Colston Budd Rogers & Kafes Pty Ltd
as Trustee for C & B Unit Trust
ABN 27 623 918 759

Our Ref: TR/11146/jj

5 September, 2019

Transport Planning
Traffic Studies
Parking Studies

Qantas Airways Limited
B Wing, Level 1, 10 Bourke Road,
Mascot NSW 2020 Australia

Attention: Charlie Westgarth
Email: charlie.westgarth@qantas.com.au

Dear Sir,

RE: QANTAS FLIGHT TRAINING CENTRE (SSD 10154)
RESPONSE TO TRAFFIC MATTERS RAISED IN FURTHER SUBMISSIONS

1. As requested we have reviewed the traffic matters raised in further submissions to SSD 10154. These submissions are in response to the Applicants Response to Submissions on the SSD. The submissions are summarised below:

   TfNSW/RMS (letter dated 29 August and email dated 22 August)

   - *the SIDRA analysis be updated to include the following:*
     - *missing traffic flows at the intersection of King Street/O'Riordan Street;*
     - *increased cycle times at signalised intersections to be within the range 120 to 130 seconds to be consistent with SCATS data;*
     - *include pedestrian late starts where applicable; and*
     - *test the sensitivity of peak flow factor of less than 100%;*
   - *based on the revised SIDRA analysis, confirm that the 95% queue lengths can be accommodated in the right turn bays into Lancaster Road (at the intersection with Qantas Drive) and into King Street West (at the intersection with O'Riordan Street);*
   - *identify any mitigation measures required should the 95% queue lengths overflow from the right turn bays; and*
   - *any approval to include conditions regarding access by oversized vehicles, preparation of Travel Demand Strategy and Workplace Travel Plan and preparation of Construction Pedestrian and Traffic Management Plan (both in consultation with the Sydney Coordination Office within TfNSW).*

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P.O. Box 5186 West Chatswood NSW 1515 Tel: (02) 9411 2411 Fax: (02) 9411 2422
Directors - Geoff Budd - Stan Kafes - Tim Rogers - Joshua Hollis ACN 002 334 296
EMAIL: cbrk@cbrk.com.au

Bayside Council

- *that the proposed development provide appropriate bicycle parking and end of trip facilities;*
- *improvements to the internal pedestrian and cycleway network; and*
- *any approval give consideration to the inclusion of a condition requiring a peer review of the traffic response to determine an appropriate monetary contribution, if any, toward the King Street/O'Riordan Street intersection upgrade works.*

2. We prepared the Traffic Report for the SSD (Traffic Report for Proposed Relocation of the Flight Training Centre, Mascot, May 2019) and response to submissions dated 31 July 2019. Our response to the traffic matters raised in further submissions to the SSD is set out below. We note that the matters raised in the TfNSW submission with regards to the SIDRA analysis were provided to us by RMS in an email dated 22 August 2019 (along with other matters). The updated SIDRA analysis to be undertaken reflects the additional work agreed with RMS.

Response to Matters raised by TfNSW

Missing traffic flows at the intersection of King Street/O'Riordan Street Right Turn into King Street

3. The missing traffic flows through the King Street/O'Riordan Street intersection (48 vehicles in the AM peak hour and 40 vehicles in the PM peak hour) have been included in the updated SIDRA analysis and are shown in Figures 1 and 2.

Increase Cycle Times to between 120 and 130 seconds Queuing in Right Turn Bays

4. The updated SIDRA analysis has set cycle times at signalised intersections to be within the range 120 and 130 seconds.

Include pedestrian late starts where applicable

5. Late starts have been included where applicable. In particular late starts have been included for the pedestrian movements at the intersections of King Street/O'Riordan Street and Qantas Drive/Lancaster Road.

Test the sensitivity of peak flow factor of less than 100%

6. We have reviewed the traffic flows through the intersections of King Street/O'Riordan Street and Qantas Drive/Lancaster Road, and found minimal variation to flows on Qantas Drive and O'Riordan Street over the AM and PM peak hours. Thus our previous adoption of 100% peak flow factor is considered appropriate. Nonetheless, as requested by RMS we have

undertaken a sensitivity test with the peak flow factor set at 98% in the updated SIDRA analysis.

Queuing in Right Turn Bays

7. The SIDRA analysis has been updated to include the suggested changes by RMS, redistributed Qantas traffic, traffic from other approved developments plus the additional traffic from other developments (as requested by Bayside Council and assessed in our response to submissions dated 31 July 2019).

8. The updated SIDRA analysis found with the RMS Airport North Precinct upgrades in place that:

- the intersection of Qantas Drive/Lancaster Road would operate with average delays of some 46 seconds and 11 seconds per vehicle in the AM and PM peak hours respectively. For the AM peak hour, this represents level of service D, a satisfactory level of intersection operation. For the PM peak hour, this represents level of service A, a good level of intersection operation;
- the 95% queue length for the right turn into Lancaster Road was 97 metres in the AM peak hour and 19 metres in the PM peak hour. The right turn bay is some 80 metres long, however observations noted the effective length is some 95 metres as vehicles queue in the intersection (when the right turn operates as filter), thus effectively accommodating the 95% queue length for the right turn into Lancaster Road in the AM peak hour. Attachment A shows that only minor works may be required to extend the right turn bay by some 20 metres (by modifying the existing median);
- the intersection of O'Riordan Street/King Street would operate with average delays of some 46 seconds and 53 seconds per vehicle in the AM and PM peak hours respectively. This represents level of service D, a satisfactory level of intersection operation; and
- the 95% queue length for the right turn into King Street (west) was 61 metres in the AM peak hour and 35 metres in the PM peak hour. The RMS concept plans for the upgrade of O'Riordan Street show the right turn bay as some 60 metres long. Thus the right turn bay can effectively accommodate the 95% queue length for the right turn into King Street (west).

9. SIDRA movement summaries are provided in Attachment B.

Oversized Vehicles

10. A condition of consent for the SSD that requires the preparation of traffic management plan and any necessary approvals for oversized vehicle access is appropriate.

Travel Demand Management Strategy/Work Place Travel Plan

11. A condition of consent for the SSD that requires the preparation of a Travel Demand Management Strategy/Work Place Travel Plan in consultation with the Sydney Coordination Office within TfNSW is appropriate.

Construction Pedestrian and Traffic Management Plan

12. A condition of consent for the SSD that requires the preparation of a Construction Pedestrian and Traffic Management Plan in consultation with the Sydney Coordination Office within TfNSW is appropriate.

Bayside Council

Bicycle Parking and End of Trip Facilities

13. The SSD will provide additional bicycle parking within the ground floor of the new multi deck car park with appropriate end of trip facilities to support the additional bicycle parking. Council has suggested that bicycle parking be provided at rate of 1 space per 10 parking spaces. With 1,200 new car parking spaces in the multi deck car park (800 are replacement spaces), 120 bicycle spaces would be required. It is proposed to provide 120 bicycle spaces with the majority within the ground level of the car park. End of trip (EOT) facilities will be provided within the existing EOT facilities located in Building D and new facilities within the new car park.

Improvements to the Internal Pedestrian and Cycleway Network

14. As part of the SSD, improvements will be made to the internal pedestrian and cycleway network within the King Street North and Trigen car park areas through the construction of new roads and footpaths around the flight training centre and multi-deck car park. A new footpath will be constructed along the King Street frontage.

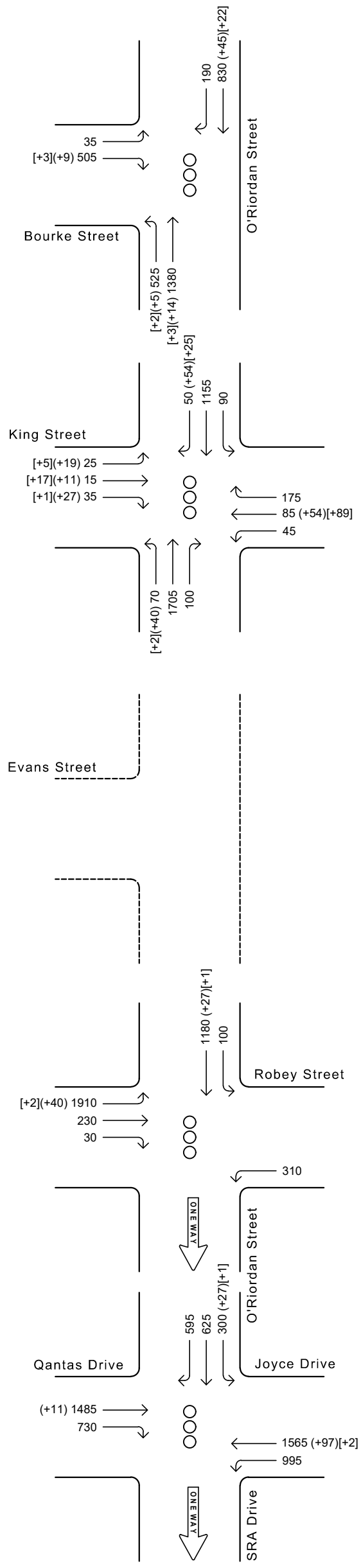
Any approval give consideration to the inclusion of a condition requiring a peer review of the traffic response to determine an appropriate monetary contribution, if any, toward the King Street/O'Riordan Street intersection upgrade works

15. This condition suggested by Bayside Council is not required as the updated SIDRA analysis to include matters raised by RMS has found no upgrades are required at the intersection of King Street and O'Riordan Street. Furthermore we note that the RMS engaged an external consultant to review the SIDRA analysis.

16. We trust the above provides the information you require. Finally, if you should have any queries, please do not hesitate to contact us.

Yours faithfully,
COLSTON BUDD ROGERS & KAFES PTY LTD

T. Rogers
Director



North

LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic
[+10] - Additional Surrounding Development Traffic
- Traffic Signals
- Roundabout

Existing redistributed weekday morning traffic flows plus development traffic plus surrounding development traffic

Figure 1

Colston Budd Rogers & Kafes Pty Ltd

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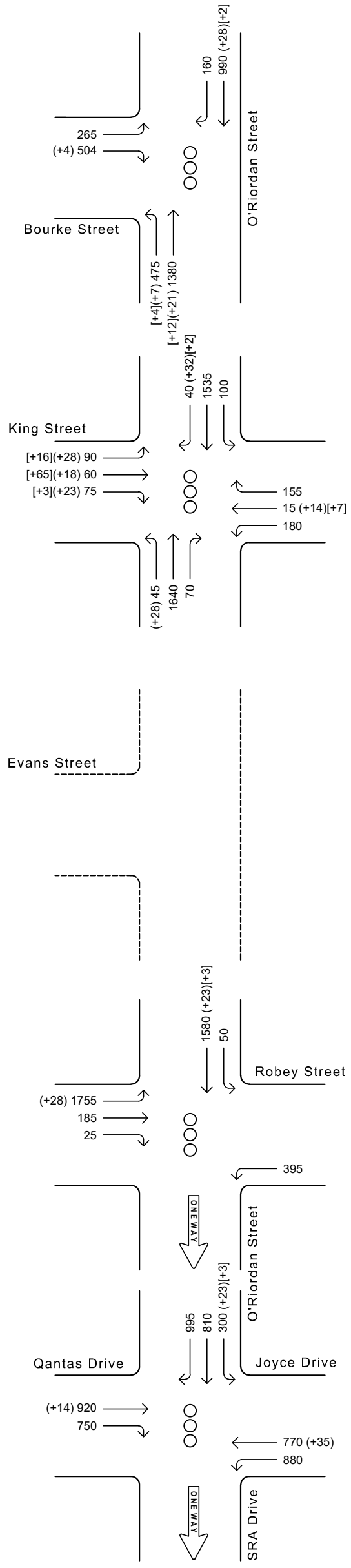

North

LEGEND

100 - Existing Peak Hour Traffic Flows
(+10) - Additional Development Traffic
[+10] - Additional Surrounding Development Traffic
- Traffic Signals
- Roundabout

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Existing redistributed weekday afternoon traffic flows plus development traffic plus surrounding development traffic

Figure 2

ATTACHMENT A

POSSIBLE EXTENSION OF RIGHT TURN BAY INTO LANCASTER ROAD AT INTERSECTION WITH QANTAS DRIVE

NOTE:
SKETCH PLAN ONLY. PROPERTY BOUNDARIES, UTILITIES, KERBLINES & DIMENSIONS ARE SUBJECT TO SURVEY AND FINAL DESIGN. TRAFFIC MEASURES PROPOSED IN THIS PLAN ARE CONCEPT ONLY AND ARE SUBJECT TO FINAL DESIGN BY CIVIL ENGINEERS.

QANTAS DRIVE - LANCASTRIAN DRIVE INTERSECTION UPGRADE CONCEPT SKETCH

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A

ATTACHMENT B

SIDRA MOVEMENT SUMMARIES

MOVEMENT SUMMARY

Site: 101 [AM EX + D - Qantas Drive - Lancastrian Drive]

Network: N101 [AM EX + D - Jetbase]

Existing Weekday Morning Peak Hour Traffic Flows Plus Development Traffic
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: Lancastrian Drive														
1	L2	35	2.0	35	2.0	0.019	3.2	LOS A	0.0	0.0	0.00	0.46	0.00	47.4
3	R2	46	2.0	46	2.0	1.089	164.8	LOS F	5.1	36.0	1.00	1.14	2.28	9.8
Approach		81	2.0	81	2.0	1.089	95.0	LOS F	5.1	36.0	0.57	0.84	1.30	15.0
East: Qantas Drive														
4	L2	192	2.0	192	2.0	0.262	22.8	LOS B	5.6	39.8	0.71	0.76	0.71	37.7
5	T1	1340	5.0	1340	5.0	1.043	122.2	LOS F	75.4	550.2	1.00	1.42	1.67	20.8
Approach		1532	4.6	1532	4.6	1.043	109.7	LOS F	75.4	550.2	0.96	1.34	1.55	21.4
West: Qantas Drive														
11	T1	2155	5.0	2155	5.0	0.674	3.0	LOS A	22.4	163.2	0.35	0.33	0.35	66.1
12	R2	384	2.0	384	2.0	0.480	24.5	LOS B	13.7	97.3	0.76	0.80	0.76	36.5
Approach		2539	4.5	2539	4.5	0.674	6.3	LOS A	22.4	163.2	0.41	0.40	0.41	62.0
All Vehicles		4152	4.5	4152	4.5	1.089	46.2	LOS D	75.4	550.2	0.62	0.76	0.85	35.5

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
P2	East Full Crossing	53	59.3	LOS E	0.2	0.2	0.96	0.96
All Pedestrians		53	59.3	LOS E			0.96	0.96

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

MOVEMENT SUMMARY

Site: 101 [PM EX + D - Qantas Drive - Lancastrian Drive]

Network: N101 [PM EX + D - Jetbase]

Existing Weekday Morning Peak Hour Traffic Flows Plus Development Traffic
Site Category: (None)
Signals - Fixed Time Coordinated Cycle Time = 125 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: Lancastrian Drive														
1	L2	355	2.0	355	2.0	0.194	3.2	LOS A	0.0	0.0	0.00	0.46	0.00	47.4
3	R2	64	2.0	64	2.0	0.243	55.2	LOS D	3.5	25.1	0.93	0.75	0.93	22.0
Approach		419	2.0	419	2.0	0.243	11.2	LOS A	3.5	25.1	0.14	0.50	0.14	40.4
East: Qantas Drive														
4	L2	37	2.0	37	2.0	0.024	6.9	LOS A	0.3	2.3	0.15	0.61	0.15	49.0
5	T1	1885	5.0	1885	5.0	0.761	14.9	LOS B	38.8	283.0	0.73	0.68	0.73	48.2
Approach		1922	4.9	1922	4.9	0.761	14.7	LOS B	38.8	283.0	0.72	0.68	0.72	48.2
West: Qantas Drive														
11	T1	1405	5.0	1405	5.0	0.489	6.0	LOS A	16.0	116.7	0.41	0.38	0.41	54.6
12	R2	55	2.0	55	2.0	0.305	36.4	LOS C	2.7	18.9	0.81	0.78	0.81	27.6
Approach		1460	4.9	1460	4.9	0.489	7.2	LOS A	16.0	116.7	0.43	0.40	0.43	53.6
All Vehicles		3801	4.6	3801	4.6	0.761	11.4	LOS A	38.8	283.0	0.54	0.55	0.54	49.6

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
P2	East Full Crossing	53	56.8	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		53	56.8	LOS E			0.95	0.95

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

MOVEMENT SUMMARY

Site: 104 [AM EX + Base + Qantas - O'Riordan St - King St]

Network: N101 [AM EX + Base + Qantas]

New Site
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	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: O'Riordan Street														
1	L2	114	2.0	114	2.0	0.905	50.3	LOS D	49.4	359.0	0.99	1.02	1.14	29.0
2	T1	1740	5.0	1740	5.0	0.905	49.0	LOS D	49.4	359.0	0.98	1.05	1.19	13.4
3	R2	102	2.0	102	2.0	0.669	66.9	LOS E	6.2	44.0	1.00	0.82	1.09	22.7
Approach		1956	4.7	1956	4.7	0.905	50.0	LOS D	49.4	359.0	0.98	1.04	1.18	15.5
East: King Street														
4	L2	46	2.0	46	2.0	0.058	25.4	LOS B	1.5	10.9	0.61	0.68	0.61	29.7
5	T1	233	2.0	233	2.0	0.403	35.9	LOS C	10.8	77.0	0.85	0.71	0.85	36.1
6	R2	179	2.0	179	2.0	0.944	90.1	LOS F	14.2	101.4	1.00	1.15	1.61	14.7
Approach		457	2.0	457	2.0	0.944	56.0	LOS D	14.2	101.4	0.88	0.88	1.12	25.9
North: O'Riordan Street														
7	L2	92	2.0	92	2.0	0.107	20.5	LOS B	2.1	14.7	0.41	0.67	0.41	36.3
8	T1	1179	5.0	1179	5.0	0.720	28.2	LOS B	29.6	216.0	0.88	0.79	0.88	17.7
9	R2	132	2.0	132	2.0	0.863	74.1	LOS F	8.6	61.6	1.00	0.95	1.37	21.4
Approach		1402	4.5	1402	4.5	0.863	32.0	LOS C	29.6	216.0	0.86	0.80	0.90	20.2
West: King Street														
10	L2	50	2.0	50	2.0	0.063	25.5	LOS B	1.7	11.9	0.61	0.68	0.61	29.7
11	T1	44	2.0	44	2.0	0.359	43.1	LOS D	5.4	39.4	0.89	0.75	0.89	32.9
12	R2	64	5.0	64	5.0	0.359	47.6	LOS D	5.4	39.4	0.89	0.75	0.89	22.6
Approach		158	3.2	158	3.2	0.359	39.4	LOS C	5.4	39.4	0.80	0.73	0.80	28.0
All Vehicles		3973	4.3	3973	4.3	0.944	43.9	LOS D	49.4	359.0	0.92	0.92	1.06	19.3

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	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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

MOVEMENT SUMMARY

Site: 104 [PM EX + Base + Qantas - O'Riordan St - King St]

Network: N101 [PM EX + Base + Qantas]

New Site
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	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: O'Riordan Street														
1	L2	74	2.0	74	2.0	0.941	61.7	LOS E	49.3	359.0	1.00	1.10	1.25	25.8
2	T1	1673	5.0	1673	5.0	0.941	62.8	LOS E	49.3	359.0	1.00	1.16	1.33	11.0
3	R2	71	2.0	71	2.0	0.780	73.7	LOS F	4.6	32.7	1.00	0.86	1.29	21.4
Approach		1819	4.8	1819	4.8	0.941	63.2	LOS E	49.3	359.0	1.00	1.14	1.32	12.4
East: King Street														
4	L2	184	2.0	184	2.0	0.227	26.6	LOS B	6.6	46.9	0.66	0.73	0.66	29.1
5	T1	37	2.0	37	2.0	0.056	28.0	LOS B	1.4	10.1	0.70	0.53	0.70	39.1
6	R2	158	2.0	158	2.0	0.943	93.7	LOS F	13.2	93.8	1.00	1.19	1.65	14.3
Approach		379	2.0	379	2.0	0.943	54.8	LOS D	13.2	93.8	0.81	0.90	1.08	21.5
North: O'Riordan Street														
7	L2	102	2.0	102	2.0	0.122	14.4	LOS A	1.6	11.2	0.28	0.64	0.28	39.8
8	T1	1566	5.0	1566	5.0	0.936	46.4	LOS D	40.2	293.8	0.99	1.05	1.18	12.1
9	R2	76	2.0	76	2.0	0.825	73.4	LOS F	4.8	34.3	1.00	0.84	1.20	21.5
Approach		1744	4.7	1744	4.7	0.936	45.7	LOS D	40.2	293.8	0.95	1.02	1.13	14.6
West: King Street														
10	L2	137	2.0	137	2.0	0.169	26.0	LOS B	4.8	33.9	0.64	0.72	0.64	29.4
11	T1	146	2.0	146	2.0	0.542	37.4	LOS C	12.2	87.8	0.88	0.78	0.88	34.9
12	R2	103	5.0	103	5.0	0.542	42.0	LOS C	12.2	87.8	0.88	0.78	0.88	24.5
Approach		386	2.8	386	2.8	0.542	34.6	LOS C	12.2	87.8	0.80	0.76	0.80	30.8
All Vehicles		4328	4.3	4328	4.3	0.943	52.9	LOS D	49.3	359.0	0.94	1.04	1.18	16.0

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	54.3	LOS E	0.2	0.2	0.95	0.95
P2	East Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
P4	West Full Crossing	53	54.3	LOS E	0.2	0.2	0.95	0.95
All Pedestrians		158	54.3	LOS E			0.95	0.95

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