Colston Budd Hunt & Kafes Pty Ltd

as Trustee for C & B Unit Trust ABN 27 623 918 759

Our Ref: TR/8209/jj

8 March, 2012

Transport Planning Town Planning Retail Studies

Roads and Maritime Services PO Box 973 PARRAMATTA CBD NSW 2124

Attention:Owen HodgsonEmail:Owen.Hodgson@rms.nsw.gov.au

Dear Sir,

<u>RE: PART 3A PROJECT: PROPOSED WINTEN/AUSTRALAND</u> <u>COMMERCIAL DEVELOPMENT, ON SITE AT</u> 396 LANE COVE ROAD AND 1 GIFFNOCK AVENUE, MACQUARIE PARK

- 1. As requested at our meeting on Monday 5 March 2012, we have prepared an addendum traffic report to address the following matters:
 - the assignment of traffic from the proposed development to the adjacent road network based the most direct routes rather than as assigned by the PARAMICS model; and
 - revised SIDRA analysis of the operation the Lane Cove Road/Waterloo Road intersection taking into account the above traffic assignment (with and without the G-Turn) and maximum cycle times (to be provided by RMS);
- 2. As noted in our transport report, the distribution of traffic to/from the proposed development was based on Council's PARAMICS model for the zone in which the proposed development is located. This is summarized below in Table 1:

Table 1	Summary of T	Summary of Traffic Distribution									
	Mor	rning	After	noon							
Location/Road	To Dev	From Dev	To Dev	From Dev							
South –	31%	5%	11%	28%							
Lane Cove Road (south)											
West –	21%	65%	52%	25%							
Epping Road (west) & M2											
East –	21%	19%	15%	18%							
Epping Road (east)											
North –	27%	11%	23%	28%							
Lane Cove Road (north)											

Suite 1801/Tower A, Zenith Centre, 821 Pacific Highway, Chatswood NSW 2067 P.O. Box 5186 West Chatswood NSW 1515 Tel: (02) 9411 2411 Fax: (02) 9411 2422 Directors - Geoff Budd - Lindsay Hunt - Stan Kafes - Tim Rogers - Joshua Hollis ACN 002 334 296 EMAIL: cbhk@cbhk.com.au

- 3. Estimates of traffic generated by the proposed development have been based on parking provision with the generation rate per space based on the surveys of the existing development on the site. The existing use of the site (largely commercial development) generated 64 vehicles per hour (two way) in the morning peak hour and 85 vehicles per hour (two way) in the weekday afternoon peak hour. With 153 spaces this represents generation rates of 0.42 and 0.55 trips per space in the weekday morning and afternoon peak hours. The use of surveyed traffic generation rates per space (rather than standard RTA traffic generation rates) is considered appropriate for the following reasons:
 - RTA rates are based on unconstrained parking provision and hence would be too high; and
 - The surveyed rates reflect the sites location and good access to public transport (adjacent the rail station and bus services within Macquarie Park).
- 4. Applying these rates to the proposed development (1,042 spaces) results in a traffic generation of some 440 vehicles per hour (two way) in the weekday morning peak hour and some 570 vehicles per hour (two way) in the weekday afternoon peak hour. When existing traffic generation from the site is deducted, the net increase in traffic is some 380 vehicles per hour (two way) in the weekday morning peak hour and some 485 vehicles per hour (two way) in the weekday afternoon peak hour. An 80/20 split was assumed for the in/out split in the AM peak with the reverse in the PM peak.
- 5. The additional traffic has been assigned to the road network based on the distributions set out in Table 1. Due to the location of proposed site accesses (on Coolinga Street and Giffnock Avenue) and the geometry of the adjacent road network (left in/left out at the intersection of Coolinga Street/Waterloo Road and left in only to Giffnock Avenue from Lane Cove Road) only traffic approaching from the site from north (along Lane Cove Road) would pass through the intersection of Lane Cove Road and Waterloo Road. It has been assumed that some 50% of the traffic approaching the site from the west would use the M2 and that some 50% of this traffic would access the site via M2 off ramp onto Lane Cove Road.
- 6. On this basis, traffic volumes for the right turn from Lane Cove Road (southbound) into Waterloo Road (westbound) would increase by 98 vehicles per hour in the AM peak hour (0.27x380x0.8 + 0.21x0.25x380x0.8) and 36 vehicles per hour in the PM peak hour (0.23x485x0.2 + 0.52x0.25x485x0.2).
- 7. We have reanalysed the operation of intersection of the Lane Cove Road/Waterloo Road taking into account the revised traffic assignment and maximum cycle time (150 seconds) as advised by RMS. The results are summarized below in Table 2.

Table 2	Summary Road/Wa	Summary of SIDRA Analysis for intersection of Lane Cove Road/Waterloo Road									
Option	Average DelayLevel of Service95% bac(seconds)(LOS)on Lane(methods)(methods)				95% back on Lane C (me ⁻	c of queue Cove Road tres)					
	AM	PM	AM	PM	AM	PM					
Existing	60	46	E	D	548	346					
Existing + Dev	70	45	E	D	599	346					
Existing + G - turn	51	53	D	D	517	462					
Existing + Dev + G -turn	65	54	E	D	599	461					

- 8. Table 2 includes an assessment of the G-turn option (banning of right turn from Lane Cove Road northbound into Waterloo Road westbound) and reconfiguration of the Waterloo Road western approach. In assessing the traffic effects of the G-turn we have reassigned the right turning traffic into Waterloo Road (eastbound) to the Waterloo Road western approach through movement.
- 9. Examination of Table 2 reveals the following:
 - the intersection of Waterloo Road and Lane Cove Road currently operates at or near capacity in the weekday morning and afternoon peak hours (LOS D/E);
 - with development traffic added to existing traffic flows the intersection would continue to operate at or near capacity in the weekday morning and afternoon peak hours (LOS D/E);
 - the provision of the G-turn provides some benefits in intersection performance in the morning peak hour, however overall it would continue to operate at or near capacity in the weekday morning and afternoon peak hours (LOS D/E).
- 10. Electronic copies of the SIDRA analysis will be forwarded to RMS for review. Copies of the SIDRA movement summaries, intersection layouts and phasing diagrams are attached to this letter.
- 11. We trust the above provides the information you require. Finally, if you should have any queries, please do not hesitate to contact us.

Yours faithfully, COLSTON BUDD HUNT & KAFES PTY LTD

Tim Fogos

<u>T. Rogers</u> Director

Lane Cove Road - Waterloo Road Existing AM (modelled) Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: L	ane Cov	e Road (sout	h)									
1	L	535	1.0	0.490	10.0	LOS A	4.9	34.7	0.12	0.68	47.2	
2	Т	2398	1.0	0.998	83.1	LOS F	77.6	547.7	1.00	1.17	17.7	
3	R	178	1.0	0.905	96.5	LOS F	9.0	63.6	1.00	0.93	16.5	
Approac	ch	3111	1.0	0.998	71.3	LOS F	77.6	547.7	0.85	1.07	19.8	
East: W	aterloo R	oad (east)										
4	L	49	1.0	0.234	74.5	LOS F	4.6	32.7	0.95	0.75	19.6	
5	Т	210	1.0	0.957	97.4	LOS F	19.7	139.4	1.00	1.10	15.9	
6	R	156	1.0	0.746	81.1	LOS F	13.2	93.0	1.00	0.86	18.7	
Approac	ch	415	1.0	0.956	88.6	LOS F	19.7	139.4	0.99	0.97	17.2	
North: L	ane Cove	e Road (north	1)									
7	L	241	1.0	0.839	36.4	LOS C	43.0	303.6	0.82	0.96	31.0	
8	Т	2159	1.0	0.838	27.4	LOS B	44.2	311.8	0.83	0.77	32.6	
9	R	481	1.0	0.978	108.0	LOS F	22.7	160.0	1.00	1.04	15.2	
Approac	ch	2881	1.0	0.978	41.6	LOS C	44.2	311.8	0.85	0.83	27.2	
West: W	<i>l</i> aterloo F	Road (west)										
10	L	62	1.0	0.075	29.5	LOS C	3.4	24.3	0.60	0.71	33.3	
11	Т	163	1.0	0.468	59.6	LOS E	12.3	87.1	0.95	0.77	22.0	
12	R	123	1.0	0.185	63.9	LOS E	5.2	36.9	0.89	0.76	21.9	
Approac	ch	348	1.0	0.467	55.7	LOS D	12.3	87.1	0.86	0.76	23.4	
All Vehic	cles	6755	1.0	0.998	58.9	LOS E	77.6	547.7	0.86	0.95	22.4	

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Moven	Movement Performance - Pedestrians												
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped					
P3	Across E approach	53	26.4	LOS C	0.1	0.1	0.59	0.59					
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96					
P7	Across W approach	53	34.0	LOS D	0.2	0.2	0.67	0.67					
All Pedestrians		159	43.2				0.74	0.74					

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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 SIDRA INTERSECTION 5.0.5.1510
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SIDRA

Lane Cove Road - Waterloo Road Existing AM (modelled) + Dev Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movem	ient Per	formance -	Vehicles				·····	dentina di nta anti-tanta di sa s			
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back (Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Average Speed km/h
South: L	ane Cov	e Road (sout	h)								
1	L	535	1.0	0.510	11.3	LOS A	6.4	45.5	0.16	0.71	46.0
2	Т	2398	1.0	1.031	106.2	LOS F	84.9	599.0	1.00	1.27	14.9
3	R	178	1.0	0.804	89.9	LOS F	8.6	61.0	1.00	0.86	17.3
Approac	h	3111	1.0	1.031	88.9	LOS F	84.9	599.0	0.86	1.15	17.1
East: W	aterloo R	Road (east)									
4	L	49	1.0	0.249	75.7	LOS F	4.7	32.9	0.96	0.75	19.4
5	т	210	1.0	1.016	125.6	LOS F	22.1	156.3	1.00	1.20	13.2
6	R	156	1.0	0.793	84.0	LOS F	13.4	94.9	1.00	0.88	18.2
Approac	ch	415	1.0	1.016	104.1	LOS F	22.1	156.3	0.99	1.03	15.4
North: L	ane Cov	e Road (north	1)								
7	Ĺ	241	1.0	0.839	36.4	LOS C	43.0	303.6	0.82	0.96	31.0
8	Т	2159	1.0	0.838	27.4	LOS B	44.2	311.8	0.83	0.77	32.6
9	R	579	1.0	1.029	131.2	LOS F	30.5	215.3	1.00	1.11	13.1
Approac	ch	2979	1.0	1.030	48.3	LOS D	44.2	311.8	0.86	0.85	25.2
West: W	laterioo I	Road (west)									
10	L	62	1.0	0.073	28.3	LOS B	3.3	23.6	0.59	0.71	33.9
11	Т	163	1.0	0.468	59.6	LOS E	12.3	87.1	0.95	0.77	22.0
12	R	123	1.0	0.185	63.9	LOS E	5.2	36.9	0.89	0.76	21.9
Approac	h	348	1.0	0.467	55.5	LOS D	12,3	87.1	0.86	0.76	23.4
All Vehic	cles	6853	1.0	1.031	70.5	LOS E	84.9	599.0	0.87	0.99	20.0

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians											
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped			
P3	Across E approach	53	26.4	LOS C	0.1	0.1	0.59	0.59			
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96			
P7	Across W approach	53	35.4	LOS D	0.2	0.2	0.69	0.69			
All Ped	estrians	159	43.6				0.75	0.75			

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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Lane Cove Road - Waterloo Road Existing PM (modelled) Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movem	ient Pe	erformance - V	/ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: I	ane Co	ve Road (south)					a.			
1	L	420	1.0	0.369	8.3	LOS A	2.5	18.0	0.08	0.62	49.0
2	Т	2189	1.0	0.883	41.8	LOS C	49.1	346.5	0.94	0.90	26.8
3	R	70	1.0	0.475	89.3	LOS F	3.8	26.9	1.00	0.73	17.4
Approad	ch	2679	1.0	0.883	37.8	LOS C	49.1	346.5	0.80	0.85	28.4
East: W	aterloo	Road (east)									
4	L	300	1.0	0.841	78.0	LOS F	23.6	166.5	1.00	0.91	19.1
5	т	160	1.0	0.635	60.2	LOS E	17.1	120.4	0.98	0.82	21.5
6	R	278	1.0	0.635	67.5	LOS E	17.1	120.4	0.96	0.83	21.2
Approad	ch	738	1.0	0.842	70.2	LOS E	23.6	166.5	0.98	0.86	20.4
North: L	ane Co	ve Road (north)									
7	L	192	1.0	0.877	50.9	LOS D	47.4	334.8	0.93	0.98	25.8
8	Т	1983	1.0	0.878	41.6	LOS C	48.2	340.6	0.93	0.90	26.8
9	R	121	1.0	0.820	93.6	LOS F	6.4	45.2	1.00	0.85	16.9
Approa	ch	2296	1.0	0.878	45.1	LOS D	48.2	340.6	0.93	0.90	25.9
West: W	Vaterloo	Road (west)									
10	L	511	1.0	0.668	35.5	LOS C	28.3	199.9	0.86	0.85	30.6
11	Т	146	1.0	0.419	59.0	LOS E	11.2	79.0	0.94	0.76	22.1
12	R	370	1.0	0.557	68.6	LOS E	13.9	98.4	0.96	0.82	20.9
Approa	ch	1027	1.0	0.668	50.7	LOS D	28.3	199.9	0.91	0.83	25.1
All Vehi	cles	6740	1.0	0.883	45.8	LOS D	49.1	346.5	0.88	0.87	25.9

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Mover	Movement Performance - Pedestrians													
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back o Pedestrian ped	f Queue Distance m	Prop. Queued	Effective Stop Rate per ped						
P3	Across E approach	53	32.7	LOS D	0.1	0.1	0.66	0.66						
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96						
P7	Across W approach	53	32.7	LOS D	0.1	0.1	0.66	0.66						
All Ped	estrians	159	44.8				0.76	0.76						

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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Lane Cove Road - Waterloo Road Existing PM (modelled) + dev Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movem	ent Per	rformance - \	Vehicles				<u>alanan 1</u> 0 - 11 a anan		200 2° 1. 0000 00 1	angana ang ang ang ang ang ang ang ang a	
Mov ID	Turn	Demand Flow veh/h	HV %	Deg Satn v/c	Average Delay sec	Level of Service	95% Back of Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: L	ane Co.	e Road (south	ı)								
1	L	420	1.0	0.369	8.4	LOS A	2.6	18.2	0.08	0.62	48.9
2	Т	2189	1.0	0.883	41.8	LOS C	49.1	346.5	0.94	0.90	26.8
3	R	70	1.0	0.475	89.3	LOS F	3.8	26.9	1.00	0.73	17.4
Approac	h	2679	1.0	0.883	37.8	LOS C	49.1	346.5	0.80	0.85	28.4
East: W	aterloo F	Road (east)									
4	L	300	1.0	0.872	82.1	LOS F	24.3	171.8	1.00	0.93	18.4
5	Т	160	1.0	0.649	61.2	LOS E	17.0	120.0	0.98	0.82	21.3
6	R	278	1.0	0.649	68.6	LOS E	17.0	120.0	0.97	0.83	21.0
Approac	h	738	1.0	0.872	72.5	LOS F	· 24.3	171.8	0.99	0.87	19.9
North: L	ane Cov	e Road (north))								
7	L	192	1.0	0.865	48.2	LOS D	45.6	321.7	0.91	0.97	26.7
8	Т	1983	1.0	0.864	38.9	LOS C	46.4	327.8	0.91	0.87	27.7
9	R	157	1.0	0.912	97.9	LOS F	8.2	57.7	1.00	0.93	16.3
Approac	h	2332	1.0	0.912	43.6	LOS D	46.4	327.8	0.92	0.88	26.4
West: W	laterloo I	Road (west)									
10	L	511	1.0	0.667	35.4	LOS C	28.3	199.5	0.85	0.85	30.6
11	Т	146	1.0	0.419	59.0	LOS E	11.2	79.0	0.94	0.76	22.1
12	R	370	1.0	0.557	68.6	LOS E	13.9	98.4	0.96	0.82	20.9
Approac	h	1027	1.0	0.667	50.7	LOS D	28.3	199.5	0.90	0.83	25.1
All Vehic	cles	6776	1.0	0.912	45.5	LOS D	49.1	346.5	0.88	0.86	26.0

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Movement Performance - Pedestrians												
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped				
P3	Across E approach	53	32.0	LOS D	0.1	0.1	0.65	0.65				
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96				
P7	Across W approach	53	32.7	LOS D	0.1	0.1	0.66	0.66				
All Pede	estrians	159	44.6				0.76	0.76				

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back (Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h	
South: I	ane Co	/e Road (south))	1			1					
1	L	535	1.0	0.480	10.0	LOS A	4.8	34.2	0.12	0.69	47.2	
2	Т	2398	1.0	0.982	73.2	LOS F	73.3	517.4	1.00	1.13	19.3	
Approad	ch	2933	1.0	0.982	61.7	LOS E	73.3	517.4	0.84	1.05	21.7	
East: W	laterloo F	Road (east)										
4	L	49	1.0	0.249	75.7	LOS F	4.7	32.9	0.96	0.75	19.4	
5	Т	210	1.0	1.016	125.6	LOS F	22.1	156.3	1.00	1.20	13.2	
6	R	156	1.0	0.793	84.0	LOS F	13.4	94.9	1.00	0.88	18.2	
Approa	ch	415	1.0	1.016	104.1	LOS F	22.1	156.3	0.99	1.03	15.4	
North: L	ane Cov	e Road (north)										
7	L	241	1.0	0.697	22.2	LOS B	25.9	183.2	0.49	0.95	38.2	
8	Т	2159	1.0	0.697	13.4	LOS A	27.3	192.4	0.50	0.47	42.2	
9	R	481	1.0	0.978	108.0	LOS F	22.7	160.0	1.00	1.04	15.2	
Approa	ch	2881	1.0	0.978	29.9	LOS C	27.3	192.4	0.58	0.61	32.3	
West: V	Vaterloo I	Road (west)										
10	L	62	1.0	0.573	64.4	LOS E	14.3	101.1	0.96	0.85	22.2	
11	Т	341	1.0	0.574	59.0	LOS E	14.9	105.1	0.97	0.81	22.0	
12	R	123	1.0	0.185	64.1	LOS E	5.2	36.9	0.89	0.76	21.8	
Approa	ch	526	1.0	0.573	60.8	LOS E	14.9	105.1	0.95	0.80	22.0	
All Vehi	cles	6755	1.0	1.016	50.7	LOS D	73.3	517.4	0.75	0.84	24.5	

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Moven	Movement Performance - Pedestrians													
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped						
P3	Across E approach	53	18.3	LOS B	0.1	0.1	0.49	0.49						
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96						
P7	Across W approach	53	35.4	LOS D	0.2	0.2	0.69	0.69						
All Pedestrians		159	40.9				0.71	0.71						

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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Existing AM (modelled) + G-turn + dev

Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Mover	ient Per	formance - V	<i>'ehicles</i>								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: I	ane Cov	/e Road (south))								
1	L	535	1.0	0.510	11.3	LOS A	6.4	45.5	0.16	0.71	46.0
2	Т	2398	1.0	1.031	106.2	LOS F	84.9	599.0	1.00	1.27	14.9
Approad	ch	2933	1.0	1.031	88.9	LOS F	84.9	599.0	0.85	1.17	17.1
East: W	aterloo F	Road (east)									
4	L	49	1.0	0.249	75.7	LOS F	4.7	32.9	0.96	0.75	19.4
5	Т	210	1.0	1.016	125.6	LOS F	22.1	156.3	1.00	1.20	13.2
6	R	156	1.0	0.793	84.0	LOS F	13.4	94.9	1.00	0.88	18.2
Approa	ch	415	1.0	1.016	104.1	LOS F	22.1	156.3	0.99	1.03	15.4
North: L	ane Cov	e Road (north)									
7	L	241	1.0	0.697	22.2	LOS B	25.9	183.2	0.49	0.95	38.2
8	Т	2159	1.0	0.697	13.4	LOS A	27.3	192.4	0.50	0.47	42.2
9	R	579	1.0	1.029	131.2	LOS F	30.5	215.3	1.00	1.11	13.1
Approa	ch	2979	1.0	1.030	37.0	LOS C	30.5	215.3	0.60	0.64	29.2
West: V	Vaterloo I	Road (west)									
10	L	62	1.0	0.574	64.4	LOS E	14.3	101.1	0.96	0.85	22.2
11	Т	341	1.0	0.574	59.0	LOS E	14.9	105.1	0.97	0.81	22.0
12	R	123	1.0	0.185	64.1	LOS E	5.2	36.9	0.89	0.76	21.8
Approa	ch	526	1.0	0.573	60.8	LOS E	14.9	105.1	0.95	0.80	22.0
All Vehi	cles	6853	1.0	1.031	65.1	LOS E	84.9	599.0	0.76	0.90	21.1

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Mover	ent Performance -	Pedestrian	S			· ·· · · ·····		
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	18.3	LOS B	0.1	0.1	0.49	0.49
P5	Across N approach	53	69.1	LOS F	0.2	0.2	0.96	0.96
P7	Across W approach	53	37.5	LOS D	0.2	0.2	0.71	0.71
All Pede	estrians	159	41.6				0.72	0.72

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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N960 SIDRA INTERSECTION Lane Cove Road - Waterloo Road

Existing PM (modelled) + G-turn + dev

Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movem	ient Pei	formance - V	/ehicles								
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: L	.ane Cov	/e Road (south)						· · · · · · · · · · · · · · · · · · ·		
1	L	420	1.0	0.408	8.4	LOS A	2.7	18.8	0.08	0.62	48.9
2	Т	2189	1.0	0.974	73.5	LOS F	65.4	461.5	1.00	1.11	19.2
Approad	ch	2609	1.0	0.974	63.0	LOS E	65.4	461.5	0.85	1.03	21.3
East: W	aterloo F	Road (east)									
4	L	300	1.0	0.976	111.3	LOS F	28.8	203.2	1.00	1.04	14.8
5	Т	160	1.0	0.700	64.7	LOS E	16.9	119.3	1.00	0.85	20.6
6	R	278	1.0	0.700	72.7	LOS F	16.9	119.3	1.00	0.84	20.2
Approad	ch	738	1.0	0.976	86.6	LOS F	28.8	203.2	1.00	0.92	17.7
North: L	ane Cov	e Road (north)									
7	L	192	1.0	0.711	30.2	LOS C	30.3	214.0	0.64	0.96	33.8
8	Т	1983	1.0	0.712	20.9	LOS B	31.4	221.4	0.64	0.60	36.5
9	R	157	1.0	0.426	78.0	LOS F	7.0	49.7	0.96	0.77	19.2
Approad	ch	2332	1.0	0.712	25.5	LOS B	31.4	221.4	0.66	0.64	34.2
West: W	laterloo	Road (west)									
10	L	511	1.0	0.967	73.6	LOS F	35.5	250.9	1.00	1.02	19.8
11	Т	216	1.0	0.597	60.5	LOS E	15.9	112.1	0.97	0.81	21.8
12	R	370	1.0	0.537	67.8	LOS E	13.8	97.6	0.96	0.82	21.0
Approac	ch	1097	1.0	0.967	69.0	LOS E	35.5	250.9	0.98	0.91	20.6
All Vehi	cles	6776	1.0	0.976	53.7	LOS D	65.4	461.5	0.82	0.87	23.7

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Moven	nent Performance ·	Pedestrians						
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	23.5	LOS C	0.1	0.1	0.56	0.56
P5	Across N approach	53	68.2	LOS F	0.2	0.2	0.95	0.95
P7	Across W approach	53	38.9	LOS D	0.2	0.2	0.72	0.72
All Ped	estrians	159	43.5				0.74	0.74

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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-586 - 500 -550 SIDRA INTERSECTION

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Lane Cove Road - Waterloo Road Existing PM (modelled) + G-turn

Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Movem	ent Pei	rformance - V	<i>ehicles</i>								614 ⁽¹¹) · · · · · · · · · · · · · · · · · ·
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back o Vehicles veh	f Queue Distance m	Prop. Queued	Effective Stop Rate	Average Speed km/b
South: L	ane Cov	/e Road (south))				voire	01		por von	NIGHTIN
1	L	420	1.0	0.408	8.4	LOS A	2.6	18.5	0.08	0.62	48.9
2	Т	2189	1.0	0.974	73.5	LOS F	65.4	461.5	1.00	1.11	19.2
Approac	:h	2609	1.0	0.974	63.0	LOS E	65.4	461.5	0.85	1.03	21.4
East: Wa	aterloo F	Road (east)									
4	L	300	1.0	0.976	111.3	LOS F	28.8	203.2	1.00	1.04	14.8
5	Т	160	1.0	0.700	64.7	LOS E	16.9	1 19.3	1.00	0.85	20.6
6	R	278	1.0	0.700	72.7	LOS F	16.9	119.3	1.00	0.84	20.2
Approac	:h	738	1.0	0.976	86.6	LOS F	28.8	203.2	1.00	0.92	17.7
North: L	ane Cov	e Road (north)									
7	L	192	1.0	0.711	30.2	LOS C	30.3	214.0	0.64	0.96	33.8
8	Т	1983	1.0	0.712	20.9	LOS B	31.4	221.4	0.64	0.60	36.5
9	R	121	1.0	0.328	77.1	LOS F	5.6	39.3	0.95	0.76	19.3
Approac	:h	2296	1.0	0.712	24.7	LOS B	31.4	221.4	0.66	0.64	34.6
West: W	laterloo I	Road (west)									
10	L	511	1.0	0.967	73.6	LOS F	35.5	250.9	1.00	1.02	19.8
11	т	216	1.0	0.597	60.5	LOS E	15.9	112.1	0.97	0.81	21.8
12	R	370	1.0	0.537	67.8	LOS E	13.8	97.6	0.96	0.82	21.0
Approac	:h	1097	1.0	0.967	69.0	LOS E	35.5	250.9	0.98	0.91	20.6
All Vehic	cles	6740	1.0	0.976	53.5	LOS D	65.4	461.5	0.82	0.87	23.8

Level of Service (Aver. Int. Delay): LOS D. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW). Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW). Approach LOS values are based on average delay for all vehicle movements.

Moven	nent Performance -	Pedestrians	S					
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back Pedestrian ped	of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	23.5	LOS C	0.1	0.1	0.56	0.56
P5	Across N approach	53	68.2	LOS F	0.2	0.2	0.95	0.95
P7	Across W approach	53	38.9	LOS D	0.2	0.2	0.72	0.72
All Ped	estrians	159	43.5				0.74	0.74

Level of Service (Aver. Int. Delay): LOS E. Based on average delay for all pedestrian movements. LOS Method: Delay (HCM). Level of Service (Worst Movement): LOS F. LOS Method for individual pedestrian movements: Delay (HCM).

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PHASING SUMMARY

Lane Cove Road - Waterloo Road Existing AM (modelled) Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program Sequence: Diamond 1 Input Sequence: G, E, H, I, D Output Sequence: G, E, H, I, D

Phase Timing Results

Phase	G	E	Н	l	D
Green Time (sec)	8	6	62	27	17
Yellow Time (sec)	4	4	4	4	4
All-Red Time (sec)	2	2	2	2	2
Phase Time (sec)	14	12	68	33	23
Phase Split	9 %	8 %	45 %	22 %	15 %



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PHASING SUMMARY

Lane Cove Road - Waterloo Road Existing PM (modelled) + G-turn Signals - Fixed Time Cycle Time = 150 seconds (Optimum Cycle Time - Minimum Delay)

Phase times determined by the program Sequence: Diamond 1 Input Sequence: E, H, I, D Output Sequence: E, H, I, D

Phase Timing Results

Phase	E	Н	I	D
Green Time (sec)	15	58	28	25
Yellow Time (sec)	4	4	4	4
All-Red Time (sec)	2	2	2	2
Phase Time (sec)	21	64	34	31
Phase Split	14 %	43 %	23 %	21 %



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