FUTURE RESIDENTIAL LOT

FUTURE AGED CARE LOT

CONTROLLED ENTRY POINT
ENTRY SIGNAGE
FIRE TANK & PUMP
BOOSTER CABINET
BBQ / COMMUNITY LAWN
POOL
COMMUNITY & WEST APARTMENT WASTE COLLECTION POINT
PICKLEBALL COURT & BOCCE LAWN
SECURE PERIMETER FENCE
WASTE COLLECTION POINT
PARK

EXIT & RC/CARAVAN ACCESS ONLY
ERGON TRANSFORMER
SITE SWITCH BOARD
RESIDENT WORKSHOP & SITE MAINTENANCE
CARAVAN / BOAT WASH
CARAVAN / BOAT PARKING

FOOT PATH
COMMUNITY
1 STOREY
APARTMENT
3 STOREYS
APARTMENT
3 STOREYS
PARK / BBQ
OUTDOOR BBQ SPACE
FOOTPATH CONNECTION - LOCATION TO BE CONFIRMED
BIKE PATH

ASSISTED LIVING / INDEPENDENT VILLAS
FOOT PATH

DOG GROOMING PARKING
DOG WALK / OFF LEASH AREA

ACOUSTIC FENCE & SECURE PERIMETER
COMMUNITY GARDEN
CHOOK PEN
BIOBASIN
WETLAND FLOOD MITIGATION

BRUCE HWY
STUART DRIVE

1 - MASTERPLAN - RETIREMENT LIVING VILLAGE
SCALE 1:750 @ A1
SCALE 1:1500 @ A3

0 15 30 45 60 75

SCALE 1: 750 @ A1
SCALE 1: 1500 @ A3

COTTEEPARKER

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PARKSIDE GROUP

BIMcloud: CPACLDBIMM01 - BIMcloud/2300/7309 Parkside Annandale Masterplan Master: 29/11/2024: 3:12 PM

ISSUE	PURPOSE	DATE	D	C	A
03	Draft DA Set	29/11/2024	VT/DL	GP	BD
02	For Coordination	22/11/2024	VT/DL	GP	BD
01	For Review	18/10/2024	VT	BD	SB

SCHEMATIC DESIGN

Parkside Annandale Masterplan

33 UNIVERSITY ROAD, ANNANDALE
CLIENT - PARKSIDE DEVELOPMENTS PTY LTD

DRAWING TITLE
MASTERPLAN - RETIREMENT VILLAGE

JOB No	DRAWING No	ISSUE
7309	SDA-1005	03

APPENDIX iv

NCE Traffic Impact Assessment

NORTHERN CONSULTING engineers

CIVIL & STRUCTURAL ENGINEERS

TRAFFIC IMPACT ASSESSMENT (STATE AGENCY AND LOCAL GOVERNMENT)

RETIREMENT LIVING – 33 UNIVERSITY ROAD, ANNANDALE MCU / RAL (PLM24/0048) SARA (2404-39801 SPL)

FOR
PARKSIDE DEVELOPMENT P/L

JOB No: **PARK0014**

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DOCUMENT CONTROL

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TABLE OF CONTENTS

APPENDICIES

APPENDIX A

DA Plans – by COTTEEPARKER

APPENDIX B

Northern Consulting Engineers – Supporting Figures and Diagrams

APPENDIX C

Northern Consulting Engineers – Miovision Traffic Movement Count Survey Spreadsheets

APPENDIX D

Northern Consulting Engineers – Existing Road Safety Audit Spreadsheets

APPENDIX E

Northern Consulting Engineers – SIDRA Results Spreadsheets

APPENDIX F

Certification Statement and Authorisation

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

NCE have been commissioned by Parkside Development P/L (Parkside) to complete an engineering investigation to develop a site at 33 University Road, Annandale, on a land parcel described as Lot 1 on SP343205. The development will include the construction of roadways, municipal services, and facilities to support and accommodate 150-160 retirement units.

This report summarises the analysis and results of the traffic study associated with the proposed development, including the likely impacts and mitigation measures required to ensure the development can proceed whilst maintaining an acceptable level of service within the state-controlled road network and local road network.

Development generated traffic rates were determined using a variety of methods namely:

1. Consideration of traffic volumes assigned within the Townsville AIMSUN Integrated Model (TAIM)
2. Physical Traffic Movement Counts (TMC),
3. Queensland Government Open Data Portal

Background projected traffic volumes within TAIM have been adopted for the assessment which align with previous works completed as part of the Townsville Connection Road (Stuart Drive) upgrade currently occurring.

The findings of this assessment (municipal roadways only) are summarised below:

- Intersection impact assessment and mitigation
    - SIDRA analysis found the existing intersection of Gartrell Drive and Shanahan Drive is expected to operate at acceptable levels of service inclusive of the proposed development generated traffic through to the design year 2036, based upon the TAIM background traffic volume predictions.
    - Whilst the TMR intersection warrant assessment indicated the inclusion of a AUL(s) may be required, further assessment through the analysis of the intersection with SIDRA modelling has indicated the intersection will perform adequately as it currently stands.
    - NCE confirm that the upgrades to the Gartrell Drive / Stuart Drive intersection currently being performed by TMR will be suitable for proposed development of the overall site at 33 University Road, Annandale, on a land parcel described as Lot 1 on SP343205. NCE concur with TCC and TMR that the traffic predictions within TAIM are suitable for the upgrade purposes and represent projected development traffic over the next 10 years adequately.

- Rad Safety Audit and Local authority traffic impact assessment and mitigation
    - Gartrell Drive is constructed as a rural road formation, without guideposts, however the roadway does include route lighting. The author considers the inclusion of route lighting assists road users in defining the roadway carriageway sufficiently to remove the need for guide posts. No further action or mitigation is recommended.

1.0 INTRODUCTION

1.1 Background

NCE have been commissioned by Parkside Development P/L (Parkside) to complete an engineering investigation to develop a site at 33 University Road, Annandale, on a land parcel described as Lot 1 on SP343205. The development will include the construction of roadways, municipal services, and facilities to support and accommodate 150-160 retirement units.

Specifically, this phase of the engagement is focused on a traffic study for the operation of the facility. This study will be utilised to support development applications associated with the development.

1.2 Previous work

Several traffic studies have been prepared and adopted as part of the Townsville Connection Road Upgrade.

- Traffic Analysis Report (Townsville Connection Road Detailed Design (Stage 2) and Business Case (Stage 4 & Active Transport) prepared by AECOM dated 07-Sept-2022 Doc No. 60663662 Rev 0

- Southern Cross Catholic College Townsville (Traffic Impact Assessment) for FortisEM dated 23rd August 2021 File Name P5239.002R

1.3 Scope and study area

The proposed development is located within the Townsville City Council (TCC) urban locality of Annandale (QLD, 4814). The site is over one land parcel described as Lot 1 on SP343205, with the land zoned as General Residential under the Townsville City Plan. The southern boundary of the lot runs parallel with University road reserve. The Eastern boundary runs parallel with Stuart Drive (Townsville Connection Road). The northern boundary runs parallel with Gartrell Drive and the western boundary lies adjacent to existing residential allotments and Shanahan Drive. The locality plan can be seen in **Figure 1-1**.

The purpose of the report is to document the traffic analysis undertaken, which has focused on the potential impacts upon the Shanahan Drive / Gartrell Drive intersection, as a direct result of the traffic generated from the proposed development.

Assessment of impacts upon the Gartrell Drive / Stuart Drive intersection are not considered within the report further then a comparison and discussion relation to the pre and post traffic generation along Gartrell Drive. Gartrell Drive / Stuart Drive intersection is currently being upgraded to a signalised intersection based upon the current and forecast traffic volumes within the TAIM which have been reviewed and adopted as being appropriate by both TCC and TMR.

Figure 1-1 Locality plan

1.4 Pre-lodgement meeting notes

Pre-lodgement meetings with TCC and SARA have been completed, namely TCC on the 27th March 2024 and SARA on the 24th May 2024 to address the development, below are the minutes recorded relevant to this Traffic Impact Assessment (TIA):

TCC PLM24/0048

•Transport impact, access, and parking code

- Parking – Parking assessment is to be included in the traffic impact assessment report.
- Access
  - The only access to the existing residential catchment and proposed

development is Shanahan Drive as per the draft plan. This access road will or will not be able to cater the traffic volume generated by the development in addition to the existing traffic. Thus, a secondary access via Gartrell Drive is encouraged, subject to the DTMR assessment.

- Extent of public roads is to be demonstrated considering the Reconfiguring a Lot proposal for the property.
- Access road over the water course is to be trafficable in 1% AEP event.
- Council records has noted that entry road to sewer pump station from University Road is only a temporary access.
- Permanent access to sewer PS will be provided via an existing easement off Shanahan Drive.

Fig: Easement over the rising main and for the future access to PS

- Road cross sections are to be in accordance with the council standard drawings.
- Traffic impact assessment is required in master planning aspect, considering the entire development including residential care, aged car and residential sub division.
- Timing of the delivery of the works also needs to be identified in the TIA.

Sara 2404-39801 SPL

Project Overview

- A Master plan has been produced for the proposed development and a reconfiguration of a lot plan. The aged care layout designs have not been decided yet. The final determination of the design and footprint will be decided by the end operator.
- The applicant advised proposed Lot 1 in the Master Plan is just a place holder to identify likely density and ultimate staging. It's development will follow at an appropriate time.
- The applicant advised the RaL plan was only registered on 8 April 2024 and there's an alternate lot on the northern corner of the Stewart Drive intersection.
- The applicant advised the subject area is zoned Low Density Residential and Retirement Facilities are anticipated in the zone. Council is reportedly supportive of the use in the proposed location.
- The applicant seeks to address potential flooding and transport corridor connections issues via consultation with SARA.
- The applicant has commenced preliminary flood modelling for the subject area and the
- proposed development layout is based on this data.
- The applicant intends to lodge a development application as soon as possible (approx. 3-4
- months).

DTMR

- A key issue for DTMR is its major project work on Bowen Road and University Road.
- The Townsville Connection Road (TCR) will likely be completed by the time the proposed development commences, so it will be important for the TIA to take into consideration the final design of the TCR. In particular, the signalisation of Gartrell Drive and any active transport design along Bowen Road. DTMR suggested traffic data could be skewed because of the road works with not as many people using it, so consideration would need to be given to that aspect within a TIA too.
- The applicant was advised to determine if there are any additional requirements for the proposed development e.g. turning lanes, widening etc. on top of the works being undertaken at the moment.
- There will be cycle networks and pedestrian pathways being installed along Bowen Road. There doesn't appear to be connectivity from the Master Plan to those active transport networks at this stage and that should be rectified to improve pedestrian opportunities.
- A development application will need to include a flood impact assessment and stormwater management plan demonstrating no worsening on the State-controlled road networks. DTMR identified the site is impacted by the 2% AEP event and the flood impact assessment should take that into consideration.
- Accommodation activities are proposed in close proximity to the State-controlled road network. Compliance will need to be demonstrated with the relevant Performance Outcomes (POs) of the State Development Assessment Provisions (SDAP). A development application should provide a Noise impact assessment demonstrating mitigation measures.
- The applicant advised the intent of the emergency access is to provide an alternative option for emergency vehicles in case Gartrell Drive is blocked. University Drive is a LAR and DTMR undertakes a more detailed assessment and higher delegation for approval is required. The applicant was advised to investigate with council whether they could provide emergency access via the pump station access. However, the applicant was advised to confirm if the council has a temporary or permanent access to the pump station.
- If the proposed development still requires emergency access via the LAR, TMR would require further justification for it, e.g. management methodologies.
- The applicant was advised to be mindful of transport network threshold requirements, noting the proposed numbers are close to threshold limits in Schedule 20 of the Planning Regulation.
- The applicant requested design detail and flood modelling for DTMRs project work. DTMR confirm for the applicant subsequent to the meeting. Note: DTMR is in the process of collating and consolidating this information and will send directly to the applicant once available.

- The development must ensure no worsening or actionable nuisance to the state-controlled road. The applicant was advised DTMR requires a greater range of flood event assessments than just best case and worse case scenarios.

The full pre-lodgement meeting minutes are available in the appendices

2.0 EXISTING CONDITIONS

2.1 Land use and zoning

The proposed development is on land zoned as Low Density Residential, within an urban footprint as per the Townsville City Plan (2014) mapping available on the TownsvilleMAPS.

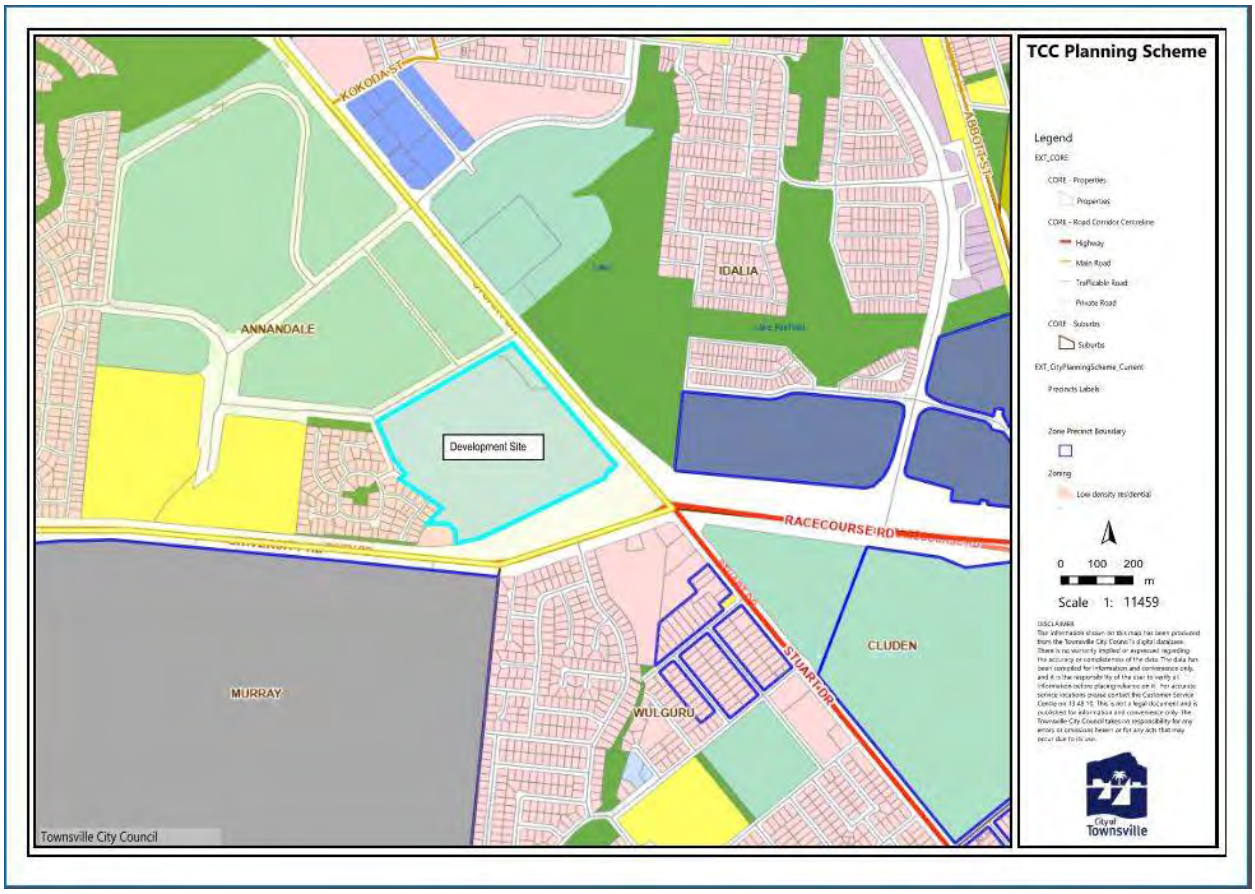

Figure 2-1 Townsville City Council planning zones – Annandale and surrounding suburbs

2.2 Adjacent land uses / approvals

Existing urban allotments to the west is currently established low density residential blocks generating typical urban residential traffic.

2.3 Surrounding road network details

The surrounding road network is made up of both local government roadways and state-controlled roadways.

2.3.1 State-controlled roadways

The proposed development is situated within the Northern District of the Queensland Department of Transport and Main Roads (TMR). The adjacent State Controlled Road Network (SCRN) comprises:

- Townsville Connection Road – Road Section 830 – access corridor for the Flinders Highway connection with Townsville City. Designated as a RT2 route for type 2 road trains and lower.

- Bruce Highway – Road Section 10M – major highway running along the coast of Queensland. Designated as a B25 route for 25m B-doubles and lower.

Figure 2-2 is an excerpt from Queensland Globe showing the heavy vehicles routes and restrictions for the areas expected to be used by the development generated traffic, labels are based on the most up to date routes and restrictions given by the NHVR.

Figure 2-2 Heavy vehicle routes and restrictions

2.3.2 Local authority roadways

The existing local road network consists of Gartrell Drive, running perpendicular to Stuart Drive (TCR) and along the northern boundary of the proposed development. Shanahan Drive connecting Gartrell Drive with the proposed development.

Neither Gartrell Drive nor Shanahan Drive are depicted within the existing or future hierarchy mapping as a major collector or above.

Below is the greater region TCC planning road map shown in **Figure 2-3** as well as the smaller scale inset of the development site and surrounding areas shown in **Figure 2-4**.

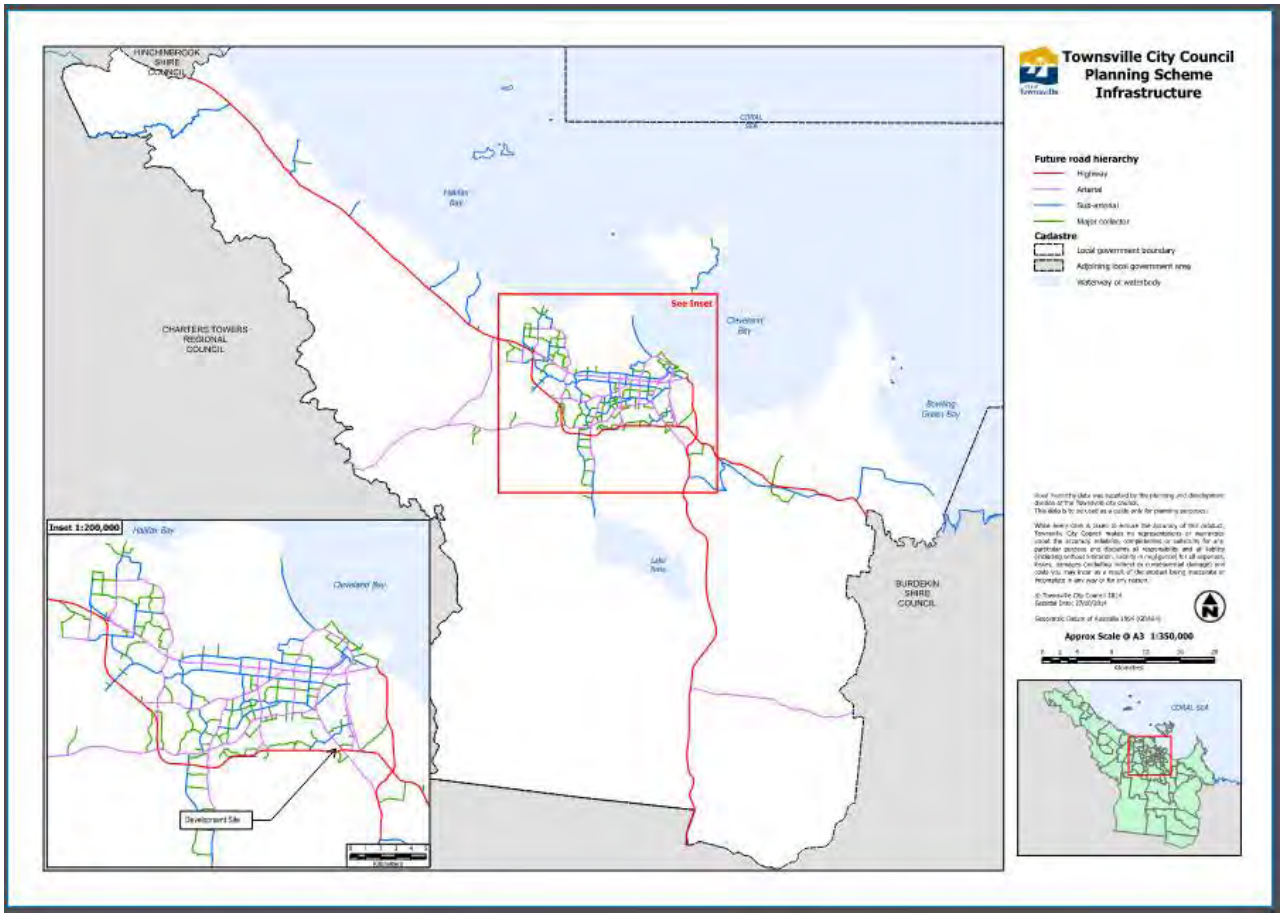

Figure 2-3 TCC Future Road Hierarchy

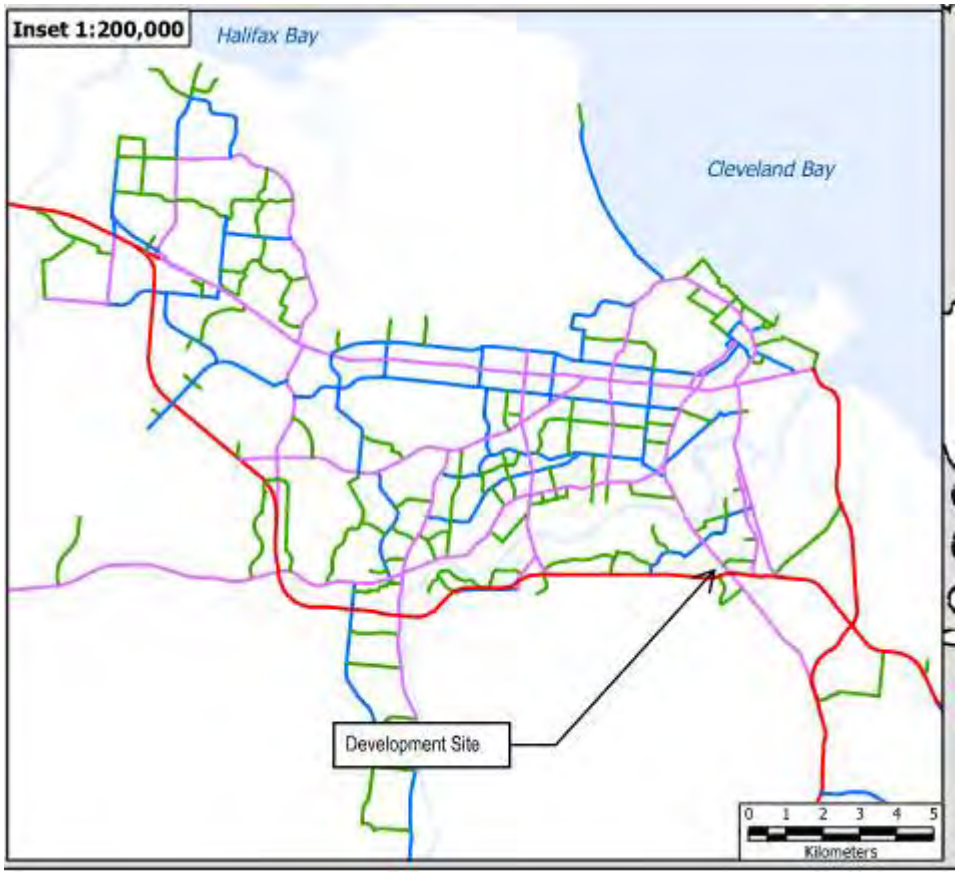

Figure 2-4 TCC Future Road Hierarchy - inset

2.4 Background traffic volumes

2.4.1 Gartrell Drive

Background traffic volumes utilised within the analysis were derived from several sources.

1. Consideration of traffic volumes assigned within the Townsville AIMSUN Integrated Model (TAIM)
2. Physical Traffic Movement Counts (TMC),
3. Queensland Government Open Data Portal
4. Predicted Traffic Movements based upon TCC Development Manual

A combination of observed traffic movement counts and traffic volumes and growth rates within TAIM have been adopted for the assessment.

1. Townsville AIMSUN Integrated Model 2026 / 2036. Full TAIM traffic data can be found in the **Appendices**.

    - **Gartrell Drive 2026:**
        - Outbound/Eastbound:
            - AADT: 1616
            - Peak AM: 288
            - Peak PM: 90
            - %HV: 3.03%
        - Inbound/Westbound:
            - AADT: 3959
            - Peak AM: 367
            - Peak PM: 387

- %HV: 3.28%

- **Gartrell Drive 2036:**
  - Outbound/Eastbound:
    - AADT: 1645
    - Peak AM: 293
    - Peak PM: 94
    - %HV: 3.1%
  - Inbound/Westbound:
    - AADT: 4003
    - Peak AM: 369
    - Peak PM: 380
    - %HV: 3.3%
    -

2. Miovision traffic movement count (TMC) survey captured by NCE at the Gartrell Drive / Shanahan Drive intersection. Footage captured between 6:00am to 18:00pm Saturday 10th August 2024 and 7:30am to 9:30am and 16:15pm to 18:15pm on the 13th, 14th & 15th August 2024. Full Miovision analysis and count data can be found in the **Appendices**.

2.4.2 Shanahan Drive

Background traffic volumes within Shanahan Drive have utilised actual traffic movement counts.

2.4.3 Assessment of available data

The above available information was reviewed and compared to determine if the current and predicted traffic loads remain within acceptable limits adopted for the recent upgrades of the Townsville Connection Road (Stuart Drive).

Traffic movement counts observed during13th – 15th August 2024 identified peak hour traffic volumes within Gartrell Drive to be as shown below:

Table 2-1 Gartrell Drive – Traffic Volume Comparison (TMC Vs AIMSUN)

Gartrell Drive	NCE (TMC) 13th – 15th August 2024	TCC AIMSUN Model predictions 2026
AM Peak	7:30am and 8:30am	
Eastbound traffic	353 vehicles	288 Vehicles
Westbound traffic	198 vehicles	367 vehicles
Shanahan Drive	45 vehicles	
PM Peak	4:15pm and 5:15pm	
Eastbound traffic	77 vehicles	90 vehicles
Westbound traffic	37 vehicles	387 vehicles
Shanahan Drive	27vehicles	

As can be deduced from the **Table 2-1** Gartrell Drive – Traffic Volume Comparison (TMC Vs AIMSUN) the movements count observed appear to be generally lower than the AIMSUN model predictions.

Significant road works are being completed within Stuart Drive / Townsville Connection Road during the survey period and will have some baring on the results. It is expected that a higher volume of traffic may utilise the link between Mervyn Crossman Drive and Gartrell Drive via the sports / school parking facility to avoid the road works on Stuart Drive. This may account for the higher-than-expected volumes during the AM peak heading eastward completing the school drop off and accepting the safer / easier left out manoeuvre from Gartrell onto Stuart Drive, but this is difficult to confirm.

Northern Consulting Engineers agree the TCC and TMR adoption of the TCC AIMSUN model as the basis of traffic volumes for the purposes of the Townsville connection Road Upgrade as suitable traffic volume estimation for vehicle usage of Gartrell Drive / Stuart Drive roadways.

2.5 Road safety issues

2.5.1 Crash data

Crash data was obtained for the area via the Department of Transport and Main Roads. Specifically, 250m either side of the existing intersection between Gartrell Drive and Shanahan Drive has been the site of a single (1) accident in 2004.

Crash data relating to Stuart Drive has deliberately been excluded as significant works are currently being completed in the corridor which will significantly improve the safety of that roadway. All preceding accident data is considered irrelevant.

Table 2-2 Crash data from Queensland globe

Location	Date and Time	Occupancy	Nature of Crash
Shanahan Drive	December 2004, Wednesday at 5:00 PM	(1) Medical treatment	Single Vehicle, Hit object, Vehs Manoeuvring: Other

2.5.2 Road safety audit

NCE have undertaken a road safety audit Gartrell Drive and Shanahan Drive as part of the Traffic impact assessment. The full audit spreadsheet is given in **Appendices**. Relevant sections of the audit have been summarised below.

Gartrell Drive:

- 6.5.3 – Guideposts and Reflectors
    - Gartrell Drive is constructed as a rural road formation, without guideposts, however the roadway does include route lighting. The author considers the inclusion of route lighting assists road users in defining the roadway carriageway sufficiently to remove the need for guide posts.

2.6 Public Transport

There are currently two services that pass within close proximity of the development site. Routes 208 and 209, refer **Figure 2-5**.

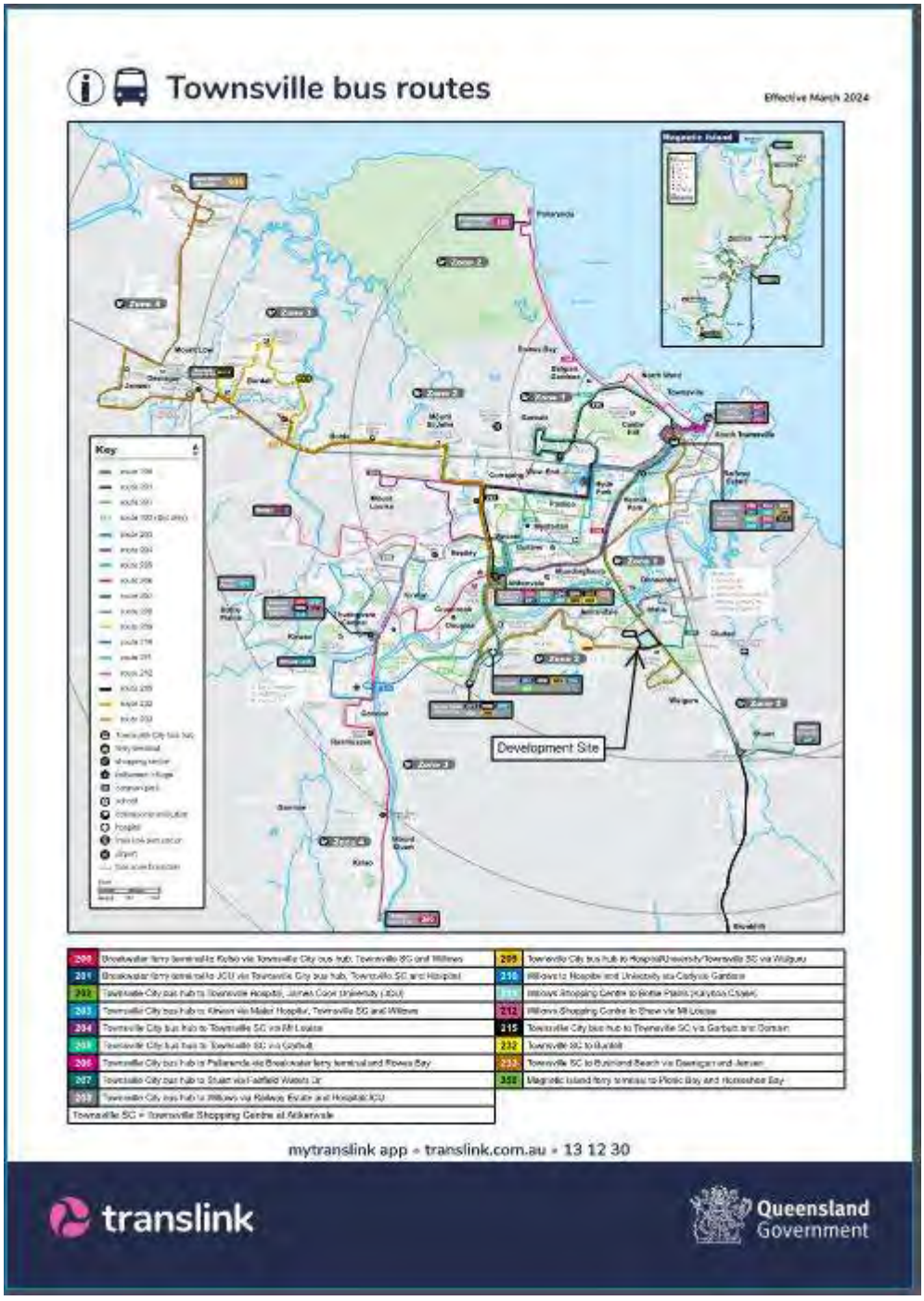

Figure 2-5 Translink Bus Route Information

3.0 PROPOSED DEVELOPMENT DETAILS

3.1 Development site plan

The development proposed is a residential retirement village (assisted living / independent villas). The total development area encompasses approximately 20.1ha. Of this area 6.6ha is proposed to be development into the residential retirement village as described previously components of the village are detailed in

Table 3-1 Retirement Village

DEVELOPMENT SUMMARY								
	No. of Beds	Type	No. of Baths	Location	Price Point	Yard Location	Area (GFA)	Quantity
APARTMENT								
	1 Bed	1A	1.5 Bath	Apartment	Standard	-	75	2
	2 Bed	2A	2 Bath	Apartment	Standard	-	91	6
	2 Bed	2B	2 Bath	Apartment	Standard	-	86-89	12
	2 Bed	2C	2 Bath	Apartment	Standard	-	88	25
	2 Bed	2D	2 Bath	Apartment	Standard	-	88	1
	3 Bed	3A	2.5 Bath	Apartment	Deluxe	-	127	5
	3 Bed	3B	2 Bath	Apartment	Standard	-	106-109	4
	3 Bed	3C	2.5 Bath	Apartment	Standard	-	128	2
	3 Bed	3D	2.5 Bath	Apartment	Standard	-	114	8
								65
VILLA								
	2 Bed	2A	1 Bath	Villa	Standard	Front	105	30
	2 Bed	2B	1 Bath	Villa	Standard	Back	107	16
	2 Bed	2C	1.5 Bath	Villa	Deluxe	Back	124	19
	3 Bed	3A	2 Bath	Villa	Standard	Front	139	18
	3 Bed	3B	2 Bath	Villa	Standard	Back	146	3
	3 Bed	3C	2 Bath	Villa	Deluxe	Back	168	8
								94
								159

Figure 1-1 shows the location of the site in context to the surrounding properties extracted from Queensland Globe and depicts the actual area that is expected to be developed. An expected site layout is depicted in **Figure 3-1**.

Figure 3-1 Expected site layout

3.2 Operational details

The development is expected to operate as a standard residential retirement village with traffic peaks expected during business hours whilst remaining active throughout the evening and night.

3.3 Proposed access and parking

Parking facilities will be provided onsite. A range of parking options will be made available from dedicated centre parking, to on-street within the community and on-site parking incorporated within each dwelling.

Please refer dwelling types for numbers of off-street parking opportunities proposed contained within the appendices.

4.0 DEVELOPMENT TRAFFIC

4.1 Traffic generation

In accordance with the Department of Transport and Main Roads Guide to Traffic Impact Assessment (GTIA) December 2018, traffic demand was sourced from the following data bases:

- QLD Government - Open Data Portal – Traffic Generation Data 2006-2019
- RTA – Guide to Traffic Generating Developments – Ver 2.2 Oct 2002

4.1.1 Traffic generation calculations

Trip calculations are shown in **Table 4-1**.

Table 4-1 Trip calculations

Northern Consulting Engineers Project Number	PARK0014		
Project Description	Annandale Retirement Village		
Traffic Survey or Construction Commencement Year	2036		
Commencement of Use Year	2026		
Projected 10 year design horizon	2036		
Figure 2.27 (Left Approach)	Gartrell Drv (w)		
Figure 2.27 (Right Approach)	Gartrell Drv (e)		
Figure 2.27 (Bottom Approach)	Shanahan Drv		
Background Growth Factor	2%		
Peak Hour Factor (12% Urban / 16% Rural)	12%		
QLD Open Portal (Retirement Village) **Assisted living / independent Villas**	**Vehicle Trips / Bedroom**	**Predicted Traffic Volumes**	
Average Weekday traffic volume per bedroom	1.64	**594**	
Average Weekend traffic volume per bedroom	1.18	**427**	
Weekday Peak hour traffic volume per bedroom	0.21	**76**	
Weekend Peak hour traffic volume per bedroom	0.16	**58**	
Site Information			
Assisted living / independent Villas	**Quantity Units**	**Bedrooms**	**Total Bed**
Villa Standard (2 Bedrooms)	46	2	92
Villa Standard (3 Bedrooms)	19	3	57
Villa Deluxe (2 Bedrooms)	21	2	42
Villa Deluxe (3 Bedrooms)	8	3	24
Apartment (1 Bedroom)	2	1	2
Apartment (2 Bedrooms)	44	2	88
Apartment (3 Bedrooms)	19	3	57
Total Units / Bedrooms	159		**362**
Shanahan Drive (Development Traffic)	**Approach Traffic (Peak Hour)**		
Assisted living / independent Villas	76		
Total	**76**		
Shanahan Drive (Existing Traffic - TCC SC6.4.5.2 - 4 (b) ii)	**Number of Existing Lots**	**Rate / Lot**	**No. Trips**
Traditional Residential (Daily Traffic)	96	10	960
Traditional Residential (Peak hr Traffic @ 12%)	96	12%	**116**
Shanahan Drive (Existing Traffic - TMC 10th - 15th August 2024)			**No. Trips**
Weekday_AM Peak 7:30am to 8:30am			**45**
Weekday_PM Peak 4:15pm to 5:15pm			**27**
Weekend_AM Peak 8:30am to 9:30am			**36**
Weekend_PM Peak 4:30pm to 5:30pm			**37**

Whilst the assessment has been based upon the current specified unit numbers, a sensitivity assessment for the range of units between 150 and 160 was also completed confirming the projected LOS is maintained for a broader range of unit numbers to introduce a degree of flexibility.

4.1.2 Traffic composition

The composition of generated traffic is expected to be largely passenger vehicles Light Vehicles (LV) with a lower percentage of Medium Rigid Vehicles (MRV) utilised as service and maintenance vehicles. An adopted 5% of Heavy Vehicles (HV) has been included within the assessment.

4.1.3 Heavy vehicle payloads

Heavy vehicle payloads have been assumed to be the legal payload limits for each vehicle type, i.e. 22.5 tonnes for (3) axle MRV. Information on vehicle payloads has been obtained from the NHVR or the GTIA Practice Note: Pavement Impact Assessment (December 2018).

4.2 Trip distribution

Sperate In/Out ratio splits have been assigned for AM and PM peaks, with a similar distribution for both onto the local road network.

AM peak includes 30% inbound traffic with 70% outbound, the percentages are reversed for the PM peak scenario. The assessment assumes 20% of traffic will turn left onto Gartrell Drive from Shanahan Drive with the remaining 80% turning right in both the AM and PM scenarios.

4.3 Development traffic volumes on the network

4.3.1 Development Generated Traffic Assignment

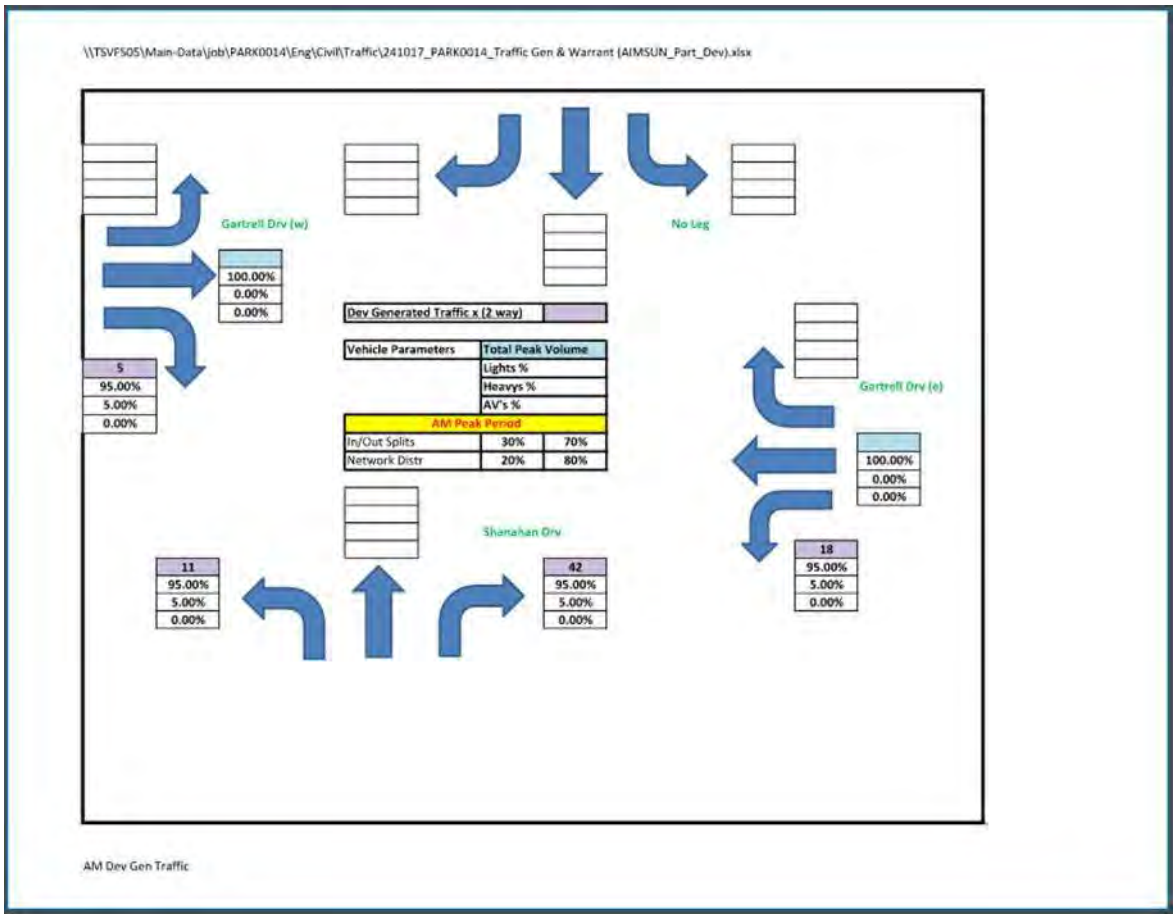

Figure 4-1 Development Generated Traffic (AM Peak)

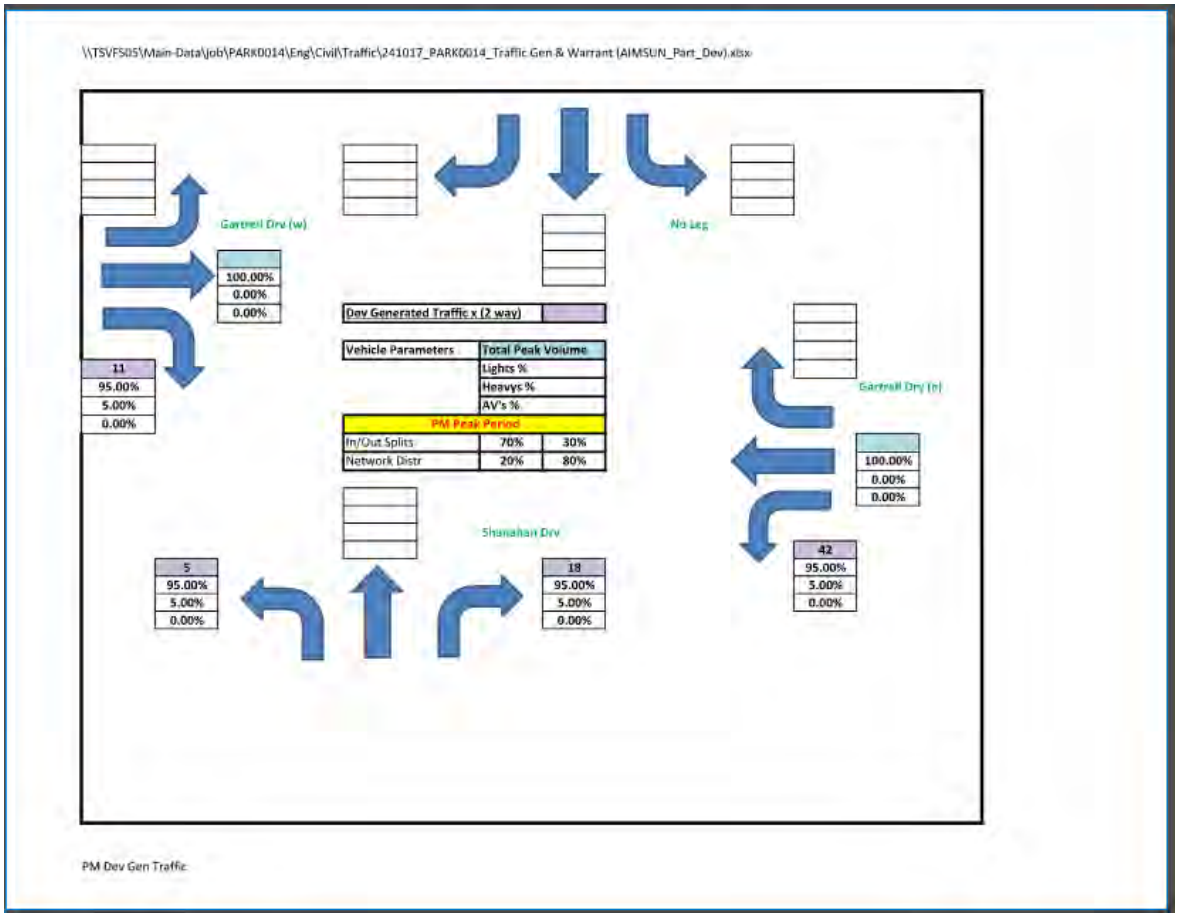

Figure 4-1 Development Generated Traffic (PM Peak)

5.0 STATE AUTHORITY: TRAFFIC IMPACT ASSESSMENT AND MITIGATION

As mentioned previously, Current upgrades to the Gartrell Drive / Stuart Drive intersection have been based upon traffic volumes modelled within the Townsville City Council AIMSUN Model (TAIM).

NCE have reviewed the TAIM and concur that the projected traffic volumes within Gartrell Drive for 2026 and 2036 appear to be consistent with the projected traffic volumes anticipated from the development and therefore no further assessment of the State Controlled Road Network have been completed.

It is considered the current upgrades will enable the development of the site without adverse impacts upon Stuart Drive (Townsville Connection Road). Adjustment to the cycle times and phases of the newly constructed signals at Gartrell Drive and Stuart Drive can be completed to manage priorities within the SCRN if required.

6.0 LOCAL AUTHORITY: TRAFFIC IMPACT ASSESSMENT AND MITIGATION

6.1 Intersection impact assessment and mitigation

6.1.1 SIDRA analysis (Gartrell Drive / Shanahan Drive)

An analysis of the existing intersection with the proposed development generation traffic for the year 2036 was undertaken using SIDRA Intersection 9 (Version 9.1.6.228). The intersection was analysed in the AM and PM peaks. Refer to **Figure 6-1** to **Figure 6-5** for SIDRA output data sheets.

SITE LAYOUT

Site: 201 [2036 AM - Part Development - Existing Priority Control (Site Folder: General)]

Development With Channelised Priority Control
Site Category: Proposed Design 1
Give-Way (Two-Way)

Layout pictures are schematic (not to scale) drawings reflecting input data. They are not design drawings.

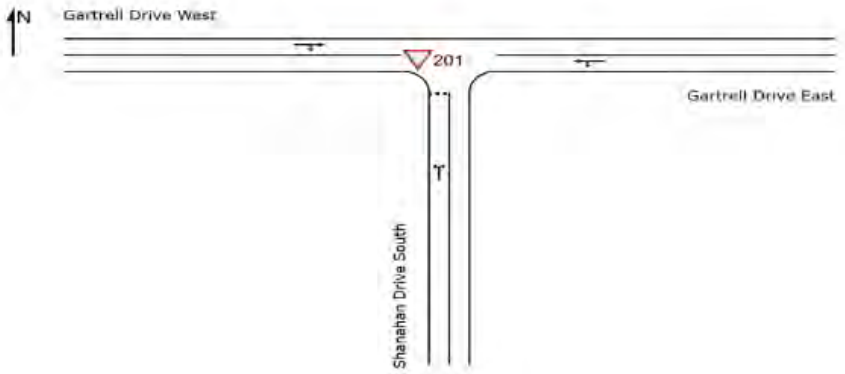

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Figure 6-1 SIDRA Data – Site Layout

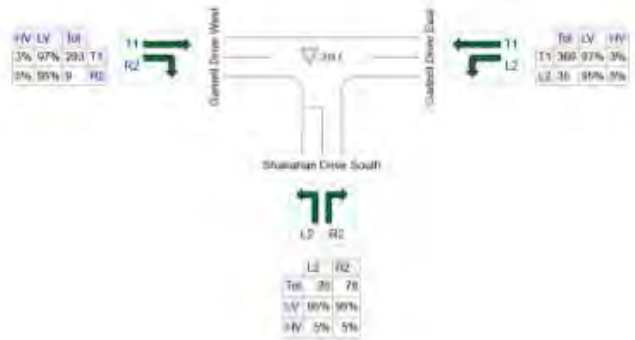
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: 201 [2036 AM - Part Development - Existing Priority Control (Site Folder: General)]

Development With Channelised Priority Control
Site Category: Proposed Design 1
Give-Way (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Shanahan Drive South	98	93	5
E: Gartrell Drive East	404	390	14
W: Gartrell Drive West	272	262	10
Total	804	776	28

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Figure 6-2 SIDRA Data – Input Volumes AM

MOVEMENT SUMMARY

▽ Site: 201 [2036 AM - Part Development - Existing Priority Control (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Development With Channelised Priority Control
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shanahan Drive South															
1	L2	All MCs	21	5.0	21	5.0	0.162	7.2	LOS A	0.5	3.9	0.54	0.80	0.54	49.9
3	R2	All MCs	82	5.0	82	5.0	0.162	10.0	LOS A	0.5	3.9	0.54	0.80	0.54	49.6
Approach			103	5.0	103	5.0	0.162	9.4	LOS A	0.5	3.9	0.54	0.80	0.54	49.7
East: Gartrell Drive East															
4	L2	All MCs	37	5.0	37	5.0	0.224	5.7	LOS A	0.0	0.0	0.00	0.05	0.00	56.7
5	T1	All MCs	388	3.3	388	3.3	0.224	0.1	LOS A	0.0	0.0	0.00	0.05	0.00	59.4
Approach			425	3.4	425	3.4	0.224	0.5	NA	0.0	0.0	0.00	0.05	0.00	59.2
West: Gartrell Drive West															
11	T1	All MCs	308	3.1	308	3.1	0.170	0.1	LOS A	0.1	0.7	0.04	0.05	0.04	59.7
12	R2	All MCs	9	5.0	9	5.0	0.170	7.4	LOS A	0.1	0.7	0.04	0.05	0.04	30.1
Approach			318	3.2	318	3.2	0.170	0.3	NA	0.1	0.7	0.04	0.05	0.04	58.0
All Vehicles			846	3.5	846	3.5	0.224	1.5	NA	0.5	3.9	0.08	0.14	0.08	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Figure 6-3 SIDRA Data – Movement Summary AM

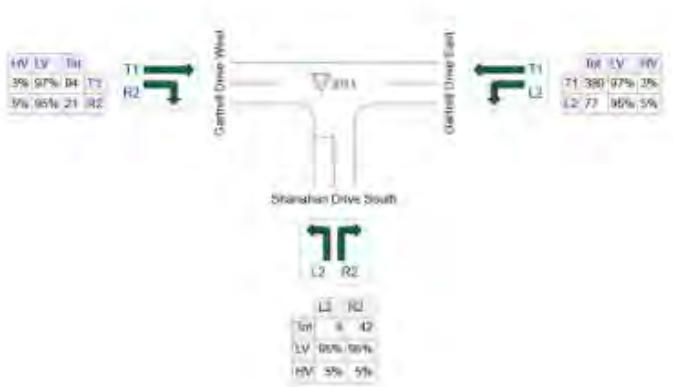
INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

▽ Site: 201 [2036 PM - Part Development - Existing Priority Control (Site Folder: General)]

Development With Channelised Priority Control
Site Category: Proposed Design 1
Give-Way (Two-Way)

Volume Display Method: Total and %



	All MCs	Light Vehicles (LV)	Heavy Vehicles (HV)
S: Shanahan Drive South	56	48	3
E: Gartrell Drive East	457	441	16
W: Gartrell Drive West	115	111	4
Total	622	599	23

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Figure 6-4 SIDRA Data – Input Volumes PM

MOVEMENT SUMMARY

Site: 201 [2036 PM - Part Development - Existing Priority Control (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.6.228

Development With Channelised Priority Control
Site Category: Proposed Design 1
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Shanahan Drive South															
1	L2	All MCs	8	5.0	8	5.0	0.071	7.2	LOS A	0.2	1.7	0.47	0.73	0.47	50.7
3	R2	All MCs	44	5.0	44	5.0	0.071	8.4	LOS A	0.2	1.7	0.47	0.73	0.47	50.5
Approach			53	5.0	53	5.0	0.071	8.2	LOS A	0.2	1.7	0.47	0.73	0.47	50.5
East: Gartrell Drive East															
4	L2	All MCs	81	5.0	81	5.0	0.255	5.7	LOS A	0.0	0.0	0.00	0.10	0.00	56.3
5	T1	All MCs	400	3.3	400	3.3	0.255	0.1	LOS A	0.0	0.0	0.00	0.10	0.00	59.0
Approach			481	3.6	481	3.6	0.255	1.0	NA	0.0	0.0	0.00	0.10	0.00	58.5
West: Gartrell Drive West															
11	T1	All MCs	99	3.1	99	3.1	0.074	0.7	LOS A	0.2	1.5	0.23	0.26	0.23	58.1
12	R2	All MCs	22	5.0	22	5.0	0.074	7.6	LOS A	0.2	1.5	0.23	0.26	0.23	29.6
Approach			121	3.4	121	3.4	0.074	1.9	NA	0.2	1.5	0.23	0.26	0.23	49.4
All Vehicles			655	3.7	655	3.7	0.255	1.8	NA	0.2	1.7	0.08	0.18	0.08	55.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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Figure 6-5 SIDRA Data – Movement Summary PM

As can be seen from the Movement Summary sheets for both the AM and PM peaks containing the proposed development generated traffic and the 2036 AIMSUN predicted traffic volumes the current configuration of the Gartrell Drive / Shanahan Drive intersection can service the development to acceptable Levels of Service (LOS A) for all legs.

6.1.2 Intersection warrant assessment

The Gartrell Drive / Shanahan Drive intersection has been assessed using the intersection warrant method outlined by the TMR Supplement to Austroads Guide to Road Design Part 4A for Unsignalised and Signalised intersections.

The intersection has been assessed for the peak background volumes with development generated traffic predicted for 2036. **Figure 6-6** and **Figure 6-7** indicate an AUL(s) may be considered appropriate in this instance, however SIDRA analysis has concluded that the intersection operates at a (LOS A) which is considered to almost free flowing. NCE therefore do not consider upgrading of the intersection to include an AUL(s) is required to allow the development to proceed whilst maintain a suitable level of service to the community.

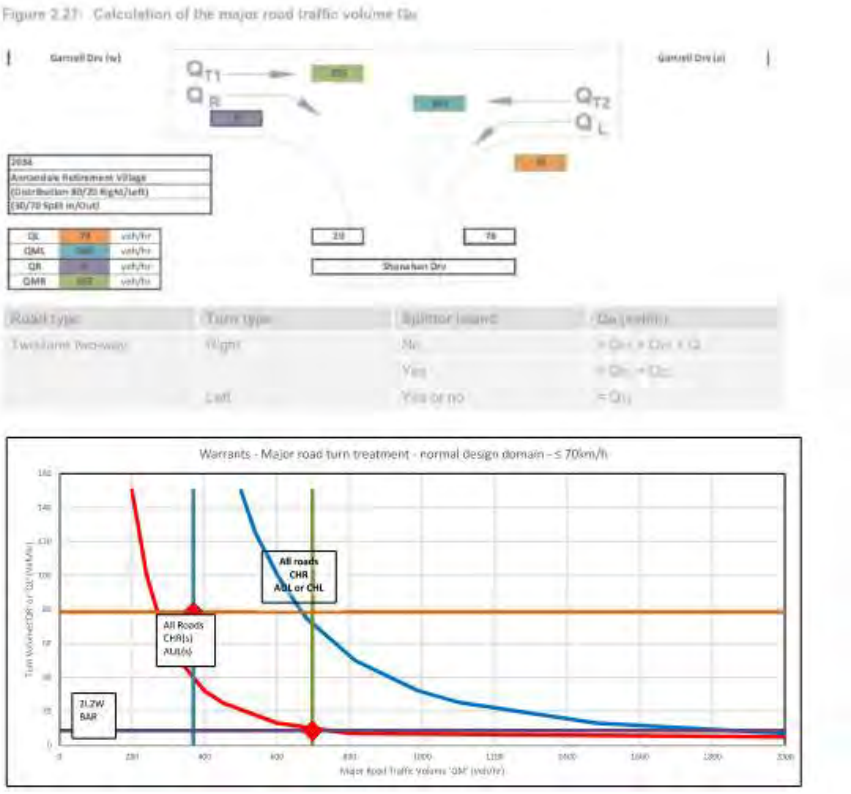

Figure 6-6 Intersection Warrant – 2036 AM Peak

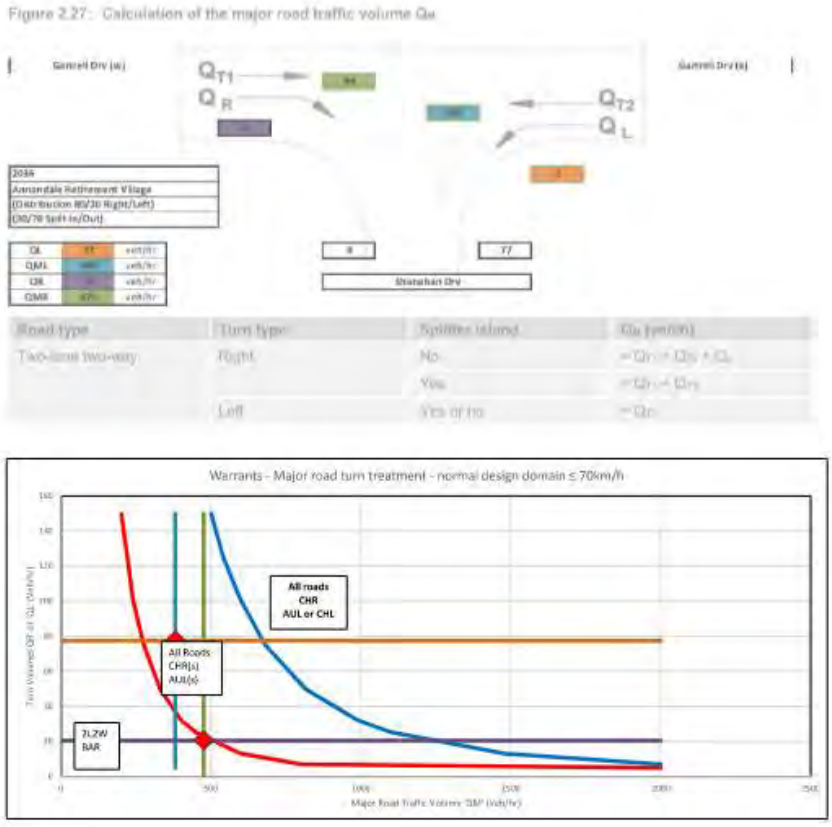

Figure 6-7 Intersection Warrant – 2036 PM Peak

6.2 Road safety impact assessment and mitigation

This section describes the works that will be undertaken to mitigate the road safety issues discussed in **Section 2.5**.

6.2.1 Road safety audit

Road safety within Gartrell Drive and or Shanahan Drive is not expected to dimmish by inclusion of the development. Commentary in relation to the matter identified in the Road safety Audit is explained further below:

Gartrell Drive:

- 6.5.3 – Guideposts and Reflectors
    - Gartrell Drive is constructed as a rural road formation, without guideposts, however the roadway does include route lighting. The author considers the inclusion of route lighting assists road users in defining the roadway carriageway sufficiently to remove the need for guide posts.

Given the route lighting provides road users with a clear definition of the carriageway, there is no need to include road edge guide posts.

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Summary of impacts and mitigation measures proposed

NCE have undertaken a traffic study for the proposed Residential Retirement Village Development at 33 University Road, Annandale, on a land parcel described as Lot 1 on SP343205. The findings of this assessment are summarised below:

- Intersection impact assessment and mitigation
    - SIDRA analysis found the existing intersection of Gartrell Drive and Shanahan Drive is expected to operate at acceptable levels of service inclusive of the proposed development generated traffic through to the design year 2036, based upon the TAIM background traffic volume predictions.
    - Whilst the TMR intersection warrant assessment indicated the inclusion of a AUL(s) may be required, further assessment through the analysis of the intersection with SIDRA modelling has indicated the intersection will perform adequately as it currently stands.
    - NCE confirm that the upgrades to the Gartrell Drive / Stuart Drive intersection currently being performed by TMR will be suitable for proposed development of the overall site at 33 University Road, Annandale, on a land parcel described as Lot 1 on SP343205. NCE concur with TCC and TMR that the traffic predictions within TAIM are suitable for the upgrade purposes and represent projected development traffic over the next 10 years adequately.

- Road Safety Audit and Local authority traffic impact assessment and mitigation
    - Gartrell Drive is constructed as a rural road formation, without guideposts, however the roadway does include route lighting. The author considers the inclusion of route lighting assists road users in defining the roadway carriageway sufficiently to remove the need for guide posts. No further action or mitigation is recommended.

7.2 Certification statement and authorisation

A signed Traffic Impact Assessment Certification can be found in appendices.

APPENDIX A

DA Plans – by COTTEEPARKER