Vincentia District Centre

Proposed Temporary Access

30 September 2010

Prepared for

Fabcot Pty Ltd

Halcrow

Contents

1 Background

As requested we have examined three options for temporary access to the Bay and Basin Leisure Centre.

The temporary access is intended to operate from the time that the District Centre Access D becomes operational until such time as Intersection E is completed and provides a new access to the Leisure Centre which will allow the existing access to be removed.

2 Consideration

In preparing the options we have has regard to the following considerations:

1. The need to signalise Access D in order to allow trucks to turn right out of it into The Wool Road.
2. The proximity of the Naval College Road roundabout which could potentially allow right turns into either Access D or the existing Leisure Centre access to be restricted, and
3. The proximity of the Leisure Centre access to Access D with implications for queuing between the two and for possible weaving complications between vehicles turning right into Access D and right out of the Leisure Centre access.

In conducting the analysis we have adopted our previous year 2016 traffic forecasts but scaled down the shopping centre traffic generation to reflect the new Stage 1 provision of about 22,400m^2 of floor space.

We believe that this approach is reasonable as the new Leisure Centre access should be provided well before 2016.

3 Options

Sketch layouts of three access options are provided on the attached diagrams. These are described below.

Option 1:

- Intersection D signalised and all movements allowed; and
- Leisure Centre access right turn into the access not permitted but all other movements permitted.
- See Appendices A1 and A2.

Option 2:

- Intersection D signalised and but right turns in not permitted; and
- All movements permitted at Leisure Centre access.
- See Appendices B1 and B2.

Option 3:

- Similar to Option 2 but a full "seagull" type intersection provided at the Leisure Centre access.
- See Appendices C1 and C2.

It should be noted that for the Leisure Centre access, the layout sketches show an additional intersection leg opposite the Leisure Centre access labled RTSB merge. This stands for Right Turn South Bound merge and is a dummy approach added into the SIDRA model to take into account extra delay to vehicles turning right out of the Leisure Centre access when they merge with southbound traffic in The Wool Road. This procedure to analyse "seagull" type intersections is in accordance with advice from the authors of the SIDRA analysis program.

4 Analysis of Options

The three options were analysed for summer peak Thursday evening and Saturday morning conditions.

The analysis of the first two options for the Leisure Centre access was complicated by the fact that some vehicles turning right out of the access would shelter in the median between The Wool Road northbound and southbound carriageways while others would seek a clear gap in the traffic along both carriageways before turning right. To take this into account separate analysis of each case was undertaken and the delay results for the right turn out of the Leisure Centre access were averaged.

For Option 3 with a full "seagull" access to/from the Leisure Centre intersection all vehicles turning right out of the Leisure Centre access would do so in stages i.e. first right across the northbound traffic and then a merge with the southbound traffic.

Table 1 summarises the results of the analysis with more detailed results provided in Appendices to this memorandum. Table 1 indicates that theoretically each option would operate satisfactorily as a temporary option. However the analysis does not take into account the weaving conflict between vehicles turning right out of the Leisure Centre and right into Access D. In addition Option 3 would more safely accommodate right turns out of the Leisure Centre as it would afford more storage in the median of The Wool Road. It would also avoid any potential queue back issues during infrequent occasions when the number of vehicles wanting to turn right into Access D may exceed the available storage capacity that would be provided.

Table 1: Results of Option analysis

Intersection		Control	Thursday PM		Saturday	
			LoS	Av. Delay	LoS	Av. Delay
Option 1 - No RT Leisure Centre						
Access Rd D / The Wool Rd		Signals	B	14.6	B	15.1
Leisure Centre Access / The Wool Rd		Give Way	D	55.2	C	33.1
Option 2 - RT Leisure Centre						
Access Rd D / The Wool Rd		Signals	A	11.8	A	11.6
Leisure Centre Access / The Wool Rd		Give Way	D	55.1	C	33.1
Option 3 - Seagull						
Leisure Centre Access / The Wool Rd	Option 1	Give Way	B	22.1	B	20.7
	Option 2	Give Way	B	22.1	B	20.7

Note: 1. LoS = Level of Service

LoS A = Excellent, LoS F = Capacity exceeded, Lowest desireable LoS = LoS D

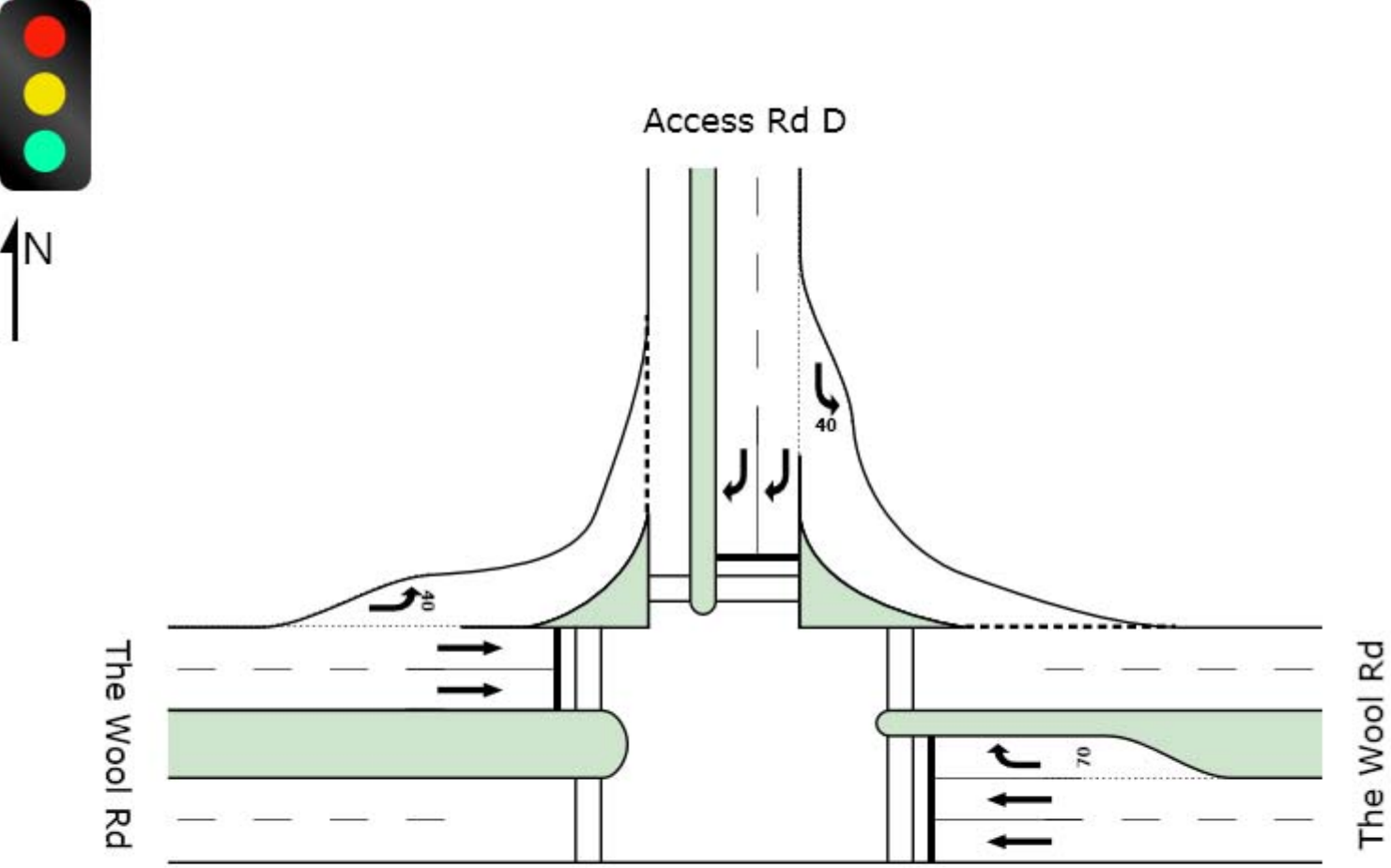
Ave delay = Average delay per vehicle in seconds per vehicle.

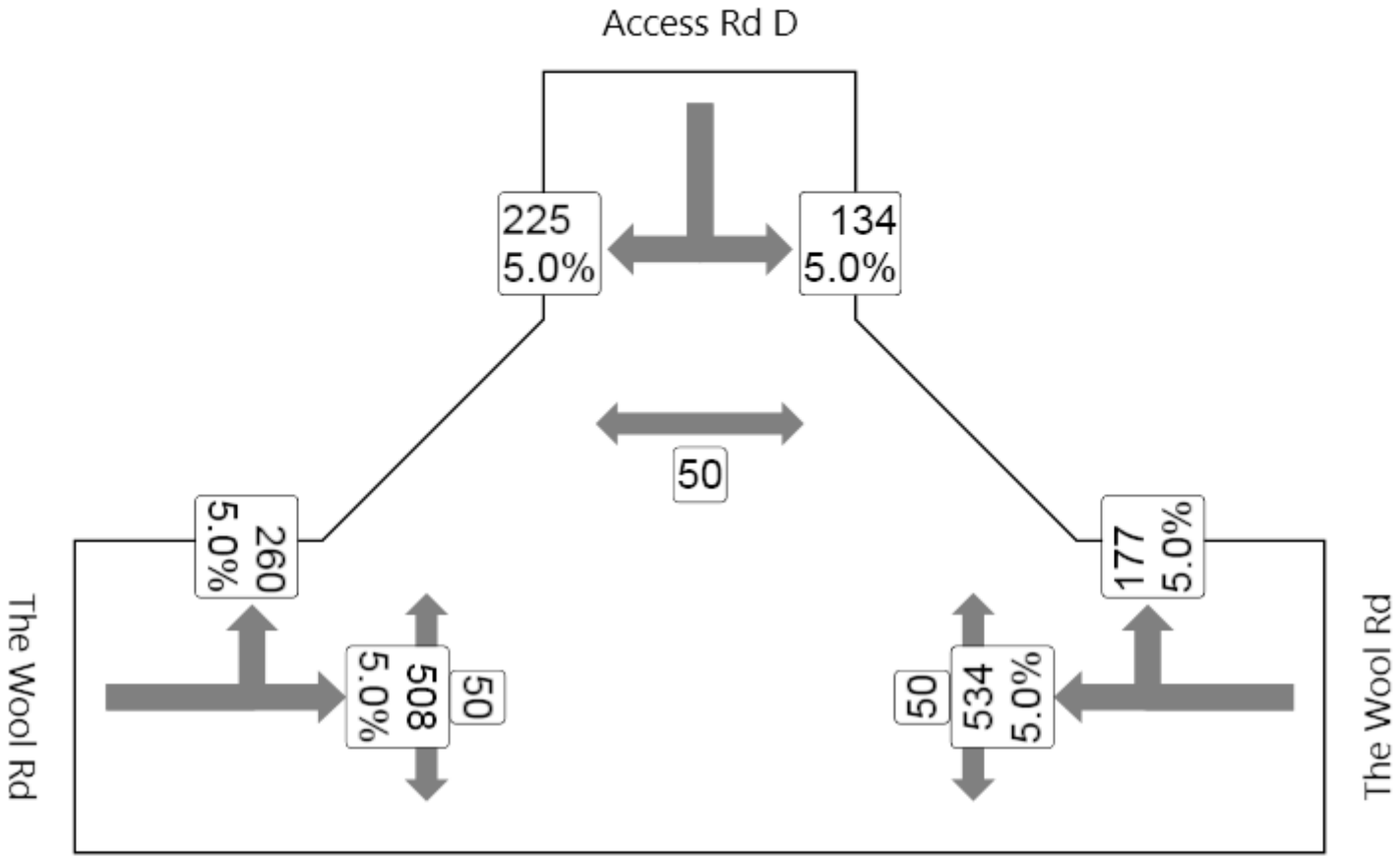
For signalised intersections applies to aggregate of all movements. For roundabouts and priority intersection applies to the most disadvantaged movement.

5 Recommendation

Based on the above analysis and considerations we recommend Option 3 as the most appropriate option for temporary access to the Leisure Centre.

Appendix A1- Option 1, Access D


Access Rd D
N
40
40
70
The Wool Rd
The Wool Rd


Access Rd D
225
5.0%
134
5.0%
50
260
5.0%
177
5.0%
The Wool Rd
508
5.0%
50
50
534
5.0%
The Wool Rd

MOVEMENT SUMMARY

Site: Access D & The Wool Rd - Thurs

The Wool Road & Access D
Thursday PM PEAK
Option 1
Signals - Fixed Time Cycle Time = 80 seconds

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	562	5.0	0.253	8.5	LOS A	6.9	50.2	0.52	0.44	46.7
6	R	186	5.0	0.668	39.4	LOS C	8.8	64.1	0.95	0.87	28.9
Approach		748	5.0	0.668	16.2	LOS B	8.8	64.1	0.62	0.55	40.5
North: Access Rd D											
7	L	141	5.0	0.219	8.9	LOS A	1.4	10.0	0.25	0.66	48.3
9	R	237	5.0	0.252	33.6	LOS C	5.1	37.2	0.83	0.78	31.2
Approach		378	5.0	0.252	24.4	LOS B	5.1	37.2	0.62	0.73	36.0
West: The Wool Rd											
10	L	274	5.0	0.311	8.6	LOS A	2.2	16.3	0.24	0.66	48.5
11	T	535	5.0	0.241	8.5	LOS A	6.5	47.8	0.51	0.44	46.8
Approach		808	5.0	0.311	8.5	LOS A	6.5	47.8	0.42	0.51	47.4
All Vehicles		1935	5.0	0.668	14.6	LOS B	8.8	64.1	0.54	0.57	42.0

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS C. 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 of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
P5	Across N approach	53	34.2	LOS D	0.1	0.1	0.93	0.93
P7	Across W approach	53	31.5	LOS D	0.1	0.1	0.89	0.89
All Pedestrians		159	33.3				0.91	0.91

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

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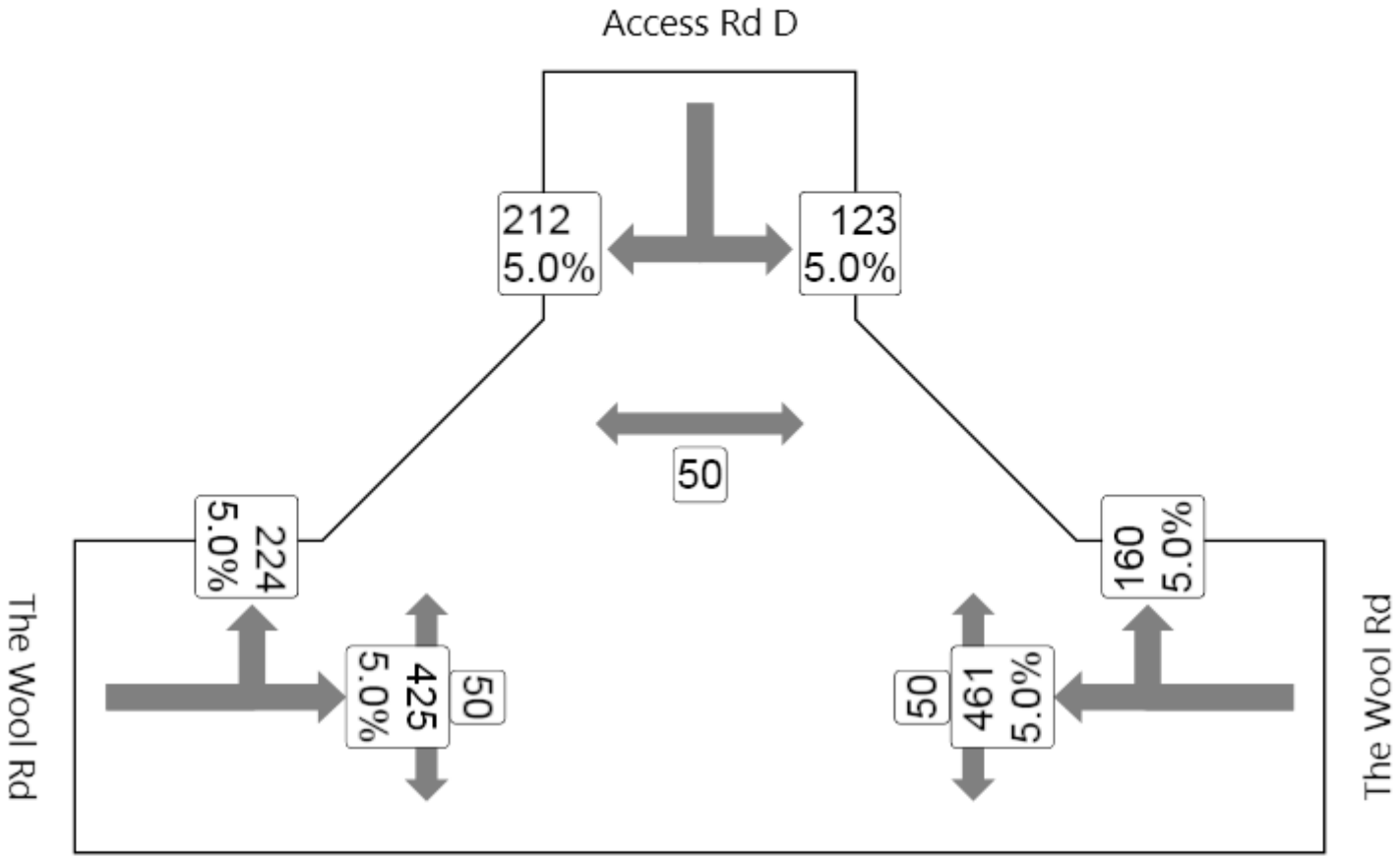
Access Rd D
212
5.0%
123
5.0%
50
224
5.0%
160
5.0%
425
5.0%
50
50
461
5.0%
The Wool Rd
The Wool Rd

MOVEMENT SUMMARY

Site: Access D & The Wool Rd - Sat

The Wool Road & Access D
Saturday PEAK
Option 1
Signals - Fixed Time Cycle Time = 70 seconds

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	485	5.0	0.243	9.6	LOS A	6.0	43.7	0.57	0.49	45.5
6	R	168	5.0	0.752	42.9	LOS D	7.9	57.8	1.00	0.92	27.6
Approach		654	5.0	0.752	18.2	LOS B	7.9	57.8	0.68	0.60	39.0
North: Access Rd D											
7	L	129	5.0	0.182	8.9	LOS A	1.1	8.2	0.27	0.66	48.3
9	R	223	5.0	0.207	28.2	LOS B	4.1	29.9	0.78	0.77	33.9
Approach		353	5.0	0.207	21.1	LOS B	4.1	29.9	0.59	0.73	38.1
West: The Wool Rd											
10	L	236	5.0	0.245	8.6	LOS A	1.7	12.4	0.24	0.66	48.4
11	T	447	5.0	0.224	9.5	LOS A	5.5	40.3	0.57	0.48	45.6
Approach		683	5.0	0.245	9.2	LOS A	5.5	40.3	0.46	0.54	46.6
All Vehicles		1689	5.0	0.752	15.1	LOS B	7.9	57.8	0.57	0.60	41.5

Level of Service (Aver. Int. Delay): LOS B. Based on average delay for all vehicle movements. LOS Method: Delay (RTA NSW).
Level of Service (Worst Movement): LOS D. 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 of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	29.3	LOS C	0.1	0.1	0.91	0.91
P5	Across N approach	53	29.3	LOS C	0.1	0.1	0.91	0.91
P7	Across W approach	53	26.6	LOS C	0.1	0.1	0.87	0.87
All Pedestrians		159	28.4				0.90	0.90

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

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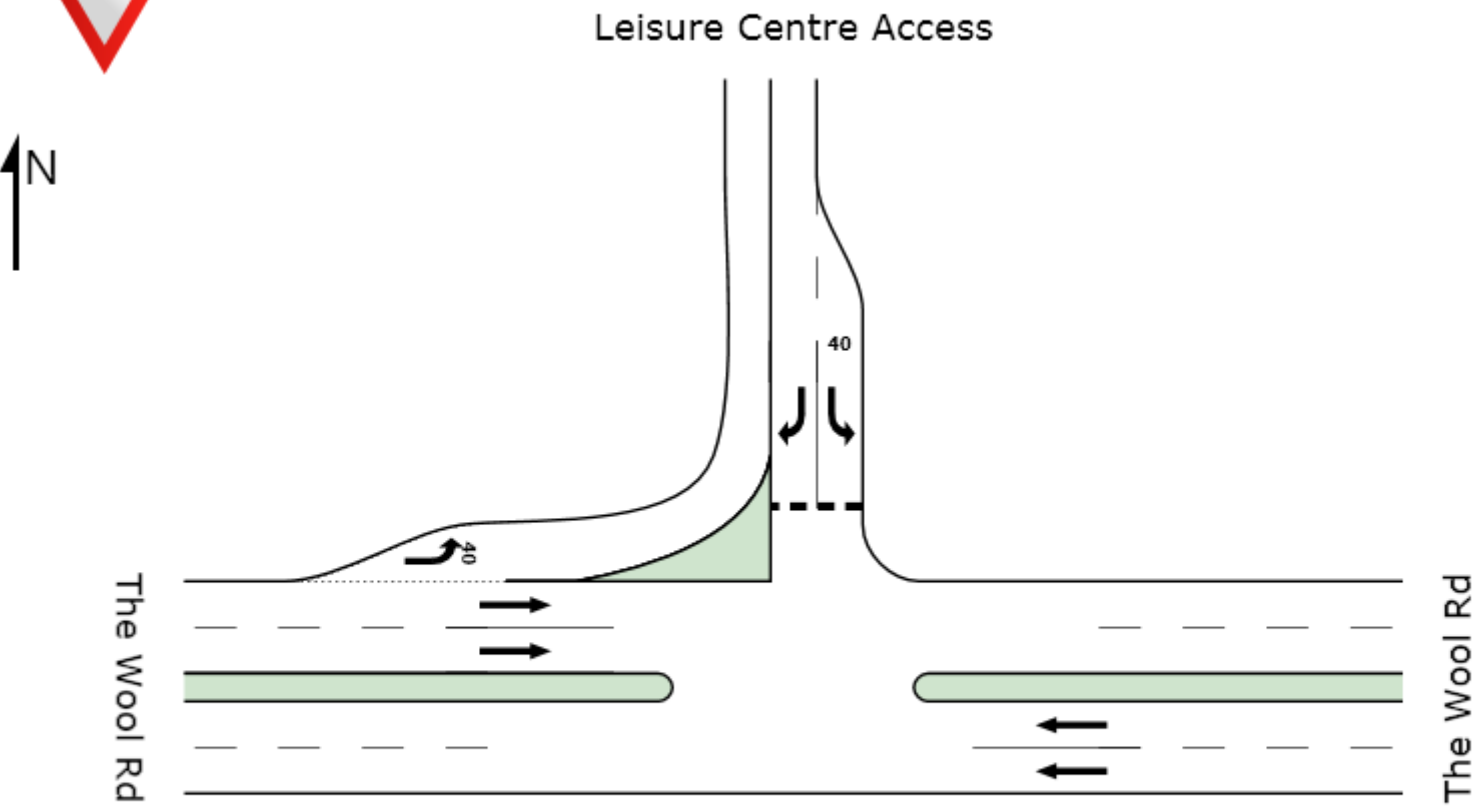
Appendix A2 – Option 1, Leisure Centre Access

Note: Results for right turn out of the Leisure Centre is average of two separate analyses.


Leisure Centre Access
N
40
40
The Wool Rd
The Wool Rd

Leisure Centre Access
48
0.0%
51
0.0%
71
0.0%
572
5.0%
663
5.0%
The Wool Rd
The Wool Rd

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Thurs - Single Stage RT

Leisure Centre Access & The Wool Rd
Thursday PM PEAK
Option 1
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	698	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		698	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
North: Leisure Centre Access											
7	L	54	0.0	0.076	11.4	LOS A	0.3	2.3	0.52	0.79	45.7
9	R	51	0.0	0.648	88.2	LOS F	3.0	21.2	0.97	1.10	17.5
Approach		104	0.0	0.648	48.6	LOS F	3.0	21.2	0.74	0.94	25.7
West: The Wool Rd											
10	L	75	0.0	0.040	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	602	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		677	4.4	0.159	0.8	LOS A	0.0	0.0	0.00	0.07	58.7
All Vehicles		1479	4.4	0.648	3.8	NA	3.0	21.2	0.05	0.10	54.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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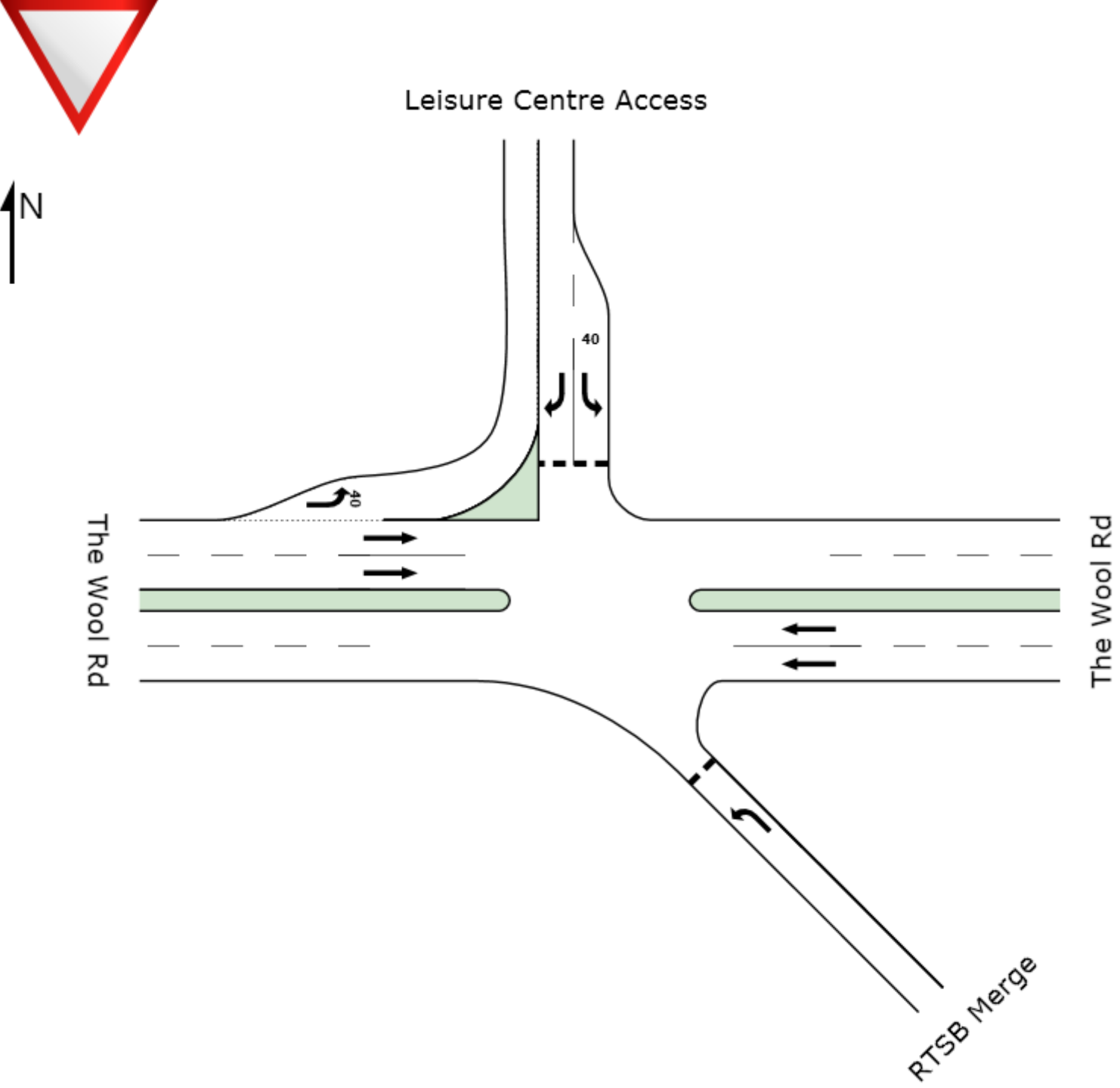
Leisure Centre Access
N
40
40
The Wool Rd
The Wool Rd
RTSB Merge

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Thurs PM - 2 Stage RT

Leisure Centre Access & The Wool Rd
Thursday PM PEAK
Option 1
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	51	0.0	0.079	10.9	LOS A	0.3	2.4	0.55	0.79	46.1
Approach		51	0.0	0.079	10.9	LOS A	0.3	2.4	0.55	0.79	46.1
East: The Wool Rd											
5	T	698	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		698	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
North: Leisure Centre Access											
7	L	54	0.0	0.076	11.4	LOS A	0.3	2.3	0.52	0.79	45.7
9	R	51	0.0	0.071	11.2	LOS A	0.3	2.2	0.52	0.78	45.8
Approach		104	0.0	0.076	11.3	LOS A	0.3	2.3	0.52	0.78	45.8
West: The Wool Rd											
10	L	75	0.0	0.040	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	602	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		677	4.4	0.159	0.8	LOS A	0.0	0.0	0.00	0.07	58.7
All Vehicles		1529	4.2	0.185	1.5	NA	0.3	2.4	0.05	0.11	57.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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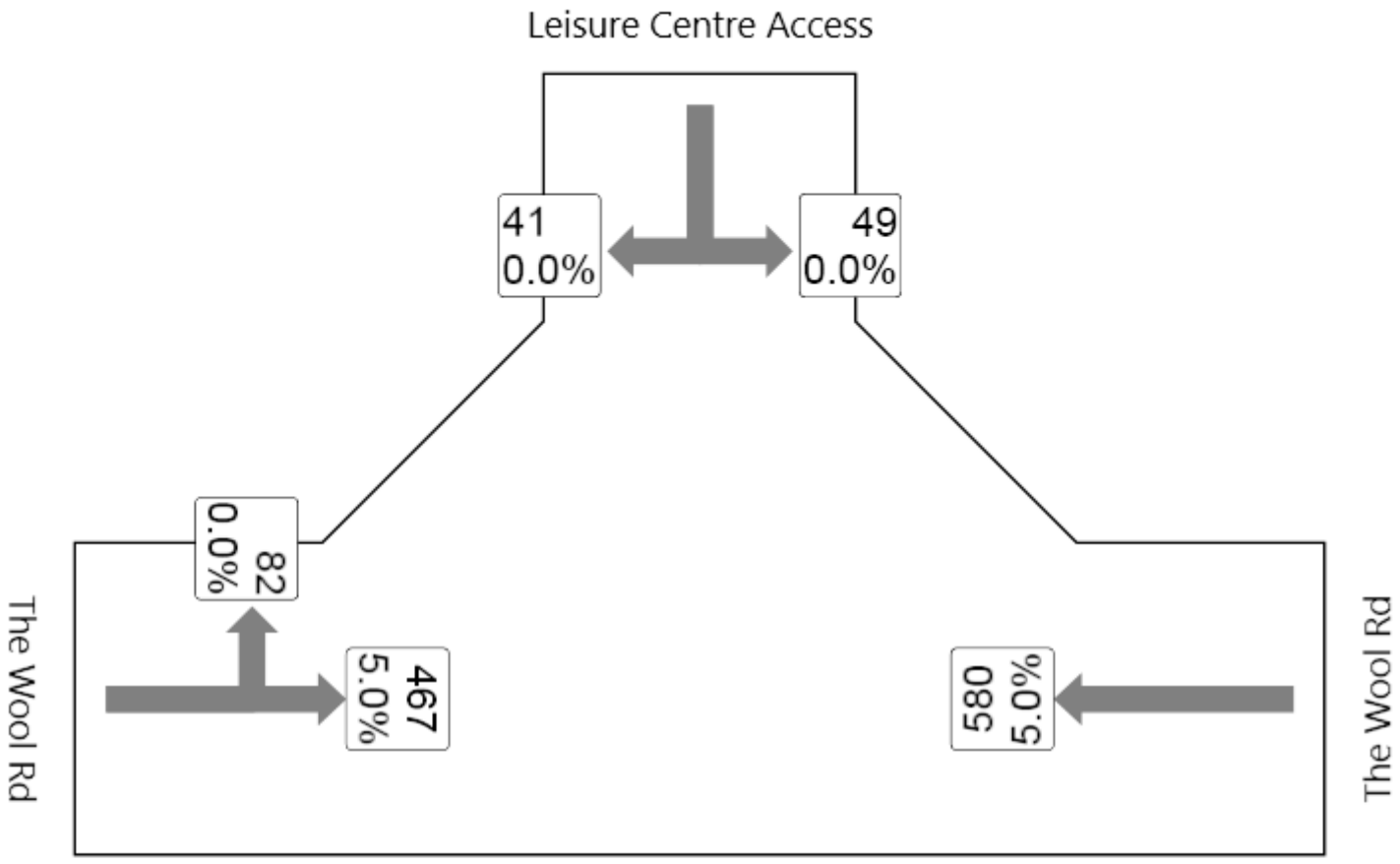
Leisure Centre Access
41
0.0%
49
0.0%
0.0%
82
The Wool Rd
467
5.0%
580
5.0%
The Wool Rd

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Sat - Single Stage RT

Leisure Centre Access & The Wool Rd
Saturday PEAK
Option 1
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	611	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		611	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
North: Leisure Centre Access											
7	L	52	0.0	0.065	10.7	LOS A	0.3	2.0	0.48	0.74	46.4
9	R	43	0.0	0.360	45.5	LOS D	1.6	11.1	0.91	1.01	26.7
Approach		95	0.0	0.361	26.5	LOS D	1.6	11.1	0.67	0.87	34.7
West: The Wool Rd											
10	L	86	0.0	0.046	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	492	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		578	4.3	0.130	1.1	LOS A	0.0	0.0	0.00	0.09	58.2
All Vehicles		1283	4.3	0.361	2.5	NA	1.6	11.1	0.05	0.10	56.2

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Sat - 2 Stage RT

Leisure Centre Access & The Wool Rd
Saturday PEAK
Option 1
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	43	0.0	0.061	10.2	LOS A	0.3	1.9	0.51	0.74	46.8
Approach		43	0.0	0.061	10.2	LOS A	0.3	1.9	0.51	0.74	46.8
East: The Wool Rd											
5	T	611	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		611	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
North: Leisure Centre Access											
7	L	52	0.0	0.065	10.7	LOS A	0.3	2.0	0.48	0.74	46.4
9	R	43	0.0	0.054	10.5	LOS A	0.2	1.7	0.47	0.73	46.5
Approach		95	0.0	0.065	10.6	LOS A	0.3	2.0	0.47	0.74	46.4
West: The Wool Rd											
10	L	86	0.0	0.046	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	492	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		578	4.3	0.130	1.1	LOS A	0.0	0.0	0.00	0.09	58.2
All Vehicles		1326	4.2	0.162	1.6	NA	0.3	2.0	0.05	0.12	57.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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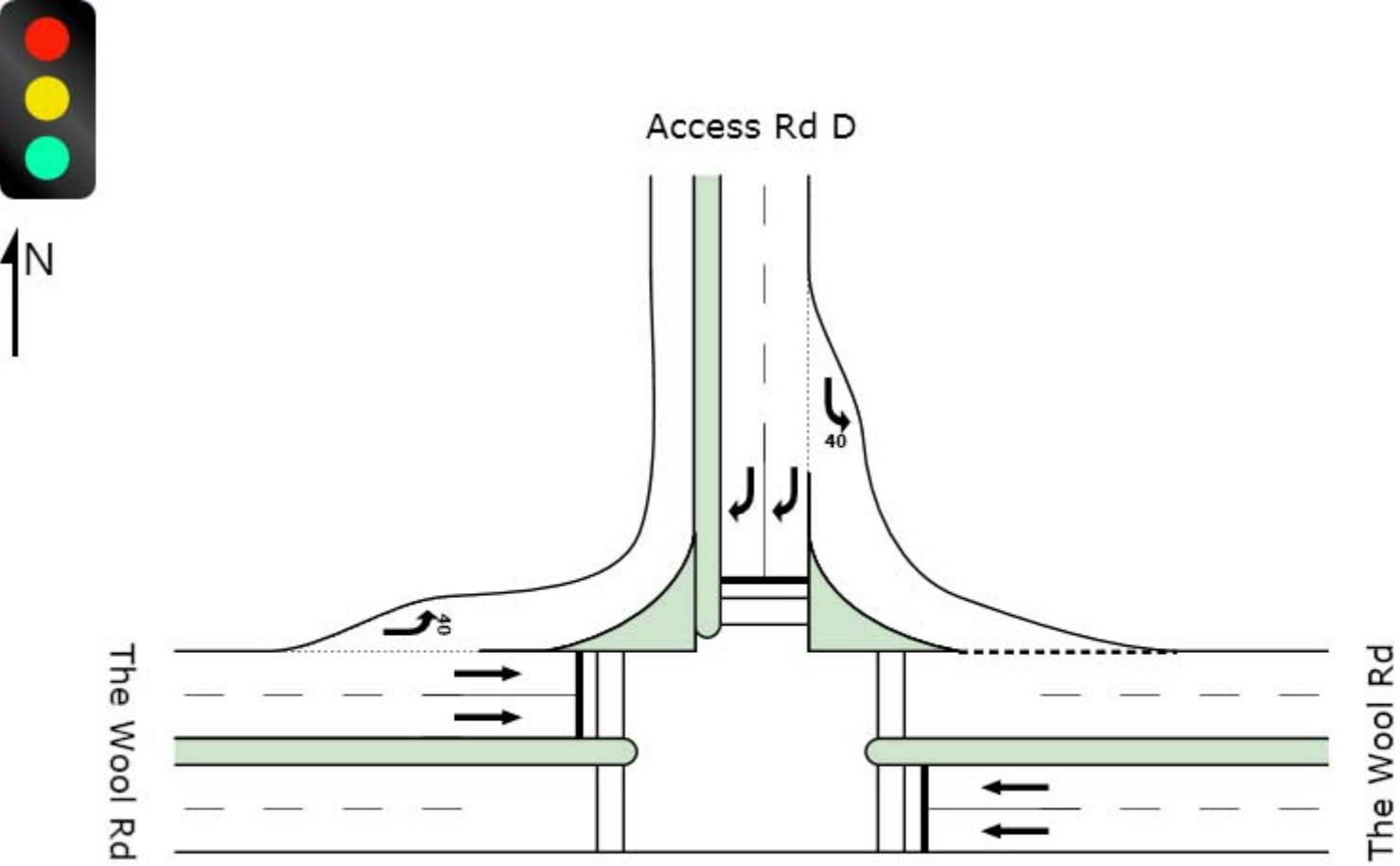
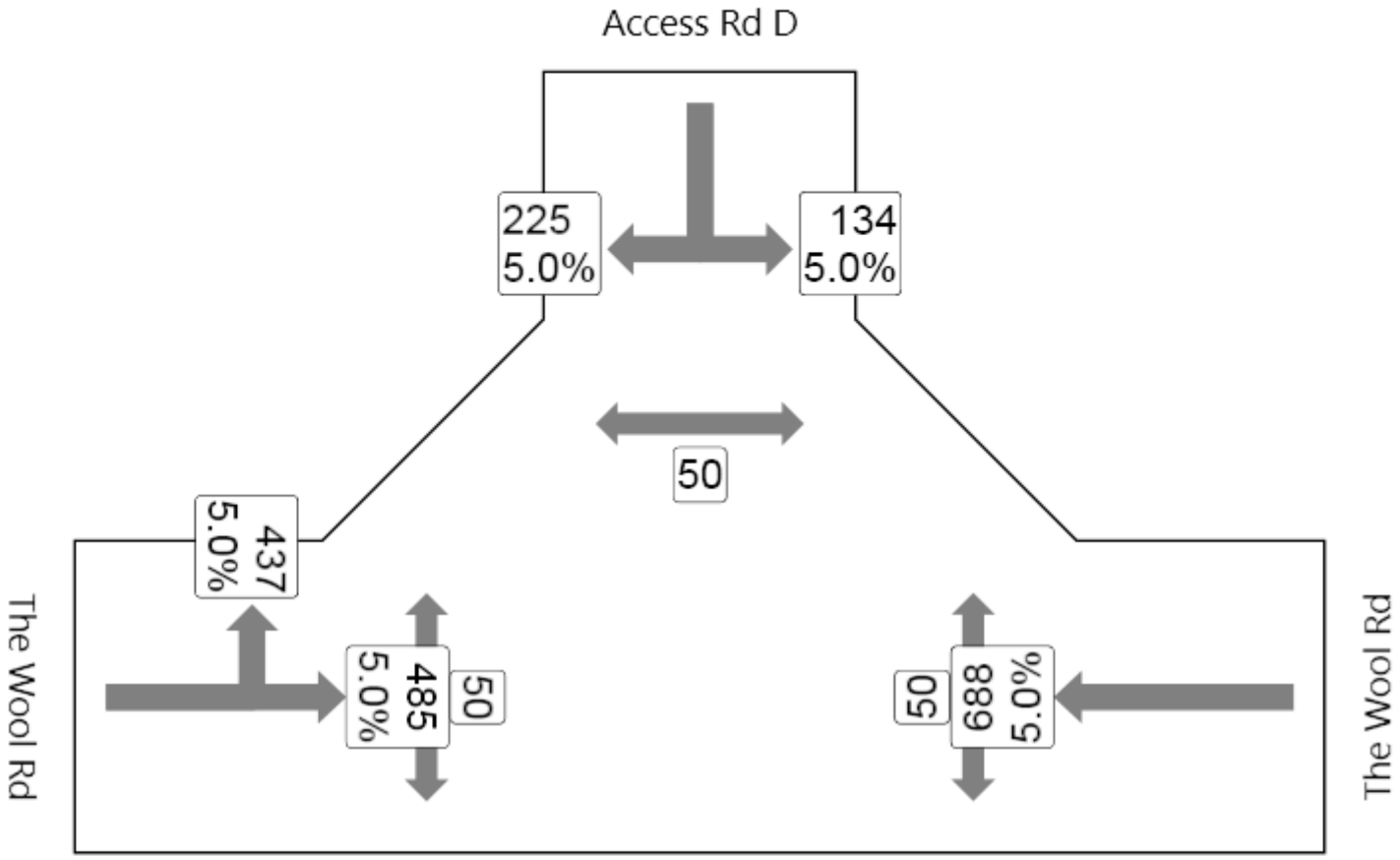
Appendix B1 – Option 2, Access D


Access Rd D
N
40
40
The Wool Rd
The Wool Rd


Access Rd D
225
5.0%
134
5.0%
50
437
5.0%
485
5.0%
50
50
688
5.0%
The Wool Rd
The Wool Rd

MOVEMENT SUMMARY

Site: Access D & The Wool Rd - Thurs PM

The Wool Road & Access D
Thursday PM PEAK
Option 2
Signals - Fixed Time Cycle Time = 50 seconds

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	724	5.0	0.479	12.3	LOS A	8.4	61.5	0.79	0.67	42.4
Approach		724	5.0	0.479	12.3	LOS A	8.4	61.5	0.79	0.67	42.4
North: Access Rd D											
7	L	141	5.0	0.191	9.4	LOS A	1.3	9.2	0.37	0.68	47.7
9	R	237	5.0	0.183	20.2	LOS B	3.0	21.7	0.72	0.76	38.7
Approach		378	5.0	0.190	16.2	LOS B	3.0	21.7	0.59	0.73	41.6
West: The Wool Rd											
10	L	460	5.0	0.257	7.7	NA[9]	NA[9]	NA[9]	0.00	0.60	49.7
11	T	511	5.0	0.338	11.5	LOS A	5.9	43.2	0.73	0.61	43.3
Approach		971	5.0	0.338	9.7	LOS A	5.9	43.2	0.39	0.61	46.1
All Vehicles		2073	5.0	0.479	11.8	LOS A	8.4	61.5	0.56	0.65	43.9

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

9 Continuous movement

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P5	Across N approach	53	15.2	LOS B	0.1	0.1	0.78	0.78
P7	Across W approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		159	18.0				0.85	0.85

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

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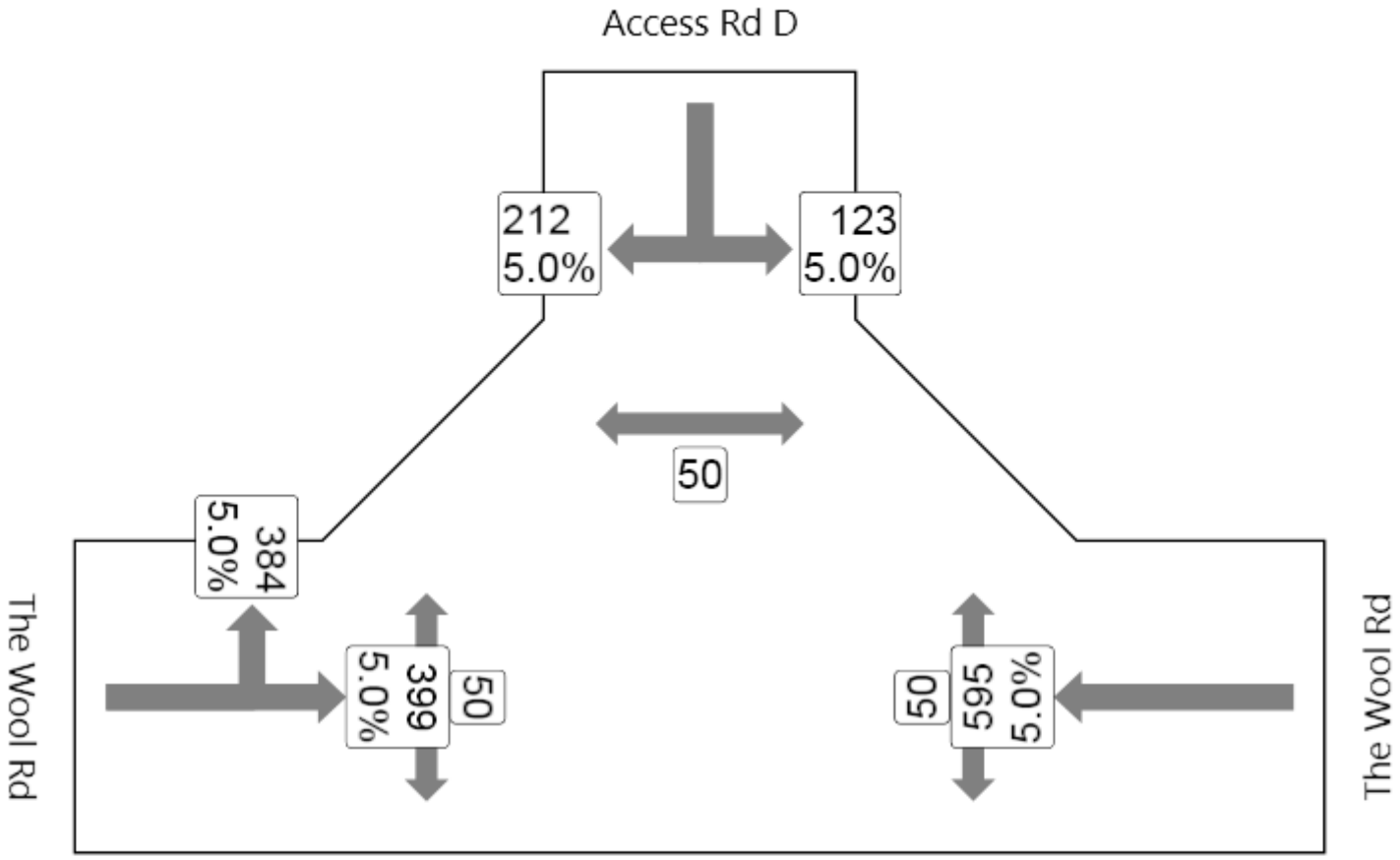
Access Rd D
212
5.0%
123
5.0%
50
384
5.0%
The Wool Rd
399
5.0%
50
50
595
5.0%
The Wool Rd

MOVEMENT SUMMARY

Site: Access D & The Wool Rd - Sat

The Wool Road & Access D
Saturday PEAK
Option 2
Signals - Fixed Time Cycle Time = 50 seconds

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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	626	5.0	0.415	11.9	LOS A	7.3	53.1	0.76	0.65	42.8
Approach		626	5.0	0.415	11.9	LOS A	7.3	53.1	0.76	0.65	42.8
North: Access Rd D											
7	L	129	5.0	0.163	9.1	LOS A	1.0	7.5	0.35	0.67	47.9
9	R	223	5.0	0.173	20.2	LOS B	2.8	20.4	0.72	0.75	38.7
Approach		353	5.0	0.173	16.1	LOS B	2.8	20.4	0.58	0.72	41.7
West: The Wool Rd											
10	L	404	5.0	0.225	7.7	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	420	5.0	0.278	11.1	LOS A	4.9	35.6	0.71	0.59	43.6
Approach		824	5.0	0.278	9.4	LOS A	4.9	35.6	0.36	0.59	46.4
All Vehicles		1803	5.0	0.415	11.6	LOS A	7.3	53.1	0.55	0.64	44.2

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

9 Continuous movement

Movement Performance - Pedestrians

Mov ID	Description	Demand Flow ped/h	Average Delay sec	Level of Service	Average Back of Queue Pedestrian ped	Average Back of Queue Distance m	Prop. Queued	Effective Stop Rate per ped
P3	Across E approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
P5	Across N approach	53	15.2	LOS B	0.1	0.1	0.78	0.78
P7	Across W approach	53	19.4	LOS B	0.1	0.1	0.88	0.88
All Pedestrians		159	18.0				0.85	0.85

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

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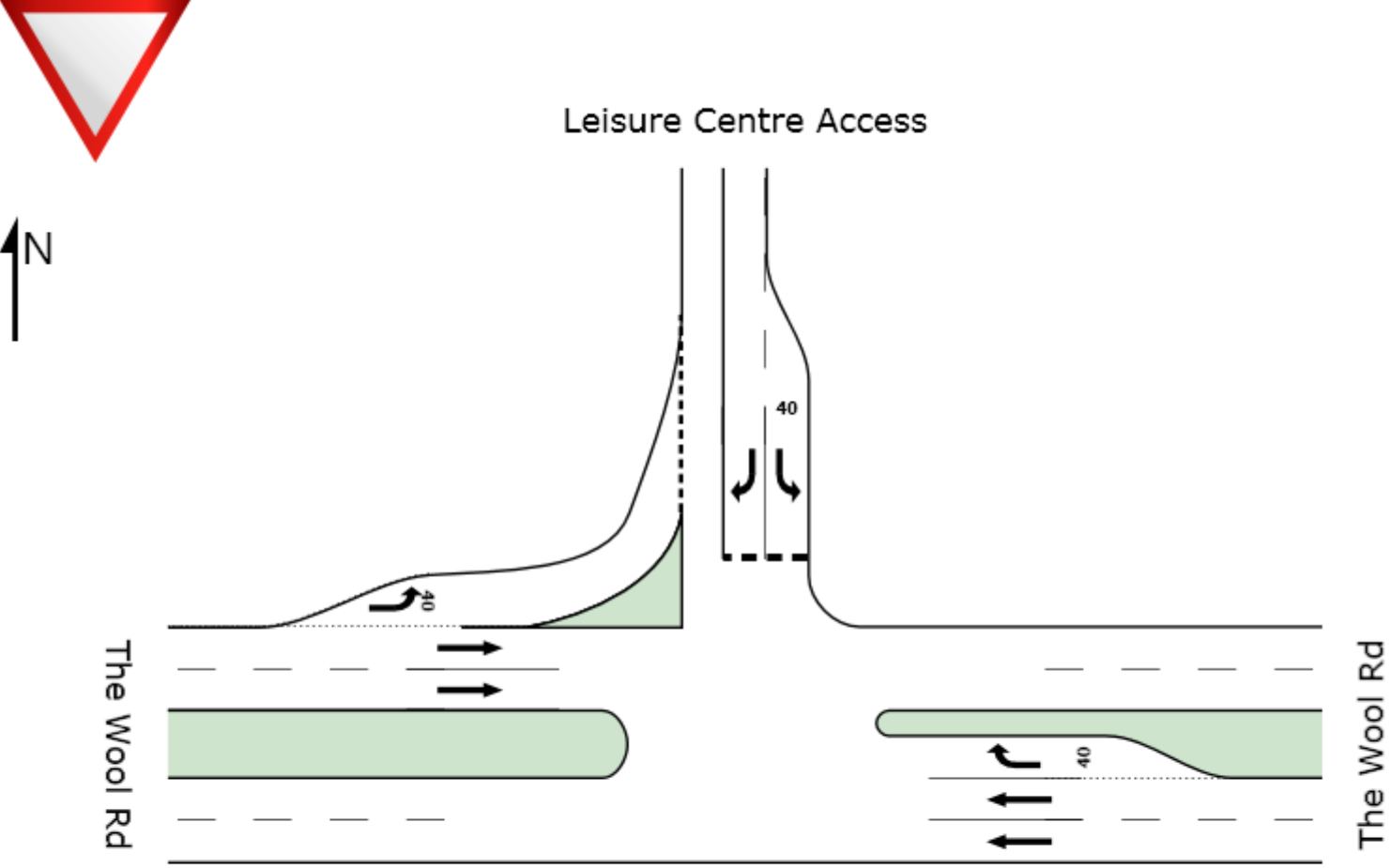
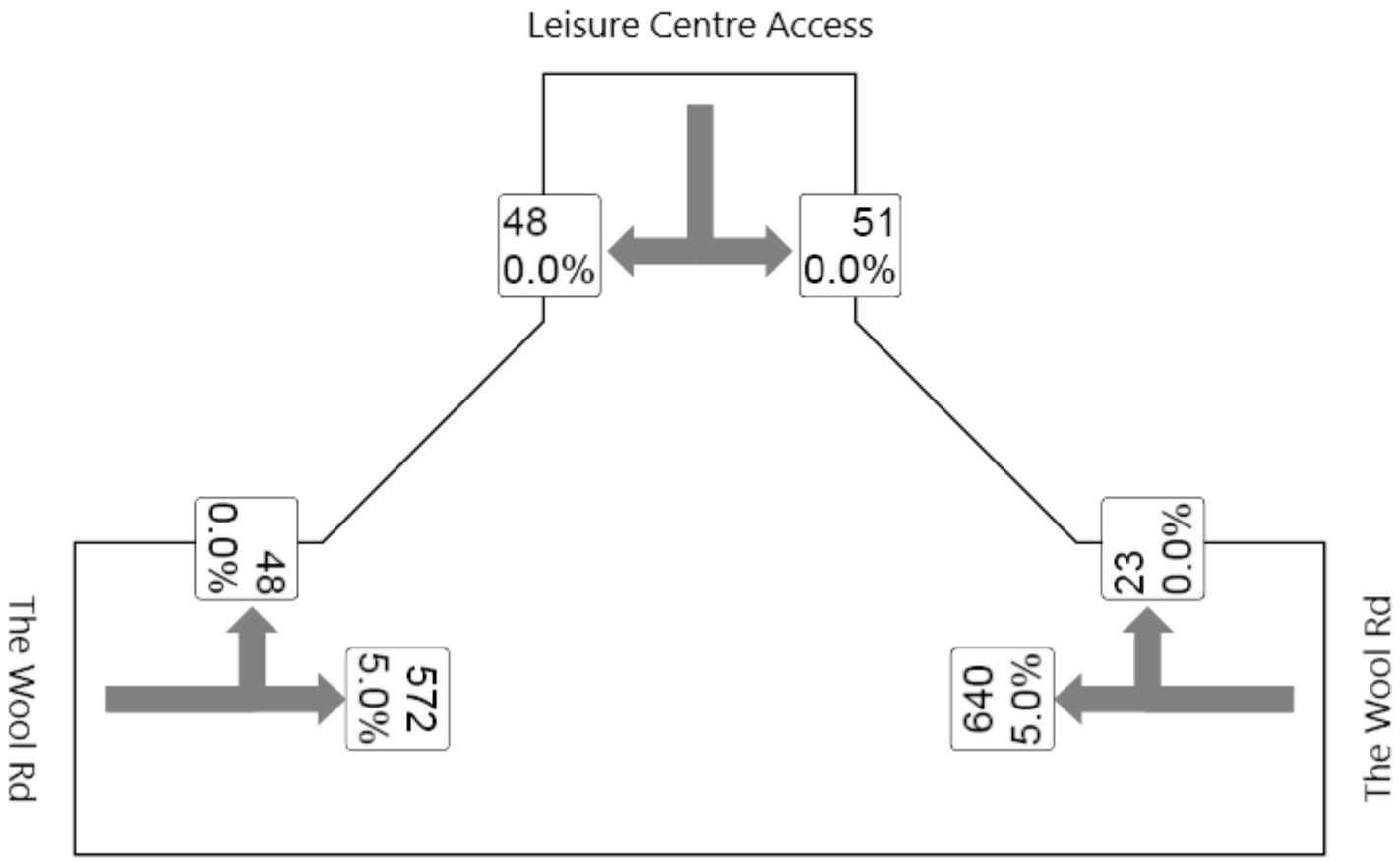
Appendix B2 – Option 2, Leisure centre Access

Note: Result for right turn out of the Leisure Centre in average of two separate analyses.


Leisure Centre Access
N
40
40
40
The Wool Rd
The Wool Rd


Leisure Centre Access
48
0.0%
51
0.0%
48
0.0%
572
5.0%
640
5.0%
23
0.0%
The Wool Rd
The Wool Rd

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Thurs PM - Single Stage RT

Leisure Centre Access & The Wool Rd
Thursday PM PEAK
Option 2
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	674	5.0	0.178	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R	24	0.0	0.032	11.1	LOS A	0.1	1.0	0.53	0.73	46.0
Approach		698	4.8	0.178	0.4	LOS A	0.1	1.0	0.02	0.03	59.4
North: Leisure Centre Access											
7	L	54	0.0	0.075	11.3	LOS A	0.3	2.3	0.51	0.78	45.8
9	R	51	0.0	0.632	84.0	LOS F	2.9	20.5	0.97	1.09	18.1
Approach		104	0.0	0.630	46.5	LOS F	2.9	20.5	0.73	0.93	26.3
West: The Wool Rd											
10	L	51	0.0	0.045	7.7	LOS A	0.2	1.3	0.09	0.57	49.3
11	T	602	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		653	4.6	0.159	0.6	LOS A	0.2	1.3	0.01	0.04	59.0
All Vehicles		1455	4.4	0.630	3.8	NA	2.9	20.5	0.06	0.10	54.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS F. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

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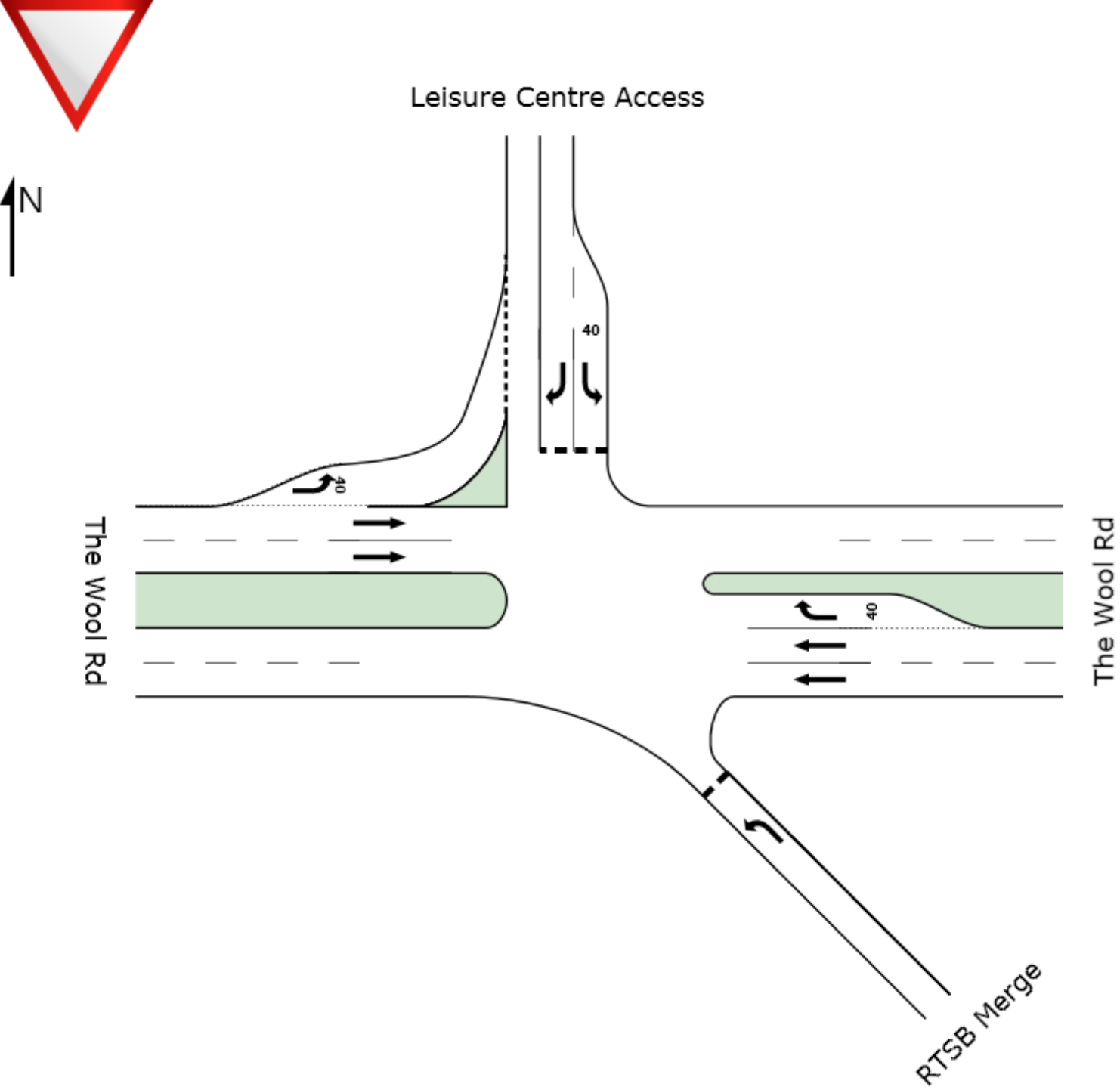
Leisure Centre Access
N
40
40
40
The Wool Rd
The Wool Rd
RTSB Merge

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Thurs PM - 2 Stage RT

Leisure Centre Access & The Wool Rd
Thursday PM PEAK
Option 2
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	51	0.0	0.077	10.7	LOS A	0.3	2.3	0.54	0.78	46.3
Approach		51	0.0	0.077	10.7	LOS A	0.3	2.3	0.54	0.78	46.3
East: The Wool Rd											
5	T	674	5.0	0.178	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R	24	0.0	0.032	11.1	LOS A	0.1	1.0	0.53	0.73	46.0
Approach		698	4.8	0.178	0.4	LOS A	0.1	1.0	0.02	0.03	59.4
North: Leisure Centre Access											
7	L	54	0.0	0.075	11.3	LOS A	0.3	2.3	0.51	0.78	45.8
9	R	51	0.0	0.072	11.3	LOS A	0.3	2.2	0.52	0.78	45.8
Approach		104	0.0	0.075	11.3	LOS A	0.3	2.3	0.52	0.78	45.8
West: The Wool Rd											
10	L	51	0.0	0.045	7.7	LOS A	0.2	1.3	0.09	0.57	49.3
11	T	602	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		653	4.6	0.159	0.6	LOS A	0.2	1.3	0.01	0.04	59.0
All Vehicles		1505	4.2	0.178	1.6	NA	0.3	2.3	0.07	0.11	57.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

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Leisure Centre Access
41
0.0%
49
0.0%
56
0.0%
467
5.0%
554
5.0%
26
0.0%
The Wool Rd
The Wool Rd

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Sat - Single Stage RT

Leisure Centre Access & The Wool Rd
Saturday PEAK
Option 2
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: The Wool Rd											
5	T	583	5.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R	27	0.0	0.031	10.3	LOS A	0.1	1.0	0.48	0.70	46.7
Approach		611	4.8	0.154	0.5	LOS A	0.1	1.0	0.02	0.03	59.2
North: Leisure Centre Access											
7	L	52	0.0	0.064	10.6	LOS A	0.3	2.0	0.47	0.74	46.5
9	R	43	0.0	0.351	44.0	LOS D	1.5	10.8	0.91	1.01	27.2
Approach		95	0.0	0.350	25.8	LOS D	1.5	10.8	0.67	0.86	35.1
West: The Wool Rd											
10	L	59	0.0	0.052	7.7	LOS A	0.2	1.5	0.09	0.57	49.3
11	T	492	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		551	4.5	0.130	0.8	LOS A	0.2	1.5	0.01	0.06	58.6
All Vehicles		1256	4.3	0.350	2.5	NA	1.5	10.8	0.07	0.11	56.1

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS D. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

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SIDRA INTERSECTION

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Sat - 2 Stage RT

Leisure Centre Access & The Wool Rd
Saturday PEAK
Option 2
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	43	0.0	0.059	10.0	LOS A	0.3	1.8	0.50	0.73	47.0
Approach		43	0.0	0.059	10.0	LOS A	0.3	1.8	0.50	0.73	47.0
East: The Wool Rd											
5	T	583	5.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R	27	0.0	0.031	10.3	LOS A	0.1	1.0	0.48	0.70	46.7
Approach		611	4.8	0.154	0.5	LOS A	0.1	1.0	0.02	0.03	59.2
North: Leisure Centre Access											
7	L	52	0.0	0.064	10.6	LOS A	0.3	2.0	0.47	0.74	46.5
9	R	43	0.0	0.055	10.6	LOS A	0.2	1.7	0.48	0.73	46.5
Approach		95	0.0	0.064	10.6	LOS A	0.3	2.0	0.47	0.74	46.5
West: The Wool Rd											
10	L	59	0.0	0.052	7.7	LOS A	0.2	1.5	0.09	0.57	49.3
11	T	492	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		551	4.5	0.130	0.8	LOS A	0.2	1.5	0.01	0.06	58.6
All Vehicles		1299	4.1	0.154	1.7	NA	0.3	2.0	0.07	0.12	57.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

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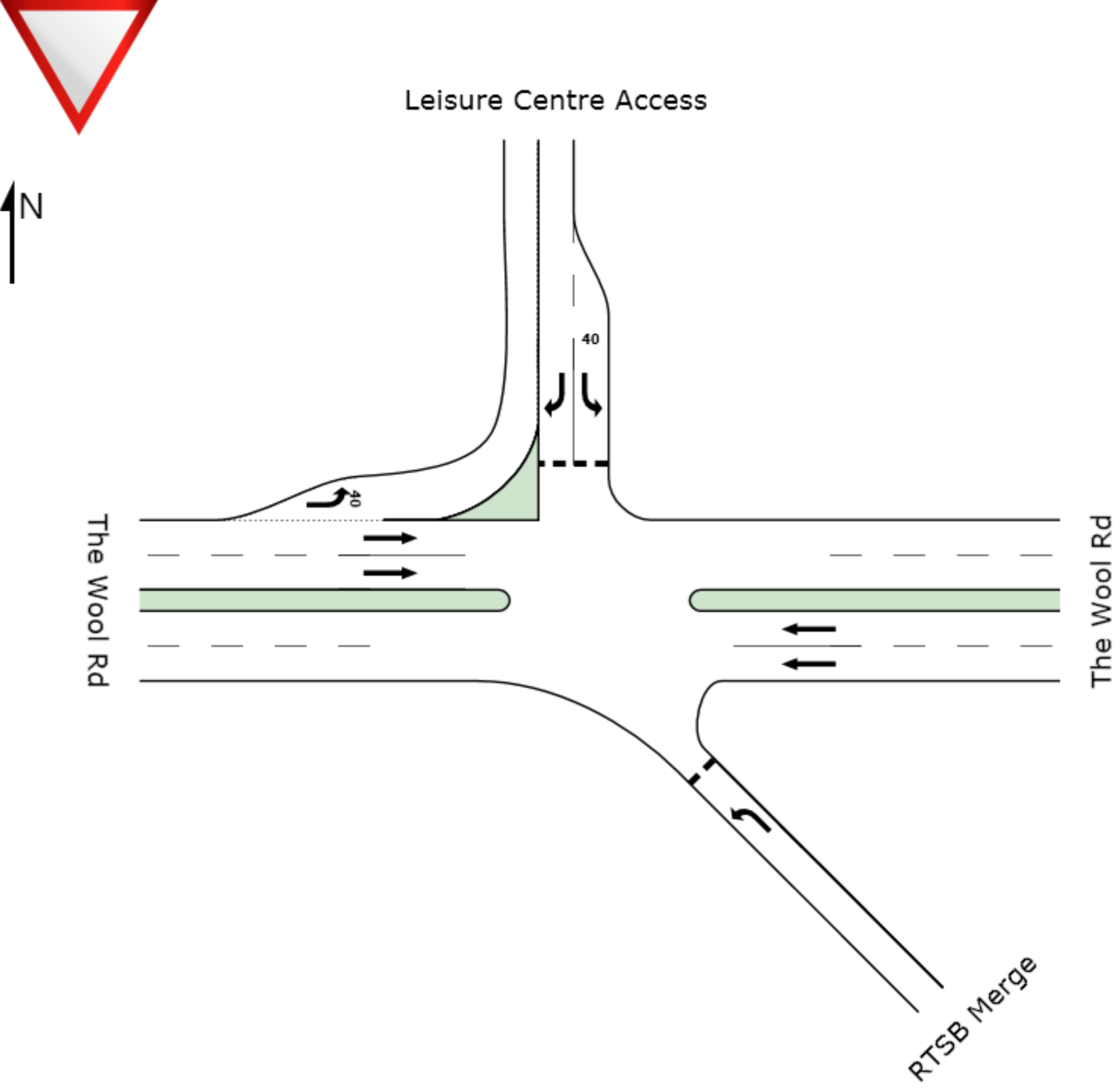
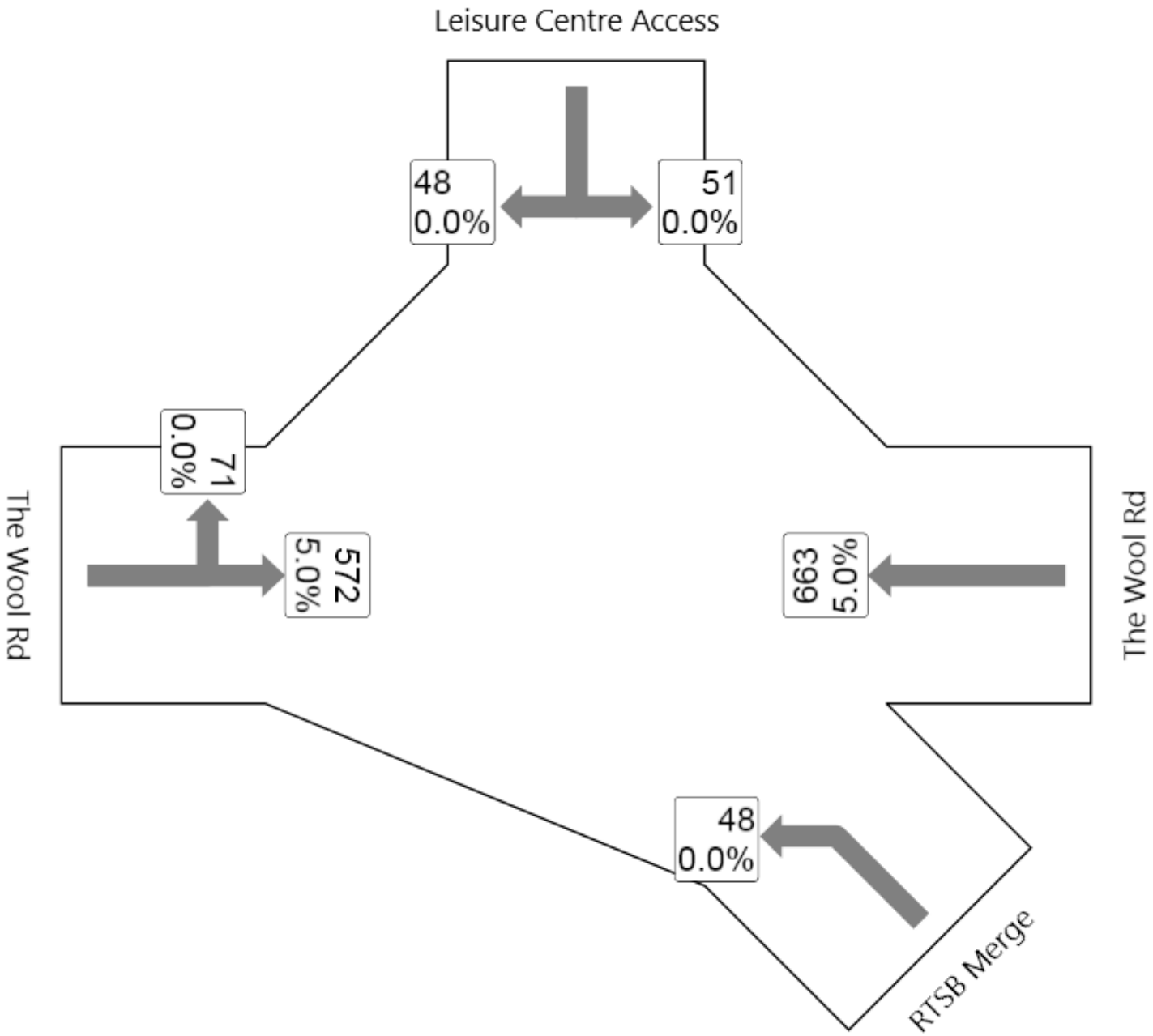
Appendix C – Option 3, Leisure Centre Access

Note: Analysis for Access D is the same as for option 2.


Leisure Centre Access
N
40
40
The Wool Rd
The Wool Rd
RTSB Merge


Leisure Centre Access
48
0.0%
51
0.0%
71
0.0%
572
5.0%
663
5.0%
48
0.0%
The Wool Rd
The Wool Rd
RTSB Merge

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Thurs PM - 2 Stage RT Seagull

Leisure Centre Access & The Wool Rd
Thursday PM PEAK
Option 1
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	51	0.0	0.075	10.9	LOS A	0.3	2.4	0.57	0.78	46.1
Approach		51	0.0	0.075	10.9	LOS A	0.3	2.4	0.57	0.78	46.1
East: The Wool Rd											
5	T	698	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		698	5.0	0.185	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
North: Leisure Centre Access											
7	L	54	0.0	0.076	11.4	LOS A	0.3	2.3	0.52	0.79	45.7
9	R	51	0.0	0.071	11.2	LOS A	0.3	2.2	0.52	0.78	45.8
Approach		104	0.0	0.076	11.3	LOS A	0.3	2.3	0.52	0.78	45.8
West: The Wool Rd											
10	L	75	0.0	0.040	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	602	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		677	4.4	0.159	0.8	LOS A	0.0	0.0	0.00	0.07	58.7
All Vehicles		1529	4.2	0.185	1.5	NA	0.3	2.4	0.05	0.11	57.6

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.

Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).

Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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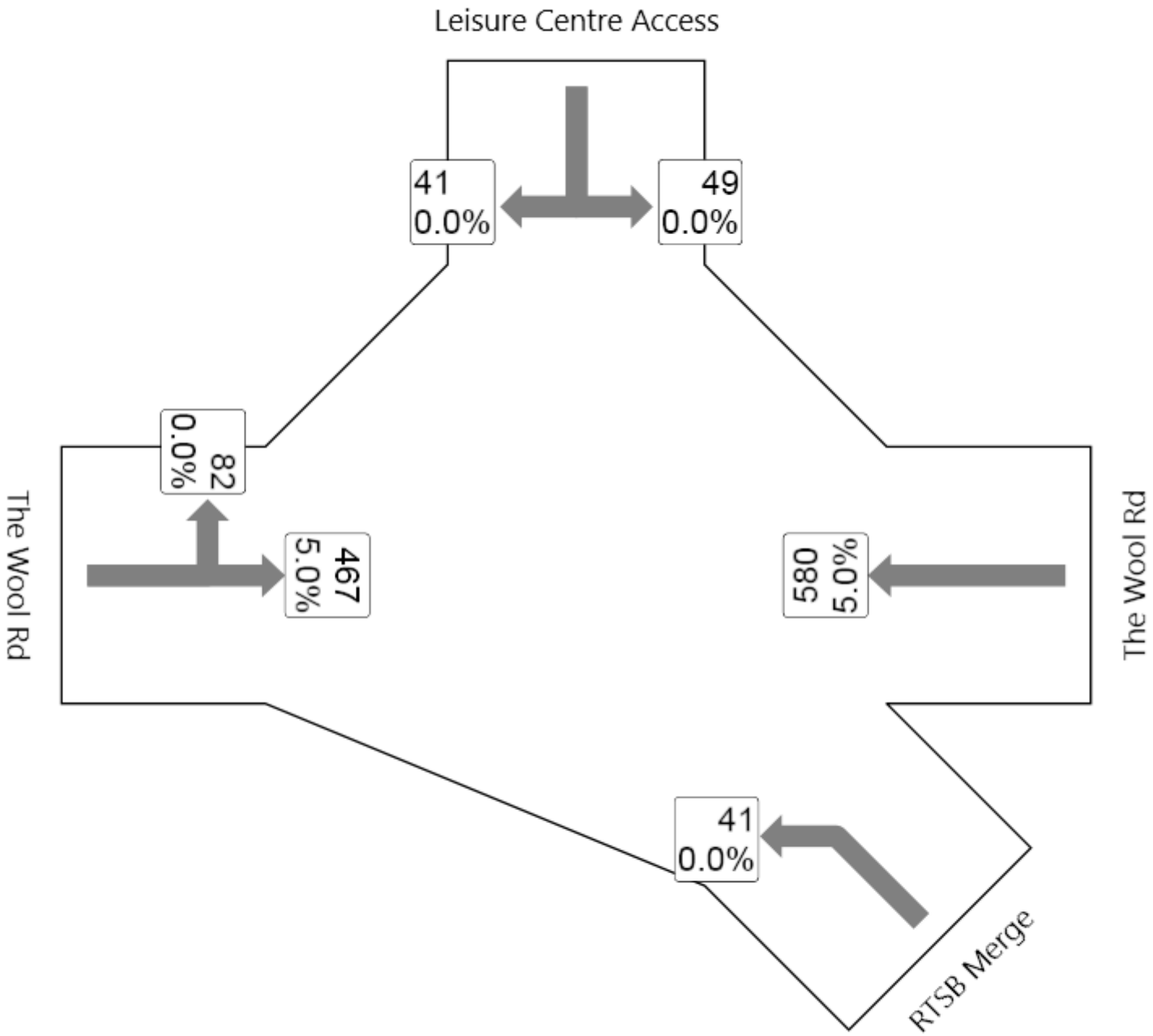
SIDRA INTERSECTION


Leisure Centre Access
41
0.0%
49
0.0%
0.0%
82
The Wool Rd
467
5.0%
580
5.0%
The Wool Rd
41
0.0%
RTSB Merge

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Sat - 2 Stage RT Seagull

Leisure Centre Access & The Wool Rd
Saturday PEAK
Option 1
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	43	0.0	0.057	10.2	LOS A	0.3	1.9	0.53	0.73	46.8
Approach		43	0.0	0.057	10.2	LOS A	0.3	1.9	0.53	0.73	46.8
East: The Wool Rd											
5	T	611	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		611	5.0	0.162	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
North: Leisure Centre Access											
7	L	52	0.0	0.065	10.7	LOS A	0.3	2.0	0.48	0.74	46.4
9	R	43	0.0	0.054	10.5	LOS A	0.2	1.7	0.47	0.73	46.5
Approach		95	0.0	0.065	10.6	LOS A	0.3	2.0	0.47	0.74	46.4
West: The Wool Rd											
10	L	86	0.0	0.046	7.6	NA[9]	NA[9]	NA[9]	0.00	0.60	49.8
11	T	492	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		578	4.3	0.130	1.1	LOS A	0.0	0.0	0.00	0.09	58.2
All Vehicles		1326	4.2	0.162	1.6	NA	0.3	2.0	0.05	0.12	57.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

9 Continuous movement

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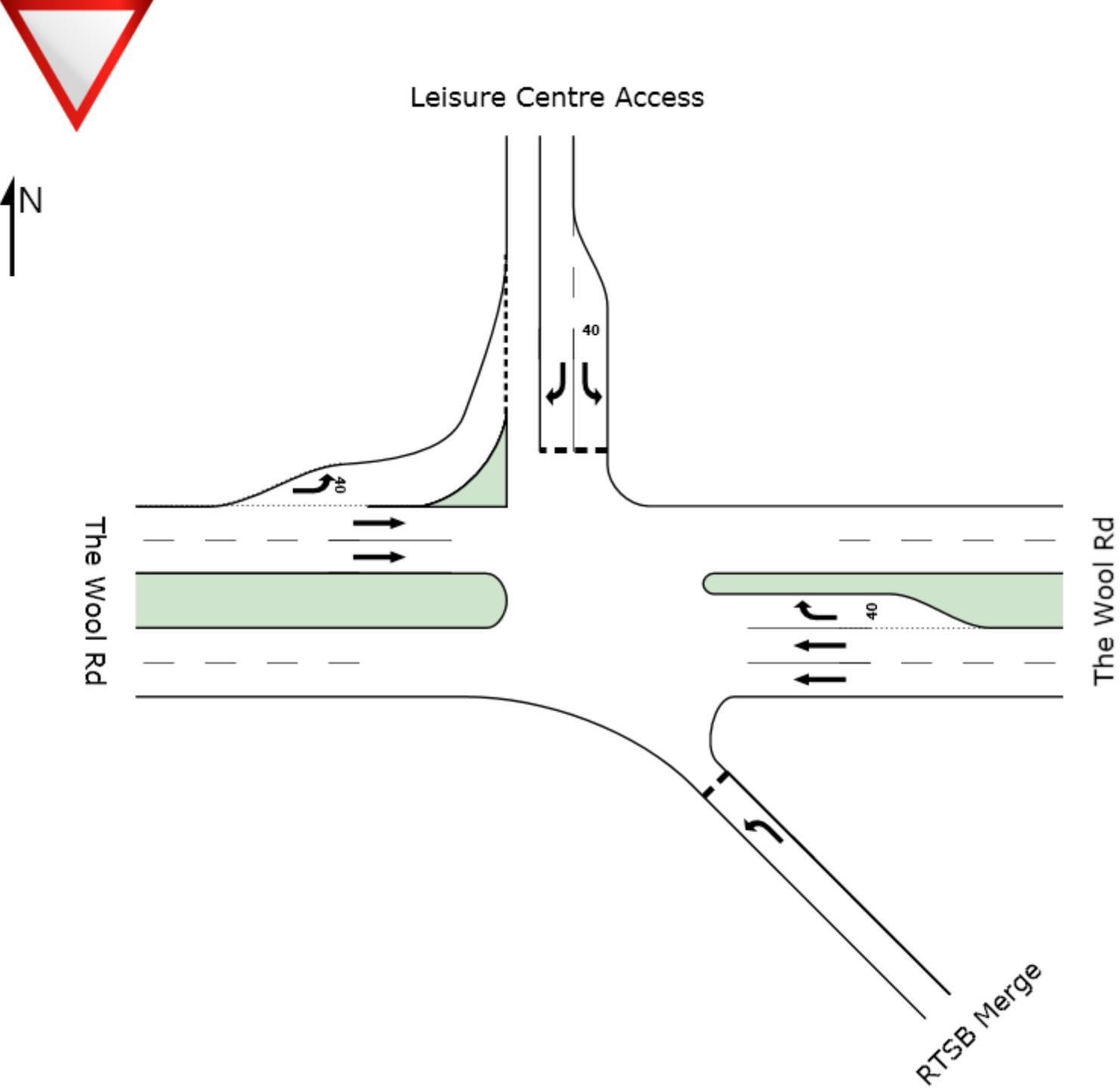
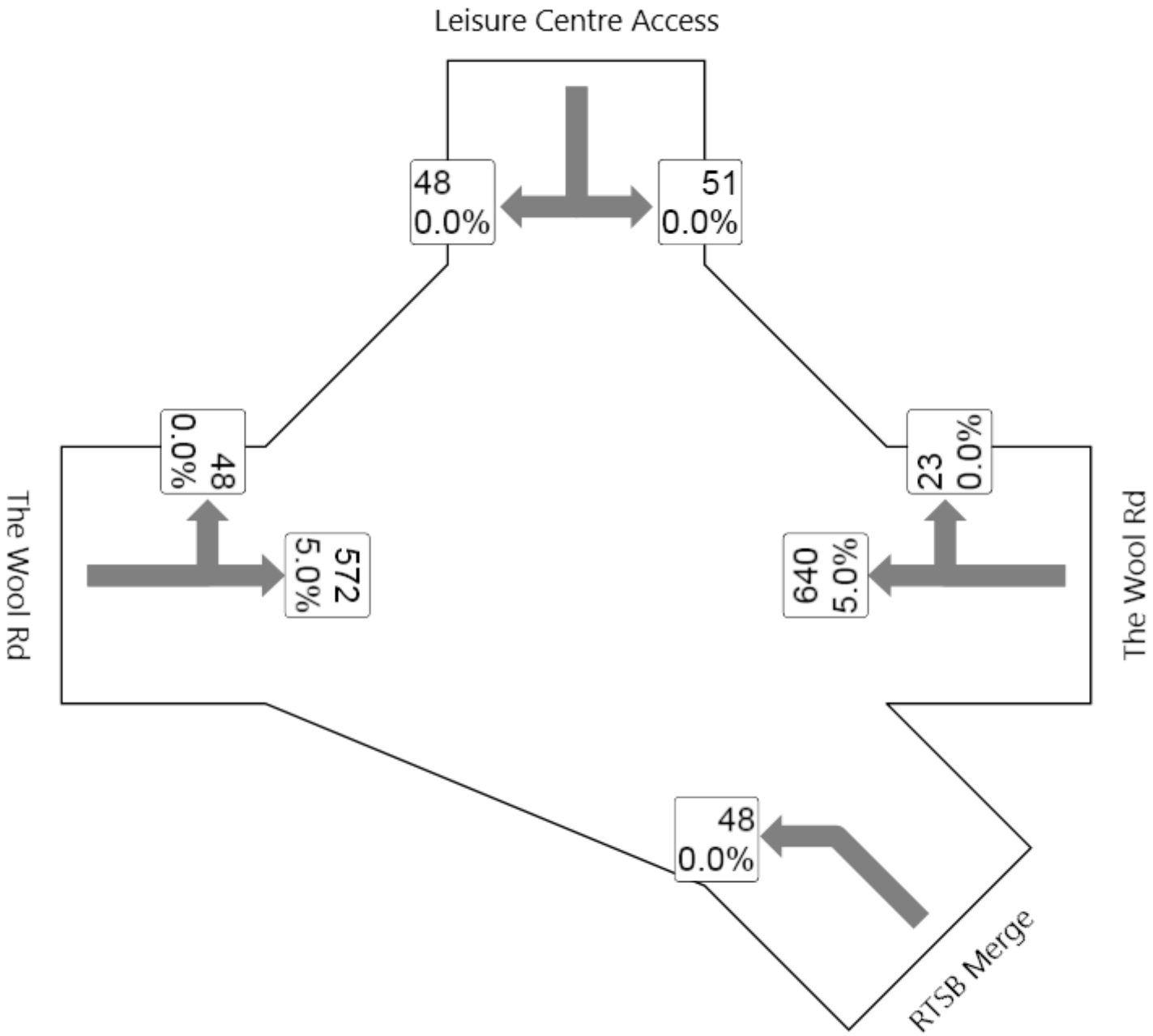

Leisure Centre Access
N
40
40
40
The Wool Rd
The Wool Rd
RTSB Merge


Leisure Centre Access
48
0.0%
51
0.0%
48
0.0%
572
5.0%
640
5.0%
23
0.0%
The Wool Rd
The Wool Rd
48
0.0%
RTSB Merge

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Thurs PM - 2 Stage RT Seagull

Leisure Centre Access & The Wool Rd
Thursday PM PEAK
Option 2
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	51	0.0	0.073	10.7	LOS A	0.3	2.4	0.56	0.77	46.3
Approach		51	0.0	0.073	10.7	LOS A	0.3	2.4	0.56	0.77	46.3
East: The Wool Rd											
5	T	674	5.0	0.178	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R	24	0.0	0.032	11.1	LOS A	0.1	1.0	0.53	0.73	46.0
Approach		698	4.8	0.178	0.4	LOS A	0.1	1.0	0.02	0.03	59.4
North: Leisure Centre Access											
7	L	54	0.0	0.075	11.3	LOS A	0.3	2.3	0.51	0.78	45.8
9	R	51	0.0	0.076	11.7	LOS A	0.3	2.3	0.54	0.80	45.4
Approach		104	0.0	0.076	11.5	LOS A	0.3	2.3	0.53	0.79	45.6
West: The Wool Rd											
10	L	51	0.0	0.045	7.7	LOS A	0.2	1.3	0.09	0.57	49.3
11	T	602	5.0	0.159	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		653	4.6	0.159	0.6	LOS A	0.2	1.3	0.01	0.04	59.0
All Vehicles		1505	4.2	0.178	1.6	NA	0.3	2.4	0.07	0.11	57.5

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

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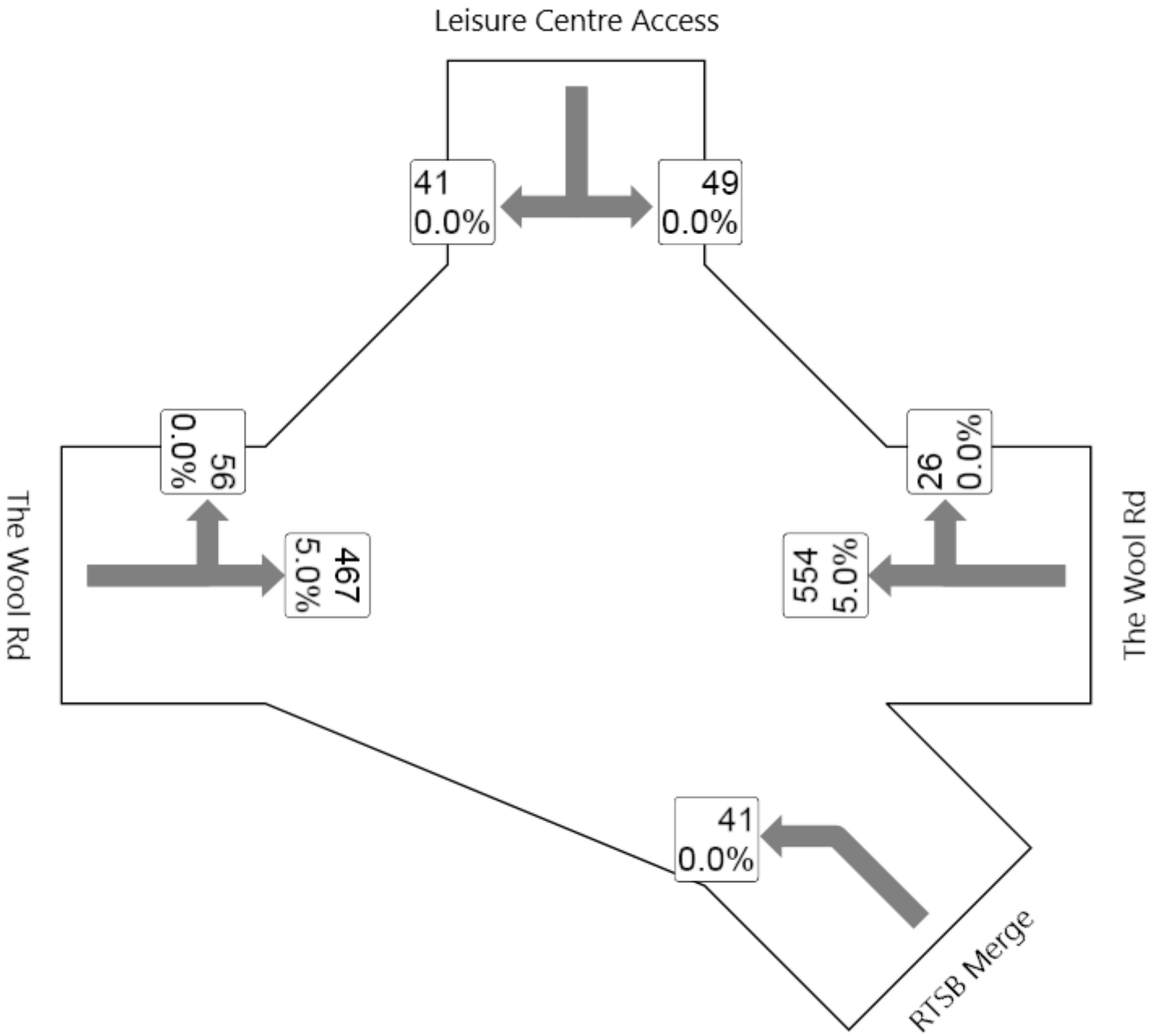
Leisure Centre Access
41
0.0%
49
0.0%
The Wool Rd
56
0.0%
467
5.0%
554
5.0%
26
0.0%
The Wool Rd
41
0.0%
RTSB Merge

MOVEMENT SUMMARY

Site: Leisure Centre Access & The Wool Rd - Sat - 2 Stage RT Seagull

Leisure Centre Access & The Wool Rd
Saturday PEAK
Option 2
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	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
South East: RTSB Merge											
21	L	43	0.0	0.055	10.0	LOS A	0.3	1.8	0.52	0.72	47.0
Approach		43	0.0	0.055	10.0	LOS A	0.3	1.8	0.52	0.72	47.0
East: The Wool Rd											
5	T	583	5.0	0.154	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
6	R	27	0.0	0.031	10.3	LOS A	0.1	1.0	0.48	0.70	46.7
Approach		611	4.8	0.154	0.5	LOS A	0.1	1.0	0.02	0.03	59.2
North: Leisure Centre Access											
7	L	52	0.0	0.064	10.6	LOS A	0.3	2.0	0.47	0.74	46.5
9	R	43	0.0	0.055	10.6	LOS A	0.2	1.7	0.48	0.73	46.5
Approach		95	0.0	0.064	10.6	LOS A	0.3	2.0	0.47	0.74	46.5
West: The Wool Rd											
10	L	59	0.0	0.052	7.7	LOS A	0.2	1.5	0.09	0.57	49.3
11	T	492	5.0	0.130	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
Approach		551	4.5	0.130	0.8	LOS A	0.2	1.5	0.01	0.06	58.6
All Vehicles		1299	4.1	0.154	1.7	NA	0.3	2.0	0.07	0.12	57.3

LOS (Aver. Int. Delay): NA. The average intersection delay is not a good LOS measure for two-way sign control due to zero delays associated with major road movements.
Level of Service (Worst Movement): LOS A. LOS Method for individual vehicle movements: Delay (RTA NSW).
Approach LOS values are based on the worst delay for any vehicle movement.

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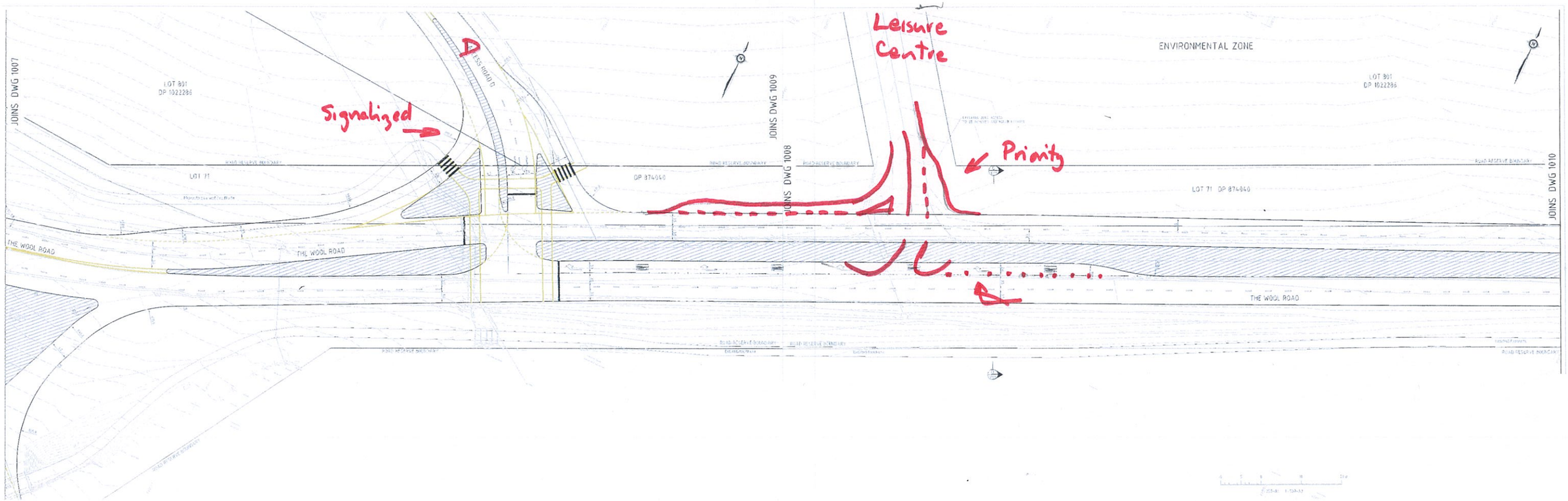
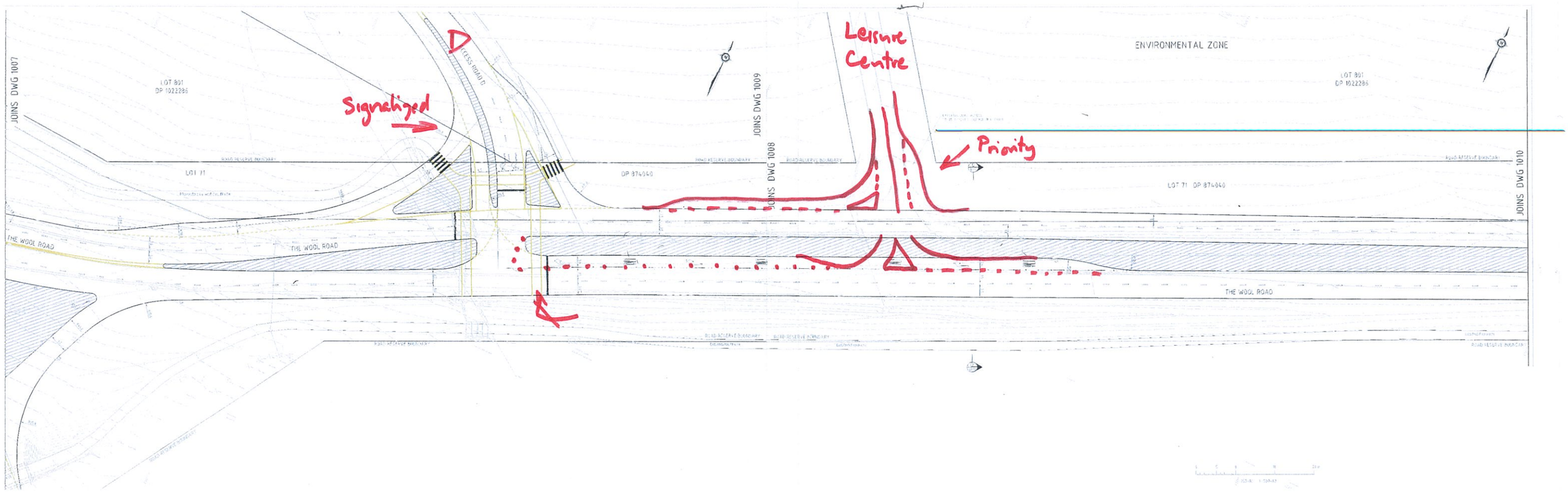
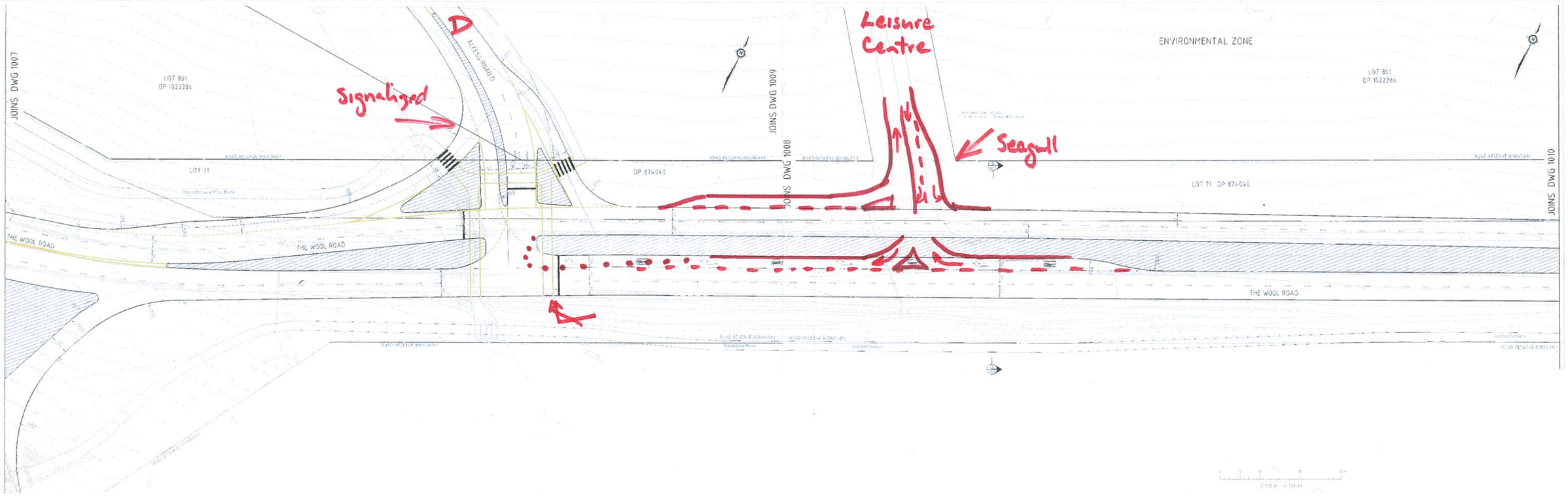
Appendix D – Sketch of Options



OPTION 1 N.R.T. LEISURE CENTRE



OPTION 2 – N.R.T. ACCESS D



OPTION 3 - SEAGULL ACCESS