Limestone & Sand Quarry

Lot 9003 Mather Drive, Neerabup
Transport Impact Statement

Prepared by: GTA Consultants (WA) Pty Ltd for Urban Resources

on 24/11/20

Reference: W201000

Issue #: C-Final

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Quality Record

Issue	Date	Description	Prepared By	Checked By	Approved By	Signed
A-Dr	15/10/2020	Draft	RD	TM		
A-Final	16/10/2020	Final – modify distributions	RD	TM	TM	
B-Final	2/11/2020	Final – update report to address CoW reqs.	RD	AM	TM	
C-Final	19/11/2020	Final – update report to address further CoW reqs.	RD	TM	TM	

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Appendices

1. INTRODUCTION

01

1.1. Background

A Development Application is currently being sought for a proposed limestone and sand quarry on land located at Lot 9003 Mather Drive in Neerabup in the City of Wanneroo. The proposed Development is expected to have up to around 500,000 to 600,000 tonnes of sand and limestone extracted from the site annually.

GTA Consultants was commissioned by Urban Resources in October 2020 to undertake a Transport Impact Statement of the proposed development. This report is a direct response to the City of Wanneroo's request to Urban Resources for an assessment on this site.

1.2. Purpose of this Report

Western Australian Planning Commission Transport Assessment Guidelines (WAPC Guidelines) provide direction on the level of assessment which is necessary to be carried out with respect to the likely traffic impact of a development proposal. Typically, any development which is expected to have a 'high' traffic impact, that is, generating more than 100 trips in the peak hour is satisfied by a Traffic Impact Assessment (TIA). Any development which is expected to generate less than 100 trips in the peak hour requires a Transport Impact Statement (TIS) to be undertaken. Both types of assessment consider the operation and layout of the site, but they differ in their assessment of external traffic impact.

In the context of this proposal, it is estimated there will be significantly less than 100 trips generated in a given peak hour if applying 'typical' traffic generation rates with generation rates being very similar to the current allowable use on the current site. In this case a TIS is appropriate. This TIS briefly outlines the transport aspects surrounding the proposed amendment. The intent of a TIS, as per the WAPC Guidelines, is to provide the approving authority with sufficient transport information to confirm that the Applicant has adequately considered the transport aspects of the amendment and that it would not have an adverse transport impact on the surrounding area.

In accordance with the WAPC Guidelines, this TIS outlines:

- Existing transport conditions proximate to the site
- Suitability of the proposed parking provision within the site
- The walking, cycling and public transport accessibility and facilities to service the site, as applicable
- The adequacy of the proposed site layout
- The traffic generating characteristics of the proposed development
- The anticipated impact of the proposed development on the surrounding road network.

1.3. References

In preparing this report, reference has been made to the following:

- City of Wanneroo District Planning Scheme No. 2
- WAPC Transport Assessment Guidelines for Development
- plans for the proposed development
- various technical data as referenced in this report
- a desktop and on-site inspection of the site and its surrounds
- other documents as nominated.

2. PROPOSED DEVELOPMENT

02

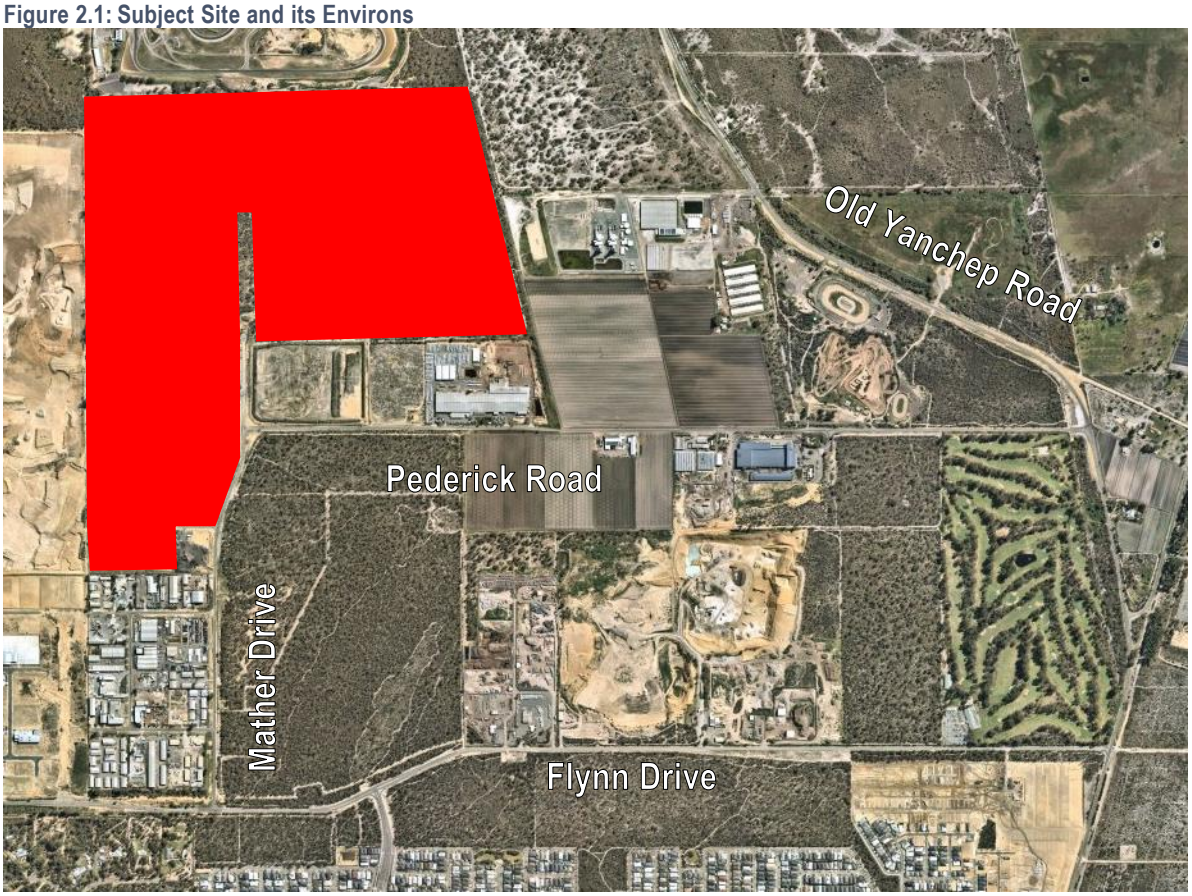
2.1. Subject Site and Surrounding Context

The subject site is located at Lot 9003 (No. 85) Mather Road in Neerabup on the west side of Mather Drive near its termination north of Pederick Road. The site of approximately 132.8Ha has a frontage of approximately 300m to Mather Drive.

The site is located north of the Neerabup Industrial area. The current site is vacant with remnants of older access tracks through the site.

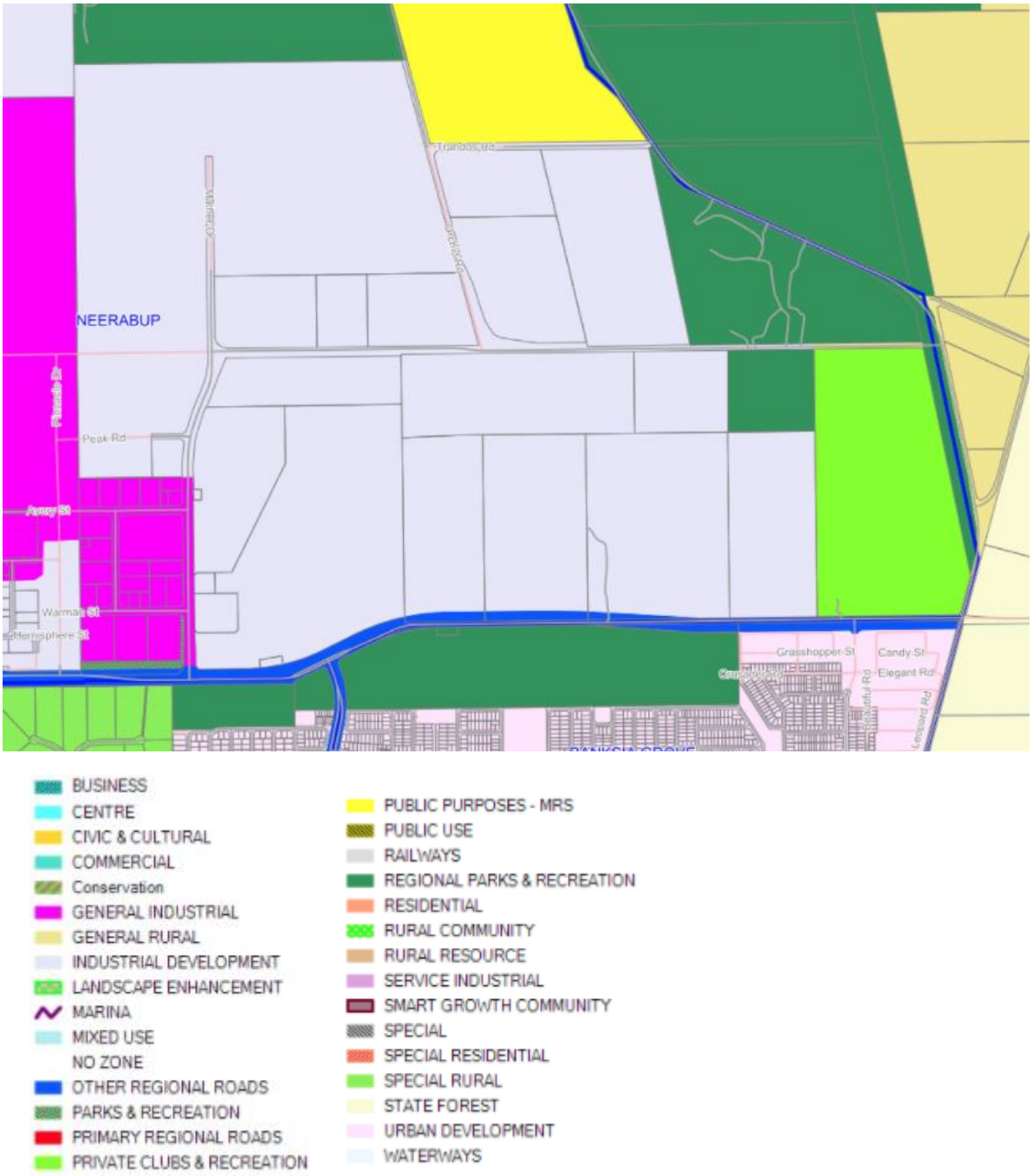
The location of the subject site and the surrounding environs is shown in Figure 2.1, and the land zoning is shown in Figure 2.2.

Figure 2.1: Subject Site and its Environs



(Photo Map courtesy of NearMap Pty Ltd)

Figure 2.2: Land Zoning Map



(Reproduced from City of Wanneroo Online Mapping Site)

2.2. Existing Land Uses

The subject site is currently undeveloped with a current District Planning Scheme 2 (DPS2) zoning of Industrial Development.

2.3. Proposed Land Use

The application proposes the development of a limestone and sand quarry with operations expected to last approximately at least 17 years with contingencies in place for 20 years of operations.

It is expected that on average, approximately 500,000 to 600,000 tonnes of sand and limestone are to be extracted from the quarry annually. This equates to approximately 100-120 laden truck movements from the quarry on a typically average day. Some years may have lesser amounts extracted and some years may have more extracted (possibly up to 300 laden trucks per day).

Refer for Appendix A for a layout of the site entry and the overall staging plan for the site.

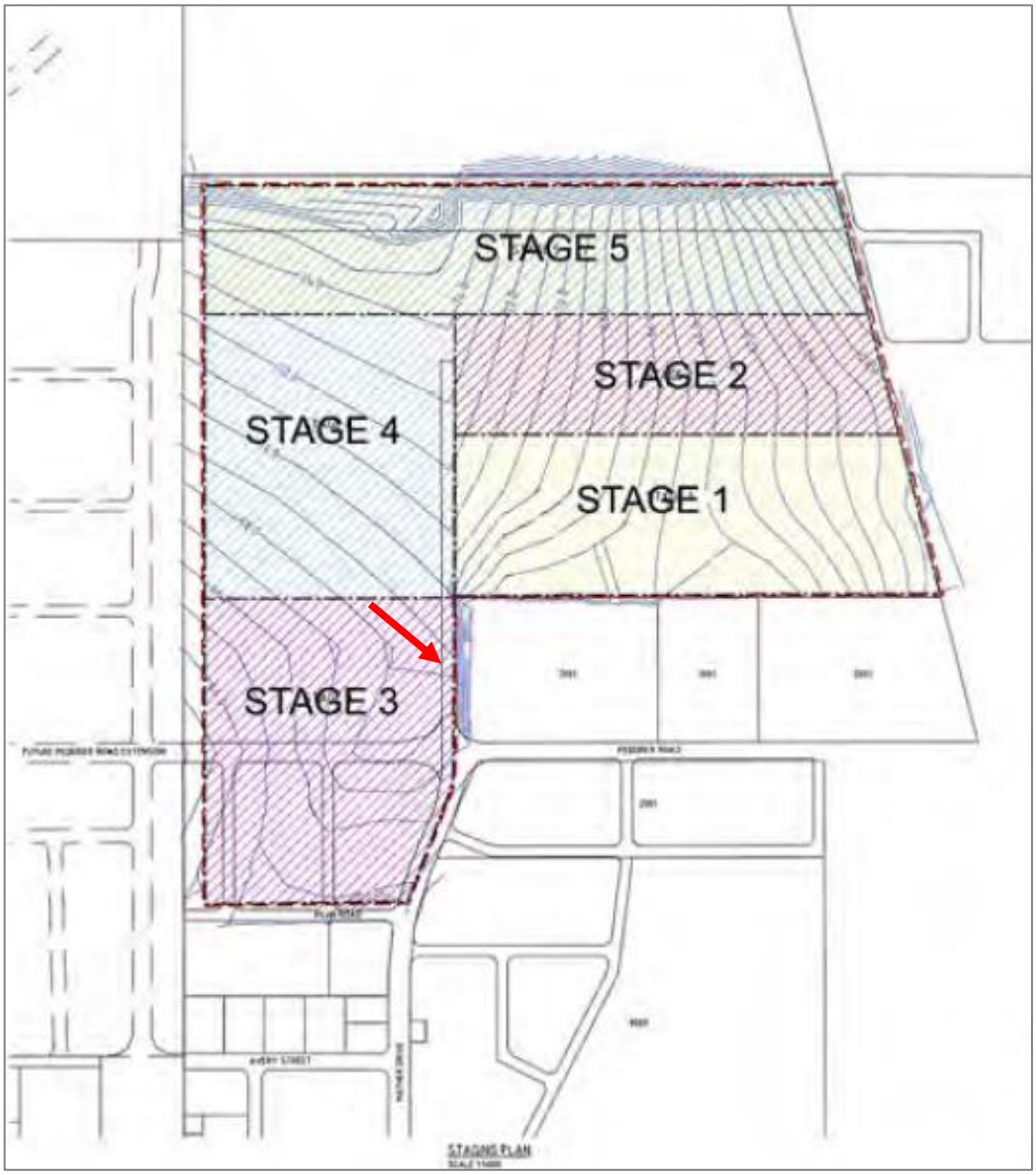
3. VEHICULAR ACCESS AND PARKING

03

3.1. Access and Parking Arrangement

As extraction works are proposed to be staged across the site, the access to the site may possibly vary slightly as extraction moves across the site. Figure 3.1 shows the proposed initial location of the entry to the site and staging of the extraction from the site. As the access is to private property, the crossovers are proposed to be designed and constructed in accordance with the City of Wanneroo's requirements for Industrial/Commercial crossovers (please also refer to Section 9.1 discussion).

Figure 3.1: Proposed Staging & Possible Access Points



(courtesy of Peritas/Urban Resources)

The crossover and driveway access to the site is to allow two-way movement of vehicles up to short B-double length, 27.5m in length, but will generally allow for two-way 19m long semi-trailer movements.

Given the relatively small size of the stages compared to the overall site area, there will be ample space available for parking of trucks and other plant/vehicles within the site, with the operator determining the best arrangement for this as operations move across the site through the various stages.

On an average day there is expected to be approximately 100-120 laden truck movements per day (with 100-120 empty truck movements returning). Across a 12-hour workday this equates to approximately 24 truck movements per hour (two-way) or one truck movement every 2.5 minutes, approximately.

Further, divided into directional flows, there is expected to be approximately **1 vehicle every 5 minutes exiting** and approximately **1 vehicle every 5 minutes entering**.

3.2. On/Off-Site Loading Facilities

The loading of trucks will occur wholly within the subject site with the location varying as extraction occurs across the site and as the staging migrates across the site. There is ample space within each stage for the loading area to be adjusted to suit the extraction process.

3.3. Parking Provision

There is no required parking for the proposed development under the DPS2, but the nearest land use type to that proposed is a Concrete Batching Plant. This requires 1 bay per employee with a minimum of 5 to be provided. The workforce for this development is expected to be 2-10 persons, depending on the intensity of the operations and thus between 5 and 10 spaces should be provided. As discussed previously, given the size of the site, there will be ample space available for parked employee vehicles, and this is expected to possibly shift throughout the site as extraction progresses. The initial main entry to the site is proposed to have a parking area to cater for employee private vehicles. The area set aside is suitable to cater for approximately 20-25 parked light vehicles.

4. HOURS OF OPERATION

04

4.1. Operating Hours

The development is proposed to operate from Monday to Saturday (excluding public holidays) between 6am and 6pm.

5. TRAFFIC VOLUMES & PARKING

05

5.1. Daily or Peak Hour Traffic Volumes

The proposed development is expected to have an extraction rate of approximately 500,000 to 600,000 tonnes per annum. Based on an average load and operating 300 days per year, the average extraction rate is expected to be approximately 100-120 laden vehicles per day with 100-120 empty vehicles retuning, so 200-240 trips per day, plus the approximately 10 employees for an additional 20 trips per day.

This rate will vary from year to year and can be expected to be less than the above and possibly more with larger contracts, refer below. The maximum rate expected for larger contracts could be up to 300 laden trucks per day with approximately 25 laden truck movements per hour with up to 30 laden trucks in the peak hour of these peak delivery contracts.

Access to and from the site is expected to be via east-west Pederick Road (and then onto Old Yanchep Road northwards and southwards) and north-south Mather Drive (and then onto Flynn Drive westwards and eastwards).

The haul routes to and from the site are expected to vary depending on where the sand or limestone will need to be hauled to and could be something similar to below (as advised by the Applicant):

- Flynn Drive to west 35%
- Flynn Drive to east 35%
- Old Yanchep Road to north 15%
- Old Yanchep Road to south 15%.

For the purpose of examining the intersection performance of the busiest intersection observed during the site visit (intersection of Flynn Drive and Mather Drive), it was assumed that all truck traffic would drive to and from the site via this intersection and turn right onto Flynn Drive. This movement is the most critical movement for the whole intersection. This is a very conservative assessment and would represent a worst-case scenario. This method of assessment was also then assumed for the intersection of Old Yanchep Road and Pederick Road - that is, all traffic for the quarry was to turn right from Pederick Road into Old Yanchep Road, this being the most critical right turn in the PM peak period.

5.2. Assessment of Development Traffic

In the Austroads publication, *Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings*, information is provided relating to the intersection and crossover performance in peak flow conditions for possible further analysis. If the calculated expected traffic flows for this development exceed those shown in Table 5.1, a further assessment is typically required. If not, the operation of the intersection is expected to be acceptable with low delays, queues, Degree of Saturation and Levels of Service (typically A) for all movements.

Table 5.1: Austroads Guidelines for Detailed Intersection Assessment

Major Road Type	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Two-lane	400	250
	500	200
	650	100
Four-lane	1,000	100
	1,500	50
	2,000	25

Table 5.2: Actual Traffic Flow at Intersections

Period	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Intersection of Flynn Dr/Mather Dr	285	280
Intersection of Old Yanchep Rd/Pederick Rd	209	35

The traffic flows on Flynn Drive are based on the Main Roads WA count site located west of Old Yanchep Road. To provide a more robust assessment, traffic count information was also sourced from the Main Roads WA count site located east of Wanneroo Road. These figures are summarised below in Table 5.3.

The traffic flows on Old Yanchep Road are based on traffic counts from Main Roads WA from the count site located north of Flynn Drive.

In both Table 5.2 above and 5.3 below the minor traffic flows are based on actual observed traffic flows on these roads with the proposed development traffic flows added.

Table 5.3: Actual Traffic Flow at Intersections

Period	Major Road Flow (two-way, vph)	Minor Road Flow (two-way, vph)
Intersection of Flynn Dr/Mather Dr	893	280
Intersection of Old Yanchep Rd/Pederick Rd	209	35

Comparing the values in Table 5.2 with Table 5.1 it is apparent that the traffic flows for the intersection of Old Yanchep Road and Pederick Road are less than the two-lane road intervention levels as shown in red in Table 5.1. At these levels, the performance of the intersection is not typically required to be assessed in more detail. The intersection of Flynn Drive and Mather Drive are more than the two-lane road intervention levels as shown in red in Table 5.1. At these levels, the performance of the intersection should be assessed in more detail. Given the high proportion of truck traffic it was considered prudent for this assessment to be undertaken in more detail for both intersections and at the request of the City of Wanneroo.

5.2.1. Intersection of Flynn Drive and Mather Drive

The intersection was assessed for the highest traffic flow condition in the PM peak with the most number of vehicles expected to be exiting Mather Drive and turning onto Flynn Drive, representing the worst conditions under which the intersection would operate. The results of this assessment are summarised below in Tables 5.4 to 5.7. This assessment was undertaken using Sidra Intersection 8. Traffic flows on Flynn Drive have been assumed to be growing at approximately 4% per annum, based on historical growth rates from 2007/08 to 2017/18. The Sidra Input intersection layouts, traffic flows and outputs are shown in Appendix B.

Table 5.4: Current Intersection Performance – 2020 PM Peak

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Flynn Dr (E)	**PM**	RT	0.02	10	1/0-1
Mather Rd (N)		RT	0.40#	18	12/1-2
Flynn Dr (W)		LT	0.01	8	0.0/0

DOS – Degree of saturation, # - Intersection DOS

Table 5.5: Current Intersection Performance – 2020 PM Peak WITH Development

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Flynn Dr (E)	PM	RT	0.04	11	2/0-1
Mather Rd (N)		RT	0.47#	20	15/2
Flynn Dr (W)		LT	0.02	8	0.0/0

Table 5.6: Expected Intersection Performance - 2030 PM Peak

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Flynn Dr (E)	PM	RT	0.03	11	1/0-1
Mather Rd (N)		RT	0.54#	25	15/2
Flynn Dr (W)		LT	0.02	8	0.0/0

Table 5.7: Expected Intersection Performance – 2030 PM Peak WITH Development

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Flynn Dr (E)	PM	RT	0.05	12	2/0-1
Mather Rd (N)		RT	0.64#	30	21/2-3
Flynn Dr (W)		LT	0.02	8	0.0/0

From the above it is apparent the delays expected for the critical movement for the intersection turning right from Mather Drive site should be approximately 30 seconds and this will be a LoS of D for this movement with the development traffic in 2030 in 10-years time. This is only marginally worse than expected for this intersection with no development traffic added. This impact is less than required under the *WAPC Transport Impact Assessment Guidelines* threshold of 35 seconds, this being for intersections. On this basis the impact of the proposed development is considered acceptable. The DoS for this movement is also less than 1.0 indicating the movement is operating below capacity.

5.2.2. Intersection of Old Yanchep Road and Pederick Road

The intersection was assessed for the highest traffic flow condition. That is, in the PM peak with the greatest number of vehicles expected to be exiting Pederick Road and turning right onto Old Yanchep Road, representing the worst-case

conditions under which the intersection would operate. The results of this assessment are summarised below in Table 5.4. This assessment was undertaken using Sidra Intersection 8. Traffic flows on Old Yanchep Road have been assumed to be growing at a similar rate to Flynn Drive, in this case approximately 4% per annum which is relatively high. The Sidra input intersection layouts, traffic flows and outputs are shown in Appendix B.

Table 5.8: Current Intersection Performance – 2020 PM Peak

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Old Yanchep Rd (S)	PM	LT	0.01	8	0/0
Old Yanchep Rd (N)		RT	0.08#	8	0/0
Pederick Rd (W)		RT	0.01	7	0/0

Table 5.9: Current Intersection Performance – 2020 PM Peak WITH Development

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Old Yanchep Rd (S)	PM	LT	0.07	9	0/0
Old Yanchep Rd (N)		RT	0.08#	9	1/0-1
Pederick Rd (W)		RT	0.01	8	0/0

Table 5.10: Expected Intersection Performance – 2030 PM Peak

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Old Yanchep Rd (S)	PM	LT	0.01	8	0/0
Old Yanchep Rd (N)		RT	0.11#	8	0/0
Pederick Rd (W)		RT	0.01	7	0/0

Table 5.11: Expected Intersection Performance – 2030 PM Peak WITH Development

Approach	Critical Turning Movements				
	Peak	Movements	DOS	Average Delay (sec)	95th Percentile Queue (m/veh)
Old Yanchep Rd (S)	**PM**	LT	0.01	9	0/0
Old Yanchep Rd (N)		RT	0.12#	9	1/0-1
Pederick Rd (W)		RT	0.01	8	0/0

From the above it is apparent the delays expected from turning right at Pederick Road to Old Yanchep Road should be approximately 9 seconds and this will be a LoS of A for this movement in 2030. This is less than required under the *WAPC Transport Impact Assessment Guidelines* threshold of 35 seconds, this being for intersections. On this basis the impact of the proposed development is considered acceptable as it meets guidelines now and 10 years into the future.

5.3. Traffic Impact

Based on the expected traffic generation of approximately 320 vehicles per day for the entire development with 70% of this expected to use Mather Drive over and above the current traffic flow of 2,400 vehicles per day on Mather Drive, the total traffic flows of approximately 2,625vpd is expected to be below the typical maximum traffic carrying capacity of Mather Drive, which is approximately 3,000vpd based on its current geometry.

With Pederick Road, the traffic flows expected on this road with the development traffic is expected to be approximately 30% of the 320 vehicles per day associate with the development over and above the current traffic flow of 515vpd. The total of 610vpd, this again less than the typical maximum traffic carrying capacity of Pederick Road, which is approximately 3,000vpd based on its current geometry.

In addition to this assessment, the increase in traffic flow on any single lane is expected to be approximately 20 vehicles per hour. Under WAPC Guidelines, sections of road with an increase in traffic flow in excess of 100 vehicles per hour per lane should be assessed, indicating that an increase of 20 vehicles per hour is low impact.

Finally, the maximum resultant lane traffic flow is expected to be 220 vehicles per hour (this includes current traffic flows and development traffic flows) on Mather Drive turning onto Flynn Drive which is within the one-way lane capacity of Mather Drive of approximately 600 vehicles per hour.

For all of these reasons, the impacts of the traffic volumes associated with the development during peak haulage periods and in 10-years' time with traffic growth on Flynn Drive on the road network.

5.4. Intersection Operation

The commonly used measure of intersection performance is referred to as the *Degree of Saturation (DoS)*. The DOS represents the flow-to-capacity ratio for the most critical movement on each leg of the intersection. For signalised intersections, a DoS of around 0.95 has been typically considered the 'ideal' limit, beyond which queues and delays increase disproportionately. For unsignalised intersections and roundabouts, this value of DoS is 0.90. [1]

Other level of service concepts are discussed below to assist the reader in understanding the following outputs from the analysis.

The level of service concept describes the quality of traffic service in terms of six levels, designated A to F, with level of service A (LOS A) representing the best operating condition (i.e. at or close to free flow), and level of service F (LOS F) the worst (i.e. forced flow). More specifically:

- *LOS A (DOS < 0.50 for unsignalised, <0.60 for signalised intersections)*: Primarily free flow operations at average travel speeds, usually about 90% of the FFS (free flow speed) for the given street class. Vehicles are completely unimpeded in their ability to manoeuvre within the traffic stream. Control delay at signalised intersections is less than 10 seconds. At non-signalised movements at intersections the average control delay is less than 10 seconds;
- *LOS B (DoS 0.50-0.70/0.60-0.75)*: Reasonably unimpeded operations at average travel speeds, usually about 70% of the FFS for the street class. The ability to manoeuvre within the traffic stream is only slightly restricted, and control delays at signalised intersections are between 10 and 20 seconds. At non-signalised movements at intersections the average control delay is between 10 and 15 seconds;
- *LOS C (DoS 0.70-0.80/0.75-0.90)*: Stable operations; however, ability to manoeuvre and change lanes in mid-block locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50% of the FFS for the street class. Signalised intersection delays are between 20 and 35 seconds. At non-signalised movements at intersections the average control delay is between 15 and 25 seconds;
- *LOS D (DoS 0.80-0.90/0.90-0.95)*: A range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40% of FFS. Signalised intersection delays are between 35 and 55 seconds. At non-signalised movements at intersections the average control delay is between 25 and 35 seconds;
- *LOS E (DoS 0.90-1.00/0.95-1.00):* Characterised by significant delays and average travel speeds of 33% of the FFS or less. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections (between 55 and 80 seconds), and inappropriate signal timing. At non-signalised movements at intersections the average control delay is between 35 and 50 seconds; and,
- *LOS F (DoS >1.00)*: Characterised by urban street flow at extremely low speeds, typically 25% to 33% of the FFS. Intersection congestion is likely at critical signalised locations, with high delays (in excess of 80 seconds), high volumes, and extensive queuing. At non-signalised movements at intersections the average control delay is greater than 50 seconds.

[1] SIDRA INTERSECTION adopts the following criteria for Level of Service assessment:

Level of Service		Intersection Degree of Saturation (DoS)	
		Unsignalised Intersection	Signalised Intersection
A	Excellent	<=0.50	<=0.60
B	Very Good	0.50-0.70	0.60-0.75
C	Good	0.70-0.80	0.75-0.90
D	Acceptable	0.80-0.90	0.90-0.95
E	Poor	0.90-1.00	0.95-1.00
F	Very Poor	>=1.0	>=1.0

In addition to the above:

- Average Delay: is the average of all travel time delays for vehicles through the intersection
- Queue: is the queue length below which 95% of all observed queue lengths fall.

5.5. Types of Vehicles

The type of vehicles expected to access the site is expected to be no larger than a RAV Network 4 size vehicle (also known as B-doubles). However, the majority of the truck traffic to and from the site is expected to be 19m long semi-trailers.

6. TRAFFIC MANAGEMENT ON FRONTAGE STREETS

06

6.1. Mather Drive

Mather Drive abuts the development site to the east and runs from north of Pederick Road in the north to terminate at Flynn Drive in the south. This road is under the care and control of the City of Wanneroo and is classified at an Access Road under Main Roads WA Functional Road Hierarchy. The road consists of 7.5m wide two-way carriageway with no footpaths on either side of the road within a 40m wide road reserve. The road is not kerbed.

Mather Drive is subject to a posted speed limit of 70km/h.

From spot traffic counts undertaken during the site visit, it is estimated Mather Drive carries approximately 2,400vpd. Traffic counts provided by the City of Wanneroo from 2012 indicated that approximately 2,330vpd used Mather Drive with 24% heavy vehicles. There have been no recorded mid-block crashes on Mather Drive.

Mather Drive is part of the RAV Network for vehicles up to Network 4 size between Flynn Drive and Pederick Road.

6.2. Pederick Road

Pederick Road runs from Mather Drive in the west to terminate at Old Yanchep Road in the east. This road is under the care and control of the City of Wanneroo and is classified at an Access Road under Main Roads WA Functional Road Hierarchy. The road consists of 7.5m wide two-way carriageway with no footpaths on either side of the road within a 20m wide road reserve. The road is not kerbed.

Pederick Road is subject to a posted speed limit of 70km/h.

From spot traffic counts undertaken during the site visit, it is estimated Pederick carries approximately 100-200vpd. Traffic counts provided by the City of Wanneroo from 2017 indicated that approximately 515vpd used Pederick Road with 38% heavy vehicles. There have been no recorded mid-block crashes on Pederick Road.

Pederick Road is part of the RAV Network for vehicles up to Network 4 size.

6.3. Intersection of Flynn Drive and Mather Drive

This intersection is a T-junction with Flynn Drive the priority road and Mather Drive the terminating leg.

There is no formal sign control with the general give-way rule applicable to traffic approaching the intersection on the Mather Drive terminating leg with a holding line provided. There is a left turn lane on the western approach of Flynn Drive and there is a slight widening of the eastern approach on Flynn Drive to allow vehicles travelling east to west to pass a vehicle stopped to turn right into Mather Drive.

In the five-year period up to 31/12/2019 there were one recorded right-angle crash requiring medical attention.

This intersection permits RAV vehicles up to Network 4 size to undertake all turn movements.

6.4. Intersection of Old Yanchep Road and Pederick Road

This intersection is a T-junction with Old Yanchep Road the priority road and Pederick Road the terminating leg.

The Pederick Road approach is controlled by Give Way signage. There is a fully protected left turn slip lane on the southern approach of Old Yanchep Road and there is a slight widening of the northern approach on Old Yanchep Road to allow vehicles travelling east to west to pass a vehicle stopped to turn right into Pederick Road.

In the five-year period up to 31/12/2019 there was one recorded right-angle crash and one sideswipe crash, neither requiring medical attention.

This intersection permits RAV vehicles up to Network 4 size to undertake all turn movements.

6.5. Intersection of Mather Drive and Pederick Road

This intersection is a T-junction with Mather Drive the priority road and Pederick Road the terminating leg.

The Pederick Road approach is controlled by the general give way rule for terminating road legs at intersections. There is a fully protected left turn slip lane on the southern approach of Old Yanchep Road and there is a slight widening of the northern approach on Old Yanchep Road Drive to allow vehicles travelling east to west to pass a vehicle stopped to turn right into Pederick Road.

In the five-year period up to 31/12/2019 there were no recorded crashes. This suggests this intersection is relatively safe.

7. PUBLIC TRANSPORT ACCESS

07

7.1. Public Transport Access

The development site is not located within a walkable catchment of any public transport. The nearest bus stop is approximately 3.5km away from the subject site.

8. ACTIVE TRANSPORT

08

8.1. Pedestrian Access/Facilities

Pedestrian Facilities Within the Development

There are no facilities currently within the subject site.

Existing Pedestrian Facilities on Surrounding Roads

There are no footpaths on either Mather Drive or Pederick Road providing pedestrian connectivity to the wider road network. There are no attractors or generators within a comfortable 800m walkable catchment of the subject site. The site has a Walk Score of 1 out of 100 indicating that all tips to and from the site will require some form of motorised vehicle.

Proposals to Improve Pedestrian Access

There are no plans or requirement to improve the pedestrian access network as part of this development as it is expected that the workforce will drive, taxi / uber or carpool to and from the site.

8.2. Cycle Access/Facilities

Cycle Facilities Within the Development

There is proposed to be no bike facilities provided for this development. Any employees that ride their bike to the site will be able to secure their bike near where they are working on plant/machinery within the site as extraction works move with the various stages.

Existing Cycle Facilities on Surrounding Roads

There are no dedicated bike lanes or cycling infrastructure along Mather Drive nor Pederick Road. The 7.5m width of the existing roads, unkerbed with narrow unsealed shoulder and posted 70km/h speed limit, does not make these roads a good riding environment for cyclists.

Proposals to Improve Cycle Access

There are no plans or requirement to improve the cycling access network as part of this development as it is expected that the workforce will all drive, taxi / uber or carpool to and from the site.

9. SITE SPECIFIC ISSUES

09

9.1. Identified Site Issues

The only transport related issue specific to this site, will be the location of the crossover/driveway access with staging development. The crossover/driveway access may possibly shift as extraction works also shift across the site with the various extraction Stages 1 to 5. The location and design of the crossover will therefore need to be approved by the City of Wanneroo if the access point is required to change as work moves from one stage to the next. This application for new crossover would be under the process for an application for a new crossover and should not require the submission of a new detailed Development Application.

10. SAFETY ISSUES

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10.1. Identified Issues

No safety issues have been identified requiring remedial measures.

11. CONCLUSION

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CONCLUSION

As a result of the transport analysis undertaken for proposed limestone and sand quarry at Lot 9003 Mather Drive in Neerabup, the following findings have been made:

- The proposed development is expected to generate approximately 100 trips per day with the majority of these (approximately 80) being trucks.
- In peak contract periods this is expected to increase to approximately 320 per day with approximately 300 of these being trucks.
- The development has a Walk Score of 1 (out of 100) representing extremely poor walking network and by virtue of its location it is expected that most movements to and from the site will require the use of motorised vehicles.
- During the development of this TIS report, City of Wanneroo provided actual traffic counts undertaken by the City on both Pederick Road (2017 counts) and on Mather Road (2012 counts) with heavy vehicle percentages. GTA has modelled these volumes in SIDRA Intersection 8 with a focus on heavy vehicles turning right into Pederick Road from Old Yanchep Road.
- Based on the revised analysis, the impacts of the increase in traffic volumes associated with the development during peak haulage/contract periods, now and in 10-years' time, with background traffic growth allowed for, are expected to still be acceptable based on the analysis as presented in this report. The impacts are within acceptable limits provided under WAPC Guidelines and Austroads guidance.

The required WAPC checklist for this transport impact statement is at **Appendix C**.

A. DEVELOPMENT PLANS

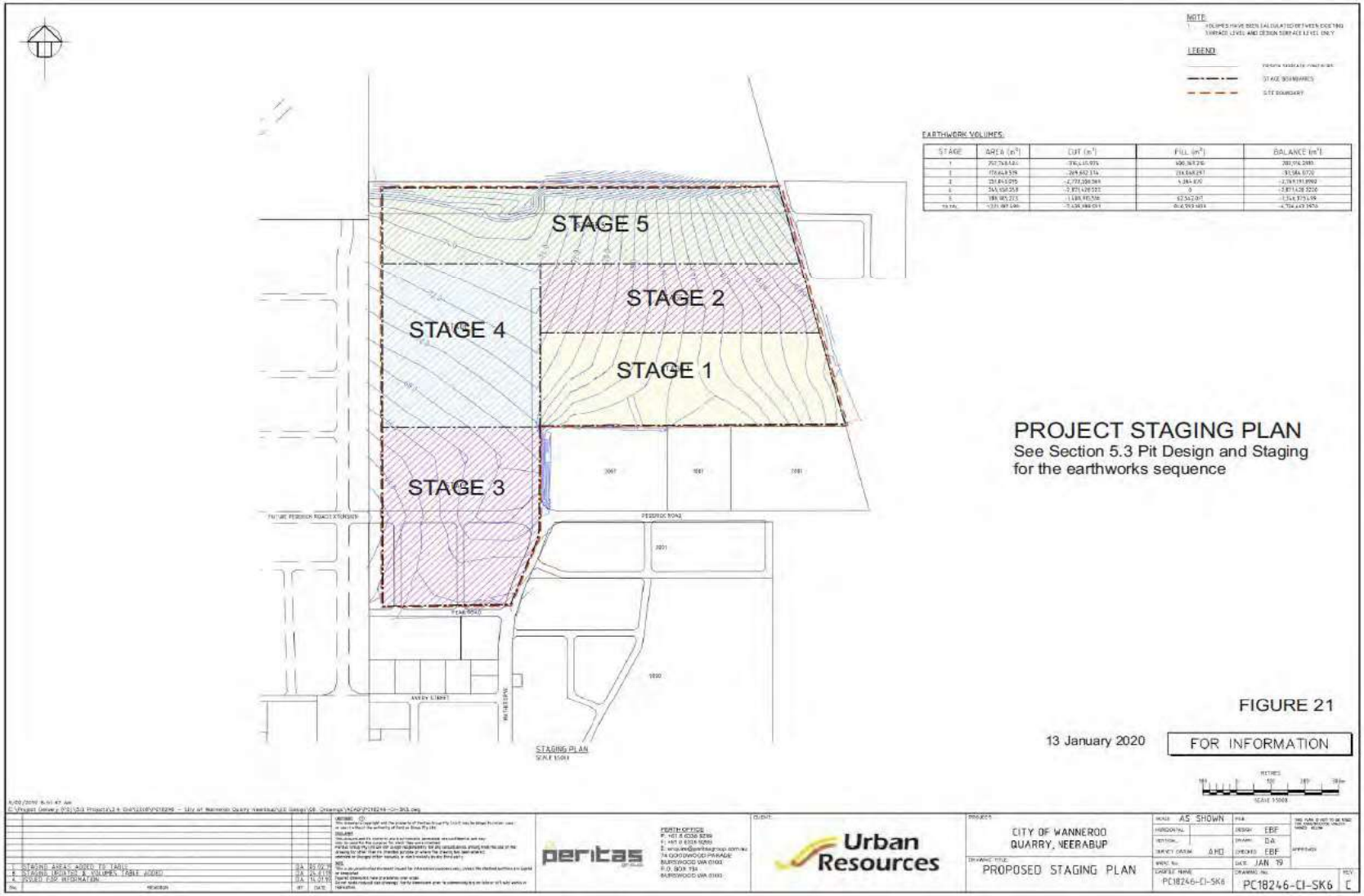


Figure 21: Project staging plan

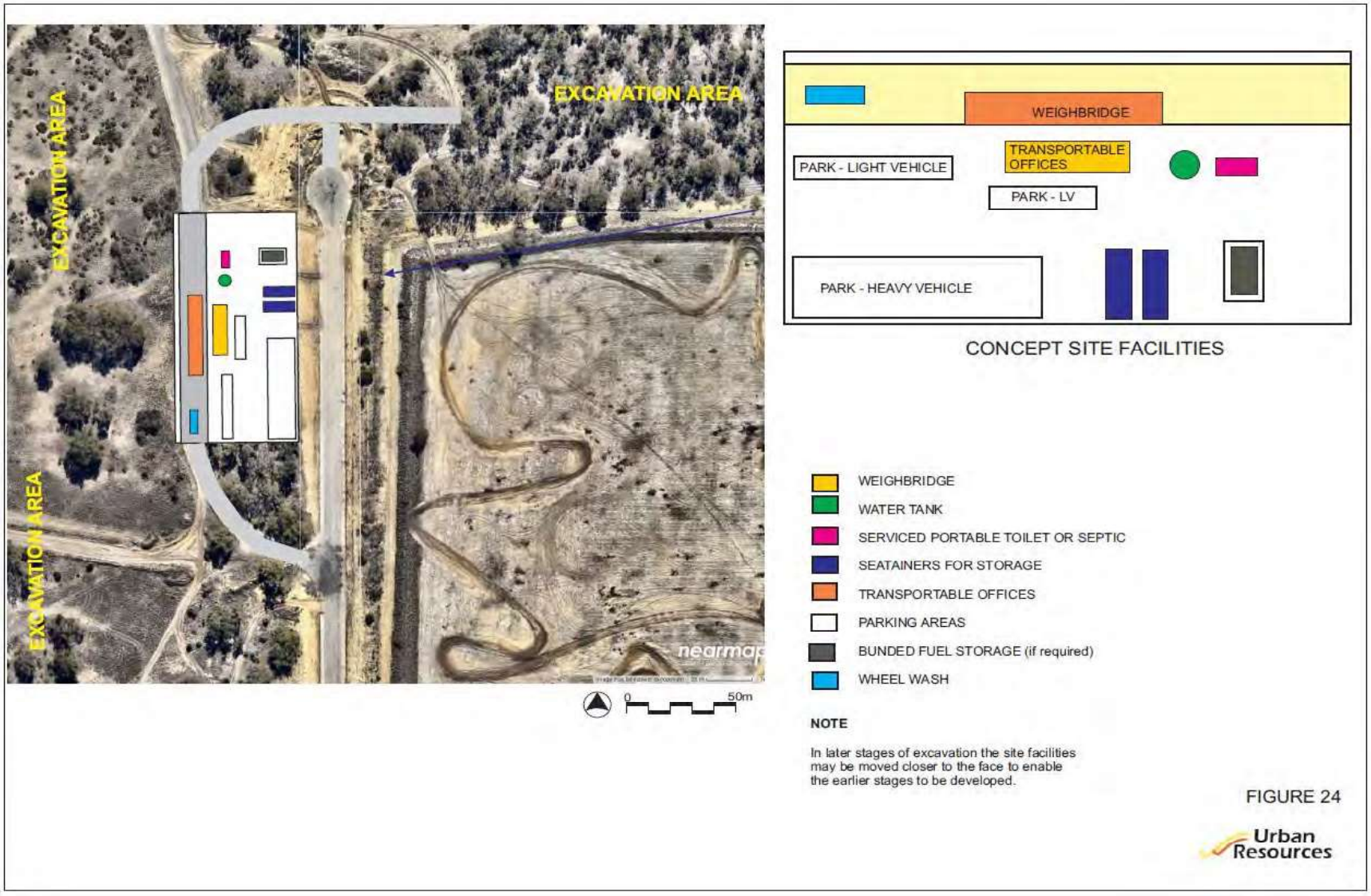


Figure 24: Concept site facilities

B. SIDRA INTERSECTION INPUTS & OUTPUTS

MOVEMENT SUMMARY

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

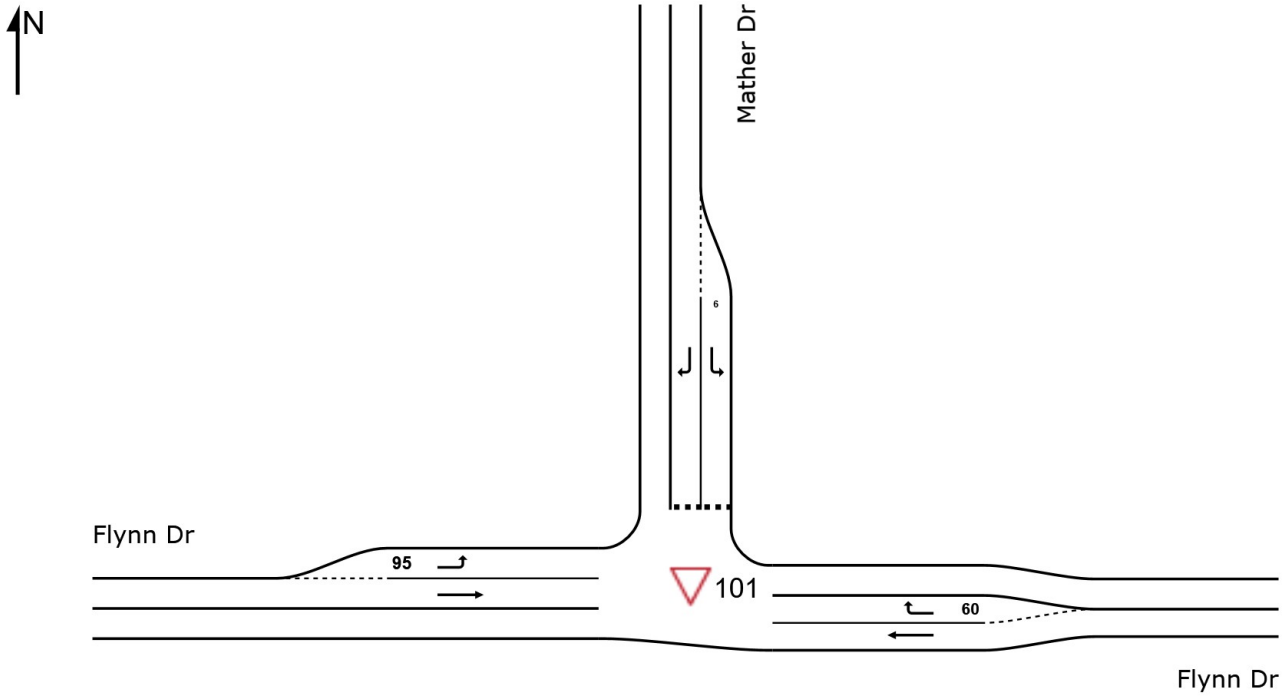
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	582	21.0	0.347	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
6	R2	21	50.0	0.023	9.9	LOS A	0.1	1.0	0.49	0.66	0.49	47.8
Approach		603	22.0	0.347	0.4	NA	0.1	1.0	0.02	0.02	0.02	78.0
North: Mather Dr												
7	L2	55	16.0	0.051	8.1	LOS A	0.2	1.6	0.43	0.65	0.43	56.2
9	R2	143	9.0	0.317	14.3	LOS B	1.2	8.8	0.75	0.94	0.91	52.7
Approach		198	10.9	0.317	12.6	LOS B	1.2	8.8	0.66	0.86	0.77	53.6
West: Flynn Dr												
10	L2	21	50.0	0.015	7.9	LOS A	0.0	0.0	0.00	0.63	0.00	51.7
11	T1	358	21.0	0.209	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		379	22.6	0.209	0.5	NA	0.0	0.0	0.00	0.03	0.00	77.6
All Vehicles		1180	20.3	0.347	2.5	NA	1.2	8.8	0.12	0.17	0.14	72.4

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.

SITE LAYOUT

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



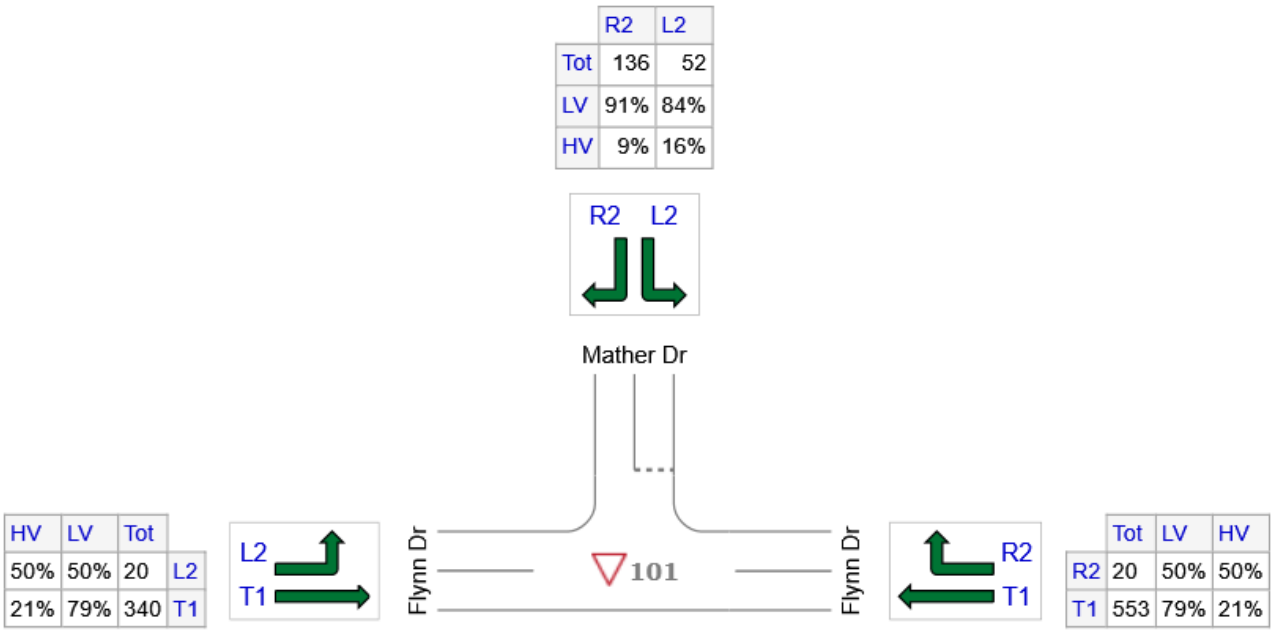
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Flynn Dr	573	447	126
N: Mather Dr	188	167	21
W: Flynn Dr	360	279	81
Total	1121	893	228

DEGREE OF SATURATION

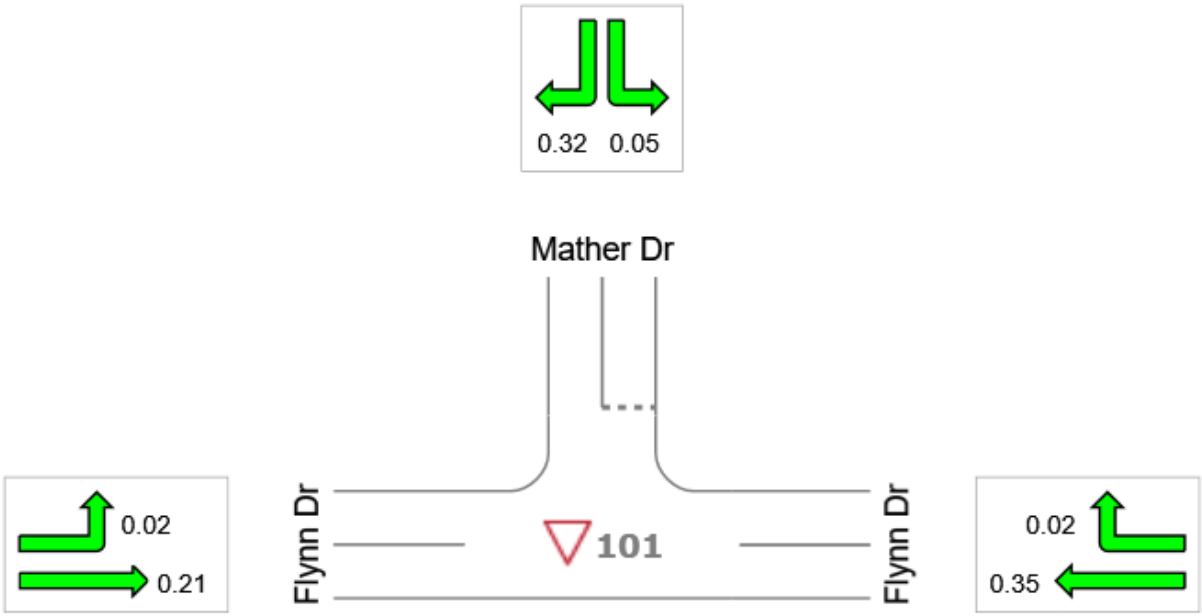
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

All Movement Classes

	Approaches			Intersection
	East	North	West	
Degree of Saturation	0.35	0.32	0.21	0.35



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

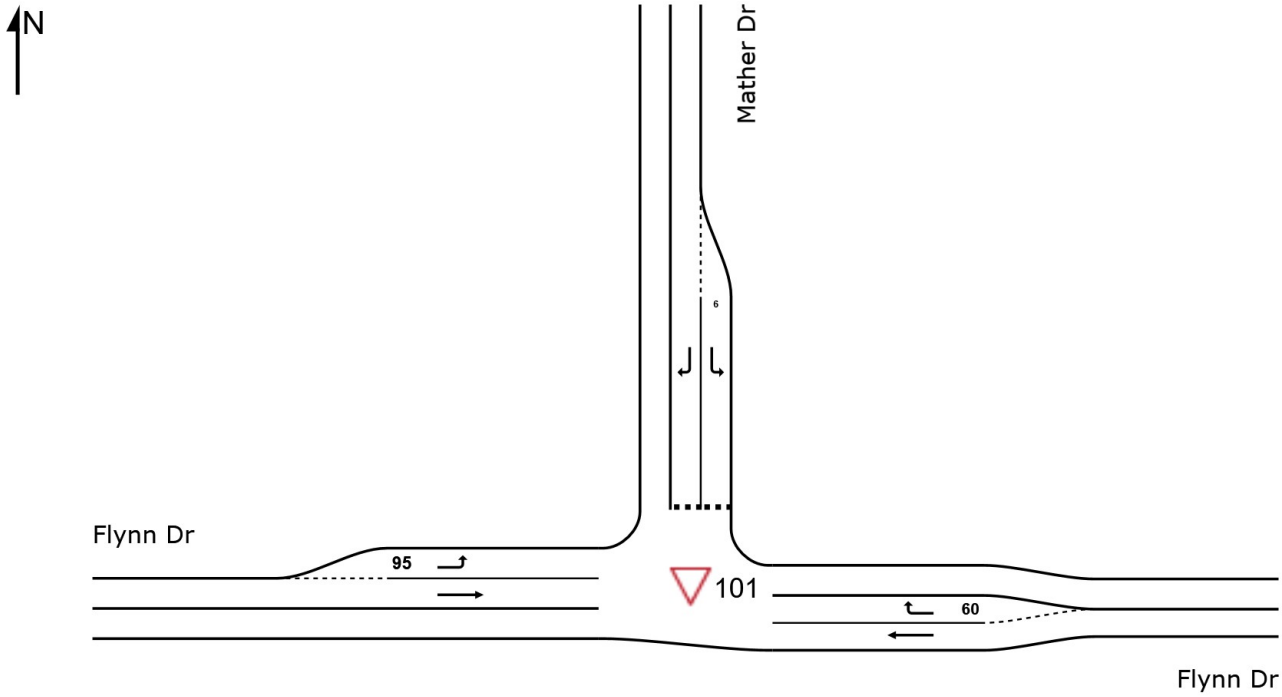
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	582	21.0	0.346	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.8
6	R2	32	66.7	0.039	10.8	LOS B	0.2	1.8	0.52	0.69	0.52	44.5
Approach		614	23.3	0.346	0.6	NA	0.2	1.8	0.03	0.04	0.03	76.7
North: Mather Dr												
7	L2	65	29.5	0.067	8.6	LOS A	0.3	2.3	0.44	0.67	0.44	52.9
9	R2	154	15.2	0.370	15.7	LOS C	1.4	11.2	0.78	0.97	1.00	50.4
Approach		219	19.5	0.370	13.6	LOS B	1.4	11.2	0.68	0.88	0.83	51.1
West: Flynn Dr												
10	L2	32	66.7	0.025	8.2	LOS A	0.0	0.0	0.00	0.63	0.00	48.4
11	T1	358	21.0	0.209	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		389	24.7	0.209	0.7	NA	0.0	0.0	0.00	0.05	0.00	75.9
All Vehicles		1222	23.1	0.370	3.0	NA	1.4	11.2	0.13	0.19	0.16	70.2

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.

SITE LAYOUT

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



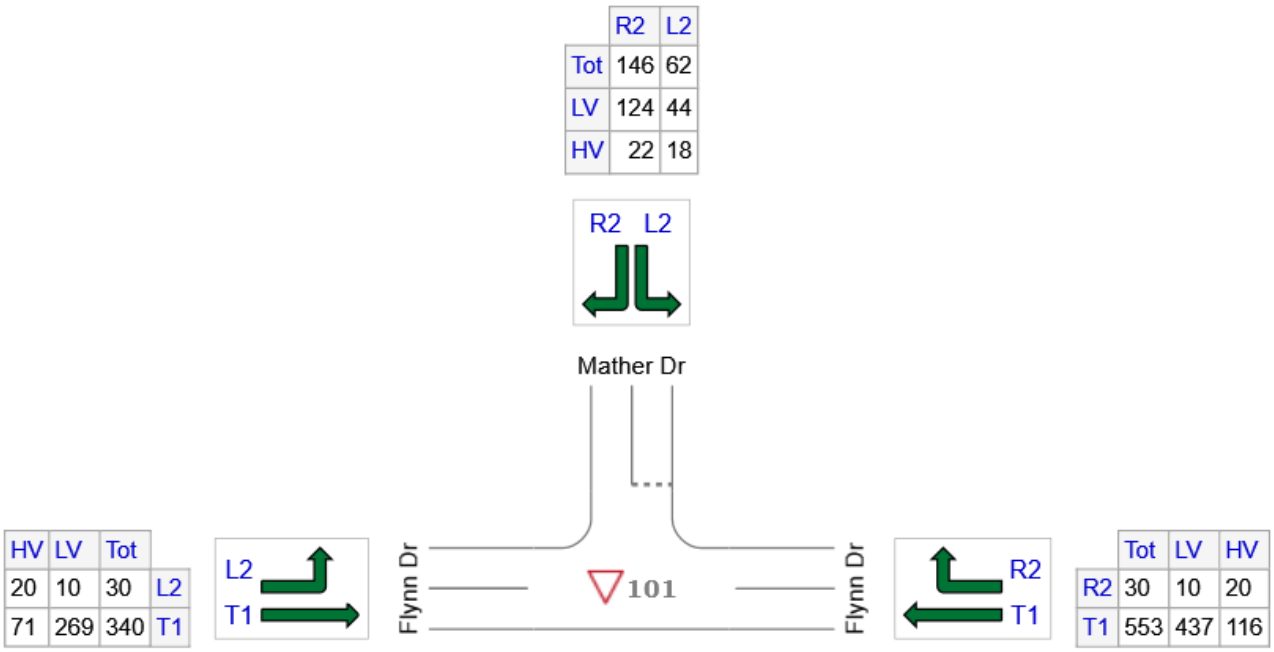
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Flynn Dr	583	447	136
N: Mather Dr	208	167	41
W: Flynn Dr	370	279	91
Total	1161	893	268

Organisation: GTA CONSULTANTS | Created: Tuesday, 24 November 2020 09:18:31
Project: T:\W20100-20199\W201000 Lot 9003 Mather Drive, Neerabup\Modelling\Project1.sip8

DEGREE OF SATURATION

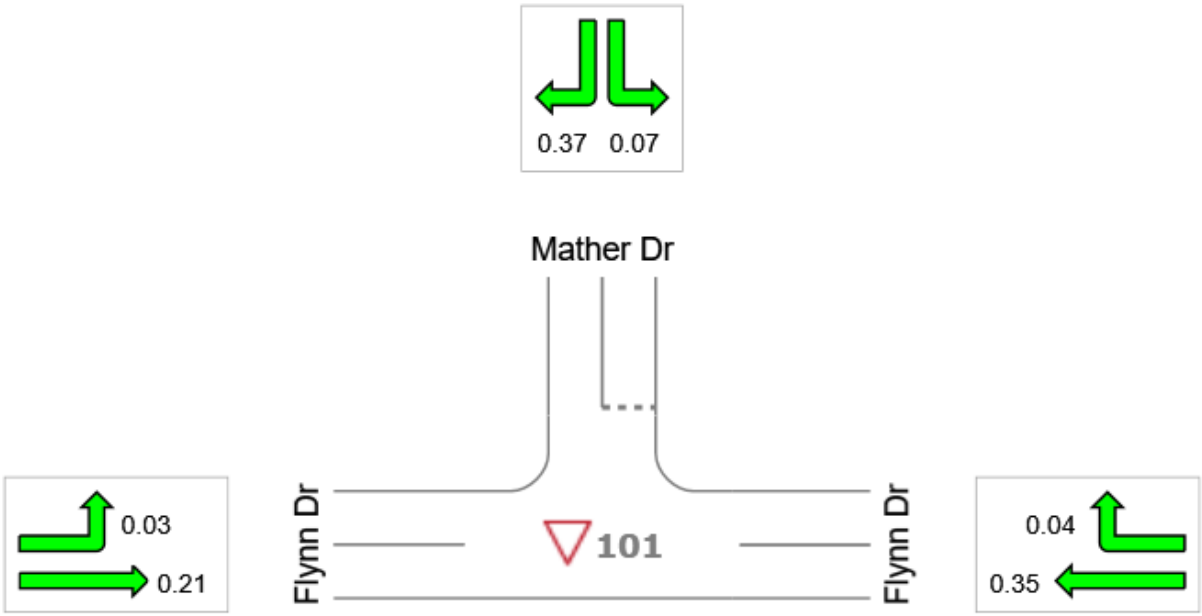
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

All Movement Classes

	Approaches			Intersection
	East	North	West	
Degree of Saturation	0.35	0.37	0.21	0.37



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

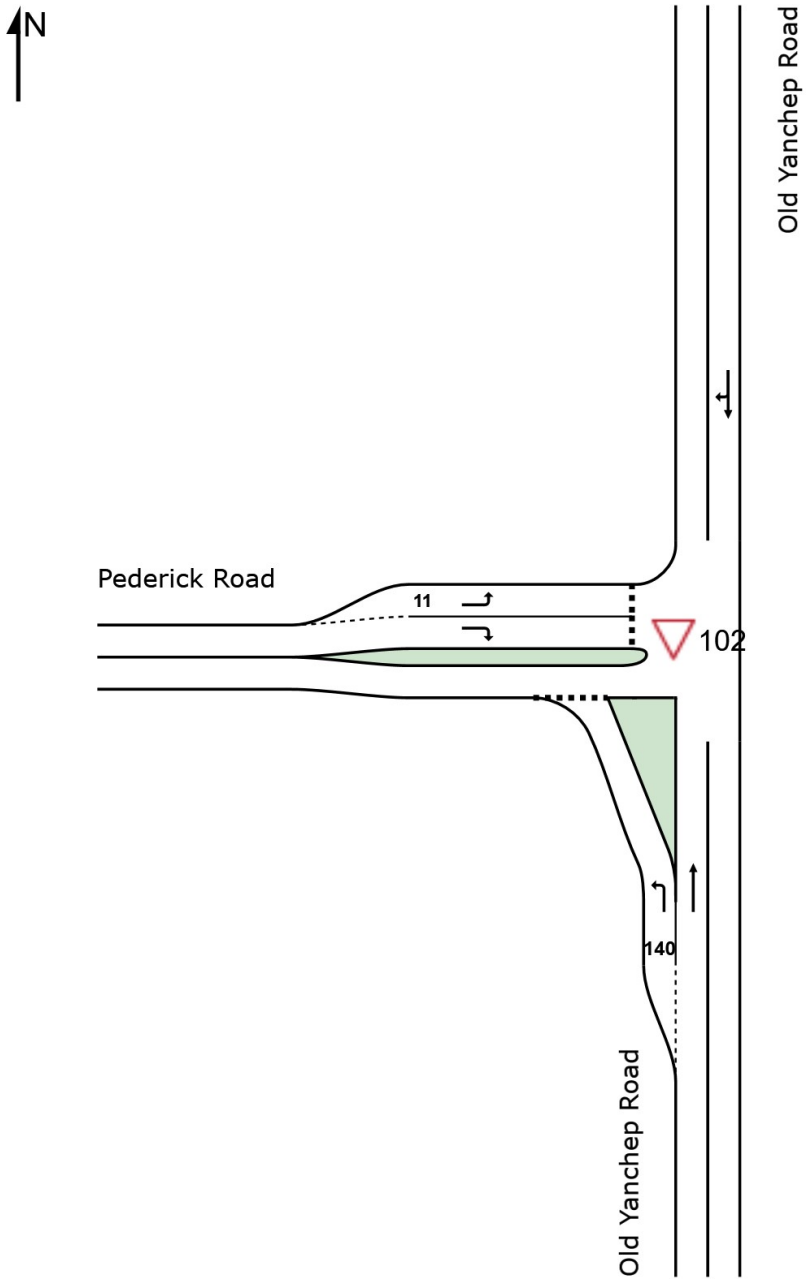
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Old Yanchep Road												
1	L2	4	0.0	0.003	7.9	LOS A	0.0	0.1	0.03	0.62	0.03	65.3
2	T1	87	18.2	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	90.0
Approach		92	17.4	0.050	0.4	LOS A	0.0	0.1	0.00	0.03	0.00	88.4
North: Old Yanchep Road												
8	T1	133	18.2	0.078	0.0	LOS A	0.0	0.2	0.01	0.02	0.01	89.2
9	R2	4	0.0	0.078	7.6	LOS A	0.0	0.2	0.01	0.02	0.01	73.7
Approach		137	17.6	0.078	0.2	NA	0.0	0.2	0.01	0.02	0.01	88.7
West: Pederick Road												
10	L2	4	0.0	0.003	6.6	LOS A	0.0	0.1	0.18	0.55	0.18	63.7
12	R2	4	0.0	0.002	6.6	LOS A	0.0	0.1	0.22	0.57	0.22	63.5
Approach		8	0.0	0.003	6.6	LOS A	0.0	0.1	0.20	0.56	0.20	63.6
All Vehicles		237	16.9	0.078	0.5	NA	0.0	0.2	0.02	0.04	0.02	87.4

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.

SITE LAYOUT

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



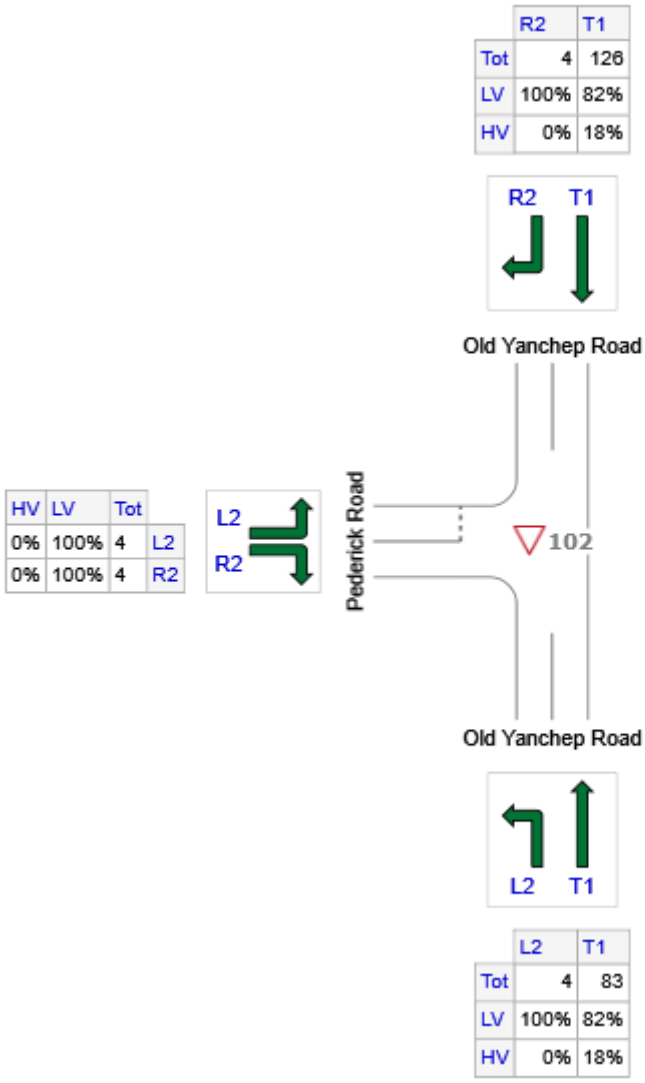
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Old Yanchep Road	87	72	15
N: Old Yanchep Road	130	107	23
W: Pederick Road	8	8	0
Total	225	187	38

DEGREE OF SATURATION

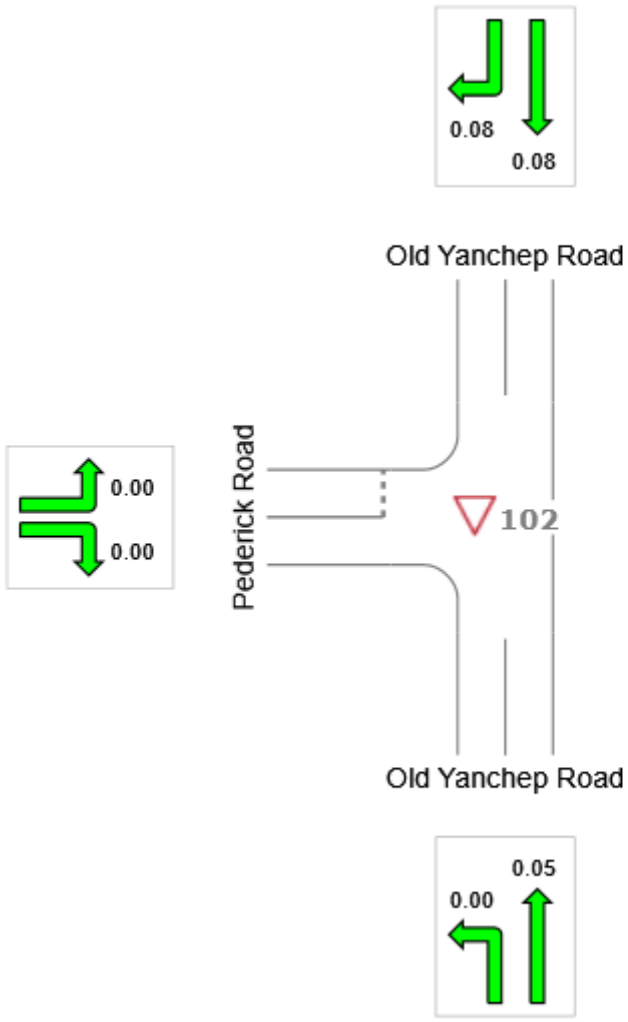
Ratio of Demand Volume to Capacity, v/c ratio per movement

▽ Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

All Movement Classes

	Approaches			Intersection
	South	North	West	
Degree of Saturation	0.05	0.08	0.00	0.08



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

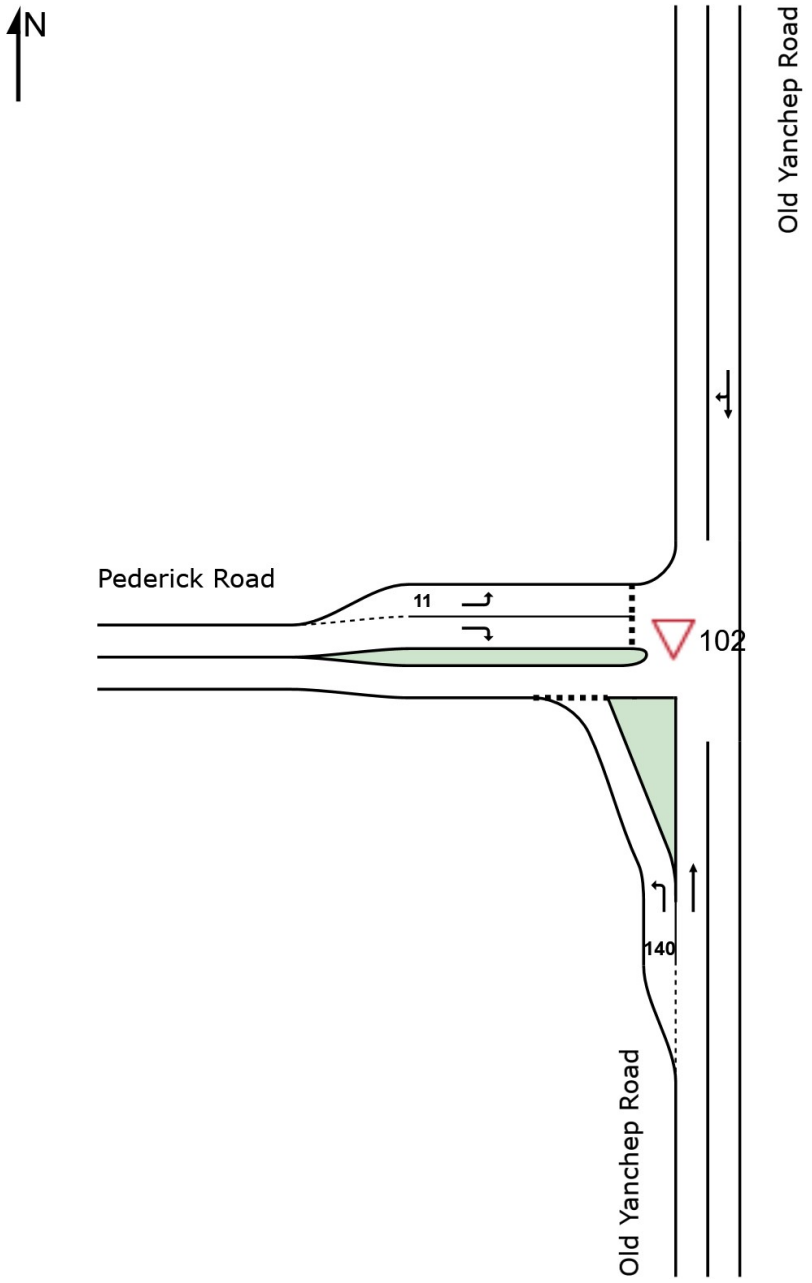
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Old Yanchep Road												
1	L2	9	55.6	0.007	9.0	LOS A	0.0	0.3	0.06	0.59	0.06	50.4
2	T1	87	18.2	0.050	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	90.0
Approach		97	21.9	0.050	0.9	LOS A	0.0	0.3	0.01	0.06	0.01	83.5
North: Old Yanchep Road												
8	T1	133	18.2	0.085	0.0	LOS A	0.1	0.7	0.04	0.04	0.04	89.0
9	R2	9	55.6	0.085	9.0	LOS A	0.1	0.7	0.04	0.04	0.04	54.5
Approach		142	20.7	0.085	0.6	NA	0.1	0.7	0.04	0.04	0.04	85.4
West: Pederick Road												
10	L2	9	55.6	0.008	7.6	LOS A	0.0	0.3	0.21	0.55	0.21	50.1
12	R2	9	55.6	0.007	7.7	LOS A	0.0	0.2	0.26	0.58	0.26	49.7
Approach		19	55.6	0.008	7.6	LOS A	0.0	0.3	0.24	0.57	0.24	49.9
All Vehicles		258	23.7	0.085	1.2	NA	0.1	0.7	0.04	0.09	0.04	80.5

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.

SITE LAYOUT

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



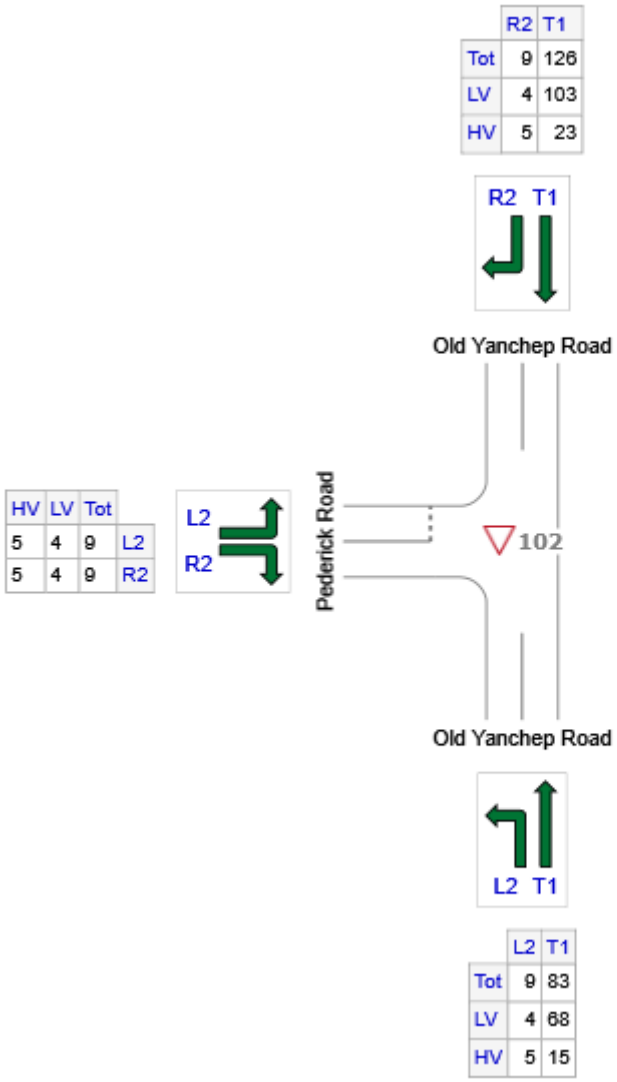
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Old Yanchep Road	92	72	20
N: Old Yanchep Road	135	107	28
W: Pederick Road	18	8	10
Total	245	187	58

DEGREE OF SATURATION

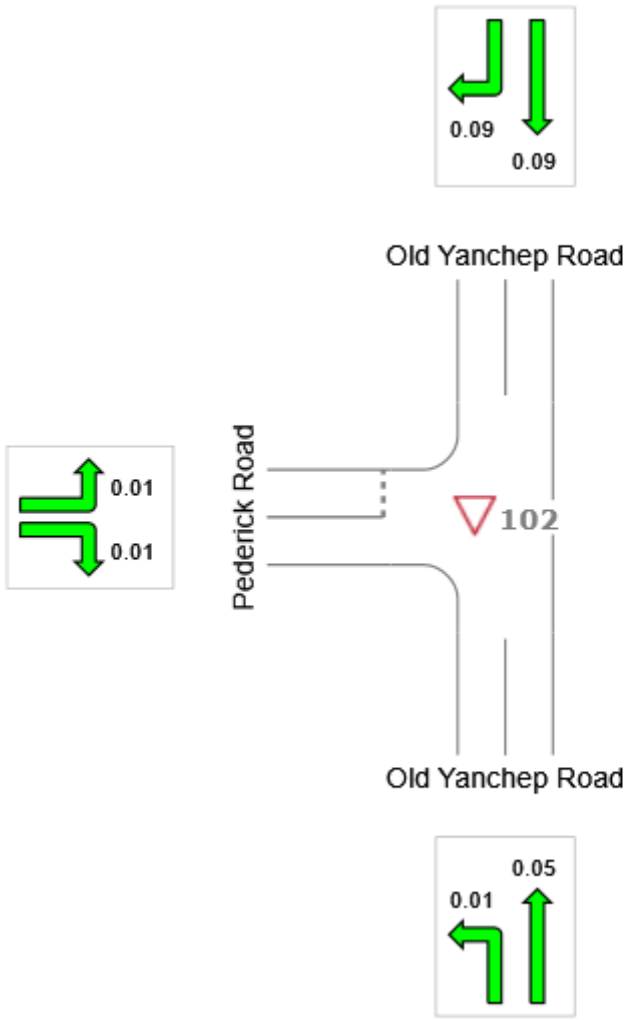
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

All Movement Classes

	Approaches			Intersection
	South	North	West	
Degree of Saturation	0.05	0.09	0.01	0.09



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

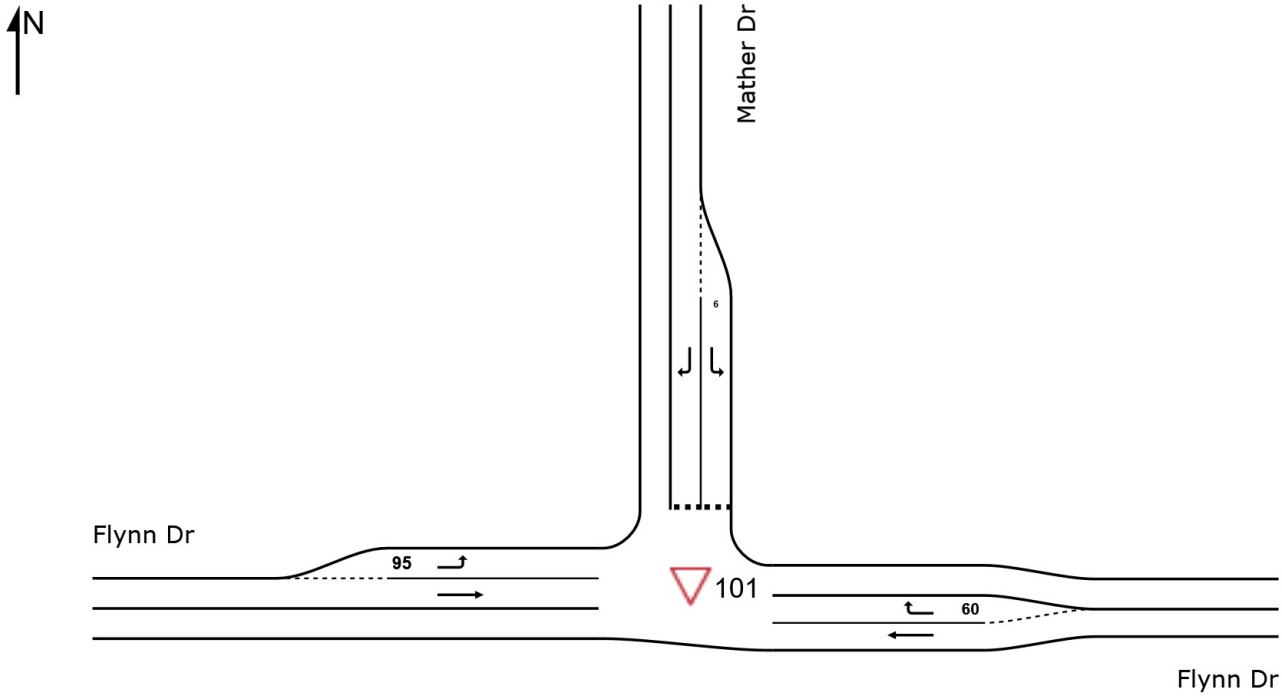
Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	815	21.0	0.486	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
6	R2	21	50.0	0.028	11.2	LOS B	0.1	1.1	0.57	0.72	0.57	47.1
Approach		836	21.7	0.486	0.4	NA	0.1	1.1	0.01	0.02	0.01	78.3
North: Mather Dr												
7	L2	55	16.0	0.061	9.0	LOS A	0.2	1.8	0.51	0.72	0.51	55.6
9	R2	143	9.0	0.538	24.6	LOS C	2.0	15.4	0.90	1.05	1.31	45.9
Approach		198	10.9	0.538	20.3	LOS C	2.0	15.4	0.79	0.96	1.09	48.2
West: Flynn Dr												
10	L2	21	50.0	0.015	7.9	LOS A	0.0	0.0	0.00	0.63	0.00	51.7
11	T1	501	21.0	0.292	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		522	22.2	0.292	0.4	NA	0.0	0.0	0.00	0.03	0.00	78.1
All Vehicles		1556	20.5	0.538	2.9	NA	2.0	15.4	0.11	0.14	0.15	72.5

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.

SITE LAYOUT

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



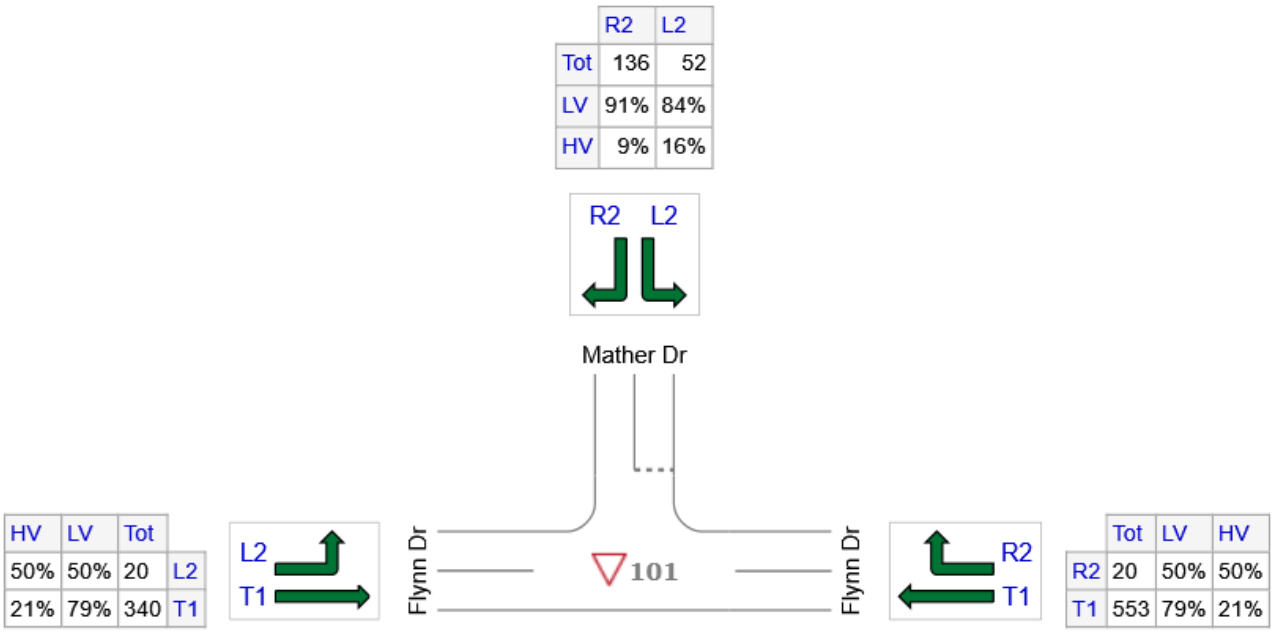
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Flynn Dr	573	447	126
N: Mather Dr	188	167	21
W: Flynn Dr	360	279	81
Total	1121	893	228

DEGREE OF SATURATION

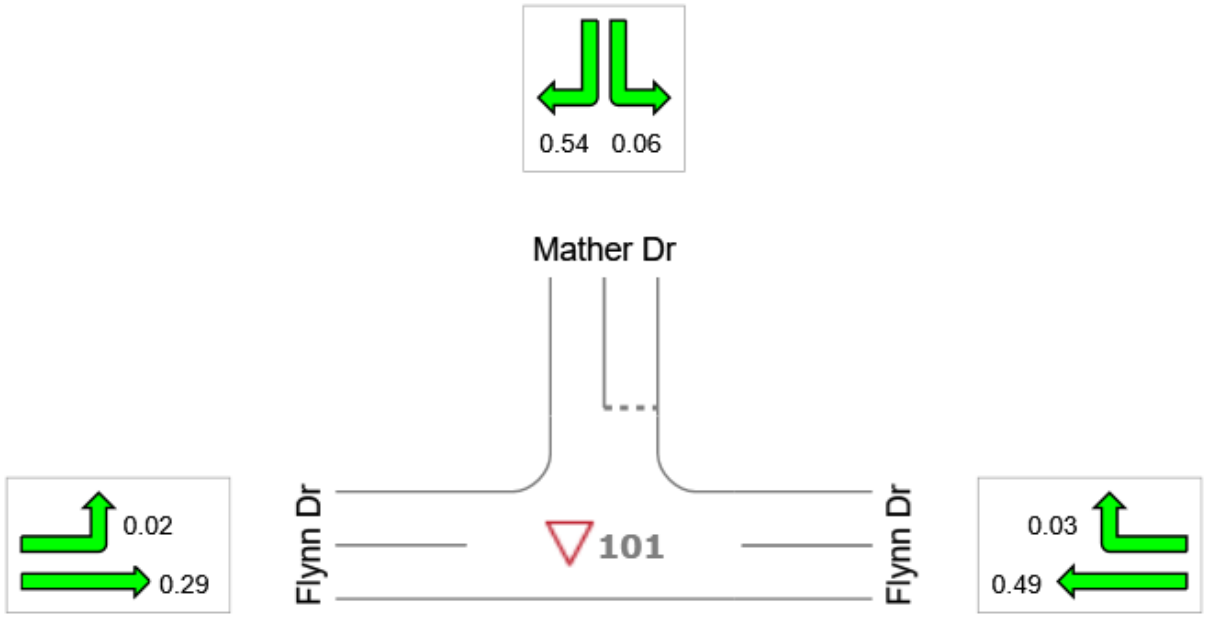
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 101 [Flynn Dr - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

All Movement Classes

	Approaches			Intersection
	East	North	West	
Degree of Saturation	0.49	0.54	0.29	0.54



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

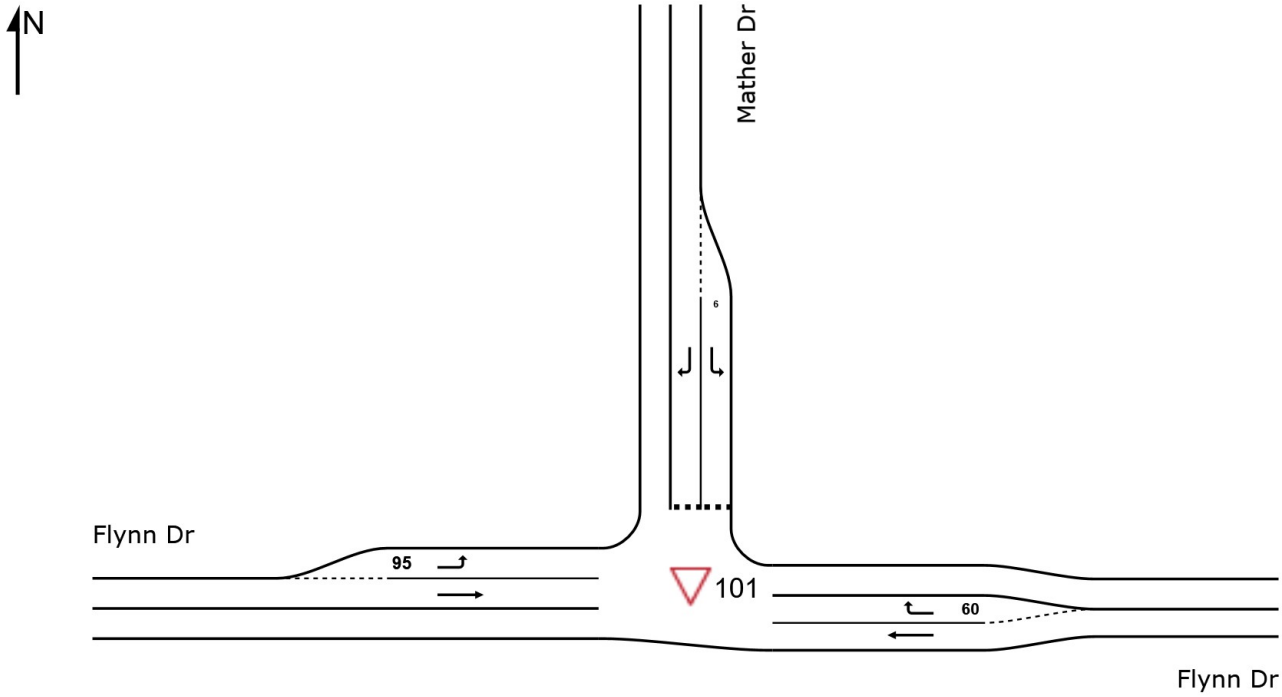
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
East: Flynn Dr												
5	T1	815	21.0	0.485	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	79.7
6	R2	32	66.7	0.048	12.3	LOS B	0.2	2.1	0.59	0.77	0.59	43.7
Approach		847	22.7	0.485	0.5	NA	0.2	2.1	0.02	0.03	0.02	77.3
North: Mather Dr												
7	L2	65	29.5	0.081	9.6	LOS A	0.3	2.6	0.53	0.75	0.53	52.1
9	R2	154	15.2	0.640	29.6	LOS D	2.6	20.6	0.93	1.11	1.52	42.3
Approach		219	19.5	0.640	23.6	LOS C	2.6	20.6	0.81	1.00	1.22	44.8
West: Flynn Dr												
10	L2	32	66.7	0.025	8.2	LOS A	0.0	0.0	0.00	0.63	0.00	48.4
11	T1	501	21.0	0.292	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	79.9
Approach		533	23.7	0.292	0.5	NA	0.0	0.0	0.00	0.04	0.00	76.9
All Vehicles		1598	22.6	0.640	3.7	NA	2.6	20.6	0.12	0.16	0.18	70.2

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.

SITE LAYOUT

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



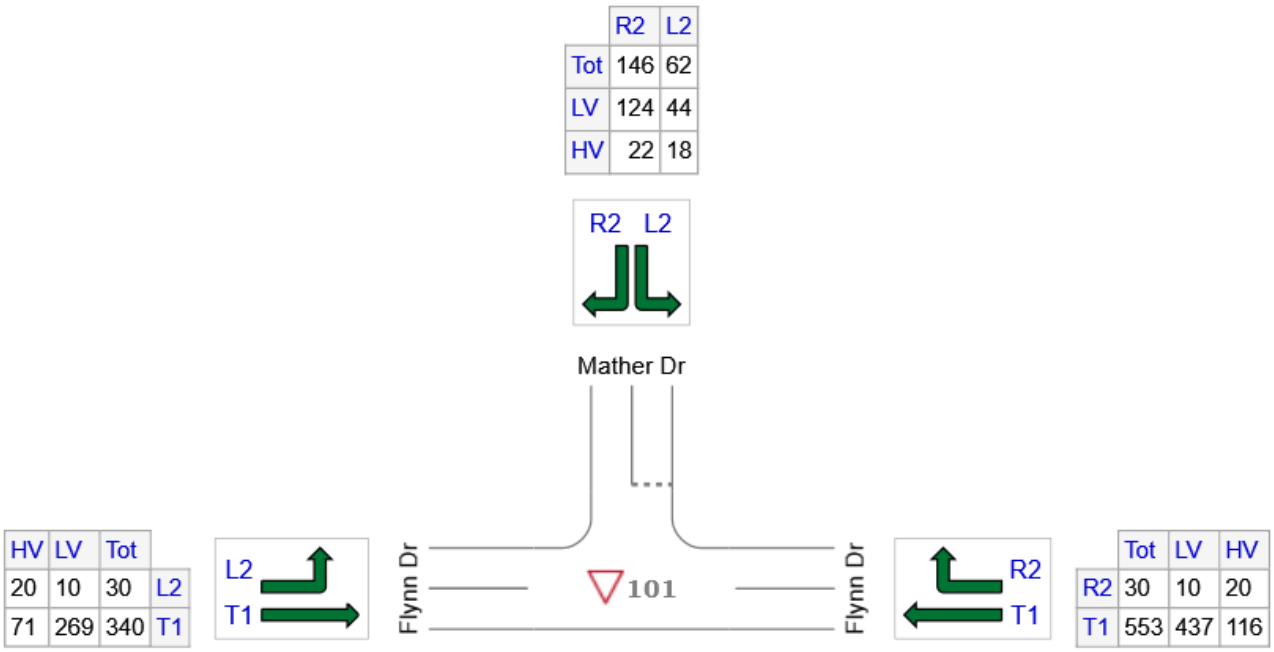
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
E: Flynn Dr	583	447	136
N: Mather Dr	208	167	41
W: Flynn Dr	370	279	91
Total	1161	893	268

Organisation: GTA CONSULTANTS | Created: Tuesday, 24 November 2020 09:10:46
Project: T:\W20100-20199\W201000 Lot 9003 Mather Drive, Neerabup\Modelling\Project1.sip8

DEGREE OF SATURATION

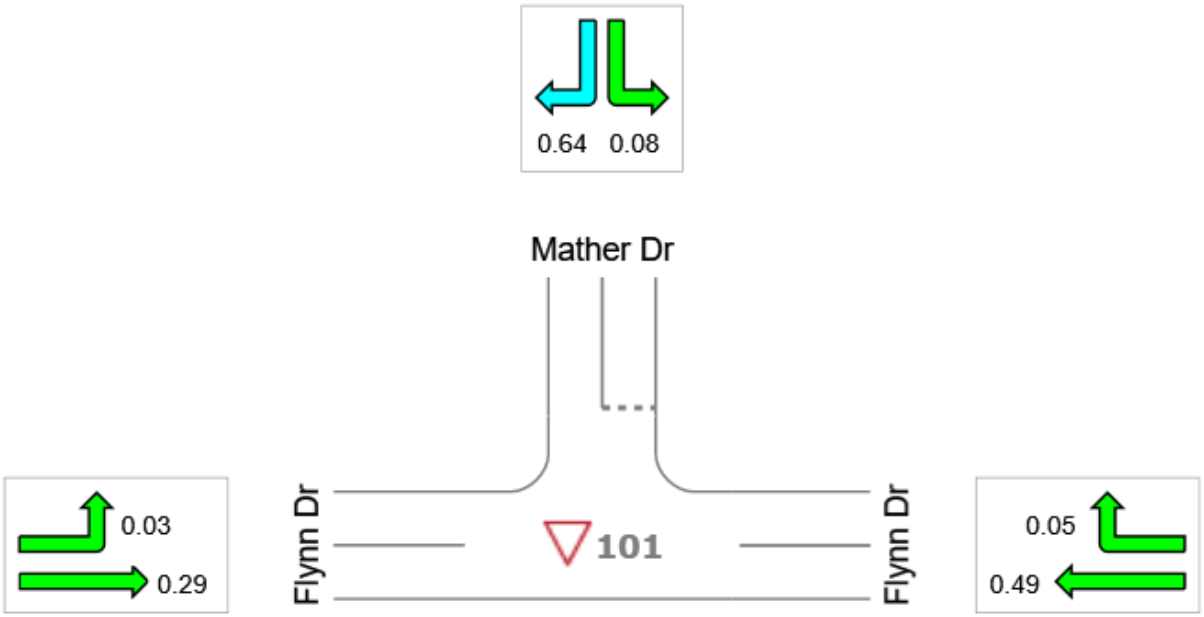
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 101 [Flynn Dr - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

All Movement Classes

	Approaches			Intersection
	East	North	West	
Degree of Saturation	0.49	0.64	0.29	0.64



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

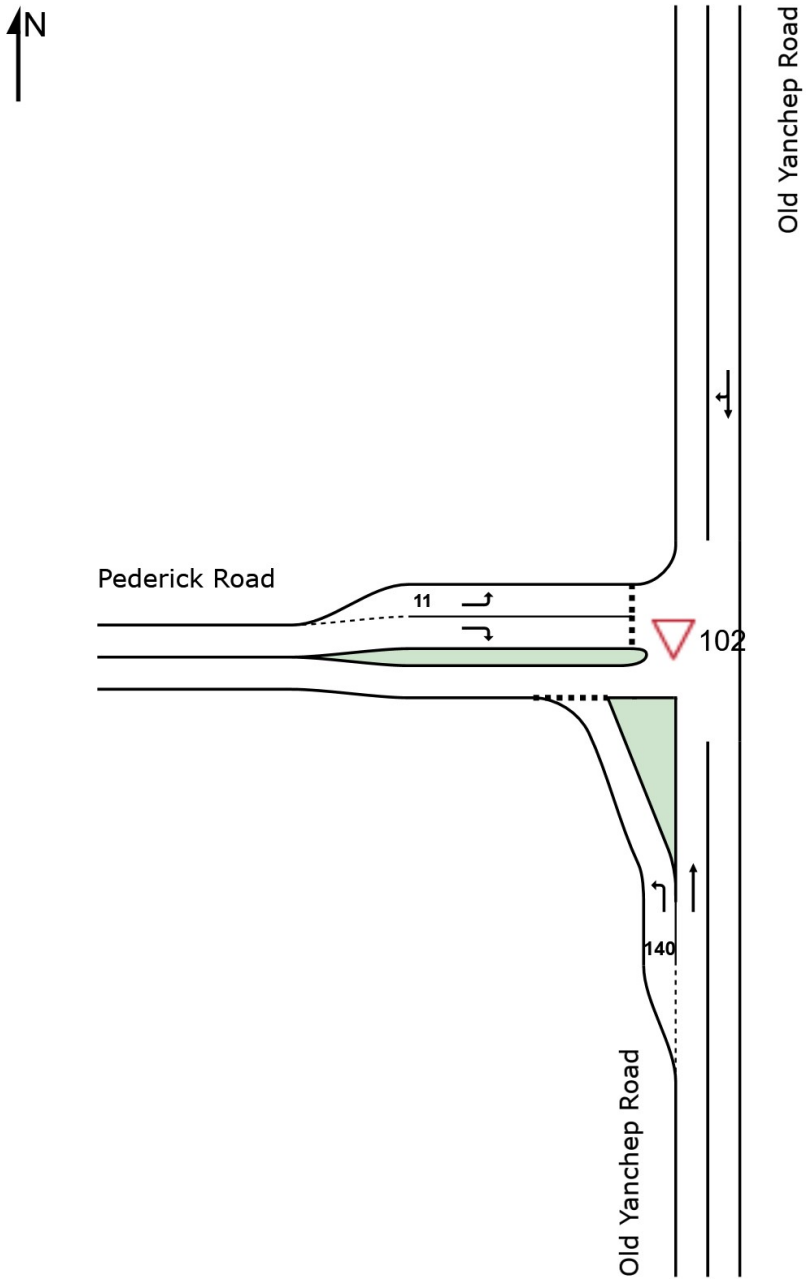
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Old Yanchep Road												
1	L2	4	0.0	0.003	7.9	LOS A	0.0	0.1	0.03	0.62	0.03	65.3
2	T1	122	18.2	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	90.0
Approach		127	17.6	0.070	0.3	LOS A	0.0	0.1	0.00	0.02	0.00	88.8
North: Old Yanchep Road												
8	T1	186	18.2	0.109	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	89.4
9	R2	4	0.0	0.109	7.7	LOS A	0.0	0.2	0.01	0.01	0.01	73.9
Approach		190	17.8	0.109	0.2	NA	0.0	0.2	0.01	0.01	0.01	89.0
West: Pederick Road												
10	L2	4	0.0	0.003	6.7	LOS A	0.0	0.1	0.22	0.55	0.22	63.6
12	R2	4	0.0	0.003	6.7	LOS A	0.0	0.1	0.27	0.57	0.27	63.3
Approach		8	0.0	0.003	6.7	LOS A	0.0	0.1	0.24	0.56	0.24	63.4
All Vehicles		325	17.3	0.109	0.4	NA	0.0	0.2	0.01	0.03	0.01	88.0

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.

SITE LAYOUT

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



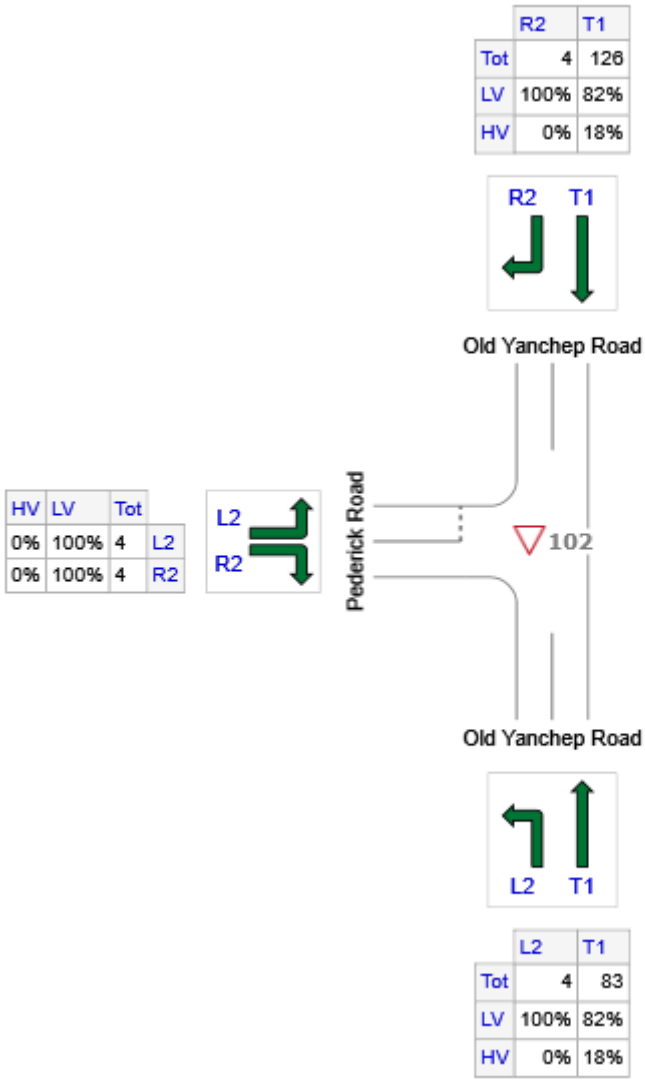
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Old Yanchep Road	87	72	15
N: Old Yanchep Road	130	107	23
W: Pederick Road	8	8	0
Total	225	187	38

DEGREE OF SATURATION

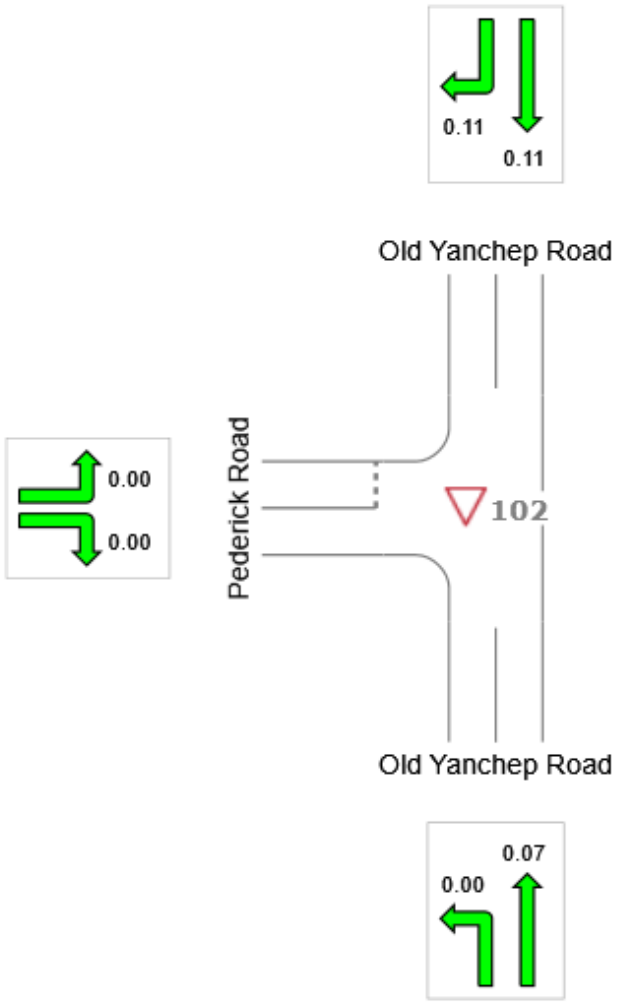
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 102 [Old Yanchep Rd - Base]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

All Movement Classes

	Approaches			Intersection
	South	North	West	
Degree of Saturation	0.07	0.11	0.00	0.11



Colour code based on Degree of Saturation

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

MOVEMENT SUMMARY

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

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: Old Yanchep Road												
1	L2	9	55.6	0.007	9.0	LOS A	0.0	0.3	0.06	0.59	0.06	50.4
2	T1	122	18.2	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	90.0
Approach		132	20.9	0.070	0.7	LOS A	0.0	0.3	0.00	0.04	0.00	85.1
North: Old Yanchep Road												
8	T1	186	18.2	0.116	0.1	LOS A	0.1	0.8	0.04	0.03	0.04	89.2
9	R2	9	55.6	0.116	9.3	LOS A	0.1	0.8	0.04	0.03	0.04	54.6
Approach		195	20.0	0.116	0.5	NA	0.1	0.8	0.04	0.03	0.04	86.5
West: Pederick Road												
10	L2	9	55.6	0.009	7.8	LOS A	0.0	0.3	0.25	0.56	0.25	49.9
12	R2	9	55.6	0.008	7.9	LOS A	0.0	0.3	0.32	0.60	0.32	49.5
Approach		19	55.6	0.009	7.8	LOS A	0.0	0.3	0.28	0.58	0.28	49.7
All Vehicles		346	22.3	0.116	1.0	NA	0.1	0.8	0.04	0.07	0.04	82.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
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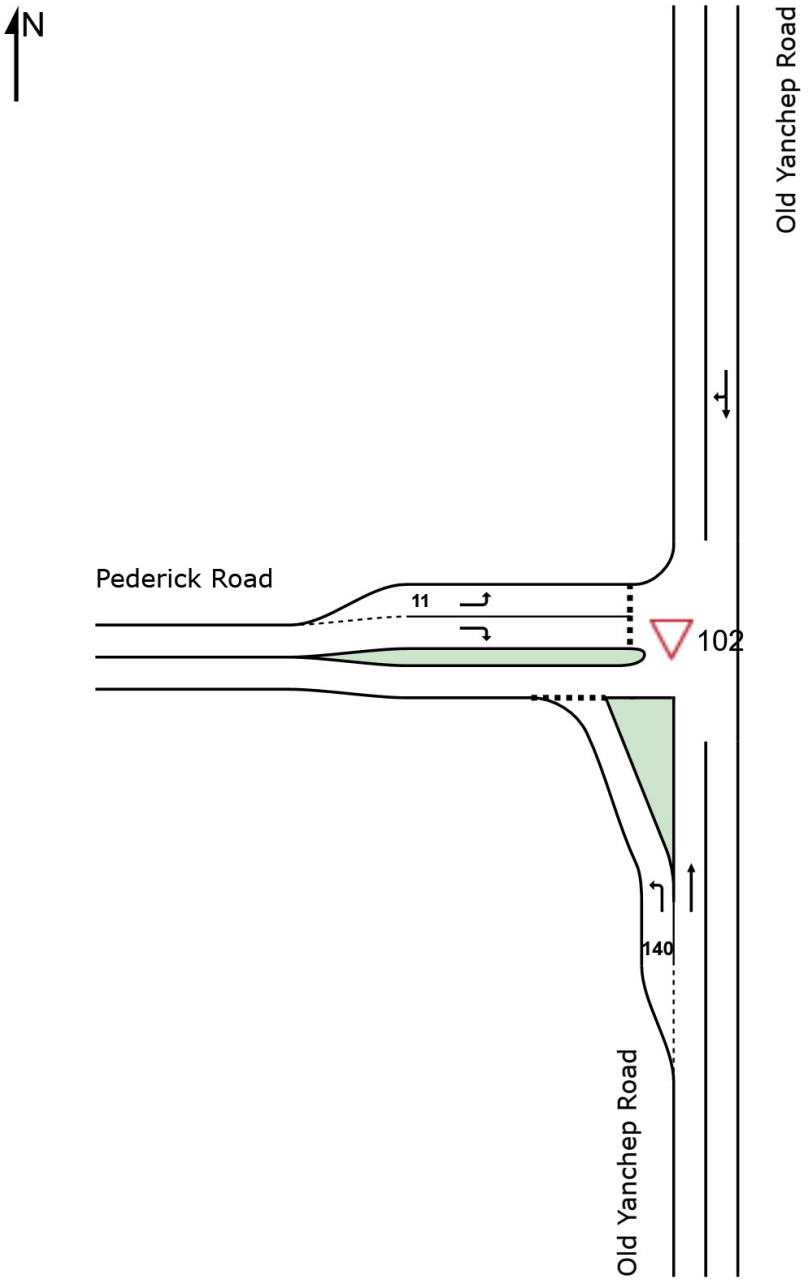
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard 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.

SITE LAYOUT

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)



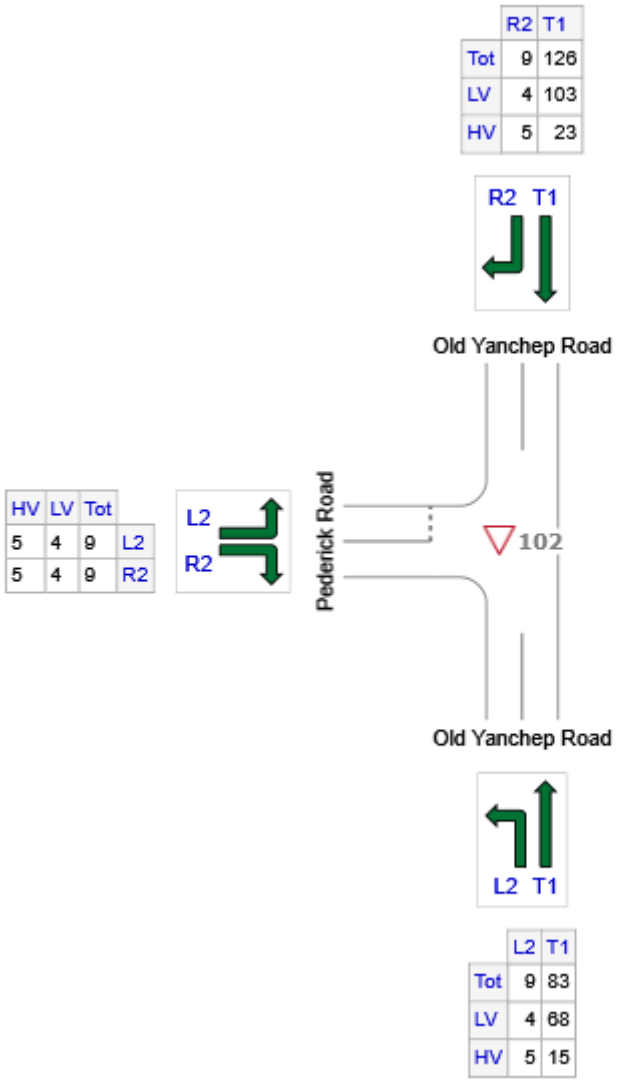
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)

Volume Display Method: Separate



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Old Yanchep Road	92	72	20
N: Old Yanchep Road	135	107	28
W: Pederick Road	18	8	10
Total	245	187	58

DEGREE OF SATURATION

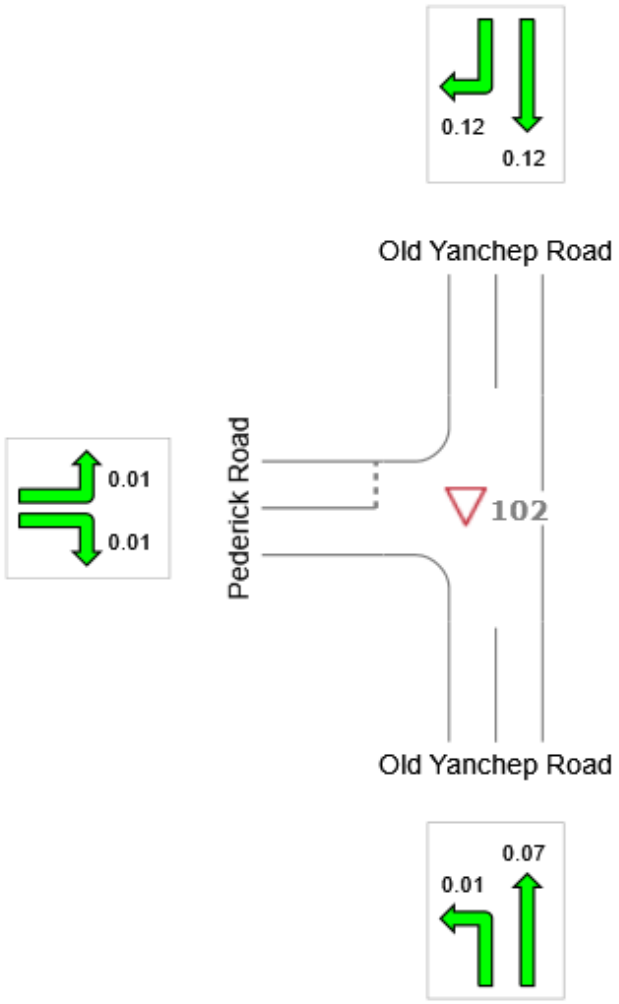
Ratio of Demand Volume to Capacity, v/c ratio per movement

Site: 102 [Old Yanchep Rd - Base - with Dev]

New Site
Site Category: (None)
Giveway / Yield (Two-Way)
Design Life Analysis (Final Year): Results for 10 years

All Movement Classes

	Approaches			Intersection
	South	North	West	
Degree of Saturation	0.07	0.12	0.01	0.12



Colour code based on Degree of Saturation

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

C. WAPC GUIDELINES CHECKLIST

APPENDIX: WAPC GUIDELINES CHECKLIST

Item	Provided	Comments/Proposals
Proposed Development		
Existing Land Uses	Y	
Proposed Land Use	Y	
Context with Surrounds	Y	
Vehicular Access and Parking		
Access Arrangements	Y	
Public, Private, Disabled Parking Set Down/Pick Up	Y	
Service Vehicle (Non-Residential)		
Access Arrangements	Y	
On/Off-Site Loading Facilities	Y	
Service Vehicles (Residential)		
Rubbish Collection and Emergency Vehicle Access	Y	
Hours of Operation (Non-Residential Only)	Y	
Traffic Volumes		
Daily or Peak Hour Traffic Volumes	Y	
Type of Vehicles (E.G. Cars, Trucks)	Y	
Traffic Management on Frontage Streets	Y	
Public Transport Access		
Nearest Bus/Train Routes	Y	
Nearest Bus Stops/Train Stations	Y	
Pedestrian/Cycle Links to Bus Stops/Train Station	Y	
Pedestrian Access/Facilities		
Existing Pedestrian Facilities Within the Development (If Any)	Y	
Proposed Pedestrian Facilities Within Development	Y	
Existing Pedestrian Facilities on Surrounding Roads	Y	
Proposals to Improve Pedestrian Access	Y	
Cycle Access/Facilities		
Existing Cycle Facilities Within the Development (If Any)	Y	
Proposed Cycle Facilities Within Development	Y	
Existing Cycle Facilities on Surrounding Roads	Y	
Proposals to Improve Cycle Access	Y	
Site Specific Issues	Y	
Safety Issues		
Identify Issues	Y	
Remedial Measures	Y	

APPENDIX: WAPC GUIDELINES CHECKLIST

Proponent's Name: _____

Company: _____ Date: _____

Transport Assessor's Name: _____Rodney Ding_____

Company: ___GTA Consultants_____ Date: ____17/11/2020_____

GTAconsultants

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