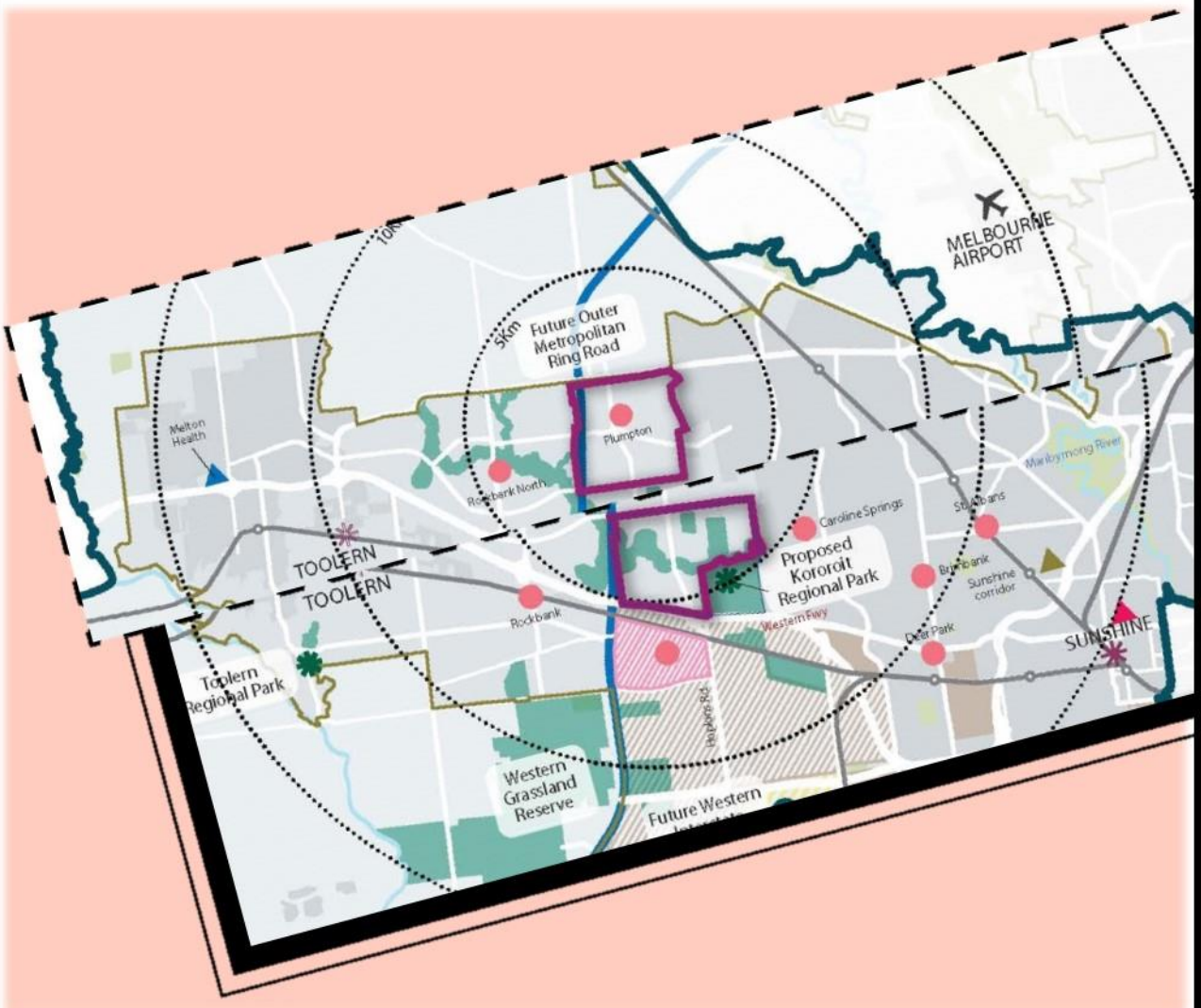
Expert Witness Statement
Traffic Engineering

Melton Planning Scheme
Amendments C146 and C147
PSP 1078 & 1080 Plumpton and Kororoit



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21 November 2016

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1. INTRODUCTION

My name is Stephen Pelosi and I am a Director at *movendo Pty Ltd* and a Consulting Traffic and Transport Engineer. *movendo* conducts business from the Ground Floor at 25 Ross Street, South Melbourne.

I completed a Bachelor degree in Civil Engineering at RMIT in December 1985 and have over 30 years of experience in traffic engineering and transport planning, particularly in the areas of planning and assessment of urban road networks, assessment of the traffic impacts of development proposals, preparation of local area traffic management strategies, town and regional centre traffic studies, pedestrian and bicycle design, parking studies and road safety audits. I have worked extensively across Australia, the Middle East, Asia and Latin America, advising private clients and government agencies on transport and infrastructure issues.

I have held senior executive positions in local government, as well as consultant firms. Prior to becoming a founding Director at *movendo*, I worked at transport consultancies UrbanTrans (2 years), AECOM (Technical Director 10 years), Aurecon (Associate 4½ years). I also worked at the City of Melbourne for 11 years in the traffic engineering office in various capacities.

I have been engaged by Melton City Council to consider various traffic engineering issues in relation to Amendments C146 (Plumpton PSP) and C147 (Kororoit PSP) to the Melton Planning Scheme. More particularly, I have been requested to consider the traffic implications of various aspects associated with the design of the proposed future road network servicing Plumpton and Kororoit, as envisaged in the Precinct Structure Plans associated with Amendments C146 and C147. Specifically, the issues I have examined include:

1. Pedestrian crossing at Tarleton Road (Plumpton PSP) – Proposed New Facility.
2. Pedestrian / bike paths on primary arterial roads (Plumpton & Kororoit PSPs) – Preferred Cross-section.
3. Bike paths on secondary arterial roads (Plumpton & Kororoit PSPs) – Preferred Cross-section. (I have taken new information into account – compared with my previous assessment of this matter – including discussions with the Senior Policy Advisor at Bicycle Network as well as a review of existing off-road bike paths on secondary roads).
4. Taylors Road / Saric Court intersection (Kororoit PSP) – Preferred Treatment.
5. Plumpton Road and Sinclairs Road (Plumpton & Kororoit PSPs) – Road Classification.

The scope of my expert evidence is limited to consideration of the above matters, as detailed in this report.

Appendix A contains a statement setting out my qualifications and experience, and the other matters raised by Planning Panels Victoria 'Guide to Expert Evidence'. A copy of my curriculum vitae is provided in Appendix B.

2. PROPOSED AMENDMENTS C146 AND C147 (PLUMPTON AND KORORROIT PSPS)

2.1. OVERVIEW

Amendments C146 and C147 (Plumpton and Kororoit PSPs) have been prepared to facilitate future urban development. The Victorian Planning Authority (VPA) is the planning authority in respect of both Amendments.

The Plumpton PSP covers a land area of 1,016 hectares located approximately 30 kilometres to the west of the Melbourne CBD. The Precinct is bounded by Melton Highway to the north, the approved Taylors Hill West PSP to the east, Taylors Road and the draft Kororoit PSP to the south and the Outer Metropolitan Ring road (OMR) reservation and the approved Rockbank North PSP and future Warrensbrook PSP to the West. The Plumpton Precinct and future urban structure, including the road network, is illustrated in Figure 1. Amendment C146 provides a framework for a combined residential and employment hub with approximately 10,680 dwellings (resulting in a projected population of around 29,900 people) and realisation of around 12,000 jobs.

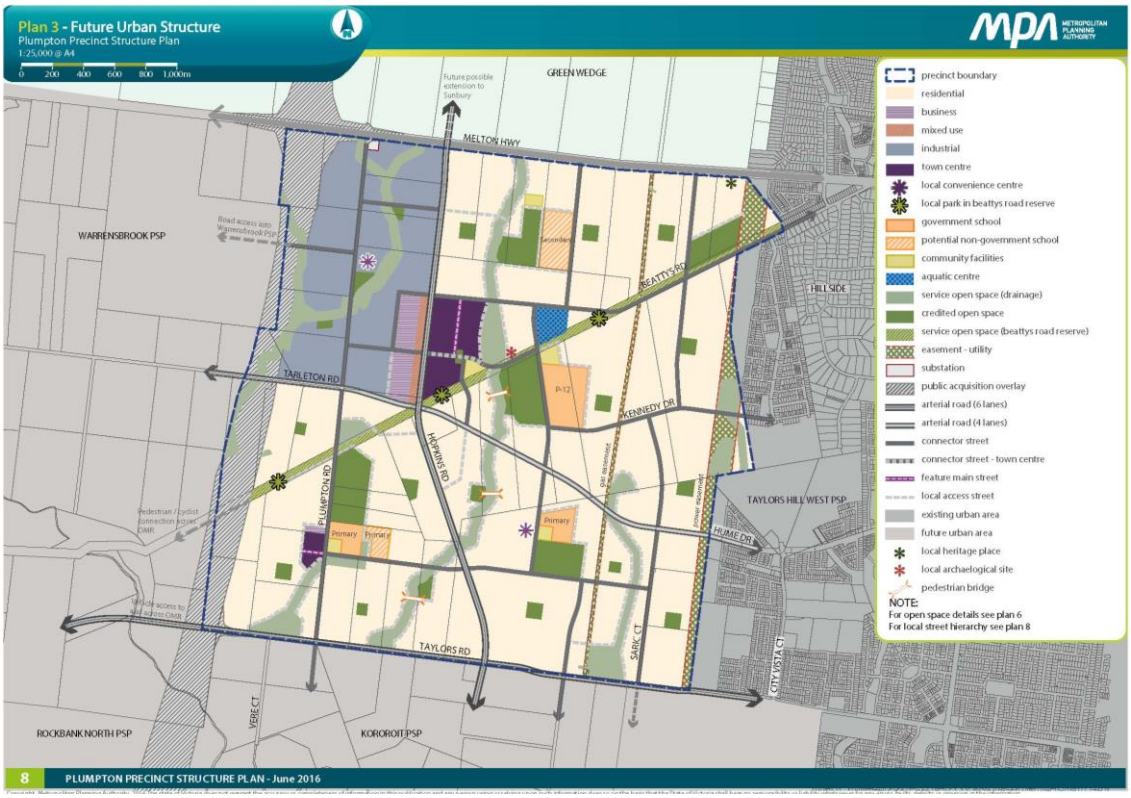


Figure 1: Plumpton Precinct – Future Urban Structure
(extract from Plumpton PSP, Plan 3 – Future Urban Structure)

The Kororoit PSP covers a land area of 925.45 hectares located approximately 30 kilometres to the west of the Melbourne CBD. The Precinct is bounded by Taylors Road and the draft Plumpton PSP to the north, Monaghans Lane (north of Kororoit Creek), Kororoit Creek and Sinclairs Road (south of Kororoit Creek) to the east, the Western Freeway and draft Mt Atkinson and Tarneit Plains PSP to the south, and the Outer Metropolitan Ring road (OMR) reservation and approved Rockbank North PSP to the west. The Kororoit Precinct and future urban structure, including the road network, is illustrated in Figure 2. Amendment C147 provides a framework for a combined residential and employment hub with approximately 9,200 dwellings (resulting in a projected population of around 25,875 people) and realisation of over 2,000 jobs.

Figure 2: Kororoit Precinct – Future Urban Structure
(extract from Kororoit PSP, Plan 3 – Future Urban Structure)

There is a set of key development objectives guiding both the Plumpton and Kororoit PSP areas including several that involve "Transport and Movement". Objective O20 of the Plumpton PSP states "Provide safe, continuous and inviting paths of travel for pedestrians and cyclists to key destinations and trails, including the Major Town Centre and Local Town Centre; schools and community hubs; shared paths along waterways and easements; and to the Kororoit Creek and proposed Kororoit Regional Park to the south". Objective O17 of the Kororoit PSP states "Provide safe, continuous and inviting paths of travel for pedestrian and cyclists to key destinations and trails, including the Plumpton Major Town Centre to the north; Local Town Centres; schools and community hubs; shared paths along waterways and easements; and to the Kororoit Creek and proposed Kororoit Regional Park".

Guideline G52 of the Plumpton PSP states that street layouts should provide multiple convenient routes to key destinations such as schools, community facilities, sports reserves, Plumpton Major Town Centre and the Local Town Centre. Guideline G45 of the Kororoit PSP states that street layouts should provide multiple convenient routes to key destinations such as schools, community facilities, sports reserves, Local Town Centres, Local Convenience Centres and access to the possible future Mt Atkinson station south of the Western Freeway.

There is also a strong emphasis on sustainable transport modes. The sections on Public Transport and Walking and Cycling of the PSP documents provides a comprehensive set of requirements and guidelines to ensure that the street network must be designed to so that 95% of all households are located within 400 metres of public transport services, and all households can directly and conveniently walk to public transport services. Furthermore, all subdivisions must deliver a simple street network which is easy to navigate and provides direct and convenient pedestrian access to connector and arterial roads and to key destinations. The PSPs highlight the need to provide strong connections and continuous paths of travel to, from and within the town centres to promote walking, cycling and public transport use.

2.2. DESIGN PRINCIPLES & RELEVANT GUIDELINE DOCUMENTS

This report examines several traffic engineering matters in relation to the transport network proposed under Amendments C146 and C147 (Plumpton and Kororoit PSPs). It is therefore relevant, when assessing the adequacy of elements within the transport network, to first understand the principles used in 'designing' road networks both as part of a precinct structure planning process and, more broadly, by reference to well-established traffic engineering design guidelines. A number of guideline documents exist to inform the planning of transport networks in growth areas – two of which are particularly relevant in the context of the Plumpton and Kororoit PSPs. These two guideline documents are:

1. The "Precinct Structure Planning Guidelines" produced by the State Government's former Growth Areas Authority in 2009 (and revised in 2013).
2. The November 2015 VicRoads 'working document' known as "Guidance for Planning Road Networks in Growth Areas".

In addition to the State Government's PSP guidelines and VicRoads' Planning Road Networks in Growth Areas guidelines, relevant elements to the matters discussed in this report can be found in guidance published by Austroads (the association of Australasian road transport and traffic agencies) and the Victorian Government. Collective guidance from these documents helps to inform bicycle and pedestrian network planning and road design – which are relevant to the Plumpton and Kororoit PSPs. The 'additional' guideline / reference documents presented in this section include:

3. Victorian Government's "Public Transport Guidelines for Land Use and Development".
4. "Guide to Road Design Part 6A: Pedestrian and Cyclist Paths" – this Austroads Guide deals with provisions for cyclists and pedestrians.
5. Austroads' research report examining pedestrian-cyclist conflict on shared paths and footpaths – the report is titled "AP-R287/06 Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths".
6. Clause 56.06 of the Victoria Planning Provisions (VPP).

Thus, there are six documents presented in this section. A discussion on relevant content from each of these documents is provided below.

2.2.1 GROWTH AREAS AUTHORITY – PRECINCT STRUCTURE PLANNING GUIDELINES; PART TWO PREPARING THE PRECINCT STRUCTURE PLAN

Part Two of the guidelines – "*Preparing the Precinct Structure Plan*" (hereinafter referred to as the 'PSP guidelines') – provides a step-by-step guide to preparing a Precinct Structure Plan in Melbourne's growth areas such as Plumpton and Kororoit. The PSP guidelines define 7 key elements to inform the preparation of a design for a precinct:

1. Image and character;
2. Housing;
3. Employment and town centres;
4. Community facilities;
5. Open space and natural systems;
6. Transport and movement, and;
7. Utilities and energy.

There are 15 standards identified for Element Six (Transport and movement) – the most relevant for this report are summarised below.

Standard S9
Marked bicycle lanes are provided on all collector streets. On all arterial roads, provide a shared bicycle/footpath (segregated where possible) and on road bicycle lanes wherever possible.

Standard 12
Pedestrian crossing points are provided along key pedestrian desire lines, on both sides of all legs of signalised intersections in town centres, and at appropriate bus stops.

Standard 14
In areas of anticipated high pedestrian/cyclist demand, and where necessary and appropriate, crossings for these users should be provided across barriers such as railway lines, service easements and watercourses. These should be at a maximum spacing of 400m. Road bridges should be constructed at regular intervals (ideally at about 800 metres spacing and up to a maximum of 1600m spacing) over these barriers.

Other aspects contained in the PSP guidelines that are relevant for this report include:

Chapter 3: Create the Structure *(this chapter deals with interalia the Spacing of Arterial Roads)*

A number of standards have been identified which the preliminary and future urban structure should respond to. These include: Standard S1 – "1.6 km road grid for arterial roads with safe and efficient connections to the arterial road network, adjusted where necessary to reflect local context".

Definition of Connector Street (section 6.2 Glossary of Terms, page 53)

A lower order street providing for low to moderate volumes and moderate speeds linking local streets to the arterial network. Managed by the relevant local council.

Definition of Arterial Road (section 6.2 Glossary of Terms, page 53)

A higher order road providing for moderate to high volumes at relatively high speeds typically used for inter-suburban journeys and linking to freeways.

2.2.2 VICROADS – GUIDANCE FOR PLANNING ROAD NETWORKS IN GROWTH AREAS

This VicRoads document is currently a 'working document'. It nonetheless provides insights into road elements that are of interest to VicRoads. Importantly it is broadly consistent with the road network planning principles outlined in the Growth Areas Authority (now Victorian Planning Authority) Precinct Structure Planning Guidelines. It is relevant to note VicRoads' advice, when considering the bicycle and pedestrian cross-sectional elements of arterial roads, as well as mid-block pedestrian/cyclist crossing opportunities:

Primary Arterials – Recommended Bicycle/Pedestrian Features (section 3.3 "Application of planning the urban structure principles", page 16)

Separate footpath and two-way off road bicycle paths to be provided on both sides of the road.

- Footpath to be provided adjacent to the property frontage or loop road i.e. outside road reservation.
- Providing a footpath further away from an arterial road can be considered improving amenity for pedestrians.
- Such an arrangement will require the provision of access/crossing points for users to enable safe passage to access Primary Arterial intersections.
- In the absence of a loop road the footpath is also to be accommodated within the road reservation, adjacent to the two-way off road bicycle path.

Secondary Arterials – Recommended Bicycle/Pedestrian Features (section 3.3 "Application of planning the urban structure principles", page 17)

- Pedestrian crossing points will be provided at a greater frequency than on primary arterials.
- Separate footpath and two-way off road bicycle paths to be provided on both sides of the road, complemented with a high level-of-service at intersections to enable pedestrians and cyclists to maintain their overall journey continuity and quality. If additional space is required within the secondary arterial road reservation, then the footpath could be provided adjacent to the property frontage or loop road i.e. outside the road reservation. Such an arrangement will require the provision of access/crossing points for users to enable safe passage to public transport located along secondary arterials as well as to intersections.

VicRoads has indicated a typical cross section design for secondary arterial roads that achieves two-way off road bicycle paths on both sides of the road. This is reproduced as Figure 3.

Figure 3: Default Midblock Cross Section for Secondary Arterial Road
(extract from VicRoads' Guidance for Planning Road Networks in Growth Areas – Section 4.5, page 46)

Connector Streets – Function (section 3.3 "Application of planning the urban structure principles", page 17)

Connector streets are not expected to carry through traffic – that is the function of the arterial road network. Therefore, clear differentiation in appearance and function, including lower speed limits (40 or 50 km/h), regular property access, narrower cross sections and limited intersection capacity is appropriate.

Safe System Principles (section 3.3 "Application of planning the urban structure principles", page 21)

When making planning decisions in growth areas, consideration must be given to competing demands and conflicts between different land uses and transport modes whilst aiming to maximise the overall safety and efficiency of the network.

This principle aligns with VicRoads' legislative responsibility under the Road Management Act 2004, to ensure that the road is safe for all users. Road infrastructure provided in the network must contribute to Victoria's Road Safety Strategy 2013-2022. The strategy outlines Victoria's 'Safe System' vision of zero fatalities and zero serious injuries on Victorian roads.

Also important is the protection of vulnerable users including pedestrians and cyclists. The provision of appropriate facilities, including road crossing opportunities, is essential to protect the safety of these road users.

Vulnerable Road User Treatments (section 4.3 "Application of ultimate network principles"; sub-section on "Safe System Principles", page 32)

Cyclists and pedestrians are vulnerable to serious injury or fatality if hit by a car, with severity rising strongly with higher speeds. Treatments must be provided to address safety of these users, including pedestrian and bicycle paths and crossings. Pedestrian and cyclist facilities should be provided along all arterial roads and safe controlled crossing points are to be provided at all intersections. Paths should be designed to be convenient and direct to ensure that vulnerable road users are encouraged to use them.

Providing for pedestrians at intersections and mid-block crossings (section 4.3 "Application of ultimate network principles"; sub-section on "Sustainable Transport Principle", page 32)

This section outlines a 'principle' about providing transport infrastructure to facilitate and encourage sustainable transport, such as public transport, walking and cycling, to complement the adjacent land use.

For primary arterial roads pedestrian crossing facilities should be provided at least every 800 metres and for secondary arterial roads at least every 400 metres. Primary arterials forming part of the Principal Public Transport Network may require more frequent crossings, dependent on bus stop spacing, to cater for the higher expected numbers of bus patrons. However, consideration should be given to providing pedestrian crossing facilities on arterial roads no closer than 200 metres apart, to try and minimise disruption and retain the intended mobility and access functions of arterial roads.

Wherever walking or cycling paths are planned to cross an arterial road mid-block, an appropriate crossing facility, often a fully-controlled crossing incorporating lanterns and actuators for both pedestrians and bicycles, should be provided to allow for the safe and legal crossing of the road.

Provide transport infrastructure that supports sustainable transport take up (section 5.3 "Application of interim design principles"; sub-section on "Sustainable Transport Principle", page 53)

The purpose of this principle is to increase the mode share of sustainable transport modes, such as public transport, walking and cycling, by ensuring that interim infrastructure provided supports sustainable transport.

As a minimum, separate footpath and two-way off road bicycle paths should be provided on both sides of all arterial roads in the ultimate position. This will assist in encouraging sustainable transport take up. Midblock pedestrian crossing facilities should be considered for the interim design where an attractor is located on at least one side of the road (e.g. recreation facilities) and in proximity to midblock bus stops.

2.2.3 VICTORIAN GOVERNMENT – PUBLIC TRANSPORT GUIDELINES FOR LAND USE AND DEVELOPMENT

The Victorian Government (through the former Department of Transport) published the Public Transport Guidelines for Land Use and Development in 2008. The Guidelines' aim was to assist decision making on statutory and strategic planning proposals for land use developments that affect public transport planning and delivery.

Section 3.3 Design Principles (Buses), sub-section 3.3.1 Local Road Design (page 17):

On road sections, other than through roundabouts, undivided connector roads to be used by buses must have:

- For two lane, two way roads a clear trafficable road width of 7.0 metres, with separate designated space for cyclists and/or parking. If parking is intended, then a separate parking lane or indented spaces, or a shared parking and bicycle lane should be provided. Note that the cycling and parking spaces are in addition to the 7.0 metre trafficable road width required for bus operations, as shown by the Undivided Connector Road.

Connector streets with a central median, if to be used by buses, must have a road carriageway width of:

- At least 5.0 metres in each direction, when a shared bicycle and traffic lane is provided
- 5.2 metres when a dedicated bicycle lane and a separate traffic lane are provided. In conjunction with the above carriageway dimensions, the overall clear zone must be 7.0 metres. The median surface within the clear zone must be trafficable by low floor buses in all weather conditions and the kerbing must be mountable or semi-mountable in accordance with road authority guidelines.

The above cross-sectional arrangements are shown in Figure 4.

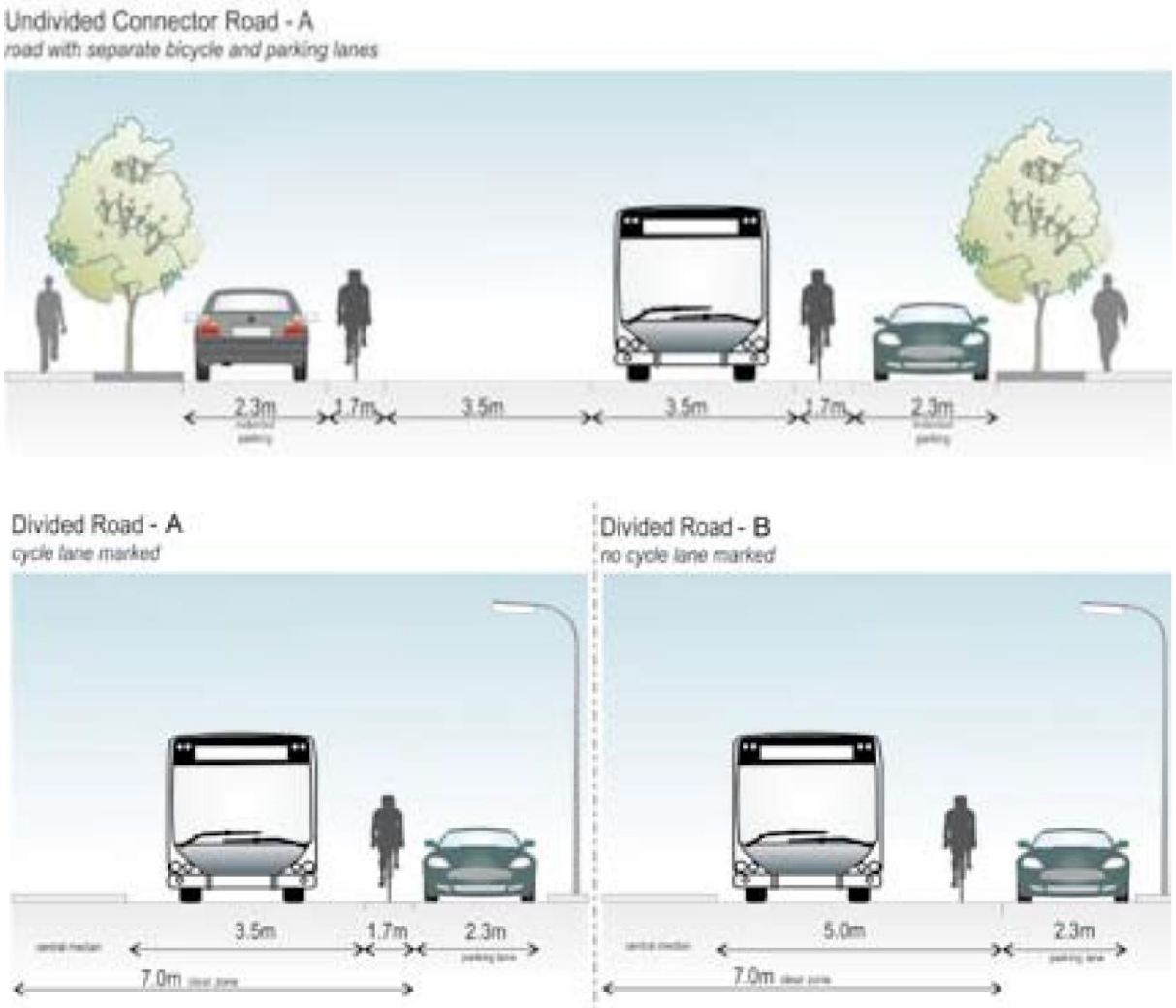


Figure 4: Typical local road cross-sections for bus routes (undivided road)
(extract from Public Transport Guidelines for Land Use and Development – Figure 16, page 18)

2.2.4 AUSTROADS – GUIDE TO ROAD DESIGN PART 6A: PEDESTRIAN AND CYCLIST PATHS

This Austroads Guide outlines appropriate conditions applicable to the adoption of 'shared' or 'separated' bicycle facilities. The key recommendations are as follows:

Figure 2.1, Section 2.2.3 (page 7):

Path volumes suggested in order to limit the incidence of conflict between users (significantly lower than the capacity of the principal path types)

- Shared paths are 'recommended' when pedestrian and cyclist volumes during peak periods on a typical day are low. (*Low demand is defined as 'Infrequent use of path' – less than 10 users per hour*)
- Shared paths are not 'recommended' when demand is (in both directions of travel) more than 50 users per hour

Section 3.4 (pages 10-11):

A shared use path may be appropriate where:

- Demand exists for both a pedestrian path and a bicycle path but where the intensity of use is not expected to be sufficiently great to provide separate facilities.
- An existing low-use footpath can be modified to provide for cyclists by satisfying legal requirements and as necessary upgrading the surface, width and kerb ramps.
- There is an existing road nearby which caters well for faster cyclists (e.g. has on-road bicycle lanes), to limit the extent of user conflict on the shared path.

Section 3.4 (page 11):

A significant issue associated with shared use paths is the variety of users who display various characteristics that can lead to conflict between them. These characteristics include differences in speed, space requirements, age, user expectation (as some users expect exclusive or priority use) and predictability (e.g. cyclists, pedestrians walking dogs, roller bladers, and skateboard riders).

Section 3.5 (page 12):

- A separated path may be appropriate where there is a significant volume of both cyclists and pedestrians such that shared use would lead to safety and operational problems. These situations typically arise in areas that attract high pedestrian and cyclist recreational or commuting movements (e.g. foreshore promenades and major inner city bridges).

Commentary 5 (page 108):

There is potential for conflict between the various users of a shared use path. To minimise this, a shared use path design should be to a high standard which provides adequate sight distance between cyclists and other users. It should desirably also provide a clear zone adjacent to the path to enable cyclists to safely run off the path to escape an incident (e.g. potential head-on collision with another cyclist; entanglement with a dog leash or evasive action to avoid a dog that is off the leash). Widths of 4.0 metres or more may be required where the numbers of cyclists and pedestrians are high or there is a high probability of conflict between users (e.g., people walking dogs, roller bladders and skaters, etc.).

2.2.5 AUSTROADS – RESEARCH REPORT AP-R287/06 PEDESTRIAN-CYCLIST CONFLICT MINIMISATION ON SHARED PATHS AND FOOTPATHS

Table 2.1, Section 2.3.3 (page 5)

Key findings from this research report – with respect to shared paths – are as follows:

- Pedestrian-cyclist conflict is common with significant volume of cyclists and pedestrians or a mix of recreational pedestrians and commuting cyclists
- Level of Service for cyclists can be poor where interference by other path users results in slower speeds
- Shared paths are beneficial to a range of path users but need to be managed effectively
- Appropriate with modest numbers of pedestrians and cyclists
- It is important that the path's design is suitable for its use and demand, that authorities adequately monitor users' behaviour on the path, and that the connections between path, road and driveways are carefully considered

2.2.6 CLAUSE 56.06 OF THE VICTORIA PLANNING PROVISIONS

The Melton Planning Scheme incorporates the Victoria Planning Provisions (VPP). Clause 56.06 includes the VPP consideration of "Access and Mobility Management", which outlines a number of objectives and associated standards with respect to:

- Integrated mobility
- Walking and cycling network
- Public transport network
- Neighbourhood and street network
- Lot access

The lot access objective (56.06-8) is 'to provide for save vehicle access between roads and lots'. Standard C21 specifies 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 (Designs of roads and neighbourhood streets) provides advice with respect to the expected traffic volume, target speed and carriageway geometry for different road classifications, including access lanes, access places, access streets, connector streets and arterial roads.

The road classifications relevant to matters discussed in this report are connector streets and arterial roads. Clause 56.06 defines two levels of connector streets, as follows:

Connector street – level 1

- Traffic volume – 3,000 vehicles per day
- Target speed – 50 km/h
- Carriageway width – 3.5 metres minimum lane width in each direction of travel and parking lane width of 2.3 metres for parallel parking

Connector street – level 2

- Traffic volume – 3,000 to 7,000 vehicles per day
- Target speed – 60 km/h or 50 km/h
- Carriageway width – 3.5 metres minimum lane width in each direction of travel and parking lane width of 2.3 metres for parallel parking

The Clause 56.06 definition of an arterial road is as follows:

Arterial roads

- Traffic volume – greater than 7,000 vehicles per day
- Target speed – as required by the relevant roads authority
- Carriageway width – as required by the relevant roads authority

3. MELTON CITY COUNCIL ISSUES

The five issues that I have been requested to examine include:

1. Pedestrian crossing at Tarleton Road (Plumpton PSP) – specifically the necessity for a new signalised pedestrian crossing facility at the intersection of the proposed Olive Grove shared path with Tarleton Road (to service the north-south pedestrian / cyclist route)
2. Pedestrian / bike paths on primary arterial roads (Plumpton & Kororoit PSPs) – Preferred Cross-section to cater for pedestrian and bicycle facilities
3. Bike paths on secondary arterial roads (Plumpton & Kororoit PSPs) – Preferred Cross-section to cater for pedestrian and bicycle facilities
4. Taylors Road / Saric Court intersection (Kororoit PSP) – Preferred intersection treatment.
5. Plumpton Road and Sinclairs Road (Plumpton & Kororoit PSPs) – Appropriateness of proposed road classification with respect to current utilisation.

Each is discussed in more detail below.

3.1. PEDESTRIAN CROSSING AT TARLETON ROAD (PLUMPTON PSP) – PROPOSED NEW FACILITY

3.1.1 STATUS – PEDESTRIAN CROSSING OPPORTUNITIES ON TARLETON ROAD

Plan 9 – Public Transport and Path Network on page 52 of the Plumpton PSP shows off-road shared paths extending north-south along both sides of the waterway corridor associated with the Olive Grove Development Services Scheme. Plan 9 also shows the shared paths crossing Tarleton Road between signalised intersections to the east and west. Those intersections are identified as IN-09 and IN-10 on Plan 12 – Precinct Infrastructure – Transport (ICP) on page 64.

3.1.2 COUNCIL'S POSITION

I am instructed that Council is concerned at the lack of a pedestrian crossing at the intersection of the Olive Grove shared paths and Tarleton Road. Council has requested, in its submission in response to exhibition of the Plumpton PSP, the inclusion of pedestrian signals at this intersection (item 183 on page 45 of Council's submission).

Council considers the shared paths will provide a strong north-south pedestrian and cyclist route connecting residential areas in the south of the PSP area to the Plumpton Major Town Centre.

3.1.3 RELEVANT MATTERS FOR CONSIDERATION

1. Tarleton Road is identified in the PSP as a 4-lane arterial road (a 'secondary arterial').
2. VicRoads' guidance for planning road networks in growth areas states that *"… pedestrian crossing facilities should be provided … for secondary arterial roads at least every 400 metres. … consideration should be given to providing pedestrian crossing facilities on arterial roads no closer than 200m apart, to try and minimise disruption and retain the intended mobility and access functions of arterial roads."*
3. The distance between the proposed signalised intersections (IN-09 and IN-10) east and west of the point where Olive Grove crosses Tarleton Road is nearly 600 metres.

4. A new pedestrian crossing at the intersection of the Olive Grove shared paths and Tarleton Road would likely to positioned approximately 250-300 metres from the nearest alternative crossings, east and west. This spacing is consistent with VicRoads' guidance for planning road networks in growth areas. The location where the Olive Grove shared paths cross Tarleton Road is shown in Figure 5.

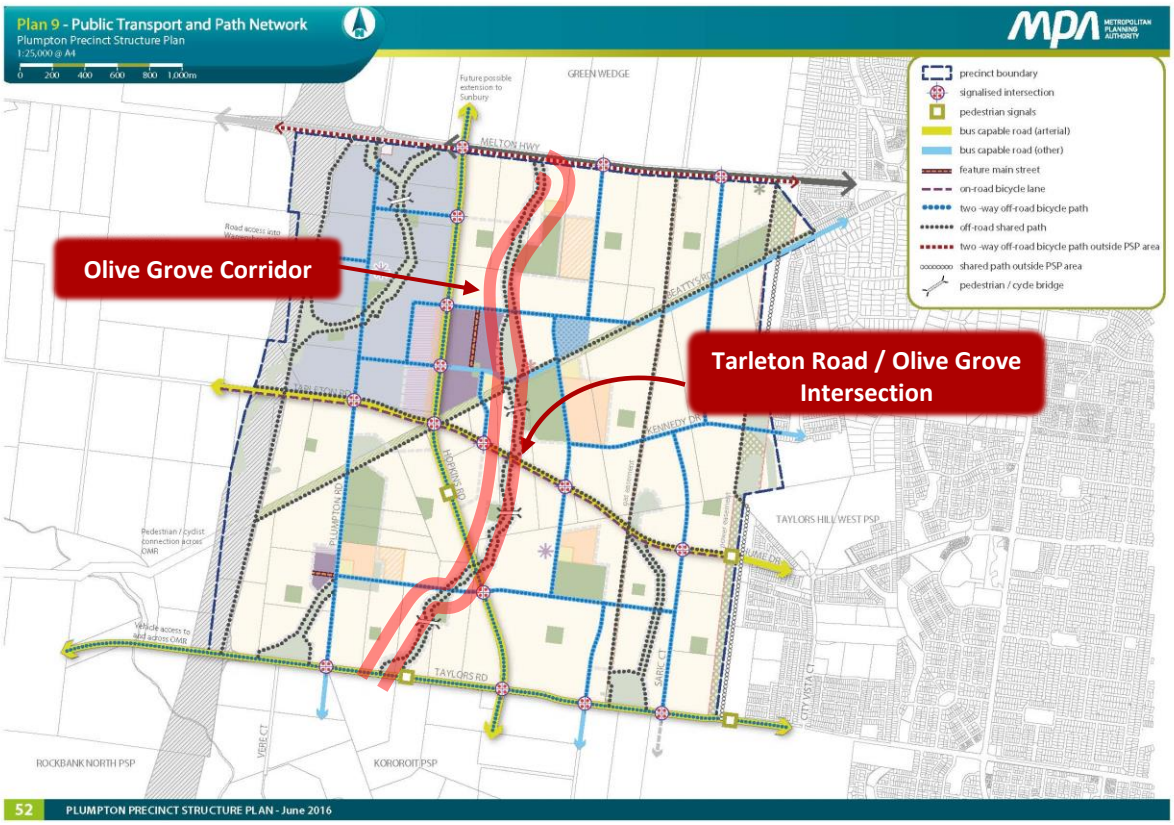


Figure 5: Plumpton Path Network
(extract from Plumpton PSP, Plan 9 – Public Transport and Path Network)

5. The absence of a formal pedestrian crossing at the intersection of the Olive Grove shared paths and Tarleton Road would force users of the shared paths to either:
   a. detour from their desired north/south desire line – adding a distance of around 500-600 metres to their trips; or
   b. risk crossing a 4-lane arterial road unaided.
6. When considering pedestrian and cyclist movements along and between the Plumpton and Kororoit PSP areas, the proposed shared paths extending north-south along both sides of the open space / waterway corridor known as Olive Grove are likely to provide the most attractive and dominant alternative for walking and cycling in a safe off-road environment. The north-south connectivity provided by the proposed shared paths along Olive Grove will be significant as the corridor links to the Plumpton Town Centre and other key attractions – as highlighted in Figure 5. In recognition of the Olive Grove corridor's strategic importance, the PSPs already identify the provision of signalised pedestrian crossings where the Olive Grove corridor crosses Hopkins Road (southern end) and Taylors Road.

7. The Plumpton and Kororoit PSPs recognise the importance of providing effective connections. Section 2.1 'Vision' of the Kororoit PSP states that "*Walking and cycling to town centres, schools and parks will be the modes of choice along tree-lined streets with dedicated, off-road pedestrian and cycle paths. Historic dry stone walls will contribute to place-making and increase the appeal of walking and cycling along streets throughout the Precinct*". Section 2.1 'Vision' of the Plumpton PSP states that "*Walking and cycling to town centres, schools and parks will be the modes of choice along tree-lined streets with dedicated pedestrian and cycle paths*".
8. Section 2.2 of the Plumpton PSP states that "The development of the Plumpton PSP area is guided by a set of key development objectives" – of which objective 13 reads "*Encourage walking, cycling and other recreation opportunities by providing connections between the various elements of the open space network including along streets, local parks, sports reserves, public plazas, waterways, gas and powerlines easements, and the historic Beattys Road goldfields route*" and objective 20 reads "*Provide safe, continuous and inviting paths of travel for pedestrians and cyclists to key destinations and trails, including the Major Town Centre and Local Town Centre; schools and community hubs; shared paths along waterways and easements; and to the Kororoit Creek and proposed Kororoit Regional Park to the south*". Similarly-worded objectives are found in the Kororoit PSP – numbered 12 and 17 (in its respective Section 2.2).

3.1.4 CONCLUSION

Given the strategic importance and likely high utilisation rate of the Olive Grove shared paths – in their capacity as north/south pedestrian/cyclist routes servicing both the Plumpton and Kororoit PSPs – it is considered highly desirable to provide a safe pedestrian crossing facility across Tarleton Road at the point where it crosses the Olive Grove corridor.

3.2. PEDESTRIAN / BIKE PATHS ON PRIMARY ARTERIAL ROADS (PLUMPTON & KOROROIT PSPS) – CROSS-SECTION

3.2.1 STATUS – ROAD CROSS SECTIONS

Pages 99 and 100 in the Plumpton PSP and pages 103 and 104 in the Kororoit PSP set out the road cross-sections for primary arterial 6-lane roads. Those cross-sections show the two-way bike path and pedestrian path 'joined' on the opposite side to the 'Local Frontage Road'. The PSP cross-section is reproduced in Figure 6.

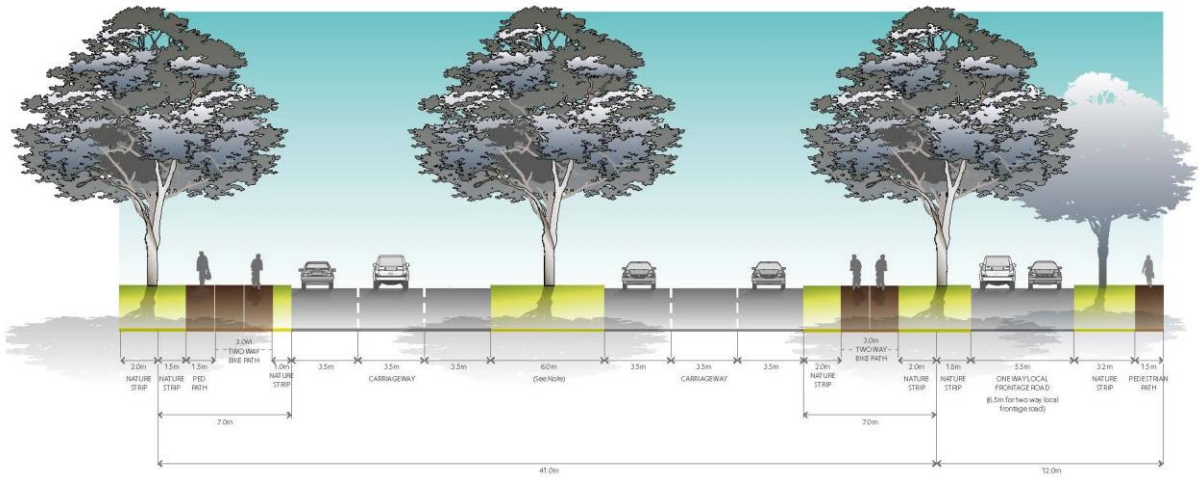


Figure 6: Proposed Cross Section Primary Arterial Road – 6 lane
(extract from Plumpton Precinct Structure Plan – Appendix D, page 99)

3.2.2 COUNCIL'S POSITION

I am instructed that Council is not supportive of the current proposed cross-section. Council's preference, on Primary Arterials, is to provide separation between the pedestrian path and two-way bike path (item 196 on page 49 of the Plumpton submission and item 146 on page 43 of the Kororoit submission). The cross section in Figure 7 is proposed by Council as an alternative for the Primary Arterial Road cross section shown in the PSPs.

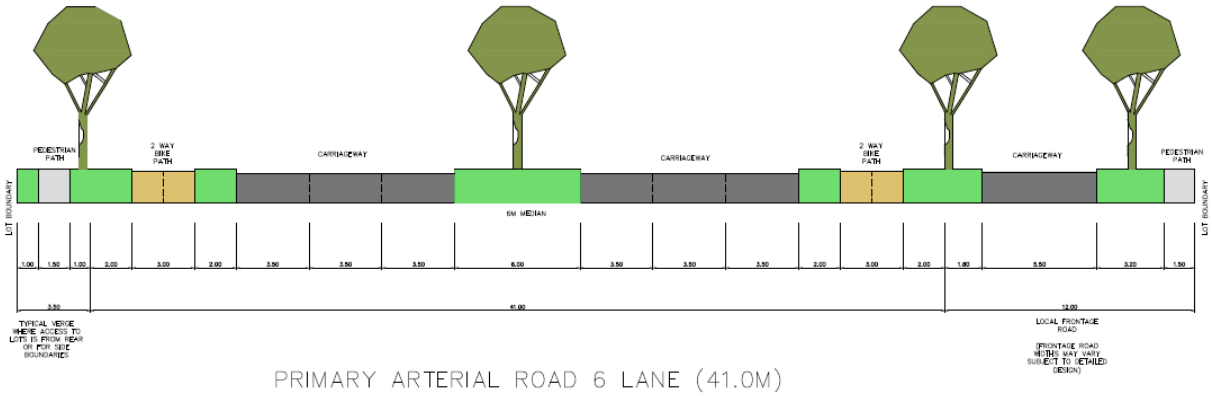


Figure 7: Council-Preferred Cross Section Primary Arterial Road – 6 lane

3.2.3 RELEVANT MATTERS FOR CONSIDERATION

1. Cyclist and pedestrian use of pathways on primary arterial roads is expected to be high – consistent with the intent of the 'Development objectives' in both PSPs, which describe the aspiration to provide safe, continuous and inviting paths of travel for pedestrian and cyclists to key destinations and trails, including the Plumpton Major Town Centre to the north; Local Town Centres; schools and community hubs; shared paths along waterways and easements.
2. The PSP guidelines define 7 key elements to inform the preparation of a design for a precinct, one of which – Element Six involves 'Transport and Movement'. There are 15 standards identified for Element Six – the most relevant for this context is standard S9: "*… On all arterial roads, provide a shared bicycle/footpath (segregated where possible) and on road bicycle lanes wherever possible*".
3. The VicRoads working document "Guidance for Planning Road Networks in Growth Areas" recommends that Primary Arterials should have separate footpath and two-way off road bicycle paths on both sides.
4. Austroads' Guide to Road Design Part 6A: Pedestrian and Cyclist Paths outlines appropriate conditions applicable to the adoption of 'shared' or 'separated' bicycle facilities. Shared paths are 'recommended' when pedestrian and cyclist volumes during peak periods on a typical day are low. (Low demand is defined as 'Infrequent use of path' – less than 10 users per hour). Shared paths are not 'recommended' when demand is (in both directions of travel) more than 50 users per hour. Furthermore, a separated path may be appropriate where there is a significant volume of both cyclists and pedestrians such that shared use would lead to safety and operational problems. These situations typically arise in areas that attract high pedestrian and cyclist recreational or commuting movements – which is the logical and desired outcome for the proposed cyclist and pedestrian facilities on both the primary and secondary arterials in the Plumpton & Kororoit PSPs.
5. Austroads' Research Report "AP-R287/06 Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths" identifies that pedestrian-cyclist conflict is common on shared paths with significant volume of cyclists and pedestrians or a mix of recreational pedestrians and commuting cyclists. It also identifies that shared paths are only appropriate with modest numbers of pedestrians and cyclists.

3.2.4 CONCLUSION

The adoption of cross sections for Primary Arterial roads, as currently proposed in the PSP (where two-way bike path and pedestrian path are joined), is inconsistent with good design guidance for facilities that are expected to be well utilised.

The Council-preferred separation of the two-way bike path and pedestrian path on the opposite side to the 'Local Frontage Road' on the Primary Arterial cross section (as shown indicatively in Figure 7) is consistent with the desired design outcome to achieve separation of cyclist and pedestrian facilities – as envisaged by relevant VPA, VicRoads and Austroads guidelines.

3.3. BIKE PATHS ON SECONDARY ARTERIAL ROADS (PLUMPTON & KOROROIT PSPS) – CROSS-SECTION

3.3.1 STATUS – ROAD CROSS SECTIONS

Pages 101 and 102 in the Plumpton PSP and page 105 in the Kororoit PSP set out the road cross-sections for secondary arterial 4-lane roads. There are 2 variations to the proposed secondary arterial cross section (only one is shown in Figure 8) – both feature the provision of a 1.5-metre wide on-road bike lane in each direction. Those cross-sections also show off-road shared paths. The PSP cross-section is reproduced in Figure 8.

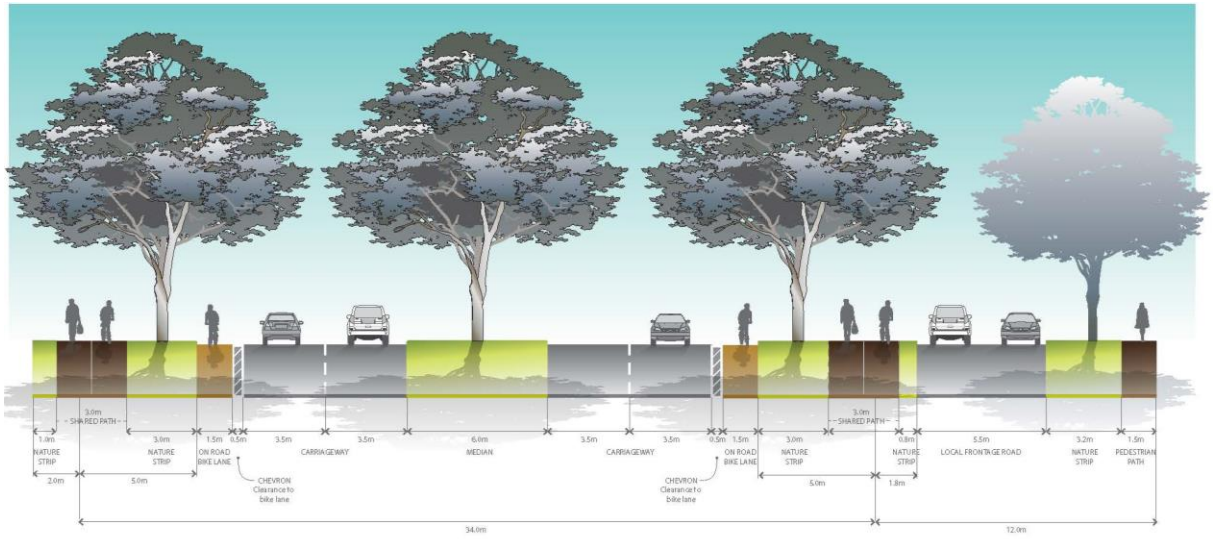


Figure 8: Proposed Cross Section Secondary Arterial Road (extract from Plumpton Precinct Structure Plan – Appendix D, page 101)

3.3.2 COUNCIL'S POSITION

I am instructed that Council is not supportive of the current proposed cross-section that provides on road bike lanes. Council's preference is to provide two-way off-road bike paths on Secondary Arterial Roads on each side of the road reserve (item 197 on page 49 of the Plumpton submission and item 147 on page 44 of the Kororoit submission). Council proposes the alternative cross-section shown in Figure 9, which features two way off road bicycle paths in each direction and includes separation between the pedestrian and bike paths.

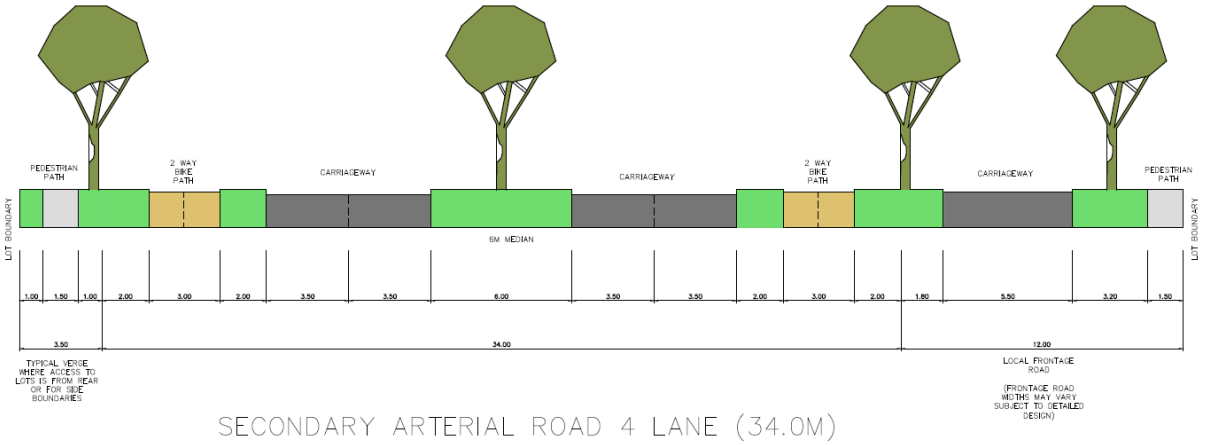


Figure 9: Council-Preferred Cross Section Secondary Arterial Road

3.3.3 RELEVANT MATTERS FOR CONSIDERATION

1. Additional deliberations have been undertaken on this matter since my previous assessment dated 2 September 2016 with respect to Amendment C162 to the Melton planning Scheme (Mt Atkinson and Tarneit Plains PSP). The additional deliberations include discussions with Bicycle Network's Senior Policy Advisor on 17 November 2016 (to establish that organisation's views on how bicycle lanes should be provided on Secondary Arterial Roads) and the identification, inspection and operational monitoring of existing off-road bike paths on secondary arterial roads.
2. Bicycle Network's Senior Policy Advisor expressed the view that can be summarised as follows: "*On-road bicycle lanes only suit a small minority of potential riders (confident adults) for a limited range of trips (longer commuting trips and training rides) while off-road paths (on both sides of the road) suit a wider percentage of the community as well as separating potential conflict with pedestrians. Provision of off-road bicycle facilities serves to help reduce potential conflict and also encourages all members of the community to benefit from the safer active travel infrastructure. By removing on-road bike lanes and providing off-road shared paths and off-road bike only paths, the conflict between buses and bikes is also removed. Planners cannot create a bicycle network that will appeal to all types of bike riders without off-road two-way bike paths on both sides of arterial roads.*"
3. Examples of existing off-road bicycle path facilities on Secondary Arterial Roads are shown in Figure 10 and Figure 11. Figure 10 is a recently constructed facility in Todd Road, Port Melbourne and is an exclusive bike path. Figure 11 shows an older off-road bike facility that has been in place on Dynon Road for a long time. It is a shared path though in practice it acts as an exclusive bike path given the scarcity of pedestrian activity on the southern interface of the corridor (due to the absence of active street frontages).

Figure 10: Todd Road, Port Melbourne
Example of Secondary Arterial Road with two-way off-road bike path

Figure 11: Dynon Road, West Melbourne
Example of Secondary Arterial Road with two-way off-road shared bike path

4. Cyclist and pedestrian use of pathways on Plumpton's and Kororoits's secondary arterial roads is expected to be high – consistent with the intent of the 'Development objectives' in both PSPs, which describe the aspiration to provide safe, continuous and inviting paths of travel for pedestrian and cyclists to key destinations and trails, including the Plumpton Major Town Centre to the north; Local Town Centres; schools and community hubs; shared paths along waterways and easements. In particular, the important role expected of the secondary arterials is highlighted by the connections they provide and the land uses that they service:
5. Neale Road connects people from the surrounding region to the Kororoit Regional Park. It also connects Caroline Springs to new PSP areas; and
6. Tarleton Road is the extension of Hume Drive and represents the key east-west connection between Taylors Hill West, Plumpton and Warrensbrook PSP areas. It also provides connection to the Plumpton Major Town Centre, as well as the industrial and business zoned land in the north-west corner of the PSP (north of Tarleton Road and west of Hopkins Road – the principal source of the anticipated 12,000 jobs to be created in the Plumpton PSP). Given that Tarleton Road abuts the industrial / business precinct – it is likely that it will also carry a notable proportion of trucks.
7. Within the context of the multiple employment, recreational and retail destinations serviced by Tarleton Road and Neale Road it is considered that both of these secondary arterials will be key routes within the PSP areas and servicing traffic from the surrounding PSPSs and broader region. As such they are both expected to attract a mix of cyclists with varying abilities.
8. Tarleton Road and Hume Drive are both identified as 'bus capable arterials' and are therefore expected to form part of the Principal Public Transport Network. This will lead to a situation where, in addition to interaction with trucks moving to/from the industrial / business precinct, cyclists will also interact with buses on road.
9. The expected volumes of traffic on Tarleton Road in Plumpton and Neale Road in Kororoit are high. Both are assumed to be secondary arterials in the Jacobs modelling (Transport Modelling Report – PSP 1078 Plumpton and PSP 1080 Kororoit). The traffic volume forecasts prepared by Jacobs for the future year 2046 feature Tarletons Road with a forecast up to 17,400 vehicles per day (two-way) and Neale Road with a forecast up to 18,300 vehicles per day (two-way).

10. The existing endorsed cross-section for Hume Drive in the nearby PSP area to the east of Plumpton (Taylors Hill West) features on road bike paths in the ultimate cross-section. Currently, Hume Drive had been constructed as a single lane in each direction with an off-road shared path. There is no on-road bike lane in the interim cross section.
11. If Tarleton Road was to be constructed with off-road bike paths, in response to its forecast high traffic volumes, heavy vehicles and the presence of buses, Council would need to make adjustments and accommodate the transition between Tarleton Road and Hume Drive. Council may also retrofit Hume Drive, and any other secondary arterial, with off-road bike paths – where such action is deemed appropriate in consideration of the volume and type of traffic and the desired mix of cyclists to be attracted to those routes.
12. The Plumpton & Kororoit PSPs include a road hierarchy with cross-sectional details provided at Appendix D and Appendix G respectively. The PSP hierarchy of roads (in order of decreasing importance) is 'Primary Arterial', 'Secondary Arterial', 'Connector' and 'Local Access Street'. The cross sections shown in Appendix D and Appendix G (in the Plumpton & Kororoit PSPs respectively) for primary arterials and connectors both feature dedicated off road bike paths. However, the two secondary arterial cross sections feature on road bike lanes. This represents an inconsistency in the treatment of cyclists with an undesirable practical consequence. Specifically, it would force a user moving 'up the hierarchy' of roads to cross between off- and on-road facilities. This means that cyclists would experience a reduction in the level of protection when travelling from a fully separated off-road bike facility on a connector street to a more exposed on-road facility on a secondary arterial road and finally back to 'full protection' in the off-road bike path context found on the primary arterial roads.
13. The VicRoads working document "Guidance for Planning Road Networks in Growth Areas" recommends that on Secondary Arterials separate footpath and two-way off road bicycle paths be provided on both sides of the road.
14. Austroads' Guide to Road Design Part 6A: Pedestrian and Cyclist Paths outlines appropriate conditions applicable to the adoption of 'shared' or 'separated' bicycle facilities. Shared paths are 'recommended' when pedestrian and cyclist volumes during peak periods on a typical day are low. (Low demand is defined as 'Infrequent use of path' – less than 10 users per hour). Shared paths are not 'recommended' when demand is (in both directions of travel) more than 50 users per hour. Furthermore, a separated path may be appropriate where there is a significant volume of both cyclists and pedestrians such that shared use would lead to safety and operational problems. These situations typically arise in areas that attract high pedestrian and cyclist recreational or commuting movements – which is the logical and desired outcome for the proposed cyclist and pedestrian facilities on both the primary and secondary arterials in the Plumpton & Kororoit PSPs.
15. Austroads' Research Report "AP-R287/06 Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths" identifies that pedestrian-cyclist conflict is common on shared paths with significant volume of cyclists and pedestrians or a mix of recreational pedestrians and commuting cyclists. It also identifies that shared paths are only appropriate with modest numbers of pedestrians and cyclists.

3.3.4 CONCLUSION

The adoption of cross sections for Secondary Arterial Roads, as currently proposed in the PSP (where on road bike lanes are proposed) is inconsistent with published design guidance.

The Council-preferred provision of two-way off road bicycle paths on both sides of Secondary Arterial Roads (as shown indicatively in Figure 9) is consistent with the desired design outcome of providing cyclists full separation from motorised vehicles – as envisaged by relevant VPA, VicRoads and Austroads guidelines.

3.4. TAYLORS ROAD / SARIC COURT INTERSECTION (PLUMPTON & KORODROIT PSPS) – PREFERRED TREATMENT

3.4.1 STATUS – PROPOSED INTERSECTION DESIGN

Plan 12 – Precinct Infrastructure – Transport (ICP) on page 54 of the Kororoit PSP shows Intersection IN-16 at the intersection of Taylors Road and Saric Court. Table 9 – Precinct Infrastructure on page 63 identifies Intersection IN-16 as a four-way intersection. Plan 8 – Road Network Plan on page 48 of the Plumpton PSP identifies the Taylors Road and Saric Court intersection as a signalised intersection. Plan 9 – Public Transport and Path Network on page 52 of the Plumpton PSP identifies Saric Court as a 'Bus Capable Road' and with 'two way off road bicycle path' – as is Taylors Road.

3.4.2 COUNCIL'S POSITION

I am instructed that Council's preference would be for the Taylors Road and Saric Court intersection to remain a signalised four-way intersection, as envisaged in the Plumpton PSP, to provide connectivity for properties to the south of Taylors Road.

3.4.3 RELEVANT MATTERS FOR CONSIDERATION

1. Submitter 20 to the Kororoit PSP claims that traffic analysis does not justify construction of a signalised four-way intersection and that the southern leg of the intersection should be removed.
2. 'One Mile Grid Traffic Engineering' has reviewed the proposed road network, on behalf of submitter 20, with respect to 921 Taylors Road, Plumpton. 921 Taylors Road is located on the south side of Taylors Road within the Kororoit PSP. 'One Mile Grid Traffic Engineering' has concluded that the proposed cross-section should be replaced by 'a lower order local intersection to the east' – primarily on the grounds that the southern leg of a four-way intersection at Taylors Road / Saric Court is unwarranted (on traffic generation grounds – based on an estimated 200 lots at 921 Taylors Road) and may encourage short-cutting through local roads.
3. Analysis of the road network layouts identified in the Plumpton and Kororoit PSPs does not reveal any obvious potential or desire lines for future short-cutting traffic though the subdivision at 921 Taylors Road.
4. 'One Mile Grid Traffic Engineering' has identified that the nearest alternative signalised intersections (to the east and west of Taylors Road / Saric Court) are located at Sinclairs Road (480 meters to the west) and City Vista Court (880 metres to the east)
5. Under the ultimate scenario (with the establishment of a 6-lane divided arterial road on Taylors Road) the failure to provide a four-way signalised intersection at Taylors Road / Saric Court would force motorists headed for 921 Taylors Road (and arriving from the west) to travel an additional 1.66 kilometres to perform a U-turn at the City Vista Court. Motorist wishing to exit 921 Taylors Road and head east would need to travel an additional 0.96 kilometres to perform a U-turn at Sinclairs Road.
6. Failure to signalise Taylors Road / Saric Court would compromise safe bus/cyclist/pedestrian movements across Taylors Road at Saric Court (both routes are identified in the Plumpton and Kororoit PSPs as 'Bus Capable Road' and equipped with 'two way off road bicycle path').

7. Given the intended function of Taylors Road and Saric Court as important components in the future bus and bicycle networks, the signalisation of the intersection is considered not only essential on safety grounds, but also logical – in order to avoid buses/cyclists having to cross (unaided) up to 6 lanes of traffic in an 80 km/h speed limit environment.
8. The 'logical' requirement to signalise Taylors Road / Saric Court provides the opportunity for safe connectivity for properties to the south of Taylors Road – by allowing signalised access via a fourth (southern leg) to this intersection. Such a treatment will obviate the need for motorists to travel unnecessarily long distances to alternate intersections to the east and west to perform U-turns.

3.4.4 CONCLUSION

The provision of a four-way signalised intersection at Taylors Road / Saric Court offers optimum safety outcomes for motorists turning onto and off Taylors Road (an ultimate 6-lane, 80km/h primary arterial road). The signalisation complements and supports the intended bus/bicycle functions expected on Taylors Road and Saric Court. Furthermore, the location of the intersection and likely design of internal roads within the 921 Taylors Road subdivision are highly unlikely to lead to an increased potential to attract short-cutting traffic from the arterial road through the subdivision. In the improbable scenario that such patterns became evident in the future – effective control measures can by readily implemented through traffic signal controls to 'inhibit' the capacity of any 'undesirable' movements. Importantly, future residents in the 200 lots envisaged at 921 Taylors Road will be able to enjoy safe and convenient access to the arterial network – by the shortest route.

3.5. PLUMPTON ROAD AND SINCLAIRS ROAD (PLUMPTON & KORODROIT PSPS) – ROAD CLASSIFICATION

3.5.1 STATUS – PROPOSED ROAD CLASSIFICATION

Plumpton Road and Sinclairs Road are proposed to be connector streets in the Plumpton and Kororoit PSPs, which allow for direct residential frontages. This designation supports the Transport and Movement *requirements* and *guidelines* specified in the Plumpton and Kororoit PSPs. More specifically, the proposed design and layout of Plumpton Road and Sinclairs Road achieves the desirable spacing frequency of the road network – Standard C17 (under 56.06-4 Neighbourhood street network objective) of Clause 56.06 of the VPP (Melton Planning Scheme) states that the neighbourhood street network should be designed to include arterial roads at intervals of approximately 1.6 kilometres and connector streets approximately halfway between arterial roads. This spacing is illustrated in Figure 12 and Figure 13.

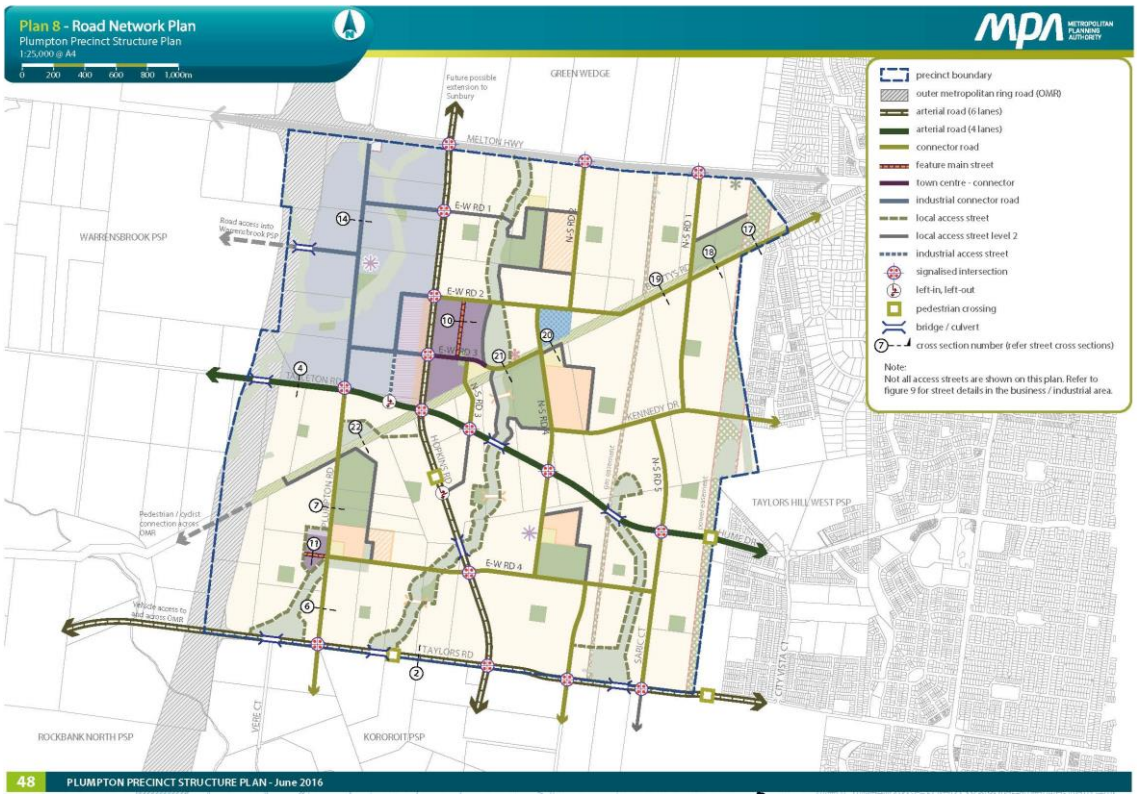


Figure 12: Plumpton Precinct – Road Network
(extract from Plumpton PSP, Plan 8 – Road Network Plan)

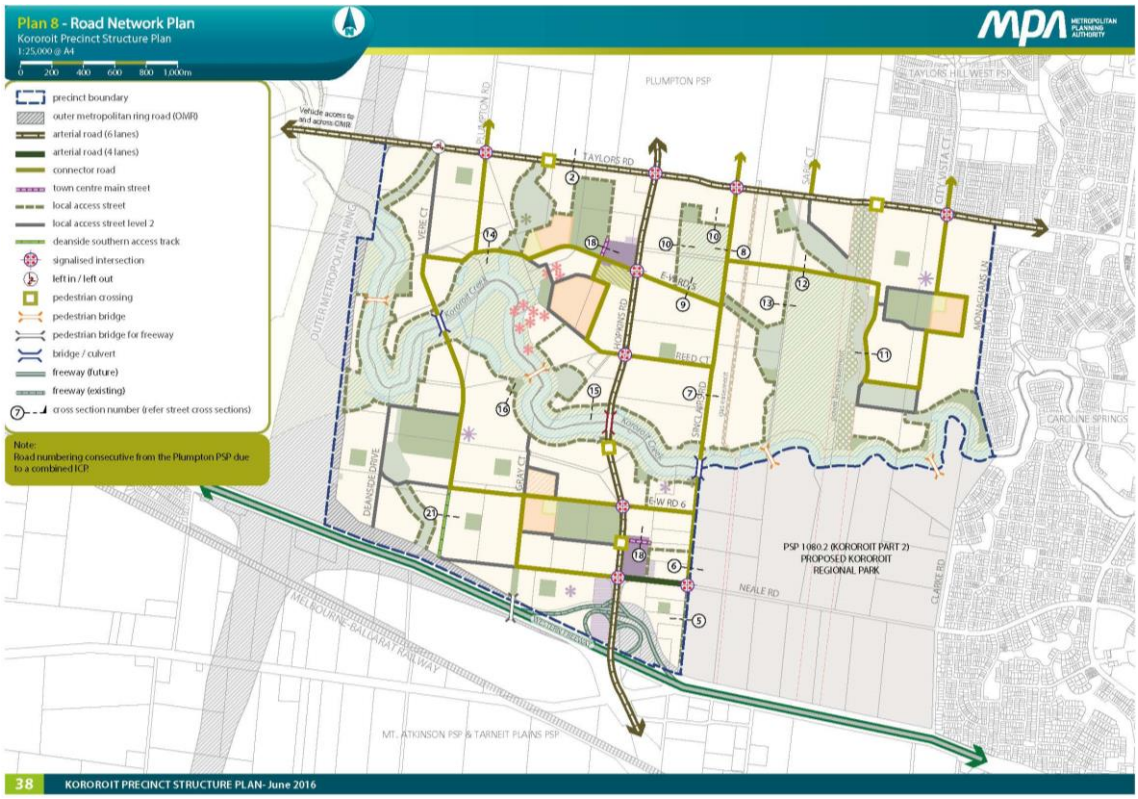


Figure 13: Kororoit Precinct – Road Network
(extract from Kororoit PSP, Plan 8 – Road Network Plan)

3.5.2 COUNCIL'S POSITION

I am instructed that Council is concerned that the existing level of through traffic and truck volumes on Sinclairs and Plumpton Roads could be a safety issue for dwellings directly fronting the roads. Council's submissions in response to exhibition of the Plumpton and Kororoit PSPs note that sections of those roads are currently approaching capacity and that additional traffic from the development of the PSP areas will result in the roads operating over capacity until Hopkins Road is extended (page 6 of the Councils' Plumpton submission and page 5 of the Kororoit submission).

Council's submissions seek:

- the following new requirement in the Plumpton PSP (item 143 at page 37 of Council's submission):
  - No new direct access to be provided to Plumpton Road (between Taylors Road and Tarleton Road) until the first carriageway for the Hopkins Road alignment and the first carriageway of Tarleton Road between (Hopkins Road and Plumpton Road) are constructed, unless otherwise agreed by the responsible authority.
- the following new requirement in the Kororoit PSP (item 97 at page 30 of Council's submission):
  - No new direct access to be provided to Sinclairs Road until the first carriageway for the Hopkins Road alignment is constructed between Neale Road and Taylors Road unless otherwise agreed by the responsible authority.

3.5.3 RELEVANT MATTERS FOR CONSIDERATION

1. The PSP guidelines define Arterial Roads as higher order roads providing for moderate to high volumes at relatively high speeds typically used for inter-suburban journeys and linking to freeways. Connector streets, in contrast, are defined as lower order street providing for low to moderate volumes and moderate speeds linking local streets to the arterial network.
2. Clause 56.06 of the Melton Planning Scheme provides advice with respect to the expected traffic volume, target speed and carriageway geometry for different road classifications. With respect to connector streets and arterial roads, it specifies the following:

   <u>Connector street – level 1</u>
   - Traffic volume – 3,000 vehicles per day
   - Target speed – 50 km/h
   - Carriageway width – 3.5 metres minimum lane width in each direction of travel and parking lane width of 2.3 metres for parallel parking

   <u>Connector street – level 2</u>
   - Traffic volume – 3,000 to 7,000 vehicles per day
   - Target speed – 60 km/h or 50 km/h
   - Carriageway width – 3.5 metres minimum lane width in each direction of travel and parking lane width of 2.3 metres for parallel parking

   <u>Arterial roads</u>
   - Traffic volume – greater than 7,000 vehicles per day
   - Target speed – as required by the relevant roads authority
   - Carriageway width – as required by the relevant roads authority

3. The connector street design cross section proposed for Plumpton Road and Sinclairs Road features 3.5 metre traffic lanes in each direction and 2.1 metre parking bays on each side. Clause 56.06 of the Melton Planning Scheme is consistent with the proposed traffic lane width for both roads but suggests marginally wider parking bays (at 2.3 metres).
4. Traffic Counts undertaken by the City of Melton between 18 and 25 November 2014 have revealed that the weekday average two-way traffic volume on Sinclairs Road, south of Taylors Road is 9,494 vehicles per day. During the same weeklong period, the weekday average two-way traffic volume on Plumpton Road was recorded at 6,935 vehicles per day.
5. It is highly probable that in the 2 years since Council has undertaken counts (November 2014 to November 2016) the traffic volume on both Plumpton Road and Sinclairs Road has further increased from the previous 6,935 and 9,494 vehicles per day respectively, as a result of ongoing development and growth in the region.
6. Under Clause 56.06 of the Melton Planning Scheme, a road carrying over 7,000 vehicles per day is an arterial. Therefore, the existing traffic volumes on Sinclairs Road classify it as an arterial road, even in the absence of any development having commenced on the Kororoit PSP. The traffic volumes on Plumpton Road are marginally under the 7,000 vehicles per day threshold. However, as this is a weekday average, daily volumes can be expected to frequently exceed 7,000 vehicles per day, also classifying Plumpton Road as an arterial road – again, even in the absence of any development having commenced on the Plumpton and Kororoit PSPs.
7. Plumpton Road and Sinclairs Road are proposed to be connector streets; however, they are currently operating as arterials (irrespective of their designation) and traffic volumes are expected to increase as a result of the development of the Plumpton and Kororoit PSP areas.
8. The 'Future Urban Structure' identified for Plumpton and Kororoit (Plan 3 in both PSPs) shows two proposed north-south 'arterial' roads: Hopkins Road and the Outer Metropolitan Ring Road (OMR) – the timing of which is unknown, but assumed to at least 15+ years.
9. At full build-out, the resultant north-south arterial road spacing is:
    a. Leakes Road to OMR **2.5km**
    b. OMR to Hopkins Road **1.8km**
    c. Hopkins Road to Caroline Springs Boulevard **3km**
10. Up until such time that the OMR is delivered, the north-south arterial road spacing will be
    a. Leakes Road to Hopkins Road **4.3km**
    b. Hopkins Road to Caroline Springs Boulevard **3km**
11. Under both the OMR and non-OMR scenarios, the spacing of arterial roads is much higher than the desirable target of a 1.6 kilometre grid for metropolitan areas (as identified in the PSP guidelines, VicRoads guidance for planning road networks in growth areas and the VPP).
12. The wider spacing of arterial roads will place increased pressure on both Sinclairs Road and Plumpton Road, as well as Hopkins Road, as there is a lack of other north-south alternative roads.
13. Ultimately if development abutting Sinclairs Road and Plumpton Road is of the pattern expected to be found on connector streets (characterised by frequent and closely spaces property crossovers) this would have serious safety implications for the road network – as cars will need to reverse onto an 'interim' arterial road (until such time that Hopkins Road is fully constructed).
14. Clause 56.06 of the Melton Planning Scheme envisages two levels of connector streets. Level 1 is specified as carrying up to 3,000 vehicles per day and is clearly the more common typology. Level 1 connector streets would be expected to perform a traditional function of connecting access places and access streets through and between neighbourhoods. The designation of Level 2 connector streets appropriately recognises that there may be instances where some connector streets are carrying higher traffic volumes (between 3,000 and 7,000 vehicles per day) – this would be manifested in areas where connectors progressively get closer to the arterial network that they provide links to.

15. In this context, the Planning Scheme guidance for connector street level 2 envisages a speed limit of up to 60 km/h, which again is incompatible with the connector street outcome that is envisaged along Plumpton and Sinclairs Roads (specifically – with a lower speed limit of 50 km/h).
16. Standard C17 under 56.06-4 (Neighbourhood street network objective) of Clause 56.06 of the Melton Planning Scheme specifies that the neighbourhood street network must 'provide clear physical distinction between arterial roads and neighbourhood street types' (including connector streets).
17. The design of connector streets across the Melton municipality broadly reflects the desired function and physical geometry and configuration for this road type. Figure 14 shows an example of a connector street in Caroline Springs, known as Lawson Way. Lawson Way is just under a kilometre in length and acts as the main collector for traffic generated in the broad local street network to the south-west of Taylors Road and Caroline Springs Boulevard. Figure 15 shows an example of a connector street in Brookfield, known as Botanica Springs Boulevard. Botanica Springs Boulevard is just over a kilometre in length and acts as the main collector for traffic generated in the broad local street network to the north of Taylors Road and to the west of Clarkes Road. Lawson Way and Botanica Springs Boulevard are largely consistent – in both their design and operation – with the Plumpton and Kororoit PSPs and the PSP guidelines. As the photos illustrate, it would be highly unlikely that connectors such as those shown would be capable of sustaining arterial traffic volumes without compromising safety for the dwellings directly fronting the roads. More specifically, the carriage of high traffic volumes over significant lengths would be broadly incompatible with the intended function of connector streets and their 'intimate' neighbourhood presence, as illustrated in Figure 14 and Figure 15.

Figure 14: Lawson Way – Connector Street in Caroline Springs

Figure 15: Botanica Springs Boulevard – Connector Street in Brookfield

3.5.4 CONCLUSION

Irrespective of current and future road designations, and given their current traffic volumes, Plumpton Road and Sinclairs Road are effectively operating as arterial roads. With the objective of optimising road safety, until such time when traffic volumes on both roads are reduced to levels consistent with the desired function of connector streets, Plumpton Road and Sinclairs Road should be managed as arterial roads. Furthermore, development on either side of Plumpton Road and Sinclairs Road should not take place unless existing traffic volumes are significantly reduced as this could be a safety issue for dwellings directly fronting the roads. More specifically, no new direct access (in the form of new properties directly fronting and having access to the road) should be provided to Plumpton Road (between Taylors Road and Tarleton Road) until the first carriageway for the Hopkins Road alignment and the first carriageway of Tarleton Road (between Hopkins Road and Plumpton Road) are constructed. Similarly, no new direct access should be provided to Sinclairs Road until the first carriageway for the Hopkins Road alignment is constructed between Neale Road and Taylors Road. Establishment of the first carriageway of Hopkins Road will provide the necessary arterial road alternative to cater for the traffic currently using Plumpton Road and Sinclairs Road.

4. MY OPINION

It is my opinion that there are several traffic matters that are not appropriately addressed in the Plumpton and Kororoit PSPs. Having reviewed all relevant documentation, I have formed the views outlined below:

4.1. PEDESTRIAN CROSSING AT TARLETON ROAD (PLUMPTON PSP) – PROPOSED NEW FACILITY

A new signalised pedestrian crossing at the intersection of Tarleton Road with the Olive Grove shared paths is highly desirable given the strategic importance and likely high utilisation rate of the Olive Grove shared paths – in their capacity as north/south pedestrian/cyclist routes servicing both the Plumpton and Kororoit PSPs. A signalised pedestrian crossing facility will optimise safety for all road users.

4.2. PEDESTRIAN / BIKE PATHS ON PRIMARY ARTERIAL ROADS (PLUMPTON & KORODROIT PSPS) – CROSS-SECTION

The Primary Arterial cross section should achieve separation of cyclist and pedestrian facilities – both of which should be off-road.

4.3. BIKE PATHS ON SECONDARY ARTERIAL ROADS (PLUMPTON & KORODROIT PSPS) – CROSS-SECTION

The Secondary Arterial cross section should provide two-way off road bicycle paths on both sides of roads and there should not be any on-road bicycle lanes.

4.4. TAYLORS ROAD / SARIC COURT INTERSECTION (KORODROIT & KORODROIT PSPS) – PREFERRED TREATMENT

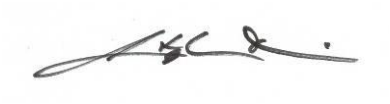
The provision of a four-way signalised intersection at Taylors Road / Saric Court offers optimum safety outcomes for all road users and is an appropriate treatment.

4.5. PLUMPTON ROAD AND SINCLAIRS ROAD (PLUMPTON & KORODROIT PSPS) – ROAD CLASSIFICATION

Development on either side of Plumpton Road and Sinclairs Road should not take place unless existing traffic volumes are significantly reduced – as this could be a safety issue for dwellings directly fronting the roads. I am of the view that new direct access (in the form of new properties directly fronting and having access to the road) should only be provided to Plumpton Road (between Taylors Road and Tarleton Road) when the first carriageway for the Hopkins Road alignment and the first carriageway of Tarleton Road (between Hopkins Road and Plumpton Road) are constructed. Similarly, I am of the view that no new direct access should be provided to Sinclairs Road until the first carriageway for the Hopkins Road alignment is constructed (between Neale Road and Taylors Road).

5. DECLARATION

I have made all the inquiries that I believe are desirable and appropriate and no matters of significance which I regard as relevant have to my knowledge been withheld from the Panel.



Signed

Date: 21 November 2016

APPENDIX A – MATTERS RAISED BY PPV GUIDE TO EXPERT EVIDENCE

In accordance with PPV guidance for the preparation of expert evidence the following details are provided:

(a) the name and address of the expert;

Stephen Pelosi, Ground Floor 25 Ross Street, South Melbourne.

(b) the expert's qualifications and experience;

I am a director of *movendo Pty Ltd* and I have 30 years of experience in transport planning and traffic engineering in Australia, New Zealand, the Middle East, Asia, Latin America and the US. My full CV is attached as Appendix B. I completed a Bachelor of Engineering (Civil) at RMIT University in 1985. I have held senior executive positions in government and consulting firms and in these roles I have been responsible for the delivery of major transport projects and for the provision of strategic and business advice to governments, infrastructure providers and developers on land use/transport studies, multi-modal transport assessments, masterplanning new communities, detailed transport systems analysis, road safety assessments, transport demand forecasting, route planning, public transport studies and bicycle & pedestrian strategies.

Of particular relevance to the Plumpton and Kororoit PSPs, I have been involved with numerous transport and traffic assessments in support of urban design frameworks and structure plans for numerous communities in the Cities of Melton, Maribyrnong, Moonee Valley, Ballarat, Colac Otway, Melbourne, Hume, Shepparton, Glenferrie, Knox, Warrnambool, Kilmore, Surf Coast, Banyule, Mitchell, Nillumbik, Bendigo, Yarra, Mildura, Glen Eira and Bayside. I have also undertaken numerous traffic studies for private clients ranging from detailed facility design to analysis of infrastructure requirements for large development proposals in Australia, China and the Middle East.

(c) a statement identifying the expert's area of expertise to make the report;

My training and experience, as highlighted in my CV, including involvement with many major transport infrastructure and masterplanning projects in Victoria, Australia and internationally – qualifies me to comment on the traffic matters outlined in this report.

Through my career, I have had considerable involvement in transport infrastructure planning and design, including various public transport and rail projects (Craigieburn Rail Electrification, South Morang Rail Extension project, City Circle Tram, Box Hill tram extension in Melbourne), several road projects (Peninsula Link, Western Distributor, East West Link, Calder Freeway, Geelong Bypass in Victoria and the Western Sydney Orbital in New South Wales).

I have also appeared, as expert traffic and transport witness, at numerous tribunal and panel hearings, EES/EIS hearings and planning scheme amendment hearings. In particular, I have appeared as witness for the Peninsula Link Freeway and East West Link projects in Melbourne, Bass Gas, Otway Gas, Calder Freeway and Geelong Bypass projects in Victoria and also prepared an Expert Witness Statement for the Victorian Desalination Plant EES.

(d) a statement identifying any other significant contributors to the report and where necessary outlining their expertise;

Not Applicable

(e) all instructions that define the scope of the report (original and supplementary and whether in writing or oral);

I have been requested by Melton City Council to express my expert opinion as to the traffic implications of various aspects associated with the design of the proposed future road network servicing Plumpton and Kororoit PSPs.

(f) the identity of the person who carried out any tests or experiments upon which the expert has relied on and the qualifications of that person;

Not Applicable

(g) the facts, matters and all assumptions upon which the report proceeds;

My report is based on a review of Amendments C146 and C147 to the Melton Planning Scheme, specifically the extent to which various transport network issues have been addressed in the incorporated documents titled "Plumpton PSP" and "Kororoit PSP".

(h) reference to those documents and other materials the expert has been instructed to consider or take into account in preparing his or her report, and the literature or other material used in making the report;

My report is based on several documents and other materials that I have been instructed to consider or take into account in preparing the report, as well as other documents that I have referenced in forming my opinions as outlined in the report.

Plumpton and Kororoit PSP documents

1. Background report – Plumpton and Kororoit PSPs; June 2016
2. Plumpton and Kororoit PSPs; both June 2016

Council submission

3. Council submission on Plumpton and Kororoit PSPs; both dated 22 August 2016 respectively

Traffic documents

4. Transport Modelling Assessment report for the VPA by Jacobs; 7 June 2016
5. 'One Mile Grid Traffic Engineering' Traffic Advice; 12 October 2016
6. VicRoads guidance for planning road networks in growth areas (working document); November 2015

Other documents

7. Precinct Structure Planning Guidelines produced by the State Government's former Growth Areas Authority – Part Two Preparing the Precinct Structure Plan; 2009 (revised in 2013)
8. Clause 56.06 of the Victorian Planning Provisions (VPP)
9. Victorian Government's "Public Transport Guidelines for Land Use and Development"; 2008.
10. Austroads – Guide to Road Design Part 6A: Pedestrian and Cyclist Paths
11. Austroads Research Report AP-R287/06 Pedestrian-Cyclist Conflict Minimisation on Shared Paths and Footpaths (2006)

(i) a summary of the opinion or opinions of the expert;

It is my opinion that there are several traffic matters that are not appropriately addressed in the Plumpton and Kororoit PSP documents. Having reviewed all relevant documentation, I have formed the views outlined below:

PEDESTRIAN CROSSING AT TARLETON ROAD (PLUMPTON PSP) – PROPOSED NEW FACILITY

A new signalised pedestrian crossing at the intersection of Tarleton Road with the Olive Grove shared paths is highly desirable given the strategic importance and likely high utilisation rate of the Olive Grove shared paths – in their capacity as north/south pedestrian/cyclist routes servicing both the Plumpton and Kororoit PSPs. A signalised pedestrian crossing facility will optimise safety for all road users.

PEDESTRIAN / BIKE PATHS ON PRIMARY ARTERIAL ROADS (PLUMPTON & KORoroit PSPS) – CROSS-SECTION

The Primary Arterial cross section should achieve separation of cyclist and pedestrian facilities – both of which should be off-road.

BIKE PATHS ON SECONDARY ARTERIAL ROADS (PLUMPTON & KORoroit PSPS) – CROSS-SECTION

The Secondary Arterial cross section should provide two-way off road bicycle paths on both sides of roads and there should not be any on-road bicycle lanes.

TAYLORS ROAD / SARIC COURT INTERSECTION (KORoroit PSP) – PREFERRED TREATMENT

The provision of a four-way signalised intersection at Taylors Road / Saric Court offers optimum safety outcomes for all road users and is an appropriate treatment.

PLUMPTON ROAD AND SINCLAIRS ROAD (PLUMPTON & KORoroit PSPS) – ROAD CLASSIFICATION

Development on either side of Plumpton Road and Sinclairs Road should not take place unless existing traffic volumes are significantly reduced – as this could be a safety issue for dwellings directly fronting the roads. I am of the view that new direct access (in the form of new properties directly fronting and having access to the road) should only be provided to Plumpton Road (between Taylors Road and Tarleton Road) when the first carriageway for the Hopkins Road alignment and the first carriageway of Tarleton Road (between Hopkins Road and Plumpton Road) are constructed. Similarly, I am of the view that no new direct access should be provided to Sinclairs Road until the first carriageway for the Hopkins Road alignment is constructed (between Neale Road and Taylors Road).

(j) a statement identifying any provisional opinions that are not been fully researched for any reason (identifying the reason why such opinions have not been or cannot be fully researched);

Not Applicable

(k) a statement setting out any questions falling outside the expert's expertise and whether the report is incomplete or inaccurate in any respect.

In the process of preparing this report, I have not identified any questions outside of my area of expertise in traffic engineering and transport planning. I have visited the site, undertaken observations and reviewed relevant documentation assigned to me. I have also drawn on my 30 years of experience in traffic and transport planning. As a result of my deliberations, I have formed the views outlined in this report with respect to the traffic and transport implications of various aspects associated with Amendments C146 and C147.

APPENDIX B – CURRICULUM VITAE

STEPHEN *Pelosi*

EMPLOYMENT HISTORY

Current	Director, movendo
2001 . 2011	Technical Director, AECOM
1997 . 2001	Senior Associate, Traffic & Transport Leader, Connell Wagner (now Aurecon)
1986 . 1996	Team Leader Traffic Engineering & Transport Planning, City of Melbourne

CAREER HISTORY

Stephen has 30 years of experience in transport planning and traffic engineering in Australia, the Middle East, Asia, the United States and Latin America. He has held senior executive positions in government and consulting firms and in these roles he has been responsible for the delivery of major transport projects and for the provision of strategic and business advice to governments, infrastructure providers and operators on traffic and parking, patronage, revenue potential, risk assessment and management strategies.

Stephen's extensive project experience in delivering a wide variety of programs and projects in the traffic and transport sector has enabled him to develop excellent leadership capabilities, as well as appreciate the importance of undertaking effective consultation and negotiations with a wide range of community and stakeholder groups. Over nearly 3 decades, Stephen has established a strong reputation as a group facilitator working with communities, technical experts and policy makers to proactively engage communities in decision-making, support policy development and implementation and manage processes of change and conflict. His primary focus has been facilitating an integrated approach to the planning of transport infrastructure and systems – recognising, and having respect for, the cultural and social planning requirements as well as understanding the aspirations of communities; with an eye to delivering more sustainable outcomes for the future.

Stephen's work across the world has included masterplanning projects, detailed transport systems analysis, land use/transport studies, multi-modal transport assessments, road safety plans, asset management studies, formulation and implementation of Intelligent Transport Systems, development of transport models, preparation of sustainable transport strategies, demand forecasting, route planning, public transport schemes and bicycle & pedestrian plans. He has also advised developers and government agencies on transport and infrastructure issues, with emphasis on economically viable, efficient, safe and sustainable transport systems. Stephen has led the transport analysis for, and appeared to provide expert testimony on, several major projects, including East West Link, Peninsula Link Freeway, Geelong Bypass, Calder Freeway, Victorian Desalination Plant, Channel Deepening Project in Port Phillip Bay and Bass Gas/Otway Gas projects.

Stephen has regularly taken the opportunity to share his considerable experience through preparation of technical papers and participation in conferences, including most recently various workshop sessions in 2012 in support of the 2010-2020 National Traffic and Transport Strategy for Kuwait, sponsored by the United Nations Development Programme and the government of Kuwait.

Stephen's technical expertise covers all areas related to the planning of sustainable transport systems and cost effective infrastructure provisions:

Traffic engineering for road, public transport, bicycle and pedestrian projects
Transport planning
Transport system design for mixed-use developments
Traffic and patronage forecasting
Transport network evaluation
Transport policy analysis
Infrastructure feasibility studies
Transport modeling
Road safety
Logistics

QUALIFICATIONS

1985

RMIT University
Bachelor of Engineering (Civil)

PROJECT EXPERIENCE

Traffic and transport studies for the Melbourne CBD

client || City of Melbourne *location* || Melbourne *year* || 1986-2014

Over the past 30 years, Stephen has delivered numerous transport projects for the City of Melbourne covering a wide range ot topics. He worked continuously as an employee at the City of Melbourne for over 11 years and has continued providing ongoing advice to Council as an expert consultant since that time.

Noteworthy City of Melbourne projects which Stephen has either participated in or led include:

- **Multiple studies for Queen Victoria Market precinct**
- Traffic engineering assessments for the Swanston Walk project
- Pedestrianisation of little streets and laneways
- Evaluation of 44 laneways for shared zone designation
- 40kph study for the Melbourne CBD (leading to its eventual introduction)
- Traffic signal operational review for the CBD
- Road safety plans
- Parking studies
- Motorcycle strategy
- Pedestrian and bicycle strategies
- Public transport projects, including the establishment of the City Circle tram
- Accident blackspot evaluations
- Local area traffic management schemes, including current schemes for North Melbourne, Kensington, SouthYarra, East Melbourne and West Melbourne
- St Kilda Road microsimulation to coordinate traffic signals and promote cycling priority
- Transport system review for City North and Arden Macaulay
- Transport efficiency study for the CBD's north edge
- Sustainable transport strategy for Southbank Structure Plan
- Traffic and parking studies for the Southbank Arts Precinct
- Traffic and parking analyses in support of Council's Urban Forest Strategy
- Represented Council on multiple major projects, including the Formula 1 Grand Prix, special events planning for the sports and entertainment precinct, inaugural White Night traffic engineering and 2006 Commonwealth Games
- Represented Council on the evaluation of impacts of major transport infrastructure and development projects, including CityLink, Crown Casino and initial development of Docklands
- Interim advisory truck route through North and West Melbourne
- Review of the municipal wide road hierarchy
- Microsimulation of King Street
- Major taxi strategy in collaboration with State government and taxi operators
- Worked with VicRoads on the central city emergency plans
- Facilitated implementation of the Night Rider bus services

Docklands transport plan and model

client || Places Victoria *location* || Melbourne *year* || 2011-2012

In 2011-2012, Stephen led the preparation of a Transport Plan and Transport Model for Docklands. The Docklands area is located on the western edge of Melbourne's central business district and is an extension of the city's major employment hub. From one of Victoria's first ports to an industrial wasteland in the 1990s, Docklands is being transformed into a modern residential, commercial and visitor destination in the heart of Melbourne. The headquarters of some of the biggest businesses in Australia are now located in Docklands, along with a growing residential community. The study involved an extensive survey program with thousands of online and paper surveys undertaken with workers, residents, visitors and those attending events at Etihad Stadium, to understand travel behaviour of people moving to and from Docklands. The work included development of a Transport Model, which takes into account existing and future development and infrastructure proposals in and around Docklands to provide traffic predictions, forecasts of public transport usage and an analysis of pedestrian and cycling patterns at key stages of Docklands development. The Model forecasts traffic volumes when various assumptions are made regarding land use and development yield, infrastructure configuration and capacity, and travel mode split. The Docklands Transport Model was used as a key tool for testing and ultimately defining the preferred land use, transport infrastructure and travel behaviour outcomes for Docklands. The Transport Plan used Model outputs and other sources to examine the key issues and infuences on access and mobility at Docklands, and identify the priority transport projects and initiatives required in Docklands over the next ten years and beyond, to ensure Docklands is well placed to cope with the substantial growth still to occur.

Congestion management strategy Kallang Paya Lebar expressway

client || Land Transport Authority *location* || Singapore *year* || 2007-2008

While at AECOM, Stephen project managed this commission from the Singapore Land Transport Authority (LTA) to develop a congestion management strategy for the 8.5 kilometre KPE Tunnel (built at a cost of around U$1 billion and the longest subterranean road tunnel in southeast Asia and the world's 6th longest underground road project - at its time of construction). The study examined both weekday commuter peak period demands, as well as emergencies and other specific incidents within the tunnel. Central to development of the congestion management strategy was the use of a large-scale VISSIM traffic micro-simulation model. As a result of the approach adopted, critical improvements to the initially proposed road-layout designs were identified in advance of tunnel opening and a number of ITS options were proposed and tested in VISSIM, including the first potential implementation of ramp metering on the island of Singapore. Phase 1 of the KPE, a 3km limited-movement section of tunnel, opened in October 2007 incorporating designs developed directly from the VISSIM modeling. Study recommendations for the fully-open tunnel, incorporating further geometric refinements, were prepared in advance of full scheme opening in 2008.

Grand prix feasibility study

client || State of Bahrain *location* || Bahrain *year* || 2001-2002

While at AECOM, Stephen managed a traffic and transport study undertaken for the purposes of assessing Bahrain's transport systems in support of a broader feasibility study for introducing Formula One Grand Prix racing to Bahrain. The study examined the capacity of existing traffic routes, the necessity for road capacity upgrades, parking impacts and requirements, public transport and pedestrian movement both inside and outside the proposed track location and concluded with a set of recommended improvement actions. The key recommendations were ultimately implemented, enabling the successful staging of the inaugural Bahrain Grand Prix.

CityScope Analysis with the Massachusetts Institute of Technology

client || MIT *location* || Boston *year* || 2013-current

Stephen, in collaboration with the Changing Places Research Group of the Massachusetts Institute of Technology (MIT) Media Lab, is using CityScope to inform the planning process for a new community of 50,000 people in Queensland. CityScope is a modelling tool developed by MIT scientists to create a tangible, interactive, real-time data observatory and urban intervention simulator. The system consists of physical scale models (built of LEGO bricks), 3D projection mapping (using Rhino, Illustrator and Photoshop) and 3D parametric modelling (using Grasshopper) to prototype the design of communities by quantifying system-level effects of planning decisions on travel behaviour, energy consumption, food production and emissions (greenhouse gases and air pollutants). CityScope is designed to help people understand complex inter-relationships, and to make informed decisions about urban design, public policy, planning and the introduction of new urban systems and technology.

Moonee Valley walking and cycling strategy

client || City of Moonee Valley *location* || Melbourne *year* || 2010-2012

Between 2010 and 2012, Stephen led the preparation of a walking and cycling strategy for the inner-city municipality of Moonee Valley in inner Melbourne. Moonee Valley, located a short distance north of the Melbourne CBD, has a population of around 120,000 people. The city's strategic goals include providing smart, sustainable and accessible transport that connects its people and communities to achieve a healthy environment and sustainable future. The project involved walking and cycling audits, safety reviews, evaluation of intersection improvements, network development, as well as the preparation, conduct and analysis of pedestrian and cyclist surveys. The study also involved input from key stakeholders and community groups. The site work and consultative activities, including numerous focus groups, were informed by an extensive literature review of previous studies and best international practices in terms of safety and infrastructure provision for pedestrians and cyclists. The strategy developed a comprehensive set of recommendations for infrastructure improvement actions, policy and planning changes and associated travel behaviour programs.

Pedestrian Priority Network (PPN)

client || Victoria Department of Transport (DoT) *location* || Melbourne *year* || 2010

While at AECOM, Stephen worked with Tract Consultants on the definition of PPNs for the DoT. PPNs represent a key step in helping to realise Government objectives for a more sustainable transport system. The study team developed a simple yet robust methodology that can be consistently applied to identify PPNs to enable transport practitioners to readily identify areas for action, prioritise investment and maximise walking within activity centres across Victoria.

Safer Road Design for Older Pedestrians

client || Victoria Walks *location* || Melbourne *year* || 2014-2015

Victoria Walks commissioned movendo to investigate engineering measures to make roads safer for older pedestrians. This study focussed on identifying barriers that prevent older people from walking and formulating infrastructure and operational improvements. A review of worldwide research and engineering literature, crash data and discussions with multidisciplinary experts was undertaken to provide informed views in regard to the issues which affect safety of older pedestrians and the nature of treatments which can be implemented to improve safety.

Maribyrnong integrated transport strategy

client || City of Maribyrnong *location* || Melbourne *year* || 2011-2012

Stephen was technical leader in the delivery of an Integrated Transport Strategy for the inner city municipality of Maribyrnong in Melbourne. The study included a review of existing transport development plans and policies and the collection of demographic and transport data for Maribyrnong and surrounding areas. The analysis considered conditions not only in the City of Maribyrnong, but also in surrounding areas in order to understand the influence of other municipal, regional and state transport issues and activities upon Maribyrnong. Significant consultation and engagement with relevant authorities and stakeholders were undertaken. The main outcome of the project was the identification and prioritisation of actions, through an Implementation Plan, with respect to transport access and mobility elements that emphasise sustainable transport solutions and will guide transport planning within Maribyrnong over the next ten years. The transport strategy policies and actions aim to make Maribyrnong a city where it is possible for people to walk and cycle more often, and catch public transport with ease, thus relieving congestion on the road network, and reducing the City of Maribyrnong's contribution to transport related greenhouse gas emissions.

2006 Commonwealth Games

client || Department of Infrastructure *location* || Melbourne *year* || 2005-2006

While at AECOM, Stephen was responsible for the development of a transport model to obtain estimates of the likely impact of the transport task for the Melbourne Commonwealth Games on the normal base load flows on the transport system. This two-year project included forecasting impacts on and utilisation of all forms of public transport as well as private vehicles on the road network. As part of this study, solutions were developed that involved: intersection analysis and design, traffic signal coordination strategies, traffic operations and staging during events, and special pedestrian management in the vicinity of the Sports Stadia.

Western Sydney orbital – traffic study

client || Road Transport Authority *location* || Sydney *year* || 2003-2004

While at AECOM, Stephen coordinated the preparation of traffic management plans for the Western Sydney Orbital (WSO) – the major circumferential freeway through Sydney's north western suburbs; a 40 km motorway linking three other key motorways and saving motorists significant amounts of time. The project included regional modeling and detailed traffic engineering design for:

-17 interchanges along the motorway to provide access to adjoining communities and improve transport options to these areas.
-38 underpasses and overpasses to maintain local access for pedestrians, cyclists and motorists along the full length of the motorway
-40 km off-road shared cycle / pedestrian pathway traverses the motorway and connects with the Sydney Cycleway network

As a result of the implementation of the WSO, motorists travelling on the road can avoid up to 48 sets of traffic lights on the overall trip. The study also included the use of ITS to provide:

-Intelligent vehicle speed detection and operate at variable speeds up to 100 km/h.
-A cashless, free-flow electronic tollway with no toll booths and no slowing or stopping.

East West Link Melbourne – Independent Traffic & Transport Assessment and Expert Witness Testimony

client || Linking Melbourne Authority *location* || Melbourne *year* || 2013-2014

Stephen was commissioned to peer-review all Traffic Impact Assessment analyses undertaken for the East West Link project – an 18km cross-city road connection extending across Melbourne from the Eastern Freeway to the Western Ring Road (estimated cost of $16-$18 billion). Stephen provided an independent assessment of all traffic/transport planning matters associated with the project and its impact on the surrounding road network, including public transport and sustainable transport modes. Stephen also appeared, as the State Government's expert witness, at the Assessment Committee in early 2014, having reviewed in excess of 1,500 community submissions received – that were related to traffic and transport matters. The Committee considered the merits of the first stage of the East West Link, a 6km section connecting the Eastern Freeway with CityLink – together with a separate connection to the Port of Melbourne area.

WestLink Planning and Consultation Study

client || Linking Melbourne Authority *location* || Melbourne *year* || 2009-2010

While at AECOM, Stephen was one of the principal traffic and transport analysts for this study, which included a review and assessment of a variety of infrastructure options to help inform selection of a preferred design solution. The eventual evaluation of a number of shortlisted options included alignment and arrangements for connections to the Western Ring Road and alignments for connection with Dynon and Footscray Roads taking into account transport modelling forecasts and induced demand factors. The traffic engineering investigations also comprised review of required upgrades to existing roads and intersections with consideration for future road widenings and land acquisition.

Mitcham Frankston Motorway (now East Link)

client || VicRoads *location* || Melbourne *year* || 2004-2005

Stephen led the development of a dynamic VISSIM traffic microsimulation model of this major highway project (40km highway with a tunnel and around 20 grade separated intersections) and managed the traffic analysis for this study. The project involved creating a corridor model, using VISSIM, suitable for input of traffic forecasts by a metropolitan transport model - CUBE. The application of multiple VISSIM simulation scenarios enabled effective options analysis and resolution of the preferred highway scheme design. All freeway interchanges were included in the VISSIM model and tested with varying traffic loads.

Peninsula Link Route Selection, Concept Design Development and Expert Traffic & Economics Witness

client || Linking Melbourne Authority *location* || Melbourne *year* || 2007-2009

While at AECOM, Stephen was the technical transport director for a planning feasibilty study of a new freeway extending for over 20 kilometers on Melbourne's south-eastern fringe. Originally known as the Frankston Bypass, the roadway is nearing completion and is now known as Peninsula Link. The study, conducted in 2008/09, involved preparation of preliminary road designs (tested with modelling and microsimulation) and also included a full environmental assessment of various road options. In his role as technical transport director, Stephen provided traffic safety and traffic engineering advice to test different road options. He also provided expert witness evidence to a Panel hearing covering all modeling aspects (including the development/validation of a sub area traffic model - extracted from the metropolitan wide model - for the base and future year forecasts).

Selected Publications and Presentations

March and November 2012	'National Traffic and Transport Sector Strategy for Kuwait 2010-2020', Towards Sustainable and Safe Transport for Current and Future Generations International Training Workshops, Kuwait
June 2010	'Sustainable Transport: Integration of Land Use and Transport' at the 2010 Australasian Centre for the Governance and Management of Urban Transport (GAMUT) Conference on Sustainable Transport: Varied Contexts – Common Aims, University of Melbourne, Australia
June 2010	'Transporte Sostenible: Integración de Planeación Urbana y Transporte' in REvive Monterrey Fórum 2010: Innovative Transportation Solutions, Monterrey, México
May 2010	'Sustainable Transport: Integration of Land Use and Transport' in World Metro Rail Summit Shanghai, China
April 2009	'Singapore Kallang-Paya Lebar Expressway - Developing a Tunnel Congestion Management Strategy Using Micro-Simulation' in Traffic Engineering and Control (TEC) Journal
August 2008	'Singapore Kallang-Paya Lebar Expressway - Tunnel Congestion Management Strategy Developed with VISSIM and Accident Incident Management/ Road Safety Plan' at the 8th International Symposium on Transport Simulation Surfers Paradise, Queensland, Australia
2001-2011	Guest Lecturer in Transport Planning and Traffic Engineering at the University of Melbourne Faculty of Architecture, Building and Planning Melbourne, Australia