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Traffic Engineering

PLANS AND DOCUMENTS
referred to in the PDA
DEVELOPMENT APPROVAL

Approval no: DEV2018/961

Date: 10 September 2021

Queensland Government

TRAFFIC IMPACT ASSESSMENT

PROPOSED INDUSTRIAL ESTATE

4499 – 4651 MOUNT LINDESAY HIGHWAY,

NORTH MACLEAN

LOT 39 ON SP258739

(In Response to Further Issues Dated 18th November, 2018)

Prepared for

WEARCO PTY LTD

1 MARCH 2019

DOCUMENT REGISTER

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Prepared by	Luke Rytenskild, Dare Janzekovic

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			Name / Position	Signature
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1.0 INTRODUCTION

Rytenskild Traffic Engineering (RTE) has been engaged by Wearco Pty Ltd to prepare a Traffic Impact Assessment of its proposed industrial subdivision at North Maclean.

The site forms part of the Great Flagstone Priority Development Area and therefore this report forms part of an application to be lodged with the Department of Infrastructure, Local Government and Planning for assessment.

This version of the report responds to the following Further Issues raised by EDQ. A brief response is provided in relation to each, with further detailes provided in the report.

2) Transport Network
a) EDQ is seeking a connection (link road) between the existing cul de sacs

Response:
The proposed masterplan has been modified and no longer contains any cul-de-sac roads.

b) EDQ is also seeking

- *that an 8m dedication be shown on the subdivision plan. EDQ indicated that this Crowson Lane dedication would be considered trunk infrastructure and infrastructure credits would apply*
- *that an interim design for the intersection with Crowson Lane be allowed for in the subdivision design and shown on the plans*

There was also discussion around the ability of the proposed north-south road running adjacent to the Mt Lindsay Highway to fulfil the function of the indicative north-south 'Regional Road' shown on Maps 2 & 3 of the Development Scheme. The road will provide direct access to all the remaining lots in the PDA fronting the Mt Lindsay highway in circumstances where alternative internal PDA access to the north may not be possible or severely impact PDA layouts due to potential environmental values and protection within PDA Lot 1 on RP113251. In this respect the road will serve a 'trunk' purpose.

It was also discussed that whilst service roads generally do not form part of the trunk network, the construction of the road as part of the proposal would be of mutual benefit to the proponent and the State. Access to lots off the service road would be designed appropriately (adequate separation of driveways, vehicle queuing etc) so to not compromise the future function of the service road. Such is typical of similar service road systems throughout south east Queensland (eg Pacific Mway service road system through at Ormeau and Yatala), and therefore the cost of constructing the service road, if carried out as part of the project, should be shared between the project and the State. That is, a proportion of the cost should be creditable.

Response:
An allowance for the 8.0 metre dedication has been provided on the latest masterplan.

Indicative plans of the interim and ultimate access arrangements are shown in Section 3.2. SIDRA modelling has been carried out for each of these scenarios. The SIDRA modelling indicates that the interim layout will function satisfactorily for a considerable period of time. The need and timing for traffic signals largely depends on future background traffic growth on Crowson Lane. It is recommended that further traffic modelling be carried out at each stage of the development to determine the required timing for signals.

It is noted that any upgrade works to Crowson Lane, including land dedication is considered to be trunk and therefore creditable

Commentary in relation to the applicant's responsibility for the cost of constructing the north – south service road is provided in section 5.

c) EDQ is seeking some advice in relation to how the stormwater management devices and biodiversity areas can be accessed for maintenance purposes

Response:
This item has been addressed by the projects Civil Engineers.

d) EDQ is seeking further information and review on the trip generation rates proposed as part of the traffic report submitted with the application.

Response:
Trip generation rates have been based on surveys of other large industrial developments at Yatala. A copy of these surveys has been provided as Appendix A. A sensitivity analysis has been carried out using a trip rate of 0.4 trips per 100m^2 of GFA, which is specified as being appropriate forwarehouse style development in the TMR Road Planning and Design Manual. It is recommended that further traffic analysis be carried out ona stage by stage basis, using actual development trip generation rates, which can be surveyed at that time.

2.0 SUBJECT SITE

2.1 Location of Subject Site

The site is located within the Greater Flagstone Priority Development Area (GFPDA), and is part of the North Maclean Industry and Business Zone. The location of the site within the context of the GFPDA is shown in Figure 2.1.

As shown in Figure 2.2, the subject site is located to the southwest of the Mount Lindesay Highway / Crowson Lane interchange roundabout, and is formally identified as Lot 39 on SP258739. The site has an area of approximately 118 hectares.

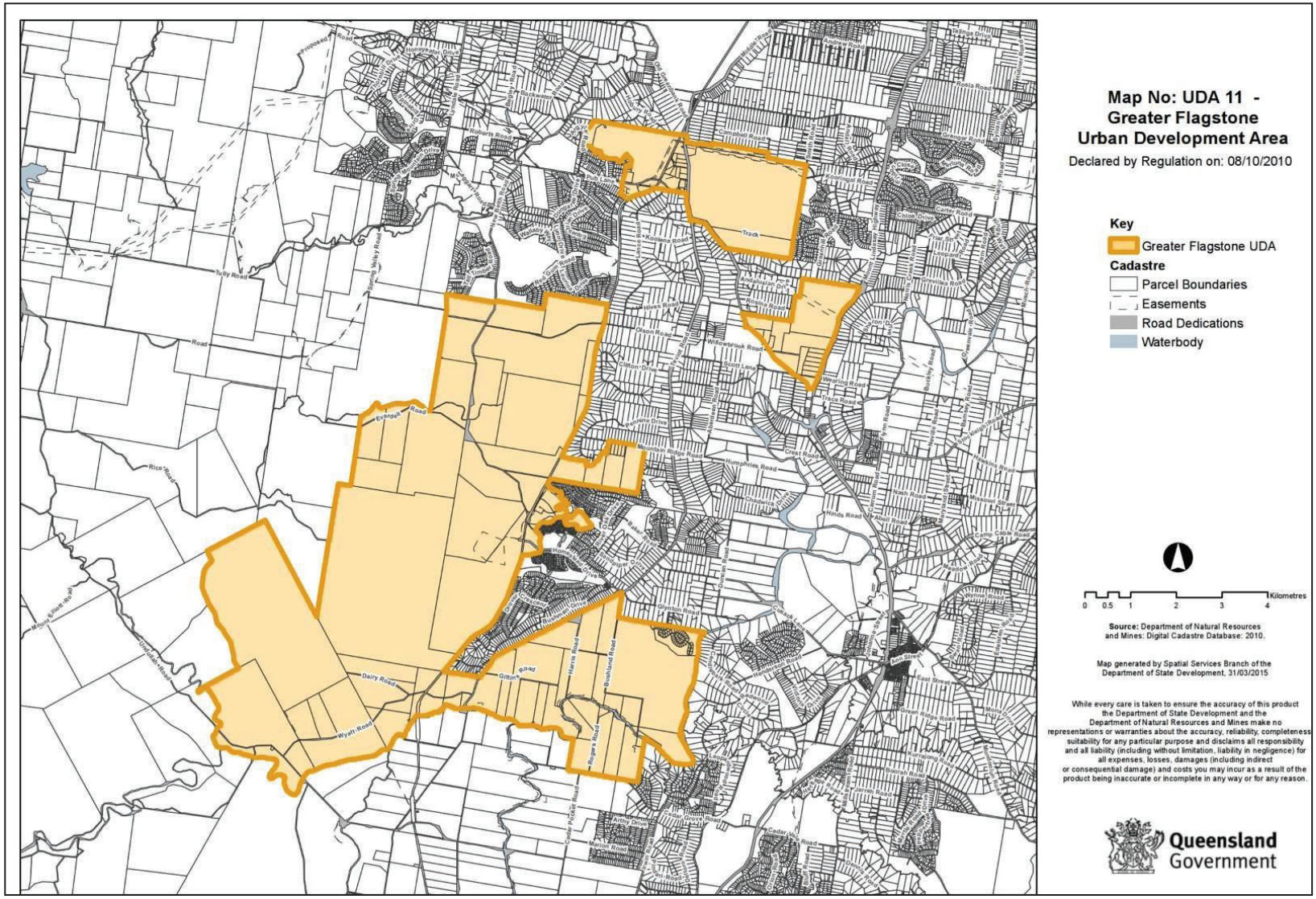


FIGURE 2.1 – LOCATION OF SUBJECT SITE

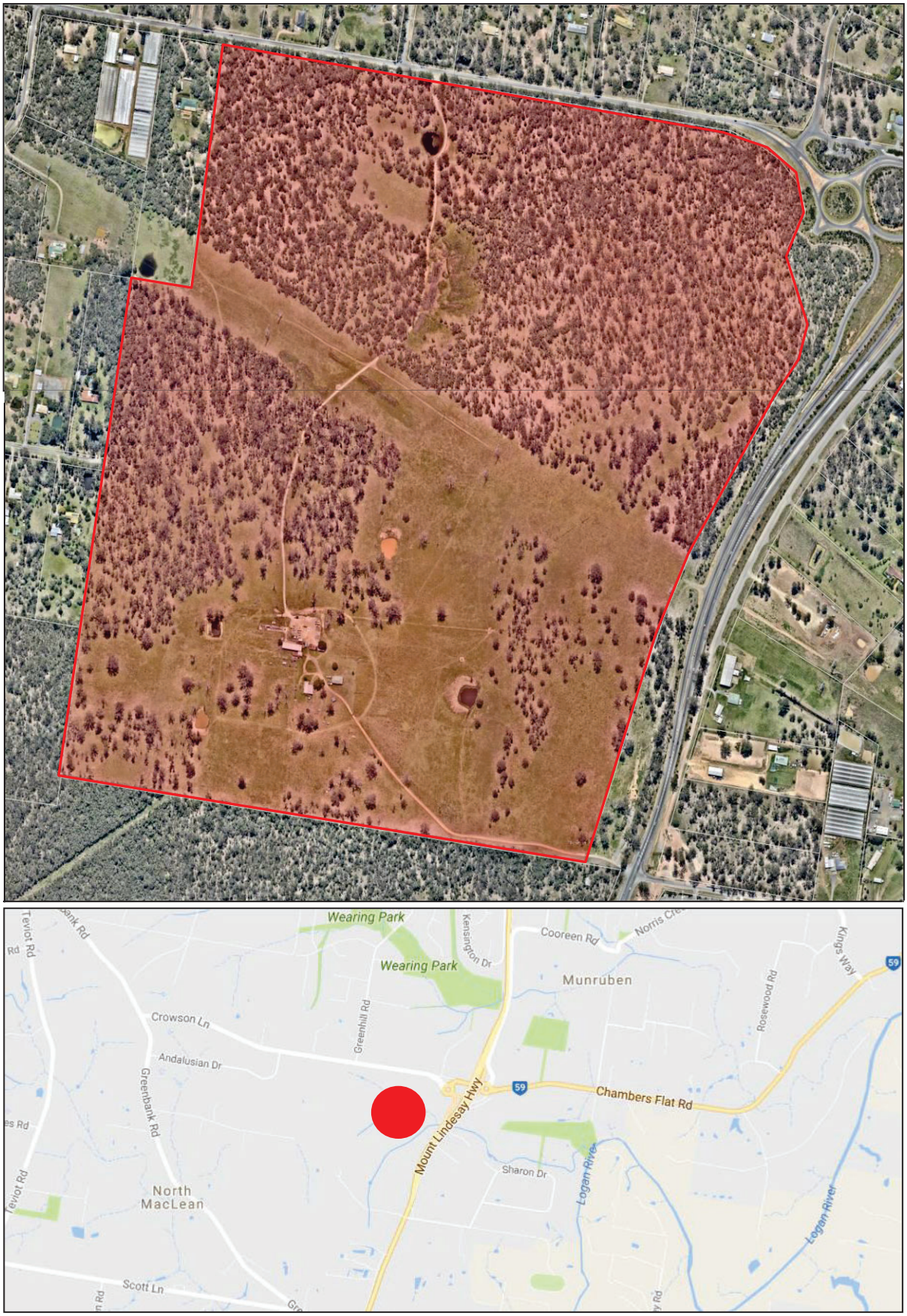


FIGURE 2.2 – LOCATION OF SUBJECT SITE

2.2 Existing Road Network

Crowson Lane is a two lane rural road providing through movement between the Mount Lindesay Highway and Greenbank Road, and also access to adjoining rural residential properties. Crowson Lane generally has a posted speed limit of 80km/hr, with a reduced speed limit of 60km/hr near the Mount Lindesay Highway interchange. Crowson Lane intersects with the Mount Lindesay Highway interchange via a single lane roundabout which was constructed as part of the Mount Lindesay Highway upgrade.

The Mount Lindesay Highway is a State controlled road and is the primary arterial route south of the Logan Motorway and west of the Pacific Motorway. Adjacent to the subject site the highway has been upgraded to a dual carriageway road however currently only a single lane is provided in each direction. The highway has been designed to suit a future upgrade to four lanes.

The Mount Lindesay Highway / Chambers Flat Road / Crowson Lane interchange comprises of a roundabout on each side with a connecting overbridge. On and off ramps to the Highway are provided for each direction of travel.

Images of Crowson Lane and the Crowson Lane / Mount Lindesay Highway interchange are shown in Figures 2.3 to 2.4.

FIGURE 2.3 – IMAGES OF CROWSON LANE ADJACENT TO THE SITE

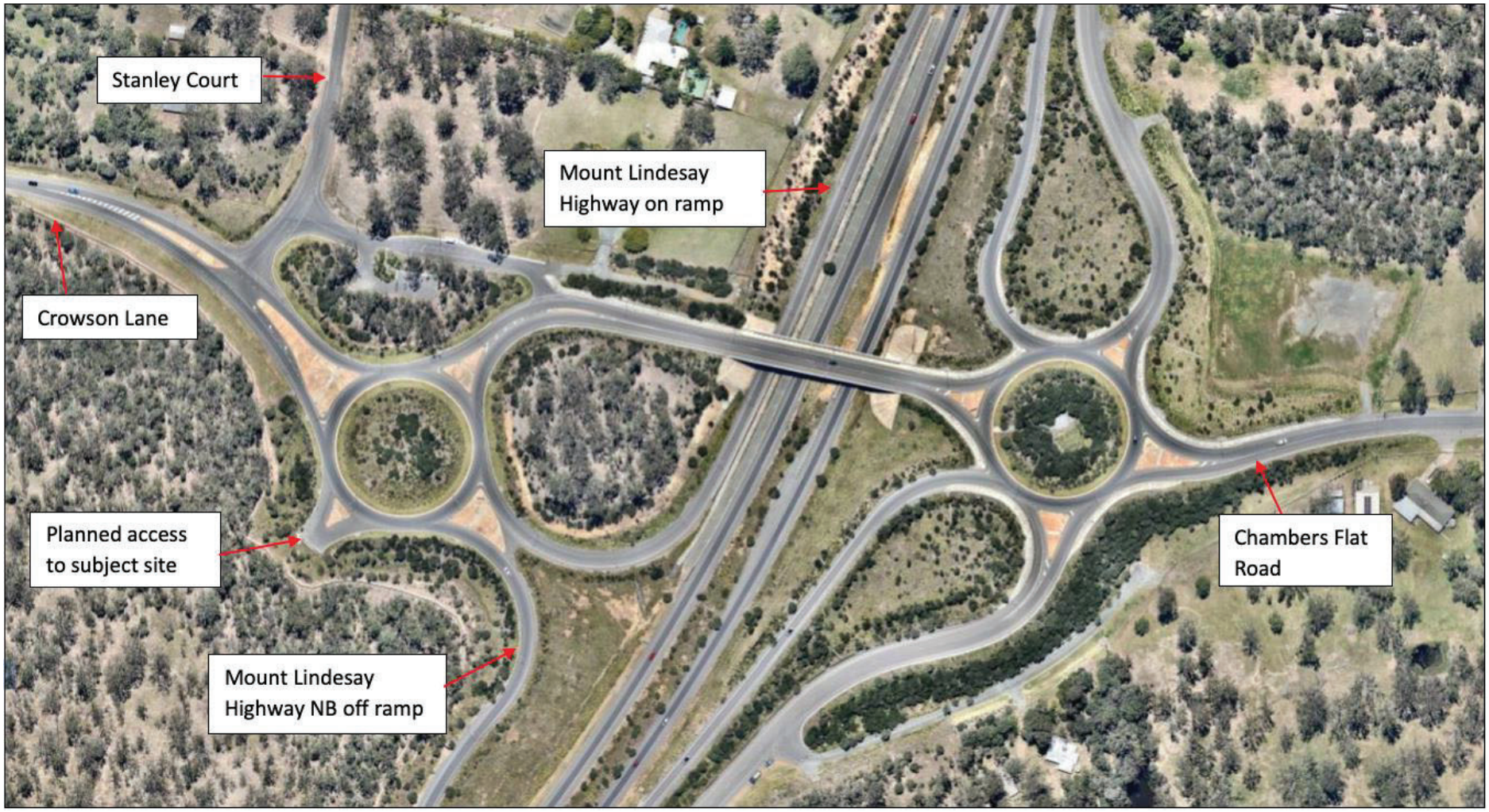


FIGURE 2.4 – EXISTING INTERCHANGE BETWEEN MT LINDESAY HIGHWAY AND CHAMBERS FLAT ROAD AND CROWSON LANE

Rytenskild Traffic Engineering carried out peak period traffic counts at the Mt Lindesay Highway / Crowson Lane intersection (roundabout) in November 2016. A summary of the surveyed peak hour volumes is provided below. As shown, traffic volumes at the intersection are currently low and particularly on the Crowson Lane leg.

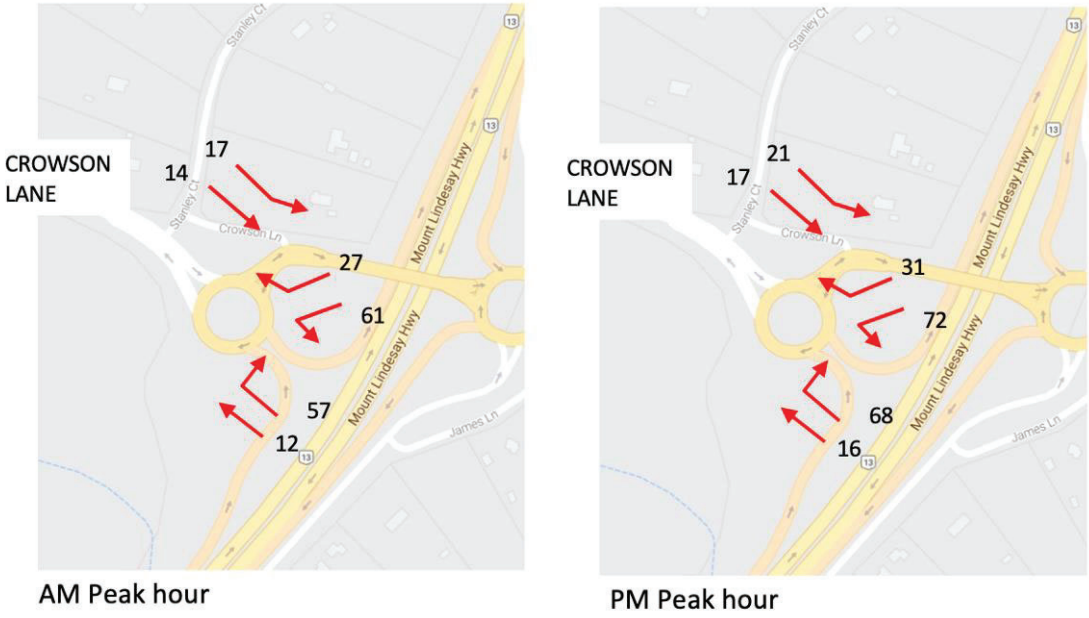


FIGURE 2.5 – SURVEYED (2016) PEAK HOUR TRAFFIC VOLUMES AT THE MT LINDESAY HIGHWAY / CROWSON LANE INTERSECTION

2.3 Planning Future Road Network

Detailed road network planning has been carried out as part of studies associated with the Greater Flagstone Priority Development Area (GFPDA) and also by TMR. As shown in Figures 2.6 – 2.9, it is intended that Crowson Lane will upgraded to a major east/west link connecting the Mount Lindesay Highway to Greenbank Road and Teviot Road. The TMR West Mount Lindesay Highway Development Corridor Major Road Network Study prepared in 2010 states the following objectives in relation to Crowson Lane:

Crowson Lane	Upgrade the corridor to provide for major traffic growth and travel demand. Improve pedestrian and cycle facilities adjacent and across the corridor. Ensure existing sensitive land uses are appropriately mitigated from the adverse impacts of traffic growth or transitioned to less sensitive uses over time. Minimise the number of access points to improve safety and capacity. Develop an appropriate level of bus priority.

In the West Mount Lindesay Highway study prepared by TMR, it is stated that Crowson Lane, along with other roads in the area, would become a major urban arterial east – west link. As shown in Figure 2.8, Crowson Lane will provide a direct connection between the Mount Lindesay Highway and Teviot Road, which will be the major north -south corridor through Flagstone, extending down too Bromelton.

Figure 14.1 ***2056 Future Road Network***

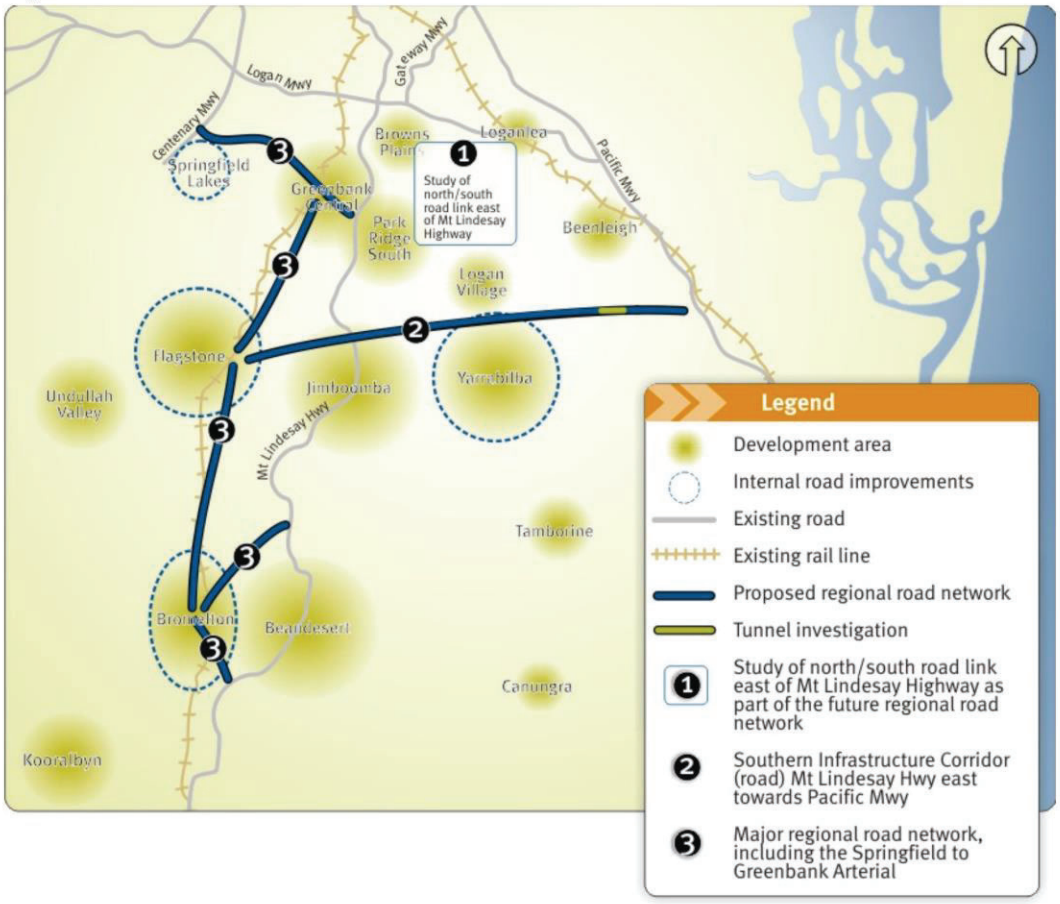


FIGURE 2.6 – PLANNED LONG TERM ROAD NETWORK

SOURCE: TMR MT LINDESAY / BEAUDESERT STRATEGIC TRANSPORT NETWORK INVESTIGATION 2009

Map 3 - Centres and transport network

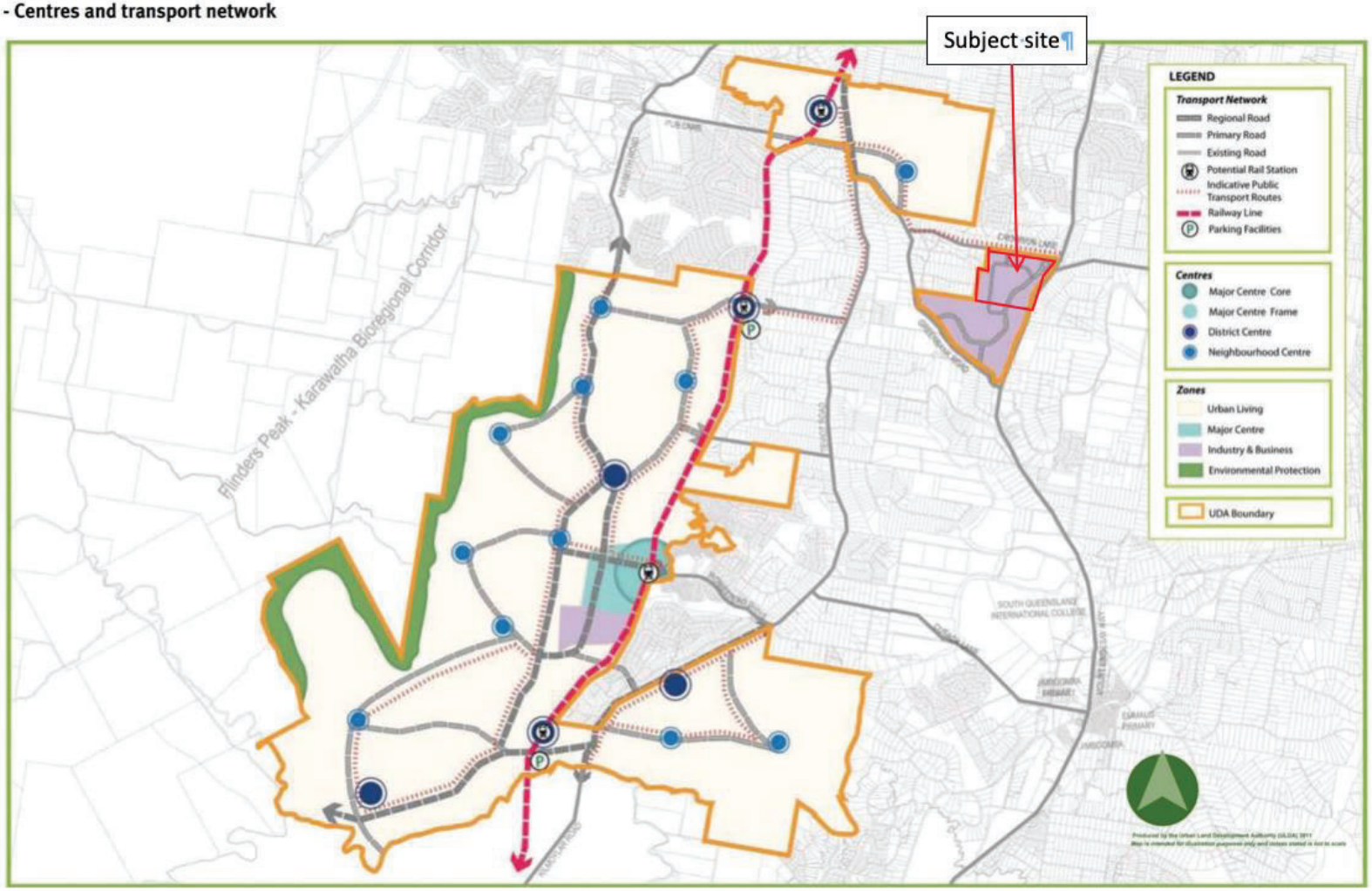


FIGURE 2.7 – STRATEGIC TRANSPORT NETWORK

SOURCE: GREATER FLAGSTONE PRIORITY DEVELOPMENT AREA

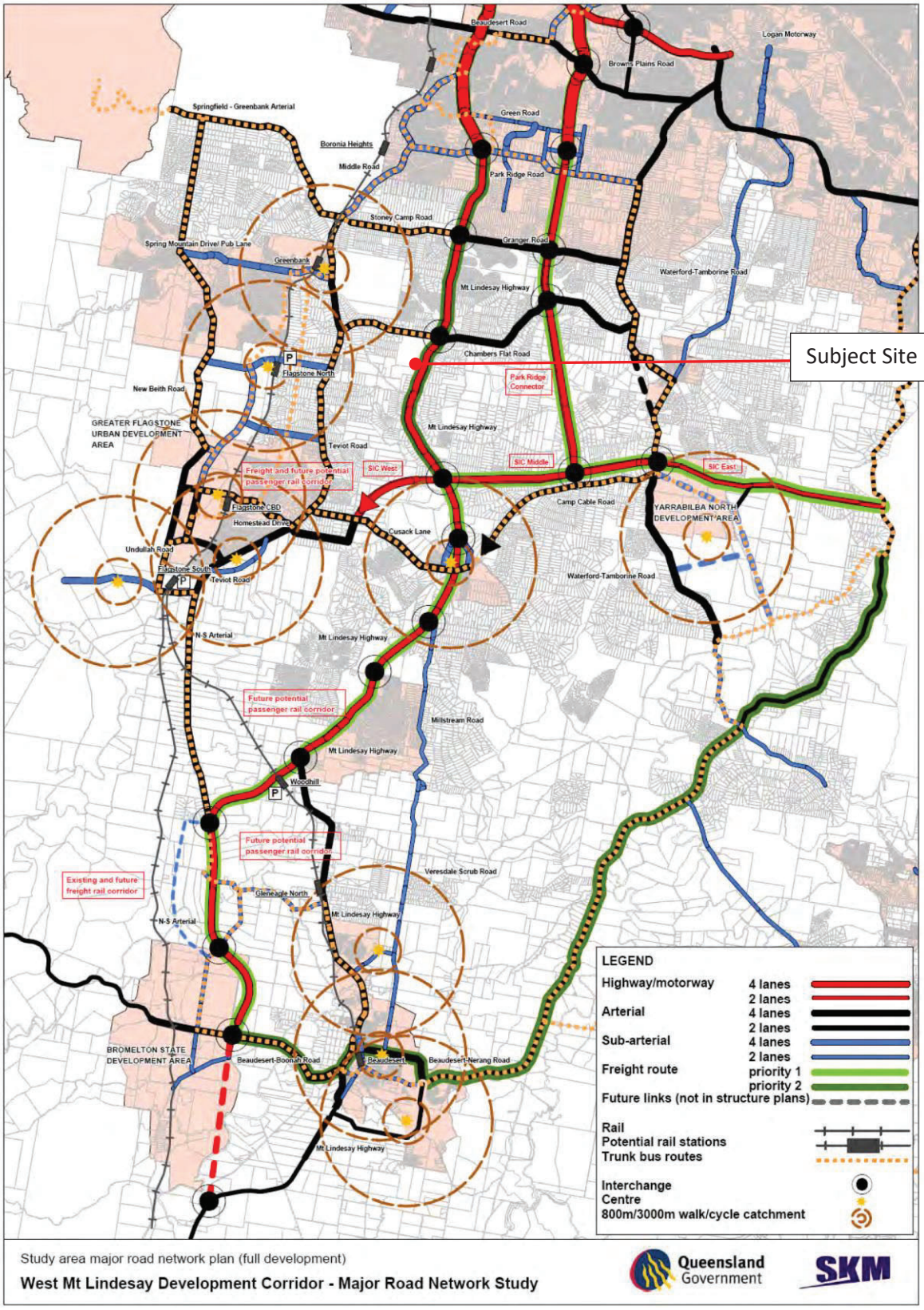


Figure 7.1 Proposed major road network plan for the study area (full development)

FIGURE 2.8 – FUTURE ROAD NETWORK PLANNING (OVERALL NETWORK)

SOURCE: WEST MT LINDESAY HWY DEVELOPMENT CORRIDOR MAJOR ROAD NETWORK STUDY 2010

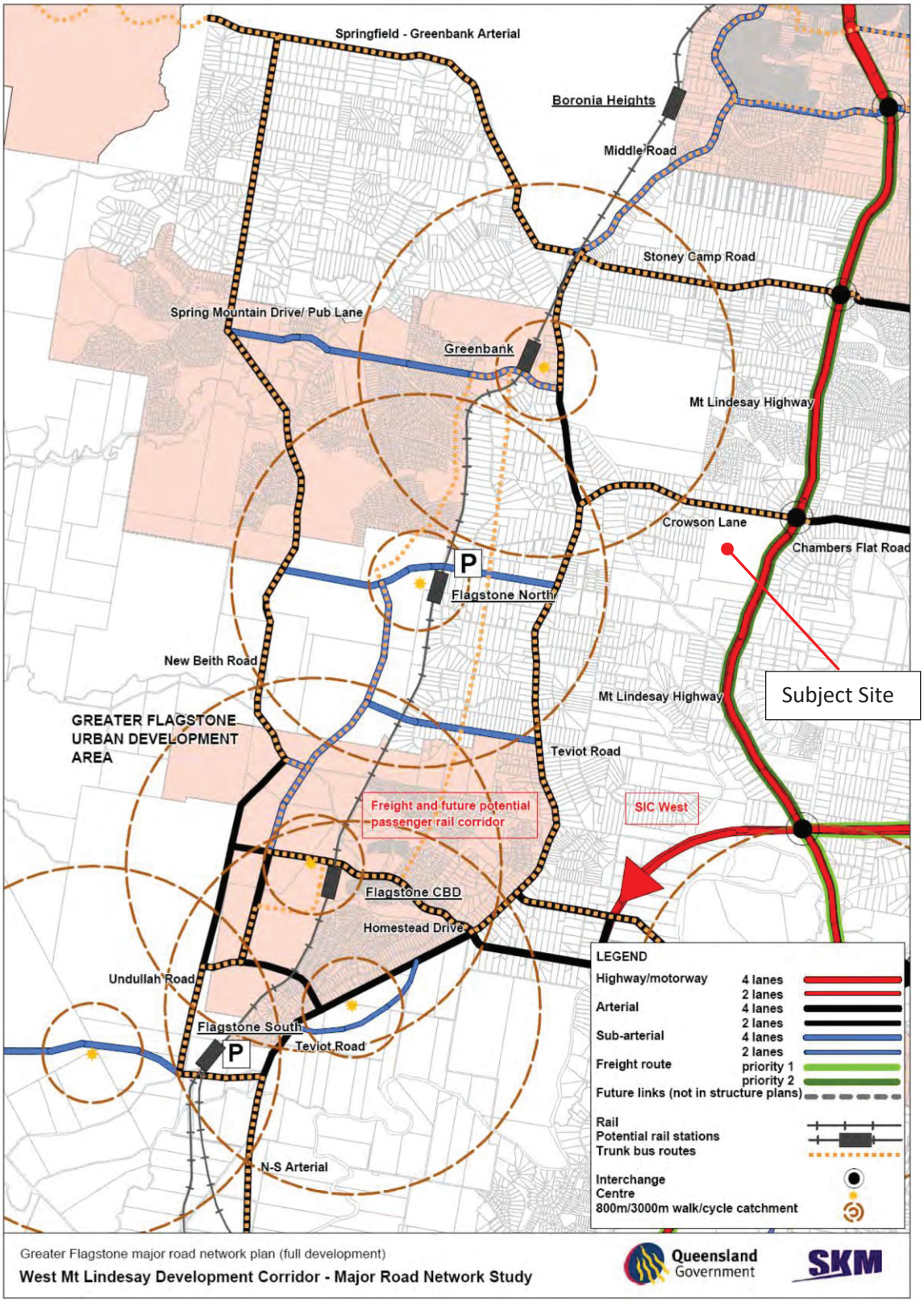


Figure 7.2 Proposed major road network plan for Greater Flagstone

FIGURE 2.9 – FUTURE ROAD NETWORK PLANNING (GREATER FLAGSTONE)

SOURCE: WEST MT LINDESAY HWY DEVELOPMENT CORRIDOR MAJOR ROAD NETWORK STUDY 2010

3.0 DEVELOPMENT PROPOSAL

3.1 Proposed Layout

The proposed plan of development comprises of a 4 lot industrial subdivision (refer to Figure 3.1). The areas of the proposed lots are as follows:

Lot 1: 14.97 hectares
Lot 2: 20.0 hectares
Lot 3: 26.68 hectares
Lot 4: 50.17 hectares
Total: 111.82 hectares

3.2 Vehicle Access

It is proposed that access be gained via the planned service road along the Mt Lindesay Highway frontage of the site, and a new intersection with Crowson Lane, opposite Greenhill Road. It is expected that there will be some individual lot access from the service road. The appropriate location of those access points would be addressed as part of a future application when specific details are known.

The intersection on Crowson Lane will be constructed as a priority controlled junction with dedicated left and right turn lanes. An 8 metre wide land dedication will be provided along the site frontage to achieve a 29 metre wide road reserve. This will allow the Rural Arterial – Single Carriageway to be achieved.

It is envisaged that traffic signals will be required in the long term when Crowson Lane is upgraded to a four lane profile (Urban Collector Road – Multi Modal Dual Carriageway). It is envisaged in the ultimate scenario that a further 8m wide dedication will be provided on the northern side of Crowson Lane. Together with the 8m wide land dedication on the southern site of Crowson Lane provided as part of this application, the required ultimate road reserve width of 37m will be achieved.

Concept plans of the interim and ultimate intersection arrangements are shown in Figures 3.2 and 3.3.

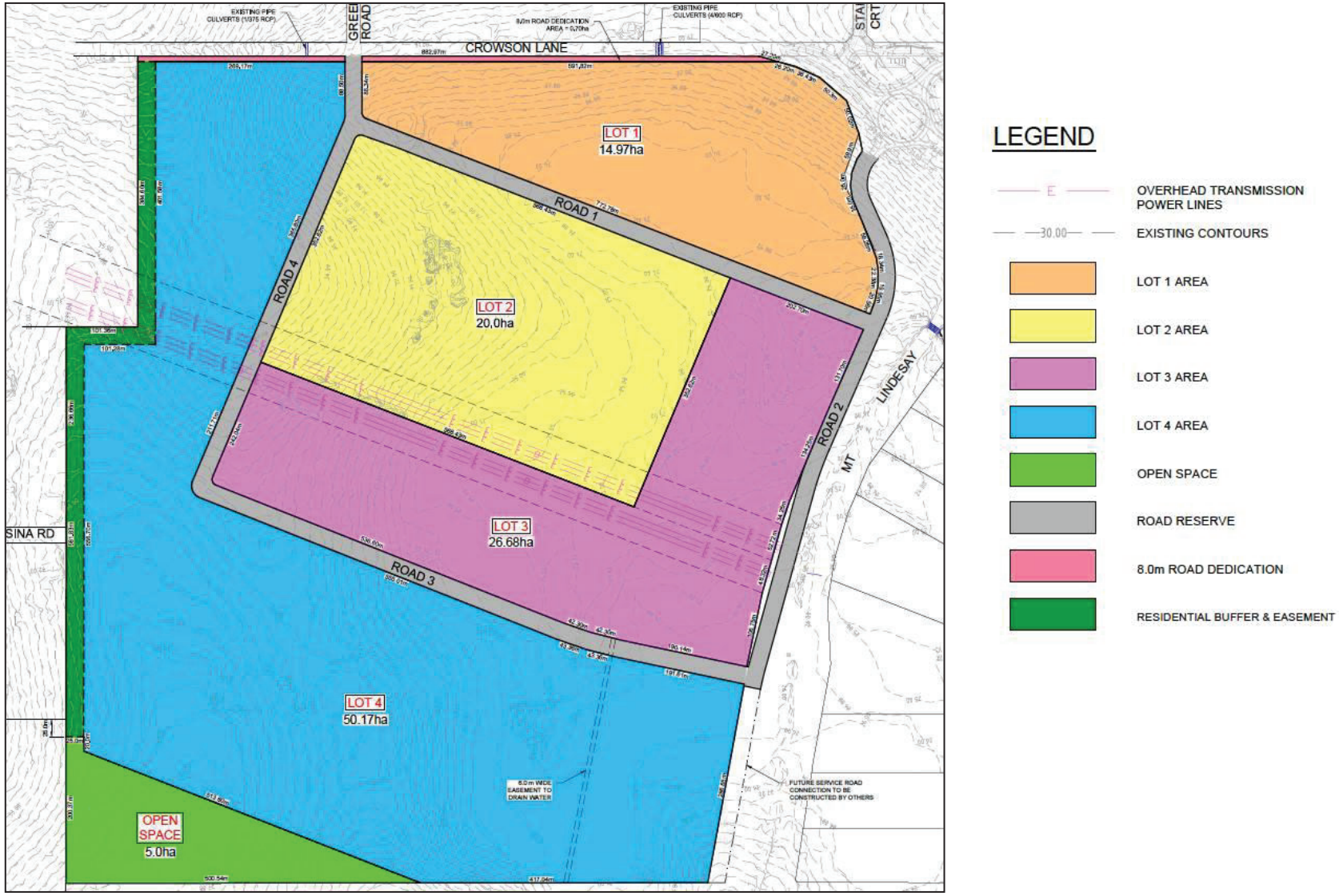


FIGURE 3.1 – PROPOSED SITE PLAN

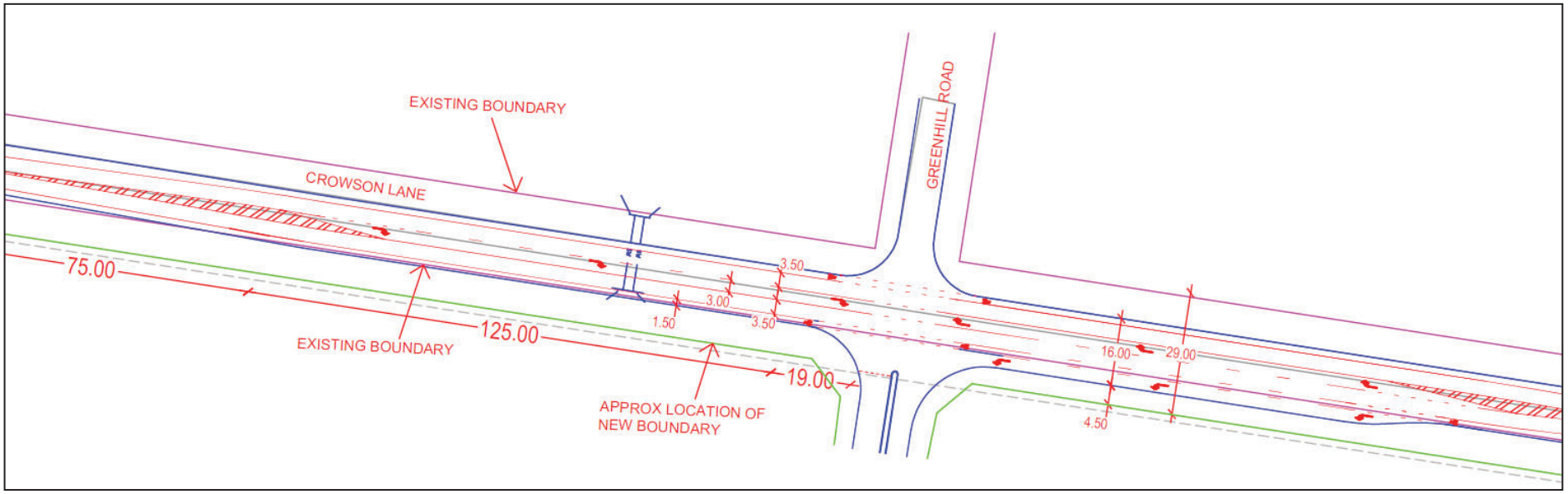


FIGURE 3.2 – PROPOSED INTERSECTION WITH CROWSON LANE (INTERIM LAYOUT)

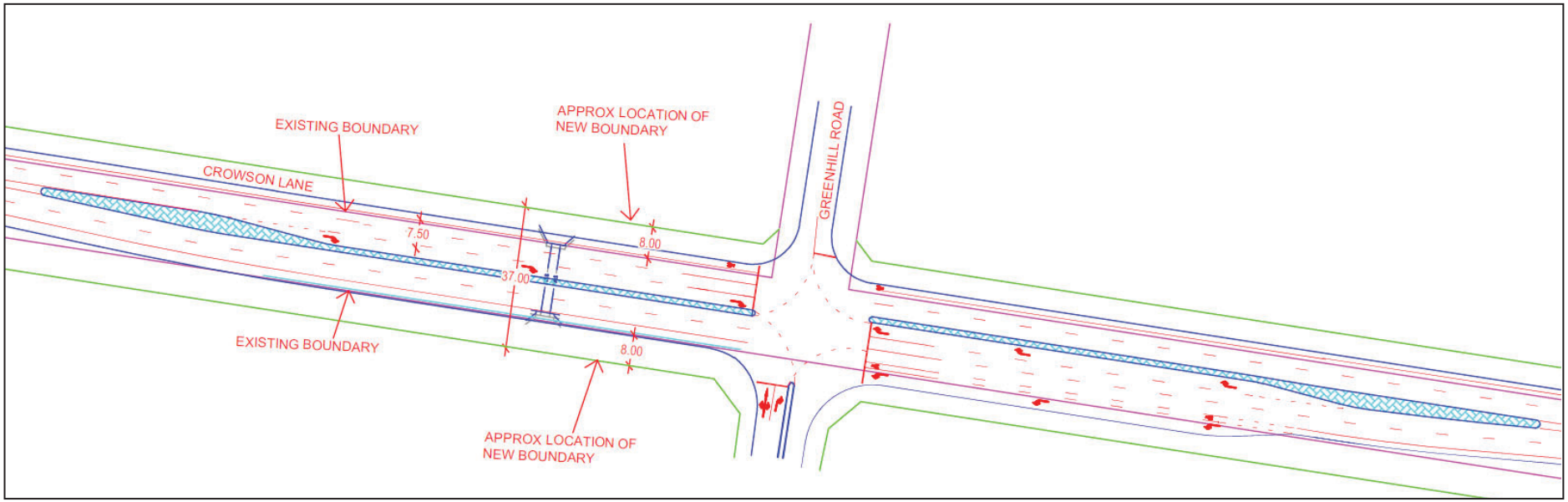


FIGURE 3.3 – PROPOSED INTERSECTION WITH CROWSON LANE (ULTIMATE LAYOUT)

4.0 DEVELOPMENT TRAFFIC

4.1 Trip Generation

Given the location of the site and the size of the proposed lots, it is expected that the estate will generally be occupied by 'large' users such a warehouses, factories and distribution centres. The following trip rates are considered to be appropriate for the site given its scale and isolation from other industrial areas:

Peak Hour Trips: 0.2 trips per 100m^2 GFA
Daily trips - 4 trips per 100m^2 GFA

The above rates are based on surveys of a large industrial parcel at Yatala which has similar lot characteristics to the proposal. A sensitivity analysis has also been carried out using a rate of 0.4 peak hour trips / 100m^2 GFA, which is specified by the TMR RPDM for warehouse uses.

Assuming a 45% site cover to the developable area of 111.82 hectares, the potential total floor area of future development in the estate is 503,000m^2. Application of the above trip rate (0.4) results in a trip generation estimate of 2,000 vehicle trips per hour.

Table 4.1 – Estimated Development Traffic Generation (peak hour)

Morning Peak Hour			Afternoon Peak Hour		
In	Out	Total	In	Out	Total
1,400	600	**2,000**	800	1,200	**2,000**

Peak Hour Distribution: AM 70 / 30, PM – 40 / 60

4.2 Traffic Distribution

The distribution of trips generated by the estate will vary as the surrounding area and road network develops, particularly large residential estates such as Flagstone and Flinders (to the west), and Yarrabilba (to the east). However, for the purposes of this assessment, the following distribution is considered to be reasonable :

To / from the north on the Mt Lindesay Hwy - 65%
To / from the south on the Mt Lindesay Hwy - 10%
To / from the east via Chambers Flat Road - 10%
To / from the west via Crowson Lane / Greenbank Rd - 15%

The majority of heavy vehicles generated by the estate will travel to and from the north via the Mt Lindesay Highway, connecting to the Logan, Gateway and Pacific Motorways.

Resultant estimates of peak hour traffic distributions are shown in Figures 4.1 and 4.2.

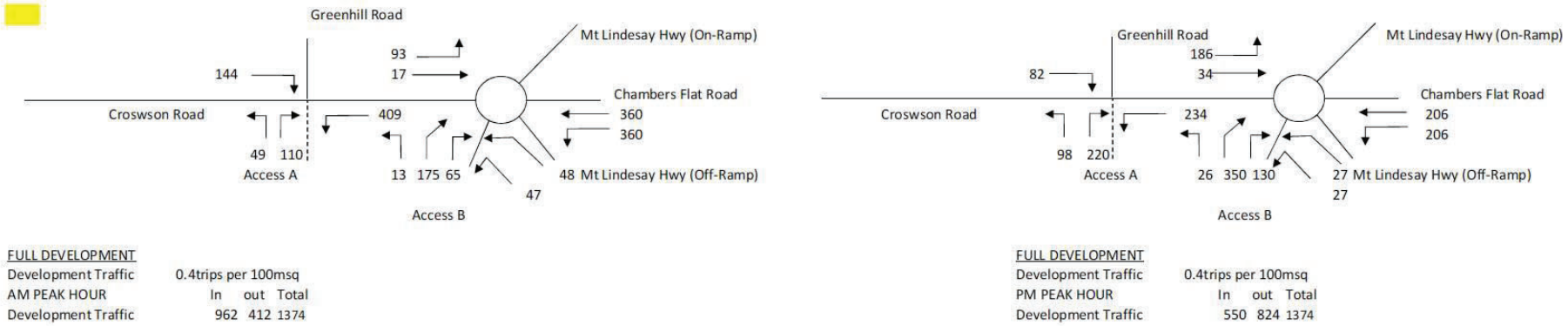
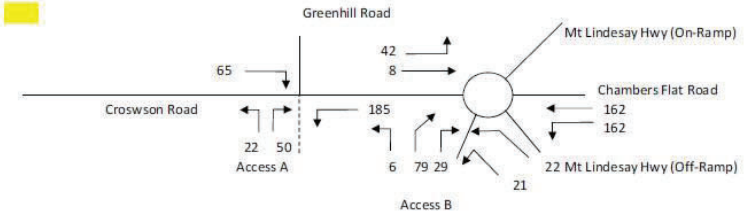
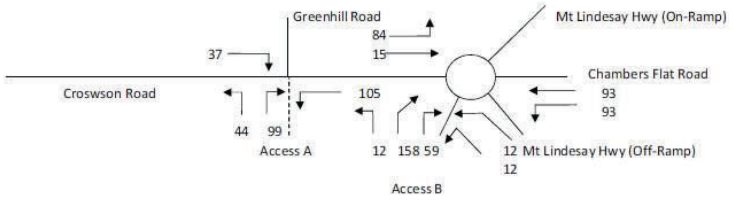


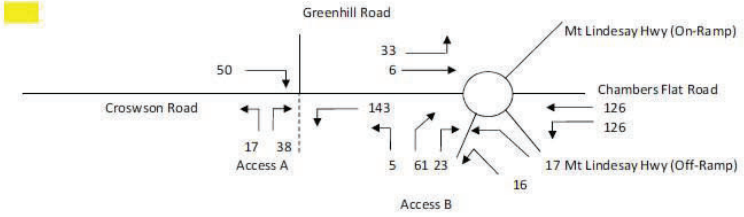
FIGURE 4.1 – DEVELOPMENT TRAFFIC ESTIMATES (FULL DEVELOPMENT)



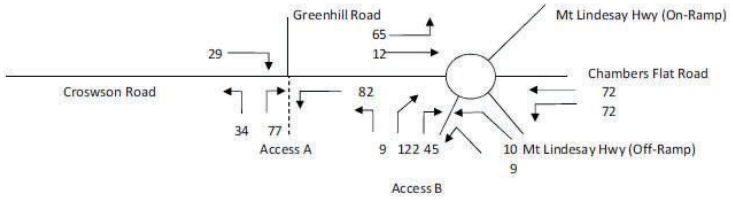
LOTS 1 & 2 ONLY 34 ha = ###
Development Traffic 0.4trips per 100msq
AM PEAK HOUR In out Total
Development Traffic **434 186 620**



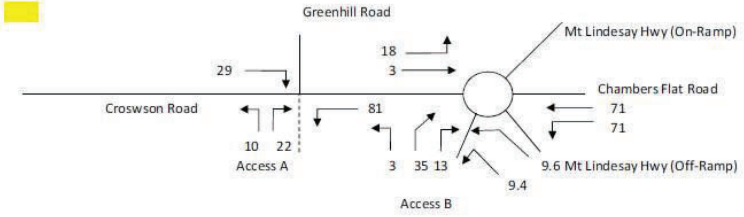
LOTS 1 & 2 ONLY 34 ha = ###
Development Traffic 0.4trips per 100msq
PM PEAK HOUR In out Total
Development Traffic 248 372 620



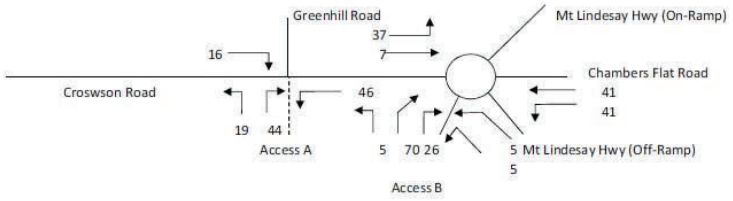
LOT 3 ONLY 27 ha = ###
Development Traffic 0.4trips per 100msq
AM PEAK HOUR In out Total
Development Traffic **336 144 480**



LOT 3 ONLY 27 ha = ###
Development Traffic 0.4trips per 100msq
PM PEAK HOUR In out Total
Development Traffic 192 288 480

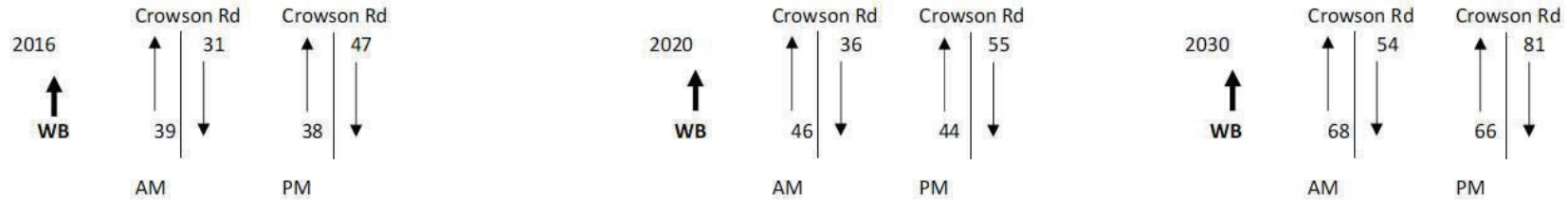


LOT 4 ONLY 15 ha = ###
Development Traffic 0.4trips per 100msq
AM PEAK HOUR In out Total
Development Traffic **191 82 273**



LOT 4 ONLY 15 ha = ###
Development Traffic 0.4trips per 100msq
PM PEAK HOUR In out Total
Development Traffic 109 164 273

FIGURE 4.2 – DEVELOPMENT TRAFFIC ESTIMATES (PER LOT)



AM Peak				4%										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
WB	39	41	42	44	46	47	49	51	53	56	58	60	62	65	68
EB	31	32	34	35	36	38	39	41	42	44	46	48	50	52	54

PM Peak				4%										
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
WB	38	40	41	43	44	46	48	50	52	54	56	58	61	63	66
EB	47	49	51	53	55	57	59	62	64	67	70	72	75	78	81

FIGURE 4.3 – ESTIMATES OF FUTURE BACKGROUND GROWTH ON CROWSON LANE

4.3 Road Network Impact

As shown in Section 2, traffic volumes on Crowson Lane and at the North Maclean interchange are currently low and the single lane on / off ramps and roundabouts function without any significant queuing or delays. As discussed in the West Mount Lindesay Highway Development Corridor Major Road Network Study, it is expected that Crowson Lane will eventually need to be upgraded to a four lane profile.

The traffic generation of the development was accounted for during the design of the Mount Lindesay Highway / Chambers Flat Road / Crowson Lane interchange. However, for completeness an analysis of year 2030 traffic conditions has been carried out to ensure that the roundabout will function satisfactorily under medium term traffic conditions. An annual traffic growth rate of 4% has been applied in order to estimate year 2030 background traffic volumes.

SIDRA software has been used to model the operation of the Mt Lindesay Highway / Crowson Lane roundabout at the year 2030, assuming the full development of the site and the background traffic volumes shown in Figure 4.4.

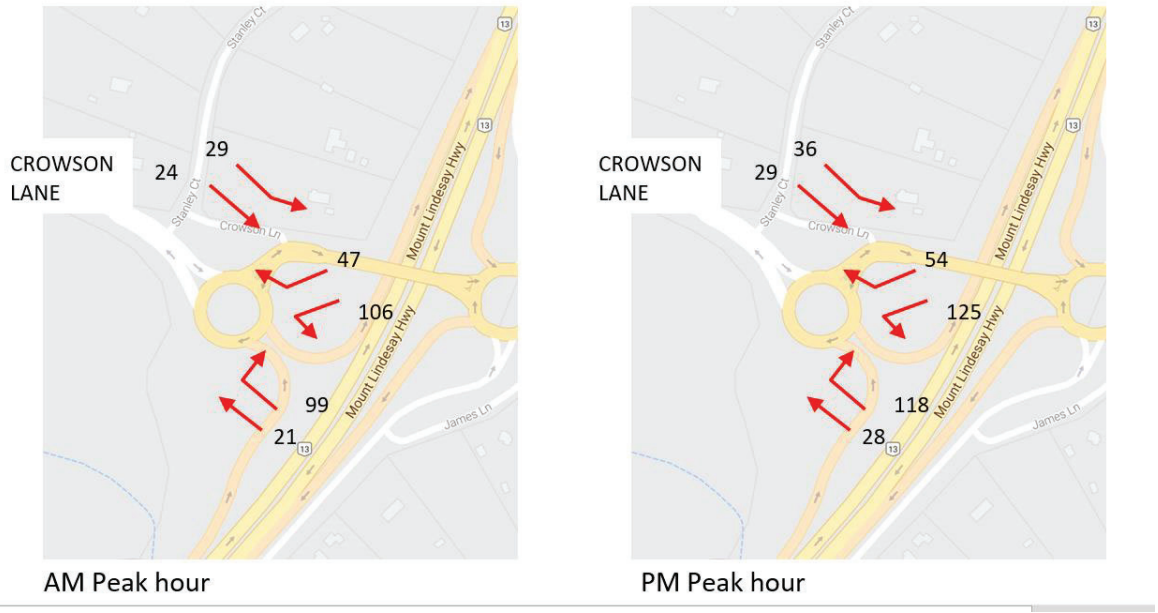


FIGURE 4.4 – ESTIMATED FUTURE BACKGROUND (2030) PEAK HOUR TRAFFIC VOLUMES AT THE MT LINDESAY HWY / CROWSON LANE INTERSECTION

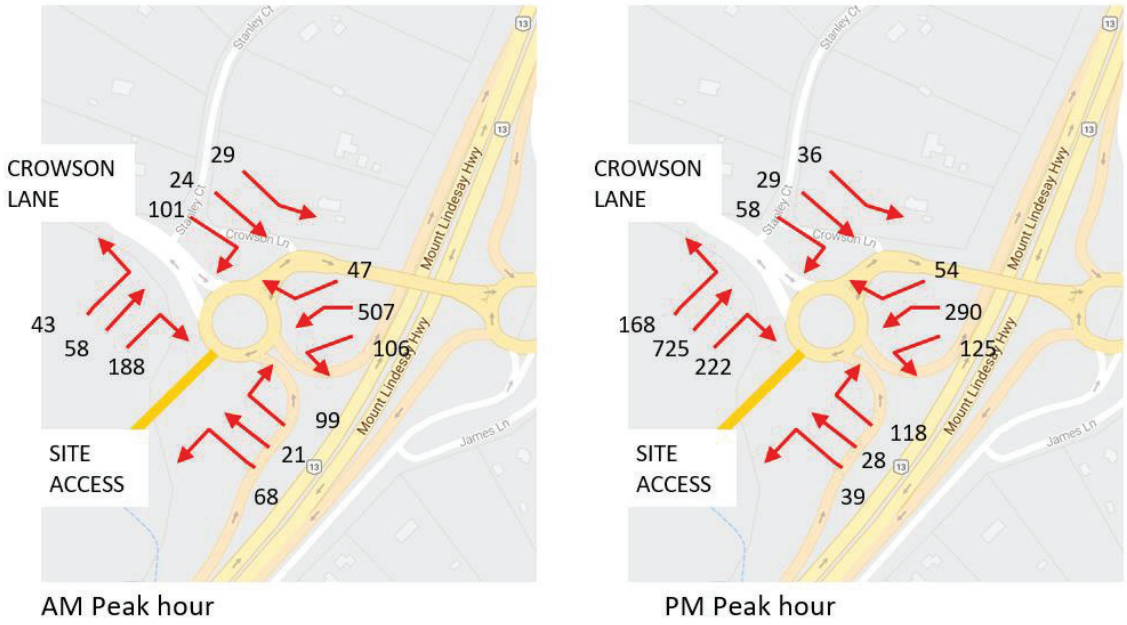


FIGURE 4.5 – ESTIMATED YEAR 2030 PEAK HOUR TRAFFIC VOLUMES AT THE MT LINDESAY HWY / CROWSON LANE INTERSECTION (WITH DEV)

Detailed SIDRA output for the Mt Lindesay Highway / Crowson Lane intersection is provided as Appendix B. As shown, the analysis indicates that the intersection will function satisfactorily under the project year 2030 traffic conditions.

The analysis indicates that a short queue of up to five vehicles will form on the service road approach to the Crowson Lane roundabout. The proposed Road 2 intersection will be located over 200 metres south of the roundabout. As shown in Figure 4.5, traffic modelling indicates that vehicles queuing at the proposed service road / Road 1 intersection will be low and well clear of the Crowson Lane intersection.

The service road will be designed so that there is sufficient width available for southbound through traffic to pass vehicles queued to turn right into the proposed estate roads.

MORNING PEAK HOUR

MOVEMENT SUMMARY

Site: Road 1 / Road 2 North Maclean AM peak

Road 1 (Serv Rd) / Road 2 AM PEAK HOUR
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 1 (SERV RD)											
1	L2	5	20.0	0.092	5.8	LOS A	0.0	0.0	0.00	0.02	57.2
2	T1	153	20.0	0.092	0.0	LOS A	0.0	0.0	0.00	0.02	59.8
Approach		158	20.0	0.092	0.2	NA	0.0	0.0	0.00	0.02	59.7
North: ROAD 1 (SERV RD)											
8	T1	356	20.0	0.206	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	356	20.0	0.258	6.6	LOS A	1.4	11.3	0.35	0.59	51.5
Approach		712	20.0	0.258	3.3	NA	1.4	11.3	0.18	0.29	55.4
West: ROAD 2											
10	L2	153	20.0	0.120	6.5	LOS A	0.5	4.2	0.29	0.55	52.5
12	R2	5	20.0	0.019	17.0	LOS C	0.1	0.5	0.75	0.86	44.9
Approach		158	20.0	0.120	6.8	LOS A	0.5	4.2	0.30	0.56	52.2
All Vehicles		1027	20.0	0.258	3.4	NA	1.4	11.3	0.17	0.29	55.5

AFTERNOON PEAK HOUR

MOVEMENT SUMMARY

Site: Road 1 / Road 2 North Maclean PM peak

Road 1 (Serv Rd) / Road 2 PM PEAK HOUR
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 1 (SERV RD)											
1	L2	5	20.0	0.180	5.8	LOS A	0.0	0.0	0.00	0.01	57.2
2	T1	305	20.0	0.180	0.0	LOS A	0.0	0.0	0.00	0.01	59.9
Approach		311	20.0	0.180	0.1	NA	0.0	0.0	0.00	0.01	59.8
North: ROAD 1 (SERV RD)											
8	T1	203	20.0	0.118	0.0	LOS A	0.0	0.0	0.00	0.00	60.0
9	R2	203	20.0	0.178	7.4	LOS A	0.8	6.8	0.47	0.66	51.2
Approach		406	20.0	0.178	3.7	NA	0.8	6.8	0.23	0.33	55.2
West: ROAD 2											
10	L2	305	20.0	0.289	7.6	LOS A	1.3	10.8	0.47	0.67	51.9
12	R2	5	20.0	0.014	13.5	LOS B	0.0	0.4	0.66	0.78	47.0
Approach		311	20.0	0.289	7.7	LOS A	1.3	10.8	0.48	0.67	51.8
All Vehicles		1027	20.0	0.289	3.8	NA	1.3	10.8	0.24	0.34	55.4

FIGURE 4.5 – MODELLING OF PROPOSED SERVICE ROAD / ROAD 1 INTERSECTION

5.0 RESPONSIBILITY FOR SERVICE ROAD CONSTRUCTION

The proposed road layout includes the construction of the highway service road along the site frontage. It is understood that the service road is planned by TMR, given that land has been taken from the subject site for its future construction. Furthermore, a stub has been provided at the interchange roundabout to establish its alignment.

This is considered to be a highly desirable outcome for the local area for the following reasons:

- The service road will be critical to providing connectivity to the balance of the SDA area to the south and Greenbank Road. It is also an important component of the highway system as it will provide for local trips and allow for alternative movement in the event that the highway needs to be closed due to an incident or road works.
- The future extension of the service road to the south will enable traffic generated by that area to access the Mt Lindesay Highway via the existing grade – separated interchange at Chambers Flat Road / Crowson Lane. Whilst traffic signals are planned to be constructed at the Mt Lindesay Highway / Greenbank Road intersection, these are considered to be an interim solution until the Highway is grade – separated through to Jimboomba. The service road will allow access to the existing grade separate interchange, which will reduce pressure on and extend the life of the at grade intersection (signals) at Greenbank Road.
- The connection of the service road to the south will allow local trips to occur within the SDA area and other local areas instead of those vehicles having to make short trips on the Highway between Greenbank Road and Crowson Lane.

The connectivity of the proposed road network within the site between Crowson Lane and the service road is an added benefit as it will reduce impact upon the existing roundabout at the Highway / Crowson Lane interchange. The proposal would establish the formation of the service road so that it can be extended as development occurs to the south. This will encourage the development of the local road network between Crowson Lane and Greenbank Road.

Considering the benefit of the service road to the local area and wider road network, it is considered that the service road will serve a trunk purpose, and therefore its construction cost should be fully creditable.

6.0 SUMMARY OF CONCLUSIONS & RECOMMENDATIONS

- The subject site is located within the Greater Flagstone Priority Development Area (GFPDA), and is part of the nominated North Maclean Industry and Business Zone. The site is located to the southwest of the Mount Lindesay Highway / Crowson Lane interchange roundabout, and has an area of approximately 118 hectares.

- The proposed plan of development comprises of a four lot industrial subdivision, with a total developable area of approximately 111 hectares. It is proposed that access be gained via the planned service road along the Mt Lindesay Highway frontage of the site, and a new intersection with Crowson Lane, opposite Greenhill Road. The intersection on Crowson Lane will be constructed as a priority controlled junction with dedicated left and right turn lanes. It is envisaged that traffic signals will be required when Crowson Lane is upgraded to a four lane profile.

- Crowson Lane is a two lane rural road providing through movement between the Mount Lindesay Highway and Greenbank Road, and also access to adjoining rural residential properties. Crowson Lane generally has a posted speed limit of 80km/hr, with a reduced speed limit of 60km/hr near the Mount Lindesay Highway interchange.

- Road network planning carried out by the Department of Transport and Main Roads as part of the *West Mount Lindesay Highway Development Corridor Major Road Network Study* indicates that Crowson Lane will be upgraded to a four lane sub-arterial road, and will function as a primary east – west link between the Mount Lindesay Highway and Teviot Road.

- Traffic analysis for projected volumes (assuming 4% pa growth) at the year 2030 indicate that the Mt Lindesay Highway / Crowson Lane intersection will function satisfactorily with the proposed development. Traffic modelling indicates that the proposed interim (priority controlled) intersection on Crowson Lane will operate satisfactorily for a considerable period of time. The need for traffic signals will primarily depend on population growth in the area and resultant background traffic growth on Crowson Lane.

- Considering the benefit of the service road to the local area and wider road network, it is considered that the service road will serve a trunk purpose, and therefore its construction cost should be fully creditable (refer to Section 5).

APPENDICES

APPENDIX A – PERFORMANCE CRITERIA (INTERSECTION MODELLING)
APPENDIX B – SIDRA MODELLING (INTERIM INTERSECTION ON CROWSON LANE)
APPENDIX C – SIDRA MODELLING (ULTIMATE INTERSECTION ON CROWSON LANE)
APPENDIX D – SIDRA MODELLING (CROWSON LANE / HIGHWAY SERVICE ROAD)

APPENDIX A – PERFORMANCE CRITERIA (INTERSECTION PERFORMANCE)

1. Level of Service (LOS)

LOS	Traffic Signals and Roundabouts	Give Way and Stop Signs
'A'	Good operation.	Good operation.
'B'	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
'C'	Satisfactory.	Satisfactory but accident study required.
'D'	Operating near capacity.	Near capacity and accident study required.
'E'	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.
'F'	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode.

2. Average Vehicle Delay (AVD)

The AVD provides a measure of the operational performance of an intersection as indicated on the table below which relates AVD to LOS. The AVD's listed in the table should be taken as a guide only as longer delays could be tolerated in some locations (i.e. inner city conditions) and on some roads (i.e. minor side street intersecting with a major arterial route).

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation.	Good operation.
B	15 to 28	Good with acceptable delays and spare capacity.	Acceptable delays and spare capacity.
C	29 to 42	Satisfactory.	Satisfactory but accident study required.
D	43 to 56	Operating near capacity.	Near capacity and accident study required.
E	57 to 70	At capacity; at signals incidents will cause excessive delays. Roundabouts require other control mode.	At capacity and requires other control mode.

3. Degree of Saturation (DS)

The DS is another measure of the operational performance of individual intersections.

For intersections controlled by **traffic signals**[1] both queue length and delay increase rapidly as DS approaches 1, and it is usual to attempt to keep DS to less than 0.9. Values of DS in the order of 0.7 generally represent satisfactory intersection operation. When DS exceeds 0.9 queues can be anticipated.

For intersections controlled by a **roundabout or GIVE WAY or STOP signs**, satisfactory intersection operation is indicated by a DS of 0.8 or less.

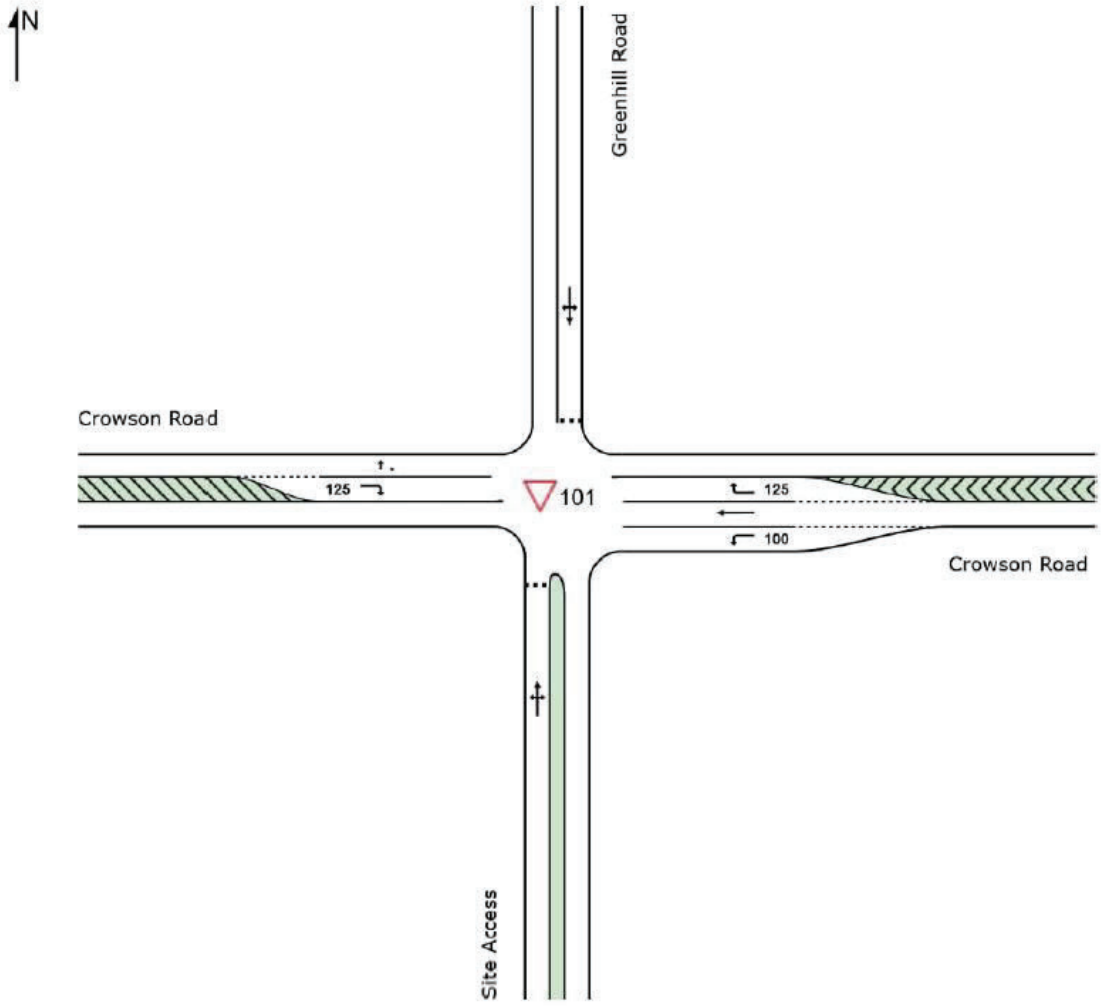
[1] *The values of DS for intersections under traffic signal control are only valid for cycle length of 120 secs.*

APPENDIX B – SIDRA MODELLING (INTERIM INTERSECTION ON CROWSON LANE)

SITE LAYOUT

▽ Site: 101 [2020 AM Peak - With Development (Interim) - STAGES 1 & 2 ONLY]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)



MOVEMENT SUMMARY

Site: 101 [2020 AM Peak - With Development (Interim) - STAGES 1 & 2 ONLY]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	22	5.0	0.088	5.7	LOS A	0.3	2.2	0.19	0.58	0.19	52.3
2	T1	1	5.0	0.088	6.3	LOS A	0.3	2.2	0.19	0.58	0.19	52.8
3	R2	50	5.0	0.088	7.6	LOS A	0.3	2.2	0.19	0.58	0.19	52.4
Approach		73	5.0	0.088	7.0	LOS A	0.3	2.2	0.19	0.58	0.19	52.4
East: Crowson Road												
4	L2	185	5.0	0.103	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	46	10.0	0.025	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	5.0	0.009	5.6	LOS A	0.0	0.4	0.15	0.55	0.15	52.5
Approach		251	5.9	0.103	4.6	NA	0.0	0.4	0.01	0.47	0.01	54.4
North: Greenhill Road												
7	L2	20	5.0	0.041	5.7	LOS A	0.1	1.0	0.12	0.56	0.12	52.9
8	T1	1	5.0	0.041	6.8	LOS A	0.1	1.0	0.12	0.56	0.12	53.4
9	R2	20	5.0	0.041	6.8	LOS A	0.1	1.0	0.12	0.56	0.12	52.6
Approach		41	5.0	0.041	6.3	LOS A	0.1	1.0	0.12	0.56	0.12	52.8
West: Crowson Road												
10	L2	20	5.0	0.031	5.6	LOS A	0.0	0.0	0.00	0.21	0.00	56.3
11	T1	36	10.0	0.031	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	58.0
12	R2	65	5.0	0.046	6.3	LOS A	0.2	1.5	0.34	0.58	0.34	52.0
Approach		121	6.5	0.046	4.3	NA	0.2	1.5	0.18	0.41	0.18	54.4
All Vehicles		486	5.8	0.103	5.0	NA	0.3	2.2	0.09	0.48	0.09	53.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [2020 PM Peak - With Development (Interim) - STAGES 1 & 2 ONLY]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	44	5.0	0.165	5.8	LOS A	0.6	4.3	0.19	0.58	0.19	52.5
2	T1	1	5.0	0.165	6.1	LOS A	0.6	4.3	0.19	0.58	0.19	53.0
3	R2	99	5.0	0.165	7.3	LOS A	0.6	4.3	0.19	0.58	0.19	52.5
Approach		144	5.0	0.165	6.8	LOS A	0.6	4.3	0.19	0.58	0.19	52.5
East: Crowson Road												
4	L2	105	5.0	0.059	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	44	10.0	0.024	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	5.0	0.009	5.7	LOS A	0.0	0.4	0.18	0.54	0.18	52.4
Approach		169	6.3	0.059	4.2	NA	0.0	0.4	0.02	0.42	0.02	54.8
North: Greenhill Road												
7	L2	20	5.0	0.041	5.8	LOS A	0.1	1.0	0.16	0.56	0.16	52.8
8	T1	1	5.0	0.041	6.2	LOS A	0.1	1.0	0.16	0.56	0.16	53.3
9	R2	20	5.0	0.041	6.9	LOS A	0.1	1.0	0.16	0.56	0.16	52.6
Approach		41	5.0	0.041	6.3	LOS A	0.1	1.0	0.16	0.56	0.16	52.7
West: Crowson Road												
10	L2	20	5.0	0.041	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	56.7
11	T1	55	10.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
12	R2	37	5.0	0.024	6.0	LOS A	0.1	0.8	0.26	0.56	0.26	52.2
Approach		112	7.5	0.041	3.0	NA	0.1	0.8	0.09	0.29	0.09	56.0
All Vehicles		466	6.1	0.165	4.9	NA	0.6	4.3	0.10	0.45	0.10	54.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [2030 AM Peak - With Development (Interim) - STAGES 1 & 2 ONLY]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	22	5.0	0.093	5.8	LOS A	0.3	2.3	0.24	0.60	0.24	52.1
2	T1	1	5.0	0.093	6.6	LOS A	0.3	2.3	0.24	0.60	0.24	52.6
3	R2	50	5.0	0.093	7.9	LOS A	0.3	2.3	0.24	0.60	0.24	52.2
Approach		73	5.0	0.093	7.3	LOS A	0.3	2.3	0.24	0.60	0.24	52.2
East: Crowson Road												
4	L2	185	5.0	0.103	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	68	10.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	5.0	0.009	5.7	LOS A	0.0	0.4	0.18	0.54	0.18	52.4
Approach		273	6.2	0.103	4.2	NA	0.0	0.4	0.01	0.43	0.01	54.8
North: Greenhill Road												
7	L2	20	5.0	0.042	5.8	LOS A	0.1	1.0	0.16	0.57	0.16	52.7
8	T1	1	5.0	0.042	7.2	LOS A	0.1	1.0	0.16	0.57	0.16	53.2
9	R2	20	5.0	0.042	7.1	LOS A	0.1	1.0	0.16	0.57	0.16	52.5
Approach		41	5.0	0.042	6.5	LOS A	0.1	1.0	0.16	0.57	0.16	52.6
West: Crowson Road												
10	L2	20	5.0	0.041	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	56.7
11	T1	54	10.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
12	R2	65	5.0	0.047	6.4	LOS A	0.2	1.5	0.35	0.59	0.35	51.9
Approach		139	6.9	0.047	3.8	NA	0.2	1.5	0.17	0.36	0.17	55.0
All Vehicles		526	6.2	0.103	4.7	NA	0.3	2.3	0.10	0.45	0.10	54.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [2030 PM Peak - With Development (Interim) - STAGES 1 & 2 ONLY]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	44	5.0	0.174	5.8	LOS A	0.6	4.6	0.25	0.60	0.25	52.2
2	T1	1	5.0	0.174	6.5	LOS A	0.6	4.6	0.25	0.60	0.25	52.7
3	R2	99	5.0	0.174	7.8	LOS A	0.6	4.6	0.25	0.60	0.25	52.3
Approach		144	5.0	0.174	7.2	LOS A	0.6	4.6	0.25	0.60	0.25	52.3
East: Crowson Road												
4	L2	105	5.0	0.059	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	66	10.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	5.0	0.009	5.7	LOS A	0.0	0.4	0.21	0.54	0.21	52.3
Approach		191	6.7	0.059	3.7	NA	0.0	0.4	0.02	0.37	0.02	55.4
North: Greenhill Road												
7	L2	20	5.0	0.043	5.9	LOS A	0.1	1.1	0.21	0.57	0.21	52.7
8	T1	1	5.0	0.043	6.5	LOS A	0.1	1.1	0.21	0.57	0.21	53.2
9	R2	20	5.0	0.043	7.3	LOS A	0.1	1.1	0.21	0.57	0.21	52.4
Approach		41	5.0	0.043	6.6	LOS A	0.1	1.1	0.21	0.57	0.21	52.6
West: Crowson Road												
10	L2	20	5.0	0.056	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	57.1
11	T1	81	10.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.9
12	R2	37	5.0	0.025	6.0	LOS A	0.1	0.8	0.28	0.56	0.28	52.1
Approach		138	7.9	0.056	2.4	NA	0.1	0.8	0.08	0.24	0.08	56.7
All Vehicles		514	6.4	0.174	4.6	NA	0.6	4.6	0.11	0.42	0.11	54.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [2030 AM Peak - With Development (Interim) - FULL DEVELOPMENT]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	49	5.0	0.253	5.8	LOS A	0.9	6.7	0.30	0.65	0.30	50.8
2	T1	1	5.0	0.253	8.7	LOS A	0.9	6.7	0.30	0.65	0.30	51.3
3	R2	110	5.0	0.253	10.5	LOS B	0.9	6.7	0.30	0.65	0.30	50.9
Approach		160	5.0	0.253	9.1	LOS A	0.9	6.7	0.30	0.65	0.30	50.9
East: Crowson Road												
4	L2	409	5.0	0.228	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	53.4
5	T1	68	10.0	0.037	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	5.0	0.009	5.7	LOS A	0.0	0.4	0.18	0.54	0.18	52.4
Approach		497	5.7	0.228	4.9	NA	0.0	0.4	0.01	0.49	0.01	54.2
North: Greenhill Road												
7	L2	20	5.0	0.047	5.8	LOS A	0.2	1.2	0.16	0.58	0.16	52.4
8	T1	1	5.0	0.047	10.4	LOS B	0.2	1.2	0.16	0.58	0.16	52.8
9	R2	20	5.0	0.047	8.0	LOS A	0.2	1.2	0.16	0.58	0.16	52.1
Approach		41	5.0	0.047	7.0	LOS A	0.2	1.2	0.16	0.58	0.16	52.3
West: Crowson Road												
10	L2	20	5.0	0.041	5.6	LOS A	0.0	0.0	0.00	0.16	0.00	56.7
11	T1	54	10.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	58.5
12	R2	144	5.0	0.134	7.6	LOS A	0.6	4.3	0.52	0.71	0.52	51.4
Approach		218	6.2	0.134	5.5	NA	0.6	4.3	0.34	0.52	0.34	53.4
All Vehicles		916	5.7	0.253	5.8	NA	0.9	6.7	0.14	0.53	0.14	53.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [2030 PM Peak - With Development (Interim) - FULL DEVELOPMENT]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	98	5.0	0.434	6.6	LOS A	2.4	17.7	0.32	0.69	0.40	50.7
2	T1	1	5.0	0.434	8.8	LOS A	2.4	17.7	0.32	0.69	0.40	51.2
3	R2	220	5.0	0.434	10.4	LOS B	2.4	17.7	0.32	0.69	0.40	50.8
Approach		319	5.0	0.434	9.3	LOS A	2.4	17.7	0.32	0.69	0.40	50.7
East: Crowson Road												
4	L2	234	5.0	0.130	5.6	LOS A	0.0	0.0	0.00	0.57	0.00	53.4
5	T1	66	10.0	0.036	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	60.0
6	R2	20	5.0	0.009	5.7	LOS A	0.0	0.4	0.21	0.54	0.21	52.3
Approach		320	6.0	0.130	4.5	NA	0.0	0.4	0.01	0.45	0.01	54.6
North: Greenhill Road												
7	L2	20	5.0	0.047	5.9	LOS A	0.2	1.2	0.22	0.58	0.22	52.3
8	T1	1	5.0	0.047	7.9	LOS A	0.2	1.2	0.22	0.58	0.22	52.8
9	R2	20	5.0	0.047	8.1	LOS A	0.2	1.2	0.22	0.58	0.22	52.1
Approach		41	5.0	0.047	7.0	LOS A	0.2	1.2	0.22	0.58	0.22	52.2
West: Crowson Road												
10	L2	20	5.0	0.056	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	57.1
11	T1	81	10.0	0.056	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.9
12	R2	82	5.0	0.062	6.6	LOS A	0.3	2.0	0.39	0.61	0.39	51.8
Approach		183	7.2	0.062	3.6	NA	0.3	2.0	0.18	0.34	0.18	55.3
All Vehicles		863	5.9	0.434	6.2	NA	2.4	17.7	0.17	0.52	0.20	53.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [ULTIMATE Peak - With Development (Interim) - STAGE 1 ONLY (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	10	5.0	5.289	7927.5	LOS F	43.5	317.2	1.00	1.77	4.98	0.4
2	T1	1	5.0	5.289	8371.7	LOS F	43.5	317.2	1.00	1.77	4.98	0.4
3	R2	22	5.0	5.289	7968.1	LOS F	43.5	317.2	1.00	1.77	4.98	0.4
Approach		33	5.0	5.289	7968.0	LOS F	43.5	317.2	1.00	1.77	4.98	0.4
East: Crowson Road												
4	L2	80	5.0	0.045	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	1650	10.0	0.901	0.8	LOS A	0.0	0.0	0.00	0.00	0.00	58.5
6	R2	20	5.0	0.095	23.6	LOS C	0.3	2.3	0.92	0.97	0.92	41.9
Approach		1750	9.7	0.901	1.3	NA	0.3	2.3	0.01	0.04	0.01	58.0
North: Greenhill Road												
7	L2	20	5.0	4.505	6455.2	LOS F	48.3	352.9	1.00	2.16	6.59	0.5
8	T1	1	5.0	4.505	7017.8	LOS F	48.3	352.9	1.00	2.16	6.59	0.5
9	R2	20	5.0	4.505	6540.0	LOS F	48.3	352.9	1.00	2.16	6.59	0.5
Approach		41	5.0	4.505	6510.3	LOS F	48.3	352.9	1.00	2.16	6.59	0.5
West: Crowson Road												
10	L2	20	5.0	0.748	5.8	LOS A	0.0	0.0	0.00	0.01	0.00	57.6
11	T1	1350	10.0	0.748	0.3	LOS A	0.0	0.0	0.00	0.01	0.00	59.4
12	R2	28	5.0	0.887	336.1	LOS F	3.1	22.5	1.00	1.14	1.66	9.1
Approach		1398	9.8	0.887	7.1	NA	3.1	22.5	0.02	0.03	0.03	53.5
All Vehicles		3222	9.7	5.289	168.2	NA	48.3	352.9	0.04	0.08	0.16	15.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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: 101 [ULTIMATE Peak - With Development (Interim) - STAGES 1 ONLY (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Interim)
Site Category: (None)
Giveway / Yield (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	19	5.0	8.330	13306.8	LOS F	84.6	617.6	1.00	2.06	6.33	0.3
2	T1	1	5.0	8.330	13609.5	LOS F	84.6	617.6	1.00	2.06	6.33	0.3
3	R2	43	5.0	8.330	13352.4	LOS F	84.6	617.6	1.00	2.06	6.33	0.3
Approach		63	5.0	8.330	13342.7	LOS F	84.6	617.6	1.00	2.06	6.33	0.3
East: Crowson Road												
4	L2	46	5.0	0.026	5.6	LOS A	0.0	0.0	0.00	0.58	0.00	53.4
5	T1	1350	10.0	0.737	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	59.5
6	R2	20	5.0	0.565	182.4	LOS F	1.6	11.8	0.99	1.03	1.14	14.8
Approach		1416	9.8	0.737	3.0	NA	1.6	11.8	0.01	0.03	0.02	56.9
North: Greenhill Road												
7	L2	20	5.0	5.579	8425.8	LOS F	52.9	386.1	1.00	1.91	5.61	0.4
8	T1	1	5.0	5.579	8848.4	LOS F	52.9	386.1	1.00	1.91	5.61	0.4
9	R2	20	5.0	5.579	8464.6	LOS F	52.9	386.1	1.00	1.91	5.61	0.4
Approach		41	5.0	5.579	8455.0	LOS F	52.9	386.1	1.00	1.91	5.61	0.4
West: Crowson Road												
10	L2	20	5.0	0.912	6.3	LOS A	0.0	0.0	0.00	0.01	0.00	56.6
11	T1	1650	10.0	0.912	0.9	LOS A	0.0	0.0	0.00	0.01	0.00	58.2
12	R2	16	5.0	0.112	30.6	LOS D	0.3	2.4	0.93	0.97	0.93	38.7
Approach		1686	9.9	0.912	1.2	NA	0.3	2.4	0.01	0.02	0.01	57.9
All Vehicles		3206	9.7	8.330	372.3	NA	84.6	617.6	0.04	0.09	0.21	8.2

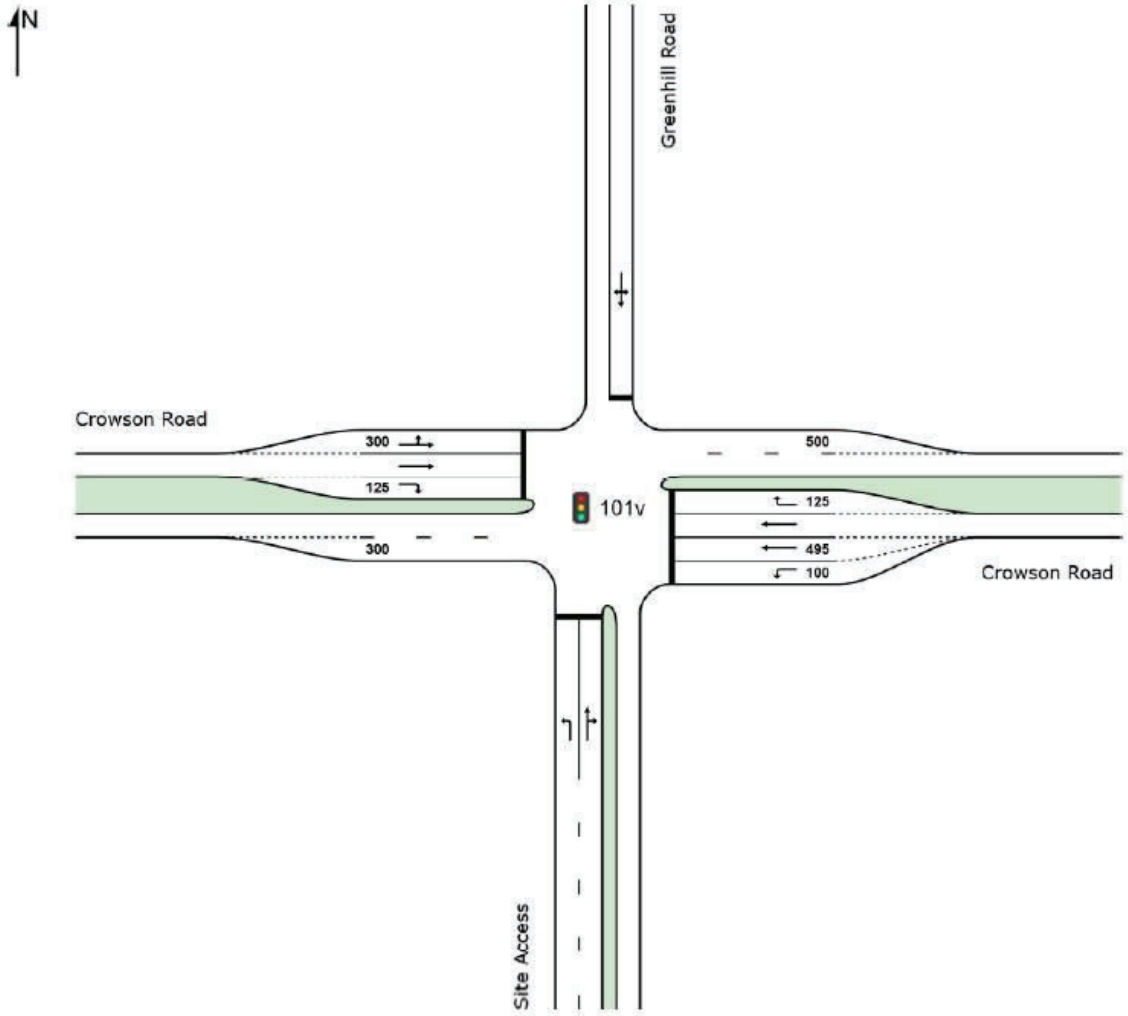
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and 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.

APPENDIX C – SIDRA MODELLING (ULTIMATE INTERSECTION ON CROWSON LANE)

SITE LAYOUT

Site: 101v [ULTIMATE Peak - With Development (Signals) - (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Signals)
Site Category: (None)
Signals - Fixed Time Isolated



MOVEMENT SUMMARY

Site: 101v [ULTIMATE Peak - With Development (Signals) - (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Signals)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	49	5.0	0.120	42.0	LOS D	2.1	15.3	0.83	0.73	0.83	34.9
2	T1	1	5.0	0.851	63.7	LOS E	6.7	49.0	1.00	0.97	1.44	28.2
3	R2	110	5.0	0.851	69.3	LOS E	6.7	49.0	1.00	0.97	1.44	27.8
Approach		160	5.0	0.851	60.9	LOS E	6.7	49.0	0.95	0.89	1.25	29.7
East: Crowson Road												
4	L2	409	5.0	0.411	20.6	LOS C	12.5	91.3	0.62	0.77	0.62	43.8
5	T1	1650	10.0	0.891	33.6	LOS C	49.4	375.4	0.89	0.93	1.03	38.6
6	R2	20	5.0	0.204	62.6	LOS E	1.1	8.0	0.99	0.70	0.99	29.0
Approach		2079	9.0	0.891	31.4	LOS C	49.4	375.4	0.84	0.90	0.95	39.4
North: Greenhill Road												
7	L2	20	5.0	0.419	63.9	LOS E	2.3	16.7	1.00	0.73	1.00	28.9
8	T1	1	5.0	0.419	58.3	LOS E	2.3	16.7	1.00	0.73	1.00	29.3
9	R2	20	5.0	0.419	63.9	LOS E	2.3	16.7	1.00	0.73	1.00	28.9
Approach		41	5.0	0.419	63.8	LOS E	2.3	16.7	1.00	0.73	1.00	28.9
West: Crowson Road												
10	L2	20	5.0	0.624	20.5	LOS C	23.2	176.1	0.69	0.63	0.69	46.8
11	T1	1350	10.0	0.624	14.9	LOS B	23.2	176.4	0.69	0.63	0.69	48.1
12	R2	145	5.0	0.809	64.6	LOS E	8.4	61.7	1.00	0.91	1.27	28.7
Approach		1515	9.5	0.809	19.8	LOS B	23.2	176.4	0.72	0.66	0.75	45.2
All Vehicles		3795	9.0	0.891	28.3	LOS C	49.4	375.4	0.80	0.80	0.88	40.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

PHASING SUMMARY

Site: 101v [ULTIMATE Peak - With Development (Signals) - (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Signals)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 110 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

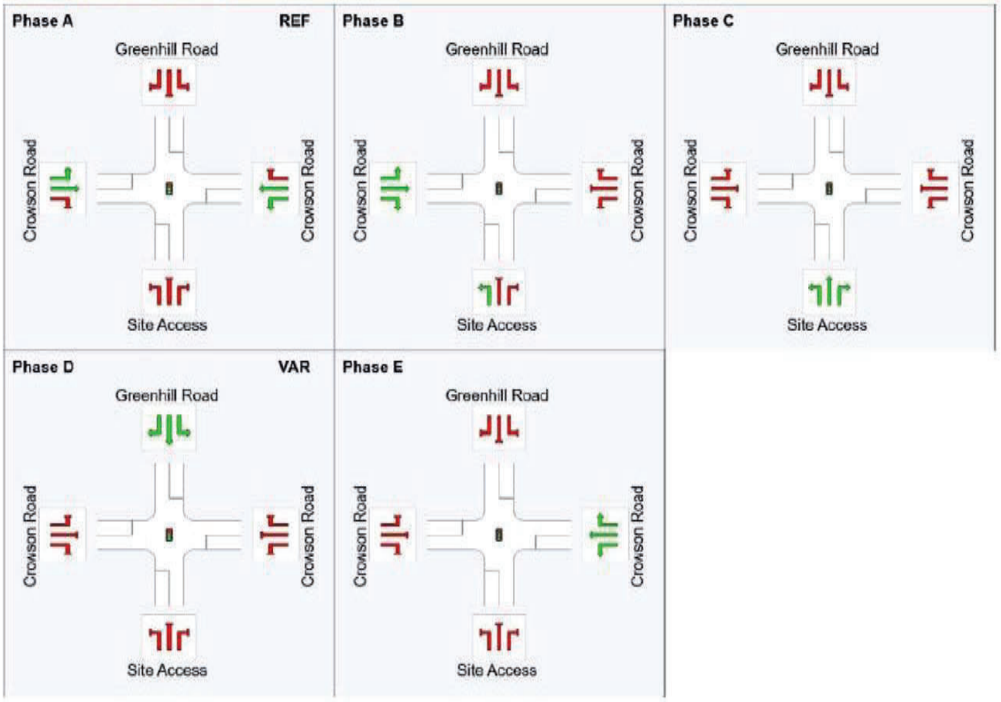
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D*, E
Output Phase Sequence: A, B, C, D*, E
(* Variable Phase)

Phase Timing Summary

Phase	A	B	C	D	E
Phase Change Time (sec)	0	55	72	86	98
Green Time (sec)	49	11	8	6	6
Phase Time (sec)	55	17	14	12	12
Phase Split	50%	15%	13%	11%	11%

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

Output Phase Sequence



REF: Reference Phase
VAR: Variable Phase

MOVEMENT SUMMARY

Site: 101v [ULTIMATE Peak - With Development (Signals) - (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Signals)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
South: Site Access												
1	L2	100	5.0	0.207	45.0	LOS D	4.9	35.7	0.81	0.76	0.81	33.9
2	T1	1	5.0	0.873	67.9	LOS E	18.7	136.3	1.00	0.97	1.28	27.3
3	R2	264	5.0	0.873	73.5	LOS E	18.7	136.3	1.00	0.97	1.28	27.0
Approach		365	5.0	0.873	65.7	LOS E	18.7	136.3	0.95	0.91	1.15	28.6
East: Crowson Road												
4	L2	233	5.0	0.238	21.8	LOS C	7.6	55.2	0.56	0.73	0.56	43.2
5	T1	1650	10.0	0.886	35.3	LOS D	53.7	407.8	0.90	0.90	0.99	37.9
6	R2	20	5.0	0.242	74.2	LOS E	1.3	9.5	1.00	0.70	1.00	26.6
Approach		1903	9.3	0.886	34.1	LOS C	53.7	407.8	0.86	0.88	0.94	38.3
North: Greenhill Road												
7	L2	20	5.0	0.495	75.7	LOS E	2.7	19.9	1.00	0.73	1.00	26.4
8	T1	1	5.0	0.495	70.1	LOS E	2.7	19.9	1.00	0.73	1.00	26.8
9	R2	20	5.0	0.495	75.7	LOS E	2.7	19.9	1.00	0.73	1.00	26.4
Approach		41	5.0	0.495	75.6	LOS E	2.7	19.9	1.00	0.73	1.00	26.4
West: Crowson Road												
10	L2	20	5.0	0.697	27.9	LOS C	32.1	243.7	0.79	0.72	0.79	42.8
11	T1	1350	10.0	0.697	21.9	LOS C	32.1	243.7	0.77	0.71	0.77	44.0
12	R2	83	5.0	0.860	82.1	LOS F	5.9	43.2	1.00	0.95	1.47	25.2
Approach		1453	9.6	0.860	25.4	LOS C	32.1	243.7	0.79	0.72	0.81	42.2
All Vehicles		3762	9.0	0.886	34.3	LOS C	53.7	407.8	0.84	0.82	0.91	38.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
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.

PHASING SUMMARY

Site: 101v [ULTIMATE Peak - With Development (Signals) - (ULTIMATE BACKGROUND 30k vpd)]

16378 - Crowson Road / Greenhill Road Intersection (Signals)
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 130 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

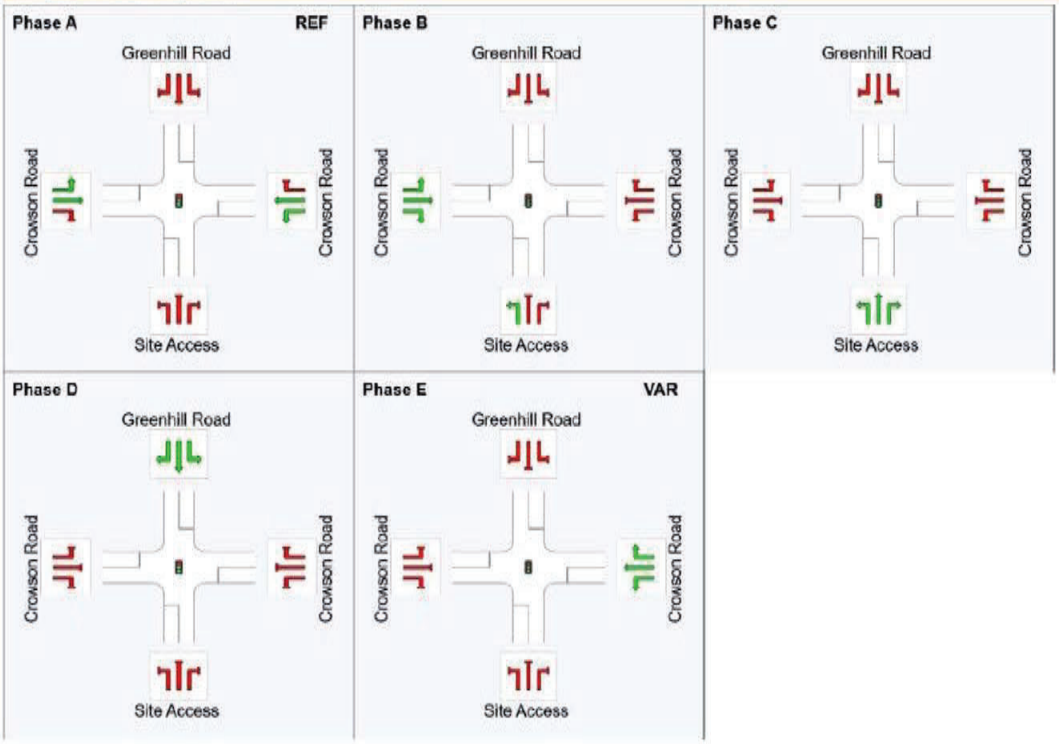
Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Opposed Turns
Reference Phase: Phase A
Input Phase Sequence: A, B, C, D, E*
Output Phase Sequence: A, B, C, D, E*
(* Variable Phase)

Phase Timing Summary

Phase	A	B	C	D	E
Phase Change Time (sec)	0	65	78	106	118
Green Time (sec)	59	7	22	6	6
Phase Time (sec)	65	13	28	12	12
Phase Split	50%	10%	22%	9%	9%

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

Output Phase Sequence



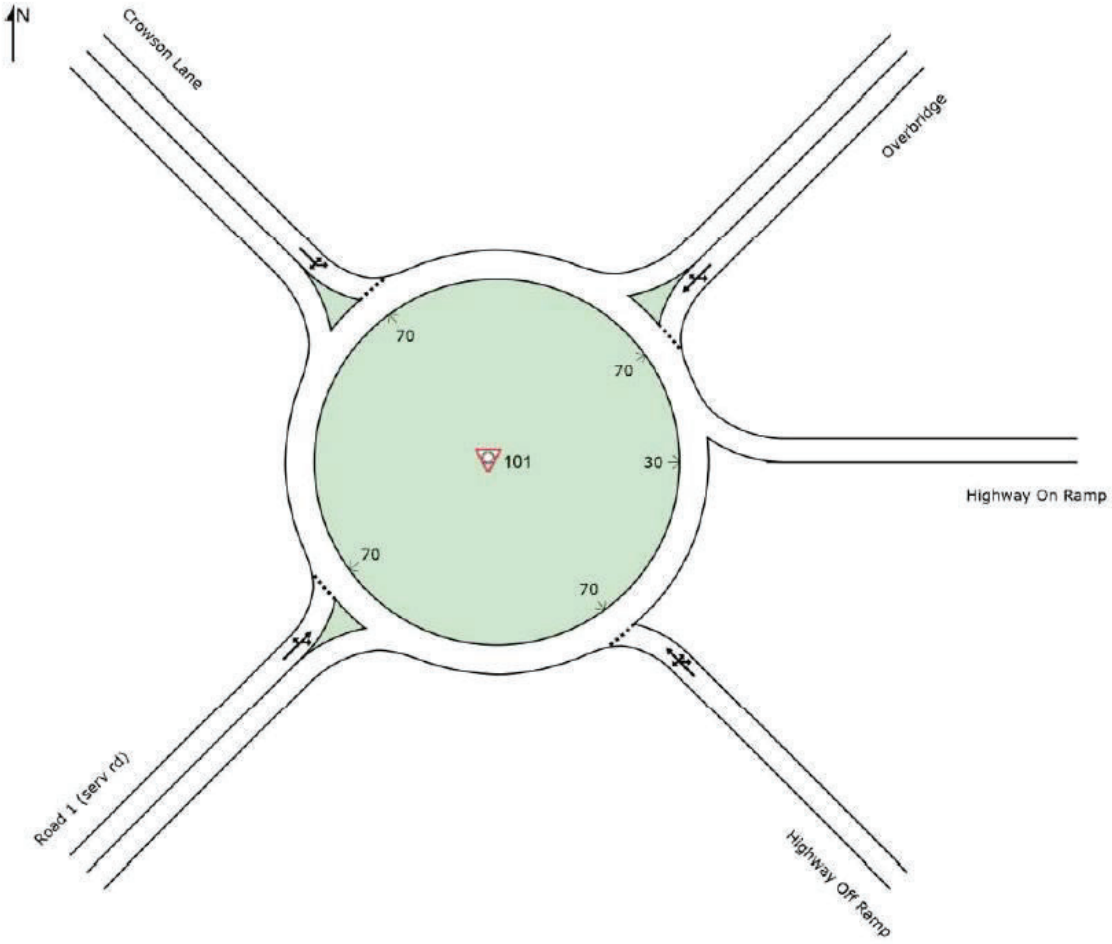
REF: Reference Phase
VAR: Variable Phase

APPENDIX D – SIDRA MODELLING (CROWSON LANE / HIGHWAY SERVICE ROAD)

SITE LAYOUT

Site: 101 [2030 AM Peak - without development 4% p.a. growth]

16375 - Crowson Lane / Site Access Intersection
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [2030 AM Peak - without development 4% p.a. growth]

16375 - Crowson Lane / Site Access Intersection
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Highway Off Ramp												
4	L2	1	20.0	0.076	2.3	LOS A	0.4	2.8	0.15	0.53	0.15	53.8
5	T1	21	10.0	0.076	2.7	LOS A	0.4	2.8	0.15	0.53	0.15	56.7
6	R2	99	10.0	0.076	9.9	LOS A	0.4	2.8	0.15	0.53	0.15	58.5
23b	R3	1	0.0	0.076	11.2	LOS B	0.4	2.8	0.15	0.53	0.15	60.3
Approach		122	10.0	0.076	8.6	LOS A	0.4	2.8	0.15	0.53	0.15	58.1
NorthEast: Overbridge												
24b	L3	106	0.0	0.089	2.5	LOS A	0.5	3.3	0.11	0.43	0.11	55.8
8	T1	1	20.0	0.089	2.4	LOS A	0.5	3.3	0.11	0.43	0.11	59.2
9	R2	47	10.0	0.089	9.8	LOS A	0.5	3.3	0.11	0.43	0.11	61.1
Approach		154	3.2	0.089	4.7	LOS A	0.5	3.3	0.11	0.43	0.11	57.4
NorthWest: Crowson Lane												
10	L2	29	10.0	0.035	2.4	LOS A	0.2	1.2	0.23	0.28	0.23	58.0
27a	L1	24	0.0	0.035	2.5	LOS A	0.2	1.2	0.23	0.28	0.23	60.3
12	R2	1	20.0	0.035	10.2	LOS B	0.2	1.2	0.23	0.28	0.23	62.1
Approach		54	5.7	0.035	2.6	LOS A	0.2	1.2	0.23	0.28	0.23	59.1
SouthWest: Road 1 (serv rd)												
1	L2	1	20.0	0.002	2.6	LOS A	0.0	0.1	0.29	0.38	0.29	55.9
2	T1	1	20.0	0.002	3.1	LOS A	0.0	0.1	0.29	0.38	0.29	59.1
32a	R1	1	0.0	0.002	8.7	LOS A	0.0	0.1	0.29	0.38	0.29	59.8
Approach		3	13.3	0.002	4.8	LOS A	0.0	0.1	0.29	0.38	0.29	58.2
All Vehicles		333	6.2	0.089	5.8	LOS A	0.5	3.3	0.14	0.44	0.14	57.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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: 101 [2030 PM Peak - without development 4% p.a. growth]

16375 - Crowson Lane / Site Access Intersection
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Highway Off Ramp												
4	L2	1	20.0	0.092	2.3	LOS A	0.5	3.5	0.17	0.53	0.17	53.8
5	T1	28	10.0	0.092	2.7	LOS A	0.5	3.5	0.17	0.53	0.17	56.8
6	R2	118	10.0	0.092	9.9	LOS A	0.5	3.5	0.17	0.53	0.17	58.5
23b	R3	1	0.0	0.092	11.2	LOS B	0.5	3.5	0.17	0.53	0.17	60.3
Approach		148	10.0	0.092	8.5	LOS A	0.5	3.5	0.17	0.53	0.17	58.1
NorthEast: Overbridge												
24b	L3	125	0.0	0.104	2.5	LOS A	0.6	4.0	0.12	0.43	0.12	55.8
8	T1	1	20.0	0.104	2.4	LOS A	0.6	4.0	0.12	0.43	0.12	59.2
9	R2	54	10.0	0.104	9.8	LOS A	0.6	4.0	0.12	0.43	0.12	61.1
Approach		180	3.1	0.104	4.7	LOS A	0.6	4.0	0.12	0.43	0.12	57.3
NorthWest: Crowson Lane												
10	L2	36	10.0	0.043	2.5	LOS A	0.2	1.5	0.25	0.29	0.25	57.9
27a	L1	29	0.0	0.043	2.5	LOS A	0.2	1.5	0.25	0.29	0.25	60.1
12	R2	1	20.0	0.043	10.2	LOS B	0.2	1.5	0.25	0.29	0.25	62.0
Approach		66	5.8	0.043	2.6	LOS A	0.2	1.5	0.25	0.29	0.25	58.9
SouthWest: Road 1 (serv rd)												
1	L2	1	20.0	0.002	2.8	LOS A	0.0	0.1	0.32	0.38	0.32	55.7
2	T1	1	20.0	0.002	3.2	LOS A	0.0	0.1	0.32	0.38	0.32	59.0
32a	R1	1	0.0	0.002	8.8	LOS A	0.0	0.1	0.32	0.38	0.32	59.6
Approach		3	13.3	0.002	4.9	LOS A	0.0	0.1	0.32	0.38	0.32	58.0
All Vehicles		397	6.2	0.104	5.8	LOS A	0.6	4.0	0.16	0.44	0.16	57.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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: 101 [2030 AM Peak - without development 4% p.a. growth - FULL DEVELOPMENT (0.4 trips / 100msq)]

16375 - Crowson Lane / Site Access Intersection
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Highway Off Ramp												
4	L2	47	20.0	0.274	6.9	LOS A	2.2	17.1	0.89	0.78	0.89	52.2
5	T1	69	10.0	0.274	7.1	LOS A	2.2	17.1	0.89	0.78	0.89	55.0
6	R2	99	10.0	0.274	14.3	LOS B	2.2	17.1	0.89	0.78	0.89	56.7
23b	R3	1	0.0	0.274	15.4	LOS B	2.2	17.1	0.89	0.78	0.89	58.5
Approach		216	12.1	0.274	10.4	LOS B	2.2	17.1	0.89	0.78	0.89	55.2
NorthEast: Overbridge												
24b	L3	106	0.0	0.658	4.7	LOS A	6.8	52.8	0.72	0.63	0.75	52.5
8	T1	360	20.0	0.658	4.9	LOS A	6.8	52.8	0.72	0.63	0.75	55.4
9	R2	407	10.0	0.658	12.1	LOS B	6.8	52.8	0.72	0.63	0.75	57.0
Approach		873	12.9	0.658	8.2	LOS A	6.8	52.8	0.72	0.63	0.75	55.7
NorthWest: Crowson Lane												
10	L2	46	10.0	0.123	3.3	LOS A	0.7	5.4	0.49	0.37	0.49	56.3
27a	L1	117	0.0	0.123	3.3	LOS A	0.7	5.4	0.49	0.37	0.49	58.5
12	R2	1	20.0	0.123	11.2	LOS B	0.7	5.4	0.49	0.37	0.49	60.2
Approach		164	2.9	0.123	3.4	LOS A	0.7	5.4	0.49	0.37	0.49	57.9
SouthWest: Road 1 (serv rd)												
1	L2	13	20.0	0.235	5.1	LOS A	1.7	12.2	0.71	0.67	0.71	52.6
2	T1	65	20.0	0.235	5.5	LOS A	1.7	12.2	0.71	0.67	0.71	55.5
32a	R1	175	0.0	0.235	10.8	LOS B	1.7	12.2	0.71	0.67	0.71	56.0
Approach		253	6.2	0.235	9.2	LOS A	1.7	12.2	0.71	0.67	0.71	55.7
All Vehicles		1506	10.6	0.658	8.2	LOS A	6.8	52.8	0.72	0.63	0.74	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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: 101 [2030 PM Peak - without development 4% p.a. growth - FULL DEVELOPMENT (0.4 trips / 100msq)]

16375 - Crowson Lane / Site Access Intersection
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	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	Aver. No. Cycles	Average Speed km/h
SouthEast: Highway Off Ramp												
4	L2	27	20.0	0.180	4.3	LOS A	1.2	9.3	0.64	0.62	0.64	53.0
5	T1	55	10.0	0.180	4.6	LOS A	1.2	9.3	0.64	0.62	0.64	55.9
6	R2	118	10.0	0.180	11.8	LOS B	1.2	9.3	0.64	0.62	0.64	57.6
23b	R3	1	0.0	0.180	13.0	LOS B	1.2	9.3	0.64	0.62	0.64	59.4
Approach		201	11.3	0.180	8.8	LOS A	1.2	9.3	0.64	0.62	0.64	56.5
NorthEast: Overbridge												
24b	L3	125	0.0	0.463	4.1	LOS A	3.6	27.5	0.63	0.59	0.63	53.0
8	T1	206	20.0	0.463	4.3	LOS A	3.6	27.5	0.63	0.59	0.63	55.9
9	R2	260	10.0	0.463	11.5	LOS B	3.6	27.5	0.63	0.59	0.63	57.6
Approach		591	11.4	0.463	7.4	LOS A	3.6	27.5	0.63	0.59	0.63	56.0
NorthWest: Crowson Lane												
10	L2	70	10.0	0.269	5.2	LOS A	2.0	14.4	0.75	0.56	0.75	54.8
27a	L1	215	0.0	0.269	5.1	LOS A	2.0	14.4	0.75	0.56	0.75	56.9
12	R2	1	20.0	0.269	13.1	LOS B	2.0	14.4	0.75	0.56	0.75	58.5
Approach		286	2.5	0.269	5.1	LOS A	2.0	14.4	0.75	0.56	0.75	56.3
SouthWest: Road 1 (serv rd)												
1	L2	26	20.0	0.433	4.6	LOS A	3.2	25.3	0.68	0.56	0.68	54.1
2	T1	350	20.0	0.433	5.1	LOS A	3.2	25.3	0.68	0.56	0.68	57.1
32a	R1	130	0.0	0.433	10.4	LOS B	3.2	25.3	0.68	0.56	0.68	57.7
Approach		506	14.9	0.433	6.4	LOS A	3.2	25.3	0.68	0.56	0.68	57.1
All Vehicles		1584	10.9	0.463	6.9	LOS A	3.6	27.5	0.67	0.58	0.67	56.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
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.