

Proposed Two-Way Traffic
Langley Avenue, Cremorne

TRAFFIC MANAGEMENT PLAN

30 January 2015

Ref 13505

VARGA TRAFFIC PLANNING Pty Ltd
Transport, Traffic and Parking Consultants 

Suite 6, 20 Young Street, Neutral Bay NSW 2089 - PO Box 1868, Neutral Bay NSW 2089
Ph: 9904 3224 Fax: 9904 3228

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1. INTRODUCTION

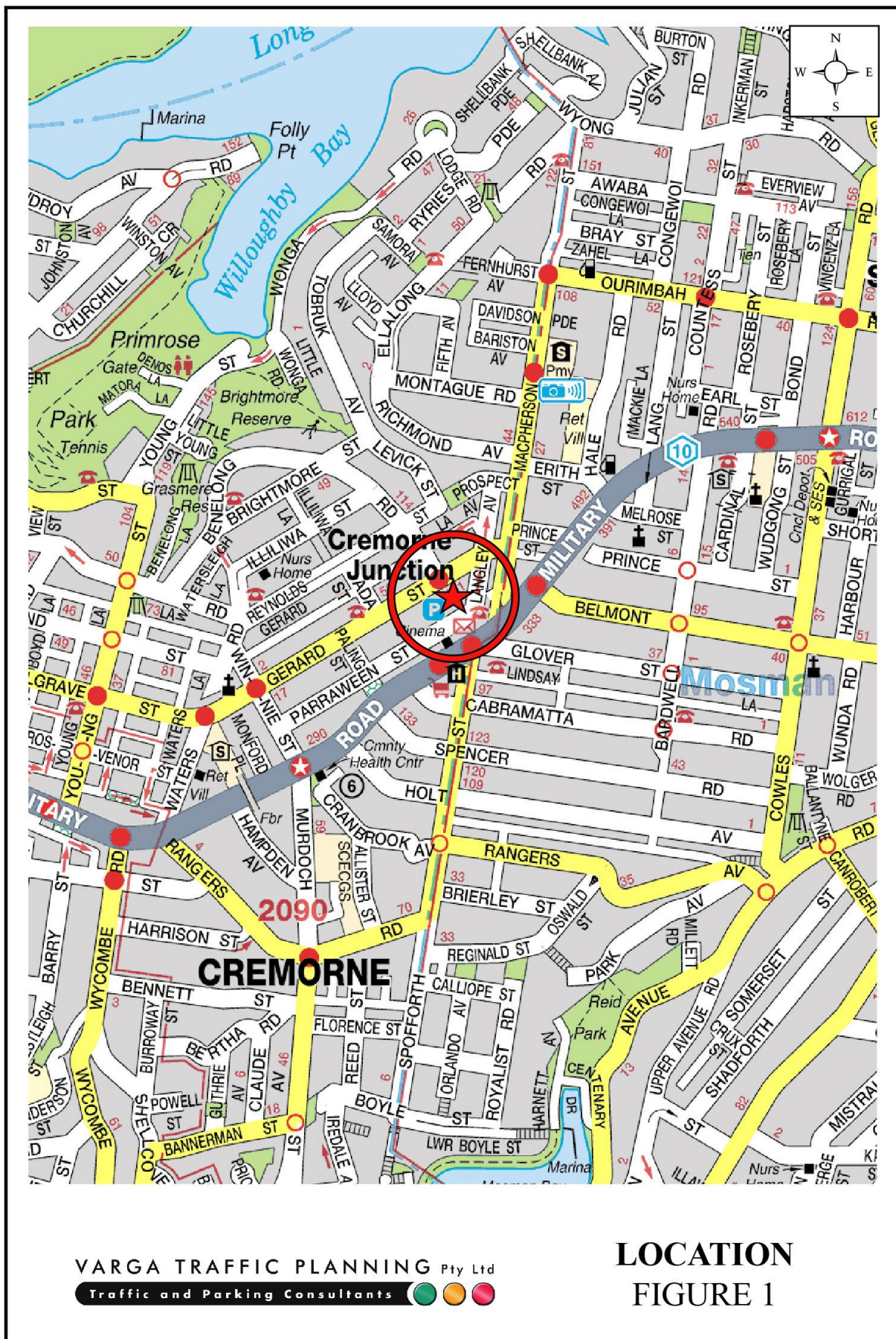
This Traffic Management Plan has been prepared on behalf of North Sydney Council to review the traffic implications of a proposal to implement two-way traffic flows in the southern half of the section of Langley Avenue between Gerard Street and Parraween Street, Cremorne.

The purpose of the proposed two-way traffic flows in the southern part of Langley Avenue is to enable the vehicular access driveway serving the public car parking area in Parraween Street to be relocated to Langley Avenue.

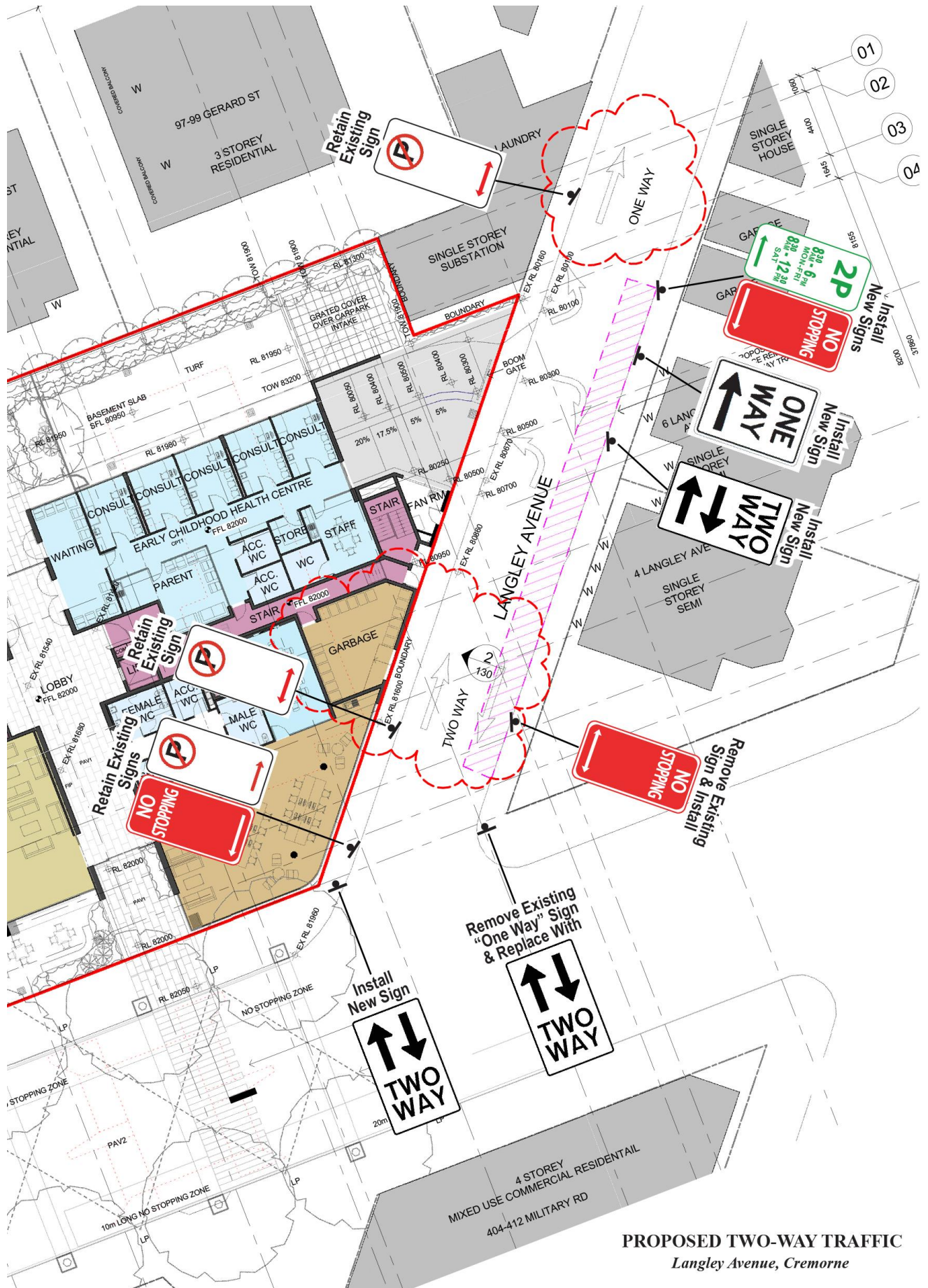
The conversion to two-way traffic will enable traffic departing the car parking area via the new driveway in Langley Avenue to return to Parraween Street and then proceed in either an eastbound or westbound direction along Parraween Street, as occurs at present.

The works are proposed as part of an expansion of the existing public car parking area to provide three underground parking levels in conjunction with an upgrade of the existing Community Health Centre on the site, and the provision of a residential and retail component on the levels above.

A plan illustrating the proposed traffic and parking arrangements in Langley Avenue is reproduced in the following pages.







PROPOSED TWO-WAY TRAFFIC
Langley Avenue, Cremorne

2. EXISTING CONDITIONS

Road Hierarchy

The road hierarchy allocated to the road network in the vicinity of the site by the Roads and Maritime Services is illustrated on Figure 3.

Military Road is classified by the RMS as a *State Road* and provides the key east-west road link in the area, linking Falcon Street to Spit Road. It typically carries three traffic lanes in each direction in the vicinity of the site, with opposing traffic flows separated by a central median island. Clearway/Bus Lane restrictions apply during commuter peak periods.

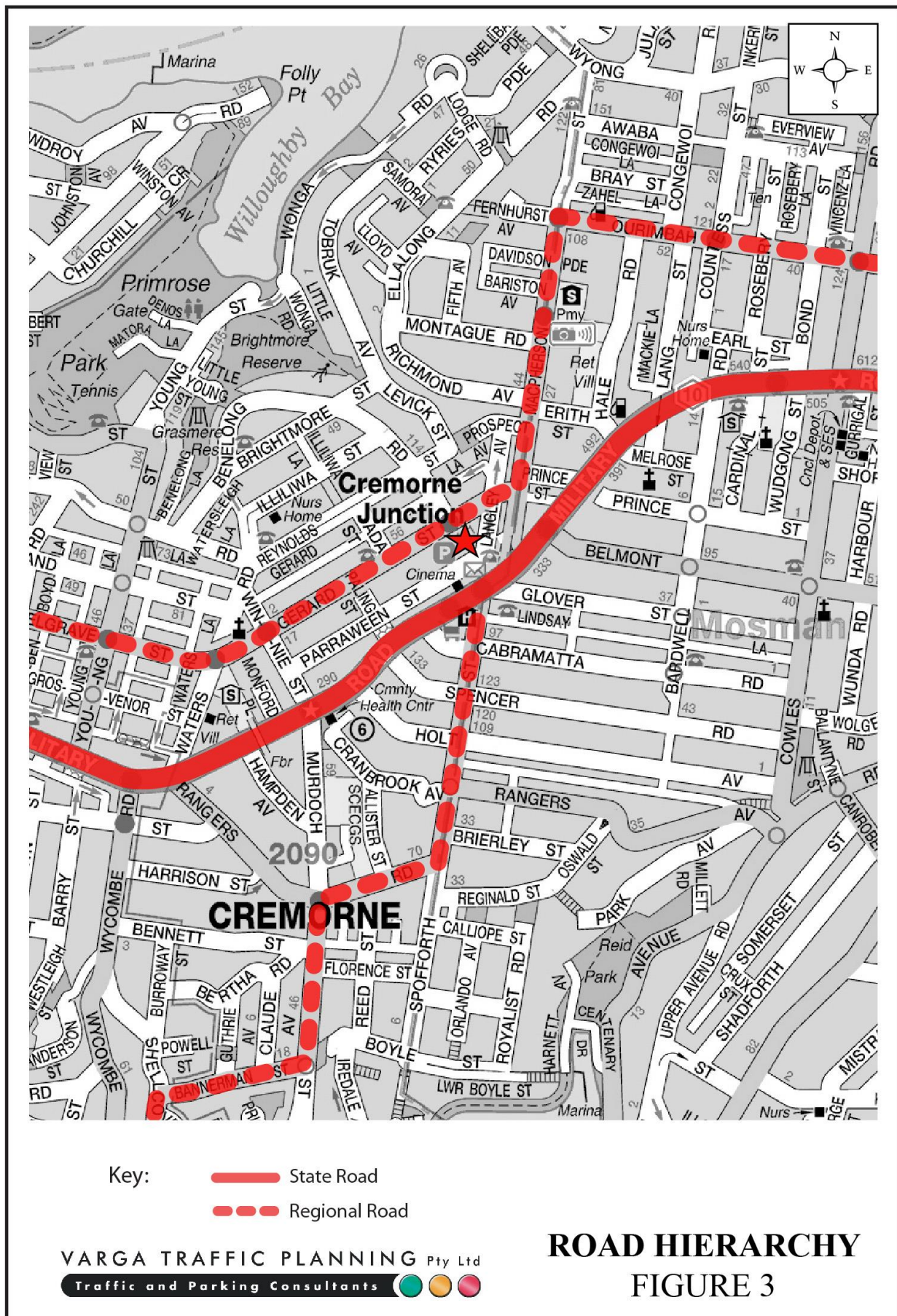
The Belgrave Street / Gerard Street / Macpherson Street / Ourimbah Street route is classified by the RMS as a *Regional Road* which provides a secondary east-west road link in the area, between Ernest Street and Spit Road. It typically carries two traffic lanes in each direction in the vicinity of the site with kerbside parking generally permitted outside commuter peak periods.

Parraween Street and Langley Avenue are local, unclassified roads which are primarily used to provide vehicular and pedestrian access to frontage properties. Kerbside parking is generally permitted on both sides of the road.

Existing Traffic Controls

The existing traffic controls which apply to the road network in the vicinity of the site are illustrated on Figure 4. Key features of those traffic controls are:

- a 60 km/h SPEED LIMIT which applies to Military Road
- a 40 km/h SPEED LIMIT which applies to Parraween Street
- a 50 km/h SPEED LIMIT which applies to all other local roads in the area



- TRAFFIC SIGNALS in Military Road where it intersects with Spofforth Street and also Belmont Road
- ONE-WAY northbound restriction in Langley Avenue in between Gerard Street and Parraween Street
- PEDESTRIAN CROSSING in Parraween Street just west of Langley Avenue.

Existing Traffic Conditions

An indication of the existing traffic conditions on the road network in the vicinity of the site is provided by peak period traffic surveys and 7-day “tube” surveys undertaken as part of this traffic study. The traffic surveys were undertaken at the Parraween Street/Langley Avenue intersection, whilst the “tube” surveys were undertaken in Langley Avenue over a week-long 24-hour period. The results of the surveys are reproduced in full in Appendix A and reveal that:

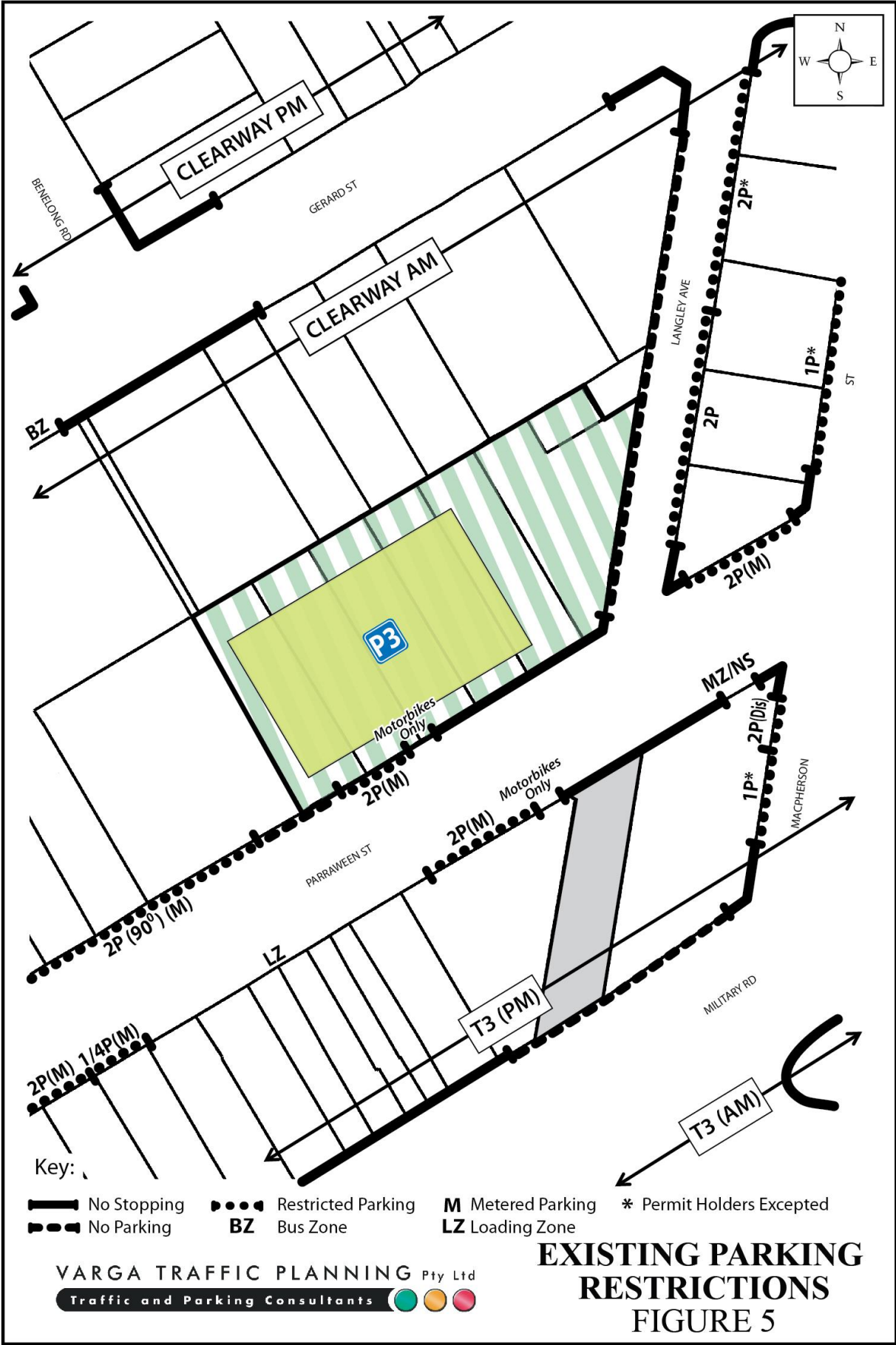
- two-way traffic flows in Parraween Street during the AM peak period are typically in order of 300 vehicles per hour (vph)
- two-way traffic flows in Parraween Street during the PM peak period are typically in the order of 150 vehicles per hour (vph) during peak periods
- one-way northbound traffic flows in Langley Avenue are typically in the order of 20 vph during peak periods.

The traffic surveys were also used to identify the level of traffic activity generated by the existing council car parking area. Those surveys found that the existing car parking area and community health centre generated a maximum of 71 vph in the morning and 111 vph in the afternoon, although it is noted that these *site peaks* did not coincide with the *road peak* traffic flows mentioned above.

Existing Kerbside Parking Restrictions

The existing kerbside parking restrictions which apply to the road network in the vicinity of the site are illustrated on Figure 5 and comprise:

- NO PARKING restrictions on the western side of Langley Avenue along the entire site frontage
- 2 HOUR PARKING on the eastern side of Langley Avenue
- NO STOPPING restriction on both sides of Parraween Street, including a section of the site frontage
- 2 HOUR PARKING (Metered) restriction on both sides of Parraween Street, including a section of the site frontage
- MOTORCYCLE ONLY restrictions on both sides of Parraween Street, including a short section of the Parraween Street site frontage
- 3 HOUR PARKING restriction within the Parraween Street Car Park.



3. PROPOSED TWO-WAY TRAFFIC ARRANGEMENTS

It is proposed to implement two-way traffic flows in the southern half of the section of Langley Avenue between Gerard Street and Parraween Street, Cremorne.

The purpose of the proposed two-way traffic flows in the southern part of Langley Avenue is to enable the vehicular access driveways serving the public car parking area in Parraween Street to be relocated to Langley Avenue.

The conversion to two-way traffic will enable traffic departing the public car parking area via the new driveway in Langley Avenue to return to Parraween Street, and then to proceed in either an eastbound or westbound direction along Parraween Street, as occurs at present.

The proposed change will eliminate the need for a circuitous detour via a left-turn into Gerard Street if the existing one-way restrictions were retained.

In particular, it will simplify the departure routes for traffic intending to proceed northbound along Macpherson Street or to turn left from Macpherson Street into Military Road.

This section of Langley Avenue has a pavement width of 6.8m between kerbs, and is sufficient to accommodate a single traffic lane with kerbside parking, or two-way traffic flows *without* kerbside parking.

The proposed conversion to tow-way traffic will result in the loss of approximately 5 kerbside parking spaces located along the eastern side of Langley Avenue between the proposed car park exit and Parraween Street. The 5 kerbside parking spaces are subject to a 2 *hour parking* restriction during business hours and do *not* form part of the local *resident parking scheme*.

It is considered that the loss of the 5 kerbside parking spaces will be offset by the substantial increase in the number of parking spaces to be provided in the public car parking area as part of the development proposal.

Traffic Assessment

There will be no change to the existing northbound traffic flows in Langley Avenue which can continue as occurs at present.

However, the proposed expansion of the public car parking and associated facilities will result in an increased traffic generation potential of the site, with the majority of that traffic expected to approach and depart the proposed public car parking area via the intersection of Parraween Street and Langley Avenue.

The projected traffic flows expected to be generated by the expansion proposal are illustrated on the traffic assignment shown on Figure 6. Those traffic flows have been assigned to the adjacent road network in accordance with the trends identified by the surveys of existing traffic flows.

The traffic implications of the proposal in terms of road network capacity can be assessed using the SIDRA capacity analysis program, as is widely used by the RMS and many LGA's for this purpose. Criteria for evaluating the results of SIDRA capacity analysis are reproduced in the following pages.

The results of the SIDRA capacity analysis are summarised in Table 3.1 below, revealing that:

- under the proposed traffic arrangements the intersection is expected to operate at *Level of Service "A"*
- total average vehicle delays at the intersection under the proposed arrangements are expected to be in the order of 1.4 seconds per vehicle.

In summary, the capacity analysis confirms that the proposed development will not have any unacceptable traffic implications in terms of road network capacity.

TABLE 3.1
RESULTS OF SIDRA CAPACITY ANALYSIS
PARRAWEEEN STREET & LANGLEY AVENUE INTERSECTION

	AM	PM	SATURDAY
LOS	A	A	A
D/S	0.120	0.086	0.126
AVD	1.4	2.1	2.5

LOS – Level of Service; D/S – Degree of Saturation; AVD – Average Vehicle Delays

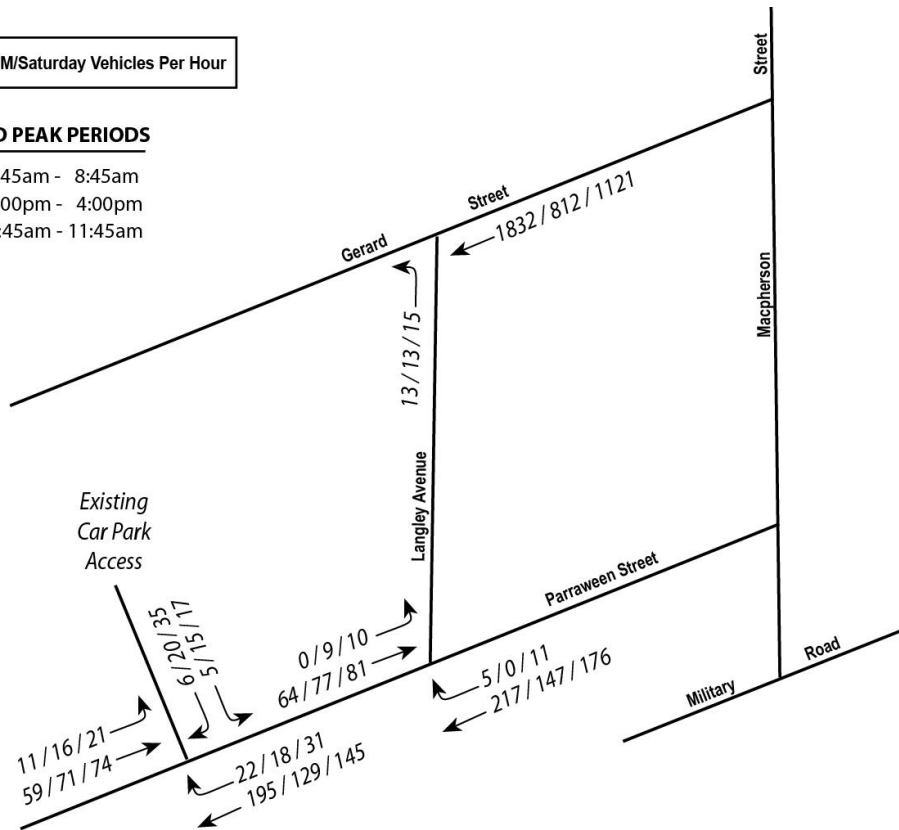
LEGEND: AM/PM/Saturday Vehicles Per Hour

ON-ROAD PEAK PERIODS

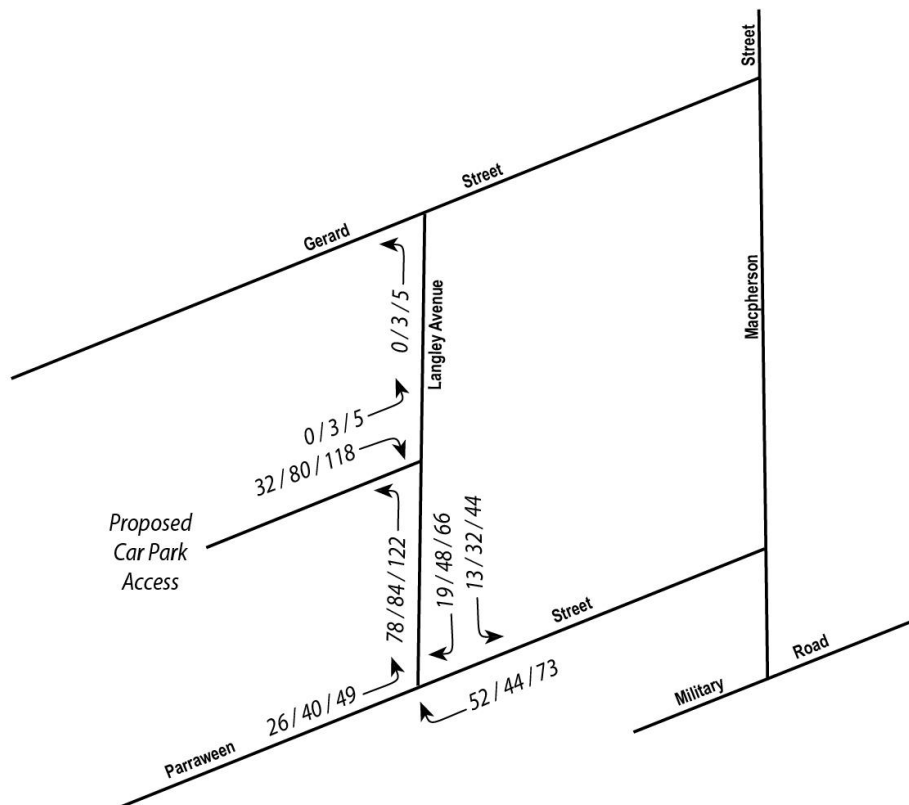
AM: 7:45am - 8:45am

PM: 3:00pm - 4:00pm

SAT: 10:45am - 11:45am



EXISTING TRAFFIC VOLUMES



TRAFFIC ASSIGNMENT

FIGURE 6

4. TRAFFIC MANAGEMENT PLAN

A. Description of Proposed Measures

Is a detailed plan of the proposed measures necessary?

No.

Implementation of two-way traffic flows in the southern part of Langley Avenue will result in the loss of approximately 5 kerbside parking spaces along the eastern side of Langley Avenue.

B. Identification and Assessment of Impact of Proposed Measures

Is a detailed assessment required?

No.

The proposed change to two-way traffic is intended to enable traffic departing the public car parking area to return to their intended departure routes via Parraween Street, without the need for a circuitous detour via a left-turn into Gerard Street. In particular, it will simplify departure routes for traffic intending to proceed northbound along Macpherson Street or to turn left from Macpherson Street into Military Road.

C. Measures to Ameliorate the Impact of Reassigned Traffic

Is an assessment required?

No.

The purpose of the change is to minimise any reassignment of traffic, as detailed above. An analysis of the Parraween Street/Langley Avenue intersection using the SIDRA capacity analysis program indicates that the intersection will operate at Level of Service “A” and with minimal delays at all times.

D. Assessment of Public Transport Services Affected

Is an assessment required?

No.

Langley Avenue and Parraween Street are not on public transport routes.

E. Details of Provision Made for Emergency Vehicles, Heavy Vehicles, Cyclists and Pedestrians

Are these details required?

No.

The proposed change to two-way traffic will not affect:

- pedestrian access
- cycle routes
- emergency vehicle access
- heavy vehicle access

F. Assessment of Effect on Existing and Future Developments with Transport Implications

Is an assessment required?

No.

A separate assessment has been provided for the proposed expansion of the public car parking area and associated facilities.

Impacts to other future developments will be negligible, if any.

G. Assessment of Effect of Proposed Measures on Traffic Movements in Adjoining Council Areas

Is an assessment required?

No.

There will be no effect on adjoining Council areas.

H. Public Consultation Process?

Is a public consultation process required?

Yes.

North Sydney Council is currently undertaking a consultation process with local tenants and property owners.

CONCLUSION

The foregoing assessment has found that the proposed change to two-way traffic in the southern part of Langley Avenue will have minimum effect on the current road network, as it is primarily intended to maintain existing traffic flow options for car park users following relocation of the car park access driveway from Parraween Street to Langley Avenue.

Accordingly, no additional road treatments are considered necessary other than changes to sign posting as illustrated on the Concept Plan.

APPENDIX A

TRAFFIC SURVEY DATA

Count Number 621 Ref : VAR Lat/Long : S33.82674 / E151.23080 UBD 216 M-7
 Street LANGLEY AVENUE, CREMORNE : From MILITARY ROAD to PROSPECT STREET : NORTH BOUND
 Location Between Parraween Street and Gerard Street, midblock, on No Parking Sign Carriageway

TOTAL COUNT MATRIX

Start Date 19-MAY-14
 Start Time 100
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 27
 Weekly 85th Percentile Speed 37
 Five Day AADT 196
 Seven Day AADT 191

	MON 19TH	TUE 20TH	WED 21ST	THU 22ND	FRI 23RD	SAT 24TH	SUN 25TH	5 Day Total Average		7 Day Total Average	
Midnight - 1am	0	1	0	1	0	1	1	2	0	4	1
1am - 2am	0	0	0	1	0	0	2	1	0	3	0
2am - 3am	0	0	0	0	0	0	2	0	0	2	0
3am - 4am	0	0	0	0	1	0	0	1	0	1	0
4am - 5am	0	0	1	2	0	0	0	3	1	3	0
5am - 6am	2	0	0	0	1	0	0	3	1	3	0
6am - 7am	2	4	2	5	4	1	0	17	3	18	3
7am - 8am	4	2	5	3	7	1	3	21	4	25	4
8am - 9am	3	6	5	6	4	6	4	24	5	34	5
9am - 10am	6	8	16	17	11	6	2	58	12	66	9
10am - 11am	13	20	13	15	16	8	5	77	15	90	13
11am - Midday	8	12	10	14	25	13	11	69	14	93	13
Midday - 1pm	7	22	14	9	11	10	32	63	13	105	15
1pm - 2pm	12	22	7	11	9	13	25	61	12	99	14
2pm - 3pm	7	17	15	13	15	11	7	67	13	85	12
3pm - 4pm	15	15	13	12	8	21	26	63	13	110	16
4pm - 5pm	11	12	10	14	19	12	20	66	13	98	14
5pm - 6pm	11	27	15	14	21	16	9	88	18	113	16
6pm - 7pm	17	18	18	16	53	27	9	122	24	158	23
7pm - 8pm	9	10	17	10	30	24	5	76	15	105	15
8pm - 9pm	6	7	11	7	14	5	7	45	9	57	8
9pm - 10pm	5	2	5	3	3	3	2	18	4	23	3
10pm - 11pm	0	7	7	8	6	5	2	28	6	35	5
11pm - Midnight	0	2	1	1	2	3	0	6	1	9	1
Total	138	214	185	182	260	186	174	979	195	1339	191



R.O.A.R. DATA

Reliable, Original & Authentic Results

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Mobile.0418239019

Client : Varga Traffic Plar
 Job No/Name : 4864 CREMORNE Parking & Traffic
 Day/Date : Thursday 31st October 2013

PEDS	WEST	NORTH	EAST	
Time Per	Parraween St	Car Park	Parraween St	TOT
0700 - 0715	0	1	2	3
0715 - 0730	0	3	14	17
0730 - 0745	0	6	23	29
0745 - 0800	0	6	27	33
0800 - 0815	0	2	10	12
0815 - 0830	0	6	21	27
0830 - 0845	0	4	21	25
0845 - 0900	0	5	27	32
0900 - 0915	0	9	20	29
0915 - 0930	0	14	25	39
0930 - 0945	0	7	14	21
0945 - 1000	0	7	14	21
Per End	0	70	218	288

PEDS	WEST	NORTH	EAST	
Peak Per	Parraween St	Car Park	Parraween St	TOT
0700 - 0800	0	16	66	82
0715 - 0815	0	17	74	91
0730 - 0830	0	20	81	101
0745 - 0845	0	18	79	97
0800 - 0900	0	17	79	96
0815 - 0915	0	24	89	113
0830 - 0930	0	32	93	125
0845 - 0945	0	35	86	121
0900 - 1000	0	37	73	110
PEAK HR	0	20	81	101

Lights	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Time Per	I	L	R	L	R	I	TOT
0700 - 0715	10	0	1	0	1	18	30
0715 - 0730	14	3	1	0	3	23	44
0730 - 0745	11	4	0	0	5	40	60
0745 - 0800	15	1	1	1	10	53	81
0800 - 0815	8	4	1	2	3	57	75
0815 - 0830	17	2	2	0	7	59	87
0830 - 0845	19	4	2	2	2	25	54
0845 - 0900	13	3	4	5	8	47	80
0900 - 0915	11	5	4	3	3	41	67
0915 - 0930	12	7	2	2	7	37	67
0930 - 0945	6	4	7	3	3	32	55
0945 - 1000	12	5	5	6	5	24	57
Per End	148	42	30	24	57	456	757

Heavies	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Time Per	I	L	R	L	R	I	TOT
0700 - 0715	2	0	0	0	0	0	2
0715 - 0730	0	0	0	0	0	1	1
0730 - 0745	0	0	0	0	0	0	0
0745 - 0800	0	0	0	0	0	0	0
0800 - 0815	0	0	0	0	0	1	1
0815 - 0830	0	0	0	0	0	0	0
0830 - 0845	0	0	0	0	0	0	0
0845 - 0900	0	0	0	0	0	0	0
0900 - 0915	0	0	0	0	0	0	0
0915 - 0930	0	0	0	0	0	0	0
0930 - 0945	0	0	0	0	0	0	0
0945 - 1000	0	0	0	0	0	0	0
Per End	2	0	0	0	0	2	4

Combined	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Time Per	I	L	R	L	R	I	TOT
0700 - 0715	12	0	1	0	1	18	32
0715 - 0730	14	3	1	0	3	24	45
0730 - 0745	11	4	0	0	5	40	60
0745 - 0800	15	1	1	1	10	53	81
0800 - 0815	8	4	1	2	3	58	76
0815 - 0830	17	2	2	0	7	59	87
0830 - 0845	19	4	2	2	2	25	54
0845 - 0900	13	3	4	5	8	47	80
0900 - 0915	11	5	4	3	3	41	67
0915 - 0930	12	7	2	2	7	37	67
0930 - 0945	6	4	7	3	3	32	55
0945 - 1000	12	5	5	6	5	24	57
Per End	150	42	30	24	57	458	761

Lights	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
0700 - 0800	50	8	3	1	19	134	215
0715 - 0815	48	12	3	3	21	173	260
0730 - 0830	51	11	4	3	25	209	303
0745 - 0845	59	11	6	5	22	194	297
0800 - 0900	57	13	9	9	20	188	296
0815 - 0915	60	14	12	10	20	172	288
0830 - 0930	55	19	12	12	20	150	268
0845 - 0945	42	19	17	13	21	157	269
0900 - 1000	41	21	18	14	18	134	246

Heavies	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
0700 - 0800	2	0	0	0	0	1	3
0715 - 0815	0	0	0	0	0	2	2
0730 - 0830	0	0	0	0	0	1	1
0745 - 0845	0	0	0	0	0	1	1
0800 - 0900	0	0	0	0	0	1	1
0815 - 0915	0	0	0	0	0	0	0
0830 - 0930	0	0	0	0	0	0	0
0845 - 0945	0	0	0	0	0	0	0
0900 - 1000	0	0	0	0	0	0	0

Combined	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
0700 - 0800	52	8	3	1	19	135	218
0715 - 0815	48	12	3	3	21	175	262
0730 - 0830	51	11	4	3	25	210	304
0745 - 0845	59	11	6	5	22	195	298
0800 - 0900	57	13	9	9	20	189	297
0815 - 0915	60	14	12	10	20	172	288
0830 - 0930	55	19	12	12	20	150	268
0845 - 0945	42	19	17	13	21	157	269
0900 - 1000	41	21	18	14	18	134	246

PEAK HR	51	11	4	3	25	209	303
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PEAK HR	0	0	0	0	0	1	1
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PEAK HR	51	11	4	3	25	210	304
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R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph.88196847, Fax 88196849, Mob.0418-239019

Client : Varga Traffic Plar

Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

1

2

3

4

5

6

7

8

9

N



TOTAL VOLUMES
FOR COUNT
PERIOD

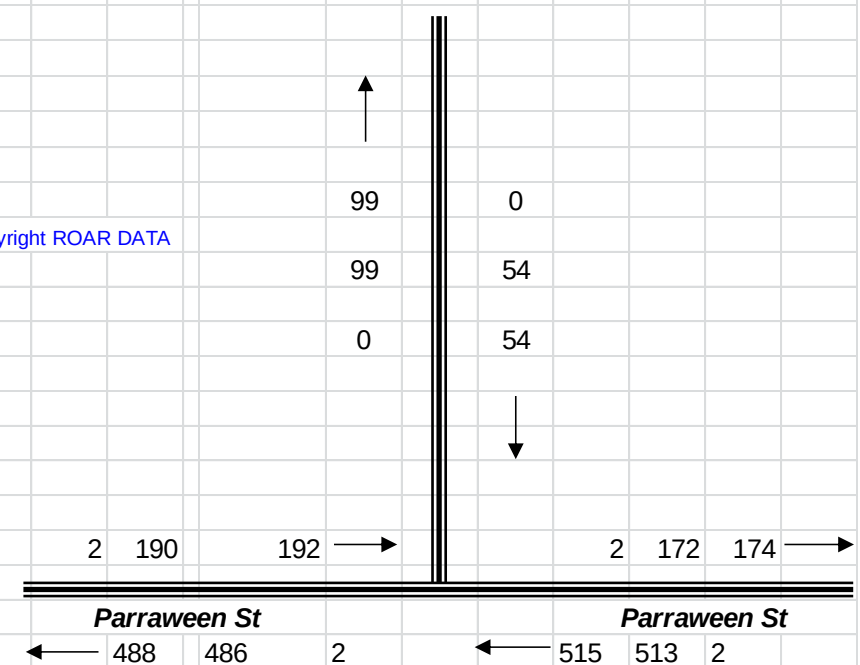
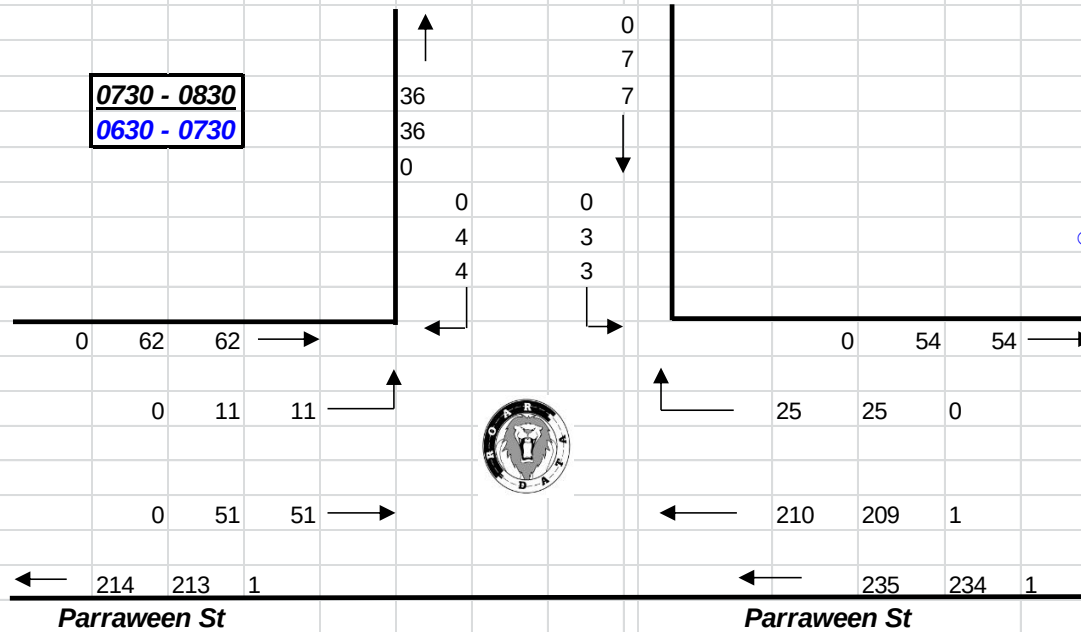
Car Park

Car Park

0730 - 0830

0630 - 0730

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Client : Varga Traffic Plar

Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

At Start **10**

CAR PARK

Time Per	Accumulation
0700 - 0715	10
0715 - 0730	15
0730 - 0745	24
0745 - 0800	33
0800 - 0815	37
0815 - 0830	44
0830 - 0845	46
0845 - 0900	48
0900 - 0915	49
0915 - 0930	59
0930 - 0945	56
0945 - 1000	55

At Finish **55**

Capacity **63**



R.O.A.R. DATA

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Client : Varga Traffic Plc

Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

PEDS	WEST	NORTH	EAST	
Time Per	Parraween St	Car Park	Parraween St	TOT
1500 - 1515	0	21	19	40
1515 - 1530	0	14	21	35
1530 - 1545	0	11	25	36
1545 - 1600	0	8	15	23
1600 - 1615	0	6	18	24
1615 - 1630	0	7	13	20
1630 - 1645	0	5	12	17
1645 - 1700	0	3	14	17
1700 - 1715	0	8	13	21
1715 - 1730	0	2	22	24
1730 - 1745	0	10	33	43
1745 - 1800	0	2	23	25
Per End	0	97	228	325

PEDS	WEST	NORTH	EAST	
Peak Per	Parraween St	Car Park	Parraween St	TOT
1500 - 1600	0	54	80	134
1515 - 1615	0	39	79	118
1530 - 1630	0	32	71	103
1545 - 1645	0	26	58	84
1600 - 1700	0	21	57	78
1615 - 1715	0	23	52	75
1630 - 1730	0	18	61	79
1645 - 1745	0	23	82	105
1700 - 1800	0	22	91	113
PEAK HR	0	39	79	118

Lights	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Time Per	I	L	R	L	R	I	TOT
1500 - 1515	13	4	5	4	7	33	66
1515 - 1530	22	5	11	7	1	35	81
1530 - 1545	20	4	1	3	7	38	73
1545 - 1600	16	3	3	1	3	23	49
1600 - 1615	26	4	4	3	2	32	71
1615 - 1630	11	3	2	1	2	22	41
1630 - 1645	14	5	6	5	2	37	69
1645 - 1700	18	3	3	0	5	29	58
1700 - 1715	19	4	7	3	1	17	51
1715 - 1730	16	4	5	4	4	19	52
1730 - 1745	18	9	10	10	8	23	78
1745 - 1800	11	14	13	7	8	37	90
Per End	204	62	70	48	50	345	779

Heavies	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Time Per	I	L	R	L	R	I	TOT
1500 - 1515	0	0	0	0	0	0	0
1515 - 1530	0	0	0	0	0	0	0
1530 - 1545	0	0	0	0	0	0	0
1545 - 1600	0	0	0	0	0	0	0
1600 - 1615	0	0	0	0	0	0	0
1615 - 1630	0	0	0	0	0	0	0
1630 - 1645	0	0	0	0	0	0	0
1645 - 1700	0	0	0	0	0	0	0
1700 - 1715	0	0	0	0	0	0	0
1715 - 1730	0	0	0	0	0	0	0
1730 - 1745	0	0	0	0	0	0	0
1745 - 1800	0	0	0	0	0	0	0
Per End	0	0	0	0	0	0	0

Combined	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Time Per	I	L	R	L	R	I	TOT
1500 - 1515	13	4	5	4	7	33	66
1515 - 1530	22	5	11	7	1	35	81
1530 - 1545	20	4	1	3	7	38	73
1545 - 1600	16	3	3	1	3	23	49
1600 - 1615	26	4	4	3	2	32	71
1615 - 1630	11	3	2	1	2	22	41
1630 - 1645	14	5	6	5	2	37	69
1645 - 1700	18	3	3	0	5	29	58
1700 - 1715	19	4	7	3	1	17	51
1715 - 1730	16	4	5	4	4	19	52
1730 - 1745	18	9	10	10	8	23	78
1745 - 1800	11	14	13	7	8	37	90
Per End	204	62	70	48	50	345	779

Lights	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
1500 - 1600	71	16	20	15	18	129	269
1515 - 1615	84	16	19	14	13	128	274
1530 - 1630	73	14	10	8	14	115	234
1545 - 1645	67	15	15	10	9	114	230
1600 - 1700	69	15	15	9	11	120	239
1615 - 1715	62	15	18	9	10	105	219
1630 - 1730	67	16	21	12	12	102	230
1645 - 1745	71	20	25	17	18	88	239
1700 - 1800	64	31	35	24	21	96	271
PEAK HR	84	16	19	14	13	128	274

Heavies	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
1500 - 1600	0	0	0	0	0	0	0
1515 - 1615	0	0	0	0	0	0	0
1530 - 1630	0	0	0	0	0	0	0
1545 - 1645	0	0	0	0	0	0	0
1600 - 1700	0	0	0	0	0	0	0
1615 - 1715	0	0	0	0	0	0	0
1630 - 1730	0	0	0	0	0	0	0
1645 - 1745	0	0	0	0	0	0	0
1700 - 1800	0	0	0	0	0	0	0
PEAK HR	0	0	0	0	0	0	0

Combined	WEST		NORTH		EAST		
	Parraween St		Car Park		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
1500 - 1600	71	16	20	15	18	129	269
1515 - 1615	84	16	19	14	13	128	274
1530 - 1630	73	14	10	8	14	115	234
1545 - 1645	67	15	15	10	9	114	230
1600 - 1700	69	15	15	9	11	120	239
1615 - 1715	62	15	18	9	10	105	219
1630 - 1730	67	16	21	12	12	102	230
1645 - 1745	71	20	25	17	18	88	239
1700 - 1800	64	31	35	24	21	96	271
PEAK HR	84	16	19	14	13	128	274



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Client : Varga Traffic Plc

Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

1	2	3
4	5	6
7	8	9



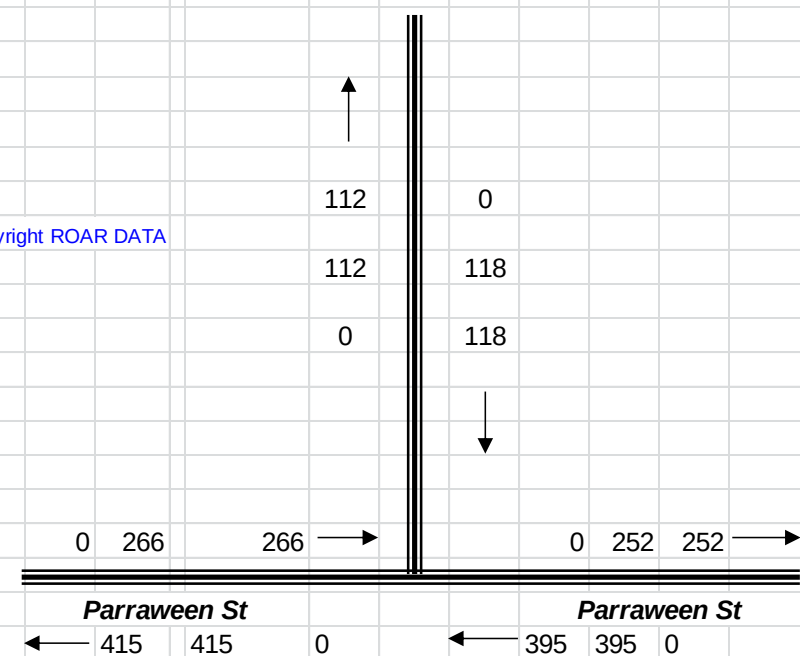
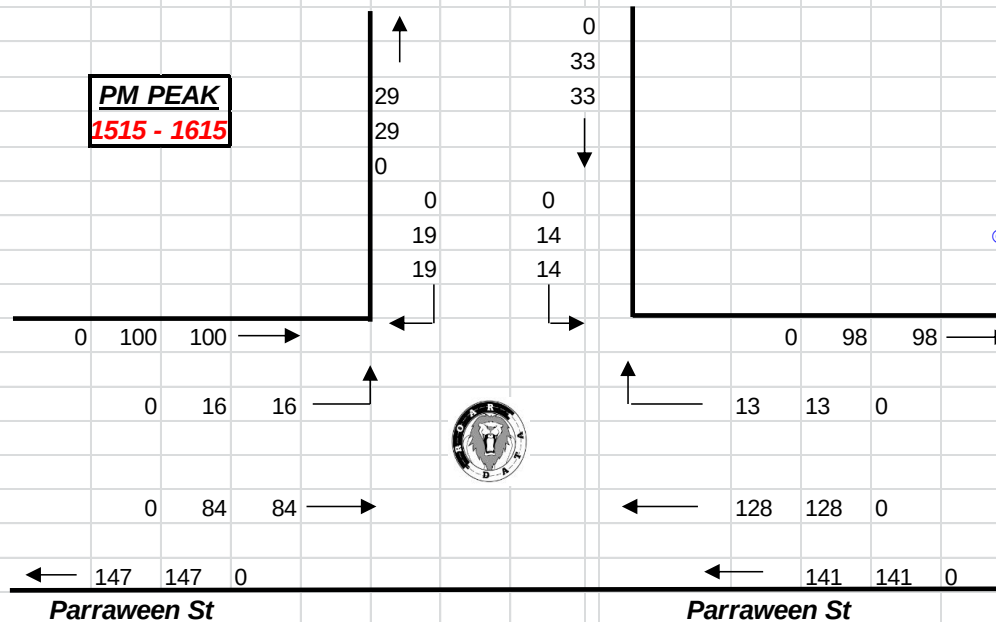
**TOTAL VOLUMES
FOR COUNT
PERIOD**

PM PEAK
1515 - 1615

Car Park

Car Park

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Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

At Start **58**

Time Per	CAR PARK Accumulation
1500 - 1515	60
1515 - 1530	48
1530 - 1545	55
1545 - 1600	57
1600 - 1615	56
1615 - 1630	58
1630 - 1645	54
1645 - 1700	59
1700 - 1715	54
1715 - 1730	53
1730 - 1745	50
1745 - 1800	52

At Finish **52**

Capacity **63**



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Client : Varga Traffic Planning
Job No/Name : 4864 CREMORNE Parking & Traffic
Day/Date : Thursday 31st October 2013

Intersection Layout

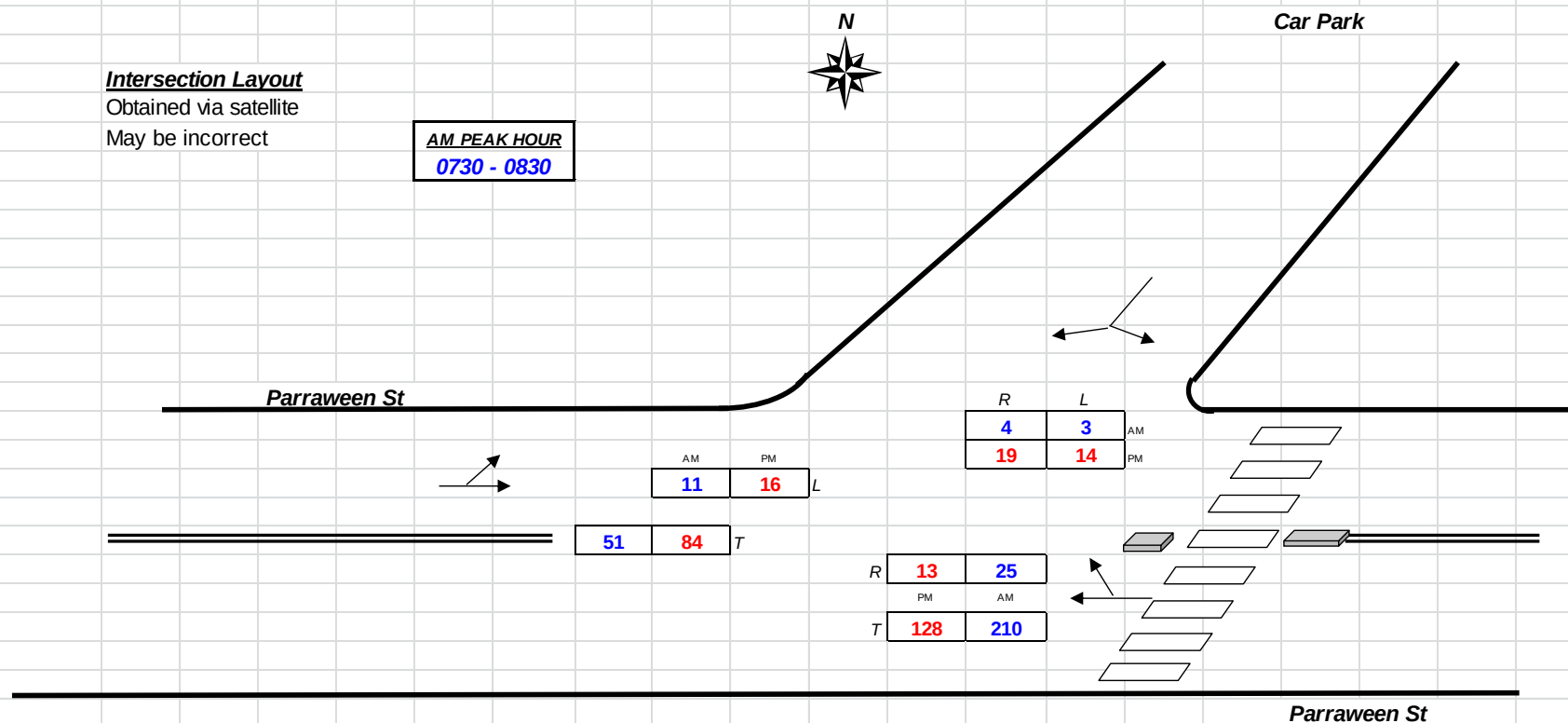
Obtained via satellite

May be incorrect

AM PEAK HOUR
0730 - 0830



Car Park



Combined figures only

PM PEAK HOUR
1515 - 1615

Weather >>>





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Mobile.0418239019

Client : Varga Traffic Plar

Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

PEDS	WEST	NORTH	EAST	
Time Per	Parraween St	Langley Ave	Parraween St	TOT
0700 - 0715	0	1	0	1
0715 - 0730	0	9	0	9
0730 - 0745	0	2	0	2
0745 - 0800	0	8	0	8
0800 - 0815	0	3	0	3
0815 - 0830	0	6	0	6
0830 - 0845	0	2	0	2
0845 - 0900	0	4	0	4
0900 - 0915	0	3	0	3
0915 - 0930	0	2	0	2
0930 - 0945	0	6	0	6
0945 - 1000	0	5	0	5
Per End	0	51	0	51

PEDS	WEST	NORTH	EAST	
Peak Per	Parraween St	Langley Ave	Parraween St	TOT
0700 - 0800	0	20	0	20
0715 - 0815	0	22	0	22
0730 - 0830	0	19	0	19
0745 - 0845	0	19	0	19
0800 - 0900	0	15	0	15
0815 - 0915	0	15	0	15
0830 - 0930	0	11	0	11
0845 - 0945	0	15	0	15
0900 - 1000	0	16	0	16
PEAK HR	0	19	0	19

Lights	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Time Per	I	L	R	L	R	I	TOT
0700 - 0715	10	0			0	19	29
0715 - 0730	14	0			1	26	41
0730 - 0745	11	0			2	45	58
0745 - 0800	16	0			1	63	80
0800 - 0815	10	0			3	60	73
0815 - 0830	17	0			1	66	84
0830 - 0845	21	0			0	27	48
0845 - 0900	18	0			0	55	73
0900 - 0915	14	0			0	44	58
0915 - 0930	14	0			1	44	59
0930 - 0945	9	0			1	35	45
0945 - 1000	17	1			0	29	47
Per End	171	1	0	0	10	513	695

Heavies	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Time Per	I	L	R	L	R	I	TOT
0700 - 0715	2	0			0	0	2
0715 - 0730	0	0			0	1	1
0730 - 0745	0	0			0	0	0
0745 - 0800	0	0			0	0	0
0800 - 0815	0	0			0	1	1
0815 - 0830	0	0			0	0	0
0830 - 0845	0	0			0	0	0
0845 - 0900	0	0			0	0	0
0900 - 0915	0	0			0	0	0
0915 - 0930	0	0			0	0	0
0930 - 0945	0	0			0	0	0
0945 - 1000	0	0			0	0	0
Per End	2	0	0	0	0	2	4

Combined	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Time Per	I	L	R	L	R	I	TOT
0700 - 0715	12	0	0	0	0	19	31
0715 - 0730	14	0	0	0	1	27	42
0730 - 0745	11	0	0	0	2	45	58
0745 - 0800	16	0	0	0	1	63	80
0800 - 0815	10	0	0	0	3	61	74
0815 - 0830	17	0	0	0	1	66	84
0830 - 0845	21	0	0	0	0	27	48
0845 - 0900	18	0	0	0	0	55	73
0900 - 0915	14	0	0	0	0	44	58
0915 - 0930	14	0	0	0	1	44	59
0930 - 0945	9	0	0	0	1	35	45
0945 - 1000	17	1	0	0	0	29	47
Per End	173	1	0	0	10	515	699

Lights	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
0700 - 0800	51	0	0	0	4	153	208
0715 - 0815	51	0	0	0	7	194	252
0730 - 0830	54	0	0	0	7	234	295
0745 - 0845	64	0	0	0	5	216	285
0800 - 0900	66	0	0	0	4	208	278
0815 - 0915	70	0	0	0	1	192	263
0830 - 0930	67	0	0	0	1	170	238
0845 - 0945	55	0	0	0	2	178	235
0900 - 1000	54	1	0	0	2	152	209
PEAK HR	54	0	0	0	7	234	295

Heavies	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
0700 - 0800	2	0	0	0	0	1	3
0715 - 0815	0	0	0	0	0	2	2
0730 - 0830	0	0	0	0	0	1	1
0745 - 0845	0	0	0	0	0	1	1
0800 - 0900	0	0	0	0	0	1	1
0815 - 0915	0	0	0	0	0	0	0
0830 - 0930	0	0	0	0	0	0	0
0845 - 0945	0	0	0	0	0	0	0
0900 - 1000	0	0	0	0	0	0	0
PEAK HR	0	0	0	0	0	1	1

Combined	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
0700 - 0800	53	0	0	0	4	154	211
0715 - 0815	51	0	0	0	7	196	254
0730 - 0830	54	0	0	0	7	235	296
0745 - 0845	64	0	0	0	5	217	286
0800 - 0900	66	0	0	0	4	209	279
0815 - 0915	70	0	0	0	1	192	263
0830 - 0930	67	0	0	0	1	170	238
0845 - 0945	55	0	0	0	2	178	235
0900 - 1000	54	1	0	0	2	152	209
PEAK HR	54	0	0	0	7	235	296



R.O.A.R. DATA

Reliable, Original & Authentic Results

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Client : Varga Traffic Plar

Job No/Name : 4864 CREMORNE Parking & Traffic

Day/Date : Thursday 31st October 2013

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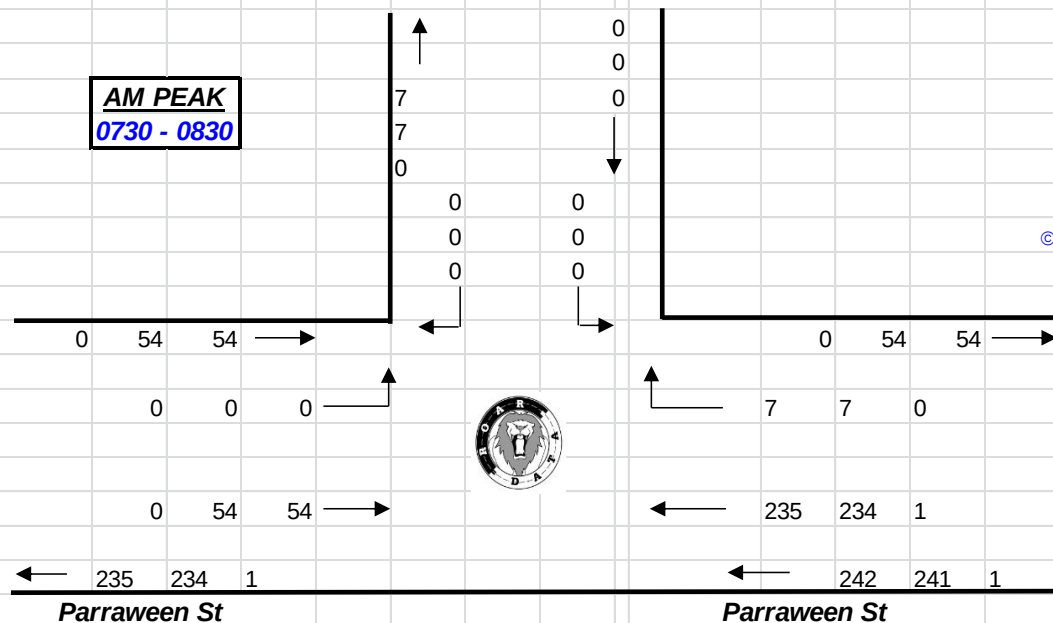
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TOTAL VOLUMES
FOR COUNT
PERIOD

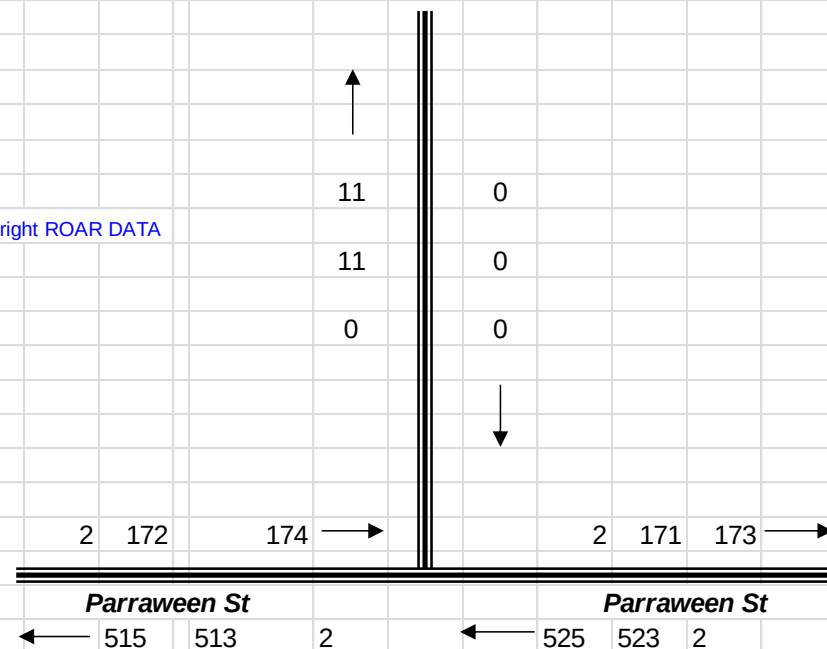
Langley Ave

AM PEAK
0730 - 0830



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Langley Ave





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Mobile.0418239019

Client : Varga Traffic Plc
 Job No/Name : 4864 CREMORNE Parking & Traffic
 Day/Date : Thursday 31st October 2013

PEDS	WEST	NORTH	EAST	
Time Per	Parraween St	Langley Ave	Parraween St	TOT
1500 - 1515	0	16	0	16
1515 - 1530	0	9	0	9
1530 - 1545	0	9	0	9
1545 - 1600	0	3	0	3
1600 - 1615	0	8	0	8
1615 - 1630	0	3	0	3
1630 - 1645	0	5	0	5
1645 - 1700	0	6	0	6
1700 - 1715	0	8	0	8
1715 - 1730	0	2	0	2
1730 - 1745	0	5	0	5
1745 - 1800	0	10	0	10
Per End	0	84	0	84

PEDS	WEST	NORTH	EAST	
Peak Per	Parraween St	Langley Ave	Parraween St	TOT
1500 - 1600	0	37	0	37
1515 - 1615	0	29	0	29
1530 - 1630	0	23	0	23
1545 - 1645	0	19	0	19
1600 - 1700	0	22	0	22
1615 - 1715	0	22	0	22
1630 - 1730	0	21	0	21
1645 - 1745	0	21	0	21
1700 - 1800	0	25	0	25
PEAK HR	0	29	0	29

Lights	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Time Per	I	L	R	L	R	I	TOT
1500 - 1515	17	0			0	40	57
1515 - 1530	26	3			0	36	65
1530 - 1545	20	3			0	45	68
1545 - 1600	14	3			0	26	43
1600 - 1615	26	3			0	34	63
1615 - 1630	7	5			1	24	37
1630 - 1645	19	0			0	39	58
1645 - 1700	17	1			0	34	52
1700 - 1715	21	1			0	18	40
1715 - 1730	19	1			0	23	43
1730 - 1745	27	1			0	31	59
1745 - 1800	17	1			0	45	63
Per End	230	22	0	0	1	395	648

Heavies	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Time Per	I	L	R	L	R	I	TOT
1500 - 1515	0	0			0	0	0
1515 - 1530	0	0			0	0	0
1530 - 1545	0	0			0	0	0
1545 - 1600	0	0			0	0	0
1600 - 1615	0	0			0	0	0
1615 - 1630	0	0			0	0	0
1630 - 1645	0	0			0	0	0
1645 - 1700	0	0			0	0	0
1700 - 1715	0	0			0	0	0
1715 - 1730	0	0			0	0	0
1730 - 1745	0	0			0	0	0
1745 - 1800	0	0			0	0	0
Per End	0	0	0	0	0	0	0

Combined	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Time Per	I	L	R	L	R	I	TOT
1500 - 1515	17	0	0	0	0	40	57
1515 - 1530	26	3	0	0	0	36	65
1530 - 1545	20	3	0	0	0	45	68
1545 - 1600	14	3	0	0	0	26	43
1600 - 1615	26	3	0	0	0	34	63
1615 - 1630	7	5	0	0	1	24	37
1630 - 1645	19	0	0	0	0	39	58
1645 - 1700	17	1	0	0	0	34	52
1700 - 1715	21	1	0	0	0	18	40
1715 - 1730	19	1	0	0	0	23	43
1730 - 1745	27	1	0	0	0	31	59
1745 - 1800	17	1	0	0	0	45	63
Per End	230	22	0	0	1	395	648

Lights	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
1500 - 1600	77	9	0	0	0	147	233
1515 - 1615	86	12	0	0	0	141	239
1530 - 1630	67	14	0	0	1	129	211
1545 - 1645	66	11	0	0	1	123	201
1600 - 1700	69	9	0	0	1	131	210
1615 - 1715	64	7	0	0	1	115	187
1630 - 1730	76	3	0	0	0	114	193
1645 - 1745	84	4	0	0	0	106	194
1700 - 1800	84	4	0	0	0	117	205
PEAK HR	86	12	0	0	0	141	239

Heavies	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
1500 - 1600	0	0	0	0	0	0	0
1515 - 1615	0	0	0	0	0	0	0
1530 - 1630	0	0	0	0	0	0	0
1545 - 1645	0	0	0	0	0	0	0
1600 - 1700	0	0	0	0	0	0	0
1615 - 1715	0	0	0	0	0	0	0
1630 - 1730	0	0	0	0	0	0	0
1645 - 1745	0	0	0	0	0	0	0
1700 - 1800	0	0	0	0	0	0	0
PEAK HR	0	0	0	0	0	0	0

Combined	WEST		NORTH		EAST		
	Parraween St		Langley Ave		Parraween St		
Peak Per	I	L	R	L	R	I	TOT
1500 - 1600	77	9	0	0	0	147	233
1515 - 1615	86	12	0	0	0	141	239
1530 - 1630	67	14	0	0	1	129	211
1545 - 1645	66	11	0	0	1	123	201
1600 - 1700	69	9	0	0	1	131	210
1615 - 1715	64	7	0	0	1	115	187
1630 - 1730	76	3	0	0	0	114	193
1645 - 1745	84	4	0	0	0	106	194
1700 - 1800	84	4	0	0	0	117	205
PEAK HR	86	12	0	0	0	141	239



R.O.A.R. DATA

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Client : Varga Traffic Plc
Job No/Name : 4864 CREMORNE Parking & Traffic
Day/Date : Thursday 31st October 2013

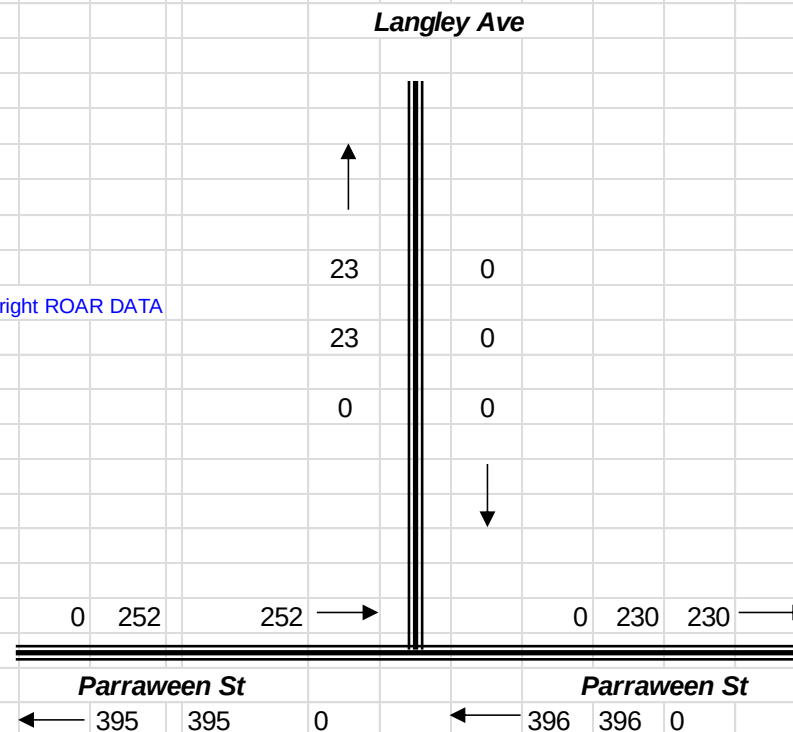
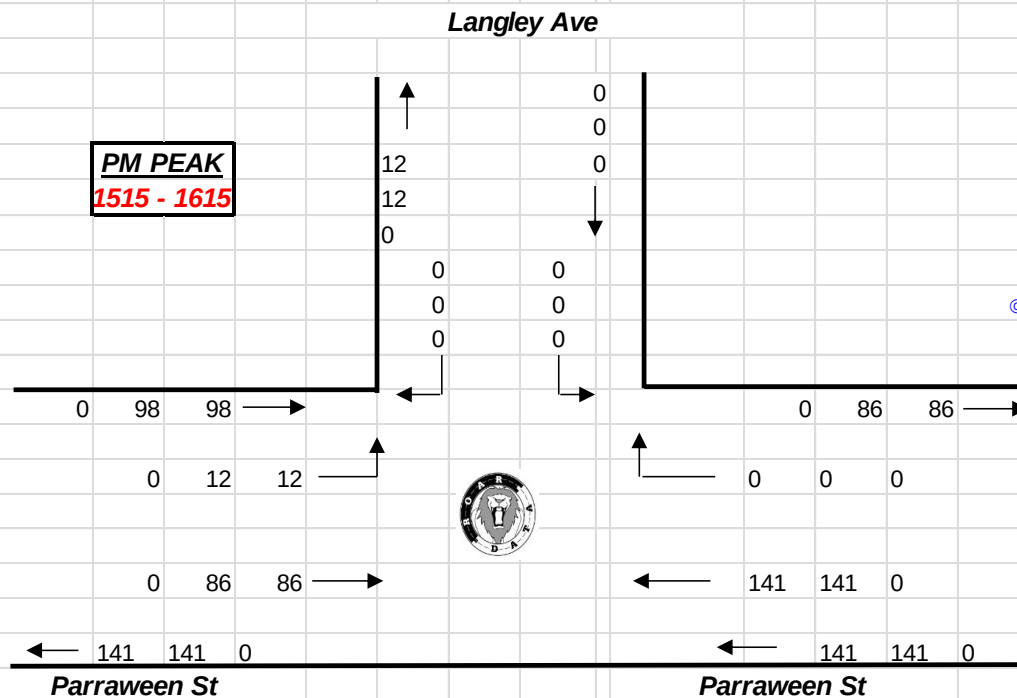
1	2	3
4	5	6
7	8	9



TOTAL VOLUMES
FOR COUNT
PERIOD

PM PEAK
1515 - 1615

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Client : Varga Traffic Planning
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Day/Date : Thursday 31st October 2013

Intersection Layout

Obtained via satellite

May be incorrect

AM PEAK HOUR
0730 - 0830



Langley Ave

One Way

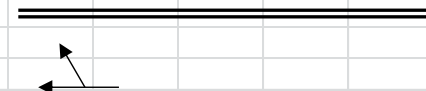
Parraween St



AM	PM	
0	12	L

54	86	T
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R	0	7
	PM	AM
T	141	235



Parraween St

Combined figures only

PM PEAK HOUR
1515 - 1615

Weather >>>



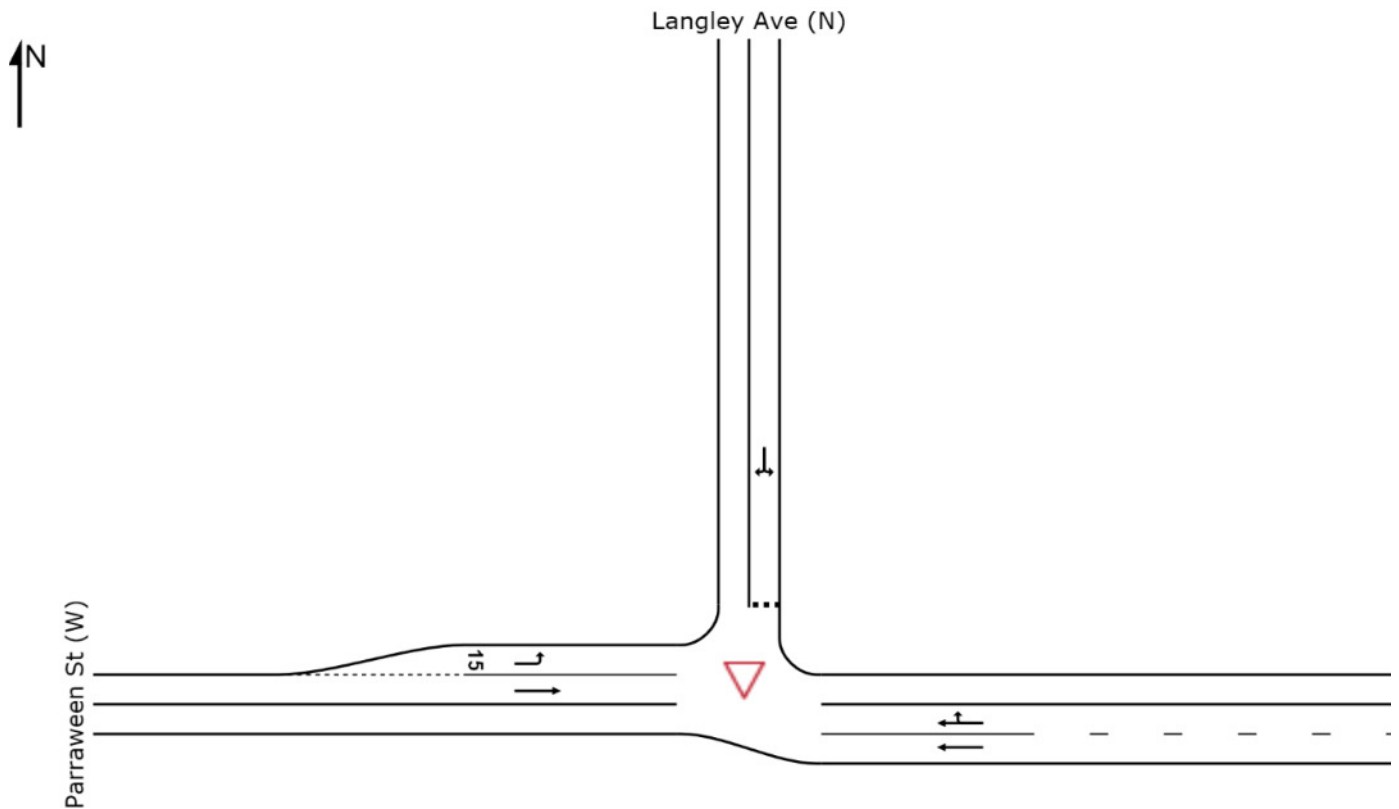
APPENDIX B

SIDRA SUMMARIES

SITE LAYOUT

▽ Site: Proposed SAT

Parraween Street & Langley Avenue, Cremorne
Giveaway / Yield (Two-Way)



Created: Thursday, 29 January 2015 1:52:11 PM
SIDRA INTERSECTION 6.0.24.4877

Project: \\vtp_nas\data\Data\Jobs01\Jobs\Tram\SIDRA\13505 Cremorne Carpark\PAR_LANP.sip6
8000110, 6016655, VARGA TRAFFIC PLANNING, PLUS / 1PC

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SIDRA
INTERSECTION 6

MOVEMENT SUMMARY

Site: Proposed AM

Parraween Street & Langley Avenue, Cremorne
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Parraween St (E)											
5	T1	195	0.0	0.120	0.3	LOS A	0.7	4.7	0.15	0.10	39.4
6	R2	57	0.0	0.120	3.9	LOS A	0.7	4.7	0.20	0.14	39.1
Approach		252	0.0	0.120	1.1	NA	0.7	4.7	0.16	0.11	39.3
North: Langley Ave (N)											
7	L2	13	0.0	0.036	4.9	LOS A	0.1	0.9	0.20	0.48	38.1
9	R2	19	0.0	0.036	4.9	LOS A	0.1	0.9	0.20	0.48	38.0
Approach		32	0.0	0.036	4.9	LOS A	0.1	0.9	0.20	0.48	38.0
West: Parraween St (W)											
10	L2	26	0.0	0.014	3.4	LOS A	0.0	0.0	0.00	0.45	38.7
11	T1	59	0.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		85	0.0	0.030	1.0	NA	0.0	0.0	0.00	0.14	39.6
All Vehicles		369	0.0	0.120	1.4	NA	0.7	4.7	0.13	0.15	39.3

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.

MOVEMENT SUMMARY

Site: Proposed PM

Parraween Street & Langley Avenue, Cremorne
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Parraween St (E)											
5	T1	129	0.0	0.084	0.3	LOS A	0.5	3.2	0.17	0.12	39.4
6	R2	44	0.0	0.084	4.0	LOS A	0.5	3.2	0.22	0.15	39.0
Approach		173	0.0	0.084	1.3	NA	0.5	3.2	0.18	0.13	39.3
North: Langley Ave (N)											
7	L2	32	0.0	0.086	4.6	LOS A	0.3	2.3	0.22	0.49	38.2
9	R2	48	0.0	0.086	4.7	LOS A	0.3	2.3	0.22	0.49	38.1
Approach		80	0.0	0.086	4.7	LOS A	0.3	2.3	0.22	0.49	38.1
West: Parraween St (W)											
10	L2	49	0.0	0.026	3.4	LOS A	0.0	0.0	0.00	0.45	38.7
11	T1	62	0.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		111	0.0	0.032	1.5	NA	0.0	0.0	0.00	0.20	39.4
All Vehicles		364	0.0	0.086	2.1	NA	0.5	3.2	0.13	0.23	39.0

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.

MOVEMENT SUMMARY

Site: Proposed SAT

Parraween Street & Langley Avenue, Cremorne
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Parraween St (E)											
5	T1	145	0.0	0.117	0.3	LOS A	0.6	4.3	0.17	0.16	39.3
6	R2	84	0.0	0.117	4.0	LOS A	0.6	4.3	0.24	0.23	38.7
Approach		229	0.0	0.117	1.7	NA	0.6	4.3	0.20	0.18	39.1
North: Langley Ave (N)											
7	L2	44	0.0	0.126	5.0	LOS A	0.5	3.5	0.23	0.51	38.0
9	R2	66	0.0	0.126	5.1	LOS A	0.5	3.5	0.23	0.51	37.9
Approach		110	0.0	0.126	5.1	LOS A	0.5	3.5	0.23	0.51	37.9
West: Parraween St (W)											
10	L2	59	0.0	0.032	3.4	LOS A	0.0	0.0	0.00	0.45	38.7
11	T1	64	0.0	0.033	0.0	LOS A	0.0	0.0	0.00	0.00	40.0
Approach		123	0.0	0.033	1.6	NA	0.0	0.0	0.00	0.22	39.4
All Vehicles		462	0.0	0.126	2.5	NA	0.6	4.3	0.15	0.27	38.9

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.