



TRAFFIC IMPACT ASSESSMENT

RESIDENTIAL SUBDIVISION

**PART LOT 4 DP 1145348
487 RAYMOND TERRACE ROAD, CHISHOLM**

PREPARED FOR: AVID PROPERTY GROUP

NOVEMBER 2021

21/211

**TRAFFIC IMPACT ASSESSMENT
AVID PROPRERT GROUP****WATERFORD COUNTY RESIDENTIALSUBDIVISION
PART LOT 4 DP 1145348
487 RAYMOND TERRACE ROAD, CHISHOLM**

Intersect Traffic Pty Ltd (ABN: 43 112 606 952)

Address:16 Mount Harris Drive
Maitland Vale NSW 2320
PO Box 268
East Maitland NSW 2323**Contact:**(Mob) 0423 324 188
Email: jeff@intersecttraffic.com.au**QUALITY ASSURANCE**

This document has been prepared, checked and released in accordance with the Quality Control Standards established by Intersect Traffic Pty Ltd.

Issue	Date	Description	By
A	23/11/21	Draft	JG
B	25/11/21	Edit / Client Amendments	JG
C		Final Proof	JG
D		Approved	JG

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Date 25th November 2021**Disclaimer**

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1.0 INTRODUCTION

Intersect Traffic Pty Ltd (Intersect Traffic) was engaged by ADW Johnson on behalf of Avid Property Group to undertake a traffic impact assessment for a proposed 193 lot residential subdivision of part Lot 4 DP 1145348 487 Raymond Terrace Road, Chisholm. The subdivision yields 192 new residential lots and a residue lot and represents the latest stage of the Waterford County residential estate.

The subject site is located to the north of Raymond Terrace Road, east of Settler's Boulevard and south of McFarlanes Lane and is currently vacant land with a small clay pit within the site. The proposed subdivision plan is shown in **Attachment A**. The land area covered in the subdivision is within the Thornton North Urban Release Area.

The main access to the site will be via the existing subdivision road network within the Waterford County residential estate and will include Cora Way, Silverwisp Road and Settler's Boulevard to Raymond Terrace Road. All new subdivision roads will be constructed to Maitland City Council requirements.

This report is required to support a development application to Maitland City Council as the consent authority. The report presents the findings of the traffic assessment and includes the following.

1. An outline of the existing situation near the site.
2. An assessment of the traffic impacts of the proposed development including the predicted traffic generation and its impact on existing road and intersection capacities.
3. Reviews parking, public transport, pedestrian, and cycle way requirements for the proposed development, including assessment against Council and Australian Standards.
4. Presentation of conclusions and recommendation.

2.0 SITE DESCRIPTION & LOCATION

The site currently contains the vacant land described as Lot 4 DP 1145348 487 Raymond Terrace Road, Chisholm. The site is zoned R1 General Residential & E3 Environmental Management pursuant to the Maitland LEP (2011). The area of the subject site is approximately 23 ha.

The site is located on the northern side of Raymond Terrace Road, Chisholm east of Settlers Boulevard and Silverwisp Road and generally south of Tigerhawk Drive. The site is 4.7 km east of the East Maitland Shopping Centre, 4.2 km north east of Greenhills Shopping Centre and 1.7 km north of the Thornton Shopping Centre. **Figure 1** below shows the site location from a local context. **Photograph 1** below shows the existing site conditions.

The proposed subdivision plans showing the proposed internal road network including the connection to the existing external road network are shown in **Attachment 1**.



Photograph 1 – Existing site conditions.

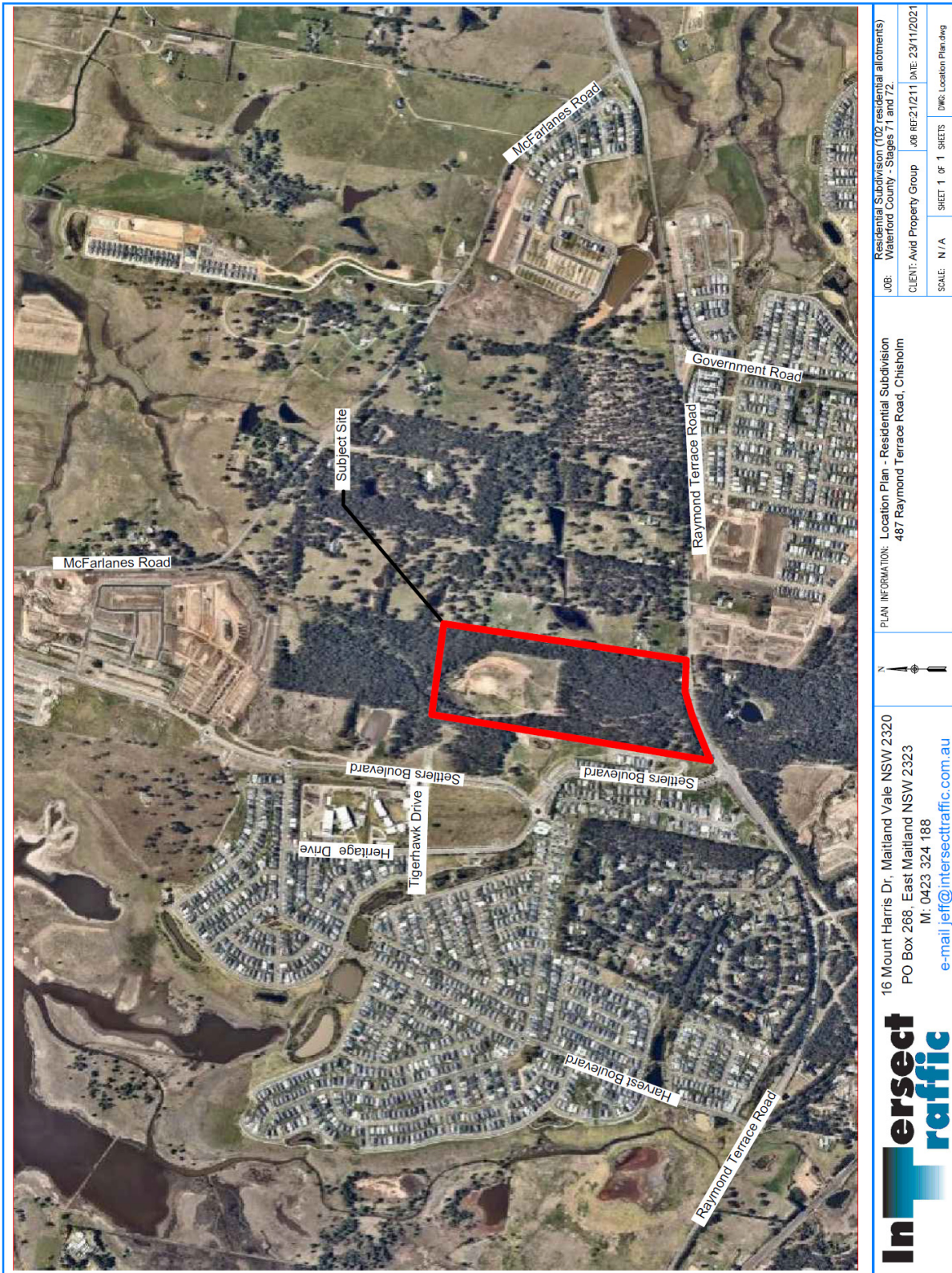


Figure 1 – Site Location

<p>Residential Subdivision (102 residential allotments) JOB: Waterford County - Stages 71 and 72 CLIENT: AVID Property Group JOB REF: 21/211 DATE: 23/11/2021 SCALE: N/A SHEET 1 of 1 SHEETS DWG: Location Plan.dwg</p>	
<p>PLAN INFORMATION: Location Plan - Residential Subdivision 487 Raymond Terrace Road, Chisholm</p>	
<p>16 Mount Harris Dr, Maitland Vale NSW 2320 PO Box 268, East Maitland NSW 2323 M: 0423 324 188 e-mail jeff@intersecttraffic.com.au</p>	

3.0 EXISTING ROAD NETWORK

In terms of the local road network, the roads most likely to be impacted by the additional traffic generated by the proposed development will be Cora Way, Tigerhawk Drive, Settlers Boulevard and Raymond Terrace Road.

Raymond Terrace Road near the site is a classified main road (MR104) under the care and control of the NSW Roads and Maritime Services (RMS) providing a single travel lane in both directions constructed to a typical rural standard. Lane widths are between 3.2 and 3.5 metres. The road would perform the function of a sub-arterial road connecting Maitland to Raymond Terrace. On inspection the road was observed to be in good condition with an 80 km/h speed zoning along the site frontage. **Photograph 2** shows Raymond Terrace Road near the site.



Photograph 2 – Raymond Terrace Road at Settler’s Boulevard intersection

Settler’s Boulevard and Tigerhawk Drive are local roads under the care and control of Maitland City Council which under a functional road hierarchy perform the function of a collector road as they collect and distribute traffic from the Waterford County residential estate to the sub-arterial road network at Raymond Terrace Road. On inspection these roads were found to be two-lane two-way urban roads with kerb and gutter and longitudinal drainage and parking lanes on both sides of the road. Travel lane widths are in the order of 3.5 metres while parking lanes are generally 2 to 3.4 metres wide. A 50 km/h speed zoning exists within the residential estates except where the variable school zones exist near the catholic primary and high schools. The roads being relatively new construction are all in good condition. Settler’s Boulevard and Tigerhawk Drive have off-road cycleways within shared pathways on both sides of the road. Settlers Boulevard in this location also has additional turning lanes provided at intersections. **Photograph 3** below shows Settler’s Boulevard near the site, **Photograph 4** below shows the Tigerhawk Drive connection to the site, **Photograph 5** below shows Settlers Boulevard near at the Cora Way intersection and **Photograph 6** shows a typical local street connection to the site.



Photograph 3 – Settler's Boulevard near the site.



Photograph 4 – Tigerhawk Drive connection to the site.



Photograph 5 – Settler's Boulevard at Cora Way intersection



Photograph 6 – Greenling Drive connection to Settler's Boulevard.

Cora Way and Silverwisp Road are local roads under the care and control of Maitland City Council providing vehicular access to properties along their length. They have been constructed to service an existing home display village adjacent to the site. On inspection these roads were found to be two-lane two-way urban roads with kerb and gutter and longitudinal drainage. Their carriageway widths were measured as 8 metres between kerbs allowing limited parking along their length. A 50 km/h speed zoning would apply to these streets that will be either extended into the proposed development or connected to as part of the proposed development. Both roads have a 1.2 metre wide pedestrian footpath along one side only of the road and the roads were observed to be in excellent condition as shown in **Photographs 7 & 8** below.



Photograph 7 – Cora Way near site.



Photograph 8 – Silverwisp Road near site.

4.0 ROAD NETWORK IMPROVEMENTS

As part of the original planning for the Thornton North Urban Release Area a traffic study was undertaken by Parsons Brinckerhoff (2003) to inform the Thornton North Masterplan. This study assessed the regional transport and traffic impacts of the urban release area and identified the required road and intersection upgrades required to mitigate the traffic impacts. These road and intersection upgrades were then included within the Thornton North Developer Contributions Plan so that all developers could pay their fair and reasonable contribution to the works.

Administration of the developer contributions plan is the responsibility of Maitland City Council who must also organise and plan the construction works once development has reached the stage that triggers the required works. It is concluded that for this development payment of the required developer contributions ensures that the external road network is upgraded to a suitable standard to cater satisfactorily for additional traffic generated by the subdivision. The latest schedule of works for the developer contribution plan sourced from Maitland City Council’s website is reproduced below. It is also noted the developer contributions plan includes for additional cycleways in the area as shown below.

THORNTON NORTH CYCLEWAYS

Location			Est. Capital Cost	Est. Land Cost	Total Cost	Estimated Timing
Thornton R2	TN36	Somerset Dve to Raymond Terrace Road	\$180,300	\$0	\$180,300	1500 lots
Thornton R2 - Supp	TN36S	Thornton Station to Raymond Terrace Road	\$412,300	\$0	\$412,300	3000 lots
Scenic S5	TN37	Melford Station to Raymond Terrace Road	\$250,000	\$20,000	\$270,000	4500 lots
TOTAL			\$842,600	\$20,000	\$862,600	

THORNTON NORTH ROADS AND TRAFFIC FACILITIES

Services / Facilities	Location	Description	Est. Capital Cost	Est. Land Cost	Total Cost	Estimated Timing	
Road Upgrades	TN38	Raymond Terrace Road	Intersection 4 to Haussman Drive	\$5,992,357	\$767,604	\$6,759,961	Stage 1
	TN39		Haussman to The Boulevarde	\$10,896,727	\$303,002	\$11,199,729	Stage 1
	TN40		The Boulevarde to Government Road	\$6,969,829	\$1,212,007	\$8,181,836	Stage 2
	TN41		Government Road to McFarlanes Road	\$6,984,612	\$686,804	\$7,671,416	Stage 2
	TN42	Haussman Drive	Raymond Terrace Road to Railway Avenue	\$14,503,670	\$3,313,871	\$17,817,541	Stage 1
	TN44	Thornton Road	Railway Avenue and Glenwood Drive	\$7,151,104	\$59,828	\$7,210,932	Stage 1
	TN45	McFarlanes Road	Government Road to TN52	\$6,349,640	\$579,568	\$6,929,208	Stage 2
	TN46	Government Road	Raymond Terrace Road to Sommerset Drive	\$1,674,814	\$246,651	\$1,921,465	Stage 1
Intersections	TN47	Raymond Terrace Road / New Intersection West	\$1,216,758	\$0	\$1,216,758	Stage 1	
	TN48	Haussman Drive / Raymond Terrace Road	\$2,020,919	\$0	\$2,020,919	Stage 1	
	TN49	The Boulevarde / Raymond Terrace Road	\$1,246,019	\$0	\$1,246,019	Stage 1	
	TN50	Raymond Terrace Road / Government Road	\$2,140,733	\$0	\$2,140,733	Stage 2	
	TN51	Raymond Terrace Road / McFarlanes Road	\$1,432,678	\$0	\$1,432,678	Stage 2	
	TN52	McFarlanes Road / The Boulevarde	\$1,179,791	\$0	\$1,179,791	Stage 2	
	TN53	Haussman Drive / Taylor Avenue	\$1,981,514	\$4,944	\$1,986,458	Stage 1	
	TN54	Railway Avenue / Glenroy Street	\$3,794,138	\$2,197,475	\$5,991,613	Stage 1	
	TN55	Huntingdale Drive / Thornton Drive	\$1,137,841	\$0	\$1,137,841	Stage 1	
	TN56	Thornton Road / Glenwood Drive	\$3,678,586	\$498,199	\$4,176,785	Stage 1	
	TN57	Government Road / New Intersection	\$641,324	\$0	\$641,324	Stage 1	
	TN58	Government Road / New Intersection	\$641,324	\$0	\$641,324	Stage 1	
New Roads	TN58	The Boulevarde (additional 4.0m wide median)	\$1,354,847	\$754,000	\$2,108,847	Stages 1,2	
	TN59	Fringe Road (additional 6.0m reserve, 1.5m for shared way and 2.5m parking lane)	\$2,583,849	\$120,000	\$2,703,849	Stages 1,2	
TOTAL			\$85,573,074	\$10,743,953	\$96,317,027		

It is noted that the developer contributions plan for the Thornton North area provides for contributions to the following road upgrades relevant to the road network around the site;

1. Raymond Terrace Road – upgrading to four lanes.
2. Raymond Terrace Road / Haussman Drive intersection.

Note: - works at the Settlers Boulevard and Harvest Boulevard intersections with Raymond Terrace Road have already been completed as part of previous development works.

5.0 TRAFFIC VOLUMES

Existing traffic volumes on Raymond Terrace Road and Settlers Boulevard have been determined from manual traffic counts carried out by Northern Transport Planning and Engineering (NTPE) on behalf of Intersect Traffic at the Raymond Terrace Road / Settler’s Boulevard signalised intersection. This traffic count data (provided in **Attachment B**) has been extrapolated to 2021 and 2031 predicted traffic counts by adopting a 5% p.a. background traffic growth rate on Settler’s Boulevard and a 4% p.a. traffic growth rate on Raymond Terrace Road reflecting the rate of development in the Thornton North area. The predicted existing two-way mid-block existing traffic volumes calculated from this data are shown below in **Table 1** noting the peak hours were between 8 am and 9 am and between 4.45 pm and 5.45 pm.

Table 1 – Existing and 2031 AM & PM peak hour traffic volumes.

Road Section	2021AM	2021PM	2031AM	2031PM
Raymond Terrace Road (west of Settlers Boulevard)	1,441	1,407	2,133	2,083
Raymond Terrace Road (east of Settlers Boulevard)	1,197	1,170	1,772	1,732
Settlers Boulevard (north of Raymond Terrace Road)	852	611	1388	996

This data has been used in this assessment.

6.0 ROAD CAPACITY

The capacity of urban roads is generally determined by the capacity of intersections. However, Table 4.3 of the *RTA’s Guide to Traffic Generating Developments* provides some guidance on mid-block capacities for urban roads for a LoS C. This table is reproduced below.

**Table 4.3
Typical mid-block capacities for urban roads with interrupted flow**

Type of Road	One-Way Mid-block Lane Capacity (pcu/hr)	
Median or inner lane:	Divided Road	1,000
	Undivided Road	900
Outer or kerb lane:	With Adjacent Parking Lane	900
	Clearway Conditions	900
	Occasional Parked Cars	600
4 lane undivided:	Occasional Parked Cars	1,500
	Clearway Conditions	1,800
4 lane divided:	Clearway Conditions	1,900

Source: - *RTA’s Guide to Traffic Generating Developments (2002)*.

Based on these tables it is considered that:

- ◆ Raymond Terrace Road and Settler’s Boulevard would have a two-way mid-block capacity of up to 1,800 vtpm for a level of service (LoS) C;

However Raymond Terrace Road as a major sub-arterial road could still operate satisfactorily with a LoS D with lane capacities of 1,200 vtpm while Settler’s Boulevard as a 2 lane divided road would still be operating at a LoS C with lane capacities up to 1,000 vtpm.

The road capacities adopted in this assessment for the local road network impacted by this development are therefore as shown below in **Table 2**.

Table 2 - Adopted Road Capacities

Street	Two Way Road Capacity (vtp/h)
Raymond Terrace Road LoS D	2,400
Settlers Boulevard LoS C	2,000

The highest predicted peak two-way traffic counts in 2021 and 2031 for Raymond Terrace Road is 1,441 and 2,133 vtp/h, respectively and for Settlers Boulevard was 852 vtp/h and 1,388 respectively (refer to **Section 5**). These traffic volumes are below the relevant road network capacity thresholds shown in **Table 2**. Therefore, based on the available traffic data it can be concluded that there is spare mid-block two-way road capacity within the local and state road network to cater for additional development.

7.0 ALTERNATE TRANSPORT MODES

Hunter Valley Buses operates service route 189 Stockland’s Greenhills to Thornton (**Figure 2** below) within the vicinity of the development site. Route 189 runs along Raymond Terrace Road north along Settlers Boulevard to Heritage Drive then does a loop along Heritage Drive to Tigerhawk Drive and back to Settlers Boulevard and Raymond Terrace Road. The nearest bus stops to the site would be in Settler’s Boulevard near the Heritage Drive roundabout and in Tigerhawk Drive near the St Aloysius Primary College considered to be within convenient walking distance to the site. This service provides access for residents to the major retail, commercial and medical facilities in the area as well as providing connection to local train stations on the Hunter Line.

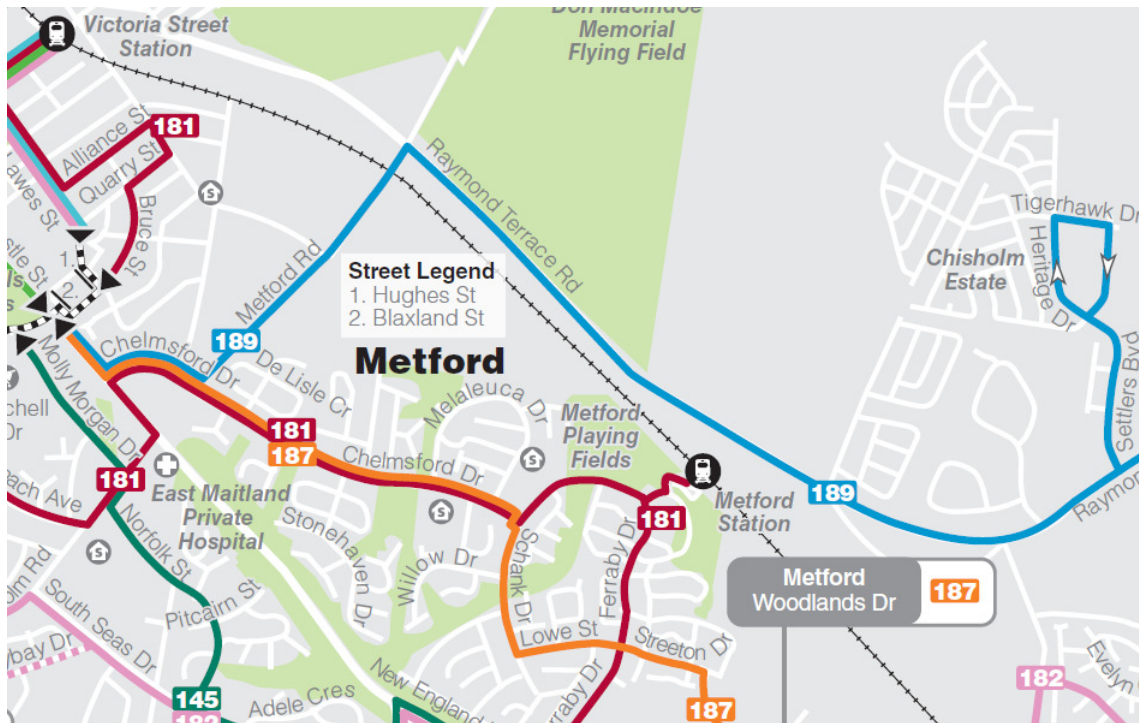


Figure 2 – Hunter Valley Buses Service Route 189

An existing off road shared pedestrian / bicycle path runs along the eastern and western sides of Settler’s Boulevard and Tigerhawk Drive. These path connect to existing bus stops, schools and a future commercial precinct in Waterford County. A pedestrian footpath also exists on the northern side of Cora Way to Silverwisp Road where it extends along the western side of Silverwisp Road servicing an existing home display village that is adjacent to the site. **Photograph 9** below shows the existing bus stop on Settler’s Boulevard near the Heritage Drive roundabout while **Photograph 10** shows the off-road shared pathway on the eastern side of Settler’s Boulevard near the site.

Overall it is considered that the Waterford County residential estate has an extensive network of constructed concrete footpaths and on and off-road cycleways that would encourage these alternative transport mode trip making within the residential estate.



Photograph 9 – Bus Stop Settler’s Boulevard near Heritage Drive.



Photograph 10 – Off-road shared pathway eastern side of Settler’s Boulevard.

8.0 DEVELOPMENT PROPOSAL

The proposed development is a 193-lot residential subdivision of Lot 4 DP 1145348 – 487 Raymond Terrace Road, Chisholm. The development provides 192 new residential lots ranging in size from 487 m² to 2195 m². The subdivision plan showing the proposed internal road network including connection to the existing external road network are shown in **Attachment A**.

All new internal subdivision roads, improvements to existing roadways, footways and cycleways will be constructed to Maitland City Council requirements (Manual of Engineering Standards). The internal roads include all priority controlled T-intersections and is consistent with the Chisholm structure plan representing best practice road network design.

9.0 TRAFFIC GENERATION

The RTA's *Guide to Traffic Generating Development's* and TfNSW's *Technical Direction (TDT 2013/4)* provide relevant traffic generation rates for various land-uses including low density residential. The most relevant rate for this development is provided within the Technical Direction and relates to low density residential development.

Rates.

Daily vehicle trips = 10.7 per dwelling in Sydney, 7.4 per dwelling in regional areas

Weekday average evening peak hour vehicle trips = 0.99 per dwelling in Sydney (maximum 1.39), 0.78 per dwelling in regional areas (maximum 0.90).

Weekday average morning peak hour vehicle trips = 0.95 per dwelling in Sydney (maximum 1.32), 0.71 per dwelling in regional areas (maximum 0.85).

*(The above rates do **not** include trips made internal to the subdivision, which may add up to an additional 25 %).*

Therefore, based on the above advice and adopting the maximum generation rates as previously required by Maitland City Council the likely traffic generation for the development can be calculated as follows.

Daily vehicle trips	= 192 x 7.4 = 1,421 vtpd;
PM peak hour	= 192 x 0.9 = 173 vtph.
AM peak hour	= 192 x 0.85 = 164 vtph.

These additional traffic volumes are adopted in this assessment

10.0 TRIP DISTRIBUTION

Before carrying out any traffic assessment the additional external peak hour traffic generated by the development needs to be distributed through the adjoining road network. This involves making many assumptions as to distribution patterns to and from the development. In distributing traffic onto the existing road network an assessment of likely origins and destinations as well as a review of the manual traffic count data collected at the Raymond Terrace Road / Settlers Boulevard has been made and the following trip distribution is considered appropriate;

- ◆ 100 % of traffic will utilise Settler's Boulevard to access Raymond Terrace Road.
- ◆ At Raymond Terrace Road / Settlers Boulevard intersection development traffic is distributed 30 % to the east and 70 % to the west.

- ◆ 80 % of trips are outbound and 20 % inbound in the AM peak and 30 % outbound and 70 % inbound in the PM peak given this is a residential subdivision.
- ◆ 55 % of development traffic will access Settler’s Boulevard via Tigerhawk Drive, 10 % via Greenling Drive and 35 % via Cora Way.

The resulting development traffic trip distribution is shown in **Figure 3** below

11.0 TRAFFIC IMPACTS OF DEVELOPMENT

11.1 Road Network Capacity

It has previously been shown in **Section 6** of this report that the local road network is currently operating within its technical mid-block capacity.

The proposed subdivision of the site is likely to generate the following additional traffic on the local road network as shown below in **Table 3** based on **Figure 3** above.

Table 3 – Additional development traffic – road network legs

Road	Section	AM peak (vtph)	PM peak (vtph)
Raymond Terrace Road	west of Settlers Boulevard	98	110
Raymond Terrace Road	east of Settlers Boulevard	42	47
Settlers Boulevard	north of Raymond Terrace Road	140	157

The addition of the traffic generated from the development onto the existing traffic volumes determined in **Section 5** will not result in the capacity thresholds determined in **Section 6** to be reached. With 4% and 5% per annum traffic growth on the road network added to the development traffic over a ten-year period these road capacity thresholds are still not reached. The 4% p.a. and 5% p.a. background traffic growth has been used to account for normal background traffic growth (1.5 % p.a.) plus future development of other areas of the Thornton North urban release area. This is demonstrated in **Table 4** below.

Table 4 - Road Capacity Assessment

Road Section	Capacity (vtph)	2021AM	2021PM	2031AM	2031PM	AM development	PM development
Raymond Terrace Road (west of Settlers Boulevard)	2,400	1,539	1,517	2,231	2,246	98	110
Raymond Terrace Road (east of Settlers Boulevard)	2,400	1,239	1,217	1,814	1,801	42	47
Settlers Boulevard (north of Raymond Terrace Road)	2,000	992	768	1,528	1,252	140	157

Therefore, it can be concluded that the local and state road network subject to suitable intersection controls being in place has sufficient spare capacity to cater for the proposed development.

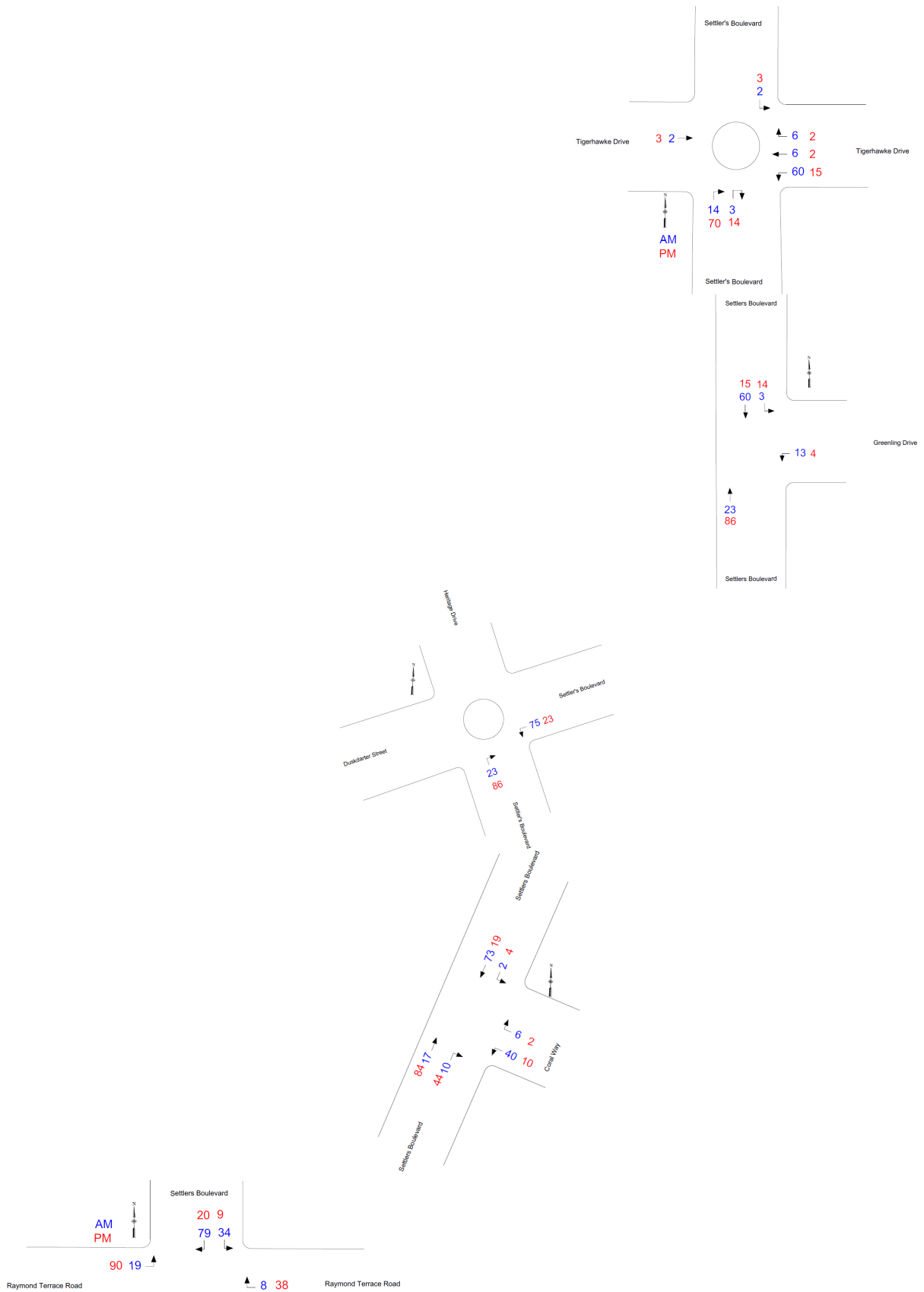


Figure 3 – Development Traffic Trip Distribution

11.2 Intersection Capacity

The major intersections impacted by this development are;

- ◆ Raymond Terrace Road / Settlers Boulevard signalised intersection; and
- ◆ Settler’s Boulevard / Tigerhawk Drive roundabout.

There will be some impact on the Raymond Terrace Road / Haussman Drive intersection because of this development however the impact is deemed to be minor. Further the intersection is identified within the Thornton North Developer Contributions Plan works schedule for upgrading therefore the payment of developer contributions by this development would represent its fair and reasonable contribution to any upgrading. Therefore, no further analysis of this intersection would be required particularly if the assessment of the Raymond Terrace Road / Settlers Boulevard intersection shows the development has no adverse impact on the operation of this intersection.

The Settler’s Boulevard / Tigerhawk Drive intersection has been designed and constructed to cater for the full development of the Waterford residential estate and is in accordance with the estates structure plan. As a high level of intersection control i.e. roundabout and traffic volumes through the intersection during peak hour road network periods less than 2,000 vph it would be expected to cater for the additional traffic from this development and no further intersection analysis is considered warranted.

Assessment of the capacity of the Raymond Terrace Road / Settler’s Boulevard signalised intersection has been undertaken using the Sidra Intersection 9 modelling software. This software package predicts likely delays, queue lengths and the levels of service that will occur at intersections. Assessment is then based on the level of service (LoS) requirements of TfNSW shown below:

Table 4.2
Level of service criteria for intersections

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

Source: - RTA’s Guide to Traffic Generating Developments (2002).

Assumptions made in this modelling were;

- ◆ Traffic distribution from the development as per **Figure 3**.
- ◆ Modelling carried out for 10-year horizon period expected to cater for full development of the proposed subdivision.
- ◆ Background traffic growth assumed to be 4 % per annum on Raymond Terrace Road being representative of normal background traffic growth plus likely additional traffic generated by other developments within the Thornton North urban release area.
- ◆ Background traffic growth assumed to be 5% per annum Settlers Boulevard based on current development rates.
- ◆ The Sidra models for the most recent subdivision approved for the Avid Group have been re-established ensuring all traffic from the approved developments in the Estate have been included. Therefore the modelling includes the cumulative impact of all currently known development in the area.

The results of the modelling for the intersections are summarised in **Table 5** below. The Sidra movement summary tables are provided in **Attachment C**.

Table 5 – Sidra Results (all vehicles) – Raymond Terrace Road / Settler’s Boulevard

Modelled Peak	Degree of Saturation (v/c)	Average Delay (s)	Level of Service	95% back of queue length (cars)
2021 AM + development	0.568	23.7	B	9.4
2021 PM + development	0.597	20.7	B	9.2
2031 AM + development	0.760	37.2	C	24.3
2031 PM + development	0.944	28.5	C	20.4

This modelling shows that the Raymond Terrace Road / Settlers Boulevard signalised intersection would operate satisfactorily during both the AM and PM peak periods and would continue to do so post development and with 10 years traffic growth to 2031. Average delays, LoS and 95% back of queue lengths all remain at acceptable levels based on the TfNSW assessment criteria listed above.

Some development traffic may also use the Raymond Terrace Road / Harvest Boulevard intersection and the Settler’s Boulevard / McFarlanes Road intersection to access the estate however traffic volumes would be insignificant and would not adversely impact on these intersections.

It is concluded that the subject subdivision will not have an adverse impact on the local and state road network through unacceptable intersection.

11.4 Vehicular Access

The lots being between 487 m² and 2,195 m² with road frontages exceeding 15 metres will have sufficient room to construct an urban residential access crossing from the local road network to each individual lot. These would need to be constructed to Maitland City Council requirements. The suitability of these accesses would be assessed at development application stage for each of the individual allotments.

11.5 Off-Street Car Parking

As a residential subdivision the development itself does not generate any on-site parking demand. However future development of each of the allotments will generate a parking demand and on-site car parking will need to be further assessed at the development application stage for the development of each individual allotment.

11.6 Internal Road layout

The proposed internal road layout has been assessed against the requirements of Maitland City Council’s Manual of Engineering Standards road types and dimensions table and general best practice for intersection control. The following has been determined;

- ◆ Four-way cross intersections have been eliminated with all intersections being T-intersections therefore the network is suitable safe and efficient.
- ◆ Traffic volumes at all internal intersections will be below the thresholds recommended by Austroads as representing the point when uninterrupted flow conditions exist. Therefore as post development these intersections will operate with uninterrupted flow conditions no further intersection analysis is required.

Major road type ¹	Major road flow (vph) ²	Minor road flow (vph) ³
Two-lane	400	250
	500	200
	650	100
Four-lane	1000	100
	1500	50
	2000	25

Source: - Austroads Guide to Traffic Management – Part 6 – Intersections, Interchanges & Crossings (2010)

- ◆ Road reserve widths provided are consistent with the requirements of the road types and dimension table within Maitland City Council’s Manual of Engineering Standards (MOES).

Overall it is considered the proposed internal road layout is satisfactory and compliant with Maitland City Council requirements.

12.0 PEDESTRIAN & CYCLE FACILITIES

As a residential subdivision the proposal is likely to generate additional pedestrian and bicycle traffic. Provision of pedestrian pathways / cycleways within the subdivision would provide benefit to pedestrians / cyclists and will need to be provided in accordance with Maitland City Council’s subdivision standards and in accordance with Council’s DCP requirements. These will be conditioned on any consent issued by Maitland City Council in accordance with Council’s MOES.

Further additional pedestrian pathways are provided within the subdivision to ensure that not only is there external connectivity with external paths but internal connectivity with all lots within the subdivision is also achieved even with footpaths on one side of the road only.

Overall it is concluded a suitable pedestrian and cycleway network will be provided within the subdivision allowing connection to the existing infrastructure provided within both residential estates.

13.0 PUBLIC TRANSPORT FACILITIES

The proposed development will generate some additional public transport usage particularly regarding school bus services. From a review of the plans all lots are within 500 metres from existing bus routes along Raymond Terrace Road, Settlers Boulevard, Heritage Road and Tigerhawk Drive, therefore the existing bus route is considered to be within convenient walking distance of the development and it is unlikely that in the future any bus routes will be required to run through the proposed subdivision. Therefore none of the new internal roads within the Estate aside from the extension of Tigerhawk Drive would be required to be constructed suitably as a future bus route.

The provision of shelters and seats for new and existing bus stops does not appear to be part of the Thornton North developer contributions plan so it would not be expected that such facilities would be required within this subdivision until a demand for the public transport route is established. However, if required based on any advice from Transport NSW and Hunter Valley Buses appropriate conditions of consent would be agreeable.

Overall it can be concluded the proposed subdivision provides suitable infrastructure to allow a suitable public transport service to support the site.

14.0 CONCLUSIONS

This traffic impact assessment for a proposed 193 lot residential subdivision of part Lot 4 DP 1145348 487 Raymond Terrace Road, Chisholm has concluded:

- ◆ Existing traffic volumes on the local and state road network are within the technical mid-block capacity standards for urban roads determined by Austroads and Transport for NSW (TfNSW).
- ◆ The local and state road network is currently operating with satisfactory levels of service and acceptable delay for motorists and has capacity to cater for additional traffic associated with new development in the area.
- ◆ The proposed subdivision is likely to generate an additional 164 vtpd during the AM peak traffic period and 173 vtpd during the PM peak traffic period or 1,421 vtpd.
- ◆ The local and state road network has sufficient spare capacity to cater for the development traffic generated by this development and other developments in the area without adversely impacting on the levels of service experienced by motorists on the road network through to at least 2031.
- ◆ SIDRA modelling of the Raymond Terrace Road / Settlers Boulevard signalised intersections has shown that with the additional traffic from the proposed subdivision and other future developments in the area included, these intersections will operate with satisfactory levels of service at least until 2031.
- ◆ The development would have an insignificant impact on the Raymond Terrace Road / Harvest Boulevard and Settler's Boulevard / McFarlanes Road intersections while all other existing intersections and future intersections within the estate are in accordance with the current structure plan for the area.
- ◆ The Raymond Terrace Road / Haussman Drive T-intersection is identified within the Thornton North Developer Contributions Plan for upgrading along with many other external roads and intersections within the Thornton North area. Payment of the developments development contributions would represent the development's fair and reasonable contribution to the required upgrading works at these intersections ensuring the external road network is upgraded as required to cater for additional traffic from this and other developments in the area.
- ◆ The proposed lots are of suitable size to ensure an urban residential access crossing from the local road network to each individual lot. These would need to be constructed to Maitland City Council requirements. The suitability of these accesses would be assessed at development application stage for each of the individual allotments.
- ◆ That future development of the new allotments would be able to accommodate the required on-site car parking and the development will not generate an unacceptable on-street car parking demand that would adversely impact on the local road network.
- ◆ The proposed internal road layout is satisfactory and compliant with Maitland City Council Manual of Engineering Standards.
- ◆ A suitable pedestrian and cycleway network will be provided within the subdivision allowing connection to the existing infrastructure provided within the residential estate.
- ◆ The proposed development will generate additional public transport usage particularly regarding school bus services. From a review of the plans all lots are within 500 metres of the existing bus routes along Raymond Terrace Road, Settlers Boulevard, Heritage Road and Tigerhawk Drive; therefore the existing bus route is considered to be within convenient walking distance of the development and it is unlikely that in the future any bus routes will be required to run through the proposed subdivision. Therefore none of the new internal roads within the Estate aside from the extension of Tigerhawk Drive would be required to be constructed suitably as a future bus route.

15.0 RECOMMENDATION

Having carried out this traffic impact assessment for the proposed 193 lot residential subdivision of part Lot 4 DP 1145348 487 Raymond Terrace Road, Chisholm it is recommended that the proposal can be supported from a traffic perspective as it will not adversely impact on the local and state road network and complies with all relevant Maitland City Council, Australian Standard and Transport for NSW requirements.



JR Garry BE (Civil), Masters of Traffic
Director
Intersect Traffic Pty Ltd



ATTACHMENT A

Subdivision Plan



LEGEND

- SITE CONTROL BOUNDARY
- - - PROPOSED DEVELOPMENT APPLICATION
- ADJACENT BOUNDARY
- FUTURE BOUNDARY

Working beyond expectations

EXISTING SITE NATURAL SURFACE PLAN

location: CHISHOLM
 council: MARLBOROUGH CITY COUNCIL
 drawing ref: 19043/171-21-DA-104
 client: AVID Property Group Johnson

AVID
 Property Group Johnson
 central coast office: ph: (02) 436 4300
 nsw office: ph: (02) 8562 7111
 www.avidjohnson.com.au

Scale (A4 orientation) 1:5000
 DATE: 18/08/2022
 CONTOUR INTERVAL: 1.0m

NOTES: NOTE PLANS ARE PREPARED IN COLOUR

• project management
 • civil engineering
 • infrastructure
 • superintendency
 • economic analysis
 • social impact
 • town planning
 • surveying
 • development feasibility
 • valuation
 • urban design

19043/171-21-DA-104



LEGEND

- SITE CADASTRAL BOUNDARY
- PROPOSED DEVELOPMENT
- ADJACENT BOUNDARY
- FUTURE BOUNDARY
- 31 STAGE NUMBER
- PROPOSED LOTS
- FUTURE LOTS SUBJECT TO SEPARATE DA

TABLE

100 LOTS	STAGE 1A
10 LOTS	STAGE 2
10 LOTS	TOTAL

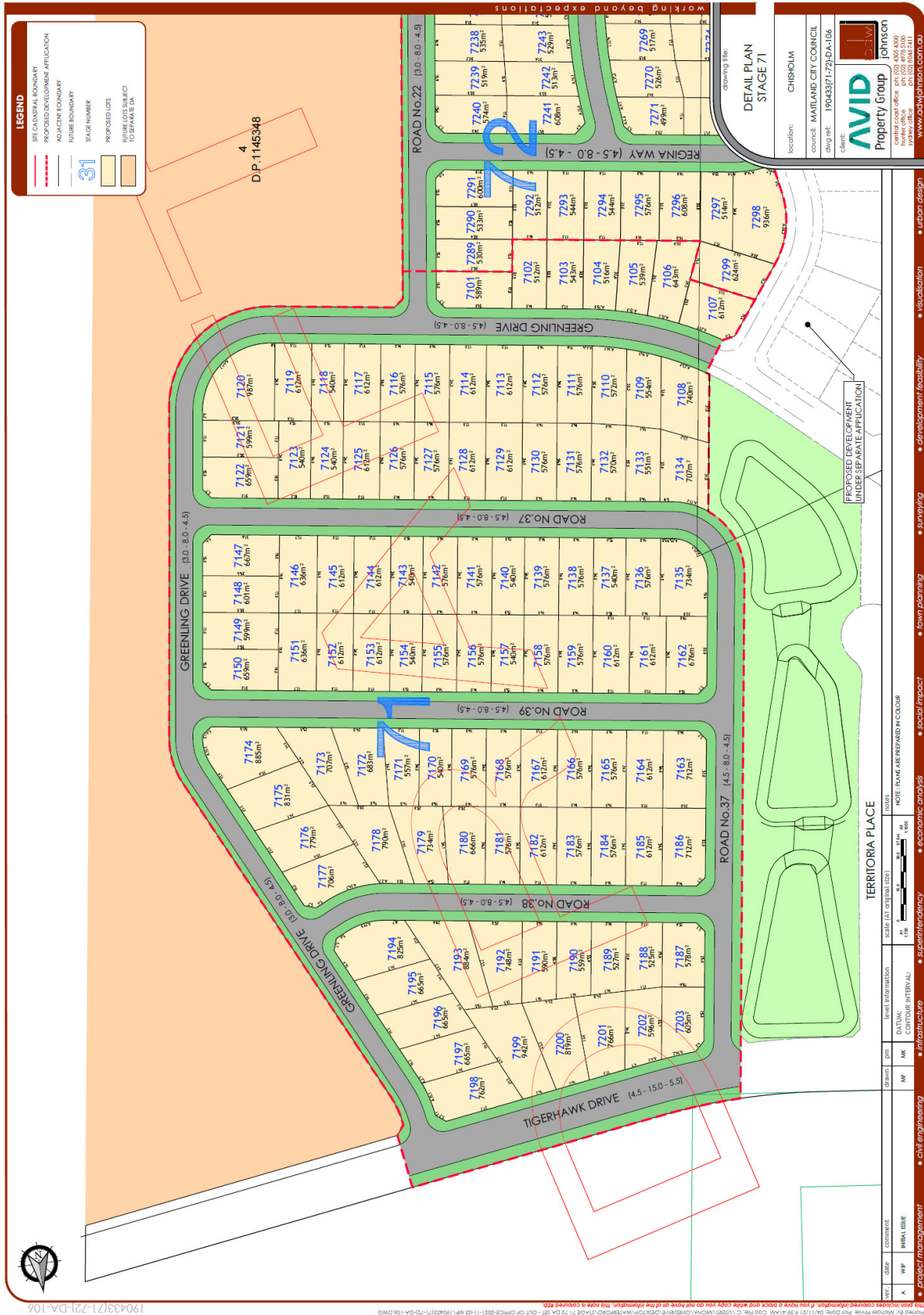
drawing file:
OVERALL MASTERPLAN

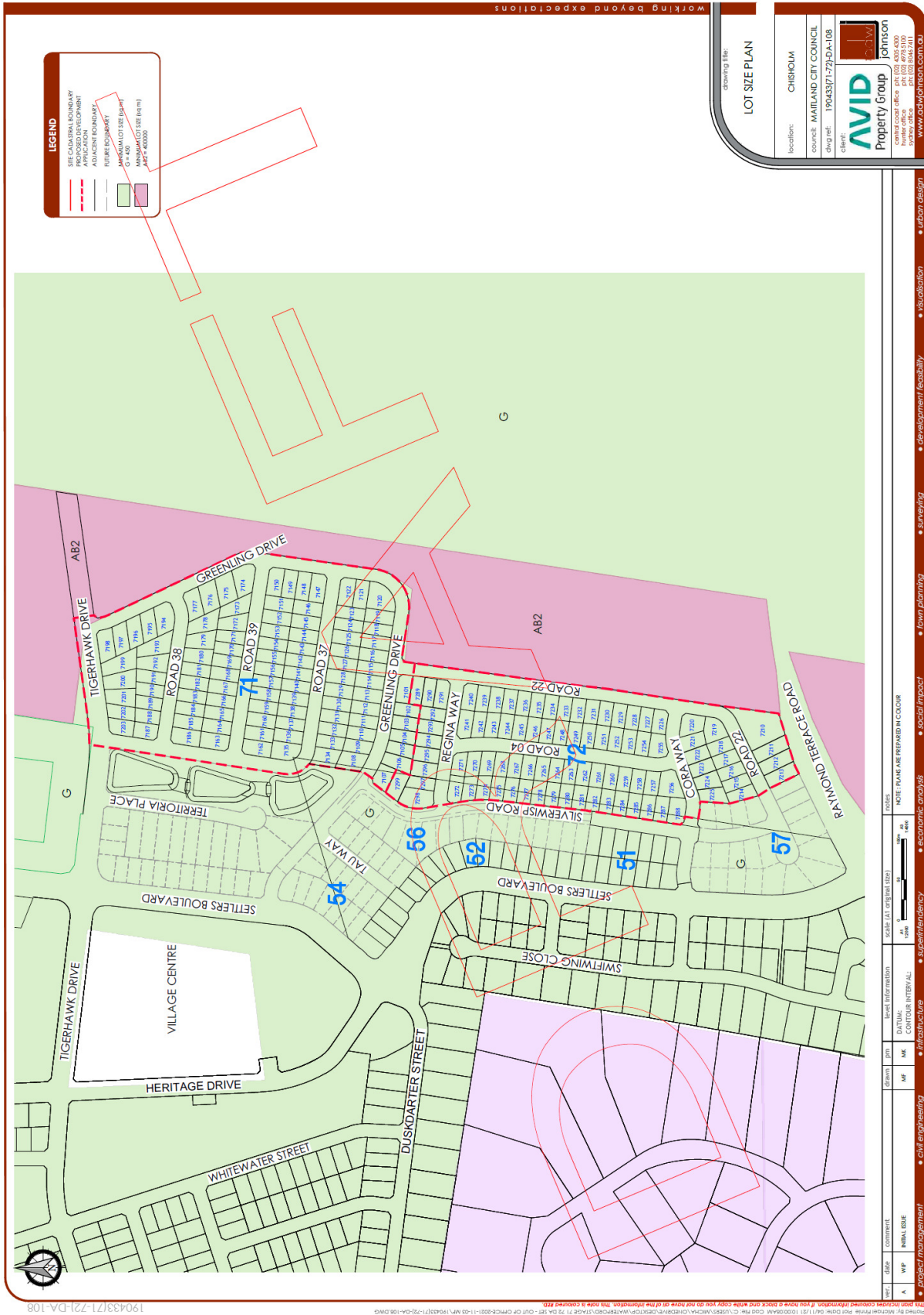
location: CHISHOLM
 council: MALLAND CITY COUNCIL
 dwg ref: 190433/71-2/1-DA-105

client:
AVID Property Group
 Johnsson
 central coast office: ph: (02) 400 4000
 narrabri office: ph: (02) 400 4000
 www.avidjohnson.com.au

190433/71-2/1-DA-105
 190433/71-2/1-DA-105
 190433/71-2/1-DA-105
 190433/71-2/1-DA-105

- urban design
- valuation
- development feasibility
- surveying
- town planning
- economic analysis
- social impact
- infrastructure
- civil engineering
- project management





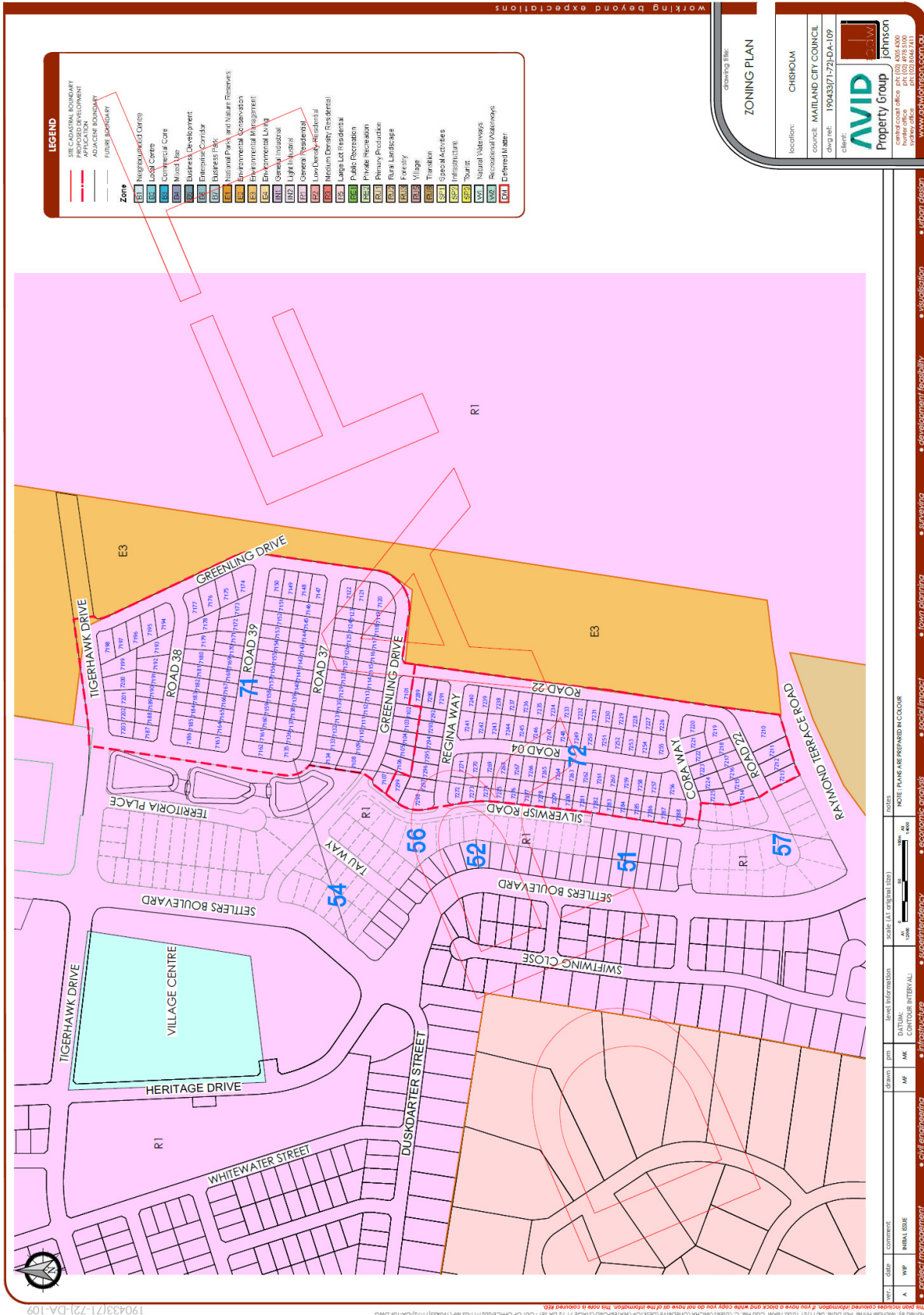
190433171-221-DA-108

Working beyond expectations

location: CHISHOLM
 council: MALLARD CITY COUNCIL
 drawing ref: 190433171-221-DA-108

AVID
 Property Group Johnson
 contact call office: ph: (03) 4265 4300
 mail office: ph: (03) 4265 4300
 www.avidjohnson.com.au

- project management
- civil engineering
- infrastructure
- superintendency
- economic analysis
- social impact
- town planning
- surveying
- development feasibility
- urban design
- valuation



190433/71-2/1-DA-109

ATTACHMENT B

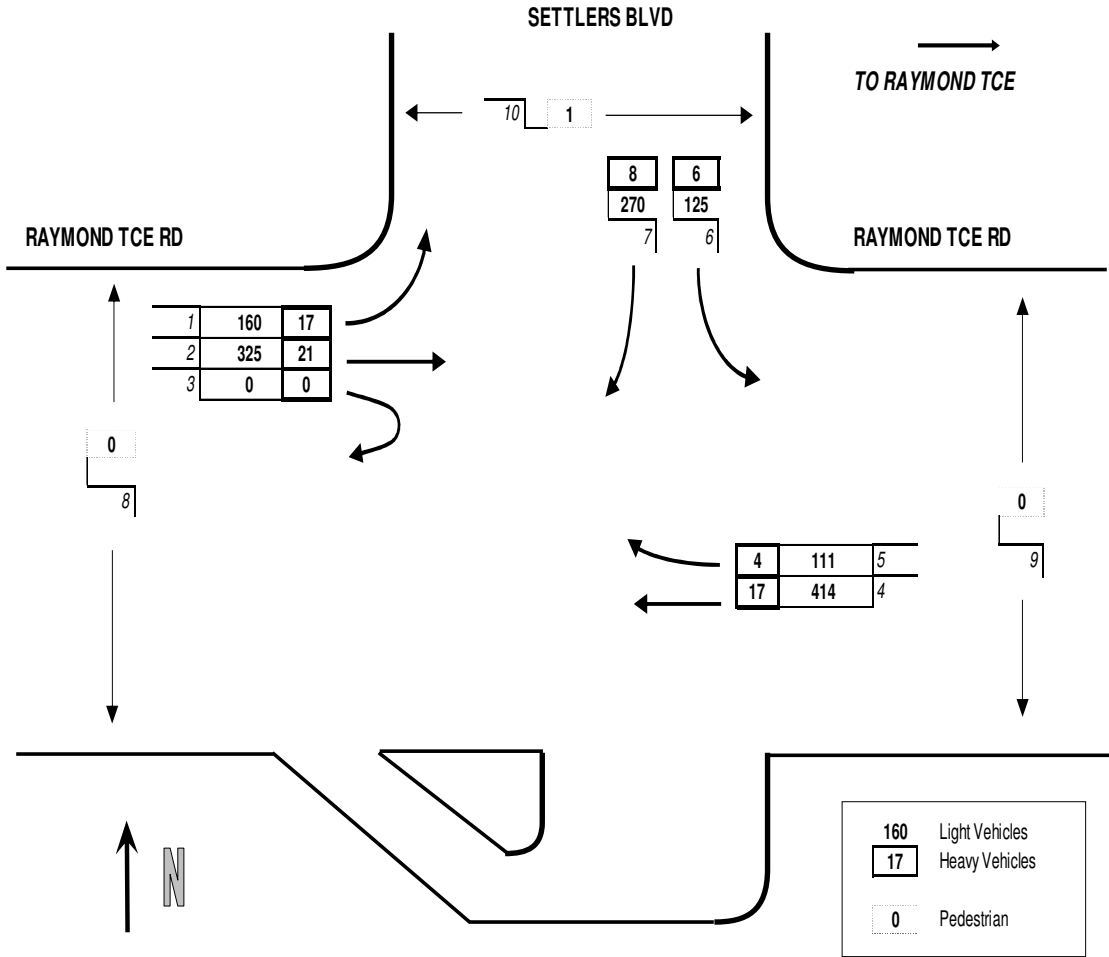
Traffic Count Data

11/10/2017 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

9:00 <<< HOUR ENDING

Wednesday

Summary:	
RAYMOND TCE RD / SETTLERS BLVD	
1405	Total Light Vehicles
73	Total Heavy Vehicles
1	Total Pedestrians



10/10/2017 - RAYMOND TCE RD / SETTLERS BLVD, CHISHOLM

17:45 <<< HOUR ENDING

Tuesday

Summary:

RAYMOND TCE RD / SETTLERS BLVD

1332 Total Light Vehicles

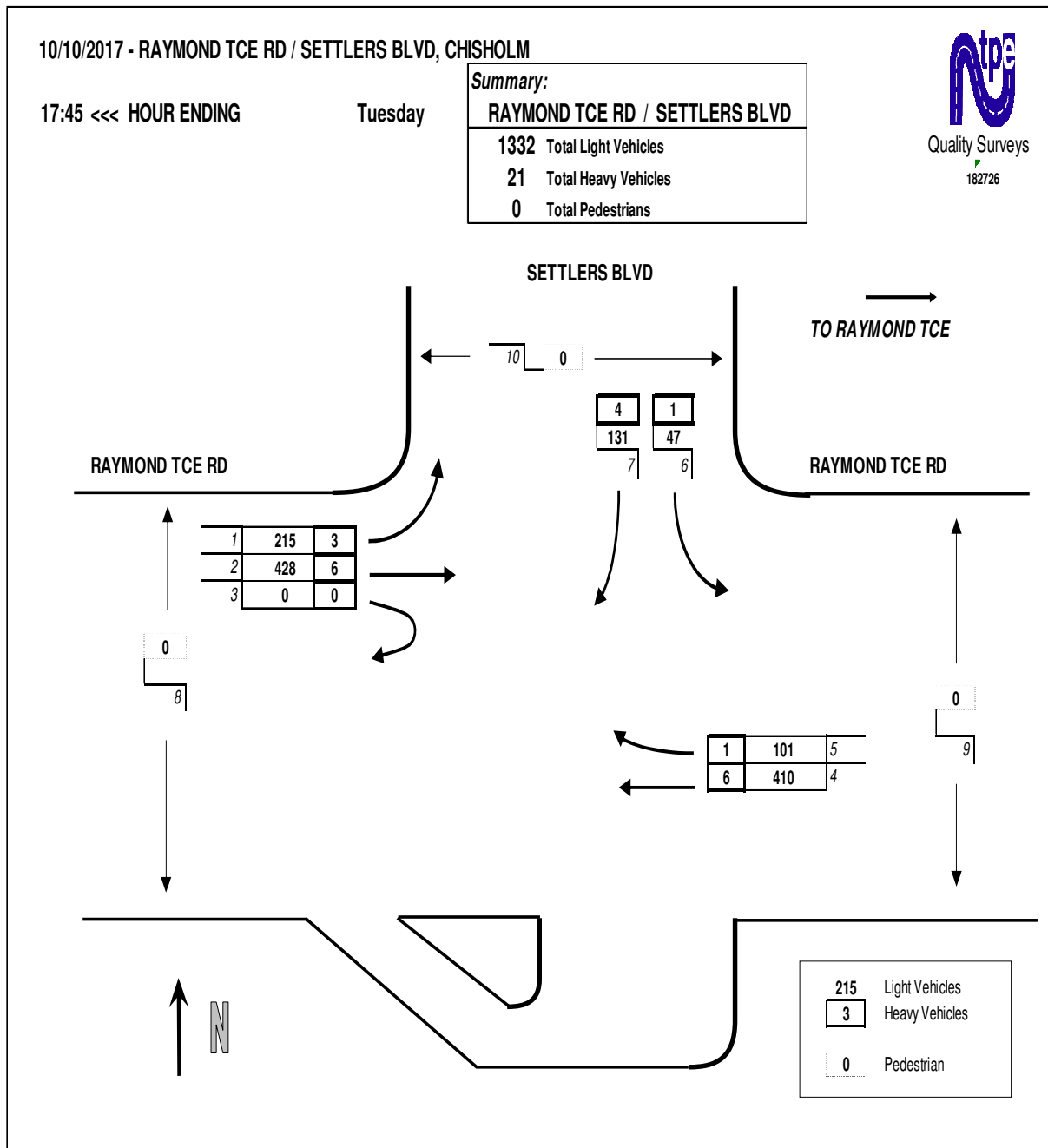
21 Total Heavy Vehicles

0 Total Pedestrians



Quality Surveys

182726



ATTACHMENT C

SIDRA Movement Summary Tables

MOVEMENT SUMMARY

Site: 101 [2021AM + development (Site Folder: General)]

Raymond Terrace Road / Settlers Boulevard signals
Includes all approved Avid Property developments to date.

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 68 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 3 years

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h	[HV] veh/h	[Total veh/h	[HV] %				[Veh. veh	[Dist] m				
East: Raymond Terrace Road														
5	T1	492	17	553	3.5	0.503	22.4	LOS B	8.2	59.2	0.84	0.70	0.84	54.2
6	R2	100	4	116	4.0	* 0.396	36.8	LOS C	3.6	26.1	0.91	0.78	0.91	37.8
Approach		592	21	669	3.5	0.503	24.9	LOS B	8.2	59.2	0.85	0.72	0.85	50.4
North: Settlers Boulevard														
7	L2	172	6	199	3.5	0.474	25.6	LOS B	7.6	54.8	0.82	0.79	0.82	41.2
9	R2	295	8	341	2.7	* 0.529	28.4	LOS B	7.6	54.8	0.87	0.79	0.87	40.1
Approach		467	14	541	3.0	0.529	27.4	LOS B	7.6	54.8	0.85	0.79	0.85	40.5
West: Raymond Terrace Road														
10	L2	147	17	170	11.6	0.150	12.1	LOSA	2.1	16.2	0.39	0.71	0.39	50.8
11	T1	423	21	476	5.0	* 0.568	22.0	LOS B	9.4	68.8	0.84	0.70	0.84	54.2
12u	U	1	0	1	0.0	0.005	34.6	LOS C	0.0	0.2	0.84	0.62	0.84	43.6
Approach		571	38	647	6.7	0.568	19.4	LOS B	9.4	68.8	0.72	0.70	0.72	53.3
All Vehicles		1630	73	1857	4.5	0.568	23.7	LOS B	9.4	68.8	0.80	0.73	0.80	47.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
						[Ped ped	[Dist] m					
East: Raymond Terrace Road												
P2	Full	1	1	28.3	LOS C	0.0	0.0	0.91	0.91	59.4	40.5	0.68
North: Settlers Boulevard												
P3	Full	1	1	25.6	LOS C	0.0	0.0	0.87	0.87	54.2	37.2	0.69
West: Raymond Terrace Road												
P4	Full	1	1	28.3	LOS C	0.0	0.0	0.91	0.91	62.0	43.8	0.71
All Pedestrians		3	3	27.4	LOS C	0.0	0.0	0.90	0.90	58.5	40.5	0.69

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [2021PM + development (Site Folder: General)]

Raymond Terrace Road / Settlers Boulevard signals

Includes all approved Avid developments

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 59 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 3 years

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
East: Raymond Terrace Road														
5	T1	485	6	546	1.2	0.469	18.5	LOS B	6.9	48.7	0.82	0.68	0.82	57.3
6	R2	213	1	247	0.5	*0.491	27.9	LOS B	6.2	43.4	0.87	0.81	0.87	41.6
Approach		698	7	792	1.0	0.491	21.4	LOS B	6.9	48.7	0.83	0.72	0.83	51.3
North: Settlers Boulevard														
7	L2	109	1	126	0.9	0.343	26.2	LOS B	3.7	26.5	0.84	0.76	0.84	41.3
9	R2	84	4	97	4.8	*0.383	32.0	LOS C	3.7	26.5	0.92	0.75	0.92	38.3
Approach		193	5	223	2.6	0.383	28.7	LOS C	3.7	26.5	0.87	0.76	0.87	40.0
West: Raymond Terrace Road														
10	L2	262	3	303	1.1	0.313	16.4	LOS B	5.0	35.3	0.59	0.76	0.59	48.2
11	T1	475	6	534	1.3	*0.597	18.8	LOS B	9.2	65.4	0.84	0.71	0.84	56.9
12u	U	1	0	1	0.0	0.003	25.2	LOS B	0.0	0.2	0.73	0.63	0.73	49.1
Approach		738	9	839	1.2	0.597	18.0	LOS B	9.2	65.4	0.75	0.73	0.75	53.4
All Vehicles		1629	21	1854	1.3	0.597	20.7	LOS B	9.2	65.4	0.80	0.73	0.80	50.5

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
						[Ped ped]	[Dist] m					
East: Raymond Terrace Road												
P2	Full	1	1	23.8	LOS C	0.0	0.0	0.90	0.90	55.0	40.5	0.74
North: Settlers Boulevard												
P3	Full	1	1	22.9	LOS C	0.0	0.0	0.88	0.88	51.5	37.2	0.72
West: Raymond Terrace Road												
P4	Full	1	1	23.8	LOS C	0.0	0.0	0.90	0.90	57.5	43.8	0.76
All Pedestrians		3	3	23.5	LOS C	0.0	0.0	0.89	0.89	54.7	40.5	0.74

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: 101 [2031AM + development (Site Folder: General)]

Raymond Terrace Road / Settlers Boulevard signals
Includes all approved Avid Property developments to date.

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 114 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 13 years

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
		[Total veh/h	HV] veh/h	[Total veh/h	HV] %				[Veh. veh	Dist] m				
East: Raymond Terrace Road														
5	T1	492	17	819	3.5	0.760	37.4	LOS C	19.6	141.5	0.87	0.76	0.87	45.2
6	R2	100	4	189	4.0	*0.595	56.4	LOS D ¹¹	9.9	71.5	0.95	0.81	0.95	31.4
Approach		592	21	1008	3.6	0.760	41.0	LOS C	19.6	141.5	0.89	0.77	0.89	41.8
North: Settlers Boulevard														
7	L2	172	6	324	3.5	0.660	39.3	LOS C	20.5	147.6	0.87	0.83	0.87	36.1
9	R2	295	8	556	2.7	*0.737	42.8	LOS D ¹¹	21.6	154.6	0.92	0.85	0.92	34.9
Approach		467	14	881	3.0	0.737	41.5	LOS C	21.6	154.6	0.90	0.84	0.90	35.3
West: Raymond Terrace Road														
10	L2	147	17	277	11.6	0.225	13.4	LOS A	5.1	38.9	0.35	0.71	0.35	50.1
11	T1	423	21	704	5.0	*0.759	36.0	LOS C	24.3	177.0	0.88	0.77	0.88	45.1
12u	U	1	0	1	0.0	0.005	50.4	LOS D ¹¹	0.1	0.4	0.83	0.63	0.83	36.7
Approach		571	38	983	6.8	0.759	29.6	LOS C	24.3	177.0	0.73	0.75	0.73	46.4
All Vehicles		1630	73	2871	4.5	0.760	37.2	LOS C	24.3	177.0	0.84	0.79	0.84	40.9

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
						[Ped ped	Dist] m					
East: Raymond Terrace Road												
P2	Full	1	1	37.1	LOS D	0.0	0.0	0.81	0.81	68.3	40.5	0.59
North: Settlers Boulevard												
P3	Full	1	1	33.2	LOS D	0.0	0.0	0.76	0.76	61.8	37.2	0.60
West: Raymond Terrace Road												
P4	Full	1	1	38.8	LOS D	0.0	0.0	0.82	0.82	72.4	43.8	0.60
All Pedestrians		3	4	36.4	LOS D	0.0	0.0	0.80	0.80	67.5	40.5	0.60

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.

MOVEMENT SUMMARY

Site: 101 [2031PM + development (Site Folder: General)]

Raymond Terrace Road / Settlers Boulevard signals

Includes all approved Avid developments

Site Category: (None)

Signals - Actuated Isolated Cycle Time = 87 seconds (Site Practical Cycle Time)

Design Life Analysis (Final Year): Results for 13 years

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV] veh/h	[Total veh/h]	[HV] %				[Veh. veh]	[Dist] m				
East: Raymond Terrace Road														
5	T1	485	6	808	1.2	0.589	24.7	LOS B	14.7	104.2	0.82	0.71	0.82	52.6
6	R2	213	1	402	0.5	*0.944	51.3	LOS D ¹¹	19.4	136.0	1.00	0.92	1.19	32.9
Approach		698	7	1209	1.0	0.944	33.5	LOS C	19.4	136.0	0.88	0.78	0.94	43.8
North: Settlers Boulevard														
7	L2	109	1	206	0.9	0.359	30.5	LOS C	7.4	52.7	0.78	0.77	0.78	39.8
9	R2	84	4	158	4.8	*0.401	38.8	LOS C	7.4	52.7	0.88	0.77	0.88	35.8
Approach		193	5	364	2.6	0.401	34.1	LOS C	7.4	52.7	0.82	0.77	0.82	37.9
West: Raymond Terrace Road														
10	L2	262	3	494	1.1	0.424	17.0	LOS B	10.4	73.8	0.53	0.77	0.53	48.2
11	T1	475	6	791	1.3	*0.751	25.5	LOS B	20.4	144.5	0.86	0.75	0.86	51.8
12u	U	1	0	1	0.0	0.004	36.2	LOS C	0.0	0.3	0.77	0.64	0.77	42.8
Approach		738	9	1286	1.2	0.751	22.2	LOS B	20.4	144.5	0.73	0.75	0.73	50.4
All Vehicles		1629	21	2859	1.3	0.944	28.5	LOS C	20.4	144.5	0.80	0.77	0.83	45.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Parameter Settings dialog (Site tab).

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

¹¹ Level of Service is worse than the Level of Service Target specified in the Parameter Settings dialog.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance												
Mov ID	Crossing	Input Vol.	Dem. Flow	Aver. Delay	Level of Service	AVERAGE BACK OF QUEUE		Prop. Que	Effective Stop Rate	Travel Time	Travel Dist.	Aver. Speed
						[Ped ped]	[Dist] m					
East: Raymond Terrace Road												
P2	Full	1	1	37.7	LOS D	0.0	0.0	0.93	0.93	68.9	40.5	0.59
North: Settlers Boulevard												
P3	Full	1	1	25.0	LOS C	0.0	0.0	0.76	0.76	53.7	37.2	0.69
West: Raymond Terrace Road												
P4	Full	1	1	37.7	LOS D	0.0	0.0	0.93	0.93	71.4	43.8	0.61
All Pedestrians		3	4	33.5	LOS D	0.0	0.0	0.87	0.87	64.6	40.5	0.63

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)

Pedestrian movement LOS values are based on average delay per pedestrian movement.