TRAFFIC AND PARKING IMPACT ASSESSMENT OF PROPOSED ALTERATIONS AND ADDITIONS TO BROOKVALE PUBLIC SCHOOL

2-8 Old Pittwater Road in Brookvale

Traffic and Parking Impact Report

Prepared for: Brookvale Public School

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1. INTRODUCTION

Motion Traffic Engineers was commissioned by Brookvale Public School to undertake a traffic and parking impact assessment of proposed alterations and additions to Brookvale Public School at 2-8 Old Pittwater Road in Brookvale. Brookvale Public School has frontage to Old Pittwater Road, Beacon Hill Road and Elizabeth Place.

Currently there are 348 students, 18 permanent staff and 16 temporary staff.

This traffic report focuses on the proposed development and changes in car usage and car park utilisation and additional trips from the proposed development.

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

Brookvale Public School is in the Low-Density Residential land zone with St Augustine's College Sydney and Brookvale Oval located in the north and east respectively. There are retail shops and commercial businesses along Pittwater Road. The land uses south of Pittwater Road and Old Pittwater Road are predominately industrial and commercial, while the land uses north of these roads are primarily residential. Brookvale Public School is located north of Old Pittwater Road in the part residential area.

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

Figure 3 shows a photograph of the site.

Figure 1: Location of the Subject Site on Aerial

Figure 2: Street Map of the Location of the Development Site

Figure 3: Photograph of the Site from Old Pittwater Road

2.2 Road Network

This section describes the roads near the proposed development.

Pittwater Road is an arterial road with three lanes each way and a sign posted speed limit of 60km/hr. School zone is in operation between 8am and 9:30am as well as between 2:30pm to 4pm on school days, which restricts the speed limit to 40km/hr. A bus lane is provided for northbound traffic from 3pm to 7pm Monday to Friday and for southbound traffic from 6am to 10am Monday to Friday. Time restricted on street parking is permitted on both sides of the road. Figure 4a shows a photograph of Pittwater Road.

Old Pittwater Road is a sub arterial road with two lanes each way east of Dale Street and a sign posted speed limit of 50km/hr. School zone is in operation between 8am and 9:30am as well as between 2:30pm to 4pm on school days, which restricts the speed limit to 40km/hr. On street parking is prohibited east of Dale Street. Figure 4b shows a photograph of Old Pittwater Road.

Winbourne Road is a collector road with one lane each way and a sign posted speed limit of 50km/hr. Time restricted on street parking is permitted on both sides of the road. Figure 4c shows a photograph of Winbourne Road.

Beacon Hill Road is a sub arterial road with two lanes each way and a sign posted speed limit of 50km/hr. School zone is in operation between 8am and 9:30am as well as between 2:30pm to 4pm on school days, which restricts the speed limit to 40km/hr. Time restricted on street parking is permitted on both sides of the road. Figure 4d shows a photograph of Great Western Highway.

Roger Street is a collector road with one lane each way and a sign posted speed limit of 50km/hr. School zone is in operation between 8am and 9:30am as well as between 2:30pm to 4pm on school days, which restricts the speed limit to 40km/hr. Time restricted on street parking is permitted on both sides of the road. Figure 4e shows a photograph of Roger Street.

Figure 4a: Pittwater Road looking to East

Figure 4b: Old Pittwater Road looking to South

Figure 4c: Winbourne Road looking to East

Figure 4d: Beacon Hill Road looking to East

Figure 4e: Roger Street looking to South

2.3 Public Parking Opportunities

Brookvale Public School is in the Low-Density Residential land zone where on street parking is permitted on nearby streets such as Alfred Road, Gulliver Street and Consul Road. Site visits show that there are a number of vacant car spaces on these roads.

2.4 Parking within the School

On site parking is provided within the school with a 46 car spaces available.

The parking block running parallel to Old Pittwater Road is generally used by staff.

The remaining parking area is located in the loop circulating parking area to the pedestrian entrance to the school. Both staff and parents use this parking area.

Nearly all car spaces are occupied during the drop off and pick up period.

The on site car spaces are no more than 50 percent occupied outside of the drop off or pick up period on school days.

2.5 Intersection Description

As part of the traffic assessment, two intersections are assessed:

- Signalised intersection of Pittwater Road with Old Pittwater Road and Winbourne Road
- Signalised intersection of Old Pittwater Road with Beacon Hill Road and Roger Street

External traffic travelling to and from the development site will most likely need to travel through one of the above intersections.

The signalised intersection of Pittwater Road with Old Pittwater Road and Winbourne Road is a four-leg intersection. The right turn movement from Pittwater Road into Winbourne Road is not permitted while right turning from Winbourne Road into Pittwater Road is also not permitted except for buses. All other movements are permitted. Pedestrian crossings are provided on all four approaches. The bus lanes operate during 3pm to 7pm northbound and during 6am to 10am southbound Monday to Friday on Pittwater Road. Clearways apply during the weekday commuter period on Pittwater Road.

Figures 5a and 5b present the layout of this intersection during the weekday morning and afternoon respectively using SIDRA – an industry standard

intersection software. The numbers on the lane represent the length of short lanes in metres.

The signalised intersection of Old Pittwater Road with Beacon Hill Road and Roger Street is a four-leg intersection with all turn movements permitted. Left slip lanes are provided on Old Pittwater Road. Additionally, pedestrian crossings are provided on all but the southwestern approach. Figure 6 presents the layout of this intersection using SIDRA.

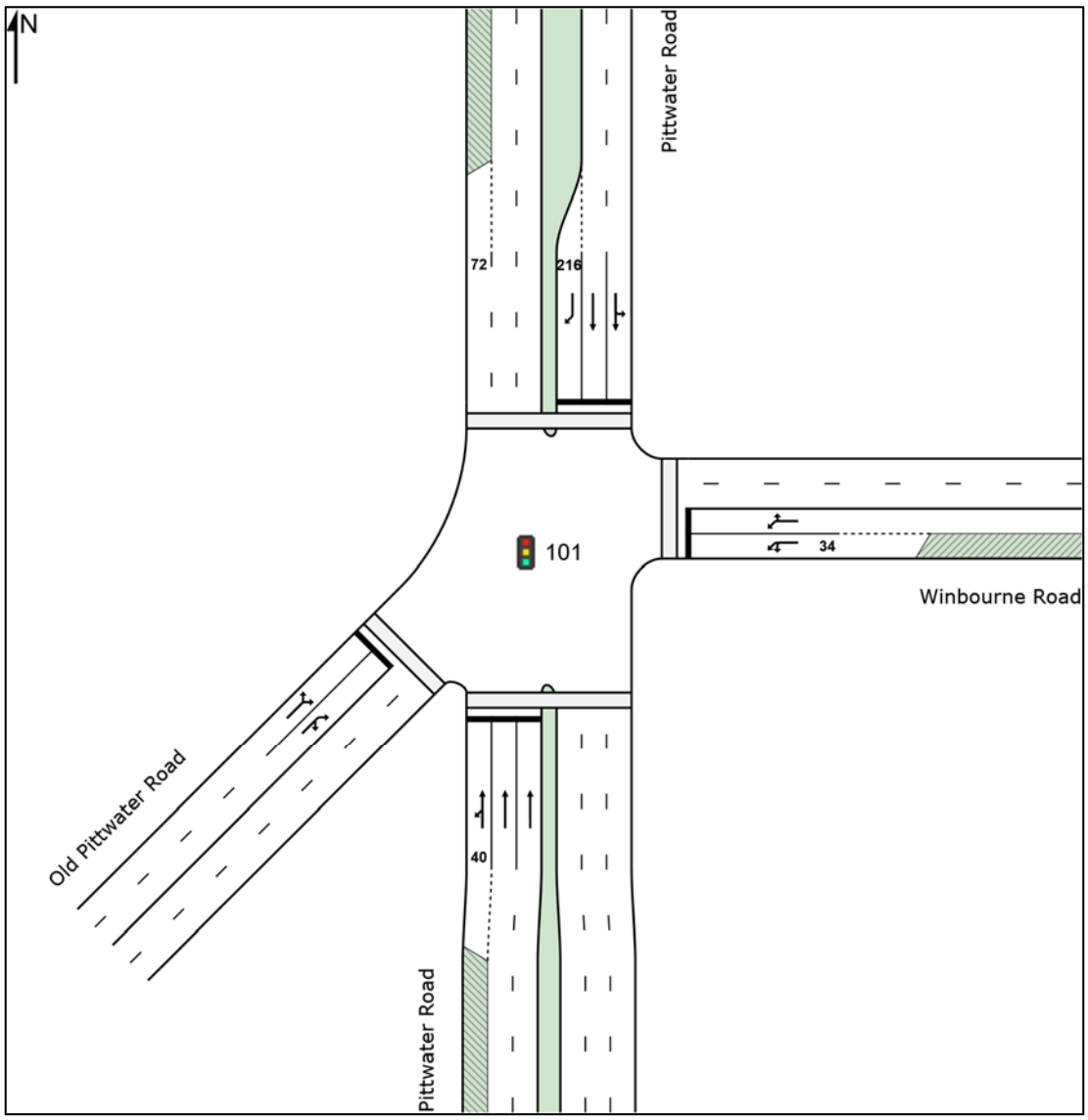

Figure 5a: Signalised intersection of Pittwater Road with Old Pittwater Road and Winbourne Road AM (SIDRA)

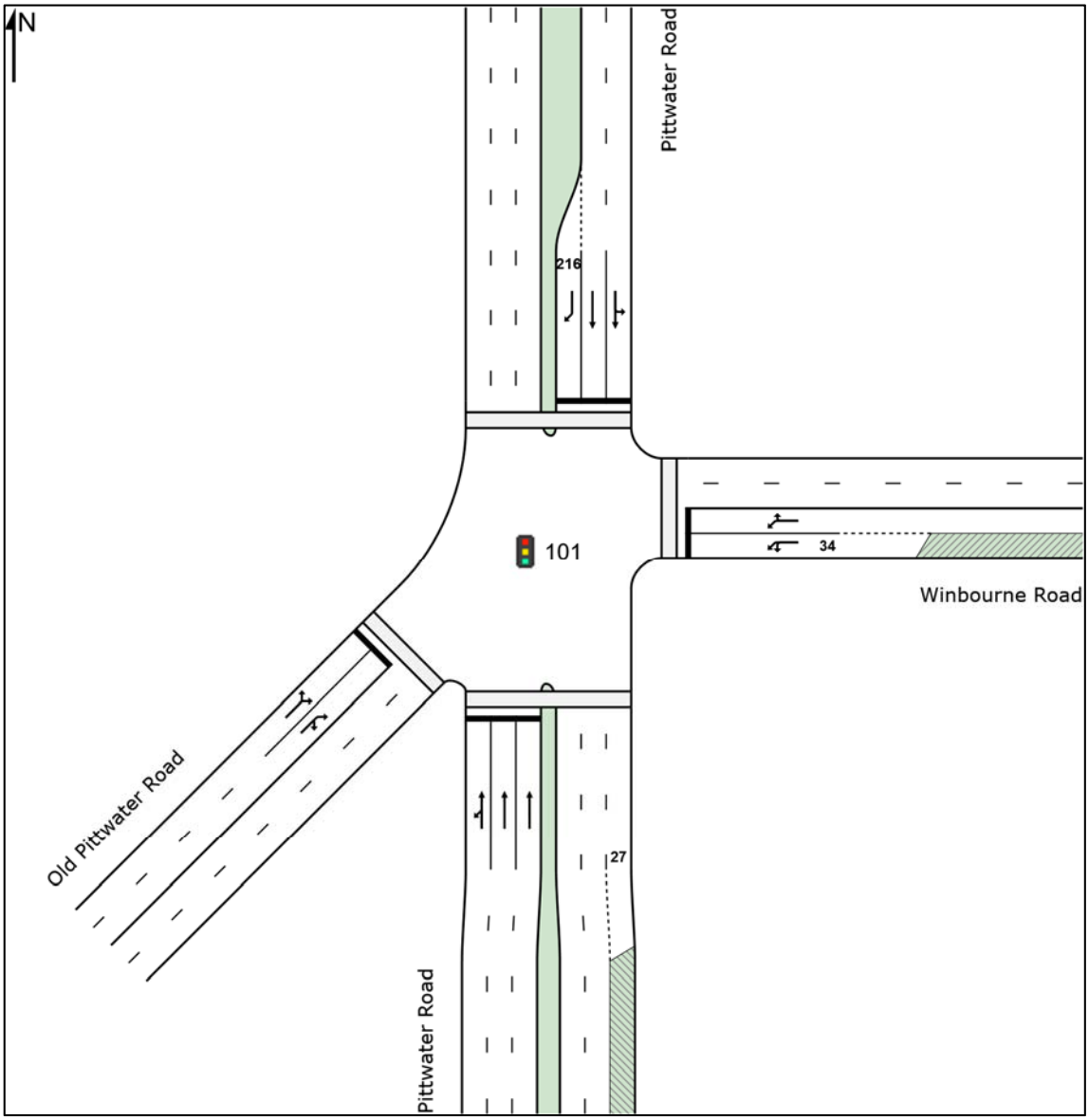

Figure 5b: Signalised intersection of Pittwater Road with Old Pittwater Road and Winbourne Road PM (SIDRA)

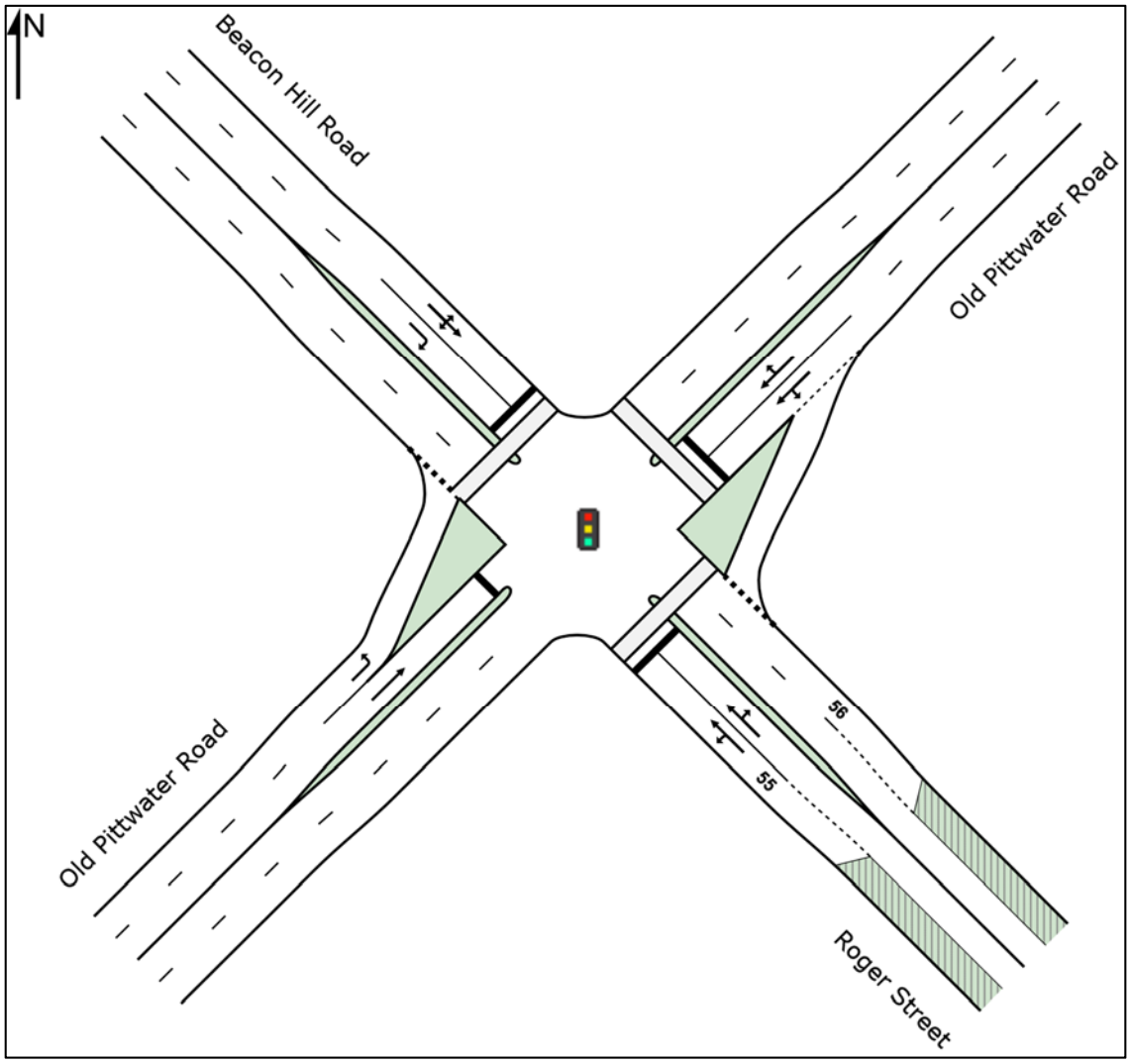

Figure 6: Signalised intersection of Old Pittwater Road with Beacon Hill Road and Roger Street (SIDRA)

2.6 Existing Traffic Volumes

As part of the traffic assessment, traffic counts have been undertaken at the intersections for the school weekday AM and PM peak periods. The school AM and PM peak hours were from 8am to 9am and from 3pm to 4pm respectively. It is noted that the school peak hours do not coincide with the network peak hours in the afternoon. The traffic surveys were undertaken on a weekday in March 2019.

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

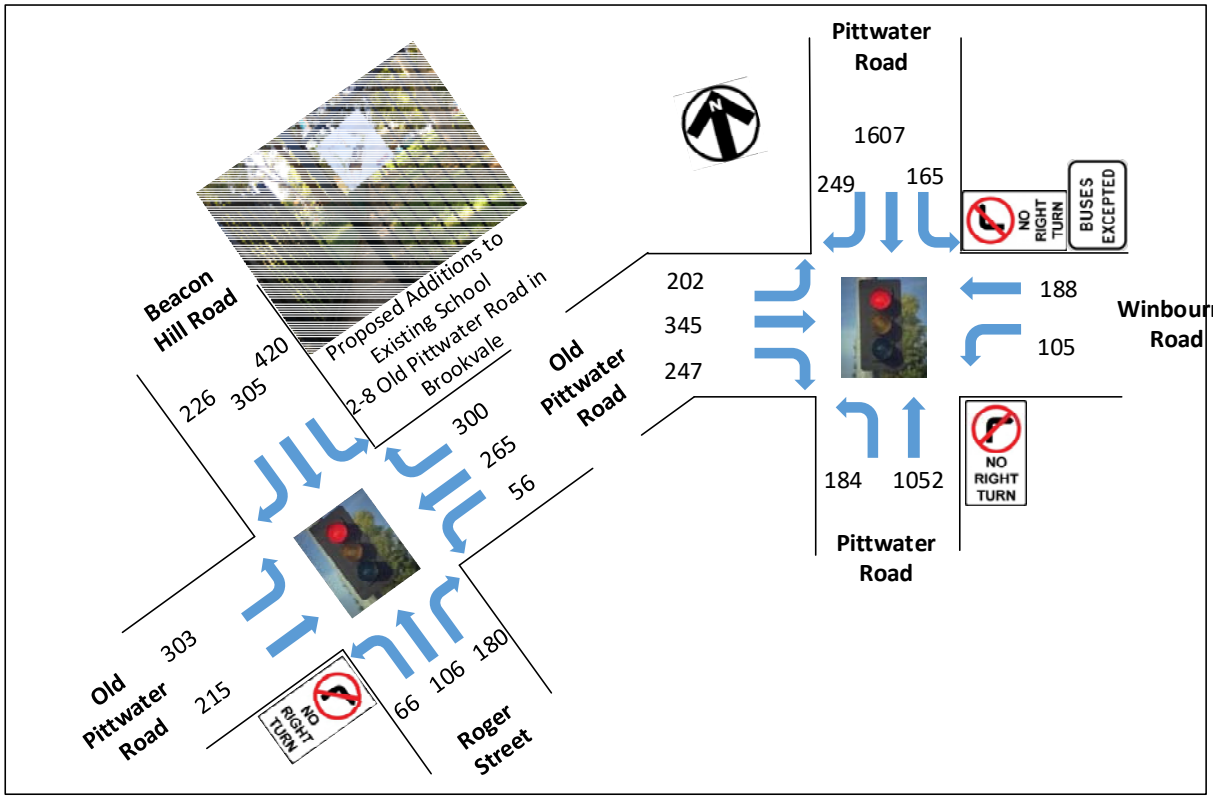

Figure 7: Existing Weekday Traffic Volumes School AM Peak Hour

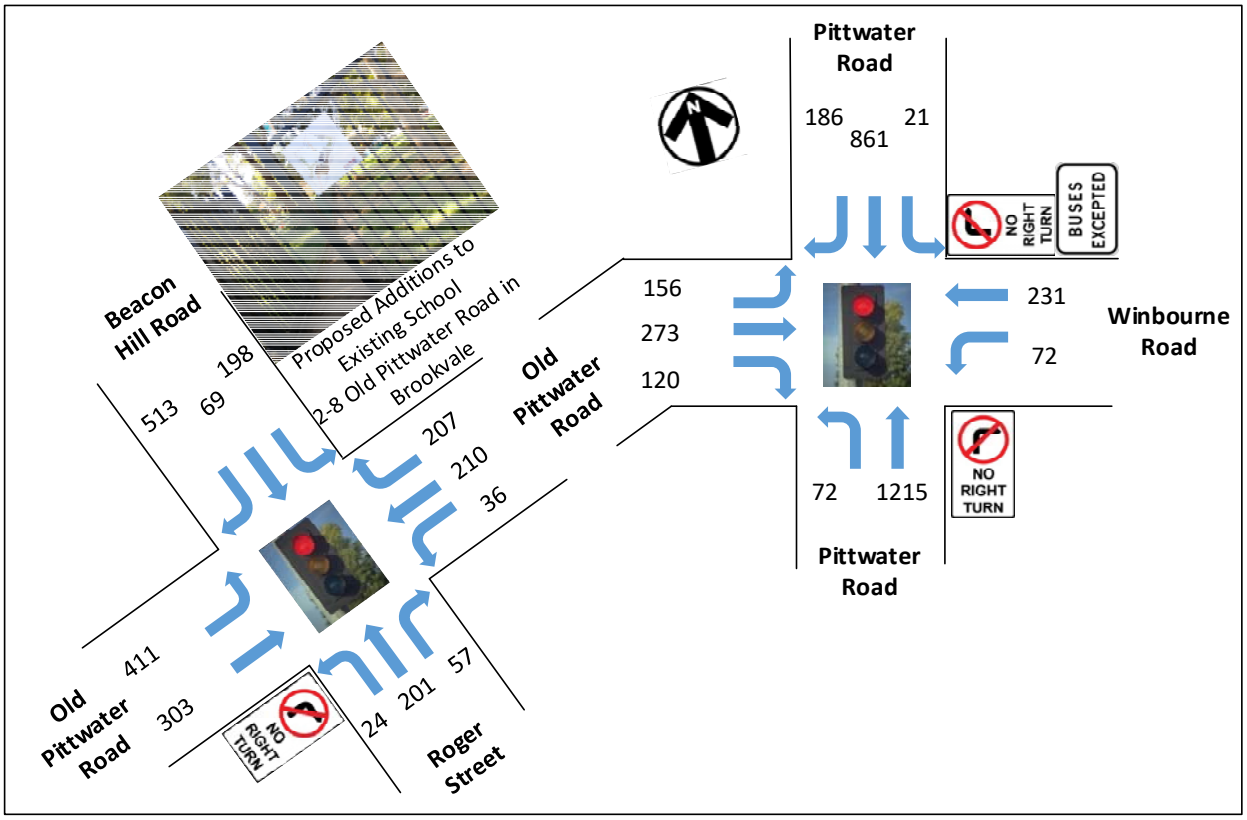

Figure 8: Existing Weekday Traffic Volumes School PM Peak Hour

2.7 Intersection Assessment

An intersection assessment has been undertaken for:

- Signalised intersection of Pittwater Road with Old Pittwater Road and Winbourne Road
- Signalised intersection of Old Pittwater Road with Beacon Hill Road and Roger Street

The existing intersection operating performance was assessed using the SIDRA software package (version 8) 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:

Signalised intersection of Pittwater Road and Old Pittwater Road and Winbourne Road

- The intersection has an overall LoS D and C for the weekday school AM and PM peak hours respectively
- There is spare capacity at this intersection

Signalised intersection of Old Pittwater Road with Beacon Hill Road and Roger Street

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

The full SIDRA results are presented in Appendix A.

2.8 Public Transport

Brookvale Public School is 70 metres walking distance from the Pittwater Road bus corridor. This stop is serviced by bus routes 146, 151, 158, 169, 178, 180, 185, 188, 193, 199, E78 and E79. These provide transport to a range of suburbs including North Sydney, Neutral Bay, Mosman, Seaforth, Manly, Collaroy Plateau, etc. Figure 9 shows the proximity of the site to public transport services.

Overall the site has excellent access to public transport.

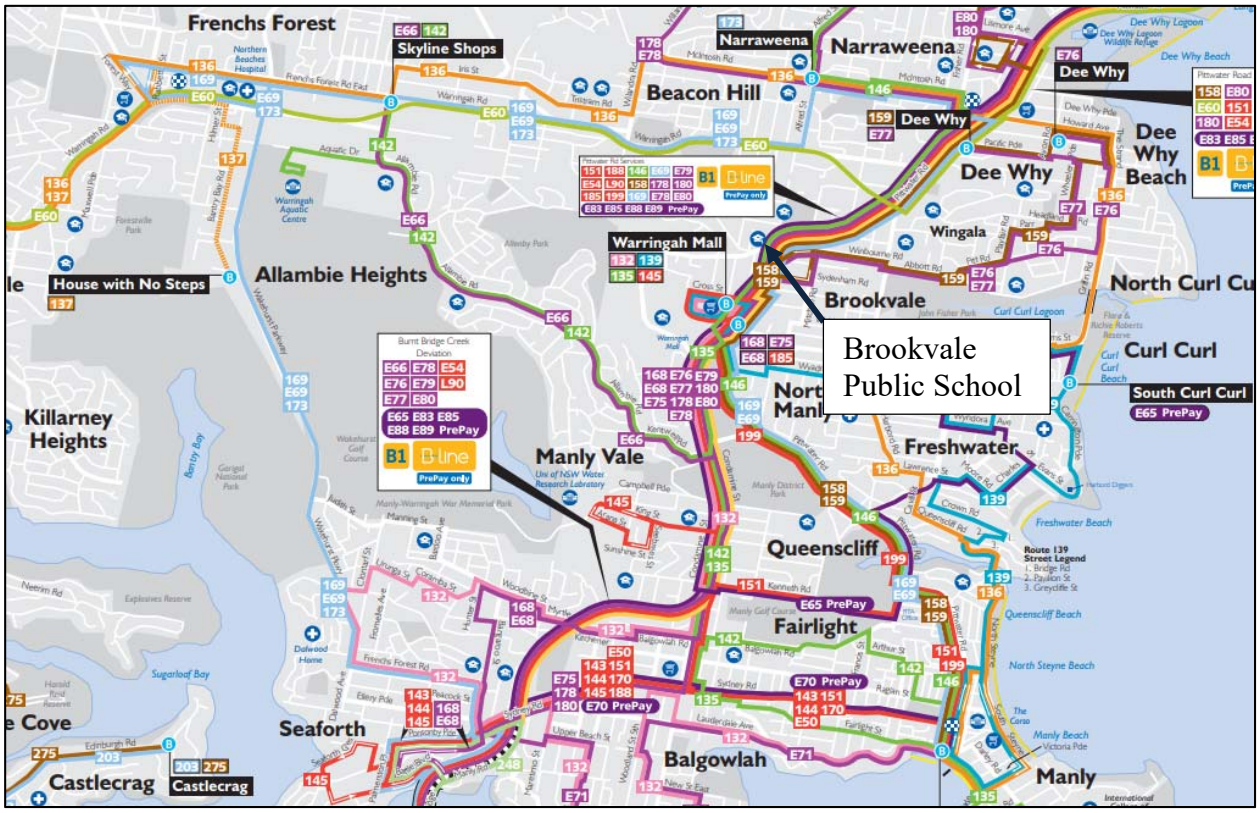

Figure 9: Public Transport Services Nearby

2.9 Conclusions on the Existing Conditions

Brookvale Public School is in a residential area with a number of on-street parking opportunities along nearby residential streets.

The nearby intersections have spare capacity to accommodate additional traffic.

The site has excellent access to public transport.

3. PROPOSED ALTERATIONS AND ADDITIONS

The proposed alterations and additions of the School include the following land uses:

- A stage/hall with a Gross Floor Area of 294.4 m^2
- Store rooms with a Gross Floor Area of 95.6 m^2
- OSHC office and kitchenette with a Gross Floor Area of 34.8 m^2
- An access washroom and shower room with a Gross Floor Area of 6.4 m^2
- A patio with a Gross Floor Area of 216.7 m^2
- A total Gross Floor Area of 647.9 m^2

There is an existing car park and drop off area on the ground level with vehicle access and egress via Old Pittwater Road.

There are 46 car spaces in the existing car park.

A full scaled plan of the proposed development is provided as part of the Development Application. Scaled measurements should use these plans.

4. CAR PARKING CONSIDERATIONS

The proposed alterations and additions do not alter the classroom or teaching area. The additional School Hall and store rooms will only improve the amenity of the School. Hence, there will not be an increase in the number of students or car parking demand as a direct result of the proposed changes to the school.

The proposed school hall will be used as an assembly hall, rehearsals for the daily or weekly activities. The school enrolment will not increase because of the school hall.

Additionally, the School Hall might be used to host special events such as a School Play (theatre). However, these events are not regular by any means and will most likely be outside of school hours. The on site will be used for school events.

As stated above, the existing car park capacity will remain the same. The number of car spaces does not need to increase since there will not be any increase in number of children as a direct consequence of the proposed alterations and additions.

Australian Bureau of Statistics publishes that the population growth rate of New South Wales in 2018 is 1.6 percent. The gradual increase of student numbers for Brookvale Public School is expected to be in in is proportional to the growth of the population, and it is expected that the student numbers will grow by the same percentage over time, currently 1.6 percent, and is very low.

5. VEHICLE TRAFFIC IMPACT CONSIDERATIONS

As discussed in the previous Section, the proposed School Hall and store rooms do not alter the classroom area and nor the teaching capacity of Brookvale Public School. The number of students will not increase as a direct result of the proposed alterations and additions. Consequently, the traffic generation will remain the same as the existing conditions in the weekday school AM and PM peak hours.

School events might be held on a rare occasion in the School Hall; however, these events will mostly likely be on Saturdays or after hours on a weekday when there is minimal traffic in the nearby road network.

As stated previously, the population growth rate of New South Wales in 2018 is 1.6 percent. It is expected that student numbers and hence vehicular trips will follow the same trend year on year, which is minimal in terms of traffic generation.

6. CONCLUSIONS

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

Parking

- The proposed development does not alter the current car parking demand
- Car parking is provided within the existing car park

Traffic

- The proposed alterations and additions do not generate any additional trips in the weekday peak hours following its completion
- There are no traffic engineering reasons why a planning consent for the proposed alterations and additions to Brookvale Public School, should be refused.

APPENDIX A

SIDRA Intersection Results for the Existing Traffic Conditions

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pittwater Road												
1b	L3	1084	0.0	0.968	65.7	LOS E	77.6	543.1	0.89	1.06	1.23	14.0
2	T1	1052	0.0	0.416	19.0	LOS B	24.8	173.3	0.65	0.57	0.65	36.0
Approach		2136	0.0	0.968	42.7	LOS D	77.6	543.1	0.77	0.82	0.94	21.0
East: Winbourne Road												
4	L2	105	0.0	0.430	48.6	LOS D	8.7	61.2	0.91	0.79	0.91	20.5
4a	L1	231	0.0	0.430	46.9	LOS D	8.7	61.2	0.91	0.78	0.91	19.5
6	R2	5	100.0	0.430	48.9	LOS D	8.6	61.8	0.91	0.78	0.91	21.8
Approach		341	1.5	0.430	47.5	LOS D	8.7	61.8	0.91	0.78	0.91	19.9
North: Pittwater Road												
7	L2	165	0.0	0.668	16.2	LOS B	29.5	206.6	0.63	0.62	0.63	38.6
8	T1	1607	0.0	0.668	11.7	LOS B	29.8	208.4	0.63	0.60	0.63	41.9
9a	R1	249	0.0	0.977	101.0	LOS F	20.7	145.2	1.00	1.35	1.82	11.5
Approach		2021	0.0	0.977	23.1	LOS C	29.8	208.4	0.68	0.70	0.78	32.3
SouthWest: Old Pittwater Road												
30a	L1	202	0.0	0.980	100.5	LOS F	37.9	265.1	1.00	1.38	1.70	10.9
32a	R1	345	0.0	0.980	100.9	LOS F	37.9	265.1	1.00	1.37	1.72	10.7
32b	R3	247	0.0	0.980	105.3	LOS F	32.1	224.5	1.00	1.33	1.75	10.0
Approach		794	0.0	0.980	102.2	LOS F	37.9	265.1	1.00	1.36	1.72	10.5
All Vehicles		5292	0.1	0.980	44.4	LOS D	77.6	543.1	0.78	0.85	1.00	21.1

Table A1: Signalised Intersection Performance of Pittwater Road with Old Pittwater Road and Winbourne Road Weekday AM Peak Hour Existing Conditions

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Roger Street												
1	L2	66	0.0	0.905	71.3	LOS F	8.9	62.3	1.00	1.16	1.59	17.0
2	T1	106	0.0	0.905	67.9	LOS E	8.9	62.3	1.00	1.16	1.59	20.9
3	R2	108	0.0	0.905	71.4	LOS F	8.8	61.5	1.00	1.16	1.60	15.6
Approach		280	0.0	0.905	70.1	LOS E	8.9	62.3	1.00	1.16	1.59	18.2
NorthEast: Old Pittwater Road												
4	L2	56	0.0	0.488	34.6	LOS C	13.2	92.7	0.84	0.76	1.03	23.8
5	T1	265	0.0	0.488	31.5	LOS C	13.2	92.7	0.84	0.76	1.03	20.8
6	R2	300	0.0	0.918	71.2	LOS F	20.9	146.0	1.00	1.15	1.50	18.3
Approach		621	0.0	0.918	51.0	LOS D	20.9	146.0	0.92	0.95	1.26	19.4
NorthWest: Beacon Hill Road												
7	L2	420	0.0	0.915	53.2	LOS D	46.2	323.1	1.00	1.07	1.24	21.5
8	T1	305	0.0	0.915	49.8	LOS D	46.2	323.1	1.00	1.07	1.24	23.8
9	R2	226	0.0	0.291	26.0	LOS B	8.0	55.7	0.70	0.73	0.70	28.8
Approach		951	0.0	0.915	45.6	LOS D	46.2	323.1	0.93	0.99	1.11	23.8
SouthWest: Old Pittwater Road												
10	L2	303	0.0	0.292	9.2	LOS A	5.4	38.0	0.47	0.62	0.47	35.8
11	T1	215	0.0	0.328	29.2	LOS C	8.6	60.0	0.79	0.66	0.79	21.7
Approach		518	0.0	0.328	17.5	LOS B	8.6	60.0	0.60	0.64	0.60	30.5
All Vehicles		2370	0.0	0.918	43.8	LOS D	46.2	323.1	0.86	0.92	1.10	22.8

Table A2: Signalised Intersection Performance of Old Pittwater Road with Beacon Hill Road and Roger Street Weekday AM Peak Hour Existing Conditions

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Pittwater Road												
1b	L3	60	0.0	0.084	18.2	LOS B	1.4	9.5	0.61	0.67	0.61	26.8
2	T1	1215	0.0	0.712	19.9	LOS B	19.5	136.3	0.88	0.78	0.88	27.3
Approach		1275	0.0	0.712	19.8	LOS B	19.5	136.3	0.87	0.78	0.87	27.3
East: Winbourne Road												
4	L2	72	0.0	0.434	34.5	LOS C	5.6	39.4	0.92	0.77	0.92	22.5
4a	L1	231	0.0	0.434	33.7	LOS C	5.6	39.4	0.93	0.77	0.93	21.5
6	R2	1	100.0	0.434	36.4	LOS D	5.2	36.7	0.94	0.77	0.94	23.0
Approach		304	0.3	0.434	33.9	LOS C	5.6	39.4	0.93	0.77	0.93	21.7
North: Pittwater Road												
7	L2	21	0.0	0.199	18.3	LOS B	4.0	28.3	0.65	0.56	0.65	30.0
8	T1	861	0.0	0.836	24.9	LOS C	28.0	196.1	0.90	0.89	1.01	25.3
9a	R1	186	0.0	0.599	36.8	LOS D	7.0	49.2	0.98	0.81	0.98	20.6
Approach		1068	0.0	0.836	26.8	LOS C	28.0	196.1	0.91	0.87	0.99	24.5
SouthWest: Old Pittwater Road												
30a	L1	156	0.0	0.796	39.8	LOS D	12.5	87.8	1.00	0.98	1.19	19.6
32a	R1	273	0.0	0.796	40.1	LOS D	12.5	87.8	1.00	0.98	1.21	19.4
32b	R3	120	0.0	0.796	43.5	LOS D	10.3	72.1	1.00	0.99	1.23	18.2
Approach		549	0.0	0.796	40.8	LOS D	12.5	87.8	1.00	0.98	1.21	19.2
All Vehicles		3196	0.0	0.836	27.1	LOS C	28.0	196.1	0.91	0.84	0.97	24.2

Table A3: Signalised Intersection Performance of Pittwater Road with Old Pittwater Road and Winbourne Road Weekday PM Peak Hour Existing Conditions

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
SouthEast: Roger Street												
1	L2	24	0.0	0.672	31.8	LOS C	4.1	28.6	1.00	0.88	1.17	25.6
2	T1	201	0.0	0.672	28.5	LOS B	4.1	28.6	1.00	0.88	1.17	28.9
3	R2	57	0.0	0.672	31.9	LOS C	4.0	28.2	1.00	0.88	1.17	24.1
Approach		282	0.0	0.672	29.4	LOS C	4.1	28.6	1.00	0.88	1.17	27.9
NorthEast: Old Pittwater Road												
4	L2	36	0.0	0.428	19.3	LOS B	5.2	36.3	0.85	0.73	0.95	29.9
5	T1	210	0.0	0.428	16.1	LOS B	5.2	36.3	0.85	0.73	0.95	27.0
6	R2	207	0.0	0.821	34.1	LOS C	6.5	45.4	1.00	1.07	1.45	25.6
Approach		453	0.0	0.821	24.6	LOS B	6.5	45.4	0.92	0.89	1.18	26.4
NorthWest: Beacon Hill Road												
7	L2	198	0.0	0.767	26.7	LOS B	10.9	76.4	0.98	0.95	1.15	28.0
8	T1	69	0.0	0.767	23.3	LOS B	10.9	76.4	0.98	0.95	1.15	29.8
9	R2	513	0.0	0.767	26.7	LOS B	10.9	76.4	0.98	0.94	1.15	28.6
Approach		780	0.0	0.767	26.4	LOS B	10.9	76.4	0.98	0.95	1.15	28.6
SouthWest: Old Pittwater Road												
10	L2	411	0.0	0.377	6.4	LOS A	3.5	24.4	0.53	0.64	0.53	37.2
11	T1	303	0.0	0.534	18.2	LOS B	7.1	49.4	0.89	0.75	0.89	26.2
Approach		714	0.0	0.534	11.4	LOS A	7.1	49.4	0.68	0.69	0.68	33.3
All Vehicles		2229	0.0	0.821	21.6	LOS B	10.9	76.4	0.87	0.84	1.01	29.3

Table A4: Signalised Intersection Performance of Old Pittwater Road with Beacon Hill Road and Roger Street Weekday PM Peak Hour Existing Conditions