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Report
Prepared for
Wyndham City Council

March 2019

Service Road Access Review

Tarneit Road and Sayers Road,
Tarneit

ratio:traffic

Version	Date	Reason for Issue	Prepare By	Check By
D01	11/02/2019	Draft	C. Hogan E. Constable	B. Young
F01	01/03/2019	Final	C. Hogan	B. Young

Directory Path	Y:\12001 - 12500\12102 - Tarneit - Sayers Road, Tarneit (Residential Developement)\Reports
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1 Executive Summary:

Wyndham City Council are seeking to introduce a Public Acquisition Overlay (PAO) via Amendment C162 to facilitate the construction of service roads to provide access to a number of properties. The PAO would apply along the southern side of Sayers Road between Tarneit Road and Morris Road and along the eastern side of Tarneit Road between Sayers Road and Hogans Road. Ratio Consultants has reviewed the traffic engineering merits of the proposal.

Why is a service road being proposed?

Most properties within the study area contain single dwellings within large lot sizes of approximately 4,000sqm. As a result of changes to zoning controls that facilitate more development, Council anticipates these lots will be developed for higher density housing or commercial uses in the years to come with some of the development recently completed or already underway.

As the density increases in the area, so does the traffic generated from the sites gaining direct access from Sayers Road and Tarneit Road. As the traffic volumes on Sayers Road and Tarneit Road have increased and will continue to do so as a result of growth in the area, the appropriateness of direct access warrants consideration.

What are the benefits of service roads?

- Service roads improve the safety and efficiency of arterial roads. They do so by separating arterial road traffic from traffic seeking access to properties fronting these roads.
- Service roads consolidate the movements of vehicles to and from the arterial road to a singly entry and exit point. This reduces the number of conflict points. Studies suggest that fewer conflict points results in improved safety of the road for both motorists using the road for thoroughfare and those using the road for property access.
- Studies also indicate that by limiting the number of access points to the arterial road network, the flow of traffic and efficiency of the network is also improved.
- The provision of service roads to replace direct access aligns with the objectives and best practice guidelines of the Wyndham Planning Scheme and Austroads Guide to Traffic Management.

2.1 Introduction

Ratio Consultants has been commissioned by Wyndham City Council to review their proposal to establish a service road to provide access for properties along Sayers Road and Tarneit Road in Tarneit, which currently have direct access to these roads.

The affected properties are those fronting the southern side Sayers Road, between Tarneit Road and Morris Road, and the eastern side of Tarneit Road between Sayers Road and Hogans Road.

These properties are depicted in Figure 2.1.

Figure 2.1 Sections of Tarneit Road and Sayers Road that form part of the study



Covenants that have previously restricted these properties to one dwelling per lot are progressively being removed. As land prices in the area are increasing, it is likely that the density of the development along Sayers Road and Tarneit Road will continue to increase.

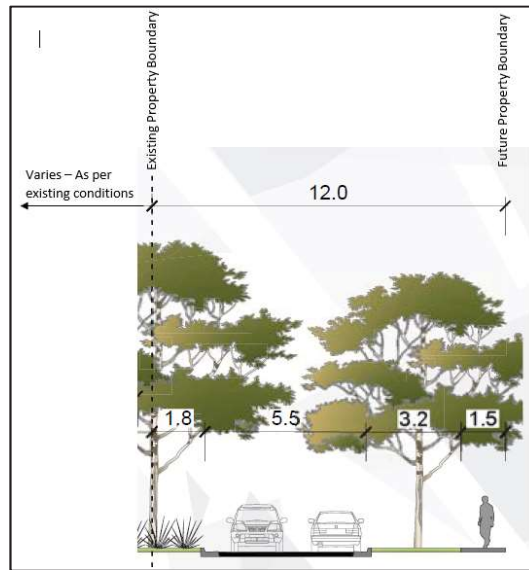
The properties currently gain direct access from Sayers Road and Tarneit Road, which both carry high volumes of daily traffic.

This study was commissioned to determine whether service roads are justified, both from a traffic safety perspective as well as a transport planning standpoint.

This report is submitted to inform the Planning Scheme Amendment C162 which seeks to introduce the Public Acquisition Overlay (PAO) that has been drafted to facilitate the future construction of these service roads. The PAO essentially sets aside a 12m wide reservation to provide sufficient space for the future construction of service roads to provide access to these properties. Owners of the properties will have the land covered by the PAO purchased from them prior to the commencement of the works.

The proposed cross section of the service roads is displayed in Figure 2.2.

Figure 2.2: Proposed service road cross section



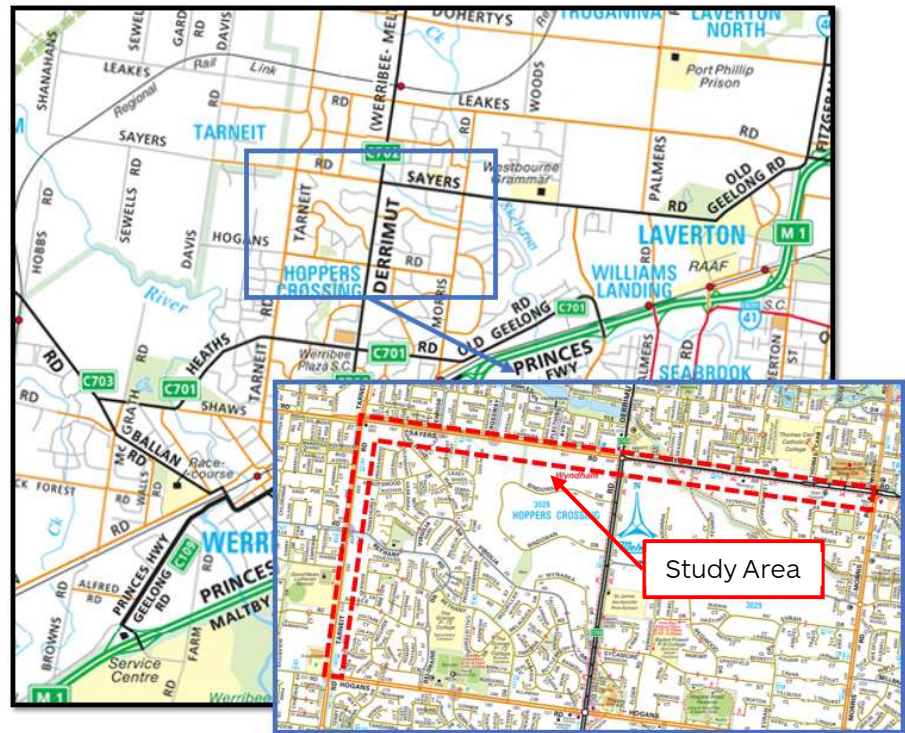
In the preparation of this report the following aspects were considered:

- The existing access arrangements.
- The existing and future traffic volumes along Sayers Road and Tarneit Road.
- Industry Best Practice – As determined by Austroads Guide to Traffic Management.
- The relative benefits of service roads.
- Alternative options for improving safety and efficiency, including a 'no action' approach.

3.1 Study Area

As outlined in Section 2, the study area consists of the properties on the southern side of Sayers Road (between Tarneit Road and Morris Road) and those along the eastern side of Tarneit Road (between Sayers Road and Hogans Road), in Tarneit. The study area and surrounding road network is shown below in Figure 3.1.

Figure 3.1: Study area and surrounding road network



The subject properties along Sayers Road and Tarneit Road are generally rectangular in shape and have frontages onto Sayers Road and Tarneit Road of approximately 40 metres and depths of approximately 102 metres. The subject properties along Tarneit Road and along Sayers Road between 727-797 Sayers Road are located in a General Residential Zone (GRZ1), the subject properties between 381-723 Sayers Road are located in a Low Density Residential Zone (LDRZ).

3.2 Road Network

Sayers Road is a VicRoads declared Arterial Road east of its intersection with Derrimut Road. West of Derrimut Road, Sayers Road is a Council Managed Main Road. Sayers Road runs in an east-west direction between Shanahans Road, in Mount Cottrell and continues as Old Geelong Road, in Laverton North. Sayers Road accommodates two traffic lanes in each direction, a dedicated bicycle lane in each direction and dedicated turn lanes within the centre median west of Derrimut Road. East of Derrimut Road, Sayers Road accommodates one traffic lanes in each direction and right turn bays to accommodate movements into side streets.

Sayers Road has a posted 60km/h speed limit.

Tarneit Road is a Council managed Main Road that essentially runs in a north-south direction between Boundary Road, in Truganina and Railway Avenue, in Werribee. Between Sayers Road and Caraleena Drive, Tarneit Road has a carriageway width of approximately 21.2 metres

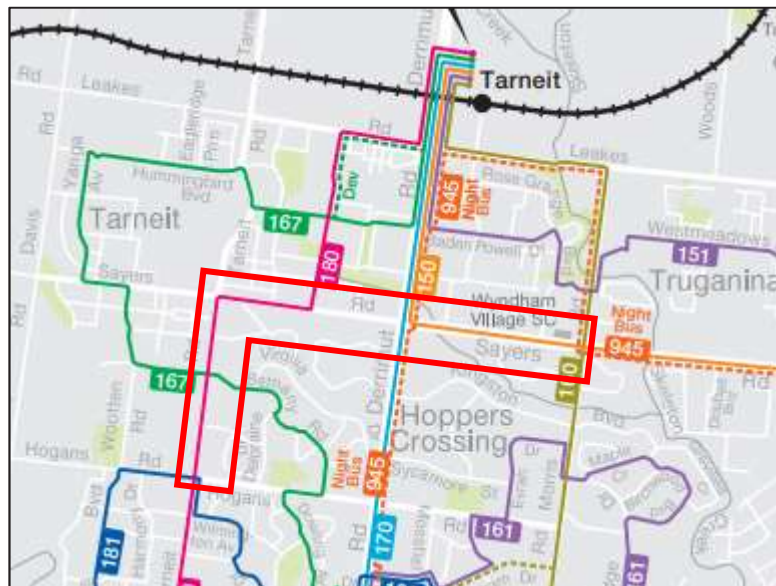
accommodating two traffic lanes in each direction, a dedicated bicycle lane on the western side of the road and dedicated turn lanes within the centre median. Footpaths are provided on both sides of the road. Tarneit Road has a 70km/h posted speed limit, which will be changed to 60km/h with the removal of the 70km/h speed limits.

3.3 Sustainable Transport

Sayers Road, Tarneit Road and roads which intersect with these roads within the study area support a number of bus services as shown in Figure 3.2. The following bus services operate in close proximity of the subject area:

- Bus Route 150 (Williams Landing Station – Tarneit Station via Sayers Road);
- Bus Route 160 (Hoppers Crossing Station – Tarneit Station via Morris Road);
- Bus Route 167 (Hoppers Crossing Station – Tarneit Station via Werribee Plaza SC);
- Bus Route 180 (Werribee Station – Tarneit Station via Tarneit Road); and
- Night Bus 945 (City – Geelong Road – Tarneit – Hoppers Crossing – Werribee – Wyndham Vale).

Figure 3.2: Wyndham Public Transport Map



There are numerous bus stops that accommodate the Route 180-bus-service on both Sayers Road and Tarneit Road and the Route 150-bus-service on Sayers Road within the study area. On Sayers Road these pairs of bus stops are located:

- Opposite 797 Sayers Road and paired with the stop at 803 Tarneit Road;
- 771 and opposite 777 Sayers Road, and
- 743 and opposite 747 Sayers Road;
- 501 and opposite 489 Sayers Road;
- 423 and opposite 441 Sayers Road, and;
- 393 and opposite 399 Sayers Road.

On Tarneit Road these pairs of bus stops are located:

- 803 Tarneit Road and paired with the stop opposite 797 Sayers Road;
- 669 and 682 Tarneit Road;
- 645 and 624 Tarneit Road, and;
- 589 and 570 Tarneit Road.

Bicycle Facilities

The subject area has access to on road bicycle lanes in the form of dedicated bicycle lanes along Tarneit Road between Sayers Road and Caraleena Drive as shown in Figure 3.3 and along Sayers Road west of Derrimut Road as shown in Figure 3.4.

Figure 3.3 Typical cycle lane provision on Tarneit Road

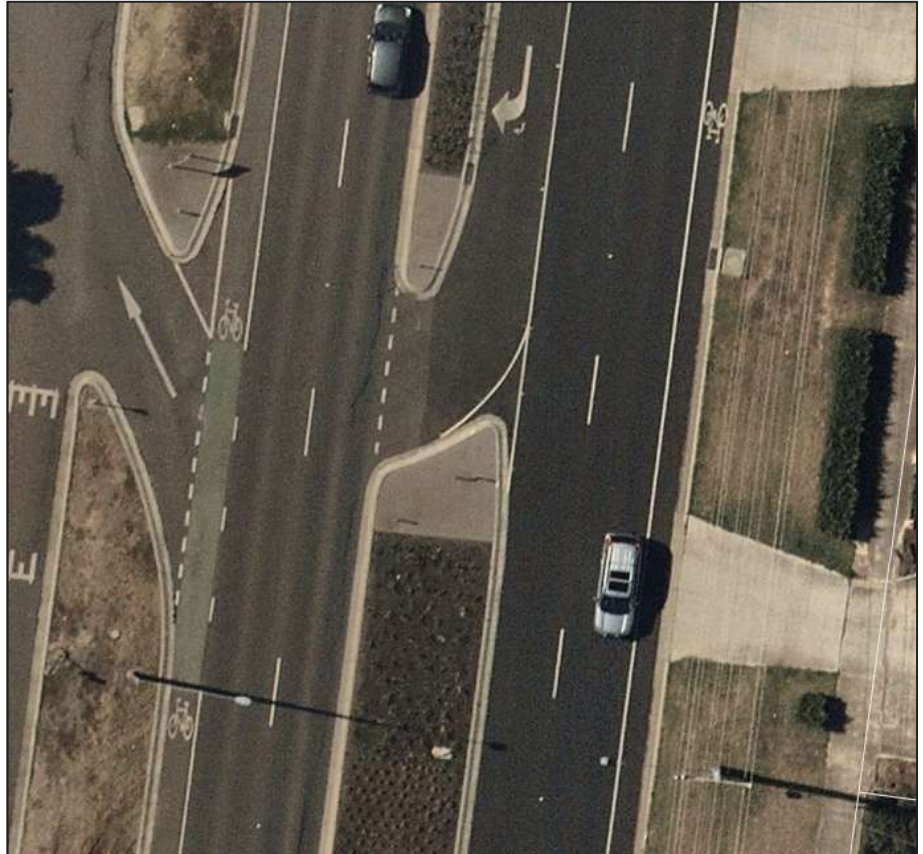


Figure 3.4 Typical cycle lane provision on Sayers Road



3.4 Existing Access Arrangements

The properties within the study area currently contain a mixture of single and unit residential dwellings or businesses, reflecting the covenant restrictions, and where these have been removed.

Properties fronting the southern carriageway of Sayers Road or the eastern carriageway of Tarneit Road gain access to these major roads either via a single width vehicle crossing or two single width vehicle crossings connected in a horseshoe arrangement, as shown in Figure 3.5 and Figure 3.6.

Figure 3.5: Sayers Road - Single width and horseshoe access arrangement



Figure 3.6: Tarneit Road - Single width and horseshoe access arrangement



3.5 Approved Developments

The study area includes properties which have been developed or have been approved for development. These sites will have to be managed during the preparation of the PAO and may require amended planning permits in instances where for example the approved parking provision is impacted by the overlay.

This section considers the applicable road management policies and best practice guidelines as it relates to access arrangements to arterial roads. In particular:

- The Planning Scheme provides objectives in relation to access between roads and lots at Clause 56.
- With respect to establishing industry 'best practice', reference is made to the Austroads Guide to Traffic Management (GTM).
- A merits assessment has been undertaken, having regard to available industry research.

4.1 Clause 56 Assessment

Clause 56.06 of the Wyndham Planning Scheme sets out a number of access objectives sought for residential subdivisions. In relation to lot access in particular, Clause 56.06-8 has the broad lot access objective to 'To provide for safe vehicle access between roads and lots'.

Standard C21 of Clause 56.06-8 then states that *"Vehicle access to lots abutting arterial roads should be provided from service roads, side or rear access lanes, access places or access streets where appropriate and in accordance with the access management requirements of the relevant roads authority."*

Table C1 to Clause 56.06-8 then goes on to define a number of road types, including their design traffic carrying capacities. 'Arterial Roads' are defined as roads carrying greater than 7,000vpd.

Traffic count surveys were carried out from Tuesday 16 October to Tuesday 23 October 2018 on Sayers Road just west of Derrimut Road, and on Tarneit Road just north of Hogans Road. The surveys indicated that the current traffic volumes along Sayers Road and Tarneit Road are 19,225vpd and 19,389vpd, respectively.

The Wyndham North Traffic Modelling undertaken by AECOM indicated that by 2046 the traffic volumes along Tarneit Road within the study area will be 30,300vpd, while Sayers Road between Tarneit Road and Derrimut Road will be between 28,900-34,300vpd and between Derrimut Road and Morris Road will be 31,500vpd.

The Planning Scheme clearly discourages direct access to lots fronting arterial roads, directing instead to the adoption of service roads, side or rear access lanes, access places or access streets.

The proposed service lanes for Sayers Road and Tarneit Road align with the Wyndham Planning Scheme

4.2 Industry Best Practice

Austroads is the association of Australian and New Zealand road transport and traffic authorities. The association promotes improved transport outcomes by providing expert technical input to national policy development on road and road transport issues. They produce a number of practical guides which are used as reference material by Traffic and Transport practitioners, including a series on Traffic Management which has 15 parts and covers a broad range of topics.

Part 4 of *The Austroads Guide to Traffic Management: Network Management* contains broad strategies and objectives for managing road networks to provide effective traffic management for all road users.

Part 5 of the *Austrroads Guide to Traffic Management: Road Management* contains high level information in relation to traffic management between major intersections and includes a section on access management.

Both Part 4 and 5 of the most recent publication of Austrroads (February 2019) have been reviewed in relation to the appropriate to access arrangements for the lots within the study area.

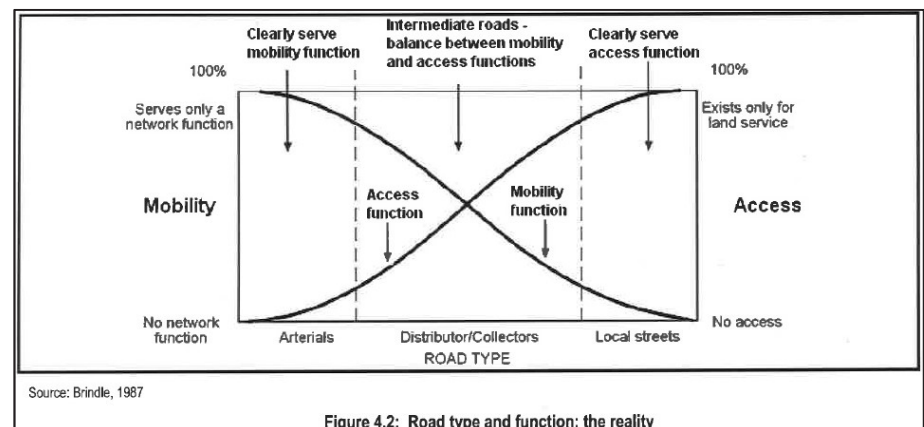
The Austrroads Guides are adopted by VicRoads as the accepted guidelines for access management.

Austrroads GTM Part 4: Network Management

Part 4 of the Austrroads Guide to Traffic Management notes that roads meet two primary roles; one being to facilitate the movement of people and goods and the other being a place for people. Roads satisfy these needs to varying degrees, carrying both a traffic carrying function as well as providing access to properties.

Both Sayers Road and Tarneit Road are planned to perform an increasing 'movement function', with future volumes between 29,000vpd and 34,000vpd expected. Figure 4.1 extracted from the Guide describes the inverse relationship between mobility and access which are subsidiaries of movement and place.

Figure 4.1: Figure 2.9 extracted from Austrroads GTM Part 4: Network Management



Source: *Austrroads Guide to Traffic Management Part 4: Network Management*

As shown in Figure 4.1, as access from a road is increased its mobility decreases. Arterial roads have few access points and high mobility while local streets have many access points and low mobility.

Austrroads GTM Part 5: Road Management

Part 5 of the *Austrroads Guide to Traffic Management: Road Management* discusses 'access management', which is defined as the process of controlling the movement of traffic between a road and adjacent land.

The purpose of access management is to protect the safety and efficiency of the traffic function of the road, while acknowledging the needs and amenable use of adjacent land, particularly safe and appropriate access.

The objective for access management is to achieve a level of interaction between the road and abutting land that is consistent with the function of the particular road.

Further, the need for access management arises because vehicle movements generated by abutting properties can create potential safety issues and interruptions in the traffic flow along a road. On arterial roads carrying high traffic volumes, traffic efficiency is of greater importance and these interruptions creates a greater risk of crashes, inefficiencies and other costs to the community.

An effective access management strategy protects the level of service on important through traffic routes and provides safe and appropriate access to adjacent land.

A range of access management categories are defined that could apply to different road types. Table 2.1 from the guide would best describe the study area sections of Sayers Road and Tarneit Road as Category 2B roads, or roads with restricted access based on their traffic carrying functions.

Specific access control tools identified along these road types include the provision of service roads to provide access to driveways and to limit the number of access points to the major road. Direct access is discouraged.

Roads with unrestricted access are typically for local roads whereby the primary function of the road is to provide access to local areas and property.

The access management strategy proposed by Council for the lots within the study area is in accordance with the relevant Austroads guidelines.

Arterial Road Access Management Guidelines

Section 4 of *A Framework for Arterial Road Access Management* guidelines outlines a number of tools to regulate the incidence of turning conflicts, speed differentials within the arterial flow, and side friction.

The appropriate access management techniques for lots fronting arterial roads suggested in Table 1 of the Guide is to adopt a service road, or a contiguous subdivision road (or loop road).

Opportunities for alternative access arrangements to existing lots are usually limited. In this case, there exists an opportunity to apply an access management strategy that is more in line with current practices for the type of development envisaged. The Guidelines further state in Section 6.4.1 that roads in transitional areas should be placed under a corridor access management plan which has regard for the likely future status and functions of the road, as well as the future use and disposition of the adjacent land.

Summary

Council's proposed service road access plan is in accordance with the network management methods outlined in the Austroads Guidelines (Guide to Traffic Management Parts 4 & 5 and *A Framework for Arterial Road Access Management*), reflecting the increased future access needs of the study area lots and the predicted increase in road traffic on both main road frontages.

4.3 Advantages of Service Roads

The provision of service roads as opposed to allowing direct access significantly reduces the number of conflict points and the associated potential for vehicle to vehicle conflict. A service road treatment provides a safer outcome as a result.

This section describes what conflict points are, their relationship with traffic safety and the relative benefits on offer through the provision of service roads.

Conflict Points

Points of conflict are locations identified within intersections in which accidents can occur as a result of turning manoeuvres.

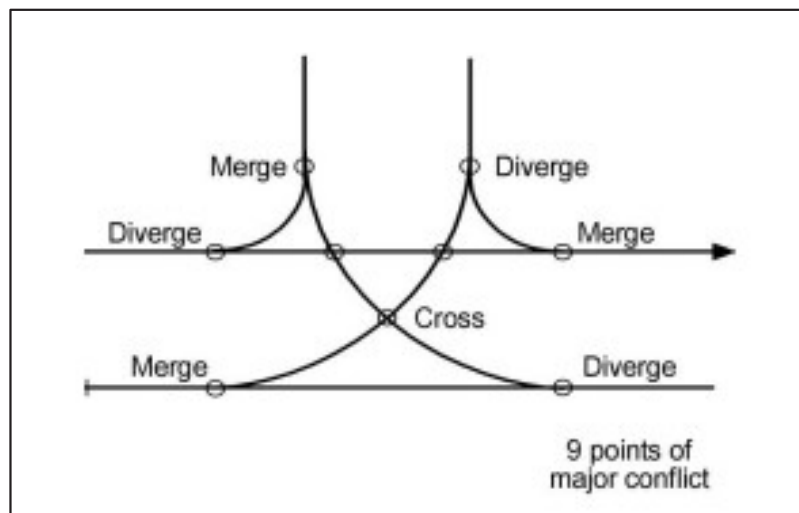
Section 2.5 of Part 6 of *The Austroads Guide to Traffic Management: Intersections, Interchanges and Crossings* states that “the potential for conflict within an intersection should be minimised through reduction of the number of points of conflict.”

Section 2.5 of Part 6 of The Guide to Traffic management identifies that the intersection manoeuvres involving conflicts are:

- Merging;
- Diverging in which the vehicles following is forced to slow;
- Weaving; and
- Crossing.

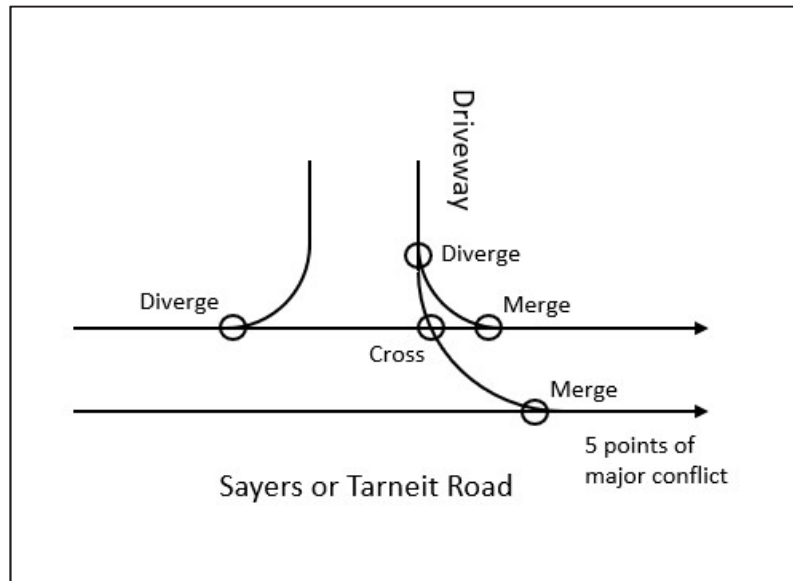
In the case of a typical T-intersection on an undivided road, there are nine conflict points, as illustrated in Figure 4.2.

Figure 4.2: Typical T-Intersection Points of Conflict – undivided road



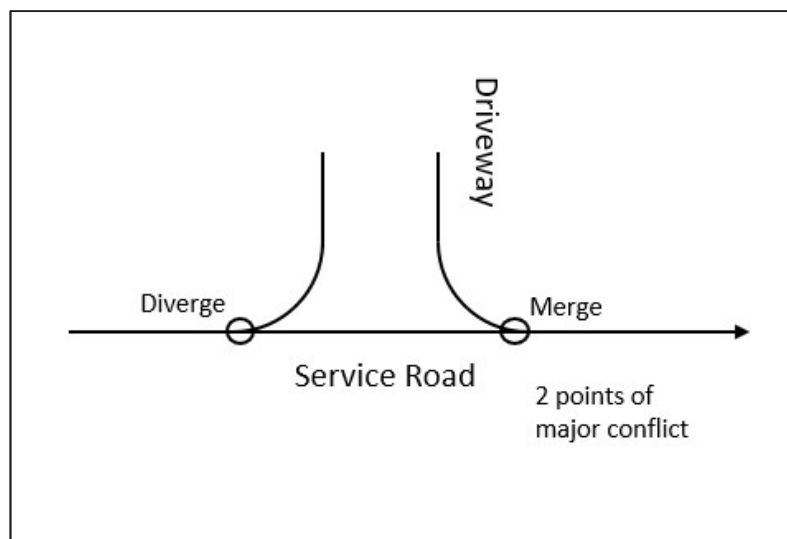
Several properties along Sayers Road currently have this configuration, however, most properties within the study area exhibit the conflict point diagram as shown in Figure 4.3 as a result of having a divided carriageway.

Figure 4.3: Typical Points of Conflict Diagram - divided roads



As service roads consist of a single one-way trafficable lane each driveway intersection will comprise of two conflict points, as illustrated on Figure 4.4.

Figure 4.4: Driveway/Service Road - Points of Conflict

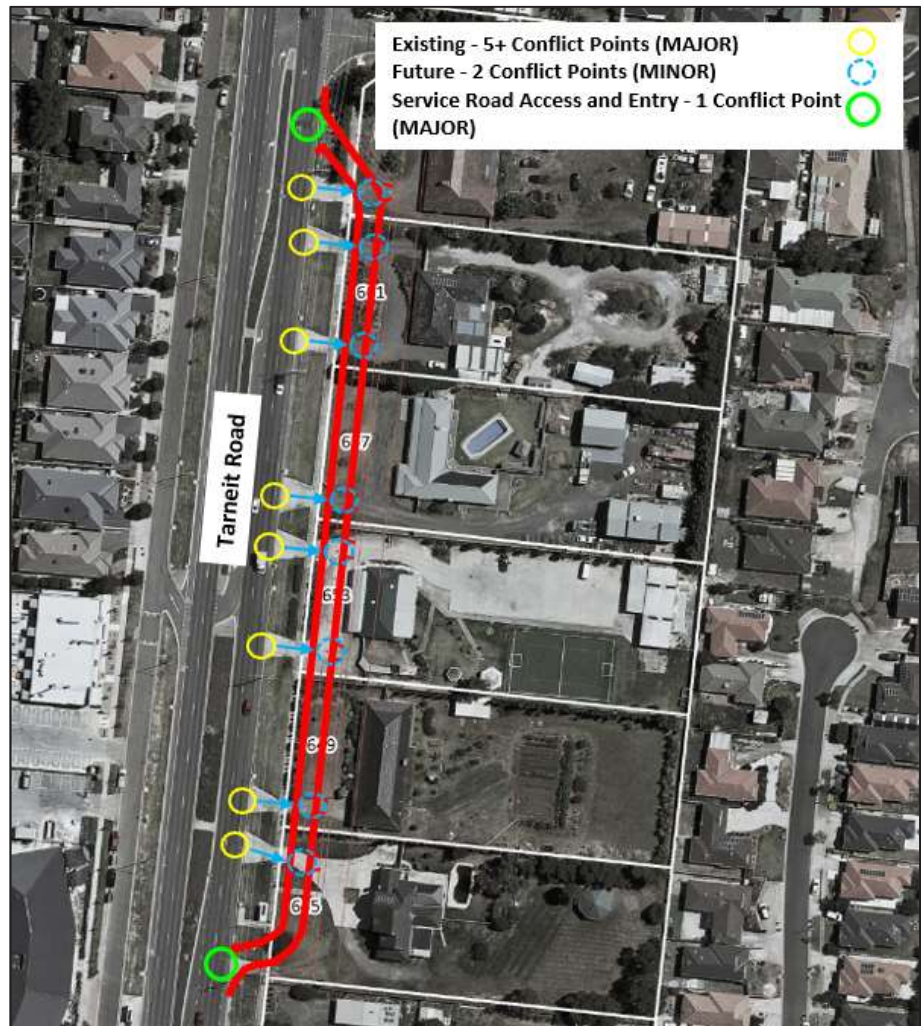


A major advantage of service roads is the associated reduction of conflict points along the major road. The provision of service roads removes the conflict points resulting from the direct access driveways from each fronting property and replace them with two conflict points, one at the entry (diverge conflict) and one at the exit (merge conflict) to the service road.

The number of conflict points are not only reduced by the introduction of service roads, but the severity of conflict points (how severe an accident would likely be at a conflict point location) is also reduced due to lower vehicle speeds and volumes along service roads. As such, conflict points along Sayers Road and Tarneit Road are considered to be major conflict points while conflict points along the proposed service roads are considered to be minor conflict points.

The change in number, location and severity of conflict points is illustrated in Figure 4.5 which depicts an example of one the proposed service roads.

Figure 4.5: Change in number and location of conflict points



The diagram above illustrates eight direct access driveways along a section of proposed service road, each of which contains five conflict points within the major road (Tarneit Road), corresponding to 40 conflict points in total.

In contrast, the future service road features two connections to the major road (one conflict point at the entry and two at the exit point) and two conflict points each at the service road connections to property access. This corresponds to three conflict points in the major road environment and 16 conflict points in the relatively safer service road environment owing to the lower traffic speeds and volumes.

Relationship Between Conflict Points and Safety

The relationship between conflict points and safety of intersections was explored in the study *“Development of the kinetic energy management model and safe intersection design principles”* by Monash University Accident Research Centre.

The study stated that *“Conflict points at an intersection are the specific locations where two users have the potential to collide should both*

movements occur concurrently. The number of conflict points varies between road geometries as well as the permitted movements at each intersection. Intersection designs that reduce the number of conflict points then reduce the potential for a crash. Therefore, reducing the number of conflict points is a key principle in increasing safety at intersections” (Monash 2010).

This is reflective of studies which show a correlation between an increase in access points along arterial roads and increases in crashes.

A compilation of Australian and overseas experience affirmed that an increased frequency of access to rural and urban arterials will inevitably lead to increases in crashes. On urban arterial roads, allowing direct access and frequent minor junctions can increase the casualty crash rate by 30% on divided roads and 70% on undivided roads (Austroads 2000).

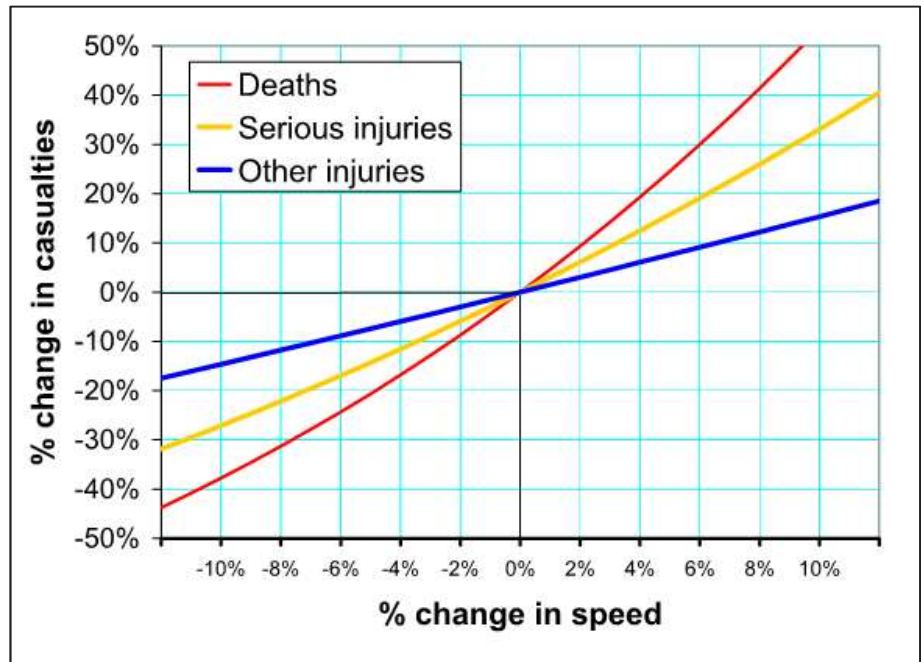
Further, an Australian study showed 1-2% increase in the number of crashes could be expected for each additional residential access point on an urban road (Ogden 1993). It also showed that going from 2 to 6 intersections and/or access points per km would result in a 20-100% increase in the crash rate on four lane urban roads, and a 50-100% increase on two lane urban roads (Ogden 1993).

As such, the reduction in conflict points through the introduction of service roads will result in a reduction in crash potential along Sayers Road and Tarneit Road and for motorists travelling to and from the affected properties within the study area.

Traffic speed and service roads

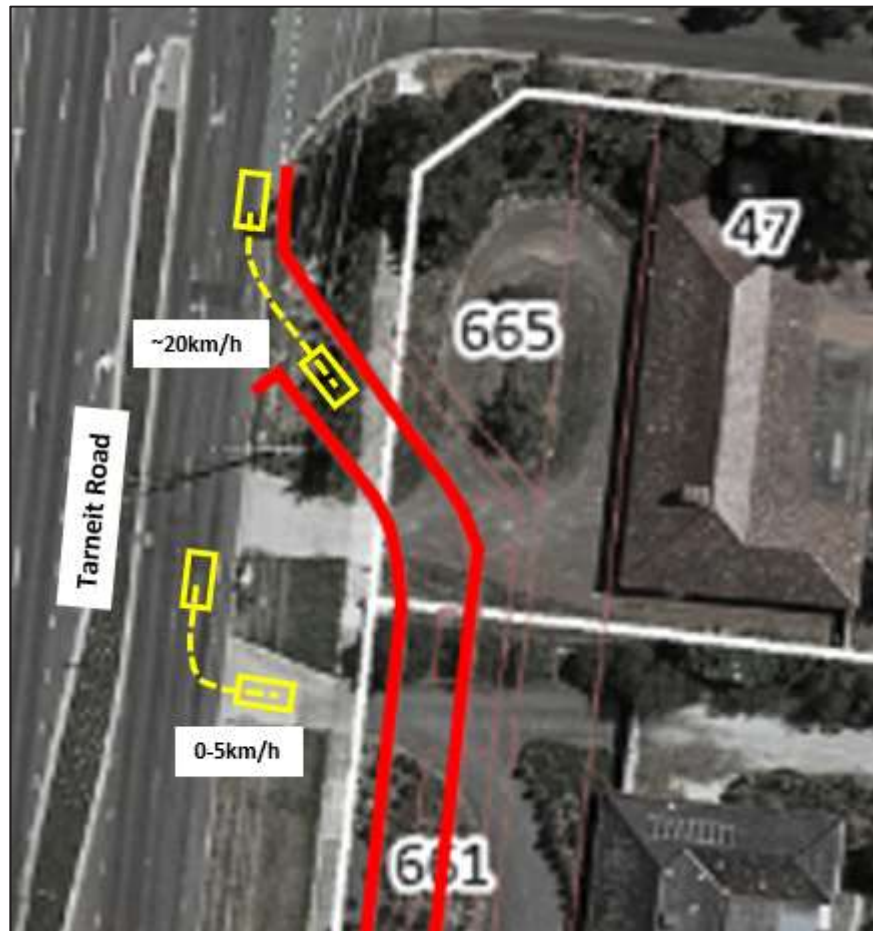
The speed limit along Sayers Road and Tarneit Road is 70km/h, while the speed limit along the service roads will be 50km/h. Crashes which occur at higher speeds are more likely to be fatal or cause injuries. Any crashes that occur at the conflict points along the service road would result in a lesser consequence compared to those associated with direct access to the arterial road network. The slower speed environment associated with service roads therefore presents a safer outcome. This is reflected in Austroads Guide to Road Safety Series Part 3: Speed Limits and Speed Management which presents the relationship between vehicle speeds and casualty rates as per the graph represented in Figure 4.6.

Figure 4.6: Vehicle speed vs casualty relationship



Furthermore, due to the geometry, vehicles accessing the service roads are not required to decelerate as much as a vehicle accessing a driveway. Drivers entering a driveway are required to slow to a near stop before entering whereas vehicles entering a service road will often slow to no less than 20km/h due to the angle of access typically being between 30-45 degrees from the main road. As such direct access driveways present a greater probability and consequence of rear-end collisions. This is depicted in Figure 4.7.

Figure 4.7: Vehicle entry manoeuvres, service road vs direct access



Traffic volumes on service roads

In addition to the reduction of conflict points, service roads experience significantly lower traffic volumes. As mentioned in Section 4.1, existing traffic volumes along Sayers Road and Tarneit Road are 19,225vpd and 19,389vpd respectively with volumes anticipated to increase to approximately 30,000vpd by 2046. Traffic volumes along the service roads are a result of traffic generated by the properties being serviced by the service road.

To demonstrate the relative difference in traffic volumes, the anticipated traffic volumes for the proposed service road along 587-625 Tarneit Road has been compared to the existing southbound traffic volumes along Tarneit Road.

This service road will provide access to eight properties, including one property which has been developed into a multi townhouse development consisting of 16 dwellings and two other properties which have approved permits to be developed.

One of the approved developments is also for a townhouse development with 16 dwellings while the other development is for a childcare centre catering up to 160 children.

The RTA Guide to Generating Traffic Developments outlines a rate for dwelling houses of 9 daily movements per dwelling. Application of this rate to the five existing single dwelling properties, the 16 townhouse

development and the approved 16 townhouse development equates to 333vpd.

The RTA Guide to Generating Traffic Developments outlines a rate of 1.6 vehicle movements (0.8 ingress, 0.8 egress) per child in the morning and 1.6 vehicle movements per child in the evening. Application of this rate to the future childcare centre is 512vpd.

As such, the estimated future potential traffic volume along the service road providing access to 587-625 Tarneit Road is approximately 845vpd. This is significantly less than the existing 9,305vpd along the southbound carriageway of Tarneit Road.

The much lower traffic environment expected on the proposed service roads results in a reduced probability of conflict at the conflict points present at the property access points compared to the existing direct-access arrangement.

Crash Severity

It is industry practice to assume that the peak hour traffic volume of a road is 10% of the daily traffic volume. Based on this, the peak hour traffic volume of the service road is 85 vehicles. This is an average of one vehicle every 0.7 minutes or one vehicle every 42 seconds in the peak hour. By comparison, the peak hour volume of Sayers Road and Tarneit Road are 19,225vpd and 19,389vpd respectively. This is approximately one vehicle per 0.03 minutes or one vehicle per 1.8 seconds.

It can therefore be reasonably assumed that if a crash were to occur, the probability of the crash involving more than two vehicles on either Tarneit Road or Sayers Road is higher than on a service road as the frequency of vehicles is higher. The severity of a crash on the arterial roads would therefore be higher as more vehicles would be involved. Additionally, as previously mentioned, the speed on the arterial roads is 70km/h as opposed to standard speeds on service roads of 50km/h. Crashes which occur at higher speeds are more likely to be fatal or cause injuries

The inclusion of a service road is therefore likely to decrease the severity of crashes should they occur.

Summary

The combination of reduced conflict points, improved geometry, slower vehicle speeds and significantly lower traffic volumes will result in a reduction in crash potential and reduction in severity of crashes.

4.4 Effects of Driveway Frequency on Efficiency

The Institute of Transportation Engineers Journal of 1998 states that the number of driveways and unsignalized intersections affects the operation of traffic along an arterial road. The basis is that as the number of access points increase, so do the number of conflicts, reducing the safety and increasing the travel time, delay and emissions.

The access density is the rate of access provision along a given stretch of road. The critical access density is the access density that, once exceeded, research found an increased travel time along the road of 10-15 percent. This is due to an excess of vehicles decelerating in the left lane to turn into the accesses, thereby slowing the overall traffic speeds along the main road.

The critical access density was determined to be 20 accesses per kilometre for one-way roads.

Sayers Road and Tarneit Road currently host more than 25 accesses per kilometre and are therefore expected to experience increased travel times as a result of the existing access density. The introduction of service roads will reduce the access density along Sayers Road and Tarneit Road to approximately 7 accesses per kilometre and 11 accesses per kilometre respectively, and will therefore increase efficiency along these roads.

When a service road is introduced, the conflicts relating to property access movements are contained within the service road and do not impact the efficiency of the adjacent arterial road. In the absence of a service road, vehicles travelling along the left lane of the arterial road are required to slow down for each downstream vehicle (vehicles which are ahead of them on the road) turning into a property or turning out of a property to join the traffic stream. This has a “butterfly” effect on the upstream vehicles (the traffic behind the vehicles entering the property accesses) which can slow vehicles to a stop upstream of the property access. A service road reduces these turning movements to a single entry and exit movement and thus increases the efficiency of the arterial road.

As such, the service roads not only reduce crash potential but also increase efficiency by reducing the number of conflict points along Sayers Road and Tarneit Road and benefit the operation of the wider road network.

4.5 Alternative Access Treatments

Alternative access management strategies have been considered for the study area, one being the use of loop roads, one being deceleration lanes and the other being a no action approach.

Loop Road Option

Loop roads can be used to provide access to lots fronting arterial roads constructing a road parallel to the main frontage road which then links to a minor road, thereby removing the need for any direct access to the main frontage road.

Loop roads generally need to be considered as part of larger subdivisions, so that they can be integrated with the surrounding road layout in an efficient manner. In this case, the study area includes a strip of narrow lots that sit on the periphery of an existing subdivision, where road and lot layout is not conducive to the introduction of loop roads. Accordingly, the use of loop roads is not considered to be a feasible mean of access to the lots within the study area.

Deceleration Option

Left-turn deceleration lanes could also be used to provide access to lots adjoining arterial roads. The turning lane would separate vehicles accessing properties and through traffic, thereby reducing the potential conflict. The provision of deceleration lanes to access the lots within the study area would be problematic because of the length required allow vehicles to slow down and safely make the required turn. Table 5.2 of *The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections* specifies a deceleration distance of at least 75m. Providing deceleration lanes of this length make it difficult to access properties on the immediate exit lane of an intersection.

The provision of deceleration lanes typically works best when providing access to either an intersection road, or to a large lot. It is not a desirable treatment for providing access to a large number of smaller lots along a road frontage.

No Action Option

In considering the alternative access arrangement options the existing access arrangements were also reviewed to determine their potential to continue to provide access for the properties within the study area.

Currently, each property has direct access to either Sayers Road or Tarneit Road. Continuation of these arrangements will not see the safety or traffic network benefits that will result from the service roads. Namely:

- The number of conflict points will not reduce.
- The properties that gain access from Sayers Road and Tarneit Road are likely to be developed in the future. As this happens, the volumes of traffic accessing the properties are likely to increase. The number of conflict points will remain as is but as the traffic volumes increase, so will the crash potential.
- If an access related crash is to occur, the severity will be worse than had the crash occurred in a service road as:
 - Service roads are generally limited to 50km/h whereas the posted speed limit on both Sayers Road and Tarneit Road is 70km/h. Crashes which occur at higher speeds are more likely to be fatal or cause injuries.
 - The increased traffic volumes on Sayers Road and Tarneit Road increase the potential for conflict and the potential for a crash to involve multiple vehicles.
- The efficiency of Sayers Road and Tarneit Road will not be improved by the amalgamation of access points.

4.6 Service Road Design

A 12m wide reserve has been specified in the PAO to cater for the construction of the proposed service roads.

The 12m service road allowance is consistent with the cross-sections developed and implemented across Melbourne's growth corridors. This width allows for a 1.5m footpath, 3.2m wide verge and a 5.5m wide service road with parking kerbside allowed on one side.

The proposed 12m cross section for the service roads is considered to be in line with current design practice.

The service roads are broken up into a number of short lengths along the Sayers Road and Tarneit Road frontages. The breaks are provided where minor roads intersect with these roads.

The short service road lengths ensure that vehicle speeds will be low and the level of traffic using the service road sections is minimised.

Where the proposed service roads approach minor roads, vehicles are diverted onto the main road. The service road is then recommenced on the departure side of the intersections. This is the preferred treatment to the alternative of intersecting the service road with the minor roads and allowing vehicles to continue through along the service road, which can create a road safety issue because of the greater risk of conflict that results.

On the basis of the above, the proposed service road layout is considered to have been designed appropriately.

5 Conclusion:

The following conclusions are made against proposed adoption of service roads to access the future development of the lots within the study area:

- The Planning Scheme clearly discourages direct access to lots fronting arterial roads, directing instead to the adoption of service roads, side or rear access lanes, access places or access streets.
- The provision of service roads will reduce the number of conflict points and will experience significantly less traffic volumes.
- Council's proposed service road access plan is in accordance with the network management methods outlined in the industry-accepted Austroads Guidelines, reflecting the current and increased future access needs of the study area lots and the predicted increase in road traffic on both main road frontages.
- Adopting service roads to provide access would result in a reduction in the risk of casualty crashes compared to allowing direct access to occur.

Accordingly, the service road proposal is considered to be the appropriate road access management strategy for the redevelopment of the south side of Sayers Road and the east side of Tarneit Road.