Submission to the

# Inquiry into Expanding Melbourne's Free Tram Zone

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PTUA

PUBLIC TRANSPORT USERS ASSOCIATION

# Contents




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# 1 Introduction

The Public Transport Users Association (PTUA) welcomes the opportunity to contribute to the Inquiry into Expanding Melbourne's Free Tram Zone (FTZ) and commends the committee for its interest in improving public transport.

The liveability, sustainability and productivity of Melbourne are seriously challenged by high levels of car dependence and forced car ownership among many households, particularly in middle and outer suburbs (Currie *et al.* 2018). The underdevelopment of alternatives to private motor vehicle use is leading to costs and impacts such as:

- Lost productivity (PTUA 2014a; Forth 2019);
- Social exclusion (Scheurer *et al.* 2017; Giles-Corti and Arundel 2017);
- High household transport costs (Wang 2013; Walks 2018);
- Sedentary lifestyles and heightened risk of non-communicable disease (Beavis and Moodie 2014; PTUA 2007);
- Poor air quality and associated health risks (CAUL and MEI 2017); and
- Rising road transport emissions (DELWP 2019).

At current service levels, public transport is not fulfilling its potential to resolve these challenges, particularly in middle and outer suburbs where frequencies are relatively low, operating spans often limited, and services poorly coordinated. The barriers to greater use of public transport are well-understood and the existence of fares (provided they are cost-competitive) is not generally a major factor (PTUA 2009a; PTUA 2018). Addressing these challenges will require significant investment in public transport infrastructure and service provision, particularly in middle and outer suburbs that are currently grossly underserviced. Free public transport policies that narrow the revenue base should be considered against alternative asset and service proposals that improve the network's ability to serve a growing city and not just serve those areas that are comparatively well-serviced at present (Walker 2013). On this basis and for reasons elaborated in this submission, the PTUA does not support the FTZ nor its proposed expansion.

# 2 Expansion of the Free Tram Zone

Overseas experience has shown that free public transport mainly attracts people who had previously walked or cycled, while having limited effect on private motor vehicle use (Storchmann 2003; Fearnley 2013; Hess 2017; Tomanek 2017; Yle 2020). This is likely due to users of low cost active transport often being more cost conscious than motorists who are

willing to pay (car purchase, registration, insurance, maintenance, fuel, etc.) for speed, flexibility and personal space, while the FTZ add none of those three and actually reduces speed and personal space for public transport users through increased crowding. This means free public transport is often ineffective at reducing road congestion but may instead reduce the amount of incidental physical activity undertaken by users which could have negative health consequences.

The impact of introducing free tram travel in the Melbourne CBD in 2015 is confounded by the simultaneous capping of Zone 1+2 fares at Zone 1 levels which resulted in a large fare reduction for people travelling by public transport into the city from outer suburbs (see Section 6.1 below). So mode shift from private car to public transport could be influenced by either the Zone 1+2 fare reduction and/or the introduction of the FTZ. These simultaneous but separate effects can be disentangled by comparing travel into the FTZ from Zone 1 - which did not benefit from fare capping - and from Zone 2 which has benefitted from fare capping.

Data from the Victorian Integrated Survey of Travel and Activity (VISTA) indicates that the 2015 changes have contributed to significant mode shift from private car to public transport in travel from Zone 2 into the FTZ (Table 1). However, VISTA data (Table 2) also shows a sharp fall in public transport mode share and increase in driving in travel to the FTZ from Zone 1 (where the 2015 changes to Zone 1+2 fare capping do not apply). At the same time there is no clear trend in mode share for trips wholly within Zone 1 (outside the FTZ) or wholly within Zone 2 where neither the 2015 changes to fare capping nor the FTZ apply. This data supports suggestions that the FTZ encourages people to drive into or close to the FTZ instead of catching public transport (e.g. see Figure 1), but that this effect was moderated to some extent by the substantial reduction in fares for Zone 1+2 travel.

**Table 1:** Proportion of travel (distance) by mode for trips from Zone 2 to FTZ.

| | **2012** | **2013** | **2014** | **2015** | **2016** |
|---|---|---|---|---|---|
| Active transport | 2% | 2% | 3% | 3% | 2% |
| Public transport | 58% | 58% | 54% | 57% | 62% |
| Private vehicle | 39% | 40% | 43% | 40% | 35% |

**Table 2:** Proportion of travel (distance) by mode for trips from Zone 1 to FTZ.

| | **2012** | **2013** | **2014** | **2015** | **2016** |
|---|---|---|---|---|---|
| Active transport | 16% | 15% | 13% | 15% | 14% |
| Public transport | 53% | 52% | 57% | 54% | 47% |
| Private vehicle | 31% | 33% | 30% | 32% | 39% |


**Figure 1:** Car park advertising signage. The FTZ has featured as a marketing tool for CBD-fringe car parks.

VISTA data also indicates that the proportion of trip segments wholly within the FTZ that were taken by tram increased but that this was largely at the expense of walking and cycling with no clear reduction in the proportion of trip segments in private vehicles (Table 3). This is consistent with the international evidence referred to above.

**Table 3:** Proportion of trip segments (number) wholly within FTZ by mode.

| | 2012 | 2013 | 2014 | 2015 | 2016 |
|---|---|---|---|---|---|
| Walking | 91.2% | 94.9% | 91.2% | 90.9% | 90.0% |
| Tram | 5.1% | 2.8% | 5.1% | 6.1% | 7.2% |
| Other public transport | 1.4% | 0.6% | 1.3% | 1.0% | 1.5% |
| Cycling | 1.2% | 0.5% | 0.2% | 0.3% | 0.1% |
| Private vehicle | 1.2% | 1.2% | 1.7% | 1.7% | 1.2% |

The FTZ covers the most crowded sections of Melbourne's tram routes which exacerbates crowding and can lead to passengers being forced to wait for subsequent services. This problem can be particularly acute for people with mobility impairments that require the use of mobility aids and for parents with prams. In some cases the tram may be full of people taking free trips within the FTZ that would previously have been made on foot while fare-paying passengers wishing to travel beyond the FTZ are unable to board. This crowding on trams and at tram stops creates safety risks and increases the amount the dwell time while passengers get on and off. As a result average tram speeds through the CBD have fallen from 15km/h to 11km/h, which has lengthened journey times for passengers and reduced the effective capacity of the tram fleet. The lack of fare revenue from fare-free passengers,

combined with comparatively low passenger loadings outside the FTZ, also reduce the revenue to provide additional services that would relieve crowding.

A large majority of visitors to the CBD and surrounding area are public transport users from middle and outer suburbs and regional Myki areas who do not benefit from the FTZ since they have already paid fares to travel to and from the CBD (see Figure 2). The daily cap on Myki money and Myki passes mean that not only is CBD tram travel typically included as part of their daily fare, they also pay no extra for lunchtime tram travel[1]. The bulk of people who do benefit from the FTZ generally fall into at least one of the following groups:

## 1. People who drive into the CBD and park within or near the FTZ.

Provision of free public transport within the inner city while charging for public transport access to the inner city creates an incentive to drive into the FTZ leading to worse road congestion, air pollution and risk of road trauma (Wiseman *et al.* 2012). People who drive into the CBD generally have substantially higher incomes than people who use public transport and are less in need of a public subsidy (see Figure 2).

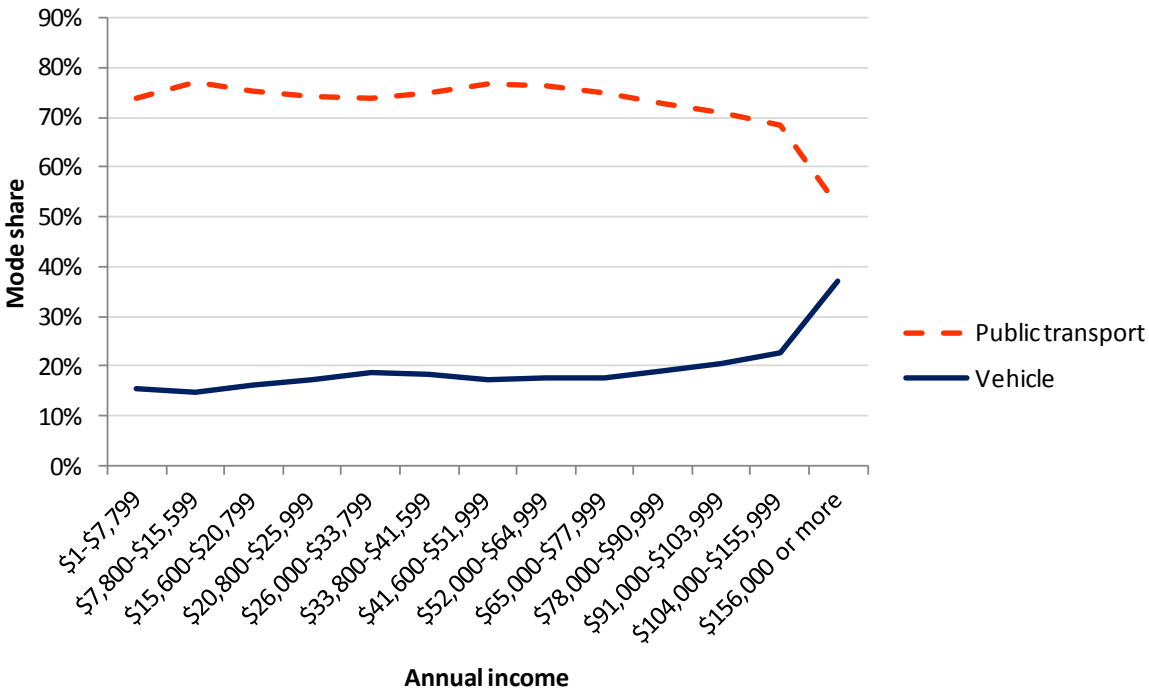


**Figure 2:** Mode share for journeys into Melbourne (SA2) for work. Note: Total Personal Income by Method of Travel to Work where Usual Place of Residence outside Melbourne (SA2) and Place of Work in Melbourne (SA2). ]

[1] Except for a small loophole in the Myki money capping system for people commuting to and from different zones (including at least one zone outside suburban Melbourne) and passengers connecting from Earlybird train use.

## 2. Residents in or within walking distance of the FTZ.

We note this area has comparatively good public transport service levels compared to outer suburbs and regional areas where fare-paying passengers originate. In many cases active transport will be a viable option for short journeys within the FTZ if they do not wish to pay for a public transport journey.

## 3. Interstate/international tourists staying within the FTZ.

Tourists will tend to have higher discretionary income than low income households in outer suburban and regional Victoria and be in less need of cross-subsidisation from these paying public transport users. Providing free transport effectively reduces the yield from these tourists. As for CBD residents, active transport is often a viable option for local shopping and sight-seeing.

While the FTZ may obviate the need for some short-term visitors to buy a Myki card, it fails to provide travel beyond the central city (see Figure 3) or to allow the use of buses and trains. Recent progress on alternative payment methods provides a more comprehensive solution to this issue (see Section 5.2 below) without the high opportunity cost and poor targeting of free transport.


**Figure 3:** Some of inner Melbourne's visitor attractions beyond the current and proposed FTZ. Access to more distant attractions is hindered by poor public transport as discussed below (see

Section 2.2) although public transport, particularly rail (which generally has higher service levels than buses), may be viable in some cases.

VISTA data indicates that well over 90% of trips to the Parkville medical precinct[2] for medical reasons originate outside the City of Melbourne and therefore from outside the current and proposed FTZ. This means the vast majority of patients (and families) travelling by public transport to the major hospitals in that area will have paid a fare that also covers tram travel and thus would not benefit from the FTZ even if it was extended. A significant proportion of these people travel from inner parts of Melbourne (such as Yarra, Maribyrnong and Moreland) and therefore pay the relatively high short distance fares that result from Melbourne's flat fare structure (see Section 6.1 below). Similar circumstances are likely to apply to families travelling to other hospitals around Melbourne from within their local catchments where no free travel zones exist.

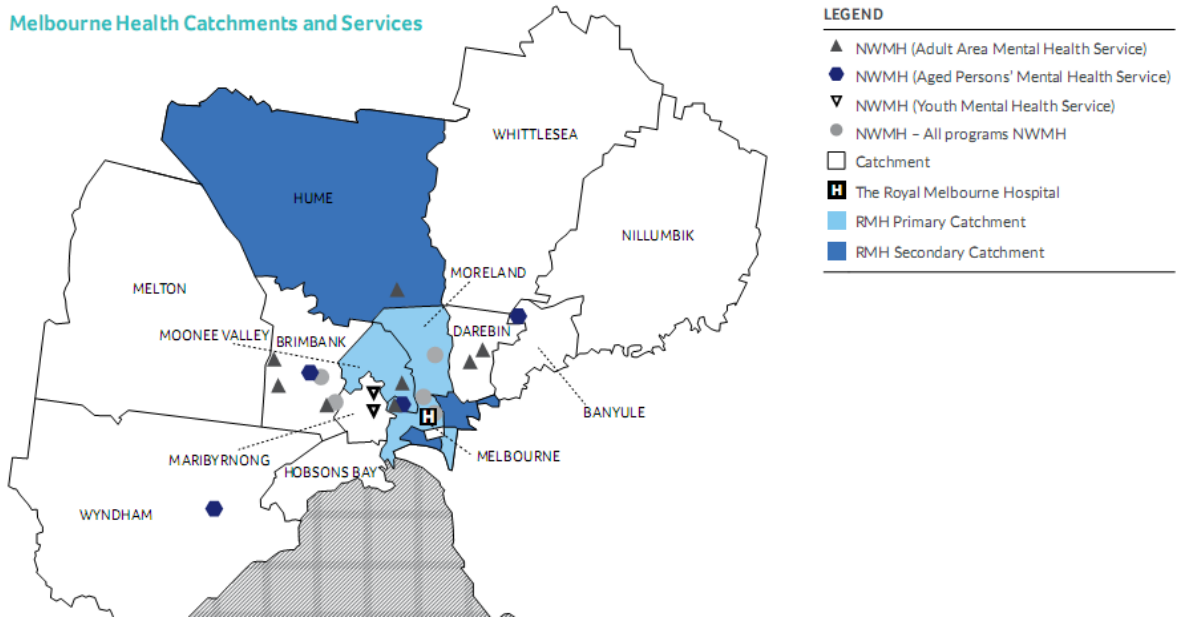


**Figure 4:** Melbourne Health Catchment. Royal Melbourne Hospital primarily serves inner city areas such as Moreland, Moonee Valley, and Yarra that are outside the current and proposed FTZ but pay relatively high fares for short trips under Melbourne's flat fare system. Image source: Melbourne Health Quality Account[3].

[2] This area includes the Royal Melbourne Hospital, Royal Women's Hospital, Royal Children's Hospital and the Victorian Comprehensive Cancer Centre.

[3] https://www.thermh.org.au/sites/default/files/media/documents/Melbourne%20Health%20Quality%20Account%202016%20-%202017.pdf

In terms of tertiary students, the majority of university students in Melbourne live outside both the current and proposed FTZs (McDonald *et al.* 2015; Fitzgerald 2018), meaning they have to pay to travel by public transport to their tertiary campus, even if it is located inside the FTZ, and therefore do not benefit from the FTZ (see Figure 5). The proposed expansion of the FTZ would bring in the Parkville and Southbank campuses of the University of Melbourne, but still leave most other tertiary campuses outside the FTZ, and still leave most students paying to travel into the FTZ. A larger proportion of international students than domestic students appear to live inside the FTZ (McDonald *et al.* 2015), and these would be the key beneficiaries of expansion of the FTZ, although only to the extent they travel to campuses within the FTZ (again excluding institutions such as Monash, LaTrobe and Deakin). With education a significant service export for Australia, there may be valid reasons for the university sector or industry portfolios of state and/or federal governments to subsidise international student travel, however we do not believe it is appropriate for other public transport users to subsidise this through higher fares or reduced service levels. Due to its limited geographic scope compared to student distribution, it is also clear that the FTZ is not a comprehensive solution to transport affordability for tertiary students as a whole, or indeed for Victorians more generally.

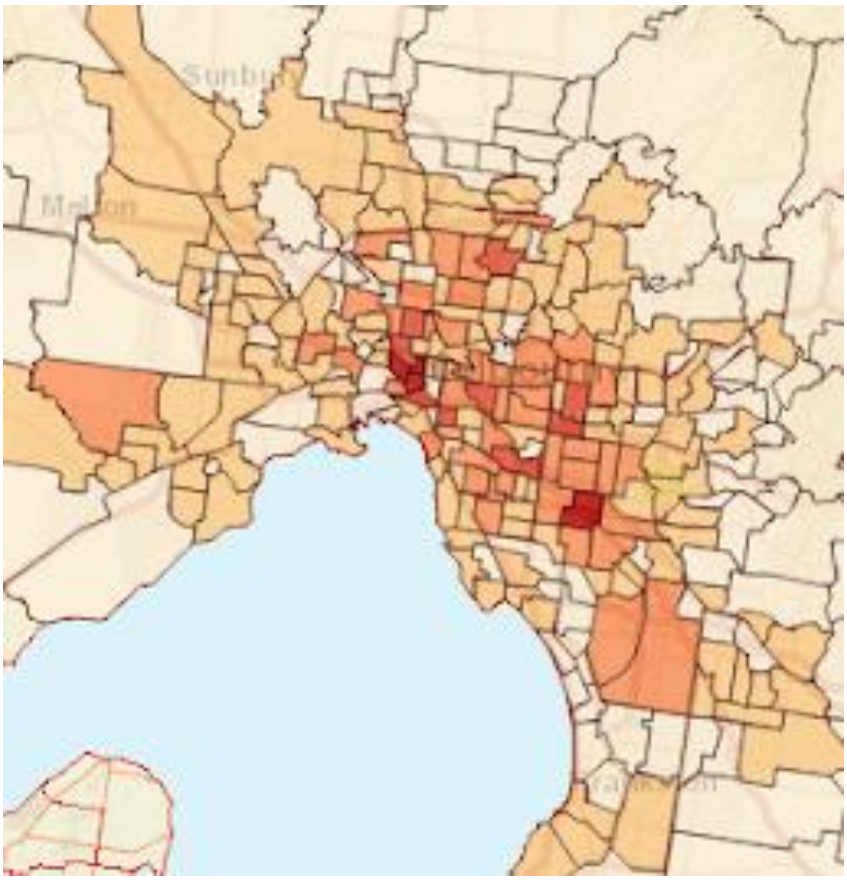

**Figure 5:** Full-time university students have a wide geographical distribution across Melbourne, with higher densities within suitable distance for active transport around major university campuses including Deakin, LaTrobe, Melbourne, Monash, RMIT, Swinburne and Victoria University. Source: Australian Bureau of Statistics.

Given this, rather than extending the Free Tram Zone and adding to its perverse outcomes and an extra $4-5 million to its current estimated $10-13 million p.a. direct cost, we believe it should be scrapped with the savings redirected to improving public transport.

## 2.1 Making the tram system more useful

As discussed above, the FTZ exacerbates the concentration of passenger loads in the inner core of the network and can lead to low rolling stock productivity outside the zone. The financial and economic viability of higher service levels through the inner core, which could help to relieve crowding, would be boosted by building fare-paying patronage in the outer sections of tram routes.

As a legacy of the train and tram systems being run separately and in competition in their first century (Mees 2000), many tram services fall short of connecting with train lines at the outer ends of their routes. This creates gaps in the public transport network that prevent transfers and leave destinations out of reach unless inefficient and uncompetitive detours are made. The results of these gaps can include near-empty trams competing for road space with cars carrying single occupants to destinations along the tram route. A number of relatively short tram route extensions would complete these missing links and enable higher patronage in the fare-paying, more lightly loaded sections of tram routes (Figure 6). This would also help to justify higher service frequencies through the more crowded inner core of the network.

**Figure 6:** Proposed tram route extensions (Carey 2013).

The current FTZ cost of $10-13 million p.a., or the significantly higher cost of an expanded FTZ, would quickly fund the most obvious tram gaps and make the network more useful to a wider range of potential users, including people travelling from outer suburbs to destinations along tram routes that currently do not connect to their heavy rail lines in middle suburbs. This would also boost the role of trams as feeder services for heavy rail and relieve pressure on railway station car parking. Compared to car parking, these tram extensions would be genuine "congestion busting" investments (Pittman *et al.* 2019).

In addition to crowding issues resulting from the FTZ, the tram system as it currently stands is also of limited usefulness to many people with mobility impairments due to the low proportion of low-floor trams in Melbourne's tram fleet, and limited geographic coverage of accessible platform stops (see Figure 7). The procurement of low-floor trams and construction of platform stops could both be accelerated by redirecting some of the cost of the FTZ to these higher priorities.

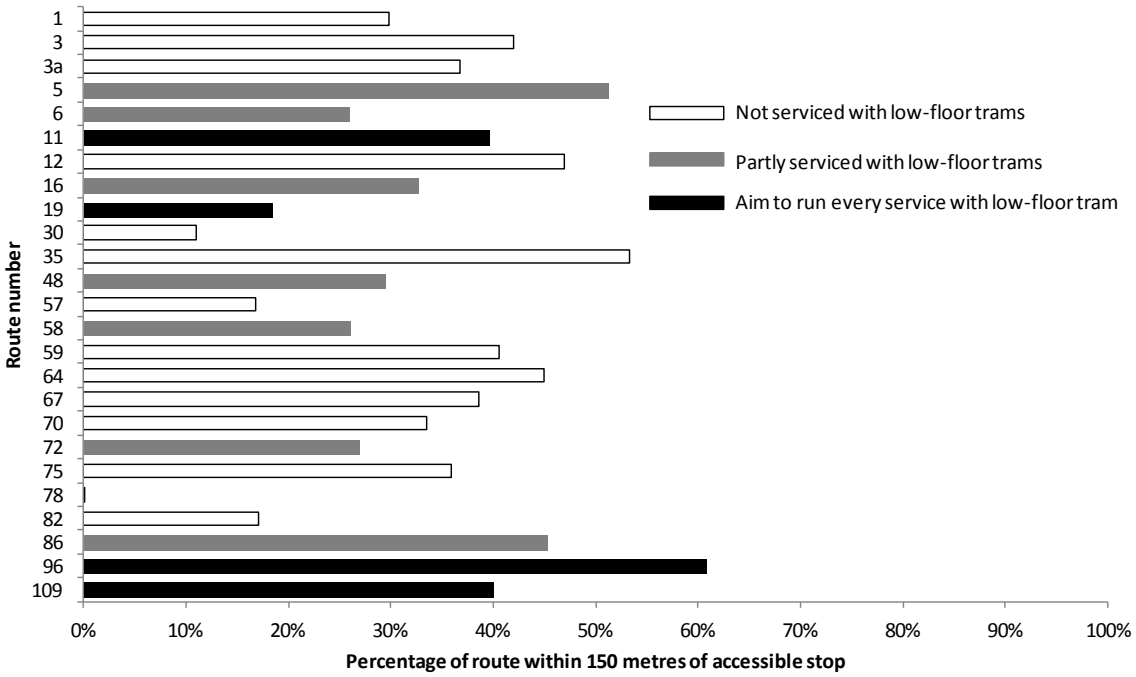


**Figure 7:** The proportion of each tram route that is within 150 metres of a platform stop that allows access by wheelchairs and mobility aids. Stops should not generally be more than 200-300 metres apart (PTUA 2009b) which implies a maximum of 150 metres to a stop at any point along the route. Many routes are not served by low-floor trams and are therefore not accessible even at platform stops.

## 2.2 Expansion of useful public transport

The full potential value of public transport lies not just in individual routes or zones, but in a seamless network of integrated services. Few people's lives are based around destinations along a single route, so the ability to transfer to connecting services, (or make "linked journeys"), is fundamental to a useful public transport system (Figure 8). In reality this ability only exists where transfers are physically practical (see Section 4.2) and connection times are minimised.

**Low frequency network**
A collection of lines that function separately if you are willing to plan your journey in detail. The area you can reach by a simple journey is restricted to those places that are within walking distance from the line that passes the place where you are. Change of lines where they cross each other is not very attractive. Waiting times will often be long, and you will need detailed information about more than one line. Transfering is perceived as a large barrier, and these crossing points are seen as being of little value. In reality, it is misleading to call this collection of lines a network.

**Network with some high frequency lines or sections**
The service is good along the lines or sections with high frequency. Transfer is more attractive at places with such a service, but only in one direction, towards the high frequency section. The total number of origin-destination combinations that are given a better service is limited. Even very high frequencies on the best sections will not change this general picture.

**High frequency network: Network effect**
When all or many of the lines or sections have high frequency, the network effect is created. The network can be used by the public transport passengers in a similar manner to motorists' use of the road network. You may travel everywhere in the network, almost at the time of your own choice. Instead of being barriers to travel, transfers open up a large number of new travel opportunities. All lines and all modes of transport "feed" each other with traffic and increase each other's market share.

**Figure 8:** The network effect for users of public transport (Nielsen *et al.* 2005).

A major barrier to linked journeys is long waiting times for connecting services that result from low off-peak service levels across much of the network and low frequencies at most times, but particularly on weekends, across the bus network (PTUA 2014c). This limit on the usefulness of public transport would be a significant factor in the growth of off-peak and weekend road congestion (Currie *et al.* 2018; Butt *et al.* 2018; Jacks *et al.* 2018). Increased service levels, particularly off-peak, on weekends and across the bus network, would greatly increase the usefulness of public transport for many people, including students, seniors and people with disabilities, and help to reduce the costs of forced car ownership (Currie *et al.* 2018; Walker 2013). Increasing service levels will obviously increase gross operating costs, however the increased patronage that flows from increased service levels (Balcombe 2004) would make a significant contribution to enabling this through increased fare revenue on the clear proviso that passengers pay fares and public transport is not free.

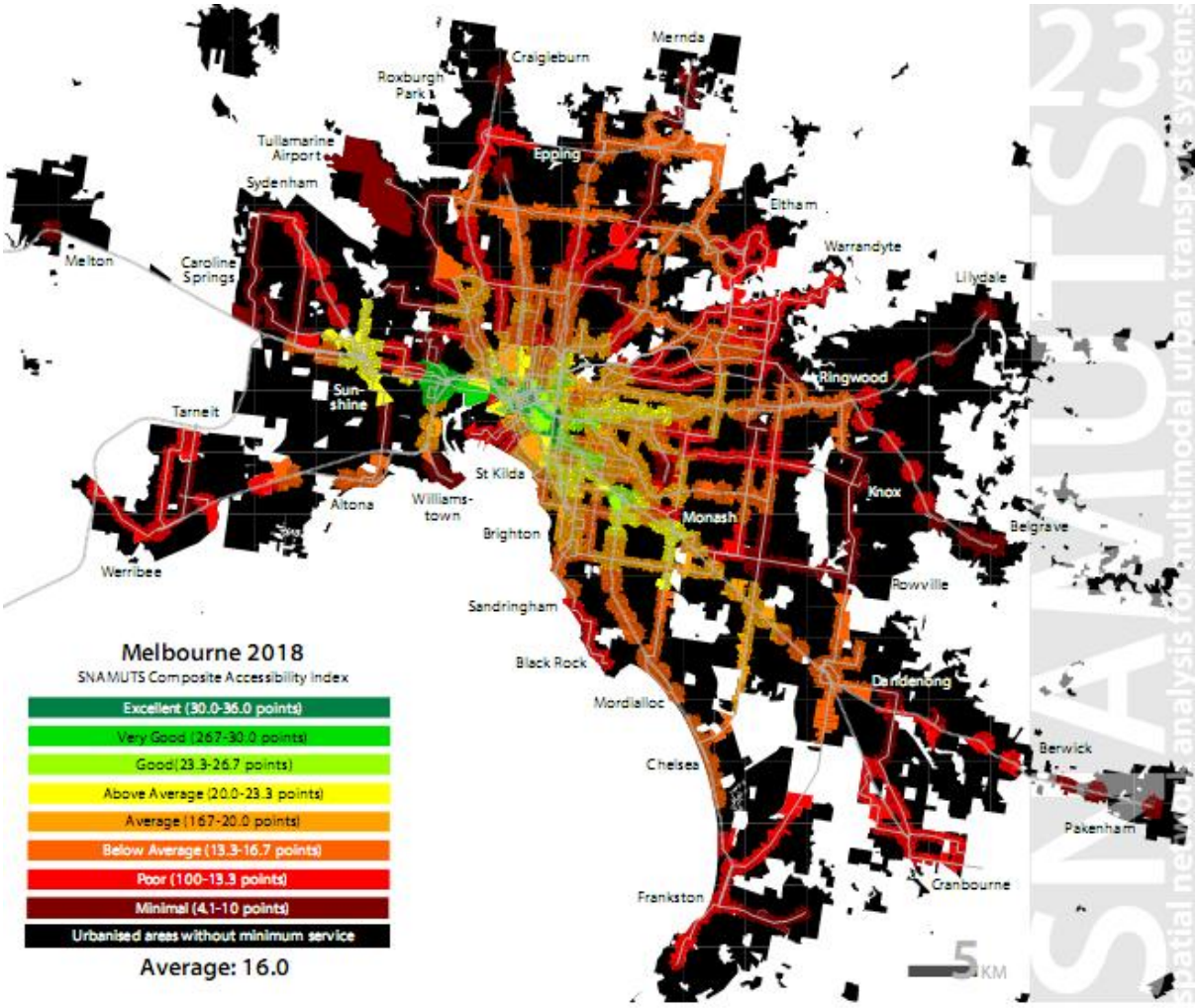


**Figure 9:** The Composite Accessibility Index for Melbourne developed as part of the Spatial Network Analysis for Multi-modal Urban Transport Systems (SNAMUTS) project. This index incorporates indicators such as service levels and network connectivity to assess spatial variation in the usefulness of public transport. Large areas of Melbourne currently have very poor public transport by this measure. Source: http://www.snamuts.com/

# 3 Full-time students

## 3.1 Free public transport

Full-time students may be found in households across all categories of income and socio-economic status (Czarnecki 2018). Free fares for all full-time students would therefore be very poorly targeted and would reduce resources available for programs targeting more vulnerable households. Free travel for full-time students would also remove the ability to use reduced off-peak pricing to move time-flexible student travel outside of peaks, if the free travel included peak travel. Similarly, free travel would deprive the network of revenue to fund student-heavy services and invest in infrastructure particularly useful to students such as the Suburban Rail Loop, and proposed interim Smartbus (Barton 2019), which will

serve three major university campuses and other smaller educational institutions. Free travel for students may also shift students who live near their educational institution from active transport to public transport, increasing crowding around educational institutions, similar to the effect of the FTZ in the CBD, and reducing incidental physical activity (Storchmann 2003).

Ahead of the 2018 Victorian state election the Parliamentary Budget Office costed a similar proposal for free public transport for primary and secondary students at $244 million over four years. The cost of also covering full-time tertiary students would presumably be substantially higher given the sizable university population in Melbourne and regional cities. Therefore free public transport for full-time students would carry a very large opportunity cost while failing to address service deficiencies that reduce the practicality of public transport for many students in under-serviced parts of suburban and regional Victoria (see Section 2.2).

In contrast, it is entirely appropriate to continue existing student concessions and to provide needs-based support to low income households to ensure access to education. For example, heavily-discounted student passes could be available where a student or their carer (e.g. parent) has a health care card. However, while starting to stretch beyond the scope of this inquiry, it is also important to consider the household's broader access needs in addition to school transport and ensure these are being met through affordable transport options and suitably located housing. Free or discounted student travel will not of itself overcome systemic disadvantage, particularly where scarce resources are flowing to high income households in comparatively well-serviced areas through non-means-tested free transport. Discounted, or even free, transport is not a substitute for a comprehensive approach to income support, affordable housing, affordable utilities, education and healthcare that is beyond the capacity of public transport budgets to adequately address.

## 3.2 Meeting student travel needs and reducing costly car dependence

Many upper-secondary and tertiary students have casual or part-time jobs that involve evening and/or weekend work. Travel at these times is hampered by low service frequencies and limited operating spans (see Section 2.2). These service deficiencies either result in costly car dependence (that is clearly not resolved by free public transport) or long travel times with negative impacts on academic performance. Long waits for services at night time can also negatively affect actual or perceived safety, particularly for young women, and limit the ability to utilise public transport (Whitzman *et al.* 2019). The cost of transport in these cases can be minimised by ensuring students are not forced to own and operate a car by inadequate public transport services (Wang 2013; Currie *et al.* 2018).

Active transport also has many financial, health and developmental benefits (Carver 2011; Duggan *et al.* 2018; McDonald *et al.* 2016; Nakanishi *et al.* 2017), and this may be

undermined by free public transport. The large recurrent cost of free student transport could instead be directed to improving the safety of local active transport networks for people of all ages and abilities, including routes to schools, universities and public transport stops (OCOS 2018; Carey 2019), along with improving public transport service quality to make it more useful to more students more of the time.

# 4 Seniors

## 4.1 Free public transport

As for students, people over 60 (or however "senior" is defined) can be found right along the income and wealth spectrums. Since Seniors Cards are not means tested, they may be held by comparatively wealthy retirees or semi-retirees with some control over their hours of work. In either case free travel for seniors would be poorly targeted, with significant opportunity costs, and would undermine the ability of off-peak pricing to attract seniors to off-peak travel rather than undertaking peak travel, if the free travel included peak travel.

As for people of all ages, needs-based concessions are entirely appropriate and targeted discounts should be offered to low income seniors such as Pensioner Concession Card holders.

## 4.2 Mobility for older Victorians

Older people may sometimes be facing declining mobility and driving competence (Freund *et al.* 2005). For these people, along with younger people with disabilities, an accessible public transport network with good spatial coverage can be of prime importance to avoid social isolation (Currie and Allen 2007; Davey 2007; Engels and Liu 2011). Victoria is making poor progress on making the transport system accessible, especially the tram network (Kennedy 2019; Rollason 2019). A key priority for making the public transport network more useful for seniors is ensuring accessibility across the network, and this should take precedence over measures that narrow the revenue base without improving service usability. The substantial cost of non-means-tested free transport should instead be directed to improving the accessibility of public transport stops (e.g. see Figure 7), the surrounding footpath network, and public transport vehicles so that more seniors are physically able to use public transport (VCOSS 2011; Rachele *et al.* 2019).

# 5 New technologies

While technologies can help to improve fundamental service quality attributes, there is a risk of expending resources on "solutions in search of a problem". Supposed techno-fixes should not distract from ensuring transport needs are being met in terms of spatial and temporal coverage, frequencies, integration, reliability, accessibility, etc (PTUA 2009a; PTUA 2014b). However we do believe there is strong merit in some technological innovations.

## 5.1 Real-time info

Service reliability is one of the key fundamental determinants of public transport use (PTUA 2009a). Although real-time information does not prevent disruptions, it can help to mitigate their impacts. An effective real-time journey planning system can incorporate planned and unscheduled service disruptions and assist passengers to find alternative paths to their destinations. The resilience of the public transport network in case of disruptions will be maximised where routes and modes are effectively integrated and multiple transfer nodes are available so that alternative paths can be found. Measures such as the tram gap filling program outlined above (see Section 2.1) and improved bus services would help to increase system resilience. Real-time information services would then enable passengers to benefit from this increased resilience.

## 5.2 Cardless payment

Cardless payment has been available on London public transport since 2014 and Mobile myki has recently become available in Melbourne for passengers with an Android mobile device containing an NFC chip. We look forward to this being extended to passengers with other types of mobile devices. Mobile myki enables visitors to Victoria, along with Victorian residents who are not regular public transport users, to travel by public transport without the need to buy a Myki card. This will ensure that tourists can travel within the inner city or beyond by public transport without first having to find a myki outlet. This also eliminates one of the main barriers to tourists using and paying for public transport when making a short visit to Melbourne. Cardless payment will therefore permit the poorly-targeted FTZ to be phased out with minimal inconvenience to tourists and visitors. Moreover, cardless payment opens up more of Melbourne to visitors than the current or expanded FTZ allows (see Figure 3).

Further development of the Mobile myki app could also make it more useful to users by providing additional information such as station facilities including bike parking or disability access, journey planning, tourist information or push notification of service disruptions (potentially tailored to users' preferences or recent travel).

## 5.3 Off-board validation

A number of jurisdictions are implementing off-board payment and/or validation systems for bus and light rail networks (NACTO 2017). While we do not believe platform stops should be considered paid zones, off-board validation could enable fare-paying passengers to validate without having to struggle through crowded trams to reach on-board validators.

## 5.4 Demand-responsive services

Various forms of flexible public transport have been proposed to provide services where current patronage does not appear to justify frequent fixed-route services. Such proposals often invoke technological innovations as enablers of efficient services that are able to meet passengers' needs where traditional public transport supposedly cannot.

Real-world experience with demand-responsive and flexible public transport has tended to show high unit costs and low vehicle productivity relative to more predictable fixed-route services (PTUA 2019). On a practical level, such services may fall victim to their own "success" with rising patronage leading to ever-more circuitous and time-consuming routing that reduces the services' appeal to a broader market. At significant levels of patronage, the services can absorb substantial funds that could be better used on more direct and time-competitive fixed-route services (Walker 2019).

While some passengers may have limited mobility, we recommend greater investment in making mainstream fixed-route services fully accessible (as discussed in Section 4.2 above) and ensuring paratransit is adequately resourced for people who are unable to make use of conventional public transport (Quednau 2018). We believe such investments have a higher priority than expansion or continuation of the FTZ.

## 5.5 High capacity signalling

In comparison to highly-performing lines in other cities, Melbourne only achieves comparatively low frequencies on its busiest railway lines due to signalling limitations (Noble 2019). While there have been some actions to improve signalling, progress has been slow. A full roll-out of high capacity signalling across the rail network would allow higher train frequencies that are more in line with best practice in other cities and significantly boost the capacity of the system. This would help to relieve crowding and enable more efficient use of existing rail infrastructure.

## 5.6 Cutting delays to public transport vehicles

Trams and buses can spend up to a third of their time stationary at traffic lights, not counting time spent loading and unloading passengers (Morton 2007). This obviously

lengthens journey times for passengers and makes public transport less competitive than private car travel that adds to road congestion. These delays also reduce the possible service frequencies and capacity that can be achieved by a given vehicle fleet. Reducing these delays allows increased service levels and network capacity with the same number of vehicles and drivers, effectively providing near-free service upgrades.

Traffic light priority systems for public transport are common in many European cities and have provided large efficiency gains for public transport agencies (Nash and Sylvia 2001). Some approaches to public transport priority only provide public transport vehicles with priority when they are running late, however more ambitious priority measures can speed up services to provide faster average speeds and higher service kilometres with the same vehicle operating hours. An ambitious approach to public transport priority could boost tram frequencies and capacity in the inner core of the network and thereby ease crowding. Similar priority measures in middle and outer suburbs, together with route reform (PTUA 2012), could contribute to raising bus service frequencies which are currently low on many routes.

Reduced delays to public transport vehicles at traffic lights and the improved service levels enabled would make public transport more competitive relative to private motor vehicles and help to reduce congestion impacts by attracting a larger share of travel. This would improve the performance of both the road and public transport networks, as well as help to reduce air pollution, carbon emissions and road trauma.

# 6 Dynamic pricing

## 6.1 Overall fare levels

Although the PTUA does not see a compelling case for free public transport (PTUA 2018), we do stress the importance of competitively priced public transport (Taylor *et al.* 2008). The introduction of the FTZ and capping of Zone 1+2 fares at Zone 1 levels have placed a larger share of the total fare revenue burden on people making short trips wholly or partially outside the FTZ. Since these changes were announced, Zones 1-only and Zone 2-only fares have increased by 26% and 21% respectively, or around twice the rate of inflation (see Figure 10), making Melbourne's Zone 1 2-hour fare the most expensive short distance fare in Australia. These large increases are also concerning given the relatively poor service provision across much of Zone 2 (see Section 2.2). The rapid increase in fares also exacerbates the large fare increment when leaving the FTZ that would only be shifted - and not eliminated - by moving the FTZ boundary. As discussed above (see Section 2 above), this then creates an incentive to drive into the FTZ and worsen urban traffic congestion. A

variation on this was seen when Zone 1+2 fares were substantially higher than Zone 1-only fares and many passengers drove to stations just within the Zone 1 boundary (Bowen 2019).

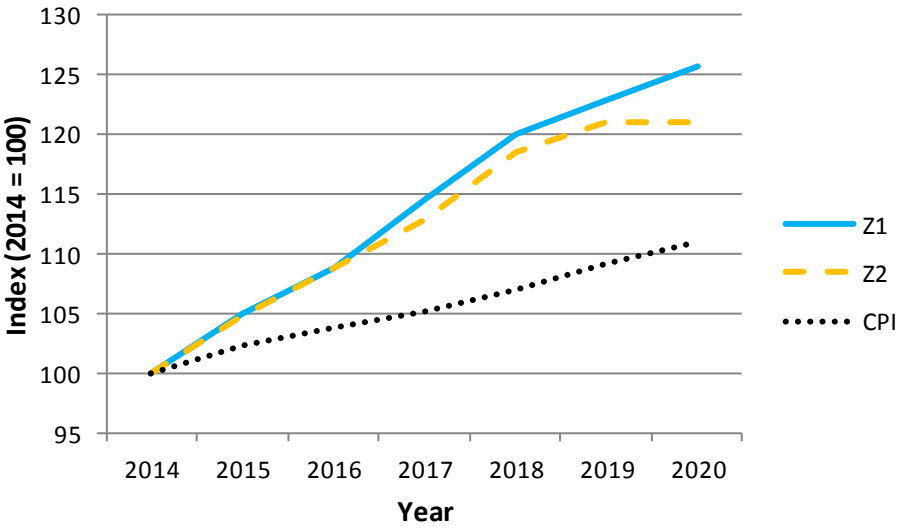


**Figure 10:** Fare inflation for short (single zone) journeys since 2014

A more equitable fare structure would avoid large fare increments at zone boundaries while still ensuring that passengers making short journeys do not pay as much as passengers making long journeys. This would entail a metropolitan fare structure that is not as flat as outside the FTZ at present, but without the punitive fare increments existing until 2015 and still in place at the FTZ boundary now.

## 6.2 Peak pricing

One factor counting against free public transport is the effect on crowding, particularly at peak times. Some people even go so far as to propose increasing fares above current levels during peak times to push passengers to off-peak travel given the high cost of major capacity augmentation. However, public transport provides significant road congestion relief benefits at peak times, so measures that deter peak public transport use may divert travellers onto congested roads unless parallel measures are also introduced to deter peak road use. The substantial external social benefits of public transport also justify a significant public subsidy for public transport journeys, although not typically to the point of making travel free (Fearnley 2013). Furthermore, workers in lower paid jobs often have limited discretion over their work times and may need to travel during peak periods. Incentives to shift public transport use from peak to off-peak should therefore be focused on carrots for off-peak travel rather than sticks for peak travel. In addition to potentially lower off-peak fares to attract more price-sensitive passengers, incentives also include fundamental service quality attributes such as turn up and go service frequency outside of peak times to make off-peak travel a viable and competitive option. To ensure the road network congestion

relief benefits of public transport are realised, latent public transport capacity should be utilised with extra services to address off-peak crowding and provide attractive service levels, particularly during shoulder-peak periods where there is greatest potential to shift current peak travel.

An often unrecognised factor in travel mode choice is the cognitive effort required (Stradling *et al.* 2001). A complex fare system will increase the mental "cost" of using public transport and reduce the likelihood of its use. A fare system should therefore be simple and multimodal with seamless transfers between services.

Off-peak pricing in Melbourne is largely limited to free Earlybird train travel arriving by 7:15am and the weekend and public holiday fare caps. Earlybird train travel is quite arbitrary in that it only addresses morning peak train services and not the afternoon peak or other modes. An unfortunate side-effect of this is that people using Earlybird train services are encouraged to drive to the station because bus and tram services are not free, which adds to railway station parking pressures. Crowded bus and tram services, such as Smartbuses serving the Manningham area, also suffer from a lack of incentive to shift travel to less crowded times. A more holistic off-peak pricing strategy would be multi-modal - applying to train, tram and bus - and therefore allow penalty-free transfers between routes and modes. The weekend and public holiday daily fare caps are set at discount from the ordinary zone 1 daily cap levels but are too high to provide any discount for zone 2 only daily cap passengers or single 2 hour fare passenger of either zone. Reduced fares would not only apply prior to 7:15am and on weekends, but also potentially apply between the morning and afternoon peaks and again after the evening peak. Ideally off-peak should also be available in periodical pass form (weekly and 28-365 day passes) for the benefit regular off-peak travellers, such as shift workers, and encourage off-peak public transport use.

In order to minimise the cognitive cost of using public transport, it is important that off-peak pricing is consistently applied to ensure it is easily understood and undue complexity does not deter potential passengers from using the system. Unpredictable or irregularly variable pricing is likely to be confusing for passengers and could result in unexpectedly high fares. This could be particularly stressful or challenging for people with cognitive impairments. Fares that increase unexpectedly are also likely to be perceived as a form of poor reliability that undermines one of the fundamental attributes of good public transport, and will damage potential users' sense of control, thereby reducing their willingness to use public transport.

# 7 Conclusion

Free public transport for certain users narrows the fare revenue base and places greater demand on remaining fare-payers to fund the system. For example, since changes to the

fare structure in 2015, including the introduction of the FTZ, fares for single zone travel have increased at around twice the rate of inflation, including in poorly-serviced Zone 2 areas (see Section 6.1). Free public transport also reduces the funding available to make much-needed improvements to public transport services such as improving accessibility for people with disabilities, increasing frequencies and lengthening operating hours in poorly-serviced areas.

The PTUA does not support the FTZ in either its present or proposed form, nor free public transport for students and Seniors Card holders. However we strongly support targeted concessions for people on low incomes regardless of age or education status, and continuation of student concessions. This should extend to full-time postgraduate students currently excluded from student concession eligibility. We also urge greater investment in service improvements to make the public transport network more useful for more people more of the time, including students, seniors and people with disabilities.

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