

To:	Northrop Consulting Engineers L11, 345 George Street Sydney NSW 2000	From:	Stantec Australia Pty Ltd Carla Bradley, Helen Aberra, Brett Maynard
Project/File:	301400272	Date:	February 9, 2023
		Version:	A

Reference: Curlewis Street/ Campbell Parade – SIDRA Modelling

Background

This technical note has been prepared by Stantec, on behalf of Northrop Consulting Engineers, and presents the impact of the proposed changes to the Curlewis Street/ Campbell Parade intersection as part of the Waverley Streetscapes project.

The project proposes a new bicycle facility along Curlewis Street to enhance connectivity through the area. The proposed bi-directional cycleway runs along the northern kerb of Curlewis Street and ties into the Bondi Beach promenade at Campbell Parade. The right existing right turn bay out of Curlewis Street is removed, with the two-lane approach narrowed to one lane to accommodate the cycleway.

This technical note assesses the operational impact of the introduction of the cycleway and associated lane reduction against the existing intersection performance at the intersection of Curlewis Street/ Campbell Parade.

Traffic Volumes

Traffic counts at the study intersection were completed on the following days:

- Thursday 27 October 2022
 - 7:30am to 9:30am
 - 3:00pm to 6:00pm
- Saturday 29 October 2022
 - 10:00am to 2:00pm

The weekday AM and PM peak hours were found to occur from 7:45am to 8:45am and 5:00pm to 6:00pm, respectively. The Saturday peak hour was observed to occur from 12:45pm to 1:45pm. Peak hour traffic volumes are summarised in Figure 1 to Figure 3, with full survey results contained in Attachment 1.

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Figure 1: Existing AM peak hour traffic volumes

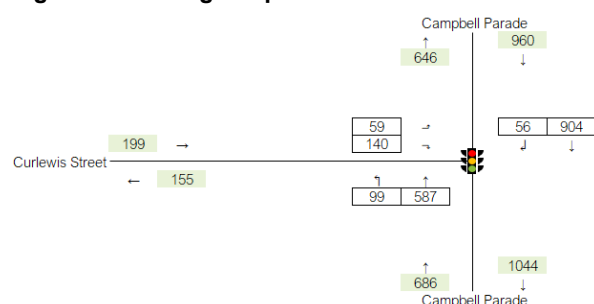


Figure 2: Existing PM peak hour traffic volumes

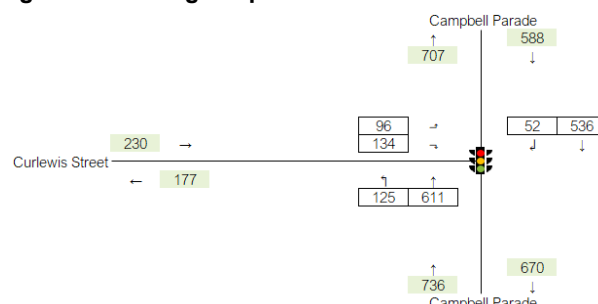
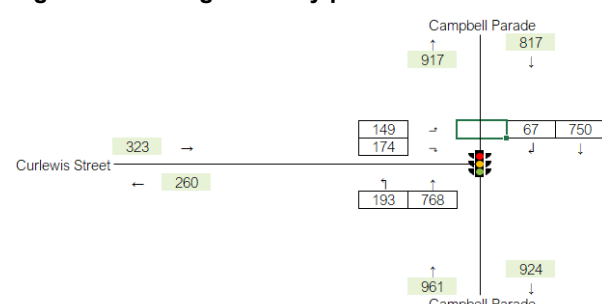


Figure 3: Existing Saturday peak hour traffic volumes



Existing Intersection Operation

The operation of the key intersections within the study area have been assessed using SIDRA INTERSECTION (SIDRA), a computer-based modelling package which calculates intersection performance.

The commonly used measure of intersection performance, as defined by the TfNSW, is vehicle delay. SIDRA determines the average delay that vehicles encounter and provides a measure of the level of service. Intersections operating at level of service D or better are generally considered to have acceptable delays.

Table 1 shows the criteria that SIDRA adopts in assessing the level of service.

Table 1: SIDRA level of service criteria

Level of service (LOS)	Average delay per vehicle (secs/veh)	Traffic signals, roundabout	Give way & stop sign
A	Less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays and spare capacity	Acceptable delays and spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Near capacity	Near capacity, accident study required
E	57 to 70	At capacity, at signals incidents will cause excessive delays	At capacity, requires other control mode
F	Greater than 70	Extra capacity required	Extreme delay, major treatment required

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Table 2 presents a summary of the existing operation of the intersection, with full results and calibration details presented in Attachment 2.

Table 2: Existing operating conditions

Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
AM	Campbell Parade (NE)	0.42	8	71	A
	Curlewis Street (NW)	0.37	30	35	C
	Campbell Parade (SW)	0.37	12	61	A
	Overall	0.42	12	71	A
PM	Campbell Parade (NE)	0.27	11	47	A
	Curlewis Street (NW)	0.37	33	36	C
	Campbell Parade (SW)	0.36	12	66	A
	Overall	0.37	15	66	B
Sat	Campbell Parade (NE)	0.37	10	66	A
	Curlewis Street (NW)	0.54	33	47	C
	Campbell Parade (SW)	0.53	17	109	B
	Overall	0.54	17	109	B

Based on the above assessment, the Curlewis Street/ Campbell Parade intersection currently operates satisfactorily at an overall level of service A during the AM peak and level of service B during the PM and Saturday peaks.

Proposed Intersection Layout

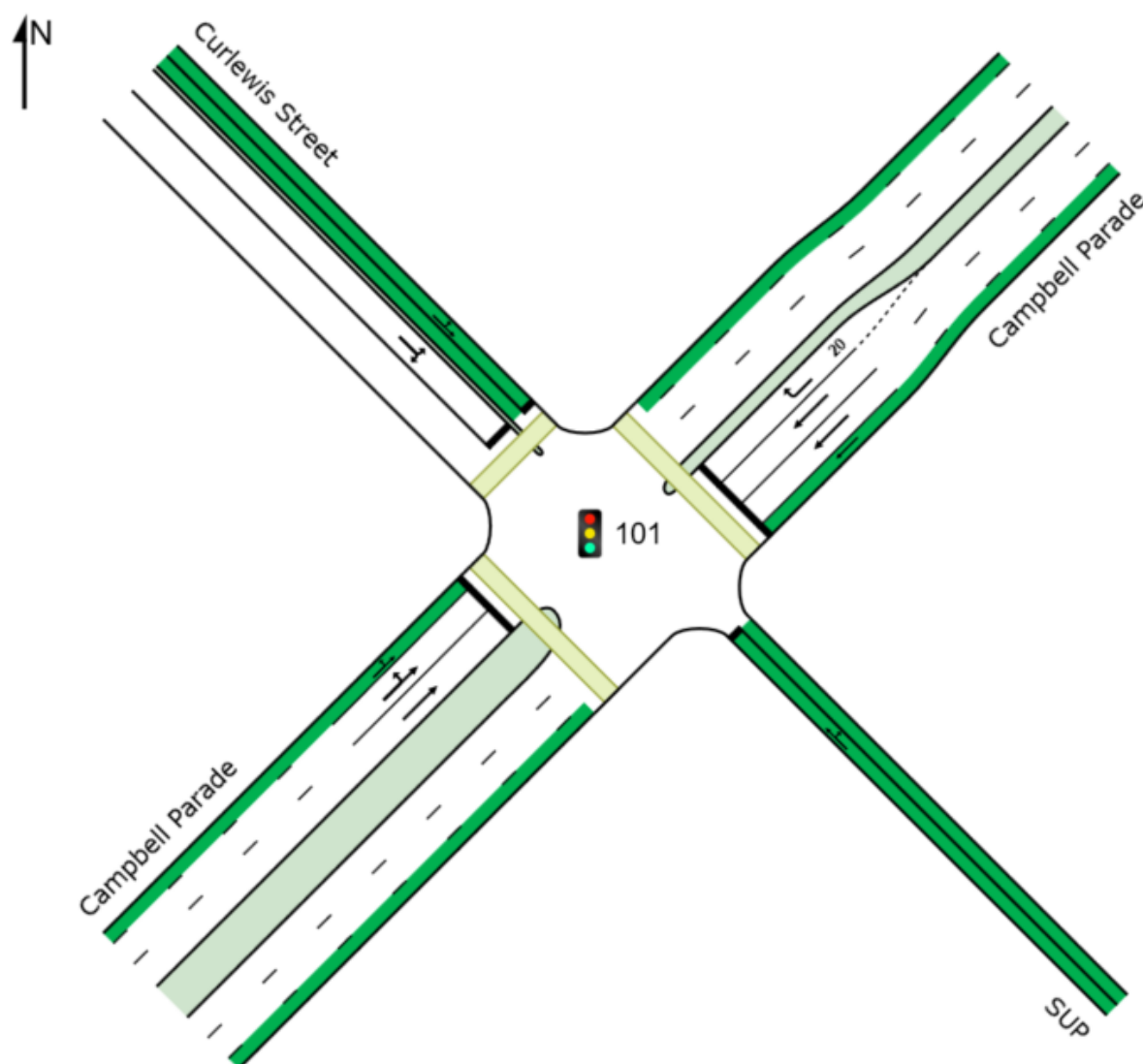
The project seeks to introduce a separated bi-directional cycleway along the northern kerb of Curlewis Street, with the existing right turn bay out of Curlewis Street to be removed. The proposed bi-directional cycleway will connect into the shared user path along Bondi Beach promenade.

Bicycle transition ramps will be provided along the Campbell Parade eastern kerb on the approach and departure to the intersection to connect with the existing southbound bicycle lane along Campbell Parade. The proposed ramps will allow southbound cyclists to access Curlewis Street westbound, and also cyclists travelling eastbound on Curlewis Street to access the southbound bicycle lane on Campbell Parade.

As per existing, the right turn from Campbell Parade northbound is not permitted. If required, a bicycle transition ramp could be added, with the existing seating area on the south-west corner to be removed.

The proposed layout is shown schematically in Figure 4.

Figure 4: Proposed intersection layout



The shared user path (SUP) is shown diagrammatically only, with the SUP running parallel to Campbell Parade in both directions. Bicycle transition ramps for the Campbell Parade southbound bicycle lane are not shown.

Traffic Impact

To determine the traffic impact of the introduction of the bi-directional cycleway a new bicycle only phase was introduced with the existing signal cycle length maintained.

It has been assumed that the proposed bi-directional cycleway will introduce additional cyclists into the area. As a result, the existing bicycle movements have been increased, with an additional 15 movements introduced on both Curlewis Street and the shared user path as follows:

- ten through movements from Curlewis Street to shared user path
- five left turn movements from Curlewis Street to Campbell Parade northbound
- ten through movements from the shared user path to Curlewis Street
- five right turn movements from the shared user path to Campbell Parade southbound.

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Table 3 presents a summary of the future operation of the intersection, with full results presented in Attachment 2.

Table 3: Future operating conditions

Peak	Leg	Degree of saturation (DOS)	Average delay (sec)	95th percentile queue (m)	Level of service (LOS)
AM	Shared User Path (SE)	0.06	38	2	C
	Campbell Parade (NE)	0.56	16	100	B
	Curlewis Street (NW)	0.47	32	52	C
	Campbell Parade (SW)	0.51	21	82	B
	Overall	0.56	20	100	B
PM	Shared User Path (SE)	0.06	44	2	D
	Campbell Parade (NE)	0.39	20	68	B
	Curlewis Street (NW)	0.48	34	63	C
	Campbell Parade (SW)	0.50	22	93	B
	Overall	0.50	23	93	B
Sat	Shared User Path (SE)	0.08	44	2	D
	Campbell Parade (NE)	0.47	18	89	B
	Curlewis Street (NW)	0.71	38	99	C
	Campbell Parade (SW)	0.73	28	144	B
	Overall	0.73	26	144	B

Under the proposed intersection changes the performance of the intersection in the AM peak period has reduced from level of service A to level of service B, with the PM and Saturday peaks continuing to operate at level of service B. The average delays have increased by eight to nine seconds, with queue lengths increased by approximately 30 metres.

These increases are considered acceptable with the overall intersection level of service continuing to be satisfactory, with spare capacity.

Notwithstanding the above, sensitivity testing was undertaken to understand the impact of increasing the signal cycle length to match the site and video observations¹. In all three peaks the degree of saturation for the intersection reduced with minor increases in average delay and queue lengths noted.

During the weekday PM peak and Saturday peak period, cyclists on the shared user path experience level of service D. This is largely related to cyclists being provided less than ten per cent of the total signal cycle time and being required to wait a full cycle. The average delays of approximately 40 seconds are less than the total cycle length indicating that all cyclists are able to proceed each phase. This is therefore satisfactory.

¹ Refer to Attachment 2 SIDRA calibration notes for details.

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Summary

Based on the analysis and information presented within this technical note, the following conclusions are made:

- The intersection of Curlewis Street/ Campbell Parade currently operates satisfactorily, with an overall level of service A in the weekday AM peak period and level of service B in the weekday PM and Saturday peak periods.
- The introduction of the proposed bi-directional cycleway on Curlewis Street requires a new bicycle only signal phase and bicycle transition ramps on Campbell Parade eastern kerb to cater for connections to and from the proposed cycleway.
- The introduction of the bi-directional cycleway and associated bicycle only phase increases the intersection average delay by eight to nine seconds and queue lengths by approximately 30 metres. These increases in average delay and queue lengths are considered acceptable, with no significant impact to overall intersection performance.
- In all three peak periods the proposed intersection layout is anticipated to operate at level of service B, representing a decrease in level of service for the weekday AM peak period only.

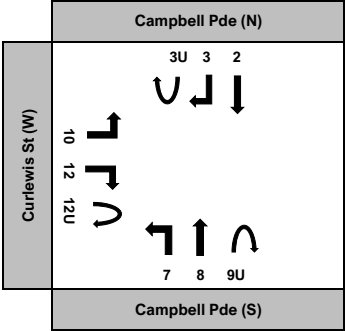
Attachment:

Attachment 1: Survey Results
Attachment 2: SIDRA Outputs

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Attachment 1: Survey Results

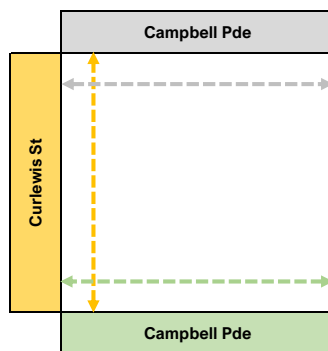
Report Type:	Classified Intersection Data - 60min
Geocounts Job ID:	1652913908893
Client Job Number:	n/a
Client Name:	Stantec
Location:	Bondi
Survey Site:	IC01 (Curlewis St/Campbell Pde)
Survey Date:	Thursday, 27th October 2022
Site Coordinates:	-33.889845, 151.2756523



AM Peak Hour:	7:45 to 8:45
PM Peak Hour:	17:00 to 18:00
AM Peak Hour Volume:	1,845
PM Peak Hour Volume:	1,556

Approach	Campbell Pde (N)												Campbell Pde (S)												Curlewis St (W)												ALL MOVEMENTS			
Movement	Movement 2 (Through)				Movement 3 (Right Turn)				Movement 3U (U Turn)				Movement 7 (Left Turn)				Movement 8 (Through)				Movement 9U (U Turn)				Movement 10 (Left Turn)				Movement 12 (Right Turn)				Movement 12U (U Turn)							
Time Interval	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total				
7:30 to 8:30	867	39	19	925	44	2	4	50	0	0	0	0	98	2	0	100	487	35	10	532	0	0	0	0	48	7	3	58	141	10	4	155	0	0	0	0	1,685	95	40	1,820
7:45 to 8:45	847	40	17	904	53	2	1	56	0	0	0	0	98	1	0	99	534	38	15	587	0	0	0	0	49	7	3	59	128	10	2	140	0	0	0	0	1,709	98	38	1,845
8:00 to 9:00	787	36	17	840	54	2	0	56	0	0	0	0	113	2	0	115	561	35	14	610	0	0	0	0	58	2	2	62	122	10	1	133	0	0	0	0	1,695	87	34	1,816
8:15 to 9:15	730	34	14	778	54	3	0	57	0	0	0	0	113	2	1	116	578	35	12	625	0	0	0	0	70	2	1	73	124	7	1	132	0	0	0	0	1,669	83	29	1,781
8:30 to 9:30	670	30	6	706	58	2	0	60	0	0	0	0	129	2	1	132	548	36	11	595	0	0	0	0	81	1	1	83	120	7	1	128	0	0	0	0	1,606	78	20	1,704
15:00 to 16:00	553	43	5	601	50	3	0	53	0	0	0	0	133	4	3	140	465	27	1	493	1	0	0	1	66	4	0	70	141	4	1	146	0	0	0	0	1,409	85	10	1,504
15:15 to 16:15	562	45	6	613	48	2	0	50	0	0	0	0	118	2	3	123	469	32	3	504	1	0	0	1	73	4	0	77	132	3	1	136	0	0	0	0	1,403	88	13	1,504
15:30 to 16:30	539	43	4	586	56	1	0	57	1	0	0	1	113	2	1	116	491	32	3	526	1	0	0	1	71	2	0	73	133	3	1	137	0	0	0	0	1,405	83	9	1,497
15:45 to 16:45	513	37	4	554	56	1	0	57	1	0	0	1	109	1	1	111	486	30	4	520	1	0	0	1	69	0	0	69	125	2	2	129	0	0	0	0	1,360	71	11	1,442
16:00 to 17:00	496	36	3	535	41	1	0	42	1	0	0	1	96	0	0	96	485	24	7	516	1	0	0	1	72	0	0	72	115	0	1	116	0	0	0	0	1,307	61	11	1,379
16:15 to 17:15	484	31	4	519	49	2	0	51	1	0	0	1	103	1	0	104	505	18	8	531	1	0	0	1	81	0	0	81	115	0	1	116	0	0	0	0	1,339	52	13	1,404
16:30 to 17:30	492	33	5	530	41	3	0	44	0	0	0	0	113	1	0	114	515	22	8	545	0	0	0	0	92	0	0	92	124	0	1	125	0	0	0	0	1,377	59	14	1,450
16:45 to 17:45	502	31	6	539	35	7	0	42	1	0	0	1	121	1	0	122	549	22	8	579	0	0	0	0	92	0	0	92	133	0	0	133	0	0	0	0	1,433	61	14	1,508
17:00 to 18:00	499	29	8	536	45	7	0	52	1	0	0	1	124	1	0	125	576	23	12	611	1	0	0	1	96	0	0	96	133	0	1	134	0	0	0	0	1,475	60	21	1,556

Report Type:	Pedestrian Data
Geocounts Job ID:	1652913908893
Client Job Number:	n/a
Client Name:	Stantec
Location:	Bondi
Survey Site:	IC01 (Curlewis St/Campbell Pde)
Survey Date:	Thursday, 27th October 2022
Site Coordinates:	-33.889845, 151.2756523



	North	South	West	Total
Peds Crossing AM:	190	326	545	1,061
Cyclists Crossing AM:	5	4	4	13
Peds Crossing PM:	280	456	1,305	1,293
Cyclists Crossing PM:	0	3	9	12
Peak Hour Peds AM:	8:30 to 9:30			
Peak Hour Cyclists AM:	7:45 to 8:45			
Peak Hour Peds PM:	17:00 to 18:00			
Peak Hour Cyclists PM:	16:30 to 17:30			



15min Peds

Leg	North	South	West	Total
7:30 to 7:45	31	49	38	118
7:45 to 8:00	27	38	45	110
8:00 to 8:15	36	40	51	127
8:15 to 8:30	21	47	74	142
8:30 to 8:45	22	39	80	141
8:45 to 9:00	23	46	75	144
9:00 to 9:15	17	28	89	134
9:15 to 9:30	13	39	93	145
15:00 to 15:15	9	28	104	141
15:15 to 15:30	21	29	117	167
15:30 to 15:45	33	16	114	163
15:45 to 16:00	15	43	101	159
16:00 to 16:15	16	59	104	179
16:15 to 16:30	25	29	105	159
16:30 to 16:45	17	34	110	161
16:45 to 17:00	26	22	116	164
17:00 to 17:15	30	39	106	175
17:15 to 17:30	27	50	110	187
17:30 to 17:45	39	49	125	213
17:45 to 18:00	22	58	93	173

60min Peds

Leg	North	South	West	Total
7:30 to 8:30	115	174	208	497
7:45 to 8:45	106	164	250	520
8:00 to 9:00	102	172	280	554
8:15 to 9:15	83	160	318	561
8:30 to 9:30	75	152	337	564
15:00 to 16:00	78	116	436	630
15:15 to 16:15	85	147	436	668
15:30 to 16:30	89	147	424	660
15:45 to 16:45	73	165	420	658
16:00 to 17:00	84	144	435	663
16:15 to 17:15	98	124	437	659
16:30 to 17:30	100	145	442	687
16:45 to 17:45	122	160	457	739
17:00 to 18:00	118	196	434	748

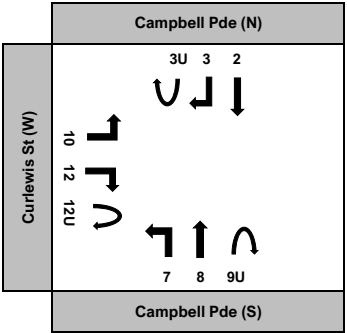
15min Cyclists

Leg	North	South	West	Total
7:30 to 7:45	1	0	0	1
7:45 to 8:00	2	1	1	4
8:00 to 8:15	0	3	0	3
8:15 to 8:30	1	0	1	2
8:30 to 8:45	1	0	2	3
8:45 to 9:00	0	0	0	0
9:00 to 9:15	0	0	0	0
9:15 to 9:30	0	0	0	0
15:00 to 15:15	0	0	1	1
15:15 to 15:30	0	0	2	2
15:30 to 15:45	0	0	0	0
15:45 to 16:00	0	0	2	2
16:00 to 16:15	0	0	1	1
16:15 to 16:30	0	2	1	3
16:30 to 16:45	0	0	1	1
16:45 to 17:00	0	0	0	0
17:00 to 17:15	0	0	1	1
17:15 to 17:30	0	1	0	1
17:30 to 17:45	0	0	0	0
17:45 to 18:00	0	0	0	0

60min Cyclists

Leg	North	South	West	Total
7:30 to 8:30	4	4	2	10
7:45 to 8:45	4	4	4	12
8:00 to 9:00	2	3	3	8
8:15 to 9:15	2	0	3	5
8:30 to 9:30	1	0	2	3
15:00 to 16:00	0	0	5	5
15:15 to 16:15	0	0	5	5
15:30 to 16:30	0	2	4	6
15:45 to 16:45	0	2	5	7
16:00 to 17:00	0	2	3	5
16:15 to 17:15	0	2	3	5
16:30 to 17:30	0	1	2	3
16:45 to 17:45	0	1	1	2
17:00 to 18:00	0	1	1	2

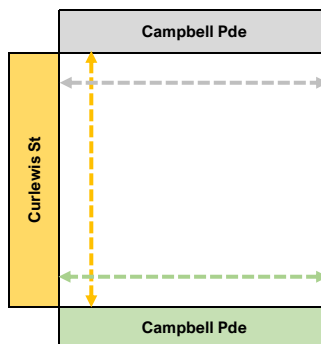
Report Type:	Classified Intersection Data - 60min
Geocounts Job ID:	1652913908893
Client Job Number:	n/a
Client Name:	Stantec
Location:	Bondi
Survey Site:	IC01 (Curlewis St/Campbell Pde)
Survey Date:	Saturday, 29th October 2022
Site Coordinates:	-33.889845, 151.2756523



Peak Hour SAT:	12:45 to 13:45
Peak Hour Volume SAT:	2,103

Approach	Campbell Pde (N)												Campbell Pde (S)												Curlewis St (W)															
Movement	Movement 2 (Through)				Movement 3 (Right Turn)				Movement 3U (U Turn)				Movement 7 (Left Turn)				Movement 8 (Through)				Movement 9U (U Turn)				Movement 10 (Left Turn)				Movement 12 (Right Turn)				Movement 12U (U Turn)				ALL MOVEMENTS			
Time Interval	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total	Light	Heavy	Cyclists	Total
10:00 to 11:00	648	32	18	698	73	3	0	76	0	0	0	0	192	6	0	198	598	28	18	644	1	0	0	1	119	1	2	122	136	4	1	141	0	0	0	0	1,767	74	39	1,880
10:15 to 11:15	626	36	18	680	71	3	0	74	0	0	0	0	171	5	1	177	601	27	21	649	1	0	0	1	139	1	1	141	133	5	2	140	0	0	0	0	1,742	77	43	1,862
10:30 to 11:30	633	32	16	681	74	3	1	78	0	0	0	0	178	6	1	185	606	27	16	649	1	0	0	1	138	0	4	142	135	6	3	144	0	0	0	0	1,765	74	41	1,880
10:45 to 11:45	637	29	11	677	76	3	1	80	0	0	0	0	184	7	2	193	613	25	14	652	1	0	0	1	134	1	5	140	150	7	5	162	0	0	0	0	1,795	72	38	1,905
11:00 to 12:00	616	29	13	658	77	3	1	81	2	0	0	2	178	7	2	187	647	21	22	690	1	0	0	1	141	1	5	147	163	8	5	176	0	0	0	0	1,825	69	48	1,942
11:15 to 12:15	636	26	12	674	75	2	1	78	2	0	0	2	193	7	1	201	664	27	27	718	1	0	0	1	141	2	6	149	159	7	4	170	1	0	0	1	1,872	71	51	1,994
11:30 to 12:30	623	26	12	661	79	2	0	81	2	0	0	2	185	6	1	192	676	28	35	739	1	0	0	1	148	4	4	156	159	6	3	168	1	0	0	1	1,874	72	55	2,001
11:45 to 12:45	621	26	11	658	87	1	1	89	3	0	0	3	191	4	3	198	675	27	34	736	0	0	0	0	158	4	5	167	160	5	0	165	1	0	0	1	1,896	67	54	2,017
12:00 to 13:00	642	22	10	674	79	1	1	81	1	0	0	1	204	6	3	213	667	30	32	729	0	0	0	0	149	5	4	158	151	3	0	154	1	0	0	1	1,894	67	50	2,011
12:15 to 13:15	663	23	12	698	77	1	1	79	2	0	0	2	190	5	4	199	695	28	26	749	0	0	0	0	148	4	5	157	175	6	0	181	0	0	0	0	1,950	67	48	2,065
12:30 to 13:30	693	29	12	734	73	2	1	76	2	0	0	2	183	5	5	193	705	27	21	753	1	0	0	1	140	2	5	147	173	5	2	180	0	0	0	0	1,970	70	46	2,086
12:45 to 13:45	706	30	14	750	62	2	3	67	1	0	0	1	183	6	4	193	717	26	25	768	1	0	0	1	143	2	4	149	164	5	5	174	0	0	0	0	1,977	71	55	2,103
13:00 to 14:00	715	31	10	756	72	2	3	77	1	0	0	1	161	5	4	170	694	27	21	742	2	0	0	2	163	1	5	169	160	6	7	173	0	0	0	0	1,968	72	50	2,090

Report Type:	Pedestrian Data
Geocounts Job ID:	1652913908893
Client Job Number:	n/a
Client Name:	Stantec
Location:	Bondi
Survey Site:	IC01 (Curlewis St/Campbell Pde)
Survey Date:	Saturday, 29th October 2022
Site Coordinates:	-33.889845, 151.2756523



	North	South	West	Total
Peds Crossing SAT:	1,530	2,212	6,183	9,925
Cyclists Crossing SAT:	6	7	23	36
Peak Hour Peds SAT:	11:00 to 12:00			
Peak Hour Cyclists SAT:	12:00 to 13:00			

15min Peds

Leg	North	South	West	Total
10:00 to 10:15	53	56	235	344
10:15 to 10:30	44	115	286	445
10:30 to 10:45	92	64	294	450
10:45 to 11:00	103	92	357	552
11:00 to 11:15	86	109	325	520
11:15 to 11:30	61	124	394	579
11:30 to 11:45	88	135	364	587
11:45 to 12:00	90	181	414	685
12:00 to 12:15	77	155	384	616
12:15 to 12:30	88	138	475	701
12:30 to 12:45	114	169	422	705
12:45 to 13:00	137	168	454	759
13:00 to 13:15	131	168	496	795
13:15 to 13:30	116	176	475	767
13:30 to 13:45	151	160	378	689
13:45 to 14:00	99	202	430	731

60min Peds

Leg	North	South	West	Total
10:00 to 11:00	292	327	1,172	1,791
10:15 to 11:15	378	380	1,262	2,020
10:30 to 11:30	342	389	1,370	2,101
10:45 to 11:45	338	460	1,440	2,238
11:00 to 12:00	325	549	1,497	2,371
11:15 to 12:15	316	595	1,556	2,467
11:30 to 12:30	343	609	1,637	2,589
11:45 to 12:45	369	643	1,695	2,707
12:00 to 13:00	416	630	1,735	2,781
12:15 to 13:15	470	643	1,847	2,960
12:30 to 13:30	498	681	1,847	3,026
12:45 to 13:45	535	672	1,803	3,010
13:00 to 14:00	497	706	1,779	2,982

15min Cyclists

Leg	North	South	West	Total
10:00 to 10:15	0	0	2	2
10:15 to 10:30	0	1	0	1
10:30 to 10:45	0	0	0	0
10:45 to 11:00	0	0	1	1
11:00 to 11:15	0	1	4	5
11:15 to 11:30	2	0	2	4
11:30 to 11:45	0	0	1	1
11:45 to 12:00	0	0	2	2
12:00 to 12:15	0	1	3	4
12:15 to 12:30	1	1	0	2
12:30 to 12:45	1	1	3	5
12:45 to 13:00	0	1	2	3
13:00 to 13:15	2	0	0	2
13:15 to 13:30	0	0	2	2
13:30 to 13:45	0	1	0	1
13:45 to 14:00	0	0	1	1

60min Cyclists

Leg	North	South	West	Total
10:00 to 11:00	0	1	3	4
10:15 to 11:15	0	2	5	7
10:30 to 11:30	2	1	7	10
10:45 to 11:45	2	1	8	11
11:00 to 12:00	2	1	9	12
11:15 to 12:15	2	1	8	11
11:30 to 12:30	1	2	6	9
11:45 to 12:45	2	3	8	13
12:00 to 13:00	2	4	8	14
12:15 to 13:15	4	3	5	12
12:30 to 13:30	3	2	7	12
12:45 to 13:45	2	2	4	8
13:00 to 14:00	2	1	3	6

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Attachment 2: SIDRA Calibration and Outputs

Reference: Curlewis Street/ Campbell Parade Intersection – SIDRA Modelling

Existing Models Calibration

A site inspection was undertaken during the PM peak on Thursday 27 October, with key observations on phase times, user behaviour and general operation used to inform the calibration of the existing SIDRA models. In addition to site observations, review of video footage and TfNSW Interpreted SCATS history files² were used to confirm signal phasing and operation.

The following observations were made and used in the calibration of the existing SIDRA models:

- Average phase cycle times were between 80 to 100 seconds, with A Phase (Campbell Parade) observed to be given 60-70 per cent of the cycle phase. The site and video observations indicate typically longer cycle times by around ten seconds, notwithstanding, the SCATS history file cycle times were adopted.
- B phase generally operated approximately 25 per cent of the time (i.e. once every four cycles) and accounted for less than five seconds of the average cycle length.
 - To incorporate this into the SIDRA model it was assumed B phase ran every cycle with the maximum and minimum green times, along with the yellow and all-red times reduced to reflect the average phase length. Additionally, the start loss for the right turn was reduced to reflect the shortened phase time.
 - For the PM peak period where B phase had an average length of one second a dummy movement was introduced with all movements stopped.
- The left turn from Campbell Parade into Curlewis Street had a red arrow at the start of C phase, with a low volume of vehicles observed to turn left in this phase.
 - Due to conflicts in SIDRA, this left turn movement was removed from C Phase.
- Vehicles turning into Campbell Parade were observed to turn evenly into the available lanes.
 - The lane movement flow proportions were adjusted accordingly.

² Due to a system error SCATS data for the intersection count survey dates were unavailable, as such data files from 2 June 2022 and 4 June 2022 were used for calibration.

SITE LAYOUT

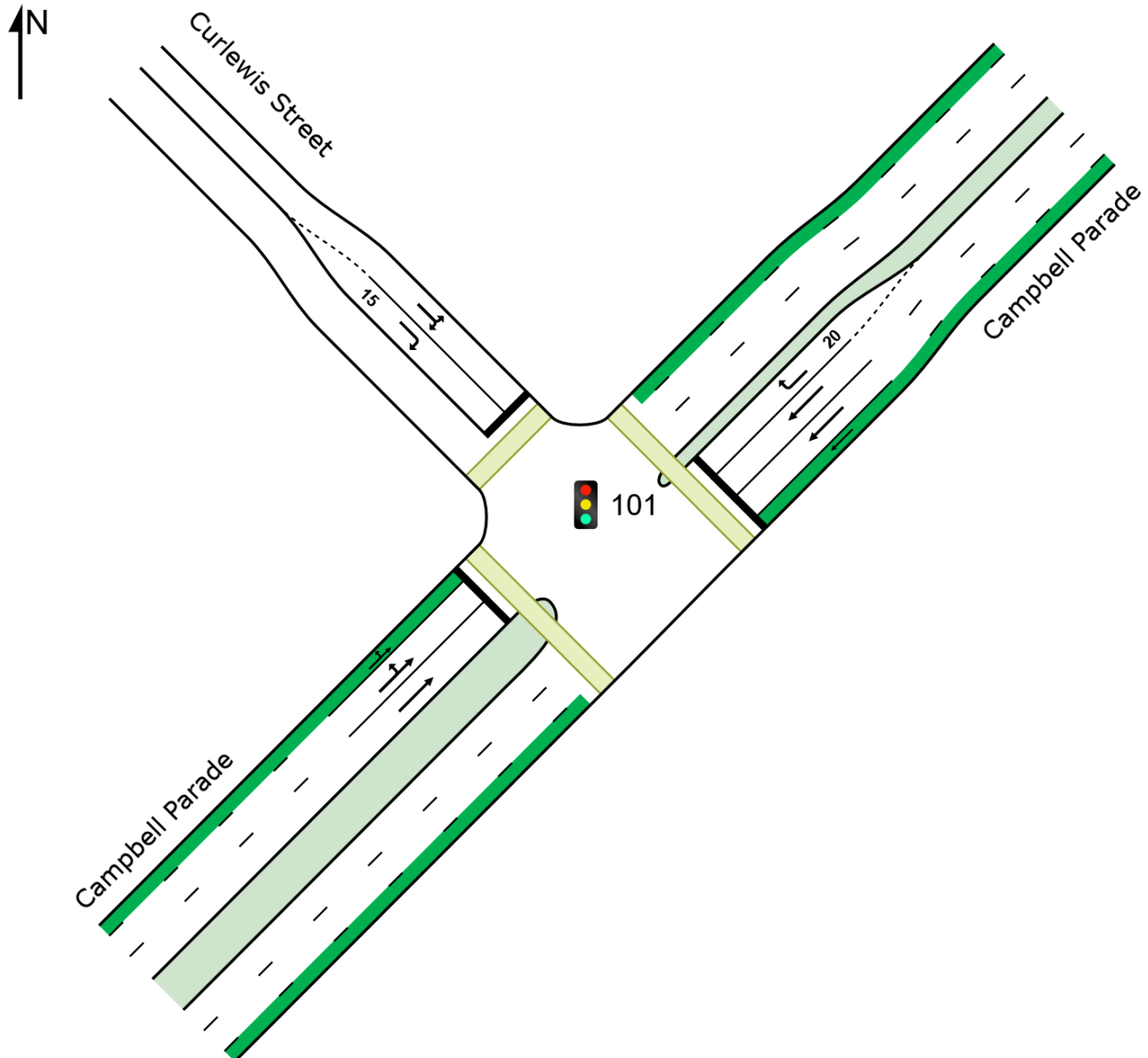
 Site: 101 [Campbell Parade/ Curlewis Street AM (Site Folder: Existing)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Project: \\Au2019-pfss01\shared_projects\301400272\technical\modelling\230125_Campbell Parade-Curlewis Street.sip9

MOVEMENT SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street AM (Site Folder: Existing)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
NorthEast: Campbell Parade														
8	T1	904	40	952	4.4	0.424	8.0	LOS A	9.8	71.0	0.54	0.47	0.54	36.7
9	R2	56	2	59	3.6	* 0.144	15.5	LOS B	1.3	9.2	0.61	0.66	0.61	34.2
Approach		960	42	1011	4.4	0.424	8.4	LOS A	9.8	71.0	0.54	0.48	0.54	36.5
NorthWest: Curlewis Street														
10	L2	59	7	62	11.9	0.144	28.9	LOS C	2.0	14.5	0.81	0.71	0.81	30.1
12	R2	140	10	147	7.1	* 0.369	30.4	LOS C	4.7	35.3	0.86	0.76	0.86	30.1
Approach		199	17	209	8.5	0.369	30.0	LOS C	4.7	35.3	0.85	0.75	0.85	30.1
SouthWest: Campbell Parade														
1	L2	99	1	104	1.0	* 0.365	16.0	LOS B	7.9	57.9	0.64	0.60	0.64	34.9
2	T1	587	38	618	6.5	0.365	11.8	LOS A	8.2	60.6	0.62	0.56	0.62	35.2
Approach		686	39	722	5.7	0.365	12.4	LOS A	8.2	60.6	0.62	0.56	0.62	35.1
All Vehicles		1845	98	1942	5.3	0.424	12.2	LOS A	9.8	71.0	0.60	0.54	0.60	35.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
NorthEast: Campbell Parade												
P3	Full	106	112	34.4	LOS D	0.2	0.2	0.93	0.93	204.8	221.6	1.08
NorthWest: Curlewis Street												
P4	Full	250	263	34.6	LOS D	0.6	0.6	0.94	0.94	198.1	212.6	1.07
SouthWest: Campbell Parade												
P1	Full	164	173	34.5	LOS D	0.4	0.4	0.93	0.93	205.1	221.8	1.08
All Pedestrians		520	547	34.5	LOS D	0.6	0.6	0.93	0.93	201.7	217.3	1.08

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.

PHASING SUMMARY

Site: 101 [Campbell Parade/ Curlewis Street AM (Site Folder: Existing)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

Input Phase Sequence: A, B, C

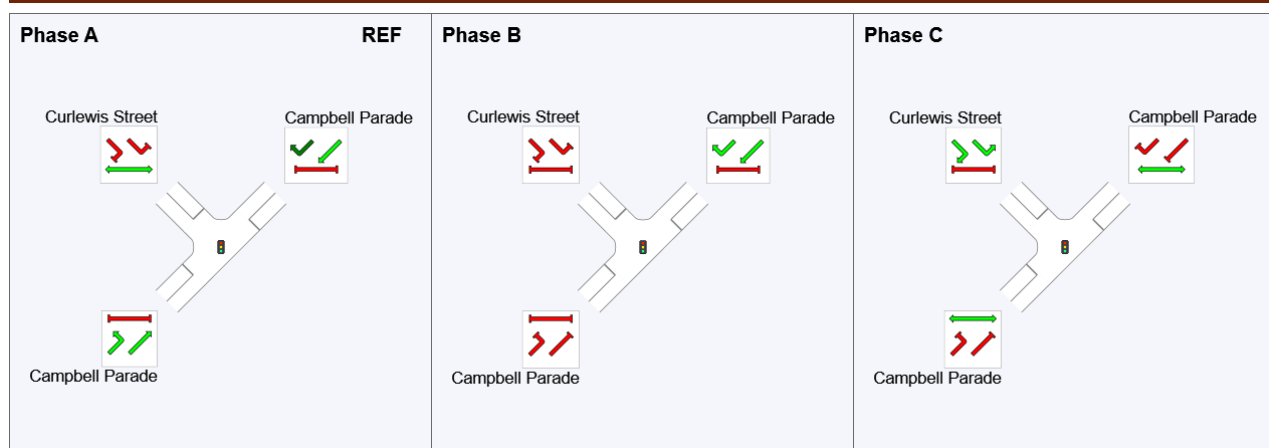
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	49	56
Green Time (sec)	43	1	22
Phase Time (sec)	49	3	28
Phase Split	61%	4%	35%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

MOVEMENT SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street PM (Site Folder: Existing)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
NorthEast: Campbell Parade														
8	T1	536	29	564	5.4	0.274	10.0	LOS A	6.4	46.8	0.53	0.45	0.53	36.0
9	R2	52	7	55	13.5	0.182	20.3	LOS B	1.5	11.7	0.64	0.67	0.64	32.9
Approach		588	36	619	6.1	0.274	10.9	LOS A	6.4	46.8	0.54	0.47	0.54	35.7
NorthWest: Curlewis Street														
10	L2	96	0	101	0.0	0.216	32.1	LOS C	3.6	24.8	0.83	0.74	0.83	29.7
12	R2	134	0	141	0.0	* 0.373	33.8	LOS C	5.1	35.7	0.86	0.76	0.86	29.3
Approach		230	0	242	0.0	0.373	33.1	LOS C	5.1	35.7	0.85	0.75	0.85	29.4
SouthWest: Campbell Parade														
1	L2	125	1	132	0.8	* 0.360	15.3	LOS B	8.9	63.5	0.59	0.59	0.59	35.1
2	T1	611	23	643	3.8	0.360	11.1	LOS A	9.2	66.3	0.58	0.53	0.58	35.4
Approach		736	24	775	3.3	0.360	11.8	LOS A	9.2	66.3	0.58	0.54	0.58	35.3
All Vehicles		1554	60	1636	3.9	0.373	14.6	LOS B	9.2	66.3	0.60	0.54	0.60	34.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
NorthEast: Campbell Parade												
P3	Full	118	124	39.4	LOS D	0.3	0.3	0.94	0.94	209.9	221.6	1.06
NorthWest: Curlewis Street												
P4	Full	434	457	40.0	LOS D	1.1	1.1	0.95	0.95	203.5	212.6	1.04
SouthWest: Campbell Parade												
P1	Full	196	206	39.5	LOS D	0.5	0.5	0.94	0.94	210.2	221.8	1.06
All Pedestrians		748	787	39.8	LOS D	1.1	1.1	0.95	0.95	206.2	216.4	1.05

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.

PHASING SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street PM (Site Folder: Existing)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

Input Phase Sequence: A, B, C

Output Phase Sequence: A, B, C

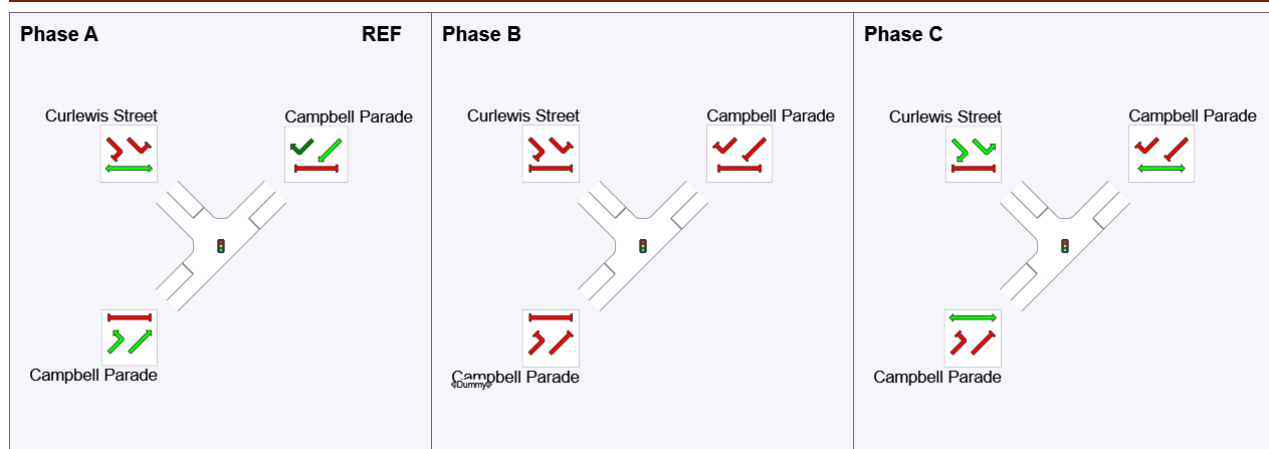
Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	58	64
Green Time (sec)	52	***	25
Phase Time (sec)	58	1	31
Phase Split	64%	1%	34%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.








*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

 Normal Movement	 Permitted/Opposed
 Slip/Bypass-Lane Movement	 Opposed Slip/Bypass-Lane
 Stopped Movement	 Turn On Red
 Other Movement Class (MC) Running	 Undetected Movement
 Mixed Running & Stopped MCs	 Continuous Movement
 Other Movement Class (MC) Stopped	 Phase Transition Applied

MOVEMENT SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street Sat (Site Folder: Existing)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
		veh/h	veh/h	veh/h	%	v/c	sec							km/h
NorthEast: Campbell Parade														
8	T1	750	30	789	4.0	0.367	9.1	LOS A	9.1	66.1	0.52	0.46	0.52	36.3
9	R2	67	2	71	3.0	* 0.218	23.4	LOS B	2.2	15.2	0.73	0.71	0.73	31.7
Approach		817	32	860	3.9	0.367	10.3	LOS A	9.1	66.1	0.54	0.48	0.54	35.8
NorthWest: Curlewis Street														
10	L2	149	2	157	1.3	0.477	33.1	LOS C	5.9	40.1	0.86	0.76	0.86	29.2
12	R2	174	5	183	2.9	* 0.543	33.7	LOS C	6.6	47.1	0.87	0.77	0.87	29.3
Approach		323	7	340	2.2	0.543	33.4	LOS C	6.6	47.1	0.87	0.77	0.87	29.3
SouthWest: Campbell Parade														
1	L2	193	6	203	3.1	* 0.530	20.9	LOS B	14.3	102.6	0.75	0.70	0.75	33.1
2	T1	768	26	808	3.4	0.530	16.3	LOS B	15.1	109.0	0.72	0.65	0.72	33.6
Approach		961	32	1012	3.3	0.530	17.2	LOS B	15.1	109.0	0.73	0.66	0.73	33.5
All Vehicles		2101	71	2212	3.4	0.543	17.0	LOS B	15.1	109.0	0.68	0.61	0.68	33.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
NorthEast: Campbell Parade												
P3	Full	535	563	40.1	LOS E	1.4	1.4	0.96	0.96	210.6	221.6	1.05
NorthWest: Curlewis Street												
P4	Full	1803	1898	42.6	LOS E	4.9	4.9	1.01	1.01	206.1	212.6	1.03
SouthWest: Campbell Parade												
P1	Full	672	707	40.4	LOS E	1.7	1.7	0.96	0.96	211.0	221.8	1.05
All Pedestrians		3010	3168	41.6	LOS E	4.9	4.9	0.99	0.99	208.0	216.3	1.04

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.

PHASING SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street Sat (Site Folder: Existing)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

Input Phase Sequence: A, B, C

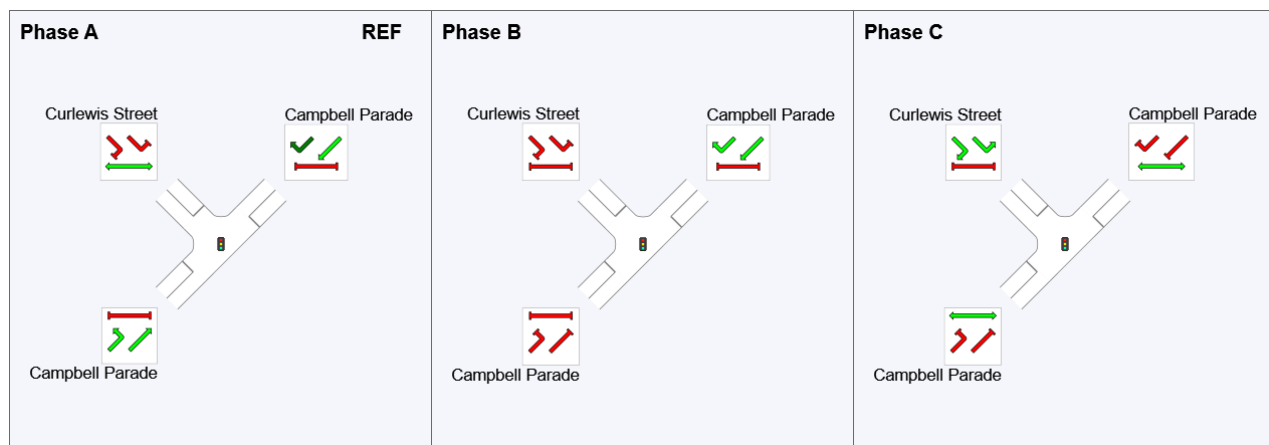
Output Phase Sequence: A, B, C

Phase Timing Summary

Phase	A	B	C
Phase Change Time (sec)	0	52	61
Green Time (sec)	46	3	26
Phase Time (sec)	52	6	32
Phase Split	58%	7%	36%













See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

 Normal Movement	 Permitted/Opposed
 Slip/Bypass-Lane Movement	 Opposed Slip/Bypass-Lane
 Stopped Movement	 Turn On Red
 Other Movement Class (MC) Running	 Undetected Movement
 Mixed Running & Stopped MCs	 Continuous Movement
 Other Movement Class (MC) Stopped	 Phase Transition Applied

SITE LAYOUT

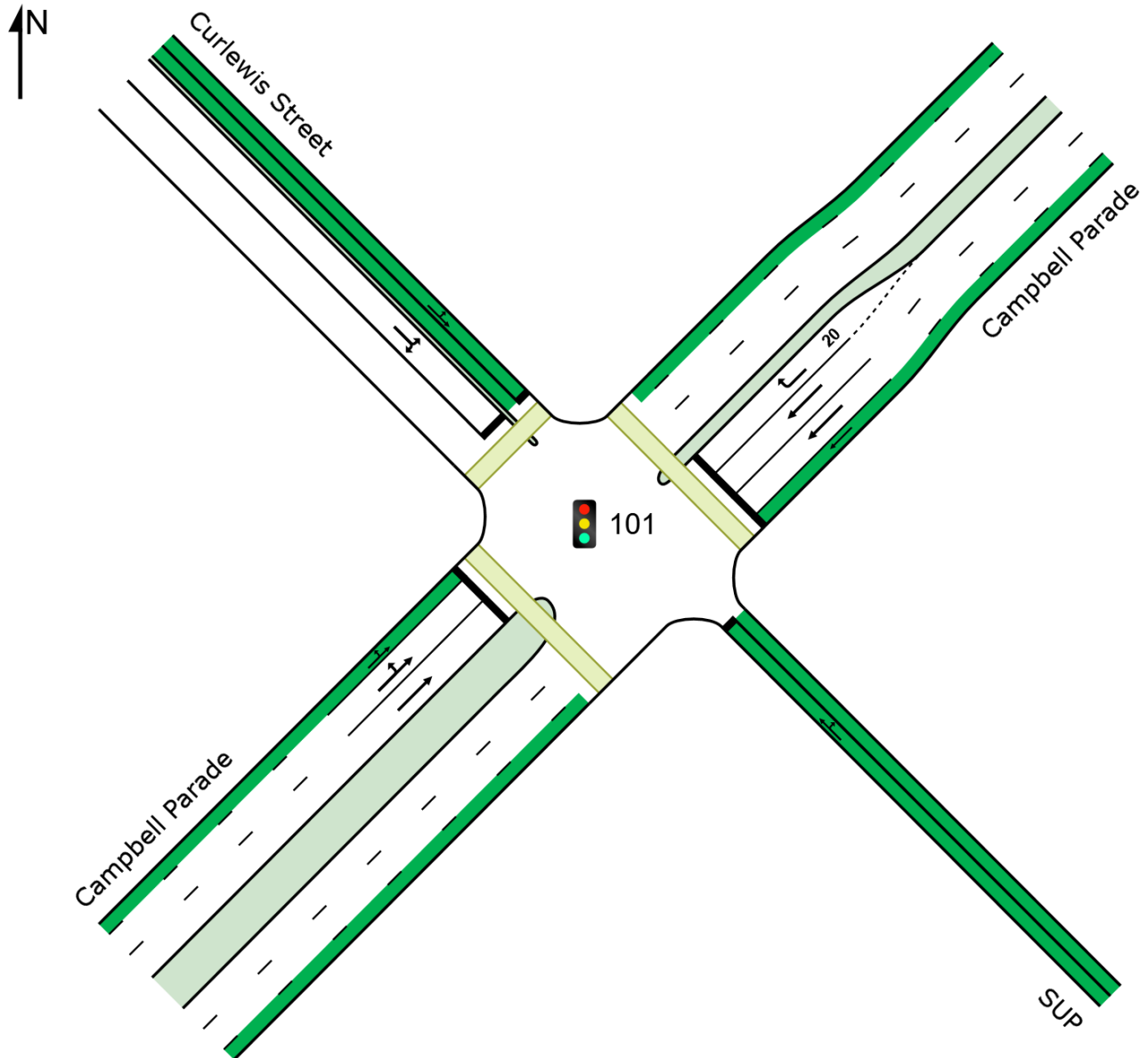
 Site: 101 [Campbell Parade/ Curlewis Street AM (Site Folder: Future)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.




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Project: \\Au2019-pfss01\shared_projects\301400272\technical\modelling\230125_Campbell Parade-Curlewis Street.sip9

MOVEMENT SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street AM (Site Folder: Future)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: SUP														
22	T1	11	0	12	0.0	* 0.060	37.6	LOS C	0.6	1.7	0.96	0.65	0.96	22.9
23	R2	5	0	5	0.0	0.060	39.5	LOS C	0.6	1.7	0.96	0.65	0.96	23.1
Approach		16	0	17	0.0	0.060	38.2	LOS C	0.6	1.7	0.96	0.65	0.96	22.9
NorthEast: Campbell Parade														
8	T1	904	40	952	4.4	0.556	15.8	LOS B	13.8	100.0	0.75	0.65	0.75	34.0
9	R2	55	2	58	3.6	* 0.195	26.5	LOS B	1.8	12.7	0.81	0.72	0.81	31.1
Approach		959	42	1009	4.4	0.556	16.4	LOS B	13.8	100.0	0.75	0.66	0.75	33.8
NorthWest: Curlewis Street														
10	L2	64	7	67	10.9	0.472	32.5	LOS C	7.0	52.3	0.91	0.77	0.91	29.3
28	T1	12	0	13	0.0	0.046	36.8	LOS C	0.8	2.0	0.95	0.65	0.95	23.0
12	R2	138	10	145	7.2	* 0.472	31.6	LOS C	7.0	52.3	0.90	0.79	0.90	29.9
Approach		214	17	225	7.9	0.472	32.2	LOS C	7.0	52.3	0.90	0.78	0.90	29.2
SouthWest: Campbell Parade														
1	L2	99	1	104	1.0	* 0.511	25.1	LOS B	10.4	75.7	0.83	0.74	0.83	32.1
2	T1	587	38	618	6.5	0.511	20.7	LOS B	11.1	82.4	0.82	0.71	0.82	32.4
Approach		686	39	722	5.7	0.511	21.3	LOS B	11.1	82.4	0.82	0.71	0.82	32.3
All Vehicles		1875	98	1974	5.2	0.556	20.2	LOS B	13.8	100.0	0.80	0.69	0.80	32.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
NorthEast: Campbell Parade												
P3	Full	106	112	34.4	LOS D	0.2	0.2	0.93	0.93	204.8	221.6	1.08
NorthWest: Curlewis Street												
P4	Full	250	263	34.6	LOS D	0.6	0.6	0.94	0.94	198.3	212.8	1.07
SouthWest: Campbell Parade												
P1	Full	164	173	34.5	LOS D	0.4	0.4	0.93	0.93	205.1	221.8	1.08
All Pedestrians		520	547	34.5	LOS D	0.6	0.6	0.93	0.93	201.8	217.4	1.08

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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PHASING SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street AM (Site Folder: Future)]**

New Site
Site Category: (None)
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 80 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Leading Right Turn
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D

Phase Timing Summary


Phase	A	B	C	D
Phase Change Time (sec)	0	37	44	52
Green Time (sec)	31	1	6	22
Phase Time (sec)	37	3	12	28
Phase Split	46%	4%	15%	35%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

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MOVEMENT SUMMARY

 Site: 101 [Campbell Parade/ Curlewis Street PM (Site Folder: Future)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
SouthEast: SUP														
22	T1	10	0	11	0.0	* 0.064	43.1	LOS D	0.7	1.8	0.96	0.65	0.96	22.1
23	R2	5	0	5	0.0	0.064	45.0	LOS D	0.7	1.8	0.96	0.65	0.96	22.3
Approach		15	0	16	0.0	0.064	43.7	LOS D	0.7	1.8	0.96	0.65	0.96	22.2
NorthEast: Campbell Parade														
8	T1	536	29	564	5.4	0.389	19.0	LOS B	9.2	67.8	0.72	0.61	0.72	33.1
9	R2	52	7	55	13.5	0.276	34.0	LOS C	2.0	15.9	0.84	0.74	0.84	29.3
Approach		588	36	619	6.1	0.389	20.3	LOS B	9.2	67.8	0.73	0.62	0.73	32.7
NorthWest: Curlewis Street														
10	L2	101	0	106	0.0	* 0.482	33.6	LOS C	9.0	62.7	0.89	0.79	0.89	29.2
28	T1	11	0	12	0.0	0.041	42.0	LOS C	0.7	1.9	0.96	0.64	0.96	22.3
12	R2	133	0	140	0.0	0.482	33.0	LOS C	9.0	62.7	0.88	0.79	0.88	29.5
Approach		245	0	258	0.0	0.482	33.6	LOS C	9.0	62.7	0.89	0.78	0.89	29.0
SouthWest: Campbell Parade														
1	L2	125	1	132	0.8	* 0.498	25.3	LOS B	12.0	85.7	0.80	0.73	0.80	32.0
2	T1	611	23	643	3.8	0.498	20.9	LOS B	12.8	92.9	0.78	0.69	0.78	32.4
Approach		736	24	775	3.3	0.498	21.6	LOS B	12.8	92.9	0.79	0.70	0.79	32.3
All Vehicles		1584	60	1667	3.8	0.498	23.2	LOS B	12.8	92.9	0.78	0.68	0.78	31.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
NorthEast: Campbell Parade												
P3	Full	118	124	39.4	LOS D	0.3	0.3	0.94	0.94	209.9	221.6	1.06
NorthWest: Curlewis Street												
P4	Full	434	457	40.0	LOS D	1.1	1.1	0.95	0.95	203.7	212.8	1.04
SouthWest: Campbell Parade												
P1	Full	196	206	39.5	LOS D	0.5	0.5	0.94	0.94	210.2	221.8	1.06
All Pedestrians		748	787	39.8	LOS D	1.1	1.1	0.95	0.95	206.3	216.5	1.05

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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PHASING SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street PM (Site Folder: Future)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

Input Phase Sequence: A, B, C, D

Output Phase Sequence: A, B, C, D

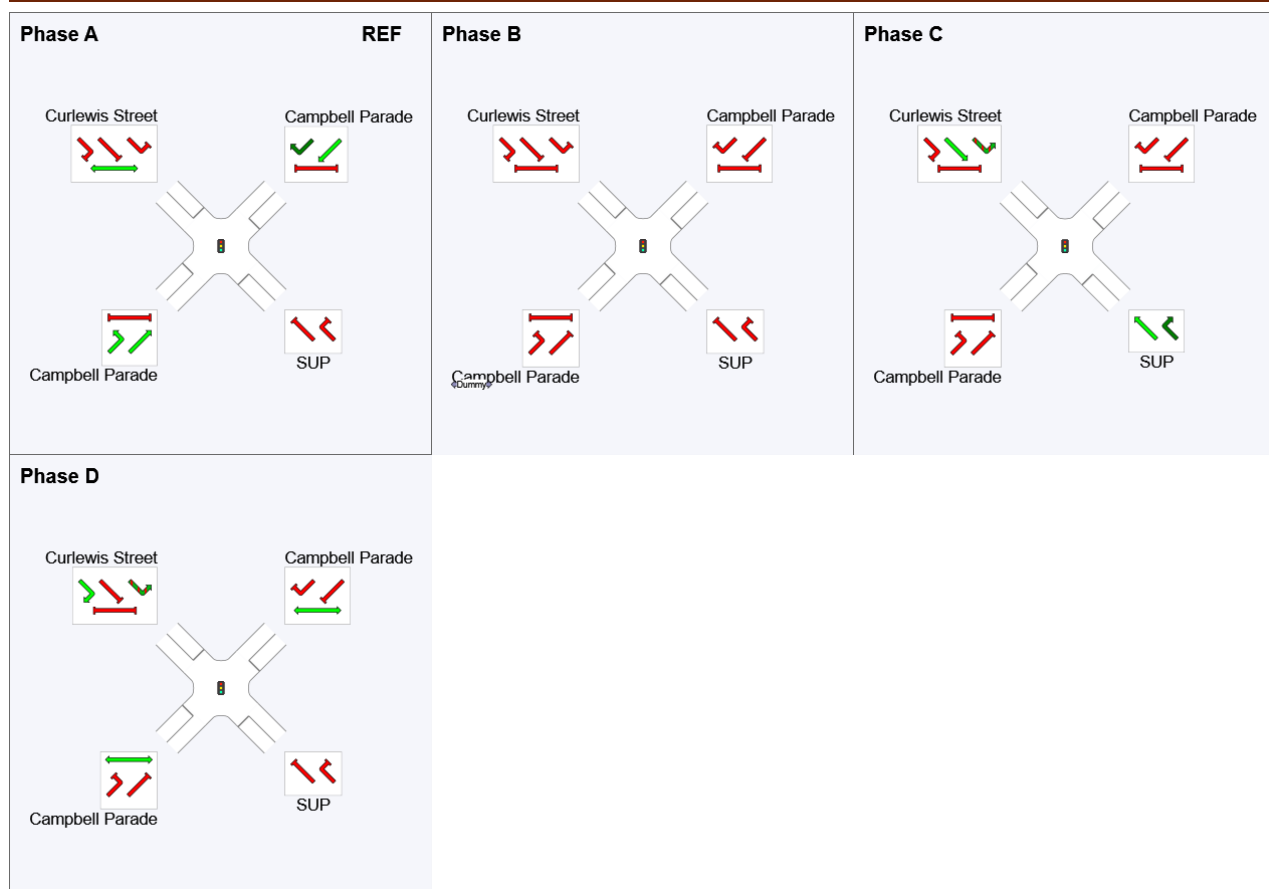
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	44	50	57
Green Time (sec)	38	***	6	27
Phase Time (sec)	44	1	12	33
Phase Split	49%	1%	13%	37%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

*** No green time has been calculated for this phase because the next phase starts during its intergreen time. This occurs with overlap phasing where there is no single movement connecting this phase to the next, or where the only such movement is a dummy movement with zero minimum green time specified. If a green time is required for this phase, specify a dummy movement with a non-zero minimum green time.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied

MOVEMENT SUMMARY

 Site: 101 [Campbell Parade/ Curlewis Street Sat (Site Folder: Future)]

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
						v/c	sec							km/h
SouthEast: SUP														
22	T1	13	0	14	0.0	* 0.075	43.1	LOS D	0.8	2.1	0.97	0.66	0.97	22.1
23	R2	5	0	5	0.0	0.075	45.0	LOS D	0.8	2.1	0.97	0.66	0.97	22.3
Approach		18	0	19	0.0	0.075	43.6	LOS D	0.8	2.1	0.97	0.66	0.97	22.2
NorthEast: Campbell Parade														
8	T1	750	30	789	4.0	0.468	16.6	LOS B	12.3	89.1	0.70	0.61	0.70	33.8
9	R2	64	2	67	3.1	* 0.276	36.9	LOS C	2.7	19.1	0.90	0.75	0.90	28.6
Approach		814	32	857	3.9	0.468	18.2	LOS B	12.3	89.1	0.72	0.62	0.72	33.3
NorthWest: Curlewis Street														
10	L2	154	2	162	1.3	0.715	38.4	LOS C	13.8	98.6	0.97	0.86	1.01	28.1
28	T1	15	0	16	0.0	0.062	42.2	LOS C	1.0	2.8	0.96	0.66	0.96	22.2
12	R2	169	5	178	3.0	* 0.715	38.0	LOS C	13.8	98.6	0.97	0.87	1.02	28.4
Approach		338	7	356	2.1	0.715	38.4	LOS C	13.8	98.6	0.97	0.85	1.01	27.9
SouthWest: Campbell Parade														
1	L2	193	6	203	3.1	* 0.725	31.9	LOS C	18.1	130.2	0.93	0.84	0.95	30.1
2	T1	768	26	808	3.4	0.725	26.8	LOS B	19.9	143.7	0.92	0.82	0.93	30.7
Approach		961	32	1012	3.3	0.725	27.9	LOS B	19.9	143.7	0.92	0.82	0.93	30.6
All Vehicles		2131	71	2243	3.3	0.725	26.0	LOS B	19.9	143.7	0.85	0.75	0.86	31.0

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

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.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
		ped/h	ped/h	sec		[Ped ped	Dist] m			sec	m	m/sec
NorthEast: Campbell Parade												
P3	Full	535	563	40.1	LOS E	1.4	1.4	0.96	0.96	210.6	221.6	1.05
NorthWest: Curlewis Street												
P4	Full	1803	1898	42.6	LOS E	4.9	4.9	1.01	1.01	206.3	212.8	1.03
SouthWest: Campbell Parade												
P1	Full	672	707	40.4	LOS E	1.7	1.7	0.96	0.96	211.0	221.8	1.05
All Pedestrians		3010	3168	41.6	LOS E	4.9	4.9	0.99	0.99	208.1	216.4	1.04

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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PHASING SUMMARY

 **Site: 101 [Campbell Parade/ Curlewis Street Sat (Site Folder: Future)]**

New Site

Site Category: (None)

Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 90 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog

Phase Times determined by the program

Phase Sequence: Leading Right Turn

Reference Phase: Phase A

Input Phase Sequence: A, B, C, D

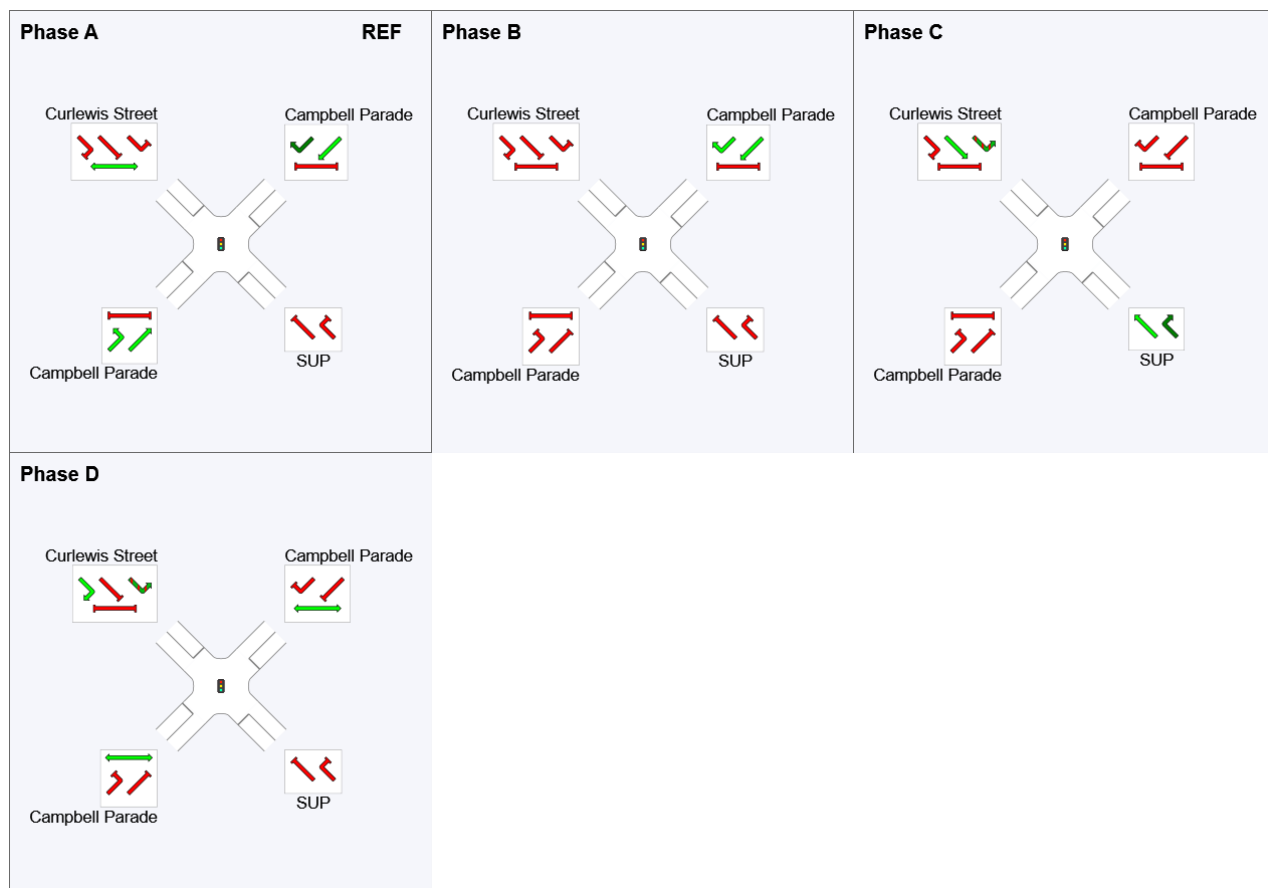
Output Phase Sequence: A, B, C, D

Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	40	49	58
Green Time (sec)	34	3	6	26
Phase Time (sec)	40	6	12	32
Phase Split	44%	7%	13%	36%

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase

	Normal Movement		Permitted/Opposed
	Slip/Bypass-Lane Movement		Opposed Slip/Bypass-Lane
	Stopped Movement		Turn On Red
	Other Movement Class (MC) Running		Undetected Movement
	Mixed Running & Stopped MCs		Continuous Movement
	Other Movement Class (MC) Stopped		Phase Transition Applied