

Meeting Date: Tuesday 26 September 2023
Location: Council Chambers, Level 1A, 1 Pope Street, Ryde and Online
Time: 6.00pm

ATTACHMENTS FOR COUNCIL MEETING

Item

15 TRAFFIC STUDY (KENT ROAD, LANE COVE ROAD AND EPPING ROAD PRECINCT)

Attachment 1 North Ryde Traffic and Parking Study (Final)

▲ **City of Ryde Council**

28th August 2023

North Ryde Traffic and Parking Study

Revision C (Final)

turnbull

Document Information

Document Title	North Ryde Traffic and Parking Study
Document Number	TF-RPT-0384-TPNTHRYDE (C)

Document Revisions

Revision	Description	Authors	Reviewer	Approver	Date
A	Initial draft report for review	D. Cheng E. Spiller	M. Dixon	D. Lowe	18/05/2023
B	Final report for issue to client	D. Cheng E. Spiller	R. Banzon	D. Lowe	11/08/2023
C	Revised final report for issue to client	D. Cheng E. Spiller	R. Banzon	D. Lowe	28/08/2023

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Definitions and abbreviations

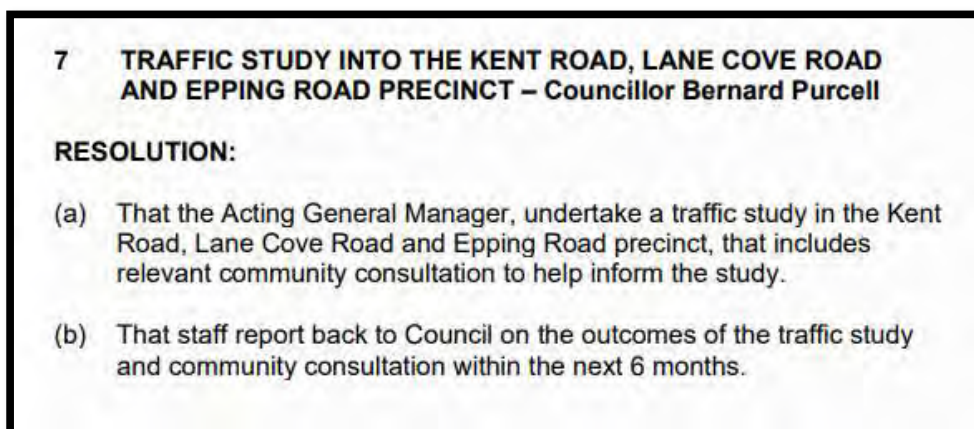
Definitions and abbreviations to be applied to the Traffic and Parking Study are listed in the table below.

Abbreviation	Definition
95% back of queue	The queue length that is only exceeded during 5% of a specified time period on a particular leg of an intersection
Auxiliary lane	A portion of the roadway adjoining the through traffic lanes, used for speed change or for other purposes supplementary to through traffic movement
DOS	Degree of Saturation
km/h	Kilometres per hour
LOS	Level of Service
NSW	New South Wales
Pcus	Passenger car units
Peak period	The period that has the highest demand volume of traffic and/or number of passengers during the day (peak hour, peak half hour, etc.)
sec/veh	Seconds per vehicle

1. Introduction

1.1. Project Background

The Traffic Services team at City of Ryde Council has been requested to investigate the traffic and parking conditions in a subset area of North Ryde and Marsfield, as per the Council resolutions made on July 26th and August 28th, 2022. These investigations must be informed by the findings of the community consultation already conducted. Extracts from the Council reports are shown in Figure 1-1 and Figure 1-2 below.

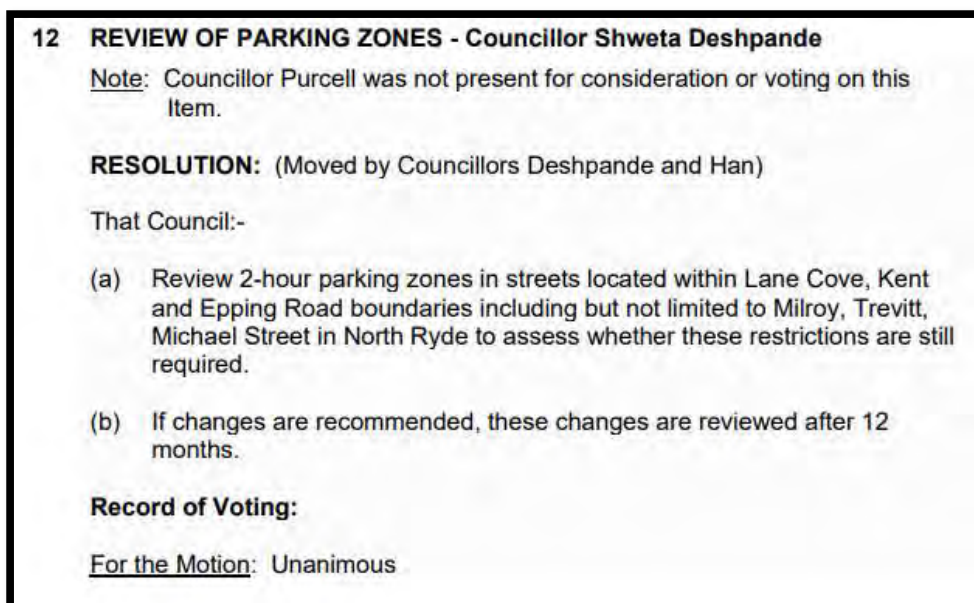


7 TRAFFIC STUDY INTO THE KENT ROAD, LANE COVE ROAD AND EPPING ROAD PRECINCT – Councillor Bernard Purcell

RESOLUTION:

- (a) That the Acting General Manager, undertake a traffic study in the Kent Road, Lane Cove Road and Epping Road precinct, that includes relevant community consultation to help inform the study.
- (b) That staff report back to Council on the outcomes of the traffic study and community consultation within the next 6 months.

Figure 1-1: Council Traffic Study resolution



12 REVIEW OF PARKING ZONES - Councillor Shweta Deshpande

Note: Councillor Purcell was not present for consideration or voting on this Item.

RESOLUTION: (Moved by Councillors Deshpande and Han)

That Council:-

- (a) Review 2-hour parking zones in streets located within Lane Cove, Kent and Epping Road boundaries including but not limited to Milroy, Trevitt, Michael Street in North Ryde to assess whether these restrictions are still required.
- (b) If changes are recommended, these changes are reviewed after 12 months.

Record of Voting:

For the Motion: Unanimous

Figure 1-2: Council Review of Parking Zones resolution

1.2. Scope and objectives of this study

The geographic scope of this Traffic and Parking Study is outlined in Figure 1-3. This precinct is bounded by Kent Road, Lane Cove Road, Epping Road, and Herring Road, and includes streets such as Milroy, Trevitt, and Michael Streets in North Ryde, where 2-hour parking zones are in effect (residents with valid permits excepted). Notably, this precinct is adjacent to Macquarie Park, the second largest commercial district in New South Wales and providing employment to approximately 30,000 people.



Figure 1-3: Traffic and Parking Study Area

1.3. Strategic direction

The City of Ryde *Local Strategic Planning Statement* proposes an open structure plan to provide space, increasing opportunities for walking and cycling paths. Within the immediate vicinity of the study area, a north-south open space link along Shrimptons Creek and an indoor recreation facility are identified for investigation at Greenwood Park, as shown in Figure 1-4.

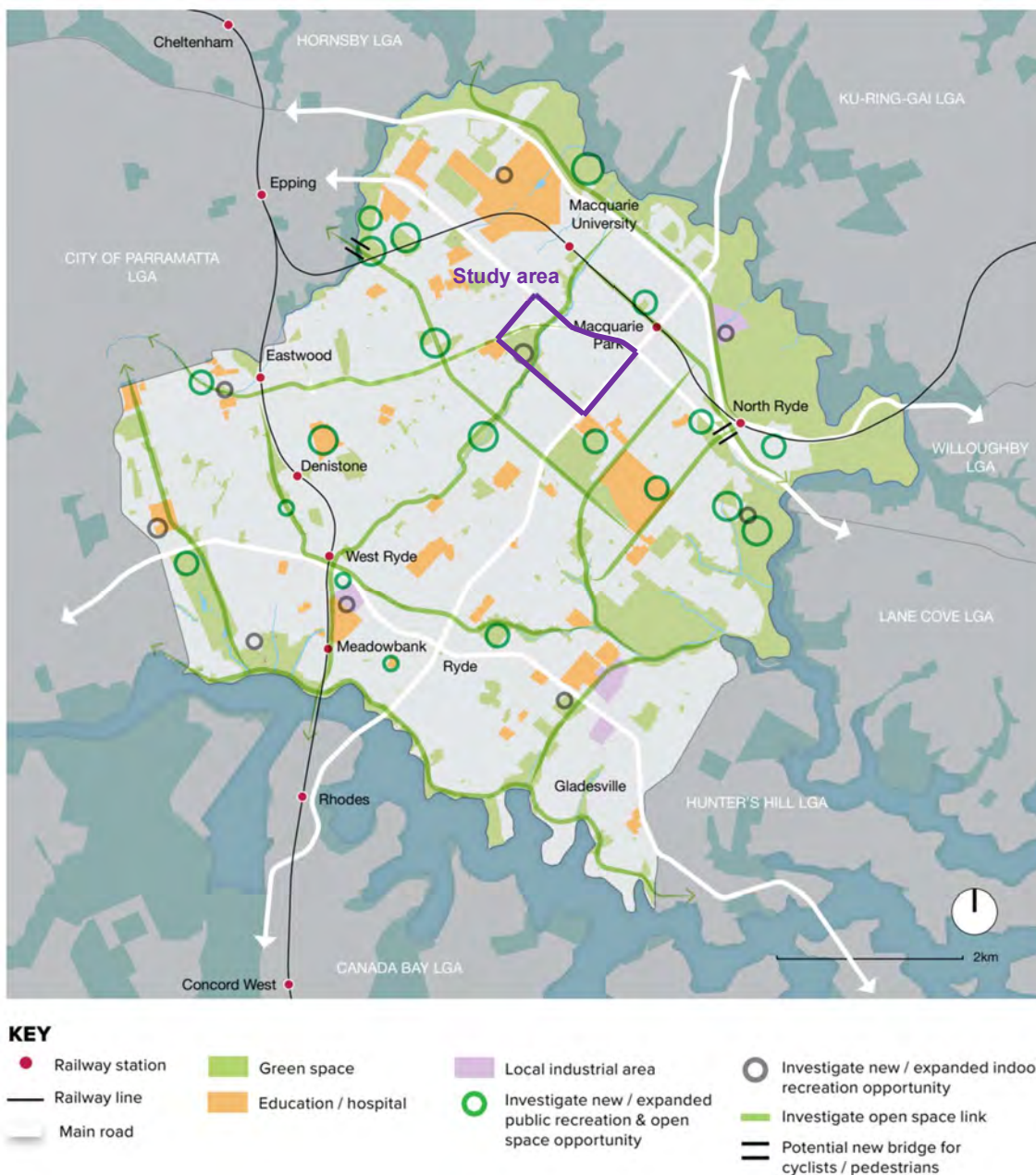


Figure 1-4: City of Ryde open space structure plan

Source: City of Ryde Local Strategic Planning Statement (2020). Figure 8 on page 20 accessed 5/4/23 at: <https://www.ryde.nsw.gov.au/files/assets/public/publications/planning/lsp/planning-ryde-local-strategic-planning-statement-march-2020.pdf>

Council's *Bicycle Strategy 2022 – 2030* and *Bicycle Action Plan 2022 – 2030* both outline how City of Ryde will benefit from more people walking and riding and promotes walking and riding as an attractive travel choice especially over the next five-years. City of Ryde's vision is to implement a well-connected bicycle network with inclusive bicycle facilities that will encourage user participation and positively influence the image of cycling, leading to secure

investment and innovation. Within the immediate vicinity of the study area, Council is currently working on completing the missing cycle links comprising a combination of on and off-road cycleways connecting Macquarie Park and West Ryde, as shown indicatively in Figure 1-5. This regional cycle route is referred to as RR03.

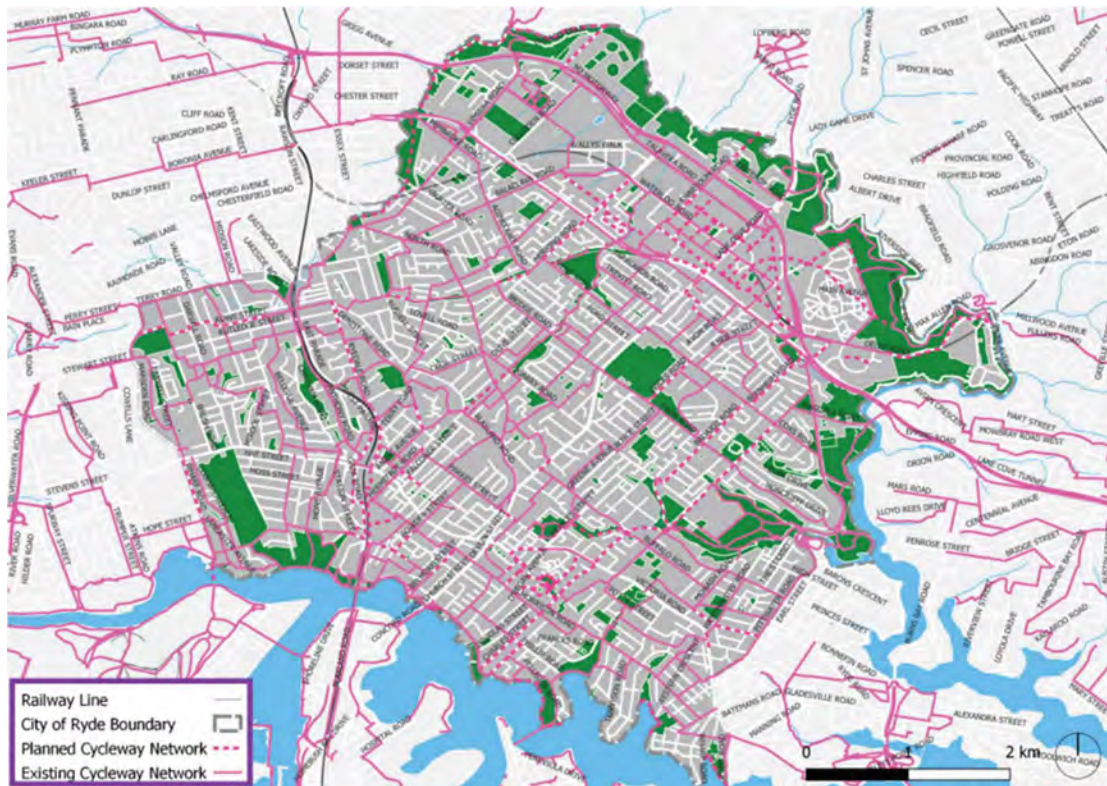


Figure 1-5: City of Ryde existing and planned cycle network

Source: City of Ryde Bicycle Action Plan 2022 – 2030. Figure 3 on page 10 accessed 25/8/23 at: <https://www.ryde.nsw.gov.au/files/assets/public/publications/parks-open-space/city-of-ryde-bicycle-action-plan-2022-2030.pdf>

2. Existing conditions

2.1. Road network

2.1.1. Existing intersection performance

Traffic modelling assessments were carried out at the following intersections to determine the existing performance of the key intersections within the study area:

1. Lane Cove Road/Kent Road (signals)
2. Lane Cove Road/Trevitt Road (left in/left out priority control)
3. Lane Cove Road/Napier Crescent (left in/left out priority control)
4. Lane Cove Road and Paul Street (left in/left out priority control)
5. Epping Road and Whiteside Street (left in/left out priority control)
6. Kent Road and Milroy Street (Give Way priority control)
7. Kent Road/Ada Street (roundabout)
8. Herring Road/Kent Road (roundabout)
9. Herring Road/Dora Street (roundabout)

The locations of these intersections are shown in Figure 2-1 below.

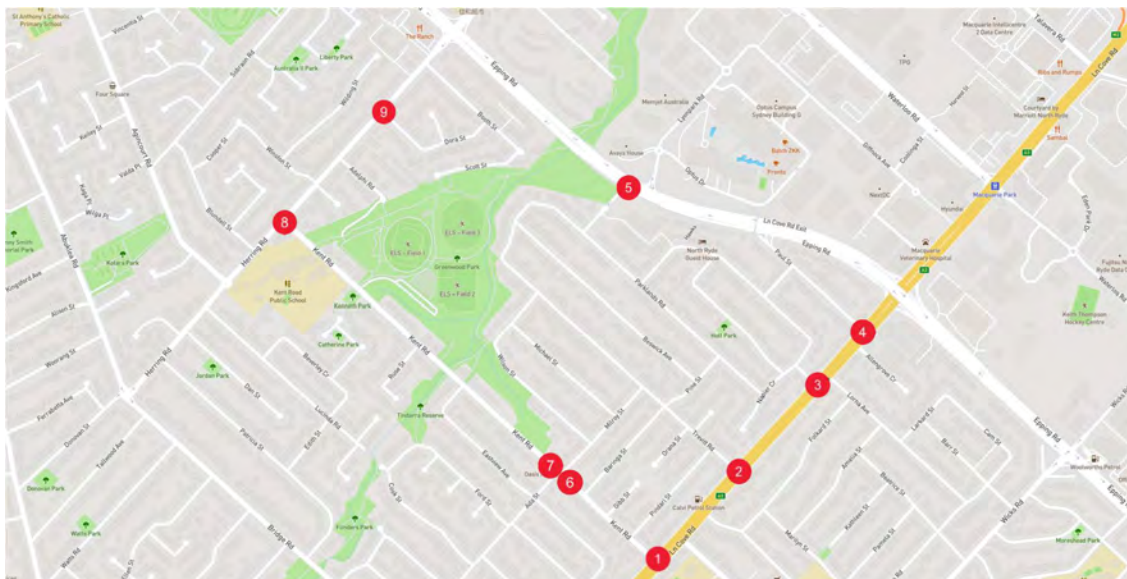


Figure 2-1: Modelled intersection locations

The approach to traffic modelling aligns with the *Traffic Modelling Guidelines* (Roads and Maritime Services, 2013), with future traffic modelling determining the impact of background growth on the study area.

Models were developed using SIDRA Intersection traffic modelling software, which is a micro-analytical tool for evaluation of intersection performance. The performance indicators reported for this assessment include Degree of Saturation (DOS), average delay, Level of Service (LOS), and 95th percentile back of queue.

The 95th percentile back of queue refers to the length of queue during a specified time period (in this case, peak hour) that is only exceeded 5% of the time during that time period. The 95th percentile back of queue length is less than the length of a single vehicle at some intersections that have significant periods where there is no vehicle waiting at an approach.

LOS was used as the primary indicator of performance and is based on criteria outlined in Table 2-1 as defined in the *Guide to Traffic Generating Developments* (Roads and Traffic Authority, 2002). For signalised intersections, the overall LOS is based on the average delay across all legs, whereas for priority-controlled intersections it is defined by the worst performing leg.

Table 2-1: Intersection LOS criteria

LOS	Average delay (seconds per vehicle)	Traffic signals and roundabouts	Give-way and stop sign
A	Less than 15	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity, required other control mode
E	57 to 70	At capacity where incidents will cause delays	At capacity, required other control mode
F	Over 70	Extra capacity required	Extreme delay, traffic signal or other major treatment required

The overall intersection performance reported in the below tables adopts the degree of saturation and 95th percentile queue lengths of the worst performing legs.

2.1.1.1 Lane Cove Road / Kent Road

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:30pm to 5:30pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-2.

Table 2-2: Lane Cove Road / Kent Road – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8am to 9am)				
Lane Cove Road northbound	0.664	20.6	B	262.0
Lane Cove Road southbound	0.668	8.6	A	97.0
Kent Road eastbound	0.653	46.2	E	113.7
Overall Intersection	0.668	18.1	B	262.0
Weekday evening peak (4:30pm to 5:30pm)				
Lane Cove Road northbound	0.569	18.3	B	202.9
Lane Cove Road southbound	0.572	7.2	A	136.3
Kent Road eastbound	0.545	68.0	E	74.4
Overall Intersection	0.572	13.9	A	202.9

2.1.1.2 Lane Cove Road / Trevitt Road

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 7am to 8am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-3.

Table 2-3: Lane Cove Road / Trevitt Road – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:00am to 8:00am)				
Lane Cove Road northbound	0.397	6.4	A	0.0
Trevitt Road eastbound	0.066	8.3	A	1.7
Overall Intersection	0.397	8.3	A	1.7
Weekday evening peak (4:15pm to 5:15pm)				
Lane Cove Road northbound	0.352	6.4	A	0.0
Trevitt Road eastbound	0.048	7.2	A	1.2
Overall Intersection	0.352	7.2	A	1.2

2.1.1.3 Lane Cove Road / Napier Crescent

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 7am to 8am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-4.

Table 2-4: Lane Cove Road / Napier Crescent – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:00am to 8:00am)				
Lane Cove Road northbound	0.408	6.5	A	0.0
Napier Crescent eastbound	0.077	8.2	A	1.9
Overall Intersection	0.408	8.2	A	1.9
Weekday evening peak (4:15pm to 5:15pm)				
Lane Cove Road northbound	0.353	6.4	A	0.0
Napier Crescent eastbound	0.042	7.3	A	1.1
Overall Intersection	0.353	7.3	A	1.1

2.1.1.4 Lane Cove Road / Paul Street

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 7am to 8am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-5.

Table 2-5: Lane Cove Road / Paul Street – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:00am to 8:00am)				
Lane Cove Road northbound	0.409	6.5	A	0.0
Paul Street eastbound	0.043	8.4	A	1.1
Overall Intersection	0.409	8.4	A	1.1
Weekday evening peak (4:15pm to 5:15pm)				
Lane Cove Road northbound	0.361	6.5	A	0.0
Paul Street eastbound	0.021	7.5	A	0.5
Overall Intersection	0.361	7.5	A	0.5

2.1.1.5 Epping Road / Whiteside Street

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-6.

Table 2-6: Epping Road / Whiteside Street – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)				
Epping Road westbound	0.222	6.5	A	0.0
Overall Intersection	0.222	6.5	A	0.0
Weekday evening peak (4:15pm to 5:15pm)				
Epping Road westbound	0.314	6.5	A	0.0
Overall Intersection	0.314	6.5	A	0.0

2.1.1.6 Kent Road / Milroy Street

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 5pm to 6pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-7.

Table 2-7: Kent Road / Milroy Street – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)				
Kent Road westbound	0.110	0.0	A	0.0
Milroy Street southbound	0.051	6.6	A	0.5
Kent Road eastbound	0.092	1.1	A	0.0
Overall intersection	0.110	6.6	A	0.5
Weekday evening peak (5:00pm to 6:00pm)				
Kent Road westbound	0.154	0.0	A	0.0
Milroy Street southbound	0.059	6.8	A	0.5
Kent Road eastbound	0.067	1.1	A	0.0
Overall intersection	0.154	6.8	A	0.5

2.1.1.7 Kent Road / Ada Street

Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 5pm to 6pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-8.

Table 2-8: Kent Road / Ada Street – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)				
Ada Street northbound	0.359	7.6	A	6.6
Kent Road westbound	0.174	4.0	A	3.5
Kent Road eastbound	0.319	9.0	A	5.7
Overall intersection	0.359	9.0	A	6.6
Weekday evening peak (5:00pm to 6:00pm)				
Ada Street northbound	0.173	7.6	A	2.6
Kent Road westbound	0.224	4.1	A	4.4
Kent Road eastbound	0.243	7.5	A	4.2
Overall intersection	0.243	7.6	A	4.4

2.1.1.8 Herring Road / Kent Road

Intersection turning movement volumes were derived from traffic surveys undertaken on Thursday, 6 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:45pm to 5:45pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-9.

Table 2-9: Herring Road / Kent Street – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)				
Herring Road northbound	0.598	8.3	A	39.2
Kent Road westbound	0.241	8.3	A	9.7
Herring Road southbound	0.263	4.3	A	12.3
Overall Intersection	0.598	8.3	A	39.2
Weekday evening peak (4:45pm to 5:45pm)				
Herring Road northbound	0.433	7.5	A	26.5
Kent Road westbound	0.438	17.4	B	24.5
Herring Road southbound	0.818	5.6	A	89.3
Overall Intersection	0.818	17.4	B	89.3

2.1.1.9 Herring Road / Dora Street

Intersection turning movement volumes were derived from traffic surveys undertaken on Thursday, 6 April 2023. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:45pm to 5:45pm. The performance of the modelled intersection under the existing traffic volumes is shown in Table 2-10.

Table 2-10: Herring Road / Dora Street – modelled existing intersection performance

Approach and peak period	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)				
Herring Road northbound	0.504	6.8	A	33.1
Dora Street westbound	0.033	8.5	A	1.1
Herring Road southbound	0.229	4.0	A	9.3
Overall Intersection	0.504	8.5	A	33.1
Weekday evening peak (4:45pm to 5:45pm)				
Herring Road northbound	0.327	3.9	A	19.2
Dora Street westbound	0.066	17.1	B	2.8
Herring Road southbound	0.679	4.0	A	56.2
Overall Intersection	0.679	17.1	B	56.2

2.1.2. Existing mid-block capacity

A capacity assessment was undertaken to determine the saturation of mid-block sections of road within the study area. This was based on criteria defined in the *Guide to Traffic Management Part 3 – Transport Study and Analysis Methods* (Austroads, 2020) and the *Highway Capacity Manual 6th Edition* (Transportation Research Board, 2016).

2.1.2.1 Theoretical capacity

As all streets within the study area show similar characteristics of two-lane, two-way streets traversing residential areas, a singular theoretical capacity has been determined for all roads.

The theoretical capacity of the study area’s residential streets has been based on the ‘occasional parked vehicles’ capacity outlined in *Guide to Traffic Management Part 3 Transport Study and Analysis Methods* (Austroads, 2020) and identified in Table 2-11. From these standards, it was determined that the existing mid-block capacity for roads in the study area is 600 pc/h).

Table 2-11: Typical mid-block capacities for urban roads with interrupted flow

Type of lane	One-way mid-block capacity (pc/h)
Median or inner lane	
Divided road	1000
Undivided road	900
Middle lane (of a 3 lane carriageway)	
Divided road	900
Undivided road	1000
Kerb lane	
Adjacent to parking lane	900
Occasional parked vehicles	600
Clearway conditions	900

Source: Table 6.1 of Austroads *Guide to Traffic Management Part 3 Transport Study and Analysis Methods* capacity for urban roads with interrupted flow.

2.1.2.2 Comparison of mid-block road capacities to existing traffic demands

Traffic volumes were determined from mid-block traffic counts collected over a week at the following times and locations:

- 7:00pm, 13 May 2021 to 7:00pm, 20 May 2021
 - Whiteside Steet north of Parklands Road
 - Paul Street east and west of McGregor Street, and west of Lane Cove Road
 - Napier Crescent west of Lane Cove Road
 - Trevitt Road west of Lane Cove Road, west of Milroy Street and west of Leslie Street
 - Pindari Road north of Kent Road
 - Gibb Street north of Kent Road
 - Baringa Street north of Kent Road
 - Milroy Street north of Kent Road
- 16 March 2023 to 21 March 2023
 - Booth Street east of Herring Road
 - Dora Street east of Herring Road
 - Adelphi Street east of Herring Road
 - Leonard Place east of Herring Road

The maximum hourly traffic volume was determined by the largest hourly traffic flow recorded for each direction in the morning and evening peaks. In instances where multiple survey locations were undertaken on the same street, the location with the highest traffic volume was used. Vehicle volumes were converted to pcus (passenger car units) by using the average heavy vehicle percentages during the survey period for each direction and applying conservative heavy vehicle pcu conversion factor of three. These traffic volumes relative to the capacity of each street are outlined in Table 2-12.

Table 2-12: Mid-block capacities of surveyed locations

Street	Direction	Volume (veh/h)	Heavy vehicle %	Volume (pcu/h)	Capacity (pcu/h)	% of Capacity
Whiteside Street						
Northbound	AM peak	162	2.4%	170	600	28%
	PM peak	83	2.4%	87	600	15%
Southbound	AM peak	56	2.9%	59	600	10%
	PM peak	42	2.9%	44	600	7%
Paul Street						
Eastbound	AM peak	77	3.0%	82	600	14%
	PM peak	78	3.0%	83	600	14%
Westbound	AM peak	45	2.8%	48	600	8%
	PM peak	68	2.8%	72	600	12%
Napier Crescent						
Northbound	AM peak	31	5.5%	34	600	6%
	PM peak	52	5.5%	58	600	10%
Southbound	AM peak	85	4.1%	92	600	15%
	PM peak	60	4.1%	65	600	11%
Trevitt Road						
Northbound	AM peak	37	3.1%	39	600	7%

Street	Direction	Volume (veh/h)	Heavy vehicle %	Volume (pcu/h)	Capacity (pcu/h)	% of Capacity
Southbound	PM peak	72	3.1%	76	600	13%
	AM peak	88	2.9%	93	600	16%
	PM peak	55	2.9%	58	600	10%
Pindari Road						
Northbound	AM peak	39	3.6%	42	600	7%
	PM peak	33	3.6%	35	600	6%
Southbound	AM peak	28	4.3%	30	600	5%
	PM peak	30	4.3%	33	600	6%
Gibb Street						
Northbound	AM peak	44	1.9%	46	600	8%
	PM peak	55	1.9%	57	600	10%
Southbound	AM peak	44	10.4%	53	600	9%
	PM peak	54	10.4%	65	600	11%
Baringa Street						
Northbound	AM peak	114	2.1%	119	600	20%
	PM peak	112	2.1%	117	600	20%
Southbound	AM peak	47	3.2%	50	600	8%
	PM peak	68	3.2%	72	600	12%
Milroy Street						
Northbound	AM peak	162	2.4%	170	600	28%
	PM peak	83	2.4%	87	600	15%
Southbound	AM peak	56	2.9%	59	600	10%
	PM peak	42	2.9%	44	600	7%
Booth Street						
Eastbound	AM peak	30	2.7%	32	600	5%
	PM peak	36	2.7%	38	600	6%
Westbound	AM peak	21	6.6%	24	600	4%
	PM peak	29	6.6%	33	600	6%
Dora Street						
Eastbound	AM peak	31	1.7%	32	600	5%
	PM peak	27	1.7%	28	600	5%
Westbound	AM peak	37	3.1%	39	600	7%
	PM peak	39	3.1%	41	600	7%
Adelphi Road						
Eastbound	AM peak	41	1.1%	42	600	7%
	PM peak	63	1.1%	64	600	11%
Westbound	AM peak	54	2.7%	57	600	10%
	PM peak	42	2.7%	44	600	7%
Leonard Place						
Eastbound	AM peak	17	0.9%	17	600	3%
	PM peak	9	0.9%	9	600	2%
Westbound	AM peak	16	5.5%	18	600	3%
	PM peak	9	5.5%	10	600	2%

As shown in Table 2-12, all streets had ample spare capacity during the surveyed times. A maximum mid-block capacity of 28% was calculated on Whiteside Street and Milroy Street in the northbound direction during the AM peak, indicating minimal congestion.

2.1.3. Parking survey times and locations

Parking surveys have been undertaken along all streets with on-street parking within the study area. The locations of these surveyed streets are shown in Figure 2-2.

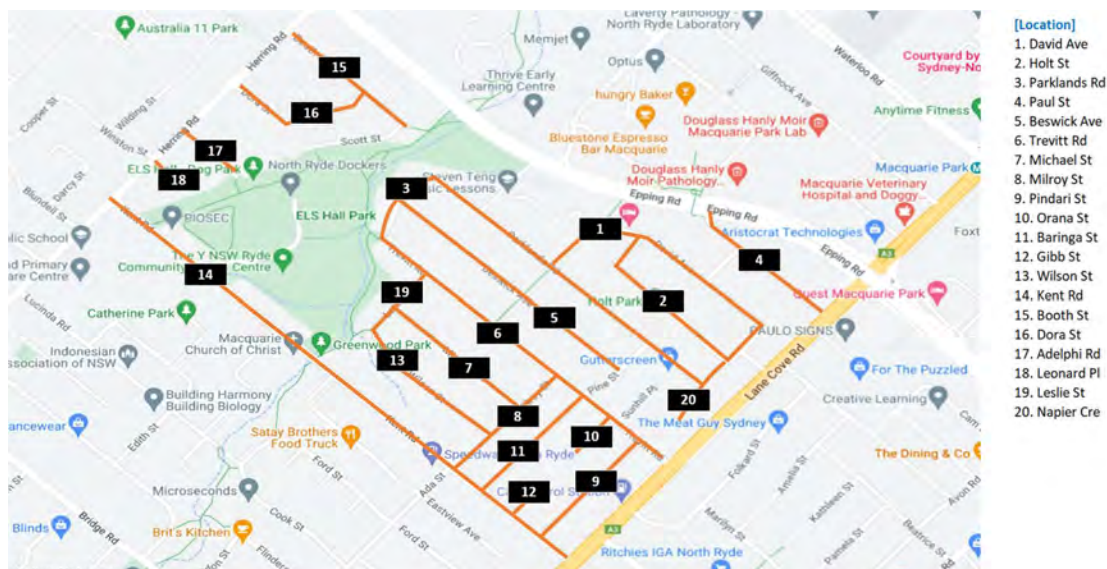


Figure 2-2: Locations of on-street parking surveyed

The parking surveys were undertaken on the following days and times:

- Saturday 18 March 2023
 - 11:00am to 1:00pm
- Tuesday 21 March 2023
 - 7:00am to 9:00am
 - 4:00pm to 6:00pm

These days do not coincide with public holidays or school holidays. The parking survey results can therefore be considered an accurate representation of a typical weekday and weekend.

2.1.4. Parking survey methodology

All nominated locations subject to the parking survey were initially inspected to note existing capacity and existing parking restrictions (e.g., untime, timed parking). Where on-street parking spaces are not signposted, the maximum number of parking spaces was determined in accordance with Australian Standard 2890.5-1993 Parking facilities Part 5: On-street parking.

On each day and time listed above, all nominated locations were surveyed by vehicle and the number of occupied spaces was documented.

2.1.5. Parking occupancy

Parking occupancy is defined as the ratio of the number of occupied spaces to the total number of available spaces:

$$\text{Parking occupancy (\%)} = \frac{\text{Number of occupied spaces}}{\text{Total number of available spaces}}$$

Low parking occupancy indicates that parking is convenient and readily available, however would be considered inefficient and costly in terms of land use. In contrast, high parking occupancy indicates efficient land use, but may lead to a reduction in public amenity if finding a parking space becomes difficult and time-consuming.

Several factors including time restrictions, turnover, paid parking (disincentivising parking), and parking location impact the demand for parking spaces. It is generally accepted that the ideal occupancy rate for on-street parking is 85% as specified in *Cruising for Parking, Transport Policy, 13(6), 479-486* (Shoup, D, 2007). This level of occupancy provides a balance between efficient land use and public amenity.

Analysis of the parking surveys showed a range in peak parking occupancy from 0% to 89% as shown in Table 2-13. Since there were no streets at 100% occupancy, parking spaces were always available on all streets during the surveyed times. Parking occupancy exceeded 85% on Napier Crescent on Tuesday 21/03/23 between 5:00pm and 7:00pm, with 89% of parking spaces occupied during these hours.

The survey results are provided in Appendix A and includes details of the surveyed streets, current parking restrictions, parking supply and the number of occupied spaces during the surveyed period. The most common restriction was “2P: 8 AM – 6 PM Mon – Fri P.H.E zone3” indicating a maximum of 2 hours parking during these hours, excluding holders of Zone 3 parking permits.

Table 2-13: Peak parking occupancy during the survey period

Parking location	Peak day and time	Total parking spaces	Peak number of occupied Spaces	Peak parking occupancy (%)
David Avenue	Tuesday 21/03/23 at 6:00pm	139	69	50%
Holt Street	Saturday 18/03/23 at 11:00am	98	29	30%
Parklands Road	Tuesday 21/03/23 at 7:00am	183	119	65%
Paul Street	Tuesday 21/03/23 at 7:00am	72	60	83%
Beswick Street	Tuesday 21/03/23 at 7:00am	144	40	28%
Trevitt Road	Tuesday 21/03/23 at 7:00am	134	32	24%
Michael Street	Saturday 18/03/23 at 12:00pm and 1:00pm	70	12	17%

Parking location	Peak day and time	Total parking spaces	Peak number of occupied Spaces	Peak parking occupancy (%)
Milroy Street	Tuesday 21/03/23 at 6:00pm	49	8	16%
Pindari Street	Saturday 18/03/23 at 1:00pm	61	15	25%
Orana Street	Tuesday 21/03/23 at 7:00am, 8:00am and 6:00pm	30	7	23%
Baringa Street	Tuesday 21/03/23 at 6:00pm	53	18	34%
Gibb Street	Tuesday 21/03/23 at 6:00pm	24	13	54%
Wilson Street	Saturday 18/03/23 at 11:00am and 12:00pm Tuesday 21/03/23 at 6:00pm	77	21	27%
Kent Road	Tuesday 21/03/23 at 7:00am	165	58	35%
Booth Street	Tuesday 21/03/23 at 8:00am	61	34	56%
Dora Street	Saturday 18/03/23 at 1:00pm	66	25	38%
Adelphi Road	Tuesday 21/03/23 at 7:00am and 8:00am	20	12	60%
Leonard Place	Tuesday 21/03/23 at 7:00am, 8:00am and 9:00am	17	11	65%
Leslie Street	Saturday 18/03/23 at 11:00am and 12:00pm, Tuesday 21/03/23 at 5:00pm	30	8	27%

Parking location	Peak day and time	Total parking spaces	Peak number of occupied Spaces	Peak parking occupancy (%)
Napier Crescent	Tuesday 21/03/23 at 5:00pm and 6:00pm	19	17	89%
All surveyed locations	Tuesday 21/03/23 at 7:00am	765	339	44%

2.2. Other transport modes

2.2.1. Public transport

The following bus routes operate on the boundary of the study area:

- 286 – Denistone East to Milsons Point via St Leonards & North Sydney
- 288 – Epping to City Erskine St
- 290 – Epping to City Erskine St via Macquarie University & North Sydney
- 291 – Epping to McMahons Point
- 297 – Denistone East to City Wynyard via Lane Cove Tunnel
- 506 – Macquarie University to City Domain via East Ryde
- 517 – Macquarie Centre to Ryde
- 518 – Macquarie University to Meadowbank Wharf

These bus services, shown in Figure 2-3, connect North Ryde and surrounding suburbs to employment centres such as Macquarie Park, North Sydney, and Sydney CBD.

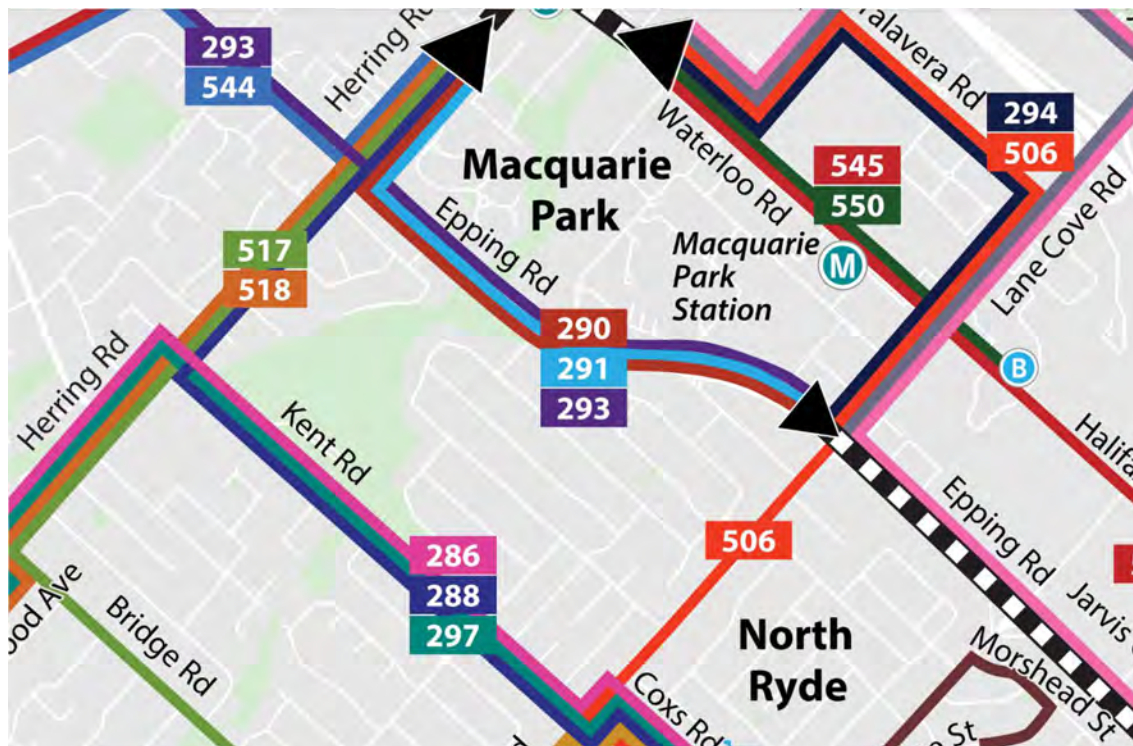


Figure 2-3: Bus routes connecting to the study area and surrounds

2.2.2. Active transport

The cycle network within the study area and surrounds includes shared use paths, quiet streets and general roads, shown in Figure 2-4. These facilities are defined as:

- Shared use path – A facility that is separated from motor vehicle traffic and is for shared use by people walking or cycling.
- Quiet street – A street that provides a quiet traffic environment due to low traffic volumes/speeds, where pedestrians have priority or where contra-flow cycling is permitted on a one-way street.
- General road – A road where bicycles share space with motor vehicles, buses or parked cars.

Cycling infrastructure is concentrated along Epping Road, Shrimptons Creek and ELS Hall Park, providing a north-south connection through the park between Macquarie Park in the north and Ryde in the south.



Figure 2-4: Cycleway facilities within study area and surrounds

Source: TfNSW cycleway finder, accessed 11/4/23, https://roads-waterways.transport.nsw.gov.au/maps/cycleway_finder/index.html

2.3. Crash analysis

The crash data gathered between 2017 and 2021 shows crashes concentrated on the periphery of the study area along Herring Road, Lane Cove Road, Epping Road and intersections along these two main roads, as shown in Figure 2-5. The majority of these crashes occurred at State Road intersections, which are the responsibility of TfNSW to upgrade.

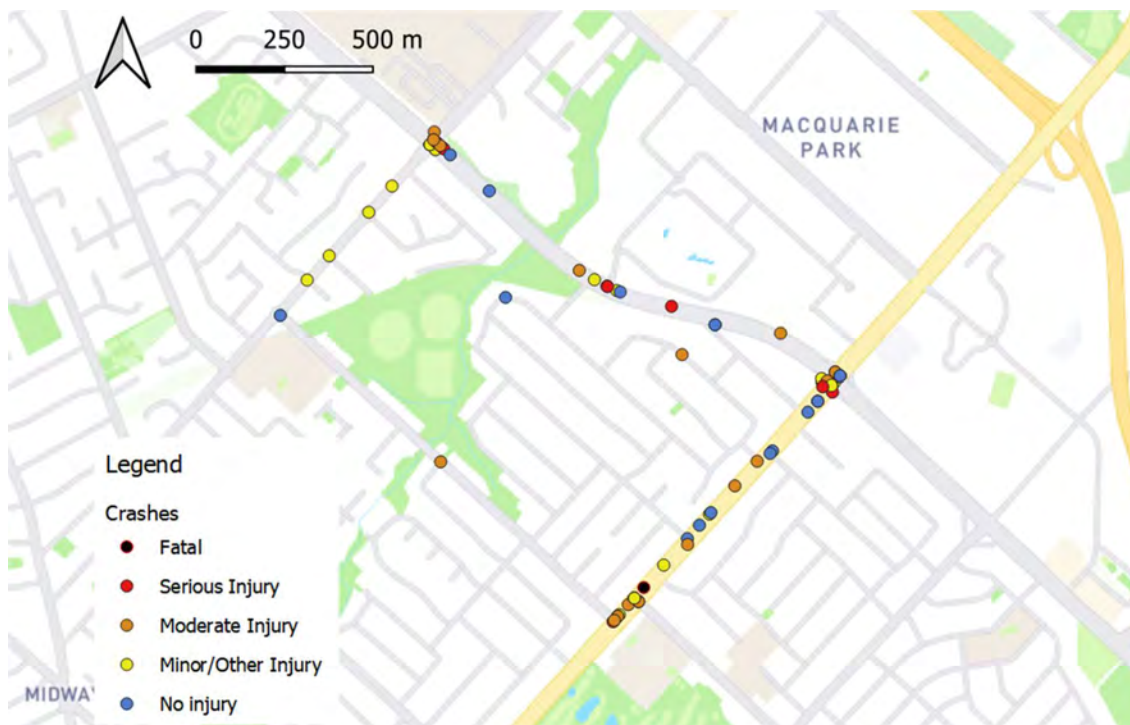


Figure 2-5: Crash locations within the study area, 2017 – 2021

Source: TfNSW Centre for Road Safety City, Crash and casualty statistics (2017 – 2021). Accessed 4/4/23 at:

https://roadsafety.transport.nsw.gov.au/statistics/interactivecrashstats/lga_stats.html?r=eyJrIjojMDA3OGRhN2UtZjRkNy00N2JmLWE0MjMtZmlyNzFiOTdmMjI3liwidCI6ImNiMzU2NzgyLWFKOWEtNDdmYi04NzhiLTdlYmNlYjg1Yjg2YyJ9&pageName=ReportSection9f6cf5f75b8d2a5569a2

2.3.1. Lane Cove Road

As shown in Table 2-14, rear end collisions were the most common crash type, which is typical of urban arterial roads like Lane Cove Road that experience significant congestion and have signalised intersections requiring motorists to stop. There were also three accidents that involved motorists leaving the carriageway and driving into an object. These may be speed related, or a result of motorists avoiding other vehicles performing lane change manoeuvres.

The fatal crash occurred on the northbound carriageway approximately 40m north of the intersection with Coxs Road, with a pedestrian emerging onto the road from the footpath into the path of a vehicle. This took place during daytime under wet and overcast weather conditions.

Table 2-14: Summary of Lane Cove Road crashes 2017-2021

Degree of injury	Natural light	Direction	Road User Movement	Traffic Units	
				1	2
Non-casualty	Darkness	Northbound	Left off carriageway into object	Car (sedan/hatch)	-
Serious	Daylight	Southbound	Rear end	Station wagon	Motorcycle
Moderate	Darkness	Northbound	Rear end	Car (sedan/hatch)	Light truck
Minor/other	Daylight	Southbound	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Non-casualty	Daylight	Northbound	Rear end	Car (sedan/hatch)	Light truck
Non-casualty	Daylight	Southbound	Other	Car (sedan/hatch)	Light truck
Non-casualty	Darkness	Southbound	Rear end	Car (sedan/hatch)	-
Moderate	Daylight	Southbound	Left off carriageway into object	Light truck	Car (sedan/hatch)
Non-casualty	Darkness	Southbound	Rear end	Utility	-
Minor/other	Daylight	Southbound	Left off carriageway into object	Car (sedan/hatch)	Car (sedan/hatch)
Non-casualty	Daylight	Southbound	Rear end	Car (sedan/hatch)	Unknown motor vehicle
Fatal	Daylight	Northbound	Pedestrian – rear side	Station wagon	Pedestrian
Moderate	Daylight	Northbound	Rear end	Large rigid	4 wheel drive
Non-casualty	Daylight	Southbound	Lane change right	Car (sedan/hatch)	Light truck

2.3.2. Epping Road

As shown in Table 2-15, rear end collisions were prevalent but less common than Lane Cove Road. A rear end collision and an adjacent – left through collision from right movement occurred at the Whiteside Street / Epping Road intersection. This is a popular route for cars “rat running” to join Epping Road westbound and the adjacent – left through collision may have been caused by poor visibility to the car approaching from the east along Epping Road.

Table 2-15: Summary of Epping Road crashes 2017-2021

Degree of injury	Natural light	Direction	Road User Movement	Traffic Units	
				1	2
Moderate	Daylight	Westbound	Adjacent – left through from right	Station wagon	Car (sedan/hatch)
Moderate	Daylight	Westbound	Emerging from driveway	Car (sedan/hatch)	Motorcycle
Non-casualty	Dusk	Eastbound	Rear end	Car (sedan/hatch)	Car (sedan/hatch)

Degree of injury	Natural light	Direction	Road User Movement	Traffic Units	
				1	2
Serious	Darkness	Eastbound	Left off carriageway into object	Motorcycle	-
Minor/other	Dawn	Eastbound	Same lane change right	Station wagon	Motorcycle
Serious	Darkness	Eastbound	Rear end	Light truck	Motorcycle
Moderate	Daylight	Westbound	Rear end	Unknown motor vehicle	4-wheel drive
Minor/other	Daylight	Eastbound	Other	Car (sedan/hatch)	Car (sedan/hatch)
Non-casualty	Daylight	Eastbound	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Non-casualty	Daylight	Westbound	Rear end	4-wheel drive	Car (sedan/hatch)
Serious	Daylight	Eastbound	Off left bend into object	4-wheel drive	-
Non-casualty	Dusk	Eastbound	Off left bend into object	Car (sedan/hatch)	-

2.3.3. Lane Cove Road / Kent Road intersection

As shown in Table 2-16, accidents occurred solely for Lane Cove Road northbound traffic, as predominantly rear-end and right through movement collisions.

Table 2-16: Summary of Lane Cove Road / Kent Road intersection crashes 2017-2021

Degree of injury	Natural light	Approach /exit	Road User Movement	Traffic Units	
				1	2
Non-casualty	Daylight	Lane Cove Road northbound	Rear end	Unknown motor vehicle	Car (sedan/hatch)
Moderate	Daylight	Lane Cove Road northbound	Rear end	Station wagon	Car (sedan/hatch)
Serious	Daylight	Lane Cove Road northbound	Rear end	Light truck	Car (sedan/hatch)
Minor/other	Daylight	Lane Cove Road northbound	Other same direction	Light truck	Light truck
Moderate	Daylight	Lane Cove Road northbound	Lane change right	Car (sedan/hatch)	Large rigid
Minor/other	Darkness	Lane Cove Road northbound	Right through	Car (sedan/hatch)	Car (sedan/hatch)
Moderate	Darkness	Lane Cove Road northbound	Right through	STA bus	4-wheel drive

2.3.4. Lane Cove Road / Epping Road intersection

As shown in Table 2-17, accidents occurred at all legs of the Lane Cove Road / Epping Road intersection. There was a substantial number of rear end collisions, concentrated on Lane Cove Road northbound, but also a mix of other crash types. There were three crashes that involved a pedestrian or cyclist northbound on Lane Cove Road.

Table 2-17: Summary of Lane Cove Road / Epping Road intersection crashes 2017-2021

Degree of injury	Natural light	Approach /exit	Road User Movement	Traffic Units	
				1	2
Minor/other	Daylight	Lane Cove Road northbound approach	Ped – near side	Car (sedan/hatch)	Pedestrian
Non-casualty	Daylight	Lane Cove Road northbound approach	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Serious	Daylight	Epping Road westbound approach	Other	Light truck	Light truck
Non-casualty	Daylight	Lane Cove Road northbound exit	Adjacent – cross traffic	Light truck	Car (sedan/hatch)
Minor/other	Daylight	Epping Road southbound exit	Other	Car (sedan/hatch)	Car (sedan/hatch)
Serious	Daylight	Lane Cove Road northbound approach	Rear end	4-wheel drive	Light truck
Moderate	Daylight	Lane Cove Road northbound approach	Manoeuvre from footway	Pedal cycle	Car (sedan/hatch)
Moderate	Daylight	Lane Cove Road northbound approach	Lane side swipe	Car (sedan/hatch)	Car (sedan/hatch)
Serious	Daylight	Lane Cove Road southbound approach	Rear end	4-wheel drive	Car (sedan/hatch)
Minor/other	Daylight	Lane Cove Road northbound approach	Head on	Station wagon	Car (sedan/hatch)
Moderate	Darkness	Lane Cove Road northbound approach	Rear end	Station wagon	Car (sedan/hatch)
Minor/other	Darkness	Lane Cove Road northbound exit	Pedestrian near side	Car (sedan/hatch)	Pedestrian

Degree of injury	Natural light	Approach /exit	Road User Movement	Traffic Units	
				1	2
Serious	Darkness	Lane Cove Road northbound exit	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Non-casualty	Darkness	Lane Cove Road northbound approach	Rear end	Car (sedan/hatch)	Car (sedan/hatch)

2.3.5. Epping Road / Herring Road intersection

The crashes at the intersection of Epping Road/Herring Road are shown in Table 2-18. The majority of crashes occurred on Epping Road or at the junction of the two roads. The most common section involving accidents was the Epping Road eastbound exit (i.e. traffic travelling eastbound on Epping Road leaving the intersection to travel towards Lane Cove Road), with five rear end collisions and a serious pedestrian injury. Most crashes at this intersection were rear end crashes involving motor vehicles (11 plus one involving a motorcycle).

Table 2-18: Summary of Epping Road / Herring Road intersection crashes 2017-2021

Degree of injury	Natural light	Approach /exit	Road User Movement	Traffic Units	
				1	2
Minor/other	Daylight	Epping Road eastbound exit	Rear end	Car (sedan/hatch)	4-wheel drive
Non-casualty	Daylight	Herring Road northbound approach	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Non-casualty	Darkness	Epping Road eastbound approach	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Serious	Daylight	Epping Road eastbound exit	Opposing – right through	4-wheel drive	Motorcycle
Minor/other	Daylight	Herring Road northbound approach	Rear end	Station wagon	Motorcycle
Minor/other	Daylight	Epping Road eastbound exit	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Minor/other	Daylight	Epping Road eastbound exit	Right turn	Motorcycle	-
Moderate	Daylight	Epping Road eastbound approach	Pedestrian – near side	Unknown motor vehicle	Pedestrian
Minor/other	Daylight	Epping Road eastbound exit	Rear end	Car (sedan/hatch)	Car (sedan/hatch)

Degree of injury	Natural light	Approach /exit	Road User Movement	Traffic Units	
				1	2
Moderate	Darkness	Herring Road northbound approach	Rear end	Car (sedan/hatch)	Car (sedan/hatch)
Minor/other	Dusk	Epping Road eastbound approach	Rear end	Car (sedan/hatch)	4-wheel drive
Serious	Daylight	Epping Road eastbound exit	Out of control on carriageway	Motorcycle	-
Non-casualty	Darkness	Herring Road northbound approach	Rear end	Car (sedan/hatch)	Station wagon
Minor/other	Darkness	Herring Road northbound approach	Rear end	4-wheel drive	4-wheel drive
Serious	Daylight	Epping Road eastbound exit	Pedestrian – emerging	Car (sedan/hatch)	Pedestrian
Moderate	Daylight	Epping Road eastbound exit	Rear end	Light truck	Car (sedan/hatch)
Moderate	Daylight	Epping Road eastbound exit	Rear end	Car (sedan/hatch)	Car (sedan/hatch)

3. Summary of community feedback

Community feedback was gathered by City of Ryde Council via email and the 'Mysocialpinpoint' platform between November and December 2022.

As shown in Figure 3-1, traffic safety (other than speeding) was the community's main concern, comprising 26% of total responses. This was followed by traffic efficiency, parking, pedestrian safety and speeding, which all shared a similar number of responses.

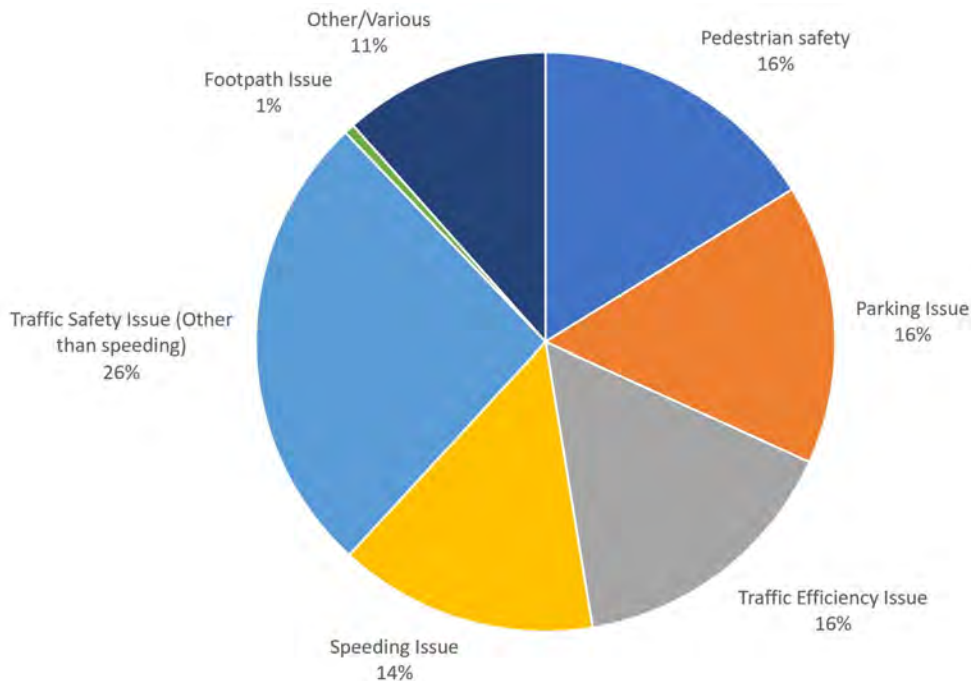


Figure 3-1: Community feedback share of responses by category

General areas of concern include:

- The common use of residential streets for “rat running” in AM and PM peaks.
- Several streets having non-existent/inadequate footpaths.
- Limited parking spaces for residents due to nearby businesses.
- Streets with parking on both sides narrowing streets for two-way vehicle travel.
- Poor adherence to 50 km/h speed limit.
- Poor adherence to 2-hour parking limits.

Particular locations of concern, shown in Figure 3-2, were identified in multiple community responses:

1. Trevitt Road / Pine Street intersection – commentary that this intersection is dangerous to cross due to a lack of pedestrian facilities, additional traffic short cutting to Epping Road and motorists disobeying road rules.

2. Kent Road / Lane Cove Road intersection – limited space at the intersection means traffic turning from Kent Road into Lane Cove Road does not have separated lanes for left and right turn movements, impacting traffic efficiency.
3. Trevitt Road / Lane Cove Road intersection – commentary that cars parked on both sides of Trevitt Road close to Lane Cove Road creates safety issues for traffic turning from Lane Cove Road.
4. Whiteside Street – a lack of pedestrian and cyclist facilities along the street makes it difficult and unsafe to access the shared use path on the southern side of Epping Road.
5. Parklands Road / Beswick Avenue intersection – commentary that cars speeding around corners with poor visibility, in addition to pedestrian and cyclist activity from the nearby bike track creates safety issues. The parked cars at the curve on Parklands Road have also been noted as creating friction between cars approaching from opposing directions.
6. David Avenue / McGregor Street intersection – commentary that there is a speeding issue on the approach to the intersection caused by peak hour traffic.
7. Paul Street / McGregor Street intersection – commentary that visibility is obstructed on the approach to the intersection by parked cars.
8. Napier Crescent between David Avenue and Lane Cove Road – a footpath is needed on the northern side of the road to provide safe access to Lane Cove Road.



Figure 3-2: Location of specific areas of concern commonly identified in community feedback

4. Future conditions

4.1. Road network

Future hourly traffic volumes for 2033 were determined by applying a 2% annual background growth factor to the traffic counts used in the existing conditions assessment in Section 2.1. The background growth factor was taken from the maximum level of annual growth recorded by a TfNSW Permanent Classifier station on the northbound side of Lane Cove Road (20 metres south of Coxs Road) between 2015 and 2018. This growth factor is considered conservative considering more people taking advantage of the ability to work from home in 2023 compared to the pre COVID-19 era.

4.1.1. Future intersection performance

4.1.1.1 Lane Cove Road / Kent Road

2033 intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:30pm to 5:30pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-1.

Table 4-1: Lane Cove Road / Kent Road – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)								
Lane Cove Road northbound	0.664	20.6	B	262.0	0.569	18.3	B	202.9
Lane Cove Road southbound	0.668	8.6	A	97.0	0.572	7.2	A	136.3
Kent Road eastbound	0.653	46.2	E	113.7	0.545	68.0	E	74.4
Overall Intersection	0.668	18.1	B	262.0	0.572	13.9	A	202.9
Weekday evening peak (4:30pm to 5:30pm)								
Lane Cove Road northbound	0.569	18.3	B	202.9	0.694	20.7	B	280.6
Lane Cove Road southbound	0.572	7.2	A	136.3	0.687	8.1	A	139.9
Kent Road eastbound	0.545	68.0	E	74.4	0.662	70.0	E	92.7
Overall Intersection	0.572	13.9	A	202.9	0.694	15.5	B	280.6

4.1.1.2 Lane Cove Road / Trevitt Road

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 7am to 8am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-2.

Table 4-2: Lane Cove Road / Trevitt Road – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:00am to 8:00am)								
Lane Cove Road northbound	0.397	6.4	A	0.0	0.483	6.4	A	0.0
Trevitt Road eastbound	0.066	8.3	A	1.7	0.106	10.2	A	2.6
Overall Intersection	0.397	8.3	A	1.7	0.483	10.2	A	2.6
Weekday evening peak (4:15pm to 5:15pm)								
Lane Cove Road northbound	0.352	6.4	A	0.0	0.438	6.4	A	0.0
Trevitt Road eastbound	0.048	7.2	A	1.2	0.073	8.6	A	1.8
Overall Intersection	0.352	7.2	A	1.2	0.438	8.6	A	1.8

4.1.1.3 Lane Cove Road / Napier Crescent

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 7am to 8am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-3.

Table 4-3: Lane Cove Road / Napier Crescent – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:00am to 8:00am)								
Lane Cove Road northbound	0.408	6.5	A	0.0	0.497	6.5	A	0.0
Napier Crescent eastbound	0.077	8.2	A	1.9	0.123	10.3	A	3.0
Overall Intersection	0.408	8.2	A	1.9	0.497	10.3	A	3.0
Weekday evening peak (4:15pm to 5:15pm)								
Lane Cove Road northbound	0.353	6.4	A	0.0	0.430	6.5	A	0.0
Napier Crescent eastbound	0.042	7.3	A	1.1	0.063	8.6	A	1.6
Overall Intersection	0.353	7.3	A	1.1	0.430	8.6	A	1.6

4.1.1.4 Lane Cove Road / Paul Street

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 7am to 8am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-4.

Table 4-4: Lane Cove Road / Paul Street – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (7:00am to 8:00am)								
Lane Cove Road northbound	0.409	6.5	A	0.0	0.499	6.6	A	0.0
Paul Street eastbound	0.043	8.4	A	1.1	0.069	10.5	A	1.7
Overall Intersection	0.409	8.4	A	1.1	0.499	10.5	A	1.7
Weekday evening peak (4:15pm to 5:15pm)								
Lane Cove Road northbound	0.361	6.5	A	0.0	0.439	6.5	A	0.0

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Paul Street eastbound	0.021	7.5	A	0.5	0.032	8.8	A	0.8
Overall Intersection	0.361	7.5	A	0.5	0.439	8.8	A	0.8

4.1.1.5 Epping Road / Whiteside Street

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:15pm to 5:15pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-5.

Table 4-5: Epping Road / Whiteside Street – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)								
Epping Road westbound	0.222	6.5	A	0.0	0.270	6.5	A	0.0
Overall Intersection	0.222	6.5	A	0.0	0.270	6.5	A	0.0
Weekday evening peak (4:15pm to 5:15pm)								
Epping Road westbound	0.314	6.5	A	0.0	0.382	6.5	A	0.0
Overall Intersection	0.314	6.5	A	0.0	0.382	6.5	A	0.0

4.1.1.6 Kent Road / Milroy Street

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 5pm to 6pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-6.

Table 4-6: Kent Road / Milroy Street – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)								
Kent Road westbound	0.110	0.0	A	0.0	0.147	0.0	A	0.0
Milroy Street southbound	0.051	6.6	A	0.5	0.071	7.2	A	0.7
Kent Road eastbound	0.092	1.1	A	0.0	0.113	1.1	A	0.0
Overall intersection	0.110	6.6	A	0.5	0.147	7.2	A	0.7
Weekday evening peak (5:00pm to 6:00pm)								
Kent Road westbound	0.154	0.0	A	0.0	0.211	0.1	A	0.0
Milroy Street southbound	0.059	6.8	A	0.5	0.084	7.5	A	0.7
Kent Road eastbound	0.067	1.1	A	0.0	0.081	1.1	A	0.0
Overall intersection	0.154	6.8	A	0.5	0.211	7.5	A	0.7

4.1.1.7 Kent Road / Ada Street

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 5pm to 6pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-7.

Table 4-7: Kent Road / Ada Street – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)								
Ada Street northbound	0.359	7.6	A	6.6	0.449	7.9	A	9.0
Kent Road westbound	0.174	4.0	A	3.5	0.216	4.1	A	4.6
Kent Road eastbound	0.319	9.0	A	5.7	0.475	10.0	A	9.8
Overall intersection	0.359	9.0	A	6.6	0.475	10.0	A	9.8
Weekday evening peak (5:00pm to 6:00pm)								
Ada Street northbound	0.173	7.6	A	2.6	0.219	7.9	A	3.5
Kent Road westbound	0.224	4.1	A	4.4	0.278	4.2	A	5.9

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Kent Road eastbound	0.243	7.5	A	4.2	0.307	7.8	A	5.6
Overall intersection	0.243	7.6	A	4.4	0.307	7.9	A	5.9

4.1.1.8 Herring Road / Kent Road

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:45pm to 5:45pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-8.

Table 4-8: Herring Road / Kent Road – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)								
Herring Road northbound	0.598	8.3	A	39.2	0.758	10.1	A	71.5
Kent Road westbound	0.241	8.3	A	9.7	0.308	8.8	A	13.3
Herring Road southbound	0.263	4.3	A	12.3	0.330	4.5	A	17.6
Overall Intersection	0.598	8.3	A	39.2	0.758	10.1	A	71.5
Weekday evening peak (4:45pm to 5:45pm)								
Herring Road northbound	0.433	7.5	A	26.5	0.537	7.8	A	37.3
Kent Road westbound	0.438	17.4	B	24.5	0.881	67.8	E	85.4
Herring Road southbound	0.818	5.6	A	89.3	1.018	35.2	C	437.1
Overall Intersection	0.818	17.4	B	89.3	1.018	67.8	E	437.1

4.1.1.9 Herring Road / Dora Street

2033 Intersection turning movement volumes were derived from traffic surveys undertaken on Wednesday, 19 April 2023 with a 2% annual background growth factor applied. Analysis of the traffic surveys showed a weekday morning peak hour from 8am to 9am and a weekday evening peak hour from 4:45pm to 5:45pm. The performance of the modelled intersection under current and future traffic volumes is shown in Table 4-9.

Table 4-9: Herring Road / Dora Street – modelled existing and future intersection performance

Approach and peak period	Existing Conditions				Future Conditions			
	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)	DOS	Average delay (sec/veh)	LOS	95% back of queue (m)
Weekday morning peak (8:00am to 9:00am)								
Herring Road northbound	0.504	6.8	A	33.1	0.615	6.8	A	50.3
Dora Street westbound	0.033	8.5	A	1.1	0.042	8.9	A	1.4
Herring Road southbound	0.229	4.0	A	9.3	0.278	4.0	A	12.1
Overall Intersection	0.504	8.5	A	33.1	0.615	8.9	A	50.3
Weekday evening peak (4:45pm to 5:45pm)								
Herring Road northbound	0.327	3.9	A	19.2	0.399	6.8	A	26.6
Dora Street westbound	0.066	17.1	B	2.8	0.124	26.5	B	5.9
Herring Road southbound	0.679	4.0	A	56.2	0.828	4.1	A	124.0
Overall Intersection	0.679	17.1	B	56.2	0.828	26.5	B	124.0

4.1.2. Future mid-block capacity

Vehicle volumes were converted to PCUs by using the same average heavy vehicle percentages during the survey period and a conservative heavy vehicle PCU factor of three. These volumes relative to the capacity of the street are outlined in Table 4-10.

Table 4-10: Forecasted 2033 mid-block capacities of surveyed locations

Street	Direction	Volume (v/h)	Heavy vehicle %	Volume (pcu/h)	Capacity (pcu/h)	% of Capacity
Whiteside Street						
Northbound	AM peak	205	2.4%	215	600	36%
	PM peak	105	2.4%	110	600	18%
Southbound	AM peak	71	2.9%	75	600	13%
	PM peak	53	2.9%	56	600	9%
Paul Street						
Eastbound	AM peak	98	3.0%	104	600	17%
	PM peak	99	3.0%	105	600	17%
Westbound	AM peak	57	2.8%	60	600	10%
	PM peak	86	2.8%	91	600	15%
Napier Crescent						
Northbound	AM peak	39	5.5%	44	600	7%
	PM peak	66	5.5%	73	600	12%
Southbound	AM peak	108	4.1%	117	600	19%
	PM peak	76	4.1%	82	600	14%
Trevitt Road						
Northbound	AM peak	47	3.1%	50	600	8%
	PM peak	91	3.1%	97	600	16%
Southbound	AM peak	112	2.9%	118	600	20%
	PM peak	70	2.9%	74	600	12%
Pindari Road						

Street	Direction	Volume (v/h)	Heavy vehicle %	Volume (pcu/h)	Capacity (pcu/h)	% of Capacity
Northbound	AM peak	49	3.6%	53	600	9%
	PM peak	42	3.6%	45	600	7%
Southbound	AM peak	36	4.3%	39	600	6%
	PM peak	38	4.3%	41	600	7%
Gibb Street						
Northbound	AM peak	56	1.9%	58	600	10%
	PM peak	70	1.9%	72	600	12%
Southbound	AM peak	56	10.4%	67	600	11%
	PM peak	68	10.4%	83	600	14%
Baringa Street						
Northbound	AM peak	145	2.1%	151	600	25%
	PM peak	142	2.1%	148	600	25%
Southbound	AM peak	60	3.2%	63	600	11%
	PM peak	86	3.2%	92	600	15%
Milroy Street						
Northbound	AM peak	205	2.4%	215	600	36%
	PM peak	105	2.4%	110	600	18%
Southbound	AM peak	71	2.9%	75	600	13%
	PM peak	53	2.9%	56	600	9%
Booth Street						
Eastbound	AM peak	37	2.7%	39	600	6%
	PM peak	44	2.7%	46	600	8%
Westbound	AM peak	26	6.6%	29	600	5%
	PM peak	35	6.6%	40	600	7%
Dora Street						
Eastbound	AM peak	38	1.7%	39	600	7%
	PM peak	33	1.7%	34	600	6%
Westbound	AM peak	45	3.1%	48	600	8%
	PM peak	48	3.1%	50	600	8%
Adelphi Road						
Eastbound	AM peak	50	1.1%	51	600	9%
	PM peak	77	1.1%	78	600	13%
Westbound	AM peak	66	2.7%	69	600	12%
	PM peak	51	2.7%	54	600	9%
Leonard Place						
Eastbound	AM peak	21	0.9%	21	600	4%
	PM peak	11	0.9%	11	600	2%
Westbound	AM peak	20	5.5%	22	600	4%
	PM peak	11	5.5%	12	600	2%

As shown in Table 4-10, the future mid-block capacity of the roads assessed would continue to operate with spare capacity. A maximum future mid-block capacity of 36% was calculated on Whiteside Street and Milroy Street in the northbound during the AM peak, indicating that congestion would not be an issue by 2033.

5. Options development

5.1. Areas of concern

5.1.1. Modelling results

Results from the SIDRA models developed of the existing conditions (2023) and future conditions (2033) were investigated to understand the operational efficiency of the modelled intersections. Under the existing scenario, all modelled intersections perform at LOS A or LOS B, signifying smooth traffic flow, acceptable delays, and spare capacity. In the future, the 2033 models showed similar results, with most intersections performing at LOS A or LOS B.

At the Lane Cove Road / Kent Road signalised intersection, although the overall intersection performs at LOS A or LOS B under the existing and future scenarios, the Kent Road eastbound approach performs at LOS E during the AM and PM peak. Given that Lane Cove Road carries a substantially higher number of vehicles compared to Kent Road, traffic signal phasing at the intersection favours northbound and southbound movements on Lane Cove Road, limiting the green time allocated to the Kent Road approach in a signal cycle.

At the Herring Road / Kent Road intersection, the models showed a deterioration in future intersection performance during the PM peak from LOS B to LOS E. Delays would be experienced on the Kent Road westbound approach due to these motorists required to give way to the higher traffic volumes on Herring Road in the southbound direction. The Herring Road southbound approach would experience an approximate 440 metre queue length, with queues extending past the Herring Road / Dora Street intersection to the north.

5.1.2. The common use of residential streets for “rat running” in AM and PM peaks

As per community feedback, Lane Cove Road experiences heavy traffic congestion during peak hours, causing many drivers to turn left at Trevitt Road, Napier Crescent, or Paul Street to access Epping Road westbound via Paul Street. During a site visit, it was observed that Paul Street is the most popular shortcut as it offers a quick bypass of the busy Epping Road/Lane Cove Road intersection, shown in Figure 5-1. Comparatively, the traffic levels on other streets were found to be less pronounced. Although the additional “rat running” vehicles do not currently cause any major traffic issues on the local road network, Council should routinely monitor these streets to ensure that future traffic volumes due to “rat running” does not compromise the safety of local residents and vulnerable users in the area.

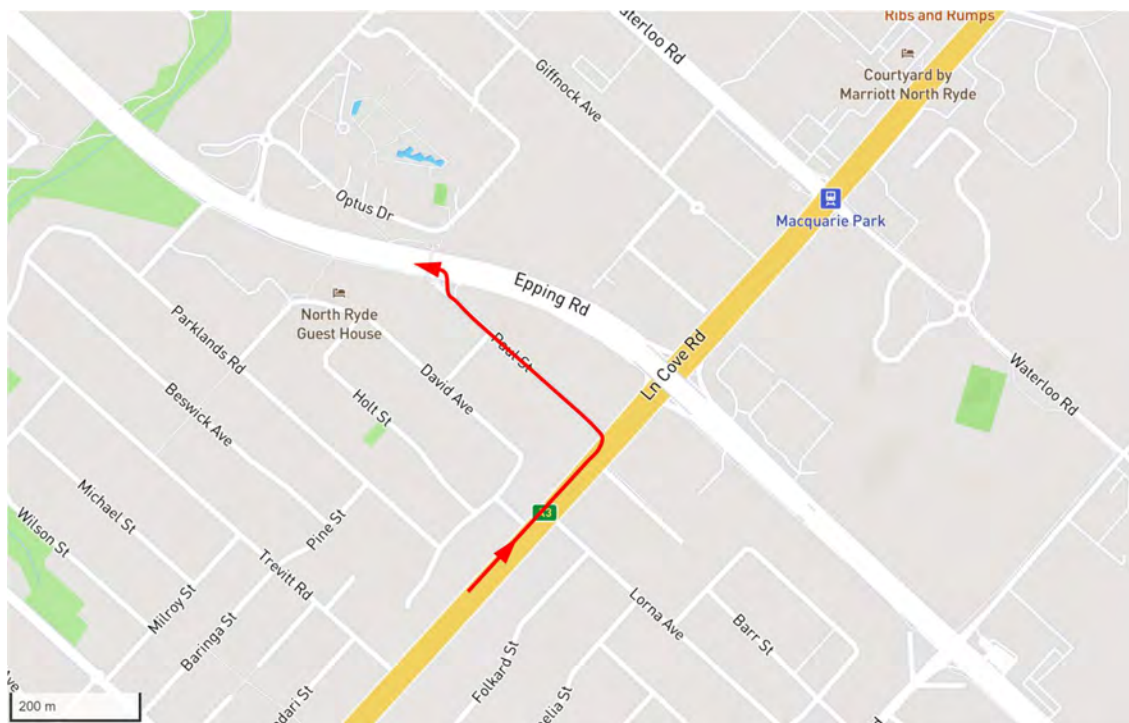


Figure 5-1: Paul Street alternative route

5.1.3. Several streets with non-existent/inadequate footpaths

As the area has a predominantly car-centric design, several streets have limited pedestrian and cyclist infrastructure, which may result in potential safety issues if pedestrians are required to walk on the road. Locations which have missing pedestrian, or cyclist links are shown in Figure 5-2 and include:

- Napier Crescent between David Avenue and Lane Cove Road – a footpath is located on the southern side of the crescent only, with no pedestrian connectivity to Lane Cove Road from the northern side of Napier Crescent.
- Whiteside Street – no footpaths are provided on both sides of the street north of driveway for 5 Whiteside Street, disconnecting Whiteside Street from the shared path on the southern side of Epping Road.
- Adelphi Road – no footpaths are provided on both sides of the road this street, which is currently used by pedestrians travelling to the dog park, sports ovals, and shared use path.

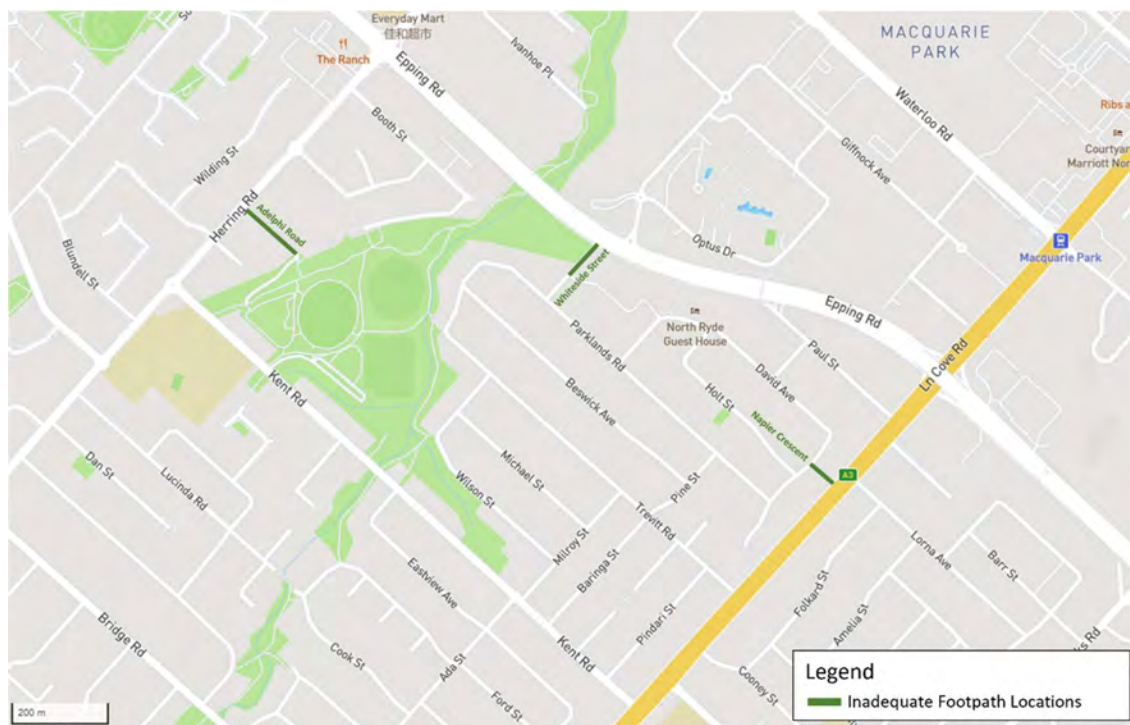


Figure 5-2: Location of streets identified as having inadequate footpaths

5.1.4. Traffic at the Kent Road / Lane Cove Road intersection

5.1.4.1 Single lane on the Kent Road approach

Residents have noted that the Kent Road approach to the intersection is marked as a single lane. The current width of the eastbound carriageway on Kent Road on approach to Lane Cove Road does not comply with the minimum width requirements for two (2) traffic lanes specified within *Austrroads Guide to Road Design Part 3 Geometric Design*. Whilst our modelling and observations have found that the provision of an additional short eastbound approach lane on Kent Road can help ease congestion within this local road during weekday peak periods, such a measure would require significant land acquisition, which will impact on adjoining residential properties and existing footpaths/shared paths. Further, it should be noted that the existing (2023) and future (2033) overall operational performance (Level of Service) for the intersection has been assessed to be good/acceptable based on the criteria specified within the *Guide to Traffic Generating Developments*.

5.1.4.2 Northbound traffic queuing across Kent Road from the Lane Cove Road/Coxs Road intersection

The short distance between the Coxs Road / Lane Cove Road and Kent Road / Lane Cove Road intersection limits storage and during peak period, with queues on Lane Cove Road extending past Kent Road, as shown in Figure 5-3. These downstream queues reduce the capacity of the left turn from Kent Road onto Lane Cove Road.



Figure 5-3: Downstream queue overflowing at the Kent Road / Lane Cove Road intersection

5.1.5. Visibility obstruction from parked cars

Visibility issues resulting from parked cars were shown to be of concern in the community feedback and were observed during the site investigation. The following two intersections were identified as requiring additional mitigation measures to reduce potential safety risks:

- Trevitt Road / Lane Cove Road – cars parked on both sides of Trevitt Road near the intersection reduce the available road space for vehicles to turn into or out of Trevitt Road, increasing the risk of a vehicle collision.
- Paul Street / McGregor Street – cars parked on the Paul Street east approach may cause sight distance issues for vehicles turning left or right from McGregor Street (and vice-versa).

The intersections with the potential for safety risks are shown in Figure 5-4.



Figure 5-4: Visibility obstruction from parked cars at the Trevitt Road / Lane Cove Road and Paul Street / McGregor Street intersections

5.2. Multi-modal improvement recommendations

The recommendations are mapped in Figure 5-5 and summarised in Table 5-1.

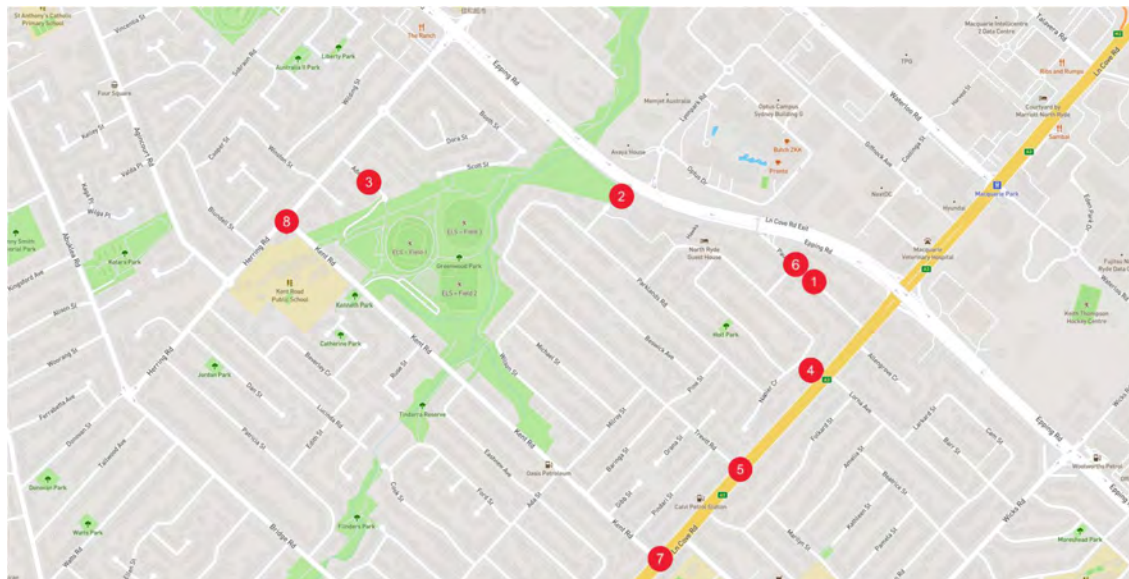


Figure 5-5: Improvement recommendation locations

Table 5-1: Summary of multi-modal improvement recommendations

Issue	No.	Location	Recommendation
Additional traffic on the local road network due to “rat-running” during peak periods	1	McGregor Street / Paul Street	Council to continue monitoring traffic volumes on Paul Street and consider installing Watts profile speed hump or other form of approved raised threshold on the Paul Street east approach to slow down traffic approaching the intersection, improving safety and amenity, and acting as a deterrent for rat running traffic. A scheme may be needed depending on the success of the individual implementation and would be subject to relevant approvals, public consultation, and availability of funding.
Missing pedestrian and cycle links	2	Whiteside Street between Epping Road and current footpath	Council to consider the opportunity to complete the missing link by providing a shared use path along the eastern side of Whiteside Street to facilitate pedestrian and bicycle access to the shared use path on the southern of Epping Road. Given that Whiteside Street is a one-way southbound street from Epping Road, bicycle access is not permitted. The proposed upgrade would be subject to relevant approvals, public consultation and availability of funding.
	3	Adelphi Street between Herring Road and ELS Park	Council to consider the opportunity to complete the missing link by providing a footpath on the southern side of the street. The location of existing trees would make it more difficult to implement a footpath on the northern side. The proposed upgrade would be subject to relevant approvals, public consultation and availability of funding.

Issue	No.	Location	Recommendation
	4	Napier Crescent connecting to Lane Cove Road	Council to consider the opportunity to complete the missing link by providing a footpath on the northern side of Napier Crescent to accommodate pedestrian movements towards Lane Cove Road. The proposed upgrade would be subject to relevant approvals, public consultation and availability of funding.
Poor visibility at intersections due to parked vehicles	5	Trevitt Road / Lane Cove Road	Council to consider removing one or two on-street parking spaces by relocating the existing 'No Stopping' sign on both sides of Trevitt Road 10m west of its current location to improve visibility and road safety at the intersection.
	6	Paul Street / McGregor Street	Council to consider removing one or two on-street parking spaces by relocating the existing 'No Stopping' sign on the southern side of Paul Street on the east approach, 10m east of its current location to improve sight distance and road safety at the intersection.
Future intersection capacity	7	Lane Cove Road / Kent Road	No upgrades warranted as the intersection has been assessed to operate with an overall good/acceptable Level of Service.
	8	Herring Road / Kent Road	Council to monitor efficiency at this intersection and consider need for signalisation should operational performance deteriorate in the future. A potential signalised intersection layout that would operate at LOS C is shown in Figure 5-6, with separate left turn short lanes on Herring Road southbound and Kent Road east and a right turn bay for Herring Road northbound. Further investigations would need to be undertaken to determine the feasibility of this option.

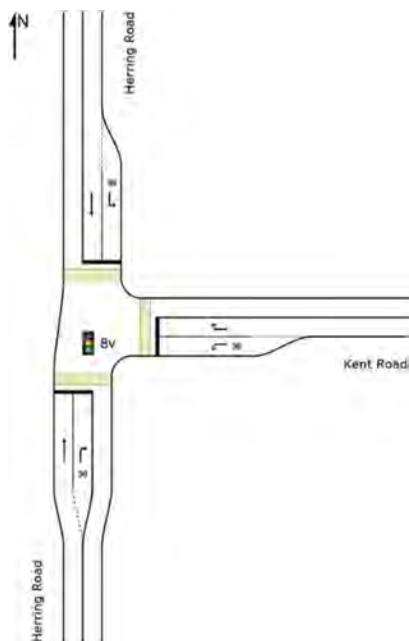


Figure 5-6: Potential future signalised intersection layout at Herring Road / Kent Road

6. Conclusion

City of Ryde Council has identified the study area covered in this report as a potential location for traffic and parking improvements.

To assess the efficiency of the road network, intersection modelling was conducted using SIDRA. The results indicated good existing traffic performance except at the Herring Road / Kent Road intersection. This intersection currently operates at LOS A and B in the existing scenario, however, is projected to deteriorate to LOS E in the future PM peak scenario.

Community feedback received highlighted the need for traffic calming measures on roads used as a shortcut between Lane Cove Road and Epping Road, as well as concerns over pedestrian safety. Mid-block capacity analysis was undertaken as part of this investigation and demonstrated that there is sufficient capacity on all streets to accommodate existing and future traffic volumes. Parking spaces were also available on all roads surveyed.

The parking surveys showed that there were no parking capacity issues (parking occupancy less than 85%) on the majority of streets on the surveyed days. An exception was observed on Napier Crescent on the surveyed Tuesday between 5:00pm and 7:00pm where parking occupancy reached 89%. Overall, a parking occupancy of 44% was observed when considering all surveyed streets. Based on these findings, it is evident that the existing on-street parking restrictions within the study area (being primarily 2-hour parking resident permit holders excepted) are appropriate to service the parking needs of local residents in the area. Parking vacancies also assist with the safety and efficiency of traffic flow in many of the local roads in the study area, which have a narrow carriageway width.

The following multi-modal recommendations were made for the study area to address feedback from the public consultation, which is subject to further investigations, approval from relevant authorities and availability of funds:

- Implement traffic calming device (or scheme if required) at the McGregor Street / Paul Street intersection.
- Complete missing pedestrian and cycle links through the provision of footpaths or shared use paths on:
 - Whiteside Street,
 - Adelphi Street,
 - Napier Crescent.
- Remove a low number of on-street parking to improve visibility and sight distance near the:
 - Trevitt Road / Lane Cove Road intersection,
 - Paul Street / McGregor Street intersection.
- Consider upgrading the following intersections to improve operational performance and/or efficiency:
 - Kent Road / Herring Road (if routine monitoring determines this is required in the future).

Appendix A Parking survey results

David Avenue

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
West	Parklands Road and McGregor Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	51	20	16	18	16	13	6	7	7	14
North	McGregor Street and Napier Crescent	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	23	2	2	2	5	5	3	16	14	21
East	Napier Crescent and Holt Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	40	12	18	11	15	13	9	17	17	18
South	Holt Street and Parklands Street	Reserved: Disabled only	1	0	0	0	0	0	0	1	0	0
		2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	24	15	14	13	16	9	3	10	16	16
Total			139	49	40	44	52	40	21	51	54	69
Occupancy				36%	29%	32%	37%	29%	15%	37%	39%	50%

Holt Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	David Avenue and Napier Crescent	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	52	14	11	9	16	18	4	10	13	16
West	Napier Crescent and David Avenue	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	46	15	12	11	12	8	7	5	8	11
Total			98	29	23	20	28	26	11	15	21	27
Occupancy				30%	23%	20%	29%	27%	11%	15%	21%	28%

Parklands Road

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
West	Trevitt Road and Whiteside Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	29	12	11	13	21	21	15	14	19	23
	Whiteside Street and David Avenue		20	7	5	9	18	19	12	13	16	16
	David Avenue and Napier Crescent		43	9	7	12	20	20	18	14	11	18
South	Napier Crescent and Pine Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	66	20	16	15	36	31	11	19	21	24
	Pine Street and Beswick Avenue	No Parking: 5AM - 11AM Friday 2P: 8AM - 6PM Mon- Thus 11AM - 6PM Fri P.M.E zone3	4	3	3	3	4	4	2	3	3	3
	Beswick Avenue and Trevitt Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	7	2	2	3	6	6	1	5	4	6
Total			98	29	183	56	47	59	119	111	65	76
Occupancy				31%	26%	32%	65%	61%	36%	42%	45%	55%

Paul Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	Epping Road and Lane Cove Road	2P: 8 AM - 6 PM Mon- Fri P.H.E zone3	28	13	10	9	28	24	18	14	18	24
		Reserved: Motorbikes only	3	0	0	0	1	1	2	2	1	2
West	Lane Cove Road and McGregor Street	2P: 8 AM - 6 PM Mon- Fri P.H.E zone3	29	11	8	7	21	13	10	10	14	18
	McGregor Street and Epping Road		12	5	3	3	10	10	6	7	7	9
Total			72	29	21	19	60	48	36	33	40	53
Occupancy				40%	29%	32%	83%	67%	50%	46%	56%	74%

Beswick Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Parklands Road and Pine Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	72	21	19	14	21	16	13	11	16	16
South	Pine Street and Parklands Road		72	17	14	17	19	17	17	8	8	12
Total			144	38	33	31	40	33	30	19	24	28
Occupancy				26%	22%	21%	28%	23%	21%	13%	17%	19%

Trevitt Road

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Parklands Road and Pine Street	2P: 8 AM - 6 PM Mon- Fri P.H.E zone3	54	15	14	11	12	12	9	8	10	11
	Pine Street and Sunhill Place		7	2	2	1	4	3	1	2	1	3
	Sunhill Place and Lane Cove Road		11	0	0	0	2	0	0	1	0	1
South	Lane Cove Road and Pindari Street	2P: 8 AM - 6 PM Mon- Fri P.H.E zone3	6	0	0	0	0	0	0	0	0	0
	Pindari Street and Orana Street		4	0	0	0	0	0	0	0	0	0
	Orana Street and Baringa Street		5	2	2	2	2	1	1	1	0	3
	Baringa Street and Milroy Street		6	0	0	0	1	0	0	0	1	0
	Milroy Street and Leslie Street		32	3	5	4	8	1	3	5	3	4
	Leslie Street and Parklands Road		9	0	0	0	3	1	0	3	3	2
Total			134	22	23	18	32	18	14	20	18	24
Occupancy				16%	17%	13%	24%	13%	10%	15%	13%	18%

Michael Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Leslie Street and Milroy Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	34	3	6	7	2	0	0	2	1	1
South	Milroy Street and Leslie Street		36	4	6	5	4	1	0	0	0	0
Total			70	7	12	12	6	1	0	2	1	1
Occupancy				10%	17%	17%	9%	1%	0%	3%	1%	1%

Milroy Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	Trevitt Road and Kent Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	26	2	1	1	1	1	0	1	3	3
West	Kent Road and Wilson Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	8	1	1	1	2	1	1	0	2	3
	Wilson Street and Michael Street		7	1	0	1	0	0	0	0	2	3
	Michael Street and Trevin Road		8	0	0	0	0	0	0	0	0	0
Total			49	4	2	3	3	2	1	1	7	8
Occupancy				8%	4%	6%	6%	4%	2%	2%	14%	16%

Pindari Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	Trevitt Road and Kent Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	32	4	6	7	6	4	4	7	7	6
West	Kent Road and Trevitt Road		29	5	7	8	7	7	5	4	3	3
Total			61	9	13	15	13	11	9	11	10	9
Occupancy				15%	21%	25%	21%	18%	15%	18%	16%	15%

Orana Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	Trevitt Road and No Through Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	13	3	3	2	1	1	1	0	0	1
West	No Through Road and Trevitt Road		17	1	0	1	6	6	4	5	5	6
Total			30	4	3	3	7	7	5	5	5	7
Occupancy				13%	10%	10%	23%	23%	17%	17%	17%	23%

Baringa Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	Trevitt Road and Kent Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	26	2	3	2	1	1	0	8	8	11
West	Kent Road and Trevitt Road		27	4	4	3	9	8	5	1	3	7
Total			53	6	7	5	10	9	5	9	11	18
Occupancy				11%	13%	9%	19%	17%	9%	17%	21%	34%

Gibb Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
West	Kent Road and No Through Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	11	5	5	5	7	5	5	2	2	6
East	No Through Road and Kent Road		13	4	4	6	2	2	2	5	7	7
Total			24	9	9	11	9	7	7	7	9	13
Occupancy				38%	38%	46%	38%	29%	29%	29%	38%	54%

Wilson Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Leslie Street and Milroy Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	32	7	11	9	6	5	3	8	8	12
South	Milroy Street and Leslie Street		45	14	10	9	8	6	2	4	7	9
Total			77	21	21	18	14	11	5	12	15	21
Occupancy				27%	27%	23%	18%	14%	6%	16%	19%	27%

Kent Road

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Herring Road and Milroy Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	70	19	11	13	19	20	18	10	11	8
		Motorbikes only	2	0	0	0	0	0	0	0	0	0
	Milroy Street and Baringa Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	6	1	0	0	2	0	0	0	0	0
	Baringa Street and Gibb Street		4	1	1	1	1	0	0	1	0	1
	Gibb Street and Pindari		6	1	0	0	0	0	0	0	0	0
South	Lane Cove Road and Ada Street	No Restriction	18	7	6	6	9	10	11	11	10	11
	Ada Street and Eastview Avenue	Mail zone	1	0	0	0	0	0	0	0	0	0
		No Restriction	23	5	5	4	17	11	12	13	10	11
		Motorbikes only	5	0	0	0	0	0	0	0	0	0
		No Restriction	16	8	6	6	9	10	8	12	11	12
	Ruse Street and Herring Road	8:00 - 9:30 AM, 2:30 - 4:00 PM Mon-Fri Kiss and Ride	14	0	0	0	1	4	5	0	0	0
Total			165	42	29	30	58	55	54	47	42	43
Occupancy				25%	18%	18%	35%	33%	33%	28%	25%	26%

Booth Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
South	Scott Street and Dora Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	9	3	3	4	3	4	4	1	3	5
	Dora Street and Herring Road		20	6	6	8	10	11	9	7	8	10
North	Herring Road and Scott Road	Disabled only	2	1	1	1	1	1	1	2	0	0
		2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	30	17	15	15	15	18	16	9	14	15
Total			61	27	25	28	29	34	30	19	25	30
Occupancy				44%	41%	46%	48%	56%	49%	31%	41%	49%

Dora Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Herring Road and Nola Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	18	7	7	6	9	11	10	5	4	6
	Nola Street and Booth Street		15	3	4	5	2	2	3	2	2	2
South	Booth Street and Herring Road		33	12	12	14	9	11	11	6	8	8
Total			66	22	23	25	20	24	24	13	14	16
Occupancy				33%	35%	38%	30%	36%	36%	20%	21%	24%

Adelphi Road

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Herring Road and No Through Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	18	8	6	6	9	9	8	5	5	9
		Disabled only	1	0	0	0	1	1	1	0	0	0
South	No Through Road and Herring Road	Disabled only	1	0	0	0	0	0	0	0	0	0
Total			20	8	6	6	12	12	11	5	5	9
Occupancy				40%	30%	30%	60%	60%	55%	25%	25%	45%

Leonard Place

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
North	Herring Road and No Through Road	No Parking: 5:00 – 11:00 Friday	4	0	0	0	1	1	1	1	1	1
		No Restriction	7	4	5	6	5	5	5	4	4	3
South	No Through Road and Herring Road	No Parking: 5:00 – 11:00 Friday	6	4	4	3	5	5	5	3	2	2
Total			17	8	9	9	11	11	11	8	7	6
Occupancy				47%	53%	53%	65%	65%	65%	47%	41%	35%

Leslie Street

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	Trevitt Road and Michael Street	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	8	0	1	1	2	2	1	2	2	1
	Michael Street and Wilson Street		6	0	0	0	0	0	0	0	1	1
West	Wilson Street and Trevitt Road		16	8	7	6	4	3	2	0	5	1
Total			30	8	8	7	6	5	3	2	8	3
Occupancy				36%	29%	32%	20%	17%	10%	7%	27%	10%

Napier Crescent

Side	Between	Restriction	Supply	Occupied spaces								
				Saturday 18/3/23			Tuesday 21/3/23					
				11:00	12:00	13:00	7:00	8:00	9:00	16:00	17:00	18:00
East	David Avenue and Parklands Road	2P: 8 AM - 6 PM Mon - Fri P.H.E zone3	11	1	1	1	9	9	5	7	9	9
West	Parklands Road and Holt Avenue		8	0	0	0	6	5	5	5	8	8
Total			19	1	1	1	15	14	10	12	17	17
Occupancy				5%	5%	5%	79%	74%	53%	63%	89%	89%