

Centre for Urban Research

# Early delivery of equitable and healthy transport options in new suburbs

## Final report

Unclassified

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## Executive Summary

This is the final report of the three-year study, *Early delivery of equitable and healthy transport options in new suburbs*. It was funded jointly by RMIT University, through its Urban Futures Enabling Capability Platform, and contributions from the Victorian Planning Authority, the Cities of Casey and Wyndham, and Stockland Australia.

The project was premised on the understanding that the provision of alternative means of transport to the car provides a range of significant health, environmental, societal, and economic benefits. However, in the early years of growth suburbs, alternatives to the car, such as public transport, walking and cycling, are often difficult to use or absent. While early provision of walking and cycling paths is now standard in new suburbs, local destinations to walk or cycle to are generally some of the last elements to be built; and bus services commonly arrive years after residents have moved in. Thus, in the early life of growth suburbs and for a considerable time afterwards, urban form and transport provision do little to promote active and public transport use. Thus, early in the lifetime of the growth suburbs, and for a considerable time afterwards, the urban form and transport provision are doing little to promote active and public transport use. Scarcity of employment and the lack of local destinations lead to long travel times, with 63% of residents in our study stating that travel times had a negative impact on their family life and 47% that it had a negative impact on their health.

Public transport services and development of town centres are dependent on state funding, developers' financial imperatives and cooperation between stakeholders. Early delivery is often assumed to be too expensive and not viable for the low numbers of residents in growth areas. This study aimed to shed light on this problem – to understand the costs and benefits of the early delivery of transport options. This analysis showed that the early delivery of high-quality public and active transport provision to all growth areas would cost \$8.8 billion but would bring \$36.6 billion in benefits - a very favourable benefit/cost ratio.

The study had four main approaches, investigating:

- the process of planning in Melbourne's growth areas, through document analysis and 30 semi-structured interviews with professionals involved in the process;
- the current situation and lived experience in the growth areas through a GIS analysis of urban form and destinations and a resident survey and resident interviews in two case study areas;
- the costs and benefits of early delivery of transport options, through transport scenarios of early, medium and late delivery at low, medium and high quality;
- alternative funding options for early delivery, assessing each against an evaluation framework to analyse their potential and ease of implementation.

While our study started before the COVID-19 pandemic, clearly the pandemic has and will have an impact on the delivery of transport services. The situation has reinforced the importance of local living, increased concern about crowding on public transport and has led to a much stronger acceptance of working from home. Time will tell how the permanence of these changes.

### Planning for new suburbs in Melbourne

In Victoria the Precinct Structure Planning (PSP) process for growth suburbs incorporates a range of priorities for active, public and road transport, however it does not control delivery. Infrastructure for walking and cycling is generally built with the initial development, however provision of local destinations and mixed uses is often absent in the early years of the suburb due to viability concerns. Utilisation of active transport infrastructure will be far greater if these lead to useful destinations so that concurrent delivery of local retailing is important.

Implementation of public transport is more problematic. While the PSPs can plan for bus routes and bus-capable roads, the provision of a bus service depends on state government funds and the network of routes which extend beyond the geographical boundaries of the PSP. The provision of a bus service currently must be justified through development of a business case. However, a minimum level of



public transport service should be considered to be essential and directly linked to development approval and finance processes. A base level of public transport is essential as mobility is a precondition for participation in society (including work, education, care, health services, cultural and social life) and is central to the quality of life. Social and economic participation is inherently connected to basic democratic values, such as equal opportunities and social justice. Enabling full social and economic participation is fundamental to the functioning of a democratic and socially just society.

The delivery of state infrastructure and operational expenditure is often politicised and contested. While *Plan Melbourne* requires development in growth areas to be staged to better link infrastructure delivery, sequencing of state infrastructure is only in early stages and appears not to be a priority. At the local level the timing and delivery of aspects of any new development is primarily determined by developers' financial imperatives for cash-flow, leading to extended delivery time frames and town centres and higher density areas being developed last. Determining the sequencing and timing of development more firmly through the PSPs and providing opportunity for early co-location of services in town centres is necessary to enable better planning.

### **The current situation of transport options in new suburbs**

Urban form elements that research has demonstrated improve public and active transport uptake are local destinations, mixed land uses, increased dwelling density and street connectivity. For walking and cycling, infrastructure such as foot or cycling paths, perceived and actual safety, as well as green and open space and an 'aesthetic' environment are also important.

Street connectivity, active transport infrastructure and to some extent access to open space are currently catered for in the growth areas, as footpaths are generally built at the same time as roads. However, public transport service in the first three years of development is rare and provision of local destinations and mixed uses is often absent in the early years of the suburb.

Our GIS analysis shows that **currently** only 4% of dwellings in mostly built-up PSP areas are within 1km of an activity centre with a supermarket. The PSP Guidelines ambitiously suggest that 80-90% of residences should be within that distance once PSP areas are fully built. The current average net dwelling density is at 10 dwellings per hectare using a net density based on previously published research definitions. Using the definition of the PSP Guidelines, PSP areas achieve an average net density of 18 dwellings per hectare according to analysis conducted by the VPA. Both results are below the 20-25 dwellings per hectare that research suggests is needed for public transport viability and walkability. While it is to be expected that new urban areas will initially have fewer destinations it is anticipated that there will be more destinations and greater accessibility with the roll-out of town centres and provision of the complete street network. In the same way, density is likely to increase with further urban development. Yet, the results show that early delivery of these key features lags behind. Similarly, while PSPs plan for bus routes, the implementation is also lagging. Only 25% of dwellings are within 400m walking distance of a public transport stop, clearly beneath the objective of 95% in the current PSP Guidelines and Victoria Planning Provisions. Planning and providing for more destinations earlier in the lifetime of a suburb is crucial to encourage a higher use of active and public transport.

### **The lived experience in growth suburbs**

Experiences of residents of growth suburbs correspond to the situation described before. Surveys and interviews for this project were conducted in two areas, one in Casey and one in Wyndham. The resident survey showed that 64% of respondents found that their travel times were longer than expected in their new suburb and that this impacts their quality of life. The interviews showed increased stress due to unpredictable travel times from traffic congestion or poor public transport connections. Some interviewees reported feeling isolated further away from friends and family. The car dependence of the suburb worried some of the residents, who reported that transport and access had become more important to them since moving in.

While existing attitudes to public transport affect usage, the move to a new environment provides a good opportunity for change of habits if alternative modes are available. Active transport usage was

limited, with 58% surveyed stating that they walk rarely or never for trips from home to any destination and far more that they rarely or never cycle. Half of the survey respondents considered walking or cycling would take too much time, while 19% said they did not feel safe doing so. The interviews showed that greater distance to shops resulted in residents shopping less frequently, often weekly, so they buy less fresh food and get less physical activity, potentially impacting their health. Residents expected shops and public transport would arrive soon after they move in, stimulated by assurances from the developer or real estate agents when buying.

### **The costs and benefits of early delivery of transport options**

For this study different transport scenarios of early, medium and late delivery and with low, medium and high quality of transport provision were established for two case study areas to understand the differences in costs and benefits between those different options.

Benefits we quantified include a) physical health benefits, b) social and economic participation benefits, and c) household savings from reduction in number of cars owned. A reduction in cars on the road has additional environmental benefits and congestion benefits.

The early delivery of transport options is more expensive than delayed delivery, as a current dollar is more expensive than a future dollar. Just as costs decrease with later delivery, the quantified benefits also decrease with later delivery, making later investments less valuable. Benefits are lower when transport scenarios are implemented later because people will benefit later and thus have fewer years of benefits. Furthermore, we have modelled a higher uptake of transport options when they are provided earlier, as behaviour change is more likely when transport options already exist when residents move in (see Gunn et al. 2021 and Pemberton et al. 2021 for more detail).

Our analysis shows that the overall benefits of providing high-quality transport options early in the case study areas in Casey and Wyndham add up to about \$1.374 billion and \$1.058 billion, compared to implementation costs of about \$59 million; or in other words a benefit-cost-ratio of 23.3 and 17.9 respectively. An extrapolation of our results to all residential PSPs shows that the early delivery of high-quality public and active transport provision to all growth areas would cost \$8.8 billion but would bring \$36.6 billion in benefits. The benefit-cost ratio is less extreme for the extrapolation at 4.2. The main reason for the difference lies in the decision to extrapolate costs incurred in non-PSP areas, while not extrapolating benefits for the people living in those non-PSP areas to avoid double-counting.

A large part of the overall amount of benefits is due to avoided car ownership (about 65% for early high-quality delivery). However, even if a more conservative approach towards the reduction in car ownership is taken overall benefits are still higher than costs, and even if vehicle ownership savings are disregarded altogether, the benefits of increased physical activity and social and economic participation still result in benefit-to-cost ratios of over 6. Yet, the large share of household savings in the overall benefits shows that currently a large part of transport costs is passed on to private households.

We included population outside the respective suburb that benefits from the introduction of the transport options – such as the population living within walking distance of a new bus route – into our analysis. The analysis showed that benefits of increased transport provision in a new suburb are amplified by effects on surrounding suburbs, highlighting the importance of good sequencing of development.

While overall government does not gain significant income from the benefits of transport options, health benefits and those from economic and social participation can save government (and society) costs for health care and welfare costs. Furthermore, a reduction in cars on the road has a potential influence on productivity through avoided congestion, as well as greenhouse gas emissions. Particularly in a centralised city with a radial transport system such as Melbourne, more traffic and cars in outer suburbs lead to flow-on and multiplier effects on congestion in middle and inner areas. Increased productivity can lead to more government income through taxes, and a reduction in greenhouse gas emissions can contribute at least in some small parts to the mitigation of climate

change. We did not quantify those benefits in our analysis, but Infrastructure Australia (2019) and BITRE (2015) forecast costs of congestion for Melbourne at about \$10 billion in 2030.

### Funding sources for the provision of transport options

We compared several relevant funding sources for the provision of transport options according to potential revenue, reliability, equity, ease of implementation, travel impacts and the time frame for implementation.

Our analysis suggests that the funding source that holds the best potential is transport pricing which can provide recurrent, stable and equitable funding. A broad-based land tax is also similarly strong in many respects but has less potential to favourably impact travel behaviour.

The Victorian Growth Areas Infrastructure Contribution (GAIC) could be used increasingly as funding source, as it can be used for five years of recurrent public transport services. The GAIC public transport fund should focus on the *early operations* of public transport services in growth suburbs rather than public transport *infrastructure*. A focus on early delivery is possible because of the broad nexus of the GAIC. As the GAIC is partly a betterment charge, the state government could assess whether the current GAIC rate reflects the value of betterment adequately. This could be done in relation to work on detailing the new Windfall Gain Tax. To support active transport at an early point in the lifetime of a suburb, early delivery of community infrastructure could be supported through the GAIC, ideally in cooperation with other stakeholders to provide relevant destinations in the early stages of the suburb.

### Conclusions and Recommendations

While funding is vital, it is not the only element of achieving an early delivery of transport options: better coordination, more efficient processes, and supporting land uses all play a part. The broader objective behind the call for transport options should not be forgotten - achieving a more equitable, sustainable and healthier city. Based on our findings we recommend the following:

1. A base level of public transport service, and provision for active transport, be considered essential in growth areas from the time residents move in.
2. Establish a more coordinated and strategic approach towards the development of growth areas through state infrastructure plans that support sequencing of development.
3. Develop strategic transport plans to inform planning for growth areas.
4. Introduce staged public and active transport provision, ensuring a basic level of provision at the commencement of settlement and then stepping up as development milestones are met.
5. Start with a public transport network of direct and frequent routes in growth suburbs, complemented by routes that provide wider geographic coverage to ensure equitable access to transport.
6. Ensure the early delivery of neighbourhood and/or town centres to encourage active transport and provide a place for community activity.
7. Increase average net density targets for growth suburbs in the PSP Guidelines to at least 25 dwellings per net developable hectare.
8. Ensure the timely implementation of local infrastructure that has been identified in contribution plans.
9. Explore integrated transport pricing and a broad-based land tax as possible funding sources to improve delivery of active and public transport infrastructure and services.
10. Use the Growth Areas Infrastructure Contribution (GAIC) as an instrument to support the early delivery of transport options.
11. Consider the costs of not providing transport infrastructure and services when undertaking cost-benefit analyses of transport infrastructure delivery options in growth areas.



## 1. Introduction

This is the final report of the three-year study, *Early delivery of equitable and healthy transport options in new suburbs*. It was funded by RMIT University, through its Urban Futures Enabling Capability Platform, and by contributions from the Victorian Planning Authority, the Cities of Casey and Wyndham, and Stockland Australia. The Department of Transport and Planning Institute Australia (Victorian Division) were further project partners, providing support and advice.

The project was premised on the understanding that the provision of alternative means of transport to the car provides a range of significant health, environmental, societal, and economic benefits. In growth suburbs, transport options other than the car, such as public transport, walking and cycling are often difficult to use or completely absent. Access to public transport is inadequate with bus services often arriving years after residents have moved in. Additionally, walkability for transport is poor due to low residential density and few destinations to walk to. Furthermore, growth suburbs are generally further away from jobs, and – at least in the beginning – shops, hospitals and leisure activities are also further away. This means that residents need to travel longer distances for many activities than residents in established suburbs, and that they mostly need to use a car for these trips. Thus, in the growth areas the use of sustainable transport is less feasible than in other areas of the city.

The need for car travel means that residents often spend a disproportionate share of their income (and time) on travelling and are more vulnerable to increasing oil prices (Currie et al. 2009, Dodson & Sipe 2008). For residents that are not able to or should not drive or without access to a car the lack of transport alternatives can impede their mobility and ability to participate in the work force and social life (Currie et al. 2009). A wide range of research has documented that poor transport options are linked to reduced participation in higher education and training, reduced access to health services, higher rates of unemployment, lower involvement in social activities and less engagement with social networks, often resulting in isolation (Awaworyi Churchill & Smyth 2019; Lucas et al. 2016; Mackett & Thoreau 2015; Van den Berg et al. 2016).

Furthermore, ‘forced car ownership’ needs to be taken into account, which refers to the need of owning a car in areas of high car dependence in order to be able to move around (Delbosc & Currie 2011). This need for owning at least one car may not be problematic for most households, but is for those with a low income, and this financial stress is even greater when every employed adult in the household needs their own car.

Apart from social and economic participation, the provision of transport alternatives to the car, also has health implications. Good quality active transport infrastructure and destinations to walk to (including public transport stops) allows people to walk and cycle to move from place to place. This has health benefits associated with the physical activity component, decreasing the risk for diseases that are connected to low levels of physical activity, such as ischemic heart disease, diabetes type 2 and some cancers (Laird et al. 2018).

Finally, the need for car travel contributes to environmental and economic issues including traffic congestion, environmental pollution, road trauma and impacts on public health, for example through contribution to a sedentary lifestyle (Armstrong et al. 2015; Badland et al. 2017a; OECD 2014).

Therefore, even though the private vehicle offers a good, and in some areas the only, mobility option for many, we argue that there needs to be other transport options available so that people have the opportunity for social, economic and community participation without relying on a car and contributing to greenhouse gas emissions and other undesired impacts of private vehicle travel. These transport options include public transport, walking and cycling.

Our focus on the early provision of these transport options stems from evidence that suggests that if transport options are provided early in the lifetime of new suburbs, residents are more likely to take them up (Thomas et al. 2016, Pemberton et al. 2021). This increased likelihood is based on the insight that people are more likely to change their habits during or shortly after a life change event, and that moving to a new suburb is generally related to life change events, such as a change in household size or employment change. When other habits are changed due to life change events, people are more susceptible to changing additional habits. Those changes can serve as a catalyst that allows existing transport mode habits to be reconsidered and changed. For example, a new route to work might be necessary anyway due to relocation and this can involve a change of travel behaviour if there are further transport options to choose from. Thus availability of transport infrastructure and services can take advantage of the possibility of breaking previous habits and setting new ones involving use of those modes. A proportion of residents will of course still change their travel behaviour when new transport options arrive in an established suburb or later in the life time of a new suburb, but achieving this change is a bit more difficult if travel habits are already engrained. More details on this discussion can be found in Pemberton et al. (2021).

Although the population growth pressure in Melbourne has decreased recently due to immigration restrictions adopted during the COVID-19 pandemic, Melbourne's infrastructure still needs to catch up from the years of strong population growth and it is likely that growth will return to some degree at least when borders are reopened. New suburbs on the fringe are expected to accommodate 30-35 % of new housing according to Melbourne's long-term planning strategy *Plan Melbourne 2017-2050* and have incorporated a large part of the growth in the last years. The populations of growth area local governments Casey and Wyndham are estimated to have grown by about 28% and 41% between 2011 and 2020 (ABS 2011, 2020), or in other words have added about 103,000 to 117,000 residents to their population in those nine years.

With little local employment and limited services, residents in outer suburbs can spend 15 or more hours per week commuting. Most residents travel by car on increasingly congested roads as public transport is absent, unreliable and overcrowded. Thus, transport costs are externalised to households, while transport inequities and health disparities increase between residents of established, well-serviced suburbs and those attracted to seemingly more affordable housing on the urban fringe.

Increasing local services and employment opportunities is a logical and beneficial approach to reduce the need for travelling long distances; delivering infrastructure that supports active transport and efficient public transport is another. The *20-minute neighbourhood* concept which is an essential element of *Plan Melbourne 2017-2050* emphasises the importance of local retail and other services in order to reduce the need to travel. The concept focuses on living locally and "giving people the ability to meet most of their daily needs within a 20-minute return walk from home, with access to safe cycling and local transport options" (DELWP 2021).

The 20-minute neighbourhood concept already provides challenges for inner and middle suburbs, and is even more difficult to achieve in outer suburbs with their generally low(er) density and only few opportunities for employment etc.

This report presents some findings on how transport provision can be improved in order to support the realisation of the 20-minute neighbourhood in growth suburbs. While our project focussed on the transport provision and process around it, we have incorporated the need for local centres into our analysis, because although the delivery of transport infrastructure and services is a prerequisite of people choosing those transport options, urban structure and the distance of key destinations have a similarly crucial role to play. If a town centre is in walking distance, people can choose to walk there, however if it is 5 km away it is highly unlikely that they will. If it is served by public transport, then some people will take this option, but if it is not available, or is inconveniently located or too

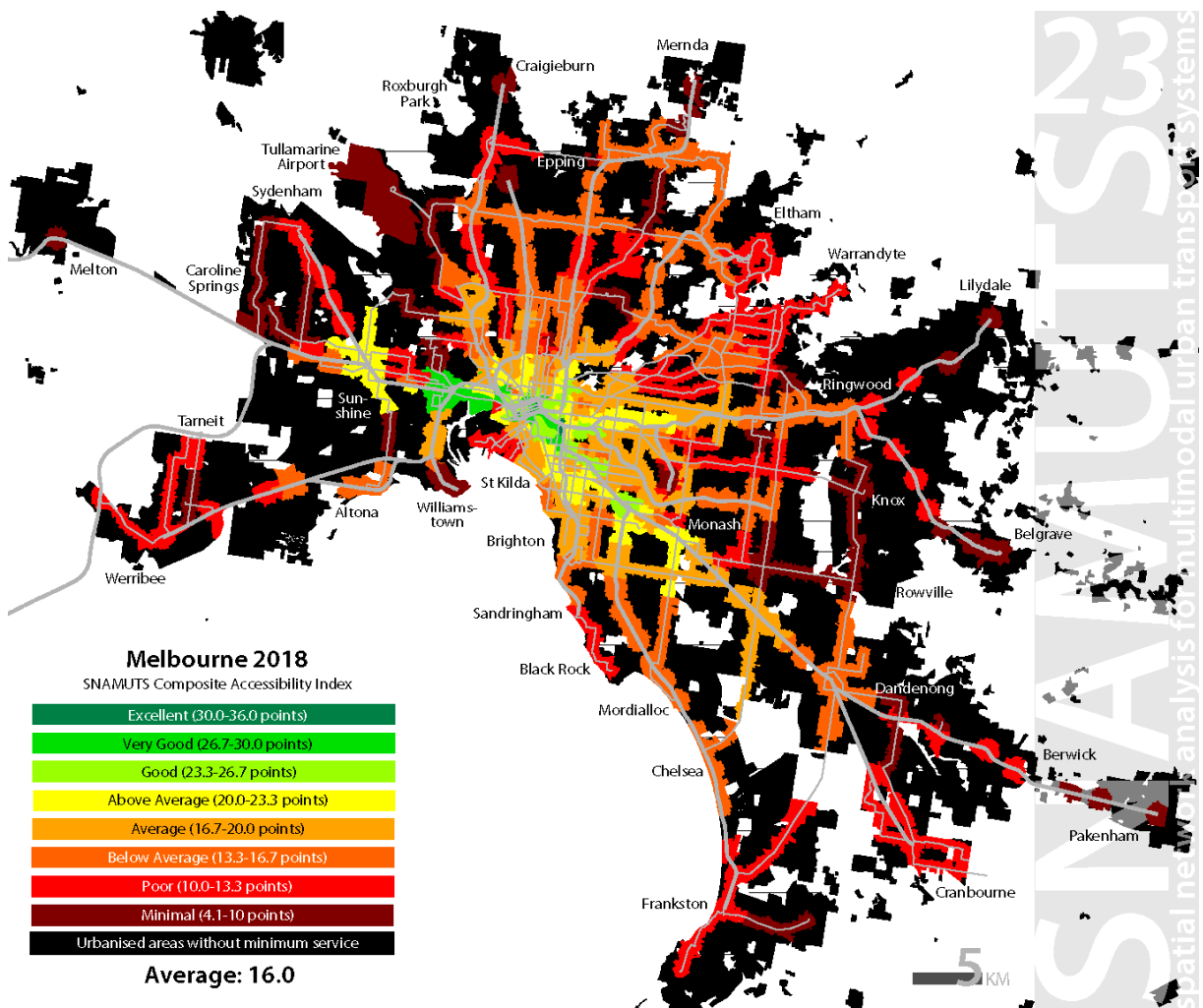
infrequent, then people will not We have therefore included considerations on key destinations, such as employment, education, health and social services, and retail within this report.

The remainder of this report will be presented as follows:

- Section 2 presents the methodology utilised in the project.
- Section 3 illustrates the process for planning new suburbs in Melbourne and provides some first suggestions/thoughts on issues found.
- Section 4 outlines the current transport provision in growth suburbs and describes the urban form elements that are conducive to the use of active and public transport and analyses the current situation in regard to transport options in Melbourne’s growth suburbs.
- Section 5 explores the costs and benefits of early delivery of transport options in new suburbs.
- Section 6 discusses funding options for the delivery.
- Section 7 summarises our findings in eleven recommendations.

Throughout the report we have placed pointers/references to the recommendations in the text: **➔ Recommendation X**. That is if a recommendation refers back to the mentioned issue or finding we have highlighted this.

Figure 1: Public transport accessibility in Melbourne



Source: SNAMUTS - <http://www.snamuts.com/melbourne-2018.html>

## 2. Methods

The study was conducted with a mix of qualitative and quantitative methods. These included an analysis of the process of planning for transport options in Melbourne’s growth areas, through both a document analysis and 30 semi-structured interviews with government and industry professionals involved in the process. The document analysis focused specifically on the Victorian Precinct Structure Planning (PSP) Guidelines (and included the new Draft PSP Guidelines published for consultation in September 2020), as well as the provisions for development contributions in the growth areas with further relevant documents included.

The current situation and lived experience of residents in the growth areas were examined through a geo-spatial analysis of urban form and destinations in built-up PSP areas as well as through a survey and interviews in two case study areas. Distances to key destinations were calculated using 2018 Geocoded National Address File data (GNAF) (PSMA 2018) as proxies for residential location (Higgs et al. 2019). The resident survey on transport and wellbeing was administered between April and June 2019 using both online survey and paper-based options. It received 352 valid responses. In the survey, respondents could consent to be contacted for a follow-up interview, and 15 interviews were conducted in each of the case study areas. The interviews were undertaken as semi-structured face-to-face interviews and took 50 minutes on average. Interviewees were between 21 and 75 years old, 14 identified as female and 16 as male. One third of the interviewees were born in Australia.

To understand the costs and benefits of the early delivery of transport options, transport scenarios of early, medium and late delivery as well as of low, medium and high quality were developed to calculate the differences in costs and benefits. Costing parameters were identified from relevant literature, such as for example the Australian Transport Assessment and Planning Guidelines (Transport and Infrastructure Council 2018) and were also peer-reviewed. Benefits and their parameters were also identified from a review of the relevant literature and included the following benefits: health benefits; social and economic participation benefits; car ownership household savings. Additionally, we reviewed literature on behaviour change in relation to relocation and life change events in order to understand potential benefits from an earlier delivery (Pemberton et al. 2021).

Exploring funding opportunities involved a literature search and review of alternative funding options, including user charges, beneficiary charges and taxes. These funding options were assessed against an evaluation framework developed from the literature to analyse their potential and ease of implementation.

Figure 2: Methods used in the four work streams

Planning process	Current situation	Costs and benefits	Funding options
<ul style="list-style-type: none"> <li>• Document analysis</li> <li>• Expert interviews</li> </ul>	<ul style="list-style-type: none"> <li>• Resident survey</li> <li>• Resident interviews</li> <li>• Geo-spatial analysis</li> </ul>	<ul style="list-style-type: none"> <li>• Focused cost-benefit analysis</li> <li>• Literature review early transport delivery and behaviour change</li> </ul>	<ul style="list-style-type: none"> <li>• Literature review</li> <li>• Analysis of funding options</li> </ul>

### 3. Planning for new suburbs in Melbourne

#### 3.1 The Precinct Structure Planning Process<sup>1</sup>

In Melbourne and, more recently, regional Victoria, new suburbs are planned for through the Precinct Structure Planning (PSP) process. It was first introduced by the Growth Areas Authority (GAA) that had been established in 2006 and which is now the Victorian Planning Authority (VPA). To assist the formal process the GAA prepared PSP Guidelines – a draft version in 2006 and the finalised version in 2009 (GAA 2009, GAA 2013). The VPA has reviewed the Guidelines recently and published a draft version for public engagement in 2020 (VPA 2020) as well as a stakeholder report on submissions from this engagement phase (VPA 2021). It is expected that the new Guidelines will be finalised in 2021.

Precinct Structure Plans (PSPs) are fairly comprehensive covering: housing lot yields; provision and location of employment land; transport networks; open space and natural systems; activity centres; and community facilities. They incorporate a range of priorities including: biodiversity; active, public and road transport; social considerations; utilities; integrated water management; bushfire management; open spaces; image and character; and employment. Following the overarching Growth Areas Corridor Plans, PSPs create a structure for urban development and the framework for statutory planning controls (GAA 2009). Once a PSP is finalised it gains statutory authority by being incorporated into the local planning scheme.

Figure 3: Example of a map from a PSP – Truganina South PSP



Source: Growth Areas Authority 2011

<sup>1</sup> This section is based on the following Briefing Paper: Kroen, A.; Taylor, E.; Goodman, R. (2018) *Precinct Structure Planning in Melbourne’s Growth Areas: Initial Thoughts on Processes and Trade-offs*. Unpublished Briefing Paper. RMIT University.



The GAA/VPA and PSPs were set up to bring more certainty into growth area planning, to ensure essential infrastructure and services are planned for and to improve and reduce the time for the planning process (DSE 2005). So, the process of PSP planning takes into account infrastructure provision, such as community facilities, schools, open space, roads, active transport and to a certain (limited) extent public transport.

## Plan implementation

While the process of developing PSPs is well-established and is an improvement on previous processes, it is apparent that many issues with the PSP areas are actually about plan *implementation*, rather than the plan itself – although there is also the need to incorporate new insights and developments into the process as the current revision of the Guidelines acknowledges. Transport is an area that demonstrates such difficulties. Planning for transport is included in the PSP process and the Department of Transport (DoT) works together with the VPA. However, while the PSPs plan for bus-capable roads and indicate where bus routes will go, the timely provision of a bus service is not guaranteed. Currently, there is no measure within the PSP that can ensure the provision of bus or other public transport services within the area at any particular time. One of the main reasons for this is that much of the financing and implementation of public transport occurs outside of the PSP process itself and has to compete with other areas of need for funding and resources. Furthermore, the difficulty in establishing an overall bus-capable road network within the PSP and surrounding areas and the unknown speed of development for the area are barriers. Thus, the implementation of the plan is hampered by processes outside the PSP process. One option for speedier implementation is direct links or triggers between building the suburb and the provision of public transport. (→

### Recommendation 4)

In contrast, active transport infrastructure is usually implemented at the time the suburb is built. However, to encourage residents to walk and cycle – and to achieve a 20-minute neighbourhood as stated in Plan Melbourne – there also need to be destinations (e.g. jobs, shops, community and health facilities) and safe connections to other areas. Therefore, the early delivery of town centres or some neighbourhood centres would be desirable. Research suggests that denser development would assist this (Boulangue et al. 2017; Giles-Corti et al. 2014) by providing greater numbers of residents in a new area more quickly. However, in a planning system where plans are implemented by developers, there is currently little scope to plan for employment, density or destinations beyond allocating land in plans, or means to speed up their implementation. Yet, new ways of collaboration and coordination could improve the current process. For instance, developers, service providers and local governments could collaborate to provide some early delivery of smaller hubs in their estates, e.g. through the combination of the display centre with a café or convenience store and a childcare centre. (→

### Recommendation 6)

Economic interests can sometimes work against (early) plan implementation. Developers may, if required to build public infrastructure, leave its construction to last if it is not essential to their development, as they aim to recoup costs through sales first. However, from a planning perspective the public infrastructure might be crucial to connect roads and improve the transport network. Developers are also likely to start with lower density away from the town centre or train station, leaving more accessible land to increase in demand. This can help with achieving higher densities and land use diversity in key locations at a later point, but it also leads to a “donut” development of an outer ring of lower densities with a hole in the (town) centre for some time. Sequencing of development and support of town centres would be desirable in this context; however property rights implications need to be taken into account.



## Info Box: Auckland

The Auckland Transport Alignment Project (ATAP) is an example of a joint strategy that aligns the transport priorities of central government and the regional council. Auckland has been growing rapidly in recent years and is forecasted to keep growing. At about 1.6 million inhabitants in 2017, it is projected to grow to about 2.3 million in 2043. It is also the fastest growing region in New Zealand. ATAP has the objective of addressing the transport challenges posed by the expected growth.

ATAP is a joint transport project between the Auckland Council and the national government, defining their joint strategic approach to developing Auckland's transport system. The Auckland Council is a regional council comprised of eight former councils in the urban area. It is responsible for strategic, spatial and infrastructure planning and service delivery in the region to address the challenges of growth. It is New Zealand's first large urban unitary council.

ATAP spells out specifies transport priorities and projects from 2018 to 2028, with forecasted costs of about NZD 28 billion. These include projects for rapid transit, strategic roads, greenfield transport infrastructure, safety programs, walking and cycling and bus and ferry improvements. The project reflects the need for transport choice. Funding for ATAP comes from the National Land Transport Fund, Crown funding, rates and the Auckland Regional Fuel Tax. While ATAP focuses on capital investment, it is also acknowledged that it is necessary to use existing infrastructure more productively, develop supportive regulatory, land-use and operational policies, explore the use of new technologies and investigate further policy options, such as road pricing.

The ATAP Package guides statutory planning processes, such as the Regional Land Transport Plan (RLTP) and the National Land Transport Programme (NLTP). The RLTP sets out the optimal timing and sequencing of projects given available funding and is developed by Auckland Transport (AT) together with the New Zealand Transport Agency (NZTA) and KiwiRail.

Overall, the Auckland Transport Alignment Project is a good example of developing a comprehensive transport plan for a whole city region in collaboration between two government levels.

The funding for all projects specified in the ATAP has been committed and/or is planned for. While it is acknowledged that more investment would be better and there is the need to think about innovative ways of funding, the existing commitment is an important step and provides security for planning those projects.

(Source: Kroen & Pemberton 2020)

## Decision-making

State agencies are generally wary of making budget commitments, especially over a longer term beyond immediate budget cycles. While the timely provision of local, generally passive infrastructure (roads, recreation) can be continually improved within the scope of PSPs, the delivery of state infrastructure and operational expenditure is considerably more politicised and uncertain. Sequencing of state infrastructure is only in its early stages and would need high level support.

Land allocation and acquisition within PSPs occurs in an upfront way for certain road infrastructure but not necessarily for other land uses such as schools, emergency services, and railway stations. Acquiring these properties depends on state government budgets and land will often only be acquired if there is an immediate plan to build the public infrastructure on it. However, there have been some recent changes to the Infrastructure Contribution Plan (ICP) process which improves the planning for public purpose land (see below) and GAIC funding is also increasingly used. Benefits of earlier commitment of land include lower prices and increased planning security.

The question of whether public transport business cases for growth areas should differ from the usual process to account for future populations arose when interviewing professionals. Budget allocation

decisions often focus on areas of highest demand, which means that new suburbs often ‘lose out’ due to low population numbers, although these can change rapidly in a couple of years once construction has started. → **Recommendation 11**

## Housing affordability and sequencing of development

Housing affordability has been one of the main drivers of state growth area planning in Victoria (DSE 2005). The constant supply of land is thought to keep land prices low, and high housing prices are often attributed to restricted supply. However, higher prices can also be caused by increased demand and – linked to this – by desirable features, including high-quality infrastructure or services. Therefore, there is a reluctance in state planning agencies to introduce more than the basic quality of services and infrastructure as a better quality of infrastructure provision for fear of generating housing cost increases, as was indicated by interviewees. This is also consistent with the principle that future owners or the first home buyers should not need to finance a disproportionately high amount of infrastructure (through their buying price), and infrastructure should instead be funded through council rates.

However, while lower quality infrastructure, including public transport, may reduce housing price pressures it also creates dispersed costs to residents in terms of travel time and expenses, and potential health impacts. In other words, while housing in growth suburbs seems affordable in terms of its purchase price, the ongoing cost of living needs to be considered (Smith et al. 2021). Savings on purchase price due to poor service provision will be paid for in other ways less obvious to the buyer. Other ways of both measuring and achieving housing affordability should be adopted.

### Sequencing of development

Sequencing of development can take place within a PSP area and across the entire growth area. Sequencing is mentioned in Clause 11 of Victoria Planning Provisions (VPP) as well as in Plan Melbourne 2017-2050. The VPP states the following objective “To manage the sequence of development in areas of growth so that services are available from early in the life of new communities.” (11.02-3S). The new Draft PSP Guidelines also refer to sequencing: “(T)he VPA works in consultation with state agencies to support sequencing through two key mechanisms: prioritisation of PSPs and staging within PSPs. (...) This seeks to ensure that the timing of PSP approvals aligns with the planning and investment decisions of infrastructure providers. Secondly, each PSP will contain guidance about the staging of development to support the delivery of infrastructure as trigger points are reached.” (VPA 2020, p. 76)

In principle, an ordered sequencing of development will enable more efficient and timely infrastructure and service provision. The sequencing of development, however, appears to be difficult to achieve in reality. There are also fears expressed that stricter sequencing could lead to a restriction of land supply and a subsequent increase in housing prices as well as constraints for smaller developers owning only few blocks of land, as indicated by interviewees. However, sequencing is about establishing order and concentrating efforts in one area at a time. It doesn’t need to result in a slowing down of overall supply of new housing lots, and greater efficiencies might actually make infrastructure and service delivery more efficient. Provisions for smaller developers can be arranged. There is a perceived risk of increased politicisation of the process and lobbying from developers who would try to steer the sequence of development towards their land areas. However, in general the development industry will accept systems and regulations that apply transparently to all, and greater certainty and predictability would be of benefit to all stakeholders.

## Housing densities and diversity

The issue of densities has always been contested in growth area planning (Buxton et al. 2016; Rowley 2017; Audit Expert Group 2008). The current PSP Guidelines and the state Planning Policy Framework within the VPPs mandate an average of at least 15 dwellings per net residential hectare and the new Draft Guidelines an average of at least 20 dwellings per net developable hectare, including higher densities in proximity to town centres (of at least 30 dwellings per net developable hectare). However, researchers commonly recommend a density of at least 25 dwellings per net hectare research to create walkability, better public transport provision and economically viable locations for shops (Boulangue et al. 2017; Gunn et al. 2018; Giles-Corti et al. 2014). → Recommendation 7

Linked to the provision of overall higher densities is the issue of housing diversity. A mix of housing types and forms enables the achievement of increased density with some very inexpensive housing as well as the more common large freestanding houses. Higher density forms of housing, and smaller housing forms (including apartments), are not necessarily supported by prospective buyers or by developers in growth area suburbs, for a range of reasons. Apartments are popular in inner city areas where the surrounding environment is rich with public spaces, services and amenities that are often lacking in growth areas. The trade-off of public and private space is quite different in new suburbs. Developer covenants widely adopted in some growth areas typically restrict construction of more than one dwelling on a lot; and proposals for apartments attract significant objection numbers (Taylor & Rowley 2017).

### 3.2 Development Contributions in Melbourne's growth areas<sup>2</sup>

The planning process for growth areas includes the development of an Infrastructure Contribution Plan (ICP) (previously Development Contribution Plan, DCP) alongside the PSP. It contains provisions for necessary *local* infrastructure within the PSP areas, such as community facilities, local roads or parks. In addition, Victoria has the Growth Areas Infrastructure Contribution (GAIC) which is for *state-funded* infrastructure in the growth areas. The *Planning and Environment Act 1987* allows for development contributions to be provided by inclusion in the planning scheme, and ICPs and the GAIC were added through amendments to the Act.

ICPs (and DCPs) use the mechanism of user pays charges, while the GAIC is a combination of a betterment charge and user pays charge. User pays contributions are a one-off monetary or in-kind contribution towards planned infrastructure in a development area, according to the anticipated share of future usage of this infrastructure (Infrastructure Victoria 2016a). In Australia, infrastructure that is solely within the respective development is usually the responsibility of the developer and not part of contribution plans (Robinson & De Gruyter 2018). A betterment charge is a contribution to the increase in value uplift from rezoning or new public infrastructure. This is also referred to as a value capture exaction, which is the broader notion. The GAIC can be considered as a betterment charge because the charge is not based on the estimated extent of infrastructure use, but rather collects money from the purchaser of the land who will benefit in some way from the future infrastructure. Furthermore, the intent behind its introduction was – apart from raising revenue to pay for parts of the state infrastructure costs in the growth areas – to reap some part of the expected increases in land value resulting from planning changes. It is however also seen as a users pays charge, as it is assumed that the costs of the contribution will be transferred to future home buyers and residents and it is charged to land purchasers rather than land owners (Taylor 2016; Kroen & De Gruyter 2021).

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<sup>2</sup> More information on development contributions in Melbourne's growth areas can be found in the following briefing paper: Kroen, A., De Gruyter, C. (2019) Development contributions and other schemes for funding infrastructure in Melbourne's growth areas. Unpublished Briefing Paper. RMIT University, and Kroen, A.; De Gruyter C. (2021) 'Development Contributions for Regional and State Infrastructure - A Case Study of Melbourne, Australia', Urban Policy & Research, pp. 1-18

Table 1: Key characteristics of funding schemes in Victoria’s growth areas

<p><b>Infrastructure Contributions Plans (ICPs)</b></p>	<p>User pays charge for essential local infrastructure                  Introduced in 2016; amended in 2018                  Incorporated into the planning scheme alongside the respective Precinct Structure Plan                  Currently only used in metropolitan greenfield growth areas                  Standard levies (without need for cost specification) and supplementary levies (with cost specification)                  From 2018 onwards land is contributed as a land levy                  Work-in-kind agreements are possible                  Allowable items and caps for expenditure in legislation</p>
<p><b>Growth Areas Infrastructure Contribution (GAIC)</b></p>	<p>Mix of user pays charge and betterment charge contributing to state funded infrastructure in growth areas                  Introduced in 2010; amended in 2011                  Per hectare rate charged to the purchaser                  Work-in-kind agreements are possible                  Applies to land zoned for urban development and brought into the Urban Growth Boundary since 2005                  Funds are spent on infrastructure projects in line with legislated objectives/areas, with approval by Planning Minister + Treasurer</p>

Source: Kroen and De Gruyter 2019

### Infrastructure Contribution Plans

The new ICP system was introduced in 2016 to provide greater clarity for councils and developers, to facilitate the purchase of land for public purposes and to simplify the preparation of a contribution plan, and with this reduce the costs and time spent on preparation (VPA 2018). Apart from standard monetary levies, a supplementary levy can also be charged in certain circumstances and land is contributed as a land levy. The infrastructure contributions of ICPs can be implemented either by financial payments or by work-in-kind towards the provision of infrastructure. Transport infrastructure items that can be levied in ICPs are for example, land and construction of council and state arterial roads, intersections with arterial roads as well as off-road walking and cycling infrastructure.

The draft ICP is developed together with the draft land use strategy for the PSP. It sets out

- the monetary levy,
- land contributions,
- land equalisation and credit amounts, and
- a list of the infrastructure funded and public purpose land to be set aside.

Once an ICP is prepared and finalised it will be incorporated into the planning scheme alongside the respective PSP. State government can set standard monetary levies (removing the need for cost specification) and infrastructure items leviable by local government (DELWP 2016).

Plans must include indicative timing for project delivery and an overall timeframe, but no required range is imposed. Generally, timeframes for the overall plan are about 20 years and different items of infrastructure are marked as short, mid or long-term items. The timeframe for project delivery may be based on an event or threshold linked to development.

The lack of clear time frames for work-in-kind (WIK) is problematic, as developers can defer as much WIK as possible until the end of the project. While this may not matter if the infrastructure is not vital, it would be beneficial to set clearer time frames for infrastructure needed to provide necessary street connectivity for public transport provision.

Since the ICP system was introduced in 2016 there have been several changes to it, e.g. introducing and changing the land contribution model. The most recent version of ICP guidelines was published in March 2021. When talking to practitioners in 2018/19 there was a certain weariness about the number of reviews which had already been undertaken while the system still was not completely finalised. The Victorian Auditor-General's Office also criticised the delay in the implementation of the ICP system in 2020 (VAGO 2020). However, practitioners expressed hope that the system will be improved in the longer term. The standardised valuation method for land contributions was mentioned positively for example, as land valuation had differed considerably previously. However, practitioners also stated that while an ICP can be set up faster, uncertainty and risk with the actual delivery of infrastructure later can increase if unplanned issues arise.

## The Growth Areas Infrastructure Contribution

The Growth Areas Infrastructure Contribution (GAIC) is the infrastructure contribution for state-funded infrastructure in the growth areas which commenced on 1 July 2010. It applies to land zoned for urban development and brought into Melbourne's Urban Growth Boundary (UGB) since 2005 and is charged as a per hectare rate from the purchaser on the first property transaction on either the sale or development of land. It is anticipated that the charge will collect between \$3.0 billion and \$3.5 billion until 2040, estimated to meet approximately 15% of the cost of providing state infrastructure and services in the growth areas (VAGO 2020).

### GAIC projects

Contributions are collected by the State Revenue Office (SRO) and distributed equally between the Growth Areas Public Transport Fund (GAPTF) and the Building New Communities Fund (BNCF). Transport infrastructure and services that can be paid through the GAPTF include:

- capital works for state-funded public transport infrastructure,
- associated land and other infrastructure acquisition, and
- a maximum five years of recurrent operating costs

Items that can be funded through the BNCF include:

- capital works for community infrastructure (health, education, libraries),
- transport infrastructure for walking and cycling), and
- land required for any of those types of infrastructure.

Part or all of the GAIC liability can be offset by providing land and/or infrastructure works to the state – by agreement with the government. This process is called work-in-kind.

State government departments and agencies can apply for projects to be funded (partially) through GAIC funds. Developers, local governments and other stakeholders can suggest projects or priorities to the relevant departments and state agencies but cannot apply for them directly themselves. Applications must be authorised by the relevant Minister and then sent to Local Government Victoria. An inter-departmental panel assesses applications and recommends projects to the Minister for Planning who consigns the authorised projects (all public transport projects and community infrastructure projects worth over \$2 million) to the Treasurer for consideration and approval (LGV 2019a). Increasingly, the Victorian government uses the Budget to allocate GAIC directly to suitable projects. The complex decision-making process and administration through four state agencies is seen critically as it makes a strategic approach and a clear overview difficult (VAGO 2020).

For the growth areas, the significant advantage of the GAIC is that they receive specific funding and do not have to compete with other areas in the budget process for these funds, as this has the potential to avoid the worst backlog of infrastructure. However, these funds do not necessarily benefit older pre-PSP areas with similar problems.

## Nexus

GAIC funds are planned to be spent in proportion to the amount collected in an area, i.e. the amount that is collected in a growth corridor should be spent in the same area (LGV 2019b). However, there is no legal requirement for this (VAGO 2020) and it is a goal over time, as opportunities and priorities may lead to spending GAIC funds on a certain project in an area in which the GAIC is still to be collected. The proportion of spending and funds collected is calculated over entire local government areas and not by PSP areas, as, particularly with regard to public transport, projects cannot always be undertaken or built in a specific area but will still benefit that area.

### Early delivery of infrastructure

One of the arguments for establishing Precinct Structure Planning was to enable the earlier delivery of infrastructure in growth areas. Early delivery of infrastructure is beneficial to the respective communities and avoid backlogs. The broad nexus makes this possible. However, there is no clear statement as to whether the GAIC is intended to assist in bringing infrastructure earlier into the suburbs or just to support the implementation of infrastructure in general. Clarification of this would improve transparency and the application of GAIC funds.

### Allocation process

A concern raised about the GAIC relates to the division between the two allocation processes through the interdepartmental panel and the budget, as it limits the ability to use GAIC funding strategically (VAGO 2020). This means that the allocation process and decision-making for GAIC funding is somewhat opaque. While funded projects are published, they cannot easily be found on state government websites. Reasons for decisions against projects by the interdepartmental panel are not communicated either publicly or internally, and allocations made through the state budget process are outside the panel process and not further justified.

### Accountability

The GAIC is estimated to meet approximately 15% of the cost of providing state infrastructure and services in the growth areas until 2040. However, there is no framework to measure whether this will be achieved and no other objectives stated against which success could be measured (VAGO 2020).

## Strategic approach and interconnection between ICPs and the GAIC

While the two development contribution systems focus on different infrastructure, they could be more strategically combined. An overarching strategic approach towards growth areas and/or development contributions would support better and more efficient implementation. For example, a pipeline of GAIC projects or a strategic plan for GAIC would enable local governments to match funding of their own and ICP funding into the same areas to achieve beneficial outcomes. There could also be a stronger and more formal role for growth area councils in suggesting projects for GAIC funding with a strategic pipeline of projects.

The link to existing PSPs and Growth Corridor Plans needs to be formalised or tightened in GAIC funding. The Growth Corridor Plans should also be updated, as most of them were developed in 2008 and have not been updated subsequently.

The Victorian Planning Authority and Local Government Victoria support a more coordinated and strategic approach and there have been improvements made. However, there is still need for more cooperation and integrated thinking in growth area planning and commitment towards strategic projects. → Recommendation 2



### Info Box: London's growth fund

Transport for London (TfL) is the integrated transport authority for Greater London. TfL runs London's public transport network and also manages the city's main roads. It is responsible for meeting the Mayor of London's Transport Strategy.

Transport for London's Growth Fund provides funding for areas with poor transport. It was established in 2012 as a component of TfL's capital investment program, with a focus on supporting jobs and housing growth via "new and enhanced public transport connections to support growth areas" (London Assembly Regeneration Committee 2015). Growth Areas in the London context include 'opportunity areas' - those areas seen as having lower quality transport connections, but where there is potential to 'unlock' housing and jobs growth. These are typically brownfields sites.

A 2015 review found that the Growth Fund had financed 9 rail and 5 road projects and had "success in bringing forward transport projects that unlock development where they otherwise would stall" (London Assembly Regeneration Committee 2015). However, the review also criticised the use of "inconsistent criteria to allocate the Growth Fund" and stressed the importance of "a fair, transparent and consistent allocation process".

By 2017, the need for increased transparency had been addressed by adoption of a published set of criteria. These criteria include ability to unlock housing and jobs growth; the potential to leverage third party funding; deliverability; and alignment with the Mayor's Transport Strategy. Notably, the criterion 'Does scheme improve access to PT for all?' can be seen as differing from traditional appraisal frameworks by including transport mode shift goals.

The Growth Fund is only a small component of TfL's capital budget, and is typically used to fill funding gaps for comparatively small projects that are partly funded (for example, by developer and local authority contributions) but require a further contribution for viability. This is reflected in the assessment criteria that refer to other funding sources, which must cover at least 50% of the total requirement.

The Growth Fund has some similarities in aims to the Growth Areas Infrastructure Contribution (GAIC). It is not necessarily a best practice model, but it does provide an operational example of a funding stream prioritising transport for areas with poor transport or with particular 'bottleneck' ('severance') challenges; and of specialised funding for "schemes with significant wider benefits but which may not fare as well under traditional appraisal frameworks" (Transport for London Programmes and Investment Committee 2018). (Source: Kroen & Pemberton 2020)

## 3.3 Some options and alternatives

Although it is fundamentally difficult to resolve some of the issues mentioned, there are options outlined below that could be considered to change some approaches.

### Basic and essential public transport provision

The onus of business case development for buses currently lies with local government and transport agencies to prove a bus route is needed and viable. If in a context of early suburban growth a basic level of public transport service were assumed as essential and directly linked to development approval and finance processes, this onus would shift and the default position would be in favour of earlier public transport provision. Definitions of basic levels of public transport or levels connected to the state of development can be found, for example, in Calgary or Auckland. (→ Recommendation 1 and Recommendation 4)

### Info Box: Calgary

The City of Calgary is the largest urban area in the Canadian province of Alberta, with a 2016 population of 1,392,609, having grown 14.6% since 2011. Central Calgary has a high concentration of office buildings, however outside of that, the built form of the city is predominantly low-rise, low-density suburbia, with wide arterial roads and an extensive freeway network. The City of Calgary is the single local government area responsible for the Calgary area.

Transport planning is handled by the City and the transit operator, Calgary Transit. The City of Calgary prepares both urban strategic plans (the *Municipal Development Plan*) and long-range transport plans (the *Calgary Transportation Plan*). Calgary Transit, the operator of the light rail and feeder bus services described below, also produced in partnership with the City of Calgary, a strategic transit services plan called *RouteAhead*. This plan details both the operational and services aspects of transit delivery for Calgary over a thirty-year timeframe. It specifically draws out intended service standards for transit at four levels:

1. Primary Transit Network – a network of high frequency services (whether light rail, bus rapid transit, streetcar/tram or frequent bus) operating at 10 minute or better service intervals over an extended operating period of at least 15 hours a day, 7 days a week, with an emphasis on speed, directness and network connectivity.
2. Frequent Transit – operating on high ridership routes, with frequency better than base but less than primary.
3. Base Transit – comprehensive community coverage, with at least 30-minute service intervals
4. 'Introductory Transit'. The Introductory category spells out the minimum requirements for initial delivery of transit services to growth areas, and how those services will be phased, with the aim of providing access to transit within a 5-minute (400m) walk. For example, when the road network allows and there are sufficient residents, Calgary Transit will first deliver weekday peak services, followed by interpeak, Saturday, evenings, and finally Sunday services until it meets the base service requirements.

(Source: Kroen & Pemberton 2020)

### Close bottle-necks

A barrier to implementing a bus route is that, as previously mentioned, developers are often only willing to build certain infrastructure towards the end of development (especially if it lies at the edge of a development area), and therefore the road network to support the route might not exist until that late stage. A solution to this might be to set clearer time frames in the ICPs for infrastructure that provides necessary street connectivity for public transport provision and also active transport connectivity and to set those time frames in a timely manner, i.e. as early as possible and necessary. The infrastructure can either be built by developers as WIK or by council. If council wants to move forward infrastructure usually built by a developer (i.e. without a contribution plan), this would need to be negotiated, similarly to the current process of ICP development (e.g. this part of infrastructure could be added to the ICP).

While council-built infrastructure that is part of an ICP is paid for by infrastructure contributions, it might be necessary for council to borrow money to build necessary infrastructure upfront. To support councils and where infrastructure lies on intersections between local and state roads, state government could assist with building this critical infrastructure and depending on the ICP and the affiliation of infrastructure could be reimbursed through an infrastructure contribution. High-quality coordination will be necessary for this. While some of this might run contrary to current budget processes and norms it would ensure that critical connecting infrastructure would be available from the beginning rather than at later stages. → Recommendation 8

## A frontier fleet

To avoid waiting for a bus service until all roads have been fully built, one possibility would be to have a small fleet of smaller buses, specifically for growth areas, so that smaller roads can be serviced, and buses do not have to undertake detours. This smaller temporary fleet could be deployed until all roads are built out and a larger bus can be used and could then move to the next suburban frontier area. Some developers already run their own bus services early in development and this proposal could potentially be paired with these services. Other options include pairing up with community transport or ride share services (see also introduction to section 4). This fleet of smaller buses would also offer an immediate short-term service during the sometimes lengthy time taken to undertake budget processes for securing new bus routes in the longer term. It could also provide the minimum service level suggested above. → **Recommendation 1 and Recommendation 4**

## Business cases

It could be beneficial to define additional objectives or conditions for business cases in growth areas, for example taking into account the opportunity cost of not providing a certain service or infrastructure in that area. Yet, there also needs to be a balance between growth areas and existing areas to avoid existing areas with a large backlogs of infrastructure falling further behind. →

**Recommendation 11**

## Housing Affordability

Housing affordability is a complex and challenging issue and PSP processes already have a strong focus on reducing supply-side issues in housing affordability, emphasising delivery of high numbers of lots to the market. However, as was indicated by interviewees, the focus on keeping down purchase prices can lead to a reluctance by state agencies to provide infrastructure or services that are perceived as non-essential and could lead to housing price increases. Yet, the adoption of a basic standard of provision for all new residential areas, although costly to fund, ought not lead to an increase in prices through demand necessarily, as it would be a matter of course in all areas. Two examples: a) the provision of roads is a standard of urban development in Australia and thus providing a road will not increase housing prices; b) if a certain level of public transport is standard, for example having a bus stop within 400m of your house with an hourly bus route, then this will not favour some houses and locations over others, and therefore not affect market demand and house prices. Thus, if a basic level of public transport service for the whole metropolitan area exists, housing affordability will not be endangered. (→ **Recommendation 4**)

Alternative approaches to improve housing affordability in PSP areas are to require the PSPs to include a certain amount of affordable/social housing – known as inclusionary zoning (Gurran & Whitehead 2011; Mukhija et al. 2010). Other options are to set local government housing targets and assist in meeting these targets (Whitzman et al. 2018). In Germany, specific preferences for housing associations that build affordable housing are also used, however, this only works for land owned by local or state government.

## Sequencing of development

Spiller and Forrest (2018) have suggested an approach whereby state government and individual local governments would agree on a preferred sequence of development for a given district for the purposes of an efficient infrastructure implementation. They would then base their forward infrastructure investment strategies on the agreed sequencing plan. Developers wishing to pursue projects which are not in line with the benchmark sequence would be required to compensate the relevant infrastructure agencies if the variation causes extra costs for these agencies. Another option would be that developers need to build the infrastructure themselves if feasible.

Trigger points can be used to support sequencing of development within PSPs. An example of a current use of a trigger point is one that indicates when a road needs to be built after a set number of house lots have been developed. This is also incorporated in the new Draft PSP Guidelines. Similar measures could in principle also be used for public transport or for community destinations. Such an approach would need high level support as it requires state infrastructure and investment and ideally an overarching strategic infrastructure plan. → Recommendation 3

## Strategic Plan

A desire for a clear strategic plan for infrastructure investment or at least some firmer commitments from the state government emerged as a theme in the interviews with practitioners from both the public and private sector. A “strategic direction for development contributions, including outcomes and targets for infrastructure delivery and supporting growth” has also been recommended by the Victorian Auditor-General (VAGO 2020, p.12) Knowledge of where and ideally when state infrastructure will be implemented would give local governments the opportunity to plan for matched funding of their own into the same areas. A desire for a pipeline of projects or strategic plan for expenditure of the GAIC was expressed by interviewees from local government, the development industry and state government agencies. A strategic pipeline would enable better forward planning and decision-making, make infrastructure spending less politicised and enable greater certainty for sequencing of infrastructure and growth. The Victorian Planning Authority and Local Government Victoria support a more coordinated and strategic approach and there have been some improvements made. However, there is still a clear need for more cooperation and integrated thinking in growth areas planning and commitment towards strategic projects. → Recommendation 2

### Info Box: Vancouver

Metropolitan Vancouver is the largest city region in British Columbia and the third largest in Canada. The total regional population was 2.46 million in 2016, an increase of 6.5% from 2011. Metro Vancouver is a political body and corporate entity for the region, operating as a ‘regional district’ and ‘greater boards’ delivering regional services, policy and political leadership on behalf of its members. The members are the 21 municipalities of the Vancouver region, plus an Electoral Area and a Treaty First Nation. Metro Vancouver delivers regional core services (water, waste management, regional parks and affordable housing); plans for the future (regional strategies, planning and regulatory responsibilities, air quality, regional growth); and is a political forum for discussion of regional community matters.

Public transport is planned, governed and delivered by TransLink, which is a statutory authority of the Metro Vancouver Regional District. Apart from public transport TransLink is also responsible for active transport and roads. TransLink is directed by both a Mayors’ Council and a Board of Directors. The Mayors’ Council includes the 21 mayors of the constituent municipalities of the Greater Vancouver Regional District and the Chief of the Tsawwassen indigenous nation. The board of directors is appointed by the Mayors’ Council, the shortlist for which is produced by the Screening Panel, which includes representation from the business community and the provincial government. Metro Vancouver provides input to TransLink on its long-term transportation strategies and 10-year transportation investment plans and is responsible for the regional growth strategy and regional air quality objectives which need to be considered by TransLink.

TransLink funds road and public transport operations, including improvements and expansion, from its share of the motor fuel tax, transit fares and a portion of property taxes collected within the region.

The current Regional Transportation Strategy was adopted in 2013 and is a long-range plan to guide transportation decisions to 2045. This is supported by a 10-Year Vision which was developed by the Mayors’ Council in 2014. This *10-Year Metro Vancouver Transit & Transportation Plan* is funded by regional, provincial and federal funding with Phase 2 currently being implemented and funding for Phase 3 not yet fully confirmed. (Source: Kroen & Pemberton 2020)

## 4. Transport options in growth suburbs

Transport options in growth suburbs are mostly oriented towards car travel. While foot and cycle paths are generally built at the same time as roads, active transport does not usually play a significant role as local destinations, such as employment and other services, are scarce. Public transport exists mostly in the form of rail lines that provide connections to the city and other relevant employment and service clusters. Bus routes leading to the train lines or other local destinations are not generally provided in the first few years of a growth suburb and are often low frequency and/or dispersed. This means that residents in outer suburbs can spend 15 or more hours per week commuting, mostly travelling by car on congested roads (Nicholls et al. 2018).

A characteristic of public transport provision which also plays out in growth suburbs are two somewhat competing objectives a) a competitive mode of transport maximizing patronage ('patronage goal') and b) providing services everywhere as a basic service for people who are dependent on public transport ('coverage goal') (Walker 2008; Loader & Stanley 2009; Nielsen et al. 2005). These competing objectives lead to very different service provision. The first approach of providing a 'patronage network' will focus on direct and frequent routes, while a 'coverage network' will focus on routes that cover as many areas as possible but are not very frequent or direct (Mulley et al. 2017). Often the solution will be a mixed network.

Growth areas will not have high demand for public transport at the beginning, and public transport will compete with the car as a transport mode to train stations, activity centres and other destinations in the city region. It makes sense therefore, to start with a few strategic bus lines that go directly to key destinations. These direct routes should be complemented by some coverage routes to ensure mobility for all households → Recommendation 5. These non-direct coverage routes can be offered through different forms of public transport provision as outlined below. These will incur different costs, provide different offers and some of them will need improved cooperation between different stakeholders.

- **Community transport** offers synergies with already existing transport provision. Community transport is generally provided by local governments and community service organisations to people who are transport disadvantaged. This could be extended to complement the public transport services provided.
- **Demand-responsive transport** provides the advantage of flexibility, as it usually allows for pick-ups and drop-offs outside a fixed route (although not all on-demand services do that) and services only run if the demand is there, saving money on trip kilometres. However, the degree of efficiency depends on the way in which the service is offered and on-demand services can decrease flexibility and reliability while not greatly reducing costs. Overall, on-demand buses or transport services can be a solution for areas with low ridership and low public transport frequency.
- Subsidising **ride-share services** is an approach utilised in the Canadian city of Innisfil (see info box). It has the advantage for government that no vehicle or driver has to be provided and that trips are timely and get people exactly where they want to go. However, the costs can be relatively high and unpredictable. A limit to the number of trips subsidised could be set to overcome this which would need to be clearly communicated.
- **Autonomous vehicles:** The character and costs of demand-responsive transport as well as ride-share services will change with the arrival some time in the future of fully autonomous vehicles which remove labour costs.

- **Commuter shuttles** are another option outside of regular public transport services for use particularly during peak hours. These can include direct buses to workplaces or to train stations, as currently provided by some developer-funded bus services.

While initial service provision is obviously important, the degree to which people utilise it will depend on a range of variables, particularly service quality, e.g. high frequencies, direct routes, coordinated timetables, easy and comfortable transfers, a simple and easily legible network, as well as certain urban form elements.

### Info Box: Innisfil

The Town of Innisfil, in southern Ontario, Canada, received attention in 2017 when the town announced a partnership with Uber for the provision of local transit services within the township. Innisfil has a population of around 36,500, dispersed across small communities over an area of around 260km<sup>2</sup>.

In April 2017 Innisfil's public transport provider decided to enter into a partnership with multinational taxi booking platform Uber, instead of providing a standard route-based system. At the time, the Town argued that a ridesharing-based solution would be less financially burdensome than a traditional fixed route bus service, while providing a higher level of service for those choosing to use it.

Innisfil Transit's Uber-as-transit solution has set fares for internal trips to key destinations, with Innisfil covering the difference between the fare Uber would charge and the transit fare. Journeys to other destinations would receive a C\$5 discount off the overall fare.

At the 4.5-month mark, the Town was subsidising transit journeys by C\$5.73 per passenger on average. For 2018 the subsidy per passenger-ride increased to about C\$7.45, with the service receiving a total of C\$640,000 of municipal funding over 2018. As a response to that financial pressure, the Town increased fares for flat-fare destinations by \$1, decreased the discount to non-flat-fare destinations by \$1, and introduced a 30 trips per month cap per rider. This highlights the difference to a traditional bus service that residents are free to use as they wish, and which provides a transport option that can be used regardless of the number of trips. While residents had initially been given Uber instead of a bus on grounds that Uber was cheaper, they were then expected to pay more on the grounds (among others) that Uber's service was allegedly better and were not able to use it as a transport means for daily commuting due to the trip cap.

While levels of reported customer satisfaction and ridership increases demonstrate that the partnership has had some successes, the financial challenges arising from the increased ridership also demonstrate a concern with the arrangement. (Source: Kroen & Pemberton 2020)

## 4.1 Urban form elements and transport goals in PSPs<sup>3</sup>

Poor mobility options can be caused by spatial factors and urban form, socio-economic factors (e.g. lower incomes, poor health, lack of information, age) and a lack of transport alternatives. Income levels, family arrangements and personal preferences all affect choices individuals make and can mean that proximity to transit or the qualities of the local urban form has limited influence on behaviour (Holz-Rau & Scheiner 2019; Li & Zhao 2017). There are a range of elements that need to be considered and implemented in order to encourage walking, cycling and use of public transport, including supporting policies, marketing campaigns, market-based instruments and metropolitan-wide and network planning. This suggests that if state decision making processes do not support active and public transport in Melbourne's new suburbs the influence of PSP transport planning will be

<sup>3</sup> More details can be found in the following Briefing Paper: Kroen, A. (2019) Transport Goals in the Precinct Structure Planning Guidelines – Unpublished Briefing Paper. RMIT University



comparatively limited. Nevertheless, this section identifies the most important urban form elements and the extent to which they are incorporated into the PSP Guidelines. Most of those elements will be considered locally in the PSPs, however it is also important to take into account the wider environment shaping walking, cycling and public transport and destinations.

Overall, academic research has found that local destinations, mixed land uses, dwelling density and street connectivity all have a positive influence on walking, cycling and the use of public transport, and they should be incorporated in the planning for new suburbs (Boulangue et al. 2017; Gunn et al. 2017; Marshall & Garrick 2010; Wang et al 2016; Pucher & Buehler 2012). While some of these elements are significant in their own right, they often work best when they are combined (Hooper et al. 2015). Furthermore, some of them are interrelated. Reasons for the positive influence are for example that if the land use is mixed and there are local destinations then it is feasible to walk or cycle to them. A higher street connectivity refers to the permeability of the street network which leads to the possibility of more direct routes, which keeps detours and travel time to a minimum. Higher densities lead to more people living closer to destinations (if and when there are any) and with this influence walking and cycling positively (Boulangue et al. 2017; Hooper et al. 2015; Frank et al. 2010; Owen et al. 2007; Saelens & Handy 2008). Higher densities do not mean that outer suburbs need high rise buildings, but a standard of two-storey houses and town houses could already increase densities a good deal in Australian suburbs without losing too many of the amenities people are looking for and without increasing prices too strongly. With better building design more dwellings could be built in the same area without being cramped. In that context, diversity is another important issue, so that more people can choose their housing according to their needs, be it the intergenerational family with children, parents and grandparents in one house or the single parent with a child to look after.

Providing relevant infrastructure, such as foot or cycling paths for walking and cycling, has unsurprisingly been found to have a positive influence, altering both the perceived and actual safety of these transport modes and also contributing to traffic calming. For cycling, addressing safety concerns in the design of road intersections also influences its uptake. Green and open space and an ‘aesthetic’ environment also have a positive influence on walking and cycling, albeit not as strongly as some other urban form elements (Pasha et al. 2016; Wang et al 2016; Hooper et al. 2015).

The location and proximity of public transport stops will influence the likelihood of walking for transport: an easy transfer is one of the key requirements for a high-quality public transport network. Catchment areas for walking are usually set at 400m for bus stops and 800m for trains (Mulley et al. 2017).

While most studies do not give specific numbers or thresholds for urban form elements, Boulangue et al. (2017) state that “an environment that encourages active modes is defined by high intersection density (referring to  $\geq 67$  intersections per square kilometres), high gross dwelling density (referring to  $\geq 20$  dwellings per hectares), diversity of local living destinations (referring to  $\geq 9$  types), as well as proximity of key destinations required for daily living including supermarkets, train stations and bus stops” (p. 164). A report for the National Heart Foundation of Australia states that “net density threshold of 20 dwellings per hectare (...) is the minimum required to encourage at least some transport-related walking” and “to make amenities and public transport viable (...) densities of between 35-43 net (...) dwellings per hectare (...) are required” (Giles-Corti et al. 2014).

The analysis of the PSP Guidelines shows that most of the specified urban form elements are covered. The standard on densities with a goal of 15 net dwellings per hectare is low in comparison to that recommended by research to be conducive to walking and cycling. The new draft Guidelines that the VPA is planning to finalise mid-2021 already prescribe a higher average density of at least 20 dwellings per Net Developable Hectare (NDHA) (VPA 2020, p. 34). Densities around activity centres, train stations or the Principal Public Transport Network (PPTN) are set at a minimum of at least 30 dwellings

per NDHA (within an 800m walkable catchment). While this is an improvement on the current Guidelines, higher densities should not only be limited to these areas (→ Recommendation 7). Research has shown that more people would live in semi-detached housing and apartments in the middle and outer areas of Melbourne and Sydney if such housing were available (Kelly et al. 2011), so these higher densities would be feasible. However, this type of housing would be more attractive if serviced by high-quality public transport networks and activity centres in growth areas. Selling higher densities without corresponding amenities, such as a train station or a town centre, is difficult according to land developers, so improvements to transport and services need to occur at least concurrently if not before with higher density housing.

Figure 4: Urban form elements conducive to active and public transport



Note: The darker elements have an influence on walking and cycling only

Local destinations and mixed land uses are generally concentrated in town centres and also in community hubs or employment areas. These areas are planned to be integrated with public transport and the cycling and walking network. The current Guidelines have the Standard that “80-90% of households should be within 1km of a town centre of sufficient size to allow for provision of a supermarket.” (GAA 2013, p. 26), while the new Draft Guidelines have the Performance Target that “80-90% of dwellings should be located within 800m of an activity centre” (VPA 2020, p.70), which would encourage walking and cycling. A distance of 800 metres or even 500 metres is certainly more desirable, as research has found that these are distances where people are more likely to walk to the supermarket (Boulangue et al. 2017; Gunn et al. 2017). Town centres are often one of the last elements of a PSP implemented due to viability considerations so that walkability is not encouraged early. Consideration is therefore needed on how to ensure that the development of these local destinations and town centres is implemented earlier (→ Recommendation 6).

Street connectivity is considered in PSP documentation through a standard for highly permeable street blocks and a road grid of 800m (connector streets) and 1.6 km (arterial roads). However, the new Draft Guidelines only refer to a grid of 1.6 km for arterial roads (VPA 2020, p. 44). For walking and cycling purposes this grid would be too coarse. Clearly there will be a more close-meshed network of local roads which will be specified in a Movement Network Plan, but there are no specific provisions in the Guidelines on its permeability or connectivity.

The provision of walking and cycling paths along streets is clearly stated in the current and Draft PSP Guidelines and is also determined in the Victoria Planning Provisions (VPP). There is also provision for

recreational paths. Infrastructure other than paths is only mentioned in the Planning Permit Considerations, as detailed planning of this infrastructure will occur at a later point in time than the PSP.

Safety is to be achieved through walking and cycling paths, and also (signalised) crossings that are mentioned in the Standards. The new Draft Guidelines have similar provisions to the current Guidelines. They also refer to the “Movement and Place Framework” for planning and designing streets.

Open space and an ‘aesthetic’ environment are covered by planning for a high-quality public realm (VPA 2020, pp. 51) and there are several Standard and Performance targets especially in relation to open space. Most residents will have access to open space close to their home if the Guidelines are followed.

Table 2: Summary of coverage of identified urban form elements in the current PSP Guidelines

Urban Form Element	Coverage in PSP Guidelines
Local Destinations	Concentration of certain uses in town centres, community hubs or employment areas. A number of destinations are mentioned, e.g. supermarkets, convenience stores, schools, community centres, open space, medical centres, post offices.
Mixed Land Uses	Considered particularly in relation to town centres, but also for local centres, for example through convenience stores.
Dwelling Density	Several specifications where medium (16-30 dw/ha) and high net density ( $\geq 30$ dw/ha) should be located; e.g. high density in town centres and on routes of the Principal Public Transport Network; and medium to high density in proximity to town centres, public transport stop, community facilities or open space.  A PSP should achieve an average density of at least 15 dwellings per net residential hectare, which is below recommended viable densities for walking, cycling and public transport in the literature.  Update of the Guidelines is to provide for residential densities of 25+ dwellings per hectare close to activity centres and high-quality public transport and an overall increase in residential densities to more than 20 dwellings per hectare is envisaged in Plan Melbourne.
Street Connectivity	Street connectivity is considered through a permeable street network for local streets and also for a coarser level with a 1.6 km and 800 m grid of arterial roads and connector roads.
Walking and Cycling Infrastructure	Walking and cycling paths are well considered in precinct structure planning. Other infrastructure is not mentioned in the Standards.
Perceived and Actual Safety for Walking and Cycling	Safety is mentioned several times in PSP guidelines, but there is no specific focus on <i>how</i> greater safety for pedestrians and cyclists could be achieved.
Traffic Calming	Traffic calming is not specifically mentioned in the PSP Guidelines.
Green and open space and an ‘aesthetic’ environment	Open space is well covered in the PSP Guidelines and if implemented according to the Guidelines most residents will have access to open space close to their home.
Integration between public transport, walking, cycling	Integration between public transport and walking and cycling is not a strong focus of the PSP Guidelines, but is mentioned.

Source: Kroen 2019

The *integration* between public transport and walking and cycling, such as specific planning for safe walking and cycling routes to public transport or walking or cycling infrastructure at bus stops or rail stations, is not a strong focus in the PSP Guidelines. One reason for this is that planning for integration between these transport modes will occur throughout the implementation phase, e.g. when a train station or bus interchange is built, and cannot be planned in detail through a PSP. It is also noted that the Draft PSP Guidelines include reference to the development of a Movement Network Plan as well as a Public Transport Plan which alludes to integration through the identification of “barriers to walking/cycling within PPTN [Principal Public Transport Network] walkable catchments (e.g. large areas of carparking) and measures to overcome access limitations” (VPA 2020, p. 45).

While not part of the urban form elements public transport network planning also has implications for the delivery of public transport services in PSP areas. The spatial coverage of public transport is an important goal in the current and Draft PSP Guidelines as well as the Victoria Planning Provisions, with slight differences in wording. Clause 56.04-1 of the VPP states 95% of dwellings should be located no more than 400m/600m/800m street walking distance from the nearest existing or proposed bus stop/tram stop/train station while the current PSP Guidelines only refer to bus stops.

However focusing on the directness of bus routes first to provide a competitive transport mode would be more desirable than a focus on coverage, as stated previously. Bringing bus route planning forward in the process, so that it can be (at least partly) incorporated, would be even more desirable. This could be supported through strategic transport plans and trigger events (→ Recommendation 3, Recommendation 4).

### Info Box: Case Studies

Our study focused on two case study areas located in the west and south-east of Melbourne. The case study located in the west in the City of Wyndham is the Truganina South PSP area (GAA 2011) with most of the area consisting of the Allura estate developed by Stockland. The case study located in the south-east in the City of Casey comprises the northern section of the Cranbourne East PSP area (GAA 2010) with most of the area consisting of the Selandra Rise estate developed by Stockland.

The Truganina South PSP area is approximately square in shape, around 1.6 km on each side, and around 250 ha in area. The Allura estate comprises around 1,300 lots, two school sites and a planned town centre. Construction in Allura started in 2012 with most development now completed, except for the town centre. The PSP area had two bus services on its boundary at the time of the research, so that some residents were at a walkable distance, while others had to walk about 2-3km to their nearest bus stop. The bus services run to two train stations on different rail lines and to retail centres.

The part of the Cranbourne East PSP we have selected for study is an approximately rectangular area of around 2.3 km by 1 km, and around 225 ha in area. The Selandra Rise estate is completely developed and also comprises around 1,300 lots, three school sites and town centre. The estate was developed as demonstration project with a focus on health and wellbeing (VicHealth 2016). In Selandra Rise a bus service going from the suburb to the nearest train station and larger shopping centre was introduced in 2014 (Delbosc et al. 2016) and there were two further bus routes on the boundary at the time of the survey and interviews.

Figure 5 shows the location of the case study areas within Greater Melbourne and their surrounding areas.



Figure 5: The case study areas and their location in Greater Melbourne



## 4.2 The current urban situation in the growth areas

After identifying which urban form elements are conducive to walking, cycling and the use of public transport and their nomination in the PSP Guidelines, this section explores the current situation in the growth suburbs. Examining the extent to which PSP goals are actually implemented on the ground is especially relevant given the comparatively high level of discretion around some elements of PSP transport planning. In the following we compare urban form elements for Greater Melbourne, inner areas and growth areas. The 'inner areas' refer to the Stonnington and Yarra local government areas. The 'growth areas' are PSP areas that had been fully or nearly built-up in 2018. These include PSPs that were developed before the current Guidelines came into effect.

The method of analysis builds on previous research (Arundel et al. 2017) and is suitable for measuring what has been delivered on the ground at a certain point in time. It uses more fine-grained analysis than comparable measurements that are used for example by the VPA. For example we use actual walking distance and not straight-line or Euclidean distances and our net density is based on ABS mesh blocks<sup>4</sup> rather than dividing net developable land by the number of houses<sup>5</sup>. Further details on the method are explained in Appendix 1.

The current urban form constructed in growth areas generally perform well on street connectivity, active transport infrastructure and to a lesser extent, access to open space. It does not perform well on local destinations, mixed uses and density. One reason for the poor performance is that these are all elements that are supposed to be delivered or completed later in the lifetime of the PSP area. This means that the PSPs areas are likely to meet the targets once fully built. However, early delivery and better implementation on-the-ground is required if active and public transport is to be encouraged.

Table 3 and Table 4 detail some results for the different areas. As an example, the average distance to an activity centre with a supermarket is 3.2km in the growth areas and only 4% of dwellings in the growth areas are within 1km of an activity centre with a supermarket.

Table 3: Distances to selected local destinations and dwellings/hectare

	Greater Melbourne		Inner areas		Growth areas	
	Distance to closest destination (m)					
	mean	SD	mean	SD	mean	SD
<b>Activity centre with supermarket</b>	1,751	1,446	797	512	3,272	1,871
<b>Convenience store</b>	1,045	1,014	498	325	1,829	916
<b>Primary school*</b>	1,051	685	759	353	1,878	1,017
<b>Community centre</b>	1,421	1,314	638	368	3,175	1,740
<b>Pharmacy</b>	1,133	943	559	312	2,707	1,729
<b>General practitioner</b>	993	856	482	308	2,150	1,348
<b>Net dwellings per hectare</b>	17	11	32	10	10	2

\* Combined primary and secondary schools were not considered in the analysis of distance to schools.  
SD = standard deviation

<sup>4</sup> Mesh blocks are the smallest geographic unit for measuring statistics primarily for census purposes. In urban areas they generally cover 30-60 houses.

<sup>5</sup> The method of measurement is further explained in the Glossary as well as in Gunn et al. 2020. It has to be acknowledged that the datasets used to produce the measures may not contain all available data-points, potentially leading to increased and more variable distances to these destinations. However, the dataset used was considered to be the best available source.



Table 4: Percentage of dwellings within 400m of a public transport stop and 1km of activity centre

	Greater Melbourne	Inner areas	Growth areas
Percentage of dwellings within 400m of a public transport stop of any kind	65%	93%	25%
Percentage of dwellings within 1km of an activity centre with a supermarket	26%	89%	4%

The current PSP Guideline's objective of 80-90% of households within 1km of an activity centre with a supermarket was clearly not achieved at the point in time at which our analysis was conducted. As mentioned previously, one of the reasons for this will be that town centres are generally built late in the lifetime of a suburb due to viability concerns. Furthermore, distances to key destinations such as shops and services are further away in the absence of a fully completed and connected street network. Thus, the figures presented as part of the analysis in this project represent accessibility at a single point in the development cycle of the growth area subject to data availability. This is in contrast to a fully realised plan which would give improved results. According to analysis provided by the VPA activity centres are generally being established within the applicable planning requirements; however our analysis suggests that there is often a lengthy period at the start of a suburb's life before residents receive the benefit of the amenity contemplated by the Guidelines.

Considering the distances to various local destinations it becomes clear that there is not a high mix of uses within the growth suburbs. This is a long way from the concept of the 20-minute neighbourhood which is a central element of Melbourne's metropolitan strategy *Plan Melbourne 2017-2050*, unless public transport services are available to those activity centres.

While the provision for active transport in most growth suburbs in Melbourne is suitable, as PSPs have requirements for foot and cycles paths which are generally built at the same time as roads, there are gaps in connectivity and poor connection to areas outside the PSP. These gaps can significantly increase safe walking and cycling distances, reducing the likelihood of active transport use.

Results for open space<sup>6</sup> are relatively good in the growth areas, but also show that there is a high variation in distances for accessing open space for residents. While the average distance to a park of any size is about 290m in the growth areas, which is comparable to the average of Greater Melbourne, only 62% of dwellings in the growth areas are within 400m of a park. The standard deviation for distance to a park of any size in growth areas is about 195m, showing that there are differences between the growth suburbs and some have better results than others. Furthermore, distances are also influenced by the street network not being fully completed in some areas. It also has to be noted that some of these results might be due to some of the analysed PSP areas being developed before the current PSP Guidelines, meaning that they did not have to adhere to the open space standards and targets currently applicable.

The current average net dwelling density in the growth areas is 10 net dw/ha<sup>7</sup>, which is beneath 15 dw/ha envisaged in the current PSP Guidelines, the densities specified in the actual PSPs, and the minimum of 20 gross dw/ha identified in research. In contrast, developers estimate that they currently deliver 18 dw/ha in greenfield areas (VPA 2020). The discrepancy between these results might possibly be explained by the industry taking into account current delivery only and not areas developed earlier,

<sup>6</sup> This measure refers to urban parks and not all forms of parkland, with nature reserves excluded. Accessibility to the park occurs via the street network.

<sup>7</sup> These densities are calculated on the basis of total number of dwellings in residential meshblocks divided by the meshblock area, which is similar (though not identical) to the measure dwellings per net residential hectare used in the current PSP Guidelines.

as well as including areas intended to be developed later at higher densities. Parts of growth areas that had not been fully or at least nearly completed were excluded from the analysis. Other recent studies have shown that overall only 21% of Melbourne's LGAs achieve 15 net dw/ha and the overall average per LGA lies at 14 net dw/ha (Arundel et al. 2017). While some of the areas might achieve higher densities when being fully built out, our results show that densities conducive to active and public transport will not be achieved until much later in the lifetime of a suburb, if at all.

The implementation of bus routes is also not occurring early in the lifetime of a suburb. Only 25% of dwellings are within 400m of a public transport stop in the growth areas. This is massively short of the objective of a 95% coverage. Unfortunately however, the objective refers to existing **and future** public transport stops, so current performance is not technically failing to meet the objective, even though this would appear to be a major loophole in the stated goals. Obviously, this does not help the residents living within 400m of an absent future bus stop, or an existent stop with no service that will not arrive until far into the future.

Taking into account other elements of high-quality public transport such as the frequency, destinations to reach and transfers within the network are also necessary. As pointed out previously, implementation of bus routes is not within the scope a PSP and low implementation has to do with the overall implementation and funding of public transport in Melbourne. Significantly more investment in public transport is needed if the VPP objective of 95% of dwellings within 400m of a bus stop, 600m of a tram stop and 800m of a train stop is to be achieved for all of Melbourne. (→

#### **Recommendation 9)**

Overall, it is apparent and unsurprising that the inner areas of Melbourne provide an urban form much more conducive to active and public transport than do the growth areas. This is not only because there is better public transport, but also because more local destinations are available in closer proximity and the density is generally higher. While it is to be expected that new urban areas will initially have fewer destinations and that this will improve in time, the time delays are clearly too long. Our results show that early in the lifetime of the growth suburbs, and for a considerable (if not indefinite) time afterwards, the urban form is not encouraging active and public transport use, and is more likely discouraging it. They also show that planning for and assisting implementation of more destinations in proximity is crucial to encouraging a higher use of active and public transport, ideally much earlier in the lifetime of a suburb. (→ **Recommendation 6)**

### **4.3 The lived experience in Melbourne's growth areas<sup>8</sup>**

Experiences of residents of growth suburbs correspond to the situation described above. In the resident survey undertaken by the project 69 % of respondents reported that their day-to-day travel had been limited or restricted in the last 12 months. Of those respondents 80% said that traffic congestion had impacted their travel, while 44% felt restricted because they had no public transport in their area and 39% because public transport did not go where they needed to go.

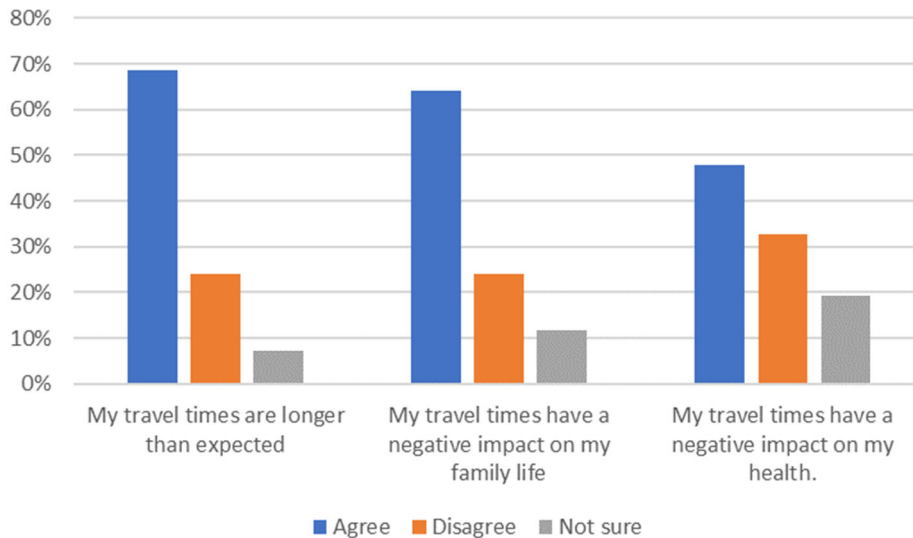
#### **The impact of the transport situation**

While most residents knew that they would have to travel further to their work and expected that traffic would be quite busy, many were surprised by the extent of it. As Figure 6 shows, for 69% of respondents travel times are longer than they expected when moving to their suburb. For 64%, travel times have a negative impact on their family life and for 48% a negative impact on their health. In the resident interviews the impact on health was reported ambiguously, which probably corresponds with

<sup>8</sup> More details can be found in the following Briefing Paper: Kroen, A.; Goodman, R. (2021) The lived transport experience of residents in Melbourne's growth areas. Unpublished Briefing Paper. RMIT University.

the fact that not all respondents feel an impact. This corresponds with a previous study which showed that, not unexpectedly, the impact was stronger for people with long commute times (Nicholls et al. 2018). Similarly, in our study, interviewees report that they sit more, and have less time for physical activity, due to long commutes. Others however reported that they walk more for leisure because they have more parks or a better quality of open space than in their previous suburb. Some acknowledged that they do less sport because they have children and are busy as young parents, rather than because they have to travel longer.

Figure 6: Travel times and their impact



When comparing the results in one of the case study areas to previous resident surveys in that area, it can be seen that there has been a constant decline in the satisfaction with the travel time to work. While 26% in 2012 were strongly satisfied with their travel time to work and only 11% were strongly dissatisfied, this has changed to only 13% being strongly satisfied with 35% being strongly dissatisfied seven years later.

The interviews showed that the most upsetting and inconvenient part of travelling is the unreliability of travel times. There is increased stress while travelling to destinations which need to be reached at an inflexible time such as for work, education or childcare. Some interviewees try to avoid the stress by leaving enough ‘buffer’ time, however, this is inefficient and can lead to wasted time at the destination. Adding to the frustration is the knowledge that the travel time can be much shorter at certain times of the day or week. Alternatives, such as other transport modes or changing jobs, are mostly not feasible due to poor transport options and a lower choice of suitable jobs in these areas (Nicholls et al. 2018).

### The satisfaction with the neighbourhood

Nevertheless, about 80% of respondents are still satisfied with their neighbourhood as a good place to live and their suburb as a convenient location. Interviewees stated that what they value about their suburb and house is affordability. This might mean simply being able to buy at all, or to buy a larger house than elsewhere, as well as being able to buy a house plus investment properties. They also valued having more space in their house, living closer to open and green space, having a more relaxed and quiet neighbourhood and having other families around in similar stages of life. This is mirrored in the survey results which show that for 85% of respondents housing affordability was very or quite important in their decision to move. Other (very or quite) important aspects were safety (90%), access

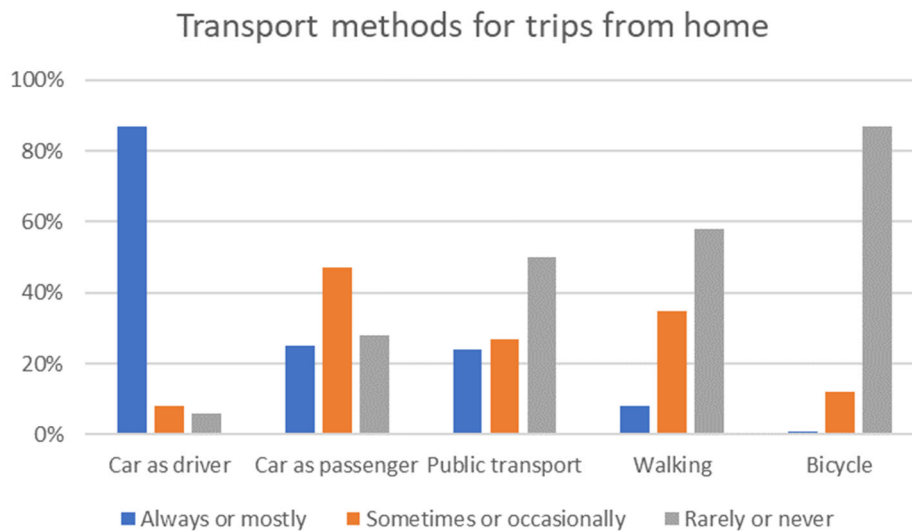
to freeways and main roads (76%) and closeness to open space (72%) and closeness to public transport (67%).

What interviewees disliked about their suburb is mostly the amount of traffic (mostly on arterial roads and towards the city, but to some extent also in the suburb). The car dependence of the suburb worries some of the residents, while others take it into account as inevitable when living in an outer suburb.

### Active transport

As can be seen in Figure 7, active transport does not play a huge role in the life of growth suburb residents. About 58% state that they rarely or never walk for trips from home to any destination and 87% rarely or never cycle. This low usage of active transport in growth suburbs is consistent with Victoria Walks’ findings that 39% of trip segments in inner Melbourne are walked, and 25% in middle suburbs, but only 17% in outer suburbs (Eady & Burt 2019). However, there is more walking (and cycling) for leisure than for transport, which has apparently to do with the high quality of internal foot and cycle paths and the poor quality of active transport connections to other suburbs and destinations. This is partly supported by reasons given for not walking more often, which include that destinations are too far away to walk (46%), walking takes too long (28%) respondents do not feel safe (19%) and there is a lack of pedestrian facilities (13%). Also cited as reasons not to walk was the weather (39%) and a lack of motivation (19%).

Figure 7: Transport methods for trips from home to any destination



### Public transport

About a quarter of respondents (24%) use public transport always or mostly and half of them (50%) use it rarely or never, as shown in Figure 7. There are some differences between the case studies with 31% of survey respondents in Wyndham using public transport almost always or mostly, in comparison to 17% of respondents in Casey. Reasons for this are most likely the location of work places and their accessibility by public transport. Yet, more people in Casey, where the case study area has a bus service in the suburb, take the bus to access the station. This is most likely due to a bus service to the station starting *within* Selandra Rise, while for Allura bus services were only available on the boundary of the estate at the time of the survey so that a large proportion of residents had to walk a relatively long distance to the bus stop. This shows that while a relevant and proximate bus service to the station

will be utilised by residents, there are a range of other factors which influence public transport usage, including proximity to jobs and other destinations and characteristics of the urban environment.

The interviews showed that in the case study areas public transport is mostly used to go to the inner city or other destinations close to a train station. Reasons mentioned were the train ride being more convenient and faster than the car to the CBD, congestion on the roads and a lack of parking spots at the destination. However, if these factors are not relevant most residents would rather use their car due to convenience, particularly for destinations where a number of transfers would be needed or where the service has low frequencies. This corresponds with reasons given in the survey for not using public transport more often, where 62% of respondents indicated that driving is faster or more reliable than public transport in their area, and 47% said that they do not have suitable public transport near their home.

Interviewees wanting to use public transport reported sometimes changing to a car due to the poor reliability and low flexibility. Similarly, the survey showed that residents who were 'high' users of public transport before moving reduced their public transport use after moving. However, they still continued to use public transport more than residents who were previously 'moderate' (1-4 days/week) or 'low' (<1 day/week) users of public transport, so that the impact of attitudes can also be seen.



## 5. The costs and benefits of early delivery of transport options<sup>9</sup>

To understand whether the benefits of early delivery of active and public transport outweigh the costs we calculated the costs and benefits of different time frames and qualities of active and public transport scenarios. The results were then extrapolated to all growth areas in Melbourne. Further detail on the methods and results can be found in a working paper available from the authors (Gunn et al. 2021).

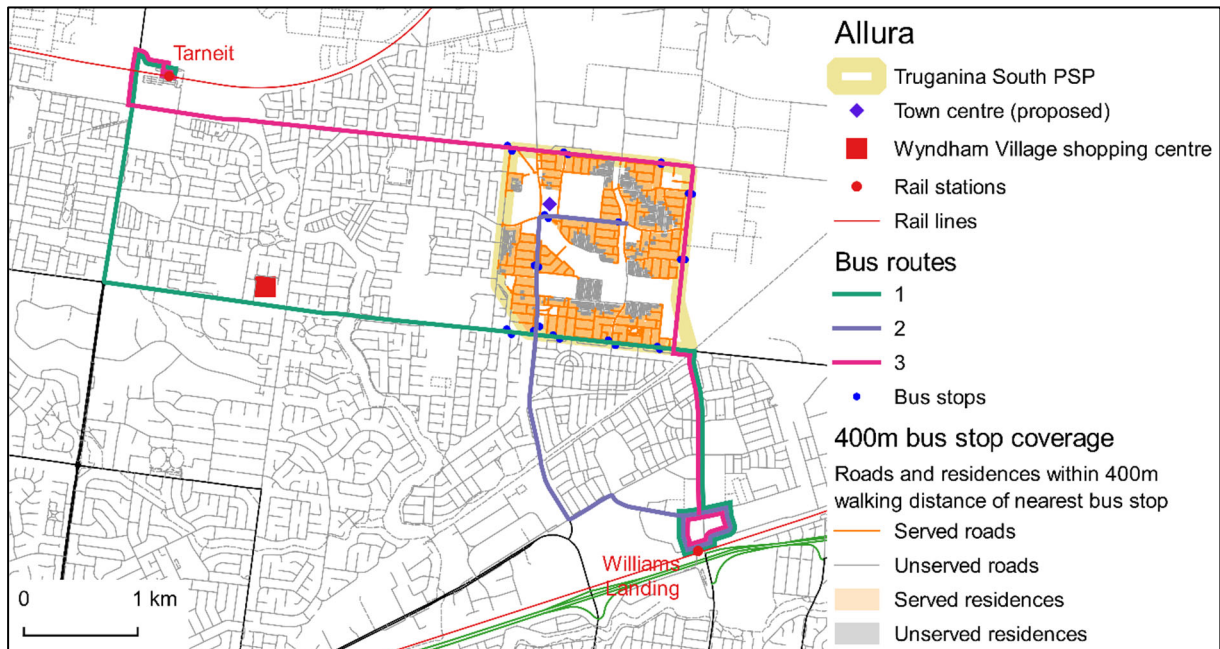
### 5.1 Scenarios of transport options

Scenarios were established for our two case study areas (including relevant surrounding areas) for active and public transport. These were divided into early, medium and late delivery with differing levels of quality – low, medium and high. Early delivery has been defined as public transport facilities delivered in Year 1 of the area's development, and active transport facilities delivered progressively over Years 1 to 5 as the area developed. Medium delivery means that active and public transport facilities are delivered five years after the start of development, and late delivery refers to delivery after 10 years. Figure 8 and Figure 9 show as an example the high-quality public transport scenario for the two case study areas.

In our scenarios active transport infrastructure includes a town centre (in different qualities) to offer destinations for walking and cycling. While active transport costs are for infrastructure alone, public transport also includes the provision of services as recurrent costs. Costing parameters for infrastructure and services were identified from relevant literature and peer-reviewed.

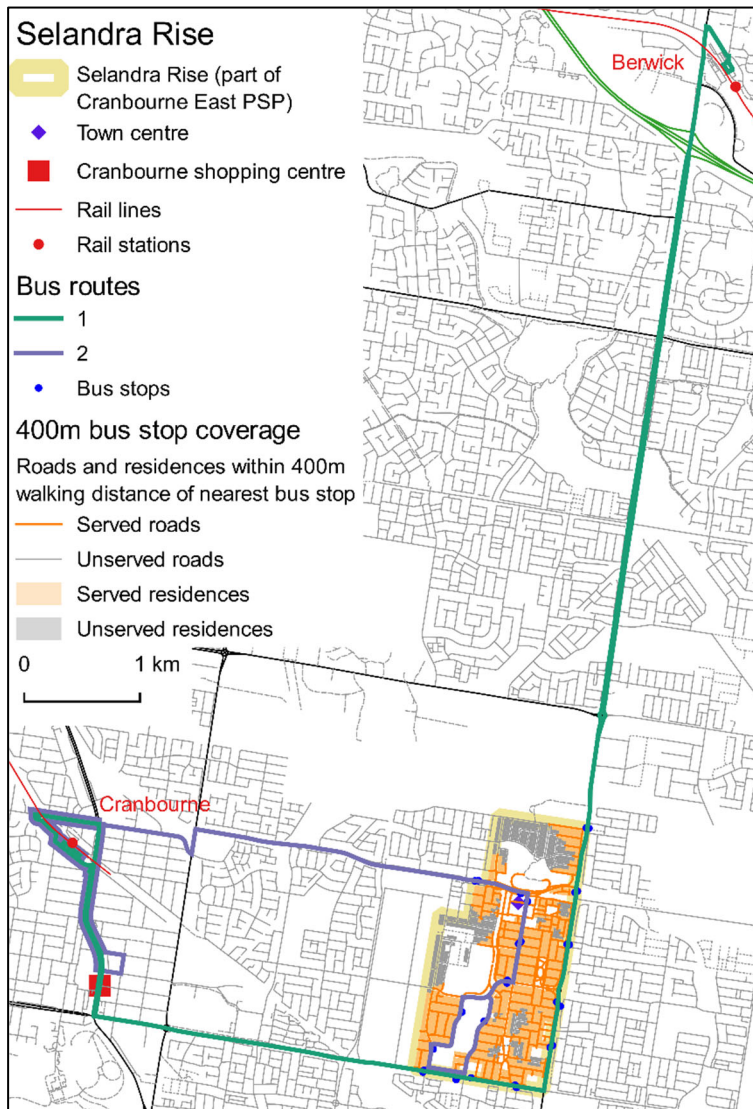
To understand the impact on areas as they are currently planned, the scenarios utilise the current densities of the case study areas. It is acknowledged, however, that higher densities would encourage walking and cycling and improve uptake and viability of public transport and the viability of town centres.

Figure 8: High-quality public transport scenario for the Wyndham case study area



<sup>9</sup> Further detail and results can be found in the following Working Paper: Gunn et al. (2021) Benefits and costs of early delivery of transport options in new suburbs. Unpublished Briefing Paper. RMIT University.

Figure 9: High-quality public transport scenario for the Casey case study area



## 5.2 Benefits

The benefits we quantified include a) physical health benefits, b) social and economic participation benefits, and c) household savings from reduction in number of cars owned. A reduction in cars on the road has additional environmental benefits and congestion benefits. In a centralised city with a high proportion of employment in the CBD and inner city and a radial transport system such as Melbourne more traffic and cars in outer suburbs lead to increased flow-on and multiplier effects on congestion in middle and inner areas. Infrastructure Australia (2019) and BITRE (2015) forecast costs of congestion for Melbourne at about \$10 billion in 2030. Thus, contributing to lower levels of congestion has overall benefits for productivity and society. However, although important we did not attempt to quantify those benefits in our analysis, and instead focused on the household savings from a reduction in car ownership.

We included population outside the respective suburb that benefits from the introduction of the transport options – such as the population living within walking distance of a new bus route – in our analysis.

In our analysis we found that available methods for quantifying benefits were less developed than for costs. This can lead to the benefits of active and public transport provision being given less weight

than the costs in standard cost-benefit analyses, which often omit the benefits of improved health and greater social and economic participation. We recommend that health, social and economic participation benefits should be assessed in business cases. We are aware that this is partly done and that particularly health benefits are increasingly measured, but methods need to be improved. The benefits of reduced car ownership should also be considered, with further work needed to develop means of quantifying both the private benefits (such as household vehicle ownership savings) and societal benefits (such as reduced pollution and congestion); and at least some of these benefits should also be assessed in business cases. Furthermore, the current focus on time travel savings as benefits for transport users needs to be rethought (Martens & Di Ciommo 2017). Switching from driving to walking will increase time travel dramatically, but will offer other benefits to the user.

Another central question for cost-benefit analysis in growth areas is to what extent *future* populations could be better accounted for in decision-making. While basing decisions upon highest existing demand is sensible, it means that growth areas often lose out and that provident planning and implementation is difficult. The inclusion of likely demand in the nearer future and the consequential definition of additional parameters would improve fore-sighted planning objectives and could potentially avoid backlogs of infrastructures and services. While this question is outside the scope of this study, we suggest that this could include the opportunity cost of not providing a certain service or infrastructure in an area. → Recommendation 11 Yet, in the current situation a balance between new suburbs and established areas with a large backlog of infrastructure and services is necessary.

### 5.3 Results

As expected, the early delivery of transport options is more expensive than delayed delivery, as is higher quality over lower quality (see Figure 10). However, as described above there are health, societal, environmental and economic benefits of providing transport options and we found that benefits exceeded costs, in all delivery timeframes, for medium and high-quality services which would justify the provision. However, benefits do not exceed costs for low-quality services, which is chiefly because we assume that this quality will not persuade people to reduce their car ownership.

Figure 10: Costs and benefits of early, medium and late delivery of transport options at a high, medium and low quality

Costs and benefits of early, medium and late delivery of transport options at high, medium and low quality										
Quality	Scenario	Early delivery			Medium delivery			Late delivery		
		Costs in million \$	Benefits in million \$	BCR	Costs in million \$	Benefits in million \$	BCR	Costs in million \$	Benefits in million \$	BCR
Low	Allura	5.1	1.5	0.30	3.4	1.0	0.29	2.3	0.6	0.28
	Selandra Rise	5.5	1.7	0.31	3.7	1.2	0.32	2.5	0.8	0.31
	<b>Growth Areas</b>	<b>839.2</b>	<b>103.7</b>	<b>0.12</b>	<b>544.2</b>	<b>75.0</b>	<b>0.14</b>	<b>370.1</b>	<b>48.6</b>	<b>0.13</b>
Medium	Allura	15.2	324.1	21.33	9.8	215.2	21.93	6.6	139.5	21.18
	Selandra Rise	25.9	458.6	17.73	17.2	313.5	18.18	11.5	203.2	17.62
	<b>Growth Areas</b>	<b>3,088.1</b>	<b>18,398.9</b>	<b>5.96</b>	<b>1,995.9</b>	<b>13,794.3</b>	<b>6.91</b>	<b>1,346.5</b>	<b>8,940.9</b>	<b>6.64</b>
High	Allura	59.0	1,057.9	17.94	39.8	706.1	17.74	26.7	457.7	17.14
	Selandra Rise	59.0	1,374.4	23.29	39.9	931.5	23.36	26.9	603.8	22.44
	<b>Growth Areas</b>	<b>8,764.8</b>	<b>36,625.4</b>	<b>4.18</b>	<b>5,884.4</b>	<b>27,408.9</b>	<b>4.66</b>	<b>4,002.3</b>	<b>17,765.4</b>	<b>4.44</b>

Notes: Early delivery: Public transport from Year 1; Active transport starting Year 1, extended Years 3 and 5 to match population; Medium time frame delivery: Public and Active transport from after Year 5; Late delivery: Public and Active transport from after Year 10; Growth Areas: Extrapolation from Allura and Selandra case studies to all residential PSPs (existing and future), BCR: benefit-to-cost ratio.

Even though the cost-benefit ratios between the different time frames of delivery do not differ to a large extent, early delivery provides better returns in absolute numbers. Also, benefits are experienced for longer, which includes the opportunity for mobility for residents without access to a car, such as children. This mobility is a precondition for participation in society (including work, education, care, health services, cultural and social life) and is central to the quality of life. This means that later investments are less 'valuable' in the sense that the quantified benefits decrease with later delivery because people will benefit later and thus have fewer years of benefits. Furthermore studies in behavioural science imply that availability of transport options at the time of a life change event related to moving increases the likelihood of their uptake overall. Therefore, we have modelled a higher uptake of transport options when they are provided earlier (Pemberton et al. 2021). From the literature we have specified this higher likelihood as producing a behavioural change uplift of 10% of health and avoided vehicle ownership benefits. The main reason for medium and late delivery providing similar benefit-cost ratios to the early delivery ratios is that the increased likelihood of uptake arising from early delivery is offset by the lower numbers of residents living in the area, and therefore the lower number of people receiving benefits, during its early years. Additionally the early delivery is more expensive because a current dollar is valued more than a dollar expended in later years. However, due to the reasons listed before we argue that with similar benefit-cost-ratios earlier delivery is the better solution, as overall higher absolute benefits are achieved and overall more people, and people benefit for longer.

When comparing the medium and high-quality scenarios, medium quality produced slightly higher benefit-to-cost ratios, providing greater value per dollar spent, while high quality produced greater absolute levels of benefits. The decision on providing medium or high-quality levels of transport options will depend on political priorities, funds and also the prevailing situation in specific areas.

Our analysis shows that the overall benefits of providing high-quality transport options early in the case study areas in Casey and Wyndham add up to about \$1.374 billion and \$1.058 billion, compared to implementation costs of about \$59 million, or in other words a benefit-cost-ratio of 23.3 and 17.9 respectively.

The case study ratios show quite a stark difference between benefits and costs. When looking at the different types of benefits, physical health benefits for high-quality transport make up about 1%, social and economic participation benefits make up about 33-37% and avoided car ownership benefits make up about 62-66% of the overall amount of benefits. While a large part of the overall amount of benefits is due to avoided car ownership, this does not imply that many households will not own a car at all. Rather it means that households may be able to own one rather than two, or two rather than three cars.

As the assumptions on car ownership could be seen as optimistic with the background assumption that the high-quality transport scenario can provide a similar quality as in the third of areas in Melbourne with the lowest car ownership (akin to a 20-minute neighbourhood) and medium quality can provide a similar quality as in the third of areas with a 'medium' car ownership, we have tested more conservative approaches towards changes in car ownership. Figure 11 shows the results of lower changes in car ownership for the case study area in Casey. So, even if vehicle ownership savings are disregarded altogether, health and social and economic participation benefits still result in benefit-to-cost ratios of over 6.

Health benefits and benefits of economic and social participation can save government (and society) costs for health care and other welfare costs. Households savings only marginally influence government income, but do affect the economy overall, as increased savings promote consumer spending. The large share of household savings in the overall benefits also shows that currently a large part of transport costs is passed on to private households. The reduction in cars on the road has a



potential influence on productivity through avoided congestion, as well as greenhouse gas emissions. Increased productivity can lead to more government income through taxes, and a reduction in greenhouse gas emissions can contribute at least in some small part to the mitigation of climate change.

Figure 11: Benefits of lower changes in car ownership for early delivery in Selandra Rise

Quality	Costs	Original Assumptions		“Half” of avoided car ownership		A “quarter” of avoided car ownership		No change in car ownership	
		Benefits	BCR	Benefits	BCR	Benefits	BCR	Benefits	BCR
Low	\$5,525,022	\$1,735,948	0.31	\$1,735,948	0.31	\$1,735,948	0.31	\$1,735,948	0.31
Med	\$25,868,221	\$458,561,696	17.73	\$310,763,671	12.01	\$236,864,658	9.16	\$162,965,645	6.30
High	\$59,016,072	\$1,374,376,840	23.29	\$918,152,854	15.56	\$690,040,861	11.69	\$461,928,868	7.83

A large component of the benefits measured in our scenarios arises from the fact that residents in surrounding areas also benefit from the introduction of transport infrastructure and services. For example, a cycle path or bus route connecting to a train station or activity centre benefits the residents living in proximity to this path or bus route. Thus, the overall benefit of the delivery of transport options also depends on how many residents live along these transport routes in neighbouring established areas. The more people live there, the more people benefit.

This highlights the importance of good sequencing of development. If new suburbs in an area are developed at around the same time, new transport options will benefit more people and synergies in terms of transportation provision and costs can be utilised to maximize benefits to residents of these areas. We appreciate that there are constraints such as the need for developers to release land in tune with market demand, which means the most efficient sequencing of estate development from an infrastructure perspective may not always be achievable. However, these departures from efficient sequencing involve adverse cost and benefit consequences.

Focussing our analysis on two growth suburbs inevitably limits the scale of benefit and costs, but of course these would be multiplied were all growth areas to be considered, and the effects of benefits are cumulative. An extrapolation of our results to all residential PSPs shows that the early delivery of a high-quality public and active transport to all growth areas would cost \$8.8 billion but would bring \$36.6 billion in benefits. The benefit-cost ratio is less extreme for the extrapolation at 4.2. The main reason for the difference lies in the decision to extrapolate costs incurred in non-PSP areas, while not extrapolating benefits for the people living in those non-PSP areas to avoid double-counting.

While some benefits may seem small when focussing on a single growth suburb, they can be substantial when taking into account flow-on effects. For example, the provision of transport options may only take a certain number of cars off the road for one suburb but extended to all growth areas this could have a significant impact on congestion levels, increasing productivity, reducing vehicle emissions. While we have not quantified these benefits, Infrastructure Australia (2019) and BITRE (2015) have estimated congestion costs for Melbourne at about \$10 billion in 2030, illustrating the magnitude of the potential benefit to be realised if congestion can be reduced. Infrastructure Australia (2019) comment that once a network is congested, delays grow more rapidly with each vehicle added, and a 4% increase in estimated population produces a 15% increase in estimated congestion costs (pp. 52, 54). We estimate that if the households in all growth areas (once they are fully developed) had vehicle ownership levels equivalent to those of the lowest car-owning one third of Melbourne's population, and not the highest one third, there would be around 685,000 fewer vehicles on Melbourne's roads. Infrastructure Victoria have found an increase in car use in inner Melbourne by



around 10%, or 100,000 additional car trips per day can result in travel time increases of almost 25% (Infrastructure Victoria 2021). In the context of these figures, a reduction of 685,000 vehicles could be expected to have significant congestion-reduction consequences.

The scenario evaluation undertaken in this analysis provides guidance for decision makers and does not represent direct savings or benefits that are necessarily tangible. However we have demonstrated in this case study that there are co-benefits for governments who provide early access to public and active transport.

## 6. Funding options<sup>10</sup>

### 6.1 Potential funding sources to support the early delivery of transport options

As the benefits of providing public and active transport will not go directly into state coffers, the project also explored potential funding sources for the provision of these transport options. Our focus was on funding for the *recurrent* costs of the operation of public transport, but we also addressed issues of funding for *infrastructure* for both public and active transport. We compared several relevant funding options according to potential revenue, reliability, equity, ease of implementation, travel impacts and the time frame for implementation (see Table 5 for an overview). Equity was divided in to horizontal and vertical equity. Horizontal equity means that people in similar economic circumstances are treated equally and costs are borne by those who benefit, while vertical equity means that people of different economic means and abilities are treated differently.

The analysis suggests that the funding source with the greatest potential is integrated transport pricing as it can provide recurrent, stable and equitable funding. A broad-based land tax performs similarly against most of the criteria. Both transport pricing and a broad-based land tax are good and efficient solutions for funding and supporting public and active transport. They both are horizontally equitable as they charge users and beneficiaries. Vertical equity can be improved through discounts for lower-income households. While a broad-based land tax is not expected to have an impact on travel behaviour, international experience shows that transport pricing leads to some trips shifting from car travel to active and public transport (Litman 2019; Infrastructure Victoria 2016b). Both options require significant change so that they cannot be implemented quickly. However, for integrated transport pricing trials can be instigated to develop suitable concepts and technologies and to showcase advantages (Infrastructure Victoria 2020a). → Recommendation 9

Further funding sources that are potentially suitable include elements of integrated transport pricing on their own or combined (road pricing, distance-based charges, parking charges, public transport fares), employment tax (i.e. payroll tax), betterment levies, a local increase in sales tax (i.e. the goods and services tax (GST)), and to some extent infrastructure contributions. Betterment levies provide an adequate mechanism to capture value gain through planning decisions (Infrastructure Victoria 2016a). However, while there is support for the concept of taxing land value uplift, betterment levies have not been a popular instrument in Australia. This may be because of vocal opposition by landowners, the large and visible amount of tax when large windfall gains occur, and a sense that this is too much market interference. Betterment levies can also be difficult to implement because measurement of value gain can prove difficult and contested. Yet, in the absence of a broad-based land tax, betterment levies can be an important and fair element to capture value and to fund public and active transport.

The recently announced Windfall Gains Tax in Victoria which is planned to come into effect in July 2022 is such a betterment levy. Landowners whose property gains \$500,000 or more in value through rezoning will have to pay a 50% levy on any gains above \$100,000. Land where the GAIC is charged is exempted. While there are no further details at the time of writing (for example about hypothecation), the Victorian Government press release suggests that the income will be “invested in public transport, schools and other vital infrastructure” (Victorian Government 2021) The discussion since the announcement clearly shows the contested nature of those levies at least from the perspective of landowners and the development industry (Coates 2021, Bleby 2021).

<sup>10</sup> More details can be found in the following Working Paper: Kroen, A.; Goodman, R. (2020) Alternative funding options for the early delivery of transport options in new suburbs. Unpublished Briefing Paper. RMIT University.

Table 5: Summary of the evaluation of funding options for early delivery of transport options

	Description	Advantages	Disadvantages
<b>Transport Pricing</b>	Pricing of transport services	Is a user fee (i.e. horizontally equitable). More efficient use of transport infrastructure.	Significant restructure needed. Costly to implement. Is regressive (vertically inequitable).
<b>Public transport fares</b>	Increase fares	Already used. Is a user fee.	Potentially discourages public transport use. Is regressive.
<b>Road Pricing</b>	Tolls on (all or some) roads, including cordon charges	Is a user fee. More efficient use of transport infrastructure. Reduces traffic congestion.	Restructure needed. Costly to implement. Is regressive.
<b>Distance-based charges</b>	Distance-based fees on vehicles registered in the respective area.	Is a user fee. More efficient use of transport infrastructure. Reduces vehicle traffic.	Significant restructure needed. Costly to implement. Is regressive.
<b>Parking charges</b>	Special property tax on parking spaces. Increase when and where public parking is priced.	Is a user fee. Reduces car trips and highlights value of land. Already used.	Is regressive. Some implementation costs.
<b>Betterment levy</b>	Special taxes on property that benefit from planning changes.	Charges beneficiaries and captures value increase.	Not a recurrent funding stream. Could potentially influence urban development.
<b>Local developer contributions</b>	A fee on new development to help finance local infrastructure.	Charges beneficiaries and future users. Already used.	Not a recurrent funding stream. Potential increase in house prices. Only for local transport infrastructure.
<b>State and regional infrastructure contribution</b>	A fee on new development to help finance state infrastructure.	Charges beneficiaries. Already used.	Not a recurrent funding stream. Potential increase in house prices.
<b>Property development</b>	Collect rents from public transport property. Sell rights to build over stations.	Relatively easy implementation. Charges beneficiaries.	Limited potential for growth areas.
<b>Property and Land Tax</b>	Introduce broad-based land/ property tax	Efficient tax. Is considered progressive.	Significant restructure needed.
<b>Sales Tax</b>	A special local sales tax.	Enables public decision for (public) transport program.	New regulations needed. Difficult to implement in Australia. Is regressive.
<b>Employment tax</b>	A levy on employers in a designated area or jurisdiction (i.e. payroll tax). Special income tax for transit or transportation.	Charge for commuters/ employers. Progressive with respect to income. Already used.	Some new regulations needed. Proof of specific benefit of commuters needed. Income tax is collected at the Commonwealth level.
<b>Fuel tax</b>	An additional fuel tax in the region.	Reduces vehicle traffic and fuel use somewhat. Already used. Is a user fee to some extent.	Is regressive. Charges fuel use and not road use.

Source: Kroen & Goodman 2020

An increased payroll tax is a successful instrument for funding public transport in France, where regional transport authorities charge 2-3% additional payroll tax and about 30% of public transport operations are funded in this way. In principle this is also possible in Victoria and has been done for other areas. For example, the recent state budget included the announcement of a payroll tax surcharge called ‘mental health and wellbeing levy’. This is a surcharge on wages paid in Victoria of 0.5% for businesses with national payrolls above \$10 million a year and of 1% for businesses with national payrolls above \$100 million (SRO 2021). However, to use such an instrument for public transport funding would need a convincing explanation of its rationale and changes to taxation rules.

### Info Box: Versement Transport France

In France, public transport is partly financed by a transport tax, the so-called ‘versement transport’ (VT). The VT is a hypothecated payroll tax, which can be levied by local authorities or municipal associations (responsible for public transport) on employers. The money received can be used both for ongoing operations and for investments.

The tax must be paid by any public or private employer with more than 11 employees located within the specific area. The VT is calculated as a percentage rate of the payroll, set by the local authorities with the rate capped by law. Larger regions can levy higher rates. For Paris, the rate is currently 2.95% and for other regions it lies between 1% and 2.5%. Nationwide, the VT collected 8.2 billion euros in 2017, which finances about a third of the operations of the transport companies in France.

The VT was introduced in the 1970s as an instrument for the revitalisation of public transport and to cover the rising public transport costs without burdening the users. The tax was first introduced in Paris in 1971 and then extended to metropolitan areas with more than 300,000 residents in 1973. The scope was gradually extended to all municipalities with more than 10,000 inhabitants.

The legal background to the tax was the consideration that the costs arising from the improvement in public transport should be borne in part by the beneficiaries. Employers were seen as benefiting through better accessibility and thus greater attractiveness for customers and employees and a lower need for parking.

Criticism of the versement transport includes that it adds to the cost of labour and could thus prevent job creation and that economically weak regions can be disadvantaged as they incur lower VT income. In addition, some critics say that the journey to work represents less than 50% of daily travel, so it could be considered illegitimate that employers play such a significant role in the funding of public transport. Despite these criticisms the simple and inexpensive collection and relatively low rate have ensured the VT’s survival.

With the new Mobility Act, drafted in 2019, the importance of the tax will actually increase further. The versement transport will become the versement mobilité, which means that the funds can also be used for other transport areas, such as cycling, carpooling, car sharing, etc. At the same time the authorities responsible for public transport become responsible for ‘mobility’, including the aforementioned transport areas. Towns with less than 10,000 inhabitants can also levy the versement mobilité. (Source Kroen & Pemberton 2020)

In the US, sales tax is a successful instrument for funding public transport, however it could be complicated to introduce the concept of *local* sales tax, or GST, in Australia due to current legislation and regulations.

Changes to existing instruments are easiest to implement, as the mechanisms for collection already exist. Possibilities here include developer contributions which will be explored in more detail in the next section, and parking charges, such as the parking levy in inner Melbourne and priced parking which could be extended in scope and collect funds for transport (Infrastructure Victoria 2020a). This is an instrument that could be connected to an overall integrated transport network pricing but could

also be extended on its own before further pricing measures are introduced. Similar to transport pricing overall, parking charges are perceived as difficult to implement due to the contested and emotional debate around parking rather than because of the need for reform.

### Info Box: Sales Tax in the US

Using sales tax income to assist funding public transport is widespread in the US, as well as to a lesser extent in Canada. Most state but also local funding of public transport in the US relies on this source. Some funding from sales tax is ongoing; other is temporary and its extension has to be decided for in a vote. For specific projects or capital investment to extend public transport (sometimes combined with other transportation investment) the sales tax can also be increased by a certain extent, usually for a specified time. Generally, the increase of the sales tax is subject to a (non-binding) plebiscitary vote and refers to a certain area, such as a county or wider city region. Additional sales taxes for public transport typically range from 0.25 to 1%. The use of sales tax for public transport as well as ballots in the US for increases in sales tax have intensified since the early 2000s, as federal funding for public transport decreased. Examples of this are Los Angeles and Denver, while Vancouver is a Canadian example of a plebiscite where the increase was rejected.

In Los Angeles County 71% of voters approved a 0.5% sales tax increase for 40 years, the so-called ‘Measure M’, in November 2016 to collect funding for the expansion of public transport, bike networks and also some minor road improvement projects. ‘Measure M’ was the fourth sales tax increase, with other successful ballot measures in 1980, 1990 and 2008.

In the Denver metropolitan area a public transport expansion program called ‘FasTracks’ began in 2004 and was conceived as a response to the predicted population growth, existing problems with traffic congestion and also as an economic development tool; a response to the economic downturn of the early 2000s. Yet, the example of Denver also shows the inherent risk of sales tax funding: the revenue in sales tax for FasTracks was lower than anticipated, particularly due to the Global Financial Crisis in 2008 so that further funding possibilities had to be pursued and the time for the program to be extended. (Source Kroen & Goodman 2020)

## 6.2 Developer contributions in Melbourne

The main mechanisms for funding infrastructure in new suburbs in Victoria, apart from local, state and federal budgets, are the Growth Areas Infrastructure Contribution (GAIC) and Infrastructure Contributions Plans (ICPs) as described in section 3.2. The GAIC is a potential funding source for the early delivery of transport options, as it collects contributions to partially fund state infrastructure in the growth areas. Developer charges for state-funded infrastructure can provide the opportunity to implement essential infrastructure earlier, reap some of the value gained from public investment and rezoning and improve urban development. Local developer contributions scheduled in the ICPs are suitable for local active transport infrastructure but funding public transport services is largely out of scope. → **Recommendation 10**

Currently, the GAIC can already be used for five years of recurrent public transport services, which provides an opportunity to initiate bus services in growth areas. It could be specifically used for the *early* delivery of bus services, giving ‘entry support’ in growth areas. These could be the special bus fleets mentioned previously in section 3.3. A focus on early delivery is possible because of the broad nexus of the GAIC which means that while funds have to be spent in proportion to the amount collected in the growth area this is seen as a goal over time. Opportunities and priorities may lead to spending GAIC funds on a certain project in an area in which the GAIC is still to be collected.

We suggest the GAIC public transport fund should focus on the early *operations* of public transport services in growth suburbs rather than public transport infrastructure. While infrastructure is

important and necessary it tends to be high-cost in new suburbs as it is mostly related to rail services (with bus stops often being provided by developers or only being put in when the bus route arrives). The rail infrastructure generally benefits a wider catchment and should therefore be paid out of the general state budget. Bus routes in contrast, provide a more local public transport service which enables connection to the larger public transport network and other destinations. Bus services are the crucial backbone of equitable public transport provision, particularly in the growth areas. Their early operation will enable future residents to move in with less dependency on a car and will deliver the benefits discussed previously.

To support active transport at an early point in the lifetime of a suburb the early delivery of community infrastructure could be supported through the GAIC community fund (BNCF), which allows for capital works for community infrastructure (e.g. health, education, libraries), transport infrastructure for walking and cycling and land required for eligible infrastructure. This can support the early delivery of a town or neighbourhood centre providing useful destinations to walk and cycle to within the suburb.

In addition to focusing the GAIC public transport fund on recurrent costs and the early delivery of services, other parts of the process also need improvement. For example, the allocation process needs to be unified to improve its strategic effect and the actual collection of GAIC funds needs to be monitored. GAIC projects also need to be more strongly aligned to the wider planning framework and ideally a strategic plan to coordinate sequencing of growth as well as a strategic transport plan (→ Recommendation 3). Public accountability should be improved by making funding decisions more transparent and public.

Another option is to use the GAIC WIK more efficiently to close transport network gaps in the street network earlier in order to enable the implementation of bus routes (this is also true for ICPs → Recommendation 8). However, this would also need to include some clearer deadlines for finalising the WIK projects. The special bus fleet of smaller buses could also be added as a possible WIK contribution.

The current charge was set “relatively arbitrarily(...) to what developers will find acceptable” (SGS 2016: 28) and there has been no publicly available rationale for the initial amount of the charge. As the GAIC is partly a betterment charge, the state government should assess whether the current GAIC rate reflects the value of betterment adequately. This could be done in relation to work on detailing the new Windfall Gain Tax. While we are aware that the GAIC has been specifically changed from a charge to land owners (like the new Windfall Gain Tax) to a charge to purchasers before it came into effect, it would be a fairer tax if it were charged to land owners at the point of the planning change (i.e. rezoning).

An increase in the GAIC could be used to introduce standard provision of basic level public transport in all growth areas. As a sample calculation: The current per hectare charge of \$117,870 per hectare would collect about \$29.5 million for a PSP of 250 hectares. If this charge would be increased by \$20,000 per hectare this would collect \$5 million more. This \$5 million corresponds roughly to the costs of the early delivery of the low-quality transport scenario in our analysis and could be used to introduce active transport infrastructure and connections earlier and as well as a basic bus service. This does not imply, however, that the GAIC should be used to fund public transport single-handedly. This use of the GAIC would clearly improve amenity and quality of life in the growth areas and the many benefits already discussed. The analysis presented in Section 5.3 demonstrated that the medium or high-quality scenarios would provide a better benefit-cost ratio and should be pursued rather than a low-quality level. A combination of general revenue (or potentially funds from integrated transport pricing or a broad-based land tax) and GAIC to provide a medium or high-quality transport service is therefore recommended.



*Local* developer contributions are also already used in Victoria (i.e. Infrastructure Contribution Plans) and can therefore be adapted short-term. Since they only apply to local infrastructure, they can be used for local active transport and public transport infrastructure needs, and as they are one-off mechanisms they are not an ongoing, reliable stream of funding over time.

Provision of local transport infrastructure is delivered largely by developers with and without specified contributions, by building footpaths, and to some extent cycling paths and bus stops in new developments. ICPs could be used to add additional infrastructure like bike hoops or bike cages or benches in town centres or at public transport stops. Additionally, and more importantly, some of the infrastructure listed in the ICP can be brought forward to improve connectivity through intersections and paths or bridges. Building an intersection or bridge that might not be crucial for accessing the development at that point in time, can still enable the opportunity of a bus to go through the estate or for active transport connections to be shorter. Clear time-frames for infrastructure that can improve street connectivity and close gaps in the public transport network should be established. Clear priorities and communication of benefits help with the implementation and enforcement of implementation, which is partly already achieved in current ICPs. However, there is no focus on the overall transport network outside the PSP area and an early delivery of transport options when prioritising different infrastructure items in the contribution plans.

## 7. Recommendations

Figure 12 presents the recommendations derived from our analysis.

Figure 12: Recommendations

- 1 A base level of public transport service, and provision for active transport, be considered essential in growth areas from the time residents move in.
- 2 Establish a more coordinated and strategic approach towards the development of growth areas through state infrastructure plans that support sequencing of development.
- 3 Develop strategic transport plans to inform planning for growth areas.
- 4 Introduce staged public and active transport provision, ensuring a basic level of provision at the commencement of settlement and then stepping up as development milestones are met.
- 5 Start with a public transport network of direct and frequent routes in growth suburbs, complemented by routes that provide wider geographic coverage to ensure equitable access to transport.
- 6 Ensure the early delivery of neighbourhood and/or town centres to encourage active transport and provide a place for community activity.
- 7 Increase average net density targets for growth suburbs in the PSP Guidelines to at least 25 dwellings per net developable hectare.
- 8 Ensure the timely implementation of local infrastructure that has been identified in contribution plans.
- 9 Explore integrated transport pricing and a broad-based land tax as possible funding sources to improve delivery of active and public transport infrastructure and services.
- 10 Use the Growth Areas Infrastructure Contribution (GAIC) as an instrument to support the early delivery of transport options.
- 11 Consider the costs of not providing transport infrastructure and services when undertaking cost-benefit analyses of transport infrastructure delivery options in growth areas.

The recommendations are elaborated in the following.

**Recommendation 1: A base level of public transport service, and provision for active transport, be considered essential in growth areas from the time residents move in.**

Delivering transport options in growth suburbs is not cheap, however, the health, societal, environmental and economic benefits from early provision make it worthwhile. Our analysis in section 5.3 has shown that the overall societal benefits in having transport alternatives available early from physical activity-related health benefits, social and economic participation as well as household savings from lower car ownership outweigh the costs. Additional benefits which we did not quantify include reduced pollution and congestion. A large part of the benefits comes from household savings due to lower car ownership, which exemplifies how currently transport costs are externalised to households in the growth areas.

Moreover, mobility is a precondition for participation in society (including work, education, care, health services, cultural and social life) and is central to the quality of life. Social and economic participation is associated with basic democratic values, such as equal opportunities and social justice. Enabling full social and economic participation is therefore the basis of a functioning democratic and socially just society.

Thus, our first recommendation is to consider public transport provision and enabling of active transport an essential infrastructure service that needs to be provided concurrently with urban development, just as are electricity, water, and roads. The difference to those other essential infrastructure services is, however, that while active transport infrastructure can to a large part be provided by developers, public transport is generally provided through the state. Additionally, it is a recurrent service, so the costs for provision will continue, and will compete with other budget priorities and necessities. Nevertheless, a minimum public transport service should be considered an essential service. Moving to a higher quality will increase benefits, as our evaluation of transport scenarios has shown.

**Recommendation 2: Establish a more coordinated and strategic approach towards the development of growth areas through state infrastructure plans that support sequencing of development.**

There is a common approach to planning in the growth areas through Precinct Structure Planning and government coordination has improved since its introduction. *Plan Melbourne* specifies objectives for the growth areas and guidance on planning for earlier provision of infrastructure and services. Yet, there is no whole of government strategic approach and coordination within state government is difficult with the many departments and agencies involved focusing on their own objectives. While the VPA and LGV support increased coordination among the different state agencies there is still need for greater collaboration and integrated thinking in growth areas planning (see section 3.1).

There is an urgent need for a public plan for infrastructure investment to which the various state agencies and departments need to adhere around the staging and timing of delivery. Work is currently being undertaken on the process for identifying a pipeline of strategic projects eligible for funding, but not as a public plan. Such a plan would give developers and residents some confidence regarding when certain infrastructure will arrive<sup>11</sup>. A clear understanding and expectation of the timing for delivery of state infrastructure would also give local governments the opportunity to match their funding and development into the same areas to achieve beneficial outcomes. Similarly, Precinct Structure Plans

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<sup>11</sup> This recommendation is similar to recommendation 33 in Infrastructure Victoria's Draft 30-year infrastructure strategy.

even though locally focused could incorporate more comprehensive thinking of GAIC funding to improve coordination with regional infrastructure.

A committed and strategic approach to timing would obviously be beneficial for coordinating sequencing of development. It would also make infrastructure spending less politicised once determined (see section 3.3). As our analysis has shown, sequencing of development can utilise benefits of increased transport provision more strategically, as benefits are amplified by effects on surrounding suburbs (see section 5.3). It would also enable the development of complete communities more quickly, maximising the social, environmental and economic benefits.

A specific agency with appropriate levels of authority could be given responsibility for ensuring the coordination of provision for growth areas<sup>12</sup>. The Office for Suburban Development<sup>13</sup> may have been thought of as such an agency but it is unclear to what extent it has been able to fulfil this task.

**Recommendation 3: Develop strategic transport plans to inform planning for growth areas.**

Precinct Structure Plans are focused on their local area but provide some directions on connections to areas outside and the broader transport network. Currently Growth Corridor Plans are the basis for PSP development. However, these plans date from 2008 and provide only a very broad view of transport infrastructure. Developing an overall network plan (the Integrated Transport Plan required through the Transport Integration Act 2010) or strategic transport plans for the different growth corridors or otherwise defined transport regions as a basis for PSP development would improve the connection of the PSP areas to their surrounding areas and the transport network and would also facilitate plan development<sup>14</sup>. The regional strategic transport plans would be connected to a staged public transport provision with definitions of triggers (see recommendation 4).

Melbourne’s transport system is a metropolitan network, and the different local areas and transport modes are interconnected. An overall network plan and/or regional plans provide the strategic approach that is currently lacking and makes local planning easier. PSPs can use the overall network plan or the regional transport plans as a basis and there is no need to start anew for every plan. The detailed regional transport plans should show current and future provision of public and other transport and define triggers as to when the different public transport routes should be implemented in what quality.

**Recommendation 4: Introduce staged public and active transport provision, ensuring a basic level of provision at the commencement of settlement and then stepping up as development milestones are met.**

We recommend that Melbourne follow the lead of the City of Calgary in Canada which introduced staged public transport provision with differing levels of transport provision (see section 3.3). The special feature in Calgary is that the city specifies how their Introductory Transit is rolled out in areas which had no public transport service before, such as growth areas. While these new areas still need to meet some requirements for population or job numbers, and public transport provision is dependent on available funds, this approach represents the idea of specifying how to introduce public transport in new areas according to a minimum standard.

<sup>12</sup> This recommendation is similar to recommendation 68 in Infrastructure Victoria’s Draft 30-year infrastructure strategy.

<sup>13</sup> The Office for Suburban Development sits within the Department of Jobs, Precincts and Regions. One of its goals is to coordinate “development activities in metropolitan Melbourne across all relevant departments and agencies, to add value and complement work already underway, remove duplication, address gaps and achieve positive outcomes for local communities” (<https://www.suburbandevlopment.vic.gov.au/home>).

<sup>14</sup> This recommendation is similar to recommendation 33 in Infrastructure Victoria’s Draft 30-year infrastructure strategy

We recommend a similar process for Melbourne, as a defined minimum level gives security for residents, but also developers, retailers and other service providers that at least some form of public transport will be available. We propose that a minimum level of service is provided from the beginning of new urban development. Options for such a specified minimum service can include a regular service, on-demand services or an integration with community transport. Developers could also be involved through providing shuttle buses as work-in-kind.

We recommend the definition of minimum standards for public transport as well as active transport, which will be implemented at certain trigger points. Trigger points can for example be the first subdivisions in an area or the first 100 dwellings. Accordingly, a higher number of dwellings will trigger a higher quality provision. Active transport infrastructure in this context are not only foot and cycle paths, but also crossings, bridges and local destinations. Similar to Calgary an introductory level can be specified for new areas. Further higher quality levels will be dependent on numbers and densities of residents and employees.

**Recommendation 5: Start with a public transport network of direct and frequent routes in growth suburbs, complemented by routes that provide wider geographic coverage to ensure equitable access to transport.**

Public transport provision is caught between patronage goals (i.e. maximizing patronage of all types) and coverage goals (i.e. achieving a high spatial coverage) (see section 4). In most cities a mixed approach is offered with some direct and frequent services and some less direct services that cover a broader geographical area. Other important factors in public transport provision are priority traffic management and control through bus lanes and priority traffic signals.

For growth areas, starting with a few strategic, direct bus lines that go directly to key destinations, such as train stations and activity centres, and connect the growth areas to other destinations within the city region is a sensible approach. However, these direct routes need to be complemented by non-direct (coverage) routes to ensure mobility for all households. These non-direct coverage routes can be offered through different forms of public transport provision, such as community transport, demand-responsive transport, or even subsidised ride-share services (see section 4). These will induce different costs and provide different offers. Collaboration and coordination between different stakeholders will provide valuable synergies. As the coverage routes provide predominantly local connections local governments should be involved in their development.

**Recommendation 6: Ensure the early delivery of neighbourhood and/or town centres to encourage active transport and provide a place for community activity.**

Infrastructure for active transport, such as foot and cycle paths, crossings and bike parking, encourages active transport (see section 4.1). However, pedestrians and cyclists also need destinations to walk or cycle to, as well as an agreeable environment on their paths, as is acknowledged in *Plan Melbourne's* 20-minute neighbourhood concept. For the growth areas, this means that it is necessary to build some of the destinations early to encourage residents to walk and cycle for transport early on in the lifetime of the suburb and avoid entrenched car dependency. However, generally town centres are one of the last elements to be built in a new suburb, as larger retail and other services are only viable with a certain number of customers (see section 3.1). From conversations with developers, we know that there is interest in coordinating with other stakeholders, such as service providers and local government, to provide some early delivery of smaller hubs in their estates. This can for example be the combination of the display centre with a café or convenience store and a childcare centre.



Our research has not found any best practice examples for this specific dilemma and did not have the scope to investigate further. We recommend and encourage state and local government as well as developers to keep thinking about how preliminary town centres or services could be implemented early, as this would provide a huge impetus for active transport.

**Recommendation 7: Increase average net density targets for growth suburbs in the PSP Guidelines to at least 25 dwellings per net developable hectare.**

A good public transport offer is a precondition for public transport uptake, and public transport can work without high densities, however, urban densities still have a role to play in making public transport more viable. Similarly, people are generally more likely to walk and cycle when densities are higher (see section 4.1). Furthermore, for a more sustainable urban development Australian cities cannot keep growing into their hinterland ‘using up’ valuable agricultural or natural land. Therefore, infill development over the whole metropolitan area and higher densities in growth suburbs are necessary and projected average densities in the PSP Guidelines should be increased to at least 25 dwellings per net developable hectare as research recommends. However, obviously different densities will be needed in different areas of the plan.

One argument in relation to density is often that higher densities are only viable once amenities have arrived. The (early) development of high-quality public transport networks and activity centres would support higher densities in growth areas and would make them more viable for developers. Correspondingly, higher densities should be required in activity centres and around major public transport stops. The new Draft PSP Guidelines acknowledge this (VPA 2020, p. 34). However, some clearer and stricter requirements would be needed to ensure that the envisaged densities are achieved. Rather than quantifying likely yield, a minimum density to be achieved should be specified. Cooperation with local government is of high importance in this area, as they prepare local strategic plans and will have views about where denser housing needs to be. Discussions and negotiations are necessary to give room to local differences and considerations.

Another argument is that more infrastructure is needed with more people moving into an area. While this is true, this infrastructure will be needed somewhere else if people are moving to other areas instead. Thus, infrastructure can be planned according to higher population numbers. Even with roads being congested, the solution is not to build more and more low-density areas further out, because as long as you have a centralised city like Melbourne, these residents will still add to traffic in the areas further in, at least to some extent. Therefore, rather than keeping spreading out, the solution lies rather in a more decentralised urban form.

High-quality design and a diversity of housing products are a necessary prerequisite to achieve the higher densities that are needed for supporting local living and a more sustainable urban development. Furthermore, good urban design in the public realm is essential to make medium density living attractive.

**Recommendation 8: Ensure the timely implementation of local infrastructure that has been identified in contribution plans.**

Infrastructure or Development Contribution Plans (ICPs and DCPs) identify the need for local infrastructure, including transport infrastructure (see section 3.2). Local government and developers can support the early delivery of transport options by ensuring that gaps in the transport network are closed early. Building an intersection that is not crucial for access at that point in time, can open up the opportunity of a bus being able to go through the estate or for active transport connections to be shorter. Clear priorities help with the implementation and also enforcement of implementation, which is partly achieved in current ICPs. However, there is no focus on the overall transport network outside

the PSP area and an early delivery of transport options when prioritising different infrastructure items in the contribution plans. The development of regional transport plans will furthermore assist with identifying crucial gaps (see recommendation 3).

**Recommendation 9: Explore integrated transport pricing and a broad-based land tax as possible funding sources to improve delivery of active and public transport infrastructure and services.**

To achieve better and earlier transport options in growth suburbs, more funding is needed for active and transport options. Similarly, to achieve the Victoria Planning Provision's standard of 95% of dwellings being within 400m of a bus stop, 600m of a tram stop and 800m of a train station more funding is needed for public transport, plus possibly an overall restructure of the network. Although benefits accrue from early delivery of transport options, these benefits do not translate into direct funds going into state coffers (see section 5.3). While state government can reconsider priorities and make more funding for active and public transport available, further options of ensuring and collecting funds will also be beneficial if not necessary, particularly given the recurrent costs of public transport provision.

We recommend pursuing transport pricing and a broad-based land tax as possible funding sources (see section 6.1). Both are horizontally equitable (i.e. people in similar economic circumstances are treated equally and costs are borne by those who benefit) as they charge users and beneficiaries. Vertical equity (i.e. people of different economic means and abilities are treated differently) can be improved through discounts for lower-income households. Both options provide recurrent funds rather than one-off payments and the revenue is relatively stable and predictable. Yet, both options require large reforms. However, they are not impossible to achieve and trials can be instigated, or a staged introduction be prepared.

**Recommendation 10: Use the Growth Areas Infrastructure Contribution (GAIC) as an instrument to support the early delivery of transport options.**

As the implementation of a broad-based land tax or transport pricing will still be some years away, we recommend modifying the Victorian Growth Areas Infrastructure Contribution (GAIC) so that it can be used to support the early delivery of transport options (see section 6.2). A focus on early delivery is possible because of the broad nexus of the GAIC which sees the proportional spending as a goal over time.

We suggest the GAIC public transport fund should focus on the *early operations* of public transport services in growth suburbs rather than public transport infrastructure. Bus routes are the crucial backbone of an equitable public transport offer, particularly in the growth areas. Their early operation will enable future residents to move in without the requirement of having a car for each household member and will deliver the benefits discussed previously. An introductory offer of public transport through a special bus fleet of smaller buses could also be added as a possible work-in-kind (WIK) contribution (see section 3.3).

To support active transport at an early point in the lifetime of a suburb, the early delivery of community infrastructure could be supported through the GAIC community fund (BNCF), which allows for capital works for community infrastructure (e.g. health, education, libraries), transport infrastructure for walking and cycling and land required for eligible infrastructure. This can support the early delivery of destinations to walk and cycle to within the suburb.

State government can also assess whether the current GAIC rate reflects the value of betterment adequately and connect it more strongly to the provision of public transport. When an introductory public transport level has been defined, the costs of its provision could approximately be calculated, and the GAIC be increased proportionately – however not to pay for all costs.

**Recommendation 11: Consider the costs of not providing transport infrastructure and services when undertaking cost-benefit analyses of transport infrastructure delivery options in growth areas.**

A significant question for new suburbs is to what extent future populations but also the costs of not providing a service could be better accounted for when planning transport (and other) provisions. Decision-making according to highest demand is sensible overall, but means that growth areas often lose out and that provident planning and implementation is difficult. It can also lead to substantial backlogs in those areas that do not have the highest demand. A balance is needed between provision to highest demand and an equitable provision to all areas of a city.

The costs of not providing a service are obviously difficult to judge but would be beneficial to decision-making. This would mean to judge the disbenefit of not providing the benefits of an infrastructure or service. Related to this are the costs of not purchasing land for public purposes. The question is how the likely increase in land prices and the security of owning the land can be valued in comparison to spending the money now which will then not be available for other programs.

The definition of additional parameters, such as the cost of not providing a certain service or infrastructure in an area, would improve fore-sighted planning objectives and could potentially avoid backlogs of infrastructures and services. This does not only refer to growth areas, but also established areas with a strong backlog of infrastructure and services.

## Acronyms

DCP – Development Contributions Plan  
 GAA – Growth Areas Authority  
 GAIC – Growth Areas Infrastructure Contribution  
 ICP – Infrastructure Contributions Plan  
 LGV – Local Government Victoria  
 PSP – Precinct Structure Plan  
 PSP Guidelines – Precinct Structure Planning Guidelines  
 VPA – Victorian Planning Authority  
 VPP – Victoria Planning Provisions

## Glossary

**Betterment levy:** In this report we understand a betterment levy as a charge on land value uplift that is caused by a planning decision. This type of beneficiary charge is sometimes also termed a ‘land value uplift charge’ (Infrastructure Victoria 2016a). This means that betterment levies put a charge on land owners whose land values have increased from planning and zoning changes. The idea behind this is to reap some of the value uplift that is caused by the planning change. There is no overall agreed definition of betterment levies and in other reports betterment levies also include charges on land value uplift and wider economic benefits caused by public investment in (transport) infrastructure (Branigan 2016).

**BNCF** → see Building New Communities Fund

**Building New Communities Fund:** The Building New Communities Fund (BNCF) is one of the two growth areas funds in which the GAIC is paid. It is for capital works for community infrastructure (health, education, justice, libraries, major recreation), environmental infrastructure (regional open space, trails), economic infrastructure (ICT), transport infrastructure (walking, cycling) and other land required for any of those types of infrastructure. (P&E Act S201VB)

**Development contributions:** Development contributions are payments or work-in-kind provided by developers towards the supply of infrastructure required to meet the needs of the community of the planned development. The Planning and Environment Act 1987 (P&E Act) allows for development contributions to be provided by inclusion in the planning scheme. The Act provides three mechanisms: development contributions plans, voluntary agreements and conditions on planning permits. A 2010 amendment to the Act also introduced the Growth Area Infrastructure Contributions (GAIC) fund to partially offset the cost of new Growth Area infrastructure. Generally, different mechanisms for charging development contributions can be used, which can be broadly described as user pays contributions, impact mitigation levies, inclusionary requirements and value capture exaction.

**GAIC** → see Growth Areas Infrastructure Contribution

**GAPTF** → see Growth Areas Public Transport Fund

**Gross density:** Gross densities refer to the density within a larger area, for example an area with residential areas, open space and industrial land. In contrast, the net density of that area only refers to the within the residential area. Often research uses gross densities because it recognizes the full land mass and how people are spread across it. Net densities in contrast show the density of the residential area without taking into account surrounding areas with other land uses. This has the advantage that different areas are easier to compare.

**Gross developable hectare:** For Precinct Structure Plans, gross developable hectare refers to the gross developable area of the plan, i.e. the total precinct area excluding encumbered land, arterial roads and other roads with four or more lanes (PSP Guidelines) but including public purpose land.

**Growth Areas Infrastructure Contribution:** The Growth Areas Infrastructure Contribution (GAIC) is a charge that contributes towards the cost of state-funded infrastructure in Melbourne's seven growth areas. It began operation on 1 July 2010 and applies to land zoned for urban development and brought into Melbourne's Urban Growth Boundary since 2005. GAIC is charged as a per hectare rate from the purchaser on the first property transaction on either the sale or development of land. It is essentially a betterment charge, however, the way it is handled and intended it has characteristics of a user pays charge as well. It is estimated that the charge will meet approximately 15% of the cost of providing state infrastructure and services in the growth areas. Contributions are distributed equally between the Growth Areas Public Transport Fund (GAPTF) and the Building New Communities Fund (BNCF). (P&E ACT S201)

**Growth Areas Public Transport Fund:** The Growth Areas Public Transport Fund (GAPTF) is one of the funds which collects GAIC contributions. It is for capital works for state-funded public transport infrastructure, associated land and other infrastructure acquisition and a maximum five years of recurrent operating costs, as well as SRO expenses. (P&E Act S201VA)

**Horizontal Equity:** People in similar economic circumstances are treated equally and costs are borne by those who benefit.

**ICP** → see Infrastructure Contributions Plan

**Infrastructure Contributions Plan:** An Infrastructure Contributions Plan (ICP) is used to collect payments towards the provision of infrastructure triggered by new development metropolitan greenfield areas. It accompanies the Precinct Structure Plan (PSP) and sets out the local infrastructure needs identified in the PSP and the monetary levy and the land contributions. Each developer within the PSP area is required to contribute to the ICP, according to the amount of land they are developing. The ICP system is based on standard levies that are pre-set for particular development settings and land uses and that infrastructure contributions may consist of a monetary component and/or a land component. (P&E Act S46G)

**Net density:** Net densities refer to the density within a residential area, in contrast to gross densities which refer to the density within a larger area, for example residential area, open space and industrial land. Net densities show the density of the residential area without taking into account surrounding areas with other land uses. This has the advantage that different areas are easier to compare. Differences exist as to how net densities are measured, for example which land uses are taken into account.

**Net developable hectare:** Net developable hectare refers to the net developable area of a Precinct Structure Plan, i.e. land within a precinct available for development excluding encumbered land, arterial roads and public purpose land, such as schools and community facilities and public open space (PSP Guidelines). It includes lots, local streets and connector streets.

**User charges:** As the name suggests user charges charge the users of services and infrastructure. Examples of user charges are service charges for water or energy, public transport fares and charges for toll roads. User charges do not generally cover all costs of the service or related infrastructure but make a contribution towards them. In addition to recovering some of the costs of infrastructure and services, user charges can also be used to manage demand and influence the use of those assets. User charges are considered horizontally equitable meaning that all people or businesses who use the infrastructure contribute to its costs. However, they are vertically inequitable (i.e. regressive) because the charge is the same regardless of ability to pay, so provisions for concessions or exemptions may need to be made. An umbrella term and overarching concept and strategic approach for charging users for access and use of the transport network is transport or network pricing. Transport pricing includes a number of instruments, such as public transport fares, road tolls, distance-based charges, fuel tax and parking levies.

**Vertical Equity:** People of different economic means and abilities are treated differently, i.e. costs should be smaller and benefits greater for people who are physically, economically or socially disadvantaged.

## Appendix 1: Dwelling density and access to supermarkets

Methods for calculating dwelling density and access to supermarkets were based on those from the *Creating Liveable Cities in Australia* report and subsequent publications (Arundel et al. 2017; Gunn et al. 2020; Higgs et al. 2019).

In brief, 2018 Geocoded National Address File data (GNAF) (PSMA 2018) were used as proxies for residential location (Higgs et al. 2019). These locations included Allura and Selandra Rise estates and other completed or near completed PSP growth areas. This resulted in 1,740,161 location points across the Greater Melbourne Statistical division. The Greater Melbourne urban area was defined using the Australian Bureau of Statistics Major Urban and Other Urban Sections of State within the Greater Capital City Area for Melbourne in 2016 (ABS 2016). Hence, non-urbanized land was excluded.

The local walkable neighbourhood for each location was defined as its 1,600 m pedestrian street network, buffered by 50 m (Badland et al. 2017b; Higgs et al. 2019). The 1,600 m pedestrian street network was derived using Open Street Map data processed using OSMnx (Boeing 2017) with a custom filter to exclude private network segments and those which are otherwise inaccessible to pedestrians (such as motorways/freeways, proposed roads, roads in construction, and those explicitly marked for no pedestrian access). An associated dataset of clean intersections was also processed using OSMnx, with a simplification tolerance of 12 m; this process ensures detailed network features such as roundabouts are not represented as multiple intersections when considering street connectivity.

Using these components, dwelling density was calculated as the total number of dwellings within Mesh Blocks intersecting the local walkable neighbourhood, divided by the neighbourhood size in hectares (Ha). Mesh Blocks are the smallest geographical unit used by the Australia Bureau of Statistics typically representing 30-60 dwellings.

Locations of supermarkets were derived using data from Open Street Map. Access to supermarkets was determined by calculating the walking distance from each residential location to its nearest supermarket location using the pedestrian street network, with the percentage of dwellings within 1km of a supermarket for an area being determined by dividing the number of dwellings within that distance in the area by the total number of dwellings in the area.

Geospatial analyses were conducted using Python 2.7.14 (van Rossum & Drake 2017) interfacing with ArcPy/ArcGIS 10.5 software with the Network Analyst extension (ESRI 2016) and a PostgreSQL 9.6 database with the PostGIS 2.3.1 extension (PostGIS 2017; PostgreSQL Global Development Group 2017).



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