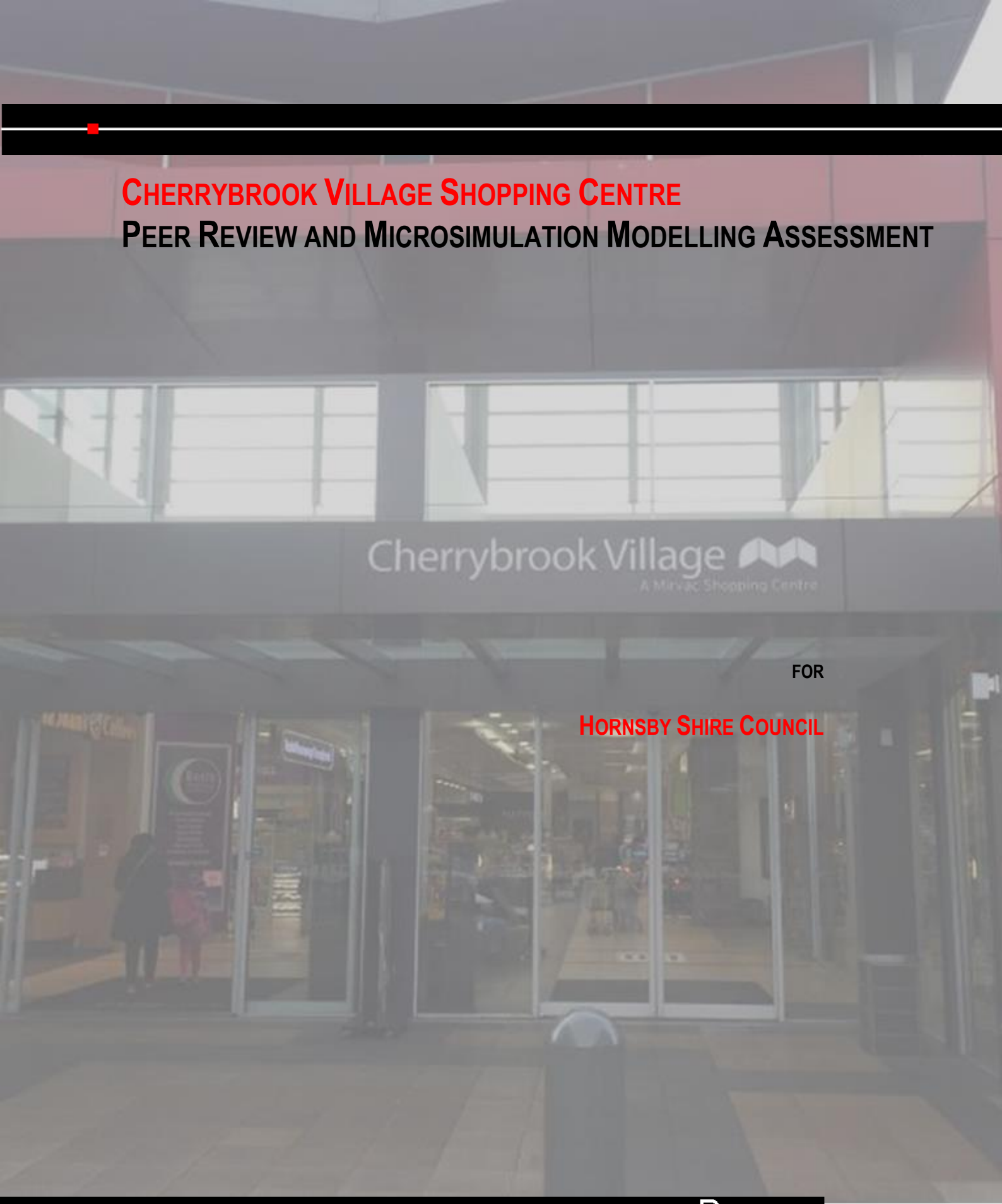
CHERRYBROOK VILLAGE SHOPPING CENTRE

PEER REVIEW AND MICROSIMULATION MODELLING ASSESSMENT



FOR

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CONTENTS

Tables

Figures

Appendices

1. INTRODUCTION

Bitzios Consulting was engaged by Hornsby Shire Council to undertake an independent assessment of the traffic reports submitted as part of the development proposal for reconfiguration and expansion of existing car parking facilities at Cherrybrook Village Shopping Centre. The peer review is expected to take into account the proposed development and the vehicular and pedestrian access requirements of the development site.

As part of the peer review, an existing condition VISSIM micro-simulation traffic model was developed for a section of Shepherds Drive to undertake traffic assessment of the impact of the proposed alterations and additions to the existing shopping centre, Cherrybrook Shopping Village, on the broader road network. The base model represents the existing traffic movements during a typical Thursday evening and a typical Saturday mid-day peak periods. The base model is deemed suitable for creating future year models to assess traffic performance in the study area in accordance with future traffic background growth and projected development trip generation.

The site location is shown below in Figure 1.1.

Figure 1.1: Site Location

1.1 PROJECT OBJECTIVES

The purpose of this project is to make alterations and additions to the existing shopping centre, Cherrybrook Shopping Village, extension to the car park and addition of a lower ground level car park with construction works being undertaken in two stages. The proposed development would accommodate a total of 623 car spaces. A new access is proposed to be introduced between the intersection of Shepherds Drive/Kenburn Avenue and Shepherds Drive/Macquarie Drive with left-in / left-out and right-in turning movements to reduce the traffic congestion at Shepherds Drive / Kenburn Avenue roundabout and to provide access to lower ground level car park.

1.2 STUDY OBJECTIVES

The purpose of this study is to develop a VISSIM microsimulation model to assess the impacts (if any) of the proposed alterations to the shopping centre and introduction of the new access on the surrounding road network performance.

Further, Bitzios Consulting will peer review the SIDRA model and associated report previously prepared by Colston Budd Rogers & Kafes Pty Ltd (CBRK) on behalf of Mirvac Asset Management to verify validity of

traffic generation, distribution and other relevant SIDRA modelling assumptions which may impact the current modelling study. VISSIM traffic models were developed for the following scenarios:

- The Existing 2017 Base Model;
- Future Base Case 2027 Model with No Development;
- Future Scenario 1: Future Base Case 2027 with Development (50/50 Split Trip Distribution from East/West);
- Future Scenario 2: Future Base Case 2027 with Development (20/80 Split Trip Distribution from East/West);
- Future Scenario 3: Future Base Case 2027 with Development (20/80 Split Trip Distribution from East/West and Shepherds Drive / Kenburn Avenue Signalised).

1.3 REPORT STRUCTURE

- **Chapter 1 – *Introduction* -** This chapter contains project background and objectives, study purpose and report structure;
- **Chapter 2 – *Existing Traffic Conditions* –** Provides the context of existing traffic conditions within the study area, overview of the base model coding, model calibration and validation outcomes;
- **Chapter 3 – *Existing Conditions Traffic Modelling* –** Provides a summary of the development of a calibrated and validated traffic model for the study area;
- **Chapter 4 – *Existing 2017 Network Performance* –** Includes a summary of the existing traffic performance within the study area and peer review of traffic study and corresponding SIDRA models undertaken by CBRK previously;
- **Chapter 5 – *Future 2027 Do Minimum Network Performance* –** Provides an overview of future 2027 base case year traffic performance;
- **Chapter 6 – Proposed Development and SIDRA Model Review**
- **Chapter 7 – *Future Scenario Assessment* –** Includes assessment summary of the two scenarios with new developments trip generation and 2027 traffic conditions; and
- ***Chapter 8 – Signal Warrant Assessm*ent**
- ***Chapter 9 – Option Assessment***
- **Chapter 8 – *Summary and Conclusion* –** Summarises the key modelling outcomes and findings from this study.

2. EXISTING TRAFFIC CONDITIONS

2.1 SHEPHERDS DRIVE

The section of Shepherds Drive under investigation extends between Kenburn Avenue in the west and Macquarie Drive in the East. Shepherds Drive is a local collector road between New Line Road to the south and Purchase Road to the north and is located within Hornsby Shire Council LGA. The section of Shepherds Drive is subject to 50 km/h speed limit. All the side roads within the study area are subject to 50km/h speed limit. The study area does not include any school zones.

2.2 MAJOR INTERSECTIONS ALONG THE CORRIDOR

Withing the section of Shepherds Drive assessed the key intersections are as follows:

- Shepherds Drive / Kenburn Avenue; and
- Shepherds Drive / Macquarie Avenue.

A description of the layout and existing key intersections of each intersection is provided in Table 2.1.

Table 2.1: Road Environment by Intersection

Section		Description	Intersection Layout
Shepherds Drive	Kenburn Avenue	This is a roundabout intersection, where Shepherds Drive provides two through lanes at the western approach to the roundabout with a dedicated left turn giving access to the shopping centre. Shepherds Drive eastern approach and Kenburn Avenue provide one through lane at each direction. Shopping Centre access provides one short left turn slip lane onto Shepherds Drive east and one through lane. Kerb side parking is permitted on all approaches and exist of the roundabout. Traffic congestion was observed during the AM peak along Shepherds Drive Eastbound during the Thursday PM Peak and Weekend Peak. No significant traffic congestion reported along the other approaches in the existing traffic conditions.	

Section		Description	Intersection Layout
	Macquarie Drive	This is a roundabout intersection, where Shepherds Drive and Macquarie Drive both provide one through lane at the approaches to the roundabout. Kerbside parking is permitted on all approaches to the roundabout except for the Shepherds Drive west approach to the roundabout, No significant queues or delays have been noted in the existing traffic conditions during Thursday PM and S	

2.3 TRAFFIC VOLUMES AND PATTERNS

2.3.1 Intersection Counts

Traffic and pedestrian counts were collected within the study area at the following intersections:

- Shepherds Drive / Kenburn Avenue; and
- Shepherds Drive / Macquarie Avenue.

The weekday PM peak and Saturday peak traffic data was collected at the following times:

- Thursday 20th July evening: Between 3:00pm and 6:00pm; and
- Saturday 22nd July mid-day: Between 9:30am and 1:30pm.

Output time interval for each of these data was 15 minutes, which included following road user classes:

Surveyed data was presented in 15-minute intervals to assist data analysis and accurate traffic modelling. The following road users were included in the survey:

- cars,
- trucks; and
- pedestrians.

The traffic counts for existing PM and Saturday peaks are shown in Figure 2.1 and Figure 2.2 respectively. The peaks were observed to be:

- Weekday PM: 5:00pm and 6:00pm; and
- Saturday: 11:15am and 12:15pm.

Complete Stick Diagrams for all modelled periods are shown in **Appendix A**.

Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 20/07/17

PM Peak (17:00-18:00)

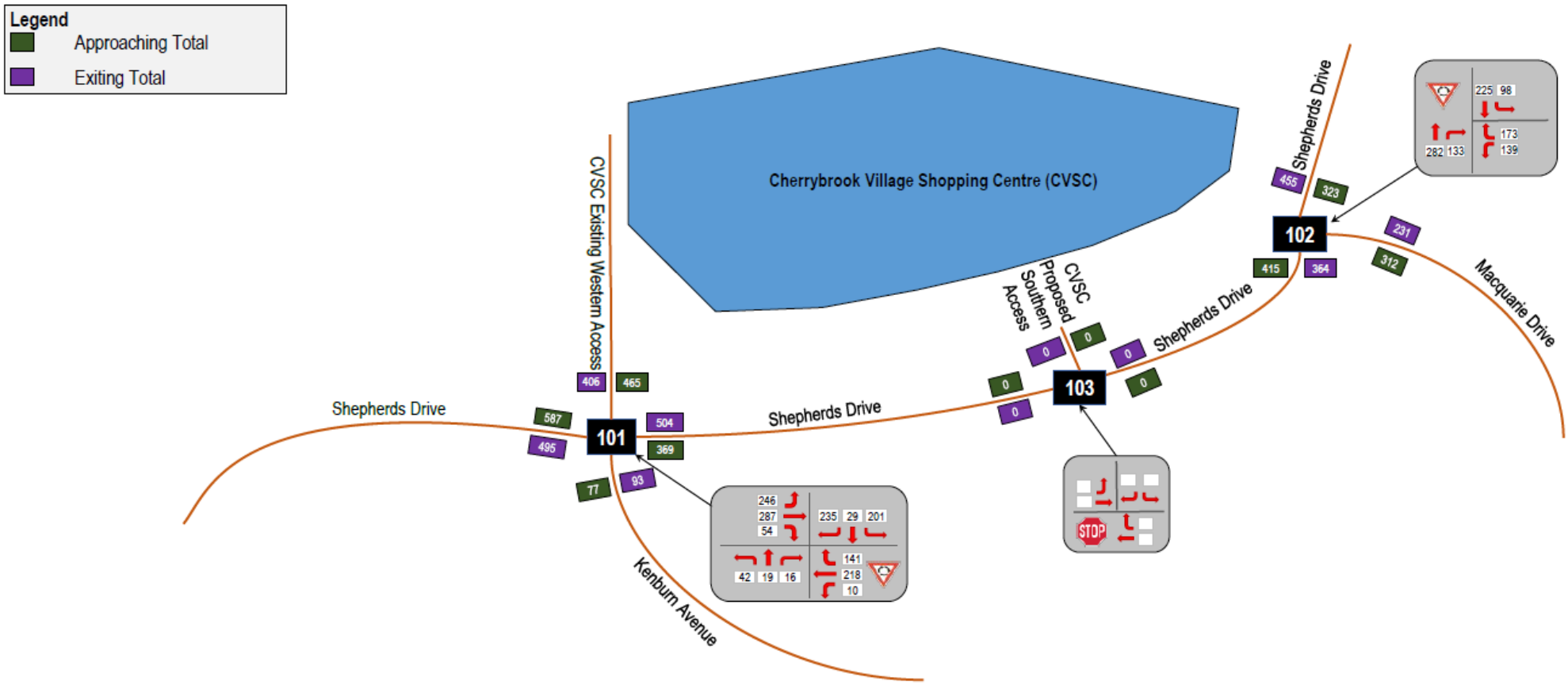


Figure 2.1: Existing PM Flow Stick Diagram

Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 22/07/17

Saturday Peak (11:15-12:15)

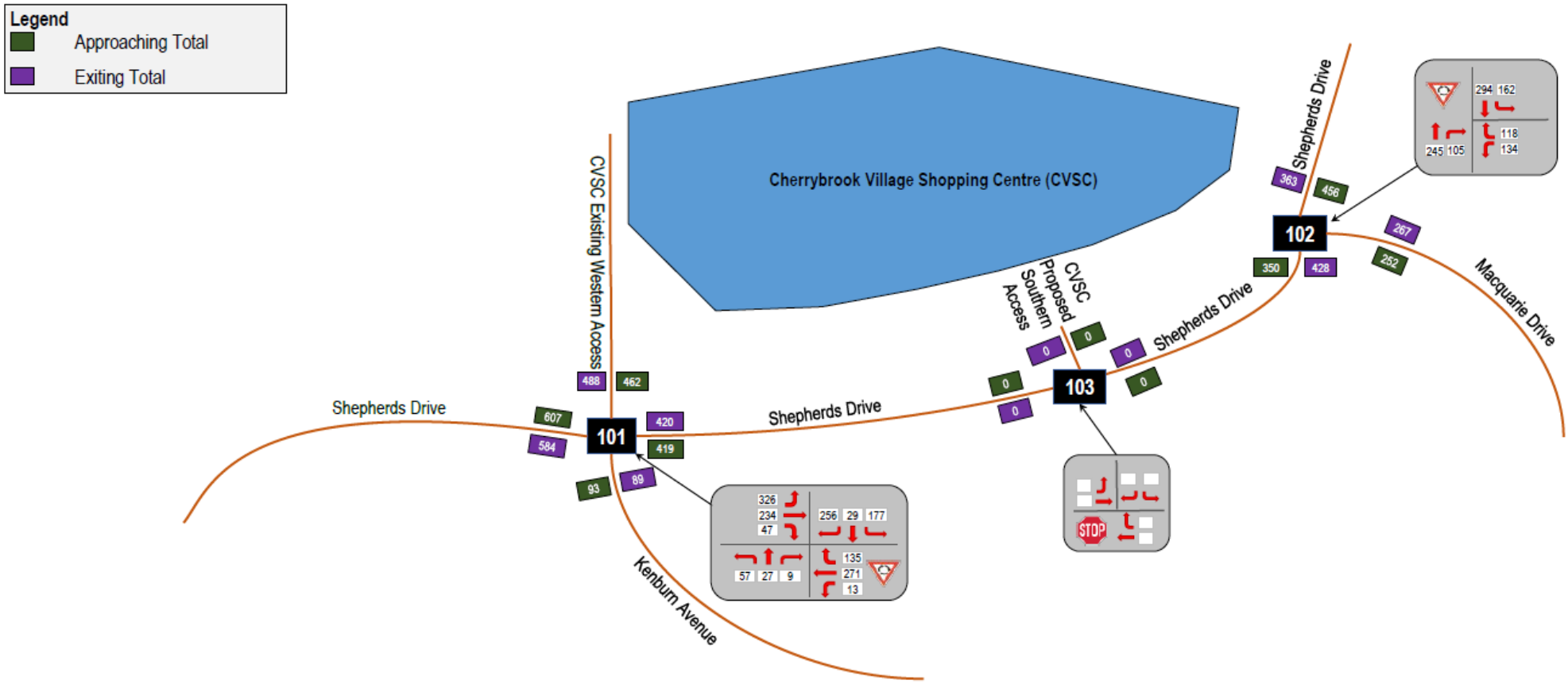


Figure 2.2: Existing Saturday Flow Stick Diagram

2.3.2 Travel Time

The study area for the travel time survey was extended to the west up to New Line Road. The route was separated into two eastbound and two westbound sub-sections in order to verify localised delays at various locations. The eastbound and westbound routes are shown in Figure 2.3.

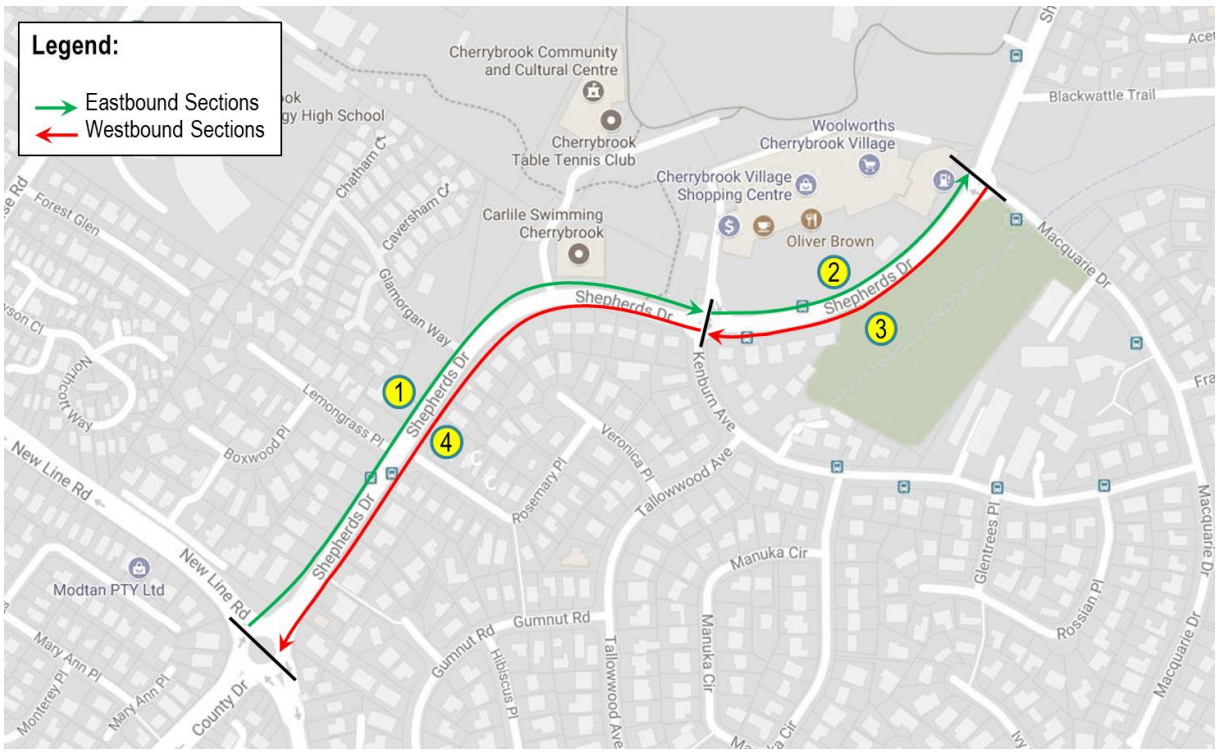


Figure 2.3: Travel Time Survey Routes and Sub-sections

Travel time surveys were carried out during the same time periods as that of intersection count surveys, which are:

- Thursday 20th July evening: Between 3:00pm and 6:00pm; and
- Saturday 22nd July mid-day: Between 9:30am and 1:30pm

3. EXISTING CONDITION TRAFFIC MODELLING

3.1 BASE MODEL CALIBRATION AND VALIDATION

3.1.1 Layout and Modelled Periods

The microsimulation traffic modelling software VISSIM was used to develop a microsimulation model for the study area, as shown in Figure 3.1.

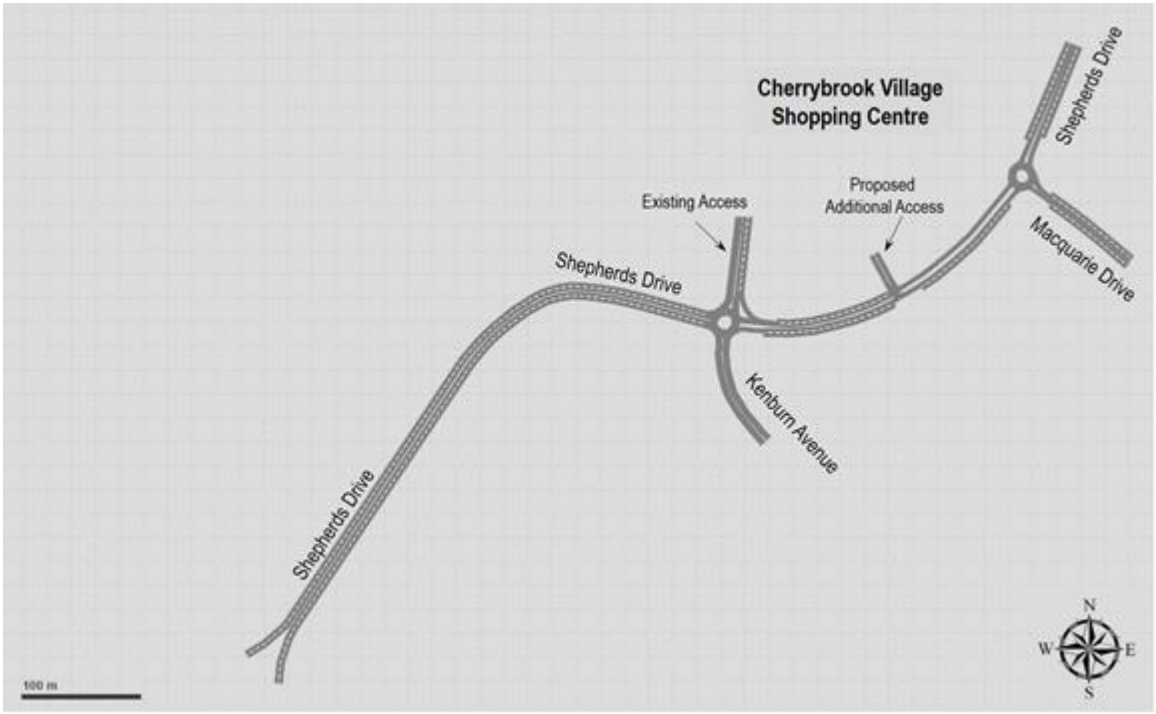


Figure 3.1: Layout of the Modelled Area

The model was calibrated and validated according to the RMS Traffic Modelling Guidelines, February 2013. The model has been set up to include a 15-minutes warm-up period, a 3/4-hour evaluation period and a 15-minutes cool-down period, for both peak periods. These are summarised in Table 3.1.

Table 3.1: Modelled AM and PM Peak Periods

Peak Periods	Warm Up	Peak Period	Cool Down
PM	14:45 – 15:00	15:00 – 16:00	18:00 – 18:15
		16:00 – 17:00	
		17:00 – 18:00	
SAT	09:15 – 09:30	09:30 – 10:30	13:30 – 13:45
		10:30 – 11:30	
		11:30 – 12:30	
		12:30 – 13:30	

3.2 INPUT DATA

A wide variety of data sets were used to build, calibrate and validate the models. These included:

- intersection turn counts by vehicles class;
- travel time surveys;
- aerial photography; and
- site observations.

3.3 BASE MODEL CODING

The VISSIM model network was developed using VISSIM version 9 software. The network was coded using the layout observed in the latest available aerials and was validated with the range of collected datasets. The "Links" in the model represent homogeneous sections of the road layout including parameters such as posted speed, reduced speed areas, conflict points etc. and were used to replicate the existing traffic operation in the model as shown in **Figure 3.1**.

Generally, VISSIM default parameters were adopted in both the PM and weekend peak models. Some of the key features of the model coding that should be noted are:

- movements within intersections and approaching zebra crossings are controlled by "Priority Rules" to provide appropriate give-way behaviours;
- vehicle inputs release all vehicles into the model are consistent with the posted speed along the relevant road. Where a posted speed limit was not observed a speed of 50 km/h was applied to vehicles on this road; and
- reduced speed areas are included in to more accurately reflect vehicle behaviour when approaching stop lines and completing certain manoeuvres.

The following aspects of the model development are more thoroughly explained below:

- Public Transport Services;
- Bus Dwell Times;
- Zone System;
- Demand Profiling; and
- Traffic Composition.

3.3.1 Public Transport Services

Updated data for public transport services within the study area were obtained from the Transport NSW government website and this data was utilised within the model. Bus routes were coded into the network as "Static Routes" as the path of these buses are predetermined long the corridor. The frequency of these buses is determined based on their actual arrival time at specific points of entry into the model area.

Table 3.2 below details the Bus services within the study area, Figure 3.2 displays these routes graphically.

Table 3.2: Bus Services within Study Area

Route Number	Route Direction	Service / Limitations	Route Reference in Figure 3.2
600	Parramatta to Castle Hill	Operates Weekdays on this route (different route on Saturday)	ab
	Castle Hill to Parramatta	Operates Weekdays on this route, outside PM Peak (different route on Saturday)	ba
620X	Dural to City Wynyard via Cherrybrook	Weekdays only	ab
	City Wynyard to Dural via Cherrybrook	Weekdays only	ba
621	Castle Hill to City Wynyard via Cherrybrook	Operates everyday	ab
	City Wynyard to Castle Hill via Cherrybrook	Operates everyday	ba
622	Dural to Milsons Point via Cherrybrook	Weekdays AM peak only	ab
	Milsons Point to Dural via Cherrybrook	Weekdays PM peak only	ba
M60	Parramatta to Hornsby	Operates everyday	db
	Hornsby to Parramatta	Operates everyday	bd
626	Dural to Pennant Hills via Cherrybrook	Weekdays only	ac
	Pennant Hills to Dural via Cherrybrook	Weekdays Only	ca

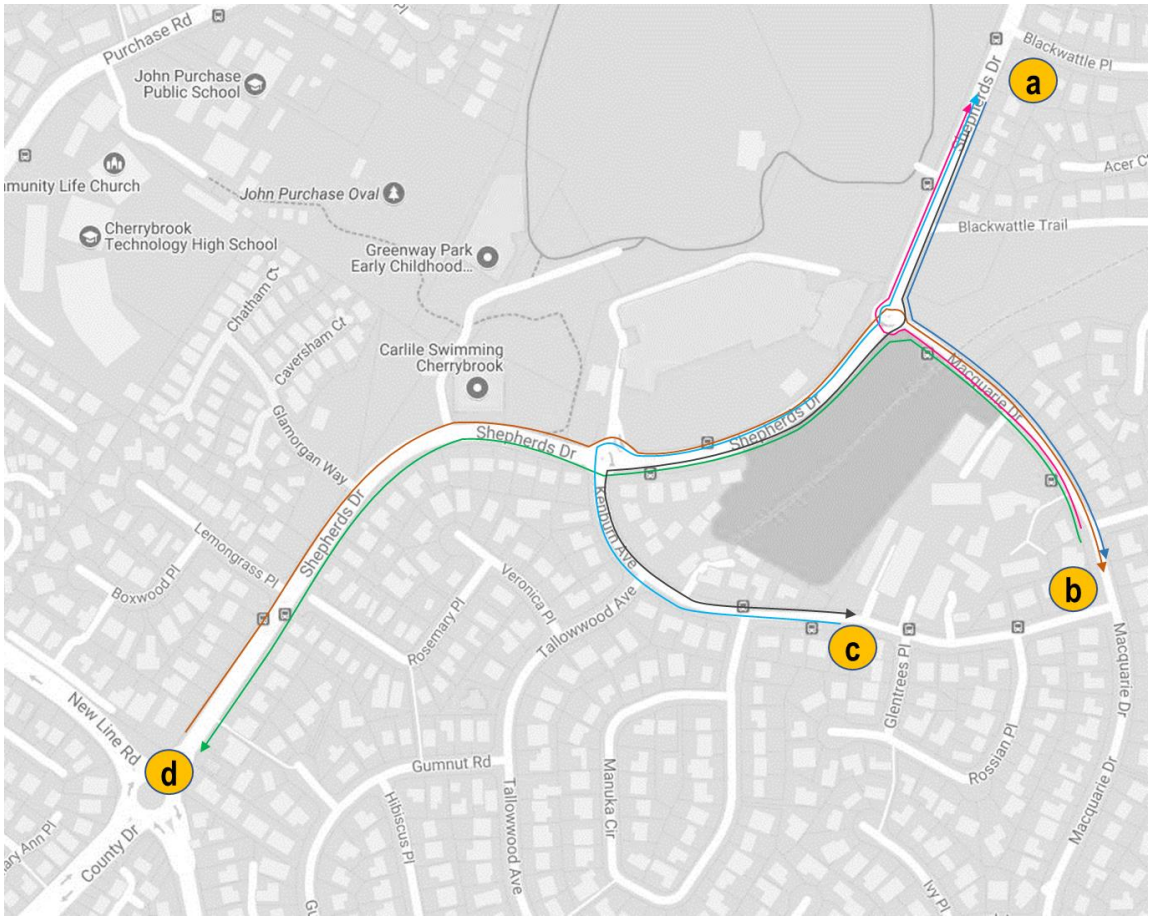


Figure 3.2: Bus Service Routes and Stops

Bus stops in the model are required to demonstrate the impact on general traffic of buses stopping and starting. On-street bus stops are present along Macquarie Drive, Shepherds Drive and Kenburn Avenue, and have been coded accordingly in the VISSIM model. Figure 3.3 presents a 3D model screenshot of a bus operating in a bus stop along Macquarie Drive within the model, near Shepherds Drive / Macquarie Drive roundabout.

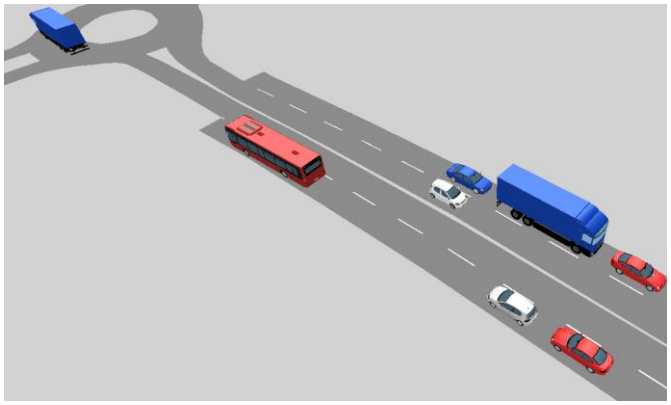


Figure 3.3: Bus Operating on Macquarie Drive

The bus stops within the study area are summarised in Table 3.3 and Table 3.4.

Table 3.3 List of Northbound Bus Stops

TSN	Description of Transit Stop	Bus Routes
2126133	Shepherds Drive at Lemongrass Place	M60
2126100	Cherrybrook Shops, Shepherds Drive	626, M60
2126101	Greenway Park, Shepherds Drive	600, 620X, 621, 622, 626
2126143	Macquarie Drive before Shepherds Drive	600, 620X, 621, 622, M60

Table 3.4 List of Southbound Bus Stops

TSN	Description of Transit Stop	Bus Routes
212668	Greenway Park, Shepherds Drive	600, 620X, 621, 622, 626
212669	Shepherds Drive opp Cherrybrook Shops	626, M60
2126134	Shepherds Drive opp Lemongrass Place	M60
2126131	Macquarie Drive after Shepherds Drive	600, 620X, 621, 622, M60

The timetabled stopping times were gathered from www.transportnsw.info for August 2017.

3.3.2 Travel Zones

Engineering judgement was applied to combine the traffic data with site observations, to estimate a "best guess" prior matrix. Each period's matrix was then run through the model with manual adjustments made to satisfactorily represent the base traffic patterns while achieving the model calibration criteria. The study area includes the following nine travel zones:

- Zone 1: Shepherds Drive (west);
- Zone 2: CVSC Existing Access;
- Zone 3: Shepherds Drive (east);
- Zone 4: Macquarie Drive;
- Zone 5: Kenburn Avenue; and
- Zone 6: Proposed CVSC Access (future scenarios only).

3.3.3 Demand Profiling

In order to ensure that the correct number of vehicles are released into the network as per defined time slices, a demand profile was constructed. Temporal traffic profiles were developed for 15-minutes periods based on the surveyed traffic data at the key intersection of Shepherds Drive and Kenburn Avenue.

The peak demand profiles are presented in Table 3.5 below.

Table 3.5: AM Traffic Demand Profile

PM Period	Demand Profile	Saturday Period	Saturday Peak
15:00-15:15	28%	09:30-09:45	23%
15:15-15:30	26%	09:45-10:00	25%
15:30-15:45	23%	10:00-10:15	27%
15:45-16:00	24%	10:15-10:30	25%
16:00-16:15	25%	10:30-10:45	23%
16:15-16:30	22%	10:45-11:00	25%
16:30-16:45	27%	11:00-11:15	25%
16:45-17:00	26%	11:15-11:30	27%
17:00-17:15	25%	11:30-11:45	24%
17:15-17:30	25%	11:45-12:00	25%
17:30-17:45	25%	12:00-12:15	25%
17:45-18:00	25%	12:15-12:30	26%
		12:30-12:45	27%
		12:45-13:00	25%
		13:00-13:15	23%
		13:15-13:30	25%

3.3.4 Traffic Composition

Traffic composition used in the model was based on the analysis of traffic mix at the Shepherds Drive and Kenburn Avenue intersection. The traffic composition used in the model is summarised in Table 3.6.

Table 3.6: AM and PM Traffic Composition

Measure	PM Peak		Saturday Peak	
	Light	Heavy	Light	Heavy
Traffic Composition	99%	1%	99%	1%

4. EXISTING NETWORK PERFORMANCE – 2017 BASE CASE MODEL

As part of this study, an existing condition VISSIM microsimulation model was developed for the Shepherds Drive Corridor within the study area. This section summarises the existing performance of the Shepherds Drive corridor within the study area.

4.1 INTERSECTION PERFORMANCE

The 2017 Base Case Thursday PM and Saturday midday performance of each intersection within the corridor is summarised in Table 4.1 and Table 4.2.

Generally, traffic at key the intersections on Shepherds Drive corridor under investigation currently experience acceptable level of delays. The maximum movement delays experienced at the Shepherds Drive / Macquarie Drive roundabout in the Thursday PM peak and Saturday midday peak are consistently low, with the maximum delay experienced four (4) seconds (LoS A). The delays experience at the Shepherds Drive / Kenburn Avenue roundabout are higher in the Saturday midday peak in comparison to the Thursday PM peak. The maximum delays occur between 10:30am and 11:30am on Saturday, measuring 37 seconds (LoS C), and between 3:00pm and 4:00pm on Thursday, measuring 21 seconds (LoS B).

Table 4.1: LoS and Delay: 2017 Base Case – Thursday PM Peak

Intersection	Intersection Control	LoS PM 2017 Base Case (delay in seconds – worst movement)		
		1500-1600	1600-1700	1700-1800
Shepherds Drive / Kenburn Avenue		B (21)	B (19)	B (18)
Shepherds Drive / Macquarie Drive		A (2)	A (3)	A (4)

Table 4.2: LoS and Delay: 2017 Base Case – Saturday Midday Peak

Intersection	Intersection Control	LoS PM 2017 Base Case (delay in seconds- worst movement)			
		0930-1030	1030-1130	1130-1230	1230-1330
Shepherds Drive / Kenburn Avenue		C (31)	C (37)	B (24)	B (27)
Shepherds Drive / Macquarie Drive		A (2)	A (2)	A (2)	A (2)

4.2 TRAVEL TIME

Surveyed travel time data was used in the comparison between the modelled and surveyed travel times for the routes. This comparison is shown for 2017 Base Case Thursday PM peak hour in Figure 4.1 to Figure 4.2 and for Saturday midday peak hour in Figure 4.3 to Figure 4.4. Each of these figures contains an average of the surveyed and modelled travel times during both the PM and Saturday peak periods and its directionality (i.e. eastbound or westbound).

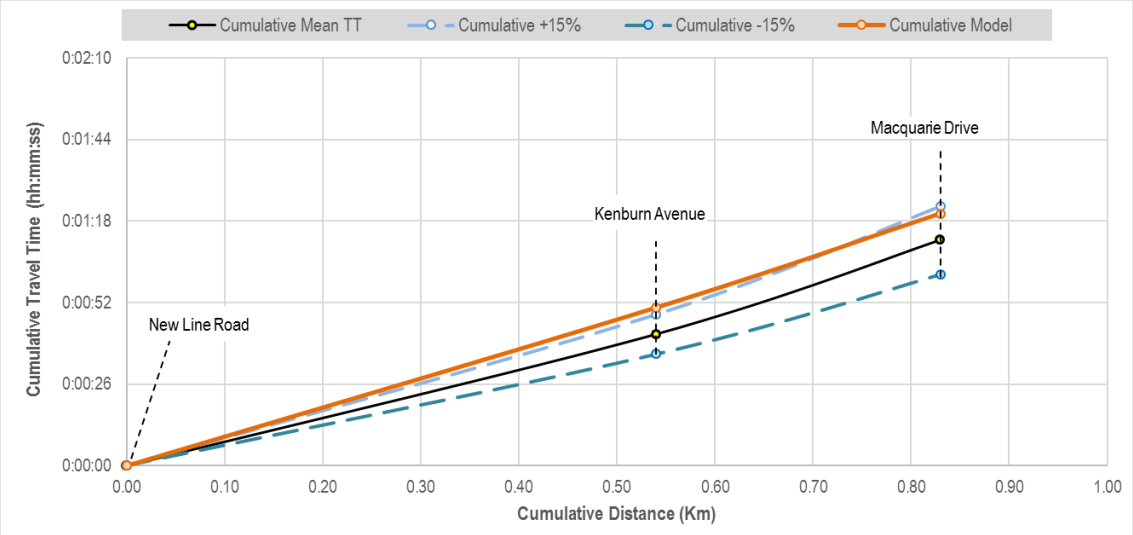


Figure 4.1: Travel Time Validation - PM (1700-1800) – Eastbound

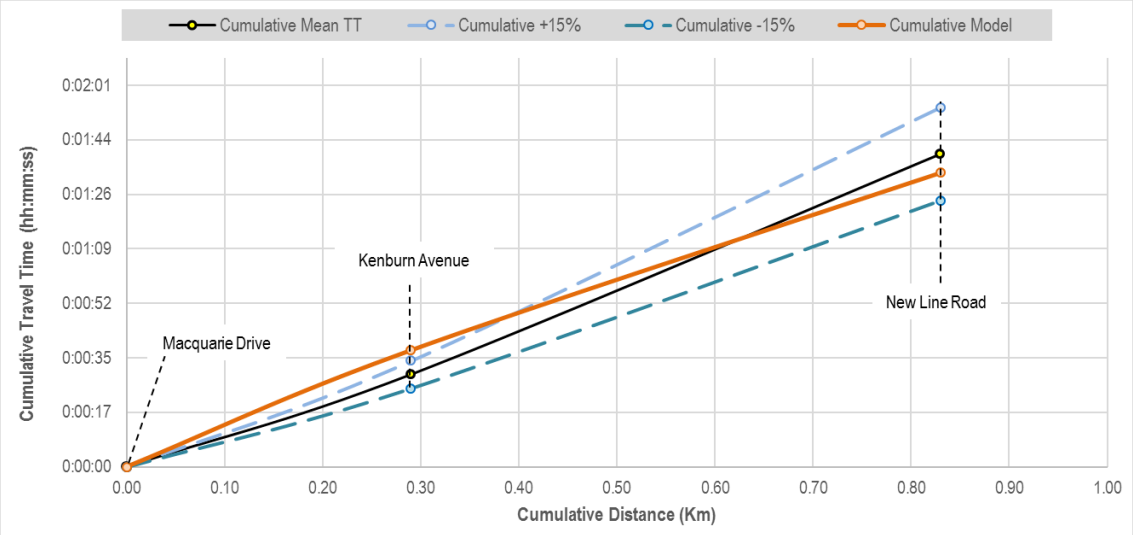


Figure 4.2: Travel Time Validation - PM (1700-1800) – Westbound

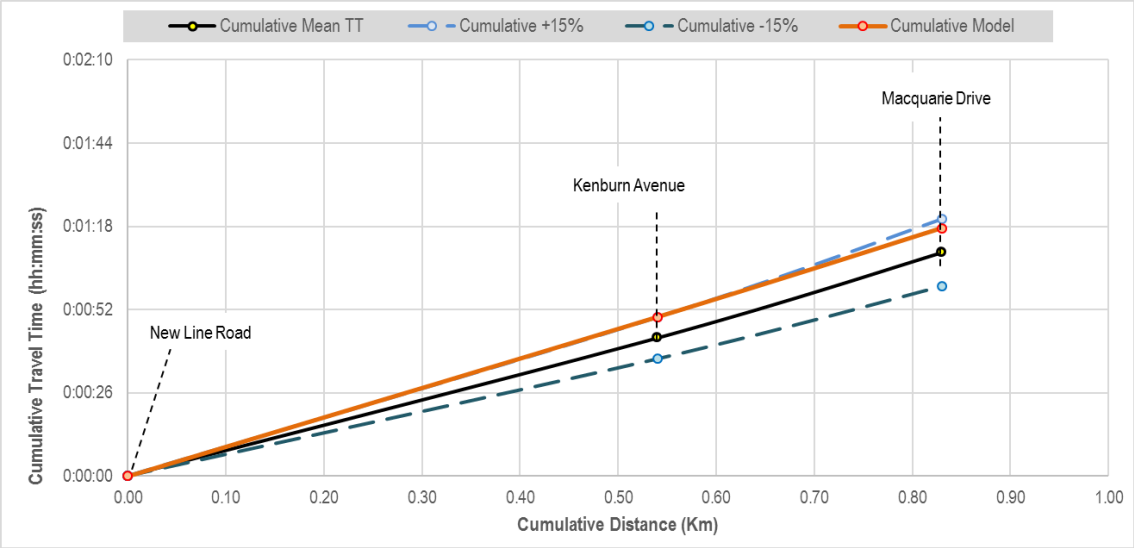


Figure 4.3: Travel Time Validation - Saturday (1230-1330) – Eastbound

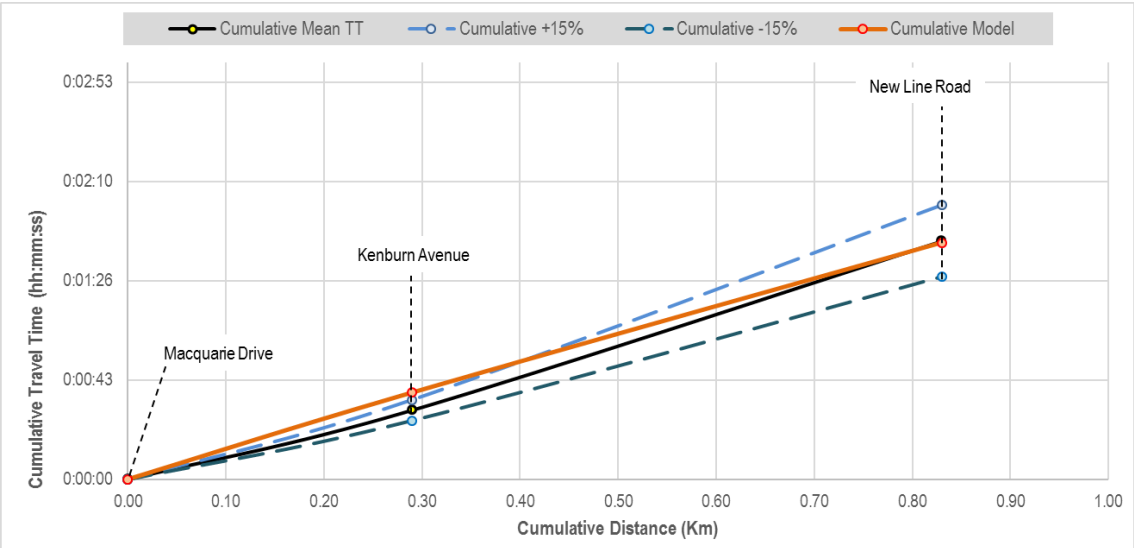


Figure 4.4: Travel Time Validation - Saturday (1230-1330) – Westbound

5. FUTURE NETWORK PERFORMANCE

5.1 OVERVIEW

The PM and Saturday peak traffic performance was assessed for the future year 2027 traffic conditions. This section summarised the do minimum 2027 traffic performance.

5.2 ESTIMATION OF FUTURE TRAFFIC GROWTH

5.2.1 Background Traffic Growth

The figure for the background traffic growth rate was developed in conjunction with the Hornsby Shire Council for application to the 2027 future traffic models. The value was decided to be a linear growth rate of 2% per annum representing a total increase in traffic of 20% over the 10-year period from 2017 to 2027.

5.3 2027 DO-MINIMUM TRAFFIC PERFORMANCE

The PM and Saturday peak traffic performance of the study area was assessed for the 2027 traffic conditions. This section summarises the traffic performance of the 2027 Do-Minimum model.

5.3.1 2027 Do-Minimum Network Assumptions

Key assumptions in the 2027 Do-Minimum Network include:

- Roadway configuration – The layout of the roads within the 2017 Base Case model have been maintained in the 2027 Do-Minimum model;
- Intersection configuration - The layout of the intersections within the 2017 Base Case model have been maintained in the 2027 Do-Minimum model;
- Increased traffic volumes – the traffic volumes in the 2027 Do-Minimum model are 20% greater than the 2017 Base Case model due to the application of the background traffic growth; and
- The Shepherds Drive westbound approach to New Line Road currently operates at low speeds due to congestion at the New Line Road roundabout. It is understood that Roads and Maritime Services (Roads and Maritime) and Transport for New South Wales (TfNSW) are currently investigating options to improve the performance of this roundabout. For the purpose of this assessment, it was assumed that in 2027, the performance of the roundabout intersection will improve and that the Shepherds Drive westbound approach to the roundabout will operate at speeds that are higher than the existing.

5.3.2 2027 Do-Minimum Intersection Analysis Results

The 2027 Do-Minimum Thursday PM and Saturday midday intersection traffic performance is compared against the 2017 Base Case Thursday PM and Saturday midday peak periods in Table 5.1 and Table 5.2. Key observations include:

- Shepherds Drive / Macquarie Street continues to operate at LoS A in all peak hour periods assessed;
- The 2027 Do-Minimum model suggests that traffic at the Shepherds Drive / Kenburn Avenue intersection would generally experience increased average delays in the PM peak and operate at LoS between B and C; and
- The 2027 Saturday peak traffic is predicted to experience additions delays. The intersection would provide LoS C across all four hours at the Shepherds Drive / Kenburn Avenue roundabout.

Detailed intersection performance analysis is presented in **Appendix B**.

Table 5.1: LoS and Delay: 2017 Base Case vs 2027 Do-Minimum – Thursday PM Peak

Intersection	Control	LoS (delay in seconds)					
		2017 Base Case			2027 Do-Minimum		
		1500-1600	1600-1700	1700-1800	1500-1600	1600-1700	1700-1800
Shepherds Drive / Kenburn Avenue		B (21)	B (19)	B (18)	B (18)	C (31)	B (25)
Shepherds Drive / Macquarie Drive		A (2)	A (3)	A (4)	A (3)	A (3)	A (5)

Table 5.2: LoS and Delay: 2017 Base Case vs 2027 Do-Minimum – Saturday Midday Peak

Intersection	Control	LoS (delay in seconds)							
		2017 Base Case				2027 Do-Minimum			
		0930-1030	1030-1130	1130-1230	1230-1330	0930-1030	1030-1130	1130-1230	1230-1330
Shepherds Drive / Kenburn Avenue		C (31)	C (37)	B (24)	B (27)	C (33)	C (40)	C (39)	C (38)
Shepherds Drive / Macquarie Drive		A (2)	A (2)	A (2)	A (2)	A (3)	A (3)	A (3)	A (3)

5.3.3 Travel Time Analysis

The comparison of travel times in 2017 Base Case and 2027 Do-Minimum across the Thursday PM and Saturday midday peaks are shown in Figure 5.1 to Figure 5.4. Overall, the westbound traffic on Shepherds Drive is predicted to experience a slight increase in delay. However, the westbound traffic on Shepherds Drive would experience slight improvement in travel times. This is due to increased travel speed on the western approach to the New Line Road / County Drive / Shepherds Drive intersection in 2027.

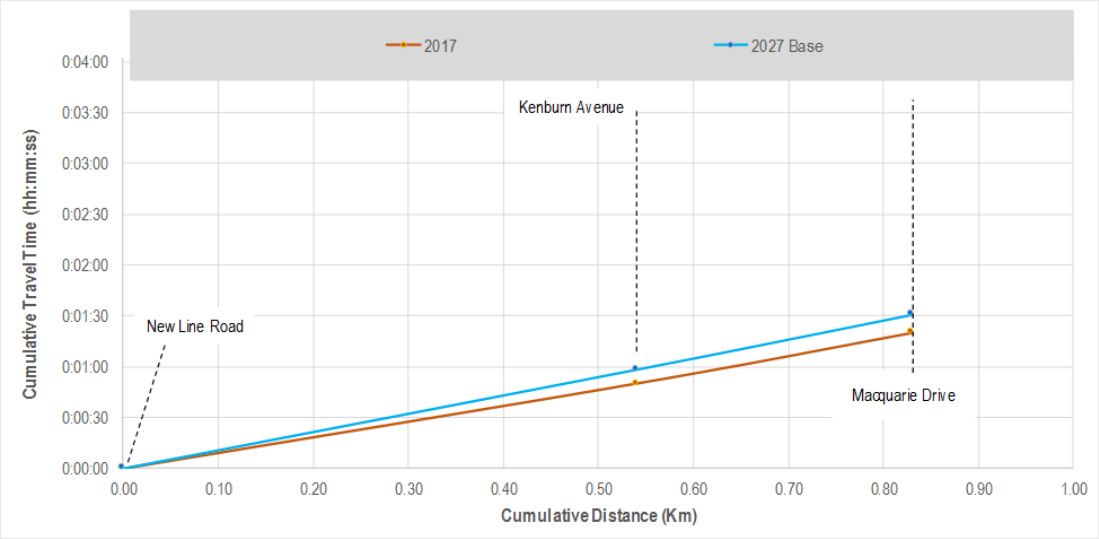


Figure 5.1: Travel Time Comparison - Thursday (1500-1600) - Eastbound

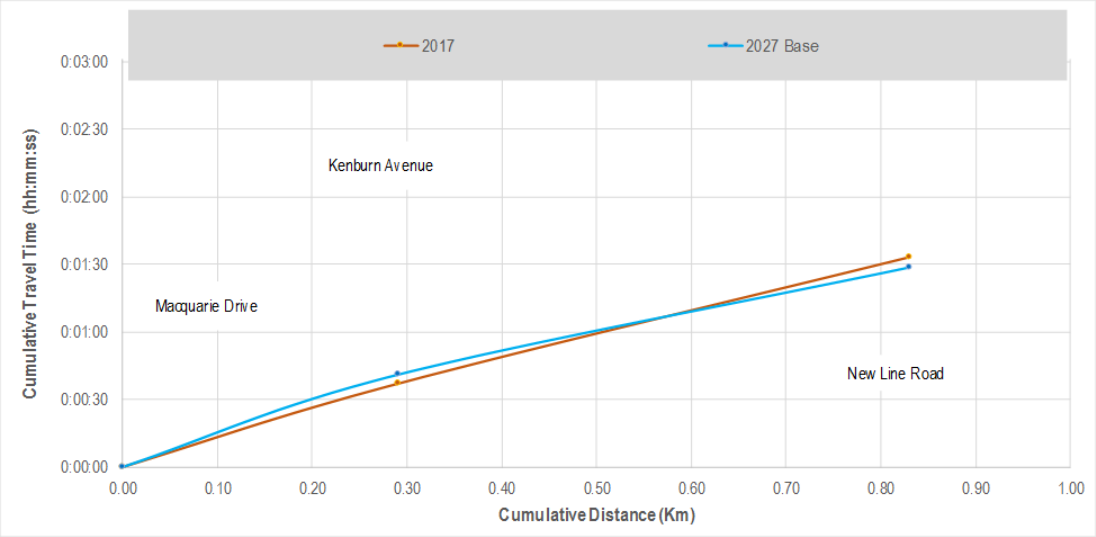


Figure 5.2: Travel Time Comparison - Thursday (1500-1600) - Westbound

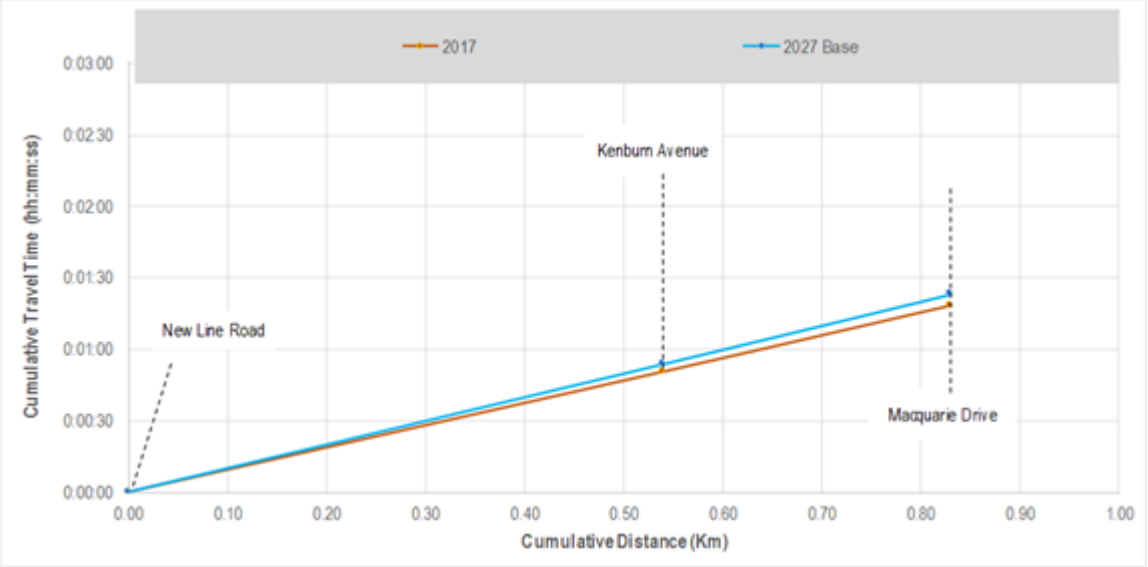


Figure 5.3: Travel Time Comparison - Saturday (1030-1130) - Eastbound

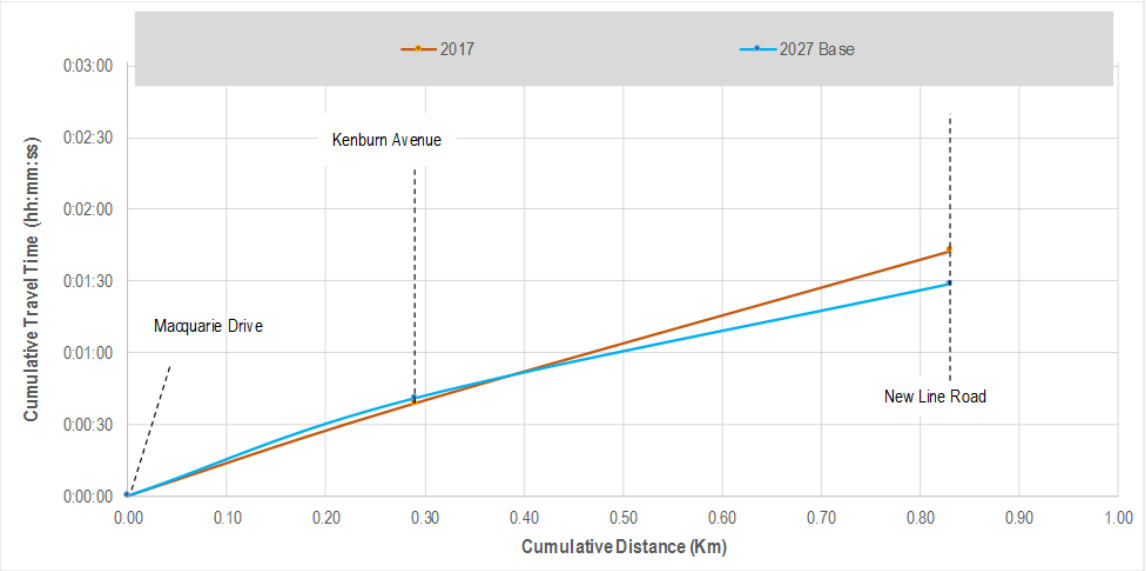


Figure 5.4: Travel Time Comparison - Saturday (1030-1130) - Westbound

6. PROPOSED DEVELOPMENT

6.1 PROPOSED DEVELOPMENT

It is proposed to reconfigure and expand the existing car parking facilities at Cherrybrook Village Shopping Centre (CVSC) located on the northern side of Shepherds Drive, Cherrybrook. The shopping centre currently has 9,636m² of retail floor space, including a supermarket, specialty stores and a child care centre. It also provides 461 on-site parking spaces. The proposed extension includes the following items:

- an additional 4,461m² GFA including new retail stores, a medical centre, gymnasium and centre management office space;
- The reconfiguration of the ground level car park and addition of one above ground car park level;
- an additional 170 on-site light vehicle parking spaces, including accessible parking spaces;
- an additional 13 motorcycle parking spaces;
- an additional 24 bicycle parking spaces; and
- a new access between CVSC and Shepherds Drive, to be located between the roundabout intersections with Kenburn Avenue and Macquarie Drive.

The proposed layout of the extended CVSC parking and new access to Shepherds Drive is shown in Figure 6.1. It is proposed that right turn movement from the CVSC car park to Shepherds Drive is not allowed.

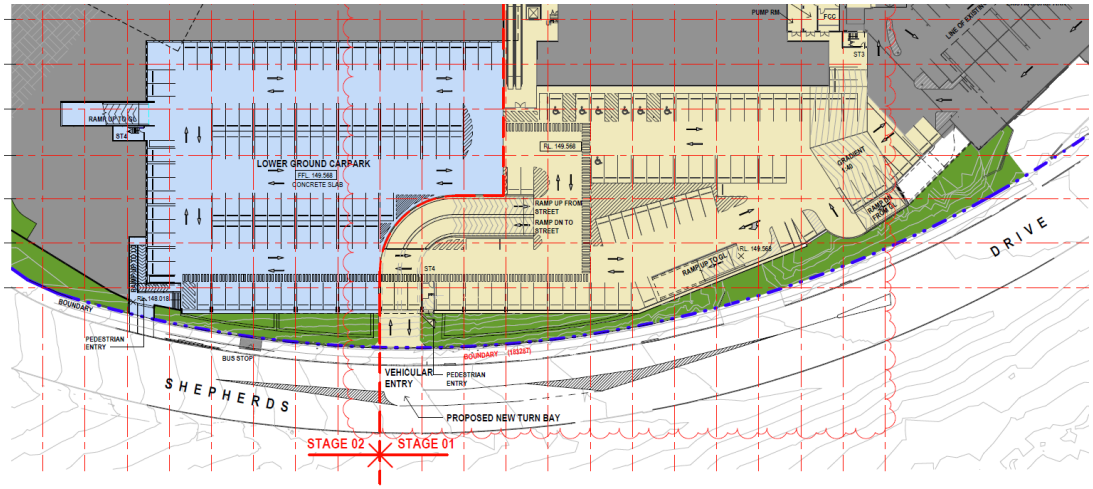


Figure 6.1: Proposed Vehicular Access on Shepherds Drive.

6.2 COLSTON BUDD ROGERS & KAFES TRAFFIC AND PARKING REPORT - SUMMARY

A traffic and parking report was undertaken by Colston Budd Rogers & Kafes (CBRK) to support the development application of the proposed extensions at Cherrybrook Village Shopping Centre. The key findings from this report include:

- CVSC generates 1,125 and 1,135 vehicles per hour (two-way) in the Thursday PM and Saturday midday peak respectively;
- The Shepherds Road intersections with Kenburn Avenue and Macquarie Drive currently operate with delays of less than 20 seconds (LoS B) during the Thursday PM and Saturday midday peak.;
- The proposed extensions provide employment opportunities which strengthen the demand for public transport connectivity;
- The proposed development is consistent with the government objectives and planning principles;
- Sufficient additional parking is proposed for light vehicles, accessible spaces, bicycles and motorcycles;
- RMS Warrants for traffic signals are not met at the proposed right turn bay on Shepherds Drive to CVSC or at the Shepherds Drive / Kenburn Avenue.
- The additional generated traffic was calculated to be 550 vehicles per hour (two-way) for the Thursday PM and Saturday midday peak, 20% of which has been assessed as passing trade;

- SIDRA modelling shows The Shepherds Road intersections with Kenburn Avenue and Macquarie Drive continue to operate with delays of less than 20 seconds with the additional development traffic;
- The proposed new access point was shown to operate with delays of less than 15 seconds (LoS A); and
- The proposed CVSC extensions and new access point will not adversely impact the surrounding traffic environment.

6.3 PEER REVIEW – SIDRA MODEL

As part of Development Application, CBRK undertook traffic analysis of two roundabout intersections. As part of the analysis SIDRA models were developed for existing conditions and post development conditions. The following intersections were analysed;

- Shepherds Drive / Kenburn Avenue;
- Shepherds Drive / Macquarie Drive; and
- CVSC access point from Shepherds Drive (future only).

As outlined above, the results from the SIDRA modelling show delays of less than 20 seconds (LoS A / B) at these intersections.

Bitzios Consulting undertook a very high-level review of the SIDRA models. The following section includes outcomes from the review for the Shepherds Drive / Kenburn Avenue roundabout intersection.

6.3.1 Outcomes of Shepherds Drive / Kenburn Avenue CBRK SIDRA Model Review

The findings from the review of the Shepherds Drive / Kenburn Avenue CBRK SIDRA model are as follows:

- Existing and development traffic volumes are considered to be acceptable according to survey and trip generation assessment results;
- CBRK model was undertaken for only one-hour period during the Thursday PM peak and Saturday midday peak;
- CBRK model did not considered background traffic growth for the next ten years; and
- The Shepherds Drive / Kenburn Avenue intersection SIDRA model did not consider the reduced speed incurred on the western approach and also on the northern approach due to traffic congestion inside the shopping centre. The congestion inside the shopping centre significantly reduces the saturation flow (i.e. intersection throughput) and the roundabout capacity. The roundabout capacity assumed in the SIDRA models does not seem to be realistic. CBRK SIDRA model is considered to be over estimating the roundabout capacity. For example, the CBRK model shows that the roundabout operates at LoS A in the Saturday midday. However, site observations suggest that traffic at the roundabout experience longer delays. Bitzios Consulting VISSIM model shows that the intersection operates at LoS between B and C in the Saturday peak.

7. SCENARIO ASSESSMENT

7.1 DEVELOPMENT TRAFFIC

The additional traffic associated with the proposed extension of the Cherrybrook Village Shopping Centre has been calculated by Colston Budd Rogers & Kafes in their traffic and parking report, which accompanied the development application. A summary of the forecast additional traffic as a result of the proposed CVSC extension is shown in Table 7.1.

Table 7.1: Proposed Development Traffic Generation – AM and PM Peak

Peak	In	Out
Thursday PM Peak	275	275
Saturday Midday Peak	275	275

No wider area traffic model was developed to understand the future traffic distribution within the study area. As a result, the following two scenarios were assumed for the distribution of future development traffic:

- 50-50 Split: Half of the total development traffic arrives and departs to / from the west (that is from New Line Road) and the remainder to / from the east; and
- 80-20 Split: 80% of the total traffic arrives and departs to / from the west (that is from New Line Road) and the remainder to / from the east.

The following 2027 traffic assessments were undertaken based on the assumed future development traffic distributions:

- Scenario 1: 50-50 Traffic Split for Development Traffic; and
- Scenario 2: 80-20 Traffic Split for Development Traffic.

7.2 SCENARIO 1

Scenario 1 incorporates the development traffic on top of the 2027 Do-Minimum model traffic volumes. Scenario 1 also includes a new CVSC access point off Shephards Drive. The distribution of the development traffic accessing CVSC is assumed to be evenly spilt from the east and west.

7.2.1 Intersection Analysis

The Scenario 1 and 2017 Base Case Thursday PM and Saturday midday peak intersection traffic performance is compared in Table 7.2 and Table 7.3.

Key observations include:

- The Shepherds Drive / Macquarie Street and Shepherds Drive / CVSC New Access intersections operate with LoS A in all peak hour periods assessed, with the exception of 12:30pm to 1:30pm on Saturday when they operate at LoS B;
- Traffic at the Shepherds Drive / Kenburn Avenue intersection experience substantial increase in delays across the entire Thursday peak (3:00pm to 6:00pm); and
- Traffic at the Shepherds Drive / Kenburn Avenue intersection experience substantial increase in delays across the entire Saturday peak period.

Detailed modelling results are presented in **Appendix C**.

Table 7.2: LoS and Delay: 2017 Base Case vs 2027 Do-Minimum – Thursday PM Peak

Intersection	Control	LoS (delay in seconds)					
		2017 Base Case			2027 Scenario 1		
		1500-1600	1600-1700	1700-1800	1500-1600	1600-1700	1700-1800
Shepherds Drive / Kenburn Avenue		B (21)	B (19)	B (18)	E (65)	F (110)	D (52)
Shepherds Drive / Macquarie Drive		A (2)	A (3)	A (4)	A (3)	A (3)	A (6)
Shepherds Drive / CVSC New Access	GIVE WAY				A (3)	A (4)	A (5)

Table 7.3: LoS and Delay: 2017 Base Case vs 2027 Do-Minimum – Saturday Midday Peak

Intersection	Control	LoS (delay in seconds)							
		2017 Base Case				2027 Scenario 1			
		0930-1030	1030-1130	1130-1230	1230-1330	0930-1030	1030-1130	1130-1230	1230-1330
Shepherds Drive / Kenburn Avenue		C (31)	C (37)	B (24)	B (27)	F (149)	F (164)	F (453)	F (317)
Shepherds Drive / Macquarie Drive		A (2)	A (2)	A (2)	A (2)	A (4)	A (4)	A (7)	B (20)
Shepherds Drive / CVSC New Access	GIVE WAY					A (3)	A (7)	A (14)	B (18)

7.2.2 Travel Time Analysis

The comparison of travel times in 2017 Base Case, 2027 Do-Minimum and 2027 Scenario 1 across the Thursday PM and Saturday midday peaks are shown Figure 7.1 in to Figure 7.4. All models assessed show very similar travel times for the eastbound travel. However, the westbound traffic in Scenario 1 are predicted to experience substantial delays when compared to the 2017 and 2027 Do-Minimum Cases.

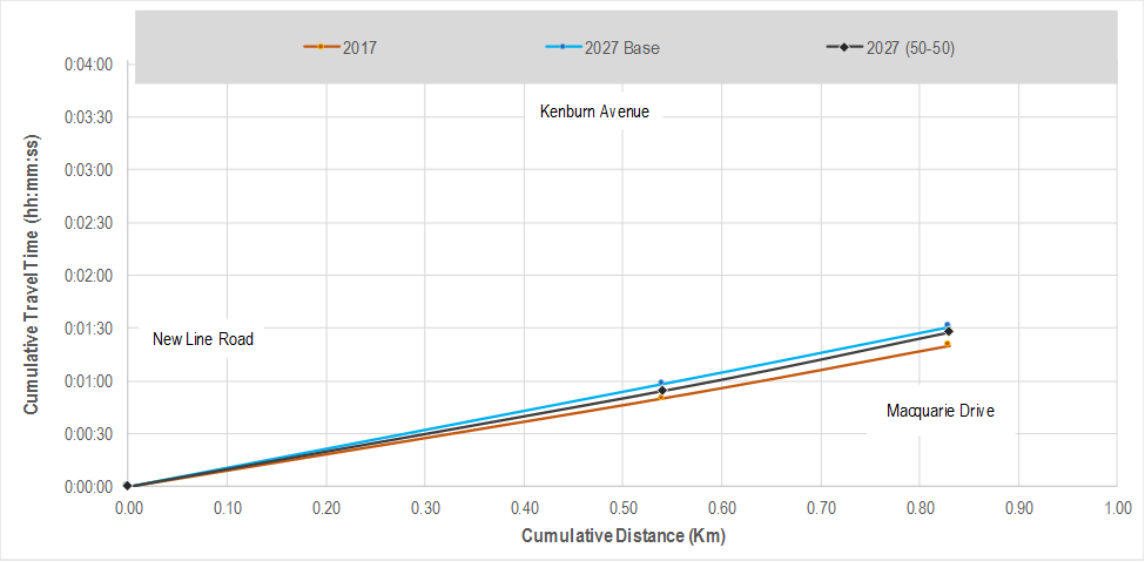


Figure 7.1: Scenario 1 Travel Time Comparison - Thursday (1500-1600) - Eastbound

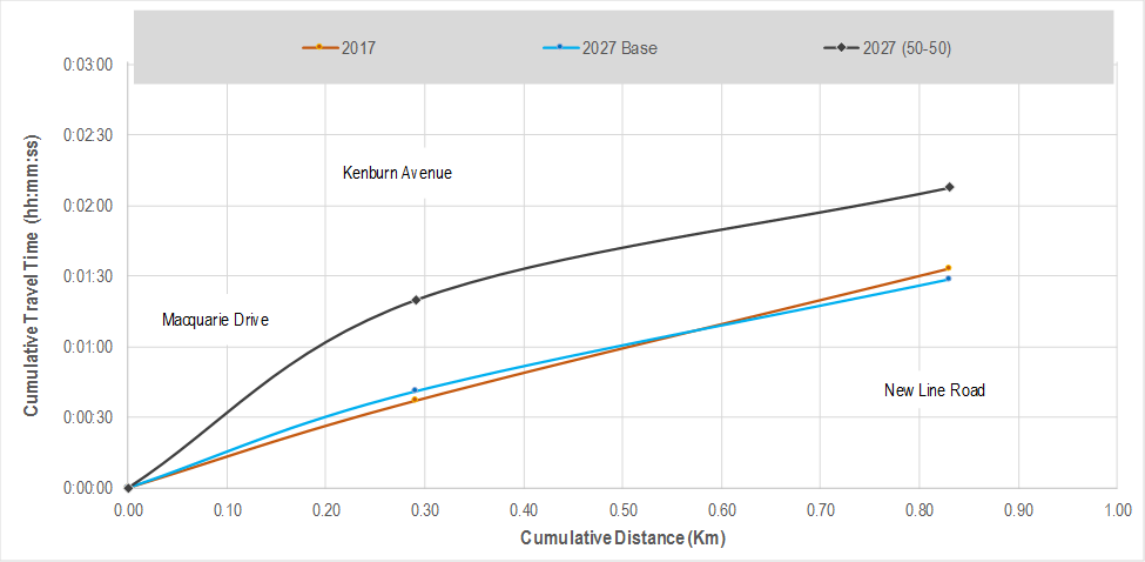


Figure 7.2: Scenario 1 Travel Time Comparison - Thursday (1500-1600) - Westbound

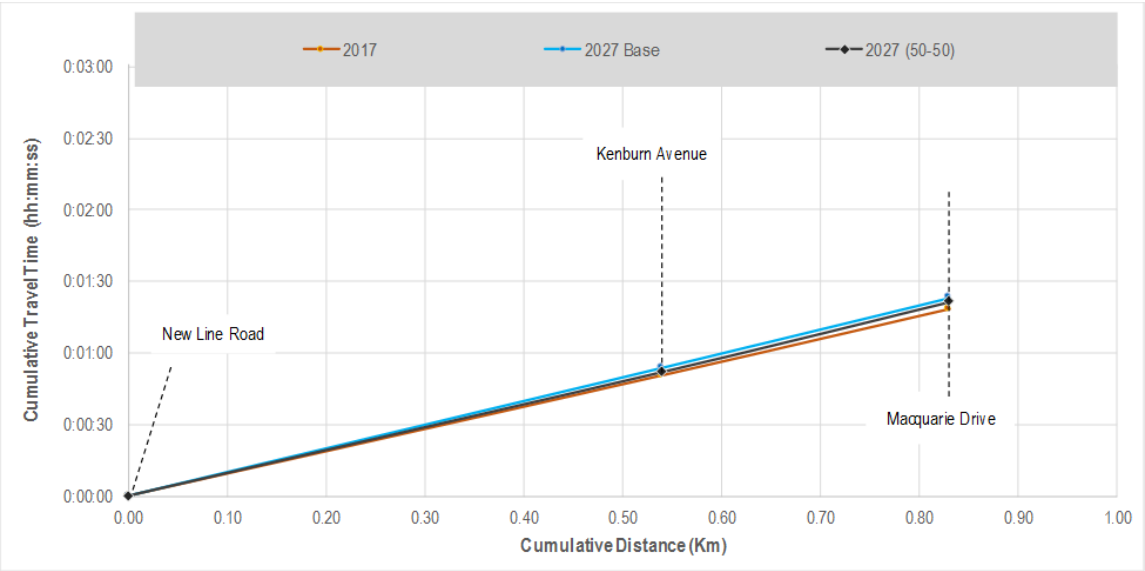


Figure 7.3: Scenario 1 Travel Time Comparison - Saturday (1030-1130) - Eastbound

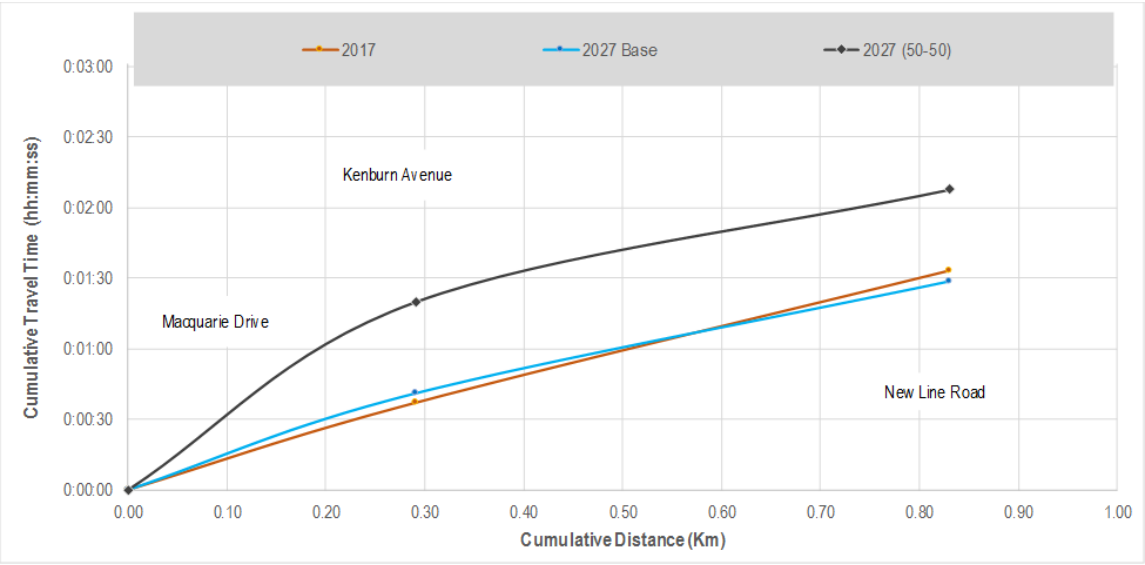


Figure 7.4: Scenario 1 Travel Time Comparison - Saturday (1030-1130) - Westbound

7.3 SCENARIO 2

Scenario 2 is same as Scenario 1 with the exception of the following:

- the distribution of the development traffic accessing CVSC is assumed spilt with 80% coming from the west and 20% coming from the east.

7.3.1 Intersection Analysis

The Scenario 2 and the 2017 Base Case Thursday PM and Saturday midday peak intersection traffic performance are compared in Table 7.4 and Table 7.5.

Key observations include:

- The Shepherds Drive / Macquarie Street and Shepherds Drive / CVSC New Access intersections operate with LoS A in all peak hour periods assessed, with the exception of 12:30pm to 1:30pm on Saturday when they operate at LoS B;
- Traffic at the Shepherds Drive / Kenburn Avenue intersection experience substantial increase in delays across the entire Thursday peak (3:00pm to 6:00pm); and
- Also, traffic at the Shepherds Drive / Kenburn Avenue intersection experience substantial increase in delays across the entire Saturday peak period.
- 172 vehicles did not enter the model network from the CVSC existing access due to congestion in the Thursday PM peak model; and
- 115 vehicles did not enter the model network from the CVSC existing access due to congestion in the Saturday midday peak model.

Table 7.4: LoS and Delay: 2017 Base Case vs 2027 Scenario 2 – Thursday PM Peak

Intersection	Control	LoS (delay in seconds)					
		2017 Base Case			2027 Scenario 2		
		1500-1600	1600-1700	1700-1800	1500-1600	1600-1700	1700-1800
Shepherds Drive / Kenburn Avenue		B (21)	B (19)	B (18)	F (80)	F (105)	F (116)
Shepherds Drive / Macquarie Drive		A (2)	A (3)	A (4)	A (3)	A (4)	A (4)
Shepherds Drive / CVSC New Access					A (3)	A (4)	A (4)

Table 7.5: LoS and Delay: 2017 Base Case vs 2027 Scenario 2 – Saturday Midday Peak

Intersection	Control	LoS (delay in seconds)							
		2017 Base Case				2027 Scenario 2			
		0930-1030	1030-1130	1130-1230	1230-1330	0930-1030	1030-1130	1130-1230	1230-1330
Shepherds Drive / Kenburn Avenue		C (31)	C (37)	B (24)	B (27)	F (137)	F (149)	F (101)	F (127)
Shepherds Drive / Macquarie Drive		A (2)	A (2)	A (2)	A (2)	A (3)	A (3)	A (3)	A (3)
Shepherds Drive / CVSC New Access						A (3)	A (4)	A (5)	A (4)

Detailed modelling results are presented in **Appendix D**.

7.3.2 Travel Time Analysis

The comparison of travel times in 2017 Base Case, 2027 Do-Minimum, 2027 Scenario 1 and 2027 Scenario 2 across the Thursday PM and Saturday midday peaks are shown in Figure 7.5 to Figure 7.8. All models assessed show very similar travel times for the eastbound travel. However, the westbound traffic in

Scenario 1 and 2 are predicted to experience substantial delays when compared to the 2017 and 2027 Do-Minimum Cases.

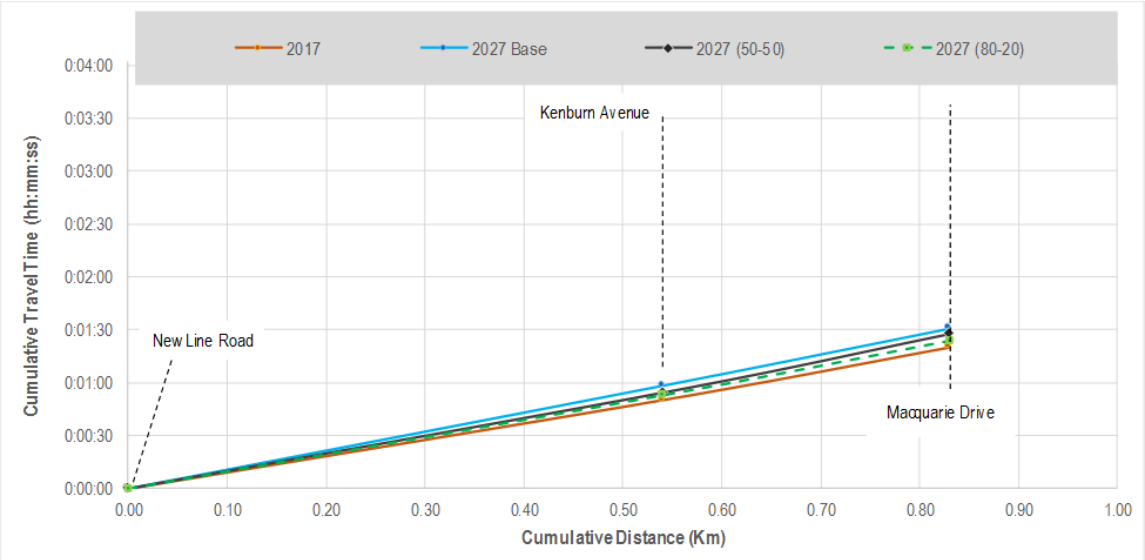


Figure 7.5: Scenario 2 Travel Time Comparison - Thursday (1500-1600) - Eastbound

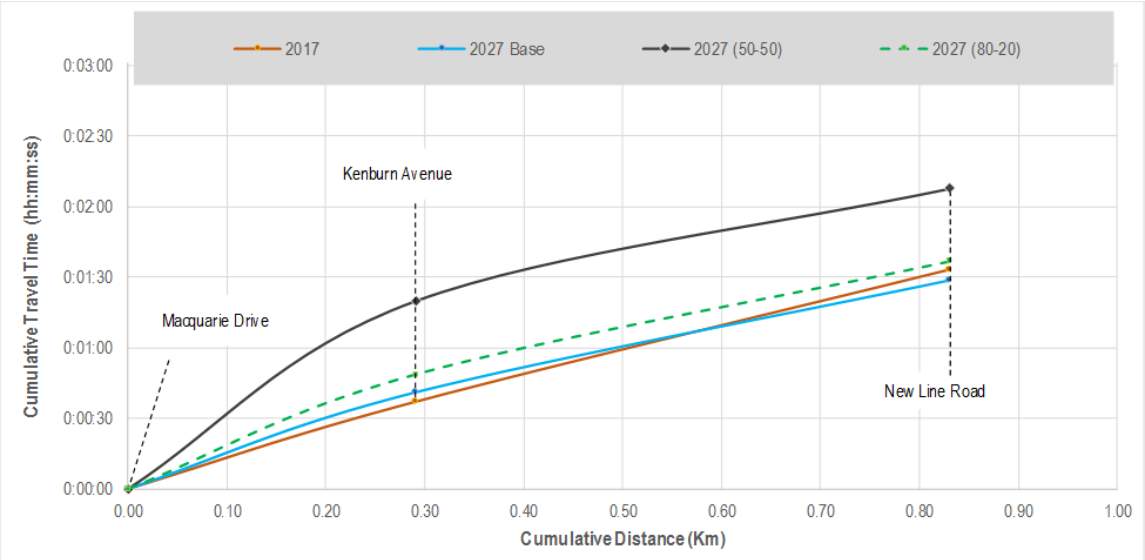


Figure 7.6: Scenario 2 Travel Time Comparison - Thursday (1500-1600) - Westbound

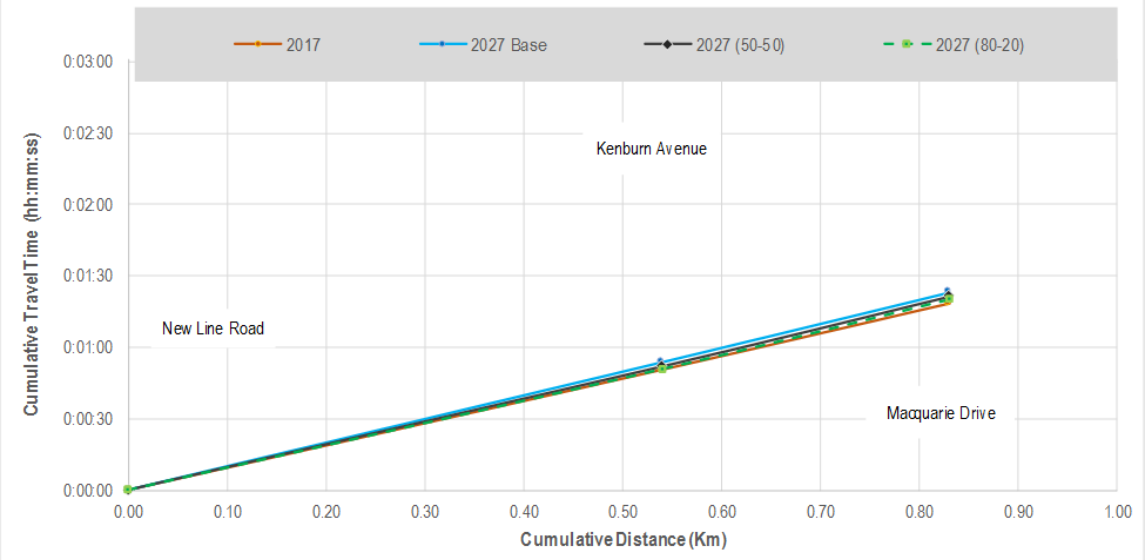


Figure 7.7: Scenario 2 Travel Time Comparison - Saturday (1030-1130) - Eastbound

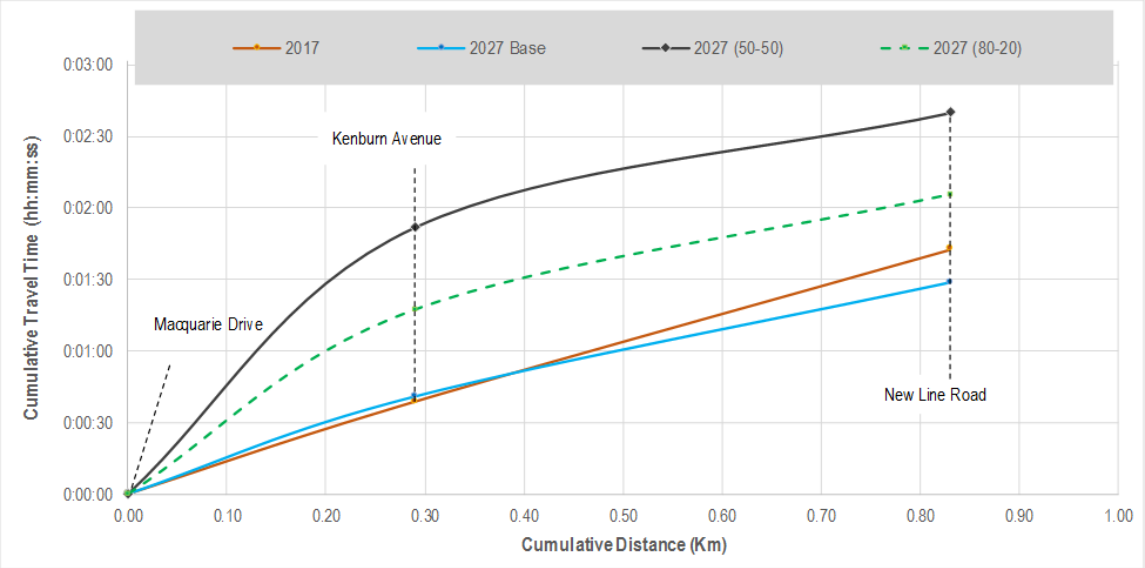


Figure 7.8: Scenario 2 Travel Time Comparison - Saturday (1030-1130) - Westbound

8. SIGNAL WARRANT ASSESSMENT

8.1 RMS SIGNAL WARRANT GUIDELINES

The Roads and Maritime signal warrant guidelines were adopted to determine whether the existing intersection at Shepherds Drive and Kenburn Avenue could be upgraded to a signalised intersection. The subject intersection consists of a major continuous flow east-west along Shepherds Drive, with a minor road flow north-south on Kenburn Avenue (south) and a Cherrybrook Village Shopping Centre Access (north). Therefore, the continuous flow warrant guideline was used, which states the following:

A signalised intersection may be considered if the following warrant is met:

For each of the four one-hour periods of an average day:

(i) the major road flow exceeds 900 vehicles/hour in each direction; and
(ii) the minor road flow exceeds 100 vehicles/hour in one direction; and
(iii) the speed of traffic on the major road or limited sight distance from the minor road causes undue delay or hazard to the minor road vehicles; and
(iv) there is no other nearby traffic signal site easily accessible to the minor road vehicles

Source: RMS Traffic signal design Section 2 – Warrants

8.2 TRAFFIC FLOW WARRANT ANALYSIS

The signal warrant assessment using the appropriate reduced warrants are summarised in Table 8.1, Figure 8.1 and Figure 8.2 show the comparison of the estimated 2027 traffic volumes with the Roads and Maritime warrant.

Table 8.1: Signal Warrant Check

Time Period	Major Road Flow Warrant					Minor Road Flow Warrant				
	Requirements	East		West		Requirements	North		South	
		Volumes (veh/hr)	Meets Warrant?	Volumes (veh/hr)	Meets Warrant?		Volumes (veh/hr)	Meets Warrant?	Volumes (veh/hr)	Meets Warrant?
3:00pm – 4:00pm	Flow > 900 veh/hr each direction	845	N	455	N	Flow > 100 veh/hr each direction	688	Y	100	Y
4:00pm – 5:00pm		820	N	630	N		631	Y	100	Y
5:00pm – 6:00pm		895	N	685	N		650	Y	100	Y
9:30am – 10:30am		805	N	510	N		575	Y	125	Y
10:30am – 11:30am		853	N	460	N		632	Y	110	Y
11:30am – 12:30pm		890	N	395	N		660	Y	110	Y
12:30pm – 13:30pm		870	N	370	N		650	Y	130	Y

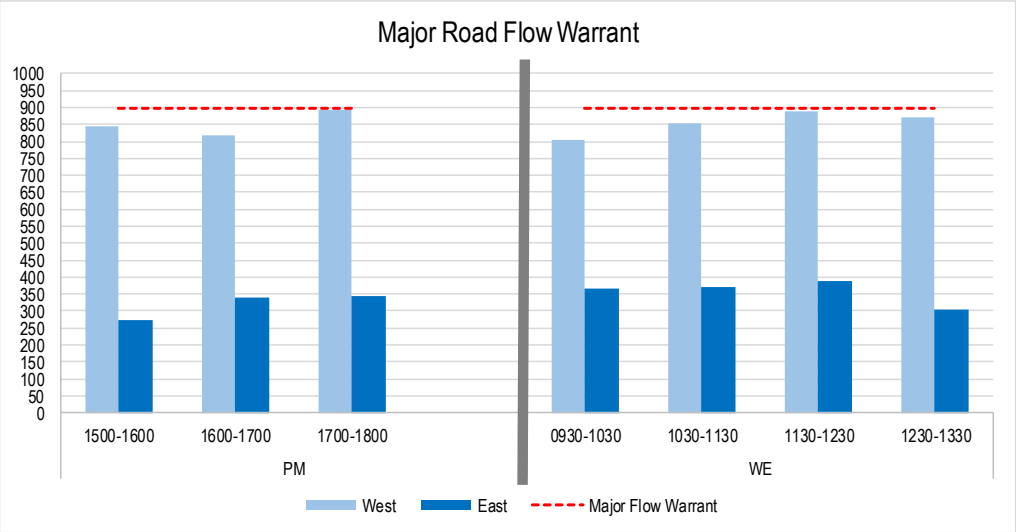


Figure 8.1: Major Road (Shepherds Drive) Flow Warrant*

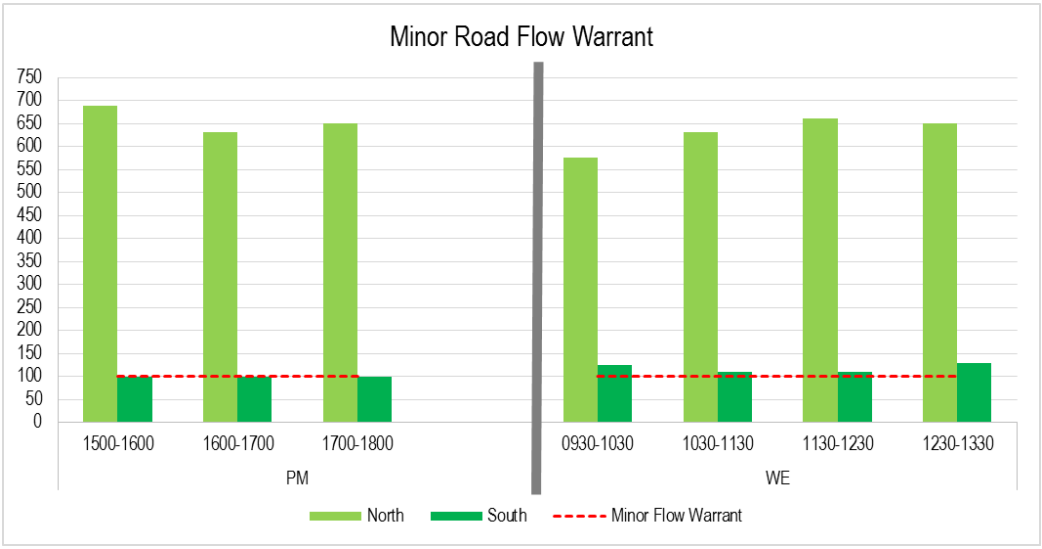


Figure 8.2: Minor Road (Kenburn Drive / CVSC Access) Flow Warrant*

**Only three time periods were surveyed in the Thursday PM peak and as such only three time periods are able to be included in the assessment.*

As seen in Table 8.1 and Figure 8.1, Roads and Maritime warrants are met for the minor road approaches and the western approach on Shepherds Drive is very close to the required figure of 900 veh/hr. The eastern approach on Shepherds Drive does not meet the requirements. Despite this, the average of the all approaches is approximately 2000 veh/hr which is the overall numbers of vehicles required by the warrant.

The major movements of this intersection are shown to be conflicting movements, with the highest traffic volumes occurring on the western and northern approaches. As a result, traffic delays, queues and subsequent driver risks are likely to be increased as one major movement impacts the ability of the other to flow. This is an important factor to include in any signal warrant assessment. Additionally, the existing roundabout intersection does not offer a safe crossing environment for pedestrians. The pedestrian survey (as summarised in **Appendix A**) shows that pedestrian crossing demand on the eastern approach of the roundabout is considered to be high. A signalised intersection will provide safe crossing facility for pedestrians.

Furthermore, it should be noted that count data used in the signal warrant assessment was only of one typical weekday. It is possible that in other weekdays flows may be higher to meet the Roads and Maritime requirements.

A performance analysis has been conducted on the study area with the Shepherd Drive / Kenburn roundabout converted to a signalised intersection to evaluate the likely impacts on the network. The results are summarised in the following chapter.

9. OPTIONS ASSESSMENT

9.1 SCENARIO 3

Scenario 3 includes the same traffic volumes adopted in Scenario 2. The road network is also same with the exception of the Shepherds Drive / Kenburn Avenue intersection. In Scenario 3, the existing roundabout intersection at Shepherds Drive / Kenburn Avenue has been converted to traffic signals. The layout of the intersection and proposed signal phasing are shown in Figure 9.1 and Figure 9.2. It is assumed that pedestrian crossing facilities would be introduced across all four approaches.

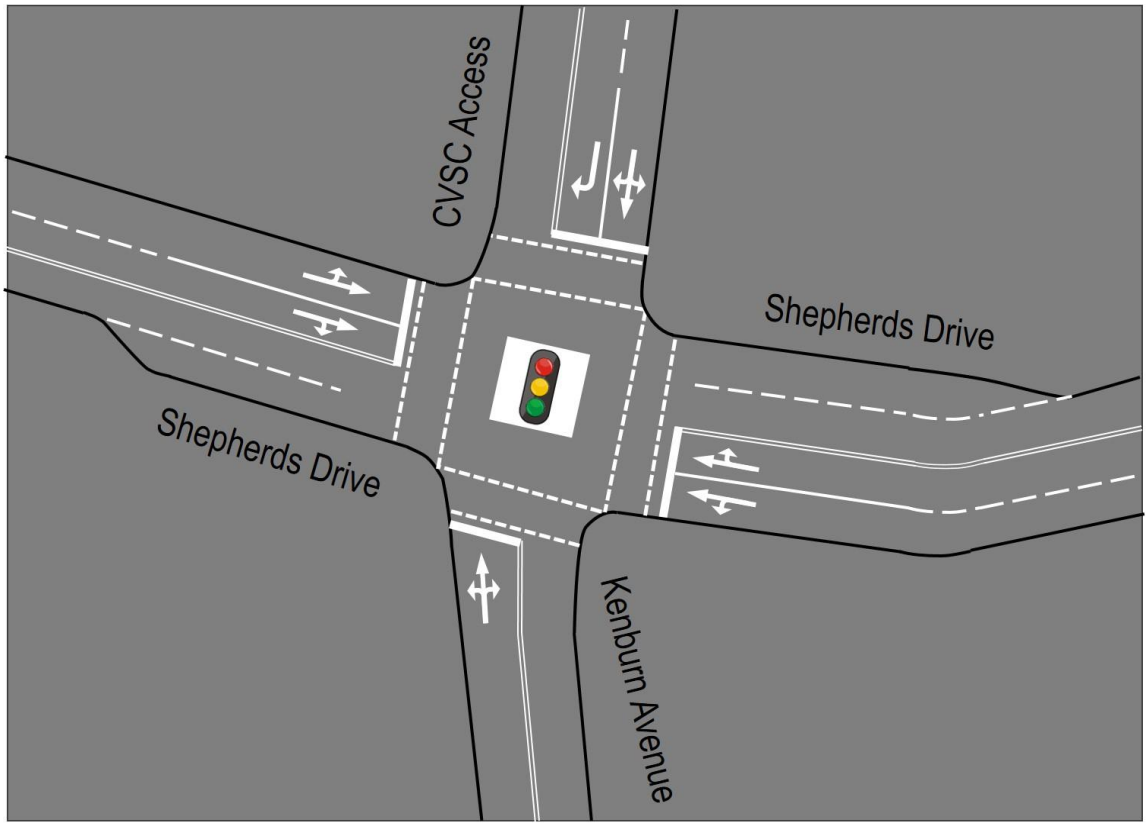


Figure 9.1: Proposed Signalised Intersection Layout at Shepherd Drive / Kenburn Avenue

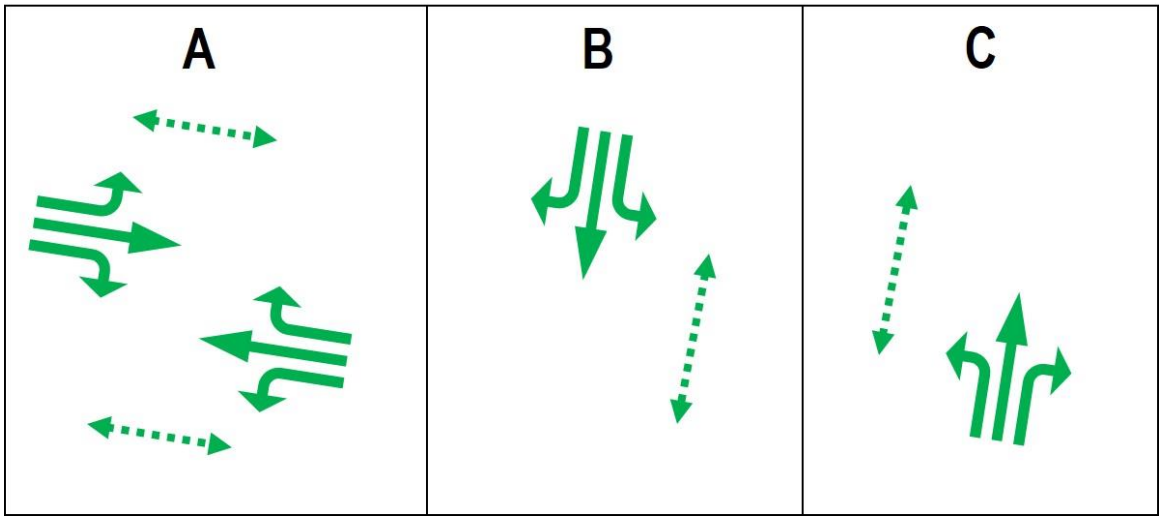


Figure 9.2: Proposed Signal Phasing at Shepherd Drive / Kenburn Avenue

9.1.1 Intersection Analysis

The Scenario 3 and the 2017 Base Case Thursday PM and Saturday midday peak intersection traffic performance are compared in Table 9.1 and Table 9.2.

Key observations include:

- The Shepherds Drive / Macquarie Street and Shepherds Drive / CVSC New Access operate with LoS A in all peak hour periods assessed;
- As compared to the 2017 Base, in Scenario 3, traffic at the Shepherds Drive / Kenburn Avenue intersection experience increased delays. However, when compared to Scenario 1 and 2, the Thursday PM and Saturday midday peak traffic experience less delays. Moreover, it should be noted that the layout adopted for the Shepherds Drive / Kenburn Avenue signalised intersection is considered to be very basic. It is anticipated that an improved intersection layout with additional turning lanes will provide substantially better intersection performance; and
- All vehicles are serviced by the Scenario 3 layout during both the PM and Saturday peak modelling periods.

Detailed modelling results are s presented in **Appendix E**.

Table 9.1: LoS and Delay: 2017 Base Case vs 2027 Scenario 3 –Thursday PM Peak

Intersection	Control	LoS (delay in seconds)					
		2017 Base Case			2027 Scenario 3		
		1500-1600	1600-1700	1700-1800	1500-1600	1600-1700	1700-1800
Shepherds Drive / Kenburn Avenue	/	B (21)	B (19)	B (18)	D (50)	E (63)	F (86)
Shepherds Drive / Macquarie Drive		A (2)	A (3)	A (4)	A (2)	A (3)	A (4)
Shepherds Drive / CVSC New Access	GIVE WAY				A (1)	A (1)	A (2)

Table 9.2: LoS and Delay: 2017 Base Case vs 2027 Scenario 3 – Saturday Midday Peak

Intersection	Control	LoS (delay in seconds)							
		2017 Base Case				2027 Scenario 3			
		0930-1030	1030-1130	1130-1230	1230-1330	0930-1030	1030-1130	1130-1230	1230-1330
Shepherds Drive / Kenburn Avenue	/	C (31)	C (37)	B (24)	B (27)	D (53)	E (57)	F (72)	F (82)
Shepherds Drive / Macquarie Drive		A (2)	A (2)	A (2)	A (2)	A (5)	A (2)	A (2)	A (2)
Shepherds Drive / CVSC New Access	GIVE WAY					A (2)	A (1)	A (1)	A (1)

9.1.2 Travel Time Analysis

The comparison of travel times in all models across the Thursday PM and Saturday midday peaks are shown in Figure 9.3 to Figure 9.6. Scenario 3 travel times are increased when compared to the other models in the eastbound travel direction. This is attributed to the delays associated with the traffic signal on the western approach of the Shepherds Drive / Kenburn Avenue intersection. In the all other scenarios, through traffic on this approach is considered to be free flowing. In contrast, travel time on the westbound direction are predicted to reduce substantially when compared with Scenario 1 and Scenario 2. Scenario 3 demonstrates the most balanced 2027 travel times of the three scenarios modelled.

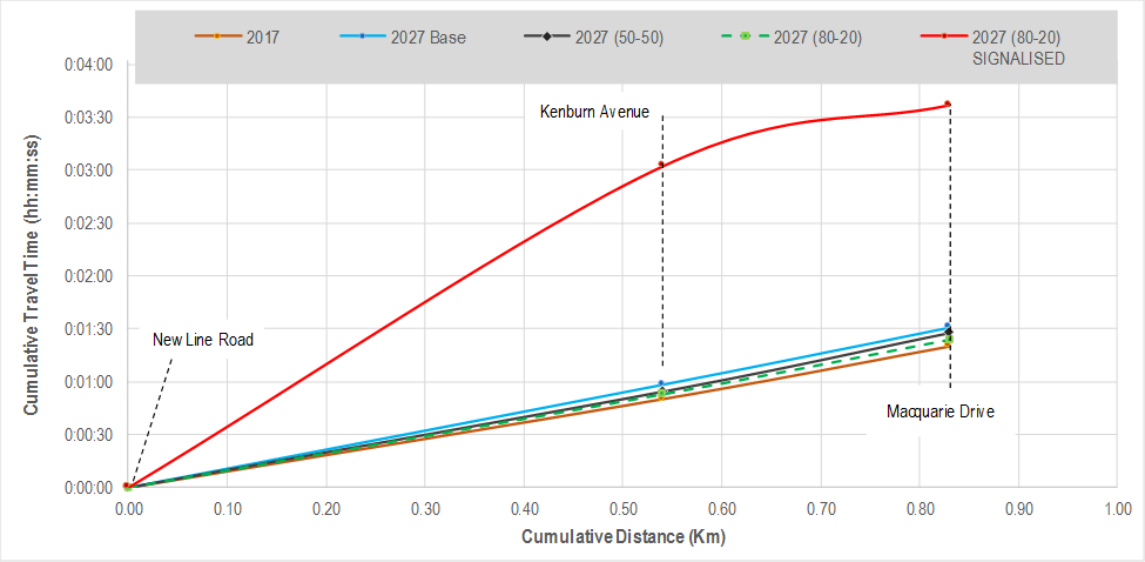


Figure 9.3: Scenario 3 Travel Time Comparison - Thursday (1500-1600) - Eastbound

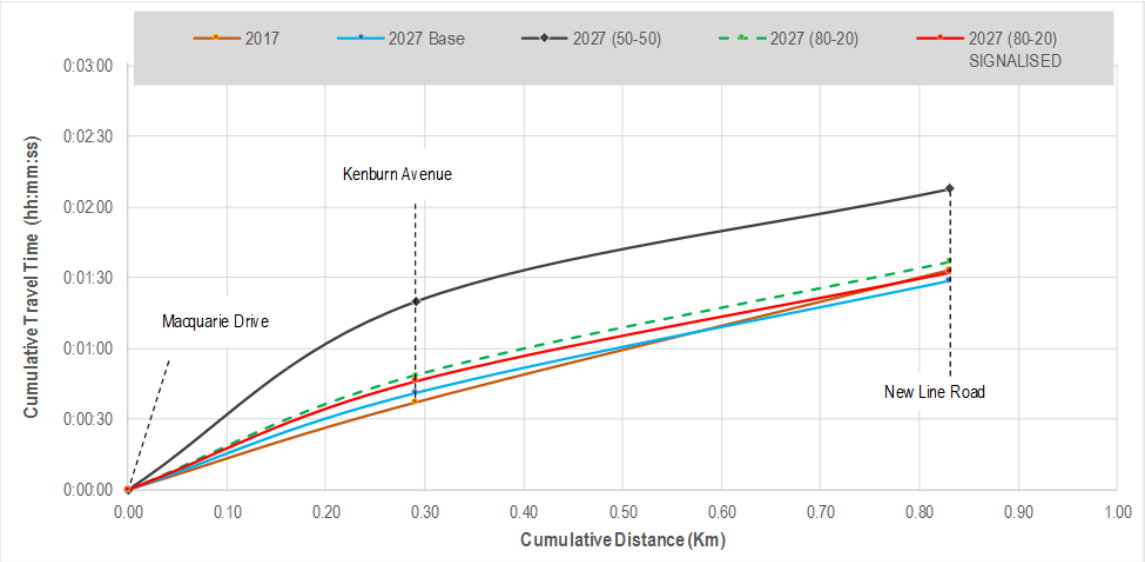


Figure 9.4: Scenario 3 Travel Time Comparison - Thursday (1500-1600) - Westbound

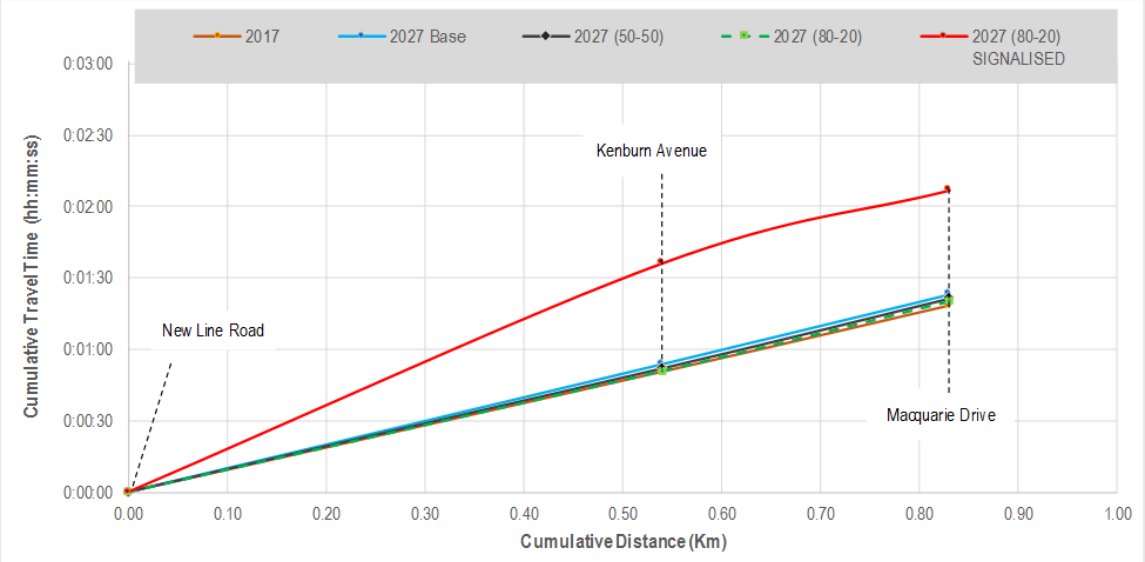


Figure 9.5: Scenario 3 Travel Time Comparison - Saturday (1030-1130) - Eastbound

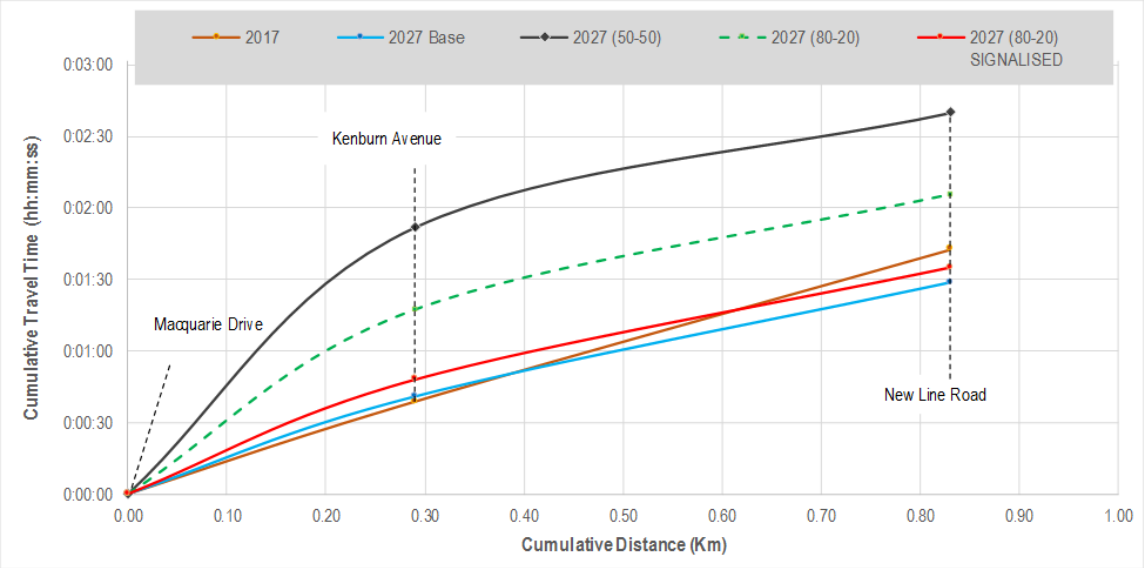


Figure 9.6: Scenario 3 Travel Time Comparison - Saturday (1030-1130) - Westbound

10. SUMMARY AND CONCLUSION

Bitzios Consulting was engaged by Hornsby Shire Council to undertake an independent assessment of the traffic reports submitted as part of the development proposal for reconfiguration and expansion of existing car parking facilities at Cherrybrook Village Shopping Centre. The peer review is expected to take into account the proposed development and the vehicular and pedestrian access requirements of the development site. As part of the assessment, an existing conditions traffic model was developed to assess the existing traffic performance. The model was then used to assess the future 2027 traffic performance. The model was also used to assess traffic performance of proposed improvement measures.

Modelled Scenario

The following scenarios were assessed in this study:

- The Existing 2017 Base Model;
- Future Base Case 2027 Model with No Development;
- Future Scenario 1: Future Base Case 2027 with Development (50/50 Split Trip Distribution from East/West);
- Future Scenario 2: Future Base Case 2027 with Development (20/80 Split Trip Distribution from East/West);
- Future Scenario 3: Future Base Case 2027 with Development (20/80 Split Trip Distribution from East/West and Shepherds Drive / Kenburn Avenue Signalised).

Key Conclusions

- The SIDRA model developed by the proponent of the development does not calibrate and validate to the existing traffic conditions. The model overestimates traffic capacity at the Shepherds Drive / Kenburn Avenue roundabout intersection. Therefore, the outcomes of the SIDRA traffic assessment which includes the development traffic, are not considered to be acceptable;
- The existing roundabout intersection at the Shepherds Drive / Kenburn Avenue intersection is predicted to provide very poor traffic performance with the 2027 PM and Saturday Peak projected traffic volumes that includes the additional traffic volumes from the proposed shopping centre extension;
- The Roads and Maritime signal warrant guidelines were adopted to determine whether the existing intersection at Shepherds Drive and Kenburn Avenue could be upgraded to a signalised intersection.
- The outcomes of the warrant assessment along with traffic modelling assessment, show that traffic signals are required before the future year 2027at the location of the existing roundabout intersection; and
- The signalised intersection will also provide safe pedestrian crossing facilities on all four approaches of the intersection.

APPENDIX A

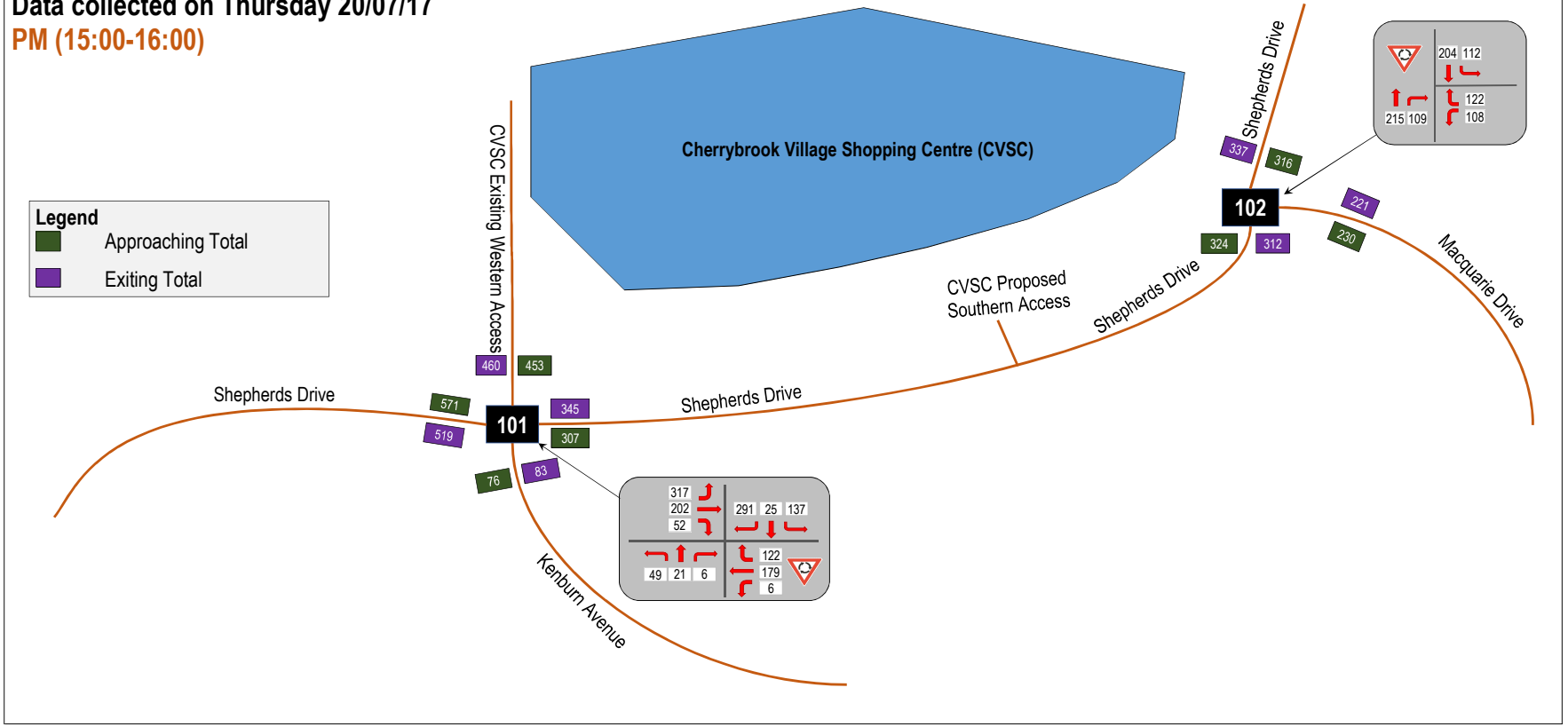
EXISTING HOURLY TRAFFIC AND PEDESTRIAN VOLUMES

Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on Thursday 20/07/17

PM (15:00-16:00)

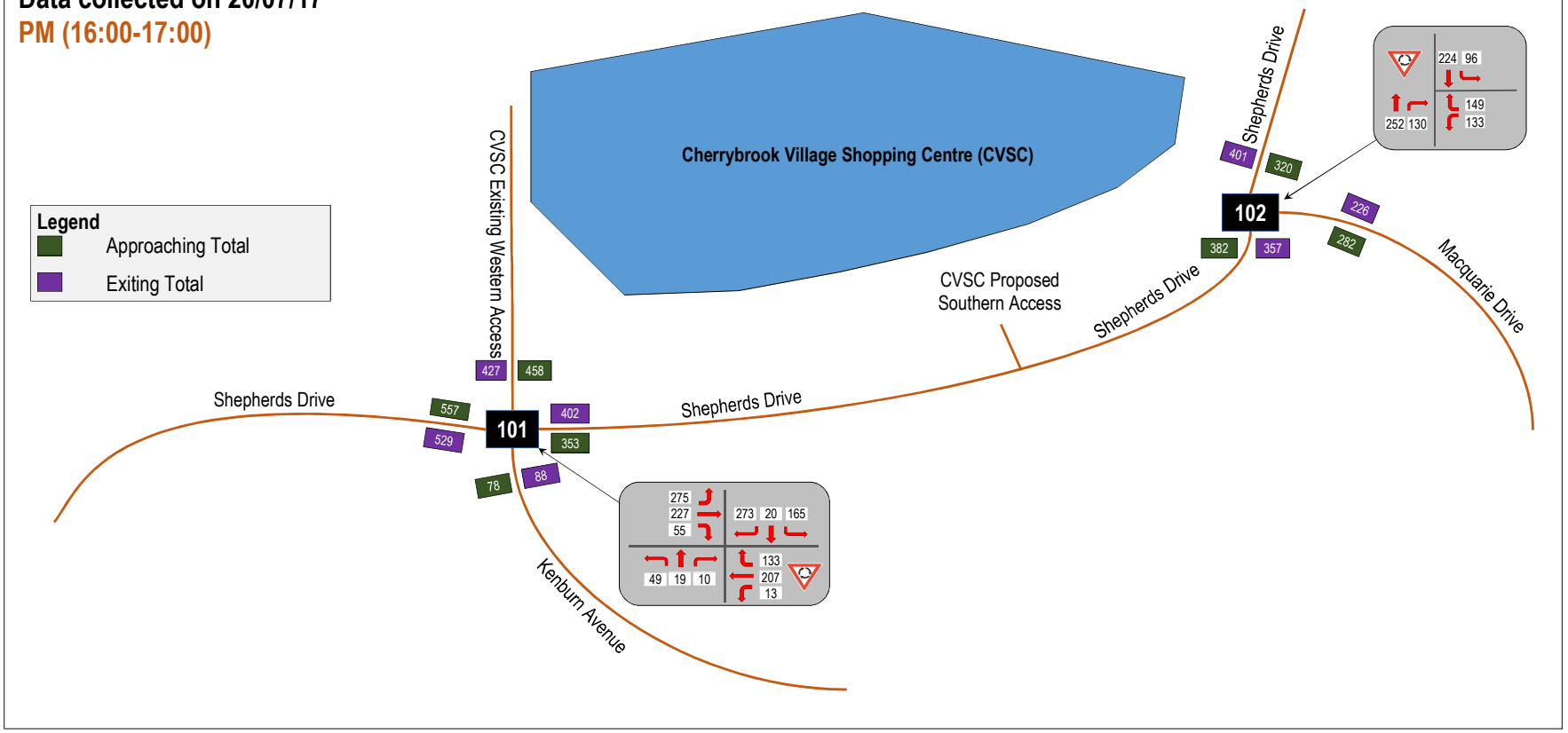


Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 20/07/17

PM (16:00-17:00)

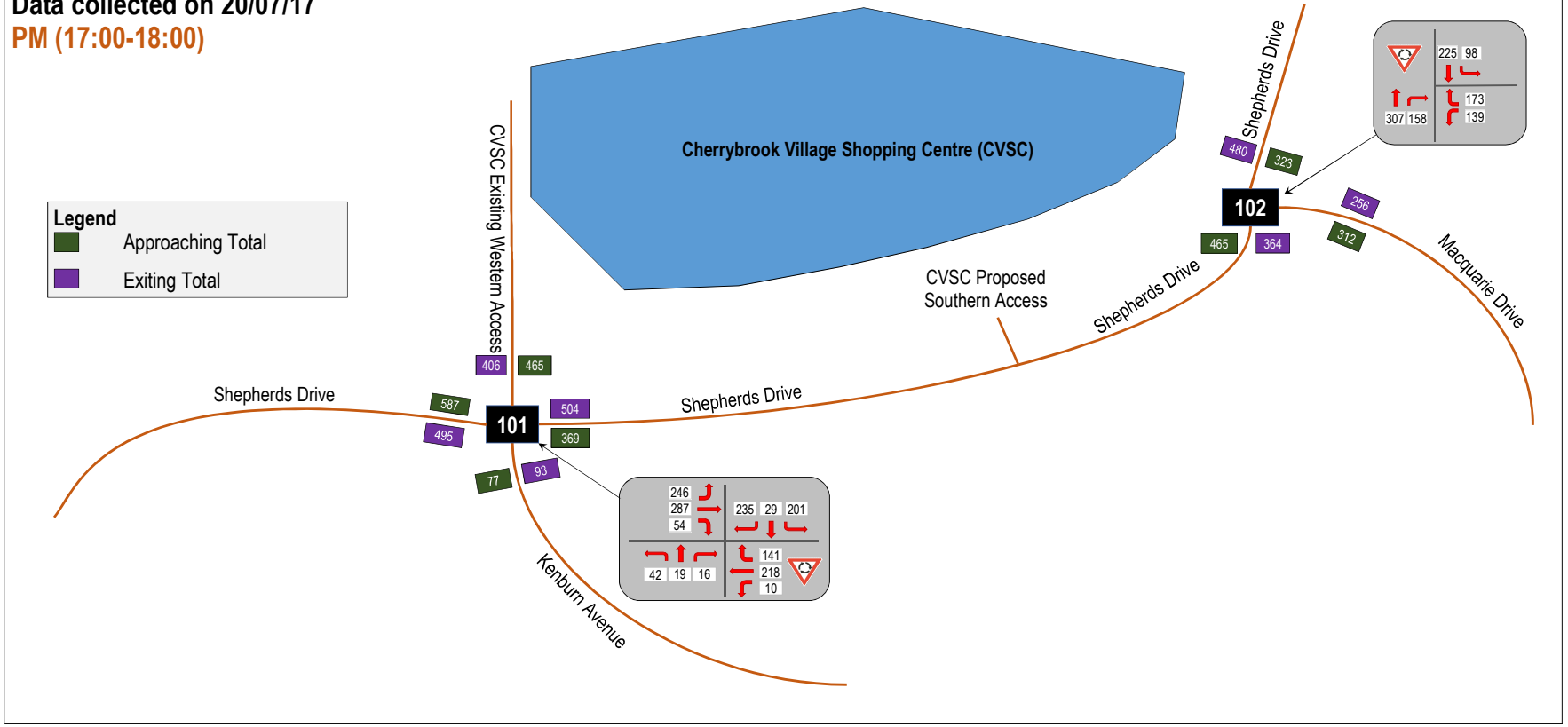


Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 20/07/17

PM (17:00-18:00)

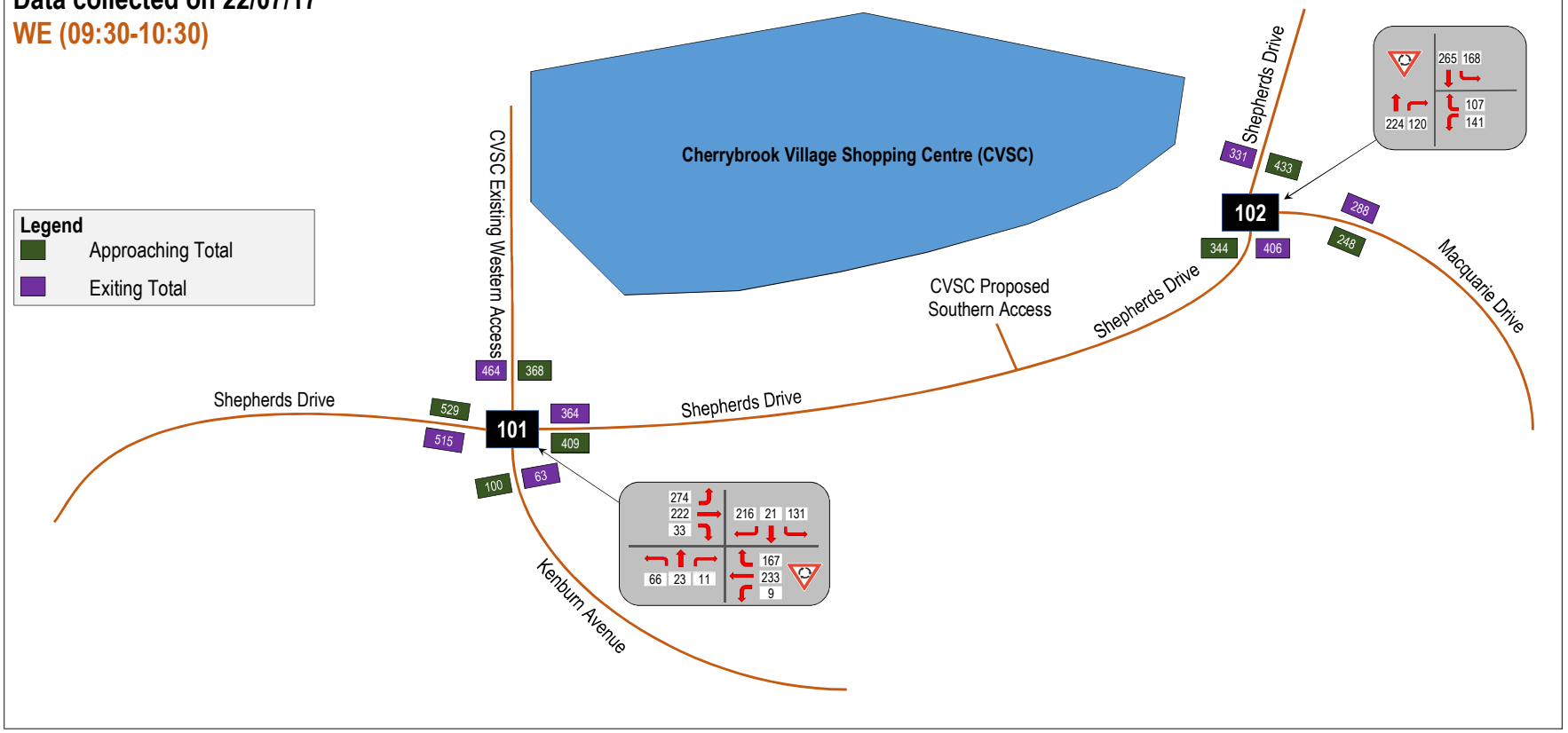


Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 22/07/17

WE (09:30-10:30)

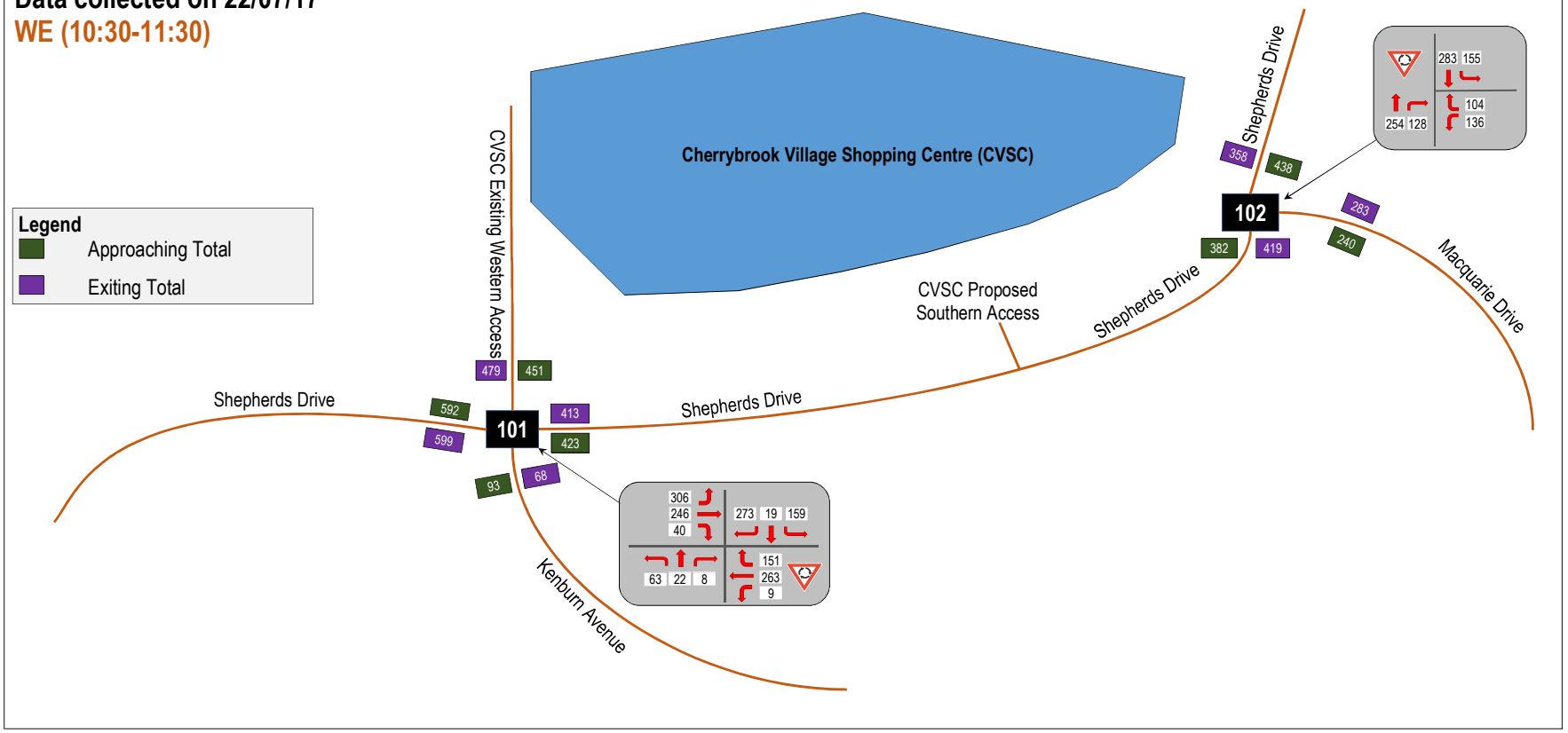


Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 22/07/17

WE (10:30-11:30)

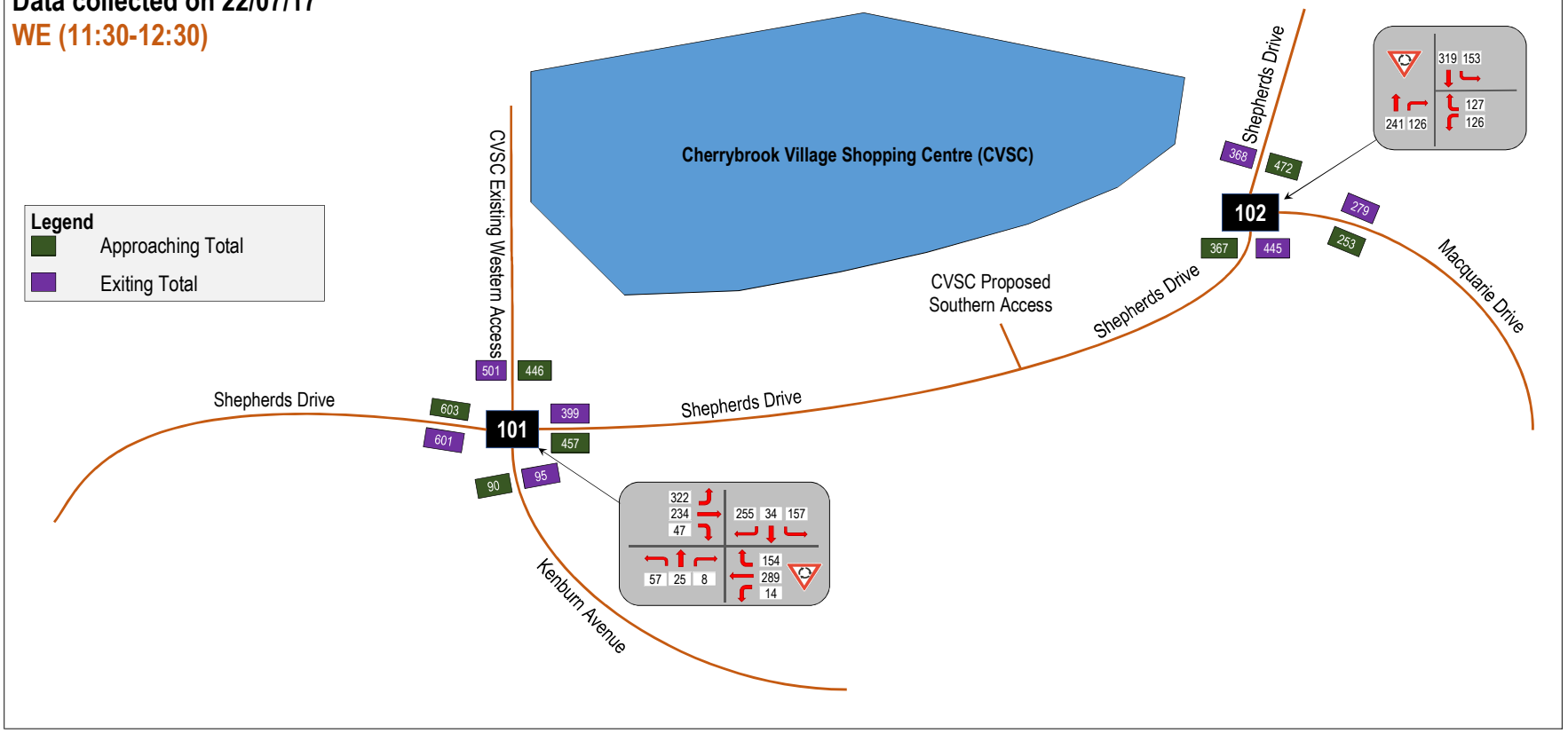


Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 22/07/17

WE (11:30-12:30)

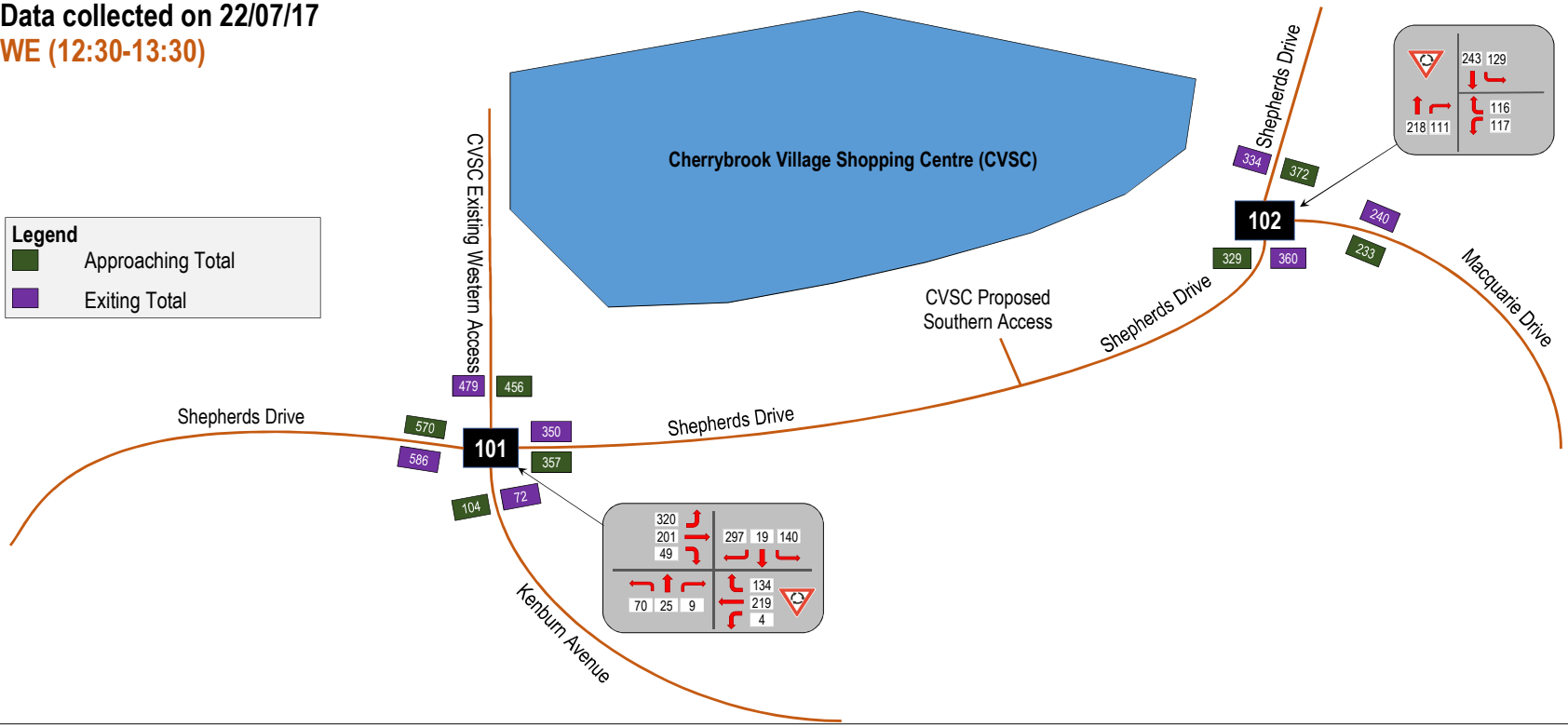


Cherrybrook Village Shopping Centre Peer Review and VISSIM Modelling

Traffic Survey Data Analysis

Data collected on 22/07/17

WE (12:30-13:30)



APPENDIX B

FUTURE 2027 DO MINIMUM NETWORK PERFORMANCE

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

PM Peak 1500-1600

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	292	291	14.0	A	9.3
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	25	24	9.5	A	9.3
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	136	138	1.4	A	5.0
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	119	117	13.8	A	8.6
				101-5		Shepherds Drive (W)	T	188	222	11.7	A	8.6
				101-6		Kenburn Avenue (S)	L	10	13	18.2	B	8.6
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	16	14.1	A	1.8
				101-8		CVSC Existing Western Access (N)	T	21	21	16.7	B	1.8
				101-9		Shepherds Drive (W)	L	49	57	14.0	A	1.8
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	53	63	5.7	A	4.2
				101-11		Shepherds Drive (E)	T	205	399	6.3	A	4.2
				101-12		CVSC Existing Western Access (N)	L	317	316	3.7	A	4.2
					All			1,423	1,677	8.6	A	4.8
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	204	268	1.1	A	0.2
		Macquarie Drive		102-3		Macquarie Drive (E)	L	113	136	1.2	A	0.2
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	122	149	2.5	A	0.7
				102-6		Shepherds Drive (S)	L	112	147	2.7	A	0.7
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	117	161	2.7	A	0.5
				102-8		Shepherds Drive (N)	T	231	289	2.7	A	0.5
					All			899	1,150	2.1	A	0.5
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	0.8	A	0.0
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		58	4.2	A	0.4
				103-5		Shepherds Drive (W)	T		356	0.2	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		390	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		164	-0.6	#N/A	0.0
					All			0	1,028	0.3	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

PM Peak 1600-1700

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	268	270	15.5	B	9.1
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	20	18.1	B	9.1
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	164	162	1.6	A	4.6
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	138	10.9	A	9.2
				101-5		Shepherds Drive (W)	T	216	257	11.8	A	9.2
				101-6		Kenburn Avenue (S)	L	11	13	7.0	A	9.2
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	14	23	30.3	C	4.9
				101-8		CVSC Existing Western Access (N)	T	22	18	22.6	B	4.9
				101-9		Shepherds Drive (W)	L	49	60	30.9	C	4.9
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	67	7.2	A	4.9
				101-11		Shepherds Drive (E)	T	233	428	7.0	A	4.9
				101-12		CVSC Existing Western Access (N)	L	276	274	3.4	A	4.8
					All			1,463	1,730	9.7	A	5.5
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	226	290	1.0	A	0.2
		Macquarie Drive		102-3		Macquarie Drive (E)	L	99	121	1.5	A	0.2
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	152	181	2.1	A	0.3
				102-6		Shepherds Drive (S)	L	136	175	2.4	A	0.3
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	140	181	3.1	A	0.6
				102-8		Shepherds Drive (N)	T	270	328	3.0	A	0.6
					All			1,023	1,276	2.2	A	0.4
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	1.6	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		59	3.8	A	0.3
				103-5		Shepherds Drive (W)	T		407	0.1	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		450	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		161	-0.6	#N/A	0.0
					All			0	1,137	0.3	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

PM Peak 1700-1800

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	237	239	21.8	B	11.2
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	29	29	17.7	B	11.2
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	200	201	3.6	A	6.3
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	139	12.2	A	9.0
				101-5		Shepherds Drive (W)	T	219	264	11.6	A	9.0
				101-6		Kenburn Avenue (S)	L	13	16	10.1	A	9.0
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	16	30	17.1	B	3.0
				101-8		CVSC Existing Western Access (N)	T	20	20	16.0	B	3.0
				101-9		Shepherds Drive (W)	L	42	49	25.0	B	3.0
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	62	11.4	A	11.2
				101-11		Shepherds Drive (E)	T	292	499	11.8	A	11.2
				101-12		CVSC Existing Western Access (N)	L	247	247	3.3	A	11.2
					All			1,506	1,795	11.6	A	7.8
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	223	295	1.5	A	0.5
		Macquarie Drive		102-3		Macquarie Drive (E)	L	104	121	2.0	A	0.5
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	178	215	3.0	A	1.0
				102-6		Shepherds Drive (S)	L	148	186	3.1	A	1.0
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	172	225	4.7	A	2.4
				102-8		Shepherds Drive (N)	T	335	410	4.9	A	2.4
					All			1,160	1,452	3.4	A	1.3
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		61	2.6	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		60	6.6	A	1.3
				103-5		Shepherds Drive (W)	T		418	0.4	A	0.6
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		572	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		159	-0.6	#N/A	0.0
					All			0	1,270	0.6	A	0.4

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

WE Peak 0930-1030

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	216	215	8.2	A	3.1
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	22	21	4.1	A	3.1
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	134	132	1.3	A	1.6
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	181	178	10.6	A	7.7
				101-5		Shepherds Drive (W)	T	242	292	8.6	A	7.7
				101-6		Kenburn Avenue (S)	L	10	14	9.3	A	7.7
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	9	19	32.8	C	4.7
				101-8		CVSC Existing Western Access (N)	T	27	23	24.8	B	4.7
				101-9		Shepherds Drive (W)	L	65	78	25.1	B	4.7
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	33	39	12.3	A	8.6
				101-11		Shepherds Drive (E)	T	225	424	9.9	A	8.6
				101-12		CVSC Existing Western Access (N)	L	273	269	4.6	A	8.5
					All			1,437	1,704	9.2	A	5.5
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	281	356	1.5	A	0.6
		Macquarie Drive		102-3		Macquarie Drive (E)	L	167	203	1.6	A	0.6
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	106	130	2.6	A	0.6
				102-6		Shepherds Drive (S)	L	149	185	3.3	A	0.6
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	124	172	2.7	A	0.5
				102-8		Shepherds Drive (N)	T	244	302	2.9	A	0.5
					All			1071	1,348	2.3	A	0.6
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	1.7	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		60	4.7	A	0.6
				103-5		Shepherds Drive (W)	T		481	0.3	A	0.2
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		412	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		161	-0.7	#N/A	0.0
					All			0	1,174	0.4	A	0.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

WE Peak 1030-1130

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	269	270	18.1	B	11.2
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	21	18.1	B	11.2
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	155	1.7	A	5.7
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	160	161	13.3	A	11.4
				101-5		Shepherds Drive (W)	T	247	296	12.5	A	11.4
				101-6		Kenburn Avenue (S)	L	14	15	14.3	A	11.4
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	17	32.4	C	6.7
				101-8		CVSC Existing Western Access (N)	T	23	23	32.0	C	6.7
				101-9		Shepherds Drive (W)	L	63	76	39.8	C	6.7
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	38	46	5.8	A	6.3
				101-11		Shepherds Drive (E)	T	249	449	8.0	A	6.3
				101-12		CVSC Existing Western Access (N)	L	303	306	4.9	A	6.2
					All			1,551	1,835	11.6	A	7.0
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	284	360	1.5	A	0.5
		Macquarie Drive		102-3		Macquarie Drive (E)	L	156	186	1.4	A	0.5
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	105	125	2.3	A	0.5
				102-6		Shepherds Drive (S)	L	137	174	2.4	A	0.5
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	138	181	2.8	A	0.4
				102-8		Shepherds Drive (N)	T	276	335	2.5	A	0.4
					All			1,096	1,361	2.1	A	0.5
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		59	1.5	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		61	3.9	A	0.3
				103-5		Shepherds Drive (W)	T		471	0.2	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		462	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		158	-0.6	#N/A	0.0
					All			0	1,211	0.3	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

WE Peak 1130-1230

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	258	259	16.5	B	10.0
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	35	32	14.7	A	10.0
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	160	1.5	A	5.1
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	165	172	22.4	B	28.7
				101-5		Shepherds Drive (W)	T	262	316	20.8	B	28.7
				101-6		Kenburn Avenue (S)	L	12	16	15.4	B	28.7
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	14	34.7	C	6.4
				101-8		CVSC Existing Western Access (N)	T	26	27	34.1	C	6.4
				101-9		Shepherds Drive (W)	L	57	65	38.9	C	6.4
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	50	59	10.8	A	10.1
				101-11		Shepherds Drive (E)	T	236	437	10.8	A	10.1
				101-12		CVSC Existing Western Access (N)	L	326	320	4.6	A	10.1
					All			1,593	1,877	14.1	A	10.9
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	317	399	1.8	A	0.8
		Macquarie Drive		102-3		Macquarie Drive (E)	L	155	182	1.6	A	0.8
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	129	155	3.0	A	0.8
				102-6		Shepherds Drive (S)	L	129	164	3.0	A	0.8
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	137	187	3.4	A	0.8
				102-8		Shepherds Drive (N)	T	263	330	3.0	A	0.8
					All			1,130	1,417	2.5	A	0.8
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		62	0.8	A	0.0
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		60	3.8	A	0.3
				103-5		Shepherds Drive (W)	T		503	0.4	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		451	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		161	-0.6	#N/A	0.0
					All			0	1,237	0.4	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (Base)

WE Peak 1230-1330

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (Base)	Delay (s)	LoS	Queue (m)
11700	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	296	293	12.4	A	7.6
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	18	21	9.5	A	7.6
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	139	139	1.4	A	3.9
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	140	139	15.3	B	13.4
				101-5		Shepherds Drive (W)	T	214	258	14.9	A	13.4
				101-6		Kenburn Avenue (S)	L	11	13	9.2	A	13.4
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	12	18	32.8	C	7.8
				101-8		CVSC Existing Western Access (N)	T	26	26	37.9	C	7.8
				101-9		Shepherds Drive (W)	L	72	84	37.8	C	7.8
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	49	56	9.7	A	6.3
				101-11		Shepherds Drive (E)	T	202	396	7.9	A	6.3
				101-12		CVSC Existing Western Access (N)	L	315	325	5.2	A	6.3
					All			1,494	1,768	11.4	A	6.9
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	244	315	1.2	A	0.4
		Macquarie Drive		102-3		Macquarie Drive (E)	L	130	156	1.2	A	0.4
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	115	137	1.8	A	0.3
				102-6		Shepherds Drive (S)	L	116	151	2.1	A	0.3
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	116	159	3.2	A	0.8
				102-8		Shepherds Drive (N)	T	239	293	2.9	A	0.8
					All			960	1,211	2.1	A	0.5
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		61	1.1	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		58	5.1	A	0.4
				103-5		Shepherds Drive (W)	T		411	0.3	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		392	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		160	-0.6	#N/A	0.0
					All			0	1,082	0.4	A	0.1

APPENDIX C

FUTURE 2027 SCENARIO 1 NETWORK PERFORMANCE

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

PM Peak 1500-1600

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	292	443	18.6	B	19.7
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	25	24	12.3	A	19.7
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	136	112	2.8	A	10.0
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	119	96	40.7	C	34.8
				101-5		Shepherds Drive (W)	T	188	228	30.1	C	34.8
				101-6		Kenburn Avenue (S)	L	10	13	27.3	B	34.8
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	14	65.0	E	7.9
				101-8		CVSC Existing Western Access (N)	T	21	20	52.8	D	7.9
				101-9		Shepherds Drive (W)	L	49	60	47.6	D	7.9
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	53	61	4.2	A	2.1
				101-11		Shepherds Drive (E)	T	205	341	4.3	A	2.1
				101-12		CVSC Existing Western Access (N)	L	317	362	3.7	A	2.1
					All			1,423	1,774	15.7	B	11.2
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	204	311	1.1	A	0.4
		Macquarie Drive		102-3		Macquarie Drive (E)	L	113	136	1.2	A	0.4
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	122	145	2.4	A	0.5
				102-6		Shepherds Drive (S)	L	112	170	2.4	A	0.5
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	117	182	2.6	A	0.4
				102-8		Shepherds Drive (N)	T	231	311	2.7	A	0.4
					All			899	1,255	2.0	A	0.4
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		125	1.1	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		149	2.7	A	0.8
				103-5		Shepherds Drive (W)	T		335	2.5	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		368	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		100	-0.6	#N/A	0.0
					All			0	1,077	1.3	A	0.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

PM Peak 1600-1700

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	268	420	25.8	B	27.1
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	19	23.1	B	27.1
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	164	138	4.2	A	14.2
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	108	38.8	C	44.0
				101-5		Shepherds Drive (W)	T	216	253	36.5	C	44.0
				101-6		Kenburn Avenue (S)	L	11	13	50.3	D	44.0
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	14	20	93.9	F	16.9
				101-8		CVSC Existing Western Access (N)	T	22	20	109.9	F	16.9
				101-9		Shepherds Drive (W)	L	49	56	95.7	F	16.9
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	67	6.1	A	4.0
				101-11		Shepherds Drive (E)	T	233	365	6.1	A	4.0
				101-12		CVSC Existing Western Access (N)	L	276	327	3.9	A	4.0
					All			1,463	1,806	21.7	B	16.2
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	226	334	1.3	A	0.3
		Macquarie Drive		102-3		Macquarie Drive (E)	L	99	119	1.2	A	0.3
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	152	182	2.4	A	0.6
				102-6		Shepherds Drive (S)	L	136	196	2.5	A	0.6
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	140	196	3.4	A	0.8
				102-8		Shepherds Drive (N)	T	270	347	3.3	A	0.8
					All			1,023	1,374	2.4	A	0.6
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		124	1.4	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		150	3.3	A	1.1
				103-5		Shepherds Drive (W)	T		379	1.4	A	0.2
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		424	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		97	-0.6	#N/A	0.0
					All			0	1,174	1.0	A	0.3

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

PM Peak 1700-1800

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	237	385	51.2	D	46.0
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	29	27	52.1	D	46.0
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	200	176	13.4	A	36.2
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	113	37.8	C	43.8
				101-5		Shepherds Drive (W)	T	219	258	32.8	C	43.8
				101-6		Kenburn Avenue (S)	L	13	13	40.6	C	43.8
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	16	28	34.7	C	5.3
				101-8		CVSC Existing Western Access (N)	T	20	17	32.1	C	5.3
				101-9		Shepherds Drive (W)	L	42	52	38.8	C	5.3
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	65	7.8	A	6.0
				101-11		Shepherds Drive (E)	T	292	447	7.9	A	6.0
				101-12		CVSC Existing Western Access (N)	L	247	297	3.4	A	6.0
					All			1,506	1,878	24.1	B	22.3
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	223	335	2.3	A	1.2
		Macquarie Drive		102-3		Macquarie Drive (E)	L	104	123	2.7	A	1.2
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	178	214	2.8	A	0.9
				102-6		Shepherds Drive (S)	L	148	209	3.2	A	0.9
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	172	239	5.8	A	4.5
				102-8		Shepherds Drive (N)	T	335	433	5.9	A	4.5
					All			1,160	1,553	4.1	A	2.2
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		124	2.2	A	0.3
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		151	5.0	A	1.8
				103-5		Shepherds Drive (W)	T		389	1.9	A	0.5
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		546	0.3	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		105	-0.7	#N/A	0.0
					All			0	1,315	1.4	A	0.6

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

WE Peak 0930-1030

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	216	366	10.5	A	8.0
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	22	21	9.9	A	8.0
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	134	105	1.1	A	4.0
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	181	153	22.9	B	28.1
				101-5		Shepherds Drive (W)	T	242	285	21.8	B	28.1
				101-6		Kenburn Avenue (S)	L	10	14	36.6	C	28.1
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	9	16	140.7	F	34.1
				101-8		CVSC Existing Western Access (N)	T	27	24	146.8	F	34.1
				101-9		Shepherds Drive (W)	L	65	73	149.1	F	34.1
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	33	40	5.2	A	2.6
				101-11		Shepherds Drive (E)	T	225	360	5.2	A	2.6
				101-12		CVSC Existing Western Access (N)	L	273	323	4.1	A	2.5
					All			1,437	1,780	19.3	B	12.5
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	281	406	1.4	A	0.5
		Macquarie Drive		102-3		Macquarie Drive (E)	L	167	202	1.6	A	0.5
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	106	127	2.8	A	1.1
				102-6		Shepherds Drive (S)	L	149	201	4.0	A	1.1
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	124	182	3.2	A	0.5
				102-8		Shepherds Drive (N)	T	244	321	2.8	A	0.5
					All			1071	1,439	2.5	A	0.7
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		124	1.2	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		152	2.7	A	0.7
				103-5		Shepherds Drive (W)	T		457	0.6	A	0.1
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		379	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		101	-0.7	#N/A	0.0
					All			0	1,213	0.7	A	0.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

WE Peak 1030-1130

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	269	420	22.5	B	21.9
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	19	18.0	B	21.9
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	134	4.7	A	14.2
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	160	129	38.6	C	74.8
				101-5		Shepherds Drive (W)	T	247	287	41.4	C	74.8
				101-6		Kenburn Avenue (S)	L	14	14	33.6	C	74.8
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	12	128.6	F	34.5
				101-8		CVSC Existing Western Access (N)	T	23	18	164.0	F	34.5
				101-9		Shepherds Drive (W)	L	63	71	159.0	F	34.5
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	38	46	5.2	A	3.7
				101-11		Shepherds Drive (E)	T	249	397	6.1	A	3.7
				101-12		CVSC Existing Western Access (N)	L	303	354	3.7	A	3.7
					All			1,551	1,901	25.0	B	24.2
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	284	405	3.1	A	1.6
		Macquarie Drive		102-3		Macquarie Drive (E)	L	156	185	2.7	A	1.6
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	105	125	2.6	A	1.0
				102-6		Shepherds Drive (S)	L	137	191	4.3	A	1.0
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	138	205	3.1	A	0.7
				102-8		Shepherds Drive (N)	T	276	363	2.9	A	0.7
					All			1,096	1,474	3.1	A	1.1
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		125	1.9	A	0.3
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		145	4.8	A	14.0
				103-5		Shepherds Drive (W)	T		440	7.3	A	10.9
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		445	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		96	-0.7	#N/A	0.0
					All			0	1,251	3.3	A	5.0

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

WE Peak 1130-1230

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	258	408	26.1	B	26.0
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	35	35	19.7	B	26.0
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	135	3.7	A	18.0
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	165	146	49.2	D	107.2
				101-5		Shepherds Drive (W)	T	262	313	45.3	D	107.2
				101-6		Kenburn Avenue (S)	L	12	17	36.0	C	107.2
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	13	453.3	F	86.4
				101-8		CVSC Existing Western Access (N)	T	26	28	440.7	F	86.4
				101-9		Shepherds Drive (W)	L	57	71	422.0	F	86.4
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	50	58	7.7	A	5.4
				101-11		Shepherds Drive (E)	T	236	377	6.9	A	5.4
				101-12		CVSC Existing Western Access (N)	L	326	370	4.9	A	5.4
					All			1,593	1,971	44.1	D	40.1
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	317	449	4.2	A	2.7
		Macquarie Drive		102-3		Macquarie Drive (E)	L	155	186	2.9	A	2.7
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	129	157	4.2	A	1.6
				102-6		Shepherds Drive (S)	L	129	178	6.6	A	1.6
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	137	200	3.9	A	1.2
				102-8		Shepherds Drive (N)	T	263	353	3.7	A	1.2
					All			1,130	1,523	4.2	A	1.8
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		123	1.7	A	0.3
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		153	6.5	A	36.9
				103-5		Shepherds Drive (W)	T		477	13.5	A	30.6
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		426	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		102	-0.6	#N/A	0.0
					All			0	1,281	6.0	A	13.6

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (50-50)

WE Peak 1230-1330

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (50-50)	Delay (s)	LoS	Queue (m)
11700	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	296	441	22.7	B	24.2
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	18	19	23.0	B	24.2
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	139	110	4.6	A	13.1
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	140	117	49.1	D	86.2
				101-5		Shepherds Drive (W)	T	214	272	45.6	D	86.2
				101-6		Kenburn Avenue (S)	L	11	13	40.7	C	86.2
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	12	19	316.9	F	74.8
				101-8		CVSC Existing Western Access (N)	T	26	28	300.1	F	74.8
				101-9		Shepherds Drive (W)	L	72	91	284.0	F	74.8
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	49	59	4.7	A	3.5
				101-11		Shepherds Drive (E)	T	202	340	5.2	A	3.5
				101-12		CVSC Existing Western Access (N)	L	315	374	4.9	A	3.4
					All			1,494	1,883	39.2	C	32.3
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	244	361	10.8	A	11.9
		Macquarie Drive		102-3		Macquarie Drive (E)	L	130	155	5.1	A	11.9
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	115	138	19.9	B	12.9
				102-6		Shepherds Drive (S)	L	116	167	20.3	B	12.9
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	116	180	2.8	A	0.7
				102-8		Shepherds Drive (N)	T	239	314	2.9	A	0.7
					All			960	1,315	9.3	A	8.5
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		127	1.4	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		146	8.2	A	57.9
				103-5		Shepherds Drive (W)	T		387	17.8	B	50.4
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		368	0.1	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		100	-0.6	#N/A	0.0
					All			0	1,128	7.3	A	21.7

APPENDIX D

FUTURE 2027 SCENARIO 2 NETWORK PERFORMANCE

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

PM Peak 1500-1600

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	292	505	79.9	F	77.5
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	25	23	79.3	F	77.5
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	136	89	45.7	D	44.0
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	119	43	28.8	B	17.2
				101-5		Shepherds Drive (W)	T	188	214	29.7	C	17.2
				101-6		Kenburn Avenue (S)	L	10	13	42.8	C	17.2
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	16	38.8	C	5.2
				101-8		CVSC Existing Western Access (N)	T	21	21	25.0	B	5.2
				101-9		Shepherds Drive (W)	L	49	57	39.1	C	5.2
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	53	62	3.5	A	1.4
				101-11		Shepherds Drive (E)	T	205	399	4.1	A	1.4
				101-12		CVSC Existing Western Access (N)	L	317	392	3.2	A	1.3
					All			1,423	1,834	33.2	C	18.8
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	204	246	1.1	A	0.4
		Macquarie Drive		102-3		Macquarie Drive (E)	L	113	136	1.4	A	0.4
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	122	149	2.1	A	0.6
				102-6		Shepherds Drive (S)	L	112	126	2.3	A	0.6
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	117	140	2.3	A	0.4
				102-8		Shepherds Drive (N)	T	231	265	2.8	A	0.4
					All			899	1,062	2.0	A	0.5
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	0.6	A	0.0
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		90	3.3	A	0.4
				103-5		Shepherds Drive (W)	T		280	0.2	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		344	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		161	-0.7	#N/A	0.0
					All			0	935	0.4	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

PM Peak 1600-1700

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	268	474	93.1	F	86.5
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	20	83.8	F	86.5
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	164	115	62.5	E	90.5
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	69	39.4	C	37.8
				101-5		Shepherds Drive (W)	T	216	264	42.0	C	37.8
				101-6		Kenburn Avenue (S)	L	11	13	40.9	C	37.8
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	14	23	76.1	F	17.1
				101-8		CVSC Existing Western Access (N)	T	22	18	84.8	F	17.1
				101-9		Shepherds Drive (W)	L	49	60	105.2	F	17.1
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	66	7.3	A	5.1
				101-11		Shepherds Drive (E)	T	233	426	6.2	A	5.1
				101-12		CVSC Existing Western Access (N)	L	276	356	3.8	A	5.1
					All			1,463	1,904	42.8	C	41.0
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	226	270	0.9	A	0.3
		Macquarie Drive		102-3		Macquarie Drive (E)	L	99	121	1.1	A	0.3
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	152	180	2.0	A	0.5
				102-6		Shepherds Drive (S)	L	136	157	2.3	A	0.5
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	140	157	3.0	A	0.9
				102-8		Shepherds Drive (N)	T	270	303	3.7	A	0.9
					All			1,023	1,188	2.3	A	0.6
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	1.4	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		89	3.5	A	0.6
				103-5		Shepherds Drive (W)	T		339	0.7	A	0.1
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		403	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		160	-0.6	#N/A	0.0
					All			0	1,051	0.6	A	0.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

PM Peak 1700-1800

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	237	392	116.4	F	86.7
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	29	23	111.0	F	86.7
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	200	120	74.7	F	87.8
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	67	20.0	B	14.2
				101-5		Shepherds Drive (W)	T	219	262	20.8	B	14.2
				101-6		Kenburn Avenue (S)	L	13	16	17.9	B	14.2
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	16	29	40.1	C	6.6
				101-8		CVSC Existing Western Access (N)	T	20	20	40.9	C	6.6
				101-9		Shepherds Drive (W)	L	42	48	38.6	C	6.6
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	64	4.8	A	4.3
				101-11		Shepherds Drive (E)	T	292	500	6.4	A	4.3
				101-12		CVSC Existing Western Access (N)	L	247	326	3.7	A	4.3
					All			1,506	1,867	39.0	C	34.2
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	223	273	1.3	A	0.4
		Macquarie Drive		102-3		Macquarie Drive (E)	L	104	121	1.7	A	0.4
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	178	215	2.5	A	0.7
				102-6		Shepherds Drive (S)	L	148	165	2.6	A	0.7
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	172	190	4.1	A	1.4
				102-8		Shepherds Drive (N)	T	335	363	4.1	A	1.4
					All			1,160	1,327	2.9	A	0.8
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		61	2.7	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		91	4.1	A	0.6
				103-5		Shepherds Drive (W)	T		347	0.4	A	0.1
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		490	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		158	-0.6	#N/A	0.0
					All			0	1,147	0.6	A	0.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 0930-1030

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	216	453	36.4	C	38.8
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	22	21	36.2	C	38.8
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	134	91	8.0	A	26.8
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	181	65	32.4	C	29.6
				101-5		Shepherds Drive (W)	T	242	287	30.5	C	29.6
				101-6		Kenburn Avenue (S)	L	10	13	26.5	B	29.6
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	9	18	137.4	F	24.9
				101-8		CVSC Existing Western Access (N)	T	27	22	106.3	F	24.9
				101-9		Shepherds Drive (W)	L	65	73	101.7	F	24.9
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	33	39	4.7	A	1.7
				101-11		Shepherds Drive (E)	T	225	420	4.0	A	1.7
				101-12		CVSC Existing Western Access (N)	L	273	353	2.8	A	1.7
					All			1,437	1,855	23.9	B	18.6
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	281	336	1.3	A	0.4
		Macquarie Drive		102-3		Macquarie Drive (E)	L	167	202	1.2	A	0.4
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	106	128	2.0	A	0.4
				102-6		Shepherds Drive (S)	L	149	167	2.8	A	0.4
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	124	146	2.2	A	0.2
				102-8		Shepherds Drive (N)	T	244	280	2.2	A	0.2
					All			1071	1,259	1.9	A	0.3
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	0.7	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		131	3.2	A	0.5
				103-5		Shepherds Drive (W)	T		373	0.4	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		364	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		164	-0.6	#N/A	0.0
					All			0	1,092	0.5	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 1030-1130

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	269	457	71.9	F	66.9
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	17	84.5	F	66.9
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	106	41.6	C	60.1
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	160	52	46.2	D	35.6
				101-5		Shepherds Drive (W)	T	247	301	35.9	C	35.6
				101-6		Kenburn Avenue (S)	L	14	17	40.0	C	35.6
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	16	137.8	F	28.3
				101-8		CVSC Existing Western Access (N)	T	23	24	119.0	F	28.3
				101-9		Shepherds Drive (W)	L	63	82	149.3	F	28.3
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	38	48	4.3	A	1.7
				101-11		Shepherds Drive (E)	T	249	450	4.4	A	1.7
				101-12		CVSC Existing Western Access (N)	L	303	384	3.2	A	1.6
					All			1,551	1,954	37.5	C	31.2
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	284	339	1.3	A	0.5
		Macquarie Drive		102-3		Macquarie Drive (E)	L	156	188	1.0	A	0.5
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	105	126	1.9	A	0.4
				102-6		Shepherds Drive (S)	L	137	152	2.2	A	0.4
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	138	161	2.9	A	0.8
				102-8		Shepherds Drive (N)	T	276	314	2.5	A	0.8
					All			1,096	1,280	1.9	A	0.5
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		59	1.5	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	4.2	A	0.9
				103-5		Shepherds Drive (W)	T		360	0.5	A	0.2
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		418	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		153	-0.6	#N/A	0.0
					All			0	1,120	0.7	A	0.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 1130-1230

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	258	455	101.4	F	85.8
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	35	28	95.6	F	85.8
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	102	65.1	E	89.4
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	165	60	40.0	C	43.8
				101-5		Shepherds Drive (W)	T	262	312	37.1	C	43.8
				101-6		Kenburn Avenue (S)	L	12	16	40.8	C	43.8
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	15	73.8	F	17.1
				101-8		CVSC Existing Western Access (N)	T	26	27	100.9	F	17.1
				101-9		Shepherds Drive (W)	L	57	65	90.5	F	17.1
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	50	54	5.3	A	4.2
				101-11		Shepherds Drive (E)	T	236	443	5.7	A	4.2
				101-12		CVSC Existing Western Access (N)	L	326	403	4.5	A	4.1
					All			1,593	1,980	42.6	C	41.3
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	317	381	1.5	A	0.9
		Macquarie Drive		102-3		Macquarie Drive (E)	L	155	182	1.7	A	0.9
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	129	155	2.2	A	0.5
				102-6		Shepherds Drive (S)	L	129	143	2.5	A	0.5
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	137	162	3.0	A	0.9
				102-8		Shepherds Drive (N)	T	263	299	3.1	A	0.9
					All			1,130	1,322	2.3	A	0.8
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		62	1.8	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	4.5	A	1.9
				103-5		Shepherds Drive (W)	T		392	1.1	A	0.9
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		397	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		166	-0.6	#N/A	0.0
					All			0	1,147	0.9	A	0.6

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 1230-1330

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
11700	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	296	500	87.6	F	86.1
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	18	23	90.6	F	86.1
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	139	104	63.2	E	76.5
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	140	26	29.5	C	15.9
				101-5		Shepherds Drive (W)	T	214	262	26.5	B	15.9
				101-6		Kenburn Avenue (S)	L	11	13	31.7	C	15.9
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	12	18	115.8	F	26.8
				101-8		CVSC Existing Western Access (N)	T	26	26	126.9	F	26.8
				101-9		Shepherds Drive (W)	L	72	79	111.6	F	26.8
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	49	60	3.7	A	1.5
				101-11		Shepherds Drive (E)	T	202	393	3.8	A	1.5
				101-12		CVSC Existing Western Access (N)	L	315	404	3.3	A	1.5
					All			1,494	1,908	40.8	C	33.1
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	244	294	1.1	A	0.4
		Macquarie Drive		102-3		Macquarie Drive (E)	L	130	156	1.1	A	0.4
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	115	137	1.6	A	0.2
				102-6		Shepherds Drive (S)	L	116	130	1.8	A	0.2
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	116	143	2.8	A	0.6
				102-8		Shepherds Drive (N)	T	239	275	2.7	A	0.6
					All			960	1,135	1.9	A	0.4
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		61	1.3	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	4.2	A	0.8
				103-5		Shepherds Drive (W)	T		297	0.4	A	0.1
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		359	0.2	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		156	-0.6	#N/A	0.0
					All			0	1,003	0.7	A	0.2

APPENDIX E

FUTURE 2027 SCENARIO 3 NETWORK PERFORMANCE

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

PM Peak 1500-1600

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	292	534	47.5	D	35.6
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	25	25	57.2	E	35.6
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	136	96	56.6	D	35.6
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	119	44	57.9	E	5.5
				101-5		Shepherds Drive (W)	T	188	217	17.6	B	5.5
				101-6		Kenburn Avenue (S)	L	10	13	25.4	B	5.5
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	16	48.4	D	6.7
				101-8		CVSC Existing Western Access (N)	T	21	21	43.0	D	6.7
				101-9		Shepherds Drive (W)	L	49	60	46.0	D	6.7
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	53	59	48.8	D	70.4
				101-11		Shepherds Drive (E)	T	205	396	49.9	D	70.1
				101-12		CVSC Existing Western Access (N)	L	317	388	70.1	F	70.1
					All			1,423	1,869	49.9	D	37.7
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	204	246	1.1	A	0.3
		Macquarie Drive		102-3		Macquarie Drive (E)	L	113	136	1.0	A	0.3
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	122	149	1.8	A	0.3
				102-6		Shepherds Drive (S)	L	112	125	1.9	A	0.3
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	117	141	3.1	A	0.4
				102-8		Shepherds Drive (N)	T	231	270	2.7	A	0.4
					All			899	1,067	2.0	A	0.3
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		60	1.4	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		90	3.1	A	0.4
				103-5		Shepherds Drive (W)	T		280	0.2	A	0.0
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		350	0.4	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		159	-0.6	#N/A	0.0
					All			0	939	0.5	A	0.1

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

PM Peak 1600-1700

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	268	491	60.0	E	46.0
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	20	71.7	F	46.0
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	164	120	76.5	F	46.0
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	67	91.9	F	11.3
				101-5		Shepherds Drive (W)	T	216	259	20.0	B	11.3
				101-6		Kenburn Avenue (S)	L	11	13	15.7	B	11.3
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	14	24	66.8	E	10.1
				101-8		CVSC Existing Western Access (N)	T	22	18	38.0	C	10.1
				101-9		Shepherds Drive (W)	L	49	58	64.8	E	10.1
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	63	64.8	E	90.4
				101-11		Shepherds Drive (E)	T	233	413	65.9	E	90.2
				101-12		CVSC Existing Western Access (N)	L	276	343	87.3	F	90.2
					All			1,463	1,889	62.9	E	49.6
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	226	270	0.9	A	0.2
		Macquarie Drive		102-3		Macquarie Drive (E)	L	99	121	1.2	A	0.2
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	152	180	2.0	A	0.4
				102-6		Shepherds Drive (S)	L	136	156	2.4	A	0.4
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	140	158	4.2	A	1.3
				102-8		Shepherds Drive (N)	T	270	298	3.9	A	1.3
					All			1,023	1,183	2.5	A	0.6
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		59	2.2	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		89	7.3	A	1.3
				103-5		Shepherds Drive (W)	T		338	0.4	A	0.3
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		397	0.5	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		158	-0.6	#N/A	0.0
					All			0	1,041	1.0	A	0.4

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

PM Peak 1700-1800

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	237	473	90.1	F	66.7
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	29	26	109.6	F	66.7
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	200	149	102.1	F	66.7
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	137	64	150.6	F	18.4
				101-5		Shepherds Drive (W)	T	219	265	22.1	B	18.4
				101-6		Kenburn Avenue (S)	L	13	16	25.2	B	18.4
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	16	28	48.6	D	7.8
				101-8		CVSC Existing Western Access (N)	T	20	20	48.6	D	7.8
				101-9		Shepherds Drive (W)	L	42	48	51.6	D	7.8
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	54	70	87.8	F	172.4
				101-11		Shepherds Drive (E)	T	292	496	93.7	F	172.1
				101-12		CVSC Existing Western Access (N)	L	247	329	111.3	F	172.1
					All			1,506	1,984	86.0	F	87.5
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	223	272	1.4	A	0.6
		Macquarie Drive		102-3		Macquarie Drive (E)	L	104	121	2.0	A	0.6
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	178	215	2.6	A	0.6
				102-6		Shepherds Drive (S)	L	148	165	2.7	A	0.6
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	172	200	5.5	A	2.9
				102-8		Shepherds Drive (N)	T	335	378	5.2	A	2.9
					All			1,160	1,351	3.5	A	1.4
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		62	3.6	A	0.3
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		91	9.5	A	3.2
				103-5		Shepherds Drive (W)	T		346	1.3	A	1.6
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		516	0.6	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		155	-0.6	#N/A	0.0
					All			0	1,170	1.5	A	1.0

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 0930-1030

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
900	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	216	460	50.1	D	31.1
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	22	22	61.0	E	31.1
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	134	91	53.0	D	31.1
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	181	63	160.2	F	23.5
				101-5		Shepherds Drive (W)	T	242	287	26.3	B	23.5
				101-6		Kenburn Avenue (S)	L	10	14	9.4	A	23.5
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	9	20	115.3	F	22.5
				101-8		CVSC Existing Western Access (N)	T	27	24	103.8	F	22.5
				101-9		Shepherds Drive (W)	L	65	80	104.1	F	22.5
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	33	39	44.5	D	72.9
				101-11		Shepherds Drive (E)	T	225	417	41.8	C	72.7
				101-12		CVSC Existing Western Access (N)	L	273	348	56.0	D	72.7
					All			1,437	1,865	53.0	D	44.5
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	281	335	2.8	A	11.9
		Macquarie Drive		102-3		Macquarie Drive (E)	L	167	203	1.8	A	11.9
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	106	129	6.2	A	6.7
				102-6		Shepherds Drive (S)	L	149	165	7.6	A	6.7
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	124	146	5.2	A	4.3
				102-8		Shepherds Drive (N)	T	244	280	6.4	A	4.3
					All			1071	1,258	4.7	A	7.6
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		61	1.9	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	8.6	A	6.6
				103-5		Shepherds Drive (W)	T		371	1.6	A	4.4
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		364	0.8	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		166	-0.6	#N/A	0.0
					All			0	1,092	1.9	A	2.2

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 1030-1130

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
4500	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	269	499	60.8	E	44.5
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	19	18	65.5	E	44.5
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	115	71.9	F	44.5
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	160	54	156.9	F	15.0
				101-5		Shepherds Drive (W)	T	247	298	22.6	B	15.0
				101-6		Kenburn Avenue (S)	L	14	16	20.9	B	15.0
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	15	76.4	F	13.5
				101-8		CVSC Existing Western Access (N)	T	23	22	66.6	E	13.5
				101-9		Shepherds Drive (W)	L	63	74	75.1	F	13.5
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	38	47	54.5	D	61.3
				101-11		Shepherds Drive (E)	T	249	434	49.4	D	61.0
				101-12		CVSC Existing Western Access (N)	L	303	372	67.3	E	61.0
					All			1,551	1,964	57.3	E	39.1
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	284	339	1.6	A	0.6
		Macquarie Drive		102-3		Macquarie Drive (E)	L	156	187	1.5	A	0.6
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	105	126	2.4	A	0.6
				102-6		Shepherds Drive (S)	L	137	153	2.3	A	0.6
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	138	159	3.0	A	0.6
				102-8		Shepherds Drive (N)	T	276	314	3.1	A	0.6
					All			1,096	1,278	2.3	A	0.6
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		58	1.9	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	6.0	A	2.0
				103-5		Shepherds Drive (W)	T		362	1.1	A	0.6
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		415	0.5	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		146	-0.6	#N/A	0.0
					All			0	1,111	1.3	A	0.5

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 1130-1230

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
8100	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	258	506	50.9	D	39.7
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	35	34	69.7	E	39.7
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	158	118	67.7	E	39.7
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	165	56	148.7	F	17.4
				101-5		Shepherds Drive (W)	T	262	315	22.2	B	17.4
				101-6		Kenburn Avenue (S)	L	12	16	15.6	B	17.4
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	8	15	73.1	F	17.0
				101-8		CVSC Existing Western Access (N)	T	26	27	91.9	F	17.0
				101-9		Shepherds Drive (W)	L	57	66	97.4	F	17.0
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	50	52	75.5	F	226.8
				101-11		Shepherds Drive (E)	T	236	442	87.6	F	226.5
				101-12		CVSC Existing Western Access (N)	L	326	394	109.6	F	226.5
					All			1,593	2,041	72.3	F	105.5
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	317	381	1.4	A	0.5
		Macquarie Drive		102-3		Macquarie Drive (E)	L	155	182	1.4	A	0.5
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	129	155	2.5	A	0.7
				102-6		Shepherds Drive (S)	L	129	144	3.2	A	0.7
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	137	166	3.8	A	1.0
				102-8		Shepherds Drive (N)	T	263	305	3.4	A	1.0
					All			1,130	1,333	2.5	A	0.7
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		63	2.2	A	0.2
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	7.3	A	2.1
				103-5		Shepherds Drive (W)	T		392	0.9	A	0.6
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		409	0.5	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		167	-0.6	#N/A	0.0
					All			0	1,161	1.4	A	0.6

P3219 Cherrybrook Village Shopping Centre Peer Review

VISSIM Data Analysis - 2027 (80-20)

WE Peak 1230-1330

1

Time	ID	Intersection	Aimsun Code	Movement Code	From	To	Turn	2017	2027 (80-20)	Delay (s)	LoS	Queue (m)
11700	1	Shepherds Drive		101-1	CVSC Existing Western Access (N)	Shepherds Drive (W)	R	296	536	84.4	F	62.1
		Kenburn Avenue		101-2		Kenburn Avenue (S)	T	18	20	92.0	F	62.1
		CVSC Existing Western Access		101-3		Shepherds Drive (E)	L	139	97	101.3	F	62.1
				101-4	Shepherds Drive (E)	CVSC Existing Western Access (N)	R	140	30	75.9	F	5.4
				101-5		Shepherds Drive (W)	T	214	261	19.4	B	5.4
				101-6		Kenburn Avenue (S)	L	11	13	15.7	B	5.4
				101-7	Kenburn Avenue (S)	Shepherds Drive (E)	R	12	19	58.1	E	17.1
				101-8		CVSC Existing Western Access (N)	T	26	26	83.9	F	17.1
				101-9		Shepherds Drive (W)	L	72	84	81.4	F	17.1
				101-10	Shepherds Drive (W)	Kenburn Avenue (S)	R	49	62	85.5	F	240.2
				101-11		Shepherds Drive (E)	T	202	401	84.3	F	239.9
				101-12		CVSC Existing Western Access (N)	L	315	405	114.0	F	239.9
					All			1,494	1,954	81.8	F	113.0
	2	Shepherds Drive		102-2	Shepherds Drive (N)	Shepherds Drive (S)	T	244	294	1.0	A	0.3
		Macquarie Drive		102-3		Macquarie Drive (E)	L	130	156	1.0	A	0.3
				102-4	Macquarie Drive (E)	Shepherds Drive (N)	R	115	137	1.5	A	0.2
				102-6		Shepherds Drive (S)	L	116	130	2.0	A	0.2
				102-7	Shepherds Drive (S)	Macquarie Drive (E)	R	116	145	2.9	A	0.3
				102-8		Shepherds Drive (N)	T	239	280	2.8	A	0.3
					All			960	1,142	1.8	A	0.3
	3	CVSC Proposed Southern Access		103-3	CVSC Proposed Southern Access (N)	Shepherds Drive (E)	L		61	1.3	A	0.1
		Shepherds Drive		103-4	Shepherds Drive (E)	CVSC Proposed Southern Access (N)	R		130	5.3	A	1.2
				103-5		Shepherds Drive (W)	T		297	0.6	A	0.2
				103-11	Shepherds Drive (W)	Shepherds Drive (E)	T		362	0.5	A	0.0
				103-12		CVSC Proposed Southern Access (N)	L		157	-0.6	#N/A	0.0
					All			0	1,007	1.0	A	0.3