From: Tim Rogers
To: RATHAN Pahee; Amanda Broderick
Cc: Mark Cleveland; Emily Dickson
Subject: ECQ - Mod 4 Updated SIDRA modelling
Date: Friday, 21 June 2019 1:56:36 PM
Attachments: Updated 21 June 2019 EX + 10 years (PM + SAT) 100 metres MOD 4 SIDRA analysis (sent to RMS).sip8
ECO SIDRA Summaries 21 June 2019.pdf

Hi Pahee/Amanda

Thank you meeting with us yesterday

As agreed please find attached updated SIDRA modelling that includes the following 2 intersection options for Rooty Hill Road South/site access/Cable Place

- Minimum cycle time of 120 seconds
- Reconfigure the site access approach to make the thru lane a shared right/thru lane

For comparison Table 1 below summarises the results along with previous analysis which has a shorter cycle time for the PM peak hour.

Table 1	Summary of SIDRA Analysis					
Option	Average Delay		LOS		Site Approach Queue	
	PM	SAT				
102 Cycle Time	24 secs	n/a	B	n/a	97m	n/a
120 Cycle Time	26 secs	31 secs	B	C	71m	84m
120 Cycle Time + Twin RT	33 secs	37 secs	C	C	84m	47m

Table 1 shows that the 120 cycle time has the overall best results in term of intersection performance and queuing between the traffic signals and roundabout (100m apart). The option of twin RT lanes reduces queues between the roundabout and traffic signals on Saturday, however the introduction of new phase results in an overall increase in intersection delay.

Note sure why the 120s cycle time is now showing a better outcome compared to what we found last week. Have reviewed this modelling and it all appears good.

Subject to RMS review, the updated modelling addresses the matters raised by RMS.

Happy to discuss should you have any queries

Regards

Tim Rogers
Director
Colston Budd Rogers & Kafes Pty Ltd
Suite 1801 - Tower A, Zenith Centre
821 Pacific Highway

Chatswood NSW 2067
PO Box 5186
West Chatswood NSW 1515
Phone: (02) 9411 2411
Fax: (02) 9411 2422
Email: tim.rogers@cbrk.com.au

MOVEMENT SUMMARY

Site: 102 [Site Access - (min 120s cycle time) Rooty Hills Road (Full Development) PM + Mod 4 + 10 years]

Network: N101 [Eastern Creek Mod 4 + 10 years (min 120s cycle time)]

Minimum 120 second cycle time
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Aver. Back of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rooty Hill Road (south)														
1	L2	5	1.0	5	1.0	0.545	10.3	LOS A	5.6	40.8	0.25	0.23	0.25	52.9
2	T1	1350	5.0	1350	5.0	0.545	4.8	LOS A	5.6	40.9	0.25	0.23	0.25	54.0
3	R2	420	1.0	420	1.0	0.804	51.4	LOS D	14.1	99.8	0.96	0.89	1.02	16.3
Approach		1775	4.0	1775	4.0	0.804	15.8	LOS B	14.1	99.8	0.42	0.39	0.43	42.2
East: Spine Road														
4	L2	420	1.0	420	1.0	0.451	18.5	LOS B	7.2	50.8	0.60	0.81	0.75	34.0
5	T1	5	1.0	5	1.0	0.014	42.7	LOS D	0.1	1.0	0.84	0.56	0.84	28.0
6	R2	230	1.0	230	1.0	0.916	77.9	LOS F	10.0	70.6	1.00	1.03	1.43	16.9
Approach		655	1.0	655	1.0	0.916	39.6	LOS C	10.0	70.6	0.74	0.89	0.99	24.3
North: Rooty Hill Road (north)														
7	L2	230	1.0	230	1.0	0.210	10.8	LOS A	2.6	18.2	0.39	0.67	0.39	42.0
8	T1	1065	5.0	1065	5.0	0.787	35.8	LOS C	18.2	133.2	0.93	0.85	0.96	32.7
9	R2	5	1.0	5	1.0	0.325	83.0	LOS F	0.2	1.5	1.00	0.62	1.00	23.6
Approach		1300	4.3	1300	4.3	0.787	31.6	LOS C	18.2	133.2	0.83	0.81	0.86	33.5
West: Cable Place														
10	L2	5	1.0	5	1.0	0.027	46.8	LOS D	0.3	2.0	0.83	0.62	0.83	32.8
11	T1	5	1.0	5	1.0	0.027	41.2	LOS C	0.3	2.0	0.83	0.62	0.83	24.9
12	R2	5	1.0	5	1.0	0.021	51.6	LOS D	0.2	1.1	0.87	0.65	0.87	28.7
Approach		15	1.0	15	1.0	0.027	46.5	LOS D	0.3	2.0	0.84	0.63	0.84	29.2
All Vehicles		3745	3.6	3745	3.6	0.916	25.6	LOS B	18.2	133.2	0.62	0.62	0.68	35.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	53.3	LOS E	0.2	0.2	0.94	0.94
P2	East Full Crossing	53	28.8	LOS C	0.1	0.1	0.69	0.69
P3	North Full Crossing	53	53.3	LOS E	0.2	0.2	0.94	0.94
P4	West Full Crossing	53	27.4	LOS C	0.1	0.1	0.68	0.68
All Pedestrians		211	40.7	LOS E			0.81	0.81

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: 102 [Site Access - (min 120s cycle time) Rooty Hills Road (Full Development) PM + Mod 4 + 10 years]

Network: N101 [Eastern Creek Mod 4 + 10 years (min 120s cycle time)]

Minimum 120 second cycle time
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: B1*, B2, C, D
Output Phase Sequence: B1*, B2, C, D
(* Variable Phase)

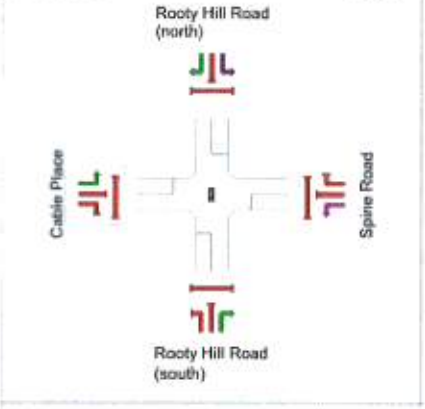
Phase Timing Summary

Phase	B1	B2	C	D
Phase Change Time (sec)	80	87	0	52
Green Time (sec)	1	27	46	22
Phase Time (sec)	7	33	52	28
Phase Split	6%	28%	43%	23%

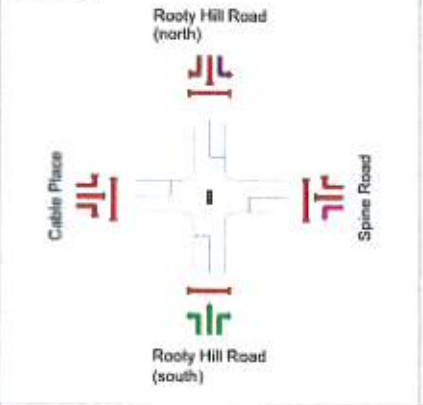
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence

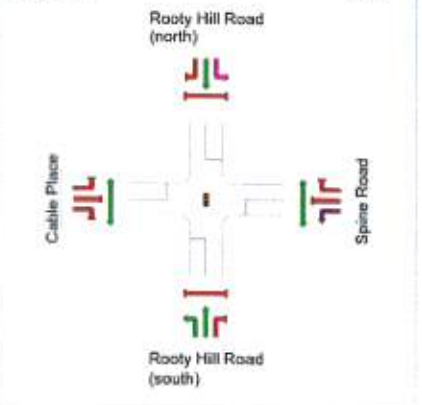
Phase B1 VAR



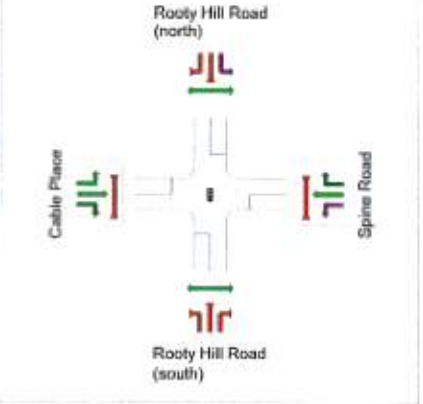
Phase B2



Phase C REF

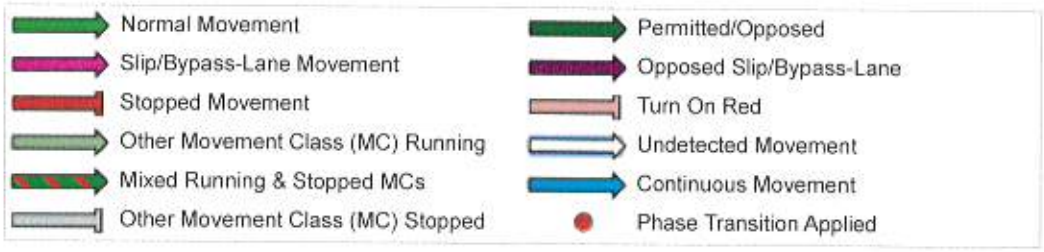


Phase D



REF: Reference Phase

VAR: Variable Phase



MOVEMENT SUMMARY

Site: 102 [Site Access - Rooty Hills Road (Full Development) SAT+ Mod 4 + 10 years twin right turn]

Network: N101 [Eastern Creek Mod 4 + 10 years SAT Stage 3 (twin right turn exit lanes)]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rooty Hill Road (south)														
1	L2	5	1.0	5	1.0	0.355	15.2	LOS B	4.5	32.7	0.36	0.32	0.36	48.6
2	T1	755	5.0	755	5.0	0.355	9.7	LOS A	4.5	32.7	0.36	0.32	0.36	48.9
3	R2	525	1.0	525	1.0	0.876	52.9	LOS D	19.1	135.1	0.98	0.93	1.11	15.9
Approach		1285	3.4	1285	3.4	0.876	27.3	LOS B	19.1	135.1	0.61	0.57	0.67	32.9
East: Spine Road														
4	L2	525	1.0	525	1.0	0.463	13.9	LOS A	6.4	44.9	0.48	0.76	0.62	37.9
5	T1	5	1.0	5	1.0	0.926	76.5	LOS F	5.7	40.4	1.00	1.05	1.57	18.7
6	R2	285	1.0	285	1.0	0.926	81.7	LOS F	6.7	47.4	1.00	1.04	1.54	16.4
Approach		815	1.0	815	1.0	0.926	38.0	LOS C	6.7	47.4	0.66	0.86	0.95	24.8
North: Rooty Hill Road (north)														
7	L2	285	1.0	285	1.0	0.278	14.1	LOS A	4.3	30.0	0.49	0.70	0.49	38.5
8	T1	790	5.0	790	5.0	0.894	59.4	LOS E	17.0	124.0	1.00	1.05	1.26	25.2
9	R2	5	1.0	5	1.0	0.325	83.0	LOS F	0.2	1.5	1.00	0.62	1.00	23.6
Approach		1080	3.9	1080	3.9	0.894	47.6	LOS D	17.0	124.0	0.86	0.96	1.05	26.8
West: Cable Place														
10	L2	5	1.0	5	1.0	0.036	52.5	LOS D	0.3	2.2	0.88	0.64	0.88	31.0
11	T1	5	1.0	5	1.0	0.036	47.0	LOS D	0.3	2.2	0.88	0.64	0.88	23.1
12	R2	5	1.0	5	1.0	0.023	54.6	LOS D	0.2	1.1	0.89	0.65	0.89	27.9
Approach		15	1.0	15	1.0	0.036	51.4	LOS D	0.3	2.2	0.88	0.64	0.88	27.7
All Vehicles		3195	2.9	3195	2.9	0.926	37.0	LOS C	19.1	135.1	0.71	0.77	0.87	28.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	43.4	LOS E	0.2	0.2	0.85	0.85
P2	East Full Crossing	53	40.9	LOS E	0.1	0.1	0.83	0.83
P3	North Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	39.3	LOS D	0.1	0.1	0.81	0.81
All Pedestrians		211	44.5	LOS E			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.

PHASING SUMMARY

Site: 102 [Site Access - Rooty Hills Road (Full Development) SAT+ Mod 4 + 10 years twin right turn]

Network: N101 [Eastern Creek Mod 4 + 10 years SAT Stage 3 (twin right turn exit lanes)]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 120 seconds (Network Optimum Cycle Time - Minimum Delay)

Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: B1*, B2, C, D, E
Output Phase Sequence: B1*, B2, C, D, E
(* Variable Phase)

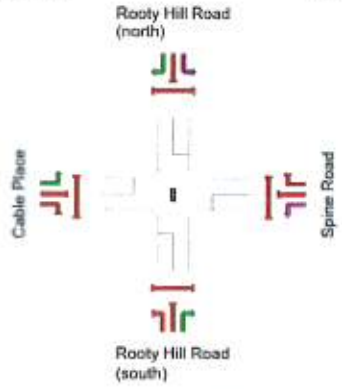
Phase Timing Summary

Phase	B1	B2	C	D	E
Phase Change Time (sec)	75	82	0	36	53
Green Time (sec)	1	32	30	11	16
Phase Time (sec)	7	38	36	17	22
Phase Split	6%	32%	30%	14%	18%

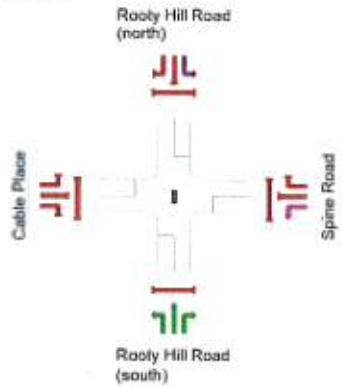
See the Phase Information section in the Detailed Output report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Phase Actuation and Phase Frequency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

Output Phase Sequence

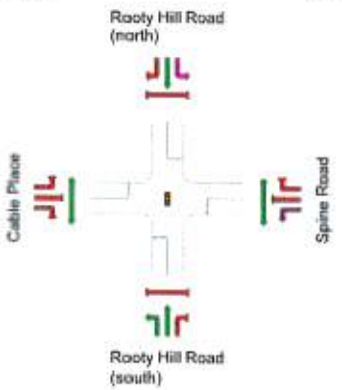
Phase B1 VAR



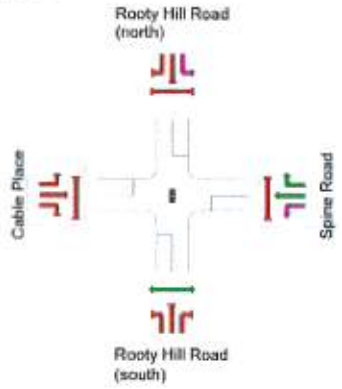
Phase B2



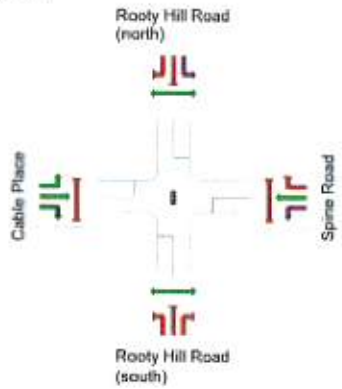
Phase C REF



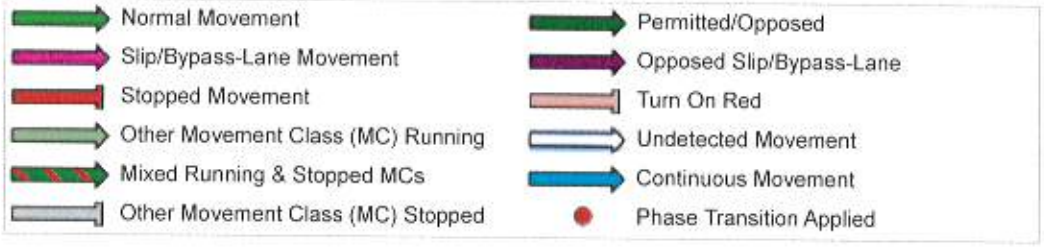
Phase D



Phase E



REF: Reference Phase
VAR: Variable Phase



MOVEMENT SUMMARY

Site: 102 [Site Access - Rooty Hills Road (Full Development) PM + Mod 4 + 10 years twin right turn]

Network: N101 [Eastern Creek Mod 4 + 10 years (twin right turn exit lanes)]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Optimum Cycle Time - Minimum Delay)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Rooty Hill Road (south)														
1	L2	5	1.0	5	1.0	0.590	14.7	LOS B	15.3	112.0	0.39	0.36	0.39	49.0
2	T1	1350	5.0	1350	5.0	0.590	9.2	LOS A	15.4	112.1	0.39	0.36	0.39	49.4
3	R2	420	1.0	420	1.0	0.871	62.4	LOS E	27.4	193.3	1.00	0.93	1.14	14.1
Approach		1775	4.0	1775	4.0	0.871	21.8	LOS B	27.4	193.3	0.54	0.50	0.57	37.9
East: Spine Road														
4	L2	420	1.0	420	1.0	0.426	19.5	LOS B	11.9	83.8	0.56	0.81	0.75	33.3
5	T1	5	1.0	5	1.0	0.915	80.9	LOS F	8.8	62.2	1.00	1.02	1.51	18.1
6	R2	230	1.0	230	1.0	0.915	86.2	LOS F	8.8	62.2	1.00	1.01	1.51	15.8
Approach		655	1.0	655	1.0	0.915	43.4	LOS D	11.9	83.8	0.72	0.88	1.02	23.0
North: Rooty Hill Road (north)														
7	L2	230	1.0	230	1.0	0.198	11.4	LOS A	4.6	32.7	0.39	0.66	0.39	41.3
8	T1	1065	5.0	1065	5.0	0.870	49.8	LOS D	37.8	276.0	0.97	0.97	1.11	27.8
9	R2	5	1.0	5	1.0	0.352	89.6	LOS F	0.4	2.7	1.00	0.62	1.00	22.5
Approach		1300	4.3	1300	4.3	0.870	43.1	LOS D	37.8	276.0	0.87	0.91	0.98	28.8
West: Cable Place														
10	L2	5	1.0	5	1.0	0.037	56.8	LOS E	0.5	3.8	0.88	0.64	0.88	29.8
11	T1	5	1.0	5	1.0	0.037	51.2	LOS D	0.5	3.8	0.88	0.64	0.88	22.0
12	R2	5	1.0	5	1.0	0.024	58.9	LOS E	0.3	2.0	0.90	0.65	0.90	26.8
Approach		15	1.0	15	1.0	0.037	55.6	LOS D	0.5	3.8	0.89	0.65	0.89	26.6
All Vehicles		3745	3.6	3745	3.6	0.915	33.1	LOS C	37.8	276.0	0.69	0.71	0.79	31.4

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network 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.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Movement 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
P1	South Full Crossing	53	49.2	LOS E	0.2	0.2	0.87	0.87
P2	East Full Crossing	53	33.3	LOS D	0.1	0.1	0.72	0.72
P3	North Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	31.9	LOS D	0.1	0.1	0.70	0.70
All Pedestrians		211	43.4	LOS E			0.81	0.81

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: 102 [Site Access - Rooty Hills Road (Full Development) PM + Mod 4 + 10 years twin right turn]

Network: N101 [Eastern Creek Mod 4 + 10 years (twin right turn exit lanes)]

Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 130 seconds (Network Optimum Cycle Time - Minimum Delay)

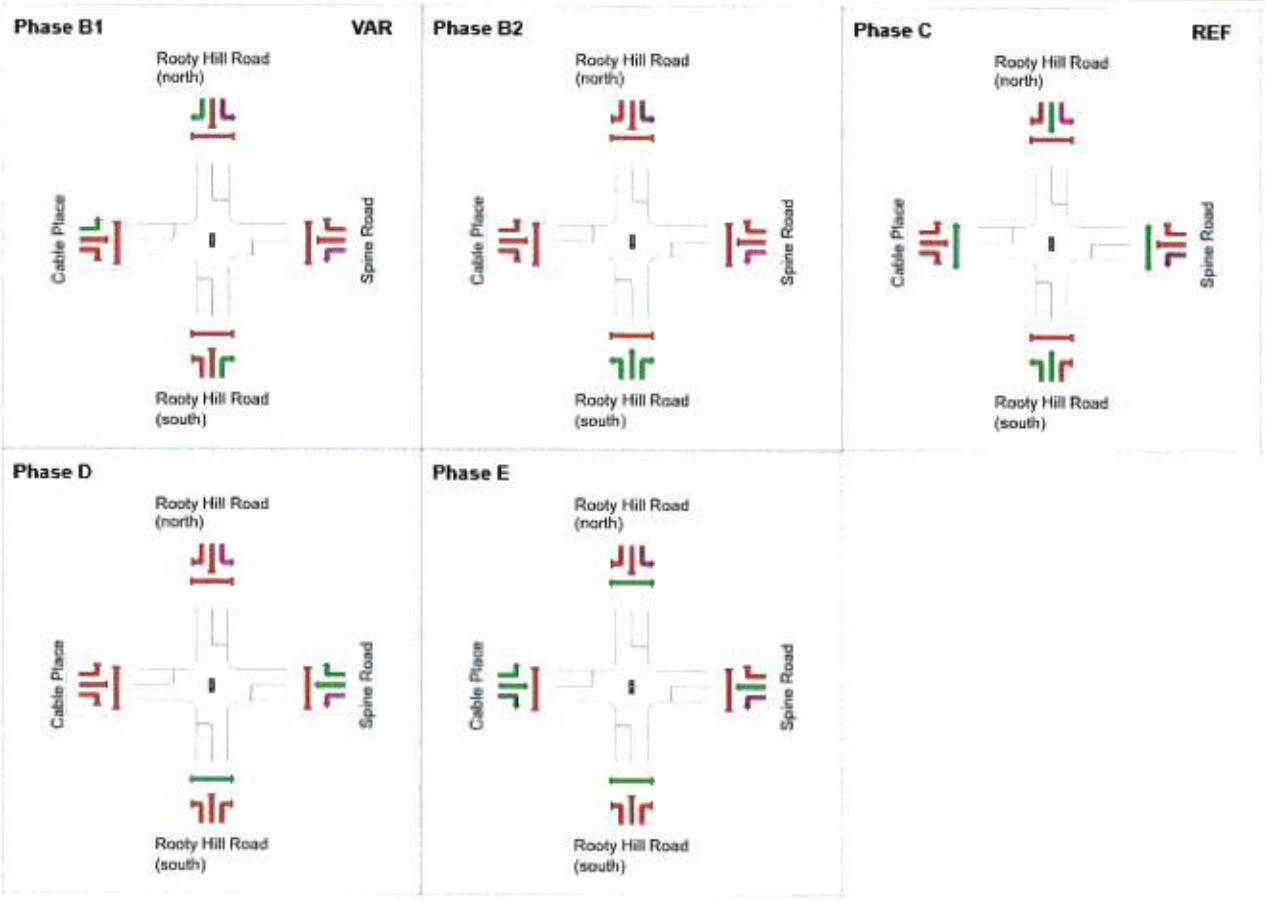
Timings based on settings in the Network Timing dialog
Phase Times determined by the program
Downstream lane blockage effects included in determining phase times
Green Split Priority has been specified
Phase Sequence: Variable Phasing
Reference Phase: Phase C
Input Phase Sequence: B1*, B2, C, D, E
Output Phase Sequence: B1*, B2, C, D, E
(* Variable Phase)

Phase Timing Summary

Phase	B1	B2	C	D	E
Phase Change Time (sec)	90	97	0	52	67
Green Time (sec)	1	27	46	9	17
Phase Time (sec)	7	33	52	15	23
Phase Split	5%	25%	40%	12%	18%

See the Phase Information section in the Detailed Output 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, Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence



REF: Reference Phase

VAR: Variable Phase