



Transport Impact Assessment

Project: Proposed Local Structure Plan Amendment
Lots 114, 123 - 125 Wattleup Road, Hammond
Park
Client: Aigle Royal Developments
Author: Paul Nguyen
Date: 2nd May 2022
Document #: 2008012-TIA-001

CONSULTING CIVIL AND TRAFFIC ENGINEERS
1 ST. FLOOR, 908 ALBANY HIGHWAY, EAST VICTORIA PARK WA 6101.
PHONE|+61 8 9355 1300
EMAIL| admin@shawmac.com.au





Document Status

Revision	Document Status	Prepared By	Reviewed By	Approved By	Date
A	Draft	P Nguyen	R Jois	R Jois	18/02/2021
B	Revised Plans	P Nguyen	-	P Nguyen	02/05/2022



Contents

1	Introduction	1
1.1	Background.....	1
1.2	Site Location	1
2	Site Proposal.....	2
2.1	Land Use.....	2
3	Existing Situation.....	6
3.1	Land Use.....	6
3.2	Existing Roads	7
3.3	Carriageway Width and Cross Section	8
3.4	Traffic Volumes	8
4	Changes to Surrounding Transport Networks	10
5	Traffic Impact Assessment.....	12
5.1	Assessment Parameters.....	12
5.1.1	Assessment Years.....	12
5.1.2	Period of Assessment.....	12
5.2	Traffic Generation	12
5.3	Traffic Distribution	14
5.4	Traffic Impact (2023).....	16
5.4.1	Intersection and Access Capacity.....	16
5.5	Long Term Assessment (2033).....	18
5.5.1	Intersection and Access Capacity.....	18
5.6	Auxiliary Lanes.....	21
6	Preliminary Access and Parking Assessment	24
6.1.1	Access Layout	24
6.1.2	Access Sight Distance	26
6.2	Parking Provision	28

6.3	Service Vehicle Access.....	29
7	Public Transport.....	30
7.1	Existing Public Transport Services.....	30
8	Pedestrian and Cycle Networks	31
9	Site Specific or Safety Issues.....	32
9.1	Crash History	32
10	Conclusion	33
	Appendix A – SIDRA Results.....	34
	Appendix B – SIDRA Results – Long Term Analysis	40
	Appendix C – Swept Path Analysis.....	46

Tables

Table 1: Road Configuration.....	8
Table 2: Weekday PM Peak Vehicle Trip Generation	13
Table 3: Saturday Mid-day Peak Vehicle Trip Generation.....	13
Table 4: SIDRA Output Summary – 2023.....	17
Table 5: SIDRA Output Summary – Long Term (2033).....	20
Table 6: City of Cockburn Parking Requirements.....	28

Figures

Figure 1: Site Location.....	1
Figure 2: Existing LSP	2
Figure 3: Existing LDP	3
Figure 4: Proposed LSP Amendment.....	4
Figure 5: Concept Neighbourhood Centre Plan.....	5
Figure 6: Aerial View (January 2022)	6
Figure 7: Road Hierarchy	7
Figure 8: Existing Weekday Daily and Peak Hour Traffic – October 2020	9
Figure 9: Proposed Road Hierarchy and Reserves (Uloth and Associates)	10
Figure 10: Changes to Surrounding Road Network.....	11
Figure 11: Weekday PM Peak Hour Traffic Distribution - 2023	15
Figure 12: Saturday Peak Hour Traffic Distribution - 2023	15
Figure 13: Modelled Intersection Layouts.....	16
Figure 14: Weekday PM Peak Hour Traffic Distribution - 2033	19
Figure 15: Saturday Peak Hour Traffic Distribution - 2033	19
Figure 16: Calculation of the Major Road Traffic Volume Q_m	21
Figure 17: Calculation of Intersection Warrants.....	22
Figure 18: Concept Urban Turn Treatments.....	23
Figure 19: Proposed Access Arrangement.....	24
Figure 20: Potential Relocation of Whadjuk Drive Access.....	25
Figure 21: Relocated Access Swept Paths.....	25
Figure 22: Sight Distance Requirements	26
Figure 23: Sight Distance Checks	27
Figure 24: Public Transport Network	30
Figure 25: Crash History – January 2016 to December 2020	32

1 Introduction

1.1 Background

Aigle Royal Developments are proposing to amend the approved Local Structure Plan (LSP) for Lots 114, 123 – 125 Wattleup Road in Hammond Park to expand the extent of the proposed neighbourhood centre. The local authority is the City of Cockburn (City).

Shawmac has been commissioned to prepare a Transport Impact Assessment (TIA) to support the proposed LSP amendment. The TIA has been prepared in accordance with the WAPC *Transport Impact Assessment Guidelines*.

1.2 Site Location

The site location is shown in **Figure 1**.

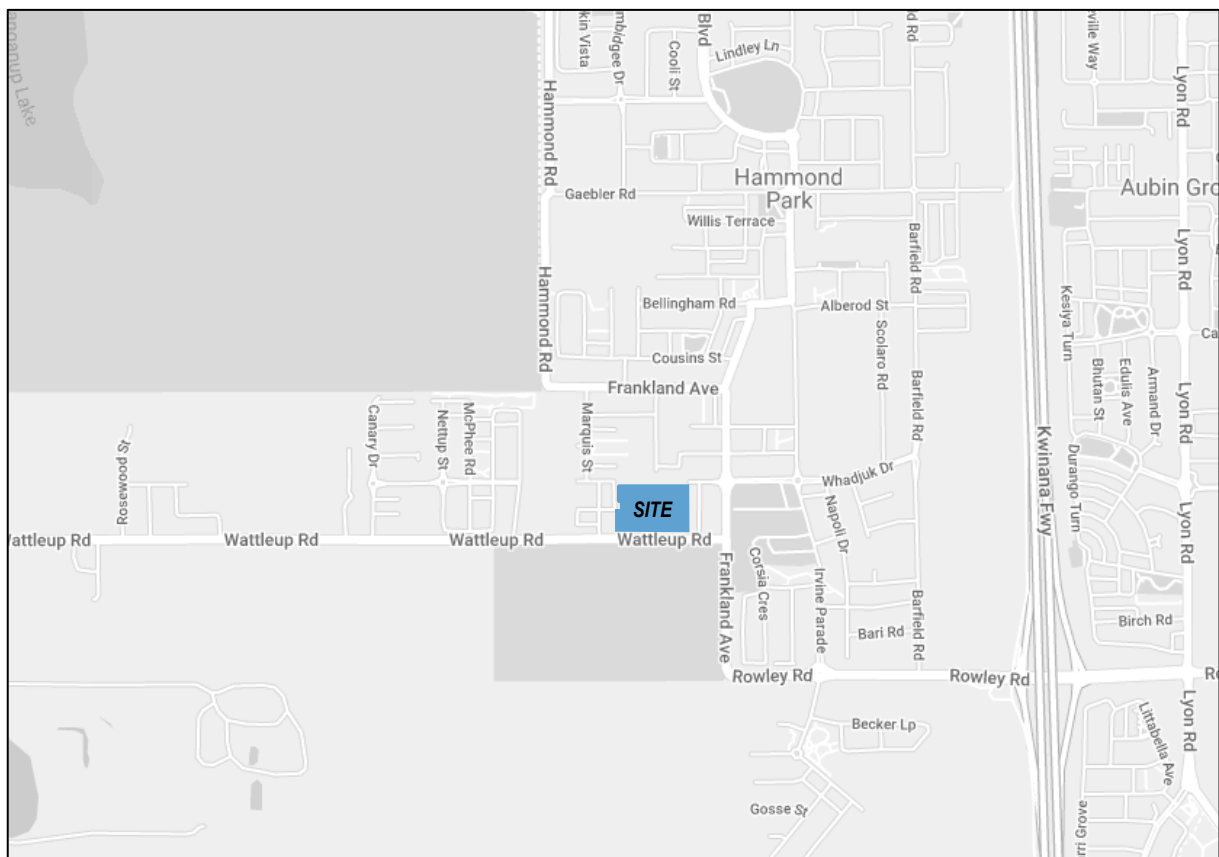


Figure 1: Site Location

2 Site Proposal

2.1 Land Use

The existing LSP is shown in **Figure 2**. The approved uses in the amendment area are primarily residential with one local centre site in the north-west corner.

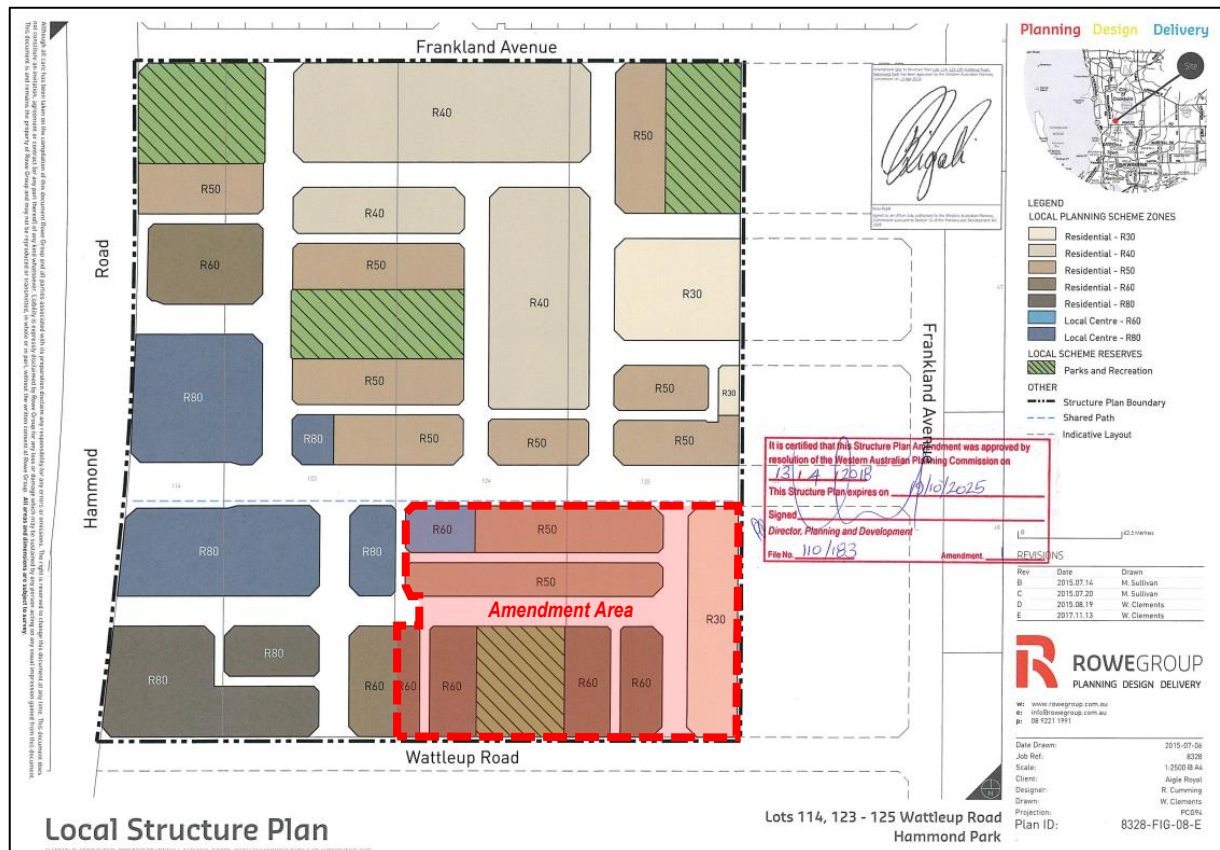


Figure 2: Existing LSP

The existing Local Development Plan (LDP) for the site is shown in **Figure 3**.

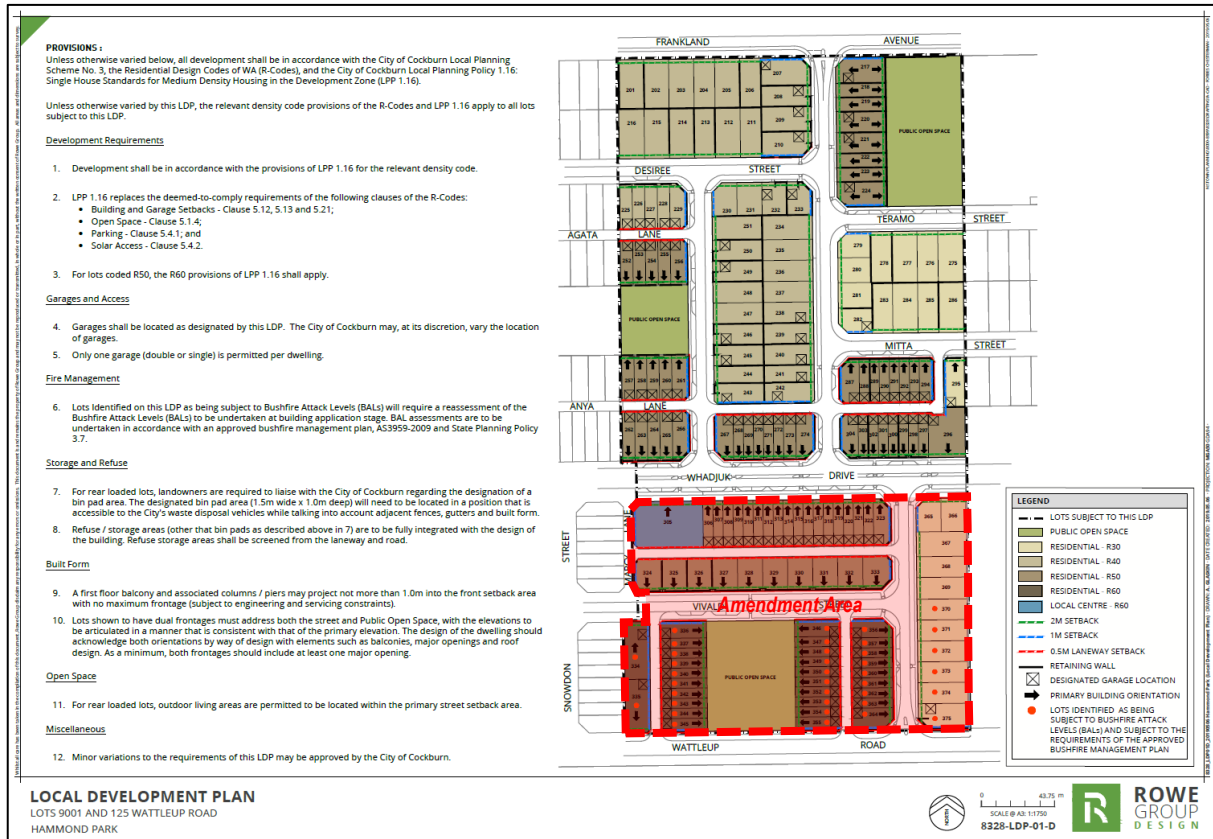


Figure 3: Existing LDP

As shown, under current planning, the amendment area would yield approximately 74 dwellings.

The proposed amended LSP is shown in **Figure 4**. It is proposed to modify the majority of the area from residential to neighbourhood centre.



Figure 4: Proposed LSP Amendment

At this stage, the proposed neighbourhood centre is expected to include a supermarket, various smaller specialty retail tenancies including a liquor store and two fast food outlets. A concept centre plan is shown in **Figure 5**. It is noted that the centre plan will be refined at the development application stage.

Based on the current concept layout, vehicle access is proposed via two new crossovers on Wattleup Road and one new crossover on Whadjuk Drive.



3 Existing Situation

3.1 Land Use

The amendment area is vacant and partly cleared for development. An aerial view of the existing site is shown in Figure 6.

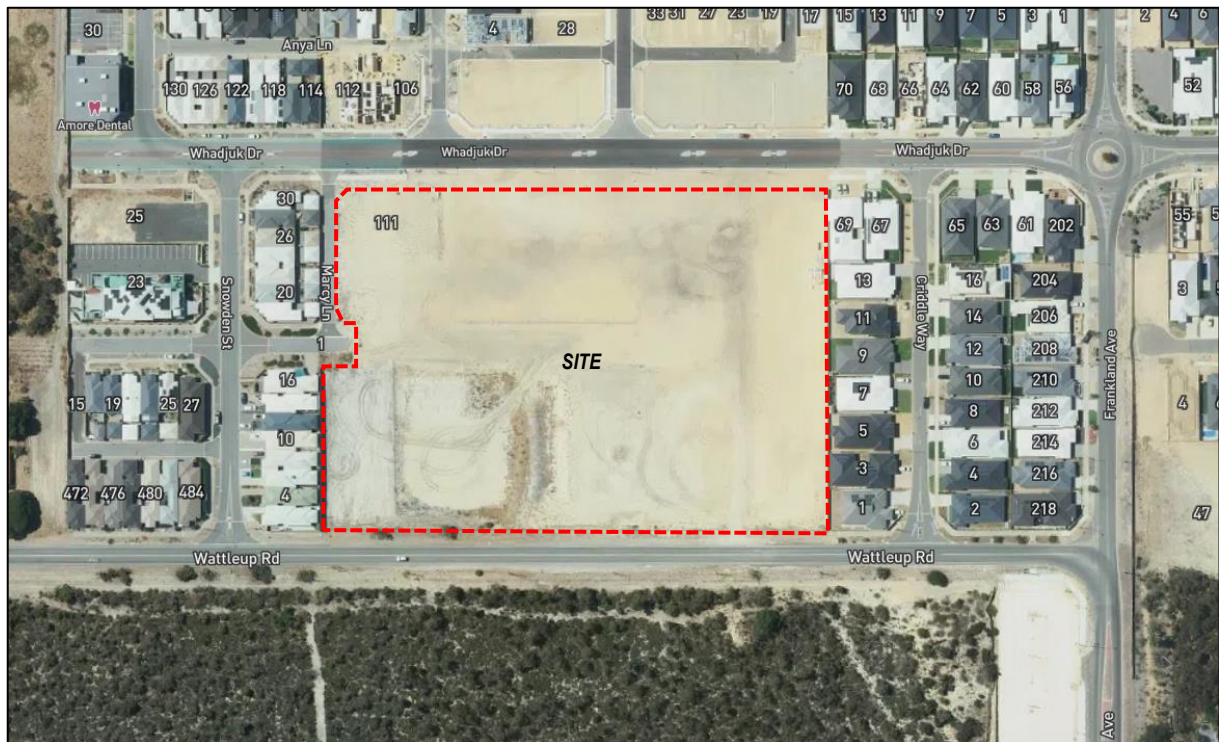


Figure 6: Aerial View (January 2022)

3.2 Existing Roads

The layout and hierarchy of the surrounding road network is shown in **Figure 7** as extracted from the MRWA Road Information Mapping System.

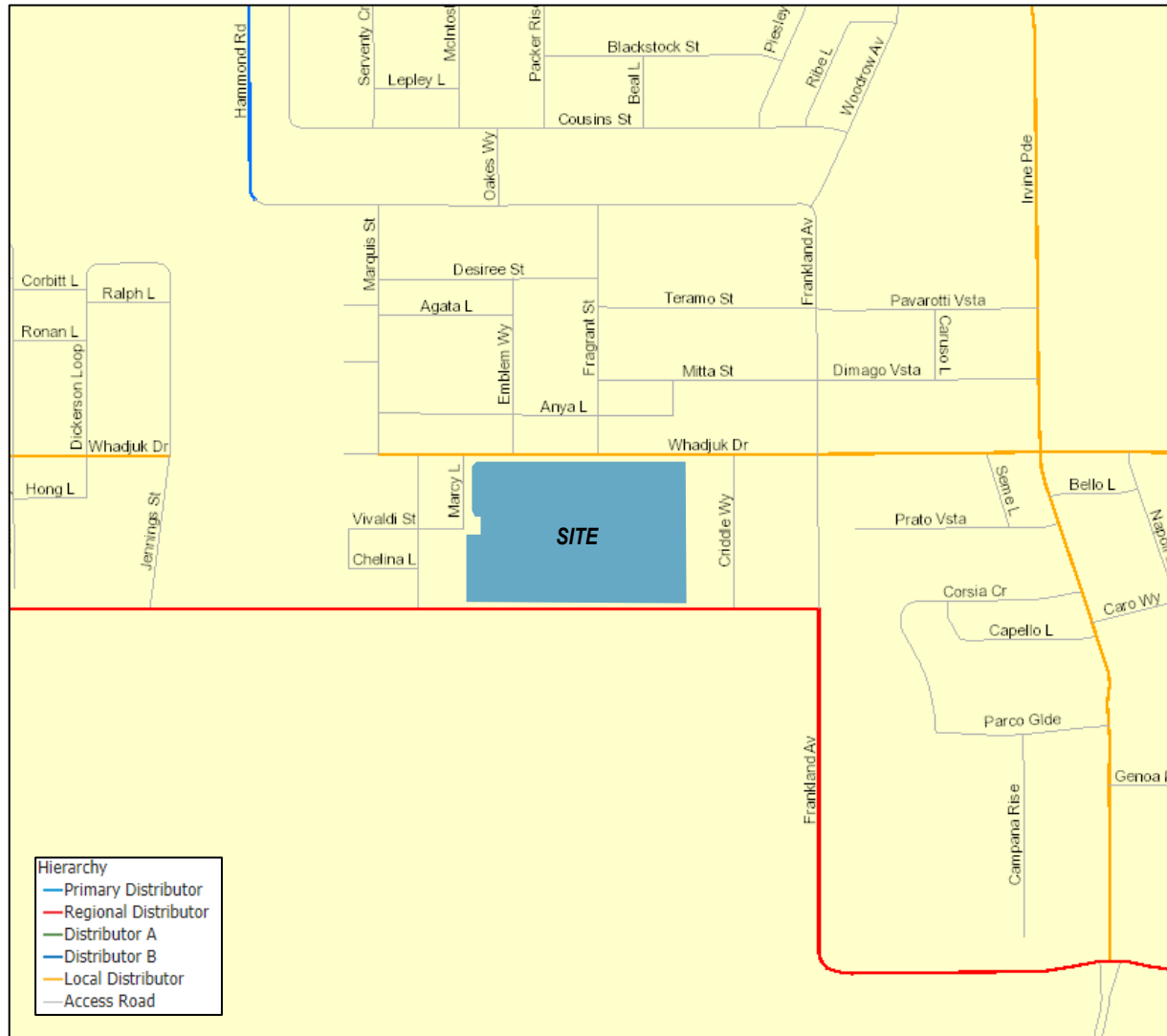


Figure 7: Road Hierarchy

3.3 Carriageway Width and Cross Section

The configuration of the perimeter roads and other relevant roads are summarised in **Table 1**.

Table 1: Road Configuration

Road	Road Type	Cross Section	Speed Limit
Wattleup Road	Regional Distributor	Single carriageway – 2 lanes	70 km/h
Frankland Ave	Regional Distributor	Single carriageway – 2 lanes	70 km/h south of Wattleup 50km/h north of Wattleup
Whadjuk Drive	Access Road	Dual carriageway – 2 lanes	50km/h
Vivaldi Street	Access Road	Single carriageway – 2 lanes	50km/h
Snowden Street	Access Road	Single carriageway – 2 lanes	50km/h
Macy Lane	Laneway	Single carriageway – 2 lanes	50km/h

3.4 Traffic Volumes

The latest available daily traffic volumes were obtained from Main Roads WA as shown in **Figure 8**.



Figure 8: Existing Weekday Daily and Peak Hour Traffic – October 2020

The weekday peak hours on the road network were from 8 to 9am in the morning and from 4 to 5pm in the afternoon.

4 Changes to Surrounding Transport Networks

The following changes to the road network are being constructed or planned:

- Rowley Road is proposed to be extended west from Frankland Avenue towards Mandogalup Road. The section between the Kwinana Freeway and the Hammond Road extension is currently planned for 2026/27 and the section west of Hammond Road is currently planned for 2027/28.
- Hammond Road is proposed to be upgraded and extended south to the proposed extension of Rowley Road and potentially further. The northern section (Branch Circus to Bartram Road) is currently under construction and planned to be completed by April 2023. The southern section from Frankland Avenue to Rowley Road is currently planned for 2027/28. The current LSP indicates that through movements along Wattleup Road across the Hammond Road extension will be blocked and the intersection will be restricted to left-in / left-out movements only. At this stage, the section of Wattleup Road east of Hammond Road and adjacent to the site would be downgraded to a Neighbourhood Connector B road.

The proposed road hierarchy and intersection layout for the LSP is shown in **Figure 9**. A summary of the planned major changes to the road network is shown in **Figure 10**.

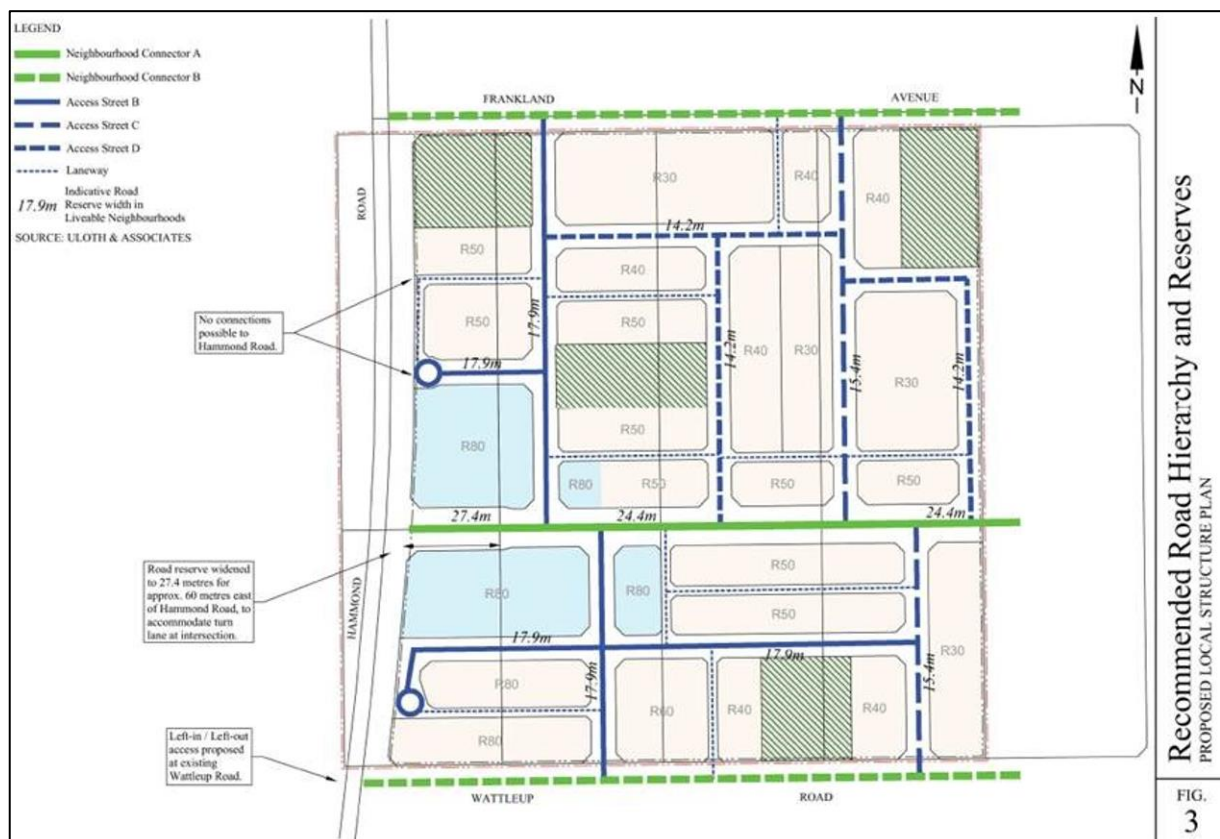


Figure 9: Proposed Road Hierarchy and Reserves (Uloth and Associates)

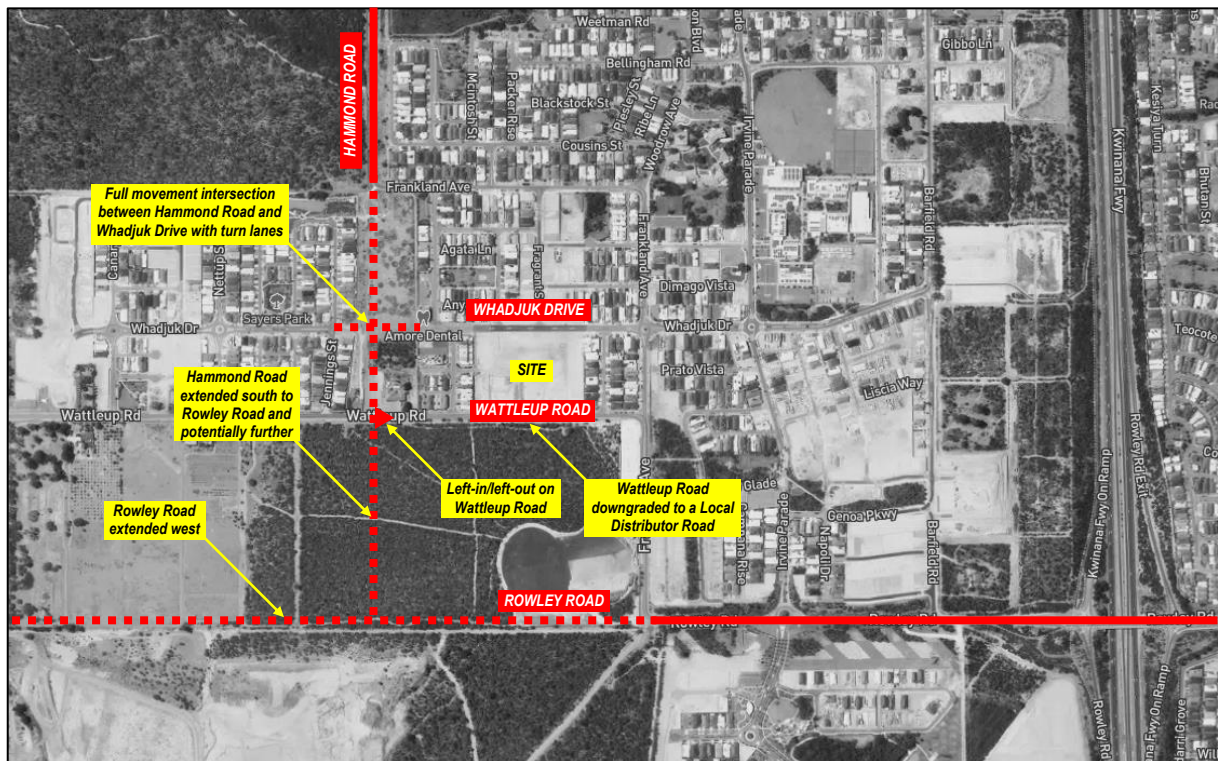


Figure 10: Changes to Surrounding Road Network

The speed limit along the entire length of Wattleup Road was recently reduced from 80km/h to 70km/h. It is understood that there is demand for the speed limit along Wattleup Road to be reduced to 50km/h as the area is developed.

The City has advised the following:

- Heavy vehicle operations are anticipated to continue along Wattleup Road in the short to medium term to cater to operates within Latitude 32 and the surrounding areas until Rowley Road is extended and taken over.
- The current 70km/hr speed limit is more suitable until the road is eventually downgraded.

Based on the above, the speed limit along Wattleup Road is likely to remain at 70km/h in the short to medium term future and would potentially reduce to 50km/h in the longer term once Rowley Road is extended.

5 Traffic Impact Assessment

5.1 Assessment Parameters

5.1.1 Assessment Years

The assessment has been based on two development horizons:

- The first year of full opening of the development which is anticipated to be 2023.
- 10 years following the first year of full opening which would be 2033.

5.1.2 Period of Assessment

The existing peak hours on the road network are from 8 to 9am and from 4 to 5pm on a weekday and generally from 11:30am to 12:30pm on Saturday.

Based on the proposed land use, the weekday PM peak hour and Saturday mid-day peak hour has been chosen for assessment as these will likely represent the peak periods of combined of site traffic and background traffic.

The weekday morning peak hour has been excluded as most of the proposed uses will generate a much lower amount of traffic than the PM peak hour.

5.2 Traffic Generation

The volume of traffic generated by the amended LSP and the net increase over the existing LSP has been estimated using traffic generation rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual 11th Edition*.

For the existing LSP, the dwelling yield was taken from the approved LDP and the local centre site was assumed to yield 1000m² of commercial/retail floorspace. The trip generation rates for *Shopping Plaza* was used as this land use is the closest match to a local or neighbourhood centre.

A proportion of the traffic generated by the *Shopping Plaza* is likely to comprise pass-by trips which are vehicles that are already on the road network that divert to the site uses before continuing on. According to the ITE guide, the average proportion of pass by trips is 40% during the weekday PM peak period and 31% during the Saturday mid-day peak period.

The traffic generation of the LSP is summarised in **Table 2** and **Table 3**.

Table 2: Weekday PM Peak Vehicle Trip Generation

Land Use	Unit	Quantity	Trip Rate		Number of Trips		
			In	Out	In	Out	Total
Existing LSP							
Residential	Dwellings	74	0.59	0.35	44	26	70
Shopping Plaza	100m² GFA	10	4.67	5.05	47	51	98
- Shopping Plaza pass by trips (40%)					-19	-20	-29
Total					72	57	139
Amended LSP							
Shopping Plaza	100m² GFA	69.5	4.67	5.05	325	351	676
- Shopping Plaza pass by trips (40%)					-130	-140	-270
Total					195	211	406
Net Increase over Existing LSP					123	154	267

Table 3: Saturday Mid-day Peak Vehicle Trip Generation

Land Use	Unit	Quantity	Trip Rate		Number of Trips		
			In	Out	In	Out	Total
Existing LSP							
Residential	Dwellings	74	0.50	0.42	37	31	68
Shopping Plaza	100m² GFA	10	5.08	4.89	51	49	100
- Shopping Plaza pass by trips (31%)					-16	-15	-31
Total					72	65	137
Amended LSP							
Shopping Plaza	100m² GFA	69.5	5.08	4.89	353	340	693
- Shopping Plaza pass by trips (31%)					-109	-105	-214
Total					244	235	479
Net Increase over Existing LSP					172	170	342

As shown, the amended LSP will generate approximately 267 new vehicle trips during the PM peak hour (123 inbound and 154 outbound) and approximately 342 new vehicle trips during the Saturday mid-day peak hour (172 inbound and 170 outbound) compared to the exiting LSP.

5.3 Traffic Distribution

The closest existing local centres are located in Aubin Grove and at the northern end of Hammond Park. The proposed centre would therefore serve the southern portion of Hammond Park, some of Wattleup and potentially some of Wandii. The distribution of the site traffic will ultimately depend on the progress of the surrounding road network. For the interim (2023) scenario, the distribution has been based on the existing road network. The interim traffic distribution is assumed as follows:

- 25% to/from the north via Frankland Avenue and Whadjuk Drive.
- 25% to/from the north via Hammond Road, Marquis Street and Whadjuk Drive.
- 20% to/from the south and east via Rowley Road, Frankland Avenue and Wattleup Road.
- 20% to/from the east via Whadjuk Drive.
- 10% to/from the west via Wattleup Road.

Figure 11 and **Figure 12** show the peak hour vehicle movements generated by the proposed centre on the adjacent road network.

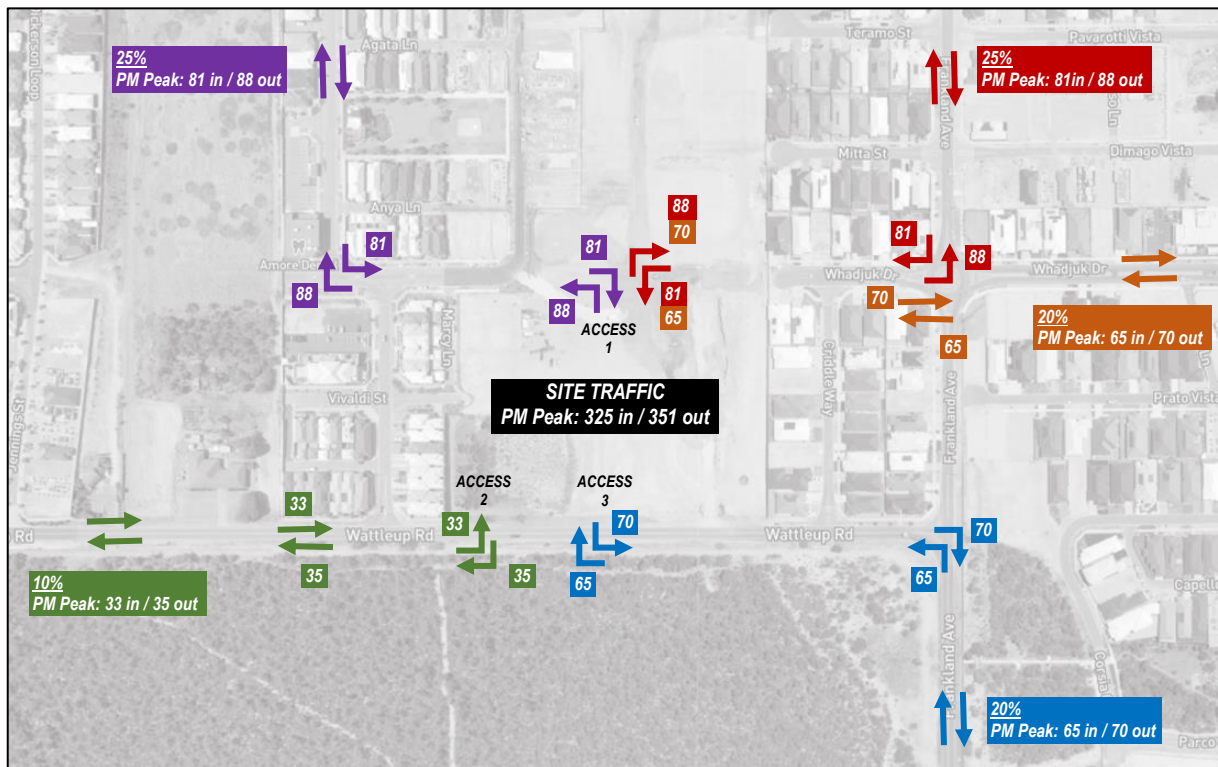


Figure 11: Weekday PM Peak Hour Traffic Distribution - 2023

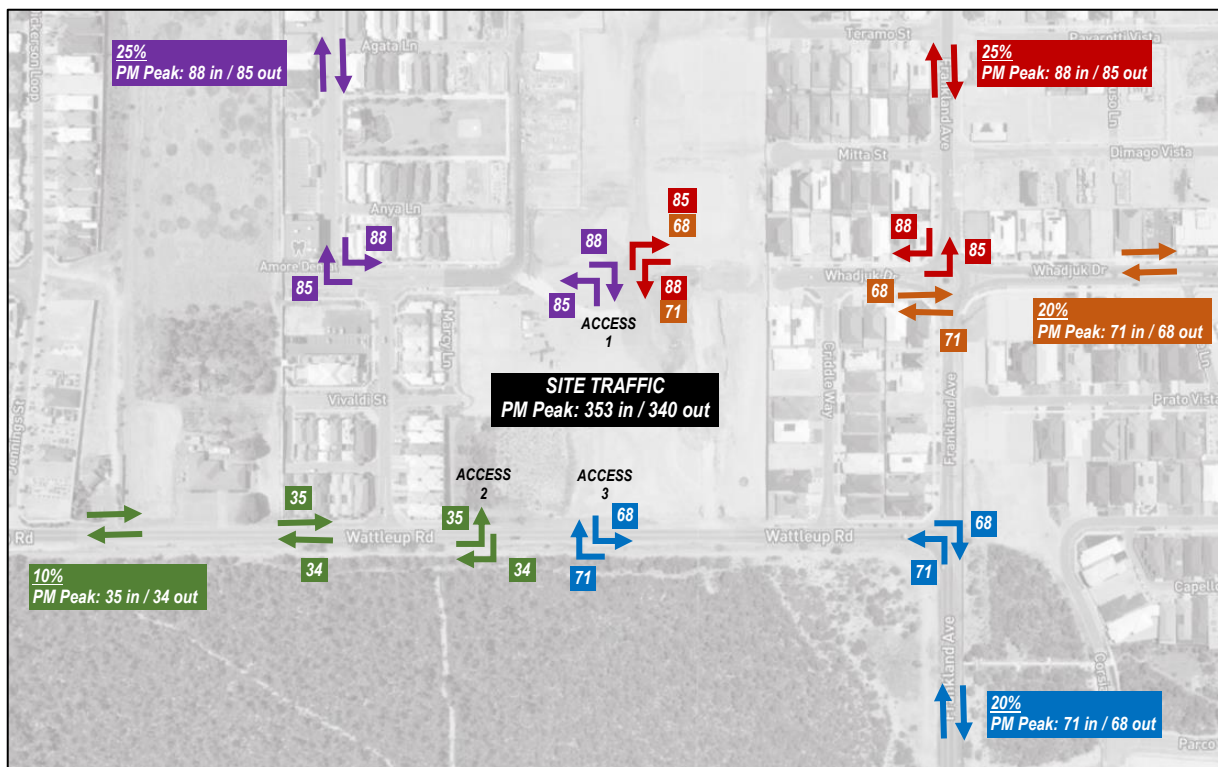


Figure 12: Saturday Peak Hour Traffic Distribution - 2023

5.4 Traffic Impact (2023)

5.4.1 Intersection and Access Capacity

The peak hour capacity of the following intersections and access points were assessed in SIDRA Intersection 9.0:

- Wattleup Road / Frankland Avenue
- Frankland Avenue / Whadjuk Drive
- Whadjuk Drive / Marquis Street
- The three proposed site access points

The model has been set up in accordance with Main Roads WA's *Operational Modelling Guidelines*. The modelled layout is shown in **Figure 13**.

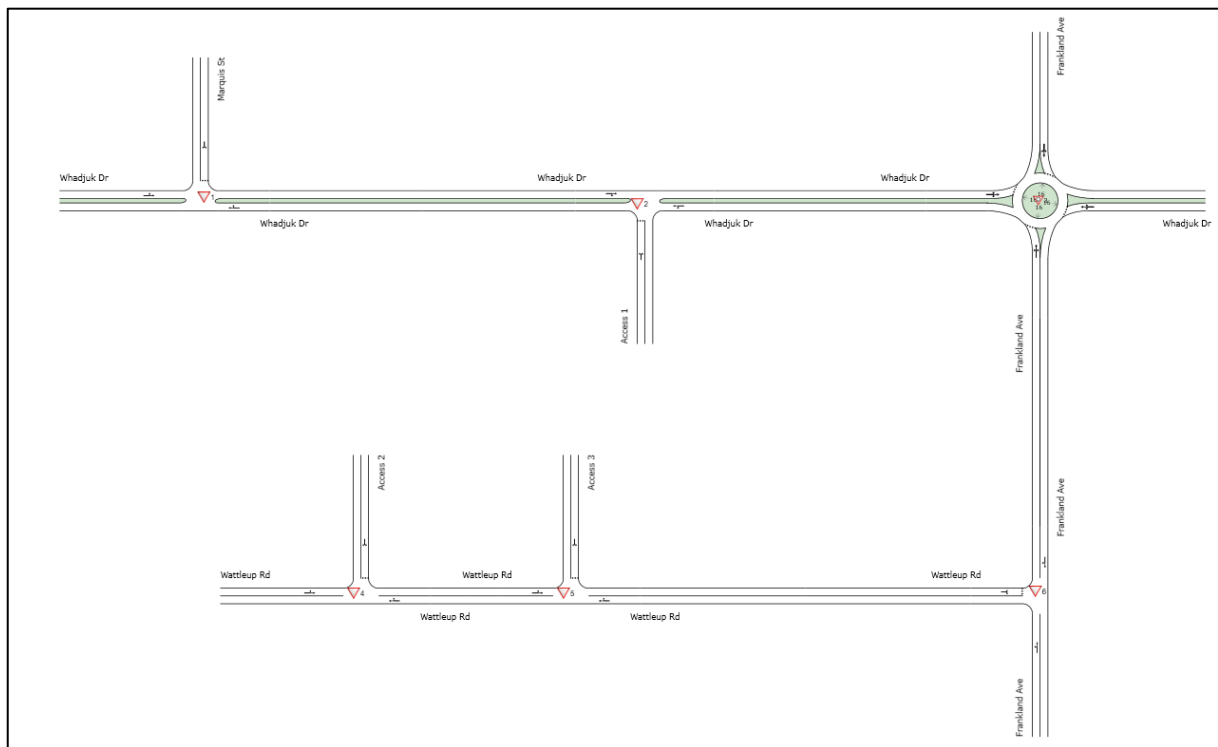


Figure 13: Modelled Intersection Layouts

The background traffic flows were derived from traffic surveys undertaken in March 2022. To account for traffic growth up to 2023, the traffic volumes on Wattleup Road, Frankland Avenue and Whadjuk Drive were factored up by 5%. Traffic generated by the new Frankland Park Sports and Community Facility on the south side of Wattleup Road were also added to the model. The volume of traffic was derived from the Transport Impact Assessment for this facility which was also prepared by Shawmac.

The results of the assessment are attached as **Appendix A** and summarised in **Table 4**.

Table 4: SIDRA Output Summary – 2023

Intersection	Peak Hour	DoS	Average Delay (s)	Worst Delay (s)	95%ile Queue	Average LoS	Worst LoS
Whadjuk Dr / Marquis Street	Weekday PM Peak	0.081	4.5s	4.8s	1.1m	A	A
	Saturday Peak	0.050	4.4s	4.7s	0.8m	A	A
Whadjuk Dr Access	Weekday PM Peak	0.154	4.5s	4.9s	1.4m	A	A
	Saturday Peak	0.149	4.5s	5.0s	1.4m	A	A
Frankland Ave / Whadjuk Dr	Weekday PM Peak	0.200	4.8s	8.6s	3.5m	A	A
	Saturday Peak	0.151	4.7s	8.3s	2.5m	A	A
Wattleup Rd Access (West)	Weekday PM Peak	0.271	0.7s	9.5s	0.85m	A	A
	Saturday Peak	0.124	1.1s	9.5s	0.3m	A	A
Wattleup Rd Access (East)	Weekday PM Peak	0.253	1.3s	9.9s	2.0m	A	A
	Saturday Peak	0.122	1.6s	8.6s	1.4m	A	A
Wattleup Rd / Frankland Ave	Weekday PM Peak	0.389	5.5s	7.2s	4.6m	A	A
	Saturday Peak	0.177	5.0s	6.8s	1.6m	A	A

As shown, all assessed intersections and access points are expected to operate well within capacity with an average Level of Service A for all locations during both peak periods. All other measures of performance (degree of saturation, average delays and queues) are well within acceptable thresholds.

5.5 Long Term Assessment (2033)

5.5.1 Intersection and Access Capacity

As there is a significant amount of development being undertaken in Hammond Park and the surrounding areas, a preliminary long term capacity assessment has been undertaken at the nearby intersections and the site access points.

The City has recommended using the projected traffic volumes from the Cockburn 2018 District Traffic Study prepared by ARUP.

The ARUP traffic study did not include estimates for Whadjuk Drive and so the long term peak hour traffic volumes have been estimated as 10% of the maximum daily traffic volume for the category of road. According to Liveable Neighbourhoods, the target maximum daily traffic volume for a Neighbourhood Connector A road is 7,000 vpd and so the peak hour volume is estimated to be 700 vph.

The ARUP study also predicted very high peak hour traffic flows along the section of Wattleup Road east of Hammond Road adjacent to the site (in the order of 1800 vph during the weekday PM peak). This volume of traffic is unlikely to eventuate if the Wattleup Road / Hammond Road intersection is restricted to left turn movements only and the adjacent section of Wattleup Road is downgraded to a Neighbourhood Connector B road. The target maximum daily traffic volume for a Neighbourhood Connector B road which is 3,000 vpd which is below the current daily traffic volumes (5,758vpd). For the purposes of the long term assessment, the current traffic volumes have been used as a conservative estimate.

Based on the above, the only traffic volumes that can be used from the ARUP study were the traffic projections for Frankland Avenue. The volumes used were from the 2031 “Do Something” scenario which included the extensions of Rowley Road and Hammond Road and the total site traffic has been added to the 2031 volumes to be conservative.

The distribution of site traffic based on the layout of the long term road network would be similar to the interim scenario except that traffic from the west is most likely to use Whadjuk Drive due to the proposed left-in/left-out restriction at the Hammond Road / Wattleup Road intersection. This would significantly reduce the traffic demand at the western access on Wattleup Road.

Figure 14 and **Figure 15** show the peak hour vehicle movements generated by the proposed centre on the adjacent road network under the long term scenario.

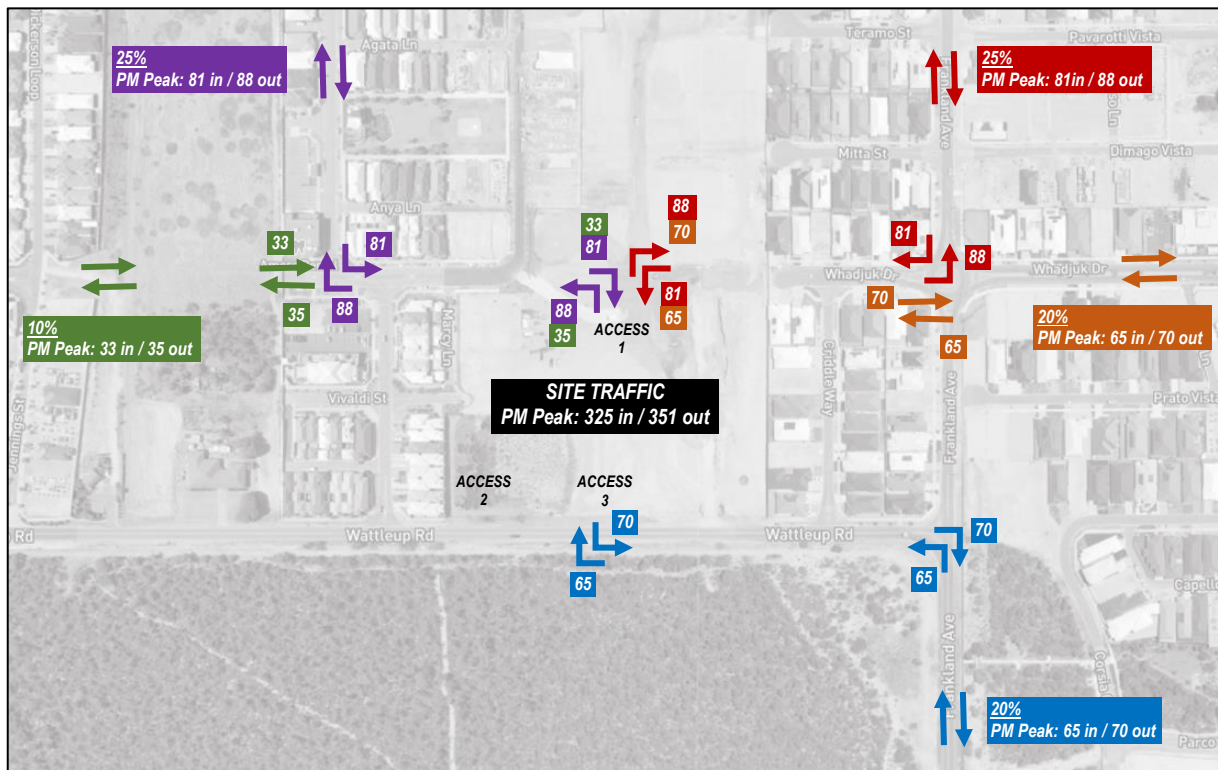


Figure 14: Weekday PM Peak Hour Traffic Distribution - 2033

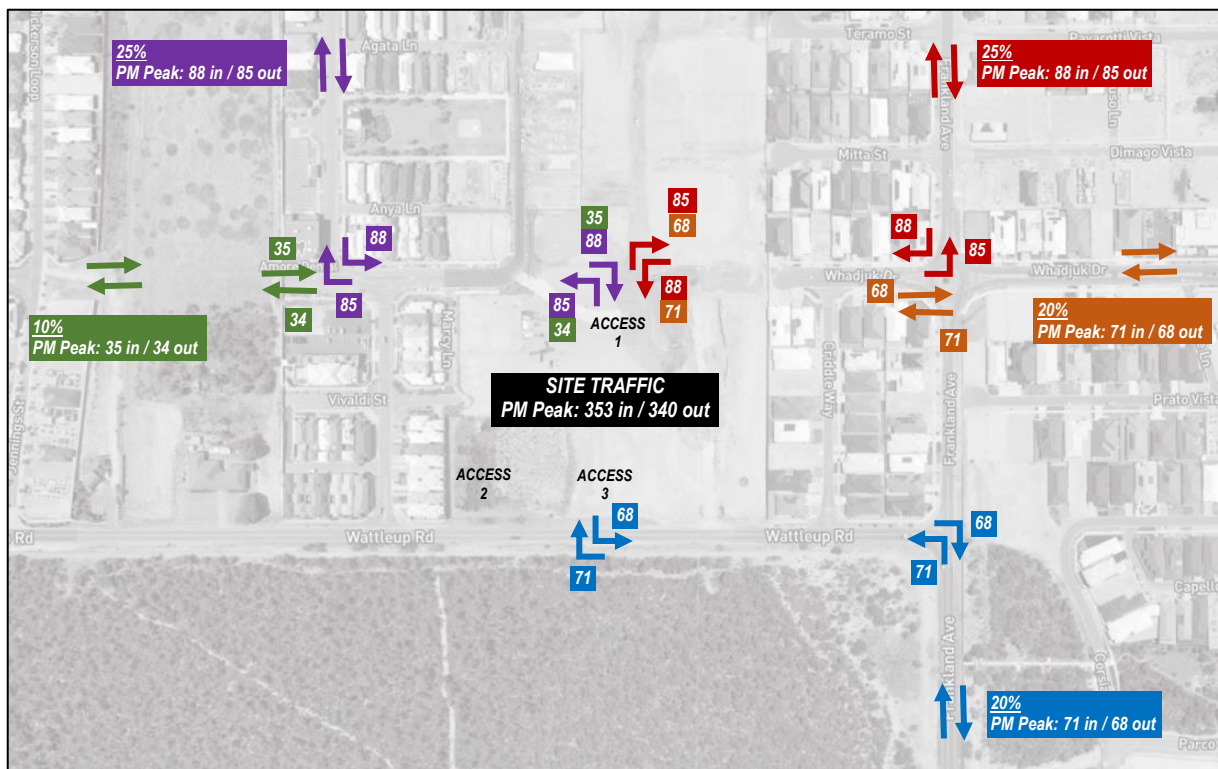


Figure 15: Saturday Peak Hour Traffic Distribution - 2033

The results of the 2033 capacity assessment are attached as **Appendix B** and summarised in **Table 5**.

Table 5: SIDRA Output Summary – Long Term (2033)

Intersection	Peak Hour	DoS	Average Delay (s)	Worst Delay (s)	95%ile Queue	Average LoS	Worst LoS
Whadjuk Dr / Marquis Street	Weekday PM Peak	0.495	4.1s	9.0s	14.5m	A	A
	Saturday Peak	0.493	4.1s	9.0s	14.4m	A	A
Whadjuk Dr Access	Weekday PM Peak	0.261	2.8s	6.8s	2.9m	A	A
	Saturday Peak	0.268	2.8s	6.9s	3.1m	A	A
Frankland Ave / Whadjuk Dr	Weekday PM Peak	0.652	11.4s	15.5s	21.3m	B	B
	Saturday Peak	0.654	11.7s	16.0s	21.7m	B	B
Wattleup Rd Access (East)	Weekday PM Peak	0.241	1.2s	9.8s	1.9m	A	A
	Saturday Peak	0.114	1.5s	8.5s	1.3m	A	A
Wattleup Rd / Frankland Ave	Weekday PM Peak	0.701	5.4s	13.2s	11.3m	A/B	B
	Saturday Peak	0.454	3.5s	10.4s	3.5m	A	B

As shown, all assessed intersections and access points are expected to operate within capacity under the long term scenario with an average Level of Service A or B for all locations during both peak periods. All other measures of performance (degree of saturation, average delays and queues) are well within acceptable thresholds.

5.6 Auxiliary Lanes

For the short to medium term future, Wattleup Road will remain a high speed, distributor road carrying a relatively high volume of traffic. The proposed access points have been assessed in accordance with MRWA *Supplement to Austroads Guide to Road Design - Part 4 A.8 – Intersection Warrants*. These warrants provide guidance for the provision of intersection turning treatments from the major road based on capacity and safety.

The through and turning volumes were calculated as per Austroads GTM Part 6 – 2017 as shown in **Figure 16** and the results of the assessment are shown in **Figure 17**.

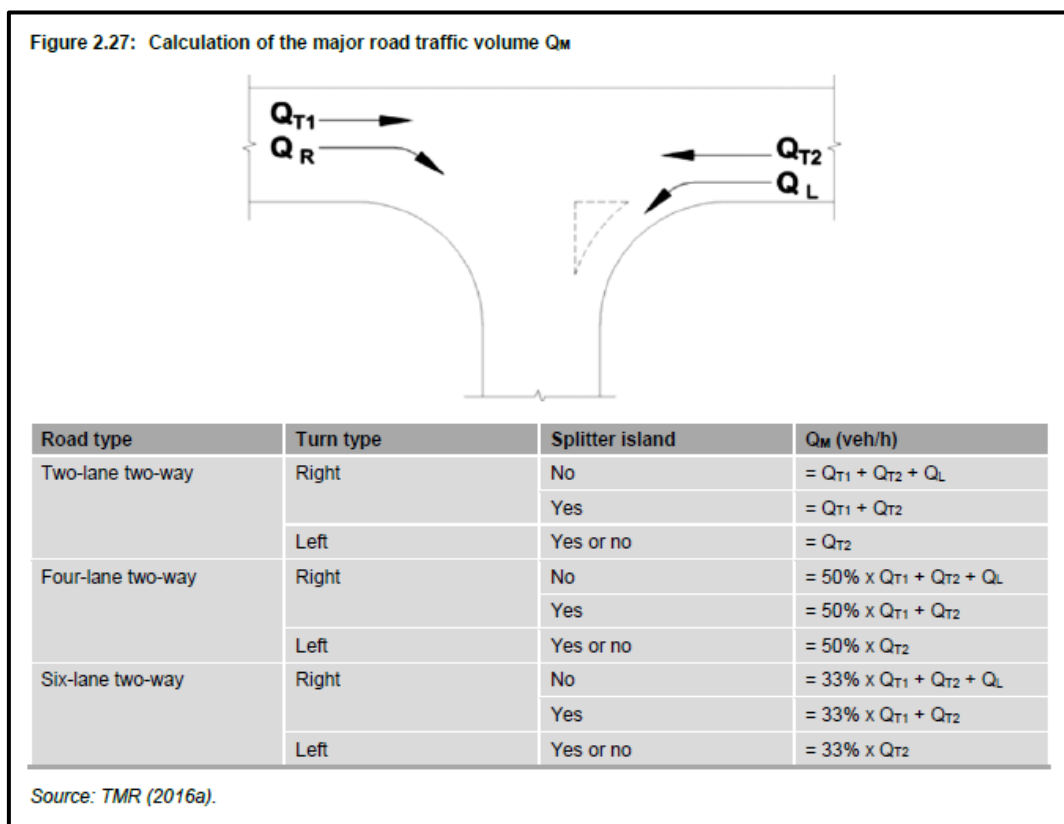


Figure 16: Calculation of the Major Road Traffic Volume Q_m

INTERSECTION WARRANTS

Main Roads WA Supplement to Austroads Guide to Road Design - Part 4 A.8

DESIGN SPEED = 80km/h
 SPLITTER ISLAND YES / NO = No
 DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	HV (%)
Q _{T1}	157	14
Q _R	0	0
Q _{T2}	444	4.1
Q _L	33	0

RIGHT TURN ASSESSMENT

Q_m = 634
 % HV = 6.338
 x = 0.00
 TREATMENT = BAR

LEFT TURN ASSESSMENT

West Access
 Weekday PM Peak

Q_m = 444
 % HV = 4.100
 x = 2.35
 TREATMENT = AUL(S)

INTERSECTION WARRANTS

Main Roads WA Supplement to Austroads Guide to Road Design - Part 4 A.8

DESIGN SPEED = 80km/h
 SPLITTER ISLAND YES / NO = No
 DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	HV (%)
Q _{T1}	125	8.8
Q _R	0	0
Q _{T2}	176	5.7
Q _L	35	0

RIGHT TURN ASSESSMENT

Q_m = 336
 % HV = 6.260
 x = 0.00
 TREATMENT = BAR

LEFT TURN ASSESSMENT

West Access
 Saturday Peak

Q_m = 176
 % HV = 5.700
 x = 1.05
 TREATMENT = BAL

INTERSECTION WARRANTS

Main Roads WA Supplement to Austroads Guide to Road Design - Part 4 A.8

DESIGN SPEED = 80km/h
 SPLITTER ISLAND YES / NO = No
 DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	HV (%)
Q _{T1}	157	14
Q _R	65	0
Q _{T2}	444	4.1
Q _L	0	0

RIGHT TURN ASSESSMENT

Q_m = 601
 % HV = 6.686
 x = 4.16
 TREATMENT = CHR

LEFT TURN ASSESSMENT

East Access
 Weekday PM Peak

Q_m = 444
 % HV = 4.100
 x = 0.00
 TREATMENT = BAL

INTERSECTION WARRANTS

Main Roads WA Supplement to Austroads Guide to Road Design - Part 4 A.8

DESIGN SPEED = 80km/h
 SPLITTER ISLAND YES / NO = No
 DUAL CARRIAGEWAY YES / NO = No

MOVEMENT	COUNT (v/h)	HV (%)
Q _{T1}	125	8.8
Q _R	71	0
Q _{T2}	176	5.7
Q _L	0	0

RIGHT TURN ASSESSMENT

Q_m = 301
 % HV = 6.987
 x = 2.30
 TREATMENT = AUR

LEFT TURN ASSESSMENT

East Access
 Saturday Peak

Q_m = 176
 % HV = 5.700
 x = 0.00
 TREATMENT = BAL

Figure 17: Calculation of Intersection Warrants

As above, the traffic volumes at western access warrant the provision of a Short Auxiliary Left (AUL(S)) turn treatment which is triggered during the weekday PM peak hour. The Basic Right (BAR) treatment is not considered necessary as minimal traffic would turn right at this access (most would turn right at the eastern access).

The traffic volumes at eastern access warrant the provision of a Channelised Right (CHR) turn treatment which is also triggered during the weekday PM peak hour. The Basic Left (BAL) treatment is not considered necessary as minimal traffic would turn left at this access (most would turn left at the western access).

The indicative layouts of the AUL and CHR turn treatments are shown in **Figure 18**. The AUL(S) is similar to the AUL treatment but is shorter.

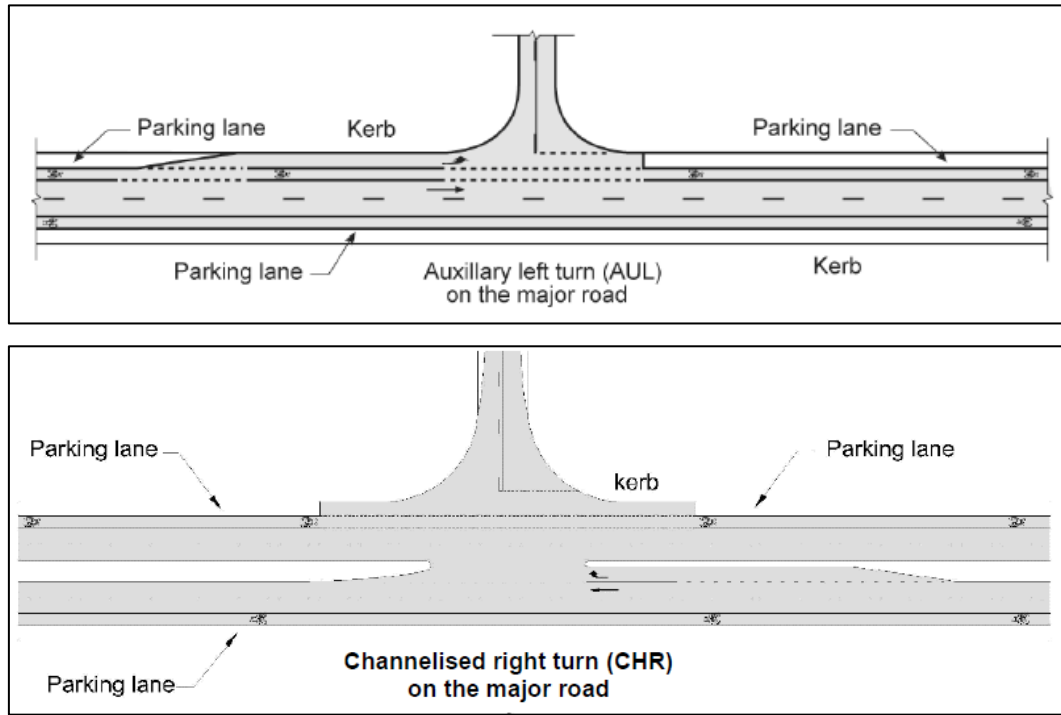


Figure 18: Concept Urban Turn Treatments

6 Preliminary Access and Parking Assessment

6.1.1 Access Layout

The proposed vehicle access arrangement is shown in **Figure 19**.

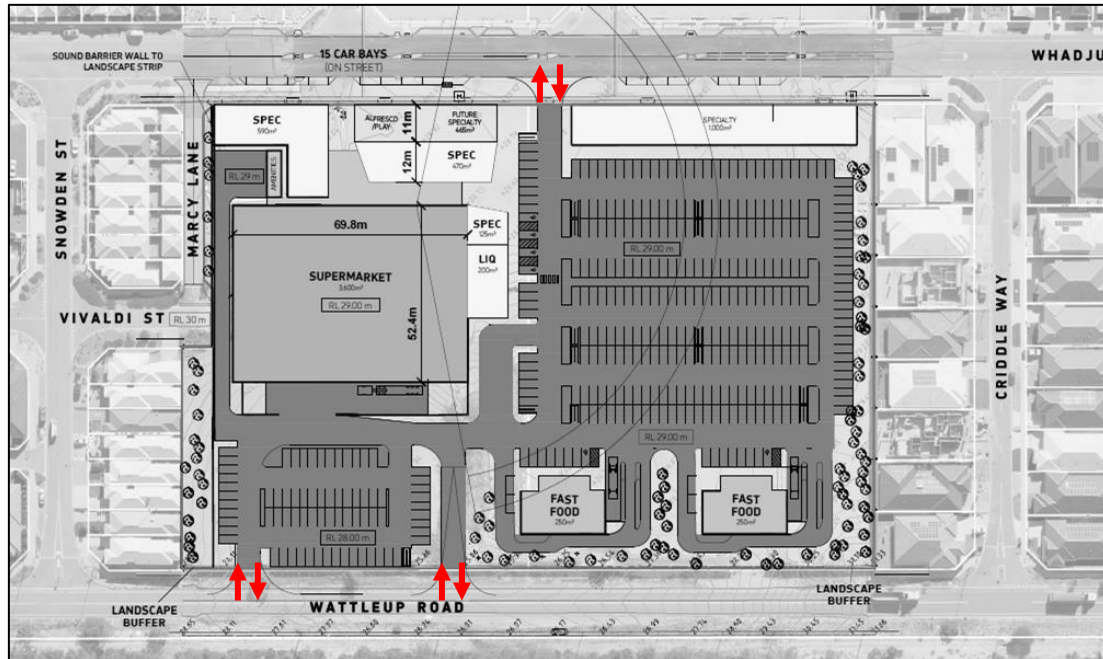


Figure 19: Proposed Access Arrangement

In order to allow full movements at the proposed access on Whadjuk Drive, it is recommended that this access is relocated to achieve at least 20m of separation from the opposite access road as shown in **Figure 20**. One of the median islands will need to be relocated to regulate right turn movements and one path connection and pram ramp will need to be removed. There are existing alternate crossings nearby as also shown.

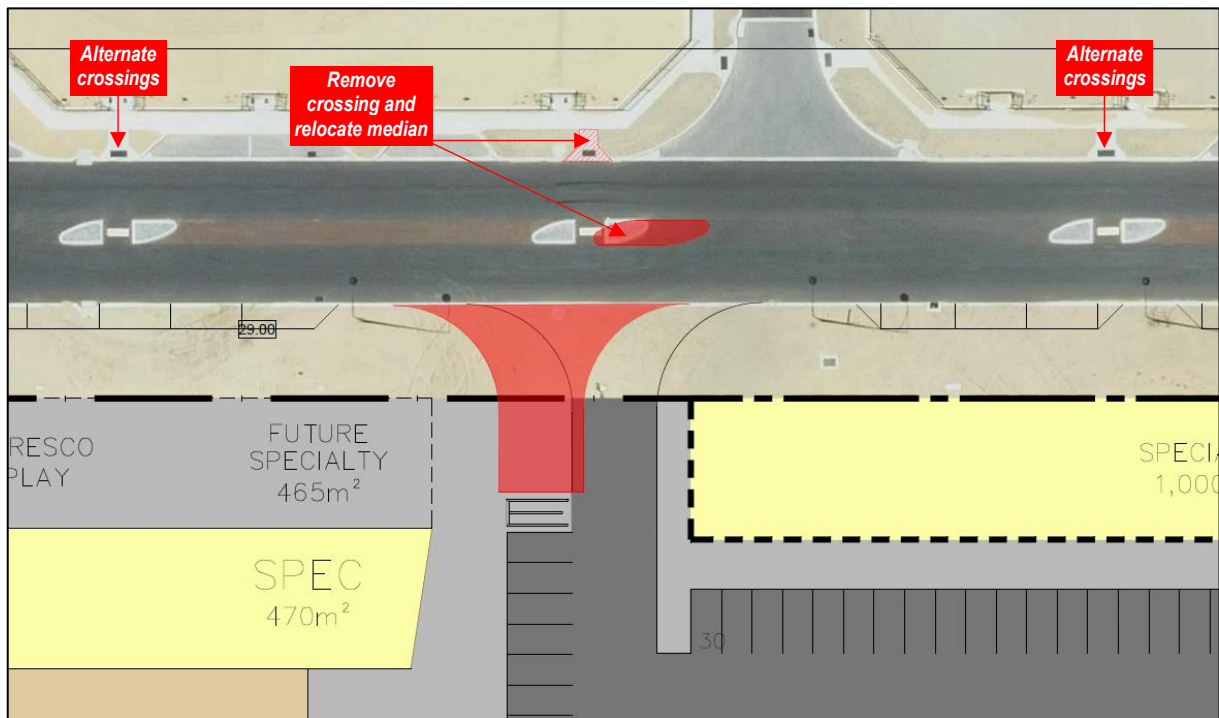


Figure 20: Potential Relocation of Whadjuk Drive Access

Swept paths based on the relocated access and median are shown in Figure 21.

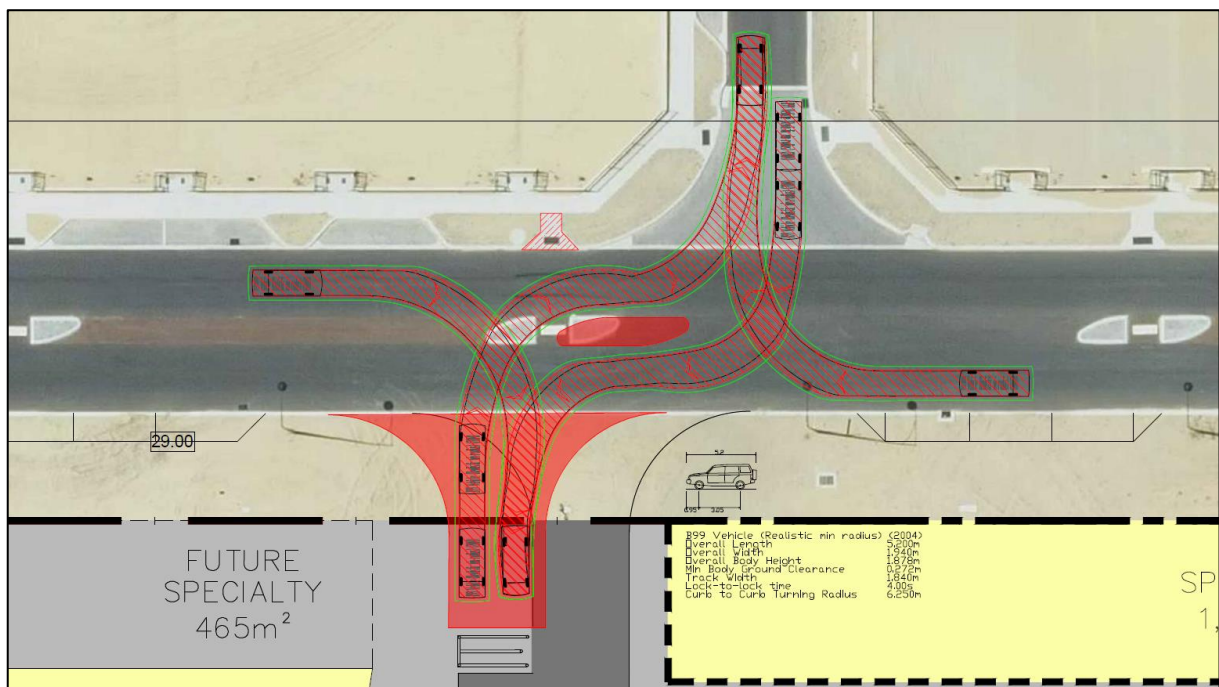


Figure 21: Relocated Access Swept Paths

6.1.2 Access Sight Distance

Sight distance requirements from vehicle exit points are defined in Figure 3.2 of AS2890.1 which is shown in Figure 22.

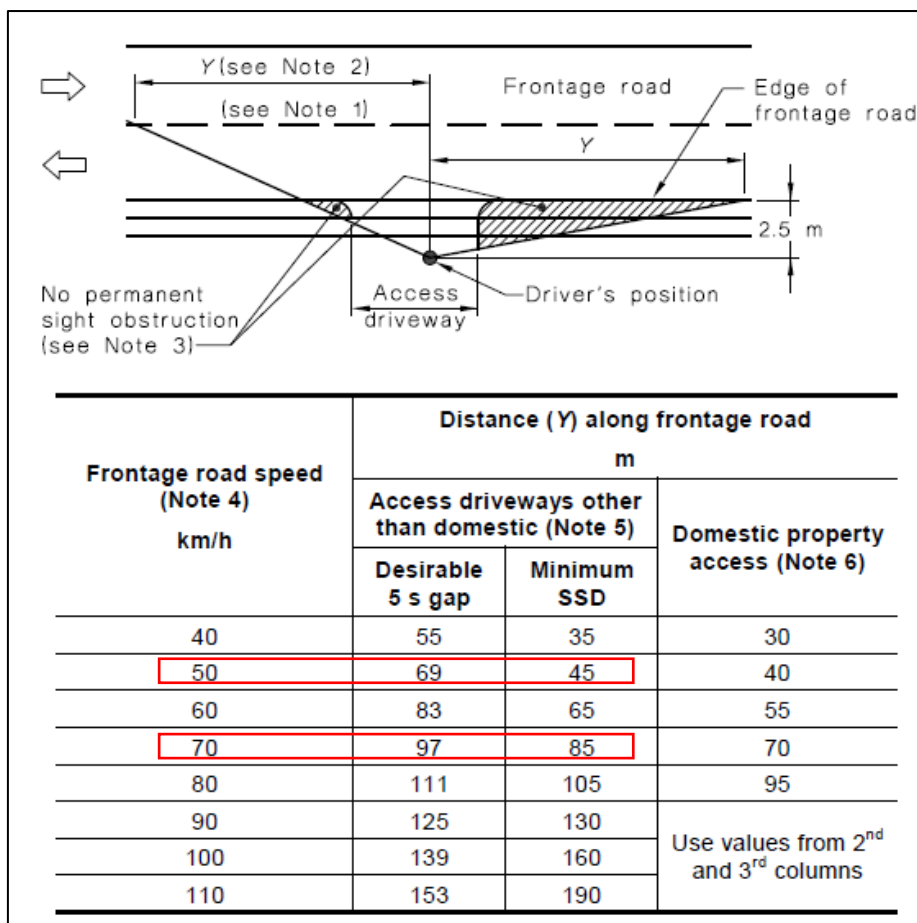


Figure 22: Sight Distance Requirements

Based on the 70km/h speed limit along Wattleup Road, the minimum required sight distance along this road is 85m (97m desirable). Based on the 50km/h speed limit along Whadjuk Drive, the minimum required sight distance along this road is 45m (69m desirable).

The sight distance checks are shown in Figure 23.

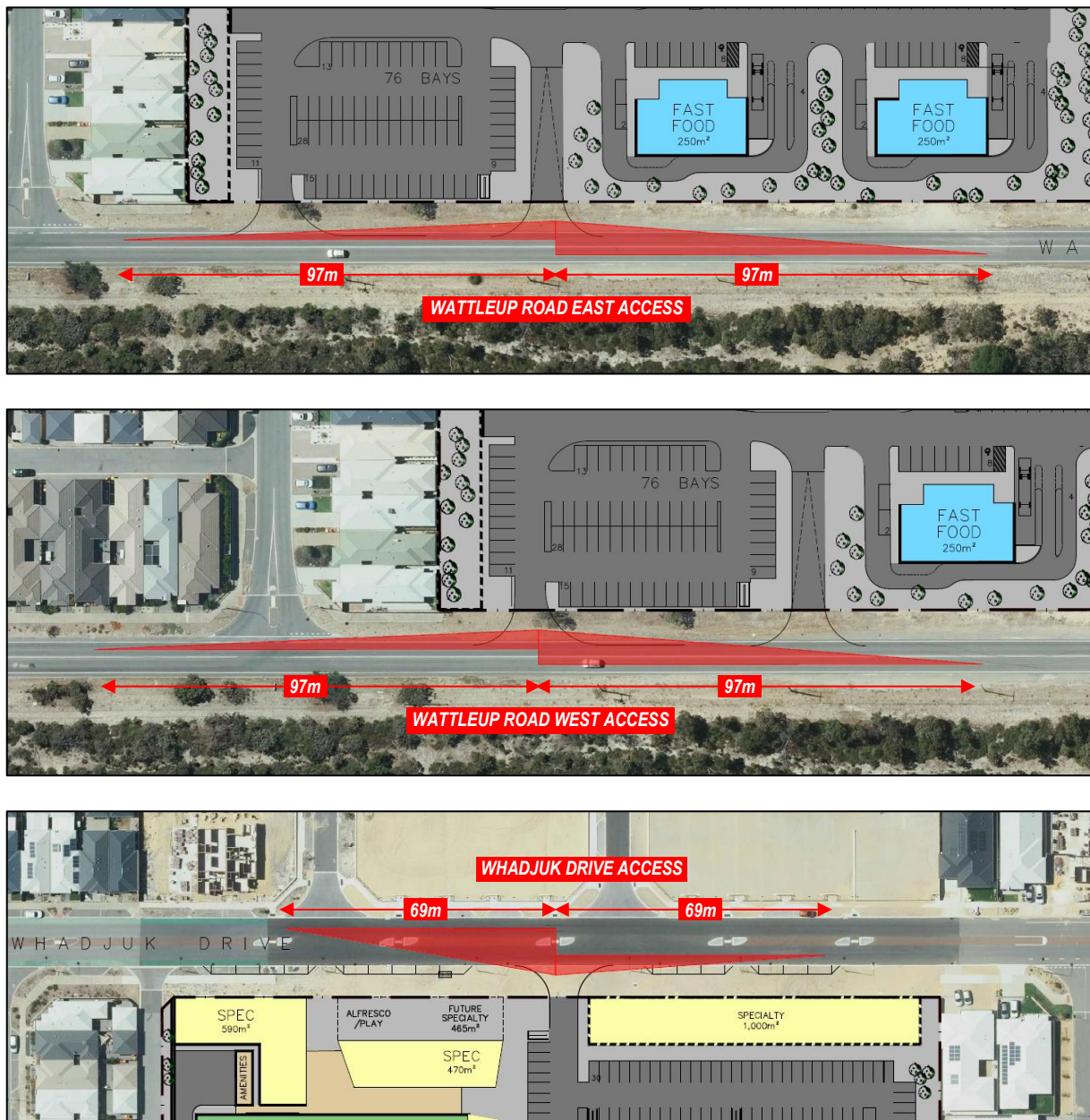


Figure 23: Sight Distance Checks

As shown, the desirable sight distance is achieved at all proposed crossover locations.

Vertically, there are crests along Wattleup Road in both directions but both crests are beyond the minimum required sight distances and so neither are considered to be an issue.

As mentioned previously, it is likely that the speed limit along Wattleup Road will be reduced. The lower speed limit would therefore reduce the actual sight distance requirements and will improve safety along the frontage road.

6.2 Parking Provision

The current concept plan proposes approximately 352 on-site car parking bays. Additional parking includes:

- 4 supermarket “click and collect” bays.
- 22 fast food drive through stacking spaces.
- 15 street parking bays along the south side of Whadjuk Drive.

The overall parking provision is therefore approximately 393 bays.

The parking requirements of the centre have been calculated in accordance with the City of Cockburn Town Planning Scheme No.3 (TPS3) as detailed in **Table 6**.

Table 6: City of Cockburn Parking Requirements

Land Use	Requirement	Quantum	Required Bays
Shop	1 bay per 12m ² NLA for 0-5000m ² NLA 1 bay per 14m ² NLA for 5000-10000m ² NLA 1 bay per 16m ² NLA for over 10000m ² NLA	6,450m ²	461 bays
Fast Food Outlet	1 bay per 15m ² GLA	500m ²	33 bays
			Total 494 bays

As shown, the centre will require approximately 494 bays. The provision of 393 bays is 101 bays short of the calculated requirement. The following is noted with regards to parking:

- The neighbourhood centre masterplan is subject to refinement and modifications at the development application stage including changes to the floorspaces and parking provision. A more detailed assessment of the parking demands will be undertaken as part of the development application.
- The above calculated does not account for potential multipurpose trips and the potential sharing of parking between the uses on the site.

6.3 Service Vehicle Access

A preliminary swept path analysis has been undertaken in Autodesk Vehicle Tracking to review whether the concept masterplan layout will allow adequate manoeuvring for service vehicles. The following vehicle movements have been tested:

- A 19m semi-trailer accessing the supermarket loading area
- An 8.8m medium rigid truck accessing the loading area in the north-west corner
- A 12.5m heavy rigid truck accessing the fast-food loading area

The swept paths are attached as **Appendix C**.

The following modifications will be required to accommodate the movement of the expected service vehicles:

- Widening at both Wattleup Road access points to accommodate the turning movement of 19.0m semi-trailers.
- Widening of the opening to the supermarket loading area to allow semi-trailers to exit.
- Reconfiguration of the north-west loading area to allow service vehicles to turn around.
- Truncation widening around the fast-food loading bays to accommodate the turning movements of the 12.5m heavy rigid trucks.
- Minor widening throughout the circulating areas to accommodate turning movements as shown in the swept path sketches.

7 Public Transport

7.1 Existing Public Transport Services

The closest available public transport service to the site is Transperth Bus Route 536 which operates between Aubin Grove Station and Hammond Park. The closest stop is on Irvine Parade adjacent to Hammond Park Secondary College which is approximately 350m walking distance from the site. The route map is shown in **Figure 24**.

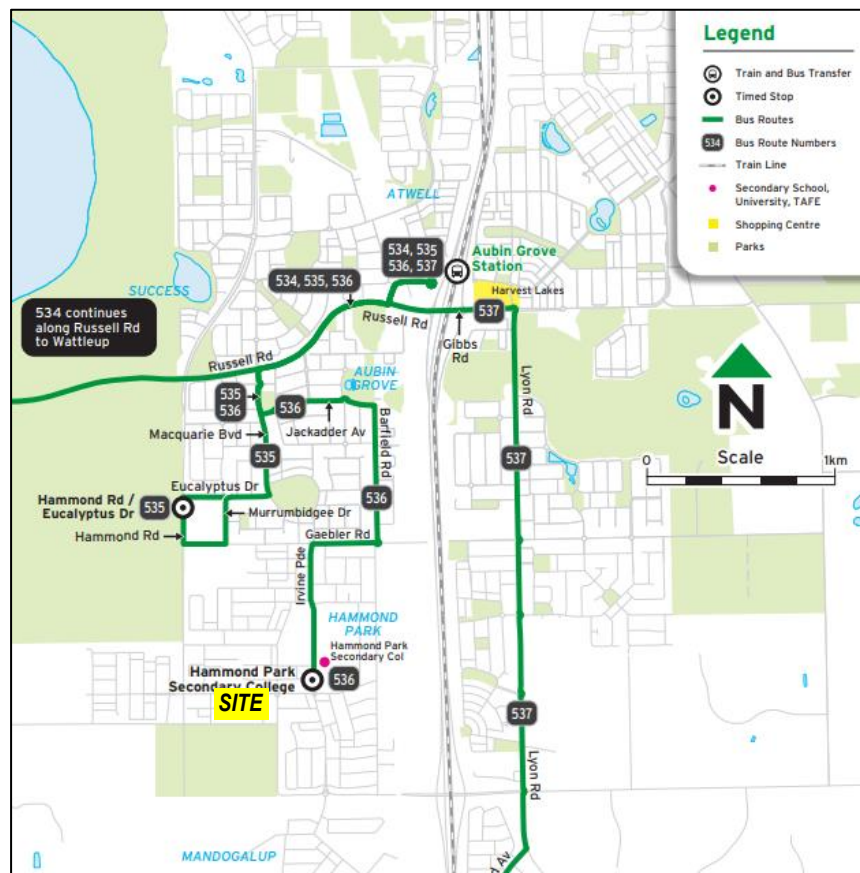


Figure 24: Public Transport Network

The Public Transport Authority (PTA) have advised of the following planned changes to the public transport services:

- Bus Route 536 will eventually extend further south once development progresses further and a suitable terminus becomes available.
- Bus Route 535 which currently operates between Aubin Grove Station and Hammond Park Primary School will also extend further south and potentially west.

8 Pedestrian and Cycle Networks

All surrounding roads currently have at least one footpath except for the section of Wattleup Road along the site frontage. The existing sections of Whadjuk Drive have a path and on-road cycle lanes along both sides of the road.

The following additional links will be required to complete the external path network:

- Continuation of the paths and cycle lanes along Whadjuk Drive adjacent to the site.
- Connection of the path along the north side of Wattleup Drive.

9 Site Specific or Safety Issues

9.1 Crash History

The crash history of the adjacent road network for the five-year period ending December 2020 was obtained from the MRWA *Reporting Centre* as summarised in **Figure 25**.

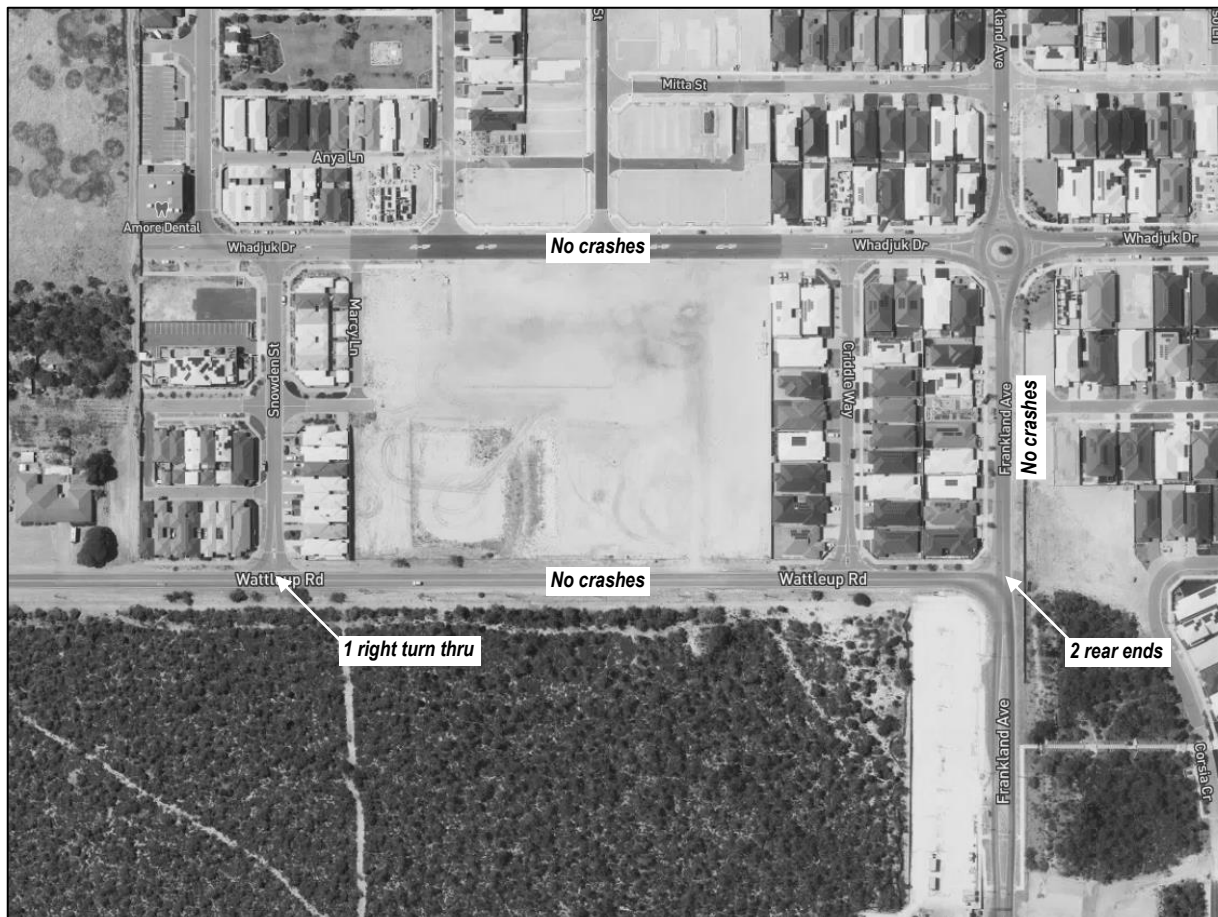


Figure 25: Crash History – January 2016 to December 2020

The crash history is low and does not indicate any safety issues on the adjacent road network. There is no indication that the amendment will increase the likelihood of crashes to an unacceptable level.

10 Conclusion

With respect to the proposed LSP amendment, the following is concluded:

- The amended LSP will generate approximately 267 new vehicle trips during the PM peak hour (123 inbound and 154 outbound) and approximately 342 new vehicle trips during the Saturday mid-day peak hour (172 inbound and 170 outbound) compared to the exiting LSP.
- A peak hour capacity analysis of the site access points and the nearby intersections indicates that there will be adequate capacity to accommodate the proposed amendment under both the interim (2023) and longer term (2033) scenarios. All assessed locations are expected to operate within capacity during the peak hours with an average Level of Service A or B.
- Under the interim scenario, the western vehicle access on Wattleup Road is likely to require the provision of a Short Auxiliary Left (AUL(S)) and the eastern access will require a Channelised Right (CHR) turn treatment. In the longer term, the speed limit along Wattleup Road is likely to be reduced to 50km/h and so the provision of turn treatments will no longer be warranted.
- A preliminary parking assessment indicates that the proposed centre will require a minimum of 494 parking bays. A more detailed parking demand assessment will be undertaken as part of the development application submission.
- In order to allow full movements at the proposed access on Whadjuk Drive, it is recommended that this access is relocated to achieve at least 20m of separation from the opposite access road
- A preliminary swept path analysis indicates that widening of the proposed vehicle accesses on Wattleup Road will be required to accommodate the expected service vehicle movement additional modifications will also be required internally in the loading areas and through the circulating roadways.
- The site currently has limited access to public transport as the area is still being developed. PTA has plans to extend several existing bus routes to service the area once development has progressed and there is demand for additional services.
- Adequate sight distance is achievable available from all access points.
- The following additional pedestrian/cyclist links will be required to complete the external network:
 - Continuation of the paths and cycle lanes along Whadjuk Drive adjacent to the site.
 - Connection of the path along the north side of Wattleup Drive.
- The crash history is low and does not indicate any safety issues on the adjacent road network. There is no indication that the amendment will increase the likelihood of crashes to an unacceptable level.

Appendix A – SIDRA Results

MOVEMENT SUMMARY

▼ Site: 1 [Whadjuk Dr / Marquis St (Site Folder: 2023 Weekday PM Peak)]

■ Network: N101 [2023 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Whadjuk Dr														
5	T1	1	0.0	1	0.0	0.063	0.0	LOS A	0.1	1.0	0.02	0.54	0.02	40.2
6	R2	150	0.0	150	0.0	0.063	4.6	LOS A	0.1	1.0	0.02	0.54	0.02	44.8
Approach		151	0.0	151	0.0	0.063	4.5	NA	0.1	1.0	0.02	0.54	0.02	44.8
North: Marquis St														
7	L2	170	0.0	170	0.0	0.081	4.6	LOS A	0.2	1.1	0.01	0.52	0.01	44.5
9	R2	1	0.0	1	0.0	0.081	4.8	LOS A	0.2	1.1	0.01	0.52	0.01	36.1
Approach		171	0.0	171	0.0	0.081	4.6	LOS A	0.2	1.1	0.01	0.52	0.01	44.4
West: Whadjuk Dr														
10	L2	1	0.0	1	0.0	0.001	3.9	LOS A	0.0	0.0	0.00	0.27	0.00	46.9
11	T1	1	0.0	1	0.0	0.001	0.0	LOS A	0.0	0.0	0.00	0.27	0.00	35.1
Approach		2	0.0	2	0.0	0.001	1.9	NA	0.0	0.0	0.00	0.27	0.00	45.4
All Vehicles		324	0.0	324	0.0	0.081	4.5	NA	0.2	1.1	0.01	0.53	0.01	44.6

MOVEMENT SUMMARY

▼ Site: 2 [Whadjuk Dr Access 1 (Site Folder: 2023 Weekday PM Peak)]

■ Network: N101 [2023 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Access 1														
7	L2	89	0.0	89	0.0	0.154	4.6	LOS A	0.2	1.4	0.05	0.54	0.05	44.3
9	R2	159	0.0	159	0.0	0.154	4.9	LOS A	0.2	1.4	0.05	0.54	0.05	44.3
Approach		248	0.0	248	0.0	0.154	4.8	LOS A	0.2	1.4	0.05	0.54	0.05	44.3
East: Whadjuk Dr														
10	L2	147	0.0	147	0.0	0.086	4.6	LOS A	0.0	0.0	0.00	0.48	0.00	45.6
11	T1	15	0.0	15	0.0	0.086	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	38.6
Approach		162	0.0	162	0.0	0.086	4.1	NA	0.0	0.0	0.00	0.48	0.00	45.3
West: Whadjuk Dr														
5	T1	14	0.0	14	0.0	0.046	0.4	LOS A	0.1	0.7	0.28	0.44	0.28	37.8
6	R2	82	0.0	82	0.0	0.046	4.9	LOS A	0.1	0.7	0.28	0.44	0.28	44.5
Approach		96	0.0	96	0.0	0.046	4.3	NA	0.1	0.7	0.28	0.44	0.28	44.2
All Vehicles		506	0.0	506	0.0	0.154	4.5	NA	0.2	1.4	0.08	0.50	0.08	44.6

**MOVEMENT SUMMARY**

Site: 3 [Frankland Ave / Whadjuk Dr (Site Folder: 2023 Weekday PM Peak)]

Network: N101 [2023 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
1	L2	9	0.0	9	0.0	0.116	4.1	LOS A	0.3	1.9	0.38	0.50	0.38	35.0
2	T1	89	1.1	89	1.1	0.116	4.1	LOS A	0.3	1.9	0.38	0.50	0.38	45.6
3	R2	31	3.2	31	3.2	0.116	8.2	LOS A	0.3	1.9	0.38	0.50	0.38	45.6
Approach		129	1.6	129	1.6	0.116	5.1	LOS A	0.3	1.9	0.38	0.50	0.38	45.3
East: Whadjuk Dr														
4	L2	15	13.3	15	13.3	0.102	4.8	LOS A	0.2	1.7	0.45	0.50	0.45	43.5
5	T1	84	0.0	84	0.0	0.102	4.5	LOS A	0.2	1.7	0.45	0.50	0.45	43.5
6	R2	7	0.0	7	0.0	0.102	8.6	LOS A	0.2	1.7	0.45	0.50	0.45	47.1
Approach		106	1.9	106	1.9	0.102	4.8	LOS A	0.2	1.7	0.45	0.50	0.45	43.9
North: Frankland Ave														
7	L2	13	0.0	13	0.0	0.200	3.8	LOS A	0.5	3.5	0.35	0.50	0.35	46.0
8	T1	147	2.0	147	2.0	0.200	3.9	LOS A	0.5	3.5	0.35	0.50	0.35	43.2
9	R2	82	0.0	82	0.0	0.200	7.9	LOS A	0.5	3.5	0.35	0.50	0.35	43.2
Approach		242	1.2	242	1.2	0.200	5.2	LOS A	0.5	3.5	0.35	0.50	0.35	43.5
West: Whadjuk Dr														
10	L2	92	0.0	92	0.0	0.154	3.8	LOS A	0.4	2.6	0.35	0.46	0.35	45.2
11	T1	78	0.0	78	0.0	0.154	3.9	LOS A	0.4	2.6	0.35	0.46	0.35	46.5
12	R2	13	0.0	13	0.0	0.154	7.9	LOS A	0.4	2.6	0.35	0.46	0.35	37.3
Approach		183	0.0	183	0.0	0.154	4.1	LOS A	0.4	2.6	0.35	0.46	0.35	45.6
All Vehicles		660	1.1	660	1.1	0.200	4.8	LOS A	0.5	3.5	0.37	0.49	0.37	44.6

MOVEMENT SUMMARY

Site: 4 [Wattleup Rd Access 2 (West) (Site Folder: 2023 Weekday PM Peak)]

Network: N101 [2023 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Wattleup Rd														
11	T1	157	14.0	157	14.0	0.114	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	69.8
12	R2	1	0.0	1	0.0	0.114	7.8	LOS A	0.0	0.0	0.01	0.01	0.01	11.2
Approach		158	13.9	158	13.9	0.114	0.1	NA	0.0	0.0	0.01	0.01	0.01	67.6
North: Access 2														
1	L2	1	0.0	1	0.0	0.054	1.7	LOS A	0.1	0.5	0.49	0.45	0.49	9.8
3	R2	36	0.0	36	0.0	0.054	3.1	LOS A	0.1	0.5	0.49	0.45	0.49	16.8
Approach		37	0.0	37	0.0	0.054	3.1	LOS A	0.1	0.5	0.49	0.45	0.49	16.7
West: Wattleup Rd														
4	L2	34	0.0	34	0.0	0.271	9.5	LOS A	0.0	0.0	0.00	0.08	0.00	64.8
5	T1	444	4.1	444	4.1	0.271	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	68.0
Approach		478	3.8	478	3.8	0.271	0.7	NA	0.0	0.0	0.00	0.08	0.00	67.6
All Vehicles		673	5.9	673	5.9	0.271	0.7	NA	0.1	0.5	0.03	0.09	0.03	52.4

MOVEMENT SUMMARY

Site: 5 [Wattleup Rd Access 3 (East) (Site Folder: 2023 Weekday PM Peak)]

Network: N101 [2023 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Wattleup Rd														
11	T1	157	14.0	157	14.0	0.162	0.9	LOS A	0.2	2.0	0.32	0.28	0.32	51.1
12	R2	66	0.0	66	0.0	0.162	9.9	LOS A	0.2	2.0	0.32	0.28	0.32	13.1
Approach		223	9.9	223	9.9	0.162	3.5	NA	0.2	2.0	0.32	0.28	0.32	18.9
North: Access 3														
1	L2	71	0.0	71	0.0	0.069	1.7	LOS A	0.1	0.7	0.46	0.35	0.46	9.9
3	R2	1	0.0	1	0.0	0.069	3.5	LOS A	0.1	0.7	0.46	0.35	0.46	9.9
Approach		72	0.0	72	0.0	0.069	1.7	LOS A	0.1	0.7	0.46	0.35	0.46	9.9
West: Wattleup Rd														
4	L2	1	0.0	1	0.0	0.253	7.2	LOS A	0.0	0.0	0.00	0.00	0.00	62.6
5	T1	444	4.1	444	4.1	0.253	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.5
Approach		445	4.0	445	4.0	0.253	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.4
All Vehicles		740	5.4	740	5.4	0.253	1.3	NA	0.2	2.0	0.14	0.12	0.14	17.7

MOVEMENT SUMMARY

Site: 6 [Wattleup Rd / Frankland Ave (Site Folder: 2023 Weekday PM Peak)]

Network: N101 [2023 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
4	L2	198	9.6	198	9.6	0.180	6.6	LOS A	0.0	0.0	0.00	0.53	0.00	58.7
5	T1	81	1.2	81	1.2	0.180	2.2	LOS A	0.0	0.0	0.00	0.53	0.00	58.7
Approach		279	7.2	279	7.2	0.180	5.3	NA	0.0	0.0	0.00	0.53	0.00	58.7
North: Frankland Ave														
11	T1	151	1.3	151	1.3	0.098	0.2	LOS A	0.1	0.5	0.13	0.08	0.13	61.0
12	R2	24	12.5	24	12.5	0.098	5.7	LOS A	0.1	0.5	0.13	0.08	0.13	45.9
Approach		175	2.9	175	2.9	0.098	0.9	NA	0.1	0.5	0.13	0.08	0.13	60.2
West: Wattleup Rd														
1	L2	48	2.1	48	2.1	0.389	6.8	LOS A	0.6	4.6	0.27	0.68	0.30	42.2
3	R2	465	3.7	465	3.7	0.389	7.2	LOS A	0.6	4.6	0.27	0.68	0.30	53.1
Approach		513	3.5	513	3.5	0.389	7.2	LOS A	0.6	4.6	0.27	0.68	0.30	52.7
All Vehicles		967	4.4	967	4.4	0.389	5.5	NA	0.6	4.6	0.17	0.53	0.18	55.3

MOVEMENT SUMMARY

Site: 1 [Whadjuk Dr / Marquis St (Site Folder: 2023 Saturday Mid-day Peak)]

Network: N101 [2023 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Whadjuk Dr														
5	T1	4	0.0	4	0.0	0.050	0.0	LOS A	0.1	0.8	0.04	0.52	0.04	40.3
6	R2	113	0.9	113	0.9	0.050	4.6	LOS A	0.1	0.8	0.04	0.52	0.04	44.8
Approach		117	0.9	117	0.9	0.050	4.4	NA	0.1	0.8	0.04	0.52	0.04	44.8
North: Marquis St														
7	L2	99	0.0	99	0.0	0.048	4.6	LOS A	0.1	0.6	0.02	0.52	0.02	44.4
9	R2	1	0.0	1	0.0	0.048	4.7	LOS A	0.1	0.6	0.02	0.52	0.02	36.1
Approach		100	0.0	100	0.0	0.048	4.6	LOS A	0.1	0.6	0.02	0.52	0.02	44.3
West: Whadjuk Dr														
10	L2	2	0.0	2	0.0	0.003	3.9	LOS A	0.0	0.0	0.00	0.21	0.00	47.4
11	T1	3	0.0	3	0.0	0.003	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	37.2
Approach		5	0.0	5	0.0	0.003	1.5	NA	0.0	0.0	0.00	0.21	0.00	45.6
All Vehicles		222	0.5	222	0.5	0.050	4.4	NA	0.1	0.8	0.03	0.51	0.03	44.6

MOVEMENT SUMMARY

Site: 2 [Whadjuk Dr Access 1 (Site Folder: 2023 Saturday Mid-day Peak)]

Network: N101 [2023 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Access 1														
7	L2	86	0.0	86	0.0	0.149	4.6	LOS A	0.2	1.4	0.05	0.54	0.05	44.3
9	R2	154	0.0	154	0.0	0.149	4.9	LOS A	0.2	1.4	0.05	0.54	0.05	44.3
Approach		240	0.0	240	0.0	0.149	4.8	LOS A	0.2	1.4	0.05	0.54	0.05	44.3
East: Whadjuk Dr														
10	L2	160	0.0	160	0.0	0.093	4.6	LOS A	0.0	0.0	0.00	0.48	0.00	45.5
11	T1	15	0.0	15	0.0	0.093	0.0	LOS A	0.0	0.0	0.00	0.48	0.00	38.5
Approach		175	0.0	175	0.0	0.093	4.2	NA	0.0	0.0	0.00	0.48	0.00	45.3
West: Whadjuk Dr														
5	T1	15	0.0	15	0.0	0.051	0.4	LOS A	0.1	0.8	0.29	0.45	0.29	37.7
6	R2	89	0.0	89	0.0	0.051	5.0	LOS A	0.1	0.8	0.29	0.45	0.29	44.5
Approach		104	0.0	104	0.0	0.051	4.3	NA	0.1	0.8	0.29	0.45	0.29	44.1
All Vehicles		519	0.0	519	0.0	0.149	4.5	NA	0.2	1.4	0.08	0.50	0.08	44.6

MOVEMENT SUMMARY

Site: 3 [Frankland Ave / Whadjuk Dr (Site Folder: 2023 Saturday Mid-day Peak)]

Network: N101 [2023 Saturday Mid-day Peak
(Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
1	L2	7	0.0	7	0.0	0.081	4.1	LOS A	0.2	1.3	0.37	0.47	0.37	35.4
2	T1	68	1.5	68	1.5	0.081	4.1	LOS A	0.2	1.3	0.37	0.47	0.37	45.8
3	R2	16	0.0	16	0.0	0.081	8.1	LOS A	0.2	1.3	0.37	0.47	0.37	45.9
Approach		91	1.1	91	1.1	0.081	4.8	LOS A	0.2	1.3	0.37	0.47	0.37	45.5
East: Whadjuk Dr														
4	L2	8	0.0	8	0.0	0.086	4.2	LOS A	0.2	1.3	0.40	0.46	0.40	43.8
5	T1	82	0.0	82	0.0	0.086	4.2	LOS A	0.2	1.3	0.40	0.46	0.40	43.8
6	R2	4	0.0	4	0.0	0.086	8.3	LOS A	0.2	1.3	0.40	0.46	0.40	47.3
Approach		94	0.0	94	0.0	0.086	4.4	LOS A	0.2	1.3	0.40	0.46	0.40	44.1
North: Frankland Ave														
7	L2	2	0.0	2	0.0	0.151	3.7	LOS A	0.4	2.5	0.31	0.51	0.31	45.8
8	T1	96	0.0	96	0.0	0.151	3.7	LOS A	0.4	2.5	0.31	0.51	0.31	43.0
9	R2	88	0.0	88	0.0	0.151	7.7	LOS A	0.4	2.5	0.31	0.51	0.31	43.0
Approach		186	0.0	186	0.0	0.151	5.6	LOS A	0.4	2.5	0.31	0.51	0.31	43.0
West: Whadjuk Dr														
10	L2	89	0.0	89	0.0	0.142	3.6	LOS A	0.3	2.4	0.28	0.44	0.28	45.4
11	T1	75	0.0	75	0.0	0.142	3.6	LOS A	0.3	2.4	0.28	0.44	0.28	46.7
12	R2	15	0.0	15	0.0	0.142	7.6	LOS A	0.3	2.4	0.28	0.44	0.28	37.8
Approach		179	0.0	179	0.0	0.142	3.9	LOS A	0.3	2.4	0.28	0.44	0.28	45.7
All Vehicles		550	0.2	550	0.2	0.151	4.7	LOS A	0.4	2.5	0.33	0.47	0.33	44.6

MOVEMENT SUMMARY

Site: 4 [Wattleup Rd Access 2 (West) (Site Folder: 2023 Saturday Mid-day Peak)]

Network: N101 [2023 Saturday Mid-day Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Wattleup Rd														
11	T1	125	8.8	125	8.8	0.081	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	69.8
12	R2	1	0.0	1	0.0	0.081	6.4	LOS A	0.0	0.0	0.01	0.01	0.01	11.2
Approach		126	8.7	126	8.7	0.081	0.1	NA	0.0	0.0	0.01	0.01	0.01	67.1
North: Access 2														
1	L2	1	0.0	1	0.0	0.037	0.5	LOS A	0.0	0.3	0.34	0.23	0.34	9.9
3	R2	35	0.0	35	0.0	0.037	1.2	LOS A	0.0	0.3	0.34	0.23	0.34	17.0
Approach		36	0.0	36	0.0	0.037	1.2	LOS A	0.0	0.3	0.34	0.23	0.34	16.8
West: Wattleup Rd														
4	L2	36	0.0	36	0.0	0.124	9.5	LOS A	0.0	0.0	0.00	0.20	0.00	63.7
5	T1	176	5.7	176	5.7	0.124	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	65.7
Approach		212	4.7	212	4.7	0.124	1.6	NA	0.0	0.0	0.00	0.20	0.00	65.1
All Vehicles		374	5.6	374	5.6	0.124	1.1	NA	0.0	0.3	0.03	0.14	0.03	45.5

MOVEMENT SUMMARY

Site: 5 [Wattleup Rd Access 3 (East) (Site Folder: 2023 Saturday Mid-day Peak)]

Network: N101 [2023 Saturday Mid-day Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Wattleup Rd														
11	T1	125	8.8	125	8.8	0.122	0.3	LOS A	0.2	1.4	0.21	0.32	0.21	51.6
12	R2	72	0.0	72	0.0	0.122	8.6	LOS A	0.2	1.4	0.21	0.32	0.21	13.1
Approach		197	5.6	197	5.6	0.122	3.3	NA	0.2	1.4	0.21	0.32	0.21	17.6
North: Access 3														
1	L2	69	0.0	69	0.0	0.050	0.5	LOS A	0.1	0.6	0.27	0.14	0.27	10.0
3	R2	1	0.0	1	0.0	0.050	1.5	LOS A	0.1	0.6	0.27	0.14	0.27	10.0
Approach		70	0.0	70	0.0	0.050	0.6	LOS A	0.1	0.6	0.27	0.14	0.27	10.0
West: Wattleup Rd														
4	L2	1	0.0	1	0.0	0.105	7.2	LOS A	0.0	0.0	0.00	0.01	0.00	62.6
5	T1	176	5.7	176	5.7	0.105	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	69.1
Approach		177	5.6	177	5.6	0.105	0.0	NA	0.0	0.0	0.00	0.01	0.00	68.8
All Vehicles		444	4.7	444	4.7	0.122	1.6	NA	0.2	1.4	0.14	0.17	0.14	15.4

MOVEMENT SUMMARY

Site: 6 [Wattleup Rd / Frankland Ave (Site Folder: 2023 Saturday Mid-day Peak)]

Network: N101 [2023 Saturday Mid-day Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
4	L2	180	6.1	180	6.1	0.148	6.5	LOS A	0.0	0.0	0.00	0.54	0.00	58.5
5	T1	67	0.0	67	0.0	0.148	2.1	LOS A	0.0	0.0	0.00	0.54	0.00	58.5
Approach		247	4.5	247	4.5	0.148	5.3	NA	0.0	0.0	0.00	0.54	0.00	58.5
North: Frankland Ave														
11	T1	107	0.0	107	0.0	0.063	0.1	LOS A	0.0	0.3	0.11	0.07	0.11	61.6
12	R2	16	0.0	16	0.0	0.063	5.2	LOS A	0.0	0.3	0.11	0.07	0.11	46.1
Approach		123	0.0	123	0.0	0.063	0.8	NA	0.0	0.3	0.11	0.07	0.11	60.9
West: Wattleup Rd														
1	L2	27	3.7	27	3.7	0.177	6.6	LOS A	0.2	1.6	0.19	0.63	0.19	42.9
3	R2	217	4.1	217	4.1	0.177	6.8	LOS A	0.2	1.6	0.19	0.63	0.19	53.2
Approach		244	4.1	244	4.1	0.177	6.7	LOS A	0.2	1.6	0.19	0.63	0.19	52.7
All Vehicles		614	3.4	614	3.4	0.177	5.0	NA	0.2	1.6	0.10	0.48	0.10	56.3

Appendix B – SIDRA Results – Long Term Analysis

MOVEMENT SUMMARY

Site: 1 [Whadjuk Dr / Marquis St (Site Folder: 2033 Weekday PM Peak)]

Network: N101 [2033 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Whadjuk Dr														
5	T1	385	4.7	385	4.7	0.495	2.5	LOS A	2.0	14.5	0.64	0.45	0.85	39.1
6	R2	438	4.1	438	4.1	0.495	7.6	LOS A	2.0	14.5	0.64	0.45	0.85	44.2
Approach		823	4.4	823	4.4	0.495	5.2	NA	2.0	14.5	0.64	0.45	0.85	42.9
North: Marquis St														
7	L2	156	2.6	156	2.6	0.229	5.8	LOS A	0.3	2.4	0.45	0.67	0.45	42.2
9	R2	75	5.3	75	5.3	0.229	9.0	LOS A	0.3	2.4	0.45	0.67	0.45	38.5
Approach		231	3.5	231	3.5	0.229	6.8	LOS A	0.3	2.4	0.45	0.67	0.45	40.9
West: Whadjuk Dr														
10	L2	75	5.3	75	5.3	0.242	3.9	LOS A	0.0	0.0	0.00	0.09	0.00	48.1
11	T1	383	4.7	383	4.7	0.242	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	43.7
Approach		458	4.8	458	4.8	0.242	0.6	NA	0.0	0.0	0.00	0.09	0.00	46.4
All Vehicles		1512	4.4	1512	4.4	0.495	4.1	NA	2.0	14.5	0.42	0.37	0.53	42.8

MOVEMENT SUMMARY

Site: 2 [Whadjuk Dr Access 1 (Site Folder: 2033 Weekday PM Peak)]

Network: N101 [2033 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Access 1														
7	L2	123	0.0	123	0.0	0.252	5.7	LOS A	0.4	2.5	0.42	0.69	0.43	42.7
9	R2	158	0.0	158	0.0	0.252	6.8	LOS A	0.4	2.5	0.42	0.69	0.43	42.7
Approach		281	0.0	281	0.0	0.252	6.3	LOS A	0.4	2.5	0.42	0.69	0.43	42.7
East: Whadjuk Dr														
10	L2	146	0.0	146	0.0	0.261	4.6	LOS A	0.0	0.0	0.00	0.16	0.00	47.9
11	T1	350	5.1	350	5.1	0.261	0.0	LOS A	0.0	0.0	0.00	0.16	0.00	45.3
Approach		496	3.6	496	3.6	0.261	1.4	NA	0.0	0.0	0.00	0.16	0.00	46.8
West: Whadjuk Dr														
5	T1	350	5.1	350	5.1	0.260	0.8	LOS A	0.4	2.9	0.33	0.16	0.33	42.9
6	R2	114	0.0	114	0.0	0.260	6.5	LOS A	0.4	2.9	0.33	0.16	0.33	46.5
Approach		464	3.9	464	3.9	0.260	2.2	NA	0.4	2.9	0.33	0.16	0.33	44.7
All Vehicles		1241	2.9	1241	2.9	0.261	2.8	NA	0.4	2.9	0.22	0.28	0.22	44.8

MOVEMENT SUMMARY

Site: 3 [Frankland Ave / Whadjuk Dr (Site Folder: 2033 Weekday PM Peak)]

Network: N101 [2033 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
1	L2	190	5.3	190	5.3	0.644	8.5	LOS A	2.9	20.9	0.84	0.86	0.98	29.0
2	T1	213	4.7	213	4.7	0.644	8.4	LOS A	2.9	20.9	0.84	0.86	0.98	42.5
3	R2	190	5.3	190	5.3	0.644	12.5	LOS B	2.9	20.9	0.84	0.86	0.98	42.5
Approach		593	5.1	593	5.1	0.644	9.7	LOS A	2.9	20.9	0.84	0.86	0.98	40.4
East: Whadjuk Dr														
4	L2	200	5.0	200	5.0	0.586	11.4	LOS B	2.3	16.8	0.91	1.02	1.14	37.8
5	T1	140	2.9	140	2.9	0.586	11.3	LOS B	2.3	16.8	0.91	1.02	1.14	37.8
6	R2	75	5.3	75	5.3	0.586	15.5	LOS B	2.3	16.8	0.91	1.02	1.14	43.4
Approach		415	4.3	415	4.3	0.586	12.1	LOS B	2.3	16.8	0.91	1.02	1.14	39.3
North: Frankland Ave														
7	L2	50	4.0	50	4.0	0.580	10.4	LOS B	2.3	16.3	0.89	0.97	1.08	43.0
8	T1	253	4.0	253	4.0	0.580	10.4	LOS B	2.3	16.3	0.89	0.97	1.08	38.3
9	R2	131	1.5	131	1.5	0.580	14.4	LOS B	2.3	16.3	0.89	0.97	1.08	38.3
Approach		434	3.2	434	3.2	0.580	11.6	LOS B	2.3	16.3	0.89	0.97	1.08	39.2
West: Whadjuk Dr														
10	L2	163	2.5	163	2.5	0.652	11.0	LOS B	3.0	21.3	0.93	1.01	1.17	39.8
11	T1	145	2.8	145	2.8	0.652	11.0	LOS B	3.0	21.3	0.93	1.01	1.17	40.7
12	R2	200	5.0	200	5.0	0.652	15.2	LOS B	3.0	21.3	0.93	1.01	1.17	27.1
Approach		508	3.5	508	3.5	0.652	12.7	LOS B	3.0	21.3	0.93	1.01	1.17	37.3
All Vehicles		1950	4.1	1950	4.1	0.652	11.4	LOS B	3.0	21.3	0.89	0.96	1.09	39.1

MOVEMENT SUMMARY

Site: 5 [Wattleup Rd Access 3 (East) (Site Folder: 2033 Weekday PM Peak)]

Network: N101 [2033 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Wattleup Rd														
11	T1	150	14.0	150	14.0	0.155	0.8	LOS A	0.2	1.9	0.31	0.29	0.31	54.3
12	R2	65	0.0	65	0.0	0.155	9.8	LOS A	0.2	1.9	0.31	0.29	0.31	13.1
Approach		215	9.8	215	9.8	0.155	3.5	NA	0.2	1.9	0.31	0.29	0.31	20.3
North: Access 3														
1	L2	70	0.0	70	0.0	0.066	1.6	LOS A	0.1	0.7	0.44	0.33	0.44	9.9
3	R2	1	0.0	1	0.0	0.066	3.3	LOS A	0.1	0.7	0.44	0.33	0.44	10.5
Approach		71	0.0	71	0.0	0.066	1.6	LOS A	0.1	0.7	0.44	0.33	0.44	9.9
West: Wattleup Rd														
4	L2	1	0.0	1	0.0	0.241	7.2	LOS A	0.0	0.0	0.00	0.00	0.00	62.6
5	T1	423	4.0	423	4.0	0.241	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	69.5
Approach		424	4.0	424	4.0	0.241	0.0	NA	0.0	0.0	0.00	0.00	0.00	69.4
All Vehicles		710	5.4	710	5.4	0.241	1.2	NA	0.2	1.9	0.14	0.12	0.14	18.3

MOVEMENT SUMMARY

Site: 6 [Wattleup Rd / Frankland Ave (Site Folder: 2033 Weekday PM Peak)]

Network: N101 [2033 Weekday PM Peak
(Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
4	L2	192	9.4	192	9.4	0.480	6.7	LOS A	0.0	0.0	0.00	0.40	0.00	62.3
5	T1	597	4.9	597	4.9	0.480	2.3	LOS A	0.0	0.0	0.00	0.40	0.00	62.3
Approach		789	6.0	789	6.0	0.480	3.4	NA	0.0	0.0	0.00	0.40	0.00	62.3
North: Frankland Ave														
11	T1	450	4.4	450	4.4	0.289	0.5	LOS A	0.2	1.5	0.11	0.03	0.13	60.0
12	R2	23	13.0	23	13.0	0.289	10.1	LOS B	0.2	1.5	0.11	0.03	0.13	46.4
Approach		473	4.9	473	4.9	0.289	1.0	NA	0.2	1.5	0.11	0.03	0.13	59.8
West: Wattleup Rd														
1	L2	46	2.2	46	2.2	0.701	11.5	LOS B	1.4	11.3	0.80	1.12	1.55	32.0
3	R2	447	3.6	447	3.6	0.701	13.2	LOS B	1.4	11.3	0.80	1.12	1.55	47.4
Approach		493	3.4	493	3.4	0.701	13.0	LOS B	1.4	11.3	0.80	1.12	1.55	46.8
All Vehicles		1755	5.0	1755	5.0	0.701	5.4	NA	1.4	11.3	0.25	0.50	0.47	55.8

MOVEMENT SUMMARY

Site: 1 [Whadjuk Dr / Marquis St (Site Folder: 2033 Saturday Mid-day Peak)]

Network: N101 [2033 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Whadjuk Dr														
5	T1	384	4.7	384	4.7	0.493	2.5	LOS A	2.0	14.4	0.64	0.45	0.85	39.1
6	R2	435	4.1	435	4.1	0.493	7.6	LOS A	2.0	14.4	0.64	0.45	0.85	44.2
Approach		819	4.4	819	4.4	0.493	5.2	NA	2.0	14.4	0.64	0.45	0.85	42.9
North: Marquis St														
7	L2	163	2.5	163	2.5	0.234	5.8	LOS A	0.3	2.5	0.45	0.67	0.45	42.2
9	R2	75	5.3	75	5.3	0.234	9.0	LOS A	0.3	2.5	0.45	0.67	0.45	38.5
Approach		238	3.4	238	3.4	0.234	6.8	LOS A	0.3	2.5	0.45	0.67	0.45	40.9
West: Whadjuk Dr														
10	L2	75	5.3	75	5.3	0.243	3.9	LOS A	0.0	0.0	0.00	0.09	0.00	48.2
11	T1	385	4.7	385	4.7	0.243	0.0	LOS A	0.0	0.0	0.00	0.09	0.00	43.7
Approach		460	4.8	460	4.8	0.243	0.6	NA	0.0	0.0	0.00	0.09	0.00	46.5
All Vehicles		1517	4.4	1517	4.4	0.493	4.1	NA	2.0	14.4	0.42	0.37	0.53	42.8

MOVEMENT SUMMARY

Site: 2 [Whadjuk Dr Access 1 (Site Folder: 2033 Saturday Mid-day Peak)]

Network: N101 [2033 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Access 1														
7	L2	119	0.0	119	0.0	0.246	5.7	LOS A	0.3	2.4	0.42	0.69	0.43	42.7
9	R2	153	0.0	153	0.0	0.246	6.9	LOS A	0.3	2.4	0.42	0.69	0.43	42.7
Approach		272	0.0	272	0.0	0.246	6.3	LOS A	0.3	2.4	0.42	0.69	0.43	42.7
East: Whadjuk Dr														
10	L2	159	0.0	159	0.0	0.268	4.6	LOS A	0.0	0.0	0.00	0.17	0.00	47.8
11	T1	350	5.1	350	5.1	0.268	0.0	LOS A	0.0	0.0	0.00	0.17	0.00	45.1
Approach		509	3.5	509	3.5	0.268	1.5	NA	0.0	0.0	0.00	0.17	0.00	46.7
West: Whadjuk Dr														
5	T1	350	5.1	350	5.1	0.267	0.8	LOS A	0.4	3.1	0.36	0.17	0.36	42.5
6	R2	123	0.0	123	0.0	0.267	6.6	LOS A	0.4	3.1	0.36	0.17	0.36	46.4
Approach		473	3.8	473	3.8	0.267	2.3	NA	0.4	3.1	0.36	0.17	0.36	44.5
All Vehicles		1254	2.9	1254	2.9	0.268	2.8	NA	0.4	3.1	0.23	0.28	0.23	44.7

MOVEMENT SUMMARY

Site: 3 [Frankland Ave / Whadjuk Dr (Site Folder: 2033 Saturday Mid-day Peak)]

Network: N101 [2033 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Roundabout

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
1	L2	190	5.3	190	5.3	0.654	8.9	LOS A	3.0	21.7	0.86	0.88	1.01	28.4
2	T1	213	4.7	213	4.7	0.654	8.9	LOS A	3.0	21.7	0.86	0.88	1.01	42.2
3	R2	190	5.3	190	5.3	0.654	13.0	LOS B	3.0	21.7	0.86	0.88	1.01	42.2
Approach		593	5.1	593	5.1	0.654	10.2	LOS B	3.0	21.7	0.86	0.88	1.01	40.0
East: Whadjuk Dr														
4	L2	200	5.0	200	5.0	0.600	11.9	LOS B	2.4	17.6	0.92	1.03	1.17	37.5
5	T1	146	2.7	146	2.7	0.600	11.8	LOS B	2.4	17.6	0.92	1.03	1.17	37.5
6	R2	75	5.3	75	5.3	0.600	16.0	LOS B	2.4	17.6	0.92	1.03	1.17	43.2
Approach		421	4.3	421	4.3	0.600	12.6	LOS B	2.4	17.6	0.92	1.03	1.17	39.0
North: Frankland Ave														
7	L2	50	4.0	50	4.0	0.588	10.6	LOS B	2.3	16.8	0.90	0.98	1.09	42.9
8	T1	253	4.0	253	4.0	0.588	10.6	LOS B	2.3	16.8	0.90	0.98	1.09	38.2
9	R2	138	1.4	138	1.4	0.588	14.5	LOS B	2.3	16.8	0.90	0.98	1.09	38.2
Approach		441	3.2	441	3.2	0.588	11.8	LOS B	2.3	16.8	0.90	0.98	1.09	39.0
West: Whadjuk Dr														
10	L2	160	2.5	160	2.5	0.647	10.9	LOS B	2.9	21.0	0.93	1.01	1.16	39.8
11	T1	143	2.8	143	2.8	0.647	10.9	LOS B	2.9	21.0	0.93	1.01	1.16	40.8
12	R2	200	5.0	200	5.0	0.647	15.1	LOS B	2.9	21.0	0.93	1.01	1.16	27.2
Approach		503	3.6	503	3.6	0.647	12.6	LOS B	2.9	21.0	0.93	1.01	1.16	37.4
All Vehicles		1958	4.1	1958	4.1	0.654	11.7	LOS B	3.0	21.7	0.90	0.97	1.10	38.9

MOVEMENT SUMMARY

Site: 5 [Wattleup Rd Access 3 (East) (Site Folder: 2033 Saturday Mid-day Peak)]

Network: N101 [2033 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Satn	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Wattleup Rd														
11	T1	119	8.4	119	8.4	0.114	0.3	LOS A	0.2	1.3	0.20	0.31	0.20	55.2
12	R2	65	0.0	65	0.0	0.114	8.5	LOS A	0.2	1.3	0.20	0.31	0.20	13.1
Approach		184	5.4	184	5.4	0.114	3.2	NA	0.2	1.3	0.20	0.31	0.20	19.1
North: Access 3														
1	L2	70	0.0	70	0.0	0.051	0.5	LOS A	0.1	0.6	0.26	0.13	0.26	10.0
3	R2	1	0.0	1	0.0	0.051	1.4	LOS A	0.1	0.6	0.26	0.13	0.26	10.6
Approach		71	0.0	71	0.0	0.051	0.5	LOS A	0.1	0.6	0.26	0.13	0.26	10.0
West: Wattleup Rd														
4	L2	1	0.0	1	0.0	0.102	7.2	LOS A	0.0	0.0	0.00	0.01	0.00	62.6
5	T1	169	5.9	169	5.9	0.102	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	69.1
Approach		170	5.9	170	5.9	0.102	0.0	NA	0.0	0.0	0.00	0.01	0.00	68.8
All Vehicles		425	4.7	425	4.7	0.114	1.5	NA	0.2	1.3	0.13	0.16	0.13	16.0

MOVEMENT SUMMARY

Site: 6 [Wattleup Rd / Frankland Ave (Site Folder: 2033 Saturday Mid-day Peak)]

Network: N101 [2033 Saturday Mid-day Peak (Network Folder: General)]

Site Category: -
Give-Way (Two-Way)

Vehicle Movement Performance														
Mov ID	Turn	DEMAND FLOWS		ARRIVAL FLOWS		Deg. Sat'n	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	HV] %	[Total veh/h	HV] %				[Veh. veh	Dist] m				
South: Frankland Ave														
4	L2	169	5.9	169	5.9	0.454	6.6	LOS A	0.0	0.0	0.00	0.39	0.00	62.5
5	T1	597	4.9	597	4.9	0.454	2.3	LOS A	0.0	0.0	0.00	0.39	0.00	62.5
Approach		766	5.1	766	5.1	0.454	3.2	NA	0.0	0.0	0.00	0.39	0.00	62.5
North: Frankland Ave														
11	T1	450	4.4	450	4.4	0.273	0.2	LOS A	0.1	0.7	0.07	0.02	0.07	60.7
12	R2	15	0.0	15	0.0	0.273	8.7	LOS A	0.1	0.7	0.07	0.02	0.07	48.0
Approach		465	4.3	465	4.3	0.273	0.5	NA	0.1	0.7	0.07	0.02	0.07	60.5
West: Wattleup Rd														
1	L2	26	3.8	26	3.8	0.333	9.2	LOS A	0.4	3.5	0.63	0.90	0.78	36.3
3	R2	213	4.2	213	4.2	0.333	10.4	LOS B	0.4	3.5	0.63	0.90	0.78	49.8
Approach		239	4.2	239	4.2	0.333	10.2	LOS B	0.4	3.5	0.63	0.90	0.78	49.2
All Vehicles		1470	4.7	1470	4.7	0.454	3.5	NA	0.4	3.5	0.12	0.36	0.15	58.9



Appendix C – Swept Path Analysis

