



**TRAFFIC AND PARKING IMPACT ASSESSMENT OF  
CHRISTIAN BROTHERS HIGH SCHOOL LEWISHAM  
AT 68-84 THE BOULEVARDE, LEWISHAM**



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**Transport Planning, Traffic Impact Assessments, Road Safety Audits, Expert Witness**

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**Site Address:** 68-84 The Boulevard, Lewisham

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# **1 INTRODUCTION**

*McLaren Traffic Engineering (MTE)* was commissioned by *Christian Brothers High School* to provide a Traffic and Parking Impact Assessment of the Christian Brothers High School Lewisham at 68-84 The Boulevard, Lewisham.

## ***1.1 Description and Scale of Development***

The Christian Brothers High school currently has approval by Marrickville Council for 1200 students. The school currently operates above this approval and as such is seeking development consent for 1350 students. The school operates between 8:15am to 3:30pm, Monday to Friday, with a sports day occurring every Thursday. Special events (end of year concerts, parent teacher nights etc) are sometimes held outside of these hours.

Currently, the school operates with 140 teachers. Under the 1350 student proposal, the 140 teachers will remain. The teaching staff under the approved 1200 students is most likely 125 teachers, therefore, the increase in 150 students most likely requires an increase of 15 teachers above the current approval.

The site provides on-site parking for 18 car parking spaces. This car park is accessed from Denison Road and is restricted to staff only.

## ***1.2 State Environmental Planning Policy (Infrastructure) 2007***

The proposed development does qualify as a development with relevant size and/or capacity under Clause 104 of the SEPP (Infrastructure) 2007 being an 'Educational Establishment' of 50 or more students given that the development involves a technical increase of 150 students above the current limit of 1,200 students. Accordingly, formal referral to the Roads and Maritime Services (RMS) is necessary and Inner West Council (Marrickville Council) officers can determine this proposal accordingly.

## ***1.3 Site Description***

The subject site is located within the Marrickville City Council Local Government Area, Marrickville Council has merged with Ashfield and Leichhardt Councils to form the new Inner West Council which will determine the development criteria for the site.

The subject site has three (3) road frontages, being The Boulevard to the south-east, Toothill Street to the north-east and Denison Road to the north-west. New Canterbury Road, a State classified road, is nearby approximately 100m to the south-east of the site.

The school is surrounded by low density residential dwellings with notably Lewisham Public School located opposite on The Boulevard. Lewisham Public School is understood to accommodate some 100 students and associated staff. It is understood that the public school grounds also accommodate a Department of Education training and office facility.

Light rail stops are located nearby, namely Waratah Mills (approximately 700m walking distance) and Lewish West (approximately 500m walking distance). Furthermore, Lewisham Railway Station is located to the north of the site approximately 500m walking distance.

#### 1.4 Site Context

The site location is shown on a map and aerial imagery in **Figure 1** & **Figure 2** respectively.



— Site Location

**FIGURE 1: SITE CONTEXT – STREET MAP**



— Site Location

**FIGURE 2: SITE CONTEXT – AERIAL PHOTO**



## **2 EXISTING SITE & SURROUNDING CONDITIONS**

### **2.1 Christian Brothers High School**

The Christian Brothers High School (CBHS) caters for Years 5 – 12, with no infants / kindergarten school or child care on-site. The school has three (3) road frontages, being The Boulevard to the south-east, Toothill Street to the north-east and Denison Road to the north-west. New Canterbury Road, a State classified road, is nearby approximately 100m to the south-east of the site.

The school is surrounded by low density residential dwellings with notably Lewisham Public School located opposite on The Boulevard. Lewisham Public School is understood to accommodate some 100 students and associated staff. It is understood that the public school grounds also accommodate a Department of Education training and office facility.

CBHS currently has the following characteristics

- Current enrolment of 1,361 students from Years 5 – 12. Typical absenteeism is about 2 to 3%. It is noted that enrolments will be reduced to 1,350 to suit the proposed application.
- Typically, there are 153 staff on-site during the day including 109 teaching staff, 33 admin, 4 casuals, 2 volunteers and 5 cleaners. It is understood that 86% of staff drive to school.
- School lessons start at 8:35am to 3:15pm
- Current student breakdown by Year as follows:
  - 128 Year 5 students
  - 157 Year 6 students
  - 186 Year 7 students
  - 180 Year 8 students
  - 209 Year 9 students
  - 176 Year 10 students
  - 168 Year 11 students
  - 157 Year 12 students of which some 30 students drive
- Off-street car parking exists with some 18 car spaces, accessed from Denison Road.
- School bus services are operated by Sydney Buses, providing an extensive network of 15 services for students, staff and visitors. The bus zone from which these school buses operate from is located on Denison Road along the schools frontage. Some 1,242 students have Opal cards, representing some 92%.

- The school has two drop-off / pick-up zones, located on The Boulevardde frontage only.

An in-class survey was undertaken in Wednesday 27<sup>th</sup> July 2016 to determine students mode of transport for travelling to and from school. The results of the surveys are shown in **Annexure A** and summarised in **Table 1** below.

**TABLE 1: STUDENT TRANSPORT MODE**

Direction		Car Driver	Car Passenger	School Bus	Public Bus	Train	Light Rail	Walk	Cycle	Total
Arriving to School	Total	30	365	573	92	130	29	47	1	1267
	Percentage	2.4%	28.8%	45.2%	7.3%	10.2%	2.3%	3.7%	0.1%	100%
Departing from School	Total	30	245	589	131	177	33	61	1	1267
	Percentage	2.4%	19.3%	46.5%	10.3%	14.0%	2.6%	4.8%	0.1%	100%

Based on the student travel modes, 31.2% of students arrive by car, 52.5% arrive by bus, 12.5% arrive by rail and 3.8% walk or cycle to school. In the afternoon, 21.7% of students depart by car, 56.8% depart by bus, 16.6% depart by rail and 4.9% walk or cycle home.

## 2.2 Road Hierarchy

The Boulevardde has the following characteristics within close proximity to the site:

- Unclassified LOCAL road
- Approximately 10m in width facilitating two-way passing and kerbside parking
- Signposted 50km/h
- Unrestricted kerbside parking permitted along both side of the street with two sections for parent drop off / pick up zones between 8:30am – 9:30am & 2:30pm – 3:30pm school days only

Toothill Street has the following characteristics within close proximity to the site:

- Unclassified REGIONAL road No. 7078
- Approximately 11m in width facilitating two-way passing and kerbside parking
- Signposted 50km/h
- Unrestricted kerbside parking permitted along both side of the street.

Denison Road has the following characteristics within close proximity to the site:

- Unclassified LOCAL road



- Approximately 10m in width facilitating two-way passing and kerbside parking
- Signposted 50km/h
- Unrestricted kerbside parking permitted along both sides of the street with several bus zones along the site frontage with parking

### **2.3 Existing Traffic Management**

- Traffic signals at New Canterbury Road / Toothill Street
- Pedestrian crossing at the intersection of Toothill Street / Denison Road
- STOP sign controlled intersection of Toothill Street / Denison Road
- Pedestrian crossing along Toothill Street connecting to Christian Brothers High School
- Stop sign controlled intersection of The Boulevarde / Toothill Street
- 15km/h traffic calming speed humps surrounding Christian Brothers High School along The Boulevarde / Denison Road
- Stop sign controlled intersection of The Boulevarde / Eltham Street
- School zone surrounding the site along all road frontages, The Boulevarde / Toothill Street and Denison Road

### **2.4 Existing Traffic Environment**

Traffic counts were completed on Wednesday 27<sup>th</sup> July 2016 at the intersections of:

- New Canterbury Road / Toothill Street
- Toothill Street / The Boulevarde
- Toothill Street / Denison Road
- Eltham Street / Denison Road
- Eltham Street / The Boulevarde

The intersection surveys were undertaken from 7:00-9:30am and 2:00-4:30pm, coinciding with the peak hours of the school. The survey sheets are reproduced in **Annexure B**.

#### **2.4.1 Intersection Performances**

Existing intersection performances have been assessed using SIDRA INTERSECTION 7. The analysis is summarised in **Table 2** below. The SIDRA output summaries are provided in **Annexure C**.

**TABLE 2: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)**

Intersection	Peak Hour	Degree of Saturation <sup>(1)</sup>	Average Delay <sup>(2)</sup> (sec/vehicle)	Level of Service <sup>(3)</sup>	Control Type	Worst Movement
<b>EXISTING PERFORMANCE</b>						
Toothhill / Denison	AM	0.36	5.1 (15.2)	<b>A</b> ( <b>B</b> )	Stop	Left Turn from Denison Rd (W)
	PM	0.26	4.1 (14.2)	<b>A</b> (A)		Left Turn from Denison Rd (E)
Toothhill / The Boulevarde	AM	0.48	6.0 (15.0)	<b>A</b> ( <b>B</b> )	Stop	Left Turn from The Boulevarde (W)
			4.1 (12.9)	<b>A</b> (A)		Left Turn from The Boulevarde (W)
	PM	0.25	6.0 (15.0)	<b>A</b> ( <b>B</b> )		Left Turn from The Boulevarde (W)
			4.1 (12.9)	<b>A</b> (A)		Left Turn from The Boulevarde (W)
New Canterbury / Toothhill	AM	0.64	21.0	B	Signals	N.A
	PM	0.67	21.7	B		N.A
Eltham / Denison	AM	0.27	6.5 (9.5)	<b>A</b> (A)	Stop	Right Turn from Eltham (N)
			6.2 (8.3)	<b>A</b> (A)		Right Turn from Eltham (S)
	PM	0.122	6.5 (8.3)	<b>A</b> (A)		Right Turn from Eltham (S)
			6.2 (8.3)	<b>A</b> (A)		Right Turn from Eltham (S)
Eltham / The Boulevarde	AM	0.13	6.6 (9.0)	<b>A</b> (A)	Stop	Left Turn from The Boulevarde (E)
			6.5 (8.5)	<b>A</b> (A)		Left Turn from The Boulevarde (E)
	PM	0.08	6.6 (9.0)	<b>A</b> (A)		Left Turn from The Boulevarde (E)
			6.5 (8.5)	<b>A</b> (A)		Left Turn from The Boulevarde (E)

NOTES:

(1) Degree of Saturation is the ratio of demand to capacity for the most disadvantaged movement.

(2) Average delay is the delay experienced on average by all vehicles. The value in brackets represents the delay to the most disadvantaged movement.

(3) Level of Service is a qualitative measure of performance describing operational conditions. There are six levels of service, designated from A to F, with A representing the best operational condition and level of service F the worst. The LoS of the intersection is shown in bold, and the LoS of the most disadvantaged movement is shown in brackets.

As shown above, the surrounding intersections are operating satisfactorily at Level of Service (LoS) A and B during the morning and afternoon peak periods. This represents minimal delays and additional capacity.

#### 2.4.2 Pickup and Drop off Rates

Pickup and drop off surveys were undertaken along the schools existing short term parking along The Boulevarde. **Table 3** summarises the total vehicle movements and the peak hour

movements along this section of kerbside parking. The parking surveys undertaken on Wednesday 27<sup>th</sup> July 2016 are provided in **Annexure D**.

**TABLE 3: EXISTING PICK-UP & DROP-OFF ACTIVITY**

Period	Cars	Kids	Rate (students per car)
Morning Total	145	187	1.29
Morning Peak Hour	123	157	1.28
Afternoon Total	55	70	1.27
Afternoon Peak Hour	54	69	1.28

Both the morning and afternoon demonstrate similar car occupancies of approximately 1.28 students per vehicle.

### **2.5 Existing Parking Environment**

The kerbside parking surveys take into consideration the current operation of the school with 1,356 students and 140 staff.

The existing local parking supply is summarised in **Table 4**.

**TABLE 4: EXISTING WEEKDAY KERBSIDE PARKING SUPPLY & SPARE CAPACITY (WITHIN 200M OF THE SITE)**

Parking Area	Total Capacity		Morning Peak Parking		Afternoon Peak Parking	
	AM	PM	Occupied	Spare	Occupied	Spare
Denison Rd	89	67	58	31	64	3
Toothill St	28	28	29	-1	27	1
Victoria St	72	72	70	2	52	20
Summer Hill St	8	8	9	-1	10	-2
Eltham St	48	48	54	-6	58	-10
Boulevard	75	75	57	18	60	15
N Canterbury Rd	34	34	5	29	5	29
Fred St	46	46	38	8	39	7
Off Street	18	18	13	5	10	8
<b>Total</b>	<b>418</b>	<b>396</b>	<b>333</b>	<b>85</b>	<b>325</b>	<b>71</b>
<b>On-Street Only</b>	<b>400</b>	<b>378</b>	<b>320</b>	<b>80</b>	<b>315</b>	<b>63</b>



Within the survey area, there are some **85** car parking spaces available in the morning peak and **71** car parking spaces in the afternoon peak within 200m walking distances from the school.

**TABLE 5: ON-STREET PARKING OCCUPANCY BY STREET NAME**

Parking Area	Total Capacity	7-10AM Spare Capacity	2-5PM Spare Capacity
Denison Rd	89/67	31 (35%)	25 (28%)
Toothill St	28	-1 (-4%)	1 (4%)
Victoria St	72	2 (3%)	20 (28%)
Summer Hill St	8	-1 (-13%)	-2 (-25%)
Eltham St	48	-6 (-13%)	-10 (-21%)
Boulevard	75	18 (24%)	15 (20%)
N Canterbury Rd	34	29 (85%)	29 (85%)
Fred St	46	8 (17%)	7 (15%)
Off Street	18	5 (28%)	8 (44%)
<b>Total</b>	<b>418/396</b>	<b>85 (20%)*</b>	<b>93 (22%)*</b>
<b>On-Street Only</b>	<b>400/378</b>	<b>80 (20%)</b>	<b>63 (17%)</b>

\*The total spare capacity is the overall minimum spare capacity of the entire survey area at any given time.

As shown above, there is an abundance of on-street parking available within close proximity to the site in both the 7-10AM and 2-5PM peak periods on a weekday. Although, a Traffic Management Plan (TMP) is needed to encourage greater use of buses but those with Opal cards given that 92% of students have Opal cards yet current usage is 52 – 57%, some 40% lower than expected. Additionally, students and staff should be encouraged to utilise nearby heavy rail and light rail modes.

Additionally, it is evident that some kerbside locations are experiencing parking conditions above capacity, either by illegal parking or drivers accepting smaller / reduced space lengths in order to park their vehicle.

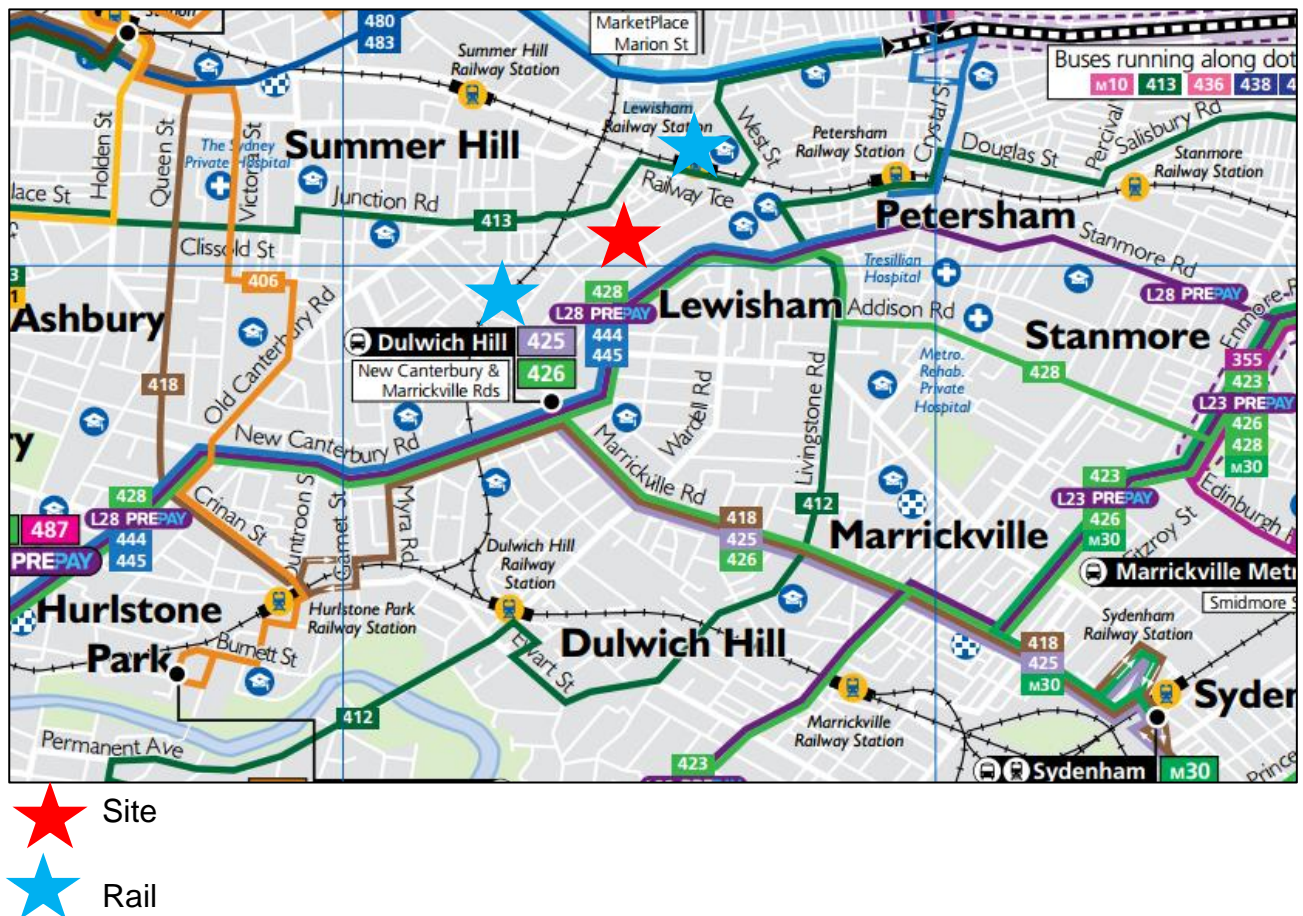
The bus accumulation is summarised in **Table 6**.

**TABLE 6: SCHOOL BUS ACCUMULATION**

	AM	PM
<b>Maximum Bus Accumulation</b>	2	6

## 2.6 Public Transport

Light rail stops are located nearby, namely Waratah Mills (approximately 700m walking distance) and Lewish West (approximately 500m walking distance). Lewisham Train Station is within 500 metres of the site and has access to bus routes 413 & N50 provided by State Transit. Bus route 413 provides access to the CBD and Campsie Station which services provided every 30 minutes while N50 is a night bus which provides services between the CBD and Liverpool. Bus routes 428, 444, 445 and L28 are provided from New Canterbury Road which is within 250m of the site. The bus routes provide access to and from the CBD, Canterbury Station, Balmain Wharf and Campsie Station.



**FIGURE 3: LOCATION OF TRAIN STATIONS & PUBLIC BUS ROUTE DETAILS**

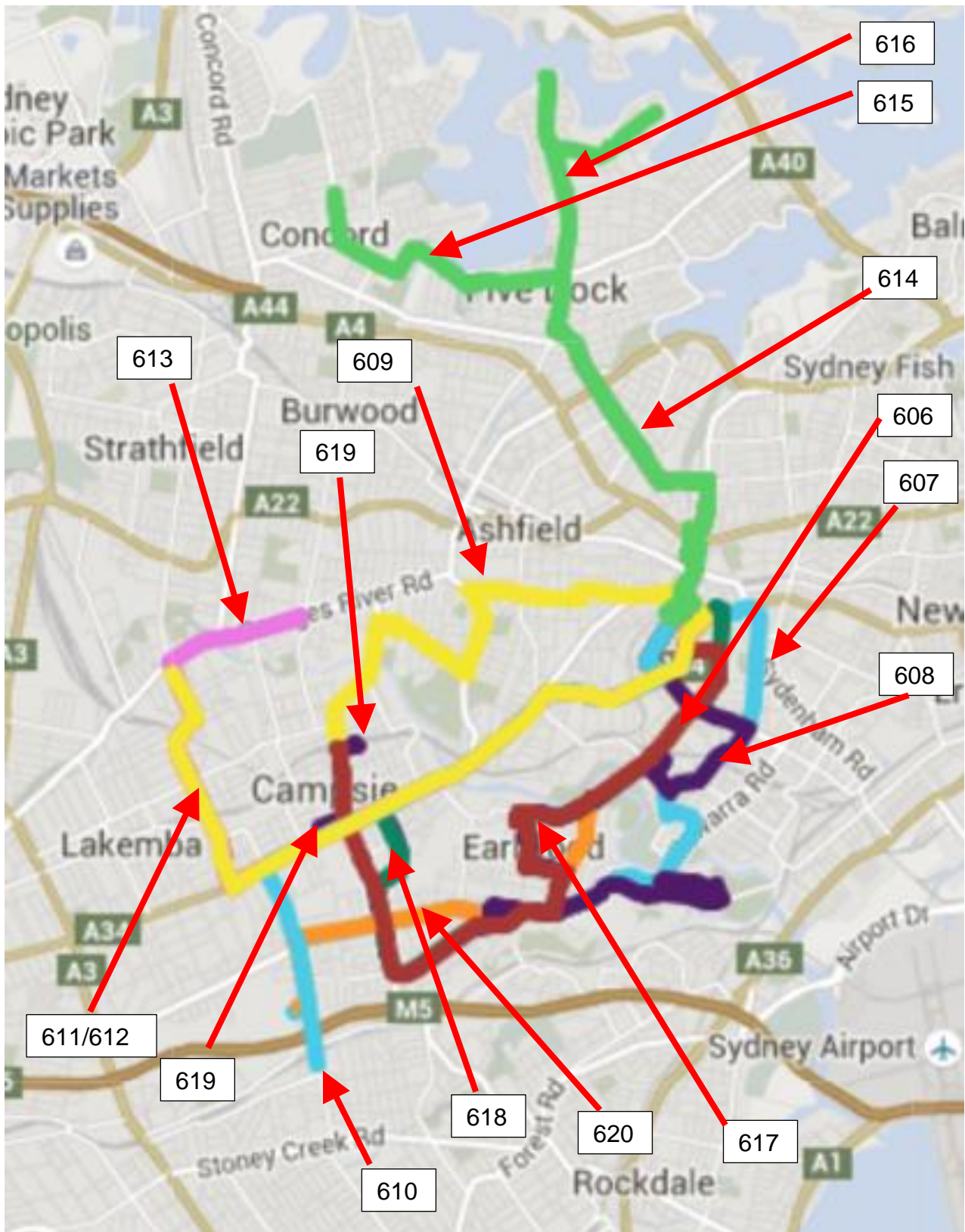
In addition to the public transport provided along New Canterbury Road and Lewisham Train Station, school buses are provided to the students which provide access to Kingsgrove, Campsie, Earlwood, Burwood, Abbotsford, Leichhardt and Balmain. The school provides ten (10) school special buses in the AM period and nine (9) in the PM period as detailed in **Table 7** and **Figure 4**.

**TABLE 7: DEDICATED SCHOOL BUS SERVICES**

Bus Number	Time Period	From	To
606	AM	Earlwood	CBHS
607	AM	Kingsgrove Depot	CBHS
608	PM	CBHS	Undercliff
609	AM	Campsie	CBHS
610	PM	CBHS	Kingsgrove Station
611	AM	Belfield	CBHS
612	PM	CBHS	Belfield
613	AM	Croydon Park	CBHS
	PM	CBHS	Croydon Park
614	AM	Fivedock Shops	CBHS
	PM	CBHS	Fivedock Shops
615	AM	Concord Shops	CBHS
	PM	CBHS	Concord Shops
616	AM	Abbotsford	CBHS
	PM	CBHS	Chiswick
617	AM	Campsie	CBHS
618	AM	Campsie	CBHS
619	PM	CBHS	Campsie
620	PM	CBHS	Kingsgrove Depot

Note: Christian Brothers High School (CBHS)





**FIGURE 4: SCHOOL BUS ROUTE**

**2.7 Future Road and Infrastructure Upgrades**

From Inner West Council Development Application tracker and website, it appears that there is no future planned road or public transport changes that will affect traffic conditions within the immediate vicinity of the subject site.

### **3 PARKING IMPACT ASSESSMENT**

#### **3.1 Council Parking Requirement**

Reference is made to *Inner West Council* which refers development within the previous LGA of Marrickville Council to the *Marrickville DCP 2011: Part 2 – Parking*. Under this DCP the subject site is identified as falling within Parking Area 3. Marrickville DCP outlines the following parking rates for Parking Area 3:

##### *Parking Area 3*

*Schools - 1 space per 2 staff for staff*

*Drop-off & pick-up facility for parents & carers*

*Fractional calculated provision numbers must be rounded up or down to the nearest whole figure.*

As previously identified, the increase sought for approval is 150 students and 15 teachers. **Table 8** below summarises Council's DCP parking requirement.

**TABLE 8: DCP PARKING REQUIREMENTS**

<b>Land Use</b>	<b>Type</b>	<b>Scale</b>	<b>Rate</b>	<b>Spaces Required</b>
School	Staff	15	1 per 2	7.5 (8)
	Parents	150	n.a	n.a
<b>Total</b>				<b>8</b>

Based on Council's DCP, the increase of approximately 15 teachers requires the provision of 8 staff parking spaces. Furthermore, Council's DCP requires drop-off and pick-up facilities for parents and carers for the additional student population. As Council's DCP does not provide a rate, this component of Council's DCP requirement is merit based and can be determined through surveys.

The site currently provides parking for up to 18 staff car spaces. Under the increase there are no new car parking spaces proposed on-site.

Whilst there is evidently a shortfall of on-site parking, the surveys undertaken of the traffic and parking conditions around the school can be used to justify this shortfall, together with the following other matters:

- a) The existing consent for the school permits a relaxation of requirements by some 71% (i.e. 1 – 18/63).
- b) Provision of a workplace travel plan that encourages staff to car pool or to use other forms of non-private vehicle travel such as heavy and light rail, bus services, bicycle and walk modes. It should be noted that the previous relaxation of 71% staff parking would equate to 2 parking spaces.
- c) An option to stack parking up to a further 2 staff cars in the school's off-street car park can be further developed and operated under a Plan of Management.

### 3.2 *Bicycle & Motorcycle parking Requirements*

Marrickville Council DCP requires the following bicycle parking to be provided for educational establishments:

#### *Bicycle Parking*

*1 staff space per 20 staff, plus*

*1 student space per 10 students*

#### *Clothes Lockers*

*1 per 3 staff spaces*

*1 per 3 student spaces*

#### *Showers*

*1 plus*

*Extra on merit assessment for staff & students*

The Council's bicycle parking and associated facilities is summarised in **Table 9** below.

**TABLE 9: COUNCIL DCP BICYCLE REQUIREMENT**

<b>Component</b>	<b>Scale</b>	<b>Bicycle Parking</b>	<b>Clothes Lockers</b>	<b>Showers</b>
Staff	15	1	0	1
Students	150	15	5	
<b>Total</b>	-	<b>16</b>	<b>5</b>	<b>1</b>

Based on Council's DCP requirement, the proposal requires 16 bicycle parking spaces, 5 clothes lockers and 1 shower.

Council's DCP requires the provision of motorcycle parking at a rate of 5% of the car parking required. Based on the 15 additional staff members requiring 8 car spaces, 0.4 motorcycle spaces would be required. As Council's DCP requires rounding up or down to the nearest whole number, zero (0) motorcycle spaces are required.

The school currently provides 10 bicycle spaces for staff and students, 7 staff showers and 2 student showers. The school provides students lockers totally 550 lockers.

Whilst the increase in student and staff population requires additional bicycle spaces, there is currently low usage of students cycling to/from the school (with the in-class surveys showing one (1) student). Staff members cycling to work is also low. There is space to provide additional bicycle spaces if the demand increases.

### 3.3 *Servicing & Loading*

The school currently operates waste collection occurs on The Boulevard. Under this application, the current waste collection method is not proposed to be modified.



Courier deliveries are undertaken kerb-side and will not be modified under this proposal.

### **3.4 Disabled Parking**

Council's DCP does not provide any disabled parking provision rates for the subject land use. However, the BCA classifies schools as a class 9B building, and therefore requires 1 space for every 100 car parking spaces or part thereof. Given that, the site provides 18 parking spaces, this equates to a requirement of one (1) disabled spaces. Therefore, the site requires one (1) disabled space which has been provided as per AS2890.6:2009 design requirements

### **3.5 Car Park Design & Compliance**

The on-site car park is not proposed to be modified and as such, remains consistent with previous approvals and is not subject to a compliance review, unless a stack parking arrangement is preferred by Council to accommodate 2 extra staff spaces within the existing 18 space off-street car park.

## 4 TRAFFIC ASSESSMENT

The impact of the expected traffic generation levels associated with the subject proposal is discussed in the following sub-sections.

### 4.1 *Traffic Generation*

As previously identified, the increase sought for approval is 150 students and 15 teachers. It has been acknowledged that the site is currently operating above approved levels, such that the sought approval of an additional 150 students and 15 teachers is currently already occurring.

Nevertheless, the traffic generation associated with the increase of 150 students and 15 teachers can be established utilising the in-class surveys undertaken (refer to **Section 2.1**). Based on the in-class surveys, the traffic generation associated with 150 students and 15 teachers is summarised in **Table 10** below.

**TABLE 10: STUDENT FORECAST TRANSPORT MODE**

Direction		Car Driver	Car Passenger	School Bus	Public Bus	Train	Light Rail	Walk	Cycle	Total
Arriving to School	Percentage	2.4%	28.8%	45.2%	7.3%	10.3%	2.3%	3.7%	0.1%	100
	Total	4	43	68	11	15	3	6	0	150
Departing from School	Percentage	2.4%	19.3%	46.5%	10.3%	14.0%	2.6%	4.8%	0.1%	100
	Total	4	29	70	16	21	4	7	0	150

Of the 150 students, during the morning period, 47 would arrive by car, 97 by public transport and 6 walking to school. In the afternoon, 33 would depart by car, 111 by public transport and 7 would walk home.

In terms of traffic generation, the addition 47 and 33 students arriving or departing in a car respectively would result in the additional car movements as follows:

In the morning

- 4 students drive to school = 4 inbound movements
- 13 staff members drive to school = 13 inbound movements
- 44 student arrive as car passenger, average of 1.28 students per car = 34 inbound vehicles and 34 outbound vehicles, a total of 68 trips
- Total of 51 inbound movements and 34 outbound movements, total of 85 trips

In the afternoon

- 4 student depart school = 4 outbound movements
- 13 staff members drive home = 13 outbound movements
- 33 students depart as car passenger, average of 1.28 students per car = 26 inbound vehicles and 26 outbound vehicles, a total of 52 trips

- Total of 26 inbound movements and 43 outbound movements, total of 69 trips

The intersection performances identified in **Table 2** include the increase in student and staff population and the associated traffic movements described above. The surrounding intersection performances are LoS “A/B” during the morning and afternoon peak periods.

## 5 CONCLUSION

In view of the foregoing, the subject proposal to increase the student and staff population is fully supportable in terms of its traffic and parking impacts. The following outcomes of this traffic impact assessment are relevant to note:

- A Traffic Management Plan (TMP) is needed to encourage greater use of buses but those with Opal cards given that 92% of students have Opal cards yet current usage is 52 – 57%, some 40% lower than expected. Additionally, students and staff should be encouraged to utilise nearby heavy rail and light rail modes.
- The existing consent for the school permits a relaxation of requirements by some 71% (i.e. 1 – 18/63). Provision of a workplace travel plan that encourages staff to car pool or to use other forms of non-private vehicle travel such as heavy and light rail, bus services, bicycle and walk modes. It should be noted that the previous relaxation of 71% staff parking would equate to 2 parking spaces.
- The intersection performances identified in **Table 2** include the increase in student and staff population and the associated traffic movements described above. The surrounding intersection performances are LoS “A/B” during the morning and afternoon peak periods

## ANNEXURE A: IN-CLASS SURVEYS

Survey Date	27/07/2016	STUDENTS USUAL MODE OF TRAVEL FROM HOME TO SCHOOL													Totals
		Class	Public Bus	School Bus	Train e.g. Lewisham Station	Light Rail e.g. Lewisham West or Waratah Mills	Family Car (as passenger)	Friend Car (as passenger)	Own Car As Driver	With staff member (As passenger)	Walking	Bicycle	Totals		
1	Year 5 - D11	3	12	2	0	9	1	0	0	0	0	0	0	27	
2	Year 5 - D12	0	14	4	0	9	1	0	0	0	0	0	0	31	
3	Year 5 - D13	0	20	0	0	8	0	0	0	0	0	0	0	28	
4	Year 5 - D14	1	14	0	1	13	1	0	0	0	0	0	0	30	
5	Year 6 - D22	2	16	2	1	9	1	0	0	0	0	0	0	31	
6	Year 6 - D23	4	13	3	0	10	0	0	0	0	0	0	0	32	
7	Year 6 - D24	2	14	2	0	9	0	0	0	0	0	0	0	29	
8	Year 6 - D25	1	12	3	0	0	12	0	0	0	0	0	0	30	
9	Year 6 - W20	2	17	0	0	10	0	0	0	0	0	0	0	31	
10	Year 7 - H41	2	16	0	0	7	0	0	0	0	0	0	0	25	
11	Year 7 - G32	1	13	1	0	8	0	0	0	0	0	0	0	23	
12	Year 7 - H31	1	11	0	0	6	1	0	0	0	0	0	0	23	
13	Year 7 - G43	1	12	4	0	5	0	0	0	0	0	0	0	23	
14	Year 7 - M15	2	13	2	0	4	0	0	0	0	0	0	0	23	
15	Year 7 - G12	3	7	4	1	8	0	0	0	0	0	0	0	24	
16	Year 7 - C14	0	12	0	0	4	0	0	0	0	0	0	0	16	
17	Year 7 - W11	2	10	3	0	5	0	0	0	0	0	0	0	21	
18	Year 8 - H42	0	11	2	0	3	1	0	0	0	0	0	0	18	
19	Year 8 - G34	3	8	1	0	9	1	0	0	0	0	0	0	23	
20	Year 8 - B31	3	5	4	1	7	0	0	0	0	0	0	0	21	
21	Year 8 - G45	4	8	2	2	4	0	0	0	0	0	0	0	20	
22	Year 8 - M14	3	6	2	2	4	0	0	0	0	0	0	0	18	
23	Year 8 - P22	1	9	2	1	6	0	0	0	0	0	0	0	19	
24	Year 8 - C12	2	12	2	1	4	0	0	0	0	0	0	0	21	
25	Year 8 - W12	0	9	3	0	9	0	0	0	0	0	0	0	21	
26	Year 9 - H44	1	9	3	0	9	0	0	0	0	0	0	0	24	
27	Year 9 - G35	0	12	5	1	6	0	0	0	0	0	0	0	24	
28	Year 9 - H35	2	7	5	0	7	0	0	0	0	0	0	0	25	
29	Year 9 - G44	1	17	1	0	8	0	0	0	0	0	0	0	27	
30	Year 9 - M13	2	15	2	0	4	0	0	0	0	0	0	0	25	
31	Year 9 - P23	4	10	3	2	6	0	0	0	0	0	0	0	25	
32	Year 9 - C23	0	12	2	0	10	1	0	0	0	0	0	0	26	
33	Year 9 - W13	2	11	6	0	7	0	0	0	0	0	0	0	28	
34	Year 10 - H45	2	13	0	0	5	0	0	0	0	0	0	0	21	
35	Year 10 - G33	4	14	0	1	3	0	0	0	0	0	0	0	23	
36	Year 10 - H34	1	11	0	0	7	0	0	0	0	0	0	0	19	
37	Year 10 - G42	2	9	3	1	8	0	0	0	0	0	0	0	23	
38	Year 10 - M12	1	10	4	0	3	0	0	0	0	0	0	0	18	
39	Year 10 - P32	4	7	2	0	1	0	0	0	0	0	0	0	15	
40	Year 10 - C11	3	7	3	1	3	0	0	0	0	0	0	0	18	
41	Year 10 - W21	1	8	4	1	9	0	0	0	0	0	0	0	23	
42	Year 11 - B41	2	3	3	0	4	0	0	0	0	0	0	0	14	
43	Year 11 - G36	0	12	1	0	1	0	0	0	0	0	0	0	15	
44	Year 11 - H32	1	13	1	2	4	1	0	0	0	0	0	0	24	
45	Year 11 - G46	0	12	2	0	4	1	0	0	0	0	0	0	20	
46	Year 11 - M11	1	8	1	3	5	0	0	0	0	0	0	0	19	
47	Year 11 - G38	0	6	2	1	9	0	0	0	0	0	0	0	18	
48	Year 11 - C22	2	4	6	0	4	0	0	0	0	0	0	0	17	
49	Year 11 - W22	1	9	3	0	5	0	0	0	0	0	0	0	18	
50	Year 12 - B44	0	6	1	0	5	0	6	0	0	0	0	0	19	
51	Year 12 - G37	2	6	3	0	3	0	3	0	0	0	0	0	18	
52	Year 12 - B33	2	2	4	0	6	0	2	0	0	0	0	0	18	
53	Year 12 - G41	1	3	4	1	6	1	3	0	0	0	0	0	19	
54	Year 12 - G14	2	4	2	5	4	1	4	1	0	0	0	0	17	
55	Year 12 - G13	1	11	2	0	3	0	2	0	0	0	0	0	19	
56	Year 12 - C21	2	4	1	3	2	1	3	0	0	0	0	0	20	
57	Year 12 - W23	2	4	2	2	2	2	6	2	0	0	0	0	20	
		92	573	130	29	334	26	30	5	47	1	1	1267		



Survey Date	27/07/2016	STUDENTS USUAL MODE OF TRAVEL FROM SCHOOL TO HOME													Totals
		Data Entry	Class	Public Bus	School Bus	Train e.g. Lewisham Station	Light Rail e.g. Lewisham West or Waratah Mills	Family Car (as passenger)	Friend Car (as passenger)	Own Car As Driver	With staff member (As passenger)	Walking	Bicycle		
1	Year 5 - D11	4	13	0	0	0	0	5	0	0	0	0	2	0	27
2	Year 5 - D12	0	16	3	5	0	0	7	1	0	0	0	1	1	31
3	Year 5 - D13	3	15	2	2	0	0	7	1	0	0	0	0	0	28
4	Year 5 - D14	1	20	1	1	0	0	5	0	0	0	0	2	0	30
5	Year 6 - D22	3	16	3	3	1	1	6	2	0	0	0	0	0	31
6	Year 6 - D23	6	15	3	3	0	0	4	0	0	0	0	4	0	32
7	Year 6 - D24	1	16	4	4	0	0	5	0	0	0	0	3	0	29
8	Year 6 - D25	2	13	4	4	0	0	7	1	0	0	0	3	0	30
9	Year 6 - W20	5	16	3	3	0	0	4	2	0	0	0	1	0	31
10	Year 7 - H41	2	15	1	1	0	0	7	0	0	0	0	0	0	25
11	Year 7 - G32	1	15	2	2	0	0	5	0	0	0	0	0	0	23
12	Year 7 - H31	2	14	0	0	0	0	3	0	0	0	0	4	0	23
13	Year 7 - G43	1	11	4	4	0	0	5	1	0	0	0	1	0	23
14	Year 7 - M15	2	13	2	2	0	0	3	0	0	0	0	3	0	23
15	Year 7 - G12	3	7	4	4	1	1	7	0	0	0	0	2	0	24
16	Year 7 - C14	0	12	1	1	0	0	3	0	0	0	0	0	0	16
17	Year 7 - W11	0	10	7	7	0	0	3	0	0	0	0	1	0	21
18	Year 8 - H42	0	11	2	2	0	0	3	1	0	0	0	1	0	18
19	Year 8 - G34	5	8	3	3	0	0	5	0	0	0	0	2	0	23
20	Year 8 - B31	4	4	5	5	1	1	6	0	0	0	0	1	0	21
21	Year 8 - G45	2	11	5	5	2	2	0	0	0	0	0	0	0	20
22	Year 8 - M14	3	10	2	2	2	2	0	0	0	0	0	1	0	18
23	Year 8 - P22	1	9	3	3	1	1	5	0	0	0	0	0	0	19
24	Year 8 - C12	6	8	2	2	1	1	4	0	0	0	0	0	0	21
25	Year 8 - W12	0	10	2	2	0	0	9	0	0	0	0	0	0	21
26	Year 9 - H44	1	12	4	4	0	0	5	0	1	1	0	1	0	24
27	Year 9 - G35	0	12	5	5	1	1	6	0	0	0	0	0	0	24
28	Year 9 - H35	3	11	4	4	1	1	4	0	0	0	0	2	0	25
29	Year 9 - G44	1	13	4	4	1	1	8	0	0	0	0	0	0	27
30	Year 9 - M13	2	15	2	2	0	0	4	0	0	0	0	2	0	25
31	Year 9 - P23	8	11	3	3	2	2	1	0	0	0	0	0	0	25
32	Year 9 - C23	3	13	3	3	1	1	3	2	0	0	0	1	0	26
33	Year 9 - W13	3	16	6	6	0	0	1	0	0	0	0	2	0	28
34	Year 10 - H45	10	8	1	1	0	0	1	0	0	0	0	1	0	21
35	Year 10 - G33	5	10	3	3	2	2	2	0	0	0	0	1	0	23
36	Year 10 - H34	3	8	2	2	0	0	6	0	0	0	0	0	0	19
37	Year 10 - G42	5	5	4	4	1	1	6	1	0	0	0	1	0	23
38	Year 10 - M12	1	11	5	5	0	0	1	0	0	0	0	0	0	18
39	Year 10 - P32	3	6	5	5	0	0	0	0	0	0	0	1	0	15
40	Year 10 - C11	2	8	4	4	1	1	2	0	0	0	0	1	0	18
41	Year 10 - W21	6	6	3	3	1	1	5	1	0	0	0	1	0	23
42	Year 11 - B41	1	2	4	4	0	0	4	0	0	0	0	3	0	14
43	Year 11 - G36	1	12	1	1	0	0	0	0	0	0	0	1	0	15
44	Year 11 - H32	1	13	2	2	1	1	4	1	0	0	0	2	0	24
45	Year 11 - G46	0	14	2	2	0	0	2	0	0	0	0	2	0	20
46	Year 11 - M11	1	10	1	1	3	3	3	0	0	0	0	1	0	19
47	Year 11 - G38	2	7	3	3	1	1	5	0	0	0	0	0	0	18
48	Year 11 - C22	2	4	8	8	0	0	2	0	1	0	0	0	0	17
49	Year 11 - W22	0	10	4	4	0	0	3	0	0	0	0	1	0	18
50	Year 12 - B44	0	6	1	1	1	1	4	0	6	0	0	1	0	19
51	Year 12 - G37	1	7	2	2	0	0	3	1	3	0	0	1	0	18
52	Year 12 - B33	2	2	4	4	0	0	6	0	2	0	0	2	0	18
53	Year 12 - G41	1	4	4	4	1	1	3	3	3	0	0	0	0	19
54	Year 12 - G14	1	6	5	5	0	0	0	1	4	0	0	0	0	17
55	Year 12 - G13	1	11	2	2	0	0	3	0	2	0	0	0	0	19
56	Year 12 - C21	2	4	1	1	3	3	2	1	3	3	0	1	0	20
57	Year 12 - W23	2	4	2	2	2	2	2	2	6	0	0	0	0	20
		131	589	177	33	219	22	30	4	61	1	1	61	1	1267

## ANNEXURE B: INTERSECTION SURVEYS (SHEET 1 OF 5)

Time		North Approach New Canterbury			South Approach New Canterbury			West Approach Toothill St			Hourly	Total
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Hour	Peak
7:00	7:15	0	20	51	0	223	27	0	53	72	1787	
7:15	7:30	0	22	68	0	202	56	0	39	62	1803	Peak
7:30	7:45	0	46	52	0	213	46	0	58	57	1772	
7:45	8:00	0	38	62	0	171	49	0	49	51	1742	
8:00	8:15	0	42	62	0	194	54	0	52	58	1756	
8:15	8:30	0	20	54	0	188	41	0	60	55	1631	
8:30	8:45	0	35	65	0	156	40	0	54	92	1589	
8:45	9:00	0	42	50	0	192	55	0	36	59		
9:00	9:15	0	32	59	0	126	32	0	41	47		
9:15	9:30	0	20	72	0	173	28	0	37	46		
14:00	14:15	0	30	86	0	82	27	0	22	25	1298	
14:15	14:30	0	34	119	0	71	30	0	38	32	1472	
14:30	14:45	0	45	125	0	78	33	0	40	22	1601	
14:45	15:00	0	42	114	0	92	36	0	42	33	1688	
15:00	15:15	0	63	137	0	100	63	0	39	44	1762	
15:15	15:30	0	61	151	0	81	44	0	56	60	1804	
15:30	15:45	0	64	147	0	89	42	0	47	41	1840	Peak
15:45	16:00	0	61	149	0	86	43	0	51	43		
16:00	16:15	0	72	188	0	93	44	0	41	50		
16:15	16:30	0	70	157	0	101	52	0	53	56		
Peak Time		North Approach New Canterbury			South Approach New Canterbury			West Approach Toothill St			Peak total	
Period Start	Period End	U	R	SB	U	NB	L	U	R	L	Peak total	
7:15	8:15	0	148	244	0	780	205	0	198	228	1803	
15:30	16:30	0	267	641	0	369	181	0	192	190	1840	

Graphic	
	<p style="text-align: center;"><b>New Canterbury Rd</b></p> <p style="text-align: center;">0      148      244 0      267      641</p> <p style="text-align: center;">North</p> <p style="text-align: center;">AM Peak 7:15 AM-8:15 AM PM Peak 3:30 PM-4:30 PM</p> <p style="text-align: center;"><b>Toothill St</b></p> <p style="text-align: center;">228      190 198      192 0      0</p> <p style="text-align: center;">0      205      780 0      181      369</p> <p style="text-align: center;"><b>New Canterbury Rd</b></p>

**TABLE 2: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)  
(SHEET 2 OF 5)**

Time		North Approach Toothill St				East Approach The Boulevarde				South Approach Toothill St				West Approach The Boulevarde				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	1	5	102	4	0	1	1	1	0	3	39	2	0	8	6	9	915	
7:15	7:30	0	1	102	5	0	2	0	2	0	3	74	6	0	6	11	9	981	
7:30	7:45	0	4	98	7	0	1	2	4	0	8	68	8	0	9	18	18	1030	
7:45	8:00	0	11	95	3	0	3	0	3	0	6	81	6	0	10	21	28	1069	Peak
8:00	8:15	0	4	86	6	0	3	2	5	0	10	66	12	0	10	17	27	1050	
8:15	8:30	0	7	94	12	0	2	0	5	0	11	50	8	0	23	20	38	987	
8:30	8:45	0	9	109	5	0	2	1	4	0	5	60	9	0	21	13	46	869	
8:45	9:00	0	9	91	8	0	3	2	5	0	7	74	14	0	13	7	15		
9:00	9:15	0	2	76	8	0	2	3	4	0	6	59	5	0	3	6	11		
9:15	9:30	0	5	77	8	0	2	1	5	0	4	38	1	0	1	7	3		
14:00	14:15	0	5	43	2	0	0	0	3	0	2	55	2	0	2	1	3	594	
14:15	14:30	0	5	63	3	0	0	1	4	0	2	55	5	0	2	2	8	716	
14:30	14:45	0	2	59	6	0	2	5	1	0	2	67	5	0	3	0	1	838	
14:45	15:00	0	9	69	9	0	1	1	2	0	1	70	4	0	3	2	2	919	
15:00	15:15	0	6	67	11	0	3	1	9	0	6	101	14	0	7	2	13	977	Peak
15:15	15:30	0	11	82	5	0	0	3	10	0	9	88	10	0	18	4	32	952	
15:30	15:45	0	9	86	3	0	4	3	5	0	1	92	13	0	5	0	13	938	
15:45	16:00	0	5	88	2	0	3	4	3	0	3	104	5	0	4	2	8		
16:00	16:15	0	5	75	3	0	0	5	5	0	3	87	19	0	4	2	7		
16:15	16:30	0	18	100	8	0	3	0	5	0	5	102	12	0	2	2	1		

Peak Time		North Approach Toothill St				East Approach The Boulevarde				South Approach Toothill St				West Approach The Boulevarde				Peak total
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	
7:45	8:45	0	31	384	26	0	10	3	17	0	32	257	35	0	64	71	139	1069
15:00	16:00	0	31	323	21	0	10	11	27	0	19	385	42	0	34	8	66	977

**Graphic**



**North Approach (Toothill St):**  
 AM Peak: U=0, R=31, SB=384, L=26  
 PM Peak: U=0, R=31, SB=323, L=21

**East Approach (The Boulevarde):**  
 AM Peak: U=0, R=10, WB=3, L=17  
 PM Peak: U=0, R=10, WB=11, L=27

**South Approach (Toothill St):**  
 AM Peak: U=0, R=32, NB=257, L=35  
 PM Peak: U=0, R=19, NB=385, L=42

**West Approach (The Boulevarde):**  
 AM Peak: U=0, R=64, EB=71, L=139  
 PM Peak: U=0, R=34, EB=8, L=66

**TABLE 2: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)  
(SHEET 3 OF 5)**

		<small>ABIN 18 434 965 435 3 Hepburn Way * Caroline Springs * Victoria * 3023 * Australia Quality data services proven since 2000 Phone: 1300 883 938 * Fax: 1300 882 932</small>				<small>QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008 OH&amp;S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001</small>													
<b>TURNING MOVEMENT SURVEY</b> <b>Eltham St and The Boulevard, Lewisham</b> <b>Wednesday, 10 August 2016</b>																			
<b>Weather:</b> Overcast <b>Suburban:</b> Lewisham <b>Customer:</b> McLaren		<b>Survey Start</b> AM: 7:00 PM: 14:00		<b>Peakhour</b> AM: 7:45 AM-8:45 AM PM: 3:00 PM-4:00 PM															
<b>Time</b>		<b>North Approach Eltham St</b>				<b>East Approach The Boulevard</b>				<b>South Approach Eltham St</b>				<b>West Approach The Boulevard</b>				<b>Hourly Total</b>	
<b>Period Start</b>	<b>Period End</b>	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	0	0	0	1	0	1	5	0	0	1	0	5	0	0	13	2	231	
7:15	7:30	0	1	0	0	0	2	0	0	0	1	0	18	0	0	9	1	300	
7:30	7:45	0	0	1	1	0	8	5	2	0	3	1	32	0	1	15	4	371	
7:45	8:00	0	0	1	0	0	9	8	2	0	3	0	48	0	2	18	7	406	Peak
8:00	8:15	0	2	4	0	0	10	8	0	0	6	5	42	0	1	13	6	363	
8:15	8:30	0	0	0	0	0	10	6	0	0	3	0	57	0	0	20	7	303	
8:30	8:45	0	2	0	0	2	8	7	2	0	4	0	61	0	0	17	5	225	
8:45	9:00	0	1	1	1	1	5	9	2	0	1	2	23	0	0	7	2		
9:00	9:15	0	1	0	0	0	7	3	0	0	4	1	13	0	0	5	3		
9:15	9:30	0	0	0	0	0	2	11	0	0	0	0	5	0	0	6	1		
14:00	14:15	0	0	1	0	0	0	3	0	0	0	0	3	0	0	3	1	72	
14:15	14:30	0	0	0	2	0	6	3	2	0	2	0	1	0	0	7	2	111	
14:30	14:45	0	0	0	0	0	0	11	0	0	1	0	1	0	0	3	0	193	
14:45	15:00	0	0	1	1	1	1	3	1	0	2	1	2	0	0	5	2	222	
15:00	15:15	0	0	1	0	1	5	8	0	0	6	2	14	0	0	8	5	235	Peak
15:15	15:30	0	2	4	3	1	11	13	4	1	21	2	32	0	1	5	7	224	
15:30	15:45	0	1	0	0	0	16	7	0	0	6	2	10	0	0	1	2	141	
15:45	16:00	0	0	1	1	0	6	10	0	0	2	1	7	0	0	3	2		
16:00	16:15	0	0	1	1	0	7	15	1	0	5	0	3	0	0	4	2		
16:15	16:30	0	0	0	0	0	2	17	1	0	0	0	1	0	0	3	0		
<b>Peak Time</b>		<b>North Approach Eltham St</b>				<b>East Approach The Boulevard</b>				<b>South Approach Eltham St</b>				<b>West Approach The Boulevard</b>				<b>Peak total</b>	
<b>Period Start</b>	<b>Period End</b>	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L		
7:45	8:45	0	4	5	0	2	37	29	4	0	16	5	208	0	3	68	25	406	
15:00	16:00	0	3	6	4	2	38	38	4	1	35	7	63	0	1	17	16	235	
<b>Graphic</b>																			

**TABLE 2: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)  
(SHEET 4 OF 5)**

Time		North Approach Toothill St				East Approach Denison Rd				South Approach Toothill St				West Approach Denison Rd				Hourly Total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	0	5	114	2	0	0	0	0	0	5	43	0	0	0	6	14	973	
7:15	7:30	0	16	94	4	0	0	0	2	0	7	70	3	0	3	11	15	1042	
7:30	7:45	0	16	108	1	0	0	1	2	0	8	77	8	0	5	26	22	1068	
7:45	8:00	0	17	100	5	0	1	1	5	0	10	80	13	0	3	26	24	1073	Peak
8:00	8:15	0	16	94	1	0	2	0	3	0	6	77	17	0	0	22	20	1034	
8:15	8:30	0	14	103	2	0	0	0	2	0	9	61	14	0	7	26	13	961	
8:30	8:45	0	6	121	5	0	2	0	3	0	5	86	17	0	1	18	15	887	
8:45	9:00	0	8	97	9	0	5	0	3	0	4	82	8	0	2	19	9		
9:00	9:15	0	4	80	9	0	1	1	0	0	3	58	5	0	2	11	11		
9:15	9:30	0	2	95	8	0	0	1	1	0	0	47	2	0	4	6	11		
14:00	14:15	0	7	49	3	0	0	1	0	0	1	55	1	0	1	1	2	622	
14:15	14:30	0	6	68	0	0	1	2	2	0	0	59	4	0	3	2	7	755	
14:30	14:45	0	11	62	0	0	1	0	3	0	0	71	6	0	1	1	5	869	
14:45	15:00	0	14	84	4	0	8	1	4	0	0	61	3	0	0	1	6	951	
15:00	15:15	0	11	77	7	0	1	1	1	0	5	108	19	0	6	2	16	991	Peak
15:15	15:30	0	13	93	5	0	3	7	9	0	3	87	27	0	10	1	10	972	
15:30	15:45	0	20	84	3	0	0	5	0	0	1	101	10	0	3	2	14	990	
15:45	16:00	1	11	87	2	0	1	2	0	0	0	99	8	0	1	3	11		
16:00	16:15	1	15	84	5	0	4	4	1	0	4	92	8	0	1	4	12		
16:15	16:30	0	24	119	6	0	2	4	2	0	0	103	5	0	1	5	15		

Peak Time		North Approach Toothill St				East Approach Denison Rd				South Approach Toothill St				West Approach Denison Rd				Peak total	
Period Start	Period End	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L		
7:45	8:45	0	53	418	13	0	5	1	13	0	30	304	61	0	11	92	72	1073	
15:00	16:00	1	55	341	17	0	5	15	10	0	9	395	64	0	20	8	51	991	



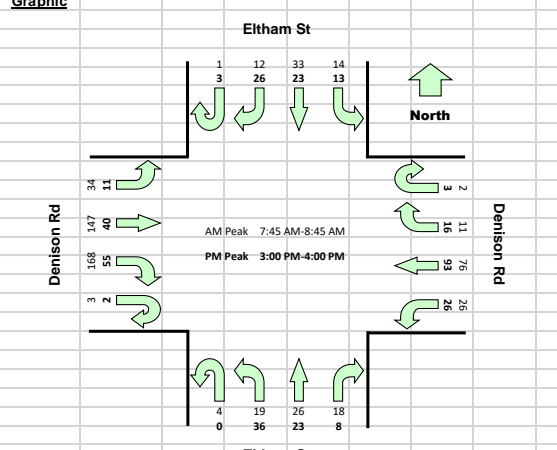
  

**Graphic**

The graphic shows a T-junction where Toothill St (North-South) intersects Denison Rd (East-West).  
**North Approach (Toothill St):** Volumes are 0 (U), 1 (R), 53 (SB), 418 (L), 13 (L).  
**East Approach (Denison Rd):** Volumes are 0 (U), 5 (R), 1 (WB), 13 (L).  
**South Approach (Toothill St):** Volumes are 0 (U), 61 (R), 304 (NB), 30 (L).  
**West Approach (Denison Rd):** Volumes are 0 (U), 15 (R), 1 (EB), 10 (L).  
**AM Peak (7:45 AM-8:45 AM):** Denison Rd volumes are 0 (U), 5 (R), 1 (WB), 13 (L).  
**PM Peak (3:00 PM-4:00 PM):** Denison Rd volumes are 0 (U), 15 (R), 1 (WB), 10 (L).  
**Denison Rd (Northbound):** Volumes are 72 (U), 51 (R), 8 (WB), 20 (L).  
**Denison Rd (Southbound):** Volumes are 0 (U), 0 (R), 1 (WB), 10 (L).  
**Toothill St (Northbound):** Volumes are 0 (U), 1 (R), 53 (SB), 418 (L), 13 (L).  
**Toothill St (Southbound):** Volumes are 0 (U), 61 (R), 304 (NB), 30 (L).  
**Denison Rd (Eastbound):** Volumes are 0 (U), 15 (R), 1 (WB), 10 (L).  
**Denison Rd (Westbound):** Volumes are 0 (U), 5 (R), 1 (WB), 13 (L).



**TABLE 2: INTERSECTION PERFORMANCES (SIDRA INTERSECTION 7)  
(SHEET 5 OF 5)**

		ABN 18 434 965 435 3 Hepburn Way * Caroline Springs * Victoria * 3023 * Australia Quality data services proven since 2000 Phone: 1300 883 938 * Fax: 1300 882 932				QUALITY ENDORSED COMPANY BY AS/NZS ISO 9001:2008 OH&S SYSTEM CERTIFIED TO AS/NZS ISO 4801:2001													
<b>TURNING MOVEMENT SURVEY</b> Eltham St and Denison Rd, Lewisham Wednesday, 10 August 2016																			
<b>Weather:</b> Overcast		<b>Survey Start</b>				<b>Peakhour</b>													
<b>Suburban:</b> Lewisham		AM: 7:00				AM: 7:45 AM-8:45 AM													
<b>Customer:</b> McLaren		PM: 14:00				PM: 3:00 PM-4:00 PM													
<b>Time</b>		<b>North Approach Eltham St</b>				<b>East Approach Denison Rd</b>				<b>South Approach Eltham St</b>				<b>West Approach Denison Rd</b>				<b>Hourly Total</b>	
<b>Period Start</b>	<b>Period End</b>	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L	Hour	Peak
7:00	7:15	0	0	1	2	2	0	2	0	0	0	1	2	3	4	20	4	359	
7:15	7:30	0	0	2	0	1	2	11	3	0	2	2	3	1	20	25	6	467	
7:30	7:45	0	2	5	1	1	1	8	8	0	2	3	5	0	22	38	4	551	
7:45	8:00	0	2	5	4	0	5	14	10	1	3	7	5	0	34	49	1	594	Peak
8:00	8:15	0	4	9	2	0	1	17	9	2	6	6	8	1	36	35	13	538	
8:15	8:30	0	1	9	5	2	3	20	3	0	4	10	5	1	53	35	11	445	
8:30	8:45	1	5	10	3	0	2	25	4	1	5	3	1	1	45	28	9	321	
8:45	9:00	0	3	3	6	1	1	9	2	0	1	3	4	0	20	27	4		
9:00	9:15	0	2	4	1	1	1	6	5	0	3	3	4	0	4	16	6		
9:15	9:30	0	1	2	0	0	0	1	1	0	0	1	2	1	4	17	8		
14:00	14:15	0	2	3	0	0	0	11	0	0	1	0	1	0	0	4	2	135	
14:15	14:30	0	4	1	1	0	1	5	1	2	3	3	2	0	0	6	0	189	
14:30	14:45	0	3	1	0	0	2	13	1	0	0	0	0	1	1	10	3	301	
14:45	15:00	1	7	2	1	2	1	15	0	0	0	0	2	2	6	6	2	356	
15:00	15:15	1	7	9	5	3	3	10	6	0	3	3	5	0	13	10	0	378	Peak
15:15	15:30	2	9	9	1	0	5	31	12	0	2	11	18	1	28	9	3	372	
15:30	15:45	0	6	3	3	0	7	31	4	0	3	6	8	0	8	8	3	296	
15:45	16:00	0	4	2	4	0	1	21	4	0	0	3	5	1	6	13	5		
16:00	16:15	0	9	6	2	1	5	24	0	0	1	3	6	2	0	12	1		
16:15	16:30	1	4	1	1	2	2	29	1	0	0	0	2	0	0	20	2		
<b>Peak Time</b>		<b>North Approach Eltham St</b>				<b>East Approach Denison Rd</b>				<b>South Approach Eltham St</b>				<b>West Approach Denison Rd</b>				<b>Peak total</b>	
<b>Period Start</b>	<b>Period End</b>	U	R	SB	L	U	R	WB	L	U	R	NB	L	U	R	EB	L		
7:45	8:45	1	12	33	14	2	11	76	26	4	18	26	19	3	168	147	34	594	
15:00	16:00	3	26	23	13	3	16	93	26	0	8	23	36	2	55	40	11	378	
<b>Graphic</b> 																			

## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 1 of 10)

### MOVEMENT SUMMARY



**Site: Toothill / Denison EX AM**

Toothill Street / Denison Road

Existing Conditions

AM

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: Toothill St S											
1	L2	64	0.0	0.226	7.7	LOS A	1.8	12.7	0.56	0.10	55.1
2	T1	320	0.0	0.226	2.1	LOS A	1.8	12.7	0.56	0.10	56.5
3	R2	32	0.0	0.226	7.6	LOS A	1.8	12.7	0.56	0.10	54.5
Approach		416	0.0	0.226	3.4	NA	1.8	12.7	0.56	0.10	56.2
East: Denison RD E											
4	L2	14	0.0	0.039	12.9	LOS A	0.1	0.9	0.55	0.91	49.2
5	T1	1	0.0	0.039	12.6	LOS A	0.1	0.9	0.55	0.91	49.0
6	R2	5	0.0	0.039	12.4	LOS A	0.1	0.9	0.55	0.91	48.7
Approach		20	0.0	0.039	12.8	LOS A	0.1	0.9	0.55	0.91	49.1
North: Toothill St N											
8	T1	440	0.0	0.272	1.9	LOS A	2.2	15.1	0.55	0.08	57.2
9	R2	56	0.0	0.272	7.4	LOS A	2.2	15.1	0.55	0.08	55.1
Approach		496	0.0	0.272	2.5	NA	2.2	15.1	0.55	0.08	56.9
West: Denison Rd W											
10	L2	76	0.0	0.357	15.2	LOS B	1.6	11.3	0.60	1.03	47.9
11	T1	97	0.0	0.357	14.9	LOS B	1.6	11.3	0.60	1.03	47.7
12	R2	12	0.0	0.357	14.6	LOS B	1.6	11.3	0.60	1.03	47.5
Approach		184	0.0	0.357	15.0	LOS B	1.6	11.3	0.60	1.03	47.7
All Vehicles		1116	0.0	0.357	5.1	NA	2.2	15.1	0.56	0.26	54.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 2 of 10)

### MOVEMENT SUMMARY



**Site: Toothill / Denison EX PM**

Toothill Street / Denison Road

Existing Conditions

AM

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: Toothill St S											
1	L2	67	0.0	0.257	7.4	LOS A	2.1	14.6	0.53	0.05	55.5
2	T1	416	0.0	0.257	1.8	LOS A	2.1	14.6	0.53	0.05	57.0
3	R2	9	0.0	0.257	7.3	LOS A	2.1	14.6	0.53	0.05	55.0
Approach		493	0.0	0.257	2.7	NA	2.1	14.6	0.53	0.05	56.8
East: Denison RD E											
4	L2	11	0.0	0.070	14.2	LOS A	0.2	1.6	0.59	0.97	48.5
5	T1	16	0.0	0.070	13.9	LOS A	0.2	1.6	0.59	0.97	48.3
6	R2	5	0.0	0.070	13.7	LOS A	0.2	1.6	0.59	0.97	48.1
Approach		32	0.0	0.070	14.0	LOS A	0.2	1.6	0.59	0.97	48.3
North: Toothill St N											
7	L2	18	0.0	0.247	8.1	LOS A	2.0	14.2	0.60	0.11	55.2
8	T1	359	0.0	0.247	2.5	LOS A	2.0	14.2	0.60	0.11	56.6
9	R2	58	0.0	0.247	8.0	LOS A	2.0	14.2	0.60	0.11	54.6
Approach		435	0.0	0.247	3.5	NA	2.0	14.2	0.60	0.11	56.3
West: Denison Rd W											
10	L2	54	0.0	0.148	12.8	LOS A	0.5	3.6	0.55	0.95	49.3
11	T1	8	0.0	0.148	12.4	LOS A	0.5	3.6	0.55	0.95	49.1
12	R2	21	0.0	0.148	12.2	LOS A	0.5	3.6	0.55	0.95	48.9
Approach		83	0.0	0.148	12.6	LOS A	0.5	3.6	0.55	0.95	49.2
All Vehicles		1042	0.0	0.257	4.1	NA	2.1	14.6	0.56	0.18	55.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 3 of 10)

### MOVEMENT SUMMARY



**Site: Toothill / The Bouvarde EX PM**

Toothill Street / The Bouvarde

Existing Conditions

PM

Stop (Two-Way)

#### Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
<b>South: Tothill St S</b>											
1	L2	37	0.0	0.188	7.5	LOS A	1.4	9.9	0.53	0.10	55.3
2	T1	271	0.0	0.188	2.0	LOS A	1.4	9.9	0.53	0.10	56.8
3	R2	34	0.0	0.188	7.4	LOS A	1.4	9.9	0.53	0.10	54.7
Approach		341	0.0	0.188	3.1	NA	1.4	9.9	0.53	0.10	56.4
<b>East: The Bouvarde E</b>											
4	L2	18	0.0	0.063	13.3	LOS A	0.2	1.5	0.55	0.93	49.0
5	T1	3	0.0	0.063	13.0	LOS A	0.2	1.5	0.55	0.93	48.8
6	R2	11	0.0	0.063	12.7	LOS A	0.2	1.5	0.55	0.93	48.6
Approach		32	0.0	0.063	13.1	LOS A	0.2	1.5	0.55	0.93	48.8
<b>North: Tothill St N</b>											
7	L2	27	0.0	0.247	6.9	LOS A	1.8	12.9	0.47	0.07	55.9
8	T1	404	0.0	0.247	1.4	LOS A	1.8	12.9	0.47	0.07	57.4
9	R2	33	0.0	0.247	6.8	LOS A	1.8	12.9	0.47	0.07	55.3
Approach		464	0.0	0.247	2.1	NA	1.8	12.9	0.47	0.07	57.1
<b>West: The Bouvarde W</b>											
10	L2	146	0.0	0.480	15.0	LOS B	2.8	19.6	0.57	1.05	47.9
11	T1	75	0.0	0.480	14.7	LOS B	2.8	19.6	0.57	1.05	47.7
12	R2	67	0.0	0.480	14.4	LOS A	2.8	19.6	0.57	1.05	47.5
Approach		288	0.0	0.480	14.8	LOS B	2.8	19.6	0.57	1.05	47.8
All Vehicles		1125	0.0	0.480	6.0	NA	2.8	19.6	0.52	0.35	54.0

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 4 of 10)

### MOVEMENT SUMMARY



**Site: Toothill / The Bouvarde EX AM**

Toothill Street / The Bouvarde

Existing Conditions

AM

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: Toothill St S											
1	L2	44	0.0	0.247	7.1	LOS A	1.9	13.4	0.50	0.06	55.7
2	T1	405	0.0	0.247	1.6	LOS A	1.9	13.4	0.50	0.06	57.2
3	R2	20	0.0	0.247	7.0	LOS A	1.9	13.4	0.50	0.06	55.2
Approach		469	0.0	0.247	2.3	NA	1.9	13.4	0.50	0.06	57.0
East: The Bouvarde E											
4	L2	28	0.0	0.088	12.4	LOS A	0.3	2.1	0.51	0.93	49.5
5	T1	12	0.0	0.088	12.1	LOS A	0.3	2.1	0.51	0.93	49.3
6	R2	11	0.0	0.088	11.8	LOS A	0.3	2.1	0.51	0.93	49.1
Approach		51	0.0	0.088	12.2	LOS A	0.3	2.1	0.51	0.93	49.4
North: Tothill St N											
8	T1	340	0.0	0.203	2.1	LOS A	1.6	11.2	0.55	0.06	57.2
9	R2	33	0.0	0.203	7.6	LOS A	1.6	11.2	0.55	0.06	55.2
Approach		373	0.0	0.203	2.6	NA	1.6	11.2	0.55	0.06	57.0
West: The Bouvarde W											
10	L2	69	0.0	0.202	12.9	LOS A	0.7	5.1	0.56	0.95	49.3
11	T1	8	0.0	0.202	12.5	LOS A	0.7	5.1	0.56	0.95	49.0
12	R2	36	0.0	0.202	12.3	LOS A	0.7	5.1	0.56	0.95	48.8
Approach		114	0.0	0.202	12.7	LOS A	0.7	5.1	0.56	0.95	49.1
All Vehicles		1006	0.0	0.247	4.1	NA	1.9	13.4	0.53	0.20	55.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 5 of 10)

### MOVEMENT SUMMARY

 **Site: Toothill / New Canterbury Rd EX AM**

Toothill Street / New Canterbury Rd

Existing Conditions

AM

Signals - Fixed Time Cycle Time = 110 seconds (User-Given Cycle Time)

#### Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
<b>East: New Canterbury Rd E</b>											
5	T1	257	0.0	0.220	10.7	LOS A	6.2	43.6	0.49	0.42	51.0
6	R2	156	0.0	0.635	32.5	LOS C	6.9	48.2	0.82	0.83	38.4
Approach		413	0.0	0.635	18.9	LOS B	6.9	48.2	0.61	0.58	45.4
<b>North: Toothill St</b>											
7	L2	240	0.0	0.631	39.5	LOS C	9.7	68.1	0.86	0.79	35.8
9	R2	208	0.0	0.631	39.5	LOS C	9.7	68.1	0.86	0.80	35.7
Approach		448	0.0	0.631	39.5	LOS C	9.7	68.1	0.86	0.80	35.7
<b>West: New Canterbury Rd W</b>											
10	L2	216	0.0	0.448	18.3	LOS B	14.8	103.7	0.59	0.63	47.0
11	T1	821	0.0	0.448	12.7	LOS A	15.1	105.9	0.59	0.56	49.0
Approach		1037	0.0	0.448	13.9	LOS A	15.1	105.9	0.59	0.58	48.6
All Vehicles		1898	0.0	0.635	21.0	LOS B	15.1	105.9	0.66	0.63	44.2

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

#### Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate per ped
					Pedestrian ped	Distance m		
P2	East Full Crossing	53	35.3	LOS D	0.1	0.1	0.80	0.80
P3	North Full Crossing	53	11.8	LOS B	0.1	0.1	0.46	0.46
P4	West Full Crossing	53	35.3	LOS D	0.1	0.1	0.80	0.80
All Pedestrians		158	27.5	LOS C			0.69	0.69

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 6 of 10)

### MOVEMENT SUMMARY

**Site: Toothill / New Canterbury Rd EX PM**

Toothill Street / New Canterbury Rd

Existing Conditions

PM

Signals - Fixed Time Cycle Time = 110 seconds (User-Given Cycle Time)

#### Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
<b>East: New Canterbury Rd E</b>											
5	T1	675	0.0	0.586	14.9	LOS B	22.3	156.3	0.68	0.61	48.2
6	R2	281	0.0	0.673	29.2	LOS C	11.8	82.5	0.82	0.83	39.8
Approach		956	0.0	0.673	19.1	LOS B	22.3	156.3	0.72	0.68	45.4
<b>North: Toothill St</b>											
7	L2	200	0.0	0.665	38.4	LOS C	14.1	98.6	0.84	0.79	36.2
9	R2	202	0.0	0.665	40.5	LOS C	14.1	98.6	0.90	0.82	35.3
Approach		402	0.0	0.665	39.5	LOS C	14.1	98.6	0.87	0.81	35.7
<b>West: New Canterbury Rd W</b>											
10	L2	191	0.0	0.174	16.4	LOS B	4.6	32.0	0.48	0.70	46.3
11	T1	388	0.0	0.348	12.2	LOS A	10.5	73.2	0.55	0.48	50.0
Approach		579	0.0	0.348	13.5	LOS A	10.5	73.2	0.53	0.55	48.7
All Vehicles		1937	0.0	0.673	21.7	LOS B	22.3	156.3	0.69	0.67	43.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

#### Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue		Prop. Queued	Effective Stop Rate per ped
					Pedestrian ped	Distance m		
P2	East Full Crossing	53	34.5	LOS D	0.1	0.1	0.79	0.79
P3	North Full Crossing	53	12.3	LOS B	0.1	0.1	0.47	0.47
P4	West Full Crossing	53	34.5	LOS D	0.1	0.1	0.79	0.79
All Pedestrians		158	27.1	LOS C			0.69	0.69

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 7 of 10)

### MOVEMENT SUMMARY

 **Site: Eltham / Denison Rd EX AM**

Eltham St / Denison Rd

Existing

AM

Roundabout

#### Movement Performance - Vehicles

Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
<b>South: Eltham St</b>											
1	L2	20	0.0	0.057	5.8	LOS A	0.3	2.0	0.27	0.56	52.3
2	T1	27	0.0	0.057	5.3	LOS A	0.3	2.0	0.27	0.56	53.0
3	R2	19	0.0	0.057	8.1	LOS A	0.3	2.0	0.27	0.56	52.6
Approach		66	0.0	0.057	6.2	LOS A	0.3	2.0	0.27	0.56	52.7
<b>East: Denison Rd</b>											
4	L2	27	0.0	0.114	6.5	LOS A	0.6	4.0	0.40	0.58	52.2
5	T1	80	0.0	0.114	6.0	LOS A	0.6	4.0	0.40	0.58	53.0
6	R2	12	0.0	0.114	8.8	LOS A	0.6	4.0	0.40	0.58	52.6
Approach		119	0.0	0.114	6.4	LOS A	0.6	4.0	0.40	0.58	52.7
<b>North: Eltham St</b>											
7	L2	15	0.0	0.066	7.1	LOS A	0.3	2.3	0.48	0.62	51.7
8	T1	35	0.0	0.066	6.7	LOS A	0.3	2.3	0.48	0.62	52.5
9	R2	13	0.0	0.066	9.5	LOS A	0.3	2.3	0.48	0.62	52.1
Approach		62	0.0	0.066	7.3	LOS A	0.3	2.3	0.48	0.62	52.2
<b>West: Denison Rd</b>											
10	L2	36	0.0	0.272	5.6	LOS A	1.7	11.6	0.22	0.58	52.1
11	T1	155	0.0	0.272	5.1	LOS A	1.7	11.6	0.22	0.58	52.9
12	R2	177	0.0	0.272	7.9	LOS A	1.7	11.6	0.22	0.58	52.5
Approach		367	0.0	0.272	6.5	LOS A	1.7	11.6	0.22	0.58	52.6
All Vehicles		615	0.0	0.272	6.5	LOS A	1.7	11.6	0.29	0.58	52.6

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 8 of 10)

### MOVEMENT SUMMARY



**Site: Eltham / Denison Rd EX PM**

Eltham St / Denison Rd

Existing

PM

Roundabout

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: Eltham St											
1	L2	38	0.0	0.063	6.0	LOS A	0.3	2.2	0.31	0.56	52.4
2	T1	24	0.0	0.063	5.5	LOS A	0.3	2.2	0.31	0.56	53.2
3	R2	8	0.0	0.063	8.3	LOS A	0.3	2.2	0.31	0.56	52.8
Approach		71	0.0	0.063	6.1	LOS A	0.3	2.2	0.31	0.56	52.7
East: Denison Rd											
4	L2	27	0.0	0.122	5.8	LOS A	0.6	4.3	0.28	0.54	52.6
5	T1	98	0.0	0.122	5.4	LOS A	0.6	4.3	0.28	0.54	53.3
6	R2	17	0.0	0.122	8.2	LOS A	0.6	4.3	0.28	0.54	53.0
Approach		142	0.0	0.122	5.8	LOS A	0.6	4.3	0.28	0.54	53.1
North: Eltham St											
7	L2	14	0.0	0.056	5.8	LOS A	0.3	1.9	0.26	0.57	52.1
8	T1	24	0.0	0.056	5.3	LOS A	0.3	1.9	0.26	0.57	52.8
9	R2	27	0.0	0.056	8.1	LOS A	0.3	1.9	0.26	0.57	52.5
Approach		65	0.0	0.056	6.6	LOS A	0.3	1.9	0.26	0.57	52.5
West: Denison Rd											
10	L2	12	0.0	0.087	5.5	LOS A	0.4	3.1	0.18	0.58	52.2
11	T1	42	0.0	0.087	5.0	LOS A	0.4	3.1	0.18	0.58	52.9
12	R2	58	0.0	0.087	7.8	LOS A	0.4	3.1	0.18	0.58	52.5
Approach		112	0.0	0.087	6.5	LOS A	0.4	3.1	0.18	0.58	52.6
All Vehicles		389	0.0	0.122	6.2	LOS A	0.6	4.3	0.25	0.56	52.8

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 9 of 10)

### MOVEMENT SUMMARY

 **Site: Eltham / The Boulevarde EX AM**

Eltham Street / The Boulevarde

Existing

AM

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
South: Eltham											
1	L2	219	0.0	0.130	5.6	LOS A	0.7	4.7	0.04	0.54	53.6
2	T1	5	0.0	0.130	0.0	LOS A	0.7	4.7	0.04	0.54	55.0
3	R2	17	0.0	0.130	5.5	LOS A	0.7	4.7	0.04	0.54	53.1
Approach		241	0.0	0.130	5.4	NA	0.7	4.7	0.04	0.54	53.6
East: The Boulevarde											
4	L2	4	0.0	0.080	9.0	LOS A	0.3	2.0	0.11	0.99	51.5
5	T1	31	0.0	0.080	8.6	LOS A	0.3	2.0	0.11	0.99	51.3
6	R2	39	0.0	0.080	8.4	LOS A	0.3	2.0	0.11	0.99	51.0
Approach		74	0.0	0.080	8.5	LOS A	0.3	2.0	0.11	0.99	51.1
North: Eltham											
7	L2	1	0.0	0.006	6.2	LOS A	0.0	0.2	0.32	0.26	54.8
8	T1	5	0.0	0.006	0.6	LOS A	0.0	0.2	0.32	0.26	56.3
9	R2	4	0.0	0.006	6.1	LOS A	0.0	0.2	0.32	0.26	54.3
Approach		11	0.0	0.006	3.4	NA	0.0	0.2	0.32	0.26	55.3
West: The Boulevarde											
10	L2	26	0.0	0.091	8.6	LOS A	0.3	2.4	0.04	1.04	51.6
11	T1	72	0.0	0.091	8.2	LOS A	0.3	2.4	0.04	1.04	51.3
12	R2	3	0.0	0.091	8.0	LOS A	0.3	2.4	0.04	1.04	51.1
Approach		101	0.0	0.091	8.3	LOS A	0.3	2.4	0.04	1.04	51.4
All Vehicles		426	0.0	0.130	6.6	NA	0.7	4.7	0.06	0.73	52.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**SIDRA  
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## ANNEXURE C: EXISTING SIDRA PERFORMANCES

(Sheet 10 of 10)

### MOVEMENT SUMMARY



**Site: Eltham / The Boulevarde EX PM**

Eltham Street / The Boulevarde

Existing

PM

Stop (Two-Way)

Movement Performance - Vehicles											
Mov ID	ODMo v	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue		Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
		Total veh/h	HV %				Vehicles veh	Distance m			
<b>South: Eltham</b>											
1	L2	66	0.0	0.060	5.6	LOS A	0.3	2.0	0.05	0.52	53.8
2	T1	7	0.0	0.060	0.0	LOS A	0.3	2.0	0.05	0.52	55.1
3	R2	37	0.0	0.060	5.5	LOS A	0.3	2.0	0.05	0.52	53.2
Approach		111	0.0	0.060	5.2	NA	0.3	2.0	0.05	0.52	53.7
<b>East: The Boulevarde</b>											
4	L2	4	0.0	0.084	8.5	LOS A	0.3	2.1	0.13	0.97	51.8
5	T1	40	0.0	0.084	8.2	LOS A	0.3	2.1	0.13	0.97	51.6
6	R2	40	0.0	0.084	8.0	LOS A	0.3	2.1	0.13	0.97	51.3
Approach		84	0.0	0.084	8.1	LOS A	0.3	2.1	0.13	0.97	51.5
<b>North: Eltham</b>											
7	L2	4	0.0	0.007	5.7	LOS A	0.0	0.3	0.16	0.28	55.2
8	T1	6	0.0	0.007	0.2	LOS A	0.0	0.3	0.16	0.28	56.6
9	R2	3	0.0	0.007	5.6	LOS A	0.0	0.3	0.16	0.28	54.6
Approach		14	0.0	0.007	3.2	NA	0.0	0.3	0.16	0.28	55.7
<b>West: The Boulevarde</b>											
10	L2	17	0.0	0.029	8.2	LOS A	0.1	0.8	0.04	1.02	51.8
11	T1	18	0.0	0.029	7.9	LOS A	0.1	0.8	0.04	1.02	51.5
12	R2	1	0.0	0.029	7.7	LOS A	0.1	0.8	0.04	1.02	51.3
Approach		36	0.0	0.029	8.1	LOS A	0.1	0.8	0.04	1.02	51.6
All Vehicles		244	0.0	0.084	6.5	NA	0.3	2.1	0.08	0.74	52.7

Level of Service (LOS) Method: Delay (RTA NSW).

Vehicle movement LOS values are based on average delay per movement

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

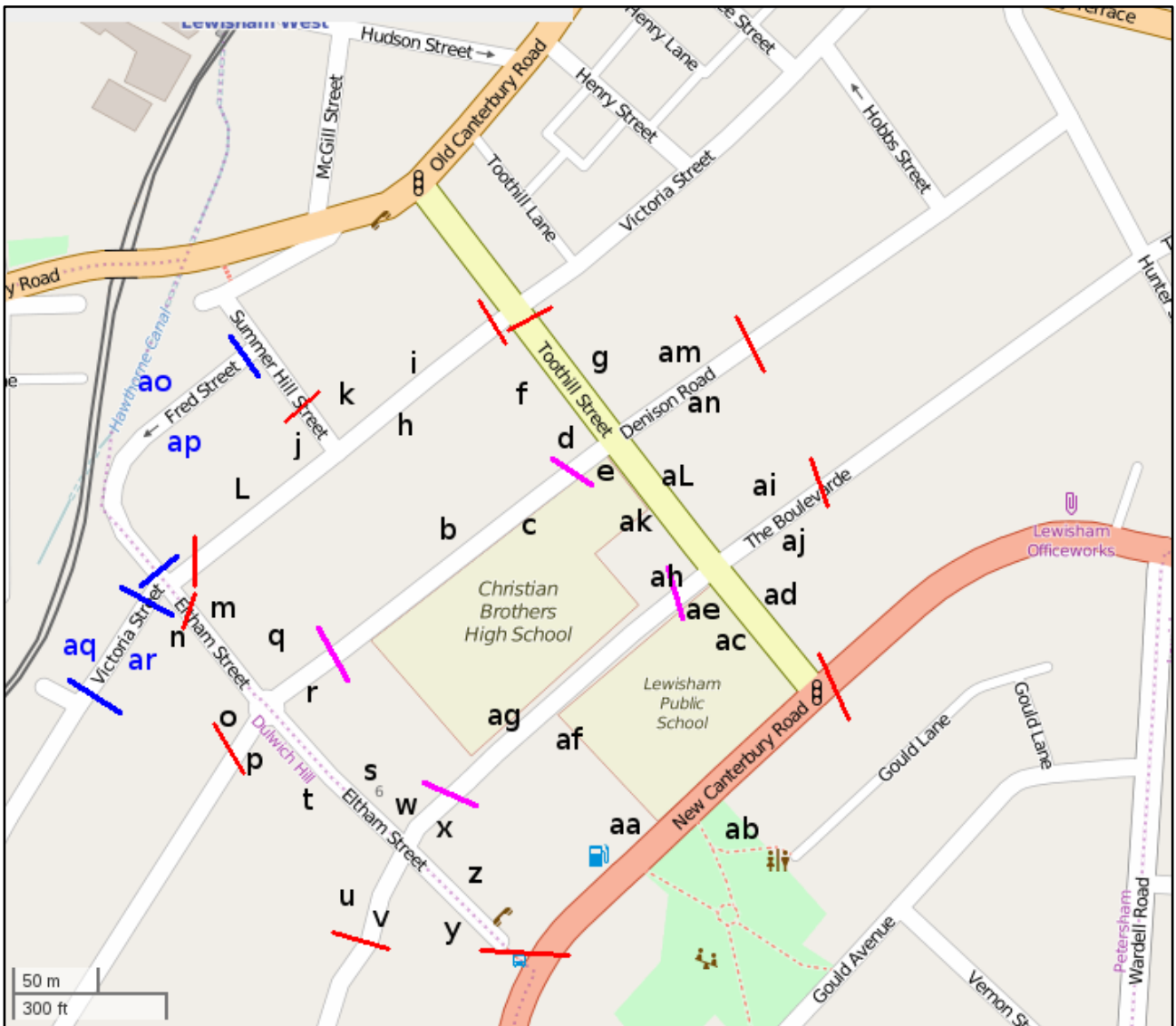
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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**ANNEXURE D: PARKING SURVEYS  
(SHEET 1 OF 4)**



## ANNEXURE D: PARKING SURVEYS (SHEET 2 OF 4)

Curtis Traffic Surveys					Start	Finish	Interval Size
					7:00	9:30	0:30
Job:	160705mcl (16_272)						
Client:	McLaren Traffic Engineering						
Date:	27/07/16						
Location:	Lewisham						
Weather:	Fine						
Surveyor:	MC						
Zone	Street	From	To	Side of Street	Capacity	Restriction	
a	off street				18		
b	Denison Rd	west 100m	east 100m	north	25	1dis+24*2r1	
c	Denison Rd	west 100m	east 100m	south	32	4bz1+14bz2+5bz3+9u	
d	Denison Rd	east 100m	Toothill St	north	3	2r1	
e	Denison Rd	east 100m	Toothill St	south	4	bz1	
f	Toothill St	Denison Rd	Victoria St	west	7	u	
g	Toothill St	Denison Rd	Victoria St	east	9	2r1	
h	Victoria St	Toothill St	Eltham St	south	28	u	
i	Victoria St	Toothill St	Summer Hill St	north	13	12*2r1+1dis	
j	Summer Hill St	Victoria St	200m	west	4	u	
k	Summer Hill St	200m	Victoria St	east	4	u	
l	Victoria St	Summer Hill St	Eltham St	north	13	u	
m	Eltham St	Victoria St	Denison Rd	east	9	u	
n	Eltham St	Victoria St	Denison Rd	west	1	u	
o	Denison Rd	Eltham St	200m	north	2	u	
p	Denison Rd	200m	Eltham St	south	2	u	
q	Denison Rd	Eltham St	west 100m	north	5	2r1	
r	Denison Rd	west 100m	Eltham St	south	4	u	
s	Eltham St	Denison Rd	Boulevard	east	9	2r1	
t	Eltham St	Denison Rd	Boulevard	west	12	u	
u	Boulevard	Eltham St	200m	north	9	u angle	
v	Boulevard	200m	Eltham St	south	2	u angle	
w	Boulevard	Eltham St	100m west	north	4	u	
x	Boulevard	100m west	Eltham St	south	3	u	
y	Eltham St	Boulevard	closure	west	10	u	
z	Eltham St	Boulevard	closure	east	7	u	
aa	N Canterbury Rd	Eltham St	Toothill St	north	14	ns1	
ab	N Canterbury Rd	Eltham St	Toothill St	south	20	pmC	
ac	Toothill St	N Canterbury Rd	Boulevard	west	0	ns	
ad	Toothill St	N Canterbury Rd	Boulevard	east		np2	
ae	Boulevard	Toothill St	100m east	south	1	u	
af	Boulevard	100m east	100m west	south	24	18u + 6np1	
ag	Boulevard	100m west	100m east	north	22	12u + 10np1	
ah	Boulevard	100m east	Toothill St	north	1	u	
ai	Boulevard	Toothill St	200m	north	4	2r1	
aj	Boulevard	200m	Toothill St	south	5	2r1	
ak	Toothill St	Boulevard	Denison Rd	west	6	u	
aL	Toothill St	Boulevard	Denison Rd	east	6	u	
am	Denison Rd	Toothill St	200m	north	7	u	
an	Denison Rd	200m	Toothill St	south	5	2r1	
ao	Fred St	Victoria St	Summer Hill St	north	24	u	
ap	Fred St	Victoria St	Summer Hill St	south	22	u	
aq	Victoria St	Eltham St	Short St	east	10	u	
ar	Victoria St	Eltham St	Short St	west	8	7u+1dis	

## ANNEXURE D: PARKING SURVEYS (SHEET 3 OF 4)

Curtis Traffic Surveys												
Job:	I60705mcl (I6_272)											
Client:	McLaren Traffic Engineering											
Day, date:	27/07/16											
Location:	Lewisham											
Weather:	Fine											
Surveyor:	MC											
							<i>Parking round commencing...</i>					
Zone	Street	From	To	Side of Street	Capacity	Restriction	7:00	7:30	8:00	8:30	9:00	9:30
a	off street				18		2	6	9	10	13	11
b	Denison Rd	west 100m	east 100m	north	25	1dis+24*2rl	20	19	20	21	22	23
c	Denison Rd	west 100m	east 100m	south	32	4bz1+14bz2+5bz3+9u	11	11	13	13	13	12
d	Denison Rd	east 100m	Toothill St	north	3	2rl	0	0	1	1	1	1
e	Denison Rd	east 100m	Toothill St	south	4	bz1	4	4	4	3	2	0
f	Toothill St	Denison Rd	Victoria St	west	7	u	2	2	3	7	7	7
g	Toothill St	Denison Rd	Victoria St	east	9	2rl	7	6	6	7	7	6
h	Victoria St	Toothill St	Eltham St	south	28	u	29	26	28	30	30	30
i	Victoria St	Toothill St	Summer Hill St	north	13	12*2rl+1dis	8	9	9	8	8	8
j	Summer Hill St	Victoria St	200m	west	4	u	5	5	5	4	4	4
k	Summer Hill St	200m	Victoria St	east	4	u	5	5	5	5	5	5
l	Victoria St	Summer Hill St	Eltham St	north	13	u	16	12	13	14	15	14
m	Eltham St	Victoria St	Denison Rd	east	9	u	8	7	7	8	8	8
n	Eltham St	Victoria St	Denison Rd	west	1	u	6	7	8	9	9	9
o	Denison Rd	Eltham St	200m	north	2	u	1	1	1	1	1	1
p	Denison Rd	200m	Eltham St	south	2	u	3	3	3	3	3	3
q	Denison Rd	Eltham St	west 100m	north	5	2rl	6	5	4	3	3	3
r	Denison Rd	west 100m	Eltham St	south	4	u	4	4	4	2	2	2
s	Eltham St	Denison Rd	Boulevard	east	9	2rl	5	4	5	6	7	6
t	Eltham St	Denison Rd	Boulevard	west	12	u	10	11	11	12	12	12
u	Boulevard	Eltham St	200m	north	9	u angle	9	11	10	9	8	8
v	Boulevard	200m	Eltham St	south	2	u angle	4	3	3	3	3	3
w	Boulevard	Eltham St	100m west	north	4	u	3	4	4	4	3	3
x	Boulevard	100m west	Eltham St	south	3	u	4	4	4	4	3	3
y	Eltham St	Boulevard	closure	west	10	u	9	11	11	10	10	10
z	Eltham St	Boulevard	closure	east	7	u	9	9	9	9	8	8
aa	N Canterbury	Eltham St	Toothill St	north	14	ns1	0	0	0	0	0	0
ab	N Canterbury	Eltham St	Toothill St	south	20	pmC	6	5	3	5	5	5
ac	Toothill St	N Canterbury Rd	Boulevard	west		ns	0	0	0	0	0	0
ad	Toothill St	N Canterbury Rd	Boulevard	east		np2	0	0	0	0	0	0
ae	Boulevard	Toothill St	100m east	south	1	u	1	1	2	2	2	1
af	Boulevard	100m east	100m west	south	24	18u + 6np1	13	12	11	15	16	16
ag	Boulevard	100m west	100m east	north	22	12u + 10np1	10	10	10	10	12	12
ah	Boulevard	100m east	Toothill St	north	1	u	1	1	2	2	2	2
ai	Boulevard	Toothill St	200m	north	4	2rl	6	6	5	5	5	5
aj	Boulevard	200m	Toothill St	south	5	2rl	1	1	2	3	3	4
ak	Toothill St	Boulevard	Denison Rd	west	6	u	5	6	5	5	8	8
aL	Toothill St	Boulevard	Denison Rd	east	6	u	6	7	7	7	7	7
am	Denison Rd	Toothill St	200m	north	7	u	7	7	8	8	8	8
an	Denison Rd	200m	Toothill St	south	5	2rl	4	4	3	3	3	3
ao	Fred St	Victoria St	Summer Hill St	north	24	u	16	16	17	18	19	19
ap	Fred St	Victoria St	Summer Hill St	south	22	u	15	16	16	18	19	19
aq	Victoria St	Eltham St	Short St	east	10	u	7	8	8	9	9	10
ar	Victoria St	Eltham St	Short St	west	8	7u+1dis	6	6	6	7	8	8

**ANNEXURE D: PARKING SURVEYS**  
**(SHEET 4 OF 4)**

<b>Curtis Traffic Surveys</b>												
Job:	160705mcl (16_272)											
Client:	McLaren Traffic Engineering											
Day, date	27/07/16											
Location:	Lewisham											
Weather:	Fine											
Surveyor:	MC											
<i>Parking round commencing...</i>												
Zone	Street	From	To	Side of Street	Capacity	Restriction	14:00	14:30	15:00	15:30	16:00	16:30
a	off street				18		11	10	10	10	9	8
b	Denison Rd	west 100m	east 100m	north	25	1dis+24*2rl	22	21	31	29	19	20
c	Denison Rd	west 100m	east 100m	south	32	4bzl+14bz2+5	12	12	10	10	8	9
d	Denison Rd	east 100m	Toothill St	north	3	2rl	1	0	0	0	0	0
e	Denison Rd	east 100m	Toothill St	south	4	bzl	0	0	0	0	0	0
f	Toothill St	Denison Rd	Victoria St	west	7	u	5	5	3	3	3	2
g	Toothill St	Denison Rd	Victoria St	east	9	2rl	5	5	6	5	4	4
h	Victoria St	Toothill St	Eltham St	south	28	u	5	5	6	6	6	2
i	Victoria St	Toothill St	Summer Hill S	north	13	12*2rl+1dis	9	10	11	10	10	8
j	Summer Hill St	Victoria St	200m	west	4	u	5	5	5	5	5	5
k	Summer Hill St	200m	Victoria St	east	4	u	5	5	5	4	3	4
l	Victoria St	Summer Hill St	Eltham St	north	13	u	16	16	17	17	17	15
m	Eltham St	Victoria St	Denison Rd	east	9	u	8	8	9	8	8	8
n	Eltham St	Victoria St	Denison Rd	west	1	u	9	8	12	9	9	9
o	Denison Rd	Eltham St	200m	north	2	u	2	2	2	1	0	1
p	Denison Rd	200m	Eltham St	south	2	u	3	3	3	3	3	3
q	Denison Rd	Eltham St	west 100m	north	5	2rl	3	3	3	2	0	2
r	Denison Rd	west 100m	Eltham St	south	4	u	2	2	3	3	3	3
s	Eltham St	Denison Rd	Boulevard	east	9	2rl	8	8	8	8	6	6
t	Eltham St	Denison Rd	Boulevard	west	12	u	11	10	10	9	7	7
u	Boulevard	Eltham St	200m	north	9	u angle	7	7	7	7	7	7
v	Boulevard	200m	Eltham St	south	2	u angle	4	4	5	5	4	4
w	Boulevard	Eltham St	100m west	north	4	u	3	3	4	4	4	4
x	Boulevard	100m west	Eltham St	south	3	u	3	3	4	4	3	3
y	Eltham St	Boulevard	closure	west	10	u	9	9	11	10	8	8
z	Eltham St	Boulevard	closure	east	7	u	7	7	8	8	6	6
aa	N Canterbury Rd	Eltham St	Toothill St	north	14	ns l	8	8	5	0	0	0
ab	N Canterbury Rd	Eltham St	Toothill St	south	20	pmC	0	0	0	0	0	0
ac	Toothill St	N Canterbury Rd	Boulevard	west		ns	0	0	0	0	0	0
ad	Toothill St	N Canterbury Rd	Boulevard	east		np2	3	3	3	3	3	3
ae	Boulevard	Toothill St	100m east	south	1	u	0	0	1	1	1	1
af	Boulevard	100m east	100m west	south	24	18u + 6npl	21	20	14	18	12	12
ag	Boulevard	100m west	100m east	north	22	12u + 10npl	15	12	13	18	12	9
ah	Boulevard	100m east	Toothill St	north	1	u	2	2	2	1	2	2
ai	Boulevard	Toothill St	200m	north	4	2rl	4	4	4	5	5	5
aj	Boulevard	200m	Toothill St	south	5	2rl	5	5	6	6	6	6
ak	Toothill St	Boulevard	Denison Rd	west	6	u	8	8	8	5	3	3
aL	Toothill St	Boulevard	Denison Rd	east	6	u	7	7	7	6	6	5
am	Denison Rd	Toothill St	200m	north	7	u	7	7	7	7	7	7
an	Denison Rd	200m	Toothill St	south	5	2rl	5	5	5	4	4	4
ao	Fred St	Victoria St	Summer Hill S	north	24	u	20	21	22	20	16	15
ap	Fred St	Victoria St	Summer Hill S	south	22	u	19	18	17	17	14	13
aq	Victoria St	Eltham St	Short St	east	10	u	7	9	9	6	5	4
ar	Victoria St	Eltham St	Short St	west	8	7u+1dis	7	9	9	8	5	3

**ANNEXURE E: PROPOSED TRAFFIC MANAGEMENT PLAN**  
**(see separate document)**