ave TCS Layout Future Volumes AM Peak]

Ada Avenue and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 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: Opposed Turns

Reference Phase: Phase B

Input Phase Sequence: A, B

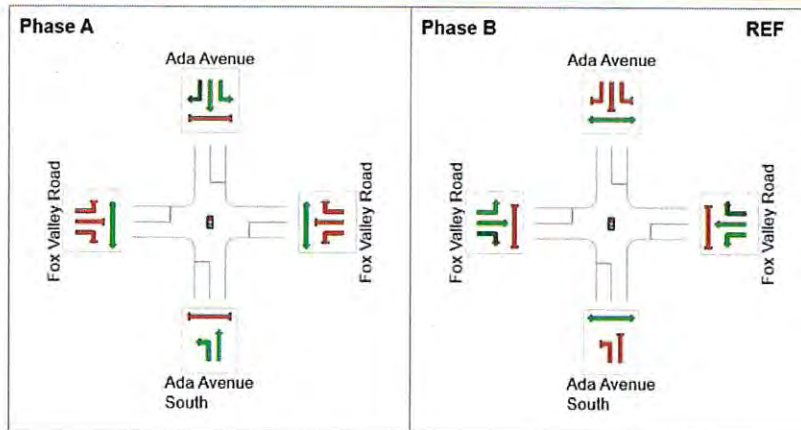
Output Phase Sequence: A, B

### Phase Timing Summary

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

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

### Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase





# PHASING SUMMARY

## Site: 1v [Ada Ave TCS Layout Future Volumes PM Peak]

Ada Avenue and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 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: Opposed Turns

Reference Phase: Phase B

Input Phase Sequence: A, B

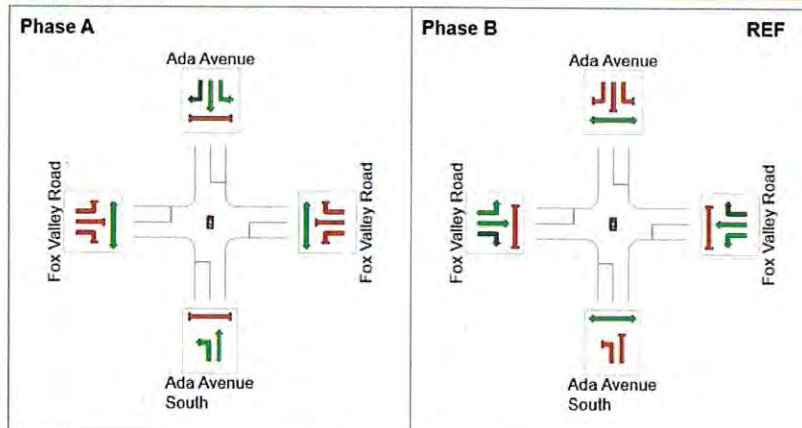
Output Phase Sequence: A, B

### Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	60	0
Green Time (sec)	34	54
Phase Time (sec)	40	60
Phase Split	40%	60%

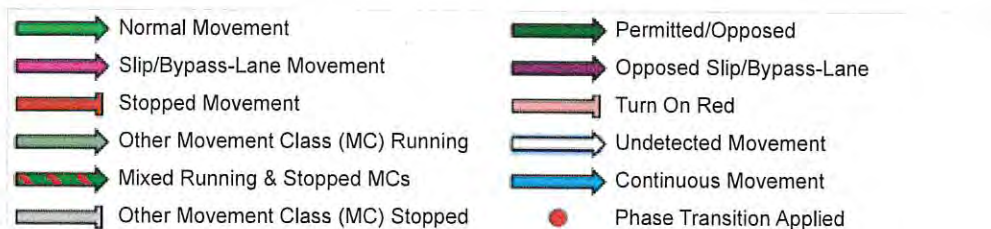
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

### Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



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Project: T:\WORK20\20174 - WAHROONGA ESTATE - From 308-2020\MODEL\Wahroonga - Fox Valley Road 30 SEPT 20.sip8

## MOVEMENT SUMMARY

### Site: 1v [Ada Ave TCS Layout Future Volumes AM Peak ]

Ada Avenue and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ada Avenue South												
1	L2	13	0.0	0.032	23.8	LOS B	0.7	5.1	0.63	0.57	0.63	37.4
2	T1	13	0.0	0.032	19.2	LOS B	0.7	5.1	0.63	0.57	0.63	37.7
Approach		25	0.0	0.032	21.5	LOS B	0.7	5.1	0.63	0.57	0.63	37.6
East: Fox Valley Road												
4	L2	8	0.0	0.506	23.6	LOS B	16.2	114.4	0.74	0.65	0.74	38.4
5	T1	631	1.3	0.506	20.2	LOS B	16.2	114.4	0.75	0.67	0.75	38.9
6	R2	104	1.0	0.506	28.5	LOS C	9.4	66.8	0.79	0.73	0.79	36.7
Approach		743	1.2	0.506	21.4	LOS B	16.2	114.4	0.76	0.68	0.76	38.6
North: Ada Avenue												
7	L2	105	1.0	0.499	28.9	LOS C	11.3	79.6	0.80	0.79	0.80	35.6
8	T1	8	0.0	0.499	24.3	LOS B	11.3	79.6	0.80	0.79	0.80	34.8
9	R2	194	0.6	0.499	28.9	LOS C	11.3	79.6	0.80	0.79	0.80	35.6
Approach		307	0.7	0.499	28.8	LOS C	11.3	79.6	0.80	0.79	0.80	35.6
West: Fox Valley Road												
10	L2	191	0.0	0.352	21.9	LOS B	10.0	70.4	0.67	0.68	0.67	39.0
11	T1	467	1.3	0.352	17.3	LOS B	10.0	70.4	0.67	0.61	0.67	40.0
12	R2	3	0.0	0.352	21.9	LOS B	10.0	70.6	0.67	0.58	0.67	39.2
Approach		661	0.9	0.352	18.7	LOS B	10.0	70.6	0.67	0.63	0.67	39.7
All Vehicles		1737	1.0	0.506	21.7	LOS B	16.2	114.4	0.73	0.68	0.73	38.4

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# MOVEMENT SUMMARY

## Site: 1v [Ada Ave TCS Layout Future Volumes PM Peak]

Ada Avenue and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ada Avenue South												
1	L2	2	0.0	0.005	27.4	LOS B	0.1	0.7	0.68	0.56	0.68	35.6
2	T1	1	0.0	0.005	22.9	LOS B	0.1	0.7	0.68	0.56	0.68	35.9
Approach		3	0.0	0.005	25.9	LOS B	0.1	0.7	0.68	0.56	0.68	35.7
East: Fox Valley Road												
4	L2	16	0.0	0.509	20.1	LOS B	16.8	119.0	0.68	0.61	0.68	40.0
5	T1	639	1.1	0.509	16.4	LOS B	16.8	119.0	0.69	0.63	0.69	40.6
6	R2	147	0.7	0.509	25.4	LOS B	8.8	62.1	0.75	0.73	0.75	37.6
Approach		802	1.0	0.509	18.1	LOS B	16.8	119.0	0.70	0.65	0.70	40.0
North: Ada Avenue												
7	L2	75	1.0	0.499	33.1	LOS C	10.3	72.9	0.85	0.80	0.85	34.2
8	T1	3	0.0	0.499	28.5	LOS C	10.3	72.9	0.85	0.80	0.85	33.3
9	R2	186	0.6	0.499	33.1	LOS C	10.3	72.9	0.85	0.80	0.85	34.2
Approach		264	0.7	0.499	33.0	LOS C	10.3	72.9	0.85	0.80	0.85	34.2
West: Fox Valley Road												
10	L2	183	0.0	0.302	18.0	LOS B	8.5	59.5	0.59	0.63	0.59	40.7
11	T1	435	1.3	0.302	14.2	LOS A	8.5	59.5	0.60	0.56	0.60	41.4
12	R2	7	0.0	0.302	19.1	LOS B	8.4	59.3	0.61	0.53	0.61	40.5
Approach		625	0.9	0.302	15.4	LOS B	8.5	59.5	0.60	0.58	0.60	41.2
All Vehicles		1695	0.9	0.509	19.4	LOS B	16.8	119.0	0.69	0.65	0.69	39.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P2	East Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## MOVEMENT SUMMARY

### Site: 1 [Ada Ave 2 Lane RAB Layout Future Volumes AM Peak]

Ada Avenue and Fox Valley Road  
Site Category: Wahroonga  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ada Avenue South												
1	L2	13	0.0	0.054	5.6	LOS A	0.2	1.5	0.57	0.69	0.57	45.3
2	T1	13	0.0	0.054	5.3	LOS A	0.2	1.5	0.57	0.69	0.57	46.5
3	R2	18	0.0	0.054	9.9	LOS A	0.2	1.5	0.57	0.69	0.57	46.7
Approach		43	0.0	0.054	7.3	LOS A	0.2	1.5	0.57	0.69	0.57	46.2
East: Fox Valley Road												
4	L2	8	0.0	0.295	4.2	LOS A	1.7	12.0	0.39	0.40	0.39	46.8
5	T1	631	1.3	0.295	3.6	LOS A	1.7	12.0	0.40	0.44	0.40	48.1
6	R2	104	1.0	0.295	8.3	LOS A	1.7	11.7	0.41	0.51	0.41	47.9
6u	U	15	0.0	0.295	12.1	LOS A	1.7	11.7	0.41	0.51	0.41	51.8
Approach		758	1.2	0.295	4.4	LOS A	1.7	12.0	0.40	0.45	0.40	48.1
North: Ada Avenue												
7	L2	105	1.0	0.317	5.1	LOS A	1.5	10.4	0.53	0.72	0.53	45.5
8	T1	8	0.0	0.317	4.8	LOS A	1.5	10.4	0.53	0.72	0.53	46.2
9	R2	194	0.6	0.317	9.4	LOS A	1.5	10.4	0.53	0.72	0.53	46.8
9u	U	2	0.0	0.317	13.1	LOS A	1.5	10.4	0.53	0.72	0.53	50.5
Approach		309	0.7	0.317	7.8	LOS A	1.5	10.4	0.53	0.72	0.53	46.3
West: Fox Valley Road												
10	L2	191	0.0	0.244	3.9	LOS A	1.3	8.9	0.30	0.41	0.30	47.3
11	T1	467	1.3	0.244	3.4	LOS A	1.3	8.9	0.31	0.40	0.31	48.6
12	R2	3	0.0	0.244	8.0	LOS A	1.2	8.8	0.31	0.39	0.31	48.7
12u	U	5	0.0	0.244	11.8	LOS A	1.2	8.8	0.31	0.39	0.31	52.9
Approach		666	0.9	0.244	3.6	LOS A	1.3	8.9	0.30	0.40	0.30	48.2
All Vehicles		1777	1.0	0.317	4.8	LOS A	1.7	12.0	0.39	0.48	0.39	47.8

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

# MOVEMENT SUMMARY

## Site: 1 [Ada Ave 2 Lane RAB Layout Future Volumes PM Peak]

Ada Avenue and Fox Valley Road  
 Site Category: Wahroonga  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Ada Avenue South												
1	L2	2	0.0	0.012	5.6	LOS A	0.0	0.3	0.58	0.67	0.58	44.8
2	T1	1	0.0	0.012	5.3	LOS A	0.0	0.3	0.58	0.67	0.58	45.9
3	R2	6	0.0	0.012	9.9	LOS A	0.0	0.3	0.58	0.67	0.58	46.1
Approach		9	0.0	0.012	8.4	LOS A	0.0	0.3	0.58	0.67	0.58	45.8
East: Fox Valley Road												
4	L2	16	0.0	0.318	4.1	LOS A	1.9	13.1	0.39	0.40	0.39	46.8
5	T1	639	1.1	0.318	3.6	LOS A	1.9	13.1	0.39	0.44	0.39	48.0
6	R2	147	0.7	0.318	8.3	LOS A	1.8	12.8	0.40	0.53	0.40	47.7
6u	U	25	0.0	0.318	12.0	LOS A	1.8	12.8	0.40	0.53	0.40	51.6
Approach		827	1.0	0.318	4.7	LOS A	1.9	13.1	0.40	0.46	0.40	48.0
North: Ada Avenue												
7	L2	75	1.0	0.269	4.9	LOS A	1.2	8.6	0.51	0.71	0.51	45.4
8	T1	3	0.0	0.269	4.6	LOS A	1.2	8.6	0.51	0.71	0.51	46.1
9	R2	186	0.6	0.269	9.2	LOS A	1.2	8.6	0.51	0.71	0.51	46.6
9u	U	1	0.0	0.269	12.9	LOS A	1.2	8.6	0.51	0.71	0.51	50.4
Approach		265	0.7	0.269	7.9	LOS A	1.2	8.6	0.51	0.71	0.51	46.3
West: Fox Valley Road												
10	L2	183	0.0	0.238	4.0	LOS A	1.3	8.8	0.33	0.42	0.33	47.2
11	T1	435	1.3	0.238	3.5	LOS A	1.3	8.8	0.34	0.41	0.34	48.4
12	R2	7	0.0	0.238	8.1	LOS A	1.2	8.7	0.34	0.41	0.34	48.5
12u	U	6	0.0	0.238	11.9	LOS A	1.2	8.7	0.34	0.41	0.34	52.7
Approach		632	0.9	0.238	3.8	LOS A	1.3	8.8	0.34	0.42	0.34	48.1
All Vehicles		1734	0.9	0.318	4.9	LOS A	1.9	13.1	0.39	0.48	0.39	47.8

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



# MOVEMENT SUMMARY

## Site: 2 [Lucinda Ave Existing Layout Future Volumes AM Peak]

Lucinda Avenue and Fox Valley Road  
 Site Category: Wahroonga  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lucinda Avenue South												
1b	L3	33	0.0	0.197	10.3	LOS A	1.4	9.8	0.93	0.90	0.93	44.1
2	T1	23	0.0	0.197	12.9	LOS A	1.4	9.8	0.93	0.90	0.93	43.1
3a	R1	33	0.0	0.197	16.0	LOS B	1.4	9.8	0.93	0.90	0.93	42.8
Approach		88	0.0	0.197	13.1	LOS A	1.4	9.8	0.93	0.90	0.93	43.4
NorthEast: Fox Valley Road												
24a	L1	21	10.0	0.773	10.1	LOS A	11.4	80.2	0.95	0.96	1.20	43.9
25	T1	612	0.9	0.773	10.1	LOS A	11.4	80.2	0.95	0.96	1.20	45.7
26b	R3	131	0.8	0.773	14.9	LOS B	11.4	80.2	0.95	0.96	1.20	44.6
26u	U	2	0.0	0.773	17.2	LOS B	11.4	80.2	0.95	0.96	1.20	47.5
Approach		765	1.1	0.773	10.9	LOS A	11.4	80.2	0.95	0.96	1.20	45.5
North: Lucinda Avenue												
7b	L3	153	0.7	0.586	9.6	LOS A	5.6	39.2	0.87	0.95	1.03	42.9
8	T1	7	0.0	0.586	9.2	LOS A	5.6	39.2	0.87	0.95	1.03	44.0
9a	R1	314	0.4	0.586	12.3	LOS A	5.6	39.2	0.87	0.95	1.03	45.3
Approach		474	0.5	0.586	11.4	LOS A	5.6	39.2	0.87	0.95	1.03	44.6
SouthWest: Fox Valley Road												
30a	L1	339	0.3	0.697	4.8	LOS A	7.7	54.4	0.73	0.59	0.73	47.2
31	T1	476	1.3	0.697	5.1	LOS A	7.7	54.4	0.73	0.59	0.73	47.4
32b	R3	9	0.0	0.697	9.9	LOS A	7.7	54.4	0.73	0.59	0.73	47.7
32u	U	19	0.0	0.697	12.3	LOS A	7.7	54.4	0.73	0.59	0.73	51.9
Approach		843	0.9	0.697	5.2	LOS A	7.7	54.4	0.73	0.59	0.73	47.4
All Vehicles		2171	0.8	0.773	8.9	LOS A	11.4	80.2	0.84	0.81	0.97	46.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).  
 Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

## MOVEMENT SUMMARY

### Site: 2 [Lucinda Ave Existing Layout Future Volumes PM Peak]

Lucinda Avenue and Fox Valley Road  
Site Category: Wahroonga  
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lucinda Avenue South												
1b	L3	33	3.2	0.136	8.1	LOS A	0.9	6.5	0.84	0.82	0.84	45.1
2	T1	18	0.0	0.136	10.5	LOS A	0.9	6.5	0.84	0.82	0.84	44.4
3a	R1	22	4.8	0.136	13.9	LOS A	0.9	6.5	0.84	0.82	0.84	44.1
3u	U	2	0.0	0.136	17.7	LOS B	0.9	6.5	0.84	0.82	0.84	47.7
Approach		75	2.8	0.136	10.7	LOS A	0.9	6.5	0.84	0.82	0.84	44.8
NorthEast: Fox Valley Road												
24a	L1	27	0.0	0.694	5.3	LOS A	7.8	55.2	0.74	0.66	0.77	45.5
25	T1	608	1.5	0.694	5.7	LOS A	7.8	55.2	0.74	0.66	0.77	46.9
26b	R3	178	1.2	0.694	10.4	LOS A	7.8	55.2	0.74	0.66	0.77	46.2
26u	U	1	0.0	0.694	12.8	LOS A	7.8	55.2	0.74	0.66	0.77	49.3
Approach		815	1.4	0.694	6.7	LOS A	7.8	55.2	0.74	0.66	0.77	46.7
North: Lucinda Avenue												
7b	L3	113	2.7	0.368	7.2	LOS A	2.7	18.9	0.80	0.82	0.80	44.2
8	T1	15	0.0	0.368	6.8	LOS A	2.7	18.9	0.80	0.82	0.80	45.4
9a	R1	152	1.7	0.368	10.0	LOS A	2.7	18.9	0.80	0.82	0.80	46.3
Approach		279	2.0	0.368	8.7	LOS A	2.7	18.9	0.80	0.82	0.80	45.6
SouthWest: Fox Valley Road												
30a	L1	476	0.5	0.850	9.0	LOS A	16.2	114.4	0.97	0.84	1.16	46.2
31	T1	483	1.5	0.850	9.4	LOS A	16.2	114.4	0.97	0.84	1.16	46.4
32b	R3	26	4.0	0.850	14.2	LOS A	16.2	114.4	0.97	0.84	1.16	46.6
32u	U	15	0.0	0.850	16.5	LOS B	16.2	114.4	0.97	0.84	1.16	51.0
Approach		1000	1.0	0.850	9.4	LOS A	16.2	114.4	0.97	0.84	1.16	46.4
All Vehicles		2168	1.4	0.850	8.3	LOS A	16.2	114.4	0.86	0.77	0.96	46.4

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

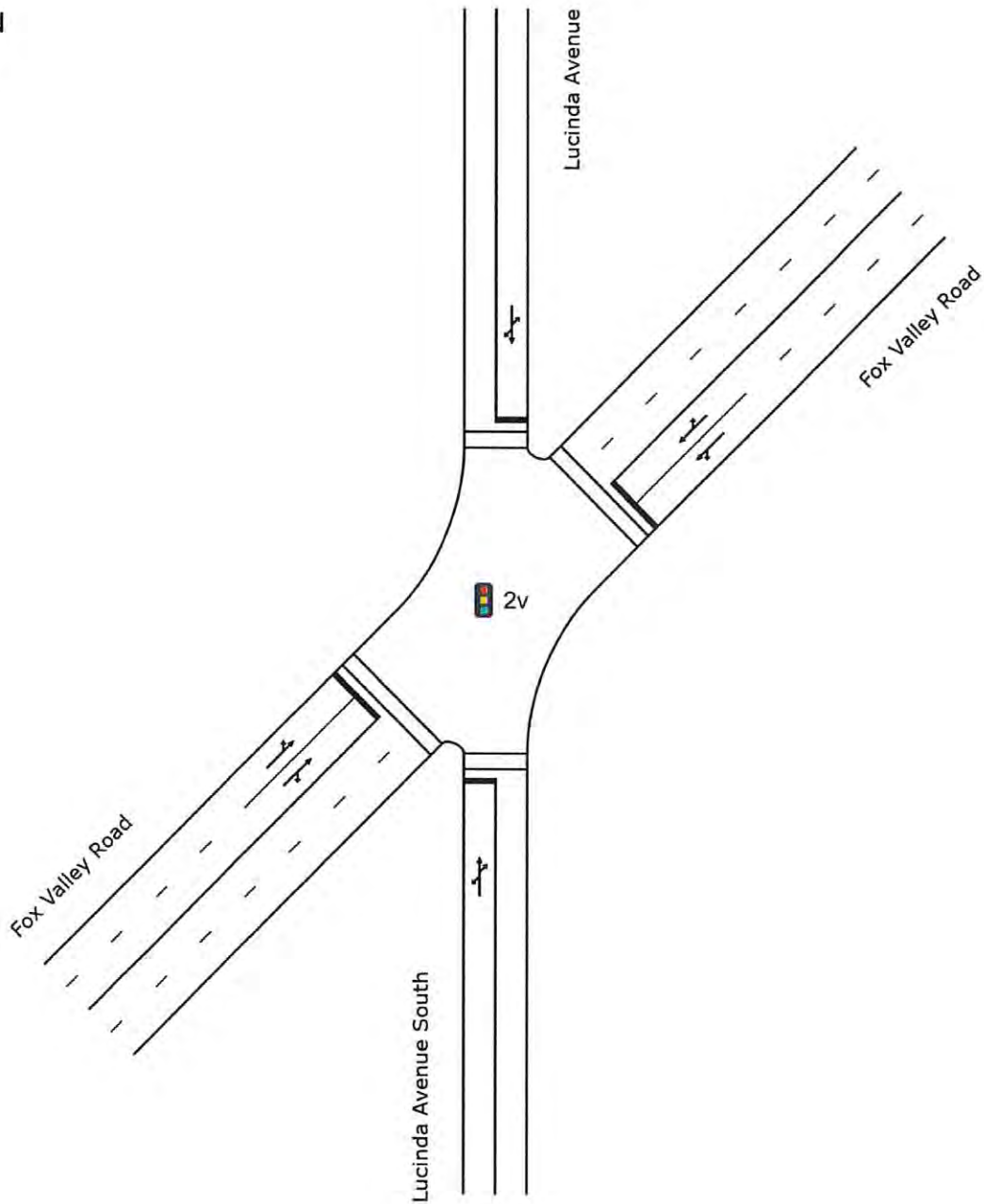
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.



# SITE LAYOUT

 Site: 2v [Lucinda Ave TCS Future]

Lucinda Avenue and Fox Valley Road  
Site Category: Wahroonga  
Signals - Fixed Time Isolated



# PHASING SUMMARY

## Site: 2v [Lucinda Ave TCS Layout Future Volumes AM Peak]

Lucinda Avenue and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 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: Opposed Turns

Reference Phase: Phase A

Input Phase Sequence: A, B

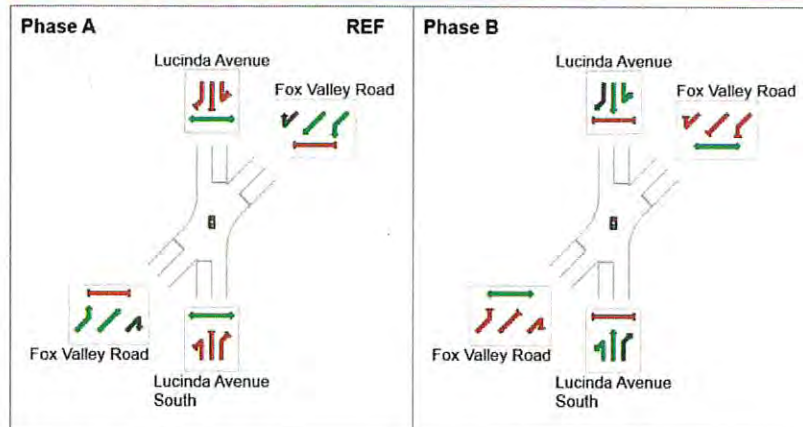
Output Phase Sequence: A, B

### Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	49
Green Time (sec)	43	45
Phase Time (sec)	49	51
Phase Split	49%	51%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

### Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# PHASING SUMMARY

## Site: 2v [Lucinda Ave TCS Layout Future Volumes PM Peak]

Lucinda Avenue and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 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: Opposed Turns

Reference Phase: Phase A

Input Phase Sequence: A, B

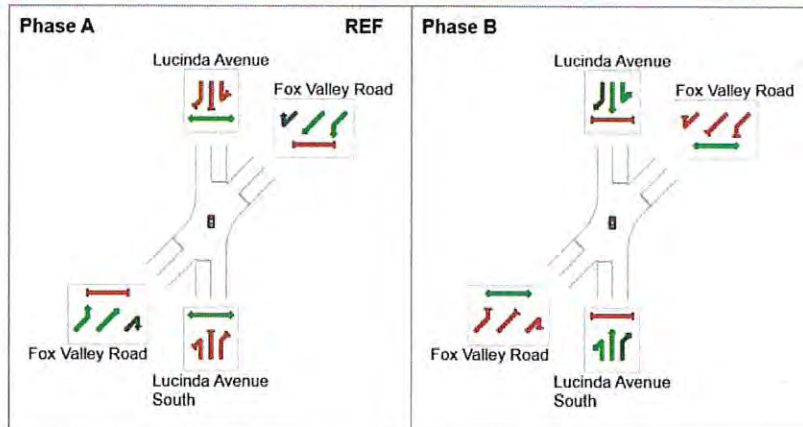
Output Phase Sequence: A, B

### Phase Timing Summary

Phase	A	B
Phase Change Time (sec)	0	66
Green Time (sec)	60	28
Phase Time (sec)	66	34
Phase Split	66%	34%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

### Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



## MOVEMENT SUMMARY

### Site: 2v [Lucinda Ave TCS Layout Future Volumes AM Peak]

Lucinda Avenue and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lucinda Avenue South												
1b	L3	33	0.0	0.140	25.2	LOS B	2.7	18.8	0.66	0.66	0.66	40.8
2	T1	23	0.0	0.140	19.8	LOS B	2.7	18.8	0.66	0.66	0.66	38.1
3a	R1	33	0.0	0.140	23.1	LOS B	2.7	18.8	0.66	0.66	0.66	38.1
Approach		88	0.0	0.140	23.0	LOS B	2.7	18.8	0.66	0.66	0.66	39.2
NorthEast: Fox Valley Road												
24a	L1	21	10.0	0.698	29.2	LOS C	23.8	168.3	0.88	0.78	0.88	36.6
25	T1	612	0.9	0.698	25.7	LOS B	23.8	168.3	0.88	0.79	0.89	39.8
26b	R3	131	0.8	0.698	45.0	LOS D	7.8	55.2	0.95	0.88	1.06	31.0
Approach		763	1.1	0.698	29.1	LOS C	23.8	168.3	0.89	0.81	0.92	38.3
North: Lucinda Avenue												
7b	L3	153	0.7	0.717	29.6	LOS C	18.9	132.8	0.87	0.84	0.87	36.1
8	T1	7	0.0	0.717	24.2	LOS B	18.9	132.8	0.87	0.84	0.87	36.1
9a	R1	314	0.4	0.717	27.5	LOS B	18.9	132.8	0.87	0.84	0.87	39.2
Approach		474	0.5	0.717	28.1	LOS B	18.9	132.8	0.87	0.84	0.87	38.3
SouthWest: Fox Valley Road												
30a	L1	339	0.3	0.508	26.5	LOS B	15.3	107.7	0.78	0.77	0.78	39.5
31	T1	476	1.3	0.508	23.9	LOS B	15.3	107.7	0.80	0.72	0.80	40.2
32b	R3	9	0.0	0.508	29.6	LOS C	14.3	101.5	0.80	0.70	0.80	40.1
Approach		824	0.9	0.508	25.0	LOS B	15.3	107.7	0.79	0.74	0.79	40.0
All Vehicles		2149	0.8	0.717	27.1	LOS B	23.8	168.3	0.84	0.78	0.85	39.0

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P6	NorthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P8	SouthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## MOVEMENT SUMMARY

### Site: 2v [Lucinda Ave TCS Layout Future Volumes PM Peak]

Lucinda Avenue and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lucinda Avenue South												
1b	L3	33	3.2	0.182	36.7	LOS C	2.8	20.0	0.81	0.71	0.81	37.3
2	T1	18	0.0	0.182	31.3	LOS C	2.8	20.0	0.81	0.71	0.81	33.9
3a	R1	22	4.8	0.182	34.6	LOS C	2.8	20.0	0.81	0.71	0.81	33.9
Approach		73	2.9	0.182	34.7	LOS C	2.8	20.0	0.81	0.71	0.81	35.6
NorthEast: Fox Valley Road												
24a	L1	27	0.0	0.530	16.7	LOS B	17.9	127.2	0.63	0.58	0.63	42.0
25	T1	608	1.5	0.530	12.5	LOS A	17.9	127.2	0.63	0.58	0.63	44.5
26b	R3	178	1.2	0.689	33.9	LOS C	7.8	55.3	0.86	0.87	0.95	33.9
Approach		814	1.4	0.689	17.3	LOS B	17.9	127.2	0.68	0.64	0.70	42.2
North: Lucinda Avenue												
7b	L3	113	2.7	0.674	41.6	LOS C	12.5	89.1	0.95	0.84	0.97	32.3
8	T1	15	0.0	0.674	36.2	LOS C	12.5	89.1	0.95	0.84	0.97	32.3
9a	R1	152	1.7	0.674	39.5	LOS C	12.5	89.1	0.95	0.84	0.97	35.9
Approach		279	2.0	0.674	40.2	LOS C	12.5	89.1	0.95	0.84	0.97	34.4
SouthWest: Fox Valley Road												
30a	L1	476	0.5	0.447	15.8	LOS B	14.0	98.2	0.59	0.72	0.59	42.9
31	T1	483	1.5	0.447	13.5	LOS A	14.0	98.2	0.63	0.59	0.63	43.9
32b	R3	26	4.0	0.447	19.1	LOS B	12.9	91.5	0.63	0.57	0.63	43.6
Approach		985	1.1	0.447	14.8	LOS B	14.0	98.2	0.61	0.65	0.61	43.4
All Vehicles		2151	1.4	0.689	19.7	LOS B	17.9	127.2	0.69	0.67	0.70	41.4

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P6	NorthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P8	SouthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## MOVEMENT SUMMARY

### Site: 2 [Lucinda Ave 2 Lane RAB Layout Future Volumes AM Peak]

Lucinda Avenue and Fox Valley Road

Site Category: Wahroonga

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lucinda Avenue South												
1b	L3	33	0.0	0.148	7.6	LOS A	0.6	4.5	0.67	0.84	0.67	45.8
2	T1	23	0.0	0.148	7.3	LOS A	0.6	4.5	0.67	0.84	0.67	45.5
3a	R1	33	0.0	0.148	10.4	LOS A	0.6	4.5	0.67	0.84	0.67	45.2
Approach		88	0.0	0.148	8.5	LOS A	0.6	4.5	0.67	0.84	0.67	45.5
NorthEast: Fox Valley Road												
24a	L1	21	10.0	0.377	4.8	LOS A	2.3	16.6	0.57	0.57	0.57	46.4
25	T1	612	0.9	0.377	5.0	LOS A	2.3	16.6	0.57	0.60	0.57	47.4
26b	R3	131	0.8	0.377	9.8	LOS A	2.3	16.3	0.58	0.65	0.58	46.4
26u	U	2	0.0	0.377	12.2	LOS A	2.3	16.3	0.58	0.65	0.58	49.6
Approach		765	1.1	0.377	5.8	LOS A	2.3	16.6	0.57	0.60	0.57	47.3
North: Lucinda Avenue												
7b	L3	153	0.7	0.586	8.3	LOS A	4.2	29.4	0.72	0.94	0.87	43.6
8	T1	7	0.0	0.586	7.9	LOS A	4.2	29.4	0.72	0.94	0.87	44.7
9a	R1	314	0.4	0.586	11.0	LOS A	4.2	29.4	0.72	0.94	0.87	45.8
Approach		474	0.5	0.586	10.1	LOS A	4.2	29.4	0.72	0.94	0.87	45.2
SouthWest: Fox Valley Road												
30a	L1	339	0.3	0.350	3.7	LOS A	2.0	14.2	0.39	0.47	0.39	48.0
31	T1	476	1.3	0.350	4.1	LOS A	2.0	14.2	0.40	0.49	0.40	48.1
32b	R3	9	0.0	0.350	8.9	LOS A	2.0	14.2	0.40	0.49	0.40	48.4
32u	U	19	0.0	0.350	11.3	LOS A	2.0	14.2	0.40	0.49	0.40	52.6
Approach		843	0.9	0.350	4.2	LOS A	2.0	14.2	0.40	0.48	0.40	48.2
All Vehicles		2171	0.8	0.586	6.2	LOS A	4.2	29.4	0.54	0.64	0.57	47.1

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

## MOVEMENT SUMMARY

### Site: 2 [Lucinda Ave 2 Lane RAB Layout Future Volumes PM Peak]

Lucinda Avenue and Fox Valley Road

Site Category: Wahroonga

Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Lucinda Avenue South												
1b	L3	33	3.2	0.115	7.0	LOS A	0.5	3.3	0.61	0.79	0.61	46.1
2	T1	18	0.0	0.115	6.6	LOS A	0.5	3.3	0.61	0.79	0.61	46.0
3a	R1	22	4.8	0.115	9.8	LOS A	0.5	3.3	0.61	0.79	0.61	45.6
3u	U	2	0.0	0.115	13.7	LOS A	0.5	3.3	0.61	0.79	0.61	49.5
Approach		75	2.8	0.115	7.9	LOS A	0.5	3.3	0.61	0.79	0.61	46.0
NorthEast: Fox Valley Road												
24a	L1	27	0.0	0.349	3.9	LOS A	2.0	14.5	0.43	0.48	0.43	46.9
25	T1	608	1.5	0.349	4.2	LOS A	2.0	14.5	0.43	0.52	0.43	47.7
26b	R3	178	1.2	0.349	9.0	LOS A	2.0	14.4	0.43	0.59	0.43	46.6
26u	U	1	0.0	0.349	11.4	LOS A	2.0	14.4	0.43	0.59	0.43	49.8
Approach		815	1.4	0.349	5.3	LOS A	2.0	14.5	0.43	0.53	0.43	47.5
North: Lucinda Avenue												
7b	L3	113	2.7	0.358	6.6	LOS A	1.8	13.1	0.63	0.79	0.63	44.6
8	T1	15	0.0	0.358	6.2	LOS A	1.8	13.1	0.63	0.79	0.63	45.7
9a	R1	152	1.7	0.358	9.4	LOS A	1.8	13.1	0.63	0.79	0.63	46.6
Approach		279	2.0	0.358	8.1	LOS A	1.8	13.1	0.63	0.79	0.63	45.9
SouthWest: Fox Valley Road												
30a	L1	476	0.5	0.425	4.0	LOS A	2.6	18.4	0.46	0.51	0.46	47.9
31	T1	483	1.5	0.425	4.4	LOS A	2.6	18.4	0.46	0.52	0.46	47.9
32b	R3	26	4.0	0.425	9.3	LOS A	2.6	18.4	0.46	0.52	0.46	48.1
32u	U	15	0.0	0.425	11.6	LOS A	2.6	18.4	0.46	0.52	0.46	52.4
Approach		1000	1.0	0.425	4.5	LOS A	2.6	18.4	0.46	0.52	0.46	48.0
All Vehicles		2168	1.4	0.425	5.4	LOS A	2.6	18.4	0.47	0.57	0.47	47.5

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

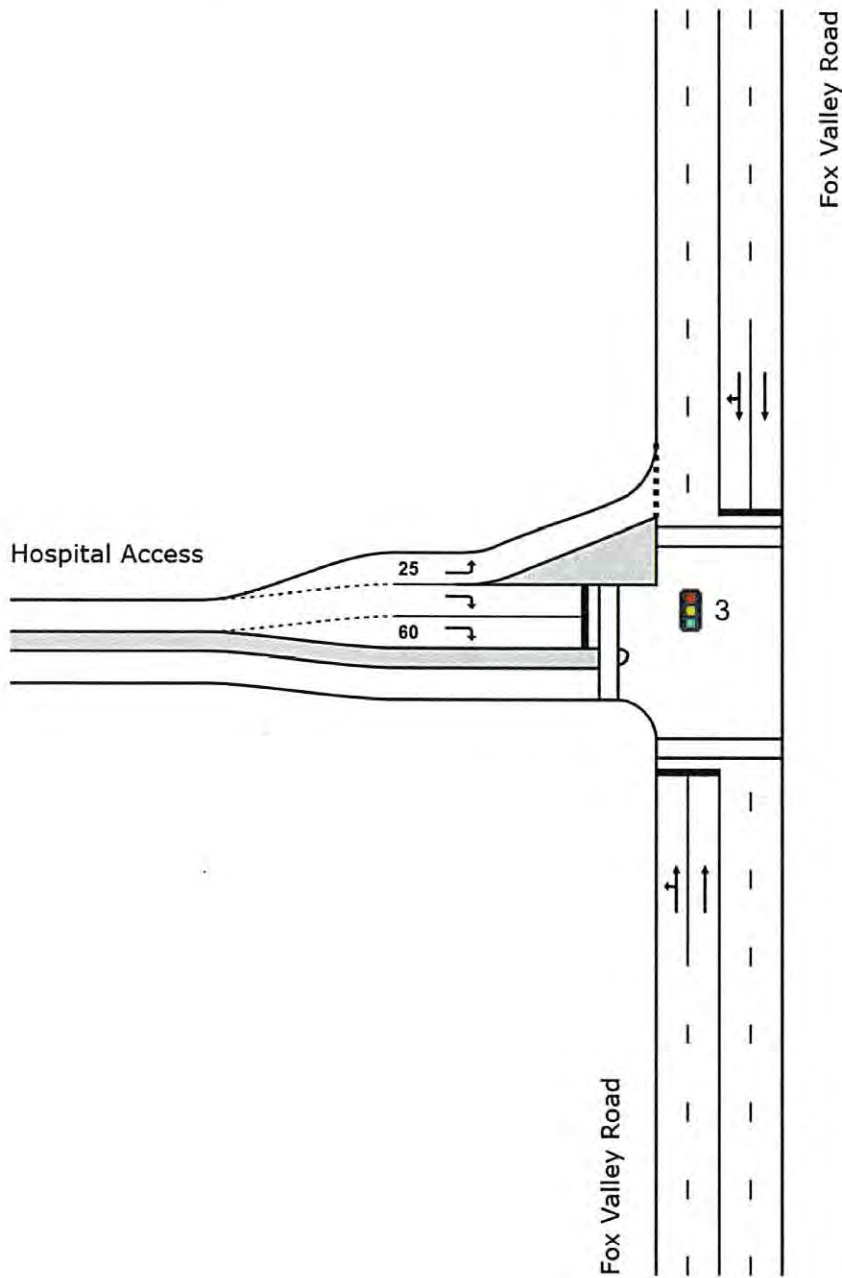
# SITE LAYOUT

## Site: 3 [Hospital Rd Future]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated





## MOVEMENT SUMMARY

### Site: 3 [Hospital Rd Future Layout Future Volumes AM Peak]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Fox Valley Road												
1	L2	226	0.3	0.432	23.4	LOS B	16.3	115.1	0.64	0.67	0.64	26.6
2	T1	663	1.5	0.432	19.0	LOS B	16.8	119.3	0.64	0.60	0.64	40.1
Approach		889	1.2	0.432	20.1	LOS B	16.8	119.3	0.64	0.62	0.64	38.2
North: Fox Valley Road												
8	T1	713	1.5	0.432	4.4	LOS A	12.3	87.3	0.34	0.32	0.34	47.3
9	R2	261	0.3	0.432	18.4	LOS B	11.5	81.0	0.68	0.75	0.68	40.3
Approach		974	1.2	0.432	8.2	LOS A	12.3	87.3	0.43	0.43	0.43	45.2
West: Hospital Access												
10	L2	98	0.3	0.103	7.2	LOS A	1.2	8.7	0.27	0.58	0.27	45.8
12	R2	59	0.3	0.159	63.5	LOS E	1.8	12.3	0.95	0.72	0.95	13.8
Approach		157	0.3	0.159	28.4	LOS B	1.8	12.3	0.52	0.63	0.52	33.3
All Vehicles		2020	1.1	0.432	15.0	LOS B	16.8	119.3	0.53	0.53	0.53	41.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
P4	West Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96	
All Pedestrians		158	59.3	LOS E			0.96	0.96	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## MOVEMENT SUMMARY

### Site: 3 [Hospital Rd Future Layout Future Volumes PM Peak]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Fox Valley Road												
1	L2	63	0.3	0.435	25.9	LOS B	12.2	86.0	0.75	0.67	0.75	26.1
2	T1	657	1.5	0.435	21.4	LOS B	12.3	87.2	0.75	0.66	0.75	39.3
Approach		720	1.4	0.435	21.7	LOS B	12.3	87.2	0.75	0.66	0.75	38.7
North: Fox Valley Road												
8	T1	441	1.5	0.284	3.8	LOS A	5.9	42.2	0.33	0.30	0.33	47.6
9	R2	205	0.3	0.284	14.1	LOS A	5.4	38.3	0.57	0.69	0.57	42.1
Approach		646	1.1	0.284	7.1	LOS A	5.9	42.2	0.40	0.42	0.40	45.8
West: Hospital Access												
10	L2	167	0.3	0.166	7.0	LOS A	1.8	12.5	0.30	0.60	0.30	45.9
12	R2	154	0.3	0.377	50.9	LOS D	3.6	25.5	0.97	0.76	0.97	16.1
Approach		321	0.3	0.377	28.0	LOS B	3.6	25.5	0.62	0.68	0.62	32.3
All Vehicles		1687	1.1	0.435	17.3	LOS B	12.3	87.2	0.59	0.57	0.59	40.2

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	North Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	West Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		158	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# PHASING SUMMARY

## Site: 3 [Hospital Rd Future Layout Future Volumes AM Peak]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C, D\*

Output Phase Sequence: A, B, C

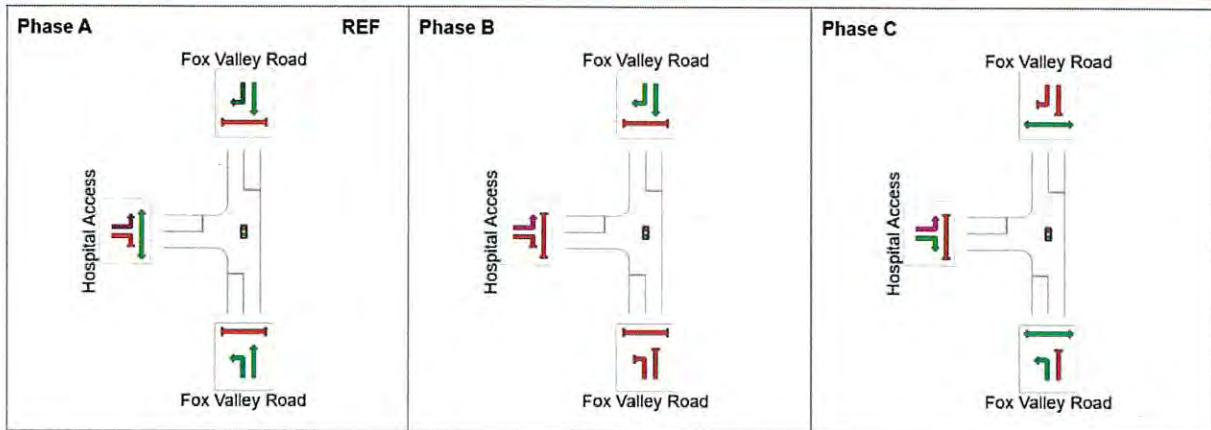
(\* Variable Phase)

### Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	76	111
Green Time (sec)	70	29	13
Phase Time (sec)	76	35	19
Phase Split	58%	27%	15%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

### Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# PHASING SUMMARY

## Site: 3 [Hospital Rd Future Layout Future Volumes PM Peak]

White Road (Hospital Access) and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Variable Phasing

Reference Phase: Phase A

Input Phase Sequence: A, B, C, D\*

Output Phase Sequence: A, B, C

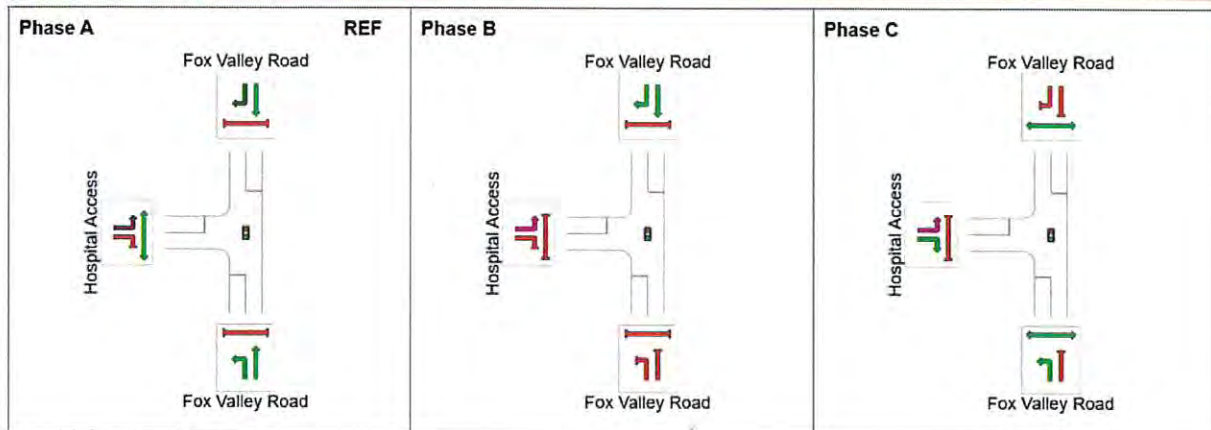
(\* Variable Phase)

### Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	49	83
Green Time (sec)	43	28	11
Phase Time (sec)	49	34	17
Phase Split	49%	34%	17%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

### Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase



# MOVEMENT SUMMARY

## Site: 7v [School Access Future RAB AM Peak]

School Access and Fox Valley Road  
 Site Category: Wahroonga  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Access Road												
4	L2	18	0.0	0.084	13.0	LOS A	0.6	4.1	0.93	0.84	0.93	31.6
5	T1	2	0.0	0.084	13.5	LOS A	0.6	4.1	0.93	0.84	0.93	12.8
6	R2	13	0.0	0.084	16.5	LOS B	0.6	4.1	0.93	0.84	0.93	40.6
Approach		33	0.0	0.084	14.4	LOS A	0.6	4.1	0.93	0.84	0.93	34.3
NorthEast: Fox Valley Road												
7	L2	34	0.0	0.733	6.0	LOS A	11.1	77.4	0.71	0.54	0.71	45.1
8	T1	788	0.0	0.733	6.2	LOS A	11.1	77.4	0.71	0.54	0.71	49.6
9	R2	152	0.0	0.733	9.5	LOS A	11.1	77.4	0.71	0.54	0.71	45.4
Approach		974	0.0	0.733	6.7	LOS A	11.1	77.4	0.71	0.54	0.71	48.9
NorthWest: School Access												
10	L2	153	0.0	0.399	10.6	LOS A	3.0	20.7	0.87	0.89	0.88	43.1
11	T1	5	0.0	0.399	10.5	LOS A	3.0	20.7	0.87	0.89	0.88	25.6
12	R2	97	0.0	0.399	13.8	LOS A	3.0	20.7	0.87	0.89	0.88	37.1
Approach		255	0.0	0.399	11.8	LOS A	3.0	20.7	0.87	0.89	0.88	41.1
SouthWest: Fox Valley Road												
1	L2	119	0.0	0.638	6.5	LOS A	7.1	49.6	0.70	0.60	0.70	40.9
2	T1	642	0.0	0.638	6.6	LOS A	7.1	49.6	0.70	0.60	0.70	49.9
3	R2	1	0.0	0.638	9.8	LOS A	7.1	49.6	0.70	0.60	0.70	37.7
Approach		762	0.0	0.638	6.6	LOS A	7.1	49.6	0.70	0.60	0.70	49.0
All Vehicles		2023	0.0	0.733	7.4	LOS A	11.1	77.4	0.73	0.61	0.73	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.  
 Roundabout Capacity Model: SIDRA Standard.  
 SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.  
 Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).  
 HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

# MOVEMENT SUMMARY


## Site: 7v [School Access Future RAB PM Peak]

School Access and Fox Valley Road  
 Site Category: Wahroonga  
 Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Access Road												
4	L2	17	0.0	0.060	8.5	LOS A	0.4	2.6	0.77	0.75	0.77	36.1
5	T1	2	0.0	0.060	8.9	LOS A	0.4	2.6	0.77	0.75	0.77	14.2
6	R2	18	0.0	0.060	12.0	LOS A	0.4	2.6	0.77	0.75	0.77	44.5
Approach		37	0.0	0.060	10.2	LOS A	0.4	2.6	0.77	0.75	0.77	39.5
NorthEast: Fox Valley Road												
7	L2	39	0.0	0.529	5.5	LOS A	5.8	40.3	0.49	0.52	0.49	46.2
8	T1	541	0.0	0.529	5.6	LOS A	5.8	40.3	0.49	0.52	0.49	50.6
9	R2	123	0.0	0.529	8.9	LOS A	5.8	40.3	0.49	0.52	0.49	46.4
Approach		703	0.0	0.529	6.2	LOS A	5.8	40.3	0.49	0.52	0.49	49.7
NorthWest: School Access												
10	L2	123	0.0	0.370	11.5	LOS A	2.7	18.8	0.89	0.91	0.89	42.3
11	T1	2	0.0	0.370	11.4	LOS A	2.7	18.8	0.89	0.91	0.89	24.6
12	R2	88	0.0	0.370	14.7	LOS B	2.7	18.8	0.89	0.91	0.89	36.1
Approach		214	0.0	0.370	12.8	LOS A	2.7	18.8	0.89	0.91	0.89	40.1
SouthWest: Fox Valley Road												
1	L2	95	0.0	0.659	6.3	LOS A	7.5	52.4	0.66	0.57	0.66	41.1
2	T1	729	0.0	0.659	6.4	LOS A	7.5	52.4	0.66	0.57	0.66	50.0
3	R2	1	0.0	0.659	9.7	LOS A	7.5	52.4	0.66	0.57	0.66	37.9
Approach		825	0.0	0.659	6.4	LOS A	7.5	52.4	0.66	0.57	0.66	49.4
All Vehicles		1779	0.0	0.659	7.2	LOS A	7.5	52.4	0.62	0.60	0.62	48.4

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

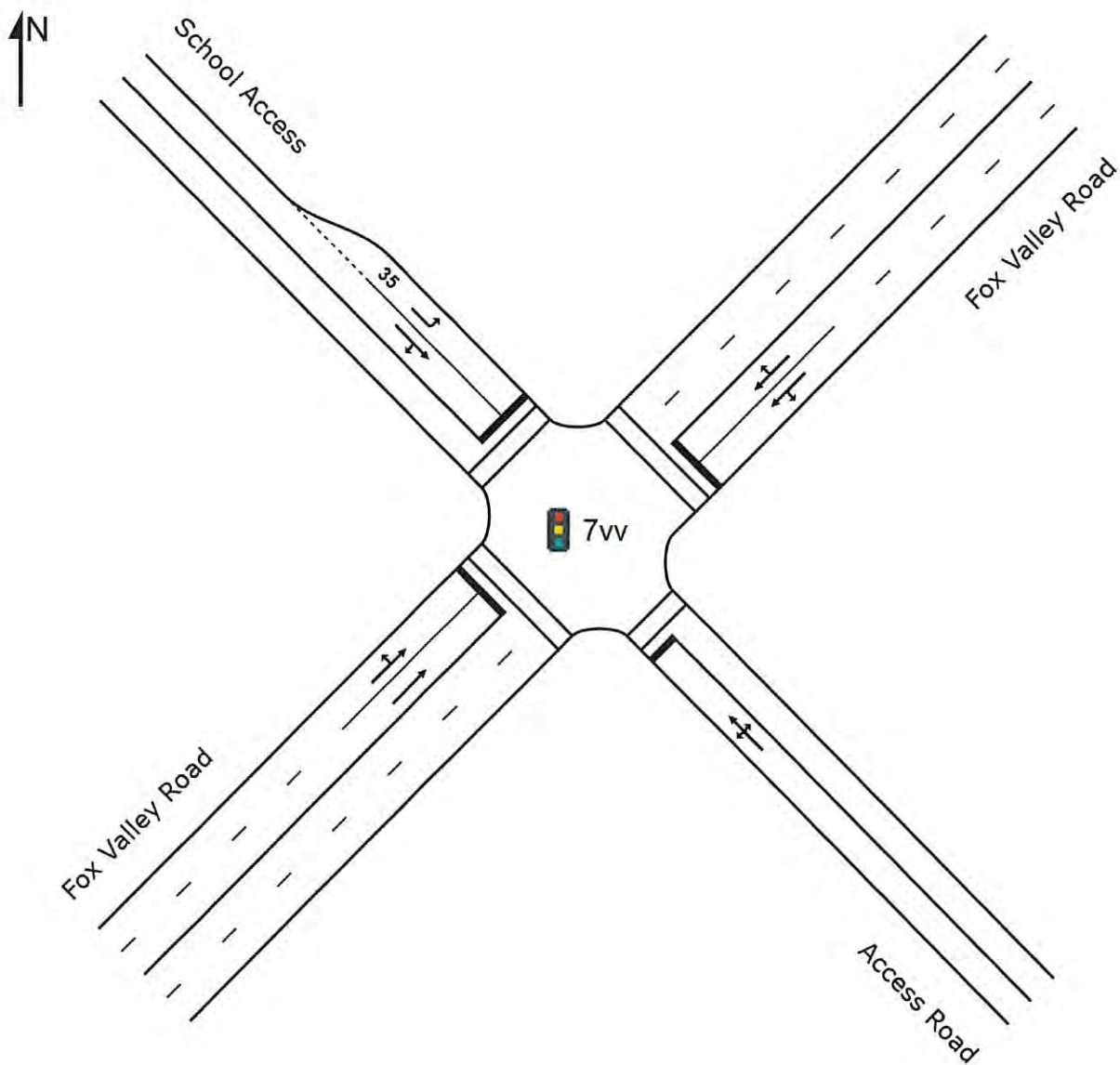
# SITE LAYOUT

 Site: 7vv [School Access Future TCS PM Peak]

School Access and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated



# MOVEMENT SUMMARY

 Site: 7vv [School Access Future TCS AM Peak]

School Access and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Access Road												
4	L2	18	0.0	0.156	46.9	LOS D	1.5	10.2	0.92	0.72	0.92	16.1
5	T1	2	0.0	0.156	43.0	LOS D	1.5	10.2	0.92	0.72	0.92	10.5
6	R2	13	0.0	0.156	46.8	LOS D	1.5	10.2	0.92	0.72	0.92	23.9
Approach		33	0.0	0.156	46.6	LOS D	1.5	10.2	0.92	0.72	0.92	19.2
NorthEast: Fox Valley Road												
7	L2	34	0.0	0.405	10.3	LOS A	10.2	71.1	0.39	0.37	0.39	48.7
8	T1	788	0.0	0.405	6.4	LOS A	10.2	71.1	0.45	0.44	0.45	51.2
9	R2	152	0.0	0.405	16.1	LOS B	10.1	70.6	0.60	0.61	0.60	41.6
Approach		974	0.0	0.405	8.1	LOS A	10.2	71.1	0.47	0.46	0.47	49.6
NorthWest: School Access												
10	L2	153	0.0	0.175	21.8	LOS B	4.2	29.7	0.61	0.73	0.61	35.9
11	T1	5	0.0	0.505	45.7	LOS D	4.9	34.0	0.98	0.79	0.98	9.7
12	R2	97	0.0	0.505	51.2	LOS D	4.9	34.0	0.98	0.79	0.98	16.8
Approach		255	0.0	0.505	33.5	LOS C	4.9	34.0	0.76	0.75	0.76	27.1
SouthWest: Fox Valley Road												
1	L2	119	0.0	0.480	28.8	LOS C	13.5	94.4	0.78	0.72	0.78	16.2
2	T1	642	0.0	0.480	23.2	LOS B	13.7	95.8	0.79	0.70	0.79	38.5
Approach		761	0.0	0.480	24.1	LOS B	13.7	95.8	0.79	0.70	0.79	34.6
All Vehicles		2022	0.0	0.505	17.9	LOS B	13.7	95.8	0.63	0.59	0.63	39.4

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

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

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate	
P2	SouthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	NorthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	NorthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P1	SouthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



# MOVEMENT SUMMARY

## Site: 7vv [School Access Future TCS PM Peak]

School Access and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Access Road												
4	L2	17	0.0	0.165	46.0	LOS D	1.6	11.4	0.92	0.73	0.92	16.3
5	T1	2	0.0	0.165	42.0	LOS C	1.6	11.4	0.92	0.73	0.92	10.7
6	R2	18	0.0	0.165	45.9	LOS D	1.6	11.4	0.92	0.73	0.92	24.1
Approach		37	0.0	0.165	45.7	LOS D	1.6	11.4	0.92	0.73	0.92	20.3
NorthEast: Fox Valley Road												
7	L2	39	0.0	0.325	10.2	LOS A	7.6	53.4	0.37	0.36	0.37	48.6
8	T1	541	0.0	0.325	5.7	LOS A	7.6	53.4	0.41	0.41	0.41	51.9
9	R2	123	0.0	0.325	15.0	LOS B	5.6	39.1	0.55	0.61	0.55	41.9
Approach		703	0.0	0.325	7.6	LOS A	7.6	53.4	0.43	0.44	0.43	50.0
NorthWest: School Access												
10	L2	123	0.0	0.195	30.6	LOS C	4.2	29.6	0.75	0.75	0.75	31.3
11	T1	2	0.0	0.417	44.1	LOS D	4.2	29.5	0.96	0.78	0.96	9.9
12	R2	88	0.0	0.417	49.6	LOS D	4.2	29.5	0.96	0.78	0.96	17.1
Approach		214	0.0	0.417	38.6	LOS C	4.2	29.6	0.83	0.76	0.83	25.0
SouthWest: Fox Valley Road												
1	L2	95	0.0	0.394	19.8	LOS B	11.5	80.8	0.63	0.60	0.63	18.5
2	T1	729	0.0	0.394	14.3	LOS A	11.7	81.7	0.63	0.57	0.63	44.6
Approach		824	0.0	0.394	14.9	LOS B	11.7	81.7	0.63	0.57	0.63	41.1
All Vehicles		1778	0.0	0.417	15.5	LOS B	11.7	81.7	0.58	0.55	0.58	41.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P2	SouthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	NorthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	NorthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P1	SouthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

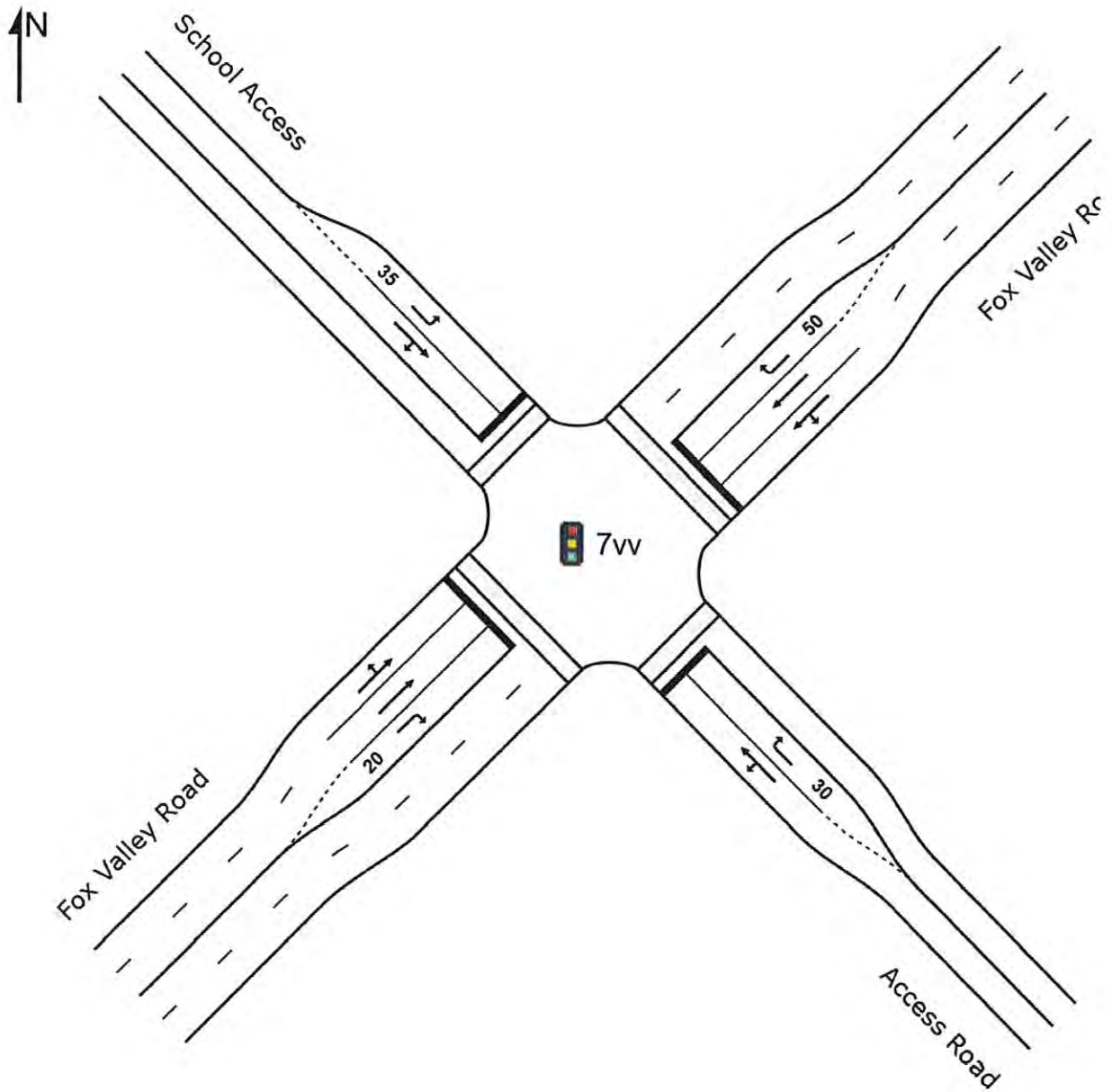
# SITE LAYOUT

 **Site: 7vv [School Access Future TCS - with RT Bay]**

School Access and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated



## MOVEMENT SUMMARY

### Site: 7vv [School Access Future TCS AM Peak - with RT Bay]

School Access and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Access Road												
4	L2	18	0.0	0.063	41.7	LOS C	0.8	5.8	0.87	0.69	0.87	17.5
5	T1	2	0.0	0.063	37.8	LOS C	0.8	5.8	0.87	0.69	0.87	11.7
6	R2	13	0.0	0.051	42.0	LOS C	0.5	3.7	0.86	0.68	0.86	25.5
Approach		33	0.0	0.063	41.6	LOS C	0.8	5.8	0.87	0.69	0.87	20.8
NorthEast: Fox Valley Road												
7	L2	34	0.0	0.298	11.2	LOS A	7.2	50.5	0.39	0.38	0.39	47.5
8	T1	788	0.0	0.298	5.6	LOS A	7.2	50.7	0.39	0.36	0.39	52.8
9	R2	152	0.0	0.280	17.5	LOS B	3.9	27.6	0.61	0.74	0.61	38.1
Approach		974	0.0	0.298	7.7	LOS A	7.2	50.7	0.43	0.42	0.43	50.1
NorthWest: School Access												
10	L2	153	0.0	0.228	29.5	LOS C	5.2	36.2	0.74	0.76	0.74	31.8
11	T1	5	0.0	0.395	41.1	LOS C	4.6	32.1	0.93	0.78	0.93	10.6
12	R2	97	0.0	0.395	46.7	LOS D	4.6	32.1	0.93	0.78	0.93	18.1
Approach		255	0.0	0.395	36.3	LOS C	5.2	36.2	0.82	0.77	0.82	26.1
SouthWest: Fox Valley Road												
1	L2	119	0.0	0.394	21.0	LOS B	11.5	80.2	0.65	0.63	0.65	18.1
2	T1	642	0.0	0.394	15.2	LOS B	11.5	80.2	0.64	0.58	0.64	43.7
3	R2	21	0.0	0.068	22.6	LOS B	0.6	4.2	0.59	0.69	0.59	24.9
Approach		782	0.0	0.394	16.3	LOS B	11.5	80.2	0.64	0.59	0.64	38.9
All Vehicles		2043	0.0	0.395	15.1	LOS B	11.5	80.2	0.56	0.53	0.56	41.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P2	SouthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	NorthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	NorthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P1	SouthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## MOVEMENT SUMMARY

### Site: 7vv [School Access Future TCS PM Peak - with RT Bay]

School Access and Fox Valley Road

Site Category: Wahroonga

Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Access Road												
4	L2	17	0.0	0.072	44.8	LOS D	0.8	5.7	0.90	0.69	0.90	16.7
5	T1	2	0.0	0.072	40.9	LOS C	0.8	5.7	0.90	0.69	0.90	11.0
6	R2	18	0.0	0.083	45.3	LOS D	0.8	5.5	0.90	0.70	0.90	24.4
Approach		37	0.0	0.083	44.8	LOS D	0.8	5.7	0.90	0.69	0.90	20.6
NorthEast: Fox Valley Road												
7	L2	39	0.0	0.202	9.7	LOS A	4.2	29.5	0.33	0.34	0.33	48.9
8	T1	541	0.0	0.202	4.2	LOS A	4.2	29.7	0.33	0.31	0.33	54.3
9	R2	123	0.0	0.229	15.6	LOS B	2.9	20.2	0.56	0.72	0.56	39.5
Approach		703	0.0	0.229	6.5	LOS A	4.2	29.7	0.37	0.38	0.37	51.1
NorthWest: School Access												
10	L2	123	0.0	0.201	31.4	LOS C	4.3	30.1	0.76	0.75	0.76	30.9
11	T1	2	0.0	0.417	44.1	LOS D	4.2	29.5	0.96	0.78	0.96	10.1
12	R2	88	0.0	0.417	49.6	LOS D	4.2	29.5	0.96	0.78	0.96	17.3
Approach		214	0.0	0.417	39.0	LOS C	4.3	30.1	0.84	0.76	0.84	24.9
SouthWest: Fox Valley Road												
1	L2	95	0.0	0.399	19.3	LOS B	11.7	82.2	0.62	0.59	0.62	18.6
2	T1	729	0.0	0.399	13.7	LOS A	11.7	82.2	0.61	0.56	0.61	45.0
3	R2	21	0.0	0.048	18.8	LOS B	0.5	3.6	0.52	0.67	0.52	27.3
Approach		845	0.0	0.399	14.4	LOS A	11.7	82.2	0.61	0.57	0.61	41.3
All Vehicles		1799	0.0	0.417	14.9	LOS B	11.7	82.2	0.55	0.52	0.55	41.7

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P2	SouthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P3	NorthEast Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P4	NorthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
P1	SouthWest Full Crossing	53	44.3	LOS E	0.1	0.1	0.94	0.94	
All Pedestrians		211	44.3	LOS E			0.94	0.94	

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

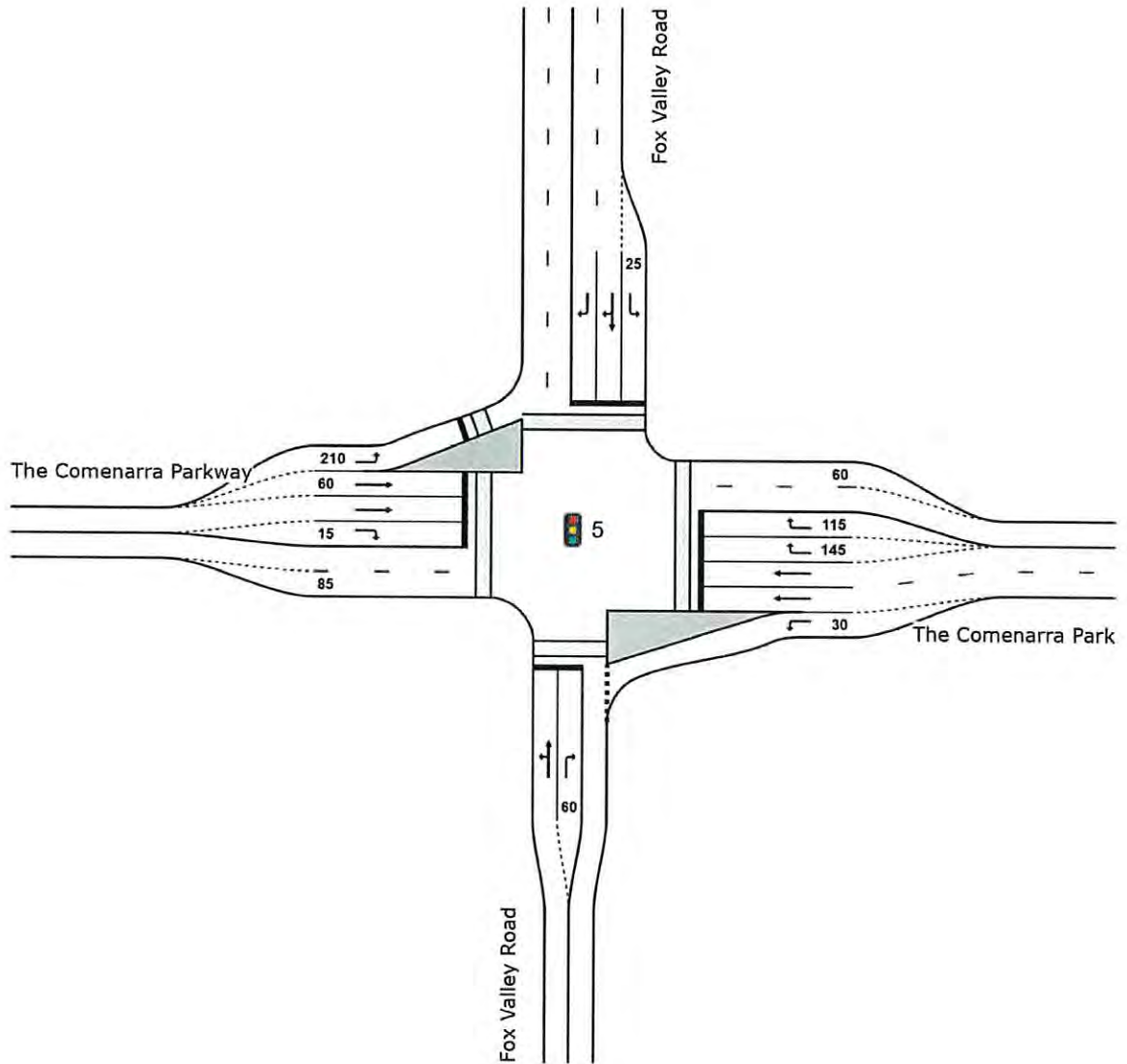
Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

# SITE LAYOUT

## Site: 5 [The Comenarra Pkwy Future]

The Comenarra Parkway and Fox Valley Road  
Site Category: Wairoonga  
Signals - Fixed Time Isolated



## MOVEMENT SUMMARY

### Site: 5 [The Comenarra Pkwy Future Layout & Volumes AM Peak]

The Comenarra Parkway and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Fox Valley Road												
1	L2	72	0.5	0.547	46.9	LOS D	6.5	45.3	0.98	0.83	1.17	28.7
2	T1	74	0.3	0.547	42.4	LOS C	6.5	45.3	0.98	0.83	1.17	21.3
3	R2	38	0.5	0.164	56.0	LOS D	2.0	14.2	0.93	0.72	0.93	26.2
Approach		183	0.4	0.547	47.0	LOS D	6.5	45.3	0.97	0.81	1.12	25.7
East: The Comenarra Parkway												
4	L2	96	0.5	0.068	5.1	LOS A	0.4	3.1	0.14	0.54	0.14	46.3
5	T1	318	2.0	0.331	31.4	LOS C	9.2	65.8	0.78	0.64	0.78	35.0
6	R2	284	1.5	0.442	32.3	LOS C	5.2	36.8	0.94	0.78	0.94	29.0
Approach		698	1.6	0.442	28.1	LOS B	9.2	65.8	0.76	0.68	0.76	34.0
North: Fox Valley Road												
7	L2	254	1.5	0.281	14.7	LOS B	5.1	36.4	0.63	0.72	0.63	37.3
8	T1	53	0.2	0.383	37.6	LOS C	6.7	47.6	0.84	0.73	0.84	22.6
9	R2	463	1.5	0.757	48.4	LOS D	20.6	146.3	0.95	0.85	0.99	24.3
Approach		769	1.4	0.757	36.5	LOS C	20.6	146.3	0.84	0.80	0.86	27.4
West: The Comenarra Parkway												
10	L2	567	1.5	0.686	20.7	LOS B	18.2	129.2	0.85	0.83	0.85	34.4
11	T1	373	2.0	0.814	52.8	LOS D	15.8	112.5	0.97	0.89	1.09	29.1
12	R2	22	0.5	0.079	38.2	LOS C	0.9	6.6	0.86	0.69	0.86	30.5
Approach		962	1.7	0.814	33.6	LOS C	18.2	129.2	0.90	0.85	0.94	31.4
All Vehicles		2613	1.5	0.814	33.9	LOS C	20.6	146.3	0.85	0.79	0.88	30.6

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Pedestrian	Back of Queue Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4B	West Slip/Bypass Lane Crossing	53	24.8	LOS C	0.1	0.1	0.90	0.90	
All Pedestrians		263	48.4	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## MOVEMENT SUMMARY

### Site: 5 [The Comenarra Pkwy Future Layout & Volumes PM Peak]

The Comenarra Parkway and Fox Valley Road

Site Category: Wairoonga

Signals - Fixed Time Isolated Cycle Time = 120 seconds (Site Optimum Cycle Time - Minimum Delay)

Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Fox Valley Road												
1	L2	37	0.5	0.363	46.6	LOS D	4.0	27.8	0.95	0.80	1.15	29.0
2	T1	57	0.3	0.363	42.0	LOS C	4.0	27.8	0.95	0.80	1.15	21.6
3	R2	44	0.5	0.191	56.2	LOS D	2.4	16.7	0.93	0.73	0.93	26.1
Approach		138	0.4	0.363	47.8	LOS D	4.0	27.8	0.95	0.78	1.08	25.5
East: The Comenarra Parkway												
4	L2	127	0.5	0.091	5.2	LOS A	0.7	4.7	0.15	0.54	0.15	46.2
5	T1	408	2.0	0.472	35.8	LOS C	13.0	92.5	0.84	0.71	0.84	33.6
6	R2	340	1.5	0.555	34.1	LOS C	6.6	46.7	0.97	0.80	0.97	28.3
Approach		876	1.6	0.555	30.7	LOS C	13.0	92.5	0.79	0.72	0.79	33.2
North: Fox Valley Road												
7	L2	194	1.5	0.207	13.6	LOS A	3.6	25.4	0.58	0.70	0.58	37.9
8	T1	77	0.3	0.366	35.2	LOS C	7.0	49.1	0.82	0.71	0.82	23.6
9	R2	465	1.5	0.723	45.0	LOS D	20.5	145.7	0.93	0.83	0.94	25.2
Approach		736	1.4	0.723	35.7	LOS C	20.5	145.7	0.83	0.79	0.83	27.6
West: The Comenarra Parkway												
10	L2	325	1.5	0.386	17.3	LOS B	8.3	59.0	0.70	0.75	0.70	36.3
11	T1	292	2.0	0.711	51.0	LOS D	11.6	82.6	0.96	0.81	1.01	29.5
12	R2	26	0.5	0.108	39.6	LOS C	1.1	8.0	0.90	0.70	0.90	30.1
Approach		643	1.7	0.711	33.5	LOS C	11.6	82.6	0.83	0.78	0.85	31.9
All Vehicles		2393	1.5	0.723	34.0	LOS C	20.5	145.7	0.82	0.76	0.84	30.8

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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

Movement Performance - Pedestrians									
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate	
P1	South Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95	
P4B	West Slip/Bypass Lane Crossing	53	24.4	LOS C	0.1	0.1	0.90	0.90	
All Pedestrians		263	48.3	LOS E			0.94	0.94	

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

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

## Appendix F

# Network Traffic Model 2017 – 2026





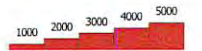


**CHANGE FROM  
2017 - 2026  
PM 2HRS**

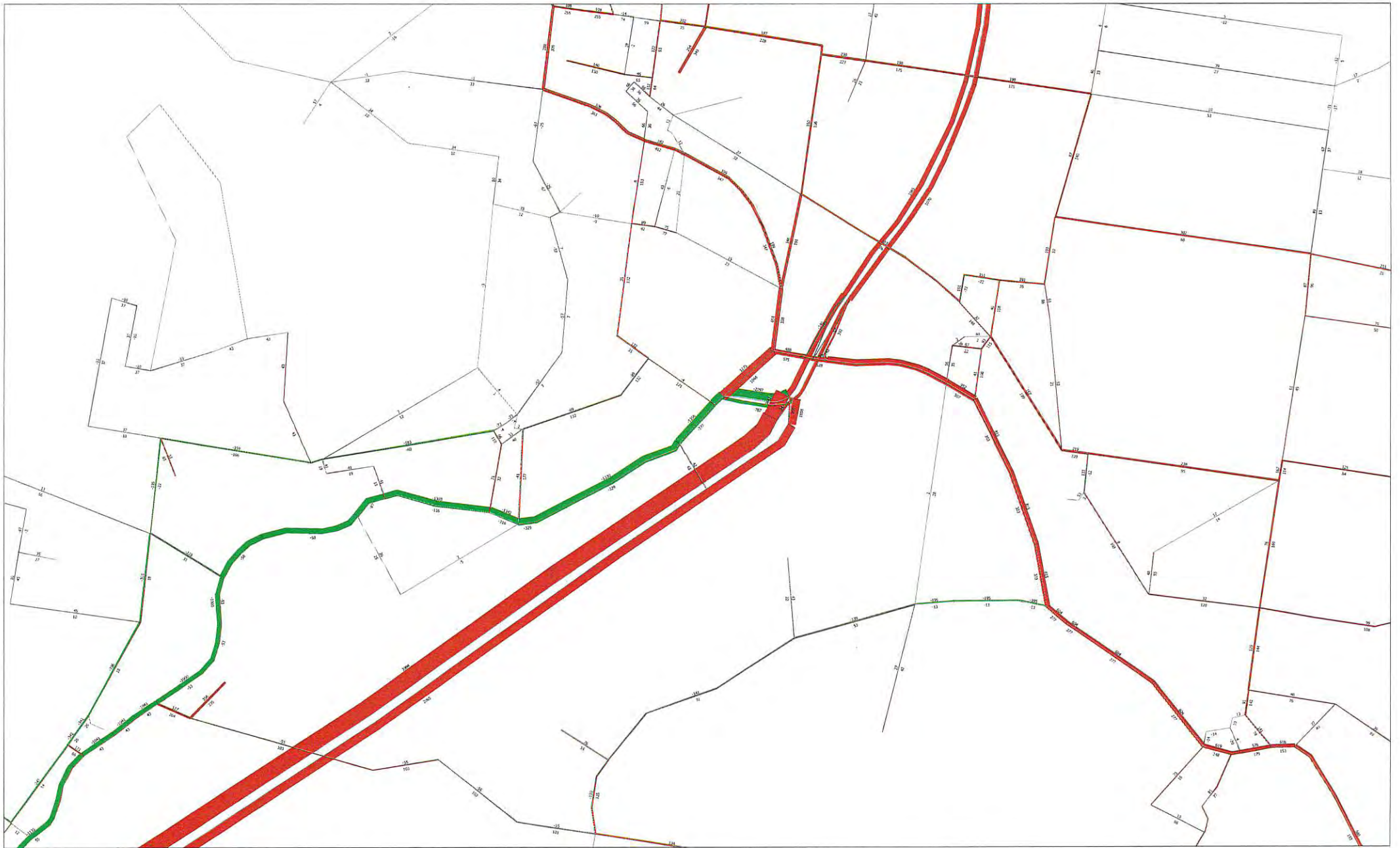
TRAFFIC VOLUME COMPARISON\_ [Scen. 2026 - 2017]



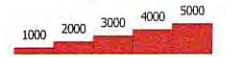
2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL  
Scenario 2026: 2026 SYDTRAFFICFORECASTMODELZ11LU16V151STMV362-7-9AM(mf34)  
2020-06-29 08:51 (Family)



TRAFFIC VOLUME COMPARISON\_ [Scen. 20260 - 20170]



2011TZ SYDNEY GMA STRATEGIC TRAFFIC FORECASTING MODEL  
Scenario 20260: 2026 SYDTRAFFICFORECASTMODELZ11LU16V151STMV362-4-6PM(mf54)  
2020-06-29 08:52 (Family)



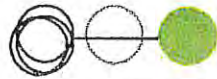
## Appendix G

# Extracts from RMS Schools, H.Den. Residential & Office Studies



Roads and Maritime Services  
Trip Generation Surveys  
Schools  
Analysis Report

transportation planning, design and delivery



GTA consultants

School Characteristics	7
School	Glenaeon Rudolf Steiner School
Region	Sydney
Suburb	Middle Cove
Street	5a Glenroy Avenue
Standard Student hours	9:00 - 15:20
Education Level	Years 3 - 12
Public/ Private	Independent
Students	300
Staff	60
Total Population	360
Staff/ Student	0.20
On-Site Car Parking Spaces	47
Accessibility Score	48
Accessibility Discount Factor	0.2
Before School Activities	N/A
After School Activities	Soccer until 17:30
<b>Surveys</b>	
Survey Day	Thursday
Survey Date	6/03/2014
AM Survey Period	7:30 - 9:30
PM Survey Period	14:30 - 17:00
5 Day Survey Period	N/A
5 Day Survey Dates	N/A
<b>Person Trips (All modes)</b>	
<b>AM Period</b>	
Peak Hour	8:00 - 9:00
Peak Hour Trips	323
Trips/ Student	1.08
Trips to Site %	0.93
Trips from Site %	0.07
<b>PM Period</b>	
Peak Hour	15:15 - 16:15
Peak Hour Trips	310
Trips/ Student	1.03
Trips to Site %	0.03
Trips from Site %	0.97
<b>Pedestrian Trips</b>	
<b>AM Period</b>	
Peak Hour	8:00 - 9:00
Peak Hour Trips	219
Trips/ Student	0.73
<b>PM Period</b>	
Peak Hour	15:00 - 16:00
Peak Hour Trips	258
Trips/ Student	0.86
<b>Vehicle Trips</b>	
<b>AM Period</b>	
Peak Hour	7:45 - 8:45
Peak Hour Trips	127
Vehicle Trips/ Student	0.42
Trips to Site %	0.59
Trips from Site %	0.41
<b>PM Period</b>	
Peak Hour	15:30 - 16:30
Peak Hour Trips	61
Vehicle Trips/ Student	0.20
Trips to Site %	0.38
Trips from Site %	0.62



CLIENTS | PEOPLE | PERFORMANCE

# **NSW Roads and Maritime Services**

## **Report for High Density Residential Trip Generation Surveys**

**Data Report**

**September 2012**



Figure 18 - Site 2 Vehicle Trip Generation (Weekday)

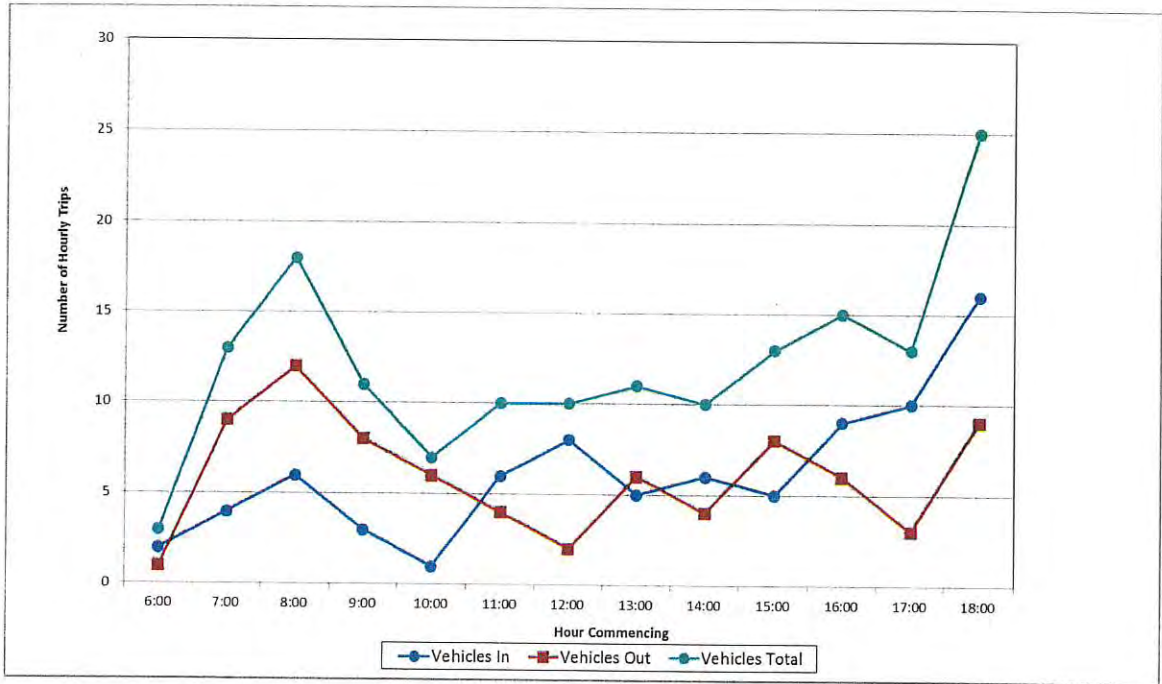


Figure 19 - Site 2 Person Trip Generation (Weekday)

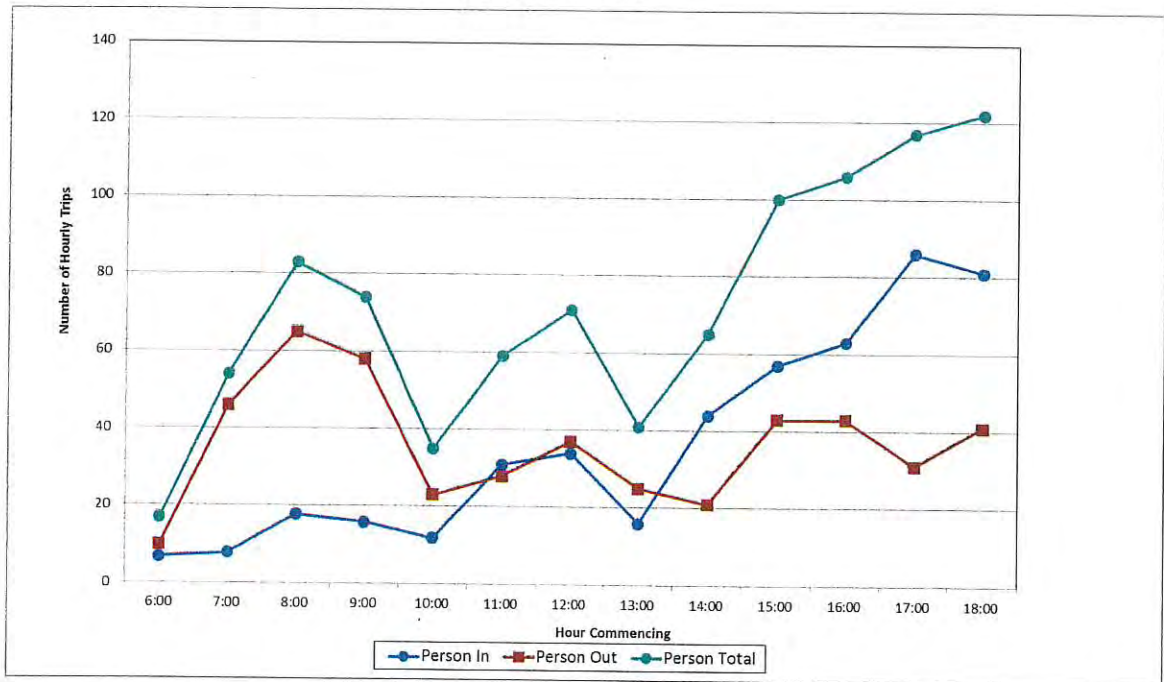


Figure 34 - Site 5 Vehicle Trip Generation (Weekday)

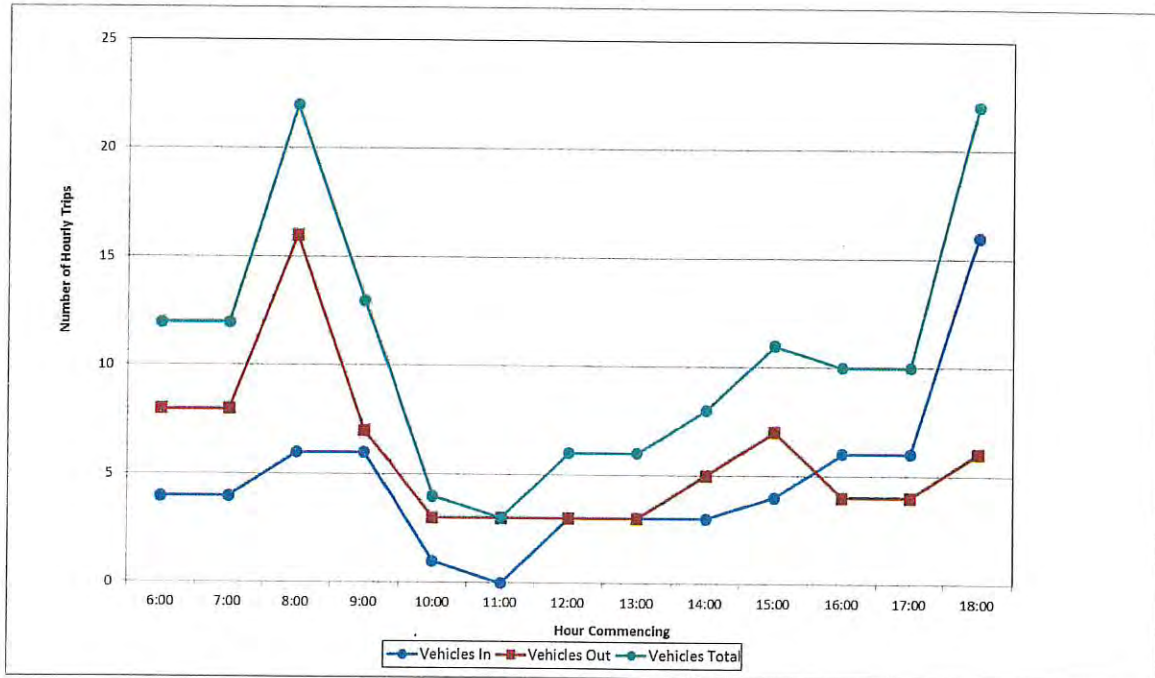


Figure 35 - Site 5 Person Trip Generation (Weekday)

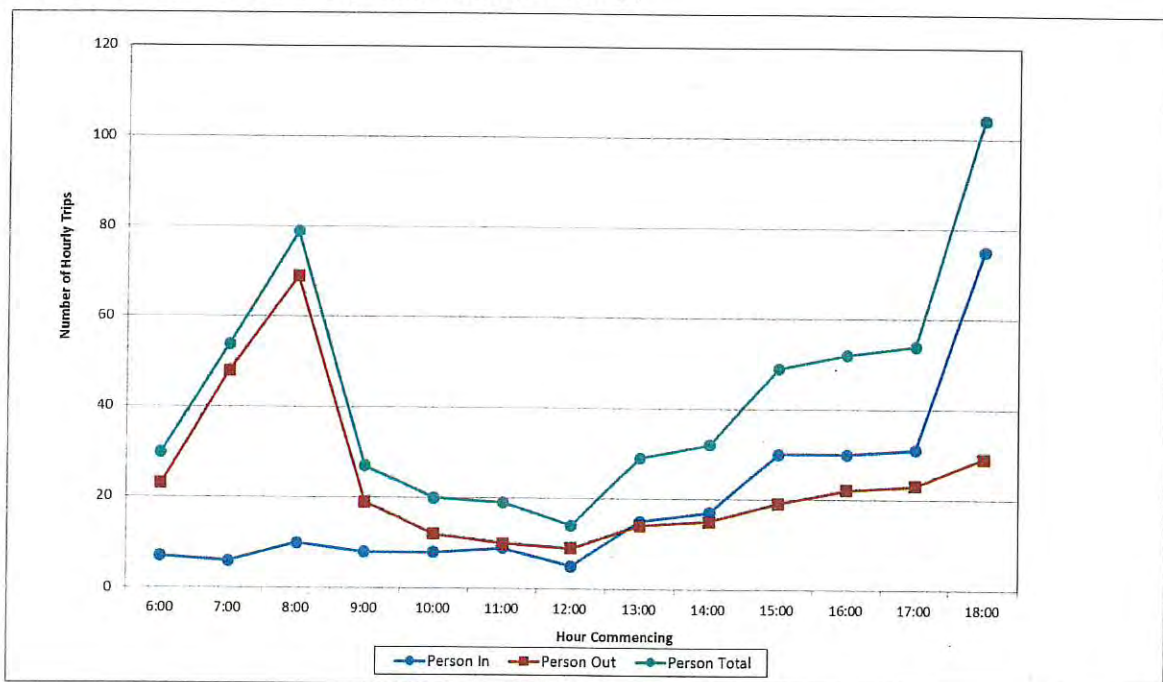


Figure 38 - Site 6 Vehicle Trip Generation (Weekday)

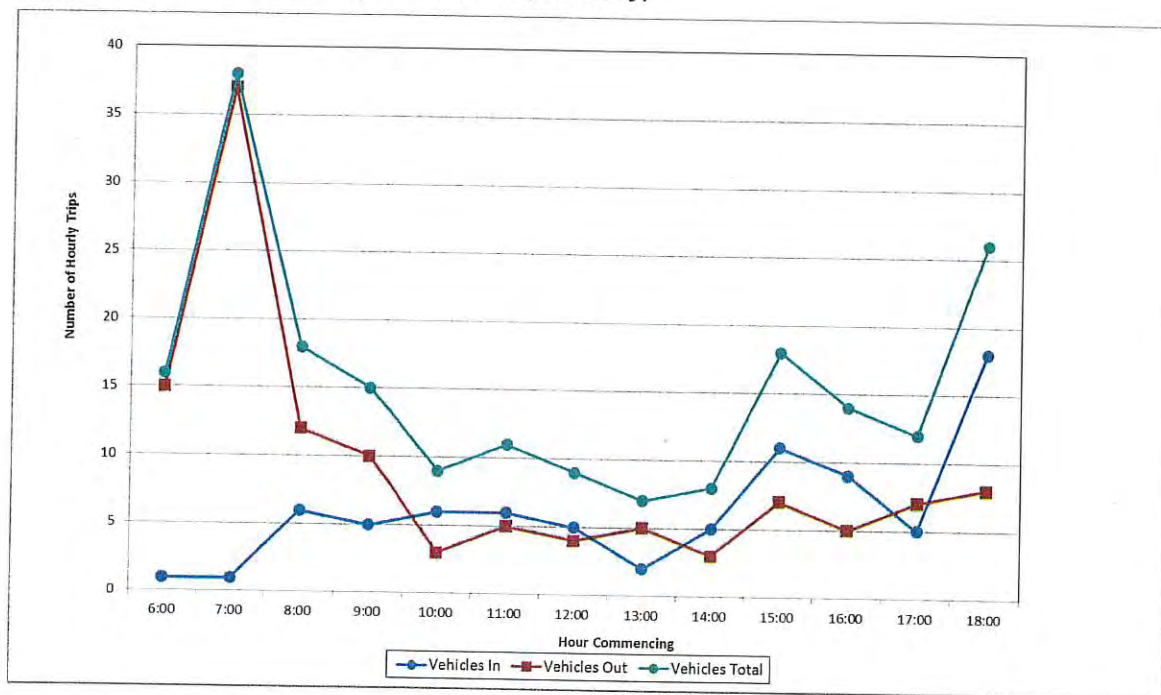
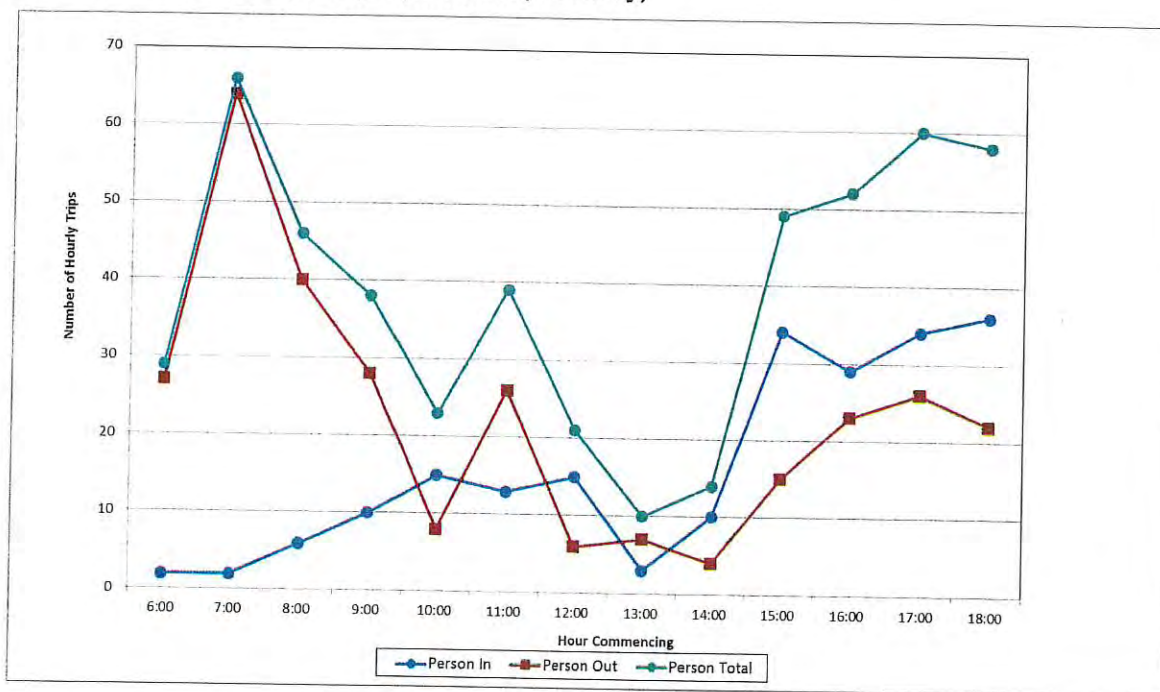
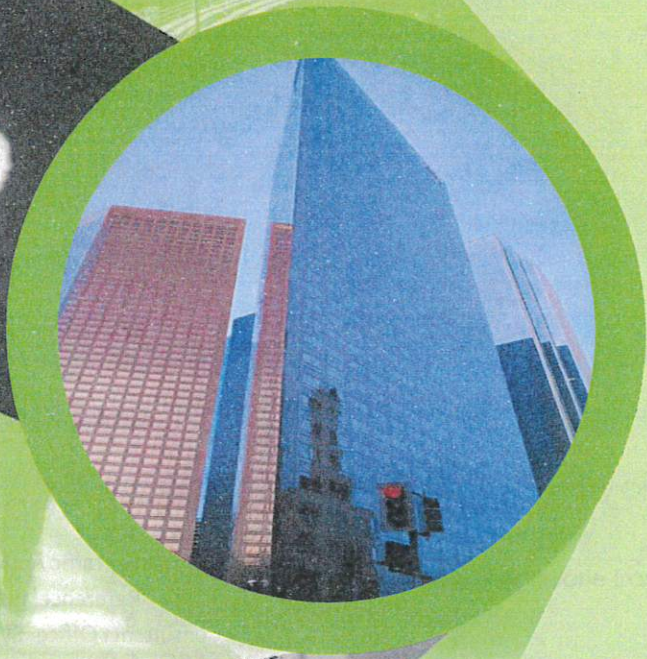
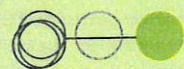


Figure 39 - Site 6 Person Trip Generation (Weekday)





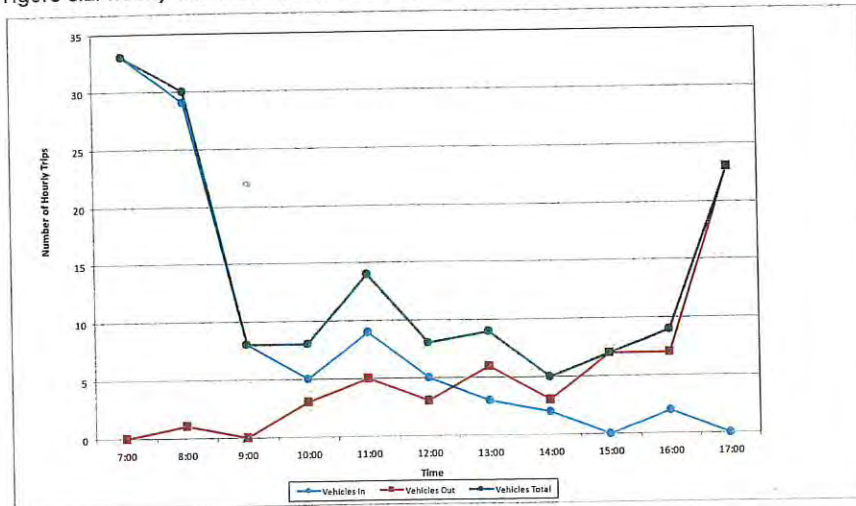
Roads and Traffic Authority  
Trip Generation and Parking  
Generation Surveys (Office  
Blocks)  
Data Report



GTAconsultants

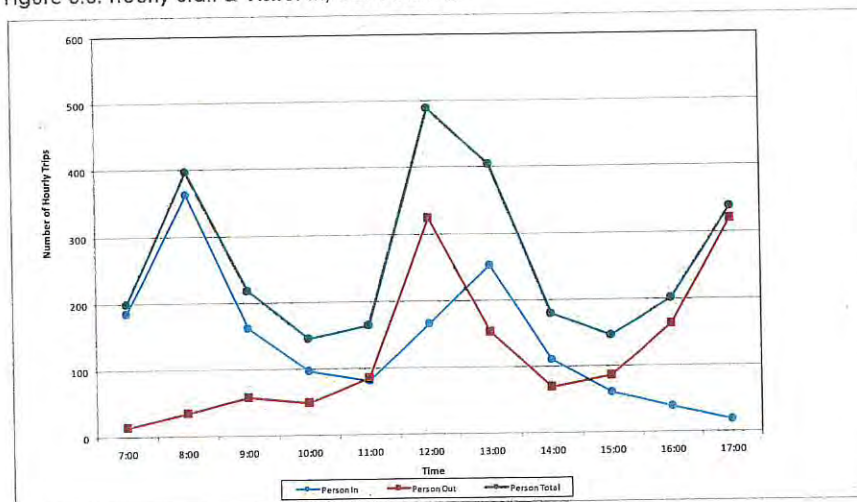
### 3.2.2 Car Parking Survey Results

Figure 3.2: Hourly Car Park In/Out Volumes



### 3.2.3 Pedestrian Survey Results

Figure 3.3: Hourly Staff & Visitor In/Out Volumes



### 3.2.4 Pedestrian Questionnaire/Interview Survey Results

There were a total of 52 respondents for this site.

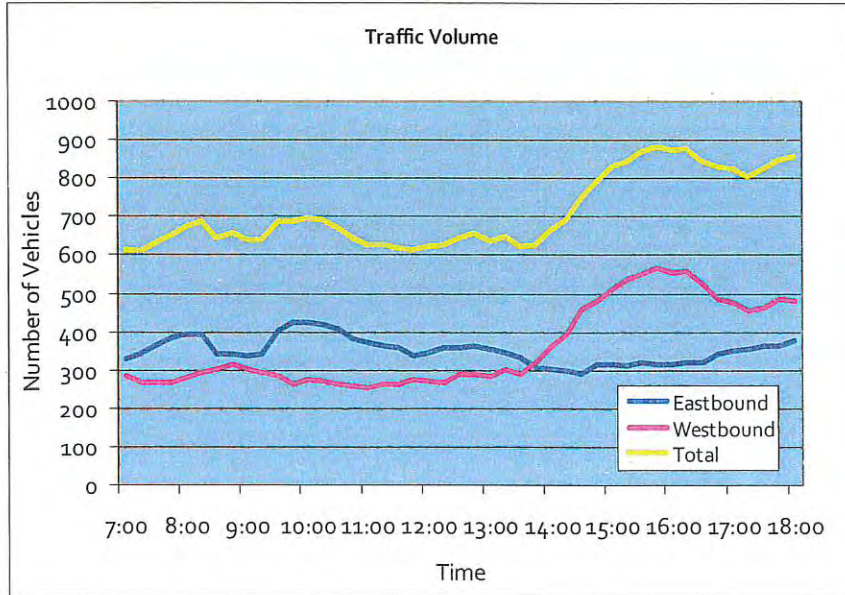
Origin Post Code Data

The average distance for the 52 respondents working or visiting this site was approximately 14km.

### 3.3 OB2 – 9 Help Street, Chatswood

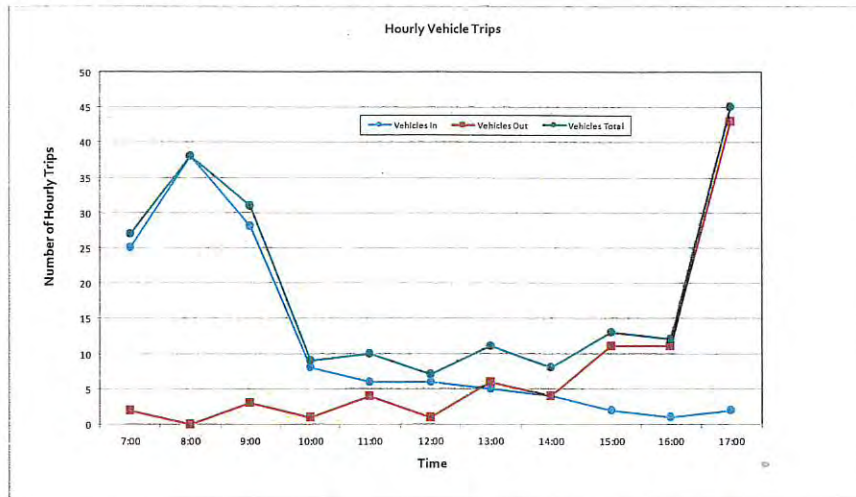
#### 3.3.1 Traffic Survey Results

Figure 3.12: Hourly Traffic Volumes



#### 3.3.2 Off Street Car Parking (In/Out) Survey Results

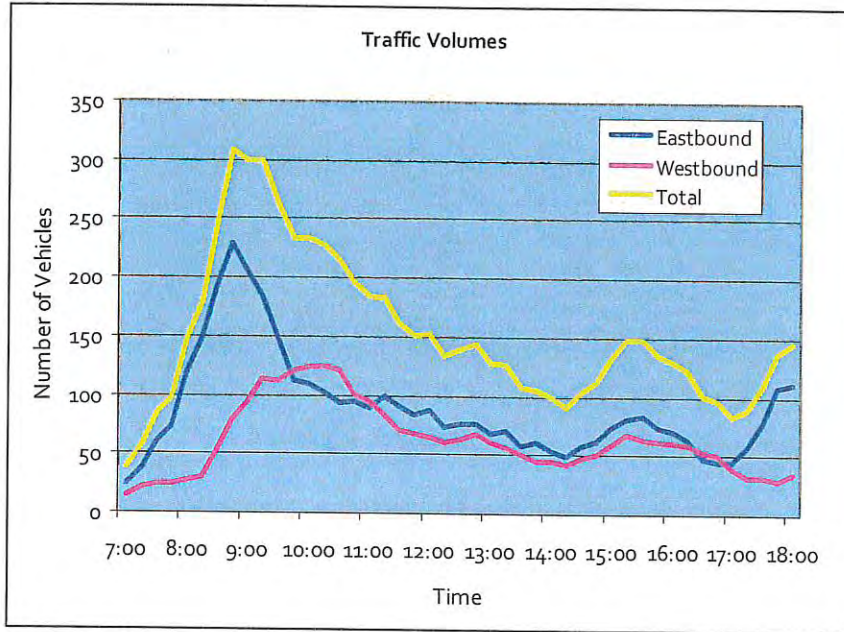
Figure 3.13: Hourly Car Park In/Out Volumes



### 3.5 OB4 – 33 Macmahon Street, Hurstville

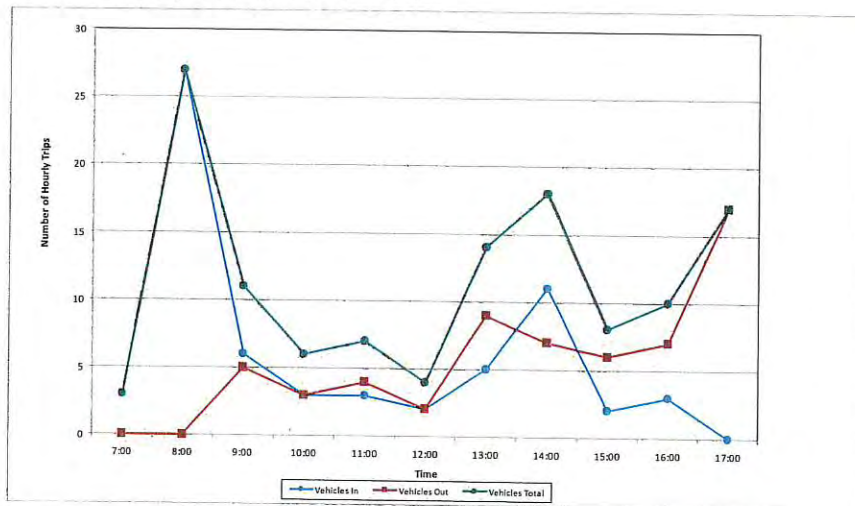
#### 3.5.1 Traffic Survey Results

Figure 3.25: Hourly Traffic Volumes



#### 3.5.2 Car Parking Survey Results

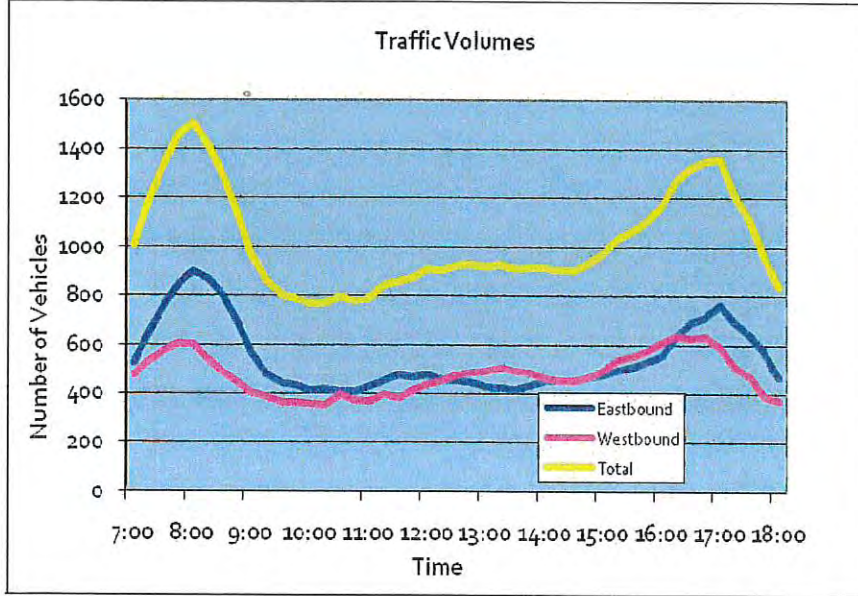
Figure 3.26: Hourly Car Park In /Out Volumes



### 3.10 OB9 – 22 Honeysuckle Drive, Newcastle

#### 3.10.1 Traffic Survey Results

Figure 3.80: Hourly Traffic Volumes



#### 3.10.2 Car Parking Survey Results

Figure 3.81: Hourly Car Park In/Out Volumes

