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TECHNICAL NOTE

Reference: P0421t06v01

6 January 2020

Frasers Property Australia
Level 2, 1C Homebush Bay Drive
Rhodes NSW 2138

Revised Response to Submissions
Ivanhoe Estate, Macquarie Park (SSD 8707)

Dear Chris,

I refer to our Technical Note dated 22 August 2019 (P0421t04) and the issues raised in the Revised Response to Submissions received in relation to the Ivanhoe Estate Master Plan, Macquarie Park SSD8707 (the Proposal), specifically the submission from Ryde City Council (Council) dated 18 June 2019 (RRTS).

Sections below provide a summary of each of the issues raised in the Council RRTS, and the Ason Group response to these issues. In preparing these responses, Ason Group has referenced the following documents of note:

- Ason Group, *Transport Management and Accessibility Plan Addendum, Ivanhoe Estate Redevelopment, Macquarie Park SSD 8707* dated 13/09/2018 (TMAP Addendum); and
- ARUP / Department of Planning and Environment, *Peer Review of Addendum Transport Report, Ivanhoe Estate*, dated 5/07/2019 (TMAP Peer Review Addendum).

Council RRTS as exhibited November 2019: Issue 9

Slip lane from Epping Road (entry only)

The deletion of the slip lane may have adverse traffic implications. However, it does result in the protection of additional trees. Re-distribution of traffic due to the removal of the slip lane must be considered. Whilst the Technical Note dated 9/10/19 provided the intersection results for with and without the Epping Road slip lane option, detailed intersection results must be provided.

The 100% concept design for the Stage 2 - Bus Priority and Capacity Improvements Project indicated that the right turn bay storage on Herring Road at Ivanhoe Place intersection will be approximately 20-25m in length, which could accommodate about 4 vehicles. Information provided on the Technical Note dated

9/10/19 is not sufficient to determine whether the right turn bay has sufficient capacity to accommodate the right turn demand without impacting on the through lane. Given that Herring Road /Ivanhoe Place intersection will be the main access for the precinct, this issue must be resolved prior to determination of the development.

Ason Group Response to Issue 9

Analysis of the network to determine the merit and impact of the left in only slip lane from Epping Road to the Site has been an ongoing, consultative and collaborative approach with stakeholders, including TfNSW (previously RMS) and Council. The initial decision to include the left-in slip lane has meant that all of the modelling results previously submitted to Council have included it. The results of the Aimsun and SIDRA modelling are provided in the original TMAP as well as the TMAP Addendum and copies of both have been provided to Council.

Since the decision to remove the left-in slip lane, a SIDRA analysis has been undertaken of the network shown in **Figure 1** to examine the future operation of the key intersections within the study area following redistribution of traffic.

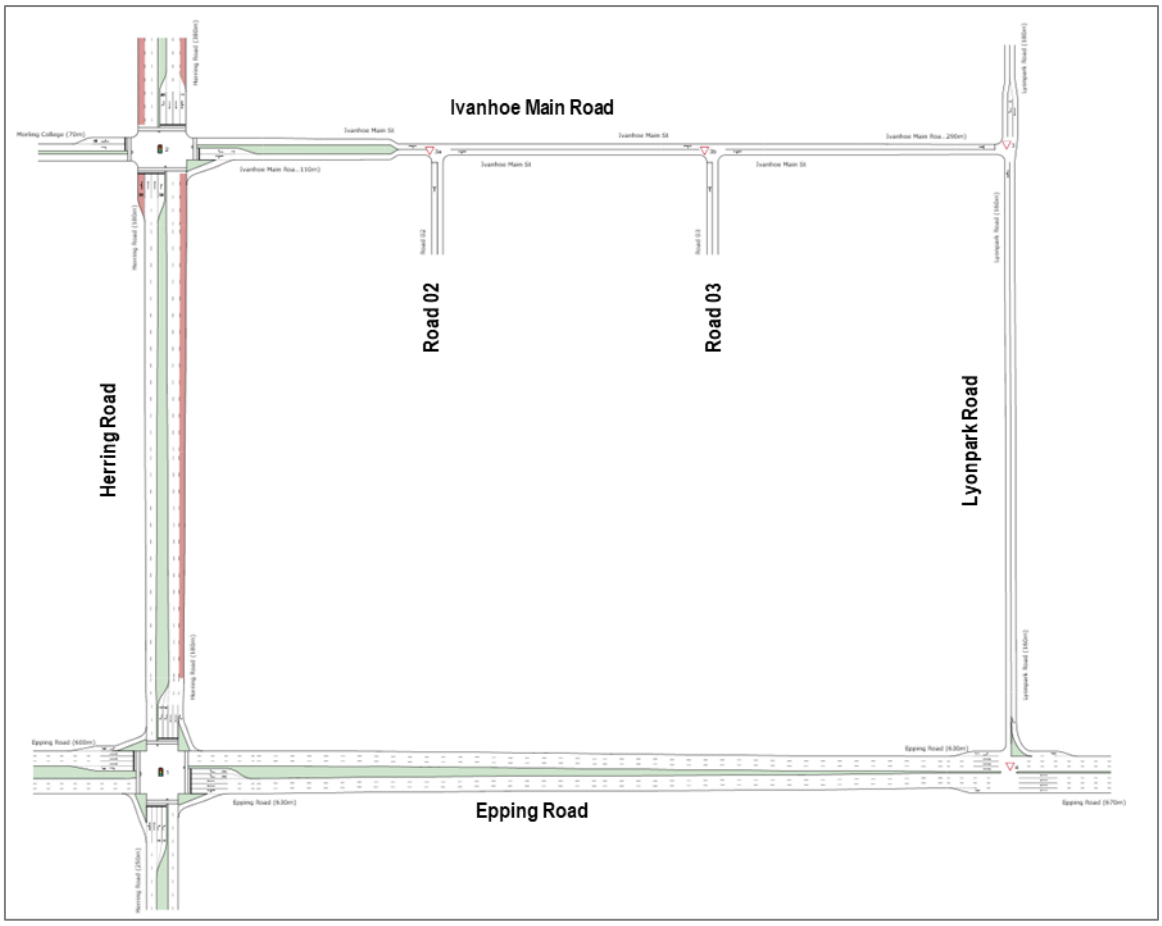


Figure 1: SIDRA Network without left-in access at Epping Road

SIDRA Assessment Parameters

For detailed assessment of intersection performance, the key modelling parameters are:

- **Delay:** Average vehicle delay in seconds.
- **LoS:** Level of Service, an indication of critical Delay in any intersection.
- **DoS:** Degree of Saturation — ratio of volumes by capacity.
- **Queue:** refers to average queue.
- **QSR:** Queue Storage Ratio — proportion of the longest queue length to corresponding approach length, which provides an indication of queue storage capacity of that approach (for example, a QSR of 0.5 means the length of the longest Queue is equal to the 50% of approach length, whereas a QSR of 1.0 indicates the back of longest Queue reaches the upstream intersection). It should be noted that short lanes are not included in determining Queue Storage Ratios.

SIDRA Modelling Results

The 2021 Base plus Development plus Upgrades SIDRA network modelling results are shown in **Table 1**.

Table 1: SIDRA Results 2021 Base plus Development plus Upgrades

Intersection	Peak	LoS	DoS	Approach with longest Queue	Queue Storage Ratio (QSR)
Epping Rd x Herring Rd	AM	F	1.04	West	0.59
	PM	F	0.97	East	0.36
Herring Rd x Ivanhoe Main	AM	B	0.67	South	0..66
	PM	D	0.92	North	0.46
Ivanhoe Main x Rd 02	AM	A	0.33	South	0.04
	PM	A	0.44	East	0.39
Ivanhoe Main x Rd 03	AM	A	0.35	South	0.04
	PM	A	0.48	West	0.03
Ivanhoe Main x Lyonpark Rd	AM	A	0.72	West	0.06
	PM	A	0.57	North	0.12
Lyonpark Rd x Epping Rd	AM	A	0.34	-	0.00
	PM	A	0.66	-	0.00

As shown above, with the exception of Epping Road x Herring Road, all other intersections would operate with acceptable LoS in each peak. The QSR values indicate that average queue length would not spill back to any upstream intersections.

The 2031 Base plus Development plus Upgrades SIDRA network modelling results are shown in **Table 2**.

Table 2: SIDRA Results 2031 Base plus Development plus Upgrades

Intersection	Peak	LoS	DoS	Approach with longest Queue	Queue Storage Ratio
Epping Rd x Herring Rd	AM	F	1.04	West	0.63
	PM	F	0.95	East	0.36
Herring Rd x Ivanhoe Main	AM	B	0.68	South	0.81
	PM	D	0.96	North	0.57
Ivanhoe Main x Rd 02	AM	A	0.37	South	0.05
	PM	A	0.51	South	0.03
Ivanhoe Main x Rd 03	AM	A	0.40	South	0.05
	PM	B	0.55	West	0.04
Ivanhoe Main x Lyonpark Rd	AM	B	0.84	West	0.09
	PM	B	0.65	North	0.12
Lyonpark Rd x Epping Rd	AM	A	0.35	-	0.00
	PM	A	0.74	-	0.00

The results indicate marginally higher delays and longer queues in each intersection. Generally, each intersection would continue to perform with LoS similar to 2021.

Detailed SIDRA modelling results for all scenarios are appended in **Attachment A**.

It should be noted that the analysis demonstrates that an approximately 20-25 metre right turn storage bay from Herring Road to Ivanhoe Place—accommodating approximately 4 vehicles—as specified in the 100% concept design for the Stage 2 - Bus Priority and Capacity Improvements Project, would not be sufficient. However, all of the modelling to date for the Proposal has used a 35 metre right turn lane as advised by RMS and provided in their Aimsun model.

Further, the maximum queue forecast for the 2031 scenario of 60 metres does not spill back to the Epping Road intersection. However, it is expected that further analysis will be conducted by TfNSW during the design phases of the signalised intersection using updated survey data to more accurately determine the required storage with consideration of the many recent network changes.

Finally, we trust the above information provides clarification and a greater appreciation of the issues identified in the RRTS. As always, please do not hesitate to contact the undersigned should you require any further information.

Yours sincerely,

Dan Budai
Senior Traffic Engineer – Ason Group
Email: dan.budai@asongroup.com.au

Attachment A: SIDRA Results

Attachment A

SIDRA Results

MOVEMENT SUMMARY

Site: 1 [AM_ Epping-Herring_ s1_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Epping Road x Herring Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (250m)														
1	L2	14	0.0	14	0.0	1.027	109.8	LOS F	17.9	127.6	1.00	1.19	1.64	16.5
2	T1	699	2.6	699	2.6	1.027	116.6	LOS F	24.1	172.2	1.00	1.25	1.63	6.6
3	R2	291	1.4	291	1.4	0.480	61.4	LOS E	5.6	40.0	0.92	0.79	0.92	12.6
Approach		1003	2.2	1003	2.2	1.027	100.5	LOS F	24.1	172.2	0.98	1.12	1.42	7.8
East: Epping Road (630m)														
4	L2	97	2.2	97	2.2	0.430	35.3	LOS C	10.4	74.0	0.73	0.70	0.84	40.5
5	T1	988	1.6	988	1.6	0.430	29.8	LOS C	10.9	77.4	0.74	0.66	0.76	47.6
6	R2	379	3.6	379	3.6	0.993	121.0	LOS F	12.0	86.4	1.00	1.08	1.61	15.2
Approach		1464	2.2	1464	2.2	0.993	53.8	LOS D	12.0	86.4	0.80	0.77	0.99	35.4
North: Herring Road (180m)														
7	L2	69	18.2	69	18.2	0.089	21.2	LOS B	1.1	8.8	0.41	0.64	0.41	22.0
8	T1	288	4.4	288	4.4	0.501	62.0	LOS E	6.4	46.8	0.93	0.75	0.93	18.4
9	R2	196	1.6	196	1.6	0.351	76.6	LOS F	4.4	30.9	1.00	0.79	1.00	23.7
Approach		554	5.1	554	5.1	0.501	62.1	LOS E	6.4	46.8	0.89	0.75	0.89	21.0
West: Epping Road (600m)														
10	L2	580	1.5	580	1.5	0.592	25.4	LOS B	11.6	82.4	0.65	0.88	0.90	39.1
11	T1	2055	1.7	2055	1.7	1.040	126.1	LOS F	50.1	355.8	1.00	1.36	1.57	14.0
12	R2	20	0.0	20	0.0	0.272	86.0	LOS F	0.9	6.4	1.00	0.70	1.00	23.4
Approach		2655	1.7	2655	1.7	1.040	103.8	LOS F	50.1	355.8	0.92	1.25	1.42	16.4
All Vehicles		5676	2.2	5676	2.2	1.040	86.2	LOS F	50.1	355.8	0.90	1.05	1.26	19.4

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	32.3	LOS D	0.1	0.1	0.66	0.66
P2	East Full Crossing	53	68.8	LOS F	0.2	0.2	0.96	0.96
P3	North Full Crossing	53	40.0	LOS D	0.2	0.2	0.73	0.73
P4	West Full Crossing	53	65.0	LOS F	0.2	0.2	0.93	0.93
All Pedestrians		211	51.5	LOS E			0.82	0.82

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: 1 [PM_ Epping-Herring_ s1_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Epping Road x Herring Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (250m)														
1	L2	21	0.0	21	0.0	0.939	120.8	LOS F	15.4	110.2	1.00	1.16	2.03	19.1
2	T1	573	2.6	573	2.6	0.939	98.2	LOS F	17.9	127.8	1.00	1.12	1.63	8.7
3	R2	188	1.1	188	1.1	0.267	60.6	LOS E	3.6	25.2	0.89	0.77	0.89	12.8
Approach		782	2.2	782	2.2	0.939	89.7	LOS F	17.9	127.8	0.97	1.04	1.46	9.8
East: Epping Road (630m)														
4	L2	280	1.1	280	1.1	0.945	83.4	LOS F	31.8	224.7	1.00	1.11	1.56	25.1
5	T1	1539	1.2	1539	1.2	0.945	76.2	LOS F	32.3	228.1	1.00	1.10	1.32	31.9
6	R2	464	2.5	464	2.5	0.771	71.8	LOS F	11.8	84.7	1.00	0.88	1.09	22.3
Approach		2283	1.4	2283	1.4	0.945	76.2	LOS F	32.3	228.1	1.00	1.06	1.30	29.6
North: Herring Road (180m)														
7	L2	277	4.6	277	4.6	0.240	9.8	LOS A	2.2	16.3	0.23	0.62	0.23	33.3
8	T1	749	1.8	749	1.8	0.949	88.2	LOS F	20.6	146.3	1.00	1.13	1.35	14.2
9	R2	536	1.0	536	1.0	0.709	79.3	LOS F	12.0	84.5	1.00	0.85	1.01	23.2
Approach		1562	2.0	1562	2.0	0.949	71.3	LOS F	20.6	146.3	0.86	0.94	1.03	18.7
West: Epping Road (600m)														
10	L2	323	1.0	323	1.0	0.417	22.2	LOS B	7.2	51.0	0.58	0.77	0.63	41.4
11	T1	1038	1.0	1038	1.0	0.751	57.2	LOS E	14.5	102.1	0.99	0.87	1.01	25.2
12	R2	177	1.2	177	1.2	0.969	109.5	LOS F	9.9	70.0	1.00	1.03	1.54	19.9
Approach		1538	1.0	1538	1.0	0.969	55.9	LOS D	14.5	102.1	0.90	0.87	0.99	26.2
All Vehicles		6165	1.6	6165	1.6	0.969	71.6	LOS F	32.3	228.1	0.94	0.98	1.18	23.9

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	43.7	LOS E	0.2	0.2	0.77	0.77
P2	East Full Crossing	53	64.0	LOS F	0.2	0.2	0.93	0.93
P3	North Full Crossing	53	55.1	LOS E	0.2	0.2	0.86	0.86
P4	West Full Crossing	53	65.9	LOS F	0.2	0.2	0.94	0.94
All Pedestrians		211	57.2	LOS E			0.87	0.87

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.

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

MOVEMENT SUMMARY

Site: 2 [AM_ Herring-Ivanhoe_ s1_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Herring Road x Ivanhoe Place
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (180m)														
1	L2	1	0.0	1	0.0	0.017	7.3	LOS A	0.0	0.3	0.05	0.06	0.05	21.9
2	T1	1315	2.3	1303	2.3	0.677	13.3	LOS A	16.9	119.6	0.45	0.41	0.45	43.4
3	R2	262	1.2	260	1.2	0.327	17.4	LOS B	3.4	24.0	0.32	0.65	0.32	24.6
Approach		1578	2.1	1564 N1	2.1	0.677	14.0	LOS A	16.9	119.6	0.43	0.45	0.43	41.3
East: Ivanhoe Main Road (110m)														
4	L2	346	1.8	346	1.8	0.301	8.1	LOS A	4.8	34.2	0.45	0.52	0.45	20.0
5	T1	8	0.0	8	0.0	0.301	6.6	LOS A	4.8	34.2	0.45	0.52	0.45	21.5
6	R2	121	0.9	121	0.9	0.645	73.3	LOS F	5.4	37.9	1.00	0.82	1.03	16.4
Approach		476	1.5	476	1.5	0.645	24.6	LOS B	5.4	37.9	0.59	0.59	0.59	17.8
North: Herring Road (380m)														
7	L2	81	1.3	81	1.3	0.342	70.4	LOS E	2.5	17.4	0.96	0.77	0.96	15.1
8	T1	189	7.8	189	7.8	0.319	60.8	LOS E	3.8	28.2	0.93	0.74	0.93	16.8
9	R2	16	0.0	16	0.0	0.204	84.3	LOS F	0.7	5.0	1.00	0.69	1.00	14.8
Approach		286	5.5	286	5.5	0.342	64.8	LOS E	3.8	28.2	0.94	0.74	0.94	16.2
West: Morling College (70m)														
10	L2	6	0.0	6	0.0	0.050	58.3	LOS E	0.6	4.3	0.86	0.68	0.86	19.2
11	T1	11	0.0	11	0.0	0.050	57.3	LOS E	0.6	4.3	0.86	0.68	0.86	5.3
12	R2	13	0.0	13	0.0	0.065	70.3	LOS E	0.5	3.6	0.93	0.68	0.93	4.4
Approach		29	0.0	29	0.0	0.065	63.1	LOS E	0.6	4.3	0.89	0.68	0.89	8.4
All Vehicles		2369	2.4	2356 N1	2.4	0.677	22.9	LOS B	16.9	119.6	0.53	0.52	0.53	31.0

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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	68.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	62.2	LOS F	0.2	0.2	0.91	0.91
P3	North Full Crossing	53	68.8	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	22.1	LOS C	0.1	0.1	0.54	0.54
All Pedestrians		211	55.5	LOS E			0.85	0.85

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: 2 [PM_ Herring-Ivanhoe_ s1_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Herring Road x Ivanhoe Place
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (180m)														
1	L2	1	0.0	1	0.0	0.017	7.9	LOS A	0.0	0.4	0.07	0.08	0.07	21.6
2	T1	1016	2.1	1015	2.1	0.466	7.0	LOS A	6.7	47.3	0.25	0.23	0.25	49.9
3	R2	179	1.2	179	1.2	0.916	64.7	LOS E	7.1	50.2	0.81	0.88	1.06	9.4
Approach		1196	1.9	1195 N1	1.9	0.916	15.6	LOS B	7.1	50.2	0.34	0.33	0.38	40.0
East: Ivanhoe Place (110m)														
4	L2	608	1.0	608	1.0	0.885	47.7	LOS D	15.6	110.0	0.90	0.93	1.01	7.6
5	T1	8	0.0	8	0.0	0.885	46.2	LOS D	15.6	110.0	0.90	0.93	1.01	9.9
6	R2	175	1.2	175	1.2	0.885	81.2	LOS F	15.6	110.0	0.99	1.06	1.29	15.3
Approach		792	1.1	792	1.1	0.885	55.0	LOS D	15.6	110.0	0.92	0.96	1.07	10.3
North: Herring Road (380m)														
7	L2	7	0.0	7	0.0	0.037	36.6	LOS C	0.5	5.6	0.66	0.54	0.66	25.0
8	T1	944	2.1	944	2.1	0.922	70.6	LOS F	24.7	174.0	1.00	1.09	1.24	15.1
9	R2	35	0.0	35	0.0	0.448	85.9	LOS F	1.6	11.3	1.00	0.72	1.00	14.6
Approach		986	2.0	986	2.0	0.922	70.9	LOS F	24.7	174.0	0.99	1.07	1.23	15.1
West: Morling College (70m)														
10	L2	21	0.0	21	0.0	0.056	53.1	LOS D	0.8	5.6	0.82	0.69	0.82	20.1
11	T1	2	0.0	2	0.0	0.056	52.1	LOS D	0.8	5.6	0.82	0.69	0.82	5.3
12	R2	8	0.0	8	0.0	0.133	82.7	LOS F	0.4	2.7	0.99	0.67	0.99	3.8
Approach		32	0.0	32	0.0	0.133	61.0	LOS E	0.8	5.6	0.86	0.69	0.86	14.7
All Vehicles		3005	1.7	3004 N1	1.7	0.922	44.6	LOS D	24.7	174.0	0.71	0.74	0.84	20.3

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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	65.9	LOS F	0.2	0.2	0.94	0.94
P2	East Full Crossing	53	36.4	LOS D	0.2	0.2	0.70	0.70
P3	North Full Crossing	53	68.8	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	21.5	LOS C	0.1	0.1	0.54	0.54
All Pedestrians		211	48.1	LOS E			0.79	0.79

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: 3 [AM_ Lyonpark-Ivanhoe_ s1_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Three Leg Priority Controlled
Giveway / Yield (Two-Way)

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: Lyonpark Road (160m)														
1	L2	17	0.0	16	0.0	0.234	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	49.3
2	T1	443	1.4	429	1.4	0.234	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		460	1.4	445 N1	1.4	0.234	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.6
North: Lyonpark Road (180m)														
8	T1	257	1.6	257	1.6	0.136	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	433	1.5	433	1.5	0.380	7.3	LOS A	0.9	6.6	0.58	0.79	0.68	32.6
Approach		689	1.5	689	1.5	0.380	4.6	NA	0.9	6.6	0.36	0.50	0.42	37.5
West: Ivanhoe Main Road (290m)														
10	L2	193	1.6	191	1.6	0.716	7.7	LOS A	2.4	16.9	0.74	1.31	1.59	28.8
12	R2	389	1.6	387	1.6	0.716	11.6	LOS A	2.4	16.9	0.74	1.31	1.59	23.3
Approach		582	1.6	578 N1	1.6	0.716	10.3	LOS A	2.4	16.9	0.74	1.31	1.59	25.5
All Vehicles		1732	1.5	1713 N1	1.5	0.716	5.4	NA	2.4	16.9	0.40	0.65	0.71	33.3

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [PM_ Lyonpark-Ivanhoe_ s1_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Three Leg Priority Controlled
Giveway / Yield (Two-Way)

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: Lyonpark Road (160m)														
1	L2	122	0.9	122	0.9	0.147	4.6	LOS A	0.0	0.0	0.00	0.24	0.00	43.0
2	T1	153	0.7	153	0.7	0.147	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	46.3
Approach		275	0.8	275	0.8	0.147	2.0	NA	0.0	0.0	0.00	0.24	0.00	45.3
North: Lyonpark Road (180m)														
8	T1	604	1.0	604	1.0	0.320	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
9	R2	793	1.1	793	1.1	0.572	7.2	LOS A	2.4	17.0	0.56	0.74	0.73	32.7
Approach		1397	1.1	1397	1.1	0.572	4.1	NA	2.4	17.0	0.32	0.42	0.42	38.5
West: Ivanhoe Main Road (290m)														
10	L2	40	0.0	40	0.0	0.372	3.8	LOS A	0.6	4.2	0.58	0.77	0.75	28.5
12	R2	137	0.8	137	0.8	0.372	13.0	LOS A	0.6	4.2	0.58	0.77	0.75	23.0
Approach		177	0.6	177	0.6	0.372	11.0	LOS A	0.6	4.2	0.58	0.77	0.75	24.5
All Vehicles		1848	1.0	1848	1.0	0.572	4.5	NA	2.4	17.0	0.30	0.43	0.39	36.4

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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 SUMMARY

Site: 3a [AM_ Ivanhoe Main x Road 02_ s1_ no Left-In_ opt1]

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 02														
1	L2	67	0.0	67	0.0	0.331	4.2	LOS A	0.6	4.0	0.58	0.78	0.70	19.9
3	R2	157	0.0	157	0.0	0.331	7.9	LOS A	0.6	4.0	0.58	0.78	0.70	19.9
Approach		224	0.0	224	0.0	0.331	6.8	LOS A	0.6	4.0	0.58	0.78	0.70	19.9
East: Ivanhoe Main St														
4	L2	98	0.0	98	0.0	0.263	2.0	LOS A	0.0	0.0	0.00	0.06	0.00	31.3
5	T1	408	0.8	408	0.8	0.263	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	29.2
Approach		506	0.6	506	0.6	0.263	0.4	NA	0.0	0.0	0.00	0.06	0.00	29.8
West: Ivanhoe Main St														
11	T1	312	0.7	310	0.7	0.200	0.5	LOS A	0.2	1.2	0.15	0.06	0.15	28.0
12	R2	42	0.0	42	0.0	0.200	4.8	LOS A	0.2	1.2	0.15	0.06	0.15	29.6
Approach		354	0.6	352[N1]	0.6	0.200	1.0	NA	0.2	1.2	0.15	0.06	0.15	28.3
All Vehicles		1084	0.5	1082[N1]	0.5	0.331	1.9	NA	0.6	4.0	0.17	0.21	0.19	27.0

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3a [PM_ Ivanhoe Main x Road 02_ s1_ no Left-In_ opt1]

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 02														
1	L2	47	0.0	47	0.0	0.307	6.5	LOS A	0.3	2.3	0.67	0.85	0.79	18.3
3	R2	66	0.0	66	0.0	0.307	10.1	LOS A	0.3	2.3	0.67	0.85	0.79	18.3
Approach		114	0.0	114	0.0	0.307	8.6	LOS A	0.3	2.3	0.67	0.85	0.79	18.3
East: Ivanhoe Main St														
4	L2	136	0.0	136	0.0	0.442	2.0	LOS A	6.2	43.4	0.00	0.05	0.00	31.4
5	T1	717	0.4	717	0.4	0.442	0.0	LOS A	6.2	43.4	0.00	0.05	0.00	29.3
Approach		853	0.4	853	0.4	0.442	0.3	NA	6.2	43.4	0.00	0.05	0.00	29.8
West: Ivanhoe Main St														
11	T1	131	0.8	130	0.8	0.159	3.5	LOS A	0.3	2.1	0.54	0.22	0.54	22.5
12	R2	58	0.0	58	0.0	0.159	7.8	LOS A	0.3	2.1	0.54	0.22	0.54	25.9
Approach		188	0.6	188	0.6	0.159	4.8	NA	0.3	2.1	0.54	0.22	0.54	23.9
All Vehicles		1155	0.4	1154[N1]	0.4	0.442	1.9	NA	6.2	43.4	0.15	0.16	0.17	27.2

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3b [AM_ Ivanhoe Main x Road 03_ s1_ no Left-In_ opt1]

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 03														
1	L2	67	0.0	67	0.0	0.354	4.0	LOS A	0.6	4.3	0.58	0.79	0.73	19.3
3	R2	157	0.0	157	0.0	0.354	8.9	LOS A	0.6	4.3	0.58	0.79	0.73	19.3
Approach		224	0.0	224	0.0	0.354	7.5	LOS A	0.6	4.3	0.58	0.79	0.73	19.3
East: Ivanhoe Main St														
4	L2	98	0.0	98	0.0	0.228	2.0	LOS A	0.0	0.0	0.00	0.07	0.00	30.7
5	T1	341	0.9	341	0.9	0.228	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	29.6
Approach		439	0.7	438 N1	0.7	0.228	0.5	NA	0.0	0.0	0.00	0.07	0.00	29.9
West: Ivanhoe Main St														
11	T1	426	0.5	424	0.5	0.255	0.3	LOS A	0.2	1.3	0.13	0.04	0.13	28.6
12	R2	42	0.0	42	0.0	0.255	4.5	LOS A	0.2	1.3	0.13	0.04	0.13	29.9
Approach		468	0.4	466 N1	0.4	0.255	0.7	NA	0.2	1.3	0.13	0.04	0.13	28.8
All Vehicles		1132	0.5	1129 N1	0.5	0.354	1.9	NA	0.6	4.3	0.17	0.20	0.20	27.9

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3b [PM_ Ivanhoe Main x Road 03_ s1_ no Left-In_ opt1]

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 03														
1	L2	47	0.0	47	0.0	0.272	7.3	LOS A	0.4	2.6	0.75	0.89	0.86	17.1
3	R2	66	0.0	66	0.0	0.272	12.3	LOS A	0.4	2.6	0.75	0.89	0.86	17.1
Approach		114	0.0	114	0.0	0.272	10.3	LOS A	0.4	2.6	0.75	0.89	0.86	17.1
East: Ivanhoe Main St														
4	L2	136	0.0	136	0.0	0.487	2.0	LOS A	0.0	0.0	0.00	0.05	0.00	30.7
5	T1	805	0.4	805	0.4	0.487	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	29.7
Approach		941	0.3	941	0.3	0.487	0.3	NA	0.0	0.0	0.00	0.05	0.00	29.9
West: Ivanhoe Main St														
11	T1	139	0.8	139	0.8	0.181	4.5	LOS A	0.4	3.0	0.59	0.22	0.59	21.3
12	R2	58	0.0	58	0.0	0.181	9.2	LOS A	0.4	3.0	0.59	0.22	0.59	25.0
Approach		197	0.5	197	0.5	0.181	5.9	NA	0.4	3.0	0.59	0.22	0.59	22.7
All Vehicles		1252	0.3	1252	0.3	0.487	2.1	NA	0.4	3.0	0.16	0.15	0.17	28.3

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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 SUMMARY

Site: 4 [AM_ Epping-Lyonpark_ s1_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Epping Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Left In - Left Out
Giveway / Yield (Two-Way)

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
East: Epping Road (670m)														
5	T1	1549	2.0	1549	2.0	0.204	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1549	2.0	1549	2.0	0.204	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
North: Lyonpark Road (160m)														
7	L2	397	1.3	397	1.3	0.219	4.4	LOS A	0.0	0.0	0.00	0.47	0.00	47.4
Approach		397	1.3	397	1.3	0.219	4.4	NA	0.0	0.0	0.00	0.47	0.00	47.4
West: Epping Road (630m)														
10	L2	636	1.5	615	1.5	0.340	6.4	LOS A	0.0	0.0	0.00	0.61	0.00	58.7
11	T1	1711	2.5	1656	2.5	0.292	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		2346	2.2	2271[N1]	2.2	0.340	1.8	NA	0.0	0.0	0.00	0.16	0.00	67.9
All Vehicles		4293	2.1	4217[N1]	2.1	0.340	1.4	NA	0.0	0.0	0.00	0.13	0.00	65.9

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [PM_ Epping-Lyonpark_ s1_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Epping Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Left In - Left Out
Giveway / Yield (Two-Way)

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
East: Epping Road (670m)														
5	T1	2303	1.5	2303	1.5	0.303	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		2303	1.5	2303	1.5	0.303	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
North: Lyonpark Road (160m)														
7	L2	1204	1.0	1204	1.0	0.663	4.4	LOS A	0.0	0.0	0.00	0.47	0.00	47.3
Approach		1204	1.0	1204	1.0	0.663	4.4	NA	0.0	0.0	0.00	0.47	0.00	47.3
West: Epping Road (630m)														
10	L2	129	0.8	129	0.8	0.071	6.4	LOS A	0.0	0.0	0.00	0.61	0.00	58.7
11	T1	1333	1.7	1333	1.7	0.234	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1462	1.6	1462	1.6	0.234	0.6	NA	0.0	0.0	0.00	0.05	0.00	69.3
All Vehicles		4969	1.4	4969	1.4	0.663	1.3	NA	0.0	0.0	0.00	0.13	0.00	62.7

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

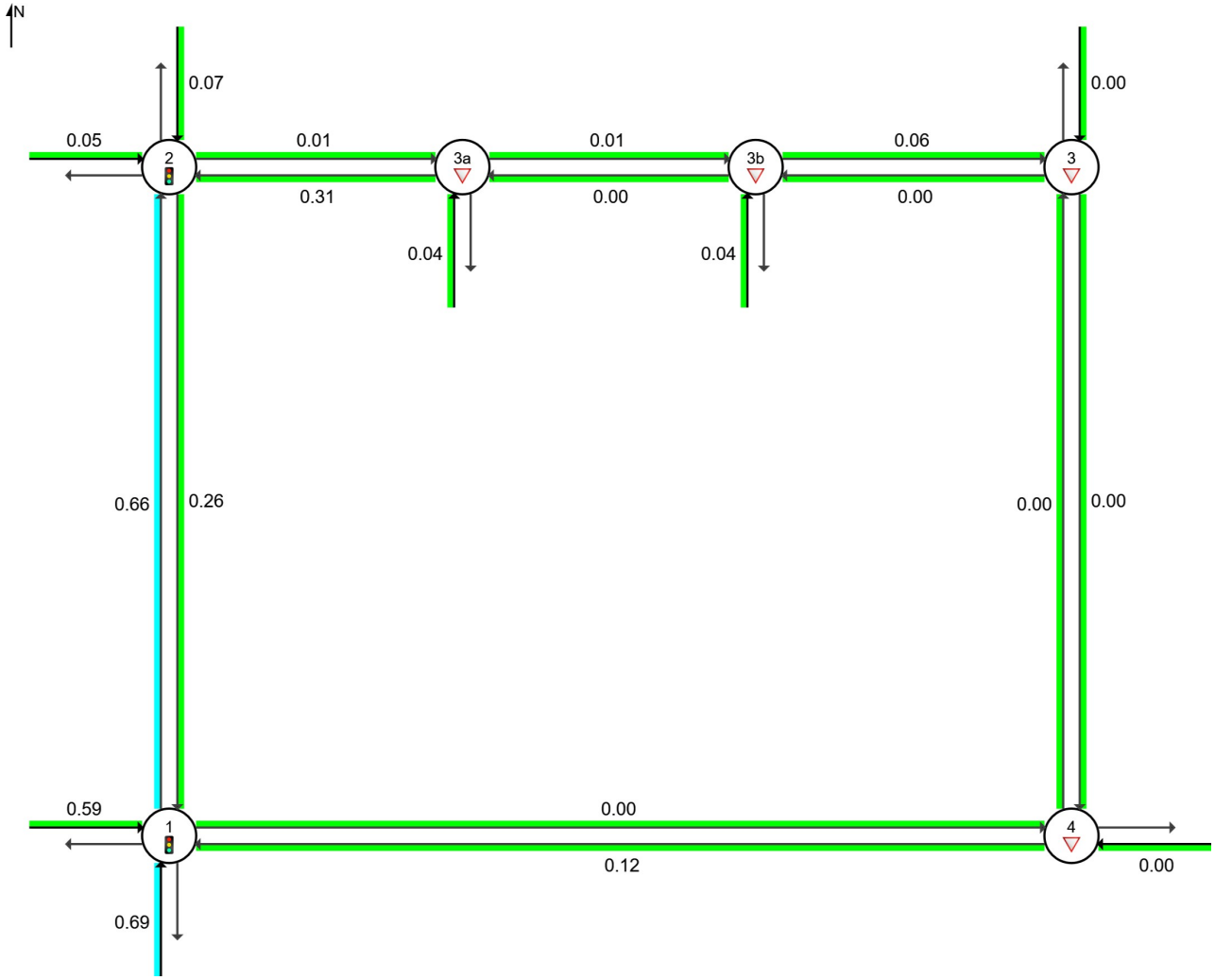
QUEUE STORAGE RATIO (PERCENTILE)

Ratio of the Aver. Back of Queue Distance to the available queue storage distance (worst lane for the approach)

Network: N1 [AM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Estate
Network Category: Coordinated
Network Cycle Time = 149 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio

[< 0.6]	[0.6 – 0.7]	[0.7 – 0.8]	[0.8 – 0.9]	[0.9 – 1.0]	[> 1.0]

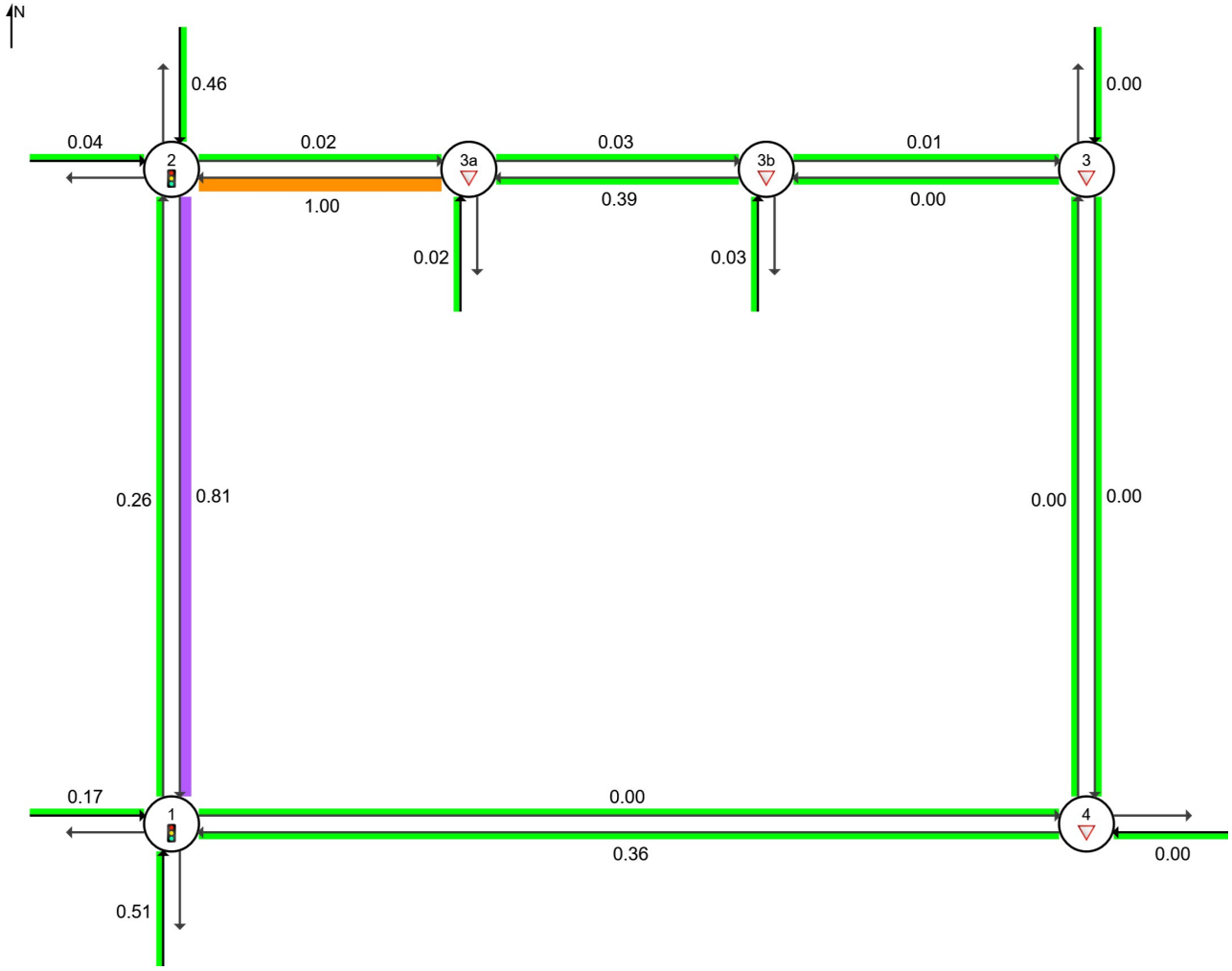
QUEUE STORAGE RATIO (AVERAGE)

Ratio of the Average Back of Queue Distance to the available queue storage distance (worst lane for the approach)

Network: N1 [PM_ Ivanhoe_ s1_no Left-In_opt1]

Ivanhoe Estate
Network Category: Coordinated
Network Cycle Time = 149 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio

[< 0.6]	[0.6 – 0.7]	[0.7 – 0.8]	[0.8 – 0.9]	[0.9 – 1.0]	[> 1.0]

MOVEMENT SUMMARY

Site: 1 [AM_ Epping-Herring_ s2_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Epping Road x Herring Road
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (250m)														
1	L2	15	0.0	15	0.0	1.025	110.6	LOS F	17.4	124.4	1.00	1.19	1.65	16.3
2	T1	739	2.4	739	2.4	1.025	116.6	LOS F	28.0	200.0	1.00	1.27	1.62	6.6
3	R2	308	1.4	308	1.4	0.885	86.6	LOS F	7.5	53.2	1.00	0.97	1.35	9.5
Approach		1062	2.1	1062	2.1	1.025	107.8	LOS F	28.0	200.0	1.00	1.18	1.54	7.4
East: Epping Road (630m)														
4	L2	107	2.0	107	2.0	0.449	36.7	LOS C	11.3	80.0	0.71	0.71	1.00	39.9
5	T1	1097	1.5	1097	1.5	0.449	28.6	LOS C	11.8	83.5	0.72	0.66	0.80	48.3
6	R2	418	3.5	418	3.5	1.033	143.0	LOS F	16.2	116.8	1.00	1.14	1.74	13.2
Approach		1622	2.1	1622	2.1	1.033	58.6	LOS E	16.2	116.8	0.79	0.78	1.05	33.8
North: Herring Road (180m)														
7	L2	88	15.5	88	15.5	0.117	28.6	LOS C	2.3	18.1	0.63	0.69	0.63	18.0
8	T1	355	3.9	355	3.9	0.504	58.4	LOS E	7.9	56.9	0.91	0.75	0.91	19.2
9	R2	239	1.8	239	1.8	0.896	92.8	LOS F	5.8	41.4	1.00	0.90	1.24	20.9
Approach		682	4.6	682	4.6	0.896	66.6	LOS E	7.9	56.9	0.91	0.80	0.99	20.0
West: Epping Road (600m)														
10	L2	602	1.4	602	1.4	0.866	48.2	LOS D	22.9	162.3	0.93	1.03	1.36	28.0
11	T1	2137	1.7	2137	1.7	1.041	126.1	LOS F	53.2	377.7	1.00	1.36	1.57	14.0
12	R2	21	0.0	21	0.0	0.214	82.6	LOS F	0.9	6.6	0.99	0.71	0.99	24.0
Approach		2760	1.6	2760	1.6	1.041	108.8	LOS F	53.2	377.7	0.98	1.28	1.52	15.8
All Vehicles		6126	2.2	6126	2.2	1.041	90.6	LOS F	53.2	377.7	0.93	1.08	1.34	18.8

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	29.7	LOS C	0.1	0.1	0.63	0.63
P2	East Full Crossing	53	66.9	LOS F	0.2	0.2	0.95	0.95
P3	North Full Crossing	53	37.8	LOS D	0.2	0.2	0.71	0.71
P4	West Full Crossing	53	59.5	LOS E	0.2	0.2	0.89	0.89
All Pedestrians		211	48.5	LOS E			0.80	0.80

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: 1 [PM_ Epping-Herring_ s2_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Epping Road x Herring Road
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (250m)														
1	L2	24	0.0	24	0.0	0.942	120.7	LOS F	19.2	136.4	1.00	1.17	2.02	19.2
2	T1	638	2.1	638	2.1	0.942	99.2	LOS F	19.2	136.4	1.00	1.14	1.65	8.6
3	R2	212	1.0	212	1.0	0.887	92.7	LOS F	5.3	37.3	1.00	0.96	1.40	9.0
Approach		874	1.8	874	1.8	0.942	98.2	LOS F	19.2	136.4	1.00	1.10	1.60	9.1
East: Epping Road (630m)														
4	L2	277	1.1	277	1.1	0.945	85.9	LOS F	32.1	226.6	1.00	1.13	1.68	24.7
5	T1	1523	1.1	1523	1.1	0.945	77.0	LOS F	32.1	226.6	1.00	1.11	1.35	31.8
6	R2	460	2.7	460	2.7	0.913	91.6	LOS F	12.9	92.8	1.00	0.98	1.34	18.8
Approach		2260	1.4	2260	1.4	0.945	81.1	LOS F	32.1	226.6	1.00	1.08	1.39	28.5
North: Herring Road (180m)														
7	L2	299	4.2	299	4.2	0.271	9.4	LOS A	2.1	15.5	0.18	0.61	0.18	33.9
8	T1	807	1.7	807	1.7	0.647	56.0	LOS D	17.7	125.7	0.94	0.82	0.94	19.7
9	R2	576	1.1	576	1.1	0.885	88.5	LOS F	13.7	97.0	1.00	0.91	1.13	21.6
Approach		1682	1.9	1682	1.9	0.885	58.8	LOS E	17.7	125.7	0.82	0.81	0.87	21.3
West: Epping Road (600m)														
10	L2	351	0.9	351	0.9	0.392	21.8	LOS B	7.4	52.2	0.56	0.78	0.64	41.7
11	T1	1137	1.0	1137	1.0	0.689	50.4	LOS D	14.9	105.3	0.95	0.83	0.95	27.2
12	R2	194	1.1	194	1.1	0.936	98.3	LOS F	10.2	72.4	1.00	0.99	1.43	21.4
Approach		1681	1.0	1681	1.0	0.936	50.0	LOS D	14.9	105.3	0.87	0.83	0.94	28.0
All Vehicles		6497	1.5	6497	1.5	0.945	69.6	LOS E	32.1	226.6	0.92	0.95	1.17	24.1

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	44.5	LOS E	0.2	0.2	0.77	0.77
P2	East Full Crossing	53	48.4	LOS E	0.2	0.2	0.81	0.81
P3	North Full Crossing	53	49.2	LOS E	0.2	0.2	0.81	0.81
P4	West Full Crossing	53	64.0	LOS F	0.2	0.2	0.93	0.93
All Pedestrians		211	51.5	LOS E			0.83	0.83

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: 2 [AM_ Herring-Ivanhoe_ s2_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Herring Road x Ivanhoe Place
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (180m)														
1	L2	1	0.0	1	0.0	0.017	9.6	LOS A	0.1	0.7	0.11	0.11	0.11	20.8
2	T1	1459	2.3	1450	2.3	0.682	13.6	LOS A	20.7	146.7	0.40	0.37	0.40	43.1
3	R2	283	1.1	282	1.1	0.372	18.7	LOS B	4.0	28.5	0.35	0.66	0.35	23.6
Approach		1743	2.1	1733[N1]	2.1	0.682	14.4	LOS A	20.7	146.7	0.39	0.42	0.39	40.9
East: Ivanhoe Main Road (110m)														
4	L2	417	1.5	417	1.5	0.349	7.4	LOS A	5.6	40.0	0.44	0.52	0.44	20.6
5	T1	8	0.0	8	0.0	0.349	5.9	LOS A	5.6	40.0	0.44	0.52	0.44	21.9
6	R2	128	0.8	128	0.8	0.684	74.1	LOS F	5.8	40.6	1.00	0.84	1.06	16.2
Approach		554	1.3	554	1.3	0.684	22.8	LOS B	5.8	40.6	0.57	0.59	0.58	18.0
North: Herring Road (380m)														
7	L2	103	1.0	103	1.0	0.375	67.9	LOS E	2.5	17.4	0.95	0.78	0.95	15.5
8	T1	244	6.5	244	6.5	0.372	58.6	LOS E	5.0	36.7	0.93	0.74	0.93	17.3
9	R2	16	0.0	16	0.0	0.204	84.3	LOS F	0.7	5.0	1.00	0.69	1.00	14.8
Approach		363	4.6	363	4.6	0.375	62.4	LOS E	5.0	36.7	0.94	0.75	0.94	16.6
West: Morling College (70m)														
10	L2	6	0.0	6	0.0	0.050	58.3	LOS E	0.6	4.3	0.86	0.68	0.86	19.2
11	T1	11	0.0	11	0.0	0.050	57.3	LOS E	0.6	4.3	0.86	0.68	0.86	5.3
12	R2	13	0.0	13	0.0	0.065	70.3	LOS E	0.5	3.6	0.93	0.68	0.93	4.4
Approach		29	0.0	29	0.0	0.065	63.1	LOS E	0.6	4.3	0.89	0.68	0.89	8.4
All Vehicles		2689	2.3	2679[N1]	2.3	0.684	23.2	LOS B	20.7	146.7	0.51	0.50	0.51	30.7

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.

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

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	68.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	59.5	LOS E	0.2	0.2	0.89	0.89
P3	North Full Crossing	53	68.8	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	22.1	LOS C	0.1	0.1	0.54	0.54
All Pedestrians		211	54.8	LOS E			0.84	0.84

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: 2 [PM_ Herring-Ivanhoe_ s2_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Herring Road x Ivanhoe Place
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Four Leg Signalised
Signals - Fixed Time Coordinated Cycle Time = 149 seconds (Network User-Given Cycle Time)

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: Herring Road (180m)														
1	L2	1	0.0	1	0.0	0.018	7.9	LOS A	0.0	0.4	0.06	0.07	0.06	21.6
2	T1	1351	1.8	1351	1.8	0.756	10.8	LOS A	18.0	127.4	0.44	0.40	0.44	45.7
3	R2	208	1.0	208	1.0	0.961	71.9	LOS F	8.6	60.8	0.75	0.91	1.10	8.6
Approach		1560	1.7	1560	1.7	0.961	19.0	LOS B	18.0	127.4	0.48	0.47	0.53	37.4
East: Ivanhoe Place (110m)														
4	L2	653	1.0	653	1.0	0.641	19.1	LOS B	15.6	110.0	0.72	0.77	0.79	13.7
5	T1	8	0.0	8	0.0	0.641	17.7	LOS B	15.6	110.0	0.72	0.77	0.79	16.2
6	R2	221	1.0	221	1.0	0.930	90.6	LOS F	11.6	81.6	1.00	1.15	1.39	14.2
Approach		882	1.0	882	1.0	0.930	37.0	LOS C	15.6	110.0	0.79	0.86	0.94	14.0
North: Herring Road (380m)														
7	L2	7	0.0	7	0.0	0.047	44.7	LOS D	0.6	6.3	0.74	0.58	0.74	21.9
8	T1	1020	2.2	1020	2.2	0.968	89.0	LOS F	30.8	217.5	1.00	1.16	1.35	12.7
9	R2	35	0.0	35	0.0	0.448	85.9	LOS F	1.6	11.3	1.00	0.72	1.00	14.6
Approach		1062	2.1	1062	2.1	0.968	88.6	LOS F	30.8	217.5	1.00	1.15	1.34	12.7
West: Morling College (70m)														
10	L2	21	0.0	21	0.0	0.056	53.1	LOS D	0.8	5.6	0.82	0.69	0.82	20.1
11	T1	2	0.0	2	0.0	0.056	52.1	LOS D	0.8	5.6	0.82	0.69	0.82	5.3
12	R2	8	0.0	8	0.0	0.040	66.0	LOS E	0.3	2.3	0.90	0.67	0.90	4.6
Approach		32	0.0	32	0.0	0.056	56.5	LOS E	0.8	5.6	0.84	0.69	0.84	15.5
All Vehicles		3536	1.6	3536	1.6	0.968	44.7	LOS D	30.8	217.5	0.72	0.77	0.88	20.7

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	68.8	LOS F	0.2	0.2	0.96	0.96
P2	East Full Crossing	53	44.5	LOS E	0.2	0.2	0.77	0.77
P3	North Full Crossing	53	68.8	LOS F	0.2	0.2	0.96	0.96
P4	West Full Crossing	53	24.3	LOS C	0.1	0.1	0.57	0.57
All Pedestrians		211	51.6	LOS E			0.82	0.82

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: 3 [AM_ Lyonpark-Ivanhoe _ s2_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Three Leg Priority Controlled
Giveway / Yield (Two-Way)

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: Lyonpark Road (160m)														
1	L2	19	0.0	19	0.0	0.265	4.6	LOS A	0.0	0.0	0.00	0.02	0.00	49.3
2	T1	494	1.3	484	1.3	0.265	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	49.6
Approach		513	1.2	503[N1]	1.2	0.265	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.6
North: Lyonpark Road (180m)														
8	T1	286	1.5	286	1.5	0.152	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	463	1.4	463	1.4	0.436	8.2	LOS A	1.2	8.4	0.63	0.88	0.82	31.3
Approach		749	1.4	749	1.4	0.436	5.1	NA	1.2	8.4	0.39	0.54	0.51	36.5
West: Ivanhoe Main Road (290m)														
10	L2	213	1.5	212	1.5	0.839	12.2	LOS A	3.7	26.0	0.84	1.82	2.50	26.6
12	R2	403	1.3	402	1.3	0.839	16.9	LOS B	3.7	26.0	0.84	1.82	2.50	21.1
Approach		616	1.4	614[N1]	1.4	0.839	15.3	LOS B	3.7	26.0	0.84	1.82	2.50	23.3
All Vehicles		1878	1.3	1867[N1]	1.4	0.839	7.1	NA	3.7	26.0	0.43	0.82	1.03	31.7

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3 [PM_ Lyonpark-Ivanhoe _ s2_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Three Leg Priority Controlled
Giveway / Yield (Two-Way)

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: Lyonpark Road (160m)														
1	L2	139	0.8	139	0.8	0.168	4.6	LOS A	0.0	0.0	0.00	0.24	0.00	43.0
2	T1	174	1.2	174	1.2	0.168	0.0	LOS A	0.0	0.0	0.00	0.24	0.00	46.3
Approach		313	1.0	313	1.0	0.168	2.0	NA	0.0	0.0	0.00	0.24	0.00	45.3
North: Lyonpark Road (180m)														
8	T1	685	1.1	685	1.1	0.361	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
9	R2	865	1.0	865	1.0	0.650	8.4	LOS A	3.3	23.4	0.64	0.85	0.97	31.0
Approach		1551	1.0	1551	1.0	0.650	4.7	NA	3.3	23.4	0.36	0.47	0.54	37.3
West: Ivanhoe Main Road (290m)														
10	L2	44	0.0	44	0.0	0.477	5.6	LOS A	0.8	5.6	0.65	0.87	0.95	26.8
12	R2	139	0.8	139	0.8	0.477	17.8	LOS B	0.8	5.6	0.65	0.87	0.95	21.3
Approach		183	0.6	183	0.6	0.477	14.8	LOS B	0.8	5.6	0.65	0.87	0.95	22.9
All Vehicles		2046	1.0	2046	1.0	0.650	5.2	NA	3.3	23.4	0.33	0.47	0.49	35.3

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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 SUMMARY

Site: 3a [AM_ Ivanhoe Main x Road 02_ s2_ no Left-In_ opt1]

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 02														
1	L2	67	0.0	67	0.0	0.370	4.9	LOS A	0.7	4.6	0.63	0.86	0.82	18.8
3	R2	157	0.0	157	0.0	0.370	9.4	LOS A	0.7	4.6	0.63	0.86	0.82	18.8
Approach		224	0.0	224	0.0	0.370	8.0	LOS A	0.7	4.6	0.63	0.86	0.82	18.8
East: Ivanhoe Main St														
4	L2	98	0.0	98	0.0	0.288	2.0	LOS A	0.0	0.0	0.00	0.06	0.00	31.4
5	T1	457	0.7	457	0.7	0.288	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	29.3
Approach		555	0.6	555	0.6	0.288	0.4	NA	0.0	0.0	0.00	0.06	0.00	29.8
West: Ivanhoe Main St														
11	T1	365	0.6	365	0.6	0.230	0.6	LOS A	0.2	1.3	0.15	0.05	0.15	28.0
12	R2	42	0.0	42	0.0	0.230	5.2	LOS A	0.2	1.3	0.15	0.05	0.15	29.5
Approach		407	0.5	407	0.5	0.230	1.0	NA	0.2	1.3	0.15	0.05	0.15	28.2
All Vehicles		1186	0.4	1185[N1]	0.4	0.370	2.0	NA	0.7	4.6	0.17	0.21	0.21	26.8

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3a [PM_ Ivanhoe Main x Road 02_ s2_ no Left-In_ opt1]

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 02														
1	L2	47	0.0	47	0.0	0.398	9.1	LOS A	0.4	3.0	0.77	0.96	0.99	15.8
3	R2	66	0.0	66	0.0	0.398	14.3	LOS A	0.4	3.0	0.77	0.96	0.99	15.8
Approach		114	0.0	114	0.0	0.398	12.1	LOS A	0.4	3.0	0.77	0.96	0.99	15.8
East: Ivanhoe Main St														
4	L2	136	0.0	136	0.0	0.510	2.0	LOS A	0.4	2.6	0.00	0.04	0.00	31.4
5	T1	851	0.4	851	0.4	0.510	0.0	LOS A	0.4	2.6	0.00	0.04	0.00	29.4
Approach		986	0.3	986	0.3	0.510	0.3	NA	0.4	2.6	0.00	0.04	0.00	29.8
West: Ivanhoe Main St														
11	T1	145	0.7	145	0.7	0.194	5.2	LOS A	0.4	2.9	0.62	0.22	0.63	20.5
12	R2	58	0.0	58	0.0	0.194	10.2	LOS A	0.4	2.9	0.62	0.22	0.63	24.4
Approach		203	0.5	203	0.5	0.194	6.6	NA	0.4	2.9	0.62	0.22	0.63	22.0
All Vehicles		1303	0.3	1303	0.3	0.510	2.3	NA	0.4	3.0	0.16	0.15	0.18	26.5

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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 SUMMARY

Site: 3b [AM_ Ivanhoe Main x Road 03_ s2_ no Left-In_ opt1]

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 02														
1	L2	67	0.0	67	0.0	0.403	4.8	LOS A	0.7	5.0	0.65	0.87	0.88	18.0
3	R2	157	0.0	157	0.0	0.403	10.8	LOS A	0.7	5.0	0.65	0.87	0.88	18.0
Approach		224	0.0	224	0.0	0.403	9.0	LOS A	0.7	5.0	0.65	0.87	0.88	18.0
East: Ivanhoe Main St														
4	L2	98	0.0	98	0.0	0.253	2.0	LOS A	0.0	0.0	0.00	0.07	0.00	30.7
5	T1	389	0.8	389	0.8	0.253	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	29.7
Approach		487	0.6	487	0.6	0.253	0.4	NA	0.0	0.0	0.00	0.07	0.00	29.9
West: Ivanhoe Main St														
11	T1	480	0.4	480	0.4	0.286	0.4	LOS A	0.2	1.5	0.13	0.04	0.13	28.5
12	R2	42	0.0	42	0.0	0.286	4.9	LOS A	0.2	1.5	0.13	0.04	0.13	29.9
Approach		522	0.4	522	0.4	0.286	0.7	NA	0.2	1.5	0.13	0.04	0.13	28.7
All Vehicles		1234	0.4	1233[N1]	0.4	0.403	2.1	NA	0.7	5.0	0.17	0.20	0.22	27.7

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 3b [PM_ Ivanhoe Main x Road 03_ s2_ no Left-In_ opt1]

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Main Road x Lyonpark Road
RMS Base 2021 plus Development plus Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: 3 leg Priority controlled
Giveway / Yield (Two-Way)

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: Road 02														
1	L2	47	0.0	47	0.0	0.353	10.3	LOS A	0.5	3.5	0.83	0.98	1.03	14.5
3	R2	66	0.0	66	0.0	0.353	17.4	LOS B	0.5	3.5	0.83	0.98	1.03	14.5
Approach		114	0.0	114	0.0	0.353	14.4	LOS A	0.5	3.5	0.83	0.98	1.03	14.5
East: Ivanhoe Main St														
4	L2	136	0.0	136	0.0	0.556	2.0	LOS A	0.0	0.0	0.00	0.04	0.00	30.8
5	T1	939	0.3	939	0.3	0.556	0.1	LOS A	0.0	0.0	0.00	0.04	0.00	29.7
Approach		1075	0.3	1075	0.3	0.556	0.3	NA	0.0	0.0	0.00	0.04	0.00	29.9
West: Ivanhoe Main St														
11	T1	154	0.7	154	0.7	0.225	7.1	LOS A	0.6	4.5	0.67	0.23	0.75	18.8
12	R2	58	0.0	58	0.0	0.225	12.6	LOS A	0.6	4.5	0.67	0.23	0.75	23.0
Approach		212	0.5	212	0.5	0.225	8.6	NA	0.6	4.5	0.67	0.23	0.75	20.3
All Vehicles		1400	0.3	1400	0.3	0.556	2.7	NA	0.6	4.5	0.17	0.15	0.20	27.8

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.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model 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 SUMMARY

Site: 4 [AM_ Epping-Lyonpark_ s2_no Left-In_opt1]

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Epping Road x Lyonpark Road
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Left In - Left Out
Giveway / Yield (Two-Way)

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
East: Epping Road (670m)														
5	T1	1717	2.0	1717	2.0	0.227	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1717	2.0	1717	2.0	0.227	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
North: Lyonpark Road (160m)														
7	L2	412	1.0	410	1.0	0.226	4.4	LOS A	0.0	0.0	0.00	0.47	0.00	47.4
Approach		412	1.0	410[N1]	1.0	0.226	4.4	NA	0.0	0.0	0.00	0.47	0.00	47.4
West: Epping Road (630m)														
10	L2	661	1.4	648	1.4	0.358	6.4	LOS A	0.0	0.0	0.00	0.61	0.00	58.7
11	T1	1779	2.4	1745	2.4	0.308	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		2440	2.2	2393[N1]	2.2	0.358	1.8	NA	0.0	0.0	0.00	0.16	0.00	67.9
All Vehicles		4568	2.0	4520[N1]	2.0	0.358	1.4	NA	0.0	0.0	0.00	0.13	0.00	66.0

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

N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.

MOVEMENT SUMMARY

Site: 4 [PM_ Epping-Lyonpark_ s2_no Left-In_opt1]

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Epping Road x Lyonpark Road
2031 Background plus Development Traffic, with Upgrades
No Left-In from Epping (this traffic redistributed as 100% Right-In from Herring)
Site Category: Left In - Left Out
Giveway / Yield (Two-Way)

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
East: Epping Road (670m)														
5	T1	2281	1.4	2281	1.4	0.300	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		2281	1.4	2281	1.4	0.300	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.9
North: Lyonpark Road (160m)														
7	L2	1351	0.9	1351	0.9	0.744	4.4	LOS A	0.0	0.0	0.00	0.46	0.00	47.2
Approach		1351	0.9	1351	0.9	0.744	4.4	NA	0.0	0.0	0.00	0.46	0.00	47.2
West: Epping Road (630m)														
10	L2	137	0.8	137	0.8	0.075	6.4	LOS A	0.0	0.0	0.00	0.61	0.00	58.7
11	T1	1406	1.6	1406	1.6	0.247	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.9
Approach		1543	1.6	1543	1.6	0.247	0.6	NA	0.0	0.0	0.00	0.05	0.00	69.3
All Vehicles		5175	1.3	5175	1.3	0.744	1.4	NA	0.0	0.0	0.00	0.14	0.00	62.2

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

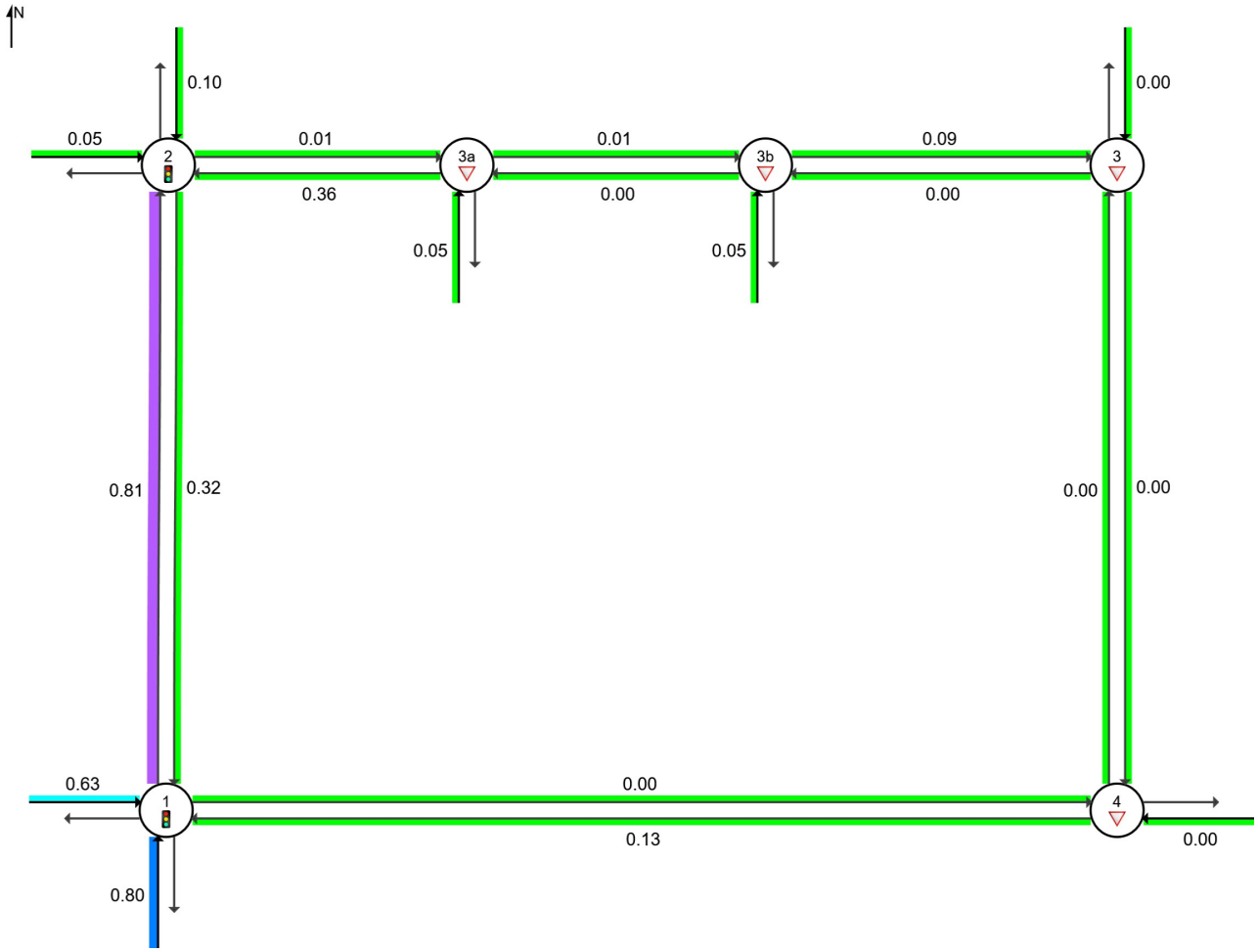
QUEUE STORAGE RATIO (AVERAGE)

Ratio of the Average Back of Queue Distance to the available queue storage distance (worst lane for the approach)

Network: N1 [AM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Estate
Network Category: Coordinated
Network Cycle Time = 149 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio

[< 0.6]	[0.6 – 0.7]	[0.7 – 0.8]	[0.8 – 0.9]	[0.9 – 1.0]	[> 1.0]

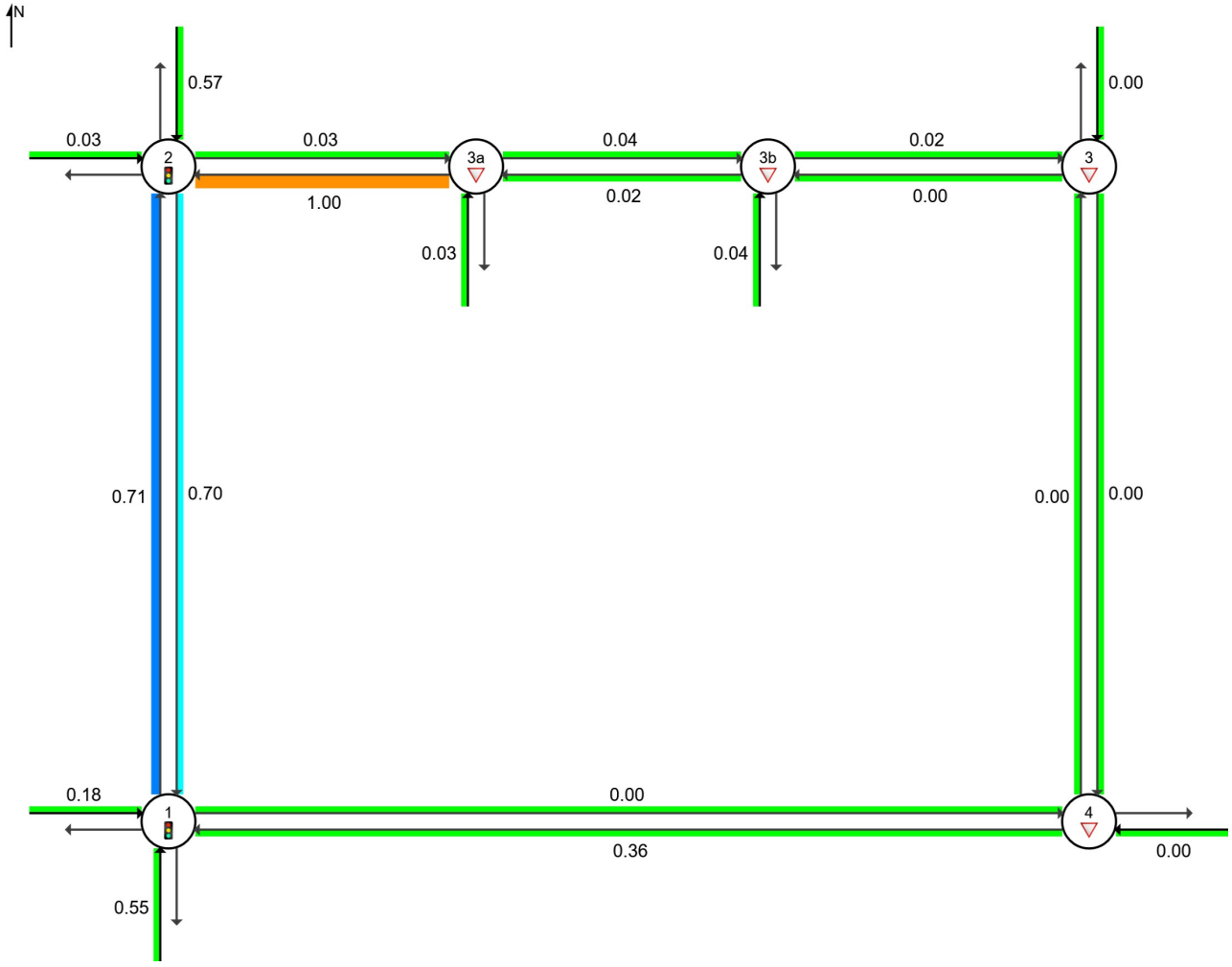
QUEUE STORAGE RATIO (AVERAGE)

Ratio of the Average Back of Queue Distance to the available queue storage distance (worst lane for the approach)

Network: N1 [PM_ Ivanhoe_ s2_no Left-In_opt1]

Ivanhoe Estate
Network Category: Coordinated
Network Cycle Time = 149 seconds (Network User-Given Cycle Time)

Short Lanes not included in determining Approach Queue Storage Ratios.



Colour code based on Queue Storage Ratio

[< 0.6]	[0.6 – 0.7]	[0.7 – 0.8]	[0.8 – 0.9]	[0.9 – 1.0]	[> 1.0]