Appendix B Traffic Report

BROWN

Traffic Report

Denman Prospect Stage 1A

Traffic and Transport Study

Land Development Agency
CANBERRA FIRST

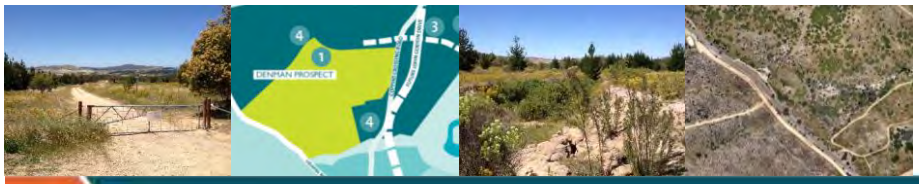
September 2014

C13172

Prepared for the Land Development Agency

Roads and Traffic

Smart Consulting



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Brown Consulting (ACT) Pty Ltd
Level 6, 121 Marcus Clarke Street
Canberra, ACT, 2601

Ph: (02) 6211 7100

2014

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-	14/04/2014	Traffic Report	TH	JS	JS
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1. Introduction

Brown Consulting has been engaged by the Land Development Agency to undertake the estate development plan, detailed design and documentation of Denman Prospect Stages 1A and 1B. As part of this design, investigations into the traffic, transport and intersections performance have been undertaken. The following report details the predicted traffic volumes and movements for the Denman Prospect urban development and analyses the major proposed intersections for the subdivision.

2. Proposed Development

2.1 Stage 1A

Denman Prospect Stage 1A is located between Uriarra Road and John Gorton Drive, south-west of Canberra City. The suburb is part of the new Molonglo development. Denman Prospect Stage 1A will be accessed by one intersection on Uriarra Road and two intersections on John Gorton Drive. Additional access points will become available in later stages of the development. The development involves multiple internal roads providing connectivity throughout the suburb and to the proposed school development to the east of Stage 1A, adjacent John Gorton Drive.

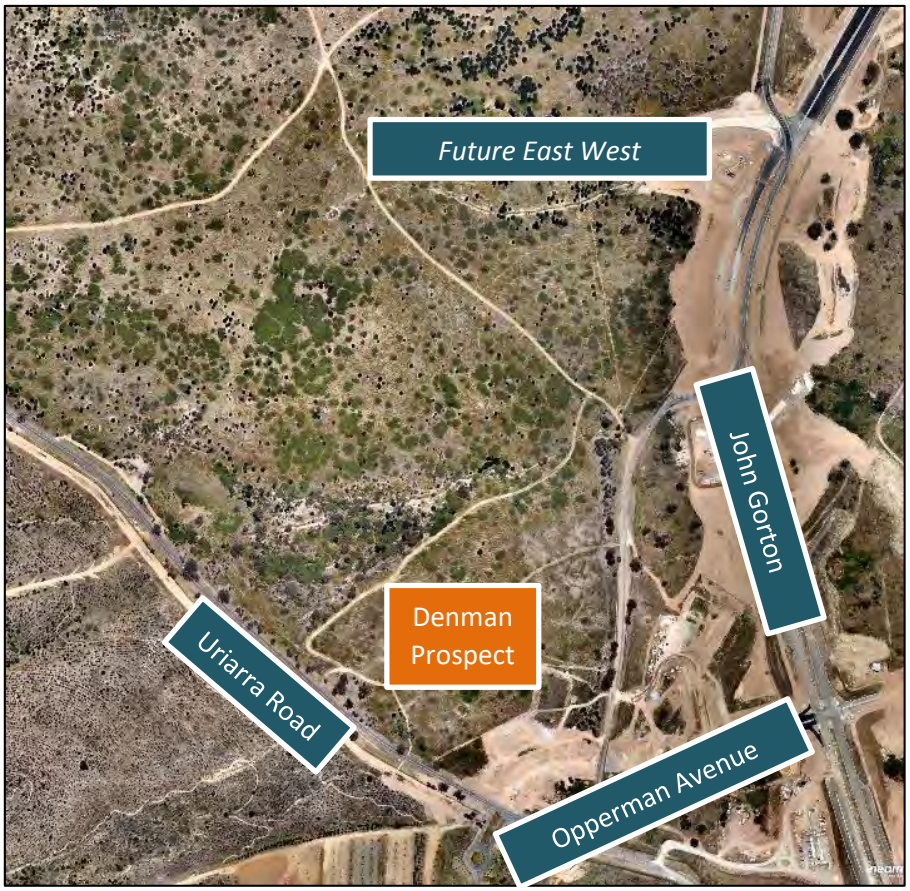

Figure 1: Denman Prospect Locality Map

3. Background Analysis

3.1 SMEC EMME Modelling

SMEC developed an EMME model to estimate the traffic movements in and around the Denman Prospect area. The model has been developed for 2016, 2021 and 2031 projections. It is important to note the EMME model incorporates the existing and future arterial roads for the road network surrounding Denman Prospect. Therefore there is a significant difference between the 2016 and 2021 models, whereby the 2016 model assumes that the East West arterial road will not be completed until after 2016. The volumes on the existing Uriarra Road will therefore be higher before the construction of the East West Arterial and hence the 2016 EMME model shows significant volumes for the Denman Prospect access from Uriarra Road.

The peak daily traffic volumes adopted as presented by the 2016, 2021 and 2031 EMME models are shown in Table 1:

	Uriarra Road	John Gorton Drive	East West Arterial
2016	560vpd	2053vpd	N/A
2021	502vpd	2902vpd	629vpd
2031	411vpd	2629vpd	2339vpd

Table 1: 2016, 2021 and 2031 EMME Model Volumes

3.2 Denman Prospect Stage 1A

Brown Consulting has developed a Road Hierarchy Plan as part of the traffic analysis for Denman Prospect Stage 1A. The hierarchy was developed using the road layout developed by Brown Consulting in conjunction with Spacelab. Each of the proposed medium density residential blocks were assumed to generate a daily traffic volume of eight vehicles.

Generation rates utilised for the hierarchy analysis can be summarised as follows:

- Proposed Schools: 1.3 trips per day / 100m2 GLFA = 1196 (Stage 1A) and 650 (Stage 1B)
- Local Community Centre: 121 trips per day / 100m2 GLFA = 4235
- Medium density residential: 8 trips/day
- High density residential: 6 trips/day

A road hierarchy map was created to determine the vehicular movements with the estate and the volumes for each of the roads within Denman Prospect Stage 1A, see **Appendix C**. The investigations revealed the resultant movements and volumes for Denman Prospect Stage 1A which in turn determined the hierarchical requirements of the suburb. The image in Figure 2 outlines the road hierarchy of Denman Prospect Stage 1A, which shows the internal road system warrants minor collector roads on all access points to Denman Prospect as daily traffic volumes are between 1,000 and 3,000 vehicles per day (vpd) on each of these movements. In addition Road 01, 02, 03 and 27 provide the main connectivity through the suburb and onto later stages of Denman Prospect Stage 1A.

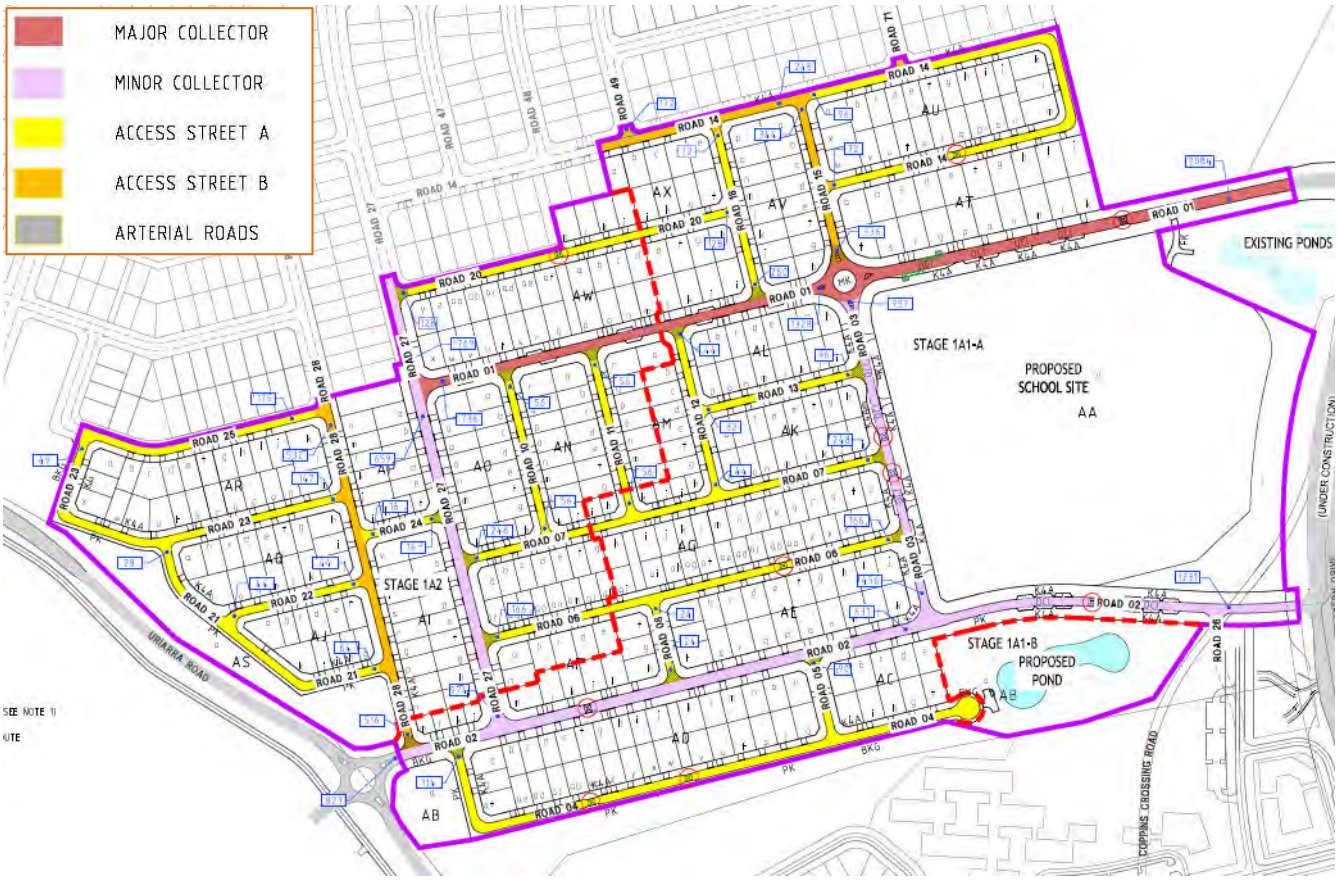

Figure 2: Road Hierarchy Plan

4. Intersection Analysis

As part of the Denman Prospect Traffic Study, intersection analysis of the three main internal intersection was undertaken. Details of these intersections are detailed in the following sections.

4.1 Road 01 / Road 15 / Road 03

The Road 01 / Road 15 / Road 03 intersection is the main roundabout for the Denman Prospect Stage 1A estate. It is anticipated that this intersection will have the highest volumes of any intersection within the suburb due to its proximity to the proposed school and the fact it is adjacent to the main Denman Prospect / John Gorton Drive intersection. The results of the intersection analysis for the Road 01 / Road 15 / Road 03 are summarised in Table 2.

	AM		PM	
	Average Delay	LOS	Average Delay	LOS
Road 01 / Road 15 / Road 03	6.2s	A	5.6s	A

Table 2: Road 01 / Road 15 / Road 03 SIDRA Summary

4.2 Road 02 / Road 03

The Road 02 / Road 03 intersection is located to the south-west of the proposed school site and provides the secondary connection to the site from John Gorton Drive. The intersection is a four lane roundabout designed to service the residential streets of Denman Prospect and provide safe vehicular/pedestrian movements. The results of the intersection analysis for the Road 02 / Road 03 are summarised in Table 3.

	AM		PM	
	Average Delay	LOS	Average Delay	LOS
Road 02 / Road 03	4.5s	A	5.0s	A

Table 3: Road 02 / Road 03 SIDRA Summary

4.3 Road 27 / Road 01

The Road 27 / Road 01 intersection is the main roundabout for the Denman Prospect Stage 1A area. This intersection is the most central intersection to the stage 1A and provides connection to both Uriarra Road and John Gorton Drive. The results of the intersection analysis for the Road 27 / Road 01 are summarised in Table 4.

	AM		PM	
	Average Delay	LOS	Average Delay	LOS
Road 27 / Road 01	5.4s	A	5.0s	A

Table 4: Road 27 / Road 01 SIDRA Summary

5. Conclusions

The traffic study undertaken for Denman Prospect Stage 1A revealed no traffic congestion, delays or level or service issues when considering the proposed design under realistic condition scenarios. The design of the estate was developed in conjunction with the traffic analysis and as such is suitable for the needs of the proposed Denman Prospect 1A development.

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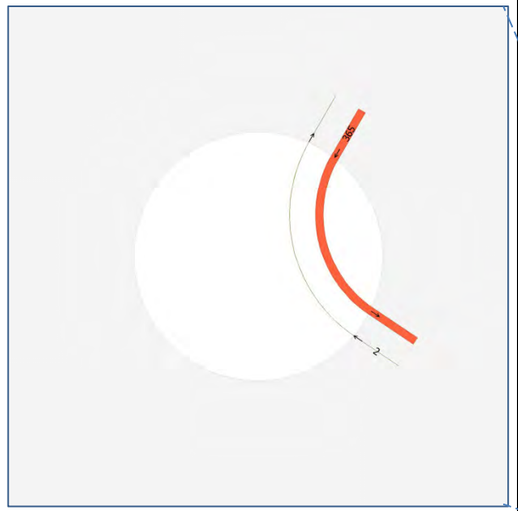
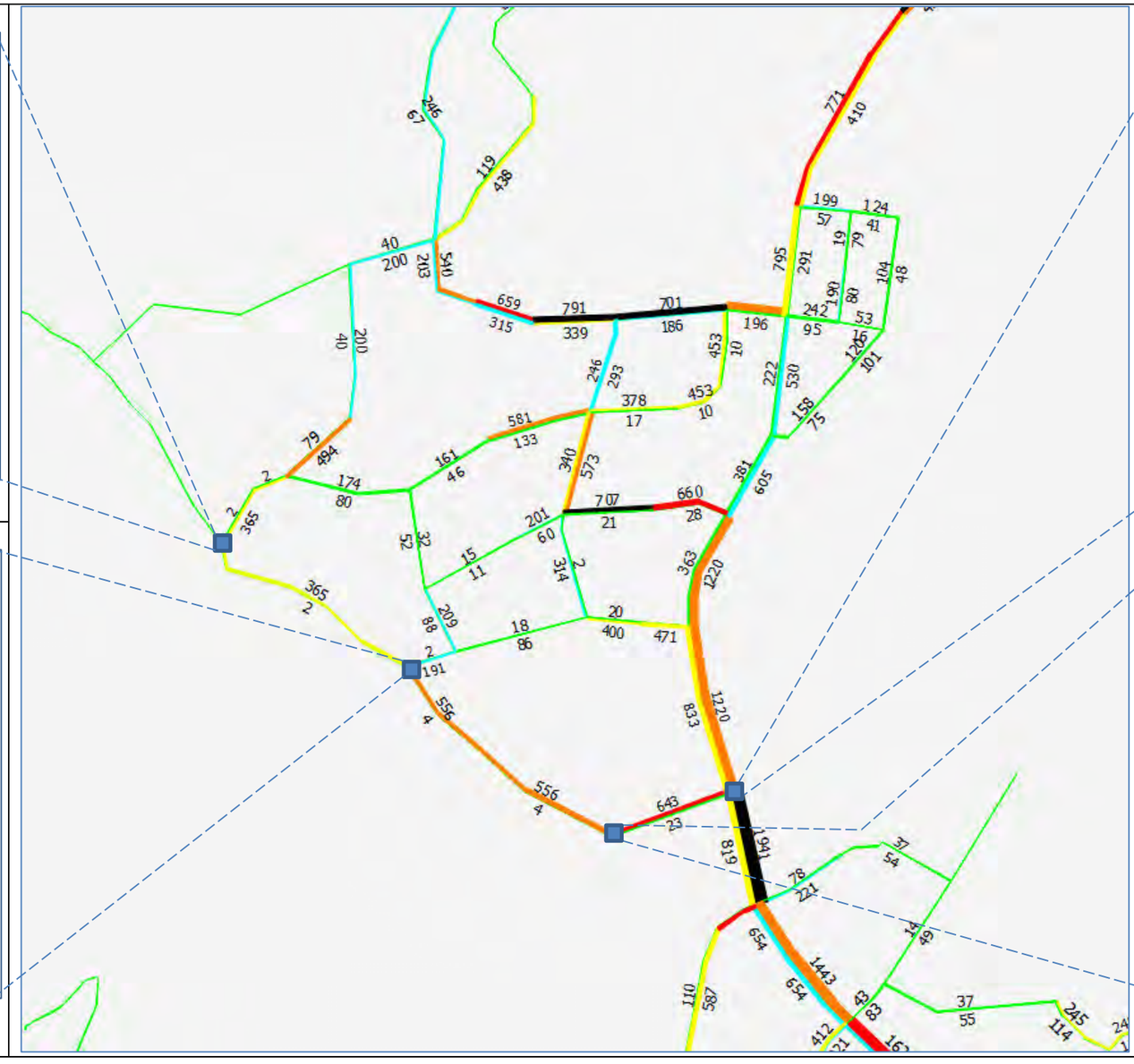
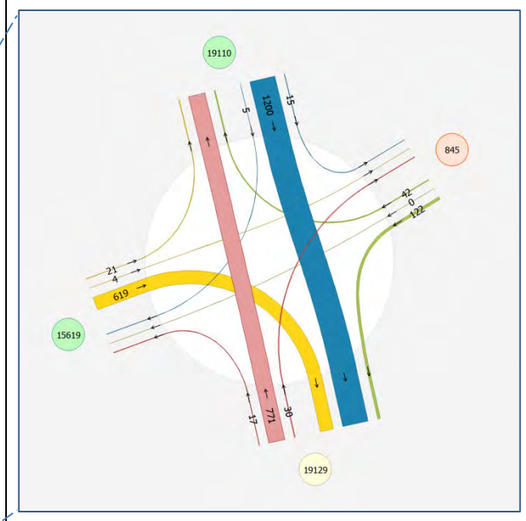
Appendices

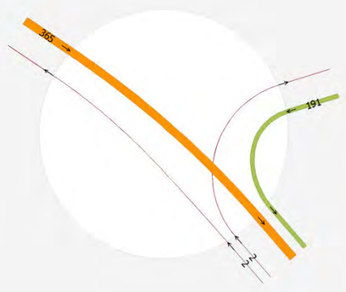
Appendix A SMEC EMME Model

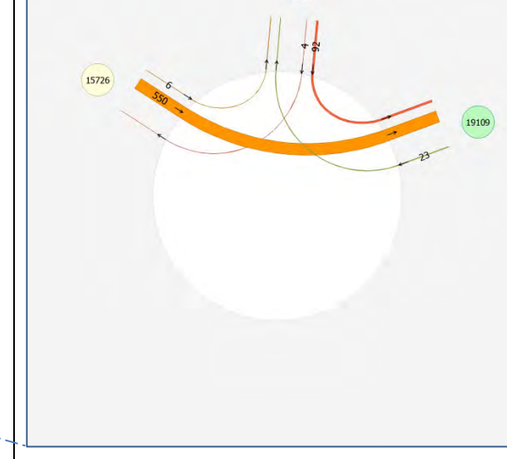
2016 Molonglo Revised



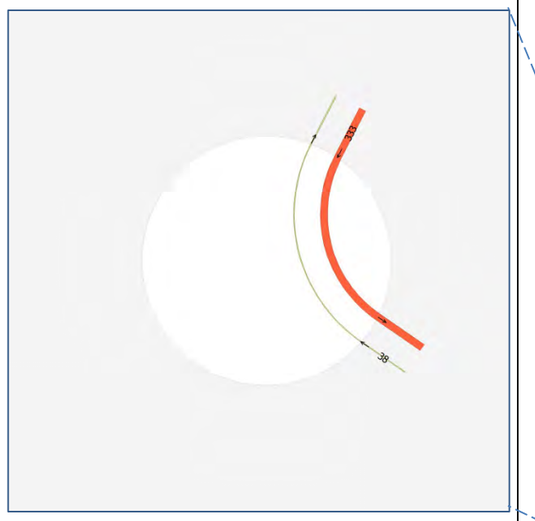


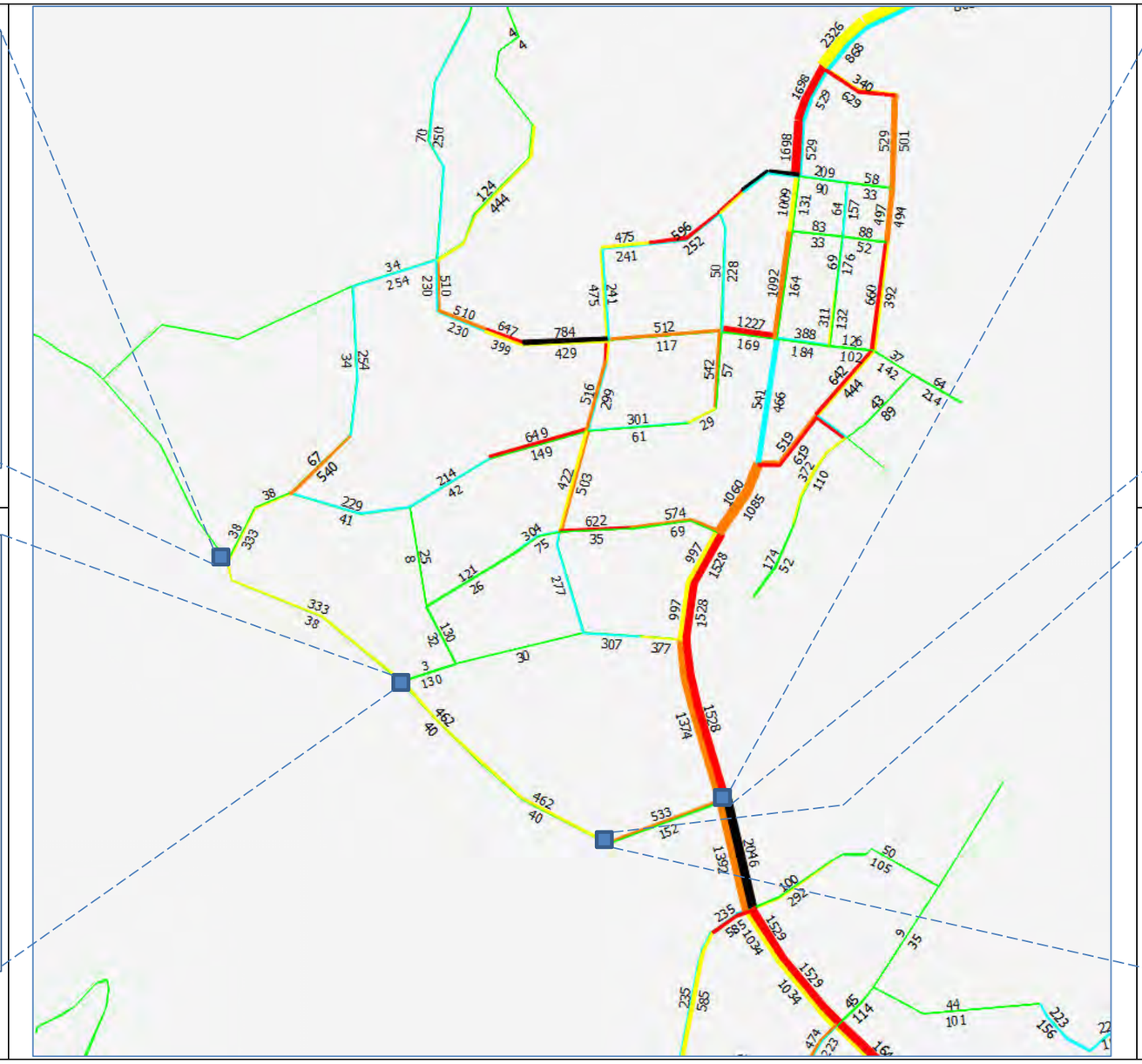


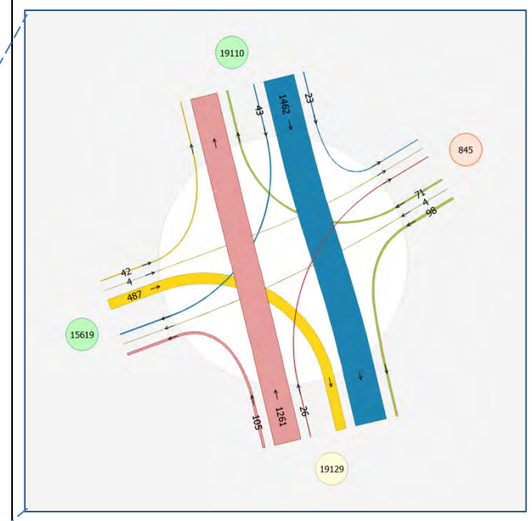


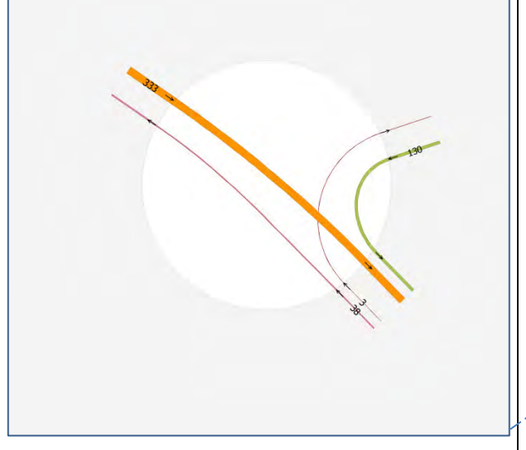


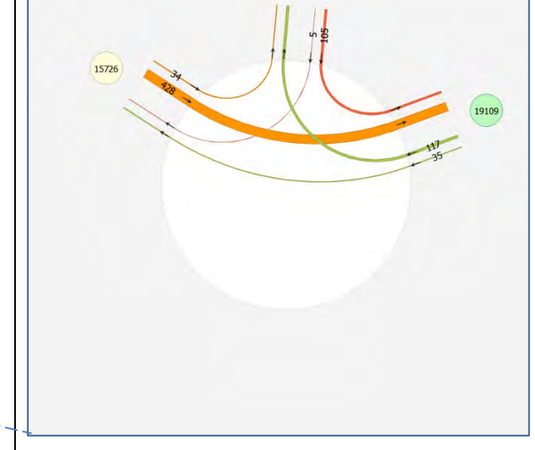
2021 Molonglo Revised



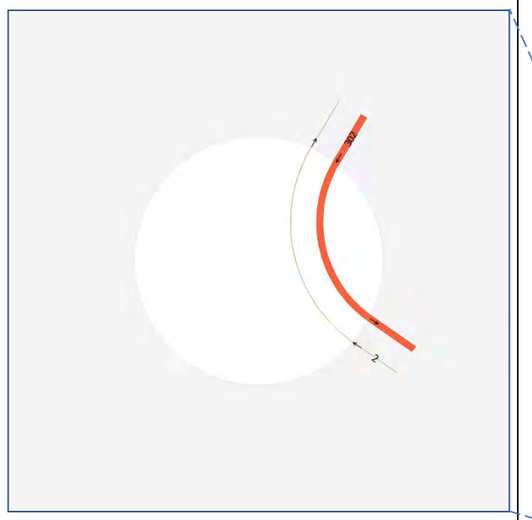


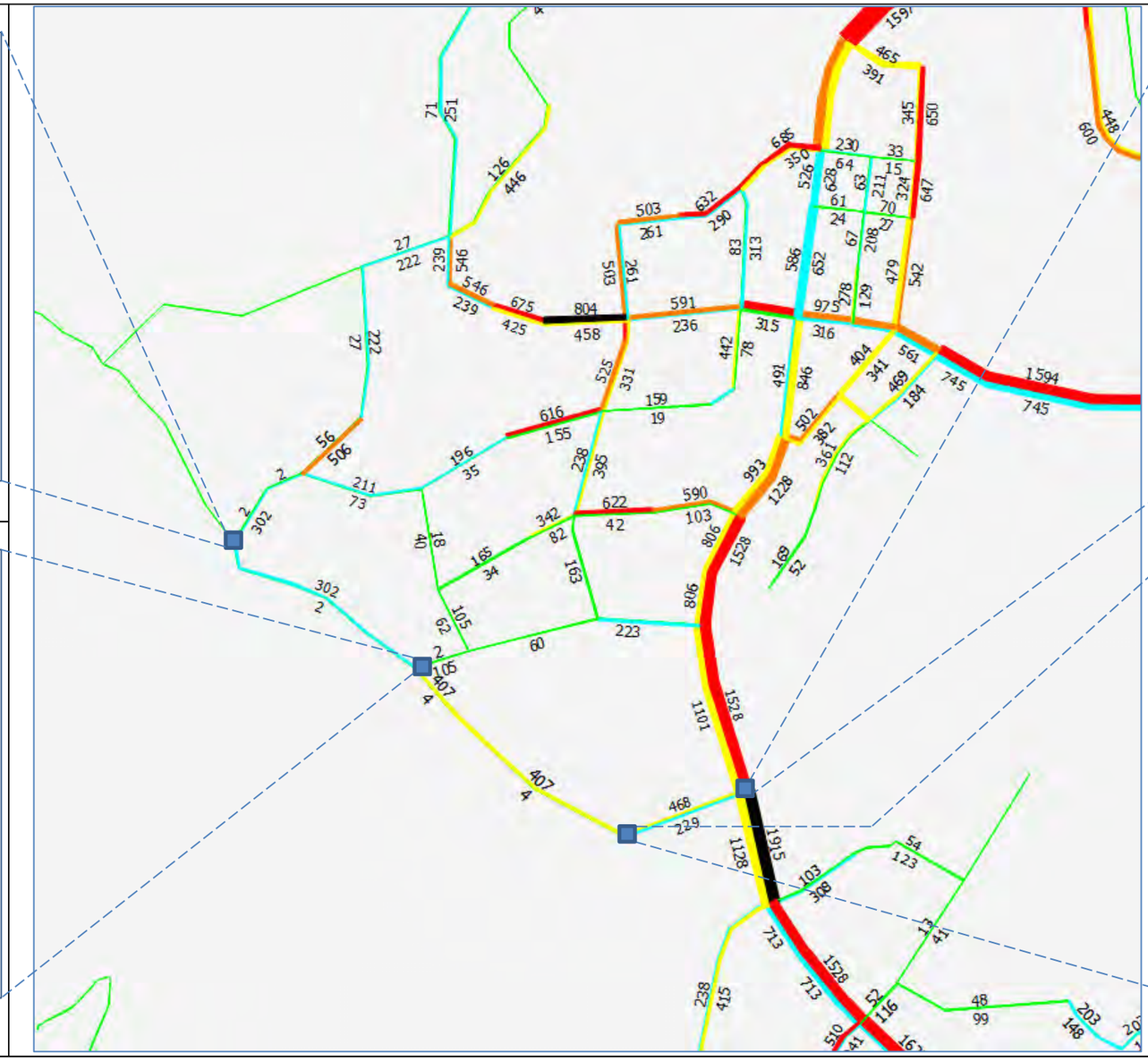


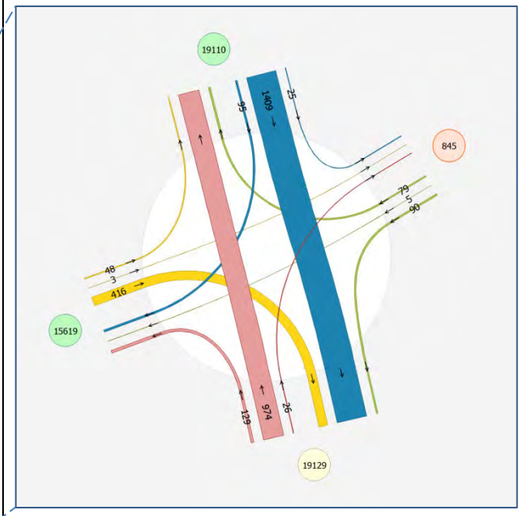


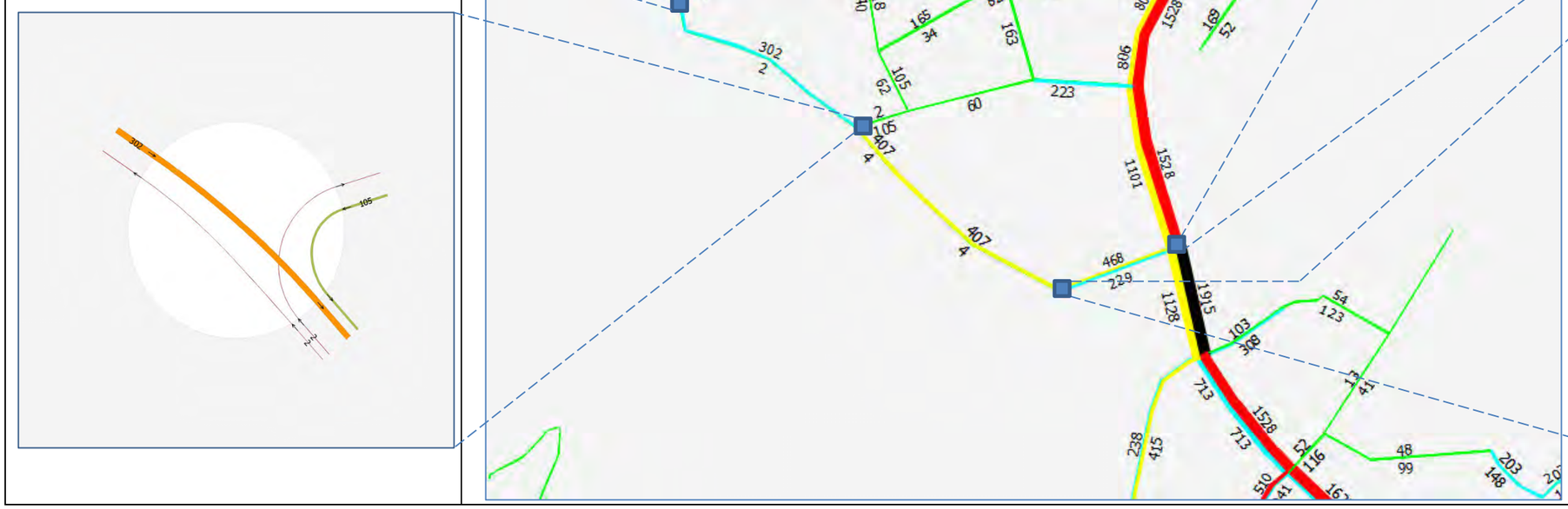


2031 Molonglo Revised









Appendix B SIDRA Output

MOVEMENT SUMMARY

Site: Road 27 / Road 01 - 2014PM

2014 AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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 per veh	Average Speed km/h
South: Road 27											
2	T1	5	5.0	0.006	0.0	LOS A	0.0	0.2	0.05	0.34	45.9
3	R2	5	5.0	0.006	6.7	LOS A	0.0	0.2	0.05	0.34	45.9
Approach		11	5.0	0.006	3.3	NA	0.0	0.2	0.05	0.34	45.9
East: Road 01											
4	L2	7	5.0	0.022	6.7	LOS A	0.1	0.5	0.04	0.55	43.0
6	R2	21	5.0	0.022	6.7	LOS A	0.1	0.5	0.04	0.55	43.0
Approach		28	5.0	0.022	6.7	LOS A	0.1	0.5	0.04	0.55	43.0
North: Road 27											
7	L2	5	5.0	0.005	6.6	LOS A	0.0	0.0	0.00	0.36	46.3
8	T1	5	5.0	0.005	0.0	LOS A	0.0	0.0	0.00	0.36	46.3
Approach		11	5.0	0.005	3.3	NA	0.0	0.0	0.00	0.36	46.3
All Vehicles		49	5.0	0.022	5.3	NA	0.1	0.5	0.04	0.46	44.3

Level of Service (LOS) Method: Delay (RTA NSW).
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: Road 27 / Road 01 - 2014AM

2014 AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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 per veh	Average Speed km/h
South: Road 27											
2	T1	5	5.0	0.008	0.1	LOS A	0.0	0.3	0.10	0.38	44.9
3	R2	8	5.0	0.008	6.7	LOS A	0.0	0.3	0.10	0.38	44.9
Approach		14	5.0	0.008	4.2	NA	0.0	0.3	0.10	0.38	44.9
East: Road 01											
4	L2	5	5.0	0.008	6.7	LOS A	0.0	0.2	0.03	0.55	43.1
6	R2	6	5.0	0.008	6.7	LOS A	0.0	0.2	0.03	0.55	43.1
Approach		12	5.0	0.008	6.7	LOS A	0.0	0.2	0.03	0.55	43.1
North: Road 27											
7	L2	24	5.0	0.015	6.6	LOS A	0.0	0.0	0.00	0.50	44.2
8	T1	5	5.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.50	44.2
Approach		29	5.0	0.015	5.5	NA	0.0	0.0	0.00	0.50	44.2
All Vehicles		55	5.0	0.015	5.4	NA	0.0	0.3	0.03	0.48	44.1

Level of Service (LOS) Method: Delay (RTA NSW).
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: Road 02 / Road 03 - 2014PM

2014 AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	95% Back of Queue Distance m	Prop. Queued	Effective Stop Rate per veh	Average Speed km/h
East: Road 02											
5	T1	5646	5.0	2.786	1610.9	LOS F	2502.5	18268.5	1.00	0.02	1.3
6	R2	65	5.0	2.786	1617.5	LOS F	2502.5	18268.5	1.00	0.02	1.3
Approach		5712	5.0	2.786	1611.0	NA	2502.5	18268.5	1.00	0.02	1.3
North: Road 03											
7	L2	5	5.0	2.810	2284.6	LOS F	15.8	115.5	1.00	1.25	0.9
9	R2	17	5.0	2.810	2284.6	LOS F	15.8	115.5	1.00	1.25	0.9
Approach		22	5.0	2.810	2284.6	LOS F	15.8	115.5	1.00	1.25	0.9
West: Road 02											
10	L2	5	5.0	0.007	6.6	LOS A	0.0	0.0	0.00	0.28	47.3
11	T1	9	5.0	0.007	0.0	LOS A	0.0	0.0	0.00	0.28	47.3
Approach		15	5.0	0.007	2.4	NA	0.0	0.0	0.00	0.28	47.3
All Vehicles		5748	5.0	2.810	1609.4	NA	2502.5	18268.5	1.00	0.03	1.3

Level of Service (LOS) Method: Delay (RTA NSW).
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: Road 02 / Road 03- 2014AM

2014 AM
Giveway / Yield (Two-Way)

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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 per veh	Average Speed km/h
East: Road 02											
5	T1	11	5.0	0.016	0.1	LOS A	0.1	0.6	0.13	0.38	44.6
6	R2	18	5.0	0.016	6.8	LOS A	0.1	0.6	0.13	0.38	44.6
Approach		28	5.0	0.016	4.3	NA	0.1	0.6	0.13	0.38	44.6
North: Road 03											
7	L2	74	5.0	0.052	6.8	LOS A	0.2	1.5	0.12	0.53	42.8
9	R2	5	5.0	0.052	6.8	LOS A	0.2	1.5	0.12	0.53	42.8
Approach		79	5.0	0.052	6.8	LOS A	0.2	1.5	0.12	0.53	42.8
West: Road 02											
10	L2	5	5.0	0.023	6.6	LOS A	0.0	0.0	0.00	0.10	49.1
11	T1	42	5.0	0.023	0.0	LOS A	0.0	0.0	0.00	0.10	49.1
Approach		47	5.0	0.023	0.7	NA	0.0	0.0	0.00	0.10	49.1
All Vehicles		155	5.0	0.052	4.5	NA	0.2	1.5	0.08	0.37	44.9

Level of Service (LOS) Method: Delay (RTA NSW).
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: Road 01 / Road 03 / Road 15 - 2014PM

2014 AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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 per veh	Average Speed km/h
South: Road 03											
1	L2	5	5.0	0.029	5.1	LOS A	0.1	0.8	0.26	1.12	41.7
2	T1	5	5.0	0.029	4.0	LOS A	0.1	0.8	0.26	1.12	41.7
3	R2	25	5.0	0.029	9.6	LOS A	0.1	0.8	0.26	1.12	41.7
Approach		36	5.0	0.029	8.1	LOS A	0.1	0.8	0.26	0.56	41.7
East: Road 01											
4	L2	102	5.0	0.175	4.6	LOS A	0.7	5.4	0.07	0.90	44.1
5	T1	101	5.0	0.175	3.5	LOS A	0.7	5.4	0.07	0.90	44.1
6	R2	68	5.0	0.175	9.1	LOS A	0.7	5.4	0.07	0.90	44.1
Approach		272	5.0	0.175	5.3	LOS A	0.7	5.4	0.07	0.45	44.1
North: Road 15											
7	L2	17	5.0	0.021	4.7	LOS A	0.1	0.8	0.18	0.86	43.7
8	T1	5	5.0	0.021	3.7	LOS A	0.1	0.8	0.18	0.86	43.7
9	R2	5	5.0	0.021	9.4	LOS A	0.1	0.8	0.18	0.86	43.7
Approach		27	5.0	0.021	5.4	LOS A	0.1	0.8	0.18	0.43	43.7
West: Road 01											
10	L2	5	5.0	0.029	4.9	LOS A	0.1	0.8	0.19	0.82	44.3
11	T1	26	5.0	0.029	3.8	LOS A	0.1	0.8	0.19	0.82	44.3
12	R2	5	5.0	0.029	9.4	LOS A	0.1	0.8	0.19	0.82	44.3
Approach		37	5.0	0.029	4.7	LOS A	0.1	0.8	0.19	0.41	44.3
All Vehicles		372	5.0	0.175	5.6	LOS A	0.7	5.4	0.11	0.45	43.9

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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: Road 01 / Road 03 / Road 15 - 2014AM

2014 AM
Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand 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 per veh	Average Speed km/h
South: Road 03											
1	L2	5	5.0	0.090	4.7	LOS A	0.3	2.5	0.13	1.16	41.4
2	T1	5	5.0	0.090	3.6	LOS A	0.3	2.5	0.13	1.16	41.4
3	R2	113	5.0	0.090	9.3	LOS A	0.3	2.5	0.13	1.16	41.4
Approach		123	5.0	0.090	8.8	LOS A	0.3	2.5	0.13	0.58	41.4
East: Road 01											
4	L2	28	5.0	0.052	4.6	LOS A	0.2	1.5	0.07	0.90	44.2
5	T1	28	5.0	0.052	3.5	LOS A	0.2	1.5	0.07	0.90	44.2
6	R2	19	5.0	0.052	9.1	LOS A	0.2	1.5	0.07	0.90	44.2
Approach		76	5.0	0.052	5.3	LOS A	0.2	1.5	0.07	0.45	44.2
North: Road 15											
7	L2	76	5.0	0.078	5.7	LOS A	0.4	2.9	0.40	0.99	43.0
8	T1	5	5.0	0.078	4.7	LOS A	0.4	2.9	0.40	0.99	43.0
9	R2	5	5.0	0.078	10.3	LOS A	0.4	2.9	0.40	0.99	43.0
Approach		86	5.0	0.078	5.9	LOS A	0.4	2.9	0.40	0.49	43.0
West: Road 01											
10	L2	5	5.0	0.099	5.0	LOS A	0.4	2.9	0.24	0.78	44.5
11	T1	113	5.0	0.099	3.9	LOS A	0.4	2.9	0.24	0.78	44.5
12	R2	5	5.0	0.099	9.6	LOS A	0.4	2.9	0.24	0.78	44.5
Approach		123	5.0	0.099	4.2	LOS A	0.4	2.9	0.24	0.39	44.5
All Vehicles		408	5.0	0.099	6.2	LOS A	0.4	2.9	0.21	0.48	43.1

Level of Service (LOS) Method: Delay (RTA NSW).
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.
Roundabout Capacity Model: SIDRA Standard.
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.

Appendix C Road Hierarchy Plan

FUTURE DENMAN PROSPECT STAGE 1B

STAGE 1A2

STAGE 1A1-A

PROPOSED SCHOOL SITE

AA

STAGE 1A1-B

PROPOSED POND

EXISTING PONDS

FUTURE WORKS (NORTH WRIGHT)

(UNDER CONSTRUCTION)

FUTURE WOR (COOMBS

JOHN GORTON DRIVE

URIARRA ROAD

COPPINS CROSSING ROAD

ROAD 01 ROAD 02 ROAD 03 ROAD 04 ROAD 05 ROAD 06 ROAD 07 ROAD 08 ROAD 10 ROAD 11 ROAD 12 ROAD 13 ROAD 14 ROAD 15 ROAD 18 ROAD 20 ROAD 21 ROAD 22 ROAD 23 ROAD 24 ROAD 25 ROAD 26 ROAD 27 ROAD 28 ROAD 29 ROAD 47 ROAD 48 ROAD 49 ROAD 71

AA AB AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ AR AS AT AU AV AW AX

LEGEND

KG	KERB AND GUTTER
MK	MOUNTABLE KERB
PK	PERMEABLE KERB
K4A	MODIFIED KERB AND GUTTER
BKG	BARRIER KERB AND GUTTER
950	VEHICLES PER DAY (NUMBER) (SEE NOTE 1)
	MINOR COLLECTOR AND BUS ROUTE
	MINOR COLLECTOR
	ACCESS STREET A
	ACCESS STREET B
	ARTERIAL ROADS
	STENCILED PAVEMENT THRESHOLD
	RAISED PAVEMENT/PEDESTRIAN CROSSING
	ESTATE BOUNDARY
	STAGE BOUNDARY
	DRIVEWAY
	ROAD NARROWING AND RAISED PAVEMENT FOR SPEED CONTROL
	PROPOSED BUS STOP (INDICATIVE)

NOTES

1. TRAFFIC GENERATION BASED ON 8VPD FOR STANDARD RESIDENTIAL AND 6VPD FOR MULTI UNIT DEVELOPMENT.
2. REFER DRAWING C13172-RHP.2+ FOR DATA TABLE.
3. ALL KERBS SHALL BE KERB AND GUTTER EXCEPT WHERE SHOWN.
4. DRIVEWAY LOCATIONS ARE INDICATIVE TO BE CONFIRMED IN DETAIL DESIGN.

		DESIGN	DRAWN	CHECK	APPROVED	DATE	AMENDMENT DETAILS
FIRST ISSUE		HA	DC			05/14	
AMENDMENTS	A	HA	DC			05/14	DRIVEWAY AND BLOCK AT SECTION AR REVISED
	B	HA	DC				LAYOUT REVISED AND OTHER GENERAL AMENDMENT TO ADDRESS EDP COMMENTS
	C						
	D						
	E						
	F						

DRAFT

WAE No. .....

PROJECT No. .....

A3 PLOT SCALE (METRES) A1 PLOT

1:4000 20 10 0 20 40 60 80 100 1:2000

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CLIENT ACT Government Economic Development; Land Development Agency CANBERRA FIRST

PROJECT DENMAN PROSPECT STAGE 1A ESTATE DEVELOPMENT PLAN

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DRAWING TITLE ROAD HIERACHY & TRAFFIC ANALYSIS PLAN

DRAWING NUMBER C13172-RHP.1+ PLAN No.16.1

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Xref's: X-A1 EDP-C13172 X-KERB C13172 X-BLOCK C13172 X-RDNAMES C13172 X-STAGE C13172 X-ROADHATCH C13172 X-POND-C13172 X-PATH C13172 20131002 - Molonglo Valley - Structure Plan FUT Arterial Roads X-BLOCK&SECTION NO-C13172

Appendix C Bushfire Report