

TRAFFIC AND PARKING IMPACT ASSESSMENT OF A PROPOSED MIXED-USE DEVELOPMENT

***892,898-902 and 906 Canterbury Road in
Roselands***

Traffic and Parking Impact Report

Prepared for: Architecture Design Studio Pty Ltd

N206390A (Version 1c)

April 2021

Motion Traffic Engineers Pty Ltd
Telephone:
940 33588
sydney@motiontraffic.com.au

ACN 600201583

1. INTRODUCTION

Motion Traffic Engineers was commissioned by Architecture Design Studio Pty Ltd to undertake a traffic and parking impact assessment of a proposed mixed-use development at 892, 898-902 and 906 Canterbury Road in Roselands. The site is currently comprised of four shops that include Yeronga School Uniforms, Smile Design, café and one vacant shop.

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

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

2. BACKGROUND AND EXISTING CONDITIONS OF THE PROPOSED LOCATION

2.1 Location and Land Use

The proposed mixed-use development lies in Local Centre B2 zone and is located in the south of Lakemba town centre. AL Hikma College is located northeast of development site. The surrounding land uses are mainly residential on south bound with commercial business on Canterbury Road. The mixed use site has frontage to Canterbury Road and Flora Street.

Currently, the site is comprised of four shops that include Yeronga School Uniforms, Smile Design, café and one vacant shop.

Figures 1 and 2 show the location of the mixed use from aerial and street map perspective respectively.

Figure 3a and 3b shows a photograph of the site from Canterbury Road and Flora Street.



Figure 1: Location of the Subject Site on Aerial



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



Figure 3a: Photograph of mixed use site at Canterbury Road in Roselands



Figure 3b: Photograph of mixed use site from Flora Street

2.2 Road Network

This section describes the roads near the proposed mixed use development.

King Georges Road is an arterial road with three lanes each way with a divided median. The sign posted speed limit is 60 km/hr. On-street parking is prohibited on both sides of the road. Figure 4a shows a photograph of King Georges Road.

Canterbury Road is an arterial road with two lane each way and a sign-posted speed limit of 60 km/hr. On-street parking is prohibited on both sides of the road in general. Figure 4b shows a photograph of Canterbury Road.

Haldon Street is a local road with one lane each way and a default-posted speed limit of 50 km/hr. On-street parking is prohibited on both sides of the road near the intersection of Canterbury Road and Haldon Street. School zone restrictions apply on the Haldon Street. Figure 4c shows a photograph of Haldon Street.

Flora Street is a local road with one lane each way and a default-posted speed limit of 50 km/hr. Time-restricted on-street parking is permitted on both sides of the road. Figure 4d shows a photograph of Flora Street.



Figure 4a: King Georges Road facing Northeast



Figure 4b: Canterbury Road facing West



Figure 4c: Haldon Street facing North from Canterbury Road



Figure 4d: Flora Street facing South from development site

2.3 Public Parking Opportunities

The mixed use is located within the Canterbury Road corridor where there are frequent commercial businesses on Canterbury Road.

Time un-restricted on-street parking is available on Flora Street. Site investigations show that there are vacant car spaces on Flora Street during weekday peak hours. A driver may need to circulate to find a vacant car space.

2.4 Intersection Description

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

- Signalised intersection of King Georges Road with Canterbury Road
- Signalised intersection of Canterbury Road with Haldon Street
- Priority intersection of Canterbury Road with Flora Street

External traffic travelling to and from the mixed use will most likely need to travel through the above intersections.

The signalised intersection of King Georges Road with Canterbury Road is a four-leg intersection with all turn movements permitted. Slip lane is provided on all approaches for the left turn. Pedestrian crossings are provided on all approaches. Figure 5 presents the layout in SIDRA 9 – an industry standard intersection modelling software. The number on the lane represents the length in metres.

The signalised intersection of Canterbury Road with Haldon Street is a three-leg three with all turn movements permitted. Pedestrian crossings are provided on all approaches except on westbound on Canterbury Road. Figure 6 presents the layout in SIDRA.

The priority intersection of Canterbury Road with Flora Street is a two-leg intersection with all turn movements permitted except right turn movements. Drivers on Flora Street need to give way to traffic on Canterbury Road. Figure 7 presents the layout of this intersection using SIDRA.

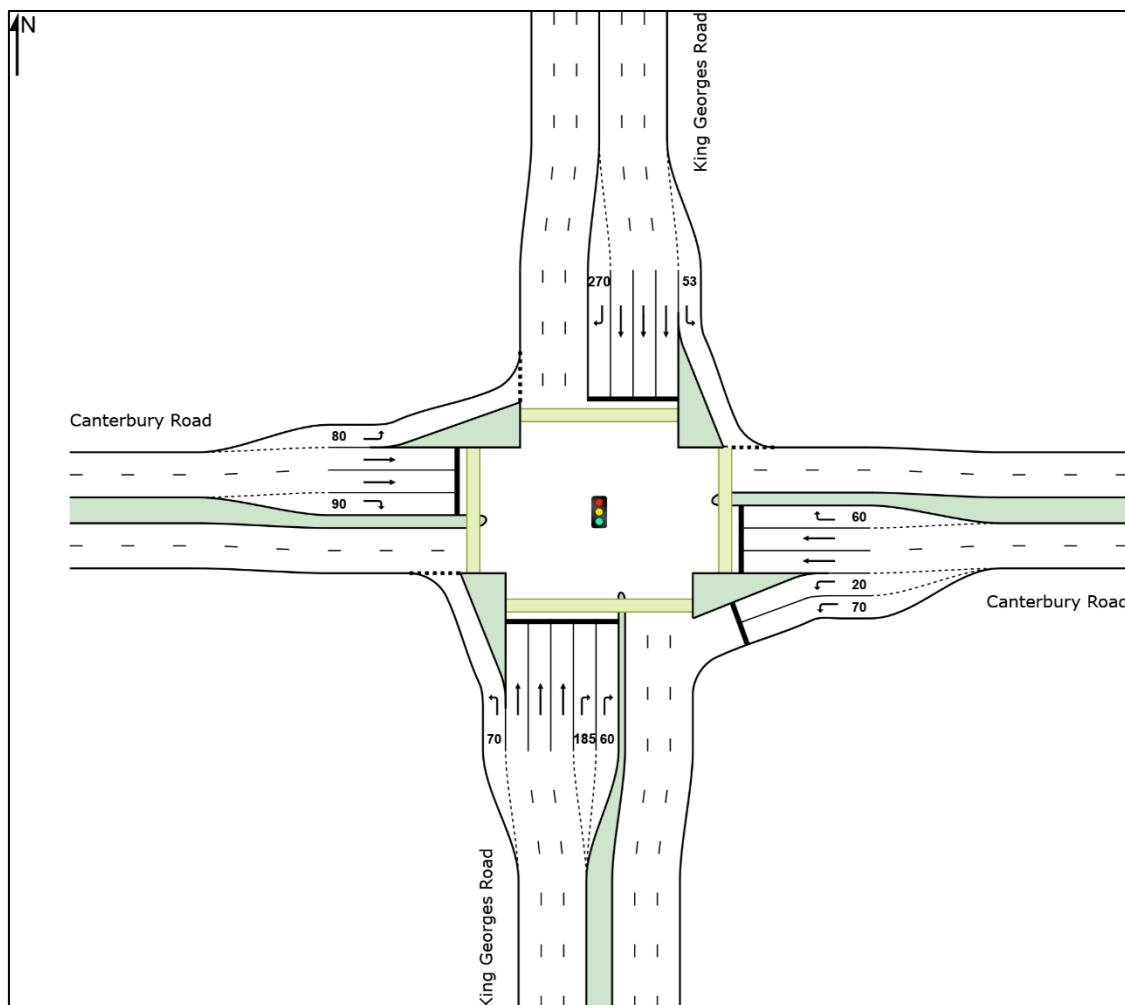


Figure 5: Signalised intersection of King Georges Road with Canterbury Road (SIDRA)

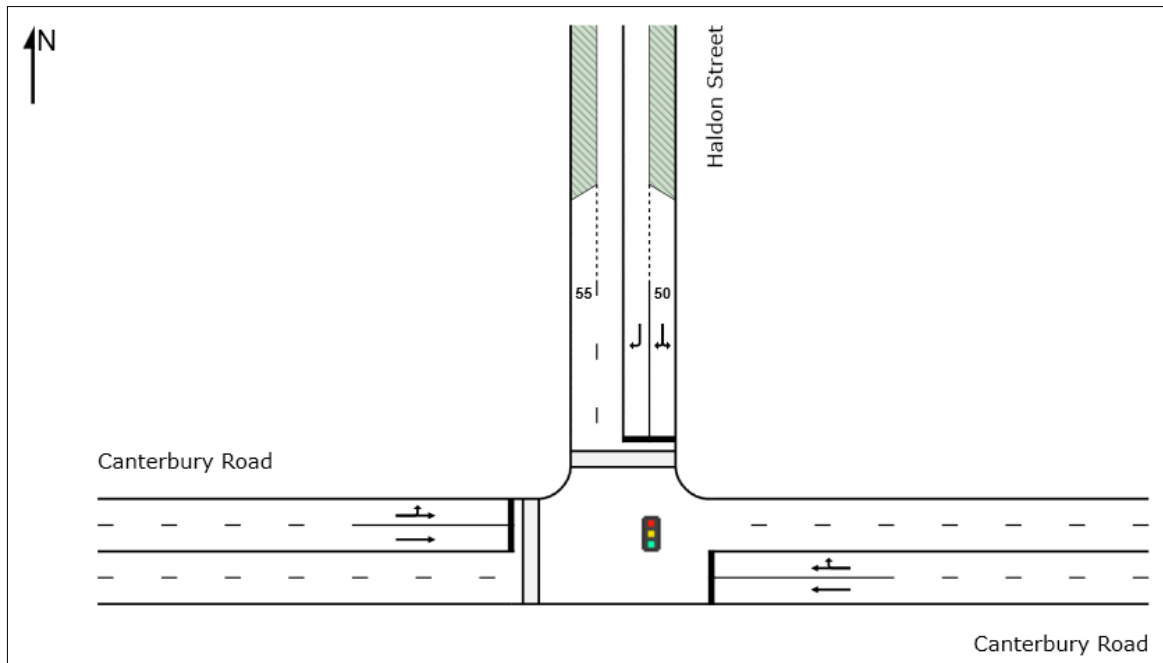


Figure 6: Signalised intersection of Canterbury Road with Haldon Street (SIDRA)

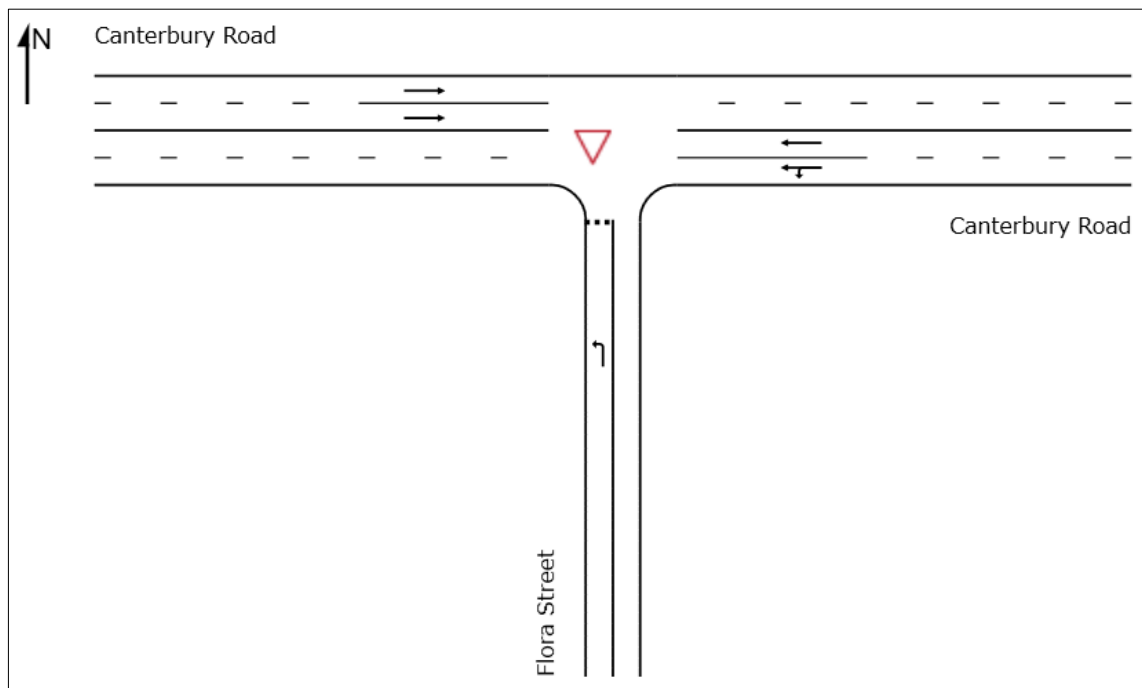


Figure 7: Priority intersection of Canterbury Road with Flora Street (SIDRA)

2.5 Existing Traffic Volumes

As part of the traffic assessment, traffic counts have been undertaken at the intersections for the weekday AM and PM peak hours. The AM and PM peak hours were from 8am to 9am and from 4pm to 5pm respectively. The traffic surveys were undertaken on a weekday in May 2020.

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



Figure 8: Existing Weekday Traffic Volumes AM Peak Hour

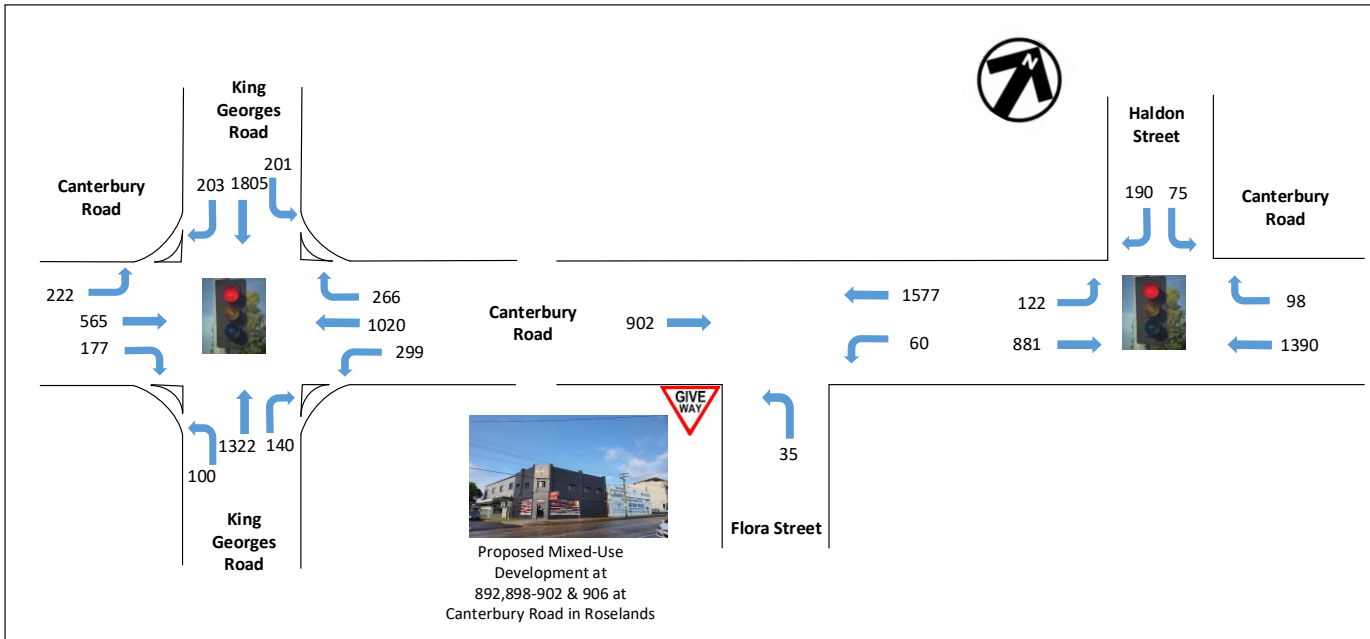


Figure 9: Existing Weekday Traffic Volumes PM Peak Hour

2.6 Intersection Assessment

An intersection assessment has been undertaken for the:

- Signalised intersection of King Georges Road with Canterbury Road
- Signalised intersection of Canterbury Road with Haldon Street
- Priority intersection of Canterbury Road with Flora Street

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

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

Table 1: Intersection Level of Service

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

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

Table 2: Intersection Average Delay (AVD)

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

The results of the intersection analysis are as follows:

Signalised intersection of King Georges Road with Canterbury Road

- The overall intersection has a Los D for both peak hours
- There is limited spare capacity at this intersection

Priority intersection of Canterbury Road with Haldon Street

- All turn movements have LoS A or B for both peak hours
- There is spare capacity at this intersection

Priority intersection of Canterbury Road with Flora Street

- All turn movements have a LoS B for both peak hours
- There is spare capacity at this intersection

The full SIDRA results are presented in Appendix A.

2.7 Public Transport

Lakemba Train Station is in proximity (1.1 km) to the proposed mixed-use site and is regularly serviced by T2 – Parramatta or Leppington to City line providing access to western suburbs such as Liverpool, Cabramatta, Summer Hills and Burwood, and T3 – Liverpool or Lidcombe to City line providing access to suburbs such as Chester Hill, Lidcombe and Ashfield.

The nearest bus stop is opposite to the mixed use site on Canterbury Road. This stop is serviced by bus routes 487 which provides access to nearby suburbs including Campsie, Belmore, Punchbowl, and Bankstown. There is another bus

stop on Haldon Street 150 metres away from the development site. This stop is serviced by bus route 450 that provides access to Strathfield and Hurstville, and bus route 946 which provides access to Greenacre and Bankstown.

Figure 10 shows the proximity of the site to public transport services.

Overall, the site has good access to public transport.

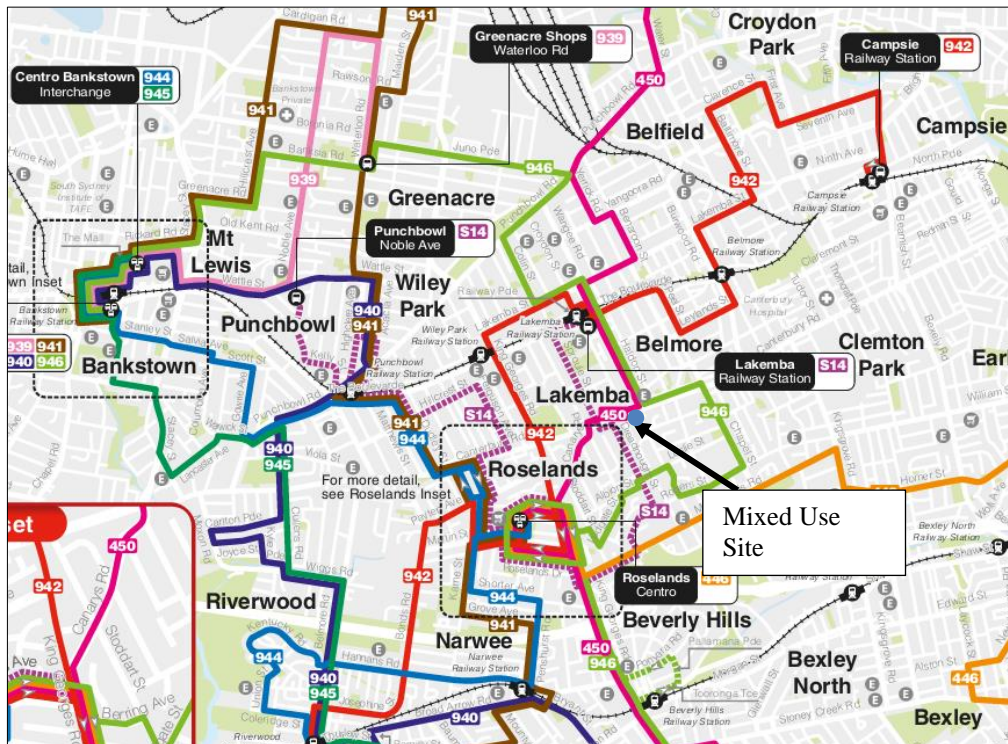


Figure: 10 Public Transport Network Map with respect to Site

2.8 Conclusions on the Existing Conditions

The proposed mixed use development is located directly south of Lakemba Town Centre with time restricted on-street parking opportunities nearby on Flora Street.

The nearby intersections have spare capacity to accommodate additional traffic. The site has excellent access to public transport.

3. PROPOSED MIXED-USE DEVELOPMENT

The land uses of the proposed mixed-use development are as follows:

Residential

- 12 one-bedroom apartments
- 34 two-bedroom apartments
- 4 three-bedroom apartments

A total of fifty apartments

Commercial

- Eight commercial units on the ground level with a total Gross Floor Area (GFA) of 667 m²

Car parking is provided on the ground floor and two basement levels with vehicle access and egress via Flora Street. Details are as followed:

- 10 car spaces at ground level
- 53 car spaces at basement one
- 52 car spaces at basement two
- 1 car wash bay at basement two

A total of one hundred and Fifteen car spaces.

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

4. CAR PARKING CONSIDERATIONS

4.1 City of Canterbury Planning Scheme

The car parking requirements for a mixed-use development are presented in *Canterbury Development Control Plan 2012* with the car parking rates as follows as it applies to the proposed mixed use development:

Multi Dwelling Housing, Attached Dwellings & Residential Flat Buildings

- 1 space per studio or one-bedroom apartment
- 1.2 spaces per two-bedroom apartment
- 2 spaces per three-bedroom or more apartment
- 1 visitor space per 5 apartments
- Bicycle parking:
 - 1 resident space per 5 dwellings
 - 1 visitor space per 10 dwellings

Shop, Business and Retail Premises for Large Local Centres

- 1 space per 66.7m² GFA (<120m²)
- 1 space per 33m² GFA (120m² - 1000m²)
- Bicycle parking:
 - 1 space per 300 m²GFA

Table 3 summarises the car parking requirements for the proposed mixed-use development. The proposed mixed-use development complies with Council's car parking requirements.

Use	Type	Number of Units	Car Parking Rate per Apartment	Car Spaces Required	Car Spaces Provided	
Apartments	1 bedroom	12	1	12	115	
	2 bedroom	34	1.2	40.8		
	3 bedroom or more	4	2	8		
	Visitor	50	0.2	10		
Total Residential				71		
Use	GFA m²	Car Parking Rate	Car Spaces Required			
Commercial	159	1 space per 33 m2	4			
	518	1 space per 66.7m2	13			
Total Commercial				17		
Total car spaces				88		115

Table 3: Summary of Car Parking Requirements Versus Provisions (Canterbury DCP)

Table 4 summarise the bicycle parking requirements for the proposed mixed-use development.

Use	Number of Dwellings	Bicycle Parking Rate residents/visitors	Bicycle Spaces Required	Bicycle Spaces Provided
Apartments	50	1 space per 5 dwellings	10	11
	50	1 space per 10 dwellings	5	
Use	GFA m ²	Bicycle Parking Rate residents/visitors	Bicycle Spaces Required	
Commercial	677	1 space per 300 m2	2.3	
Total bicycle spaces			17	11

Table 4: Summary of Bicycle Parking Requirements Versus Provisions

The proposed mixed-use development provides 115 car spaces versus 88 spaces required by *Canterbury Development Control Plan 2012*.

The proposed mixed-use development complies with Council’s Development Control Plan car parking requirements.

The proposed mixed use development provides 11 bicycle spaces versus 17 spaces required by *Canterbury Development Control Plan 2012*. The proposed mixed-use development is short of 6 bicycle spaces.

5. VEHICLE TRAFFIC IMPACT CONSIDERATIONS

5.1 Traffic Generation

The NSW RTA Guide to Traffic Generating Development Updated Traffic Surveys 2013 for residential and the RTA Guide to Traffic Generating Developments 2002 publishes trip generation rates for the commercial component of the mixed-use development as follows:

High Density Residential Flat Building

- 0.19 vehicle trips per dwelling for weekday AM peak hour
- 0.15 vehicle trips per dwelling for weekday PM peak hour

Retail

- 2 trips per 100m² gross floor area (GFA)

Table 5 present the weekday peak hour trip generation for the residential and retail component of the development respectively. The generated trips in the peak hour are modest.

Table 6 presents the net trip and trip distribution for the proposed mixed use development.

Proposed				
Peak Hour	Use	GFA m ²	Trip Generation Rate	Trips Generated
AM	Commercial	677	2 per 100m ²	14
PM			2 per 100m ²	14
Peak Hour	Use	Units	Trip Generation Rate per Unit	Trip Generated
AM	Residential	50	0.19	10
PM			0.15	8

Table 5: Trips Generated by the Proposed mixed use development during Weekday Peak Hours

	Use	Peak Hour	Origin	Destination	Total
Proposed	Commercial	AM	0	14	14
		PM	11	3	14
	Residential	AM	8	2	10
		PM	1	7	8
Net Trips	Mixed-use	AM	8	16	24
		PM	12	10	22

Table 6: Net Trip Distribution during the Peak Hours

5.2 Traffic Volumes

The additional development trips are assigned onto the local traffic network. The following figures present the existing with the development trips (in red for origin trips and blue for destination trips) for the weekday AM and PM peak hours.

The additional development trips represent a small proportion of the existing traffic volumes.



Figure 11: Weekday AM Peak Hour Traffic Volumes (Development Origin Trips in Red and Destination Trips in Blue)

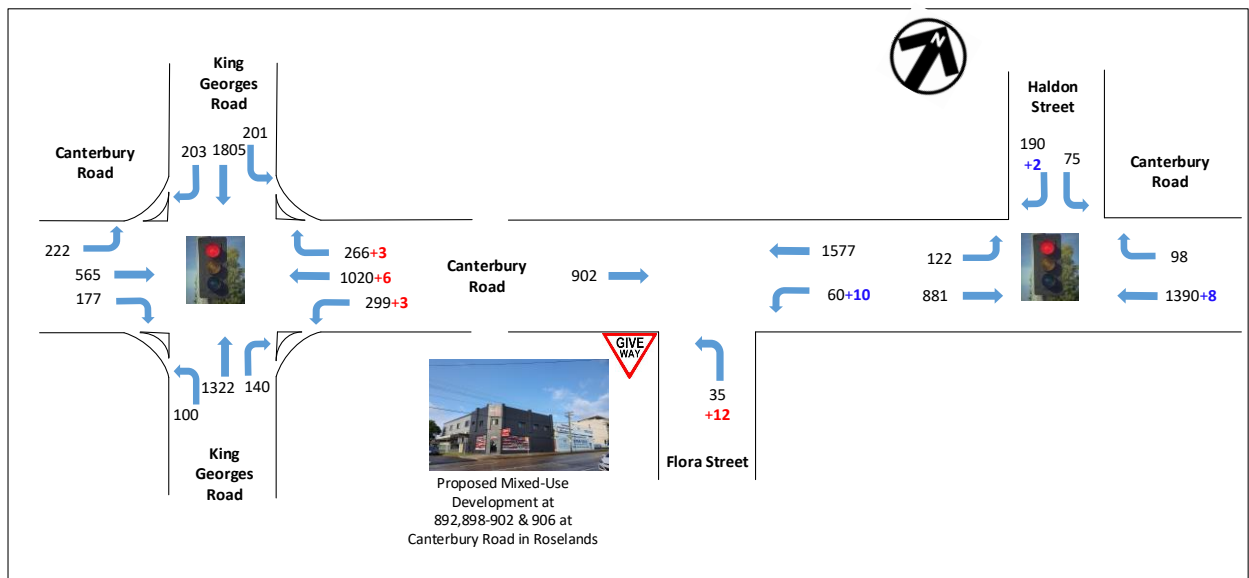


Figure 12: Weekday PM Peak Hour Traffic Volumes (Development Origin Trips in Red and Destination Trips in Blue)

5.3 Intersection Assessment

An intersection assessment has been undertaken for the three nearby intersections.

The results of the intersection analysis are as follows for the AM and PM peak hours:

Signalised intersection of King Georges Road with Canterbury Road

- All turn movements have LoS D above for both peak hours
- The additional trips do not change the LoS of any turn movements

Signalised intersection of Canterbury Road with Haldon Street

- The overall intersection has a Los B for both peak hours
- The additional trips do not change the LoS of any turn movements or the overall intersection

Priority intersection of Canterbury Road with Flora Street

- All turn movements have LoS A or B for both peak hours
- The additional trips do not change the LoS of any turn movements

The full SIDRA results with the development traffic are presented in Appendix B.

The SIDRA results for the existing conditions are presented in Appendix A.

6. CONCLUSIONS

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

Parking

- The proposed mixed-use development complies with Council's commercial and residential car parking requirements however, the proposed development is short of 6 bicycle spaces.
- One carwash bay has been provided at basement two.

Traffic

- The proposed mixed use development is a modest trip generator for the weekday AM and PM peak hours.
- The additional trips from the proposed mixed use development can be accommodated at the nearby intersections and road network without noticeably affecting intersection performance, delays or queues.
- There are no traffic engineering reasons why a development consent for the proposed mixed-use development at 892, 898-902 and 906 Canterbury Road in Roselands, should be refused.

APPENDIX A

SIDRA Intersection Results for Existing Traffic Conditions

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: King Georges Road														
1	L2	276	0.0	291	0.0	0.241	11.4	LOS A	6.5	45.7	0.44	0.66	0.44	43.4
2	T1	1776	0.0	1869	0.0	0.901*	64.0	LOS E	51.8	362.8	0.99	0.97	1.12	29.5
3	R2	169	0.0	178	0.0	0.254	67.1	LOS E	5.8	40.8	0.94	0.76	0.94	26.4
Approach		2221	0.0	2338	0.0	0.901	57.7	LOS E	51.8	362.8	0.92	0.92	1.02	30.4
East: Canterbury Road														
4	L2	121	0.0	127	0.0	0.125	57.5	LOS E	3.8	26.6	0.86	0.73	0.86	28.1
5	T1	545	0.0	574	0.0	0.471	51.3	LOS D	18.8	131.8	0.90	0.76	0.90	32.9
6	R2	336	0.0	354	0.0	0.905*	78.3	LOS F	27.4	192.0	0.99	0.97	1.23	24.3
Approach		1002	0.0	1055	0.0	0.905	61.1	LOS E	27.4	192.0	0.93	0.83	1.01	28.9
North: King Georges Road														
7	L2	519	8.7	546	8.7	0.456	12.9	LOS A	16.0	120.6	0.49	0.69	0.49	42.5
8	T1	1416	3.5	1491	3.5	0.788	53.0	LOS D	38.8	280.0	0.97	0.85	0.98	32.3
9	R2	288	6.1	303	6.1	0.903*	84.7	LOS F	24.4	179.4	1.00	0.97	1.25	23.3
Approach		2223	5.1	2340	5.1	0.903	47.8	LOS D	38.8	280.0	0.86	0.83	0.90	32.5
West: Canterbury Road														
10	L2	155	0.0	163	0.0	0.177	19.9	LOS B	5.4	38.0	0.59	0.69	0.59	39.4
11	T1	1008	0.0	1061	0.0	0.893*	66.2	LOS E	41.6	291.0	1.00	0.98	1.14	29.0
12	R2	84	0.0	88	0.0	0.174	58.0	LOS E	5.3	37.3	0.88	0.74	0.88	28.2
Approach		1247	0.0	1313	0.0	0.893	59.9	LOS E	41.6	291.0	0.94	0.93	1.05	30.0
All Vehicles		6693	1.7	7045	1.7	0.905	55.3	LOS D	51.8	362.8	0.90	0.88	0.99	30.7

Table A1: Signalised intersection of King Georges Road with Canterbury Road Weekday AM Peak Hour for Existing Conditions

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
East: Canterbury Road														
5	T1	1390	0.0	1463	0.0	0.736	10.9	LOS A	21.0	146.9	0.73	0.68	0.75	50.5
6	R2	98	0.0	103	0.0	* 0.736	25.9	LOS B	16.7	116.8	0.92	0.85	0.96	36.8
Approach		1488	0.0	1566	0.0	0.736	11.9	LOS A	21.0	146.9	0.75	0.69	0.76	49.6
North: Haldon Street														
7	L2	75	0.0	79	0.0	0.584	35.9	LOS C	5.2	36.6	0.98	0.81	1.00	28.9
9	R2	190	0.0	200	0.0	* 0.584	37.6	LOS C	5.2	36.6	0.99	0.81	1.02	28.3
Approach		265	0.0	279	0.0	0.584	37.1	LOS C	5.2	36.6	0.98	0.81	1.01	28.5
West: Canterbury Road														
10	L2	122	0.0	128	0.0	0.763	28.6	LOS C	17.1	119.5	0.95	0.89	1.03	35.2
11	T1	881	0.0	927	0.0	* 0.763	23.8	LOS B	17.3	120.8	0.95	0.89	1.02	42.6
Approach		1003	0.0	1056	0.0	0.763	24.4	LOS B	17.3	120.8	0.95	0.89	1.02	41.8
All Vehicles		2756	0.0	2901	0.0	0.763	18.9	LOS B	21.0	146.9	0.84	0.77	0.88	44.3

Table A2: Signalised intersection of Canterbury Road with Haldon Street Weekday AM Peak Hour for Existing Conditions

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total	HV]	[Total	HV]				[Veh.	Dist]				
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Flora Street														
1	L2	96	0.0	101	0.0	0.116	6.6	LOS A	0.4	3.0	0.45	0.66	0.45	45.4
Approach		96	0.0	101	0.0	0.116	6.6	LOS A	0.4	3.0	0.45	0.66	0.45	45.4
East: Canterbury Road														
4	L2	49	0.0	52	0.0	0.241	5.5	LOS A	0.0	0.0	0.00	0.07	0.00	56.6
5	T1	840	0.0	884	0.0	0.241	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.3
Approach		889	0.0	936	0.0	0.241	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.1
West: Canterbury Road														
11	T1	1670	0.0	1758	0.0	0.451	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1670	0.0	1758	0.0	0.451	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		2655	0.0	2795	0.0	0.451	0.5	NA	0.4	3.0	0.02	0.03	0.02	58.8

Table A3: Priority intersection of Canterbury Road with Flora Street Weekday AM Peak Hour for Existing Conditions

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: King Georges Road														
1	L2	100	0.0	105	0.0	0.095	12.0	LOS A	2.0	13.9	0.49	0.65	0.49	43.1
2	T1	1322	0.0	1392	0.0	0.606	36.4	LOS C	21.7	152.1	0.92	0.79	0.92	37.7
3	R2	140	0.0	147	0.0	0.280	54.8	LOS D	3.7	26.2	0.97	0.75	0.97	28.9
Approach		1562	0.0	1644	0.0	0.606	36.5	LOS C	21.7	152.1	0.90	0.78	0.90	37.0
East: Canterbury Road														
4	L2	299	0.0	315	0.0	0.303	41.1	LOS C	8.3	57.8	0.86	0.76	0.86	32.2
5	T1	1020	0.0	1074	0.0	* 0.869	46.0	LOS D	31.1	217.7	0.97	0.96	1.13	34.5
6	R2	266	0.0	280	0.0	* 0.837	60.4	LOS E	15.9	111.5	1.00	0.93	1.20	27.6
Approach		1585	0.0	1668	0.0	0.869	47.5	LOS D	31.1	217.7	0.95	0.92	1.09	32.7
North: King Georges Road														
7	L2	201	8.7	212	8.7	0.151	6.6	LOS A	2.2	16.4	0.27	0.59	0.27	45.9
8	T1	1805	3.5	1900	3.5	* 0.888	48.4	LOS D	38.8	279.7	0.99	1.00	1.16	33.6
9	R2	203	6.1	214	6.1	* 0.849	63.5	LOS E	12.4	91.3	1.00	0.95	1.26	26.9
Approach		2209	4.2	2325	4.2	0.888	46.0	LOS D	38.8	279.7	0.93	0.96	1.09	33.7
West: Canterbury Road														
10	L2	222	0.0	234	0.0	0.215	11.7	LOS A	4.6	32.4	0.50	0.67	0.50	43.3
11	T1	565	0.0	595	0.0	0.395	34.8	LOS C	12.9	90.3	0.87	0.73	0.87	38.5
12	R2	177	0.0	186	0.0	0.557	53.8	LOS D	9.6	67.0	0.99	0.80	0.99	29.2
Approach		964	0.0	1015	0.0	0.557	33.0	LOS C	12.9	90.3	0.80	0.73	0.80	37.2
All Vehicles		6320	1.5	6653	1.5	0.888	42.0	LOS C	38.8	279.7	0.91	0.87	1.00	34.7

Table A4: Signalised intersection of King Georges Road with Canterbury Road Weekday PM Peak Hour for Existing Conditions

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
East: Canterbury Road														
5	T1	1390	0.0	1463	0.0	0.736	10.9	LOS A	21.0	146.9	0.73	0.68	0.75	50.5
6	R2	98	0.0	103	0.0	* 0.736	25.9	LOS B	16.7	116.8	0.92	0.85	0.96	36.8
Approach		1488	0.0	1566	0.0	0.736	11.9	LOS A	21.0	146.9	0.75	0.69	0.76	49.6
North: Haldon Street														
7	L2	75	0.0	79	0.0	0.584	35.9	LOS C	5.2	36.6	0.98	0.81	1.00	28.9
9	R2	190	0.0	200	0.0	* 0.584	37.6	LOS C	5.2	36.6	0.99	0.81	1.02	28.3
Approach		265	0.0	279	0.0	0.584	37.1	LOS C	5.2	36.6	0.98	0.81	1.01	28.5
West: Canterbury Road														
10	L2	122	0.0	128	0.0	0.763	28.6	LOS C	17.1	119.5	0.95	0.89	1.03	35.2
11	T1	881	0.0	927	0.0	* 0.763	23.8	LOS B	17.3	120.8	0.95	0.89	1.02	42.6
Approach		1003	0.0	1056	0.0	0.763	24.4	LOS B	17.3	120.8	0.95	0.89	1.02	41.8
All Vehicles		2756	0.0	2901	0.0	0.763	18.9	LOS B	21.0	146.9	0.84	0.77	0.88	44.3

Table A5: Signalised intersection of Canterbury Road with Haldon Street Weekday PM Peak Hour for Existing Conditions

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Flora Street														
1	L2	35	0.0	37	0.0	0.074	10.2	LOS A	0.2	1.7	0.65	0.83	0.65	43.5
Approach		35	0.0	37	0.0	0.074	10.2	LOS A	0.2	1.7	0.65	0.83	0.65	43.5
East: Canterbury Road														
4	L2	60	0.0	63	0.0	0.443	5.6	LOS A	0.0	0.0	0.00	0.04	0.00	57.0
5	T1	1577	0.0	1660	0.0	0.443	0.2	LOS A	0.0	0.0	0.00	0.02	0.00	59.3
Approach		1637	0.0	1723	0.0	0.443	0.4	NA	0.0	0.0	0.00	0.02	0.00	59.2
West: Canterbury Road														
11	T1	902	0.0	949	0.0	0.243	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		902	0.0	949	0.0	0.243	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		2574	0.0	2709	0.0	0.443	0.4	NA	0.2	1.7	0.01	0.03	0.01	59.1

Table A6: Priority intersection of Canterbury Road with Flora Street Weekday PM Peak Hour for Existing Conditions

APPENDIX B

SIDRA Intersection Results for Existing Conditions with Mixed-Use Traffic

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 150 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: King Georges Road														
1	L2	276	0.0	291	0.0	0.241	11.7	LOS A	6.7	46.7	0.45	0.66	0.45	43.3
2	T1	1776	0.0	1869	0.0	0.901	64.0	LOS E	51.8	362.8	0.99	0.97	1.12	29.5
3	R2	169	0.0	178	0.0	0.254	67.1	LOS E	5.8	40.8	0.94	0.76	0.94	26.4
Approach		2221	0.0	2338	0.0	0.901	57.7	LOS E	51.8	362.8	0.92	0.92	1.02	30.4
East: Canterbury Road														
4	L2	123	0.0	129	0.0	0.127	57.5	LOS E	3.9	27.0	0.86	0.73	0.86	28.1
5	T1	549	0.0	578	0.0	0.477	51.4	LOS D	19.0	133.2	0.90	0.76	0.90	32.8
6	R2	338	0.0	356	0.0	0.912	79.8	LOS F	27.9	195.4	0.99	0.98	1.25	24.1
Approach		1010	0.0	1063	0.0	0.912	61.6	LOS E	27.9	195.4	0.93	0.83	1.01	28.8
North: King Georges Road														
7	L2	519	8.7	546	8.7	0.456	12.9	LOS A	16.0	120.6	0.49	0.69	0.49	42.5
8	T1	1416	3.5	1491	3.5	0.788	53.0	LOS D	38.8	280.0	0.97	0.85	0.98	32.3
9	R2	288	6.1	303	6.1	0.903	84.7	LOS F	24.4	179.4	1.00	0.97	1.25	23.3
Approach		2223	5.1	2340	5.1	0.903	47.8	LOS D	38.8	280.0	0.86	0.83	0.90	32.5
West: Canterbury Road														
10	L2	155	0.0	163	0.0	0.177	19.9	LOS B	5.4	38.0	0.59	0.69	0.59	39.4
11	T1	1008	0.0	1061	0.0	0.893	66.2	LOS E	41.6	291.0	1.00	0.98	1.14	29.0
12	R2	84	0.0	88	0.0	0.174	58.0	LOS E	5.3	37.3	0.88	0.74	0.88	28.2
Approach		1247	0.0	1313	0.0	0.893	59.9	LOS E	41.6	291.0	0.94	0.93	1.05	30.0
All Vehicles		6701	1.7	7054	1.7	0.912	55.4	LOS D	51.8	362.8	0.90	0.88	0.99	30.7

Table B1: Signalised intersection of King Georges Road with Canterbury Road Weekday AM Peak Hour for Existing Conditions with Mixed-Use Traffic

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist. m]				
East: Canterbury Road														
5	T1	846	0.0	891	0.0	0.609	5.9	LOS A	16.1	112.7	0.52	0.48	0.53	54.5
6	R2	72	0.0	76	0.0	* 0.609	45.9	LOS D	3.7	26.2	1.00	0.81	1.09	26.4
Approach		918	0.0	966	0.0	0.609	9.1	LOS A	16.1	112.7	0.56	0.51	0.57	51.5
North: Haldon Street														
7	L2	110	0.0	116	0.0	0.756	43.8	LOS D	8.3	58.3	1.00	0.90	1.18	26.5
9	R2	232	0.0	244	0.0	* 0.756	45.4	LOS D	8.3	58.3	1.00	0.90	1.20	26.0
Approach		342	0.0	360	0.0	0.756	44.9	LOS D	8.3	58.3	1.00	0.90	1.20	26.2
West: Canterbury Road														
10	L2	168	0.0	177	0.0	0.771	18.4	LOS B	25.9	181.6	0.82	0.77	0.82	41.4
11	T1	1502	0.0	1581	0.0	* 0.771	13.6	LOS A	26.2	183.1	0.82	0.76	0.82	48.4
Approach		1670	0.0	1758	0.0	0.771	14.1	LOS A	26.2	183.1	0.82	0.76	0.82	47.8
All Vehicles		2930	0.0	3084	0.0	0.771	16.1	LOS B	26.2	183.1	0.76	0.70	0.79	45.7

Table B2: Signalised intersection of Canterbury Road with Haldon Street Weekday AM Peak Hour for Existing Conditions with Mixed-Use Traffic

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Flora Street														
1	L2	104	0.0	109	0.0	0.125	6.6	LOS A	0.5	3.2	0.45	0.66	0.45	45.5
Approach		104	0.0	109	0.0	0.125	6.6	LOS A	0.5	3.2	0.45	0.66	0.45	45.5
East: Canterbury Road														
4	L2	65	0.0	68	0.0	0.245	5.4	LOS A	0.0	0.0	0.00	0.08	0.00	56.1
5	T1	840	0.0	884	0.0	0.245	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	59.1
Approach		905	0.0	953	0.0	0.245	0.5	NA	0.0	0.0	0.00	0.04	0.00	58.9
West: Canterbury Road														
11	T1	1670	0.0	1758	0.0	0.451	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.7
Approach		1670	0.0	1758	0.0	0.451	0.2	NA	0.0	0.0	0.00	0.00	0.00	59.7
All Vehicles		2679	0.0	2820	0.0	0.451	0.5	NA	0.5	3.2	0.02	0.04	0.02	58.7

Table B3: Priority intersection of Canterbury Road with Flora Street Weekday AM Peak Hour for Existing Conditions with Mixed-Use Traffic

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 110 seconds (Site Practical Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV %	[Total veh/h	HV %				[Veh. veh	Dist] m				
South: King Georges Road														
1	L2	100	0.0	105	0.0	0.095	12.0	LOS A	2.0	13.9	0.49	0.65	0.49	43.1
2	T1	1322	0.0	1392	0.0	0.606	36.4	LOS C	21.7	152.1	0.92	0.79	0.92	37.7
3	R2	140	0.0	147	0.0	0.280	54.8	LOS D	3.7	26.2	0.97	0.75	0.97	28.9
Approach		1562	0.0	1644	0.0	0.606	36.5	LOS C	21.7	152.1	0.90	0.78	0.90	37.0
East: Canterbury Road														
4	L2	302	0.0	318	0.0	0.306	41.1	LOS C	8.4	58.5	0.86	0.76	0.86	32.2
5	T1	1026	0.0	1080	0.0	* 0.875	46.9	LOS D	31.6	221.1	0.97	0.97	1.14	34.2
6	R2	269	0.0	283	0.0	* 0.847	61.0	LOS E	16.2	113.5	1.00	0.94	1.21	27.5
Approach		1597	0.0	1681	0.0	0.875	48.1	LOS D	31.6	221.1	0.95	0.93	1.10	32.5
North: King Georges Road														
7	L2	201	8.7	212	8.7	0.151	6.6	LOS A	2.2	16.4	0.27	0.59	0.27	45.9
8	T1	1805	3.5	1900	3.5	* 0.888	48.4	LOS D	38.8	279.7	0.99	1.00	1.16	33.6
9	R2	203	6.1	214	6.1	* 0.849	63.5	LOS E	12.4	91.3	1.00	0.95	1.26	26.9
Approach		2209	4.2	2325	4.2	0.888	46.0	LOS D	38.8	279.7	0.93	0.96	1.09	33.7
West: Canterbury Road														
10	L2	222	0.0	234	0.0	0.215	11.7	LOS A	4.6	32.4	0.50	0.67	0.50	43.3
11	T1	565	0.0	595	0.0	0.395	34.8	LOS C	12.9	90.3	0.87	0.73	0.87	38.5
12	R2	177	0.0	186	0.0	0.557	53.8	LOS D	9.6	67.0	0.99	0.80	0.99	29.2
Approach		964	0.0	1015	0.0	0.557	33.0	LOS C	12.9	90.3	0.80	0.73	0.80	37.2
All Vehicles		6332	1.5	6665	1.5	0.888	42.2	LOS C	38.8	279.7	0.91	0.87	1.00	34.6

Table B4: Signalised intersection of King Georges Road with Canterbury Road PM Peak Hour for Existing Conditions with Mixed-Use Traffic

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 70 seconds (Site Optimum Cycle Time - Minimum Delay)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
East: Canterbury Road														
5	T1	1398	0.0	1472	0.0	0.739	11.0	LOS A	21.2	148.3	0.74	0.68	0.75	50.4
6	R2	98	0.0	103	0.0	0.739*	26.0	LOS B	16.9	118.1	0.92	0.85	0.97	36.8
Approach		1496	0.0	1575	0.0	0.739	12.0	LOS A	21.2	148.3	0.75	0.69	0.76	49.6
North: Haldon Street														
7	L2	75	0.0	79	0.0	0.589	36.7	LOS C	5.3	37.1	0.98	0.81	1.01	28.6
9	R2	192	0.0	202	0.0	0.589*	37.9	LOS C	5.3	37.1	0.99	0.81	1.03	28.2
Approach		267	0.0	281	0.0	0.589	37.6	LOS C	5.3	37.1	0.99	0.81	1.02	28.3
West: Canterbury Road														
10	L2	122	0.0	128	0.0	0.763	28.6	LOS C	17.1	119.5	0.95	0.89	1.03	35.2
11	T1	881	0.0	927	0.0	0.763*	23.8	LOS B	17.3	120.8	0.95	0.89	1.02	42.6
Approach		1003	0.0	1056	0.0	0.763	24.4	LOS B	17.3	120.8	0.95	0.89	1.02	41.8
All Vehicles		2766	0.0	2912	0.0	0.763	18.9	LOS B	21.2	148.3	0.84	0.77	0.88	44.2

Table B5: Signalised intersection of Canterbury Road with Haldon Street Weekday PM Peak Hour for Existing Conditions with Mixed-Use Traffic

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

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Flora Street														
1	L2	47	0.0	49	0.0	0.099	10.2	LOS A	0.3	2.3	0.65	0.83	0.65	43.5
Approach		47	0.0	49	0.0	0.099	10.2	LOS A	0.3	2.3	0.65	0.83	0.65	43.5
East: Canterbury Road														
4	L2	70	0.0	74	0.0	0.445	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.8
5	T1	1577	0.0	1660	0.0	0.445	0.2	LOS A	0.0	0.0	0.00	0.02	0.00	59.2
Approach		1647	0.0	1734	0.0	0.445	0.4	NA	0.0	0.0	0.00	0.03	0.00	59.1
West: Canterbury Road														
11	T1	902	0.0	949	0.0	0.243	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	59.9
Approach		902	0.0	949	0.0	0.243	0.1	NA	0.0	0.0	0.00	0.00	0.00	59.9
All Vehicles		2596	0.0	2733	0.0	0.445	0.5	NA	0.3	2.3	0.01	0.03	0.01	59.0

Table B6: Priority intersection of Canterbury Road with Flora Street Weekday PM Peak Hour for Existing Conditions with Mixed-Use Traffic