TRAFFIC AND PARKING IMPACT ASSESSMENT FOR A PROPOSED BOARDING HOUSING

31-32 Park Avenue Kingswood

Prepared for: MIM Property Pty Ltd

N206378A (Version 1a)

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1. INTRODUCTION

Motion Traffic Engineers was commissioned by MIM Property Pty Ltd to undertake a traffic and parking impact assessment of proposed boarding housing development at 31-32 Park Avenue in Kingswood. Currently the site is comprised of two single residential dwellings.

The proposed boarding house will have vehicle access and egress via Park Avenue.

In the course of preparing this assessment, the subject site and its environs have been inspected, plans of the development examined, and all relevant traffic and parking data collected and analysed.

2. BACKGROUND AND EXISTING CONDITIONS OF THE PROPOSED LOCATION

2.1 Location and Land Use

The proposed Boarding housing development is located on the northern side of Great Western Highway and north of Chapman Gardens. The Kingswood Railway Station is located within 800 metres of walking distance west of the proposed site. the surrounding land uses are mainly residential with some commercial premises. The land zoning of the site is *Medium Density Residential R3.*

Currently the site is composed of two residential dwellings.

Figures 1 and 2 show the location of the development site from the aerial and street map perspective respectively.

Figure 3a and 3b shows photographs of the development site, 31 and 32 Park Avenue respectively. The site has an upward gradient from Park Avenue.

Figure 1: Location of the Subject Site on Aerial

Figure 2: Street Map of the Location of the Proposed Boarding House in relation to surveyed intersections

Figure 3a: Photograph of 31 Park Avenue

Figure 3b: Photograph of 32 Park Avenue

2.2 Road Network

This section discusses the road network adjacent to the site.

Park Avenue is a local road with one lane each way. The default speed limit is 50km/hr. Time unrestricted on-street parking is permitted on both sides of the road. Figure 4a shows a photograph of Park Avenue.

Heath Street is a local road with one lane each way. The default speed limit is 50km/hr. Time unrestricted on-street parking is permitted on both sides of the road. Figure 4b shows a photograph of Heath Street

Victoria Street is a collector road with one lane each way. The sign-posted speed limit is 50km/hr. Time unrestricted on-street parking is permitted on both sides of the road within designated parking lanes. Figure 4c shows a photograph of Victoria Street.

Richmond Road near the proposed site is a collector road with one lane each way. Within the vicinity of the site, the sign-posted speed limit on Richmond Road is 50km/hr except for the section between Victoria Street and Park Avenue, which is subjected to School Zone Restrictions during school time. Unrestricted on-street parking is permitted on both sides of the road. Figure 4d shows a photograph of Richmond Road looking south.

Copeland Street is a collector road with one lane each way. The sign-posted speed limit is 50km/hr. Unrestricted on-street parking is permitted on both sides of the road within designated parking lanes. Figure 4e shows a photograph of Copeland Street looking west.

Figure 4a: Park Avenue looking east from the Development Site

Figure 4b: Victoria Street looking west

Figure 4c: Heath Street looking South

Figure 4d: Richmond Road looking south at the roundabout intersection of Richmond Road with Copeland Street and Victoria Street

Figure 4d: Copeland Street looking west at the roundabout intersection of Richmond Road with Copeland Street and Victoria Street

2.3 Intersection Description

As part of this traffic impact assessment three intersections are assessed for the traffic generation and impacts:

- The roundabout intersection of Victoria Street with Copeland Street and Richmond Road
- The priority intersection of Victoria Street and Heath Street

External traffic to and from the proposed boarding house will need to travel through at least one of the above intersections.

The roundabout intersection of Victoria Street with Copeland Street and Richmond Road is a four-leg intersection with one circulating lane. Figure 5 shows a layout of the intersection using SIDRA (9)- an industry standard intersection assessment software. The number on the lane represents the diameter in metres of the island.

The priority intersection of Victoria Street with Heath Street is a three-leg intersection with all turn movement permitted. Drivers travelling from Heath Street must give-way to vehicles travelling on Victoria Road. Figure 6 shows a layout of

the intersection using SIDRA (9). The numbers on the lanes refer to the length of short lanes in metres.

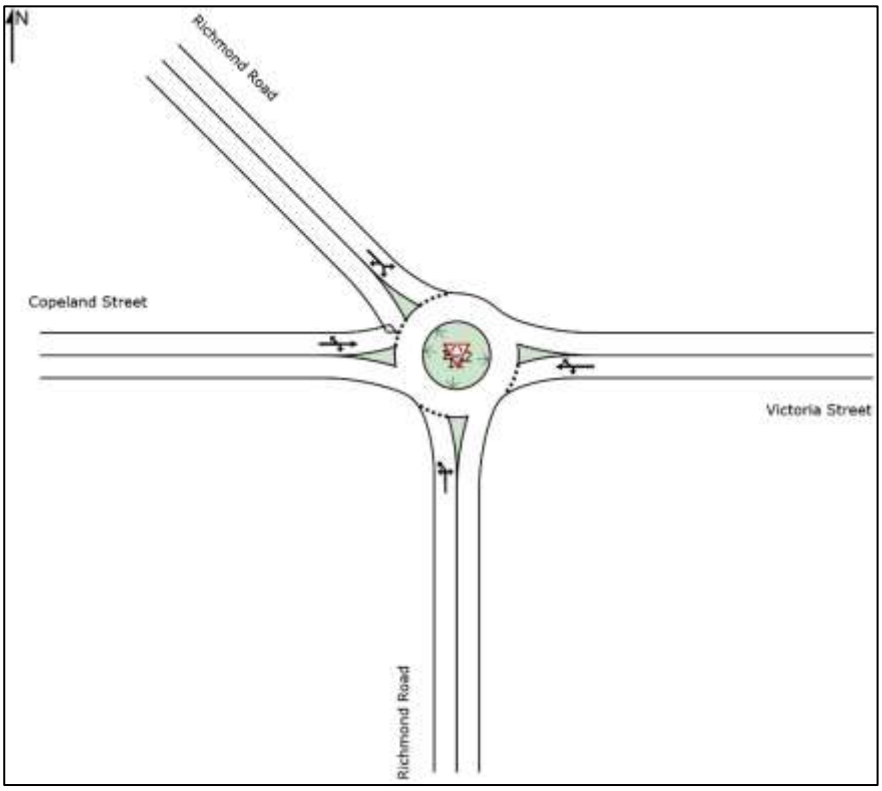

Figure 5: Roundabout intersection of Victoria Street with Copeland Street and Richmond Road (SIDRA)

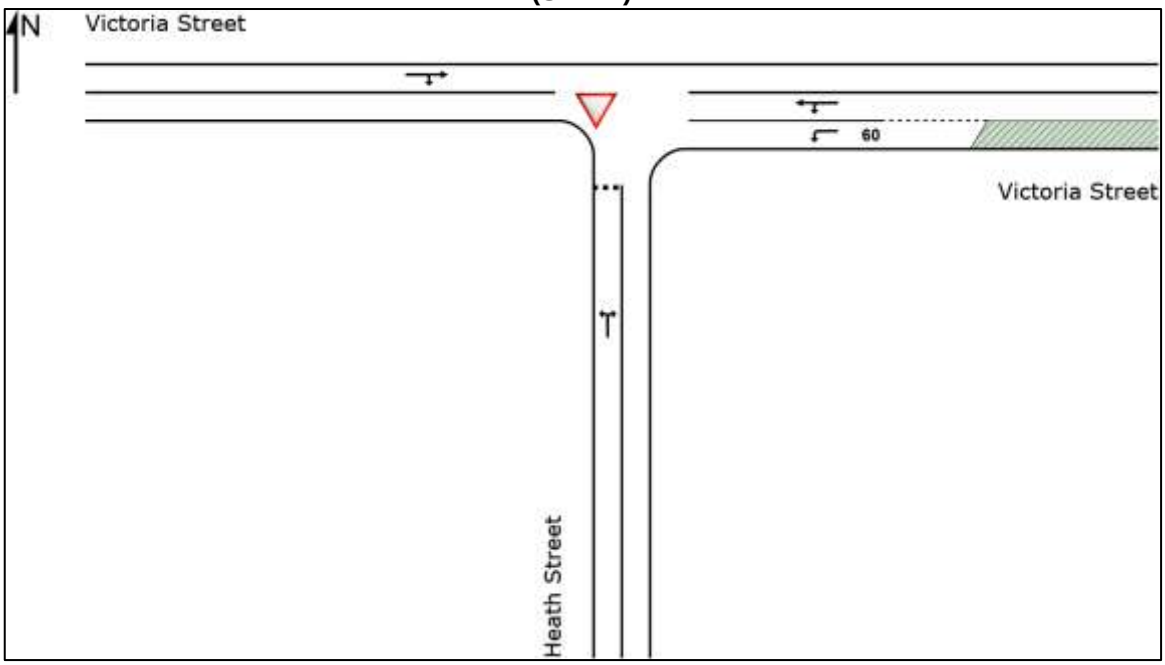

Figure 6: Priority Intersection Layout of Victoria Street with Heath Street(SIDRA)

2.4 Existing Traffic Volumes

As part of the traffic assessment, traffic counts have been undertaken at the two intersections for the weekday AM and PM peak period. The peak hours were 8:00am to 9:00am and 5pm to 6pm for the weekday AM and PM peak hours respectively. The traffic surveys were undertaken on the October 2020.

The following Figures present the traffic volumes in vehicles for the weekday peak hours.

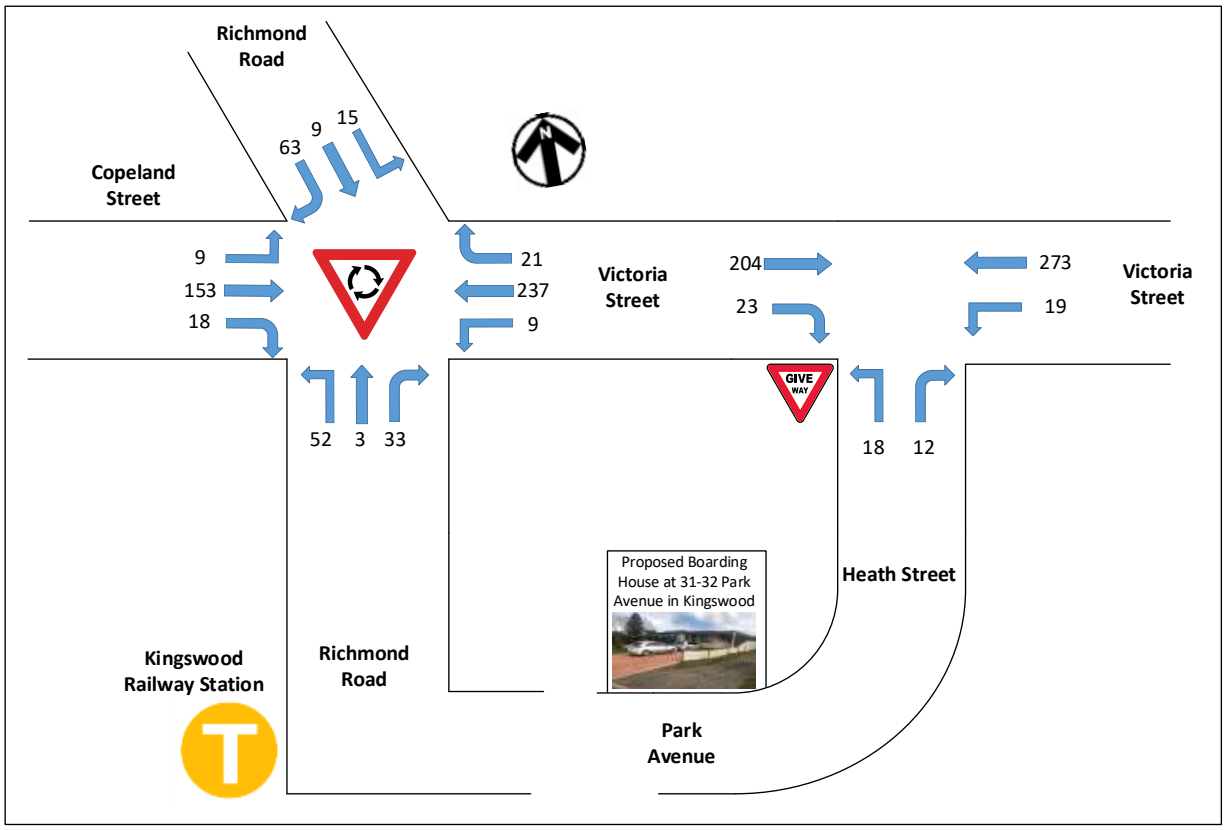

Figure 7: Existing Weekday Traffic Volumes AM Peak Hour

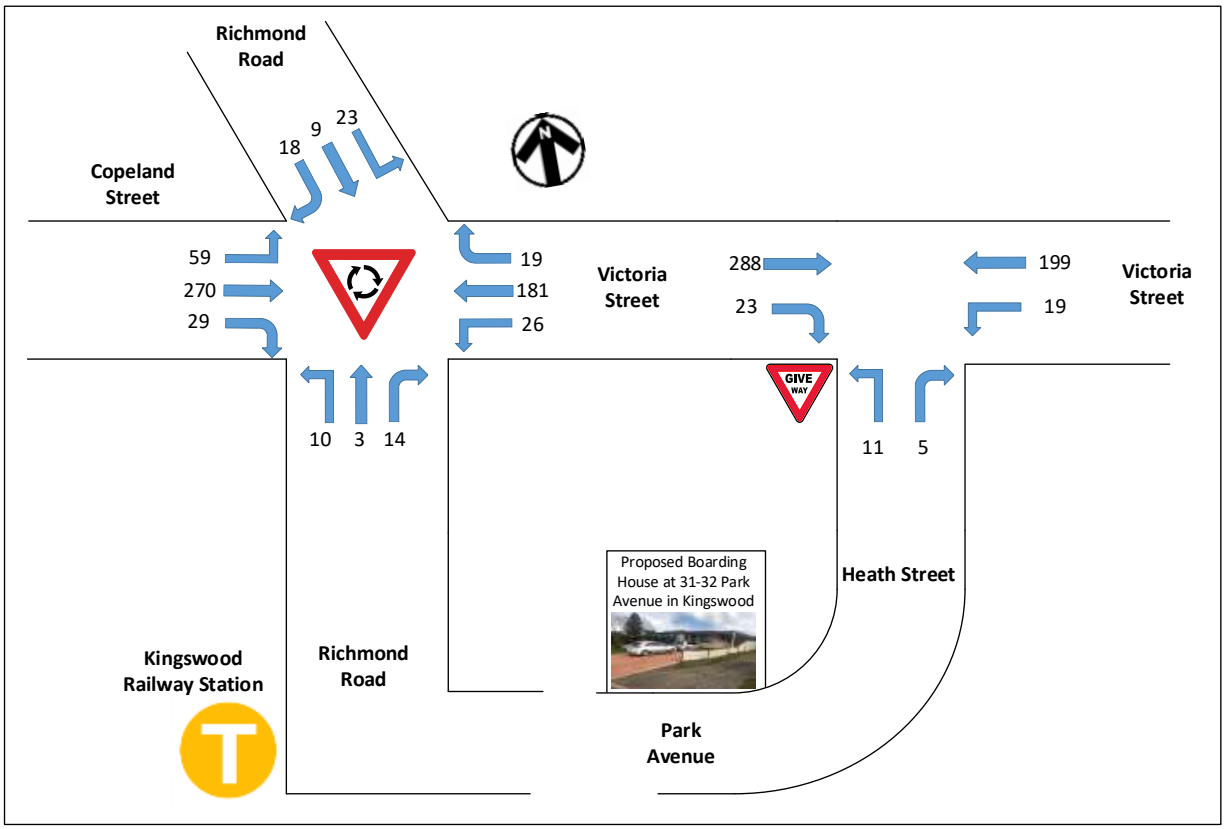

Figure 8: Existing Weekday Traffic Volumes PM Peak Hour

2.5 Intersection Assessment

An intersection assessment has been undertaken for the two surveyed intersections.

The existing intersection operating performance was assessed using the SIDRA software package (version 9) to determine the Degree of Saturation (DS), Average Delay (AVD in seconds) and Level of Service (LoS) at each intersection. The SIDRA program provides Level of Service Criteria Tables for various intersection types. The key indicator of intersection performance is Level of Service, where results are placed on a continuum from 'A' to 'F', as shown in Table 1.

LoS	Traffic Signal / Roundabout	Give Way / Stop Sign / T-Junction control
A	Good operation	Good operation
B	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	Satisfactory	Satisfactory, but accident study required
D	Operating near capacity	Near capacity & accident study required
E	At capacity, at signals incidents will cause excessive delays.	At capacity, requires other control mode
F	Unsatisfactory and requires additional capacity, Roundabouts require other control mode	At capacity, requires other control mode

Table 1: Intersection Level of Service

The Average Vehicle Delay (AVD) provides a measure of the operational performance of an intersection as indicated below, which relates AVD to LOS. The AVD's should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner-city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route). For traffic signals, the average delay over all movements should be taken. For roundabouts and priority control intersections (sign control) the critical movement for level of service assessment should be that movement with the highest average delay.

LoS	Average Delay per Vehicles (seconds/vehicle)
A	Less than 14
B	15 to 28
C	29 to 42
D	43 to 56
E	57 to 70
F	>70

Table 2: Intersection Average Delay (AVD)

The degree of saturation (DS) is another measure of the operational performance of individual intersections. For intersections controlled by traffic signals both queue length and delay increase rapidly as DS approaches 1. It is usual to attempt to keep DS to less than 0.9. Degrees of Saturation in the order of 0.7 generally represent satisfactory intersection operation. When DS exceed 0.9 queues can be anticipated.

The results of the intersection analysis are as follows:

Roundabout Intersection of Victoria Street with Copeland Street and Richmond Road

- The intersection has an overall LoS A for the AM and PM peak hours
- There is spare capacity at this intersection

Priority Intersection of Victoria Street with Heath Street

- All turn movements have a LoS A or B for AM and PM peak hours
- There is spare capacity at this intersection

The full Sidra results are presented in Appendix A.

2.6 Public Parking Opportunities

Unrestricted on-street parking is permitted on Park Avenue (in selective sections). Site investigation shows that there are ample parking spaces on Park Avenue. Figure 9 shows a photo of the vacant on-street parking spaces on Park Avenue.

Figure 9: On Street Parking on Park Avenue

2.7 Public Transport

Bus Services

The closest bus station near the development site is located 400 metres walking distance away on Victoria Street. This bus stop is serviced by bus route 785. This provides transport to the suburbs including Werrington, Cambridge Park and Penrith.

Railway

Kingswood Railway Station is located within walking distance, approximately 800 metres away from the proposed site. The railway station is frequently serviced by T1: Penrith via Parramatta and Gordon via Central.

Overall, the site has good access to public transport.

Figure 10 presents the public transport map.

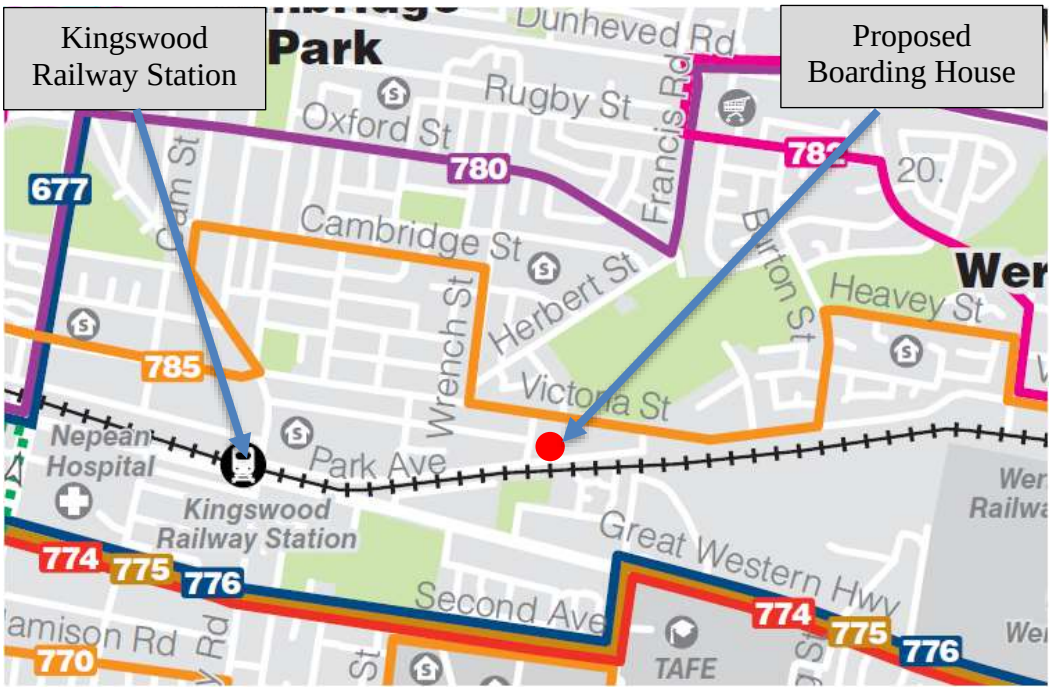

Figure 10: Local Public Transport Services

2.8 Conclusions on the Existing Conditions

The proposed boarding house is located in an area where there is reasonable number of vacant public parking is available.

The nearby intersection overall performs well with sufficient spare capacity to accommodate additional traffic.

The site has good access to public transport.

3. PROPOSED BOARDING HOUSE

The land-uses for the proposed boarding house is comprising of three attached lot and the details are as follows:

Lot 1

- One double room and one managers' room on ground floor
- Six single rooms on upper floor
- One double car port and two car spaces

Total of seven boarding rooms, one manager's room and four car spaces

Lot 2

- One double room and one manager's room on ground floor
- Six single rooms on upper floor
- Four car spaces

Total of seven boarding rooms, one manager's room and four car spaces

Lot 3

- One double room and one manager's room on ground floor
- Six single rooms on upper floor
- One double car port and two car spaces

Total of seven boarding rooms, one manager's room and four car spaces

Total of 21 boarding rooms and three manager's room and twelve car spaces

Vehicle access and egress to the car spaces and carports on each lot is via main driveway running of Park Avenue.

A full scaled plan of the proposed boarding house is provided as part of the Development Application.

4. CAR PARKING CONSIDERATIONS

4.1 State Environmental Planning Policy (Affordable Rental Housing) 2009

The car parking requirements for affordable rental housing are presented in *State Environmental Planning Policy (Affordable Rental Housing) 2009 and State Environmental Planning Policy (Affordable Rental Housing) Amendment (Parking for Boarding Houses) 2018* with the car parking rates as follows as it applies to the proposed development:

Boarding house

- 0.5 parking spaces provided for each boarding room
- Not more than 1 parking space provided for each person employed in connection with the development and who is resident on site
- At least one parking space will be provided for a bicycle, and one will be provided for a motorcycle, for every 5 boarding rooms.

Table 3 summarises the car parking requirements for the boarding house development.

Land Use	Lot Number	Number of Rooms	Car Parking Rate	Car Spaces Required	Car Spaces Provided
Boarding Room	1	7	0.5 spaces per boarding room	4	4
Manager		1	1 space per employee	0	
Boarding Room	2	7	0.5 spaces per boarding room	4	4
Manager		1	1 space per employee	0	
Boarding Room	3	7	0.5 spaces per boarding room	4	4
Manager		1	1 space per employee	0	
Total		**21**		**12**	**12**

Table 3: Car Parking Requirements and Provisions

Table 4 summarises the bicycle and motorcycle parking requirements for the proposed boarding house.

Vehicle	Number of Rooms	Parking Rate	Spaces Required	Spaces Provided
Bicycle	21	1 space per 5 boarding rooms	4	4
Motorcycle			4	4

Table 4: Bicycle and Motorcycle Parking Requirements and Provisions

The proposed boarding house provides compliant number of car, motorcycle and motorbike spaces.

The proposed boarding house is not required to provide parking for visitors. Visitors can find vacant car spaces in Park Avenue and nearby residential roads.

5. VEHICLE TRAFFIC IMPACT CONSIDERATIONS

5.1 Traffic Generation

The RTA Guide to Traffic Generating Developments 2002 and the *Updated Traffic Surveys August 2013* do not publish trip generation rates for a boarding house but it does for motel rooms as follows:

- 0.4 trips per unit for the weekday AM and PM peak hour
    - This is comparable to the car parking rate of 0.5 per

For the purposes of the traffic assessment **only**, the above trip rate is used for the boarding house traffic assessment. The rate above coincides with the rate used to calculate the car parking demand.

Table 5 summarises the estimated trip generation for the proposed boarding house.

Proposed				
Peak Hour	**Use**	**Number of Rooms**	**Trip Generation Rate**	**Trips Generated**
AM	Boarding Room	21	0.4 trips per room	9
PM			0.4 trips per room	9

Table 5: Estimated Trip Generation for the Proposed Boarding House

Table 6 summarises the trip distribution for both AM and PM peak hours.

The proposed boarding house will generate a low number of additional trips in the AM and PM peak hours.

Peak Hour	Origin	Destination	Total
AM	7	2	9
PM	2	7	9

Table 6: Trip Distribution.

5.2 Forecast Traffic Volumes

The following figures present the existing and with boarding house traffic volumes for the two peak hours distributed onto the three intersections with the boarding house traffic.

The additional boarding house traffic is in red for origin trips and blue for destination trips. The additional boarding house traffic represents a small proportion of the existing traffic.

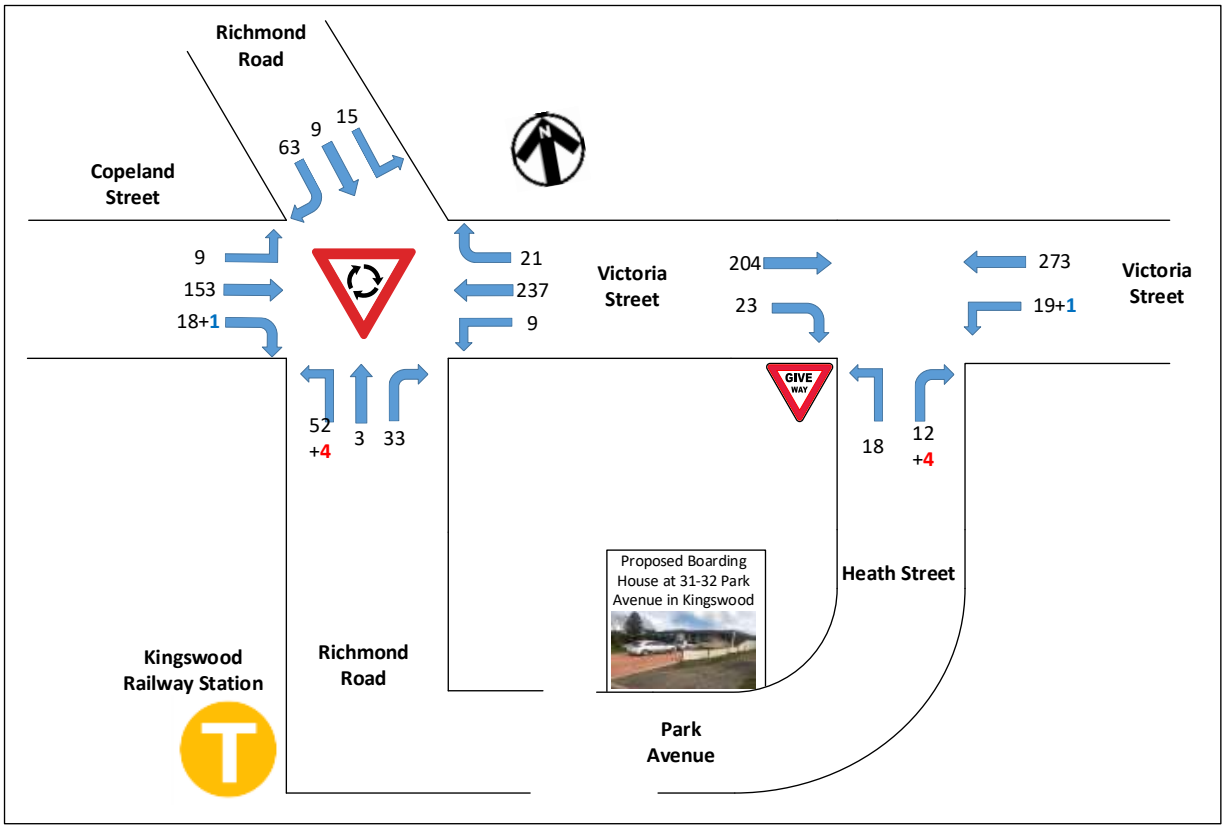

Figure 11: Existing Weekday AM Peak Hour Traffic Volumes with boarding house traffic

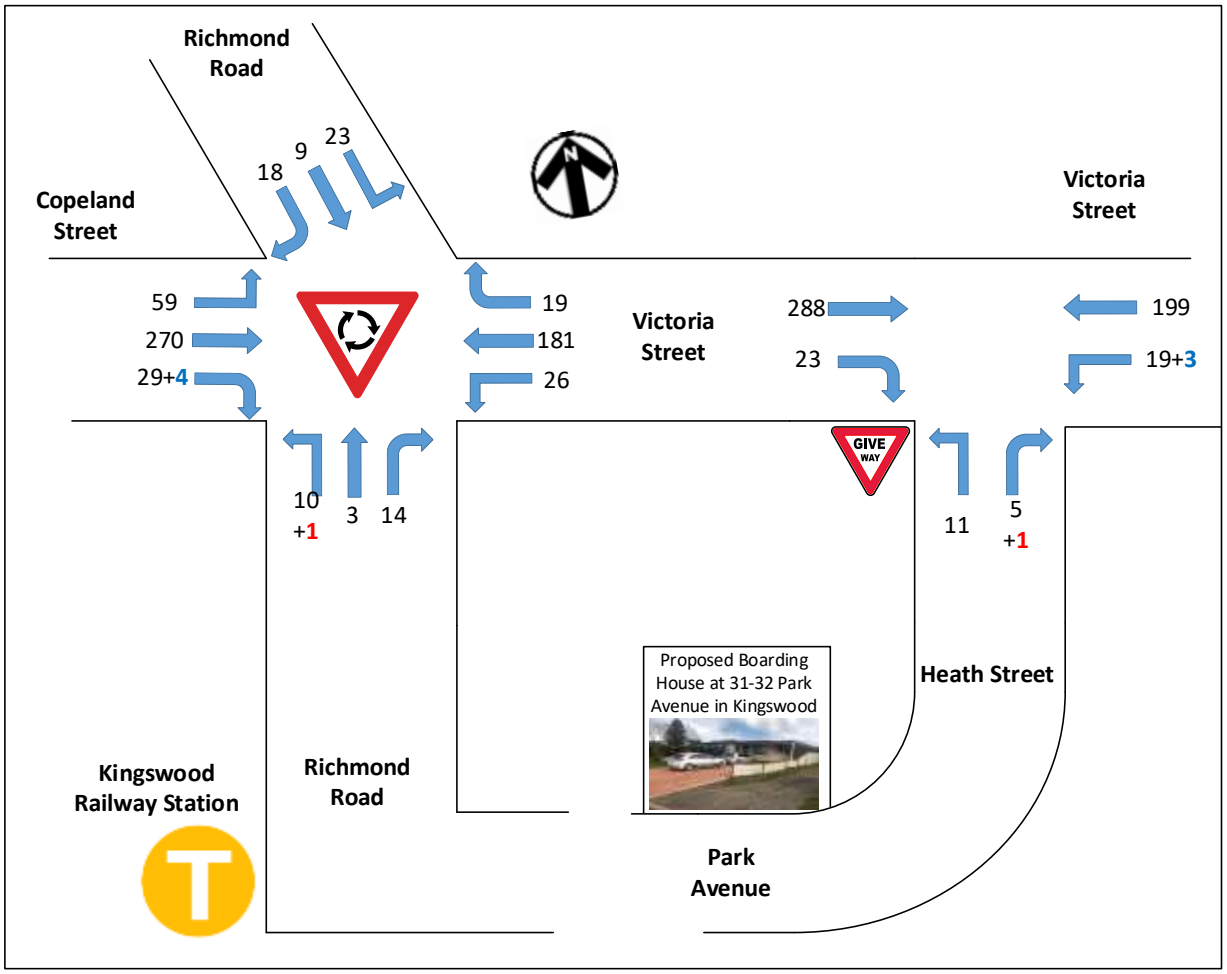

Figure 12: Existing Weekday PM Peak Hour Traffic Volumes with boarding house traffic

5.3 Intersection Assessment

This section assesses the following intersections for the existing traffic with the school traffic. The results of the intersection assessment are as follows:

Priority Intersection of Victoria Street with Heath Street

- The intersection has an overall LoS A for both AM and PM peak hours
- The additional trips do not change the overall LoS or for any turn movement

Roundabout Intersection of Victoria Street with Copeland Street and Richmond Road

- All turn movements have a LoS A for both AM and PM Peak hours
- The additional trips do not change the LoS for the overall intersection or for any turn movement

The full SIDRA results are presented in Appendix B for the existing conditions with the school traffic. The full SIDRA results are presented in Appendix A for the existing conditions.

6. CONCLUSIONS

Based on the considerations presented in this report, it is considered that:

Parking

- The proposed boarding house complies with the car, bicycle and motorbike parking requirements of the State Environmental Planning Policy

Traffic

- The proposed boarding house is a low net trip generator for the weekday AM and PM peak hours.
- The additional trips from the proposed boarding house can be accommodated at the nearby intersection without noticeably affecting intersection performance, delays or queues.
- There are no traffic engineering reasons why a planning permit for the proposed boarding housing development at 31-32 Park Avenue in Kingswood, should be refused.

APPENDIX A

SIDRA Intersection Results for Existing Traffic Conditions

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Richmond Road														
1	L2	52	0.0	55	0.0	0.092	5.1	LOS A	0.5	3.3	0.48	0.61	0.48	44.6
1a	L1	3	0.0	3	0.0	0.092	4.8	LOS A	0.5	3.3	0.48	0.61	0.48	45.3
3	R2	33	0.0	35	0.0	0.092	8.7	LOS A	0.5	3.3	0.48	0.61	0.48	45.5
Approach		88	0.0	93	0.0	0.092	6.5	LOS A	0.5	3.3	0.48	0.61	0.48	44.9
East: Victoria Street														
4	L2	9	0.0	9	0.0	0.217	3.9	LOS A	1.3	8.9	0.28	0.43	0.28	45.6
5	T1	237	0.0	249	0.0	0.217	3.9	LOS A	1.3	8.9	0.28	0.43	0.28	47.3
6a	R1	21	0.0	22	0.0	0.217	6.7	LOS A	1.3	8.9	0.28	0.43	0.28	46.9
Approach		267	0.0	281	0.0	0.217	4.2	LOS A	1.3	8.9	0.28	0.43	0.28	47.2
NorthWest: Richmond Road														
27a	L1	15	0.0	16	0.0	0.082	4.2	LOS A	0.4	2.9	0.38	0.61	0.38	45.2
29a	R1	9	0.0	9	0.0	0.082	7.3	LOS A	0.4	2.9	0.38	0.61	0.38	44.1
29b	R3	63	0.0	66	0.0	0.082	8.9	LOS A	0.4	2.9	0.38	0.61	0.38	45.7
Approach		87	0.0	92	0.0	0.082	7.9	LOS A	0.4	2.9	0.38	0.61	0.38	45.5
West: Copeland Street														
10b	L3	9	0.0	9	0.0	0.141	4.0	LOS A	0.8	5.4	0.20	0.42	0.20	46.3
11	T1	153	0.0	161	0.0	0.141	3.7	LOS A	0.8	5.4	0.20	0.42	0.20	47.5
12	R2	18	0.0	19	0.0	0.141	7.3	LOS A	0.8	5.4	0.20	0.42	0.20	46.7
Approach		180	0.0	189	0.0	0.141	4.1	LOS A	0.8	5.4	0.20	0.42	0.20	47.3
All Vehicles		622	0.0	655	0.0	0.217	5.0	LOS A	1.3	8.9	0.30	0.48	0.30	46.7

Table A1: Intersection Performance of Victoria Street with Copeland Street and Richmond Road Weekday AM Peak Hour Existing Conditions

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Richmond Road														
1	L2	52	0.0	55	0.0	0.092	5.1	LOS A	0.5	3.3	0.48	0.61	0.48	44.6
1a	L1	3	0.0	3	0.0	0.092	4.8	LOS A	0.5	3.3	0.48	0.61	0.48	45.3
3	R2	33	0.0	35	0.0	0.092	8.7	LOS A	0.5	3.3	0.48	0.61	0.48	45.5
Approach		88	0.0	93	0.0	0.092	6.5	LOS A	0.5	3.3	0.48	0.61	0.48	44.9
East: Victoria Street														
4	L2	9	0.0	9	0.0	0.217	3.9	LOS A	1.3	8.9	0.28	0.43	0.28	45.6
5	T1	237	0.0	249	0.0	0.217	3.9	LOS A	1.3	8.9	0.28	0.43	0.28	47.3
6a	R1	21	0.0	22	0.0	0.217	6.7	LOS A	1.3	8.9	0.28	0.43	0.28	46.9
Approach		267	0.0	281	0.0	0.217	4.2	LOS A	1.3	8.9	0.28	0.43	0.28	47.2
NorthWest: Richmond Road														
27a	L1	15	0.0	16	0.0	0.082	4.2	LOS A	0.4	2.9	0.38	0.61	0.38	45.2
29a	R1	9	0.0	9	0.0	0.082	7.3	LOS A	0.4	2.9	0.38	0.61	0.38	44.1
29b	R3	63	0.0	66	0.0	0.082	8.9	LOS A	0.4	2.9	0.38	0.61	0.38	45.7
Approach		87	0.0	92	0.0	0.082	7.9	LOS A	0.4	2.9	0.38	0.61	0.38	45.5
West: Copeland Street														
10b	L3	9	0.0	9	0.0	0.141	4.0	LOS A	0.8	5.4	0.20	0.42	0.20	46.3
11	T1	153	0.0	161	0.0	0.141	3.7	LOS A	0.8	5.4	0.20	0.42	0.20	47.5
12	R2	18	0.0	19	0.0	0.141	7.3	LOS A	0.8	5.4	0.20	0.42	0.20	46.7
Approach		180	0.0	189	0.0	0.141	4.1	LOS A	0.8	5.4	0.20	0.42	0.20	47.3
All Vehicles		622	0.0	655	0.0	0.217	5.0	LOS A	1.3	8.9	0.30	0.48	0.30	46.7

Table A2: Intersection Performance of Victoria Street with Heath Street Weekday AM Peak Hour Existing Conditions

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Richmond Road														
1	L2	10	0.0	11	0.0	0.026	4.4	LOS A	0.1	0.9	0.37	0.55	0.37	44.6
1a	L1	3	0.0	3	0.0	0.026	4.2	LOS A	0.1	0.9	0.37	0.55	0.37	45.3
3	R2	14	0.0	15	0.0	0.026	8.1	LOS A	0.1	0.9	0.37	0.55	0.37	45.5
Approach		27	0.0	28	0.0	0.026	6.3	LOS A	0.1	0.9	0.37	0.55	0.37	45.1
East: Victoria Street														
4	L2	26	0.0	27	0.0	0.175	3.7	LOS A	1.0	6.7	0.20	0.42	0.20	45.9
5	T1	181	0.0	191	0.0	0.175	3.7	LOS A	1.0	6.7	0.20	0.42	0.20	47.5
6a	R1	19	0.0	20	0.0	0.175	6.5	LOS A	1.0	6.7	0.20	0.42	0.20	47.1
Approach		226	0.0	238	0.0	0.175	4.0	LOS A	1.0	6.7	0.20	0.42	0.20	47.3
NorthWest: Richmond Road														
27a	L1	23	0.0	24	0.0	0.052	4.7	LOS A	0.3	1.8	0.45	0.60	0.45	45.8
29a	R1	9	0.0	9	0.0	0.052	7.8	LOS A	0.3	1.8	0.45	0.60	0.45	44.7
29b	R3	18	0.0	19	0.0	0.052	9.4	LOS A	0.3	1.8	0.45	0.60	0.45	46.3
Approach		50	0.0	53	0.0	0.052	7.0	LOS A	0.3	1.8	0.45	0.60	0.45	45.8
West: Copeland Street														
10b	L3	59	0.0	62	0.0	0.257	3.9	LOS A	1.5	10.7	0.16	0.42	0.16	46.5
11	T1	270	0.0	284	0.0	0.257	3.6	LOS A	1.5	10.7	0.16	0.42	0.16	47.6
12	R2	29	0.0	31	0.0	0.257	7.2	LOS A	1.5	10.7	0.16	0.42	0.16	46.9
Approach		358	0.0	377	0.0	0.257	4.0	LOS A	1.5	10.7	0.16	0.42	0.16	47.4
All Vehicles		661	0.0	696	0.0	0.257	4.3	LOS A	1.5	10.7	0.21	0.44	0.21	47.2

Table A3: Intersection Performance of Victoria Street with Copeland Street and Richmond Road Weekday PM Peak Hour Existing Conditions

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heath Street														
1	L2	11	0.0	12	0.0	0.017	4.0	LOS A	0.1	0.4	0.34	0.50	0.34	35.7
3	R2	5	0.0	5	0.0	0.017	7.2	LOS A	0.1	0.4	0.34	0.50	0.34	36.5
Approach		16	0.0	17	0.0	0.017	5.0	LOS A	0.1	0.4	0.34	0.50	0.34	36.0
East: Victoria Street														
4	L2	19	0.0	20	0.0	0.011	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.8
5	T1	199	0.0	209	0.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		218	0.0	229	0.0	0.107	0.3	NA	0.0	0.0	0.00	0.04	0.00	39.8
West: Victoria Street														
11	T1	288	0.0	303	0.0	0.177	0.1	LOS A	0.2	1.6	0.07	0.04	0.07	39.6
12	R2	23	0.0	24	0.0	0.177	4.6	LOS A	0.2	1.6	0.07	0.04	0.07	39.0
Approach		311	0.0	327	0.0	0.177	0.5	NA	0.2	1.6	0.07	0.04	0.07	39.6
All Vehicles		545	0.0	574	0.0	0.177	0.5	NA	0.2	1.6	0.05	0.05	0.05	39.6

Table A4: Intersection Performance of Victoria Street with Heath Street Weekday PM Peak Hour Existing Conditions

APPENDIX B

SIDRA Intersection Results for Existing Traffic Conditions with boarding house traffic

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Richmond Road														
1	L2	56	0.0	59	0.0	0.096	5.1	LOS A	0.5	3.5	0.48	0.61	0.48	44.6
1a	L1	3	0.0	3	0.0	0.096	4.8	LOS A	0.5	3.5	0.48	0.61	0.48	45.3
3	R2	33	0.0	35	0.0	0.096	8.7	LOS A	0.5	3.5	0.48	0.61	0.48	45.5
Approach		92	0.0	97	0.0	0.096	6.4	LOS A	0.5	3.5	0.48	0.61	0.48	45.0
East: Victoria Street														
4	L2	9	0.0	9	0.0	0.217	3.9	LOS A	1.3	8.9	0.28	0.43	0.28	45.6
5	T1	237	0.0	249	0.0	0.217	3.9	LOS A	1.3	8.9	0.28	0.43	0.28	47.3
6a	R1	21	0.0	22	0.0	0.217	6.7	LOS A	1.3	8.9	0.28	0.43	0.28	46.9
Approach		267	0.0	281	0.0	0.217	4.2	LOS A	1.3	8.9	0.28	0.43	0.28	47.2
NorthWest: Richmond Road														
27a	L1	15	0.0	16	0.0	0.082	4.2	LOS A	0.4	2.9	0.38	0.62	0.38	45.2
29a	R1	9	0.0	9	0.0	0.082	7.3	LOS A	0.4	2.9	0.38	0.62	0.38	44.1
29b	R3	63	0.0	66	0.0	0.082	8.9	LOS A	0.4	2.9	0.38	0.62	0.38	45.7
Approach		87	0.0	92	0.0	0.082	7.9	LOS A	0.4	2.9	0.38	0.62	0.38	45.5
West: Copeland Street														
10b	L3	9	0.0	9	0.0	0.142	4.0	LOS A	0.8	5.4	0.20	0.42	0.20	46.3
11	T1	153	0.0	161	0.0	0.142	3.7	LOS A	0.8	5.4	0.20	0.42	0.20	47.4
12	R2	19	0.0	20	0.0	0.142	7.3	LOS A	0.8	5.4	0.20	0.42	0.20	46.7
Approach		181	0.0	191	0.0	0.142	4.1	LOS A	0.8	5.4	0.20	0.42	0.20	47.3
All Vehicles		627	0.0	660	0.0	0.217	5.0	LOS A	1.3	8.9	0.30	0.48	0.30	46.7

Table B1: Intersection Performance of Victoria Street with Copeland Street and Richmond Road Weekday AM Peak Hour with boarding house traffic

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heath Street														
1	L2	18	0.0	19	0.0	0.041	4.3	LOS A	0.2	1.1	0.43	0.57	0.43	35.2
3	R2	16	0.0	17	0.0	0.041	6.9	LOS A	0.2	1.1	0.43	0.57	0.43	36.1
Approach		34	0.0	36	0.0	0.041	5.6	LOS A	0.2	1.1	0.43	0.57	0.43	35.7
East: Victoria Street														
4	L2	18	0.0	19	0.0	0.010	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.8
5	T1	273	0.0	287	0.0	0.147	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		291	0.0	306	0.0	0.147	0.2	NA	0.0	0.0	0.00	0.03	0.00	39.8
West: Victoria Street														
11	T1	204	0.0	215	0.0	0.113	0.0	LOS A	0.0	0.2	0.02	0.01	0.02	39.9
12	R2	3	0.0	3	0.0	0.113	5.0	LOS A	0.0	0.2	0.02	0.01	0.02	39.4
Approach		207	0.0	218	0.0	0.113	0.1	NA	0.0	0.2	0.02	0.01	0.02	39.9
All Vehicles		532	0.0	560	0.0	0.147	0.5	NA	0.2	1.1	0.03	0.05	0.03	39.6

B2: Intersection Performance of Victoria Street with Heath Street Weekday AM Peak Hour with boarding house traffic

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Richmond Road														
1	L2	11	0.0	12	0.0	0.027	4.4	LOS A	0.1	0.9	0.37	0.55	0.37	44.6
1a	L1	3	0.0	3	0.0	0.027	4.2	LOS A	0.1	0.9	0.37	0.55	0.37	45.3
3	R2	14	0.0	15	0.0	0.027	8.1	LOS A	0.1	0.9	0.37	0.55	0.37	45.5
Approach		28	0.0	29	0.0	0.027	6.2	LOS A	0.1	0.9	0.37	0.55	0.37	45.1
East: Victoria Street														
4	L2	26	0.0	27	0.0	0.175	3.7	LOS A	1.0	6.7	0.20	0.42	0.20	45.9
5	T1	181	0.0	191	0.0	0.175	3.7	LOS A	1.0	6.7	0.20	0.42	0.20	47.5
6a	R1	19	0.0	20	0.0	0.175	6.5	LOS A	1.0	6.7	0.20	0.42	0.20	47.1
Approach		226	0.0	238	0.0	0.175	4.0	LOS A	1.0	6.7	0.20	0.42	0.20	47.3
NorthWest: Richmond Road														
27a	L1	23	0.0	24	0.0	0.052	4.7	LOS A	0.3	1.8	0.45	0.60	0.45	45.8
29a	R1	9	0.0	9	0.0	0.052	7.8	LOS A	0.3	1.8	0.45	0.60	0.45	44.7
29b	R3	18	0.0	19	0.0	0.052	9.4	LOS A	0.3	1.8	0.45	0.60	0.45	46.3
Approach		50	0.0	53	0.0	0.052	7.0	LOS A	0.3	1.8	0.45	0.60	0.45	45.8
West: Copeland Street														
10b	L3	59	0.0	62	0.0	0.257	3.9	LOS A	1.5	10.7	0.16	0.42	0.16	46.5
11	T1	270	0.0	284	0.0	0.257	3.6	LOS A	1.5	10.7	0.16	0.42	0.16	47.6
12	R2	29	0.0	31	0.0	0.257	7.2	LOS A	1.5	10.7	0.16	0.42	0.16	46.9
Approach		358	0.0	377	0.0	0.257	4.0	LOS A	1.5	10.7	0.16	0.42	0.16	47.4
All Vehicles		662	0.0	697	0.0	0.257	4.3	LOS A	1.5	10.7	0.21	0.44	0.21	47.2

Table B3: Intersection Performance of Victoria Street with Copeland Street and Richmond Road Weekday PM Peak Hour with boarding house traffic

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Heath Street														
1	L2	11	0.0	12	0.0	0.019	4.0	LOS A	0.1	0.5	0.35	0.51	0.35	35.5
3	R2	6	0.0	6	0.0	0.019	7.2	LOS A	0.1	0.5	0.35	0.51	0.35	36.4
Approach		17	0.0	18	0.0	0.019	5.1	LOS A	0.1	0.5	0.35	0.51	0.35	35.9
East: Victoria Street														
4	L2	22	0.0	23	0.0	0.012	3.4	LOS A	0.0	0.0	0.00	0.45	0.00	37.8
5	T1	199	0.0	209	0.0	0.107	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	40.0
Approach		221	0.0	233	0.0	0.107	0.4	NA	0.0	0.0	0.00	0.05	0.00	39.8
West: Victoria Street														
11	T1	288	0.0	303	0.0	0.177	0.1	LOS A	0.2	1.6	0.07	0.04	0.07	39.6
12	R2	23	0.0	24	0.0	0.177	4.7	LOS A	0.2	1.6	0.07	0.04	0.07	39.0
Approach		311	0.0	327	0.0	0.177	0.5	NA	0.2	1.6	0.07	0.04	0.07	39.6
All Vehicles		549	0.0	578	0.0	0.177	0.6	NA	0.2	1.6	0.05	0.06	0.05	39.6

Table B4: Intersection Performance of Victoria Street with Heath Street Weekday PM Peak Hour with boarding house traffic