



690 Derrimut Road, Tarneit

Traffic & Transport Assessment (South)

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Prepared for Dennis Family Corporation

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1 Introduction

Cardno has been engaged by the Dennis Family Corporation to undertake a traffic engineering assessment of the proposed residential subdivision located at the northwest corner of the Leakes Road and Woods Road intersection in Truganina.

In the course of preparing this report, the subject site and its environs have been inspected, and plans of the proposal and relevant background information prepared by Council and the GAA has been examined.

2 Background

2.1 Location and Land Use

The subject site is triangular in shape, with a frontage of approximately 1,335 metres to Leakes Road, 780 metres to Woods Road, and a total area of approximately 75 hectares. The site is located on the north side of Leakes Road, and is bounded by Skeleton Creek to the west and the proposed Regional Rail Link to the north.

It is noted that the subject site is located within the future Truganina Wyndham North Precinct Structure Plan (PSP1090), which is currently being prepared by the Growth Area Authority (GAA). Further to the east of the subject land is the Truganina Employment Area (PSP37) which was approved by the Minister for Planning in December 2009, through Amendment C124 to the Wyndham Planning Scheme.

To the southeast is the Truganina South Community Area (PSP38) which was approved by the Minister for Planning in July 2011, through Amendment C123 to the Wyndham Planning Scheme.

Figure 1 illustrates the locality of the subject site, and Figure 2 shows the location of the site in the context of the future Truganina Wyndham North Precinct Structure Plan.

Land in the vicinity is typically rural residential in nature, with the Wyndham Village Shopping Centre located approximately 1.6 kilometres to the south.

Figure 1: Locality Plan

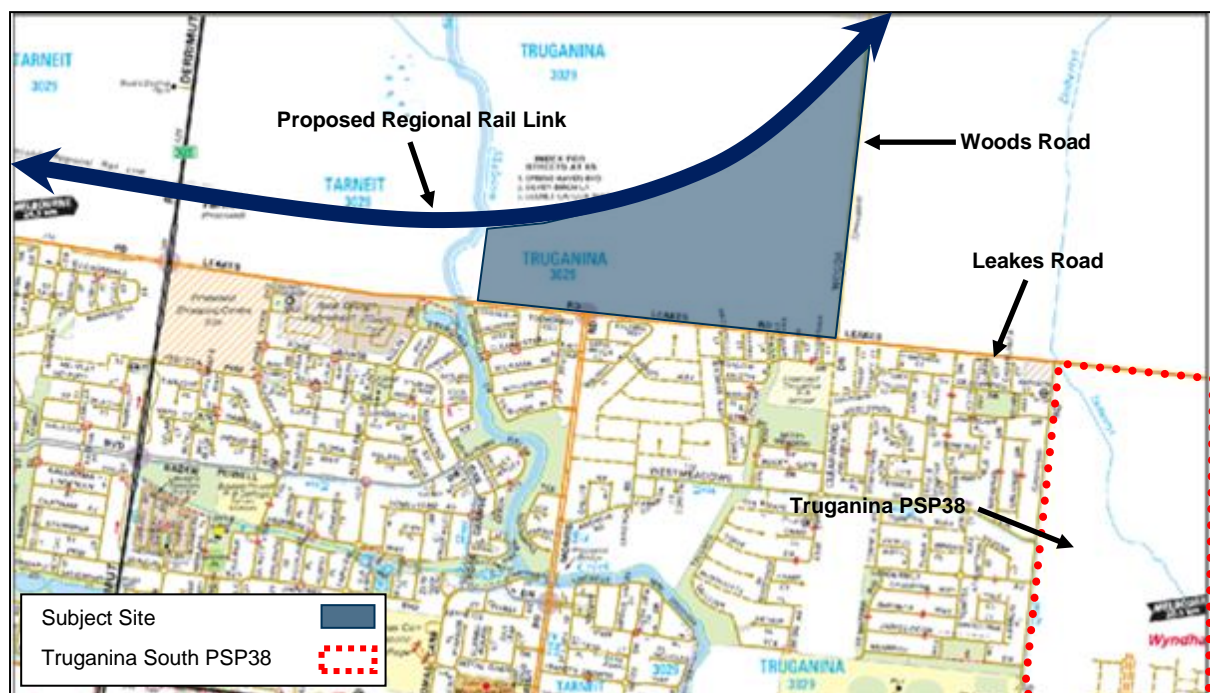
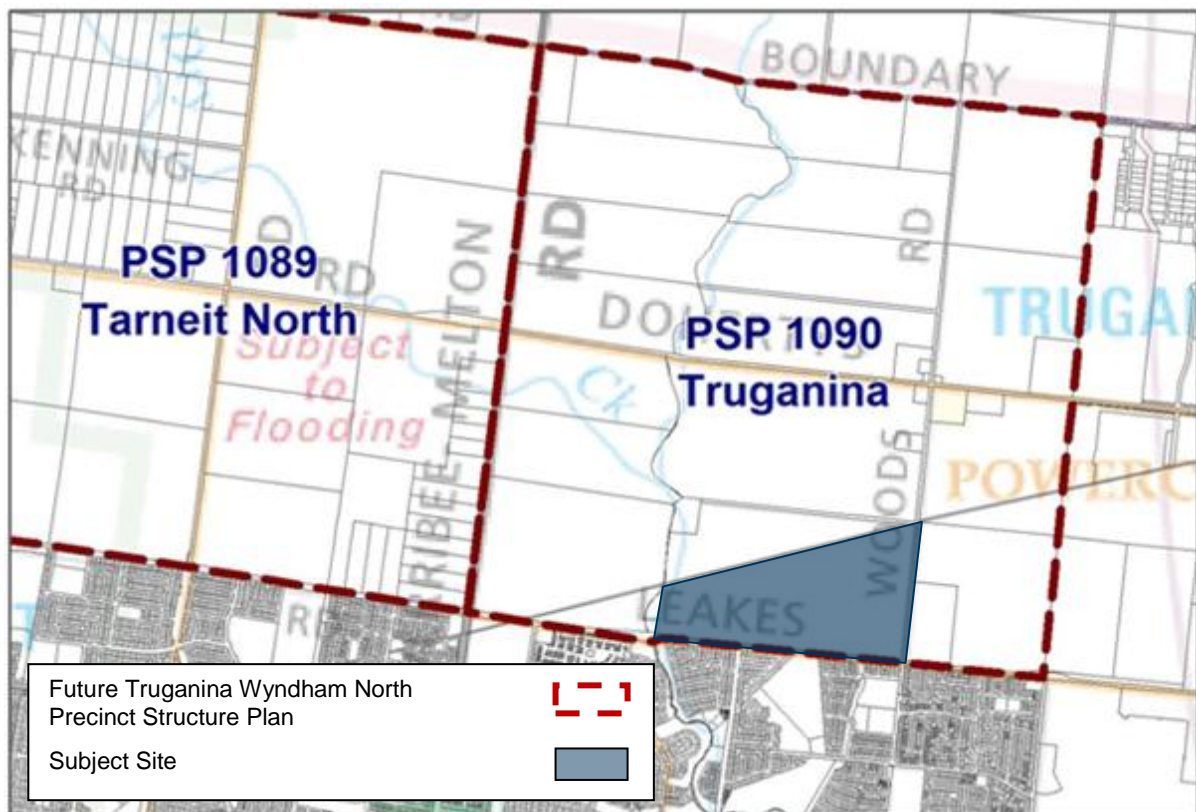


Figure 2: Future Truganina Wyndham North Precinct Structure Plan



2.2 Road Network

2.2.1 Leakes Road

Leakes Road at the frontage of the site is a local road that is aligned in an east-west direction. Leakes Road provides a connection from Shanahans Road in Mount Cottrell to Fitzgerald Road in Laverton North, from where it continues as an arterial road as Kororoit Creek Road to Victoria Street in Williamstown.

In the vicinity of the site, Leakes Road operates as a single carriageway providing a single lane in each direction, with localised widening to provide for channelized right turn treatments and left turn deceleration lanes.

Immediately opposite of the site, traffic signals are provided at the Morris Road intersection. A posted speed limit of 70km/h applies.

Leakes Road along the frontage of the site is shown in Figure 3.

Figure 3: Leakes Road looking east along the subject site



Scram counts have been sourced from Vic Roads for the intersection of Leakes Road and Morris Road during 20 to 26 August 2012. Based on the traffic counts, it is estimated that Leakes Road has a daily volume of approximately 16,000 to 18,000 vehicles during a weekday and 12,000 to 15,000 on the weekend.

It is understood that Leakes Road will be ultimately upgraded to a duplicated primary arterial road over time, and transferred to VicRoads to become part of the regional Declared Main Road network. The ultimate cross section of Leakes Road will comprise 3 traffic lanes in each direction separated by a central median.

2.2.2 Morris Road

Morris Road is aligned north to south and is currently constructed up to Leakes Road. It is understood that Morris Road in the future will extend north through to Dohertys Road and beyond. As part of the development of this parcel of land, the intersection of Morris Road and Leakes Road will be upgraded with the construction of the northern leg of the intersection.

The section south of Leakes Road is constructed with a single lane in each direction separated by a central median. Median breaks are provided at intersections to generally provide fully directional access opportunities. A bicycle and parking lane is provided within each carriageway.

The northerly extension of Morris Road is planned to operate with a 34 metre road reservation and comprise a single traffic lane in each direction separated by a central median, with a parking and bicycle lane within each carriageway commensurate with the existing southern portion.

2.2.3 Woods Road

Woods Road is a planned road aligned north to south in the vicinity of the site from Leakes Road. To the south of Leakes Road, Woods Road originates as Clearwood Drive.

Woods Road in the vicinity of the site is currently unsealed and provides local access only.

It is understood that ultimately the intersection of Woods Road and Leakes Road will be controlled by traffic signals.

2.3 Regional Rail Link

Adjacent to the northern boundary of the subject site the Regional Rail Link Authority has acquired a portion of the site for the construction of the Regional Rail Link and associated infrastructure. It is understood that the future Morris Road extension will be grade separated from the train line, either via an overpass or underpass across the railway tracks. In relation to Woods Road, this will be truncated as a result of the RRL.

2.4 Other Developments

It is understood that the land to the east of the subject site opposite Woods Road will be developed for residential dwellings in the future. The preliminary plans prepared for this land indicates that it would include up to 500 residential lots, with primary site access provided via Woods Road.

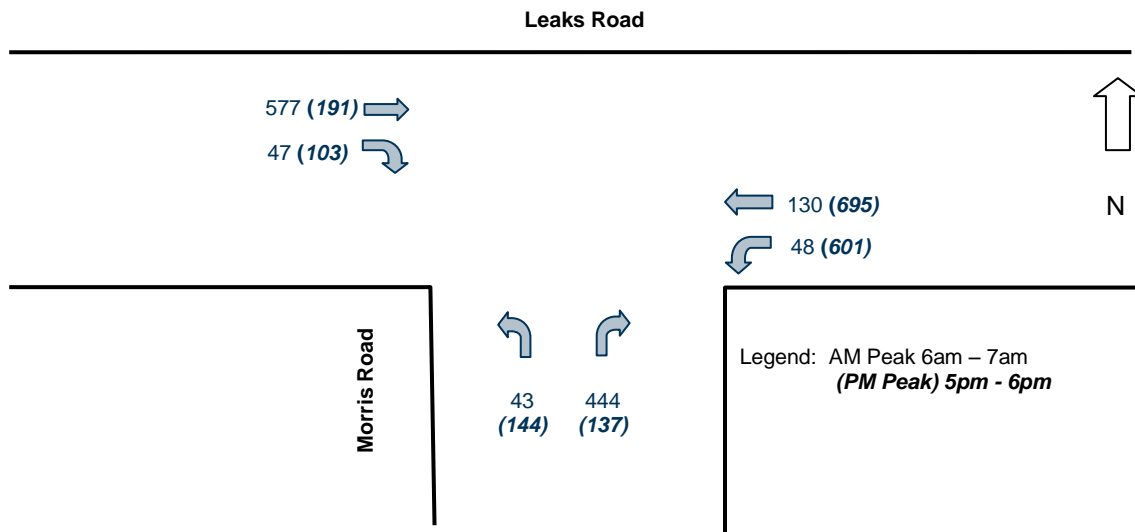
2.5 Existing Traffic Volumes

In order to establish existing traffic volumes on Leakes Road, Cardno sourced scam counts from Vic Roads at the intersection of Leakes Road and Morris Road on Wednesday 22 August 2012.

Review of the traffic counts indicates that the morning peak hour in Leakes Road was found to occur at 6am-7am with 1,155 vehicles, and the afternoon peak hour from 5pm-6pm with 1,624 vehicles.

A summary of the peak hour movements on Leakes Road is illustrated in Figure 4.

Figure 4: Existing AM and PM Peak Hour Traffic Volumes – Wednesday 22 August 2012



2.1 Existing Intersection Performance

To assess the operation of the Leakes Road and Morris Road intersection, existing peak hour traffic volumes shown in Figure 4 have been input into SIDRA.

Sidra (Signalised and Unsignalised Intersection Design and Research Aid) is a computer package, originally developed by the Australian Road Research Board that provides information about the capacity of an intersection in terms of a range of parameters, as described below:

Degree of Saturation (D.O.S.) is the ratio of the volume of traffic observed making a particular movement compared to the maximum capacity for that movement. Various values of degree of saturation and their rating are shown in Figure 5 below.

Figure 5: Rating of Degrees of Saturation

Degree of Saturation	Rating
Up to 0.6	Excellent
0.6 to 0.7	Very Good
0.7 to 0.8	Good
0.8 to 0.9	Fair
0.9 to 1.0	Poor
Above 1.0	Very Poor

The **95th Percentile** (95%ile) Queue represents the maximum queue length, in metres, that can be expected in 95% of observed queue lengths in the peak hour.

Average Delay (seconds) is the delay time that can be expected for all vehicles making a particular movement in the peak hour.

The results of the SIDRA analysis are summarised in Figure 6, and highlight that the intersection of Leakes Road and Morris Road is operating within the 'good' category during the AM and PM peak periods with minimal queues and delays experienced by motorists.

Figure 6: Existing Intersection Performance – AM and PM Peak Hours

Intersection	Approach	Movement	AM Peak			PM Peak		
			DoS	95 th %ile Queue (m)	Avg. Delay (sec)	DoS	95 th %ile Queue (m)	Avg. Delay (sec)
Leakes Road/ Morris Road	Morris Rd (South)	Left	0.05	2	9	0.41	22	14
		Right	0.64	158	40	0.60	59	63
	Leakes Rd (East)	Left	0.05	2	8	0.73	40	10
		Through	0.22	42	31	0.60	180	14
	Leakes Rd (West)	Through	0.64	185	23	0.14	21	4
		Right	0.22	19	60	0.72	48	71

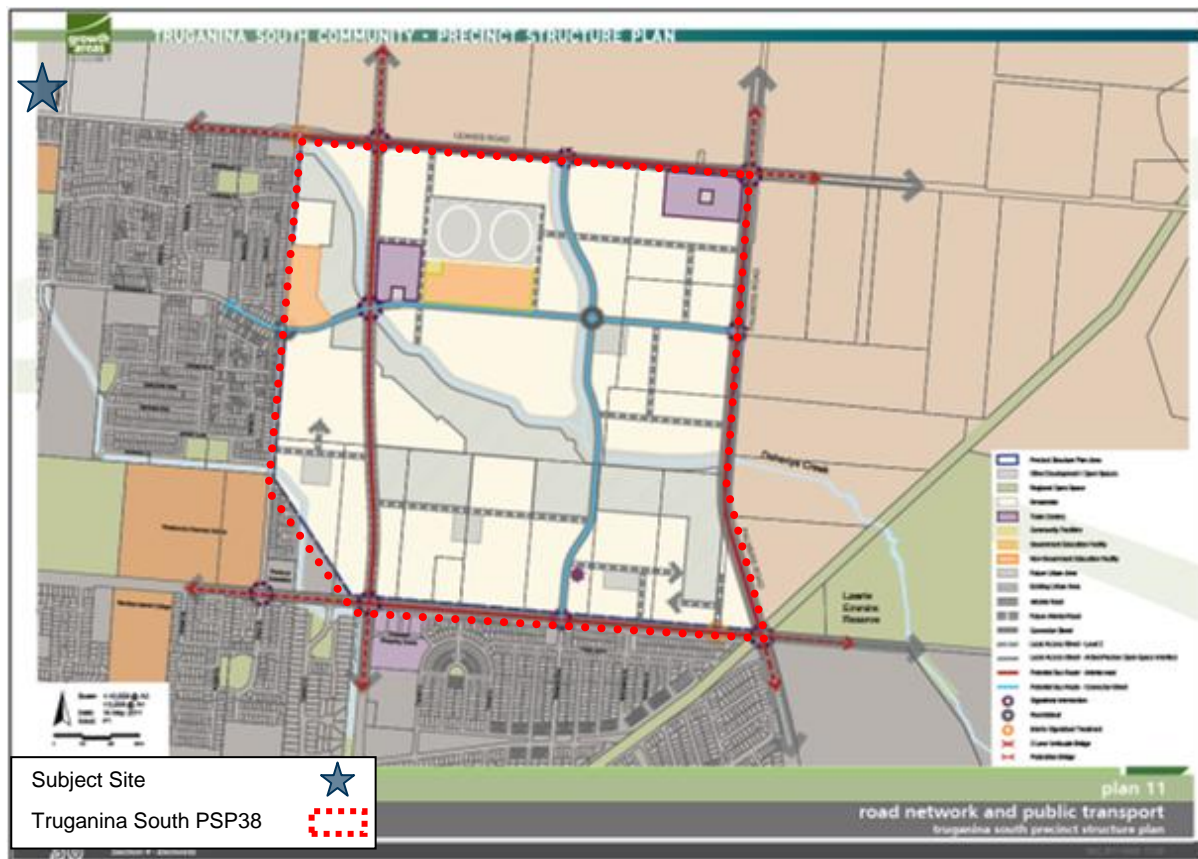
3 Truganina South Precinct Structure Plan

The subject land is located approximately 1 kilometre northwest of the Truganina South Community Area (PSP38). The Truganina South Precinct Structure Plan is a strategic plan prepared by the GAA in conjunction with the City of Wyndham as a long term guide for the future urban development of land in Truganina.

The Truganina South Precinct Structure Plan (PSP38) encompasses the land bounded by Leakes Road to the north, Palmers Road to the east, Sayers Road to the south and Marquands Road to the west in Truganina.

Figure 7 illustrates the locality of the subject site in the context of Truganina South Community Precinct Structure Plan.

Figure 7: Truganina South Community Precinct Structure Plan



3.1 Traffic Modelling

During the preparation of the Truganina South PSP, traffic modelling was not commissioned by the GAA for the Truganina South PSP area.

In order to analyse the internal and external road network of the PSP area, Cardno has developed a traffic model of the PSP area. The traffic distribution model considers expected development yields within the PSP area, existing road network connections and future road connections within and external to the Truganina South PSP area.

4 Proposed Development

4.1 General

Based on the development plan prepared by Spiire (Project Ref: 136345P23, Version 9), it is proposed to develop the subject land for the purposes of 897 residential lots, comprising a mixture of low, and medium density lots.

Figure 8 illustrates the proposed residential subdivision lot layout and external site access points.

Figure 8: Proposed Residential Subdivision Layout



4.2 External Access

The development plan illustrates 4 primary access points to the subject land from Leakes Road, comprising traffic signals access via the northern leg of the Leakes Road and Morris Road intersection, and 3 fully directional access points.

At the Leakes Road and Morris Road traffic signals, the road reservation within the site widens to 34 metres and provides signalised access to the north-south connector road (Morris Road extension) which flares to provide 6 traffic lanes, comprising 2 through lanes, a right turning lane and a left turn slip lane on departure and 2 approach lanes.

In the interim, the site access points on each side of the Leakes Road and Morris Road intersection will allow fully directional access, with provision of localised widening to facilitate turning movements. When Leakes Road is duplicated, these fully directional intersections will revert to left in/ left out operation.

To the east, secondary external access points are also available to Woods Road via internal road connections. In Woods Road, the proposed 25.5 meters road reservation has been designed to provide 1 traffic lane and kerbside parking in each direction. In the interim, the Leakes Road and Woods Road intersection will operate as a fully directional intersection with localised widening for turning lanes.

In the future, the Woods Road and Leakes Road intersection will be upgraded with traffic signals when Leakes Road is duplicated. It is understood that a Development Contributions Plan will be prepared to fund the cost of these improvement works, which also sets out the funding requirements for any other infrastructure projects in the area.

Concept functional layout plans illustrating the Leakes Road/ Morris Road and Leakes Road/ Woods Road intersections are attached in Annex 1, which was prepared by VicRoads.

4.3 Internal Road Layout

The internal road network proposes a main connector road (Morris Road extension) aligned in a north – south direction bisecting the western portion of the site, with access streets branching off the connector road to allow access to the eastern and western portion of the subdivision.

With the eastern portion of the site, it is proposed to provide a series of access roads aligned in an east-west direction with access streets branching off in a north-south direction. The internal intersection with the main local boulevard road is to be controlled by a roundabout.

The main local boulevard road with access to Leakes Road has been designed with a road reservation of 30 metres.

Adjacent to the playground area, the proposed road reservation for the main east-west access road to Woods Road is 20.7 metres, which widens to 22.7 metres at the eastern boundary of the site. Other access roads have generally been designed with a road reservation of 16 metres.

Adjacent to conservation reserve areas, the internal road has been designed with a 13 metre wide road reservation with at least 4.5 metre wide verge on one side.

Concept layout plans illustrating the above road cross sections are attached in Annex 2.

4.4 Bicycle and Pedestrian Links

Footpaths will generally be provided on either side of the main internal access streets to provide for pedestrian links through the site. Pedestrian and bicycle links will be created in the reserve connecting the site to Leakes Road and Woods Road.

Within the site, a shared path is proposed between the main local boulevard road and the Regional Rail Line, via the drainage reserve as shown in Figure 9.

Figure 9: Proposed Bicycle and Pedestrian Links



Legend

-  Arterial Road Potential Bus Route
-  Bridge (Pedestrian and Cyclist)
-  400m Walkable catchment (From open space)
-  On Road Bike Lane (1.7m both sides)
-  Shared Path (3m within open space)
-  Connector Street with Off Road 2-way Bike Lane (3m)
-  Alternative Bike route (informal)
-  Pedestrian Operated Traffic Signals
-  Melbourne Water Pipe Track Road Crossing
-  Playground (TBC)

5 Traffic Considerations

5.1 Traffic Generation

In order to determine an appropriate traffic generation rate for the subject site, the following case study data was considered relevant. Surveys were undertaken in April 2010 by Cardno at the Westleigh Gardens Estate on Princes Highway to the west of the Werribee Town Centre.

The results of this survey indicate a daily traffic generation rate of 8.7 vehicle movements per dwelling. During the commuter peak hours, residential traffic generation is typically equal to 10 per cent of the daily traffic generation.

The Westleigh Gardens estate includes 486 dwellings, and whilst serviced by a local bus route, does not have any local facilities such as shops or schools within walking distance, and therefore many residents are dependent on car travel for such activities.

Based on above, the proposed residential subdivision when fully developed, could generate traffic at 0.87 movements per dwelling during the morning and afternoon peak hours, with an average daily traffic generation of 8.7 vehicle movements.

Application of the adopted daily and peak hour generation rates to the subject site equates to projected traffic generations of 7,084 daily movements, inclusive of 780 movements in the AM and PM peak hours respectively.

Studies of residential developments indicate that during the morning peak hour approximately 20% of movements are arrivals and 80% departures, whilst during the evening peak hour 60% of movements are arrivals and 40% departures.

A summary of the likely traffic generated by the proposed development is provided in Figure 10.

Figure 10: Development Traffic Generation

Period	Arrivals	Departures	Total
AM Peak Hour	156	624	780
PM Peak Hour	468	312	780
Daily	3,902	3,902	7,804

5.2 Traffic Distribution

In consideration of the access opportunities on Leakes Road and Woods Road, the following will be assumed with regard to distribution of traffic.

- Approximately 65% of the traffic generated to / from the development will be directed towards Leakes Road.
- Approximately 35% of the traffic generated to / from the development will be directed towards Woods Road.
- Approximately 5% of the traffic will have origins/destinations within the subject land.
- Approximately 70% of the traffic will have origins/destinations to the east along Leakes Road, 30% of the traffic will have origins/destinations to the west along Leakes Road.

Based on the above, Figure 11 has been prepared to show the anticipated development traffic distribution to Leakes Road and Woods Road, whilst Figure 12 illustrates the expected peak hour volumes at the site access points to Leakes Road and the Leakes Road and Woods Road intersection.

Figure 11: Traffic Distribution

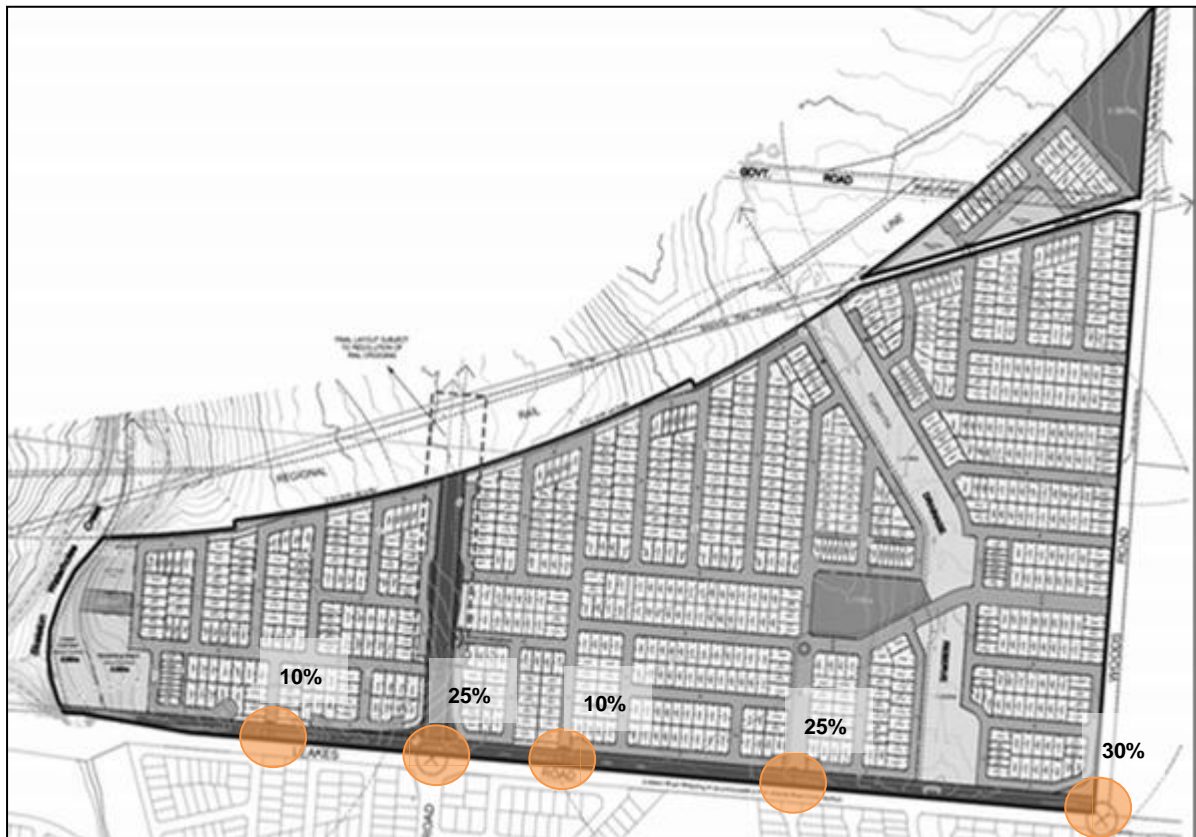
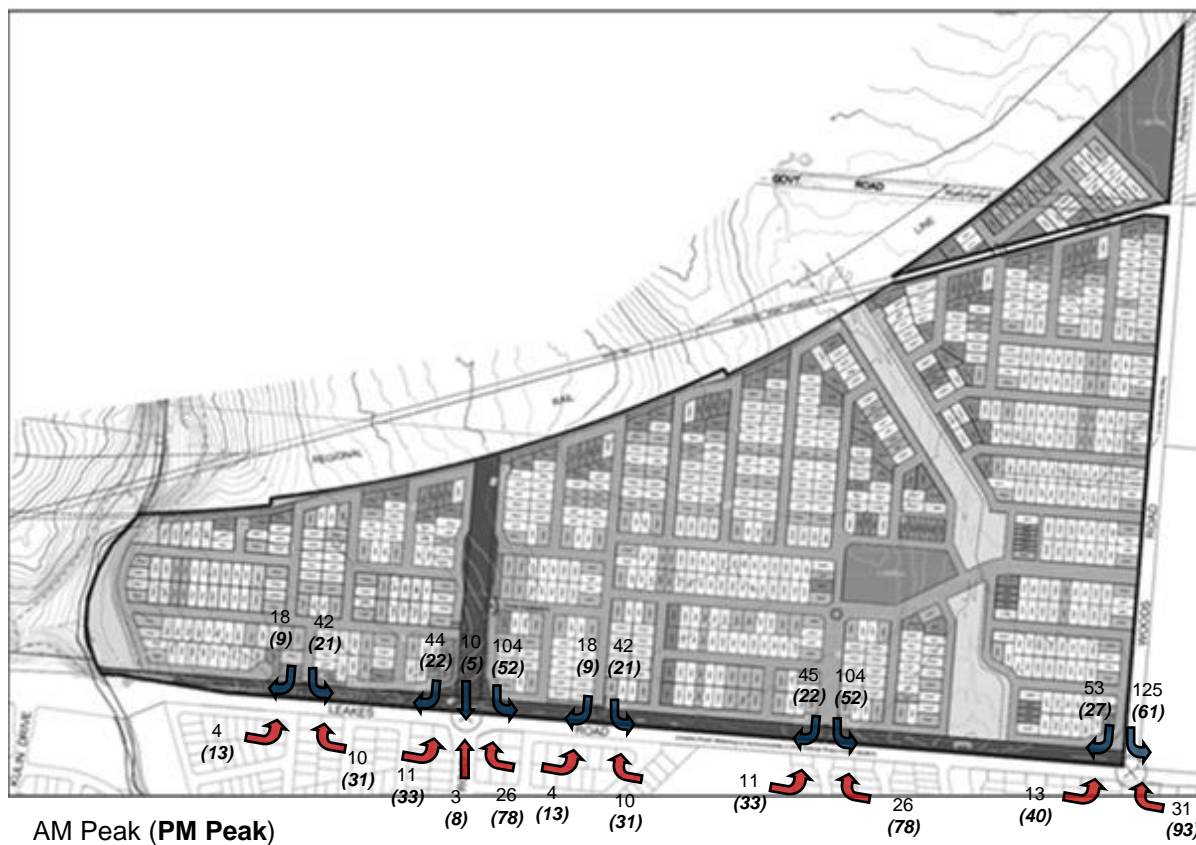


Figure 12: Anticipated Post Development Year 2012 Peak Hour Volumes



Traffic Considerations

5.3 Traffic Impact

5.3.1 Leakes Road

In the vicinity of the subject site, Leakes Road currently operates with an undivided carriageway and has a pavement width of approximately 10.8 metres, providing 1 traffic lane and shoulder in each direction. As surrounding land is developed, Leakes Road will ultimately be upgraded to a primary arterial road consisting of a divided carriageway, with up to three (3) lanes in each direction.

The recent scam counts of Leakes Road recorded a daily volume of approximately 18,000 vehicles. This level of traffic would warrant consideration for duplication.

At this stage the delivery of the duplication of Leakes Road is unknown. However, VicRoads has prepared functional designs to ascertain the spatial requirements for duplication which will inform the detailed design plans for construction. This will occur progressively along the length as will the development of the subject sites and as such will satisfactorily accommodate traffic generated by the site and the surrounding area.

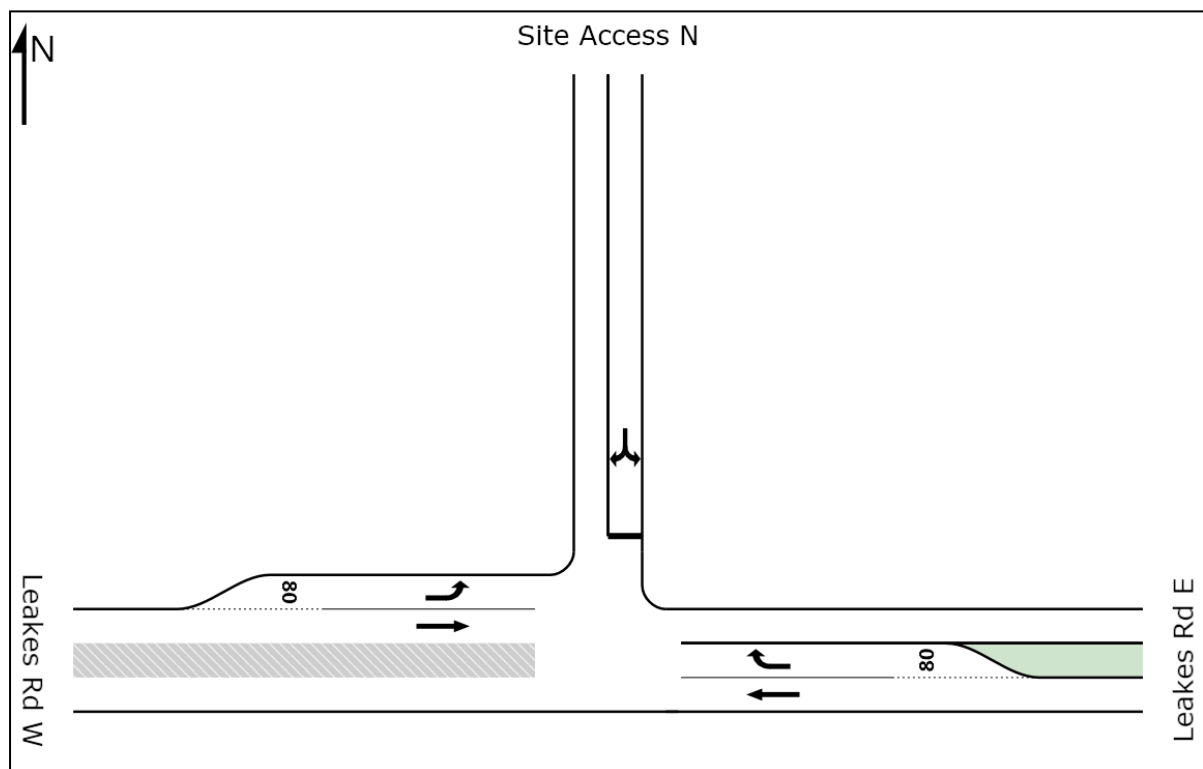
The duplicated cross section once delivered by Vic Roads will increase the capacity of Leakes Road to up to 35,000 vehicles per day.

5.3.2 Leakes Road Access Points (Main Boulevard)

For the purposes of this assessment, it will be presumed that the proposed access strategy will incorporate localised widening at the Leakes Road access points to provide auxiliary right and left turning lanes to access the site.

A concept functional layout illustrating the proposed interim access arrangements is provided in Figure 13.

Figure 13: Concept Layout



Traffic Considerations

To determine the impact of the proposed development, the through traffic volumes detailed in Figure 4 and proposed road geometry for the Leakes Road access have been input into SIDRA and analysed.

The results of the SIDRA analysis are summarised in Table 1 and they highlight that the Leakes Road access intersections are expected to operate under 'excellent' conditions after the completion of the proposed development.

Table 1: Leakes Road / Site Access Intersection Analysis

Movement	AM Peak Hour			PM Peak Hour		
	DoS	Av. Delay (s)	95th'ile Back of Queue (m)	DoS	Av. Delay (s)	95th'ile Back of Queue (m)
Leakes Rd E (T)	0.11	0	0	0.75	0	0
Leakes Rd E (R)	0.10	21	2	0.09	11	3
Site Access N (L)	0.84	59	35	0.39	34	10
Site Access N (R)	0.84	59	35	0.39	33	10
Leakes Rd W (L)	0.01	8	0	0.02	8	0
Leakes Rd W (T)	0.67	0	0	0.23	0	0

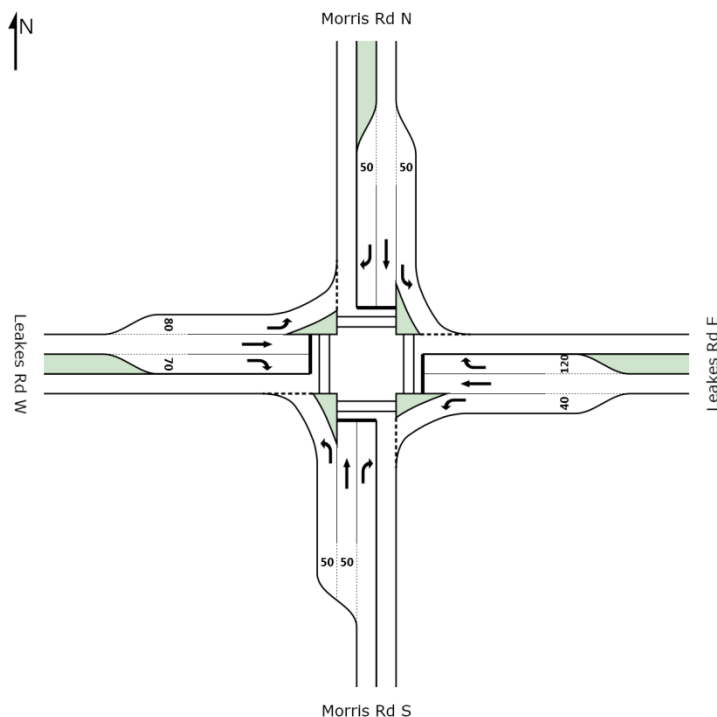
The above analysis indicates that the proposed site access points to Leakes Road will operate within the 'fair' category with manageable queues and delays to motorists departing the subject site, highlighting that the interim intersection arrangement and the unduplicated Leakes Road cross section would be an acceptable intersection treatment.

5.3.3 Leakes Road and Morris Road Intersection

As part of the development, it is proposed to construct to northern leg of the Leakes Road and Morris Road intersection, with localised widening on Leakes Road to provide auxiliary right and left turning lanes.

A concept functional layout illustrating the proposed access arrangement is provided in Figure 14.

Figure 14: Leakes Road and Morris Road Intersection Concept Layout



In relation to the Leakes Road and Morris Road intersection, Figure 15 summarise the results of the SIDRA analysis and shows projected future conditions in the AM and PM peak hour.

Figure 15: Leakes Road and Morris Road Intersection Analysis

Movement	AM Peak Hour			PM Peak Hour		
	DoS	Av. Delay (s)	95th'ile Back of Queue (m)	DoS	Av. Delay (s)	95th'ile Back of Queue (m)
Morris Rd S (L)	0.06	9	3	0.41	19	28
Morris Rd S (T)	0.02	52	1	0.04	52	3
Morris Rd S (R)	0.82	54	167	0.40	49	52
Leakes Rd E (L)	0.05	8	2	0.76	10	41
Leakes Rd E (T)	0.32	24	72	0.80	26	272
Leakes Rd E (R)	0.30	72	12	0.60	70	36
Morris Rd N (L)	0.35	25	24	0.07	9	3
Morris Rd N (T)	0.05	52	4	0.03	52	2
Morris Rd N (R)	0.16	35	13	0.07	46	8
Leakes Rd W (L)	0.01	8	0	0.03	8	1
Leakes Rd W (T)	0.80	34	243	0.23	17	50
Leakes Rd W (R)	0.54	73	22	0.80	74	49

The analysis indicates that the Leakes Road and Morris Road intersection will operate within the 'fair' category with manageable queues and delays experienced by motorists.

5.3.4 Leakes Road and Woods Road Intersection

In the interim, it is proposed that this Leakes Road and Woods Road intersection will operate as a fully directional intersection with localised widening for turning lanes. When Leakes Road is duplicated, the Woods Road and Leakes Road intersection will be upgraded with traffic signals.

Prior to the duplication of Leakes Road, the projected development traffic volumes generated the subject site to the Woods Road intersection are illustrated in Figure 16, while Figure 17 illustrates a concept functional layout of the Leaks Road and Woods Road intersection.

Figure 16: Leaks Road and Woods Road Post Development Volumes

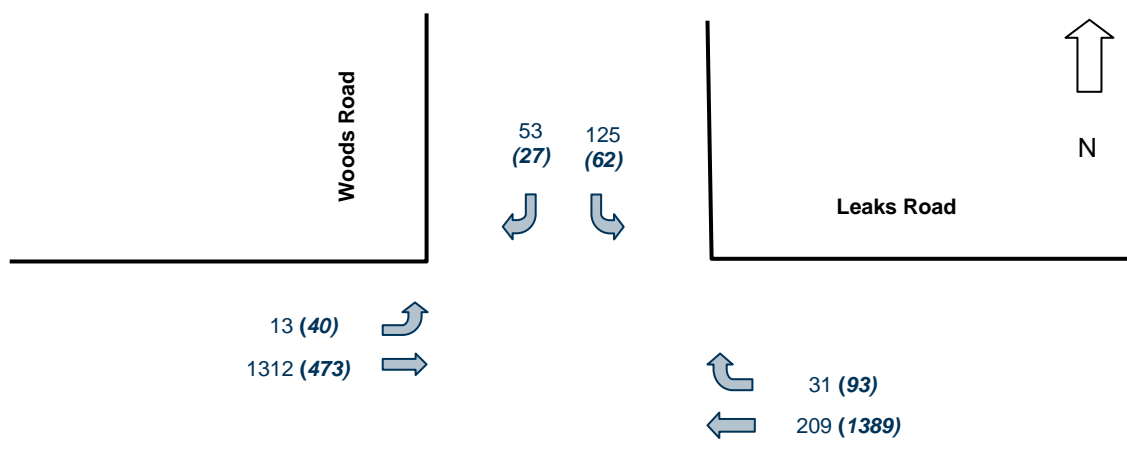
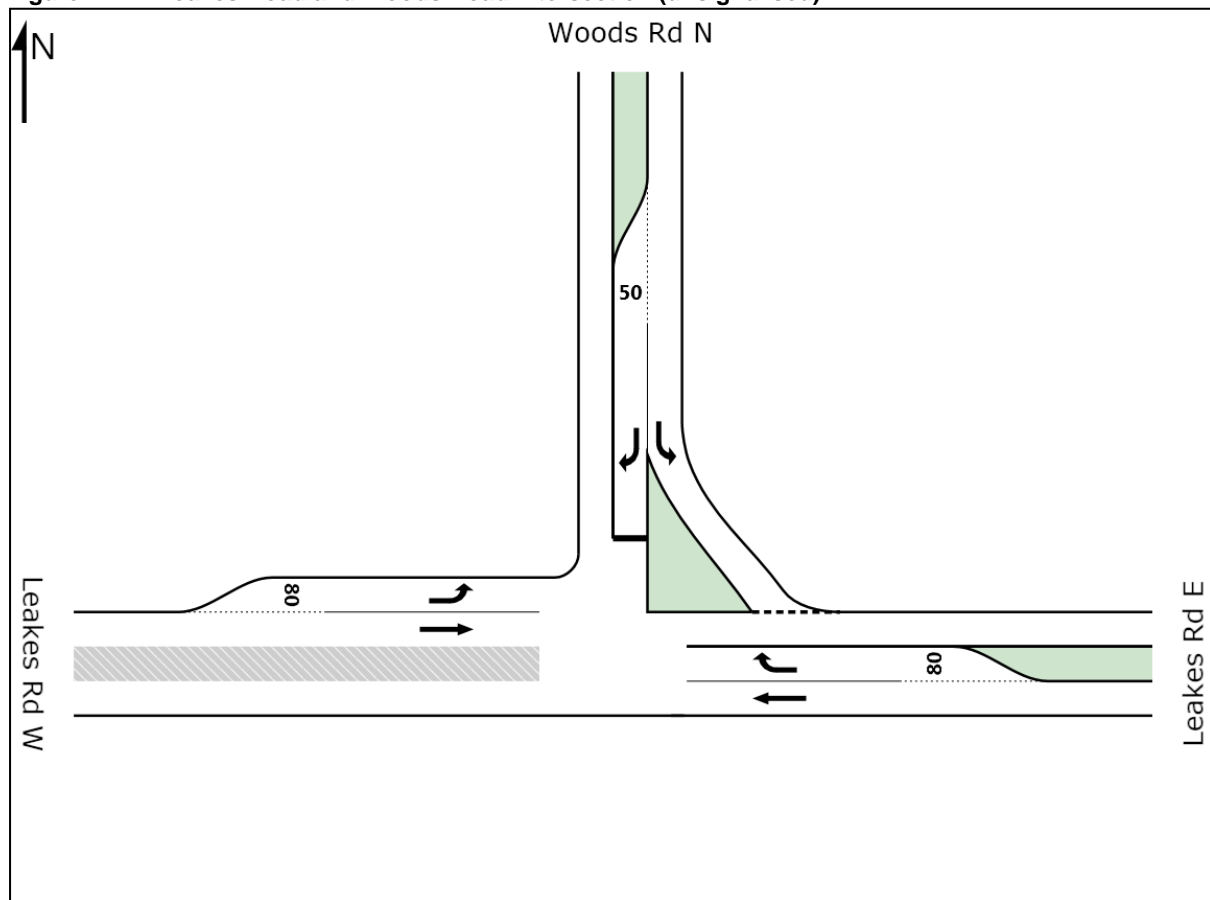


Figure 17: Leakes Road and Woods Road Intersection (unsignalised)



Based on the above, Table 2 summarise the results of the SIDRA analysis in the AM and PM peak hour.

Table 2: Leakes Road and Woods Road Intersection Analysis

Movement	AM Peak Hour			PM Peak Hour		
	DoS	Av. Delay (s)	95th'ile Back of Queue (m)	DoS	Av. Delay (s)	95th'ile Back of Queue (m)
Leakes Rd E (T)	0.12	0	0	0.76	0	0
Leakes Rd E (R)	0.14	24	3	0.12	11	3
Woods Rd N (L)	0.83	64	32	0.10	11	2
Woods Rd N (R)	0.42	45	10	0.49	94	10
Leakes Rd W (L)	0.01	8	0	0.02	8	0
Leakes Rd W (T)	0.72	0	0	0.26	0	0

Review of the above table indicates that the Leakes Road and Woods Road intersection is projected to operate within the 'fair' and category during the morning and afternoon peak respectively, with manageable traffic queues and delays. Based on this, the interim access arrangement and the unduplicated Leakes Road cross section would be an acceptable intersection treatment.

Notwithstanding the above, the land on the eastern side of Woods Road will be developed for residential purposes in the future, and will generate additional traffic to the Leakes Road and Woods Road intersection. At that time, the implementation of the proposed traffic signals at the Leakes Road and Woods Road intersection should be considered.

That being said, it is expected that future connections to the external road network will be made available via internal linkages to Leakes Road, and associated traffic distribution within the area will change over time. Therefore, further traffic analysis should be undertaken as development in the area progresses.

Based on the above, the applicant is committed to the safe and efficient operation of Woods Road. As such, the applicant has proposed to monitor the traffic volumes in Woods Road as development in the area progresses, and undertake additional traffic analysis as required to the satisfaction of the responsible authority.

6 Internal Road Layout

All roads within the subdivision have been designed to provide for convenient access to individual allotments, and have generally been designed in accordance with Clause 56 of the City of Wyndham Planning Scheme and have due consideration to the road design guidelines prepared by the GAA.

The adopted design standards are illustrated in Table 3, and consist of a mix of lower and higher order access streets, with pavement widths varying between 7.0 metres and 15 metres.

Table 3: Typical Road Design Standards

Type	Road Reserve	Carriageway	Bicycles	Parking	Pedestrians
Secondary Arterial (Morris Road)	34.0m	2 x 3.5m traffic lanes (6.0m median)	2 x 2.0m	-	1 x 3.0m wide shared path* (with the opportunity for shared path in open space area)
Local Entry boulevard	30.0m	2 x 3.5m traffic lanes (4.0m median)	2 x 1.7m	2 x 2.1m parking lanes	2 x 1.5m wide footpaths
Woods Road	25.5m	2 x 3.5m traffic lanes	-	2 x 2.1m parking lanes	2 x 1.5m wide footpaths
Access Street (Level 2)	22.7m	2 x 3.5m traffic lanes (2.5m median)	-	2 x 2.1m parking lanes	2 x 1.5m wide footpaths
Access Street adjacent to Park Edge (Level 2)	20.7m	2 x 3.5m traffic lanes (2.5m median)	-	2 x 2.1m parking lanes	1 x 1.5m and 1 x 2.5m wide footpaths
Access Street (Level 1)	16.0m	7.3m or 7.0m	-	On road	2 x 1.5m wide footpaths (with the opportunity for shared path in open space area)
Access Place	13.0m	5.5m or 7.3m	-	On road	1 x 1.5m wide footpath* (with the opportunity for shared path in open space area)

* one side only.

The above street types are shown on the road hierarchy plan included as Figure 18.

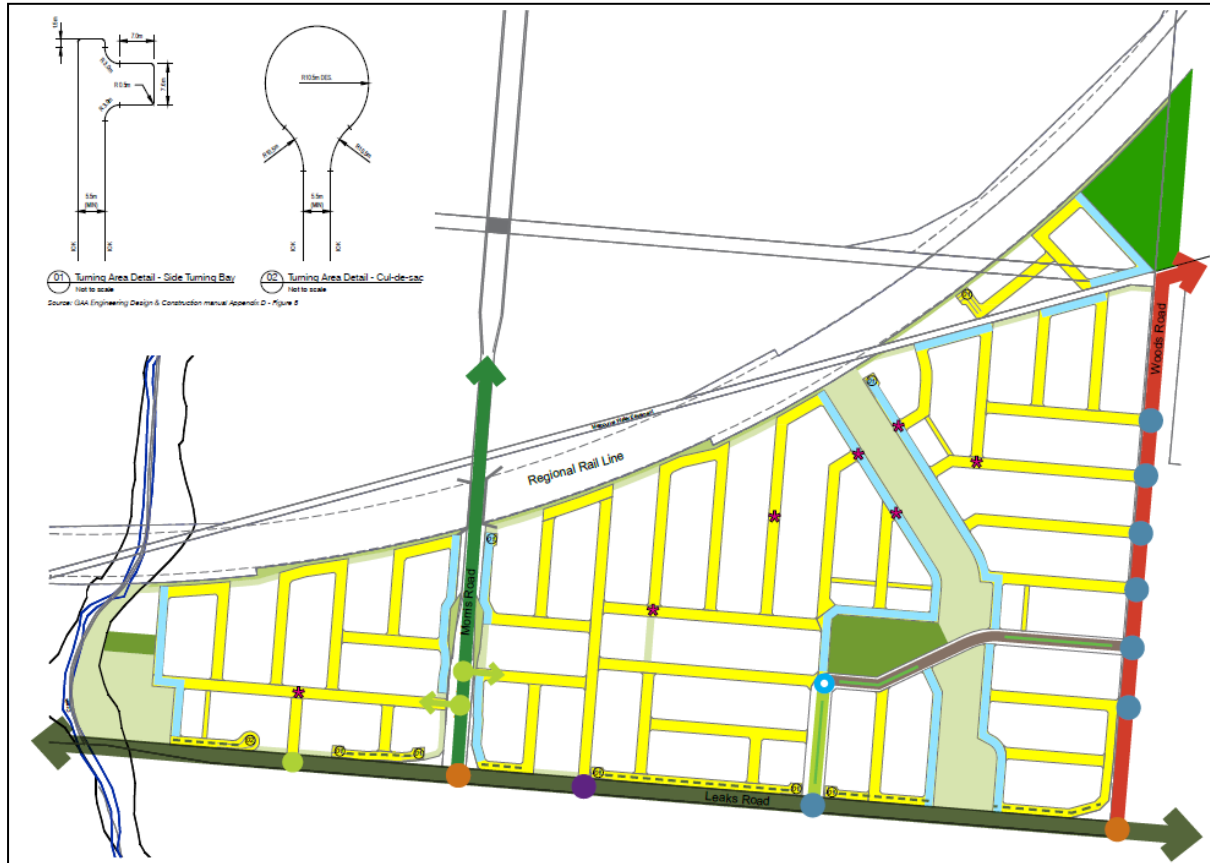
In general terms, all road cross sections have been designed in accordance with Clause 56 of the Planning Scheme. With regard to GAA recommendations of road cross sections, review of recently prepared precinct structure plans indicate the proposed road cross sections are appropriate and has more than sufficient capacity to accommodate the traffic generated from the development of approximately 870 dwellings.

For Access Street (Level 2), the GAA guideline recommended a cross section of 16 metres comprising of a 7.3 metre pavement and an 8.7 metre wide verge. Adjacent to open space areas, the GAA guideline recommended a cross section of 16 metres comprising of a 7.0 metre pavement and a 9 metre wide verge, including a shared path on one side.














In relation to the Access Place (Local Street with Reserve Frontage), the GAA guideline recommended a cross section of 13 metres comprising of a 7.3 metre pavement and an 8.7 metre wide verge. However, it is noted that the 16 metre cross section proposed for Access Place is not strictly required from a traffic function point of view.

In consideration of the small number of residential dwellings accessed via the Access Place, its short length, and the tidal nature of residential traffic, the proposed road cross sections for Access Place are considered appropriate.

Figure 18: Road Hierarchy



Legend

-  Primary Arterial Road - 6 Lane (41m)
-  Secondary Arterial Road - 4 Lane (34m)
-  Connector Street Woods Road (25.5m)
-  Access Street Level 2 (30m)
- Entry Boulevard
-  Access Street Level 2 (22.7)
- East West Boulevard
-  Access Street Level 1 (16m)
-  Access Street Level 1 (16m-5.5m Pavement)
- Subject to further investigation in functional layout
-  Access Street Level 1 (13m)
-  Road Median
-  Signalised Intersection
-  Key Roundabout Small
-  T Intersection
-  Fully Directional Ultimately Left In / Left Out Intersection
-  Left In / Left Out Intersection
-  LATM Treatment
-  Side Turning Bay
- Refer Turning Area detail 01
-  Cul-de-sac
- Refer Turning Area detail 02

7 Planning Scheme Assessment

7.1 Clause 56

Clause 56 of the Wyndham Planning Scheme relates to 'Residential Subdivision' and specifies 'Objectives' and 'Standards' to meet specified design element criteria.

With regard to traffic and car parking issues, the most relevant is *Clause 56.06; Access and Mobility Management*, consisting of the following key objectives:

- 56.06-1: Integrated Mobility Objectives
- 56.06-2: Walking and Cycling Network Objectives
- 56.06-3: Public Transport Network Objectives
- 56.06-4: Neighbourhood Street Network Objectives
- 56.06-5: Walking and Cycling Network Detail Objectives
- 56.06-6: Public Transport Network Detail Objectives
- 56.06-7: Neighbourhood Street Network Detail Objectives
- 56.06-8: Lot Access Objective

The assessment of the effectiveness of the road network in meeting the above objectives will be determined by its ability to provide;

- A safe and accessible road network;
- No incentive for through traffic intrusion;
- Suitable access for emergency and service vehicle access;
- A low speed traffic environment;
- A safe and convenient pedestrian and bicycle network;
- An attractive streetscape with a high level of residential amenity;
- Safe intersection design, with a preference for T-intersections; and
- Sufficient room for drainage systems, public utility services and street lighting.

An assessment of each of the relevant objectives is presented below:

Objective Clause 56.06-1: Integrated Mobility

The intent is to achieve an urban design that is permeable and compact that encourages walking, cycling and public transport modes, with accessibility to larger activity centres.

The proposed subdivisional road network has been designed for substantial integrated mobility networks to be created with strong linkages to the east and west.

Objective Clause 56.06-2 & 56.06-5: Walking and Cycling

The intent is to create subdivisions that encourage walking and cycling within the residential development, and between surrounding neighbourhoods.

The road network within the proposed subdivision is suitably designed to cater for and encourage both pedestrian and cyclist trips within and through the area. The internal road network has footpaths on both sides of all streets.

Objective Clause 56.06-3 & 56.06-6: Public Transport Network

The intent is to encourage the use of existing public transport infrastructure, and to create new services that provide links to surrounding activity nodes.

It is expected that over time, bus linkages and stops will be provided through the subdivision.

Objective **Clause 56.06-4 & 56.06-7:** **Neighbourhood Street Network**

The intent is for direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles.

The proposed internal subdivision roads consist of individual roads, which fall under a number of different classifications within Clause 56. It is considered that the layout proposed and the cross section of those roads is appropriate to promote safe and easy movement through the subdivision for all road users.

Furthermore, the proposed road network will provide adequate clearances to cater for the access requirements of service and emergency vehicles (e.g. typically up to an 8.8m truck).

The forecast daily traffic volumes for the internal subdivision roads are well within the recommended volume limits specified in Clause 56.06-8.

Objective **Clause 56.06-8:** **Lot Access**

The intent is to provide for safe vehicle access between roads and subdivision lots.

All internal single dwelling lots will have direct access onto the proposed internal road network via conventional crossovers.

8 Integrated Transport

8.1 Bus Routes

It is anticipated that future bus services will operate within the proposed residential subdivision via the connector street network.

It is recommended that bus stops are located at approximately 400 metre intervals along the main collector roads. These stops will be provided on road in accordance with the Department of Transport 'Public Transport – Guidelines for Land Use and Development' guidelines and consistent with the Vic Roads Bus Stop Guidelines (February 2006).

All bus stops layouts (apron dimensions, shelter locations etc) will be in accordance the relevant Wyndham City Council design guidelines.

8.2 Pedestrians & Bicycles

A strong pedestrian network is proposed on-site with all roads to be provided with footpaths on both sides of the road. In addition, a shared path is proposed within the site adjacent to open space that connects the active recreation areas to Leakes Road.

In relation to bicycle accessibility, a strong network is provided along the Main Street through the subdivision, which are supplemented by linkages to Access Streets which enable cyclists to comfortable share the road way.

The road network within the proposed subdivision is suitably designed to cater for and encourage both pedestrian and cyclist trips within and through the area. The internal road network has footpaths on both sides of all streets.

9 Traffic Management

9.1 Road Design Speeds

All roads within the subdivision will have a posted speed limit of 50 kilometres per hour.

The speed limits could be reduced as necessary in high pedestrian areas such as adjacent to school sites and any neighbourhood activity centres.

9.2 Signage and Line marking

Signage and line marking throughout the subdivision should be in accordance Vic Roads Traffic Engineering Manual Volume 2, with signage to be in accordance with the Australian Standard Manual of Uniform Traffic Control Devices, AS1742.

9.3 LATM Treatments

In general, LATM treatments should only be considered as part of the road network functional/detailed design in locations where there is an identified risk of higher than target vehicle speeds and it is not possible or practical to manage this through the planning of the subdivision street network.

Post development LATM treatments may be also be required to manage isolated identified traffic issues. LATM treatments should only be contemplated on bus routes and other high order access routes as a last resort.

When necessary, LATM's should be incorporated into intersection treatments using raised intersection or modified 'T' treatments. Examples of modified 'T' treatments are shown in Figure 19 and Figure 20. Where midblock treatments are necessary single lane 'pinch point' treatments are preferred. Midblock and raised intersection treatments may also be combined with pedestrian/bicycle crossing points where practical.

Figure 19: Modified 'T' Treatment Type 1

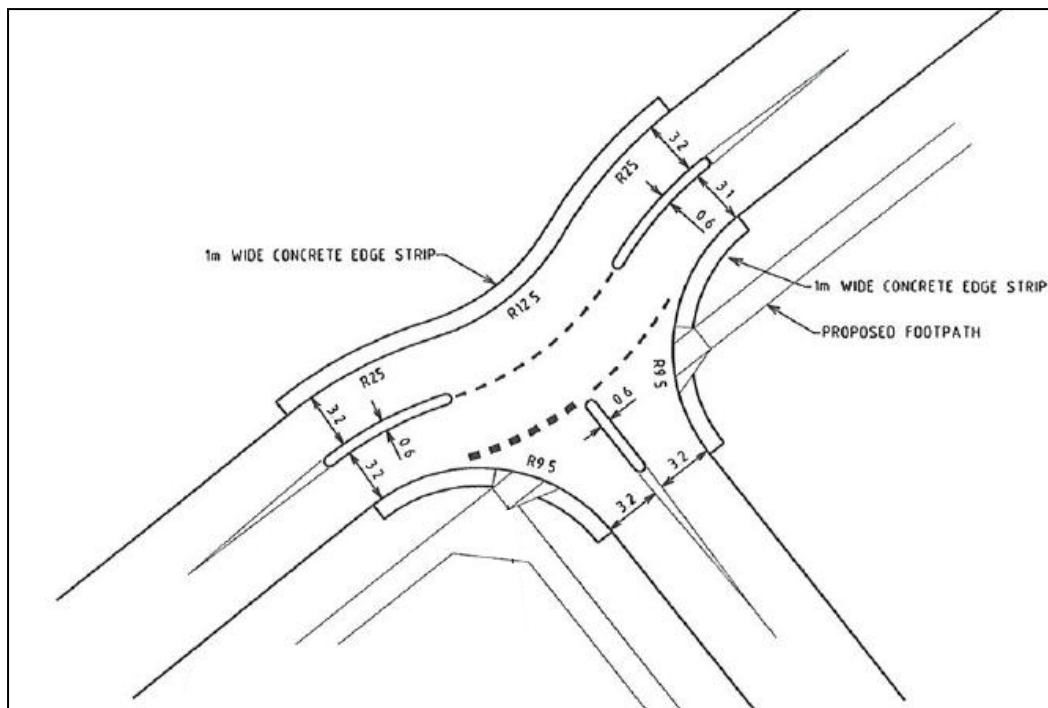
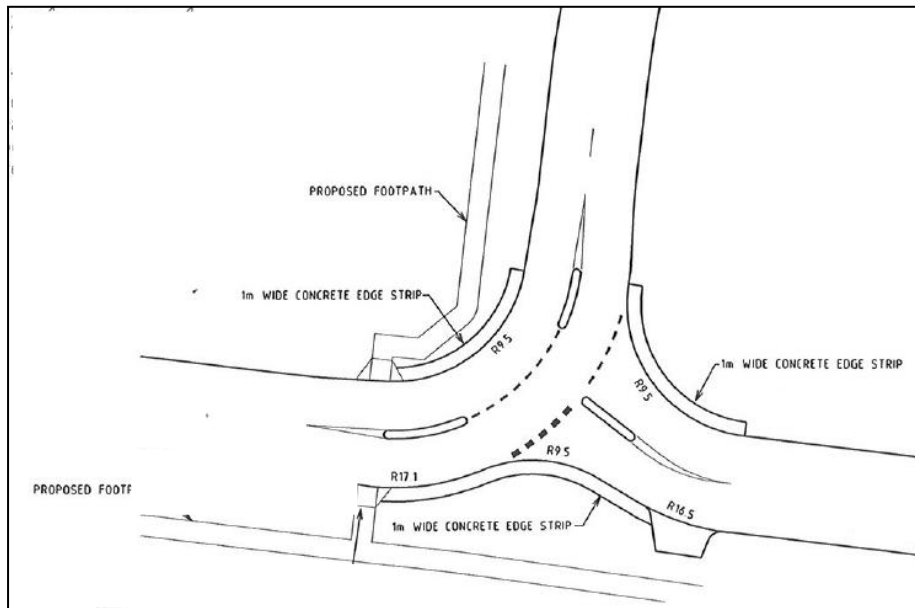


Figure 20: Modified 'T' Treatment Type 2



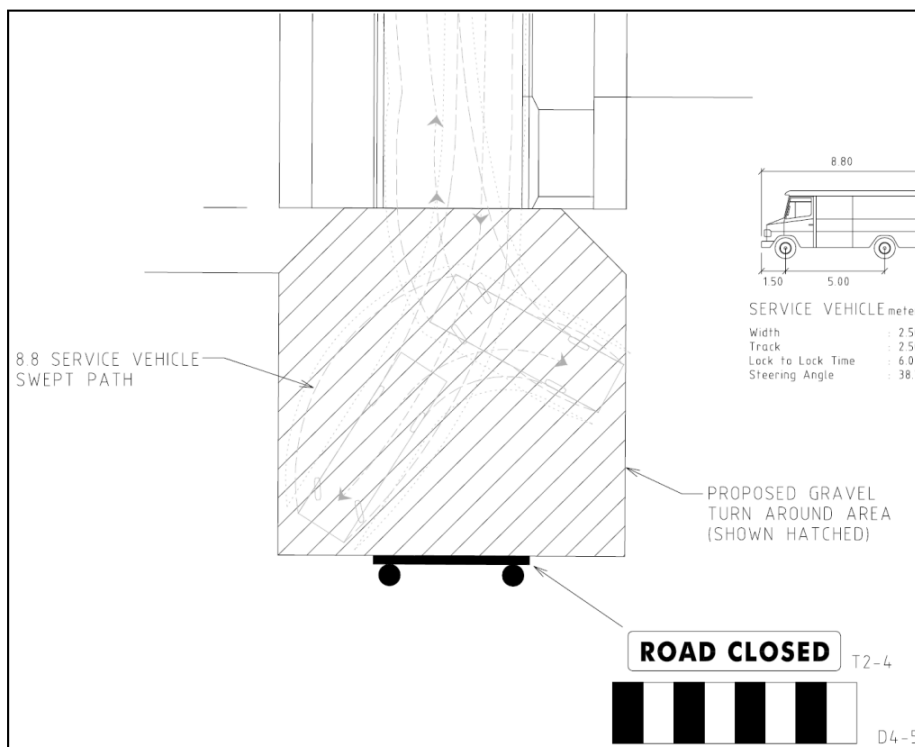
9.4 End of Stage Treatments

Where required, temporary end treatments will be installed at road discontinuations between stages. These end treatments will consist of a gravelled turn around area beyond the end of the road/street pavement with road closure signage installed at the far end of the end treatment.

End treatments will be of sufficient size to accommodate a 3 point turn manoeuvre of a medium rigid vehicle (i.e. a garbage truck / standard CFA tanker).

The proposed configuration of a typical end of stage end treatment is shown in Figure 21.

Figure 21: Temporary End of Stage Road End Treatment



10 Conclusions

Based on the preceding analysis, it is concluded that:

- The development of the site contemplates a total of 897 residential dwellings;
- The development is anticipated to generate 7,804 vehicle movements per day, with 780 vehicle movements occurring during the peak periods. Generated traffic will be distributed to both the surrounding local road network and directly to Leakes Road;
- The proposed intersection treatments will provide for the safe and efficient operation of the Leakes Road site access;
- Post subdivision traffic volumes on the local road network will remain well within, or below the target traffic volumes for the street types based on the guidelines within Clause 56 of the Wyndham Planning Scheme, and in general accordance with the PSP objectives;
- Bicycle and pedestrian links are proposed onto Leakes Road which provides adequate access to the surrounding network.

Annex 1: Leakes Road Concept Intersection Layout Plans

i) Leakes Road and Morris Road Intersection



ii) Leakes Road and Woods Road Intersection

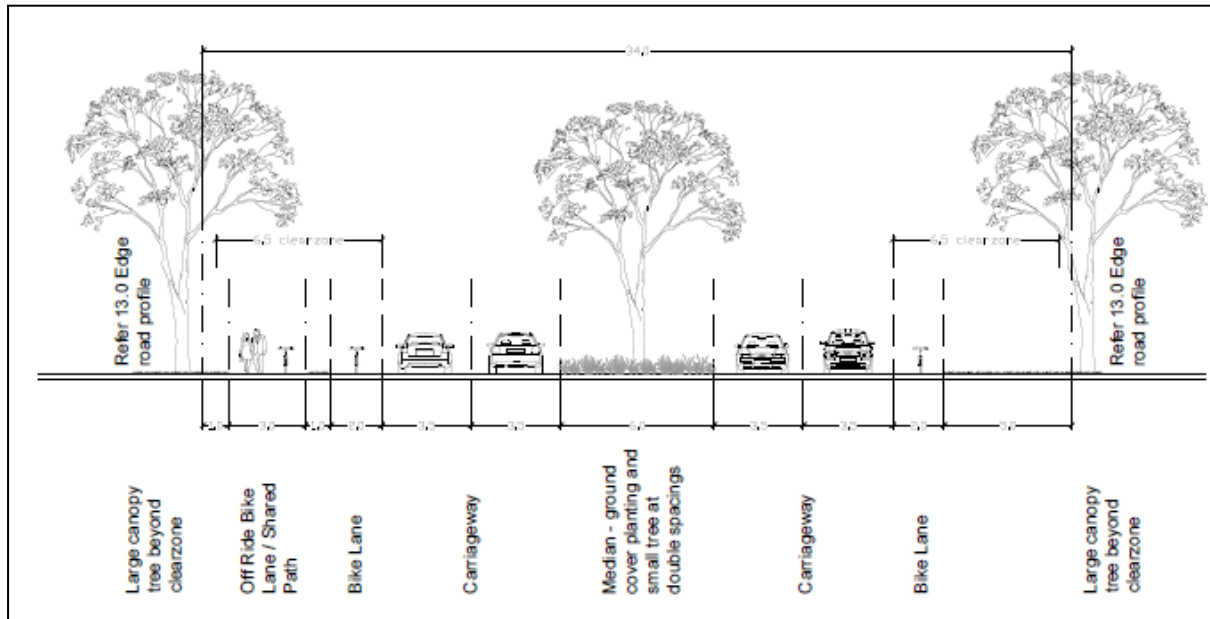


iii) Leakes Road and Woods Road Intersection

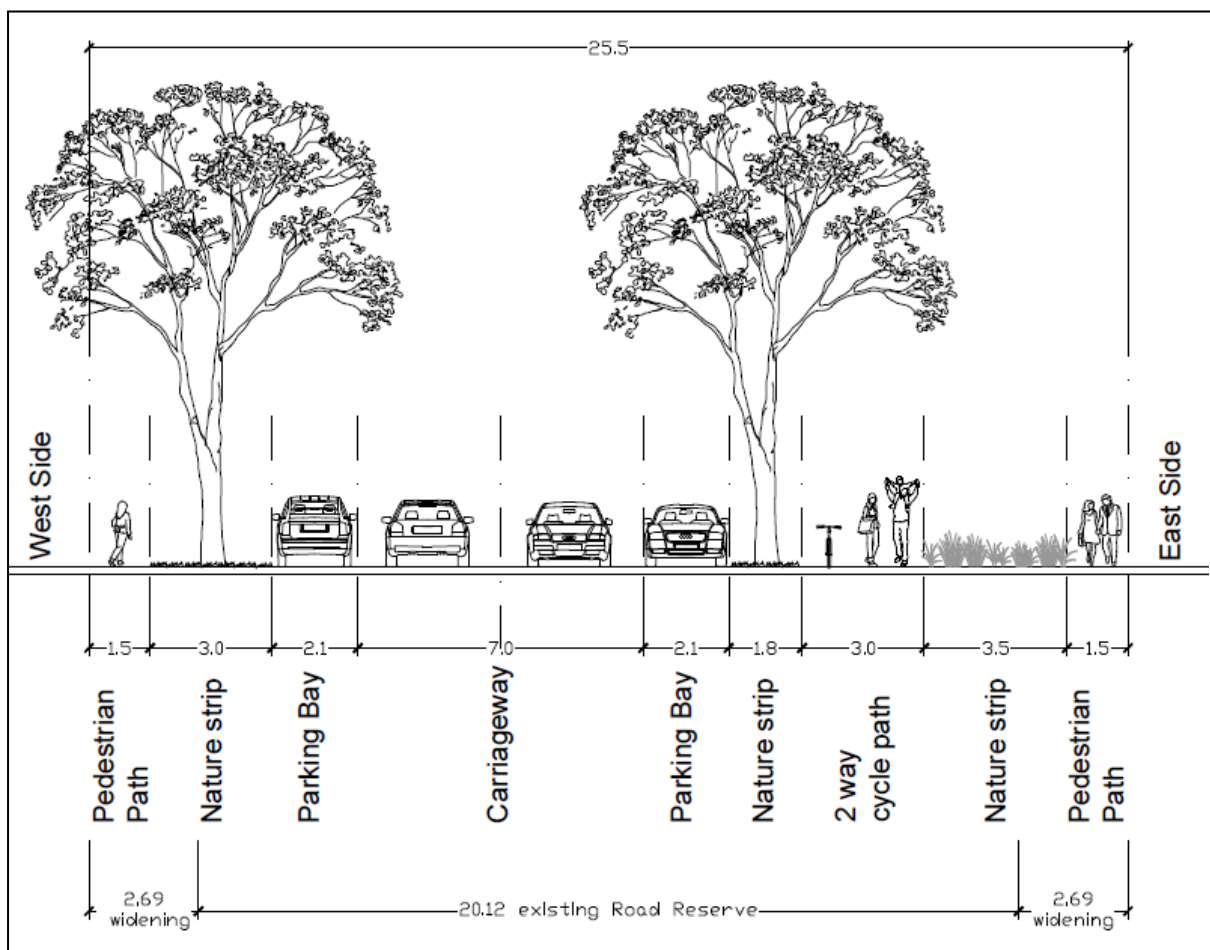


Annex 2: Typical Road Cross Section Plans

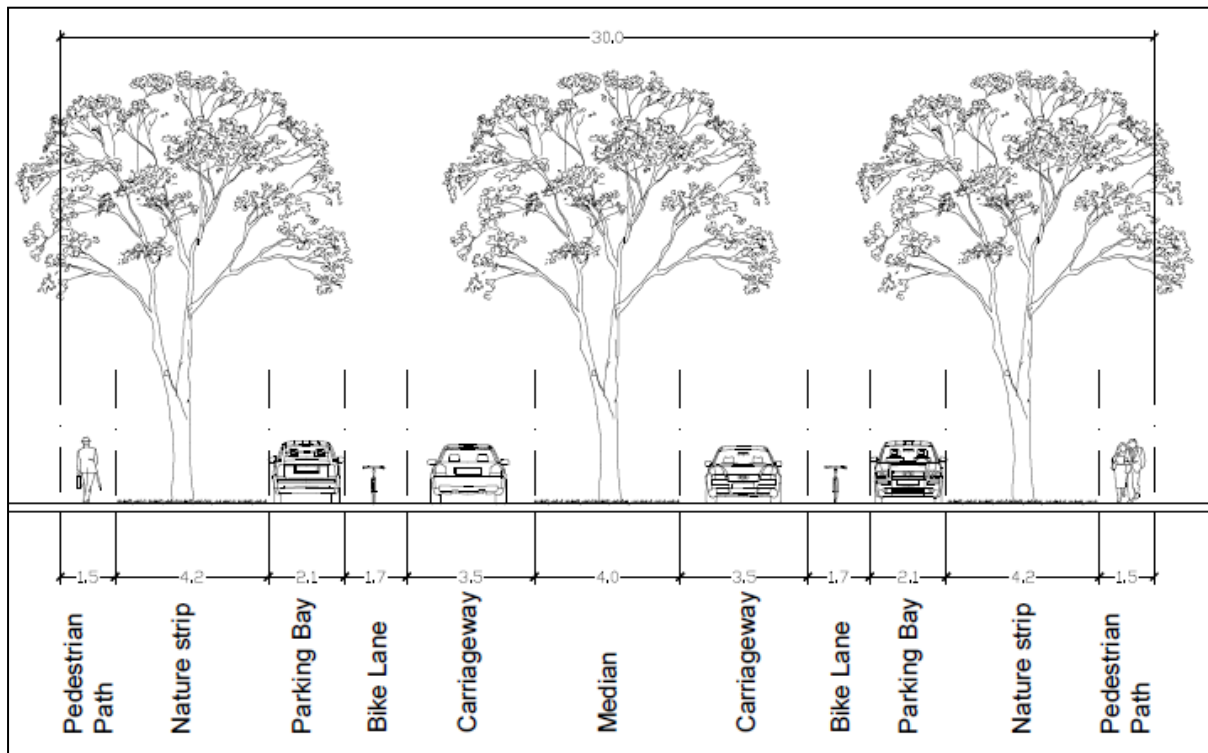
iv) Morris Road Typical Road Cross sections – 34m



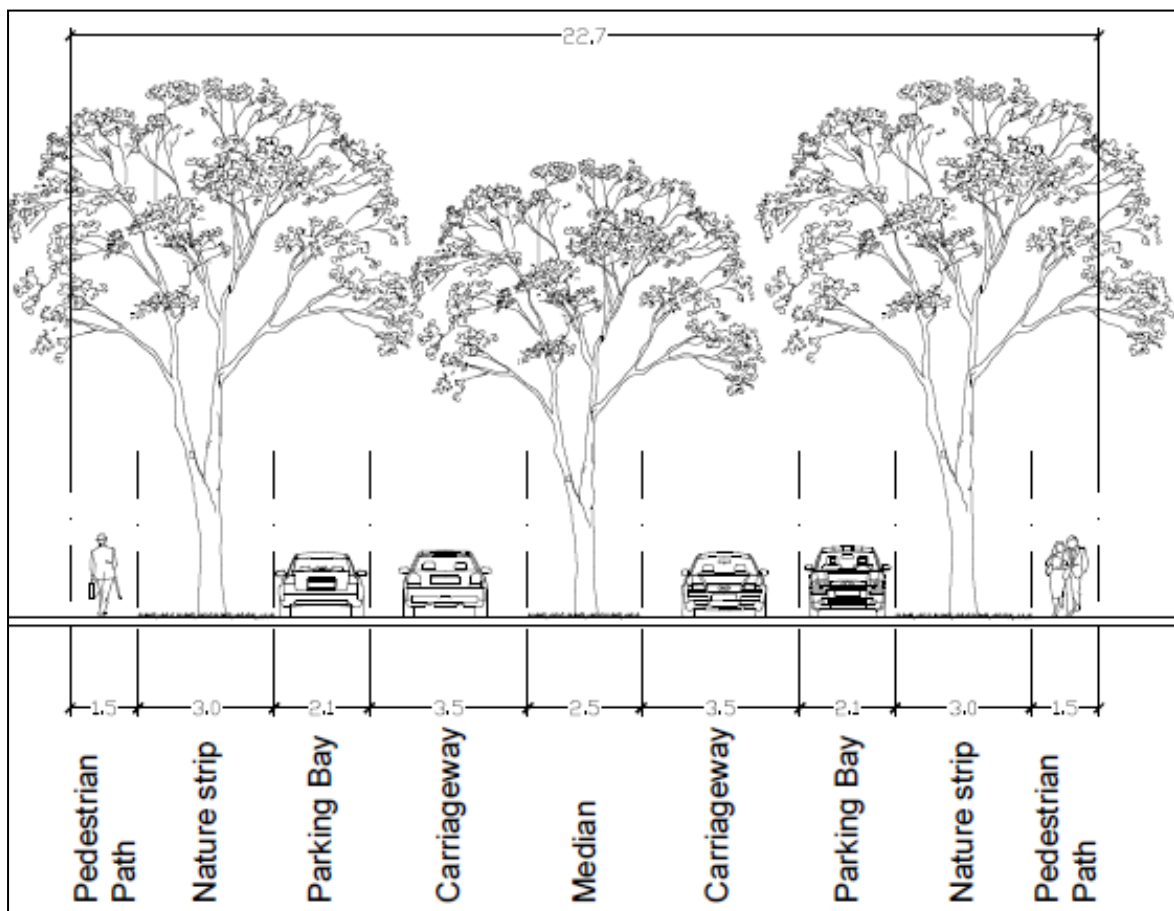
v) Woods Road Typical Road Cross sections – 25.5m with off-road bicycle shared trail



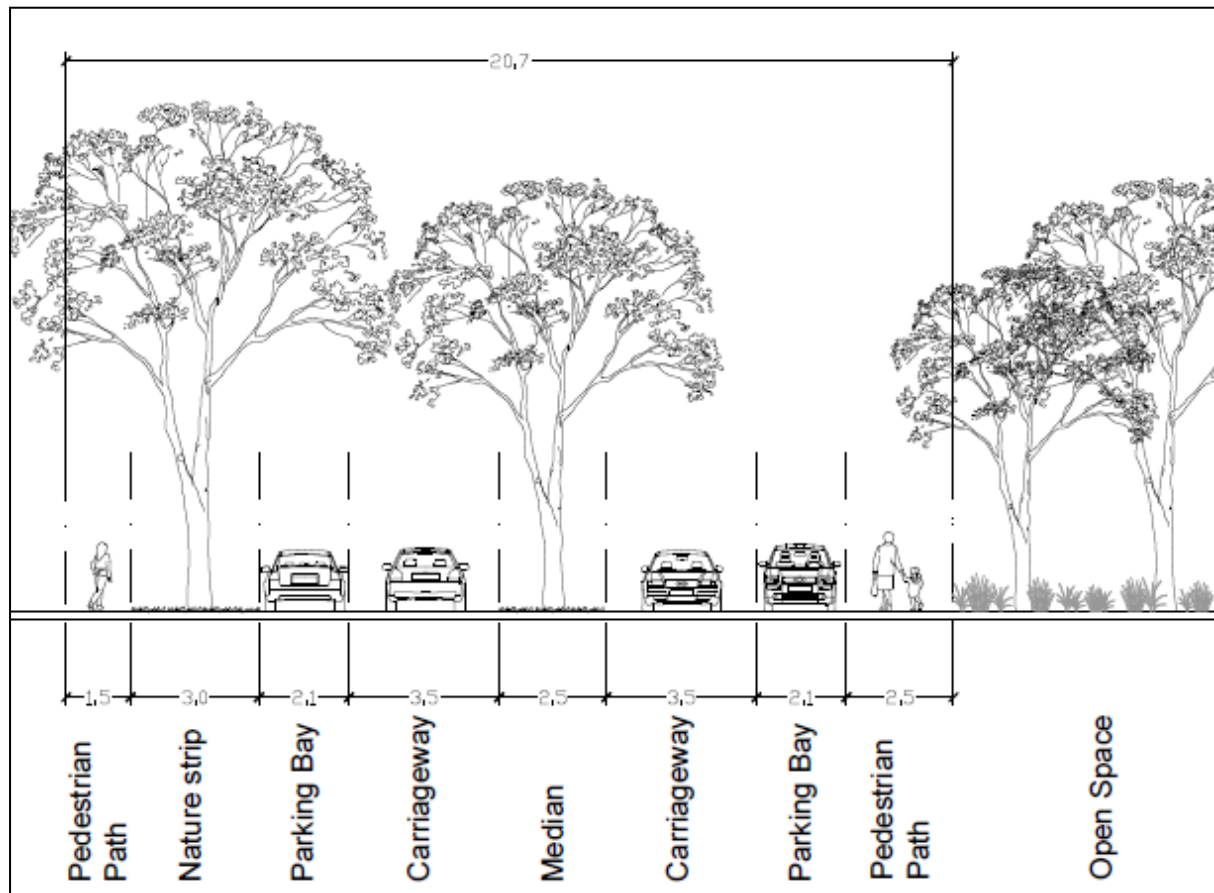
vi) Main Entry Boulevard Typical Road Cross sections (Access Street Level 2) – 30m with 4m median



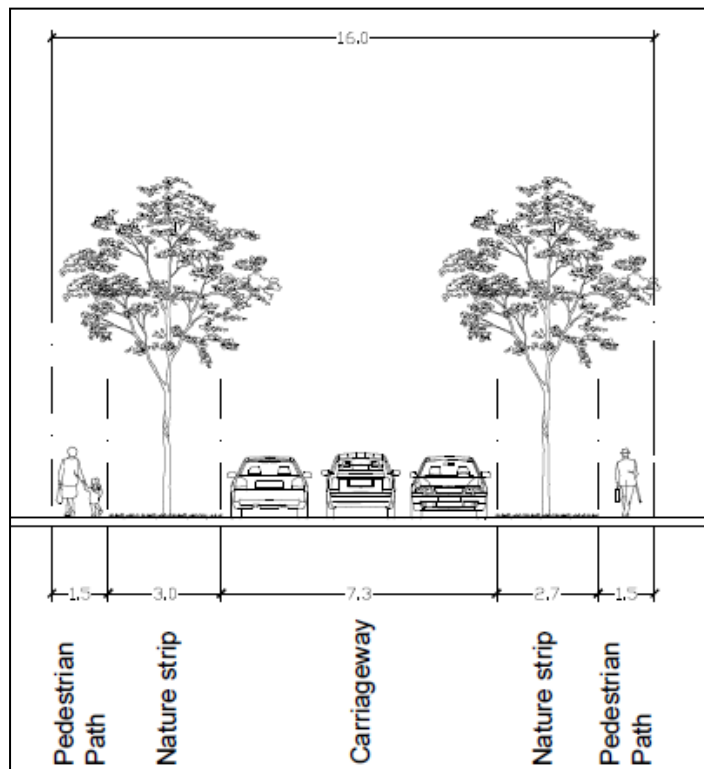
vii) East-West Boulevard (Access Street Level 2) – 22.7m with 2.5m median



viii) East-West Boulevard adjacent to Park Edge (Access Street Level 2) – 20.7m



ix) Local Access (Access Street Level 1) – 16m



x) Local Access Adjacent to Park Edge (Access Place) – 13m

