OPERATIONAL TRANSPORT MANAGEMENT PLAN

St Catherine's School Waverley 2019 Travel Survey Update
26 Albion Street, Waverley

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CONTENTS

EXECUTIVE SUMMARY

TRAFFIX has been commissioned to report the progression of modal split change and traffic conditions as a result of an Operational Transport Management Plan (OTMP). In the annual report, TRAFFIX assesses the effectiveness of the mode reduction plan, as well as the traffic conditions in the surrounding road network. This is on the request of a Community Consultative Committee established by St Catherine's School, Waverley. To keep statistics relevant, certain control points and survey questions are surveyed each year. The travel modes are collected through SurveyMonkey. A comparison of the modal splits is shown below.

Group	Students AM				
Travel Mode	ARUP 2014	ARUP 2015	Traffix 2017	Traffix 2018	Traffix 2019
Drop Off by Private Car	60%	60%	55%	54%	**51%**
Public Transport inc School Bus	19%	19%	23%	20%	**30%**
Walk	16%	16%	21%	18%	**19%**
Cycle	N/A	0%	0%	0%	**N/A**
Other	**5%**	**5%**	**1%**	**0%**	**0%**

Group	Students PM				
Travel Mode	ARUP 2014	ARUP 2015	Traffix 2017	Traffix 2018	Traffix 2019
Pick Up by Private Car	46%	46%	45%	43%	**42%**
Public Transport inc School Bus	25%	25%	30%	35%	**34%**
Walk	24%	24%	25%	22%	**23%**
Cycle	18%	0%	0%	0%	**N/A**
Other	**5%**	5%	**0%**	**0%**	**0%**

Group	Staff				
Travel Mode	ARUP 2014	ARUP 2015	Traffix 2017	Traffix 2018	Traffix 2019
Car Driver	74%	71%	70%	67%	**69%**
Public Transport inc School Bus	19%	19%	16%	17%	**19%**
Walk	5%	5%	9%	8%	**9%**
Cycle	2%	2%	2%	5%	**2%**
Other	**0%**	**0%**	**0%**	0%	1%

This is compared to the target modal splits outlined below.

Travel Mode	Staff Future Targets	Student Future Targets
Car Driver	< 65%	**N/A**
Car Passenger	> 3%	**< 49%**
Public Transport inc School Bus	> 23%	**> 34%**
Active Travel	**> 9%**	**> 13%**

This data shows that the OTMP is effective and mode share is trending towards target mode share goals. Progression of currently implemented mode shift programs should continue as survey data shows that they are effective.

Regarding traffic volumes, the daily volumes are recorded for both school terms and school holidays. The school term volumes are shown below and other relevant data is shown in **Section 4**.

Year of Survey	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Weekday	7 Day Average
2014	37921	38648	39661	40544	39285	40605	35335	39212	38857
2016	34477	35934	36138	37854	38705	38169	29792	36620	35865
2017	35572	39951	40322	40438	40287	39571	36390	39311	38932
2018	39326	40052	41850	43290	44133	41342	37784	41728	41110
2019	38431	38703	40668	40754	40841	40534	38134	39879	39879

Notably, there is negligible increase in volume for the average school term weekday from 2014 to 2019, with a recorded average weekday volume being 39,212 vehicles in 2014 and 39,879 vehicles in 2019.

The school holiday daily volumes are as tabulated below, and additional information is also found in **Section 4**.

Year of Survey	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Weekday	7 Day Average
2016	32964	33410	35438	34516	35784	32594	32134	34421	33833
2017	37313	36349	36639	37989	32273	42462	34243	36110	36749
2018	35544	35094	36410	37863	38123	36247	33579	36606	36122
2019	35056	36528	38325	39228	34729	40323	34557	36773	36964

It can be observed that there is a greater proportionate increase in volume for the average school holiday weekday from 2014 to 2019, with a recorded average weekday volume being 34,421 vehicles in 2014 and 36,733 vehicles in 2019.

These results indicate that traffic outside of the school is increasing at a faster rate than traffic generated from the school, suggesting that the OTMP in place is effective in mitigating traffic growth.

INTRODUCTION

1.1 Background

A Condition of Consent (Condition A8) for the subject site states that 'no increase in private vehicle trips to the site will be permitted'. The Conditions of Consent are provided in **Appendix A.** In order to assess compliance with Condition A8, traffic surveys in the form of automatic tube counts and peak period turning counts at the critical intersections surrounding the site were undertaken in March 2014 by Arup and October 2016, April 2017, April 2018, and April 2019 by Traffix. In addition, interview surveys have been conducted to review the methods of travel used by staff and students travelling to site.

A Community Consultative Committee (CCC) was established for this project in accordance with the Development Consent. The CCC has reviewed prior drafts of the OTMP and as a result of subsequent discussions between the school and the CCC, it was determined that the 2018 traffic survey should include an additional tube count location on Bronte Road, between Henrietta Street and High Street, to determine the traffic entering the street network at the intersection of Bronte Road and Leichhardt Street. Surveys conducted from 2018 onwards include a tube counter on Bronte Road between Henrietta and Prospect Street.

To maintain a consistent approach to the assessment, the same locations have been surveyed for one (1) week during the school term, and from 2017 onwards, one (1) week during the school holidays. Surveys from 2017 account for the existing travel strategies that have been implemented to help identify any reductions in traffic volumes that have already been achieved. Any reduction in private vehicle usage may therefore act as credit for the site, enabling the additional proposed enrolment of students, with no net increase in traffic generation to the site.

The report is structured as follows:

- Section 2: Provides an overview of previous modal splits and outlines the modal split from the travel mode survey completed in April/May 2019.

- Section 3: Outlines the target modal split distributions set out from the OTMP.

- Section 4: Describes the 2019 pneumatic tube survey results and graphically compares 2019 data with historic survey data.

2. TRAVEL MODE SURVEYS

2.1 Introduction

This section is to identify current travel mode patterns for both students and staff at St Catherine's School, Waverley. To enable this analysis, questionnaire surveys were distributed via the Survey Monkey website to staff and parents of school children between Monday 9th April and Friday 10th May 2019. This information is imperative to identifying the existing travel mode patterns and future impacts of the increase in student population and informing the trip distribution assessment.

Table 1 summarises the number of students and staff who are enrolled at or employed at St Catherine's School.

Table 1: Number of Students and Staff

Class	Count (Enrolment Records)	% (Enrolment)	Count (Surveyed)	% (Surveyed)
Full Time			115	
Part Time			30	
Casual			1	
STAFF	**200**	**100%**	**146**	**73%**
Kindergarten	19	2%	8	1%
Year 1	24	2%	11	2%
Year 2	34	3%	21	3%
Year 3	46	5%	23	4%
Year 4	58	6%	22	3%
Year 5	73	7%	43	7%
Year 6	88	9%	42	7%
Year 7	106	10%	78	12%
Year 8	115	11%	80	12%
Year 9	111	11%	84	13%
Year 10	118	12%	70	11%
Year 11	115	11%	93	15%
Year 12	107	11%	66	10%
TOTAL STUDENTS	**1014**	**100%**	**641**	**100%**

(Source: St Catherine's School Records and Traffix Survey April / May 2019)

146 staff and 641 students were accounted for in the survey summarized below and the distribution of students across the grades shows correlation with the true grade distribution, strongly suggesting that the modal surveys capture a sample that reflects the population.

2.2 Travel Mode Survey Results

2.2.1 Staff Modal Splits

Table 2 provides a comparison between baseline (2014 Arup) and subsequent Staff Mode Travel Splits.

Table 2: 2014, 2017, 2018 and 2019 Staff Travel Mode Splits

Year	ARUP 2014	Traffix 2017	Traffix 2018	Traffix 2019	Variance
Travel Mode	Percentage	Percentage	Percentage	Percentage	Percentage
Car Driver	71%	70%	67%	67%	-4%
Car Passenger	3%	3%	3%	2%	-1%
Public Transport	19%	16%	17%	19%	0%
Walk	5%	9%	8%	9%	4%
Cycle	2%	2%	5%	2%	0%
Other	0%	0%	0%	1%	1%

(Source: Arup, 2014 and Traffix Surveys, October 2017, April 2018, April/May 2019)

Table 2 shows that the percentage of respondents driving to the site has decreased this year by 4% (8 staff) from the 2014 baseline levels. The number of respondents cycling or walking to the site has increased by a total of 4% (12 staff), which suggests a proportion of staff which previously drove to the site now walk or cycle. However, the percentage of staff travelling to/from the site by public transport has remained relatively unchanged and number of car pool passengers have decreased slightly.

The TRAFFIX 2019 data indicates a 4% decrease in 'private driver only' car usage and subsequently a 4% increase in walking as a mode of transport to and from school. The change in car driver is evaluated for statistical significance by calculating its 'z-score'. The z score for the 2019 survey compared to baseline, noting that 146 results were recorded, totals **z = -1.1**,

indicating that there is an 85% chance that the results significantly show a reduction in private vehicle usage.

If the sample distribution is identical to the population distribution, this indicates that approximately 134 staff drive to St. Catherine's School.

2.2.2 Student Modal Splits (AM)

Table 3 provides a comparison between 2014, 2017, 2018 and 2019 Student Mode Travel Splits for the AM arrival of students.

Table 3: 2014, 2017,2018,2019 Student Travel Mode Splits, AM Arrivals

Travel Mode	ARUP 2014	Traffix 2017	Traffix 2018	Traffix 2019	Variance (2014 to 2019)
Private Vehicle	60%	55%	54%	51%	-9%
Walk	16%	21%	18%	19%	+3%
Bus Service Catherine's Bus	4%	7%	8%	10%	+6%
Public Transport	15%	16%	20%	20%	+5%
Other	5%	0%	0%	0%	-5%

(Source: Arup, 2014 and Traffix Surveys, October 2017, April 2018, April/May 2019)

Table 3 shows that the number of students travelling by private vehicle to the site decreased by 9% in 2019 when compared with 2014 baseline numbers. Also, 54% (551) of students travelled to school by private vehicle during the AM Peak which is 31 students below the maximum number of students permitted to travel to school by private transport in accordance with the Condition of Consent. The number of students travelling to the site by the St Catherine's private bus service increased by 4% (41 students) and the number of students walking to the site increased by 2% (20 students) in 2019 when compared to the 2014 baseline numbers.

If the sample surveyed is indicative of the population, this can be understood as 530 students travelling to St Catherine's School by car.

2.2.3 Student Modal Splits (PM)

Table 4 provides a comparison between 2014 and 2018 Student Mode Travel Splits for the PM departure of students.

Table 4: 2014, 2017,2018,2019 Student Travel Mode Splits, PM Departures

Travel Mode	ARUP 2014	Traffix 2017	Traffix 2018	Traffix 2019	Variance (2014 to 2019)
Private Vehicle	46%	45%	43%	42%	-4%
Walk	24%	25%	22%	23%	-1%
Bus Service Catherine's Bus	7%	7%	9%	10%	+3%
Public Transport	18%	24%	26%	24%	+6%
Other	5%	0%	0%	0%	-5%

(Source: Arup, 2014 and Traffix Surveys, October 2017, April 2018, April/May 2019)

Table 4 shows that the number of students travelling home by private vehicle from the site decreased by 4% in comparison with 2014 baseline numbers. The number of students travelling to the site by public transport increased by 6% (82 students). Also, the number of students travelling home from the site by the St Catherine's private bus service increased by 3% and the number of students walking home from the site decreased by 1% in 2019 when compared to 2014 baseline numbers**.** If the sample surveyed is indicative of the population, this can be understood as 426 students travelling from St Catherine's School by car.

It is evident from comparison of the ARUP 2014 and the TRAFFIX 2019 student travel mode splits, shown in **Table 3** and **Table 4**, that there is a reduction in private vehicle usage and subsequently increase in active and public transport. The reduction is significant and in the order of 9% and 4% in the AM and PM peak period respectively considering the size of sample, which consistently has over 600 results every year.

In regard to the difference in AM proportion of private vehicle usage, the z-score of such difference in results totals **z = -5.16**, meaning that there is a greater than 99.9% chance that the decrease in volume is significant. Similarly, the comparison of PM proportions of private vehicle

usage results in 2014 and 2019 gives **z = -2.03**, meaning that there is a greater than 99% chance that the decrease in volume is significant.

2.3 Future Travel Strategies

A number of travel strategies have already been put into place to encourage active travel, reduce the reliance on private vehicle travel for staff and students and to minimise the traffic impacts from activities undertaken within the RPAC. The 2014 ARUP report provided travel mode targets for staff and students to achieve no net increase in private vehicle trips to the school as follows:

Table 5 identifies the student numbers required to use alternative modes of transport for the years 2014 to 2030 to ensure no net increase in traffic is generated as the student population increases.

Table 5: Student Population from 2014 to 2030

Year	Total Student Population	Private Vehicle	Students by Bus	Students by Carpool	Students by Public Transport	Students by Active Travel
2014	970	582	39	48	146	155
2018	1,020	582*	92	48	204	94
2019	1,014	582	101	48	244	193
2020	*1,050*	*582*	*102*	*48*	*214*	***104***
2021	*1,065*	*582*	*107*	*48*	*219*	***109***
2022	*1,080*	*582*	*112*	*48*	*224*	***114***
2023	*1,095*	*582*	*117*	*48*	*229*	***119***
2024	*1,110*	*582*	*122*	*48*	*234*	***124***
2025	*1,125*	*582*	*127*	*48*	*239*	***129***
2026	*1,140*	*582*	*132*	*48*	*244*	***134***
2027	*1,155*	*582*	*137*	*48*	*249*	***139***
2028	*1,170*	*582*	*142*	*48*	*254*	***144***
2029	*1,185*	*582*	*147*	*48*	*259*	***149***
2030	*1,200*	*582*	*152*	*48*	*264*	***154***

***51% of the 2019 student population (1014 students) equates to 530 trips which is well below the baseline of private vehicles arriving at the site in 2014.** Numbers in italics subject to approval.*

It can be seen in **Table 5** that in 2030 when the school has a capacity of 1,200 students and under the circumstance that all non-private vehicle travel modes are utilised by new students equally – 152 students will be required to travel by Bus, 264 students by public transport and 154 students by active travel.

In addition, the student population increase has been divided evenly amongst all other modes of transport between 2020 and 2030. These figures are indicative and expected to be different in reality which has been the case between 2014 and 2019 as demonstrated above.

Table 5 is to be updated each year to reflect the actual travel mode patterns of the student population.

3. TRANSPORT MODE TARGET SETTING

3.1 Introduction

To meet the OTMP goals, the following staff travel goals are to be met, these include:

- 23% of staff to utilise public transport

- 9% of staff to participate in active travel

- 5% reduction in private car use by staff

3.2 Staff Travel Targets

The travel mode splits for staff in 2019 and the future targets for staff are provided in **Table 6**. The targets include a 5% improvement on private vehicle reliance for staff from 2014 survey results.

Table 6: 2019 Staff Travel Mode Splits and Future Targets

Travel Mode	2019 Traffix Survey	Future Targets	Target No. of Staff*
Car Driver	67% (135 staff)	< 65%	138
Car Passenger	2% (4 staff)	> 3%	6
Public Transport	19% (38 staff)	> 23%	49
Active Travel	11% (22 staff)	> 9%	19
*Based on a future number of 212 staff.			

(Source: Arup, 2014 and Traffix Surveys, April 2019)

3.3 Student Travel Targets

The current travel modes based on the student travel survey conducted by ARUP in 2014. The OTMP seeks to increase the use of alternate (non-private vehicle) transport for the site. The 2014 reliance upon car related transport to the school relates to approximately 60% of students (in the AM peak).

From the 2019 data it is evident that this reliance has been reduced to 51%, a 9% improvement. With this in mind, it is envisaged that the subject OTMP will encourage increased use of sustainable modes of transport, such as train, bus, bicycle and walking and utilization of the school bus service. The breakdown of the baseline travel mode split and proposed targets are shown in **Table 7.**

In addition, **Table 7** and **Table 8** show the mode splits in 2019 as per the survey results undertaken by TRAFFIX which demonstrates that the target for no private vehicle net increase from 2014 has been met and non-private vehicle mode shares have been utilised by students of the school. This will enable future potential expansion of the school by 2030 as planned.

Table 7: Student Travel Mode Splits and 2030 Future Targets

Travel Mode	Baseline AM Peak Period		Baseline PM Peak Period		Future AM Peak Period 2030	
	No.	%	No.	%	No.	%
Drop-off / Pick-up	582	60%	447	46%	582	49%
*Walk / Active Travel	155	16%	233	24%	154	13%
School Bus	39	4%	68	7%	152	12%
*Public Transport	146	15%	175	18%	264	22%
Other	48	5%	48	5%	0	-
Total	970	100%	970	100%	1200	100%

Note: The ARUP targets set out 5% of travel to shift to car-pooling. Due to the limited uptake in this travel mode in 2016 the school is proposing to further increase in St Catherine's school bus, public transport and active travel modes to reduce reliance on private vehicles.

(Source: Arup, 2014 and TRAFFIX)

Table 8: 2019 Student Travel Mode Splits

Travel Mode	Existing AM Peak Period	Existing PM Peak Period
	%	%
Drop-off / Pick-up	47%	**39%**
*Walk / Active Travel	19%	**23%**
School Bus	10%	**10%**
*Public Transport	20%	**24%**
Other	4%	**3%**
Total	**100%**	**100%**

(Source: TRAFFIX, April 2019)

4. TRAFFIC SURVEY ANALYSIS

4.1 Introduction

This aim of this section is to analyse the results of the traffic surveys. This information is imperative to identifying the existing traffic volumes patterns. These traffic surveys included tube counts for seven (7) days over two (2) separate time periods. These were one (1) week in term time (Saturday 8th April 2019– Friday 12th April 2019) and one (1) week in the school holidays (Saturday 13th April 2019 – Friday 19th April 2019).

Tube traffic counts were conducted on the following streets:

- Albion Street (between Santa Marina Avenue and Macpherson Street),

- Macpherson Street (between Albion Street and Wills Avenue),

- Leichhardt Street (between Lugar Brae Avenue and Macpherson Street), and

- Bronte Road (between Prospect Street and Henrietta Street).

Turning movement counts were conducted during the AM and PM peak periods on two Thursdays and Saturdays (term time and school holiday periods) at the following intersections:

- Macpherson Street / Leichhardt Street,

- Bronte Road / Albion Street,

- Bronte Road / Leichhardt Street, and;

- Albion Street and Macpherson Street

Surveys of the pick-up zones were undertaken during an AM and PM school peak periods on Tuesday, 9th April 2019 at:

- Both sides of Albion Street;

- The north side of Macpherson Street, and;

- The west side of Leichhardt Street

4.2 Survey Results

The surveys show that generally there has been an increase in traffic volumes during the AM (8:00am-9:00am) and PM (3:00pm-4:00pm) school peak periods on the streets surrounding the school. However, comparing this to the hour after the AM peak (9:00am-10:00am), the commuter peak (5:00pm-6:00pm) and weekend peak (12 midday-1:00pm), which would all be unaffected by school traffic, most streets have seen similar or lower increases.

Overall, the increase between 2014 and 2019 during the school peaks are in line with the AM peak, commuter peaks and weekend peak increases.

As shown in **Table 9** below, the AM school peak volumes (traffic volume from 8:00am – 9:00am) indicate a decrease in traffic volume throughout the network compared to the AM commuter peak volumes (traffic volume from 9:00am – 10:00am) which demonstrates a net increase. This is compared to the baseline survey commissioned by Arup (2014)

The school PM peak (3:00pm – 4:00pm) also indicate a decrease in traffic volume compared to baseline whereas the commuter PM peak (5:00pm – 7:00pm) indicates an increase in traffic volumes.

Therefore, despite natural growth in road usage, St Catherine's School has managed to decrease the number of cars in the network since implementation of the OTMP.

The figures and tables below outline the following:

- **Figure 1** shows the approximate location of pneumatic tubes placed for the survey.
- **Table 9** provides the volumes for Leichhardt Street, Albion Street, Macpherson Street, Bronte Road and a total of all count locations from all available surveys at critical times-of-day during the school term.
- **Table 10** provides the daily volumes for each day surveyed in 2014, 2016, 2017, 2018 and 2019 during the school term.
- **Table 11** provides the daily volumes for each day surveyed in 2016, 2017, 2018 and 2019 during the school term.
- **Figure 2** graphically compares the volumes for each day surveyed in 2014, 2016, 2017, 2018 and 2019 at peak periods during the school term.

- **Figure 3** graphically compares the volumes for each day surveyed in 2016, 2017, 2018 and 2019 at peak periods during the school holidays.
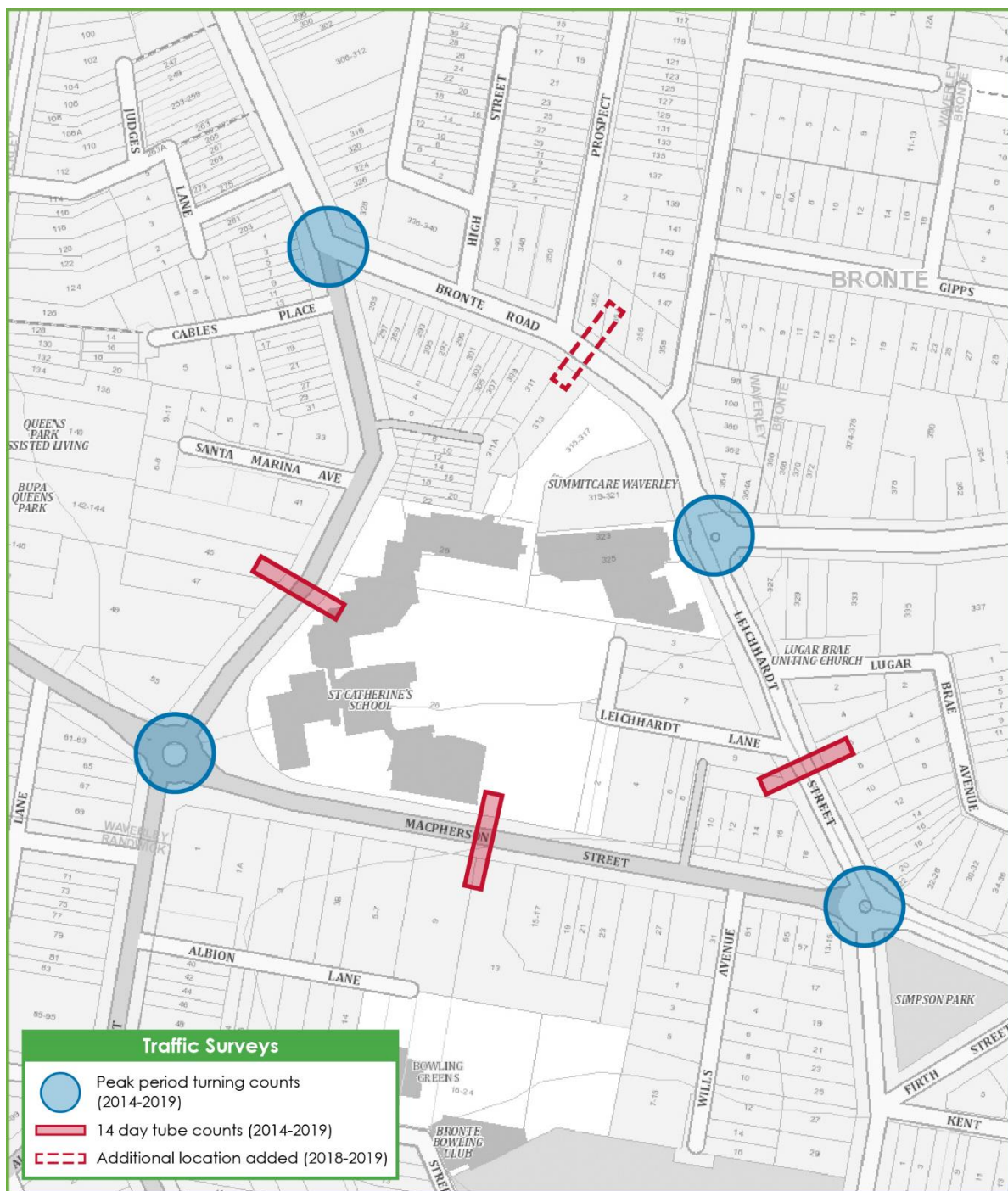- **Figure 4** graphically compares the daily volumes for each day surveyed in 2014, 2016, 2017, 2018 and 2019 during the school terms.
- **Figure 5** graphically compares the volumes for each day surveyed in 2016, 2017, 2018 and 2019 at peak periods during the school holidays.

Figure 1 - Location of Traffic Surveys

Table 9: Average Mid-block Volumes, School Term (2014 Arup, 2016-2019 Traffix)

Location	Years of surveys compared		Weekday AM Peak (8am-9am)	Weekday AM Commuter Only Peak (9am-10am)	Weekday PM School Only Peak (3pm-4pm)	Weekday PM Commuter Only Peak (5pm-6pm)	Weekday PM Commuter Only Peak (6pm-7pm)	Weekend PM Peak (12pm-1pm)
Leichhardt Street	2014		1,181	910	1,170	1,215	1,102	1,234
	2016		1,094	955	1,057	1151	1055	1,196
	2017		1,138	1,193	1024	1,215	1,280	1,373
	2018		1,322	1027	1,371	1,392	1168	1,398
	2019		1,164	1040	1,161	1,329	1,189	1,401
	2014-2019	No.	-17	130	-9	114	87	167
	2014-2019	%	-1%	+14%	-1%	+9%	+8%	+13%
			15% reduction comparing school and non-school peak times		10% reduction comparing school and non-school peak times			
	2016-2019	No.	-68	-15	++27	-30	+1	+17
	2016-2019	%	-6%	-2%	+3%	-3%	0%	+1%
Albion Street	2014		660	568	766	722	746	677
	2016		681	555	625	624	609	677
	2017		604	664	776	611	567	717
	2018		757	591	755	746	653	744
	2019		717	601	714	744	678	445
	2014-2019	No.	57	33	-52	22	-68	-233
	2014-2019	%	10%	5%	-7%	4%	-12%	-32%
			+5% increase comparing school and non-school peak times		-11% reduction comparing school and non-school peak times			
	2016-2019	No.	-40	10	-41	-2	25	-300
	2016-2019	%	-5%	2%	-5%	0%	4%	-40%

Location	Years of surveys compared		Weekday AM Peak (8am-9am)	Weekday AM Commuter Only Peak (9am-10am)	Weekday PM School Only Peak (3pm-4pm)	Weekday PM Commuter Only Peak (5pm-6pm)	Weekday PM Commuter Only Peak (6pm-7pm)	Weekend PM Peak (12pm-1pm)
Macpherson Street	2014		1,181	910	1,170	1,215	1,102	1,234
	2016		1,094	955	1,057	1151	1055	1,196
	2017		1,138	1,193	1024	1,215	1,280	1,373
	2018		1,322	1027	1,371	1,392	1168	1,398
	2019		1,026	940	1,084	1,121	1,056	1,213
	2014-2019	No.	-89	-2	-120	-14	-7	+37
	2014-2019	%	-8%	0%	-10%	-1%	-1%	+3%
			8% reduction comparing school and non-school peak times		9% reduction comparing school and non-school peak times			
	2016-2019	No.	-68	-15	++27	-30	+1	+17
	2016-2019	%	-6%	-2%	+3%	-3%	0%	+1%
Bronte Road	2018		502	435	575	626	541	596
	2019		451	461	572	646	571	511
	2018-2019	No.	-51	26	-3	20	30	-85
	2018-2019	%	-10%	+6%	-1%	+3%	+6%	-14%
			16% reduction comparing school and non-school peak times		4% reduction comparing school and non-school peak times			
Overall	2014		2,956	2,420	3,140	3,072	2,911	3,113
	2016		2,797	2,392	2,639	2,749	2,559	2,933
	2017		2,863	2,923	2,639	2,866	2,906	3,211
	2018 (excluding Bronte Rd)		3,208	2,594	3,339	3,306	2,805	3,381
	2019 (excluding Bronte Road)		2,907	2,581	2,959	3,194	2,923	3,059

Table 10: Total Daily Traffic Volumes per Day, 2014, 2016,2017,2018,2019 (School Term)

Year of Survey	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Weekday	7 Day Average
2014	37921	38648	39661	40544	39285	40605	35335	39212	38857
2016	34477	35934	36138	37854	38705	38169	29792	36620	35865
2017	35572	39951	40322	40438	40287	39571	36390	39311	38932
2018	39326	40052	41850	43290	44133	41342	37784	41728	41110
2019	38431	38703	40668	40754	40841	40534	38134	39879	39879

Table 11: Total Daily Traffic Volumes per Day, 2016,2017,2018,2019 (School Holidays)

Year of Survey	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Average Weekday	7 Day Average
2016	32964	33410	35438	34516	35784	32594	32134	34421	33833
2017	37313	36349	36639	37989	32273	42462	34243	36110	36749
2018	35544	35094	36410	37863	38123	36247	33579	36606	36122
2019	35056	36528	38325	39228	34729	40323	34557	36773	36964

Figure 2: Traffic Volumes at Critical Times, 2014, 2016, 2017, 2018, 2019 (School Term)
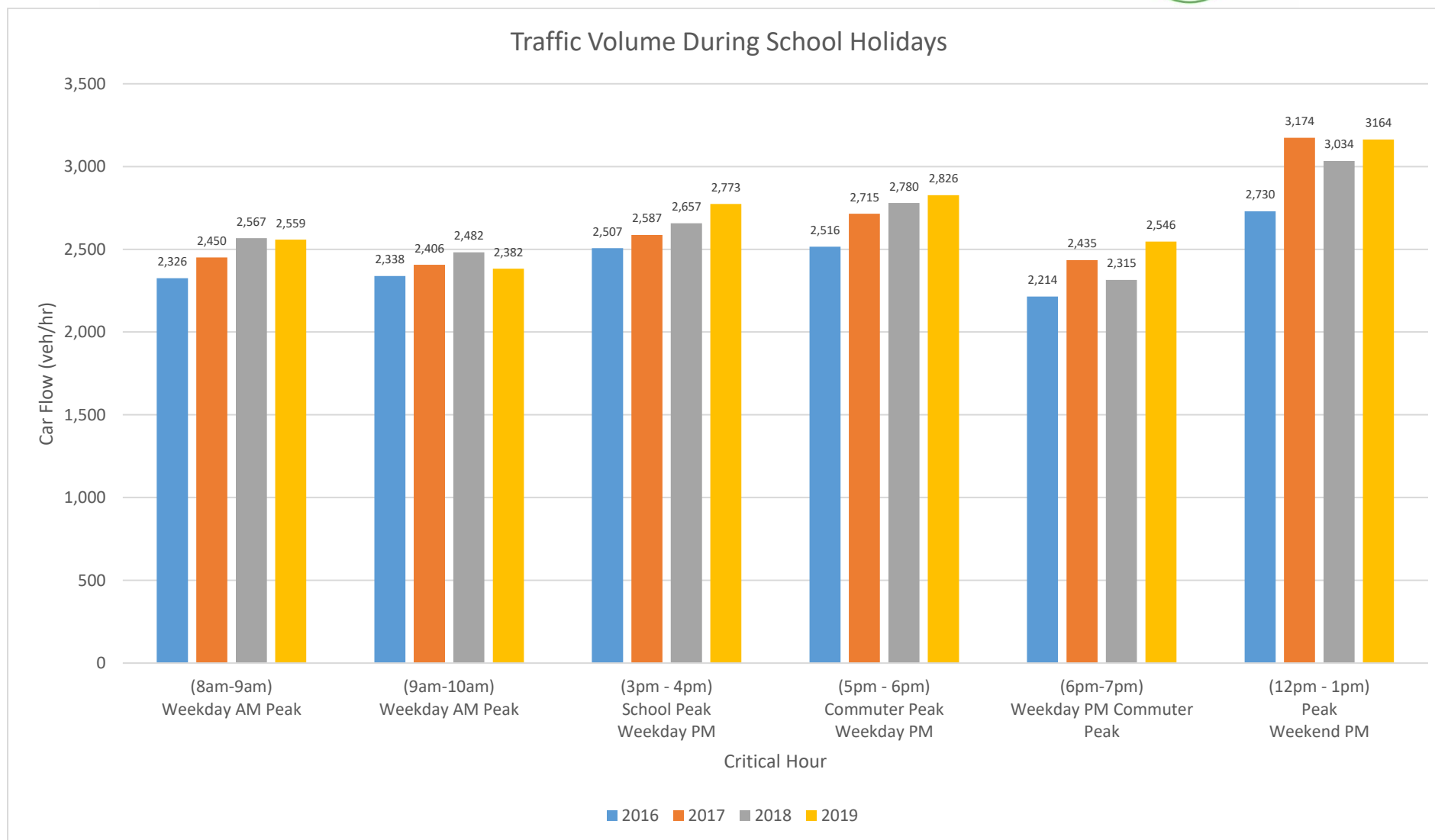
Figure 3: Traffic Volumes at Critical Times, 2016, 2017, 2018, 2019 (School Holidays)
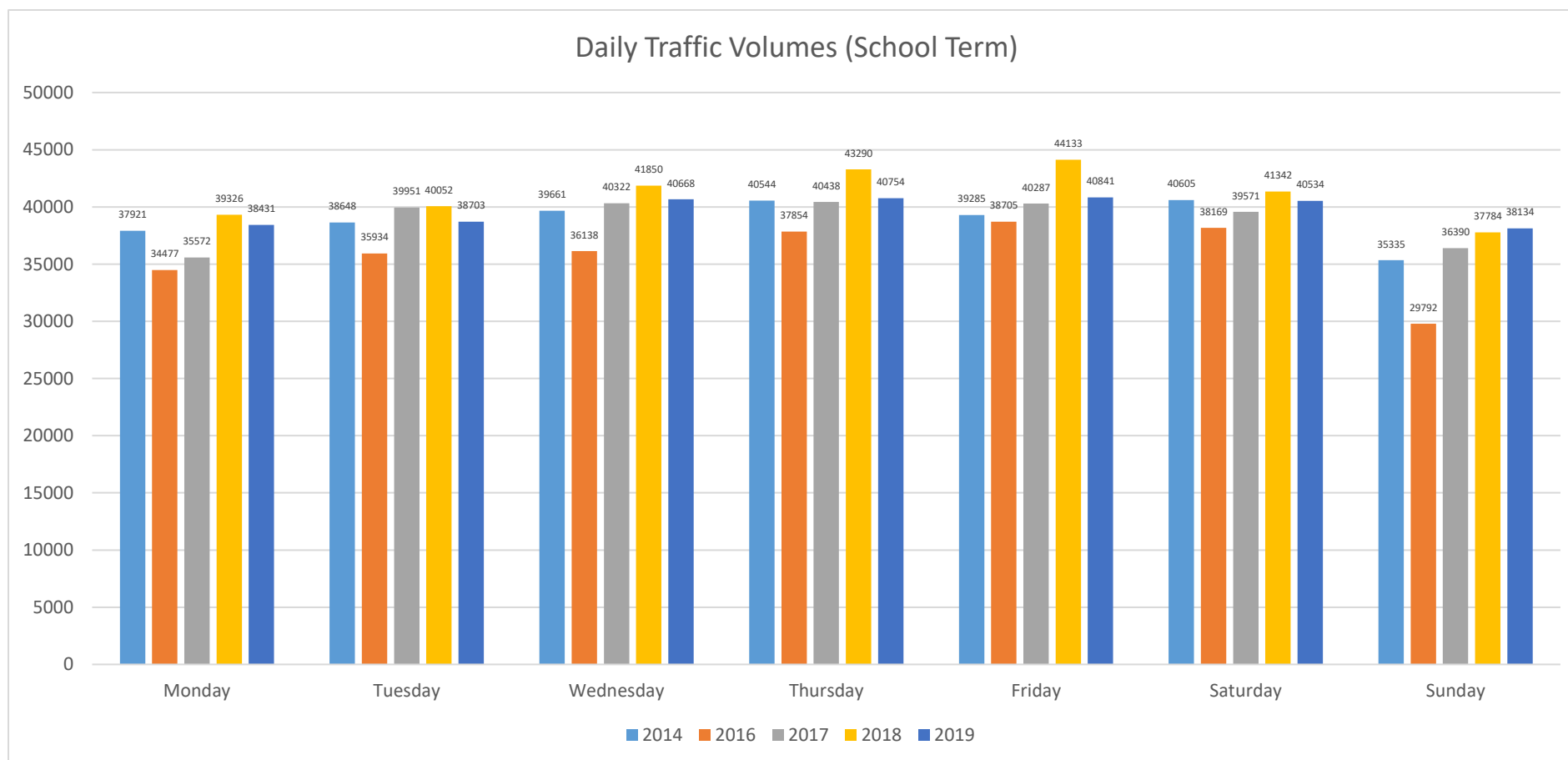
Figure 4: Daily Traffic Volume, 2014, 2016, 2017, 2018, 2019 (School Term)
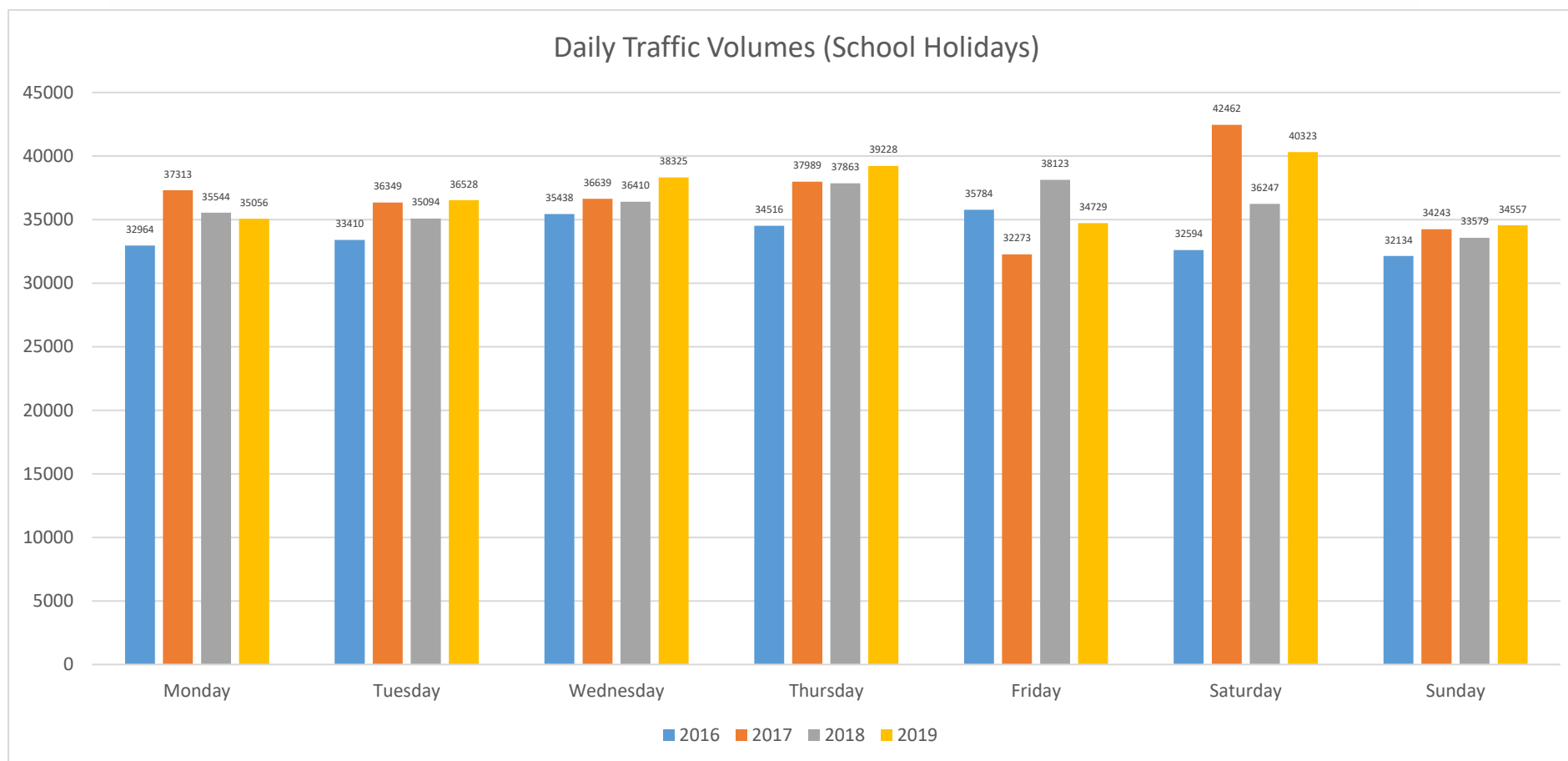
Figure 5: Daily Traffic Volume, 2016, 2017, 2018, 2019 (School Holidays)

4.3 Traffic Distribution 2019

4.3.1 School Term Intersection Diagrams

Figure 6 and **Figure 7** show the turning counts at each of the four intersections surrounding the St Catherine's site during the School term and school holidays respectively in the AM peak period between 8:00am and 9:00am.
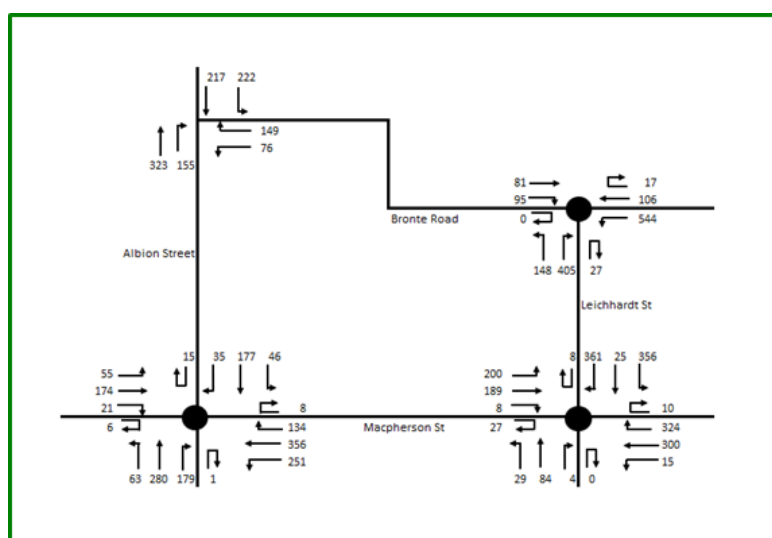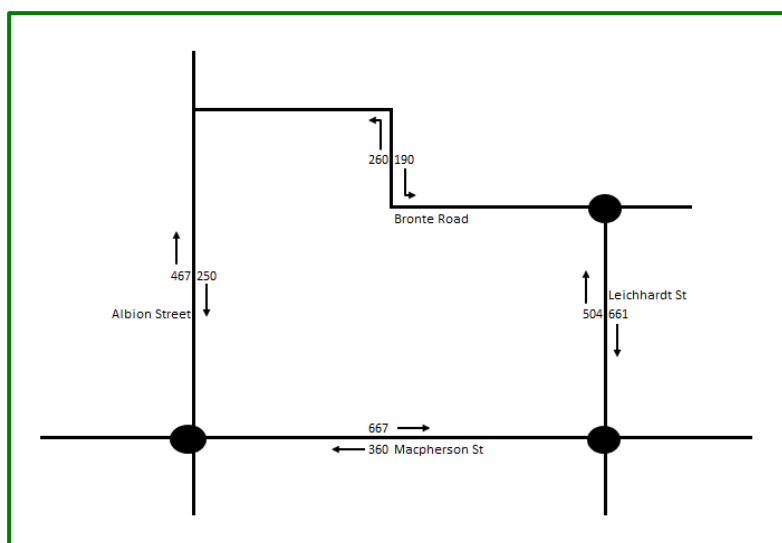

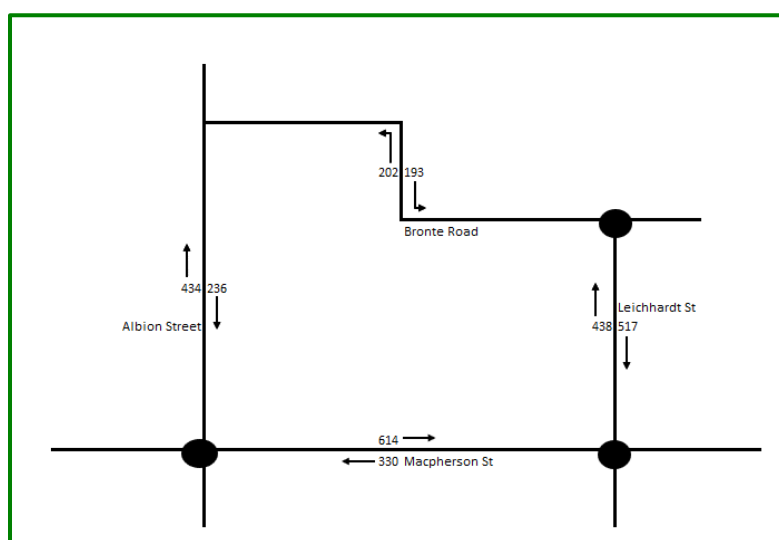**Figure 6: AM Peak (8:00am-9:00am) turning counts during School Term around St Catherine's**
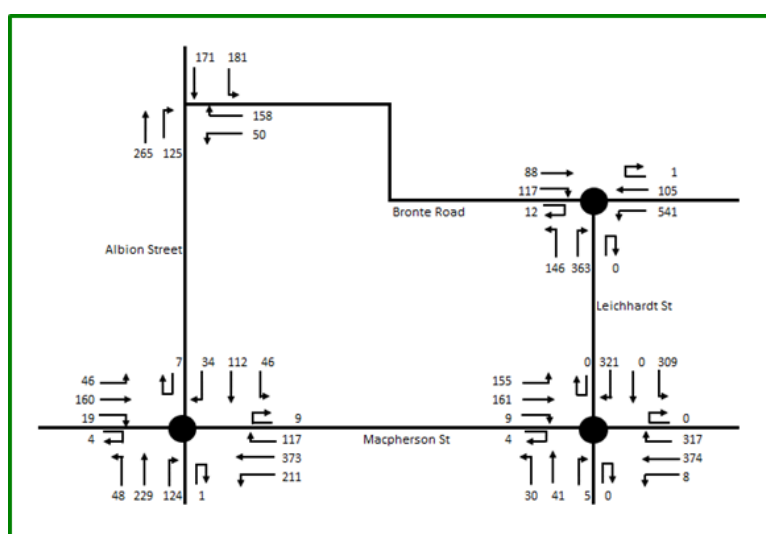
Figure 7: AM Peak (8:00am-9:00am) turning counts during School Holidays near St Catherine's

Figure 8 and Figure 9 show the turning counts at each of the four intersections surrounding the St Catherine's site during the School term and school holidays respectively in the PM peak period between 5pm and 6pm.
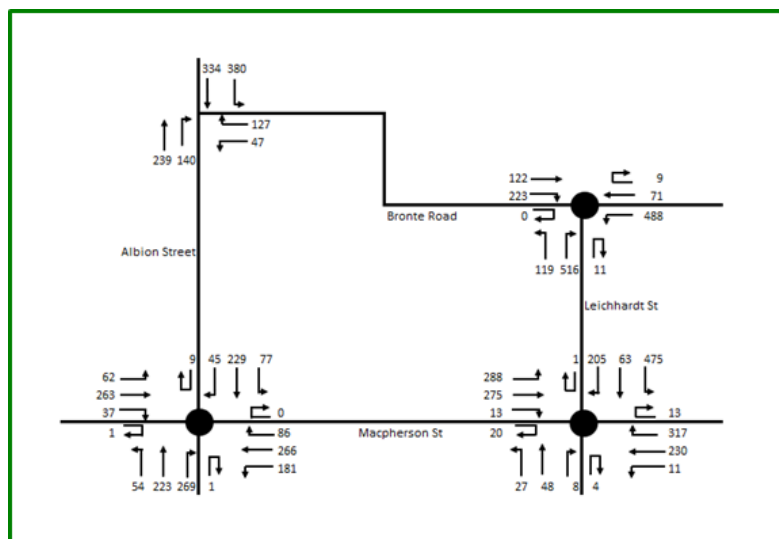
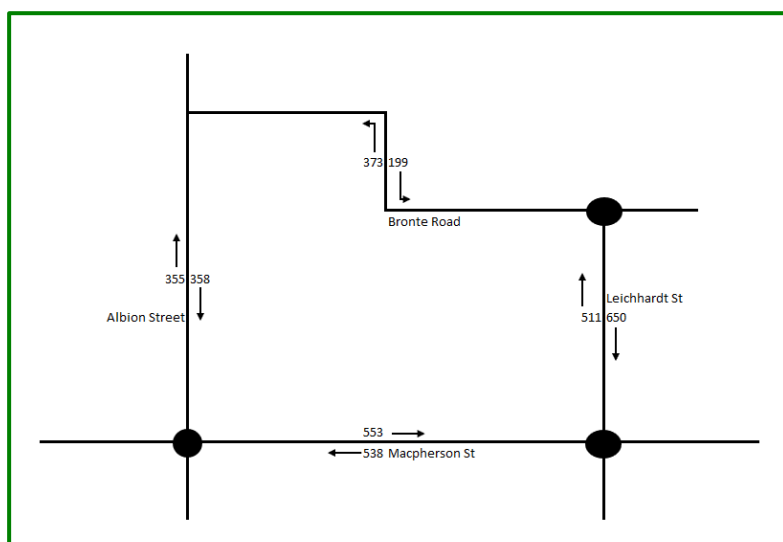**Figure 8: PM Peak (5:00pm – 6:00pm) turning counts during School Term around St Catherine's**
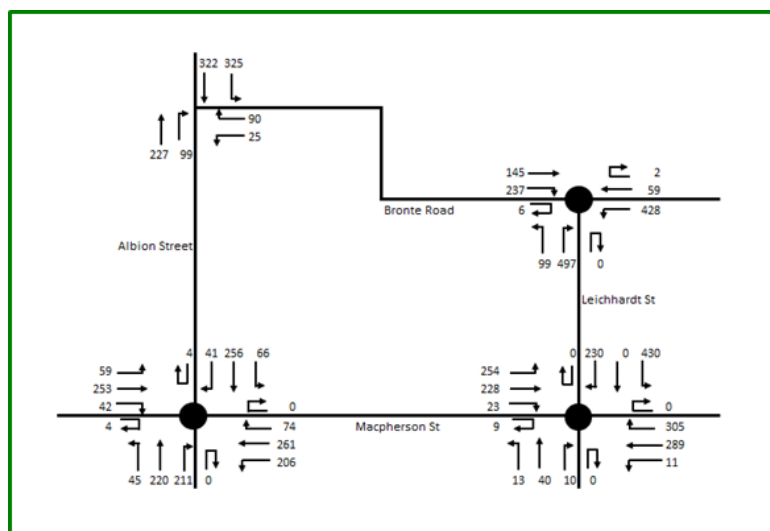
Figure 9: PM Peak (5:00pm – 6:00pm) turning counts during School Holidays around St Catherine's

4.3.2 Midblock Traffic Flows

Figure 10 and **Figure 11** show the midblock traffic flows near the St Catherine's site during the School term and school holidays respectively in the AM peak period between 8:00am and 9:00am.

Figure 10: AM Peak (8:00am-9:00am) Mid-Block Counts during School Term around St Catherine's

Figure 11: AM Peak (8:00am-9:00am) Mid-Block Counts during School Holidays around St Catherine's

Figure 12 and Figure 13 show the midblock traffic flows near the St Catherine's site during the School term and school holidays respectively in the PM school peak period between 3:00pm and 4:00pm.
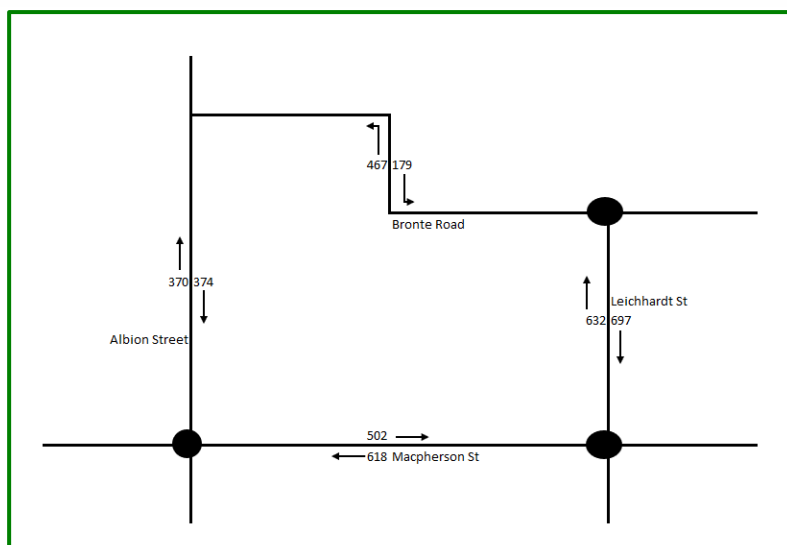

Figure 12: PM School Peak (3:00pm – 4:00pm) Mid-Block Counts during School Term around St Catherine's
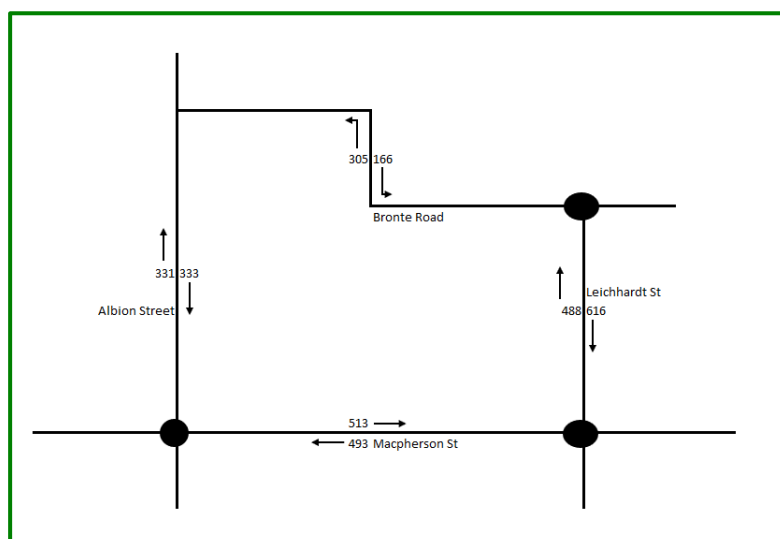
Figure 13: PM Peak (3:00pm-4:00pm) Mid-Block Counts during School Holidays around St Catherine's

Figure 14 and Figure 15 show the midblock traffic flows near the St Catherine's site during the School term and school holidays respectively in the PM commuter peak period between 5:00pm and 6:00pm.

Figure 14: PM Commuter Peak (5:00pm-6:00pm) Mid-Block Counts during School Term around St Catherine's
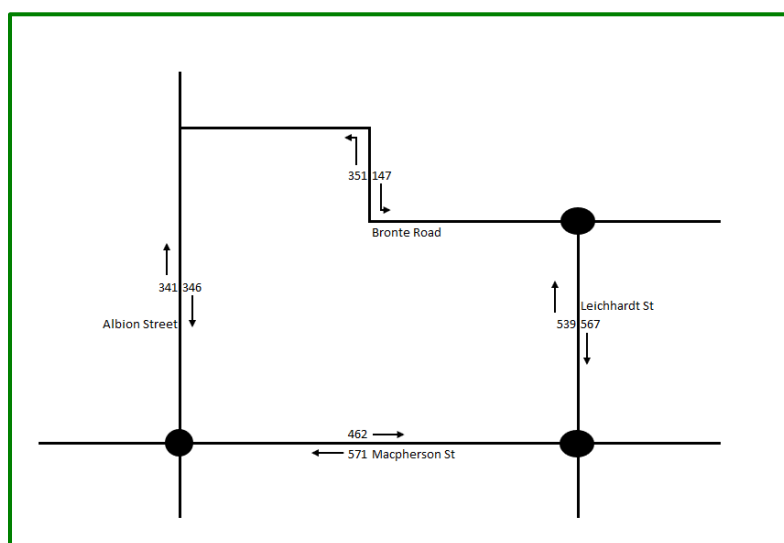

Figure 15: PM Commuter Peak (5:00pm – 6:00pm) Mid-Block Counts during School Holidays around St Catherine's

4.3.3 Difference in Term vs Holiday Intersection Volumes

Figures 16-17 below show the difference between the school term and school holiday for each movement at each intersection. It is valuable to assess whether a change in the AM peak is reflected in the PM commuter peak, as a significant difference between said scenarios indicate that the school is responsible for a large amount of traffic generation. If only small

differences in rate of volume change is observed, it can be determined that the school traffic only lightly impacts the operation of the surrounding road network.

The scale of impact of change is shown by darker shades of green. Therefore, the school does not appear to be having a significant impact on traffic flows at intersections around the site.
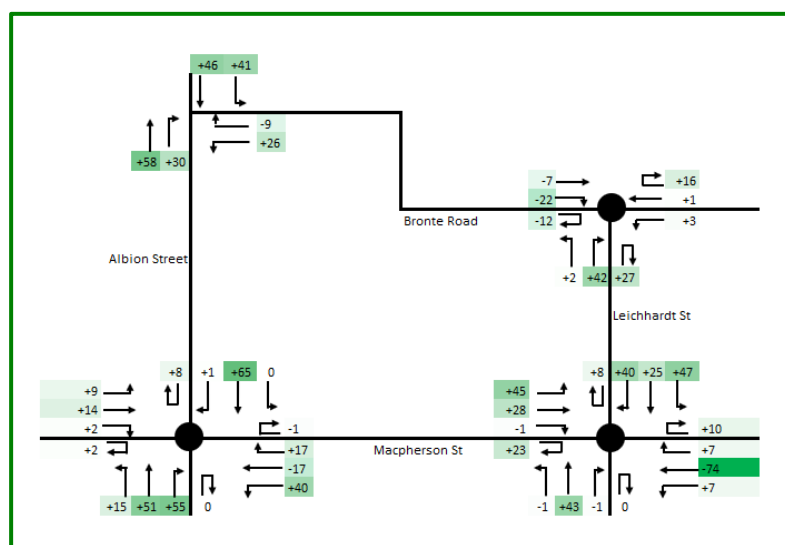

Figure 16: AM Peak (8:00am-9:00am) Turning Count Differences (Term vs Holidays)
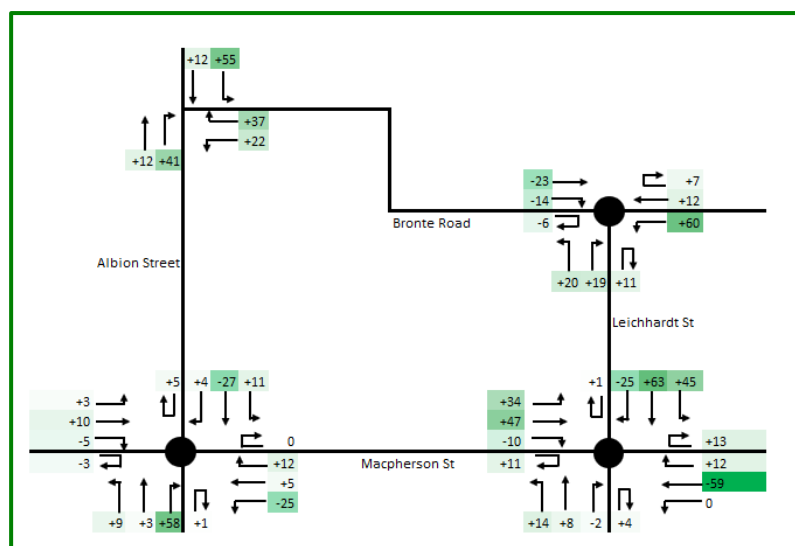

Figure 17: PM Peak (5:00pm-6:00pm) Turning Count Differences (Term vs Holidays)

It can be observed that an anomaly exists with a consistent reduction of through direction volume from the eastern leg of Macpherson Street to the western leg of Macpherson Street.

This suggests that there may have been external changed conditions to the road network and may be separately evaluated.

The difference during the AM peak which would be affected by the school during the school term has some movements with significant differences. However, when compared to the differences at the commuter peak (between 5:00pm – 6:00pm) similar changes occur for movements with significant changes. There are only six movements with significant increases in traffic during the school term which does not occur at the commuter peaks. These include:

- The through movement from the southern leg of Albion Street to the northern leg of Albion Street on the Albion Street / Macpherson Street intersection,

- the through movement from the northern leg of Leichhardt Street to the southern leg of Leichhardt Street on the Leichhardt Street / Macpherson Street intersection,

- the right turn movement from the eastern leg of Bronte Road to the southern leg of Leichhardt Street on the Leichhardt Street / Bronte Road intersection,

- the right turn movement from the southern leg of Leichhardt Street to the eastern leg of Bronte Road on the Leichhardt Street / Bronte Road intersection,

- the through movement from the northern leg of Albion Street to the southern leg of Albion Street on the Albion Street / Bronte Road intersection, and;

- the through movement from the southern leg of Albion Street to the northern leg of Albion Street on the Albion Street / Bronte Road intersection.

4.3.4 Difference in Term vs Holiday Midblock Volumes

Figures 18 – 20 below show the difference between midblock flows in a typical school term day and a typical school holiday during the morning peak (8:00am – 9:00am), the school afternoon peak (3:00pm – 4:00pm) and the commuter afternoon peak (5:00pm – 6:00pm). A darker shade of green indicates a greater difference between the school term and holiday counts.
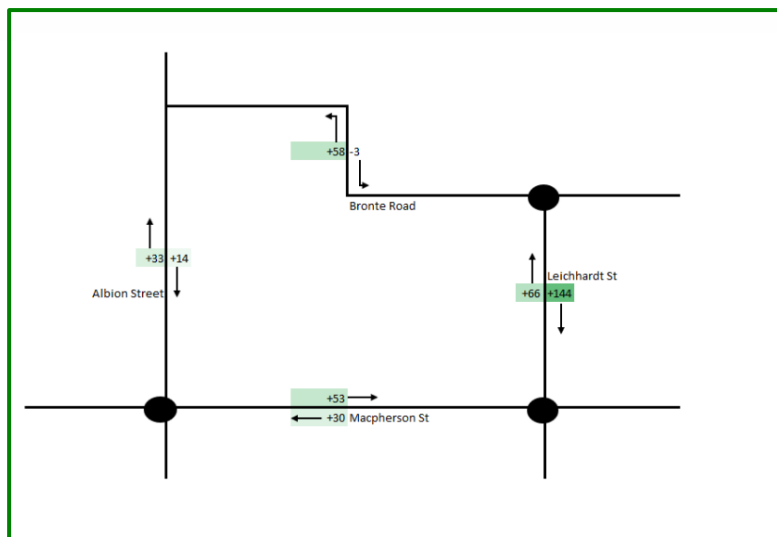
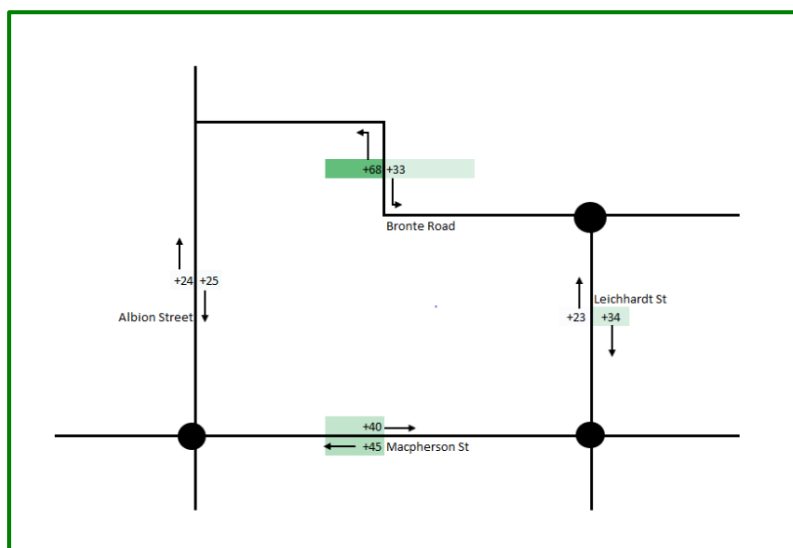**Figure 18: AM Peak (8:00am-9:00am) Midblock Count Differences (Term vs Holidays)**

Figure 19: PM Peak (3:00pm-4:00pm) Midblock Count Differences (Term vs Holidays)
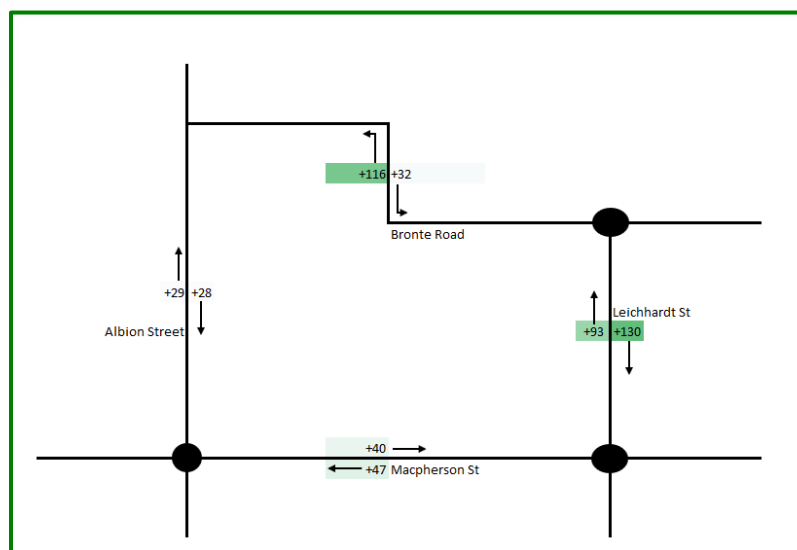
Figure 20: PM Peak (5:00pm-6:00pm) Midblock Count Differences (Term vs Holidays)

It can be observed that the south movement along Leichhardt Street and the west movement along Bronte Road facilitate the most volume of traffic during the surveyed periods and the AM peak volume closely mirrors the PM commuter peak volume. This suggests that traffic volumes are not significantly affected by the school's operation.

4.3.5 Pick-up and Drop-off Zone Turning Counts

The zones analysed are shown in **Figure 21**.

Figure 21: Pick- up and Drop-off Zones.

The results of the conducted surveys are summarized in **Table 12 – 15** below.

Table 12: Pick-up and Drop-off Turning Counts (Site 1 - Albion Street West)

AM Time	AM Drop-Off	PM Time	PM Pick-Up
8:00 – 8:15	14	2:30 – 2:45	0
8:15 – 8:30	2	2:45 – 3:00	0
8:30 – 8:45	0	3:00 – 3:15	1
8:45 – 9:00	0	3:15 – 3:30	7
N/A	-	3:30 – 3:45	1
N/A	-	3:45 – 4:00	0
TOTAL	16	TOTAL	9

Table 13: Pick-up and Drop-off Turning Counts (Site 2 - Albion Street East)

AM Time	AM Drop-Off	PM Time	PM Pick-Up
8:00 – 8:15	17	2:30 – 2:45	0
8:15 – 8:30	4	2:45 – 3:00	1
8:30 – 8:45	1	3:00 – 3:15	1
8:45 – 9:00	0	3:15 – 3:30	6
N/A	-	3:30 – 3:45	1
N/A	-	3:45 – 4:00	0
TOTAL	22	TOTAL	9

Table 14: Pick-up and Drop-off Turning Counts (Site 3 - Macpherson Street)

AM Time	AM Drop-Off	PM Time	PM Pick-Up
8:00 – 8:15	55	2:30 – 2:45	1
8:15 – 8:30	6	2:45 – 3:00	0
8:30 – 8:45	1	3:00 – 3:15	17
8:45 – 9:00	0	3:15 – 3:30	36
N/A	-	3:30 – 3:45	10
N/A	-	3:45 – 4:00	5
TOTAL	62	TOTAL	69

Table 15: Pick-up and Drop-off Turning Counts (Site 4 - Leichhardt Street)

AM Time	AM Drop-Off	PM Time	PM Pick-Up
8:00 – 8:15	32	2:30 – 2:45	0
8:15 – 8:30	16	2:45 – 3:00	4
8:30 – 8:45	0	3:00 – 3:15	23
8:45 – 9:00	1	3:15 – 3:30	7
N/A	-	3:30 – 3:45	6
N/A	-	3:45 – 4:00	7
TOTAL	49	TOTAL	47

In summary, from **Tables 12 – 15**, the pickup and drop off data for all zones demonstrate negligible traffic movements past 8.30am during the AM Peak. This further confirms the low traffic generation resulting from the school as indicated by volume surveys and intersection counts when the school term and school holiday counts are compared.

It should, however, be noted that sites 3 and 4 experience a higher magnitude of traffic than sites 1 and 2, suggesting that parents prefer waiting in these areas more. Should it be deemed that traffic volume is unevenly distributed, it would be worthwhile to analyse whether the OTMP can be altered to allow for more evenly distributed pick-up and drop-off usage.

APPENDIX A

Conditions of Consent

Development Consent by the Minister of Planning dated 6 April 2016 including condition A8 of Schedule 2, and conditions A8 a), A9 and A 10 of Schedule 3 as follows:

Schedule 2: Operational Transport Management Plan

A8. The applicant shall prepare an Operational Traffic Management Plan (OTMP) for St Catherine's School. The plan must identify mode share targets for the proposed travel strategies that target a reduction in private vehicle trips and ensure no net increase in vehicle trips, as detailed in condition A8 of Schedule 3.

Schedule 3: Operational Transport Management Plan

A8. The applicant must prepare and implement (within 3 months of its approval) an Operational Transport Management Plan (OTMP) for St Catherine's School in consultation with Council and the local community, which must identify mode share targets for the proposed travel strategies that target a reduction (and ensure "no increase") in private vehicle trips to the site (as compared to the figures provided in the EIS) the OTMP must be approved by the Secretary:

   a) Prior to the issue of any Construction Certificate and must include details regarding the travel strategies and interim tragic management measures (including details for management of the drop-off / pick-up zones, including training for supervising staff/ traffic controllers) and must be updated to the satisfaction of the Secretary.
   b) Prior to the issue of any Occupation Certificate for the RPAC and must include details regarding the travel strategies and the final traffic management measures (including details for management of the drop-off / pick up zones, including training for supervising staff / traffic controllers), and taking the monitoring results (required in condition A9) into account, and
   c) Prior to any increase in student enrolment / staff numbers above 1050 students and 202 staff and taking the monitoring and road safety audit results (required in condition A9 and E2) into account.

A9. The OTMP must provide details for each of the travel strategies and must address the following matters for each of the travel strategies:

a) Objectives and targets;
b) Timing;
c) Responsibility;
d) Funding;
e) Implementation;
f) Monitoring regime to evaluate each strategy; and
g) Monitoring of whether the overall strategies are meeting the targeted reductions in private car trips

A10. The School must make the approved OTMP, any updated OTMP and the results of the monitoring and independent auditing conducted as part of the OTMP, publicly available on the school's website and available to the Community Consultative Committee.