

DRAFT

Traffic Signal Design Warrant Report

Brickmakers Drive and Link Road intersection, Moorebank

Prepared for Benedict Industries Pty Ltd | May 2016



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Draft Report

Report J14149RPTS | Prepared for Benedict Industries Pty Ltd | 12 May 2016

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Signature		Signature	
Date	12 May 2016	Date	12 May 2016

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Document Control

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1 Introduction

A new intersection is required on Brickmakers Drive, approximately 300 metres south of Newbridge Road. This will service vehicles from a number of approved and proposed developments and, in the longer term, for vehicles from a new local road connection on the south side of Newbridge Road between Brickmakers Drive and Davy Robinson Drive.

The future local road network in the Moorebank East area is shown in the Liverpool DCP 2010 (Figure 1.1).

The future traffic volumes at the Link Road and Brickmakers Drive intersection have been analysed and compared with the RMS Warrant guidelines (provided in Appendix A) to determine whether future traffic volumes meet the RMS warrant requirement for traffic signals at the intersection.

The following existing and additional vehicular traffic movements have been considered:

- base case: 2016 traffic volumes for Brickmakers Drive;
- Scenario 1:
 - additional traffic from the approved New Brighton residential (313 dwellings) and clubhouse redevelopment traffic as identified in the GHD (2011 and 2014) traffic reports;
 - additional traffic from the proposed Moorebank Cove Residential Estate (179 dwellings);
- Scenario 2: additional traffic from the approved Moorebank Recyclers development (mainly truck traffic); and
- Scenario 3: additional traffic from the Georges Cove Marina (including potentially up to 350 residential apartments).

The existing peak hourly traffic volumes for Brickmakers Drive were surveyed by a seven day tube traffic count in March 2016 (Appendix B). Brickmakers Drive currently has sustained peak hourly traffic volumes of at least 1,039 vehicle movements two-way, over at least five hours of the day on a typical weekday. The average weekday hourly volumes are:

- morning peak hour 7–8 am = 1,039 hourly vehicle movements
- morning peak hour 8–9 am = 1,053 hourly vehicle movements
- afternoon peak hour 3–4 pm = 1,093 hourly vehicle movements
- afternoon peak hour 4–5 pm = 1,078 hourly vehicle movements
- afternoon peak hour 5–6 pm = 1,064 hourly vehicle movements



Figure 1.1 DCP map of the local road network

2 Traffic volumes on the Link Road

The peak hourly Link Road traffic volumes generated by future developments have been calculated in the traffic assessment reports for each development (Table 2.1). These calculations are for typical weekdays during the normal commuter morning and afternoon peak traffic periods.

Table 2.1 Additional peak hourly traffic from nominated developments

Peak hourly period		Total peak hourly traffic	
		In	Out
Moorebank Cove residential (179 dwellings)	Morning	30	122
	Afternoon	91	61
Moorebank Recycling development ¹	Morning	23	20
	Afternoon	13	16
Georges Cove Marina commercial uses ²	Morning	63	16
	Afternoon	62	62
Georges Cove Marina residential apartments ²	Morning	34	135
	Afternoon	101	68
All identified developments	Morning	150	293
	Afternoon	267	207

Notes: 1. From Cardno (2013). This traffic is primarily truck traffic and over 90% travels to and from the north

2. From the draft traffic impact assessments for these uses by EMM (for 350 residential apartments in addition to the commercial marina uses)

The future peak hourly directional traffic volumes from the combined development traffic are:

- 293 vehicles per hour during typical weekday morning peak hour traffic periods; and
- 267 vehicles per hour during typical weekday afternoon peak hour traffic periods.

The standard RMS traffic signal warrant “traffic demand” requirement on the minor road, specified on page 2.1 of the document (see Appendix A) is at least 200 vehicles per hour over four hours of the day (ie two hours during the morning and two hours in the afternoon). The hourly traffic volumes will meet this requirement.

3 Traffic volumes on Brickmakers Drive

The future development generated peak hourly traffic volumes using Brickmakers Drive to the north and the south of the Link Road (for typical weekdays during the normal commuter morning and afternoon peak traffic periods) have been calculated in the respective traffic generation reports for each development (Table 3.1).

Table 3.1 Brickmakers Drive peak hourly traffic including traffic from new developments

	Peak hourly period	North of the Link Road intersection	South of the Link Road intersection
Existing peak hourly traffic	Morning	1,039	1,039
	Afternoon	1,064	1,064
Moorebank Cove residential (179 dwellings)	Morning	91	61
	Afternoon	92	60
New Brighton Golf Club Residential ¹	Morning	115	115
	Afternoon	115	115
New Brighton Golf Club - New Clubhouse ²	Morning	28	28
	Afternoon	34	34
Moorebank Recycling development ³	Morning	40	3
	Afternoon	26	3
Georges Cove Marina commercial uses ⁴	Morning	48	31
	Afternoon	74	50
Georges Cove Marina residential apartments ⁴	Morning	101	68
	Afternoon	102	67
All identified developments	Morning	1,462	1,345
	Afternoon	1,507	1,393

Notes: 1. From GHD (2011) , traffic generated by 313 dwellings, distribution 50% north, 50% south
2. From GHD (2014) , traffic generated by additional club house uses, distribution 64% north, 36% south
3. From Cardno (2013). This traffic is primarily truck traffic and over 90% travels to and from the north
4. From the draft traffic impact assessments for these uses by EMM (for 350 residential apartments in addition to the commercial marina uses)

The future peak hourly traffic volumes for the Brickmakers Drive route will be generally higher to the north of the intersection. When all the identified future traffic growth is considered, the future peak hourly two way traffic volumes will be:

- Morning peak hour, approximately 1,462 vehicles per hour; and
- Afternoon peak hour approximately 1,507 vehicles per hour.

During both the morning and the afternoon peak hourly traffic periods, the average Brickmakers Drive traffic volumes will be:

- 731 vehicles per hour in each direction during the morning peak hour; and
- 754 vehicles per hour in each direction during the afternoon peak hour.

The standard RMS traffic signal warrant “traffic demand” requirement on the major road, is a sustained peak hourly directional traffic volumes of at least 600 vehicles per hour over four hours of the day (ie two hours during the morning and two hours in the afternoon). The hourly traffic volumes will meet this requirement.

The proposed traffic signals are also considered to be necessary for pedestrian accessibility and pedestrian safety, as the future Link Road will include a pedestrian/cycleway bridge on the northern side which will be an important connection in the future Moorebank East pedestrian and cycling access network between residential areas of Moorebank and the Georges River foreshore areas.

4 Intersection design options

Based on a SIDRA intersection analysis, the existing (February/March 2016) Brickmakers Drive traffic volumes are already at levels where an unsignalised Link Road intersection would operate with high traffic delays (level of service F) based on the proposed developments. Therefore an improved intersection is required for the development traffic flow to operate satisfactorily.

A design for the Brickmakers Drive and Link Road intersection (Figure 4.1) was agreed by all parties (including Liverpool City Council) in July 2013 as part of a NSW Land and Environment court case regarding the easement boundaries of the Link Road. This intersection provides a southbound left turning lane on Brickmakers Drive. The intersection is shown as unsignalised but there is allowance for the installation of traffic signals when warranted by increased traffic volumes.

It is noted that approval for an intersection in this location has been granted as part of the Moorebank Recyclers development approval (05-0157).

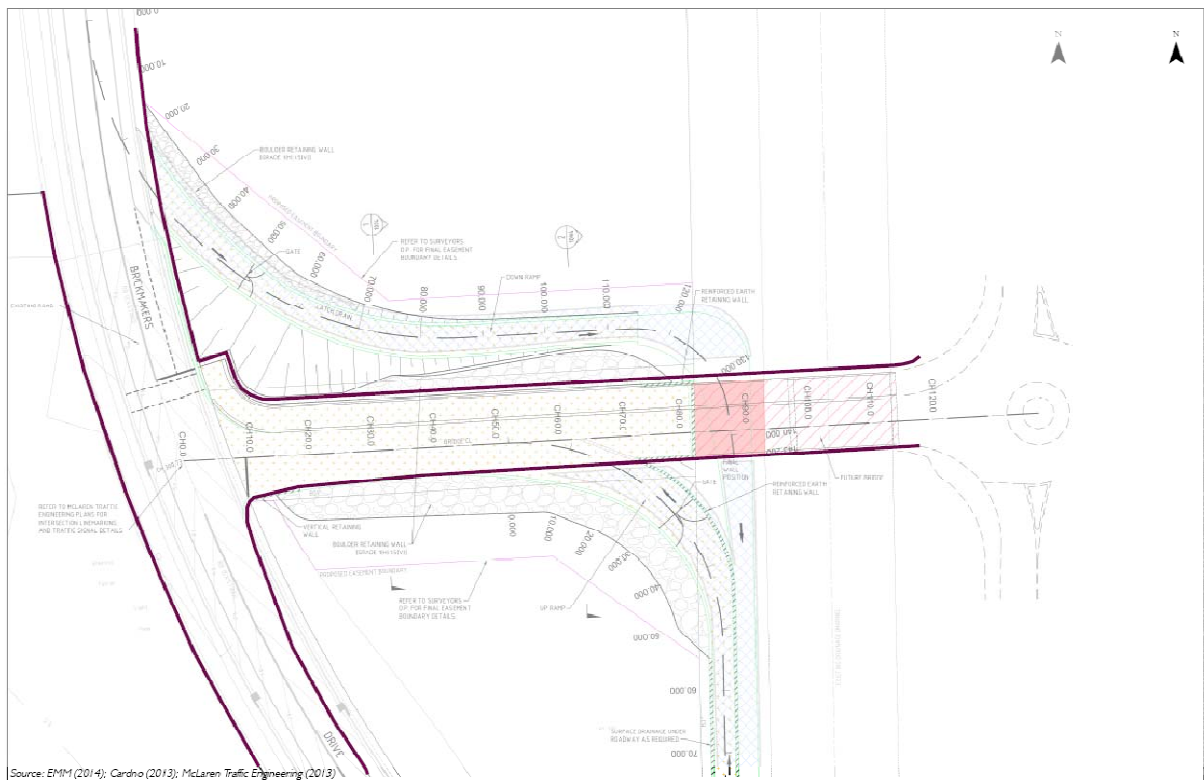


Figure 4.1 Approved intersection design from July 2013 court hearing

An alternative traffic signal controlled intersection design which provides a northbound right turning lane on Brickmakers Drive has also been considered (Figure 4.2). This alternative intersection design is the same width as the intersection shown in Figure 4.1.

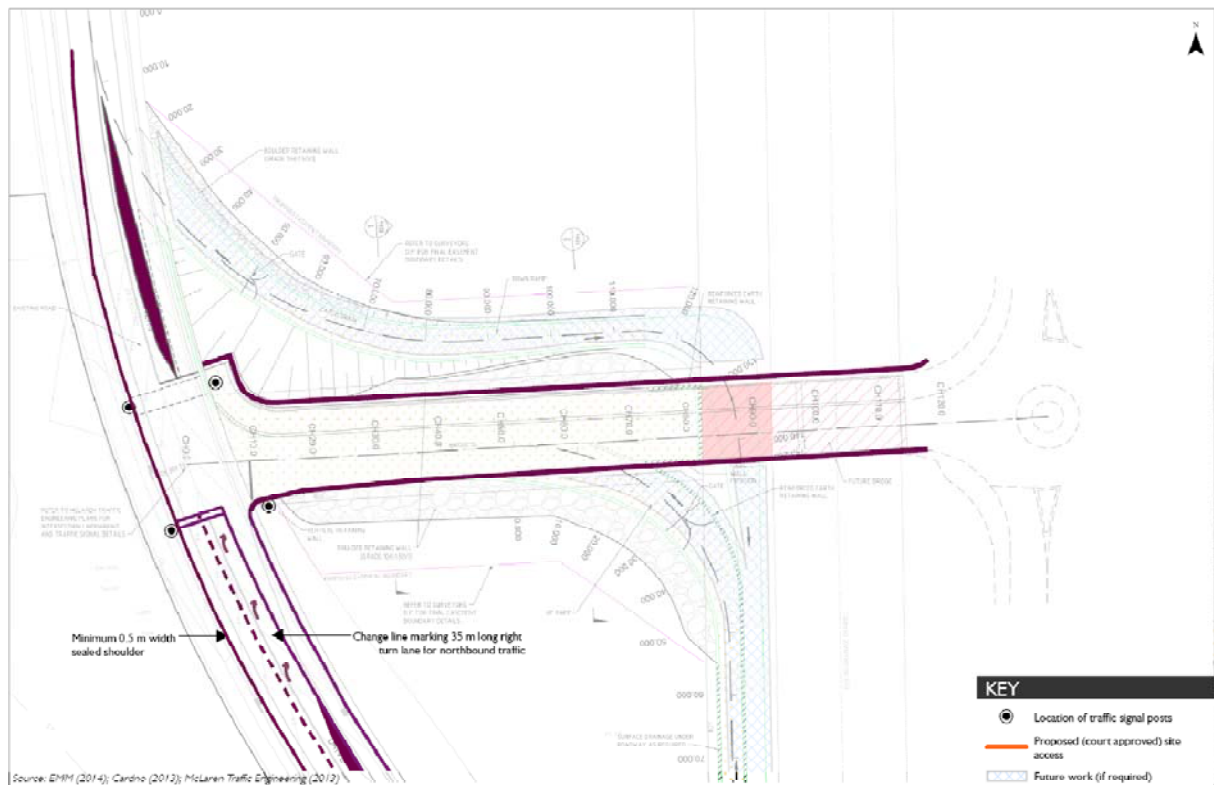


Figure 4.2 Proposed line marking for traffic signal control intersection with right turn lane

5 SIDRA analysis

A SIDRA intersection capacity analysis has been used to compare:

- the unsignalised intersection;
- the signalised intersection with one through lane in each direction and a southbound left turn lane on Brickmakers Drive (Figure 4.1); and
- the alternative traffic signal intersection design with one through lane in each direction and a northbound right turn lane on Brickmakers Drive (Figure 4.2).

The three future traffic volume scenarios in Section 1 have been considered, representing future development scenarios for the Moorebank East precinct over approximately five years.

Summaries of the intersection performance, for the three traffic scenario, are provided in Table 5.1, Table 5.2 and Table 5.3. The detailed SIDRA intersection analysis results, including the modelled intersection layouts, are provided in Appendix C.

Table 5.1 Scenario 1 intersection performance - existing traffic plus New Brighton Golf Course and Moorebank Cove residential developments

Peak hour	Operation	Unsignalised intersection	Traffic Signals with left turn lane	Traffic Signals with right turn lane
Weekday am peak hour	DOS	1.010	0.693	0.679
	LOS	F	A	A
	Average delay	162.7 s	10.2 s	9.8 s
	Maximum queue length (approach)	79 m (Link Road east)	163 m (Brickmakers Drive south)	150 m (Brickmakers Drive south)
Weekday pm peak hour	DOS	0.583	0.618	0.662
	LOS	E	A	A
	Average delay	59.1 s	8.7 s	8.1 s
	Maximum queue length (approach)	29 m (Link Road east)	162 m (Brickmakers Drive north)	176 m (Brickmakers Drive north)

Table 5.2 **Scenario 2 intersection performance - Scenario 1 plus recycling development traffic**

Peak hour	Operation	Unsignalised intersection	Traffic Signals with left turn lane	Traffic Signals with right turn lane
Weekday am peak hour	DOS	1.679	0.712	0.696
	LOS	F	A	A
	Average delay	709.7 s	10.9 s	10.5 s
	Maximum queue length (approach)	346 m (Link Road east)	164 m (Brickmakers Drive south)	151 m (Brickmakers Drive south)
Weekday pm peak hour	DOS	1.083	0.630	0.678
	LOS	F	A	A
	Average delay	234.8 s	9.6 s	8.9 s
	Maximum queue length (approach)	78 m (Link Road east)	162 m (Brickmakers Drive north)	176 m (Brickmakers Drive north)

Table 5.3 **Scenario 3 intersection performance - Scenario 2 plus marina development traffic**

Peak hour	Operation	Unsignalised intersection	Traffic Signals with left turn lane	Traffic Signals with right turn lane
Weekday am peak hour	DOS	3.358	0.827	0.809
	LOS	F	B	B
	Average delay	2,203 s	19.6 s	16.6 s
	Maximum queue length (approach)	1,083 m (Link Road east)	258 m (Brickmakers Drive south)	182 m (Brickmakers Drive south)
Weekday pm peak hour	DOS	2.536	0.773	0.823
	LOS	F	B	B
	Average delay	1,457 s	17.2 s	17.1 s
	Maximum queue length (approach)	664 m (Link Road east)	164 m (Brickmakers Drive north)	246 m (Brickmakers Drive north)

Under each of the three development scenarios considered, the traffic signals with right turn lane option provides lower traffic delays than the other options. On the basis of the SIDRA intersection capacity analysis, this is the recommended intersection treatment.

6 Summary

This traffic signal warrant analysis has considered the future traffic volumes for the Brickmakers Drive and Link Road intersection. A traffic signal controlled intersection will be required to meet the RMS warrant requirements based on the traffic demand on the minor and major roads.

The SIDRA intersection analysis comparing the future peak hour intersection capacity, traffic delays and queues lengths of two traffic signal intersection designs determined that a right turn lane on Brickmakers Drive (Figure 4.2) should be provided.

Traffic signals would also provide an important safe pedestrian crossing point on the future residential and recreational pedestrian and cycleway network for the Moorebank East area.

Appendix A

RMS Warrant Guideline

2.1 INTRODUCTION

This section describes the general warrants for the installation of traffic signals. It must be emphasised that these are only a guide. If a site satisfies the warrants, it does not necessarily mean that traffic signals are the best solution. All traffic data should be analysed and alternative treatments considered to determine the optimum solution (see Section 4 of the *Road Design Guide*). Traffic signals are sometimes installed due to public pressure or an administrative directive irrespective of the general warrants.

2.2 FACTORS INFLUENCING THE PROVISION OF TRAFFIC SIGNALS

Traffic signals are usually installed at an intersection:

- to provide traffic control at a site with a traffic capacity or road safety problem
- to control conflicting movements with high traffic flows
- to facilitate access to and from local areas in a major/minor road system, including pedestrian movements
- as part of an area wide system of traffic management

A side effect of signalisation is that the traffic flow on a major road is broken up into platoons. This assists nearby pedestrians to cross the major road and vehicles in nearby side streets to cross or enter the major road.

Factors influencing the provision of traffic signals include:

- traffic flows
- traffic conflicts
- traffic accident statistics
- pedestrian requirements
- access to major roads
- cost of installation
- availability of funds
- maintenance costs
- practicality
- feasibility
- the signposted speed limit is not more than 80km/h

General warrants are given in the following sub-sections. The figures stated should only be used as a guide and each intersection should be considered in more detail before being accepted for signal design.

2.3 SIGNALISED INTERSECTIONS

As a guide, a signalised intersection may be considered if one of the following warrants is met.

(a) Traffic demand:

For each of four one-hour periods of an average day:

- (i) the major road flow exceeds 600 vehicles/hour in each direction; and
- (ii) the minor road flow exceeds 200 vehicles/hour in one direction.

OR

(b) Continuous traffic:

For each of four one-hour periods of an average day:

- (i) the major road flow exceeds 900 vehicles/hour in each direction; and
- (ii) the minor road flow exceeds 100 vehicles/hour in one direction; and
- (iii) the speed of traffic on the major road or limited sight distance from the minor road causes undue delay or hazard to the minor road vehicles; and
- (iv) there is no other nearby traffic signal site easily accessible to the minor road vehicles.

OR

(c) Pedestrian safety:

For each of four one-hour periods of an average day:

- (i) the pedestrian flow crossing the major road exceeds 150 persons/hour; and
- (ii) the major road flow exceeds 600 vehicles/hour in each direction or, where there is a central median of at least 1.2 m wide, 1000 vehicles/hour in each direction.

OR

(d) Pedestrian safety – high speed road:

For each of four one-hour periods of an average day:

- (i) the pedestrian flow crossing the major road exceeds 150 persons/hour; and
- (ii) the major road flow exceeds 450 vehicles/hour in each direction or, where there is a central median of at least 1.2 m wide, 750 vehicles/hour in each direction; and
- (iii) the 85th percentile speed on the major road exceeds 75 km/h.

OR

(e) Crashes:

- (i) The intersection has been the site of an average of three or more reported tow-away or casualty traffic accidents per year over a three year period, where the traffic accidents could have been prevented by traffic signals; and
- (ii) the traffic flows are at least 80% of the appropriate flow warrants.

2.4 SIGNALISED MARKED FOOT CROSSINGS AT INTERSECTIONS

A signalised marked foot crossing must be provided on each leg of a signalised intersection (including T Junctions), in a built-up area, except in the following circumstances:

(a) There are significant road safety implications:

- (i) there is insufficient sight distance (see Section 4 of the *Road Design Guide*); or
- (ii) there is adverse road geometry (see Section 4 of the *Road Design Guide*).

(b) There are significant adverse transport efficiency implications

- (i) there is an unacceptable increase in delay and degree of saturation which must be substantiated by intersection modelling; or

- (c) There are parallel grade separated pedestrian facilities provided; or
- (d) There is an un-signalised approach (eg. slip lane) where a pedestrian crossing may be used (see Figure 2.1); or
- (e) The crossing would terminate in an area that is not possible for pedestrians to access (e.g. a wall or cliff face); or
- (f) The crossing is associated with a raised pavement or threshold.

The lack of adequate connecting facilities for pedestrian access (eg. no footpath or no pedestrian traffic) is not, in itself, grounds for exception.

The Manager Network Operations, Transport Management Centre, must approve all exceptions as described above.

Where an exception is granted, provision must be made in the cabling and traffic signal post locations to allow the exempted marked foot crossing to be easily provided should the exceptional conditions be removed.

Kerb ramps must be provided at each end of a signalised marked foot crossing or pedestrian crossing located at a signalised intersection (see Section 5.7 in [Geometry](#)).

Pedestrian clearance times are based on the 85th percentile walking speed of 1.2 m/s. If a site is frequently used by "slow walkers", such as the elderly or people with disabilities, different walking speeds may be chosen, in the range 0.8m/s to 1.2m/s, as considered appropriate for the situation.

If a two-stage (offset) crossing is included at a signalised intersection, it is to be provided in accordance with Section 14.3 in [Signalised Mid-block Marked Foot Crossings](#).

2.4.1 Flashing yellow arrows at signalised marked foot crossings

The flashing yellow arrow may be considered to enhance pedestrian protection at signalised intersections.

The flashing yellow arrow is intended to remind drivers of their obligation to 'give way' to pedestrians while they are completing their crossing during the flashing red 'Don't Walk' clearance period of the traffic signals.

Flashing yellow arrow pedestrian protection shall only be used in conjunction with and following red arrow protection. The red arrow protection shall not be less than for the "Walk" period, but it can be greater than it. Following the red arrow protection the flashing yellow arrow shall be displayed for the remainder of clearance 1, but not less than 2 seconds.

Flashing yellow arrow pedestrian protection is not used where there is full protection of the pedestrian phase provided by a red arrow hold, i.e. throughout the "Walk" and "Don't Walk" period.

The flashing yellow arrow may be installed at sites where one or more of the following criteria is satisfied:

- 1 or more pedestrian casualty crashes involving left turn or right turn vehicles in the last 3 years;

- heavy vehicle demand on left and/or right turn through the marked foot crossing – more than 5 vehicles per phase in any one hour period on an average day;
- high speed turning traffic – greater than 30km/h;
- high proportion of children, the elderly or people with disabilities – greater than 15% during any one hour period on an average day;
- high volume of pedestrians – greater than 250 pedestrians in any 1 hour period of an average day on the crossing applicable to the flashing yellow arrow;
- there are 2 or more lanes of traffic turning left through the marked foot crossing.

Flashing yellow arrows can be used for single or dual left turns. In either case, an opposing right turn should be held by a red arrow during the flashing yellow phase.

Flashing yellow arrows can be used for right turns at a cross intersection and from the stem of a T intersection with restrictions as follows:

The flashing yellow arrow **must not** be installed where:

- there is a conflicting opposing through movement. An opposing through movement can be eliminated by adopting a split approach phasing and thus allow the installation of flashing yellow arrows for the right turn movement;
- there are 2 or more lanes of traffic turning right through the marked foot crossing. Dual right turns must have full control;
- the 85th percentile speed of traffic is higher than 75km/h.

The red arrow hold should never be reduced by substitution with the flashing yellow arrow. The flashing yellow arrow is additional to the red arrow hold, **not** a substitute (see Section 7.10.1 in [Phasing & Signal Group Display Sequence](#)).

2.4.2 Pedestrian crossings and signalised marked foot crossings at slip lanes

A pedestrian crossing **must** be provided at all traffic signal intersections with slip lanes as shown in Figure 2.1.

If a signalised marked foot crossing is required, the same warrants that apply to a signalised mid block marked foot crossing should also be considered to apply when converting from a pedestrian crossing to a signalised marked foot crossing.

If a dedicated bicycle path has been installed on the approach to the pedestrian crossing, and bicycle paths have been provided throughout the rest of the intersection, then regardless of other warrants, the pedestrian crossing should be converted to a signalised marked foot crossing to maintain continuity of the bicycle paths.

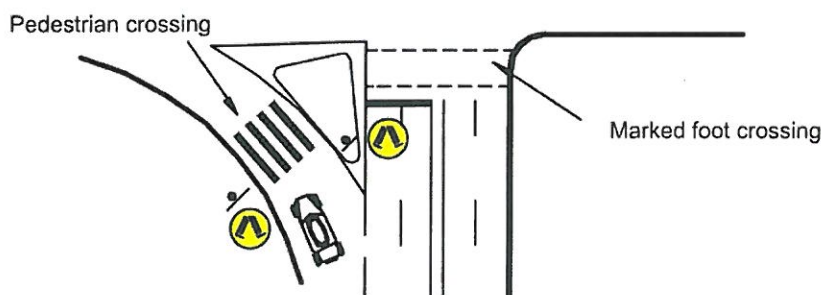


Figure 2.1 Unsignalised Approach (eg: Slip Lane etc) at the site.

Appendix B

Brickmakers Drive tube traffic count

Count Number **3289** Ref : **EMM** UBD 270 B-12
 Street **BRICKMAKERS ROAD, CHIPPING NORTON : Between NUWARRA ROAD & NEWBRIDGE ROAD (bidirectional) :**
 Location **About 350 Mtrs south of Newbridge Road, On Rail Fencing** Carriageway

Start Date 04-MAR-16
 Start Time 100
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 58
 Weekly 85th Percentile Speed 68
 Five Day AADT 13265
 Seven Day AADT 12187

TOTAL COUNT MATRIX

	MON 7TH	TUE 8TH	WED 9TH	THU 10TH	FRI 4TH	SAT 5TH	SUN 6TH	5 Day		7 Day	
								Total	Average	Total	Average
Midnight - 1am	57	48	66	68	66	126	158	305	61	589	84
1am - 2am	28	38	37	36	48	60	85	187	37	332	47
2am - 3am	29	25	30	29	32	76	67	145	29	288	41
3am - 4am	45	41	42	32	37	51	38	197	39	286	41
4am - 5am	119	121	108	105	132	68	40	585	117	693	99
5am - 6am	381	433	446	418	408	158	66	2086	417	2310	330
6am - 7am	754	818	770	778	769	269	128	3889	778	4286	612
7am - 8am	1036	957	1098	1051	1052	389	182	5194	1039	5765	824
8am - 9am	1086	1029	1061	1071	1017	574	325	5264	1053	6163	880
9am - 10am	586	678	701	630	650	667	504	3245	649	4416	631
10am - 11am	497	508	467	557	508	732	562	2537	507	3831	547
11am - Midday	495	486	513	514	534	767	645	2542	508	3954	565
Midday - 1pm	540	510	528	499	649	821	667	2726	545	4214	602
1pm - 2pm	623	621	640	582	692	733	607	3158	632	4498	643
2pm - 3pm	922	907	955	894	908	700	574	4586	917	5860	837
3pm - 4pm	1123	1034	1063	1136	1110	704	593	5466	1093	6763	966
4pm - 5pm	1065	1087	1140	1072	1024	699	623	5388	1078	6710	959
5pm - 6pm	942	1149	1089	1075	1065	645	610	5320	1064	6575	939
6pm - 7pm	849	966	944	904	934	603	531	4597	919	5731	819
7pm - 8pm	559	617	600	628	645	466	462	3049	610	3977	568
8pm - 9pm	368	444	424	473	469	365	361	2178	436	2904	415
9pm - 10pm	276	366	356	319	346	343	282	1663	333	2288	327
10pm - 11pm	191	231	221	282	348	315	196	1273	255	1784	255
11pm - Midnight	114	122	138	136	235	238	106	745	149	1089	156
Total	12685	13236	13437	13289	13678	10569	8412	66325	13265	85306	12186

Count Number **3289** Ref : **EMM** UBD 270 B-12
 Street **BRICKMAKERS ROAD, CHIPPING NORTON : From NUWARRA ROAD to NEWBRIDGE ROAD : SOUTH BOUND**
 Location **About 350 Mtrs south of Newbridge Road, On Rail Fencing** Carriageway

Start Date 04-MAR-16
 Start Time 100
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 59
 Weekly 85th Percentile Speed 68
 Five Day AADT 5671
 Seven Day AADT 5209

TOTAL COUNT MATRIX

	MON 7TH	TUE 8TH	WED 9TH	THU 10TH	FRI 4TH	SAT 5TH	SUN 6TH	5 Day		7 Day	
								Total	Average	Total	Average
Midnight - 1am	17	10	14	11	15	37	52	67	13	156	22
1am - 2am	9	10	11	8	11	28	33	49	10	110	16
2am - 3am	17	12	10	12	16	32	22	67	13	121	17
3am - 4am	23	22	26	19	21	20	11	111	22	142	20
4am - 5am	95	98	83	81	93	33	15	450	90	498	71
5am - 6am	308	343	367	340	338	102	39	1696	339	1837	262
6am - 7am	534	572	535	556	552	162	81	2749	550	2992	427
7am - 8am	769	674	784	760	766	239	93	3753	751	4085	584
8am - 9am	757	727	751	761	704	355	199	3700	740	4254	608
9am - 10am	350	397	417	348	372	346	303	1884	377	2533	362
10am - 11am	248	237	207	289	246	344	285	1227	245	1856	265
11am - Midday	202	203	209	235	224	334	301	1073	215	1708	244
Midday - 1pm	221	207	208	199	220	312	305	1055	211	1672	239
1pm - 2pm	216	213	215	214	236	287	262	1094	219	1643	235
2pm - 3pm	308	281	290	271	300	272	202	1450	290	1924	275
3pm - 4pm	319	276	299	284	310	241	214	1488	298	1943	278
4pm - 5pm	246	276	285	298	262	257	226	1367	273	1850	264
5pm - 6pm	209	282	245	257	279	222	233	1272	254	1727	247
6pm - 7pm	200	248	259	241	258	270	203	1206	241	1679	240
7pm - 8pm	166	180	183	194	215	180	176	938	188	1294	185
8pm - 9pm	126	119	132	120	147	140	152	644	129	936	134
9pm - 10pm	84	97	97	92	118	114	93	488	98	695	99
10pm - 11pm	41	61	59	86	88	110	63	335	67	508	73
11pm - Midnight	30	32	36	24	72	74	33	194	39	301	43
Total	5495	5577	5722	5700	5863	4511	3596	28357	5671	36464	5209

Count Number **3289** Ref : **EMM** UBD 270 B-12
 Street **BRICKMAKERS ROAD, CHIPPING NORTON : From NEWBRIDGE ROAD to NUWARRA ROAD : NORTH BOUND**
 Location **About 350 Mtrs south of Newbridge Road, On Rail Fencing** Carriageway

Start Date 04-MAR-16
 Start Time 100
 Duration 7 DAYS
 Interval 1 HOUR

Weekly 50th Percentile Speed 58
 Weekly 85th Percentile Speed 67
 Five Day AADT 7594
 Seven Day AADT 6977

TOTAL COUNT MATRIX

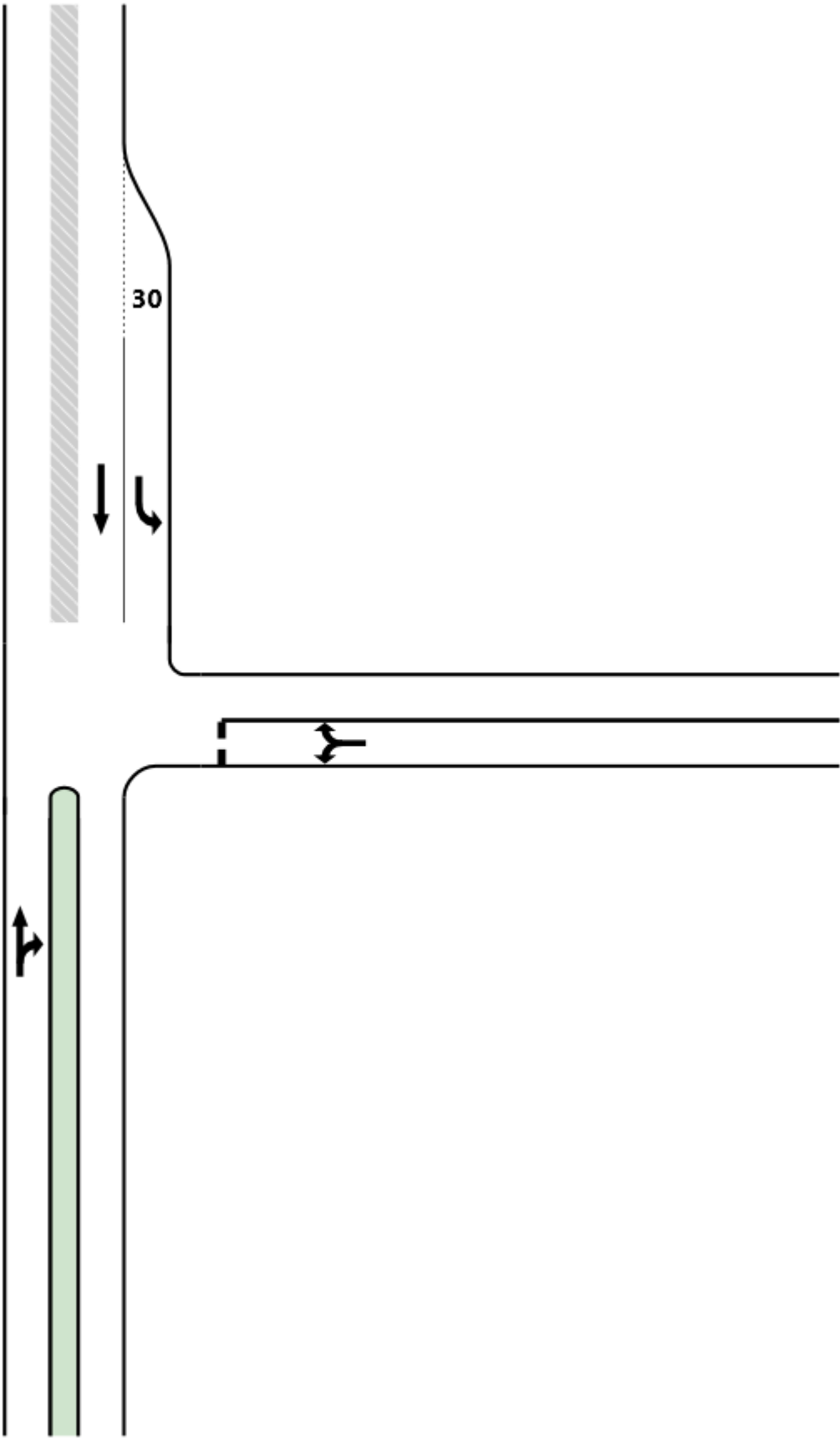
	MON 7TH	TUE 8TH	WED 9TH	THU 10TH	FRI 4TH	SAT 5TH	SUN 6TH	5 Day		7 Day	
								Total	Average	Total	Average
Midnight - 1am	40	38	52	57	51	89	106	238	48	433	62
1am - 2am	19	28	26	28	37	32	52	138	28	222	32
2am - 3am	12	13	20	17	16	44	45	78	16	167	24
3am - 4am	22	19	16	13	16	31	27	86	17	144	21
4am - 5am	24	23	25	24	39	35	25	135	27	195	28
5am - 6am	73	90	79	78	70	56	27	390	78	473	68
6am - 7am	220	246	235	222	217	107	47	1140	228	1294	185
7am - 8am	267	283	314	291	286	150	89	1441	288	1680	240
8am - 9am	329	302	310	310	313	219	126	1564	313	1909	273
9am - 10am	236	281	284	282	278	321	201	1361	272	1883	269
10am - 11am	249	271	260	268	262	388	277	1310	262	1975	282
11am - Midday	293	283	304	279	310	433	344	1469	294	2246	321
Midday - 1pm	319	303	320	300	429	509	362	1671	334	2542	363
1pm - 2pm	407	408	425	368	456	446	345	2064	413	2855	408
2pm - 3pm	614	626	665	623	608	428	372	3136	627	3936	562
3pm - 4pm	804	758	764	852	800	463	379	3978	796	4820	689
4pm - 5pm	819	811	855	774	762	442	397	4021	804	4860	694
5pm - 6pm	733	867	844	818	786	423	377	4048	810	4848	693
6pm - 7pm	649	718	685	663	676	333	328	3391	678	4052	579
7pm - 8pm	393	437	417	434	430	286	286	2111	422	2683	383
8pm - 9pm	242	325	292	353	322	225	209	1534	307	1968	281
9pm - 10pm	192	269	259	227	228	229	189	1175	235	1593	228
10pm - 11pm	150	170	162	196	260	205	133	938	188	1276	182
11pm - Midnight	84	90	102	112	163	164	73	551	110	788	113
Total	7190	7659	7715	7589	7815	6058	4816	37968	7593	48842	6977

Appendix C

SIDRA Intersection analysis results



Brickmakers Drive



New Link Road

Brickmakers Drive

MOVEMENT SUMMARY

Site: Unsignalised Weekday AM
Peak Residential Traffic

New T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.500	4.1	LOS A	8.9	62.8	0.77	0.00	41.7
3	R	13	0.0	0.500	10.8	LOS A	8.9	62.8	0.77	1.01	41.8
Approach		961	0.2	0.500	4.2	NA	8.9	62.8	0.77	0.01	41.7
East: New Link Road											
4	L	52	0.0	1.010	162.6	LOS F	11.3	79.3	1.00	2.39	10.2
6	R	77	0.0	1.010	162.7	LOS F	11.3	79.3	1.00	1.83	10.1
Approach		128	0.0	1.010	162.7	LOS F	11.3	79.3	1.00	2.06	10.1
North: Brickmakers Drive											
7	L	19	0.0	0.010	6.4	LOS A	0.0	0.0	0.00	0.61	43.3
8	T	353	0.3	0.181	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		372	0.3	0.181	0.3	NA	0.0	0.0	0.00	0.03	49.6
All Vehicles		1461	0.2	1.010	17.2	NA	11.3	79.3	0.59	0.20	33.8

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

Vehicle movement LOS values are based on average delay per movement

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

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

SIDRA Standard Delay Model used.

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SIDRA INTERSECTION 5.1.13.2093

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MOVEMENT SUMMARY

Site: Unsignalised Weekday PM
Peak Residential Traffic

New T Intersection
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	307	0.0	0.247	10.9	LOS A	3.8	26.9	0.94	0.00	37.3
3	R	38	0.0	0.247	17.5	LOS B	3.8	26.9	0.94	1.04	37.0
Approach		345	0.0	0.247	11.6	NA	3.8	26.9	0.94	0.11	37.3
East: New Link Road											
4	L	25	0.0	0.583	58.9	LOS E	2.2	15.7	0.94	1.11	20.6
6	R	39	0.0	0.583	59.1	LOS E	2.2	15.7	0.94	1.10	20.6
Approach		64	0.0	0.583	59.0	LOS E	2.2	15.7	0.94	1.10	20.6
North: Brickmakers Drive											
7	L	58	0.0	0.031	6.4	LOS A	0.0	0.0	0.00	0.61	43.3
8	T	973	0.0	0.499	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		1031	0.0	0.499	0.4	NA	0.0	0.0	0.00	0.03	49.6
All Vehicles		1440	0.0	0.583	5.7	NA	3.8	26.9	0.27	0.10	43.4

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 used.

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MOVEMENT SUMMARY

Site: Unsignalised Weekday AM
Peak Residential+Recycling
Traffic

New T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.502	4.2	LOS A	9.0	63.4	0.77	0.00	41.6
3	R	15	0.0	0.502	10.8	LOS A	9.0	63.4	0.77	1.01	41.8
Approach		963	0.2	0.502	4.3	NA	9.0	63.4	0.77	0.02	41.6
East: New Link Road											
4	L	53	0.0	1.679	709.0	LOS F	44.6	345.8	1.00	4.98	2.8
6	R	97	19.6	1.679	709.7	LOS F	44.6	345.8	1.00	3.40	2.8
Approach		149	12.7	1.679	709.5	LOS F	44.6	345.8	1.00	3.96	2.8
North: Brickmakers Drive											
7	L	19	0.0	0.010	6.4	LOS A	0.0	0.0	0.00	0.61	43.3
8	T	353	0.3	0.181	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		372	0.3	0.181	0.3	NA	0.0	0.0	0.00	0.03	49.6
All Vehicles		1484	1.5	1.679	74.3	NA	44.6	345.8	0.60	0.42	17.5

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 used.

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MOVEMENT SUMMARY

Site: Unsignalised Weekday PM
Peak Residential+Recycling
Traffic

New T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	310	0.8	0.252	10.9	LOS A	3.9	27.6	0.94	0.00	37.2
3	R	39	0.0	0.252	17.6	LOS B	3.9	27.6	0.94	1.05	36.9
Approach		349	0.7	0.252	11.7	NA	3.9	27.6	0.94	0.12	37.2
East: New Link Road											
4	L	27	0.0	1.083	234.1	LOS F	9.9	77.6	1.00	1.95	7.5
6	R	54	21.6	1.083	234.8	LOS F	9.9	77.6	1.00	1.80	7.5
Approach		81	14.3	1.083	234.6	LOS F	9.9	77.6	1.00	1.85	7.5
North: Brickmakers Drive											
7	L	58	0.0	0.031	6.4	LOS A	0.0	0.0	0.00	0.61	43.3
8	T	973	0.0	0.499	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		1031	0.0	0.499	0.4	NA	0.0	0.0	0.00	0.03	49.6
All Vehicles		1460	1.0	1.083	16.1	NA	9.9	77.6	0.28	0.15	35.6

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

Vehicle movement LOS values are based on average delay per movement

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

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

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Unsignalised Weekday AM
Peak Residential+Recycling
+Marina Traffic

New T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.547	5.8	LOS A	11.6	81.7	0.90	0.00	40.4
3	R	56	0.0	0.547	12.4	LOS A	11.6	81.7	0.90	1.11	40.7
Approach		1004	0.2	0.547	6.1	NA	11.6	81.7	0.90	0.06	40.4
East: New Link Road											
4	L	116	0.0	3.358	2202.5	LOS F	147.0	1082.9	1.00	7.65	0.9
6	R	193	9.8	3.358	2202.9	LOS F	147.0	1082.9	1.00	4.98	0.9
Approach		308	6.1	3.358	2202.7	LOS F	147.0	1082.9	1.00	5.98	0.9
North: Brickmakers Drive											
7	L	80	0.0	0.043	6.4	LOS A	0.0	0.0	0.00	0.61	43.3
8	T	353	0.3	0.181	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		433	0.2	0.181	1.2	NA	0.0	0.0	0.00	0.11	48.6
All Vehicles		1745	1.3	3.358	393.1	NA	147.0	1082.9	0.69	1.12	4.7

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

Vehicle movement LOS values are based on average delay per movement

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

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

SIDRA Standard Delay Model used.

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MOVEMENT SUMMARY

Site: Unsignalised Weekday PM
Peak Residential+Recycling
+Marina Traffic

New T Intersection
Giveaway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	Turn	Demand Flow veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	307	0.0	0.456	18.1	LOS B	5.8	40.7	1.00	0.00	32.6
3	R	107	0.0	0.456	24.7	LOS B	5.8	40.7	1.00	1.15	32.5
Approach		415	0.0	0.456	19.8	NA	5.8	40.7	1.00	0.30	32.6
East: New Link Road											
4	L	82	0.0	2.536	1456.3	LOS F	90.7	663.7	1.00	4.99	1.4
6	R	136	8.5	2.536	1456.7	LOS F	90.7	663.7	1.00	4.43	1.4
Approach		218	5.3	2.536	1456.6	LOS F	90.7	663.7	1.00	4.64	1.4
North: Brickmakers Drive											
7	L	161	0.0	0.087	6.4	LOS A	0.0	0.0	0.00	0.61	43.3
8	T	973	0.0	0.499	0.0	LOS A	0.0	0.0	0.00	0.00	50.0
Approach		1134	0.0	0.499	0.9	NA	0.0	0.0	0.00	0.09	48.9
All Vehicles		1766	0.7	2.536	184.9	NA	90.7	663.7	0.36	0.70	9.1

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 used.

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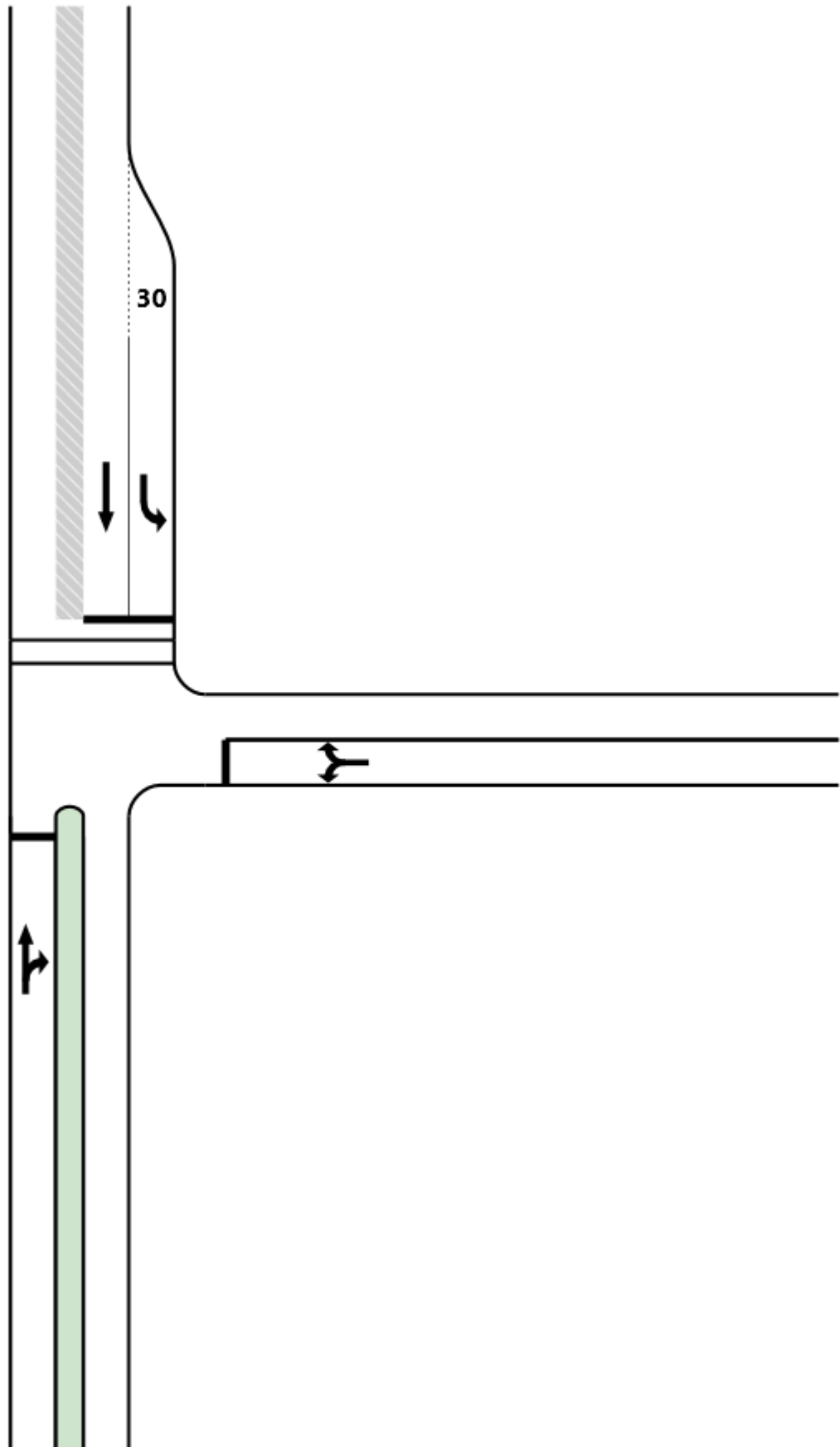
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SIDRA
INTERSECTION



Brickmakers Drive



New Link Road

Brickmakers Drive

MOVEMENT SUMMARY

Site: Traffic Signals Weekday AM
Peak Residential Traffic

New T Intersection

Signals - Fixed Time Cycle Time = 90 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 of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.693	7.4	LOS A	23.2	162.6	0.60	0.56	40.9
3	R	13	0.0	0.693	14.0	LOS A	23.2	162.6	0.60	0.95	38.8
Approach		961	0.2	0.693	7.5	LOS A	23.2	162.6	0.60	0.57	40.8
East: New Link Road											
4	L	52	0.0	0.479	46.0	LOS D	5.4	37.7	0.96	0.79	23.7
6	R	77	0.0	0.479	46.1	LOS D	5.4	37.7	0.96	0.79	23.7
Approach		128	0.0	0.479	46.1	LOS D	5.4	37.7	0.96	0.79	23.7
North: Brickmakers Drive											
7	L	19	0.0	0.042	10.1	LOS A	0.2	1.6	0.29	0.64	40.2
8	T	353	0.3	0.251	4.5	LOS A	5.2	36.2	0.36	0.32	44.1
Approach		372	0.3	0.251	4.8	LOS A	5.2	36.2	0.36	0.33	43.9
All Vehicles		1461	0.2	0.693	10.2	LOS A	23.2	162.6	0.57	0.53	39.0

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	39.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		53	39.2	LOS D			0.93	0.93

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

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

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

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MOVEMENT SUMMARY

Site: Traffic Signals Weekday PM
Peak Residential Traffic

New T Intersection

Signals - Fixed Time Cycle Time = 130 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 of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	307	0.0	0.326	7.2	LOS A	8.0	55.8	0.40	0.35	41.4
3	R	38	0.0	0.326	13.9	LOS A	8.0	55.8	0.40	0.92	38.3
Approach		345	0.0	0.326	8.0	LOS A	8.0	55.8	0.40	0.42	41.0
East: New Link Road											
4	L	25	0.0	0.346	67.0	LOS E	3.9	27.4	0.97	0.76	19.1
6	R	39	0.0	0.346	67.1	LOS E	3.9	27.4	0.97	0.76	19.1
Approach		64	0.0	0.346	67.1	LOS E	3.9	27.4	0.97	0.76	19.1
North: Brickmakers Drive											
7	L	58	0.0	0.129	9.0	LOS A	0.7	4.9	0.21	0.64	41.1
8	T	973	0.0	0.618	5.0	LOS A	23.1	161.6	0.42	0.39	43.4
Approach		1031	0.0	0.618	5.3	LOS A	23.1	161.6	0.41	0.41	43.3
All Vehicles		1440	0.0	0.618	8.7	LOS A	23.1	161.6	0.43	0.42	40.4

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	59.1	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		53	59.1	LOS E			0.95	0.95

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

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

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

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SIDRA
INTERSECTION

MOVEMENT SUMMARY

Site: Traffic Signals Weekday AM
Peak Residential+Recycling
Traffic

New T Intersection
Signals - Fixed Time Cycle Time = 85 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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.712	7.9	LOS A	23.4	164.2	0.64	0.59	40.4
3	R	15	0.0	0.712	14.5	LOS B	23.4	164.2	0.64	0.95	38.5
Approach		963	0.2	0.712	8.0	LOS A	23.4	164.2	0.64	0.60	40.4
East: New Link Road											
4	L	53	0.0	0.574	44.1	LOS D	6.0	46.8	0.98	0.80	24.2
6	R	97	19.6	0.574	44.8	LOS D	6.0	46.8	0.98	0.80	24.2
Approach		149	12.7	0.574	44.5	LOS D	6.0	46.8	0.98	0.80	24.2
North: Brickmakers Drive											
7	L	19	0.0	0.042	10.3	LOS A	0.2	1.6	0.31	0.64	40.1
8	T	353	0.3	0.257	4.8	LOS A	5.2	36.3	0.38	0.33	43.8
Approach		372	0.3	0.257	5.0	LOS A	5.2	36.3	0.38	0.35	43.5
All Vehicles		1484	1.5	0.712	10.9	LOS A	23.4	164.2	0.61	0.56	38.5

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		53	36.7	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Traffic Signals Weekday PM
Peak Residential+Recycling
Traffic

New T Intersection
Signals - Fixed Time Cycle Time = 120 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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	310	0.8	0.341	7.9	LOS A	8.1	57.1	0.43	0.38	40.7
3	R	39	0.0	0.341	14.5	LOS B	8.1	57.1	0.43	0.92	37.9
Approach		349	0.7	0.341	8.6	LOS A	8.1	57.1	0.43	0.44	40.4
East: New Link Road											
4	L	27	0.0	0.444	62.5	LOS E	4.6	36.3	0.98	0.77	19.9
6	R	54	21.6	0.444	63.3	LOS E	4.6	36.3	0.98	0.77	19.9
Approach		81	14.3	0.444	63.0	LOS E	4.6	36.3	0.98	0.77	19.9
North: Brickmakers Drive											
7	L	58	0.0	0.129	9.2	LOS A	0.7	4.9	0.23	0.65	40.9
8	T	973	0.0	0.630	5.5	LOS A	23.1	162.0	0.45	0.42	42.9
Approach		1031	0.0	0.630	5.7	LOS A	23.1	162.0	0.44	0.44	42.8
All Vehicles		1460	1.0	0.630	9.6	LOS A	23.1	162.0	0.47	0.46	39.7

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		53	54.2	LOS E			0.95	0.95

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Traffic Signals Weekday AM
Peak Residential+Recycling
+Marina Traffic

New T Intersection
Signals - Fixed Time Cycle Time = 105 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 of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.817	13.1	LOS A	36.7	257.6	0.79	0.73	36.3
3	R	56	0.0	0.817	19.7	LOS B	36.7	257.6	0.79	0.94	35.4
Approach		1004	0.2	0.817	13.4	LOS A	36.7	257.6	0.79	0.75	36.3
East: New Link Road											
4	L	116	0.0	0.827	55.8	LOS D	16.8	123.9	1.00	0.94	21.3
6	R	193	9.8	0.827	56.2	LOS D	16.8	123.9	1.00	0.94	21.3
Approach		308	6.1	0.827	56.0	LOS D	16.8	123.9	1.00	0.94	21.3
North: Brickmakers Drive											
7	L	80	0.0	0.228	12.4	LOS A	1.4	9.5	0.36	0.67	38.5
8	T	353	0.3	0.268	7.1	LOS A	7.0	49.1	0.42	0.37	41.6
Approach		433	0.2	0.268	8.1	LOS A	7.0	49.1	0.41	0.43	41.0
All Vehicles		1745	1.3	0.827	19.6	LOS B	36.7	257.6	0.73	0.70	33.1

Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	38.6	LOS D	0.1	0.1	0.86	0.86
All Pedestrians		53	38.6	LOS D			0.86	0.86

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: Traffic Signals Weekday PM
Peak Residential+Recycling
+Marina Traffic

New T Intersection
Signals - Fixed Time Cycle Time = 80 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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	307	0.0	0.773	24.1	LOS B	15.4	107.7	0.90	0.88	29.9
3	R	107	0.0	0.773	30.8	LOS C	15.4	107.7	0.90	0.97	29.6
Approach		415	0.0	0.773	25.8	LOS B	15.4	107.7	0.90	0.90	29.8
East: New Link Road											
4	L	82	0.0	0.749	44.7	LOS D	8.9	65.0	1.00	0.90	24.0
6	R	136	8.5	0.749	45.1	LOS D	8.9	65.0	1.00	0.90	24.0
Approach		218	5.3	0.749	44.9	LOS D	8.9	65.0	1.00	0.90	24.0
North: Brickmakers Drive											
7	L	161	0.0	0.363	10.9	LOS A	2.1	14.8	0.36	0.68	39.6
8	T	973	0.0	0.726	8.3	LOS A	23.5	164.5	0.68	0.63	40.0
Approach		1134	0.0	0.726	8.7	LOS A	23.5	164.5	0.63	0.63	39.9
All Vehicles		1766	0.7	0.773	17.2	LOS B	23.5	164.5	0.74	0.73	34.4

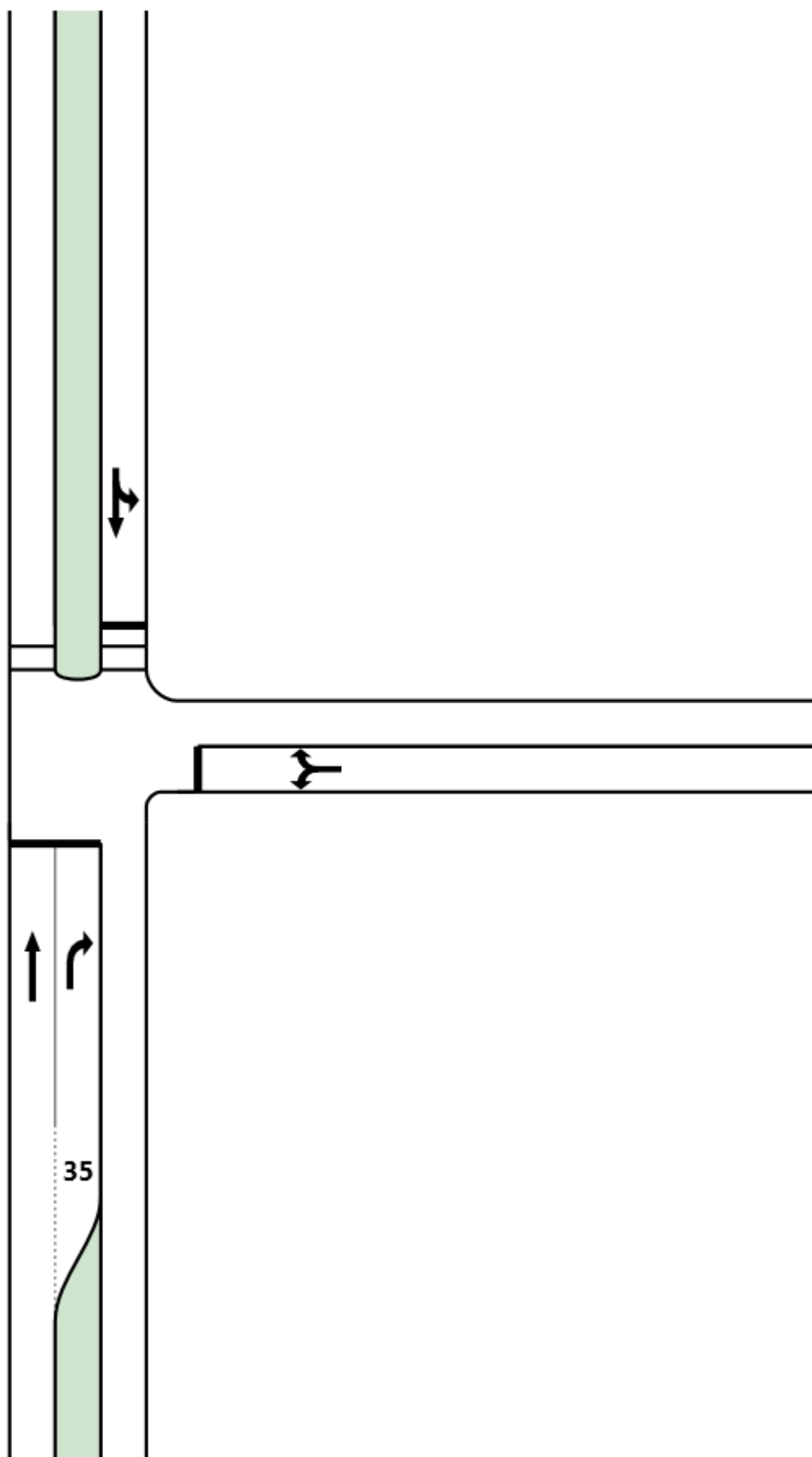
Level of Service (LOS) Method: Delay (RTA NSW).
Vehicle movement LOS values are based on average delay per movement
Intersection and Approach LOS values are based on average delay for all vehicle movements.
SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		53	34.2	LOS D			0.93	0.93

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



Brickmakers Drive



New Link Road

Brickmakers Drive

MOVEMENT SUMMARY

Site: Traffic Signals Weekday AM
Peak Residential Traffic

New T Intersection with Right Turn Lane

Signals - Fixed Time Cycle Time = 85 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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.679	7.0	LOS A	21.4	150.2	0.60	0.55	41.2
3	R	13	0.0	0.034	12.1	LOS A	0.2	1.3	0.36	0.68	38.7
Approach		961	0.2	0.679	7.1	LOS A	21.4	150.2	0.59	0.55	41.2
East: New Link Road											
4	L	52	0.0	0.490	44.2	LOS D	5.1	35.9	0.97	0.79	24.1
6	R	77	0.0	0.490	44.5	LOS D	5.1	35.9	0.97	0.79	24.1
Approach		128	0.0	0.490	44.4	LOS D	5.1	35.9	0.97	0.79	24.1
North: Brickmakers Drive											
7	L	19	0.0	0.267	10.9	LOS A	5.3	37.2	0.37	0.89	40.5
8	T	353	0.3	0.267	4.4	LOS A	5.3	37.2	0.37	0.33	44.0
Approach		372	0.3	0.267	4.8	LOS A	5.3	37.2	0.37	0.36	43.8
All Vehicles		1461	0.2	0.679	9.8	LOS A	21.4	150.2	0.57	0.52	39.3

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	36.7	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		53	36.7	LOS D			0.93	0.93

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

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

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

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SIDRA INTERSECTION 5.1.13.2093

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MOVEMENT SUMMARY

Site: Traffic Signals Weekday PM
Peak Residential Traffic

New T Intersection with Right Turn Lane

Signals - Fixed Time Cycle Time = 120 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 of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	307	0.0	0.197	3.0	LOS A	4.2	29.1	0.25	0.22	45.9
3	R	38	0.0	0.215	20.1	LOS B	1.1	7.6	0.50	0.73	33.6
Approach		345	0.0	0.215	4.9	LOS A	4.2	29.1	0.28	0.28	44.1
East: New Link Road											
4	L	25	0.0	0.346	62.5	LOS E	3.6	25.4	0.97	0.76	19.9
6	R	39	0.0	0.346	62.8	LOS E	3.6	25.4	0.97	0.76	19.9
Approach		64	0.0	0.346	62.7	LOS E	3.6	25.4	0.97	0.76	19.9
North: Brickmakers Drive											
7	L	58	0.0	0.662	11.8	LOS A	25.1	175.7	0.46	0.91	40.0
8	T	973	0.0	0.662	5.4	LOS A	25.1	175.7	0.46	0.44	42.9
Approach		1031	0.0	0.662	5.7	LOS A	25.1	175.7	0.46	0.46	42.7
All Vehicles		1440	0.0	0.662	8.1	LOS A	25.1	175.7	0.44	0.43	40.9

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	54.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		53	54.2	LOS E			0.95	0.95

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

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

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

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MOVEMENT SUMMARY

Site: Traffic Signals Weekday AM
Peak Residential+Recycling
Traffic

New T Intersection with Right Turn Lane

Signals - Fixed Time Cycle Time = 80 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 of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.696	7.5	LOS A	21.5	150.6	0.63	0.59	40.7
3	R	15	0.0	0.040	12.5	LOS A	0.2	1.5	0.38	0.68	38.4
Approach		963	0.2	0.696	7.6	LOS A	21.5	150.6	0.63	0.59	40.7
East: New Link Road											
4	L	53	0.0	0.585	42.4	LOS C	5.7	44.5	0.98	0.81	24.7
6	R	97	19.6	0.585	43.2	LOS D	5.7	44.5	0.98	0.81	24.6
Approach		149	12.7	0.585	42.9	LOS D	5.7	44.5	0.98	0.81	24.7
North: Brickmakers Drive											
7	L	19	0.0	0.273	11.1	LOS A	5.3	37.2	0.40	0.89	40.3
8	T	353	0.3	0.273	4.7	LOS A	5.3	37.2	0.40	0.35	43.7
Approach		372	0.3	0.273	5.1	LOS A	5.3	37.2	0.40	0.37	43.5
All Vehicles		1484	1.5	0.696	10.5	LOS A	21.5	150.6	0.61	0.56	38.8

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
All Pedestrians		53	34.2	LOS D			0.93	0.93

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

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

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

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MOVEMENT SUMMARY

Site: Traffic Signals Weekday PM
Peak Residential+Recycling
Traffic

New T Intersection with Right Turn Lane

Signals - Fixed Time Cycle Time = 110 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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	310	0.8	0.204	3.3	LOS A	4.2	29.6	0.28	0.24	45.5
3	R	39	0.0	0.218	21.4	LOS B	1.1	7.8	0.54	0.74	32.9
Approach		349	0.7	0.218	5.3	LOS A	4.2	29.6	0.31	0.30	43.6
East: New Link Road											
4	L	27	0.0	0.441	58.0	LOS E	4.3	33.4	0.98	0.77	20.8
6	R	54	21.6	0.441	58.9	LOS E	4.3	33.4	0.98	0.77	20.8
Approach		81	14.3	0.441	58.6	LOS E	4.3	33.4	0.98	0.77	20.8
North: Brickmakers Drive											
7	L	58	0.0	0.678	12.3	LOS A	25.2	176.2	0.51	0.92	39.7
8	T	973	0.0	0.678	5.9	LOS A	25.2	176.2	0.51	0.47	42.3
Approach		1031	0.0	0.678	6.2	LOS A	25.2	176.2	0.51	0.50	42.2
All Vehicles		1460	1.0	0.678	8.9	LOS A	25.2	176.2	0.48	0.47	40.2

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	49.2	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		53	49.2	LOS E			0.95	0.95

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

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

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

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MOVEMENT SUMMARY

Site: Traffic Signals Weekday AM
Peak Residential+Recycling
+Marina Traffic

New T Intersection with Right Turn Lane

Signals - Fixed Time Cycle Time = 70 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 of Queue Vehicles veh	Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	948	0.2	0.793	12.7	LOS A	25.9	181.5	0.81	0.78	36.6
3	R	56	0.0	0.171	16.3	LOS B	1.0	7.0	0.54	0.72	35.8
Approach		1004	0.2	0.793	12.9	LOS A	25.9	181.5	0.80	0.77	36.6
East: New Link Road											
4	L	116	0.0	0.809	40.2	LOS C	11.5	84.5	1.00	0.95	25.3
6	R	193	9.8	0.809	40.7	LOS C	11.5	84.5	1.00	0.95	25.3
Approach		308	6.1	0.809	40.5	LOS C	11.5	84.5	1.00	0.95	25.3
North: Brickmakers Drive											
7	L	80	0.0	0.365	13.6	LOS A	7.3	51.3	0.53	0.86	38.6
8	T	353	0.3	0.365	7.2	LOS A	7.3	51.3	0.53	0.47	41.0
Approach		433	0.2	0.365	8.4	LOS A	7.3	51.3	0.53	0.54	40.5
All Vehicles		1745	1.3	0.809	16.6	LOS B	25.9	181.5	0.77	0.75	34.7

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	26.6	LOS C	0.1	0.1	0.87	0.87
All Pedestrians		53	26.6	LOS C			0.87	0.87

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

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

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

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SIDRA INTERSECTION 5.1.13.2093

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MOVEMENT SUMMARY

Site: Traffic Signals Weekday PM
Peak Residential+Recycling
+Marina Traffic

New T Intersection with Right Turn Lane

Signals - Fixed Time Cycle Time = 90 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 of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South: Brickmakers Drive											
2	T	307	0.0	0.222	4.7	LOS A	4.5	31.8	0.37	0.32	43.8
3	R	107	0.0	0.727	45.3	LOS D	5.1	35.6	0.94	0.94	23.8
Approach		415	0.0	0.727	15.2	LOS B	5.1	35.6	0.52	0.48	36.0
East: New Link Road											
4	L	82	0.0	0.783	50.7	LOS D	10.1	74.2	1.00	0.91	22.5
6	R	136	8.5	0.783	51.2	LOS D	10.1	74.2	1.00	0.91	22.4
Approach		218	5.3	0.783	51.0	LOS D	10.1	74.2	1.00	0.91	22.4
North: Brickmakers Drive											
7	L	161	0.0	0.823	16.8	LOS B	35.1	246.0	0.76	0.92	36.9
8	T	973	0.0	0.823	10.4	LOS A	35.1	246.0	0.76	0.72	38.0
Approach		1134	0.0	0.823	11.3	LOS A	35.1	246.0	0.76	0.75	37.8
All Vehicles		1766	0.7	0.823	17.1	LOS B	35.1	246.0	0.73	0.70	34.5

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

Vehicle movement LOS values are based on average delay per movement

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

SIDRA Standard Delay Model used.

Movement Performance - Pedestrians								
Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Distance m	Prop. Queued	Effective Stop Rate per ped
P5	Across N approach	53	37.4	LOS D	0.1	0.1	0.91	0.91
All Pedestrians		53	37.4	LOS D			0.91	0.91

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

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

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

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SIDRA INTERSECTION 5.1.13.2093

Project: R:\Transport Planning\SIDRA RESULTS\Mirvac Moorebank 2016\Brickmakers Drive Traffic Signal

Intersection RT Lane.sip

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