Living Locally

Beveridge North-West

Volume I

A review of key literature:
Precinct structure planning and 20-minute
neighbourhoods in greenfield areas

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Living Locally - Beveridge North-West Volume I

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Acknowledgement of Country

We at the Centre for Urban Research and Sustainability & Urban Planning acknowledge the people of the Woi wurrung and Boon wurrung language groups of the eastern Kulin Nation on whose unceded lands we conduct our research, teaching and service. We respectfully acknowledge Ancestors and Elders past, present and emerging who have always been caring for Country. We pay our respects to Country, the lifeworld that sustains us all.

Our research, education and service are already in a relationship with Country and the people of Country, here and in all the places we undertake our business. As mostly non-Indigenous people, we acknowledge our obligation in this relationship: to uphold the ngarn-ga [understanding] of Bundjil and practice respect for community and culture. Though there is much we still need to learn, especially about ourselves, we affirm our dhumbali [commitment] to that work. We hold as central to our business, dhumbali to a shared future with Indigenous peoples everywhere and especially Kulin Country and peoples.

Image Credit: Louisa Bloomer, Kamilaroi

Executive Summary

This report provides a literature review of the issues associated with the 20-minute neighbourhood concept in fringe, greenfields areas of Melbourne, with a particular focus on the Beveridge North West Precinct Structure Plan (PSP) area. The report explores a range of issues associated with the implementation of the principles underpinning the delivery of the Plan Melbourne policies for '20-minute neighbourhoods' and more general strategies for localisation (or living locally) in this area, and in 'greenfield' development areas more generally. The report assesses access, land use, walkability and consequent outcomes for liveability at the site and in a broader metropolitan context.

This report is the literature review of a project was undertaken in two parts:

1. The production of a review of empirical literature on urban development, localisation and liveability with an Australian, and particularly Melbourne focus
2. The creation and testing of concepts for development as a basis for analysis of the Plan Melbourne 20-minute neighbourhood concept in greenfields development locations, and to consider elements for consideration in planning for them to meet the objectives of the *20-miunute neighbourhood as included in Plan Melbourne*

Literature Review

The review of the academic literature focussed on Australian examples, while also looking internationally, and included consideration of:

- The notions of the local city within the metropolis; living locally and the policy basis to the 20-minute neighbourhood both in Australia and internationally;
- Key drivers of local activity, including active transport, local destinations and local trip generation, in metropolitan regions and especially at the urban fringe; and,
- Evaluative issues in understanding local living and the way in which policy interventions have an impact on delivering a city of 20-minute neighbourhoods.

The key outcomes of this review were broadly categorised into:

- Regional-scale urban morphological and structural issues – such as where jobs, retailing and services are and how and where travel demand is generated, including how these processes are dynamic, for example the concurrent centralisation and diffusion of work locations and the varied demographics of this process and what it means for travel times, modes and preferences,
- Local design issues focussing on the public realm (particularly greening and permeable urban networks) and broader neighbourhood issues of proximity to services, destination mix and density of housing/population,
- Transport provision and choice as urban infrastructure, particularly the quality (and perceptions of quality) and utility of alternatives to private car ownership and use, making mixed modes work and how the timely provision of services in new residential areas affects short and long-term decisions, and how transport alternatives can support future technological and socio-economic transitions.

Introduction & Overview

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1.1   Project Introduction

This project uses the example of the Beveridge North West Precinct Structure Planning (PSP) site to explore a range of issues associated with the implementation of the principles underpinning the delivery of the Plan Melbourne objectives for '20-minute neighbourhoods' and more general strategies for localisation (or living locally), with a particularly emphasis on access, land use mix, walkability and consequent outcomes for liveability at the site and in a broader metropolitan context.

This project was undertaken in two parts:
1.   The production of a review of empirical literature on urban development, localisation and liveability with an Australian, and particularly Melbourne focus
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It is anticipated that this research will align with two aspects of advancing the objectives of the 20-minute neighbourhood – firstly to create engagement between recent research literature on urban walkability, liveability and localisation, and the practitioners and policy-makers who can operationalise this, and secondly to consider the further application of existing research into outcomes for new and proposed urban development.

The example used in this report is the Beveridge North West Precinct Structure Plan (PSP) area. This is an area covering close to 1250 hectares of land between Wallan South, Beveridge Central, the Hume Freeway and Old Sydney Rd (see map) in Melbourne's growing northern metropolitan region growth corridor. The site immediately adjoins existing (recent) residential development to the south, including Mandalay Estate, and has potential access to the Hume Freeway and to the older township of Beveridge via Lithgow St and the freeway underpass. The PSP process at this site was commenced in 2013, and a proposed PSP was released for public review in September 2019.

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1.2   Plan Melbourne, Localisation and the 20-Minute Neighbourhood

Attempts at localisation within the city-region have been an element of metropolitan strategies in Melbourne for several decades, usually relating to localisation and decentralisation of jobs, retail and other services. Typically, these have emerged in reaction to twin processes of increasing city scale (population and footprint) and a changing morphology and distribution of work, services and housing. Centrally, these have sought to address longstanding trends in private vehicle dominance in daily commuting and, consequently, in daily service needs in Australian cities, most prominently in outer suburban areas. Such models of urbanisation have long been identified as being inflexible to socio-economic change, unresponsive to changing transport models and reducing urban liveability through long commuting and limited social connectedness.

Plan Melbourne identifies these issues in several ways. The need to address urban expansion is reflected in objectives for infill development. The distributional challenges of home and work are addressed through strategies of local and regional activity centres. At the local level the need to create accessible neighbourhoods is expressed through Direction 5.1 (Create a city of 20-minute neighbourhoods) and is proposed to be implemented through Objective 5 (Melbourne is a city of inclusive, vibrant and healthy neighbourhoods) and particularly Action 75 which seeks a whole-of-government approach to implementing 20-minute neighbourhoods.

Importantly, the 20-minute neighbourhood concept in Plan Melbourne seeks to give people the ability to meet most daily needs within a 20-minute walk, cycle or public transport trip from home. This suggests dimensions of travel time, travel accessibility and the breadth of (personal) daily needs, and these are elements of the literature review below. Consequently, metrics of success include a range of urban development factors. Some of these relate to internal neighbourhood design including walkable, permeable, safe and shady streetscapes, others to planning for neighbourhood level destinations such as retailing, schools, community services and open space. Finally, there are measures that relate to access into and out of neighbourhoods, primarily through public transport access. This final element is problematic in many fringe areas of Melbourne (including Beveridge NW) as these areas are characterised by long daily commutes, by either private vehicle or (relatively distant and infrequent) public transport options, primarily taken for work purposes. Moreover, all aspects of destination-making are challenged by issues of delivery and sequencing in new developments where often in-built design features (roads, paths, sites for facilities etc) exist well before service provision, in many cases for as long as a typical residential life-time, and employment accessibility remains a key factor in residential mobility (Whelan & Parkinson, 2017).

Research on Living Locally:

A Literature Review

For this literature review, notions of walkability and access are the focus, however the critical issue of sequencing of services and a broader metropolitan setting are included given that the core of a 20-minute neighbourhood is relational, and focusses on daily living. The review includes a context for Beveridge NW, then reviews Australian (and some international) literature with a focus on concepts of localisation within contemporary metropolitan regions, strategies for their implementation and approaches to measuring and understanding success.

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2.1 Metropolitan Strategy and Living Locally: examples in policy and practice

The next three sections outline how research into Greenfield development, itself a means of resolving and planning for an increase in housing demand, as well as to increase the supply of affordable housing, have opened discussions on various policy fronts, including liveability, environmental sustainability and health (Buxton et al. 2008; Goodman 2018; Howley, Scott & Redmond 2009). The following review of research and critical literature discusses issues raised such as culture, safety, employment, natural environment, health and social cohesion, and social services.

2.1.1 Locality and Place: Localisation as an operational concept

As an urban design principle, the notion of place-making has become central to policy and practice. While as a localisation concept it has been analysed by geographers, anthropologists and theorists in the context of place versus space, such as when Casey (1996) attributes place as having superiority to space and for experiences as having been produced within or through places, more emphasis is now being given to interrelationships, networks, and practices (Friedmann 2010; Massey 2005; Myers 2002; Pierce, Martin & Murphy 2011). For example, concepts derived from Indigenous Australian understandings of place argue that the "value of places" is produced through the capacity to mediate relationships of shared identity and difference, of hierarchy and equality within a regional socio-political system" (Myers 2002, p. 116). According to Myers (2002) the practices of place-making and the experiences of place must be understood as socially and politically organized. Similarly, Massey (2004, 2005) argues that relational processes and place-making are co-constitutive. Friedmann (2010, p. 149) reviews the vast literature on place and place making to conclude that this emphasis on place-making has resulted in branding of cities and providing them with advanced infrastructure, with the result of ordinary people being displaced and the destruction of social infrastructure, and calls for more 'people centric planning'. He presents Creswell's (2014) example of Taiwan to show "how urban places are embedded in the built environment but come into being through "reiterative social practices such as the activities recorded in the neighbourhood centred on Tsu-Sze Temple in the town of Shan-Hsia" (Friedmann 2010, p. 154) indicating a role for community, or people-focussed, locations of circulation and co-presence as central to making place.

The argument for place-making is also related to the strategy for countering urban sprawl (or at least ameliorating the negative outcomes of homogenous residential land use development). Such approaches have been envisaged as one solution towards urban and environmental sustainability for example, in the form of protecting Melbourne's green belt, and curbing the pollution and decreased physical activity attributed to this urban form (Buxton & Scheurer 2007; Buxton & Tieman 2005; Ewing et al. 2003). Greenfield developments have been critiqued by many urban researchers and planners who have advocated for higher built densities in already urbanised areas and more compact urban form as the appropriate path to sustainability in and through urban areas (Buxton & Goodman 2003).

A review of the vast body of literature on urban form and sustainable transport shows that there is no single, universal model success, rather that urban research suggests several approaches that offer preferable and possible outcomes in practice. There is an emerging consensus towards a city ideal as a multi-centred city morphology connected through public transport corridors, as a network of accessible locations for living, working and other activities framed within a larger city-region (Batten 1995). Along with bi-centric developments like the Stockholm-Uppsala corridor, where the relational linkages are horizontal rather than hierarchical, a smaller but growing number of urban agglomerations are emerging, such as Randstad, Netherlands and the Kansai region in Japan (Batten 1995). These 'network cities' claim to be regions that have more diversity, creativity and locational freedom than monocentric cities of similar size, with knowledge economies, reciprocity and creative arts being emphasised and encouraged through fast and reliable transport and communications infrastructure (Batten 1995) – the advantages of metropolitan scale without its attendant disadvantages. A similar 'Network City' is the 25-year strategy that is being planned for the Perth metropolitan area that has low density suburban development spread for 130 km along the Indian Ocean coast (Curtis 2006).

Several design principles can be seen to offer benefits in reducing travel distance and the number of car trips taken and supporting public transport. These principles include urban structure (size, function, and location of urban centres relative major employment hubs for example) and urban density. These are reflected in various kinds of development concepts that have emerged in recent decades (each addressing the deficiencies of twentieth century car-dependent urban development), such as Transit Oriented Developments (Calthorpe 1993), developments designed using New Urbanism principles (Al-Hindi 2001; Al-Hindi & Till 2001; Duany & Plater-Zyberk 1994) and Smart Growth (Danielsen, Lang & Fulton 1999; Giles-Corti et al. 2008). These principles have placed the primary focus on pedestrian movement and place-making and on the notion that walking would be more prevalent, thus increasing residents' physical activity and reducing travel by car, if neighbourhoods were designed for pedestrian permeability and access, mix and density. This contrasts with conventional suburban development that does not have these services (Canepa 2007; Cervero, Guerra & Al 2017; Giles-Corti et al. 2008). However, a major concern in various environmental studies is that residents with a positive predisposition would walk, cycle or use transit irrespective of landform (Handy et al., 2005), suggesting both design and behaviour are both critical aspects of increasing active transport.

Globally, many new communities have been developed, especially the US (with its similarities to Australian suburbia), which claim to be distinct from the locally typical car-based suburban model. Marketed as environmentally- and community-friendly, these are often feted and coveted by designers and residents (Mapes & Wolch 2011; McMahon 2010). Consequently, attempts to measure the success include examples such as LEED-ND (Leadership in Energy and Environmental Design for Neighbourhood Development), which seeks to measure the sustainability of neighbourhoods by rating them on the sustainability of their design and planning (Clark et al. 2013). Szibbo (2016) outlines that "The LEED-ND certification system evaluates neighbourhoods on the basis of five considerations: Smart Location and Linkage, Neighbourhood Pattern and Design, Green Infrastructure and Building, Innovation and Design Process, and Regional Priority". These 'certified' neighbourhoods are designed to be 'liveable' with mixed-used centres and a sustainable urban form that provides: a safe, inviting, and vibrant public real; walkable streets; and connections to surrounding areas (Garde 2009; Mapes & Wolch 2011; Szibbo 2016). However, critiques of the LEED ND rating system point to the lack of criteria for housing affordability, or criteria that may encourage or incentivise developers to build more affordable housing (Szibbo 2016) suggesting that features of liveability may not be accessible to all.

Closely related to these urban design principles are the 20-minute/30-minute city concepts that are offered as a local solution to the ever-growing demand for housing and improving liveability in new suburbs that are distant from employment hubs and usually built at a low density (Calthorpe 1993; DEWLP 2017; DPC 2016; Johnson 2010; McNeil 2011; Whitzman 2017). Walkable 20-minute neighbourhoods are seen to improve productivity by reducing car use, lessening road congestion and shortening transit times. The Portland (USA) Bureau of Planning and Sustainability reports that "the 20-min neighbourhood is another name for a walkable environment, with enough destinations within a limited area to serve many community needs" (McNeil 2011, p. 53). It is also connected to 'bikeability', as it is expected that "bicycle and transit access [can] enlarge the market area for neighbourhood-serving services without increasing density" (Bureau of Planning and Sustainability cited in McNeil 2011, p. 54). Some studies and policies also claim that community health costs are reduced through enhanced participation in active travel and exercise, social inclusion and improved mental wellbeing (Davern et al. 2017). The 30-minute idea is a related concept for cities where residents can access employment, schools, shopping, services and recreational facilities within 30 minutes of home. These principles are derived from concepts like New Urbanism, in which "the reconfiguration of sprawling suburbs into

communities of real neighbourhoods and diverse districts" and "coherent" metropolitan planning are central themes (Katz 1994; CNU 1998 cited in Curtis 2006, p. 163). Such developments are promoted as solutions to the failings of suburban development, critiqued as "socially and psychologically unhealthy environments… as they created placeless, low-density, car-centric and socially isolating developments among residents" (Hooper et al. 2018, p. 4).

The planning regulations for developments inspired by New Urbanism support walkable catchments, planning by neighbourhood principles, and the presumption (and hope) that people will live and work locally in 'self-contained communities (Costley 2006). For example, Portland's (USA) Climate Action Plan sets an objective for 2030 calling for 'vibrant neighbourhoods' in which 90% of Portland residents can easily walk or bicycle to meet all basic daily, non-work needs (Bartholomew & Ewing 2009). Similarly, Perth's New Urbanism inspired suburban developments, Liveable Neighbourhoods (Falconer, Newman & Giles-Corti 2010) has strived to implement these principles in an Australian setting. Elsewhere, such projects, while praised for their design outcomes and walkability in the local areas, are criticised for not having sufficient regard for integration into metropolitan and regional transportation networks, leading to them being exclusive and segregated and remaining reliant on external car-based travel beyond the neighbourhood (Falconer, Newman & Giles-Corti 2010; Hooper et al. 2018; Mapes & Wolch 2011).

Greenfield projects on the urban/rural fringe are usually constructed at relatively low residential densities and with little housing diversity. In contrast, 'brownfield' redevelopment sites are typically more walkable and diverse (Zapata-Diomedi et al. 2019). Consequently, an exploration of the particular walkability and localisation in greenfield sites is particularly relevant. Greenfield developments include many forms such as suburban developments, intentional and conservation communities (McMahon 2010), and private-developer-led Master-Planned Estates and Communities (MPE & MPC) (Costley 2006; Roggenbuck 2019). Specifically, in the Australian context, the rise and popularity of MPEs as a market has been attributed to reported housing shortages, and the idealised 'Australian dream' (Kenna 2005; Maller & Nicholls 2014), and has included settings, as those described above, where attention to quality and permeability in the internal public realm has increased (Johnson 2010; Zapata-Diomedi et al. 2019).

The next section details the specific issues that have been raised by research that has focussed on the liveability and environmental sustainability of such greenfield development in Australia and specifically in and around Melbourne.

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2.2   Strategies for Implementation in Greenfield Sites

Research interest into how greenfield development has been conceived, implemented, managed and lived in over time, continues to increase. These suburbs and master-planned estates in and around Melbourne, and other cities around Australia, are at various stages of development, and this is reflected in the research, however a shift to concerns about environmental and social sustainability (As depicted by UN Sustainable Development Goals 11, 13, 15 and 16 (Sachs 2012; WHO 2015)[1] and the liveability in these developments is evident in recent research, as is the shift towards the increasing impact of international migration on the lived experience of new suburbia in Australia. Through the use of liveability indicators and also extending these liveability indicators to include themes such as health and well-being (Badland et al. 2014), longitudinal studies and exploring the lived experience of residents in these developments, current research has highlighted and expressed concern at how effective these developments are at providing a liveable and sustainable urban life.

[1] SDG 11: Make cities and human settlements inclusive, safe, resilient and sustainable

SDG 13: Take urgent action to combat climate change and its impacts

SDG 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels (WHO 2015, p. 8)

The advantages of walking and walkable design have also been explored widely. A 2017 study comparing brownfield and greenfield developments concluded that, "If adult residents living in the greenfield neighbourhood were instead exposed to the urban development form observed in a brownfield neighbourhood, (higher density, housing diversity, transport network, destination accessibility etc.) the incidence and mortality of physical inactivity-related chronic diseases would decrease" (Zapata-Diomedi et al. 2019). Walking in neighbourhoods has also related to other factors such as community development. Jane Jacobs (1961) provided an early articulation of the relationship between mixed land uses, social interaction, and sense of community. These combined residences, places to work, shop, and recreation, different incomes, races, or ages is encouraged because this social integration is seen to make locals walk more and drive less. Moreover, walking and community health and cohesion has been seen to be mutually critical to the accomplishment of both. Mixed use neighbourhood centres and schools were also identified as primary policy requirements associated with a sense of community and mental health outcomes (Hooper et al. 2018). This highlights the presence and provision of 'destinations' as a reason to walk as important drivers for walkability (Giles-Corti et al. 2008).

The following sections employ key liveability/sustainability domains highlighted in the current research, to present the concepts and the trajectory that exists currently in Australia, and specifically in Melbourne, regarding greenfield residential development sites.

2.2.1   Urban form and (de)centrality

There has been a wide ranging critique of continued greenfield development for housing and the various extensions to Melbourne's Urban Growth Boundary (Buxton et al. 2008; Goodman 2018; Whelan & Parkinson 2017)over several decades. However Buxton and Scheurer (2007) claim that these new residential developments could increase land use efficiency across Melbourne's greenfield growth areas by up to 64 per cent, if a proper mix of regulatory approaches, market incentives and supportive infrastructure investment was supported and implemented. This would achieve better land use efficiencies than significant areas of older established (car-based) suburbia. Such densities od residential development have many potential flow-on benefits. Findings from Melbourne examples from Nicholls, Maller and Phelan (2017); Nicholls, Phelan and Maller (2018) and Giles-Corti et al. (2008) suggest that residents in outer suburbs were keen to walk locally and walking was the most common type of physical activity in the suburbs surveyed. A briefing report from an ongoing project (Kroen, Taylor & Goodman 2018), has raised similar findings that suggest that walkability can also be enhanced with the increase in density from the 15 – 20 dwellings/ha (as proposed in Plan Melbourne) to 25 dwellings/ha, which is recommended in various empirical studies (Arundel et al. 2017).

Design, urban form, density and walkability within isolated residential areas are each an insufficient way to understand the limitations of access and localisation strategies within the metropolis. Beyond the immediate residential neighbourhood, transport scholars like Paul Mees (2009) and others have suggested efficient and frequent high quality public transport networks and services are a central solution for large metropolitan regions' daily travel and the preservation of non-urban natural environments between residential hubs. This suggests that localised walkability through design is an insufficient conceptualisation within a large metropolis. Policy goals of polycentric and network city concepts recognise that well-organized transport networks, interconnected sub-regions and neighbourhoods as well as spatially distributed economic drivers (jobs, services etc.) benefit the growth of the entire metropolitan region (Batten 1995; Meijers 2005). Consequently, conceptualising a connected city extends beyond local design to broader issues of urban infrastructure and morphology at the metropolitan or city-region scale, including examples of multi-centred (or network) city form based on public transport corridors (Curtis 2006). Principles that support a reduction in daily travel distance, the number of car trips and increasing use of mass transport (public transport) include questions of urban structure (size, function, location of urban centres relative to each other and to the CBD) and density (Batten 1995; Curtis 2006). This literature contends that all three factors, demographics, urban form and behaviour, are crucial to understanding accessibility and travel in a metropolitan region and any strategy must work in combination to address all three (Curtis 2006; Meijers 2005).

2.2.2   Metrics of place making

The empirical relationships between design, urban form and walking have been established and explored by various studies, to the extent that people moving into LNs (Liveable Neighbourhoods) (Perth's New Urbanism project) claimed that aspects of their new development's walkability (e.g., proximity of shops and services, the presence of footpaths, trees) drove their decision for residential relocation. A study, in Brisbane, Australia, on relationship between landform, built environment and walking concluded that, highly connected street networks, presence of public transport stops, and higher frequency of public transport contributed positively to walking (Rachele et al. 2018). Another study based in Christchurch, NZ showed that neighbourhoods proximate to retail, and with higher street connectivity or permeability were associated with less sedentary behaviour. Moreover, these were site and gender specific, with women's travel behaviour being more affected by these factors (Hinckson et al. 2017).

Another main concept in urban development recently has been 'liveability'. Many definitions exist and more research is contributing to what it means to be a liveable city. The key messages from the recent urban liveability reports on Melbourne (Arundel et al. 2017; Lowe et al. 2015) include:

- That liveability enhances the health and wellbeing of Melburnians, as well as supporting economic productivity.
- That walkable neighbourhoods are highly valued and underpin healthy liveable communities, yet current dwelling density targets in Melbourne are too low to effectively achieve walkable communities. Walkable neighbourhoods would be better supported by a target of at least 25 dwellings per hectare, with an even higher target around activity centres.
- Delivering liveable communities requires a whole-of-government approach to ensure integrated planning, particularly across the health, transport and planning portfolios.
- Policies to promote liveability need to be supported by best practice, evidence-informed standards that can be measured spatially, with specific targets for implementation.
- Housing affordability, local employment, access to healthy food and moderated access to retail alcohol outlets are critical aspects of liveability.
- Specific spatial policy standards and targets are needed for these liveability indicators to become effective outcomes through urban development.

2.2.3   Liveability of our greenfield suburbs - The 20-minute/liveable city

Key research on metrics of liveability in specific greenfield neighbourhoods provides a good account of relationships between design and walkability (amongst other elements of liveability) at various stages of development. Australian examples highlight the significance of local walkability, but also critical development issues including sequencing of services (as destinations and as transport options), local work and socio-economic characteristics of communities.

The RESIDE project, in Perth, Australia studied the use of 'destinations' and sought to generate precise, policy-specific measures to quantify the levels of actual on-ground implementation of a New Urbanism inspired and prescriptive policy. It investigated the impact on sense of community and mental health outcomes in residents. Although overall levels of actual, on ground realisation of the LN's policy were quite low at 47% (Hooper et al. 2015), the findings confirmed that increased compliance with the LN policy requirements (i.e., New Urbanism principles) is associated with residents experiencing a better sense of community and lower psychological distress (Hooper et al. 2015). Furthermore, the findings highlighted the importance of the installation of a diverse range of community and daily living destinations (services, retail, open space and work) that provide local opportunities to socialize, engage, and interact with others (Hooper et al. 2015). The interaction of each of the design and activity elements, and their delivery was considered to underpin the success of good community design. Fully implementing the community design element, beyond just the walking infrastructure, is clearly critical for walking and social interactions alike (Hooper et al. 2015).

Research amongst residents of the Selandra Rise estate, in Melbourne's south east, highlighted that the design quality of walking and cycling infrastructure within the estate is not matched beyond the estate boundaries, emphasising a lack of safe walking or cycling paths, pedestrian lights and crossings, and missing links in local road development isolating opportunities for walking in daily living (Nicholls, Maller & Phelan 2017; Nicholls, Phelan & Maller 2018) beyond the estate itself. The findings in this research support conclusions from the RESIDE study which found that design features within estates are, alone, insufficient to overcome

"disjointed" residential development where broader urban structure does not support active transport and localised access to daily living needs (Hooper et al. 2015). For long-distance commuters, incorporating physical activity into the daily commute was found to be important. However, uncoordinated development of outer urban regions, the lack of connections between isolated developments such as Selandra Rise and destinations for residents make active travel unappealing and unfeasible. This case study indicates that commuting remained the prime concern of the residents interviewed despite an 'early delivery' of a bus service for public transport, which was only delivered three years after the first residents had moved into the estate.

Other issues highlighting the development and thus the liveability of greenfield sites in Melbourne are the creation and availability of local jobs and employment. Research into transformational projects in Australia, claims that the lack of infrastructure in outer growth areas of the major cities has produced several social and economic issues in these high growth areas, which include limited local employment opportunities as well as limited access to employment in other locations (Denham et al. 2018). Demographic patterns show that inner and middle suburbs consist of higher levels of high-income, tertiary-educated, professionally employed households while outer urban areas (mainly greenfield developments) include high proportions by recent immigrants, lower-income households and those with lower levels of education (Spiller 2014).

While the outer suburbs are more affordable, they offer relatively lower levels of services and opportunities in terms of jobs, especially in an economy that has transitioned from manufacturing employment. "The suburban fringe generation of today has relatively few choices compared to their counterparts of 20 or 40 years ago" (Spiller 2014, p. 365). The findings of research into Selandra Rise illustrate how the gulf between policy discourse about "20 minute cities" (DTPLI 2014) and "30 minute cities" (Turnbull 2016) and residents' lived experiences can impact health in outer urban areas and is influenced by current planning and development regimes (Nicholls, Phelan & Maller 2018). Selandra Rise was the product of a co-ordinated effort to plan for positive health outcomes for residents: its marketing focussed on this result , however long commutes, particularly commuting patterns of female residents with caring responsibilities, and limited travel mode options had undesirable impacts on health and social connectedness (Nicholls, Maller & Phelan 2017; Nicholls, Phelan & Maller 2018). The implications of connectedness and excess commuting in daily travel for both physical health and mental health, especially the gendered nature of these impacts, remain an emerging area of research in Australia and elsewhere (Roberts, Hodgson & Dolan, 2011; Kent, Mulley & Stephens, 2019).

The provision of transport alternatives to private car ownership and use is a strong thread of literature on both local and metropolitan-wide access for daily needs. Australian metropolitan fringes exhibit high levels of private vehicle commuting to work and for other activities in comparison to both international cities and to other parts of Australian cities. The evidence from Melbourne's Northern Corridor (ABS, 2017) suggests heavy dependency on car transport for local and regional employment, and an emphasis on rail commuting for central city locations (noting issues of gender, occupation and income differences in the varied commuting patterns).

Critically for urban fringe areas, the levels and sequencing of public transport is linked with the sequencing of local destinations. Typically, the levels of 'forced car ownership' (or "High Car Ownership on Low Incomes") is considered to emerge from inadequate public transport or local destination options (Currie and Senbergs, 2007b). This literature also explores issues of transport exclusion (Dodson, et al. 2004; Lucas, 2012) and the early provision of high-quality public transport in addressing 'forced car ownership' and subsequent financial stresses. Despite design and allocation of space for future transport options, the promise of provision of transport alternatives is an example of "lag infrastructure" (Wear, 2016: 293) that is typically only provided when a critical population is evident, rather than at initial stages of residential development.

As an example of a multi-faceted decentralised project, the City of Wanneroo in Western Australia has initiated several medium scale projects that provide a holistic approach to "broaden its base of economy, infrastructure provision and community connectivity to both the Greater Perth metropolitan area and regional WA" (Denham et al. 2018, p. 33). The five projects proposed are expected to address the social, economic and infrastructural capacities of the region , as well as meeting the employment targets of the state and region.(Denham et al. 2018). These projects, that include agri-food networks, transport connections to Perth and rest of WA, enhanced freight linkages to a major industrial park, open-space plans, and rail and road extensions are also expected to maintain the peri urban nature of the city and deliver self-sufficiency and high order jobs to create a robust, inclusive and connected socio-economic community (Denham et al. 2018). Kroen, Taylor and Goodman (2018) suggest that

some aspects of public transport planning and financing for new suburbs may be external to the PSP process. This suggests that despite the urban form supporting public transport, state decision making processes also influence PSP transport planning (Kroen, Taylor & Goodman 2018). Thus more research is required to explore opportunities to link built form of Victoria's greenfield PSP areas to transport network planning and to the daily transport experiences of residents in growth suburbs (Kroen, Taylor & Goodman 2018).

Recently, further focus group studies on liveability on inner, middle and outer suburbs in Melbourne have yielded more information on what is valued by residents in their suburbs (Farahani, Lowe & Maller, forthcoming). This research considers the aggregation of all services, and accessibility to daily needs such as food, health and social services. The benefits of having daily living destinations nearby was seen to shape walkability and reduce car dependence. Conviviality also emerged as another theme, contributing to the liveability domains captured in previous research (Arundel et al. 2017; Gunn et al. 2017) and is closely linked to 'social cohesion and local democracy'. As measures of community cohesion and connectedness. In Melbourne, proximity and accessibility to the central city was seen as a favourable liveability domain (Farahani, Lowe & Maller, forthcoming), which reflects the findings of Spiller (2014) regarding the centralisation of jobs-rich localities and of high-value work in contemporary Australian cities, as well as the opportunities for cultural and other services in central city locations. Farahani, Lowe & Maller (forthcoming) report that outer suburban residents were more concerned about how their own neighbourhood fared compared to other suburbs, which further strengthens the relatively poor performance of outer suburban areas in terms of liveability.

In an Australia-wide report on liveable cities (Kelly et al. 2012) building in flexibility is identified as important the future of suburbia. The greenfield suburbs, the report states, are less flexible for adapting to new forms of living and working (and new forms of service delivery) than established suburbs and will thus become less attractive to live in into the future. Accordingly, the flexibility involved should include, housing options, social services and transport choices. Retailing is also identified as undergoing transition, as shopping at larger stores appears to be increasingly replaced by online retailing, however it is difficult to predict the direction this will take, or the implications of 'experience' and specialty retailing (Kelly et al. 2012). As these communities are not an homogenous population group, many of these greenfield developments and planners need to engage with and address community building for all age and employment groups, including teenagers and those working from home (Johnson, Andrews & Warner 2017; Williams & Pocock 2010) as well as for diverse cultural groups. While some inbuilt and operational flexibility is required from local governments and developers, both need to be assured of some commitments over infrastructure planned, individual zoning versus whole development approvals, and catering to community needs and new, potential developments (Minnery & Bajracharya 1999).

Studies on communities and social cohesion, particularly in Master Planned Estates (MPEs), and in fringe growth areas, have found that a focussed effort is required to accommodate the multiple complexities that are a part of creating communities in such areas (Maller & Nicholls 2014; Roggenbuck 2019). Roggenbuck (2019) found that although MPEs are marketed as friendly and social spaces, residents do not always use the infrastructure provided or take part in the social groups as envisaged by the developers. It was seen that infrastructure such as schools, child care and kindergartens or local and ethnic grocery stores tended to be where community ties were made more often than in developer-provided services (Roggenbuck 2019). Interestingly, the study points out that MPEs are emerging social environments and communities, where people themselves are involved in making communities rather than conforming to community expectations of an established neighbourhood (Roggenbuck 2019). This also brings forward the notion that such infrastructure can be a walking destination and can contribute to fostering community development and informal encounters (Roggenbuck 2019). Maller and Nicholls (2014) demonstrated that previous social ties, made before moving to MPEs, also remain, and allow ongoing contact with those social networks that are also a part of communities and social life of residents (Maller & Nicholls 2014), but that these require more (and potentially stretched) destinations for travel and commuting.

A study on community cohesion in two suburbs of Melbourne (one inner and one middle suburb) (Robertson, Colic-Peisker & Community 2015) found that purposive planning around commercial and retail streets might not create community cohesion in a way that urban regeneration is envisaged in government policy. Ethnic communities in inner areas saw the commercialisation of ethnic products as part of retail gentrification in the inner suburb, creating social inequity. Meanwhile in the middle suburb, the policy narrative of marginalisation created angst and fear of ghettos of ethnic communities being formed among the Anglo-

Australian residents (Robertson, Colic-Peisker & Community 2015). At the same time, this marginalised space was experienced as safe and communal by the ethnic communities that preferred to create community around spaces such as community centres and places of worship rather than commercial or retail centres (Robertson, Colic-Peisker & Community 2015).

Studies on mobility of older people have found that a focus on social isolation and exclusion of older people and the ageing population of Melbourne is required (Engels & Liu 2011; Liu & Engels 2012). These studies serve a 'timely warning' to policy makers to be prepared for an increasing number of non-driving members of the society (Liu & Engels 2012). This not only involves planning for better public transportation but also designing and conceiving cities that discourage social isolation and locational disadvantage (Engels & Liu 2011). For example, the way bus stops are designed to accommodate the ageing population's needs, the kind of services and infrastructure that are provided at walking or easily accessible distance needs to be considered. Transport and locational disadvantage may become starker for the ageing population as another study points out the gaps in transport infrastructure are more acute in the outer suburbs of Melbourne, compared to the inner and middle suburbs (Currie & Senbergs 2007).These gaps include, but are not limited to, number of bus stops and public transport walk catchment coverage (Currie & Senbergs 2007).

Young people in Melbourne have been identified as experiencing exclusion in their use of streets and public spaces (Malone 2002). The treatment of youth and their exclusion has been brought up by various geographers (Valentine 1996; White 1994) over many years, identifying that children and young people have been labelled variously as disruptive, and subjected to authority where they want to use the streets as their social space, which in turn can create resentment. Malone (2002) points out numerous ways youth use open space including streets in countries like Argentina and India, to explore "relationships… share and express cultural connection and differences". This is different from Australia and other western countries where a 'moral panic' has relegated youth and their expression to curfews, limited public and private spaces, surveillance, police questioning, and youth-specific spaces. According to Malone (2002), these youth specific spaces limit the activities and openness with which young people can interact with each other, along with being unsafe and not easily accessible. Similarly, another study found that strata and community titles (private realm shared spaces) in outer suburbs in Australia, as well as 'child blind' planning of apartments prevented children from playing in and accessing open spaces for leisure (Sherry 2017). Thus, inclusive, open and participatory public spaces and streets with a broader understanding of young people's needs and aspirations requires to be in consideration for liveable cities.

2.2.4   Urban Greening

Interest has emerged in policy and public discourse, including as an aspect of liveability and walkability, that has focussed on urban, heat, urban greening, urban water and urban shade infrastructure in Australian cities with this decade being declared the warmest on record globally. Concern about the direct, indirect and cumulative impacts of heat and sunlight on human health have become a critical policy concern at the local level in the design of parks and schools (Buller et al. 2017; Dobbinson et al. 2009). However clear and meaningful infrastructure solutions in the public realm are often less advanced, and subject to tensions with other objectives in urban spaces, relating to design, natural habitat and risk management, for example.

High temperature events create varied impact within communities, however, it is broadly recognized that urban residents form the frontline of this threat (Estrada, Botzen & Tol 2017), particularly in larger cities where these impacts are clearly evident through the amplification effects of an urban heat 'island' and of urban air pollution on ambient temperature (Moriarty & Honnery 2015). Consequently, urban planners are recognizing the imperative to increase adaptation strategies for excess urban heat (Inayatullah 2011). This includes the clear recognition of urban heat impacts in public health planning for Australian state and local governments (DHHS 2018). High temperatures and unsuitable public realms also result in reduced outdoor recreation activities, with consequences for chronic diseases and broader public health outcomes (Kjellstrom et al. 2010). Additionally, and particularly in Australia, the increased risk of exposure to UV radiation from low-shade urban environments is considered to contribute to the rate of skin cancer (Lefevre et al. 2015).

Natural or built shading is the oldest and most evident solution to urban heat and comforts in the public realm (Moll 1989), however, Australian cities exhibit many unequal and poorly-suited shade solutions in public and private realms. Different

populations (for example older aged cohorts) may need, and utilise, more urban shade compared to others, as may more active users of the public realm; walkers in particular. Additionally, different groups perceive outdoor thermal comfort differently. The urban context matters too, surfaces, built form, and of course local climate. The challenges of provision then relate to context of community and place, often resulting in poorly suited solutions (Boumaraf & Tacherift 2012). It is also evident that in Australian cities the distribution of green and of shade infrastructure is spatially and socio-economically uneven. Communities experiencing disadvantage are known to have poorer shade (and green) infrastructure quality and quantity (Anderson et al. 2014) and these reflect the broader issues of spatial inequality in urban design outcomes.

An aspect that is far less discussed in urban planning literature and design for outer suburbs is contact access and visual availability of blue spaces (water), which in turn is associated with lower mental distress. According to resident preference research, most participants preferred to stay close to lakes, rivers and bays and enjoyed these features in their neighbourhood (Farahani, Maller & Phelan 2018). Farahani, Maller and Phelan (2018) also found that having large back yards did not compensate for a lack of urban public greenspaces in outer area developments, with each having their own set of benefits, especially in varied socio-economic neighbourhoods. Thus , they strongly advocate for the provision of parks and other greenspaces in new developments (Farahani, Maller & Phelan 2018).

Lynbrook, in Melbourne's outer south east, is a community planned for Water Sensitive Urban Design (WSUD), along with greening, for a sustainable and resilient outcome (Barton & Argue 2007). Similarly, many conservation communities build their housing and infrastructure around greenery, at the same time contributing to the greening and climate change resilience of the area (McMahon 2010). This not only protects biodiversity, especially if native vegetation is used, it also provides paths and landscape linkages for wildlife and as habitat. This also has evident association with further sustainable practices among residents, like less waste production and backyard food production (McMahon 2010). Therefore applications of WSUD and concepts from conservation communities in suburban settings will need to be modified and used so as to produce environmental outputs that contribute to and promote healthy and liveable suburbs, and provide economic and/or social benefits to communities, as learnings from the implementation of WSUD in Lynbrook and Aurora (in Melbourne's north) show (Beza, Zeunert & Hanson 2019). In Aurora, the siting of high-density development was found conflict with the operation, placement and design of WSUD elements, reflecting fragmented information and decision making (Beza, Zeunert & Hanson 2019) and rendering the outcome sub-optimal. Lessons may be learned from the Netherlands where demonstrations of WSUD that are well integrated with urban development at various levels such as through Integrated Urban Water Cycle Management (IUWCM) program (Beza, Zeunert & Hanson 2019). Although, WSUD is identified in Plan Melbourne, it does not appear to have been implemented due to fragmentation of decision making, as well as reliance on market led approaches that dilute the sustainability benefits of water management (Beza, Zeunert & Hanson 2019).

Habitat

Addressing habitat and biodiversity at a global and city scale has become a central theme in sustainable development, linking climate change, human health and the intrinsic values of habitat for liveable cities. The evidence for valuing and revaluing urban and peri-urban biodiversity is becoming increasingly apparent globally. Cities and their regions are recognised as global hotspots for biodiversity, although these concentrations and their value are not often well recognised. Recent research confirms this for Australian city-regions (Ives et al, 2016; Garrard et al, 2018) both in remnant 'natural' systems which are often under threat from urbanisation processes, and also in 'novel' habitats, that is, those that have resulted from modifications, including in urban, suburban and peri-urban contexts. Ives et al (2016) identify the importance of Australian cities and their regions as 'hotspots' for threatened species, especially where heterogenous habitats remain. They indicate that this is both a consequence of the high levels of threatened species in these environments, but also of the complex environments in and around cities.

Garrard et al (2018) identify a need for urban design principles to support biodiversity in and around cities, both in public and private land, emphasising maintenance, but also the reintroduction of habitat. This includes ensuring linkages and dispersal of habitat and its maintenance in environments with a high risk of disturbance. They also identify the benefits of human-nature interaction, considering this to deliver local stewardship benefits. Parris et al (2018) emphasise these issues in urban design and planning practices and include the potential benefits and risks associated with novel habitats. Maclagan et al. (2018) recognise these novel habitats are important, but they caution that habitat quality is often not improved by human modification and is in

fact radically reduced for many threatened and endangered species. Geschke et al (2017) demonstrate that a more compact urban form, with land set aside for conservation, results in better biodiversity outcomes than lower density urban morphologies, notwithstanding the high levels of potential private vegetation provided in low density suburbia and exurbia. This is a similar finding to international examples (Soga et al 2014; Stott et al. 2015).

2.3 Challenges in implementation – focussed on the ground

Reviews of Melbourne's metropolitan scale strategic plans (Infrastructure Australia 2018; Kroen & Goodman 2012; Whitzman 2017) over the last two decades show that despite recognition of sustainability issues in urban growth in planning processes, implementation has not been as effective as envisaged. This is also supported by preliminary reports from an ongoing RMIT Precinct Structure Planning (PSP) and transport planning study (Kroen et al. 2018) in new urban developments, giving examples such as the lack of bus capable roads, and a lack of connected bike and pedestrian networks and facilities. As described above, Melbourne's suburban growth areas have some of the poorest access to jobs and research is showing that the newly densified inner areas are also lacking some vital services, and experience long delays when such provision does occur (Goodman 2018; Kroen, Taylor & Goodman 2018) . Even in urban renewal areas (such as Melbourne's Docklands) shortages of childcare centres, health services and particularly schools arise when housing is provided before vital infrastructure (Goodman 2018). The implementation and delivery of infrastructure and transport services comes with costs and can have implications for housing affordability on the fringe. Kroen, Taylor and Goodman (2018) review Melbourne PSPs and associated research to suggest that early infrastructure provisioning can result in a reduction in affordability of housing, while also increasing liveability and population attraction or growth. The issues with implementation that are further discussed below include, timing of infrastructure deployment and sequencing, financing – the amount and the agencies responsible, provisioning of employment opportunities.

2.3.1 Measuring success

Past and current research has shown that to accomplish the features of liveability outlined above in a neighbourhood/region, an early and sequenced delivery and construction of transport as well as infrastructure is required (Arundel et al. 2017; Denham et al. 2018; Infrastructure Australia 2018; Kroen, Taylor & Goodman 2018; Spiller & Forrest 2018). While an ideal situation would be where all infrastructure is provided in each stage of development, this has proved difficult to achieve at the fringes of Australian cities (Kroen, Taylor & Goodman 2018). Within their finance constraints developers have been unable to wait and stage new developments, leading to provisioning of housing long before transport and infrastructure (Kroen & Goodman 2019). Warr and Robson (2013) note the importance of shopping centres in new suburban areas, within a Hume municipality:

Residents' anger was particularly focussed on long delays in building a 'Town Centre', a new retail hub that was an infrastructure commitment from one of the area's major developers, which is now many years behind schedule (Warr and Robson 2013, p. 985).

The sequencing and delivery of infrastructure requires not only planning inputs from all levels of the government but also economic staging or release of funding. Spiller and Forrest (2018) lament this as a research gap, and cite only a single study that was completed for the Queensland and Commonwealth Governments over 20 previous to their work, (Kinhill Engineers 1995), to make their point about effective forward and sequential planning for infrastructure, although as noted, new research is attempting to address this (Kroen, Taylor & Goodman 2018). The Kinhill study (Kinhill Engineers 1995), assessed different forms and sequences of development for 100, 000 people in the Gold Coast corridor of Queensland and found that a population

"staging land release around infrastructure capacity would generate a saving of around 2.5% in the delivery of roads, water supply, sewers and other facilities. Applying this finding to the Victorian State Government's projected $11 billion outlay in outward urban expansion in Melbourne, a saving of close to $300 million (present value) is on offer. If Council funded infrastructure is considered, the total saving is close to half a billion dollars."

Denham et al. (2018) contend that the support of Commonwealth and State Governments is required. It quotes results from a previous report, "NGAA have estimated $73bn of infrastructure investment is required in the growth areas to 2030 (SGS Economics and Planning 2015)" (Denham et al. 2018). It also quotes other analysis (conducted by PwC in 2016) that stresses the benefits of a dedicated infrastructure fund supported by all levels of government. As state agencies tend to not commit beyond budget cycles, financing becomes uncertain (Kroen, Taylor & Goodman 2018). Similarly, with central governments, 'baskets' of money are allocated based on priorities and site/time specific assessed needs making growth areas less competitive in such programs (Kroen, Taylor & Goodman 2018).

The issues, associated with implementation, especially of transport infrastructure, as identified by Kroen, Taylor and Goodman (2018) are:

- Flexibility is an important issue for transport planning; however, it is often difficult to incorporate flexibility into long-term planning of fixed public transport routes. Early provision of buses is seen as one option to ensure flexibility (particularly on-demand buses), as are new technologies (particularly the potential for shared autonomous vehicles). However, altering bus routes after they have been established has also been reported as difficult, and there are mixed reviews of the provision of on-demand buses.
- It is difficult for government agencies to commit to certain infrastructure included in PSPs, as they do not have a specified budget for this at any stage of the development cycle, instead they are subject to budget bids to secure the funding. This has been identified for VicRoads as well as PTV, and for services such as schools.
- Work-in-Kind for the Growth Areas Infrastructure Contributions (GAIC) fund for infrastructure (particularly larger infrastructure items) is seen as difficult and too open-ended and risky by developers, except for land provision for schools.
- There may be different opinions on exactly how certain kinds of infrastructure – notably bridges and intersection - should be built, for example between Vic Roads and councils. Sometimes public transport access by buses, or as access to railway stations, is the most directly impacted by delays.
- Investment "ahead of demand" is not viable for commercial services and products, given the lack of return if there is not enough demand. Therefore, the town centre is often built towards the end of a development, as key retailers will not move in before there is sufficient catchment. Even though it would be preferable to have a town centre for marketing reasons and for achieving higher densities it is still not considered feasible to build the town centre first.
- Similarly, if a public transport service does not have a large enough catchment it will not have as many passengers and is thus considered less viable, and competitive in funding terms. Therefore building "ahead of demand" is not considered a good investment for government. The assessment of public transport may need to include different indicators than financial viability, such as social justice and the support of mobility and accessibility
- More transparent 'triggers' for the required population size to justify a transport service, have been recommended. This would mean that while a service will not be available on day one, there is an evident trigger point at which one may be planned for and which new communities may expect. Similar calculations are already applied for schools and other community infrastructure, although the interviews identify that there are higher levels of complexity with transport provision.
- Good access and transport options are seen favourably by developers as this improves the quality of a development in the market. Some developers try to lobby for transport options, particularly public transport, whereas others seem to perceive that they do not have much influence on these decisions, and therefore concentrate on other areas that need to be considered and actually implemented by the developer (e.g. utilities and roads).
- GAIC payments are planned for into the staging and financing of developments and in turn influence how areas are sequenced for development within a precinct.
- Consumers are seen to prefer lower densities, particularly in the absence of attractor services such as public transport and developed town centres.

Opportunities for employment are a critical challenge in greenfield developments. Local jobs, and especially local high-value jobs, are crucial elements of localisation strategies and the creation of 20-minute cities for daily living activities. For Cranbourne corridor PSPs (which includes Selandra Rise, the subject of research by Nicholls, Phelan and Maller (2018) found that the PSP anticipated the creation of under 3000 jobs in its area and up to 50,000 jobs within the region, although no clear mechanisms beyond setting aside areas for commercial land uses were undertaken. Simply identifying regions where employment is required

has failed in the implementation of district / activity / central activity districts since the 1950s (Townsend 2012). Identifying areas and designating land uses in a region means new jobs are likely to be slow to appear, and not synchronised with residents' aims for higher value jobs.

Furthermore, strategies for suburban development seeking local employment opportunities, whether for employment self-sufficiency, or regional dependence, have been criticised as international evidence shows that policies to achieve such targets do not actually work in practice (Martinus & Biermann 2018). This is especially the case where indicators are based on assumptions regarding a homogeneity of work opportunities between locations or on commuting between the urban core and peripheries (Martinus & Biermann 2018).

Research indicates that it is important to first incorporate commuting into analyses of residential and jobs measures at the local level, and secondly to fully understand employment dynamics to ensure that policies for travel reduction and more balanced distribution of jobs are effective (Nicholls, Phelan & Maller 2018). An oversimplified analysis of employment and the spatial distribution and socio-economic structuring of jobs might lead to greater socio-economic disparity (Martinus & Biermann 2018). Coordinated precinct structure planning with individual MPE developments such as Selandra Rise, improves on previous fragmented planning practices more typical in Melbourne's growth areas. However, this research project revealed the gap between planning goals and their actual implementation (Nicholls, Phelan & Maller 2018). It also suggests that Growth Corridor planning needs to be more effective, particularly in linking precinct structure plans to existing neighbourhoods—or state governments needs to develop an alternative planning approach (Nicholls, Phelan & Maller 2018). Clear regional implementation plans are also necessary, as are related state government budget appropriations (Wear 2016).

The data from Selandra Rise residents clearly demonstrate that residents spend a large portion of their day well beyond the local area and the region of the Cranbourne East PSP, instead spreading across a large geographic area. Planning and implementing promised infrastructure for health and other facilities needs to acknowledge and support those living patterns (Nicholls, Phelan & Maller 2018). The Selandra Rise study found that there were indications that women were most inconvenienced in terms of stress and their physical health due to long commutes to work (Nicholls, Phelan & Maller 2018). These findings are reported as matching studies in the US and Canada that have found that women were more stressed by long commutes than men (Legrain, Eluru & El-Geneidy 2015; Novaco & Collier 1994) and the British Household Panel Survey data that found long commute-associated wellbeing detriment to women but not men and linked this difference to women's larger responsibility for home and childcare work (Nicholls, Phelan & Maller 2018; Roberts, Hodgson & Dolan 2011).

Hypotheses for recommendation for further studies are based on the following criteria: "that women's physical activity practices and [body] weight are more negatively impacted by long unpredictable commutes; and (based on interview data) that personal safety concerns about exercising in non-daylight hours before or after long day of working-commuting, and greater responsibility for home and family duties" (Nicholls, Phelan & Maller 2018). Corresponding to this, another study found that due to long commutes, and unavailability of well-paid or appropriate work locally, many women work from home, mainly doing their own business (Williams & Pocock 2010). While running a business from home or being self-employed has been a regular trend in greenfield developments, such as Master Planned communities, it is women that are mostly employed as such. This, the study argues, will lead to women being phased out of gainful employment and certain sectors being devoid of their experience (Williams & Pocock 2010).

Bringing together initiatives, including built environment features, is also a challenge. While features of the built environment have been associated with positive health outcomes, identification of those built environment features that are associated with health and how they combine in providing health supportive environments has been missing in analyses (Giles-Corti et al. 2008). Demonstrating and providing case studies of what walkable and healthy built environments actually look like provides guidance to those in policy and practice seeking to design them (Giles-Corti et al. 2008). As a metric, a walkability index, as trialled in a study in Broadmeadows, 16 kms north of Melbourne , can be applied to the study areas to evaluate walkability impacts and also test out different scenarios as related to different built environment changes (Boulange et al. 2018).

While development forms can be changed in planning stages, it is challenging to expect only physical form to transform cultural

and social behaviours on its own (Grant & Perrott 2011). Evidence suggests that retailers favour large, car-based formats (Grant & Perrott 2011). Zoning for mixed use helps but does not guarantee that developers will follow this in the long term, or that even mixed-use areas will thrive. As seen in Master Planned Estates in Queensland, commercial use land has been diverted to residential land, and developers tend to design and implement built form that reflects the present demand rather than what might be envisaged as ideal in the long term. Such examples suggest that the kind of cultural and social change that is required to promote and encourage practices, such as walking and create a sustainable urban form, may require more than just land use policies and physical infrastructure (Grant & Perrott 2011).

2.3.2   The retailing challenge in a Greenfield 20-minute neighbourhood

As an attractor destination, retail is one of the strongest forms of community infrastructure and employment in suburban environments. Jane Jacobs (1961) and the more recent the works of the Danish architects Gehl and Gemzøe (1996); Gehl et al. (1999) have reinforced that retailing as a part of mixed use adds to commensality and vibrancy, enhancing a city or neighbourhood's public life (Goodman & Coote 2007). Recent investigation into retail trends around the world indicate a move away from closed malls towards resurgent town centres, as is depicted by the New Urbanism principles (Al-Hindi & Till 2001). In this model, active shop fronts and walkable neighbourhoods are considered at the core of liveable communities. For example the Town Centre policy in UK (Hughes & Jackson 2015; Stocchi, Hart & Haji 2016), seeks to protect the vibrancy of the city through restricting and regulating big box retail (closed mall and large retailers) development on the fringe of existing cities.

The challenge of creating the kind of neighbourhoods originally envisaged by Jane Jacobs in contemporary Melbourne, and especially in greenfields, according to Goodman and Taylor (unpublished), is the ubiquity of 'malls' as integrated shopping spaces, the car parks provided for customer convenience, and their mimicking of experiential events and retail, especially food and dining to encourage shoppers into the malls (SCN 2019; Southworth 2005) .This trend is seen in greenfield suburbs as well (Goodman and Taylor, unpublished), that are sometimes the only way town centres get built and anchors agree to open up shop in sparsely populated greenfield suburbs (Kroen & Goodman 2019; Kroen, Taylor & Goodman 2018).

2.4   Recognising objectives and possibilities

Despite these issues, the initial findings (Kroen & Goodman 2019; Kroen, Taylor & Goodman 2018) from RMIT University's PSP and Transport study on outer growth areas suggests small-scale changes starting with bringing bus route planning forward, with frontier bus fleets of smaller short-term buses and routes with emphasis being placed on upfront financing of 'bottleneck 'infrastructure such as bridges. It also emphasised the support of community housing in PSPs. As also suggested by other reports and empirical literature, this report too suggests higher residential densities support more walking and cycling (≥ 20 gross dwellings per hectare (Boulange et al. 2018) or ≥ 35 net dwellings per hectare for viable public transport (Giles-Corti et al. 2008). Finally, the report recommends that there be a stronger integration between public transport and walking and cycling, which seems to be missing from PSPs, also because as some of this planning will occur in the implementation phase, e.g. when a train station or bus interchange is built it is thus not part of the PSP.

Kelly et al. (2012) recommend that all precincts be planned for flexibility and adaptability as in the future residents will need choices about their places of work, home and play. These would have to include social services, transport choices and housing options. Specifically, it recommends, that a joint sale option for owners is required with pre agreed covenants, town centres need to be designed so as to be able to grow and change; restrictive covenants should have a 15 year limit to allow future adaptation; zoning needs to be reviewed frequently, so does connectivity of residents to services.

Roggenbuck (2019) suggests that, instead of creating one homogenous, overarching community of both location and character, developers should involve residents in the formation of diverse and place-specific communities. This can be done by focusing on temporary approaches, such as is being currently undertaken with pop-up community centres, such as in Point Cook, Victoria and Alkimos Beach, Western Australia (PCPOPUP 2019; Roggenbuck 2019; Social Traders 2015). The study recommends an

ontological shift where there is a mixing with other communities with MPEs. Such recommendations are supported by other studies that also suggest trying to achieve encounters and engagements by residents being involved rather than through a preconstructed social mix (Fincher et al. 2014).

Similarly, a study on bikeability in '20-minute' suburbs in Portland, Oregon (McNeil 2011) proposes a series of questions and measures as the basis for assessing the effectiveness of the infrastructure and road networks provided, including question on destination, frequency of use and willingness to ride as an approach to understanding the 'bicycle service area'.

A study of transformational infrastructural projects – those that are seen as bringing the vision of a sustainable and liveable neighbourhood closer, by "providing the basis for growth area councils to restructure economic and community functions" – uses the example of a proposed project, Mernda town centre, in the City of Whittlesea (Denham et al. 2018, p. 4) in Melbourne's northern fringe suburbs. The following plans are currently proposed for the project:

- The proposal comprises a package of 'cornerstone' town centre projects aimed at delivering growth area residents vastly improved access to critical services and infrastructure
- The Centre will provide the 2759 parcels of mostly occupied land sitting within 1500 m with access to new social services, a library and recreational facility within walking distance.
- The Centre will also increase the number of households within a comfortable walking distance of a full-service grocery story by 1,000 and increase the number of households within a comfortable walking distance of healthcare services by roughly 2,000.
- Provision of space for the provision of health and human services locally, including an aquatic and leisure centre to encourage active lifestyles and facilitating development that will promote local employment.
- It also capitalises on the opportunities that state investment in the Mernda Rail Extension project provides. With a mixed-use rail station in the Centre.
- The Victorian state government estimated that the Mernda Rail Extension project created 1,200 construction jobs and contributed to the creation of 1,800 permanent jobs in the area (Parliament of Victoria 2017).

According to Denham et al. (2018), the City of Whittlesea estimates that the package of 'cornerstone' town centre projects included in the proposal will cost approximately $270 million. This funding could come from several state and federal sources that should be prioritising investment in transit rich growth areas, as Mernda will be when the rail opens. Anticipated funding providers include, The Department of Infrastructure and Regional Development's Community Development Grants Fund, The Victorian Government's 2018-2019 Community Sports Infrastructure Fund, which includes aquatic centres in its list of applicable facilities.

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2.5   Conclusion

Critical issues in walkability in PSP areas on Melbourne fringe evidently relate to the broad locality, built form and land use mix as well as to its design for accessible, safe and permeable pathways. The key challenges that emerge are both locality-based, and part of a wider story of economic and spatial change in the metropolitan areas. These include models of service and infrastructure provision and delivery under various public and private sector models. They include a range of factors as broad as increasing urban densities and housing diversity, providing activity nodes and open space, improving the sequencing of commercial, transport and social services, and (crucially) the provision of local work. The role of government, developers and residents in these processes reveals a constant tension between expectations, delivery and daily practices of living on the metropolitan fringe.

Thinking about liveability and environmental sustainability within 20-minute neighbourhoods –especially as social equity and health concerns – raises a range of infrastructure, socio-economic and urban morphology concerns. Recent research into social practices and attitudes (Martin & Goodman 2016; Nicholls, Maller & Phelan 2017; Nicholls, Phelan & Maller 2018) suggest that willingness and ability to adopt specific practices in daily life is very dependent on structures and processes beyond the

neighbourhood level, notwithstanding the influence of local neighbourhood environments. Moreover, the experience of living in these areas is dynamic, with service provision, community life and working life 'mismatched' to household and community needs over long periods of ongoing development.

Added to this are the clear dilemmas of interventionist practices of policy in this regard. Much of the literature has identified the self-selection that occurs (whether as preference or affordability) in residential choice and accessibility. Likewise, notions of living in inclusive and sustainable communities can often be challenged, with Kaika (2017) asking what would happen if we "actually took seriously the increasing number of citizens and communities that refuse to be merely included in predefined policy frameworks and refuse to participate in fulfilling inclusiveness indicators?" The suggestion here being that there is a critical need to consider inequity in the city, inequity of access of place and environment, of opportunity which demand holistic approaches. Building resilient communities in the face of social, economic and environment change includes attention to inherent tensions in structures that make the city, and require such clear trade-offs in time, in access or in the quality of built environments.

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Further Information

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