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The review of Melbourne's Principal Public Transport Network

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Abstract

The integrated transport and land use strategy, *Melbourne 2030*, defined a Principal Public Transport Network (PPTN) in 2002 intended to provide a high quality and direct public transport connection between the activity centres. The PPTN was recently revised by the Department of Transport in response to growth in Melbourne's population, introduction of new services to support that growth, and release of several strategies to supplement the original *Melbourne 2030*.

This paper summarises the process undertaken in reviewing the PPTN. It re-examines the original definition, emphasising connection to activity centres rather than between them, sets out a list of objectives of the network and the criteria used to select the individual links that form the network.

Examples of proposed revisions to the network are presented, which would improve accessibility to activity centres, and improve both the catchment and coverage by public transport services. Relations to other defined transport networks are examined, particularly the Principal Freight Network and the Principal Bicycle Network, as is the implementation of the PPTN as both a land use planning tool and within VicRoads' network operating plans.

1. Introduction

As with other major Australian cities, Melbourne has experienced considerable growth over the past few decades in terms of both population and urban area. To address this, the transport and land use strategy *Melbourne 2030: Planning for sustainable growth* (DSE 2002) encourages development within a number of Activity Centres spread throughout the metropolitan region. The Principal and Major Activity Centres were to be connected by a Principal Public Transport Network (PPTN) providing a "high quality public transport network comprised of the existing radial fixed-rail network, extensions to this radial network and new cross-town bus routes".

Apart from a minor revision in 2003, the PPTN essentially had since remained unchanged, despite the considerable growth in the population of Melbourne and its associated transport requirements. Over the same period, the State Government has also released a number of planning and policy strategies that have relevance to the PPTN.

In response to this growth and these strategies, in 2009/10 the (Victorian) Department of Transport undertook a review of the PPTN in consultation with the Department of Planning and Community Development, the Growth Areas Authority and VicRoads. The scope of the review was to:

- update the PPTN for consistency with recent state and regional planning initiatives, suitable for inclusion in the Victoria Planning Provisions
- develop maps and resources which clearly identify what is included on the PPTN – and what has changed since it was previously published
- clarify the definition and objectives of the PPTN
- recommend a process for future reviews of the PPTN

This paper outlines the process undertaken in the review. The review identified that multiple stakeholders use and rely on the PPTN as an integrated transport and land use planning tool. This required careful management of a range of issues and concerns, ranging from developing the higher level principles, definition and objectives, through to identifying the specific links that comprise the PPTN in existing and proposed urban areas.

2. Reviewing the PPTN

The original process planned for this review was developed by the project team within the Department of Transport in close consultation with the Department of Planning and Community Development. Given the numerous stakeholders using the PPTN as an integrated transport and land use planning tool, a large part of the process involved liaison with these stakeholders and management of their often competing objectives and expectations.

The PPTN review process:

- 1) Review the roles of the PPTN and identify the key users of the PPTN as an integrated transport and land use planning tool
- 2) Discuss the role and use of the PPTN with key stakeholders
- 3) Conduct a workshop to share knowledge of how the PPTN is used and to review the definition, objectives and link selection criteria
- 4) Conduct roundtable discussions identifying proposed revisions in specific geographical areas, considering existing land use and PT services
- 5) Distribute revised definition and objectives for comment
- 6) Check proposed revisions against definition, objectives and link selection criteria
- 7) Distribute list of proposed revisions for comment
- 8) Calculate key performance indicators for the original and proposed revised PPTN
- 9) Develop and document process for future reviews of the PPTN
- 10) Distribute draft report on the review of the PPTN for comment
- 11) Collate comments and incorporate in final report
- 12) Include the revised PPTN within the Victoria Planning Provisions

In undertaking this review, it was soon found that the process would not be following this simple sequential path, but would require several iterations to refine the network.

This paper will follow these stages of the review, from a literature review of the roles of the PPTN through to the final report summarising the proposed revisions to the network.

2.1. A review of the roles of the PPTN

Figures 1 and 2 show maps of the PPTN as originally published in 2002 in *Melbourne 2030* and in the 2003 addendum to *Melbourne 2030*, respectively. The PPTN can be seen to comprise a network of road and rail-based links connecting Principal, Major, and Specialised Activity Centres within the Urban Growth Boundary (UGB). The most noticeable change in the 2003 revision was the removal of several links that extended outside the UGB.

The *Metropolitan Transport Plan* (MTP, DOI 2004) identified that orbital travel around Melbourne was relatively poorly served by public transport compared to radial travel. To address this, it announced a series of high quality *SmartBus* services offering more frequent and punctual bus services, better connections with train and tram services provided by accessible low-floor buses and bus stops, with better information about services. These services would operate on the PPTN, with the potential for future *SmartBus* services to be introduced at a later date.

The MTP also acknowledged the competing demands on our transport network and introduced the principle that "public transport will have first priority on designated routes on the PPTN". To facilitate this, VicRoads (2010) has developed a set of Network Operating Plans to better manage the road network. In addition to public transport priority, the *SmartRoads* Network Operating Plans provide for good pedestrian access into and within activity centres in periods of high demand, use of alternative routes by cars around activity centres to reduce the level of 'through' traffic, and priority for trucks in important transport routes linking freight hubs.

In addition to being a network of public transport links, the PPTN acts as an indicator that high quality public transport services connecting to Activity Centres currently are available or will be introduced. This land use planning role was confirmed in 2008 when the Director of Public Transport formally became a referral authority for planning applications under the Victoria Planning Provisions and with the release of *Public Transport Guidelines for Land Use Development* (DOT 2008a).

The *Victorian Transport Plan* (DOT 2008b) was released in December 2008, announcing several extensions to the metropolitan train network and tram / bus priority measures amongst a suite of projects. At the same time, the Victorian Freight Network Strategy (*Freight Futures*, DOT 2008c) was released, introducing a Principal Freight Network connecting several Freight Activity Centres, in much the same way that Melbourne 2030 introduced the PPTN and Activity Centres. The Victorian Government also released the latest population forecasts for the state (*Victoria in Future*, DPCD 2008a) and the land use strategy *Melbourne @ 5 million* (DPCD 2008b). *Melbourne @ 5 million* promoted the Principal Activity Centres of Footscray, Broadmeadows, Box Hill, Ringwood, Dandenong and Frankston to Central Activities Districts to encourage a polycentric city development pattern, and proposed a revision to the Urban Growth Boundary to accommodate additional housing in existing and proposed new urban areas.

All of these factors required a re-examination of both the role that the PPTN has as an integrated transport and land use tool, and of the specific links that comprise the PPTN.

An examination of current strategic planning documents from other jurisdictions found a common theme of encouraging greater density of development within a number of 'activity centres', or equivalents thereof, that are well connected by transport links. However, few others recognised the integrated transport and land use role served by the network providing those connections.

Sydney's *City of Cities* Plan (NSW 2005) is intended to support a metropolis made up of five regional cities and 22 other strategic centres. The associated *Transport Strategy for Sydney* proposes a new network of 43 strategic bus corridor services to link Sydney's major centres, railway stations, hospitals, education facilities and other community facilities, improving access to important destinations.

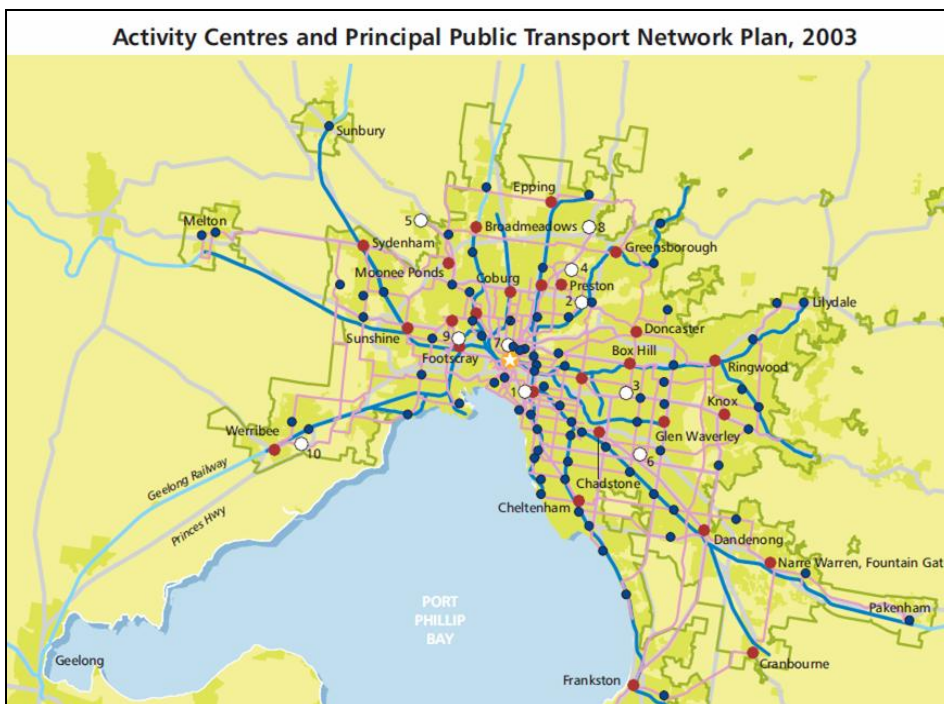
The Western Australian Planning Commission (WA 2009) includes a hierarchy of activity centres, which are defined as focal points for Perth’s passenger rail and bus networks.

The South East Queensland Regional Plan (Qld 2009) defines an Urban Footprint without specifying activity centres (or their equivalent). The Urban Footprint focuses urban growth in locations that (among others) provide reliable and effective transportation choices or otherwise reduce car use, particularly for infill and redevelopment in and around existing urban centres, and along high-frequency public transport corridors.



Source: DSE (2002)

Figure 1 – The PPTN as originally published in Melbourne 2030



Source: DSE (2003)

Figure 2 – The PPTN as published in the 2003 addendum to Melbourne 2030

2.2. Refining the definition and objectives of the PPTN

The PPTN was originally defined in Melbourne 2030 as:

A high quality public transport network that connects Principal and Major Activity Centres, and comprises the existing radial fixed-rail network, extensions to this radial network and new cross-town bus routes.

Through consultation with key stakeholders, including the Department of Planning and Community Development, the Growth Areas Authority, and VicRoads, several problems were identified with this definition:

- The definition does not adequately emphasise the land use planning role of the PPTN.
- By specifically referring to Principal and Major Activity Centres, the definition does not encompass several strategic elements that have subsequently been introduced, such as the Central Activities Districts introduced in *Melbourne @ 5 million*.
- By specifically referring to what the PPTN comprises, it precludes other public transport options that may be introduced; for example non-radial fixed-rail links, or bus routes that are not cross-town.
- The existing PPTN was focussed on providing connections between Activity Centres, whereas connections to Activity Centres were more important to serve a greater number of trips starting or finishing (but not both) in an Activity Centre.

To better reflect its role as an integrated transport and land use planning tool, the review proposed the following revised definition for the PPTN:

A declared network of integrated transport corridors connecting larger activity centres supporting more intensive land development and activity in such centres and along the network between them and providing for higher quality transport services.

A set of objectives was proposed at the same time, stating that the PPTN is intended to:

- Support the development of a network of Activity Centres (principally comprised of Central Activities Districts, and Principal, Major and Specialised Activity Centres) linked by frequent and reliable public transport services
- Achieve increased use of public transport services in the future, by:
 - Enhancing access to Activity Centres as transport hubs and preferred locations for higher density housing, jobs, community services, major entertainment facilities and educational opportunities
 - Supporting the potential for higher quality public transport services by maximising the potential catchment around stations and along PPTN corridors
 - Identifying opportunities to improve the efficiency and reliability of public transport services by nominating the highest priority public transport routes/links upon which measures to improve public transport priority and removal of impediments to public transport are a higher priority.
- Provide a framework for an integrated public transport network which includes train, tram and bus services including cross town routes, principal and local bus services
- Identify the location of future high capacity transport corridors
- Facilitate integrated transport and land use planning outcomes, including the identification of locations for new development and higher densities
- Provide for the efficient movement of public transport and the safety and comfort of passengers through the selection of appropriate alignments and the consideration of road priority and function.

2.3. Link selection criteria

In addition to the definition and objectives, a set of link selection criteria were required to enable examination of the actual links that would comprise the PPTN. These build upon the objectives shown above, but are intended to guide the evaluation and prioritisation of alternative link options.

- Encourage development within Activity Centres and along corridors that will generate high public transport demand
- Provide direct linkages to and between Activity Centres
- Contribute to an integrated public transport network
- Consider road priority and function
- Select road alignment and geometry which provides for the efficient movement of public transport and the safety and comfort of passengers.

3. Specific proposed revisions to the PPTN

The review process identified numerous proposed revisions to the PPTN across all of Melbourne's 31 Local Government Areas. Each of these proposed revisions was tested against the objectives and selection criteria, ensuring that the revised PPTN would provide for improved access to a wide range of opportunities for a greater number of people.

As an example, Figure 3 shows the proposed revisions to the PPTN in the City of Bayside, located approximately 10 km South East of the Melbourne CBD. Proposed additions to the PPTN are shown in green and proposed removals are shown in red.

The transport strategy *Meeting Our Transport Challenges* (DOI 2006) identified a number of potential PPTN links, including The Esplanade, St Kilda St and Beach Road between Sandringham and St Kilda (shown as a red dotted line in Figure 3). This potential link was considered to be in an area already well-served by road and rail PPTN links, does not provide a direct connection between activity centres, and has poor catchment opportunity beside the foreshore. The current review has recommended that this potential link not be included in the PPTN.

The review also recommended that Hampton St between South Rd and Centre Rd, and a loop around the Major Activities Centre at Church Street and Middle Brighton train station be added to the PPTN. New St south of Church St and South Rd west of Hampton St were proposed to be removed from the PPTN. These proposed revisions improved the catchment of the PPTN, with the removals already being within the catchment buffer of Brighton Beach train station. As shown in Figure 3, the proposal improves access to Church St Major Activities Centre and facilitates passenger interchanges at Middle Brighton train station along a route currently well served by bus services.

Bay St and Durrant St have been proposed to be removed from the PPTN since the area is within the catchment of North Brighton train station and these links bypass the transport interchange at Church Rd / Mid Brighton train station.



Revisions to the Principal Public Transport Network

City of Bayside

Principal Public Transport Network

- Train network and station
- Tram network
- Bus network to be retained
- Addition to the bus network
- Removal from the bus network
- Earlier proposal not being adopted

Other Transport Links

- Freeway / Arterial Road
- Other Declared Road
- 123** Melways street directory page number

Land Use

- Central Activities District
- Specialised Activity Centre
- Principal Activity Centre
- Major Activity Centre
- Urban Growth Boundary



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Figure 3 – Examples of proposed revisions to the PPTN (City of Bayside)

4. Analysis of performance indicators for the PPTN

The proposed revisions identified in the review are intended to increase both coverage and accessibility to key activities and opportunities for the people of Melbourne.

This could be achieved by declaring a much larger number of transport links as being on the PPTN. However, this approach may lead to a diluting of its effectiveness as a means of promoting an appropriate land use response and also may lead to unrealistic expectations about future high quality public transport service provision. Therefore, a balanced approach of increasing access and service levels without excessively increasing length was sought.

Three performance indicators were used to monitor the effectiveness of the PPTN in achieving the objectives outlined above:

- The **length** of the PPTN, which should grow at a similar rate to the population of Melbourne
- The **coverage** of the PPTN, which should increase the proportion of the population within walking distance
- The **service level** on the PPTN, which should increase the proportion of the PPTN that is serviced by public transport

These three indicators are readily measurable and would contribute towards the desired outcome of increasing the proportion of trips taken by public transport towards the target of 20 per cent by 2020 (DPC 2002). This outcome would be able to be measured by a travel behaviour survey, such as the Victorian Integrated Survey of Travel Activity (VISTA, DOT 2009). However, a measure such as the number of passenger kilometres travelled on the PPTN per service-kilometre would serve as a useful outcome indicator as a measure of the effectiveness of the PPTN in encouraging greater public transport use.

These three measures are discussed in turn through the remainder of this section.

4.1. Length of the PPTN

Table 1 shows that the length of PPTN has grown with the population of Melbourne between 2002 and 2010, maintaining a relatively constant ratio of approximately 400 m of PPTN per 1,000 persons. The majority of the growth has occurred in the road-based PPTN that is not served by trams, grown by 26 per cent in 8 years. The greater length of the train-based PPTN between 2003 and 2010 is a result of the Regional Rail Link project through the growth area in the outer western suburbs and extension to the rail network from Epping to South Morang in the northern suburbs and from Cranbourne to Cranbourne East in the south eastern suburbs, as announced in the *Victorian Transport Plan* (DOT 2008b).

Table 1 – Length of the PPTN by mode and Melbourne’s population, 2002-2010

Length of the PPTN by mode (km)	Year		
	2002 original	2003 revision	2010 proposed revision
Train	427	427	464
Tram	239	246	248
Bus*	706	870	892
Total	1,372	1,543	1,604
Population†	3,524,000	3,578,000	3,996,000
Length / 1,000 persons (m)	389	431	401

* Excludes road sections also served by trams

† Estimated Resident Population of Melbourne Statistical Division at 30 June 2002, 2003 and 2009 (ABS 2010)

It may be argued that if the PPTN is seen to be effective in encouraging greater development along its length, the length of the PPTN should decrease relative to the overall population. However, it is well recognised (for example *Victoria in Future*, DPCD 2008a) that population growth has tended to be greater in the growth areas to the west, north and south-east of Melbourne. These areas are acknowledged as having had lesser PPTN coverage than the inner and eastern suburbs, with the review actively seeking to increase access to the PPTN for this outwardly expanding population base.

4.2. Coverage of the PPTN

The proportion of the population that live or work within walking distance of the PPTN was calculated using population data from the 2001 and 2006 Australian Bureau of Statistics' Census of Population and Housing.

The distance from the centroid of each Census Collection District (CCD) to the closest public transport access point (station or stop) on the PPTN was calculated for each of the 5837 CCDs in the Melbourne Statistical District in the 2001 Census, and the 6325 CCDs in the 2006 Census. These distances were sorted into ascending order, enabling calculation of the proportion of the population living with a specified distance of an access point on the PPTN. This analysis was also repeated for the employment distribution in the 2006 Census.

This enabled a comparison of the coverage of the PPTN at three points:

- **at the time of introducing the original PPTN**
using the 2001 population distribution and the 2002 PPTN
- **before these proposed revisions**
using the 2006 population distribution and the 2003 PPTN
- **as a result of these proposed revisions**
using the 2006 population distribution and the 2010 PPTN.

Figure 4 shows the cumulative proportion of population within a specified distance from a stop or station on the PPTN. The original PPTN was within the walking catchment (taken as having a bus or tram stop of the PPTN within 400 metres of home or a train station within 800 metres of home) for 47.4 per cent of the population in the Melbourne Statistical District in the 2001 Census. This proportion reduced slightly to 46.5 per cent of the population in the 2006 Census, indicating a general trend of greater population growth in areas less well served by public transport. These current proposed revisions increase the proportion of population within the walking catchment of the PPTN to 48.7 per cent, based on the 2006 Census. This increased proportion is a result of a greater length of the PPTN, an increase in the proportion of the PPTN that is serviced, and an increase in the number of bus and tram stops on the serviced parts of the PPTN.

There is some variation in the proportion of persons of different age groups living within the walking catchment of public transport access points on the PPTN. Figure 5 and Table 2 show that relatively low proportions of young children and of adults aged 35 to 64 year old are within the walking catchment of a stop or station on the PPTN. This reflects the greater proportion of these age groups living in outer suburbs (evident from the ABS Census of Population and Housing) which tend to have lower access to public transport services.

Conversely, higher proportions of older children, young adults and older persons tend to be located closer to PPTN routes, reflecting their higher proportion in the better serviced inner suburbs.

Proportion living within this distance of a stop / station on the PPTN

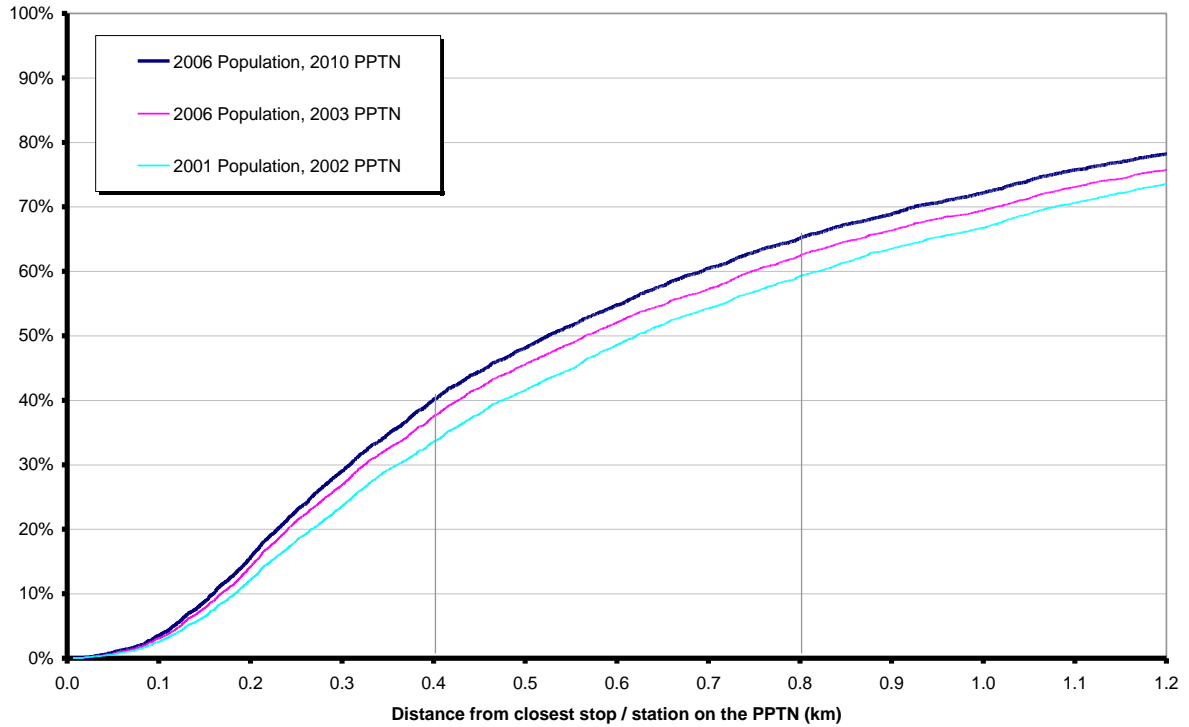


Figure 4 – Distances from the PPTN: 2001 and 2006 Population, 2003 and 2010 PPTN

Proportion living within walking catchment of a stop / station on the PPTN

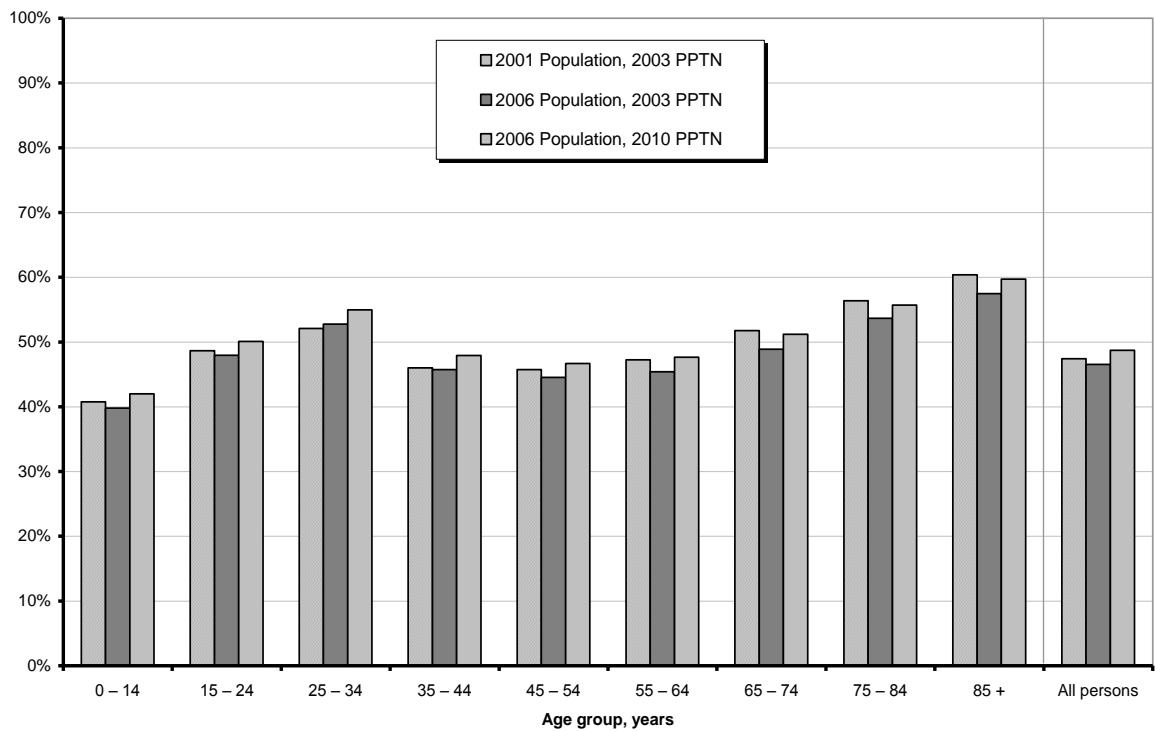


Figure 5 – Proportion of population by age group living within walking catchment of a stop or station on the PPTN: 2003-2010

Table 2 – Proportion of population living within walking catchment of a stop or station on the PPTN: 2003-2010

Age group	2006 Census	
	2003 PPTN	2010 PPTN
0 – 14	41%	42%
15 – 24	49%	50%
25 – 34	52%	55%
35 – 44	46%	48%
45 – 54	46%	47%
55 – 64	47%	48%
65 – 74	52%	51%
75 – 84	56%	56%
85 +	60%	60%
All persons	47%	49%

Figure 6 shows that these proposed revisions to the PPTN have also increased the proportion of people working within walking distance of the PPTN, based on the distribution of employment in the 2006 Census. Generally, a greater proportion of people work within walking distance of a station or stop on the PPTN compared to those living within the same distance. This is attributed to the greater levels of employment in inner suburbs and around Activity Centres to which the PPTN is intended to provide connections. Twenty per cent of employment across the Melbourne Statistical District is located within 100 metres of a stop or station on the PPTN, primarily due to the high concentration of employment in Melbourne's Central Business District and to a lesser extent the CADS and Activity Centres.

Large differences remain between the coverage of the PPTN across different local government areas. Coverage varies from above 95 per cent in the more densely populated inner suburbs to less than 20 per cent in the more sparsely populated outer suburbs. As part of the Growth Area planning process, greater development is actively being encouraged in areas that are well served by public transport (for example DPCD 2009), supported by plans to designate appropriate links in Growth Areas as future PPTN links following finalisation of the Precinct Structure Planning process.

Proportion living / working within this distance of a stop / station on the PPTN

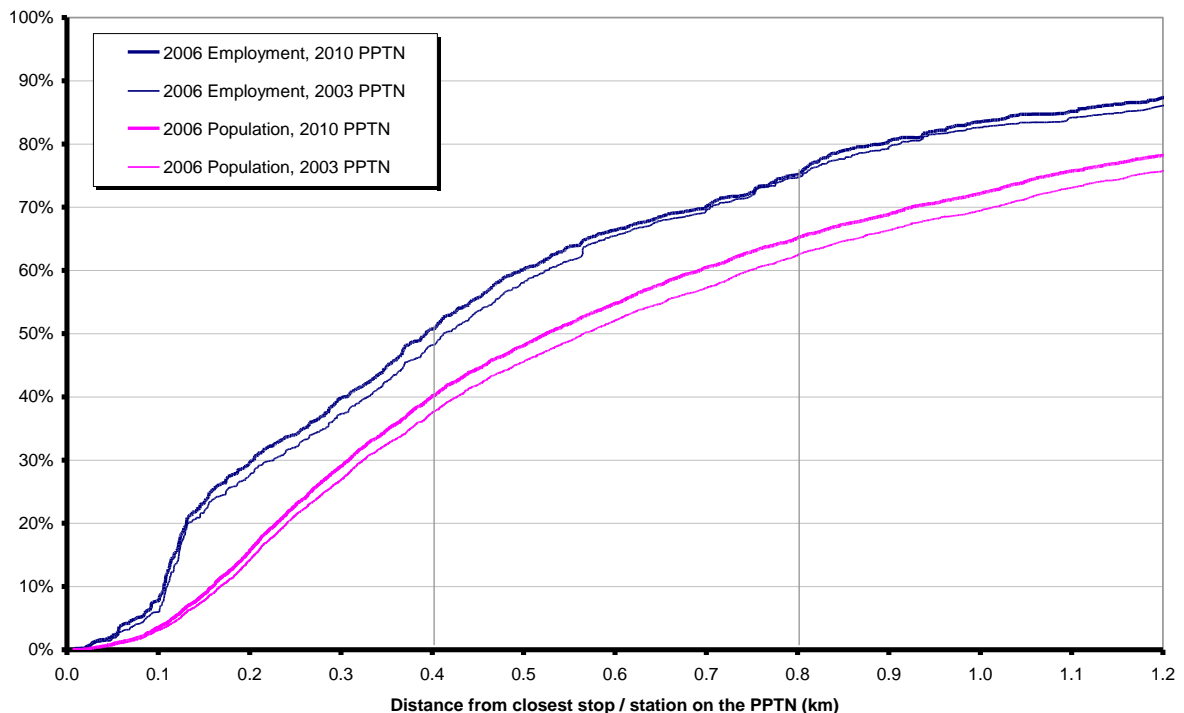


Figure 6 – Employment and Population Distances from the PPTN: 2003-2010

Across all of Melbourne, 49 per cent of the population and 9 per cent of the gross area of the 31 metropolitan local government areas (including green wedges and other undeveloped land) is within that distance of a public transport access point on the PPTN. That is, the PPTN tends to be located in relatively more densely developed areas.

Generally, the change in population distribution between the 2001 and 2006 Censuses has resulted in a greater proportion of people choosing to live in areas that tended to be further from the existing PPTN. These proposed revisions go some way towards redressing this trend, by increasing the coverage of the PPTN particularly in the Growth Areas on the urban periphery. It should be recognised that the PPTN is intended as a tool to direct development – including housing – towards more appropriate locations. As a result, early PPTN identification is required to encourage appropriate land use responses.

4.3. Service Levels on the PPTN

The vast majority (93 per cent) of the PPTN is currently serviced by train, tram or bus, as indicated by Table 3. This is an increase from having 88 per cent of the 2003 PPTN being serviced. Many of the proposed revisions to the PPTN recommended in this review had the effect of aligning the road-based PPTN with existing bus services while still retaining the same connectivity to Activity Centres. At the same time, the review has included 37 kilometres of proposed train extensions announced in the *VTP*, representing a third of the currently unserviced length of the PPTN.

Table 3 – Lengths of the PPTN by mode, road class and service status

Mode	Road Class	Current Length (km)			Proportion Serviced
		Serviced	Unserviced	Total	
	Freeway	25	0	25	(3%) 100%
	Primary Arterial	155	10	165	(19%) 94%
	Secondary Arterial	408	38	446	(50%) 91%
	Major Road	133	16	149	(16%) 89%
	Collector Road	60	10	70	(8%) 86%
	Local Road	26	5	31	(4%) 83%
	Other	5	1	6	(1%) 83%
Bus*		812	80	892	(100%) 91%
Train		427	37	464	92%
Tram		248	0	248	100%
All modes		1,487	117	1,604	93%

* Excludes road sections also served by trams

The road-based component of the PPTN is mainly served by secondary arterial roads. These roads are generally declared state roads under the jurisdiction of VicRoads, most of them having been included as public transport priority routes under the *SmartRoads* Road Use Hierarchy (VicRoads 2010).

The Department of Transport is currently examining which sections of the PPTN that are currently unserviced or relatively poorly serviced should be the highest priority candidates for upgrading to *SmartBus* - standard service levels.

It is important to acknowledge the many roles that a transport network has, and the challenges faced in managing the competing demands. Around the same time that this review was being conducted, DOT released *The Victorian Freight Network Strategy (Freight Futures, DOT 2008c)* which included a draft Principal Freight Network, and the *Victorian Cycling Strategy (DOT 2009)* which included a draft Principal Bicycle Network.

5. Future revisions to the PPTN

Future reviews of the PPTN will be required to ensure its ongoing relevance and effectiveness. However, the value of the PPTN as a land use planning tool would be undermined if the future location of the PPTN is uncertain. Clear processes for undertaking any future review are required to allow the PPTN to respond to future transport needs while enabling long term land use planning to respond appropriately to transport infrastructure.

To address that need, the review has proposed that the Director of Public Transport would be responsible for initiating any future PPTN review. In making that determination, it is important to acknowledge the importance of maintaining a consistent PPTN to support long term land use planning and the need for a review in the context of land use or transport service provision changes. Where a review is considered to be required, the extent of the review must be determined, ranging from within a nominated Activity Centre through to across the entire metropolitan area.

The PPTN requires a large degree of long-term certainty of location. To ensure this, any review of the PPTN would place highest preference on outcomes where no or minimal change to the PPTN is proposed, followed by options that propose additions to the PPTN, and lowest preference to options removing sections of the PPTN.

6. Conclusions

In the context of the growing land use and transport demands since 2003, this review of the PPTN was overdue. Multiple stakeholders were involved in the process, bringing a great depth of understanding of the issues involved and an enthusiasm to move forward in defining a network which would promote a land use response and increased patronage on improved public transport services.

Although the scope of the project was defined at the outset, the sequencing of tasks could have been organised better. Specifically, a clear articulation of the revised definition, objectives and link selection criteria would have guided the actual revision to the network and resolved a lot of the differences of opinions about specific proposed revisions.

It was opportune to conduct this review at the same time as the Principal Freight Network, the Principal Bicycle Network and VicRoads' *SmartRoads* Network Operating Plans were being developed.

Melbourne continues to grow, with forecasts of greatly increased number of residents in growth areas and around the Activity Centres and the six Central Activities Districts. The process followed by this review and documented in this paper will serve to inform future revisions to particular transport networks in Melbourne and elsewhere.

This paper has outlined a process for undertaking a review of a defined strategic transport network. The process would be equally applicable to other similar networks. A clear identification of the objectives of the network as well as the competing demands of various stakeholders is essential at the start of the review in order to streamline the process while ensuring sufficient opportunities for contribution.

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