20-MINUTE NEIGHBOURHOOD - LIVING LOCALLY RESEARCH

Prepared for Resilient Melbourne

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North Fitzroy Community Hub co-locates library, health and local council services and provides hireable multi-purpose spaces for a variety of uses.

Surry Hills Library provides spaces and services for a range of community members. Photograph by John Gollings

Hazel Glen Child and Family Centre. Design by Brand Architects. Photography by Andrew Wuttke.

EXECUTIVE SUMMARY

The 20-Minute Neighbourhood- Living Locally Research Project (Mambourin) provides detailed knowledge and recommendations to help guide the creation of 20-minute resilient neighbourhoods through community infrastructure provision in outer suburban growth areas. It also provides a community infrastructure audit for Mambourin, a master-planned community under development by Frasers Property Australia. The community infrastructure audit identifies existing and proposed infrastructure within Mambourin and surrounding areas, and the gaps in supply in the coming years.

Community infrastructure is an essential element in the 20-minute neighbourhood concept. It plays an important role in defining a community's identity and character while shaping how people socialise, learn, and engage with each other.

Developing approaches to staging community infrastructure is particularly important in outer suburban growth areas. Often, new communities do not possess the community infrastructure necessary to satisfy everyday needs and foster social cohesion as the first residents move in. This amplifies the challenge of developing inclusive, cohesive and resilient 20-minute neighbourhoods in outer suburban settings.

According to current DELWP (2019) projections, Wyndham will experience the largest population growth among all local government areas in Greater Melbourne in the coming years. Yet, like many fast-growing outer suburban areas, our analysis shows that Mambourin and surrounding Wyndham may experience a community infrastructure deficit within the 20-minute neighbourhood catchment and beyond.

Staging Community Infrastructure in Outer Suburban Communities

In order to meet the evolving needs of diverse outer suburban growth areas and support the goal of creating resilient 20-minute neighbourhoods, community infrastructure planning should follow four principles:

1. Co-locate facilities with other activities including commercial and public functions. This maximises usage and creates opportunities for social interaction amongst different people for different reasons. Co-located facilities help to define a "third place" or community anchor where people can meet and socialise, thereby building community identity. Co-location also supports safe public spaces by encouraging passive community surveillance through built design and varied programming.

2. Integrate a mix programs and services. This maximises the use of resources and is a financially efficient mode of delivery. It also encourages cross-over users and is more likely to engage first-time users in new programs. It is important to consider facility development and maintenance in partnership with public, private and community sector entities (e.g. schools, health centres) and functions (e.g. youth and senior services). This provides flexibility to better enables service providers to adapt to changing populations, conditions, and demand.

3. Be accessible to different community members from different ages, backgrounds, and abilities and provides services at different times of day and night for different purposes. An accessible and convenient location reduces the need for multiple trips and, therefore, auto-dependence. It requires proximity to multimodal transport options and minimises physical barriers to entry.

4. Respond to the particular needs and character of the community. This requires early and on-going engagement with community members. It also necessitates consideration of user identities, habits, and preferences (e.g. home-centred activity, intergenerational engagement, and cultural identity).

Community Infrastructure in Outer Suburbs

Guiding Principles:

- **Co-locate multiple and diverse activities.**
- **Integrate a mix of programs and services.**
- **Be accessible to a diverse community.**
- **Respond to specific community needs.**

Staging opportunities:

- **Infill short-term gaps in services with temporary uses**
- **Provide interim focal points on future public sites**
- **Activate vacant sites to link residents with facilities**
- **Provide interim services at existing sites**

Strategies for realisation:

- **Maximise the potential of the Community Hub**
- **Site to seed activity and link facilities**
- **Leverage flexible building types that adapt over time**

Staging community infrastructure through temporary activation strategies can support these guiding principles and respond to key challenges by:

• Providing interim services and filling infrastructure gaps as the community develops

• Distinguishing the future town centre and providing an interim focal point based on the community hub model

• Using vacant sites to physically and mentally link existing community facilities and services

• Providing additional services at existing sites during periods of growth (e.g. school as temporary market site, leisure centre as temporary business incubator).

Community Infrastructure- Mambourin

Mambourin will grow and change over the coming years and community infrastructure must be staged to accommodate this growth. The Black Forest Road Urban Design Framework (BFRUDF) identifies three indicative stages of development: short term (1-3 years), medium term (3-5 years), and long term (5-10+ years).

Mambourin will incorporate important community infrastructure including a resident leisure centre, neighbourhood park, private school, and town centre across these stages. Our findings indicate, however, that Mambourin residents may still lack access to important facilities and services in the 20-minute neighbourhood catchment (800m). Mambourin may also face a shortage of community infrastructure outside this catchment, due to its outer suburban context and limited transport accessibility.

Mambourin should consider interim uses to fill infrastructure gaps and meet community needs until the proposed infrastructure is delivered and the community matures. More broadly, Wyndham City Council and Frasers should jointly explore options for partnering with surrounding communities on shared service delivery such as local transport, library, and health services.

During the first stages of development, strategies should focus on providing interim services to plug community infrastructure gaps, meet the needs of early residents during their first years in a new home, and provide "anchoring" sites for routinised contact and building social cohesion.

Community Hubs. We suggest that the most effective means of connecting early residential development with proposed community infrastructure is the community hub model. Community hubs are flexible, multipurpose spaces that co-locate activities geared toward local needs in a single space.

Siting. Temporary activation programs can be strategically sited in two ways: to seed future activities on planned sites and infill vacant sites to link existing infrastructure.

Building types. Early temporary community infrastructure should look to multi-purpose and flexible building types. This can maximise the impact and vibrancy of the community hub by allowing adaptation over time and supporting an extended range of functions depending on community need.

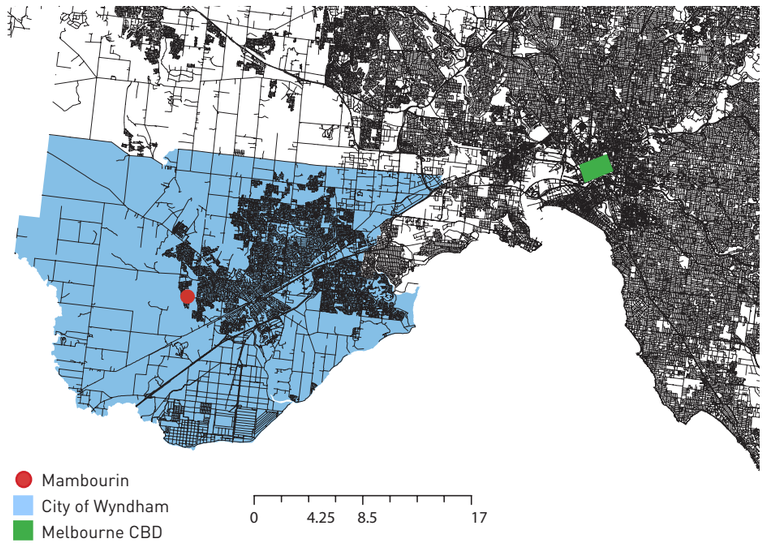


Fig. 1. Regional context

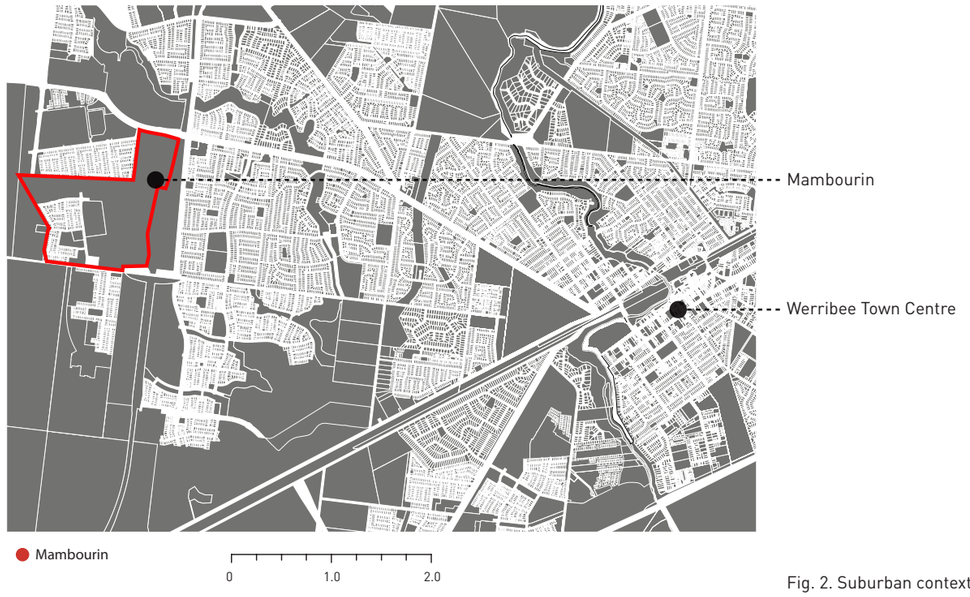


Fig. 2. Suburban context

Part 1. Project Background & Approach

1.1 INTRODUCTION

Project Background and Scope

The strategic objectives of the 20-Minute Neighbourhood-Living Locally Research Project (Mambourin) are to:

- improve knowledge for creating resilient 20-minute neighbourhoods in greenfield sites; and
- inform the approach for staging community and social infrastructure in Mambourin to accelerate community development.

This report was conducted by an interdisciplinary research team from Monash University on behalf of Resilient Melbourne, Department of Environment, Land, Water and Planning (DELWP), Wyndham City Council, and Frasers Property Australia. The report responds to the July 2019 draft Black Forest Road Urban Design Framework (BFRUDF) and is intended to inform Mambourin's community engagement program. The work will also inform the Precinct Structure Plan Guidelines currently under review by the Victorian Planning Authority and Resilient Melbourne's framework and metrics for monitoring community cohesion.

Mambourin is a 115-hectare master-planned community under development by Frasers Property Australia. The site is located in the City of Wyndham 45km southwest of the Melbourne CBD in a high growth area (Fig. 1). Mambourin comprises 1,200 residential lots (3,120 residents) and will include a resident leisure centre, private school, neighbourhood parks, and active travel amenities. An activity centre is planned for development 2022-2026 adjacent to a proposed new train station, to be developed at a later date. The activity centre is planned to include a town square and community centre including education, health, arts, and commercial spaces alongside medium-high density residential. The site is bounded by Armstrong Road to the east, Windemere Estate to the west, Black Forest Road to the south and Greens Road to the north (Fig. 2).

The vision for Mambourin is to create a 20-minute resilient neighbourhood where everyday needs are met within a short walk, ride or public transport trip. This report will help to guide the project partner's approach to creating 20-minute resilient neighbourhoods and building community connectedness in outer suburban growth areas like Mambourin.

What is a 20 Minute Neighbourhood?

According to Plan Melbourne, 20-Minute Neighbourhoods are "accessible, safe and attractive local areas where people can access most of their everyday needs within a 20-minute walk, cycle or local public transport trip" (DELWP, 2017, p. 10). Twenty-minute neighbourhoods are mixed-use places defined by a well-connected active travel network and a high-quality public realm with good access to employment, essential services, and community infrastructure (fig. 3). The concept supports local living by encouraging development that enhances both social interaction and a vibrant local economy. An area of 800 metres represents the catchment for pedestrians to reasonably access their everyday needs from home within 20 minutes

The 20-minute neighbourhood concept is applied primarily in inner and, more recently, middle suburban communities (e.g. Croydon South, Strathmore, Sunshine West). Outer suburban master planned estates that incorporate activity centres are also vital to realise the Plan Melbourne ambition of a city of 20-minute neighbourhoods. However, implementing the concept in suburban settings is hampered by the challenge of creating walkable environments in low density residential areas that are often physically disconnected from job centres, retail, and entertainment. These areas

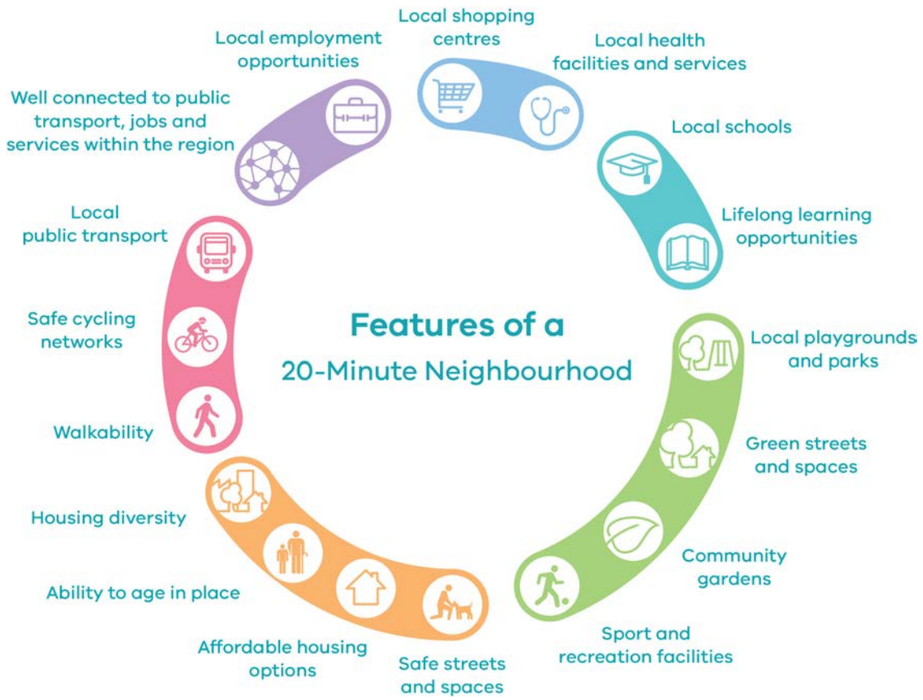


Fig. 3. Features of a 20-Minute Neighbourhood
Source: Department of Environment, Land, Water and Planning

frequently have poor public transport access and weak active transport infrastructure resulting in reliance on the automobile for everyday needs (Currie, 2010).

Moreover, new communities in outer suburban growth areas typically do not possess the community infrastructure necessary to satisfy everyday needs and foster social cohesion as the first residents move in. This amplifies the challenge of developing inclusive, cohesive and resilient 20-minute neighbourhoods in outer suburban settings.

Defining Community Infrastructure

Community or social infrastructure is an essential element in the 20-minute neighbourhood concept. In this report, we define community infrastructure as the private and "public places and spaces that accommodate community facilities and services and support individuals, families and groups to meet their social needs, maximise their potential and enhance community wellbeing" (City of Melbourne, 2014, p. 3).

This report provides a community infrastructure audit for Mambourin to identify the existing infrastructure assets and gaps in the community. The audit includes a diverse range of facilities and services including public parks, libraries, arts and cultural spaces, maternal and child health facilities, day care services, senior centres, youth support, and emergency services.

The audit classifies community infrastructure according to different catchment areas. While taking this into account, our recommendations focus on the community infrastructure necessary to provide destinations and services that support local living in a 20-minute neighbourhood. This includes traditional community infrastructure dedicated to social needs as well as non-traditional community infrastructure like coworking spaces and business incubators that may grow local economies while at the same time serve a social function for community members.

All in all, community infrastructure should respond to the educational, cultural, recreational, and health needs of a community. It therefore plays an important role in defining a community's identity and character while shaping how people socialise, learn, and engage with each other. Community infrastructure is therefore crucial to building social cohesion and place attachment (Australian Social and Recreational Research, 2008). In these ways, community infrastructure helps to build more resilient communities.

Why Stage Community Infrastructure?

Staging community infrastructure is particularly important in outer suburban growth areas. New master planned estates are typically developed in phases and therefore new residents do not have immediate access to many of the essential community services and commercial enterprises required to meet their everyday needs. This is compounded by a lack of adequate public transit to connect people to nearby communities. As the Victorian State Government (2019, p. 24) recognises, "a 20-minute neighbourhood must facilitate access to quality public transport that connects people to jobs and higher-order services."

Outer suburban communities also often lack the crucial community infrastructure that brings people together particularly during development. As Plan Melbourne outlines:

> Delays in the delivery of social infrastructure can undermine the ability of a new neighbourhood to form strong social networks—entrenching car-dependent travel patterns that make the 20-minute neighbourhood unachievable. Growth areas require the facilities and services that bring communities together…early in the development process and in the right locations (DELWP, 2017, p. 101).

Indeed, most community infrastructure plans recognise that early delivery of community infrastructure is essential. However, plans do not advise how to employ temporary activation principles to achieve this. This report responds to the Plan Melbourne directive to employ temporary spaces for community service delivery across various development stages (DELWP, 2017).

According to current DELWP (2019) projections, Wyndham will experience the largest population growth among all local government areas in Greater Melbourne in the coming years. Yet, like many fast-growing outer suburban areas, our analysis shows that Mambourin and surrounding Wyndham face a community infrastructure deficit particularly within the 20-minute neighbourhood catchment. Building knowledge around the appropriate delivery and staging of community infrastructure can help address some of the community development challenges associated with new master planned estates.

1.2 RESEARCH APPROACH

This report relies on three sources of data: 1) stakeholder meetings and interviews, 2) an international policy and literature review of strategies for staging of community infrastructure and the deployment of temporary uses and facilities in greenfield areas, and 3) a community infrastructure audit for Mambourin. Each of these tasks is essential to achieve the project objectives around improving knowledge for creating resilient 20-minute neighbourhoods in greenfield sites and for staging community infrastructure in Mambourin to accelerate community development. Meetings with project partners gave us a deeper understanding of their views, priorities, and needs. The document review provides for the identification of precedent strategies and potential challenges. The community infrastructure audit enables us to identify existing assets to build upon and gaps to target in our final recommendations.

Stakeholder Meetings

Throughout the project, the research team met with project partners to better understand their aims for the project and particular areas of interest. This included a project kick-off meeting with the Project Control group, attended by representatives of Resilient Melbourne, Department of Environment, Land, Water and Planning (DELWP), Wyndham City Council, and Frasers Property Australia. The researchers followed up this initial meeting with more focused interviews and discussion with officers from these entities.

Literature and Policy Review

A critical component of the project comprised a systematic literature and policy review on community infrastructure, staging strategies, and temporary uses and facilities. Our review of over 60 documents identified multiple gaps in knowledge and areas for further investigation. Existing policy rarely identifies explicit strategies for the delivery and staging of community infrastructure for new communities, the incorporation of business incubators and start-up facilities into community infrastructure programs, and the provision of temporary facilities in outer-suburban communities. Existing references are cursory and limited in their understanding and application of these important issues.

Mambourin Community Infrastructure Audit

The Mambourin community infrastructure audit (CIA) identifies the existing and proposed community infrastructure accessible from Mambourin and the gaps between the availability and projected demand in infrastructure supply for 2040.

The audit was conducted following a 6-step process. See the Appendix for a detailed methodology.

1. We consulted the existing literature and policy documents to define catchments or geographic levels for specific community infrastructure types (e.g. a kindergarten should be located within 400m of a site) and their standards (number of kindergartens required for 10,000 people). In total, we identified 46 different community infrastructure types, which we classified under five catchment levels (Table 1). Catchment levels 1 and 2 define the 20-minute neighbourhood.

2. We applied the network buffer method to derive the catchment sizes from Mambourin.

3. We collected spatial data and mapped 32 different types of community infrastructure across the Greater Melbourne area (the remaining community infrastructure types can be incorporated within these 32 types). We also gathered data about the community infrastructure proposed within the Mambourin site from Frasers Property.

4. We assessed accessibility levels to the existing 32 community infrastructure types from Mambourin in terms of whether they are located within their respective catchments. All community infrastructure proposed within the site are considered as accessible from Mambourin.

5. We estimated the demand for different types of community infrastructure by:

a. Estimating current residential population within the five level catchments;

b. Projecting residential population within the levels for 2040;

c. Estimating current employee population within the levels;

d. Projecting employee population within the levels for 2040; and

e. Calculating the demand for different community infrastructure based on total population (employee and residential).

6. We identified infrastructure gaps for Mambourin based on demand (projected based on population and employment) and supply (accessibility) of existing and proposed community infrastructure.

Table 1. Levels and thresholds of community infrastructure.

Levels	Name	Threshold population	Catchment size
1	Local centre	Up to 10,000	400m
2	District centre	10,000–30,000	800m
3	Sub-regional centre	30,000–60,000	3km
4	Municipal centre	60,000–150,000	6km
5	Inter-municipal centre	250,000	12km

Challenges for Planning Community Infrastructure in the Outer Suburbs

- **delivery of community infrastructure delayed by funding availability**
- **daytime outmigration of commuters**
- **a lack of public spaces and community facilities, particulatly during early stages of development**
- **few accessible community hubs particularly for young people**
- **a lack of "third places" including appropriate commercial spaces and local businesses**
- **diverse individuals and households with varied interests that may not be centred in the community**
- **residents at different life stages including stay-at home parents and teenagers**

Part 2. Staging Community Infrastructure for 20-Minute Outer Suburban Neighbourhoods

2.1 RESILIENT COMMUNITY INFRASTRUCTURE

This section identifies the key challenges, funding and delivery models, and guiding principles for the staging and delivery of community infrastructure in new outer suburban communities.

Community infrastructure encompasses local-level public and private facilities and services that provide a community support function. This encompasses activities related to education (e.g. schools and libraries), health (e.g. maternal and aged care facilities), recreation (e.g. parks and sports facilities), and the arts (including spaces for artistic production and display). Community infrastructure may be targeted toward particular segments of a community (e.g. youth, seniors, new mothers, or cultural or religious groups) and, often, facilities are geared toward meeting the needs of a multiplicity of individuals and groups. Although less recognised, community infrastructure can also support local enterprise through entrepreneurship training, co-working, maker spaces, and equipment sharing (Box 1, page 16).

Research shows that the provision of community infrastructure appropriate to local need is associated with individual and community health and wellbeing and can help to foster engaged and resilient communities (Davern, Roberts, and Higgs, 2018). A recent study that examined social cohesion across 148 Brisbane suburbs found that schools, community centres and religious institutions were key "anchoring" sites that promoted regular and routinised contact (Wickes, Zahonow, Corcoran and Kimpton, 2019). The study also found that parks, small retail shops, and cafes were associated with increased interaction among residents. Moreover, integrated community infrastructure supports multiple benefits. For example, access to green space provides a physical and mental benefit thereby reducing pressures on health infrastructure.

This in turn supports the larger 20-minute neighbourhood goal of creating safe and accessible places. However, the diversity of activities and spaces that comprise community infrastructure makes planning highly complex. Many plans recommend community infrastructure standards but these standards do not always capture the specific context and diversity of community needs and interests, nor do they recognise the diversity of planning requirements around different facility types.

The reality is that successful community infrastructure depends on understanding the evolving character and needs of its specific users as well as planning around the locational attributes of the surrounding area.

Planning Challenges for Social Cohesion and a Thriving Local Economy

Resilient community infrastructure responds to the needs and demands of the surrounding community. This is particularly challenging in the context of new and growing outer suburban communities where expectations and preferences are evolving. Although newly established master planned communities provide some important community infrastructure in the development phase, there are often few places at the outset for residents to congregate, form meaningful relationships, and engender a sense of community.

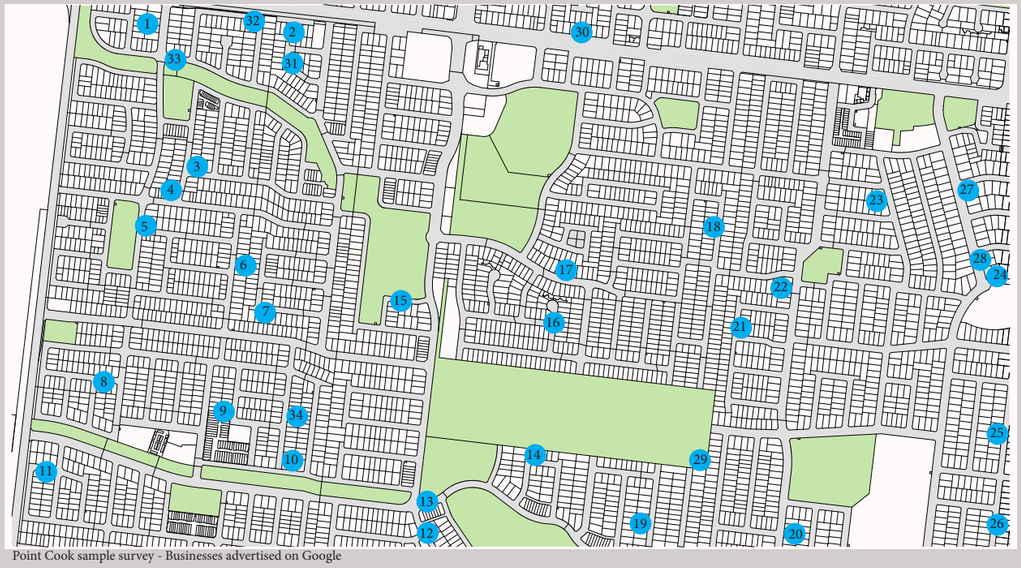
Such places also face challenges due to the larger context in which they are situated. Outer suburban growth areas are predominately comprised of low-density, large-lot subdivisions that lack the full range of community infrastructure residents require within a 20-minute neighbourhood. Although slowly changing, this built form is the product of longstanding zoning policy that specifies a separation of land uses, minimum lot sizes, and building setbacks. Additionally, as discussed below, developer contributions that fund new community

Box 1. Community Economy Infrastructure: Building Local Enterprise in the Outer Suburbs

Community economy infrastructure performs both a social and economic function to support local community development. Facilities and services may be directed toward assisting individual entrepreneurs, micro-enterprises (small firms with fewer than five employees), or social enterprises (businesses that provide a direct community benefit and/or reinvest profits back into the community).

They support a diversity of activity including retail, food production, craft manufacturing, home-based businesses, and creative economy firms (Babb et al., 2019). These shared and collaborative spaces reduce business costs, create opportunities to scale-up home-based business, and support inter-firm networking and contracting. They also form "third spaces" that foster social connections and build community.

There are multiple models of community economy infrastructure including shared work or co-working spaces, business incubators, and maker spaces. Each provide access to some combination of common space, desk or room rental, equipment rental or sharing, skills training programs, and bartering opportunities. Some offer additional support infrastructure such as childcare, professional development classes, networking events, and cafés.



Point Cook sample survey - Businesses advertised on Google

1. Lisa Jane Photography
2. Boutique Lashes
3. Soulful Prints (Art Print shop)
4. First Steps Family Day Care
5. Haircity Australia
6. Doslink Migration Investment
7. Raja Driving School
8. 13cabs airport Taxi
9. Platium Chauffear
10. Silver service taxis
11. DJn2A-Groove on DJs
12. Seriver service cabs point cook
13. Kohinoor Fashion House
14. Applebox Pet Groomers
15. Froster Tiers (wedding catering)
16. Tidy Kitchen (cake shop)
17. Regal Cupcakes
18. Excellent Threading and Waxing
19. Cake shop
20. Inimitable Impression (Gift shop)
21. Elegant Layers (Cake shop)
22. Busy Beavers Family Day Care
23. Kathys Dressmaking and Tailoring)
24. CHINA NOW PTY (Electronics store)
25. Ladybird Hair
26. ANAHAT music (Indian music school)
27. Lucky House (short term accomodation)
28. Makeup Mistress
29. Sweetems Cakes and catering
30. Dimples Creation (clothing)
31. Mortage Express
32. Panache by Divya (Clothing)
33. Australian Royalty Pageants (Fashion accessories)
34. Goddess Ibrows and lashes

Wood dust weekend at FAB9. FAB9 is a Makerspace in Footscray where designers of all skill levels can access specialist tools and prototying equipment to realise projects. Image by ravensatodds.

Slub Makerspace in Dresden, Germany. Photograph by Lukas Boxberger.

They exist in stand-alone facilities or within another community facility such as a library.

Supporting community economy infrastructure in the outer suburbs faces challenges. According to LaunchVic (2018), co-working spaces are predominately clustered in the Melbourne CBD and inner suburbs to service contract and self-employed professionals in IT and business services. Other recent studies find that the majority of "start-up neighborhoods" are essentially in 20-minute neighbourhoods, places that already possess density, good transit access, and active transport options (Credit, 2019; Florida and King, 2016).

In other words, shared work spaces are largely considered inner-city phenomena servicing the "gig economy." However, if we reframe co-working and other incubator spaces in a community economy lens, shared work environments make a lot of sense for outer suburban growth areas. They provide a flexible work option particularly for women who already manage home-based businesses because they are not able to work in regular employment due to family commitments or a long commute (Williams and Pocock, 2010). In fact, outer suburban communities contain a surprising density of home-based businesses (see figure opposite) but there is no coordinated strategy to manage and support this diverse local economic activity.

Community economy infrastructure is an opportunity for building community collaboration and sharing, bringing community members together around similar activities, interests, and objectives while growing local enterprise.

Case studies:
Food incubators
Maker spaces in Australia: and UK
How social enterprise builds an inclusive economy
Toolbox LA (USA): A multipurpose co-working and maker space

infrastructure are often delayed until subdivisions are fully developed.

This built form combined with a dearth of community infrastructure means that new outer suburban residents struggle with:

- a lack of free time due to long commutes
- daytime zones with little activity due to the outmigration of commuters
- a lack of public spaces and facilities for formal and informal community engagement,
- few accessible community hubs particularly for young people, and
- a lack of "third places" including appropriate commercial spaces for small, local businesses and local consumption.

These design and development challenges combine to harm the development of social cohesion by reinforcing auto-dependency and encouraging residents to fulfil their everyday needs far outside their immediate community. The lack of employment opportunities means that most residents cannot live and work locally. Daily, large numbers of residents commute by car often long distances from home.

The lack of access to jobs and services creates time poor communities whose residents are forced to spend long hours away from home. Residents have little time to volunteer at schools and local organizations or to participate in community events. Community infrastructure therefore plays an important role in attracting and serving residents from neighbouring areas and helps create mixed use places in order to ensure neighbourhood vitality. These challenges also point toward the importance of planning for groups at different life stages or with particular needs including teenagers and young stay-at-home mothers (William and Pocock, 2010). The dearth of private "third places" are hampered by a lack of small-scale commercial spaces that provide opportunity for small, start-up local businesses and boost local spending.

Although most policy recognises the need to serve diverse individuals and households with different needs and interests, this is difficult to achieve in practice, particularly in outer areas for a variety of reasons. Recent research in Wyndham and Casey, for example, finds that resident activities are often home-centered and relate to communities that revolve around hobbies or familial and religious affiliation rather than place (Maller and Nicholls, 2014; Roggenbuck, 2019; Warr and Robson, 2013). This research also emphasises that this is particularly the case in communities with large numbers of recent migrants to Australia where intergenerational families are common.

Indeed, community takes place at different scales and settings from the block to the neighbourhood and beyond. This poses a special challenge around employing community infrastructure to build social cohesion and community engagement in newly established communities where people maintain ties with friends and relatives in other places or are centred around the home.

Funding and Delivery Mechanisms

The Department of Infrastructure and Transport (2012) classifies urban infrastructure in two types: a) Social/community infrastructure – a mix of facilities and services that maintain quality of life such as hospitals, schools, justice and emergency facilities, community centres, local parks and sporting reserves; and b) economic infrastructure – the physical structures and facilities that provide a major organising elements of cities and regions and includes transport systems, energy, water, and telecommunication networks. While economic infrastructure is considered as a pre-requisite for a growth area and provided before residents moved in, (arguably associated services may be not be available e.g. public transport services are delayed despite having road infrastructure), community infrastructure is considered as a "lag infrastructure" in that it is usually provided only when a critical population level has been reached. As a result, there is always a higher risk of not delivering community infrastructure on time.

Given the broad range of infrastructure that falls under the category of community infrastructure, there is high variation in funding and delivery mechanisms. Generally, a large number of organisations are involved in this process. Key funding bodies include (Wear, 2016; Kellett and Nunnington, 2019):

1. local councils: source funding from rate revenue and developer contributions;

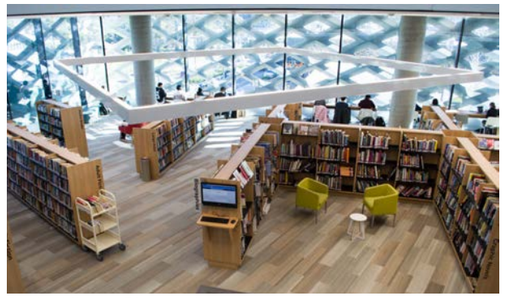
2. state government departments: provide funding to local councils towards social infrastructure;

3. state government departments: involved directly in the delivery of infrastructure such as schools, health facilities and justice facilities;

4. private sector developers: deliver town centres and other infrastructure associated with new development; and

5. other private providers: usually dependent on operational subsidies from government and deliver community infrastructure such as medical, childcare and aged care facilities.

In Victoria, Precinct Structure Plans (PSPs), prepared by the Victorian Planning Authority in collaboration with local government, provide detailed guidance on development in growth areas including a Precinct Infrastructure Plan (PIP). The Precinct Infrastructure Plans list all community infrastructure items required for development in the precinct, including a nominated lead agency for the project, an estimation of project timing, project cost and total precinct contribution to the project. Private sector developers of the precinct then provide payment (or in-kind works, facilities, and services) to local councils in the form of development contributions to supply the infrastructure as required. A weakness of this process, however, is that the funding is not readily available to commence infrastructure provision upfront. Local councils are not able to collect the development contributions until the houses are actually built and, therefore, are unable to deliver the necessary community infrastructure when the first residents move in.


Realm Library, Ringwood

In addition to development contributions (which fund council infrastructure), the Growth Areas Infrastructure Contribution (the GAIC) is a one-off charge designed to fund essential State infrastructure in fringe suburbs (Cardinia, Casey, Hume, Melton, Michell, Whittlesea, and Wyndham). The Victorian Government also developed a partnership agreement with five growth area councils (Wyndham, Melton, Hume, Whittlesea and Cardinia) to plan and deliver community infrastructure through a jointly funded "brokers" model.

In Victoria, some local councils are also eligible

Box 2. Community Hubs

Community hubs are flexible, multipurpose spaces geared toward local needs. They provide a focal point or anchor for a range of community services and may be located amongst a broader range of commercial activities. This creates opportunity for social interaction and collaboration amongst users. This flexible model of delivery also enables community infrastructure to respond to community change over time as local needs evolve. As a result, this is a financially efficient mode of delivering community services to diverse populations with varied needs over time (City of Melbourne, 2014; City of Yarra, 2016). It can be particularly useful in the early stages of master planned communities to create an anchor and sense of place early in the development process.

Community hubs take many different forms:

The $34M Aura Community Hub, located in a master planned community on the Sunshine Coast, Qld incorporates educational and community uses. An on-site primary school, shared community-school recreational amenities and community centre. The shared funding and operation model incorporating Stockland, Qld Department of Education, Sunshine Coast Regional Council, and Economic Development Queensland enabled early delivery of key community infrastructure to a major greenfield site, but faced challenges balancing partner requirements. Co-location of facilities heightens the visibility and accessibility of multiple community uses.

Aura Community Hub (impression). Source: Deicke Richards

Maroondah city council owns and operates Realm, a $24M community hub that comprises a library, information centre, business hub, art space, and café. The facility is located in Ringwood Town Square amongst a variety of commercial activity and adjacent to Ringwood Station. The business hub includes collaborative workspaces, meeting spaces, film and sound studios, and educational programs

Realm Community Hub, Maroondah City Council

Yarra Council operates Bargoonga Nganjin, North Fitzroy Library, which integrates a library, maternal child health services, Council customer service centre, community meeting spaces, and a roof-top garden in a single structure. The facility is located in an established inner-city community with excellent transit and active travel connections.

North Fitzroy Library library and Community Hub

to apply for ad-hoc funding for critical local infrastructure through the Growing Suburbs Fund (GSF). Currently, the ten interface councils participating include Cardinia, Casey, Hume, Melton, Mitchell, Mornington Peninsula, Nillumbik, Whittlesea, Wyndham, and Yarra Ranges. The GSF has funded more than 160 projects to date, 62 of which are now complete (Interface Councils, 2019). GSF projects in Wyndham include the Tarneit Community Centre Transformation and the Williams Landing Reserve Integrated Sports and Community Hub.

It is essential to understand the existing community infrastructure gaps and to plan the delivery of community infrastructure early in the development process. The Mambourin Community Infrastructure Audit in Part 3 details the infrastructure gaps at different catchment levels. It also identifies the responsible parties for a diverse range of community infrastructure. This provides an opportunity to satisfy local need and build on locational synergies.

Planning for growth communities also means planning for sufficient and expanding capacity over time. The design and service requirements of particular facilities will change as will the overall number of facilities necessary to serve a community as it grows. This is a particular challenge faced by master planned communities targeting young families. As families grow and age there are fewer local resources that proactively service the needs of different groups, particularly teenagers. For this reason, it is important to involve residents in decision-making for the appropriate delivery of community services.

Another tension arises in master planned developments around the continued servicing of amenities initially provided by the developers and then taken over by council. Issues around governance and maintenance can be problematic. Research finds that residents become reliant on developers to respond to all issues that occur in the community rather than creating the kinds of social networks that facilitate a community driven response to local problems (Wickes, 2010).

Ultimately, community infrastructure delivery requires state and local governments to act in partnership with private builders to develop the community infrastructure necessary to support the goal of socially resilient, economically self-sufficient 20-minute communities. This includes key community infrastructure like schools, healthcare, and cultural facilities as well as non-traditional community infrastructure that can incubate local economies and propel home-based businesses.

2.2 Guiding Principles for Community Infrastructure in the Outer Suburbs

In order to meet the evolving needs of socially diverse outer suburban growth areas, community infrastructure should be co-located, integrated, accessible, and responsive. Four principles are outlined on page 22.

Across each of the four principles, the design, siting, and catchment of community infrastructure matters. The physical location of community facilities and the mix of uses influences the frequency and type of user. Co-locating activities in community hubs within walking distance of other community needs is particularly important for the early development of new outer suburban communities (Box 2).

Additionally, consideration of the catchment size for different types of community infrastructure is important. Planning for overlapping catchments enables the development of shared infrastructure with adjacent communities thereby reducing the risk of unnecessarily duplicating community infrastructure and the financial burden on individual councils or communities. Options for shared delivery of community services (e.g. across suburbs, council or public-private partnerships) is also important.

Guiding Principles for Community Infrastructure in the Outer Suburbs

Principle	Description
1. Co-locate community facilities with other activities	Successful Community Infrastructure co-locates facilities with other activities including commercial and public functions. This maximises usage and creates opportunities for social interaction amongst different people for different reasons. Co-located facilities help to define "third place" or community anchor where people can meet and socialise, thereby building community identity. Co-location also supports safe public spaces by encouraging passive community surveillance through built design and varied programming.
2. Integrate a mix of programs and services	An integration of program and services maximises the use of resources and is a financially efficient mode of delivery. It also encourages cross-over users and is more likely to engage first-time users in new programs. It is important to consider facility development and maintenance in partnership with public, private and community sector entities (e.g. schools, health centres) and combining functions (e.g. youth and senior services). This provides flexibility to better enables service providers to adapt to changing populations, conditions, and demand.
3. Enable access for different community members	Successful Community Infrastructures is accessible to different community members from different ages, backgrounds, and abilities and provides services at different times of day and night for different purposes. An accessible and convenient location reduces the need for multiple trips and, therefore, auto-dependence. It requires proximity to multimodal transport options and minimises physical barriers to entry.
4. Design for the particular needs and character of the community	Successful Community Infrastructure responds to the particular needs and character of the community. This requires early and on-going engagement with community members. It also necessitates consideration of user identities, habits, and preferences (e.g. home-centred activity, intergenerational engagement, and cultural identity).

Temporary Activation

Function	• **Build local identity** • **Build awareness of community problem** • **Create public spaces** • **Encourage individual or group expression** • **Experimentation- test planning proposals** • **Foster community engagement** • **Host markets (retail, art, food)** • **Place marketing** • **Sponsor planned events** • **Support commercial enterprise (co-working and incubator spaces)**
Approach	• **Event-based: cyclical or one-off use over a defined period (markets, pop-ups)** • **Image-based: alter place meaning or image without changing use (street art, advertisements, night projections)** • **Incremental: adapt and/or intensify space over time leading to permanent use or policy (Paris Plages, Pavement to Parks)** • **Mobile: non-stationary temporary activation (food trucks, libraries and gardens)** • **Provisional: temporary use in response to interim need or experiment over a defined time period (parklets, bike lanes, pedestrian amenities, temporary store fronts)**

2.3 TEMPORARY COMMUNITY INFRASTRUCTURE IN SUBURBAN GROWTH AREAS

Temporary Infrastructure and Community Development

Temporary infrastructure encompasses a wide range of projects that transform public space and inject life into underutilised spaces through short-term, provisional activity. The function and approach toward temporary activation varies dramatically. Projects may stem from grassroots efforts to draw attention to community needs such as a shortage of green space (e.g. Park(ing) Day) or planning challenges like active transport infrastructure (e.g. Better Block). They comprise a variety of pop-up commercial spaces or markets for retail, art, and food on vacant spaces (Re:Start). They temporarily inhabit vacant storefronts, seeding new commercial and creative activity (Renew Australia). Indeed, popup retail and restaurants can be an affordable way to test a business idea and gain a reputation prior to opening a permanent establishment.

Some uses are ephemeral, others are mobile, travelling to different locations. Still other temporary uses incrementally become permanent (Pavement to Parks). Some provide access to urban experts (Atlanta City Studio) and some are just for fun (Paris Plages). Other forms of temporary use seek to "test alternative futures, offer new avenues for dialogue and education, and/or question urban development policy" (Ashley 2018). They may encourage community interaction, group expression, or spontaneous action, or consist of orchestrated efforts to market place.

Our review of policy and research shows that the most successful temporary activation projects are community-led. Project planning and implementation is frequently built around participatory processes that facilitate community interaction and engagement. They tend to focus on tackling specific local needs by mobilizing resident assets, skills, and people resulting in a sense of community ownership.

The myriad approaches to temporary activation can all support the generation of community infrastructure in 20-minute neighbourhoods by energizing people and place, and/or experimenting with urban design ideas that support 20-minute neighbourhoods as a community grows and changes. Moreover, in developing outer suburban master planned estates, temporary strategies can help to plug community infrastructure gaps as the area grows. The provision of interim community services and adaptable spaces for libraries, health services, and local transport respond to community needs locally. Providing services locally can in turn free up time for participation in other local activities. In fact, Plan Melbourne (p. 101) states that

> temporary spaces or buildings can be used for community service delivery...[and] maximise the use and the benefits gained from co-location...Community places and buildings must be planned and designed so that they can adapt as the population changes.

However, temporary projects are rarely, if ever, put into practice in a coordinated way within precinct and structure plans. They are predominately employed in an ad hoc manner as one-off projects. Planning needs to explore ways to make room for temporary uses and facilities. In some instances, local government can enable "open-source planning" and flexible zoning whereby land uses could be changed without planning permission within a range of specified permissible uses. Additionally, places can review building code requirements to support adaptive and temporary reuse or incentivise property owners to back temporary use projects.

Temporary Activation in the Outer Suburbs

Despite the diversity of applications, the wider potential of temporary infrastructure for new outer suburban communities and master planned

Point Cook Pop-up Park. Source: Point Cook Action Group.

Sprout Hub cafe and event hub. Source: Sprout Hub

School of Life Pop Up Space, by CoDesign Studio. Source: CoDesign Studio.

estates has yet to be explored. Temporary projects are more much more common in established inner city environments, although a handful import temporary activation ideas from the inner city such as the Point Cook Pop-up Park (Novacevski, 2019). While holding tremendous potential, the reality is that temporary place activation is rarely employed as a means of planned community infrastructure delivery, particularly in new communities.

Temporary activation strategies in the outer suburbs must respond to the particular character and challenges of these communities (see pp. 14-18) rather than transferring inner-city approaches. In particular, temporary infrastructure can serve to fill community infrastructure gaps as new master planned estates develop as well as provide a means of linking existing community facilities and services. Outer suburban temporary activation must consider broader questions around the specific populations and urban form to catalyse social cohesion and local economic development and, ultimately, contribute to building 20-minute neighbourhoods. This means going beyond pop-up parks, container cafés, and other inner-city approaches.

In new residential developments, temporary infrastructure can provide residents with much needed interim services. By encouraging routinised and regular social connections, temporary infrastructure can also encourage the development of social connections among new residents. For example, a pop-up nursery may attract residents with common landscaping needs towards the end of the building phase. A coffee cart with seating next door to the nursery creates a "third place" that may further facilitate informal relationship building. In conjunction, such offerings can link up to or generate school gardening programs or active living programs for seniors.

Other temporary projects can foster local entrepreneurship by tapping into the social and business needs of surrounding home-based businesses through youth entrepreneurship programs or supporting women-owned businesses, for example. These projects both retain mobile residents and support those without the means to leave the community.

Sprout Hub is a temporary coworking space, café and event space in the outer suburbs of Perth sponsored by Lendlease in partnership with Sprout Ventures. Here, the developer partnered with a social enterprise provider which manages the space under direct community leadership. The associated "seedling fund" has supported a women's shed and sustainability programs for the local primary school. In its first six months, Sprout Hub received 3,000 visitors, many of who came from outside the community. After three years, the community hub, run by a resident, moved to an adjacent area to catalyse community engagement there.

This type of temporary infrastructure can mentally anchor a new master planned estate. Bundling smaller projects or incorporating multiple uses in community hubs like the examples above can distinguish future town centres and provide an interim focal point as the community develops. Targeting vacant spaces in the first stages of development to form pattern connections between early community infrastructure like parks and schools through open and flexible facility design is also important and discussed below in Part 3.

Table 2. Community Infrastructure (CI) Audit Results.

Level	Type	Projected population	CI Requirements	CI Availability			CI Gap
				Existing	Proposed	Total	
1	Neighbourhood parks	6,962	6	1	2	3	3
	Childcare centre	6,962	1	0	1	1	0
	Church	6,962	1	0	0	0	1
	Community centre	6,962	1	0	1	1	0
	Government primary schools	6,962	1	0	1	1	0
	Kindergarten	6,962	1	0	1	1	0
	Local shops	6,962	2	0	2	2	0
	Medical & allied health services	6,962	1	0	1	1	0
	Local sports facility	6,962	2	0	1	1	1
	Post office	6,962	1	0	0	0	1
2	Aged care	7,141	1	0	0	0	1
	Catholic primary school	7,141	1	0	1	1	0
	Community health centre	7,141	1	0	0	0	1
	Maternal and child health centre	7,141	1	0	1	1	0
	Fire station	7,141	1	0	0	0	1
	Government secondary schools	7,141	1	0	0	0	1
	District/metropolitan park	7,141	1	0	1	1	0
	Tennis courts	7,141	1	0	1	1	0
3	Indoor sports/aquatic centres	27,924	1	0	0	0	1
	Ambulance station	27,924	1	0	0	0	1
	Catholic secondary school	27,924	1	0	0	0	1
	Community arts facility	27,924	1	0	1	1	0
	Branch libraries	27,924	1	0	1	1	0
	Police station	27,924	1	0	0	0	1
4	State emergency facility/complex	85,370	1	0	0	0	1
	Specialty needs schools	85,370	1	0	0	0	1
	TAFE	85,370	1	0	0	0	1
5	Hospital	279,180	2	2	0	2	0
	Law courts	279,180	2	1	0	1	1
	Public art gallery	279,180	5	2	0	2	3
	Regional park	279,180	2	0	0	0	2
	University	279,180	2	2	0	2	0

Note 1. The study only takes into account CI proposed in Mambourin. There are a number of recently completed Precinct Structure Plans surrounding Mambourin, which are likely to contain various CI (https://vpa.vic.gov.au/greenfield/interactive-status-map/). However, detailed data is not available. It is unlikely that proposed CI within the neighbouring PSPs will serve beyond their local neighbourhoods.

Note 2. Categories used for this and subsequent tables reflect those established in the source data. Future studies can include a broader range of community infrastructure for schools, religious institutions, and parks in particular.

PART 3. CASE STUDY - MAMBOURIN

3.1 COMMUNITY INFRASTRUCTURE AUDIT FOR MAMBOURIN

Table 2 outlines the results from the Mambourin community infrastructure audit. The audit was conducted for 32 different community infrastructure types categorised under five levels or catchment areas. These five levels represent the population thresholds for community infrastructure suitable for a local centre, district centre, sub-regional centre, municipal centre, and inter-municipal centre.

The first two levels (400m and 800m catchments) fall within the definition of a 20-minute neighbourhood and meet the size of population (10,000-30,000) required for a Precinct Structure Plan (PSP). As highlighted in Plan Melbourne, the remaining levels are essential to support higher order needs for a 20-minute neighbourhood and should be accessible by bicycle or public transport.

The findings from our audit, as shown in Table 2, indicate that Mambourin will lack access to some Level 1 community infrastructure (neighbourhood parks, church) even if all proposed facilities are provided. There is also a shortage of important level 2 community infrastructure, which should be provided in the 20-minute neighbourhood catchment. Additionally, access to mid and higher order (levels 3-5) community infrastructure will be a particular challenge given residents must rely on many of these amenities beyond their neighbourhood. This is due in part to a current lack of transport options in Mambourin, which constrains the level of accessibility to community infrastructure rather than the availability of these facilities. For example, Table 3 shows that some higher order community infrastructure (law courts, public art gallery) are located within the recommended 12km distance from Mambourin, but travel times to these facilities are currently substantially higher than the recommended 20 minutes by public transport.

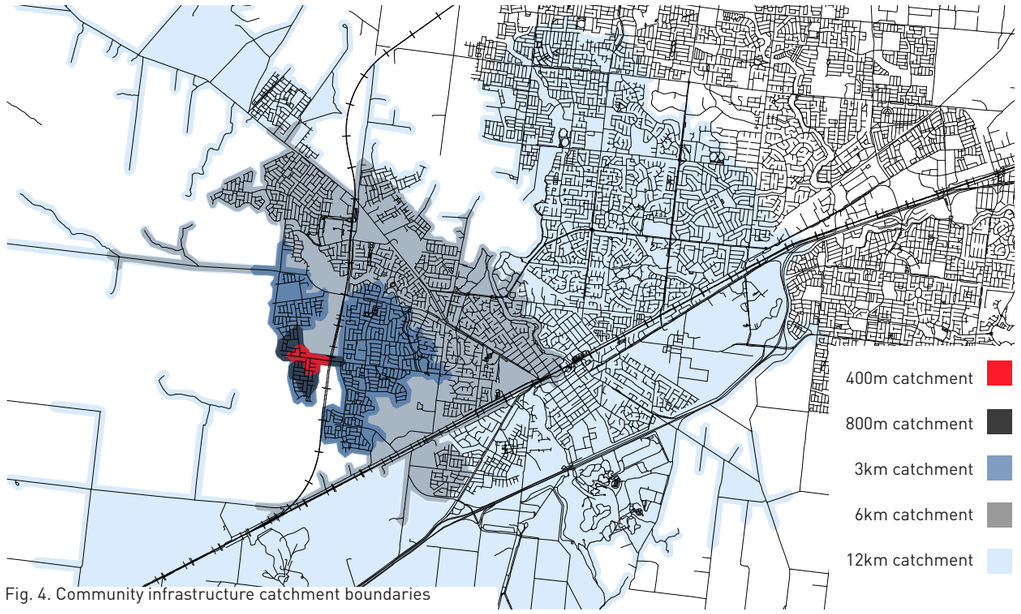


Fig. 4. Community infrastructure catchment boundaries

The proposed train station at Mambourin can play a major role in enhancing local and commuter accessibility to these and other near-by community infrastructure.

Table 4 shows the agencies responsible for delivering community infrastructure at Mambourin. A cross-examination between Tables 2 and 4 show that local government is mainly responsible for the gaps in Level 1 and 2 community infrastructure. It is expected that this will be funded through rate revenue or developer contributions, augmented by grant funding from state or commonwealth government. However, a critical success factor for Mambourin to develop as a 20-minute neighbourhood lies in the delivery of Levels 1 and 2 community infrastructure for which the responsibility does not fall on local government, but depends on timely intervention from state (e.g. secondary school) or federal (post office) government.

In contrast, the various departments in state government are responsible for the planning, funding and delivery of higher order community infrastructure currently inaccessible from Mambourin. This includes, for example, court and other emergency services. It is not uncommon to have schemes that require developers to contribute to the cost of state infrastructure. For example, the Growth Areas Infrastructure Contribution is a charge designed to fund essential State infrastructure in Victoria. South Australia introduced an infrastructure levy system with Basic and General components. While the former is designed to provide a mechanism to ensure delivery of basic on-site infrastructure, the latter is available to deliver additional infrastructure which may not be located within the site in question.

Table 2 and 4 also highlight that certain community infrastructure depend on partnerships between state and private entities for funding and delivery (e.g. Catholic School, TAFE). Here, the jointly funded "brokers" model, as applied previously in Victoria, might be an opportunity. Additionally, the co-ownership model, as applied in Queensland to fund and deliver community infrastructure, might be tested in Mambourin (Queensland Government, 2019). Co-ownership is a public-private-community sector partnership whereby these entities take a lead role in the ownership, planning and coordination of private and public development to ensure the best whole-of-community outcomes.

Table 3. Community Infrastructure by distance and time from Mambourin

Level	Type	Distance (m) to the closest (existing) CI	Desired distance (m)	Travel time* to closest (existing) CI
1	Neighbourhood parks	2 m	400m	-
	Childcare centre	1,929 m	400m	17 min
	Church	2,517 m	400m	29 min
	Community centre	2,669 m	400m	24 min
	Government primary schools	1,816 m	400m	18 min
	Kindergarten	2,435 m	400m	17 min
	Local shops	2,795 m	400m	33 min
	Medical & allied health services	4,631 m	400m	35 min
	Local sports facility	1,575 m	400m	19 min
	Post office	6,309 m	400m	36 min
2	Aged care	4,631 m	800m	31 min
	Catholic primary school	4,496 m	800m	29 min
	Community health centre	4,369 m	800m	31 min
	Maternal and child health centre	2,678 m	800m	24 min
	Fire station	4,735 m	800m	41 min
	Government secondary schools	4,481 m	800m	31 min
	District/metropolitan park	7,350 m	800m	148 min
	Tennis courts	3,227 m	800m	37 min
3	Indoor sports/aquatic centres	6,559 m	3,000m	51 min
	Ambulance station	6,604 m	3,000m	47 min
	Catholic secondary school	7,280 m	3,000m	58 min
	Community arts facility	17,568 m	3,000m	56 min
	Branch libraries	4,412 m	3,000m	28 min
	Police station	8,535 m	3,000m	50 min
4	State emergency facility/complex	16,899 m	6,000m	80 min
	Specialty needs schools	9,890 m	6,000m	62 min
	TAFE	8,693 m	6,000m	53 min
5	Hospital	10,680 m	12,000m	53 min
	Law courts	6,885 m	12,000m	39 min
	Public art gallery	6,213 m	12,000m	34 min
	Regional park	62,436 m	12,000m	150 min

*Note that travel time is calculated as walking + Public transport to the closest (existing) CI

The findings highlight the usefulness of place-based planning approaches in which all government departments and agencies work together to make Mambourin a 20-minute neighbourhood. This study provides a framework for the planning of community infrastructure for growth areas by taking into account existing community infrastructure. As our approach is based on flexible catchment sizes that goes beyond the administrative boundaries, it enables planning for community infrastructure without duplication across jurisdictions and thereby brings efficiency in service delivery. Such an approach is currently lacking in Victoria. This approach will help to overcome complexity in delivering a 20-minute neighbourhood as highlighted by the Victoria State Government (2019): The role and function of every Neighbourhood Activity Centre varies depending on its size and context within the metropolitan region. However, they should have the capacity to support a range of local services that complement the wider network of centres and needs of the community.

Table 4. Agencies Responsible for Delivery of Community Infrastructure

Level	Type	Responsible agencies*	2020	2021	2022	2023	2024	2025	2026	2027
1	Neighbourhood parks	Local Gov.								
	Childcare centre	Private & Local Gov.								
	Church									
	Community centre	Local Gov.								
	Government primary schools	Dept. of Education and Training & Local Gov.								
	Kindergarten	Local Gov.								
	Local shops	Private								
	Medical & allied health services	Dept. of Human Services								
	Local sports facility	Local Gov.								
	Post office	Federal Gov.?								
2	Aged care	Private								
	Catholic primary school	Catholic Education Office								
	Community health centre	Dept. of Human Services								
	Maternal and child health centre	Local Gov.								
	Fire station	CFA/ Local Gov.								
	Government secondary schools	Dept. of Education and Training								
	District/metropolitan park	Local Gov.								
	Tennis courts	Local Gov.								
3	Indoor sports/aquatic centres	Local Gov.								
	Ambulance station	Ambulance Victoria								
	Catholic secondary school	Catholic Education Office								
	Community arts facility	Local Gov.								
	Branch libraries	Local Gov.								
	Police station	Victoria Police								
4	State emergency facility/complex	Victoria State Emergency Services								
	Specialty needs schools	Private/State Gov.								
	TAFE	Tertiary Institutions, State and Federal Gov.								
5	Hospital	Dept. of Human Services								
	Law courts	Court Services Victoria								
	Public art gallery	Local Government								
	Regional park	Parks Victoria, Local Government								
	University	Tertiary Institutions, State and Federal Gov.								

Temporary projects can support staged community infrastructure developmet by:

- **Providing interim services and filling infrastructure gaps as the community develops**
- **Distinguishing the future town centre and providing an interim focal point based on the community hub model**
- **Using vacant sites to physically and mentally link existing community facilities and services**
- **Providing additional services at existing sites during periods of growth (e.g. school as temporary market site, leisure centre as temporary business incubator)**

3.2 STAGING COMMUNITY INFRASTRUCTURE IN MAMBOURIN

The 20-minute neighbourhood concept aims to support the development of sustainable, resilient communities. In new outer suburban growth areas, planning must confront a specific set of community infrastructure needs and challenges. To summarise, these includes:

- a high proportion of time poor commuters
- daytime zones with little activity due to the outmigration of commuters
- a lack of public spaces and facilities for formal and informal community engagement,
- few accessible community hubs particularly for young people,
- a lack of "third places" including appropriate commercial spaces for small, local businesses and local consumption,
- diverse individuals and households with varied interests that may not be centred in the immediate community (e.g. home-centred entertainment and non-place-based communities), and
- residents at different life stages with different needs including young families, teenagers and young stay-at-home mothers.

Many of these characteristics are or will be present in Mambourin. Frasers' target market is ethnically diverse young couples and families interested in purchasing their first home (Frasers, 2018). Many already live in culturally diverse outer growth areas like Wyndham where one-third of the population is from a country where English is not the native language. According to Frasers survey data, this cohort seeks proximity to transport, shopping and active living options, but in Wyndham, 69% of residents rely on a car for transportation to work. It is also notable that 39% of Wyndham residents possess no educational qualification (Wyndham Community Profile, 2018).

Frasers has responded to the community development needs in Mambourin by enlisting Co-Design Studio, Foundation for Young Australians and Neighbourlytics to identify opportunities for resident engagement and leadership. Mambourin has also received certification as a 6-star Green Star Community. Supporting this, Mambourin will incorporate important community infrastructure including a resident leisure centre, neighbourhood park, private school, and town centre containing education, health, arts, and commercial spaces alongside medium-high density residential and a proposed train station.

The Mambourin Community Infrastructure Audit shows that new Mambourin development will both benefit surrounding communities in terms of access to key community infrastructure and will benefit from existing infrastructure in surrounding communities. For example, the proposed community art facility and branch library at Mambourin will be accessible to people living in adjacent communities, while prospective residents of Mambourin will have access to nearby hospitals, courts, and other higher order community infrastructure.

The project nonetheless faces community infrastructure gaps in the 20-minute neighbourhood catchment (800m) and will need to consider interim uses until the proposed infrastructure is delivered and the community matures.

Temporary projects can support staged community infrastructure delivery in Mambourin by providing interim services and activating sites (page 32).

Early Stage (Now to 2022)
First stage residential house and land packages releases as well as the completion of the wetlands park, leisure centre and community centre.

Short term (completion in 2022)
Continued release of residential house and land packages to the west and north areas of the site along with the completion of the proposed P-12 private school.

Mid term (completion in 2024)
Continued release of residential house and land packages to the north areas of the site along with the staged development of the retail and civic areas of the site.

Long-term (completion in 2028)
Completion of the residential and retail areas and the proposed delivery of the local train station.

- Residential
- Open space
- Leisure centre
- Community Centre
- P-12 private school
- Town centre core
- Future bus interchange and train station

Fig. 5. Indicative staging diagram for Mambourin.

Additionally, Mambourin faces a shortage of the higher-level community infrastructure due to its outer suburban context and limited transport accessibility. Some important facilities are planned (e.g. community art space, library). Mambourin should explore options for partnering with surrounding communities on shared service delivery.

Below, we illustrate some of the ways that staging community infrastructure through temporary activation can respond to these challenges and support the development of a 20-minute neighbourhood.

Recommendations for staging and delivery of community infrastructure in Mambourin
Mambourin will grow and change over the next ten years and community infrastructure must be staged to accommodate this growth. The BFRUDF identifies three indicative stages of development: short term (1-3 years), medium term (3-5 years), and long term (5-10+ years) (Fig.5). The adacjent diagram shows the planning of this staging, differentiating also the very early stage development, prior to the completion of the short-term infrastructure in 2022.

The first house and land packages have already been released by Frasers Property Group and consist of low density single homes to the west of the site. During the short term, Mambourin will deliver the first residential development (including mid-high density residential) along with a resident leisure centre, school, first stage retail and mixed-use sites along Black Forest Road.

During the mid-term, the project will deliver additional retail in the Main Street and Town Centre along with civic buildings, mixed use development and mid to high density residential. This may include a supermarket, cinema, and other community infrastructure. Over the long term, it is expected that the project will provide bus service and a train station. This transport infrastructure should dramatically improve accessibility, but residents will face a lack of key community infrastructure until completion.

Many community infrastructure gaps in Mambourin can be tackled through temporary activation strategies. During the first stages of development, strategies should focus on providing interim services to plug community infrastructure gaps, meeting the needs of early residents during their first years in a new home, and providing "anchoring" sites for routinised contact and building social cohesion. Temporary activation can also play a role in creating a cohesive built environment during the staging process.

The approach to temporary activiation should focus on sites that connect early residential development with proposed community infrastructure locations and help to demarcate the future town centre. To do this, we suggest framing community infrastructure delivery around the community hub model.

As the community develops, attention should be directed toward providing additional support services as needed at existing sites like the leisure centre, school, and art centre.

SITING
Temporary activation programs can be strategically sited in two ways: to seed future activities on planned sites and infill vacant sites to link existing infrastructure.

First, temporary occupation can be used to seed activities on planned sites of future community infrastructure. This helps to

Activate vacant sites with temporary uses until they are developed, linking residential areas with the Community Hub and activating street frontages.

Develop a flexible, multi-purpose Community Hub which is able to fulfil both long term and interim needs before Level 1 Community Infrastructure is complete.

Establish the East-west axis early, complete with pedestrian and bike paths as well as landscaping and planting to link early stage and temporary uses with residential areas.

Provide / enable temporary uses which fulfil Level 1 Community Infrastructure needs, for example regular temporary services like Post Office or regular food markets

Fig. 6. Responding to challenges of staged development in Mambourin.

establish a connection to the physical site. Providing necessary services in the interim can establish travel habits within the community. In Mambourin, temporary uses can be considered on the site of a future community or civic hub and direct attention to the future Town Centre and Main Street.

Developing a community hub that bundles multiple community uses creates an interim focal point or anchor as the community develops, which is important for new build areas like Mambourin. This provisional approach is in line with the BFRUDF suggestion for a "pop-up village." However, we recommend a focus on filling community infrastructure gaps using the hub approach rather than consumption-driven strategies like food trucks and cafés alone. For instance, we identify gaps like a post office or aging in place amenities that could temporarily be part of a community hub. In any case, involving residents in decision-making around temporary uses is crucial. These initiatives can be delivered through a range of partnership models as outlined on pages 18-21.

Second, Mambourin should employ temporary projects as a form of infill, linking early community infrastructure like parks and schools and reinforce accessibility by public transport. This helps to stitch together vacant sites earmarked for later development until realisation of the final master plan and encourages use of active transport modes. Empty sites can form spatial and psychological barriers that reduce resident engagement and auto-dependency. These sites may suit event-based functions such as markets. Early serviced sites such as the Sales and Info Centre have potential to be expanded on and utilised for temporary community uses.

Overall, priority should be given to the early development of circulation and street frontages. Sites should push built form to footpaths and keep carparking to the rear. Avoid car dominated street frontages such as is present in neighbouring Hoppers Crossing, which reduces pedestrian activity and creates a barrier between activity and the street.

BUILDING TYPES

Early temporary community infrastructure should look to multi-purpose and flexible building types. Open floor plans and lightweight structures are ideally suited to temporary uses and events. Considerations should also be given to increased heights between floor and ceiling and dual access for vehicles to allow for deliveries and setup of functions. These features can maximise the impact and vibrancy of the community hub by allowing adaptation over time and supporting an extended range of functions depending on community need.

As we discuss above, Mambourin residents will lack level 1 and 2 community infrastructure in the early stages of development until final build out. However, in the first five years, temporary activation can provide residents access to key services. These uses may include core community infrastructure like childcare centres, health services, and local retail as well as support for local entrepreneurs and home-based businesses. Flexible building types can house Wyndham's existing business support activities in the afternoon and shift to serve special evening events for youth ranging from sports to computer and gaming activites.

Box 4. Building typologies for temporary activation

Converted Shipping Containers
A common typology of temporary use is the installation of small scale services provided by retrofitted shipping containers. These provide an instant structure within which services and joinery can be added. Shipping containers are often used as a kind of core from which a larger outdoor eating / activity area can be serviced.

Shed like envelope
Drawing on rural / regional typologies the 'shed like envelope' is a way to provide economical lightweight and large span covered space. The uninterrupted floor area and high ceilings mean sheds are able to accomodate a range of functions from community functions (such as the Men's Shed) or light industry, and can also be adapted over time. Sheds are a good option for local government or even religious institutions to provided interim services which may move into more permanent homes over time.

Multi-purpose shade
Shade structures can provide a simple infrastructure for inclemental weather which can form a focal point and for temporary outdoor uses such as sports events, markets and performance events. The simple pole structures becomes an infrastructure to support and arrange temporary divisions and program the space.

Empty site + annexe
Drawing on rural / regional typology of the sports field and clubhouse, this typology makes a larger open or empty site usable for temporary events by providing an adjacent, smaller serviced core. Like a clubhouse, a services annexe could contain amenities plus electricity and water points. This allows it to services larger temporary structures erected on the adjacent site.

Long term considerations for a sustainable 20-minute neighbourhood in Mambourin

Given the extant community infrastructure gaps and the complexity of funding and delivery discussed above, the following should be considered for Mambourin to become a 20-minute neighbourhood:

1. Mambourin will require two sports facilities. One of these is currently proposed for the site and will be delivered by the local authority in collaboration with the developer. The other sport facility will be needed only when the site reaches a minimum threshold population. It is expected that new PSPs will be developed in neighbouring areas of Mambourin. The Victorian Planning Authority should consult with the local authority to design a shared infrastructure provision model among the adjacent PSPs.

2. Post offices are a necessity for local residents from day one and are considered key local facilities that enable community interaction. The closest post office from Mambourin is located more than 6km away. Given that there is no existing proposal for a post office within the site and it needs to be delivered by the federal government, the local authority should initiate discussion with the federal authorities immediately. The local government can expedite the process by facilitating a temporary structure which can be shared with other uses. This program fits well with Australia Post's AP Co-Lab pop-up community space and Neighbourhood Welcome Service in Footscray.

3. Although the provision of an aged care facility is not an immediate necessity, it will be an indispensable infrastructure need in the future given the ageing trend in Australian society. Currently, the private sector is centrally involved in the provisioning of this community infrastructure. There is opportunity to deliver aged care services through the market and promote and facilitate necessary conditions for ageing in place;

4. Religious institutions are key meeting places in any neighbourhood. However, our audit shows that existing churches located in surrounding areas are not accessible from Mambourin. Moreover, little consideration is made to plan for a religious institutions within Mambourin. These institutions should be supported to meet in shared spaces such as schools or community centres where appropriate and before permanent places of worship are established. The developer should initiate consultation with different religious and other groups operating in the neighbouring communities to identify if this is needed, and if so, when, what and how this could be provided;

5. Mambourin lacks access to a community health centre. However, a maternal and child health centre is proposed within the site. This provides an opportunity for the state and council in partnership to co-locate community health services with the maternal and child health centre; and

6. Government secondary schools and fire stations are important community infrastructure. The former provides a key meeting place for families and the latter is a key emergency service. Both require state intervention and a relatively larger catchment population. As a result, the provision of these infrastructure can be delayed to secure funding and population threshold. These may be accommodated in adjacent PSP's in the future.

In some cases, staging these and other community infrastructure may be achieved through temporary activation strategies. Temporary projects may be a high profile, low-cost means of encouraging contributions from other parties while responding to the identified gaps in level 1, 2 and 3 infrastructure.

Alternatively, private entities may be contracted to facilitate and manage community services similar to the social enterprise café at Sprout Hub discussed above. This model can apply to a range of activities from childcare and aged care assistance to co-working operations and business incubators.

As discussed, with the appropriate space development, projects could draw on the skills of local entrepreneurs and home-based business owners to launch new enterprises while providing services residents need and desire (e.g. nursery, gourmet food and beverage, brew festival, creative market).Of particular note is the targeting of Mambourin as an arts and cultural centre of the Wyndham municipality in the planning/urban design framework. Community art spaces do more than just present art - they provide opportunities to build community engagement and support local creative production in myriad ways. They can also reinforce community infrastructure networks through school/education programs, business development initiatives, and space provision (Grodach, 2011).

Finally, both permanent and temporary community infrastructure has the potential to cater to existing small and home-based businesses. Our preliminary scan of adjacent suburbs in Wyndham such as Point Cook show that the suburban housing stock supports a flourishing range of home businesses. These businesses offer opportunities for temporary activation, particularly during work hours when commuters leave the suburb. Considering the needs of this unseen workforce offers potential clues to staging non-traditional community infrastructure.

Additional long term Community Infrastructure for Mambourin:

1. A second sports facility could be provided in neighbouring PSPs which will be shared by Mambourin residents

2. A Post Office should be planned and delivered by the Federal Government. Consider interim provision in a temporary structure.

3. Planning should account for the future need for an aged care facility, to be provided by the private sector.

4. Consult with local religious groups towards the provision of a religious Institution within the site.

5. Consider the provision of a community health centre to be co-located with proposed Maternal and Child Health centre.

6. Plan for the future development of a Government Secondary School as well as a Fire Station.

Part 4. Conclusions and directions for future study

This report provides detailed knowledge and recommendations to help guide the creation of 20-minute resilient neighbourhoods through community infrastructure provision in outer suburban growth areas. It also provides a community infrastructure audit for Mambourin, which identifies existing and proposed infrastructure, and the gaps in supply in the coming years. Based on these inputs, we propose recommendations for the staging and delivery of community infrastructure in Mambourin.

Based on our review of existing policy and literature, we recommend that future community infrastructure follows four guiding principles: Community infrastructure should be co-located among other public and commercial uses, integrate a mix of programs and services, be accessible to multiple community segments, and respond to community need and character.

These four principles ground our overarching recommendation to employ temporary activation strategies now to establish a community hub early in the development process. Temporary activation is also a useful means of linking and reinforcing existing community infrastructure.

Our study also points toward key areas where further research can support the development of 20-minute neighbourhoods in fast-growing outer suburban areas like Mambourin and Wyndham.

• **Development of a planning support system for community infrastructure.** Our review shows that a number of PSPs are currently being implemented and/or planned across outer suburban areas in Greater Melbourne. These PSPs have traditionally been planned independently, and as a result, planning for community infrastructure remains isolated within each precinct. The outcome of this practice is that some areas experience surplus community infrastructure while others lack access. The decision support tool will take into account both existing and proposed community infrastructure and their catchment areas to plan for appropriate community infrastructure in each precinct. This is critical to maximise the benefits of existing community infrastructure and to make the process transparent and equitable for all areas.

• **Develop a temporary activation toolkit for outer suburban communities.** Currently, there is a lack of detailed guidance on temporary activation strategies for staging community infrastructure. This report provides general guidelines, but councils and developers would benefit from a detailed set of practical tools to support the development and implementation of temporary community infrastructure.

• **Conduct detailed studies of community economy infrastructure to support the development of 20-minute neighourhoods.** Community economies play an important role in 20-minute neighbourhoods, but are often not considered among basic community infrastructure. In Wyndham specifically, this should include attention to and support for home-based businesses and other forms of local enterprise. There are also opportunities to capitalise on Mambourin's place as a future suburban arts hub. However, there is a lack of knowledge as to the types of small, home-based enterprises that currently exist and the social and economic networks that can be fostered. There are also needs specific to local entrepreneurs and artists around work preferences and constraints like childcare and commuting. Both are opportunities to encourage local employment, activate street activity, and encourage community engagement.

• **Encourage the development of temporary infrastructure masterplan in outer suburban communities.** Supported by the temporary activation toolkit, a dedicated plan focused on temporary activation strategies can help respond to the specific stage needs and management of temporary uses for particular communities like Mambourin. The masterplan can set direction around urban design requirements, simplified or flexible planning controls, and shared or multi-use infrastructure (e.g. car parks). The plan can also frame approaches and design strategies for permanent uses through temporary activation.

• **Develop a 20-minute neighbourhood change index.** Our Mambourin community infrastructure audit identifies the traditional community infrastructure accessible from Mambourin and the gaps in service, but this could be extended to other areas and include non-traditional community infrastructure that support local enterprise. as well as provide more specific detail on specialised community infrastructure such as art spaces.

• **Set benchmarks and monitor progress toward outer suburban 20-minute neighbourhoods.** We recommend that DELWP develop a monitoring instrument to gauge progress toward the realisation of 20-minute outer suburban neighbourhoods.

• **Test and evaluate temporary activation projects.** Neither academic literature or policy has evaluated the extent to which temporary projects and community hubs actually establish meaningful and sustained community connections. Frasers and Wyndham city council should consider partnering on evaluation of future temporary activation projects.

Future action to support sustainable 20-minute neighbourhoods in outer suburbs

• Development of a planning support system for community infrastructure.

• Develop a temporary activation toolkit for outer suburban communities.

• Conduct detailed studies of community economy infrastructure to support the development of 20-minute neighourhoods.

• Encourage the development of temporary infrastructure masterplan in outer suburban communities.

• Develop a 20-minute neighbourhood change index.

• Set benchmarks and monitor progress toward outer suburban 20-minute neighbourhoods.

• Test and evaluate temporary activation projects.

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Appendix

Classification of Community Infrastructure (CI)

Five broader levels of CI were adopted in this study depending on the threshold population they serve. The levels, their respective threshold population, and catchment areas were adopted based on a review of the following sources (except otherwise stated) and are outlined in Table A1:

1. Australian Social & Recreation Research Pty Ltd (2009)
2. City of Melbourne (2015)
3. Town of Kwinana (2010)

Table A1: Levels and thresholds of community infrastructure

Levels	Name	Threshold population	Catchment size	Source
1	Local centre	Up to 10,000	400m	1, 2
2	District centre	10,000–30,000	800m	1,2
3	Sub-regional centre	30,000–60,000	3km	1,3
4	Municipal centre	60,000–150,000	6km	Authors' derivation
5	Inter-municipal centre	250,000	12km	Authors' derivation

Derivation of population thresholds

While the population thresholds for the first three levels were adopted from secondary sources, these were derived for higher order CI (Level 4 – municipal centre, and Level 5 – inter-municipal centre) as outlined below:

- ***Municipal centre:*** The threshold population for CI serving municipal centre was derived as an average population size of all municipalities located within the Greater Melbourne Area, which was found to be 142,432 persons using the 2016 census data and rounded as 150,000 persons.
- ***Inter-municipal centre:*** Inter-municipal centre comprises of CI serving two or more municipalities according to the Australian Social & Recreation Research Pty Ltd (2009). As a result, total population of any two adjacent municipalities across the Greater Melbourne Area were calculated. These were then averaged to represent population threshold for CI serving inter-municipal centre.

Derivation of catchment areas

Like population thresholds, the catchment sizes of the two higher order CI (Level 4 – municipal centre, and Level 5 – inter-municipal centre) were also derived in this study as outlined below:

- ***Municipal centre***: The catchment size of CI serving a municipal centre was derived based on average distance from the centre of a municipality to its boundary. Initially, 50 points were randomly selected from the boundary line of each municipalities (Figure A1a). The distances from the centre of each municipality to their respective 50 random points were derived and averaged. The average distances of individual

municipalities located across the Greater Melbourne Area were averaged again to derive a generic catchment size for Level 4 CI.

- ***Inter-municipal centre***: CI serving inter-municipal centres should be accessible from neighbouring municipalities. As a result, the average distances from the centre of each municipality to its neighbouring municipalities were derived (see Figure A1b). The averages of individual municipalities were averaged again for all municipalities across the Greater Melbourne Area to derive a standard catchment size for Level 5 CI.

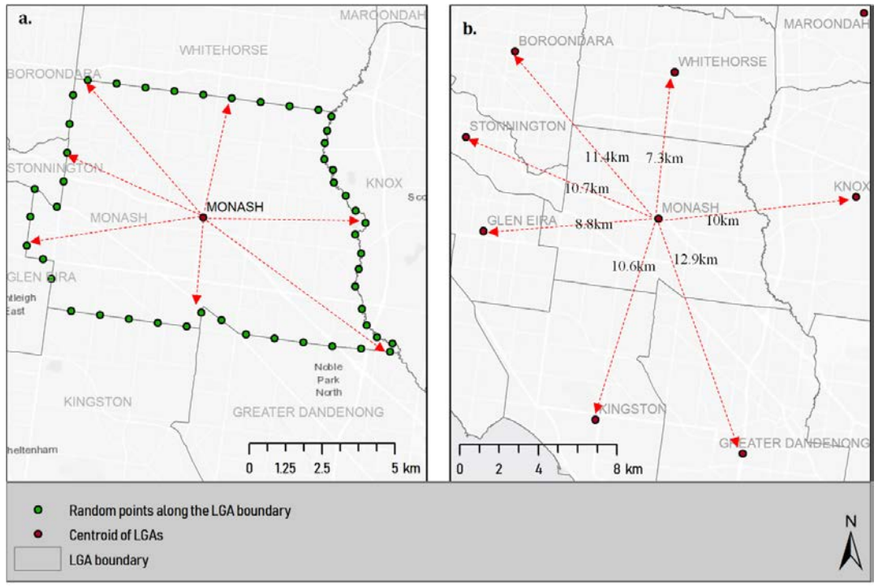


Figure A1: Derivation of catchment sizes

Identification of CI according to the catchments

A review of the literature was conducted to identify CI according to the level they serve. A further explanation of the nature of these CI, and their standards are presented in Table A2.

Table A2: Classification of community infrastructure (CI) according to catchment levels

List	CI Level	CI Name	Further explanation	Standard (#/person)
1	**1**	Neighbourhood parks	Semi-developed open space containing play equipment, seating, shade and grassed area	1/1,250
2		Childcare centre	Council or private	1/9,000
3		Church		1/10,000
4		Local community houses	Accommodates playgroups, after school care, health, fitness, leisure and learning programs, youth, seniors, counselling and self-help groups.	1/5,000
5		Youth space/facility	Incorporated in multipurpose community centre or primary school	1/8,000
6		Community arts space	Incorporated in multipurpose community centre or primary school	1/8,000
7		Government primary schools		1/9,000
8		Kindergarten		1/10,000
9		Local shops/corner stores		1/5,000
10		Medical, dental & allied health services		8 FTE GPs / 10,824
11		Post office		1/10,000
12		Local sports ground	Multipurpose sports and recreation facility incorporating a grass active playing space and facilitate football, soccer, cricket activities.	1/5,000
13	**2**	Residential aged care		1/30,000
14		Catholic primary school		1/18,000
15		Community health centre	DHS Level 2	1/30,000
16		CFA Station		1/15,000
17		Government secondary schools	Includes senior oval, indoor sports facility & performing arts facility	1/30,000
18		Maternal & child health centre	Dual facility 2 nurses - co-located with other early childhood services	1/16,000
19		District park	Children's playground BBQ, landscaping, walking trails	1/30,000
20		Lower order tennis courts	2 courts no pavilion (free to public facility)	1/25,000
21	**3**	Indoor sports/aquatic centres	25 metre pool	1/40,000
22		Ambulance station		1/60,000
23		Catholic secondary school		1/58,000
24		Community arts facility	Co-located with secondary school with capacity for wider community use	1/30,000
25		Branch libraries	Contain printed, audio and on-line information, reading area, meeting and activity rooms	1/35,000
26		Police station		1/40,000
27		District youth centres	Multipurpose community facility specifically catering for children and young people	1/25,000
28		District sports grounds	Accommodate two to four sports grounds and pavilion (two main and two smaller change rooms)	1/25,000
29		District community centre	Multipurpose facility with a major hall venue and incorporates outdoor spaces such as an amphitheatre or performance area	1/25,000
31		Dry recreation centre	Provides a wide range of sporting programs including indoor sports (basketball, netball and volleyball), exercise, fitness and health programs.	1/35,000
32	**4**	TAFE		1/150,000
33		Specialty needs schools		1/150,000
34		SES facility	Co-located with council/CFA facility	1/150,000
35		Arts and cultural centre	Facilities catering for performing arts and include theatre, drama, dance, music, and concert.	1/100,000
36		Youth centre		1/75,000
37		Sports ground		1/75,000
38		Destination park (theme		1/75,000

		park)		
39		Foreshore upgrades		1/75,000
40		Animal pound		1/75,000
41		Knowledge/community resource centre		1/75,000
42	**5**	Hospital	DHS Level 5 includes community-based health services	1/250,000
43		Law courts		1/250,000
44		Public art gallery		1/60,000
45		Regional park	Children playgrounds, BBQ, landscaping, walking trails, visitor facility	1/250,000
46		University		1/250,000

Derivation of catchment sizes from Mambourin

The derivation of catchment sizes required to locate a central point in Mambourin from which the buffers were derived. However, Mambourin is currently being constructed (Figure A3a). The internal roads of the site is not well developed yet and the site is not currently well connected to external road networks. The connectivity to both internal and external road networks is important to measure the distance from Mambourin to different CI available. As a result, a centre point of Mambourin is placed on a main road of the site to derive the catchments (Figure A3a). All CI proposed within the site are considered as accessible from Mambourin.

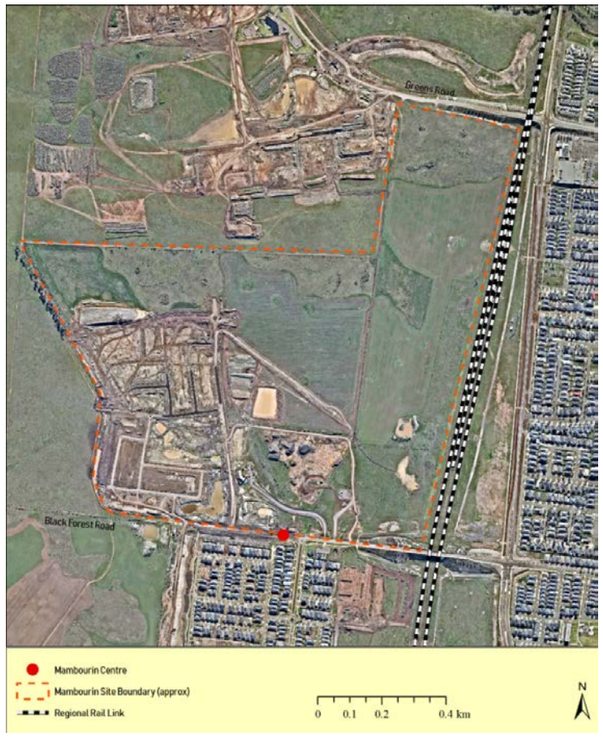


Figure A3a: Physical status of the site at the time of conducting the CI audit (satellite image, June 11, 2019)

The choice of catchment derivation method between circular buffer and network buffer was found to be a major issue in the literature. Despite the circular buffer method is commonly used, a shortcoming of this method is that circular buffers are likely to be inaccurate in areas with natural features such as rivers, lakes and cliffs or built features such as railways or suburbs with poor street connectivity. Because of this limitation of circular buffers, a few studies have used road network buffers to define areas within which an individual can travel within the specified distance (Oliver et al., 2007). Importantly, studies have found that road network buffers provide a more optimal measure for accessibility of community infrastructure (Seliske et al., 2013).

This study derived both circular and network buffers of all five catchment areas and calculated the size (area) of these catchments (Table A3). A ratio of network buffer over circular buffer shows that the network buffers cover between 27% and 59% of the areas of circular buffers, suggesting that the study area lacks network connectivity. As a result, the study adopted the network-based measure to derive the catchment sizes for a better representation of accessibility score, instead of circular distance. Figure A3b shows the spatial extent of the five catchment areas from Mambourin.

Table A3: Circular vs. network buffers

Levels	Catchment size	Catchment area: circular buffer (km^2)	Catchment area: network buffer (km^2)	Ratio of catchment areas: network/ circular
1	400m	0.50	0.30	0.59
2	800m	2.01	0.88	0.44
3	3km	28.27	7.63	0.27
4	6km	113.10	30.05	0.27
5	12km	452.39	137.41	0.30

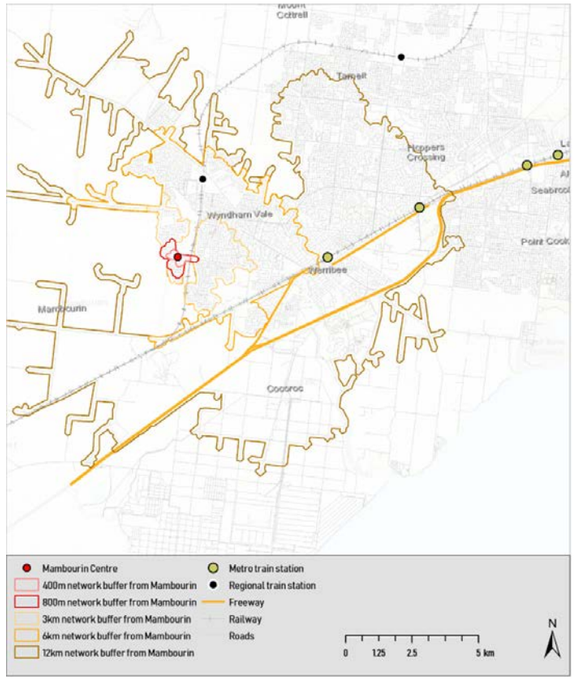


Figure A3b: Extent of search areas for different levels of CI from Mambourin

Gather existing/proposed CI data for audit

Table A2 shows a list of 46 different types of CI as initially identified to conduct audit for Mambourin in this study. The list was refined to 32 different CI types based on the type of functions they provide, the type of locations needed (e.g. co-located with other CI) for their service, and data availability. The refined list, their levels, and sources of data used to represent them spatially are outlined in Table A4.

Table A4: Classification of community infrastructure (CI) according to their levels

List	Level	CI type	Sources of data	Name of sourced data	Updated in
1	1	Neighbourhood parks	Data VIC	Parks and Conservation Reserves	July 2019
2		Childcare centre	Data VIC	Vicmap Features of Interest	July 2019
3		Church	AURIN	PSMA	August 2018
4		Community centre	AURIN	PSMA	August 2018
5		Government primary schools	Data VIC	2015 All Schools Listing	April 2019
6		Kindergarten	AURIN	PSMA	August 2018
7		Local shops	Open Street Map	Amenity Points	
8		Medical & allied health services	AURIN	PSMA	August 2018
9		Local sports facility	Data VIC	Vicmap Features of Interest	July 2019
10		Post office	AURIN	PSMA	August 2018
11	2	Aged care	Data VIC	Vicmap Features of Interest	July 2019
12		Catholic primary school	Data VIC	2015 All Schools Listing	April 2019
13		Community health centre	Data VIC	Vicmap Features of Interest	July 2019
14		Maternal & child health centre	Data VIC	Vicmap Features of Interest	July 2019
15		Fire station	Data VIC	Vicmap Features of Interest	July 2019
16		Government secondary schools	Data VIC	2015 All Schools Listing	April 2019
17		District/metropolitan park	Data VIC	Parks and Conservation Reserves	July 2019
18		Tennis courts	Data VIC	Vicmap Features of Interest	July 2019
19	3	Indoor sports/aquatic centres	Data VIC	Vicmap Features of Interest	July 2019
20		Ambulance station	AURIN	PSMA	August 2018
21		Catholic secondary school	Data VIC	2015 All Schools Listing	April 2019
22		Community arts facility	Data VIC	Vicmap Features of Interest	July 2019
23		Branch libraries	Data VIC	Vicmap Features of Interest	July 2019
24		Police station	Data VIC	Vicmap Features of Interest	July 2019
25	4	State emergency facility/complex	AURIN	PSMA	
26		Specialty needs schools	Data VIC	2015 All Schools Listing	April 2019
27		TAFE	Data VIC	Vicmap Features of Interest	July 2019
28	5	Hospital	Data VIC	Vicmap Features of Interest	July 2019
29		Law courts	Data VIC	Vicmap Features of Interest	July 2019
30		Public art gallery	Data VIC	Vicmap Features of Interest	July 2019
31		Regional park	Data VIC	Parks and Conservation Reserves	July 2019
32		University	Data VIC	Vicmap Features of Interest	July 2019

Identification of existing CI accessible from Mambourin

Accessibility to different levels of (existing) CI were identified based on whether a particular CI type is located within their respective catchment area from Mambourin. Each CI type was mapped and the shortest path distance from the centre of Mambourin was also calculated. Figures A5a, A5b, A5c, A5d, and A5e respectively show accessibility to Levels 1, 2, 3, 4 and 5 CI from Mambourin. If a certain type of CI is located within their respective catchment area, then the number of such CI was also counted.

Figure A5a: Accessibility to Level 1 CI (existing) from Mambourin

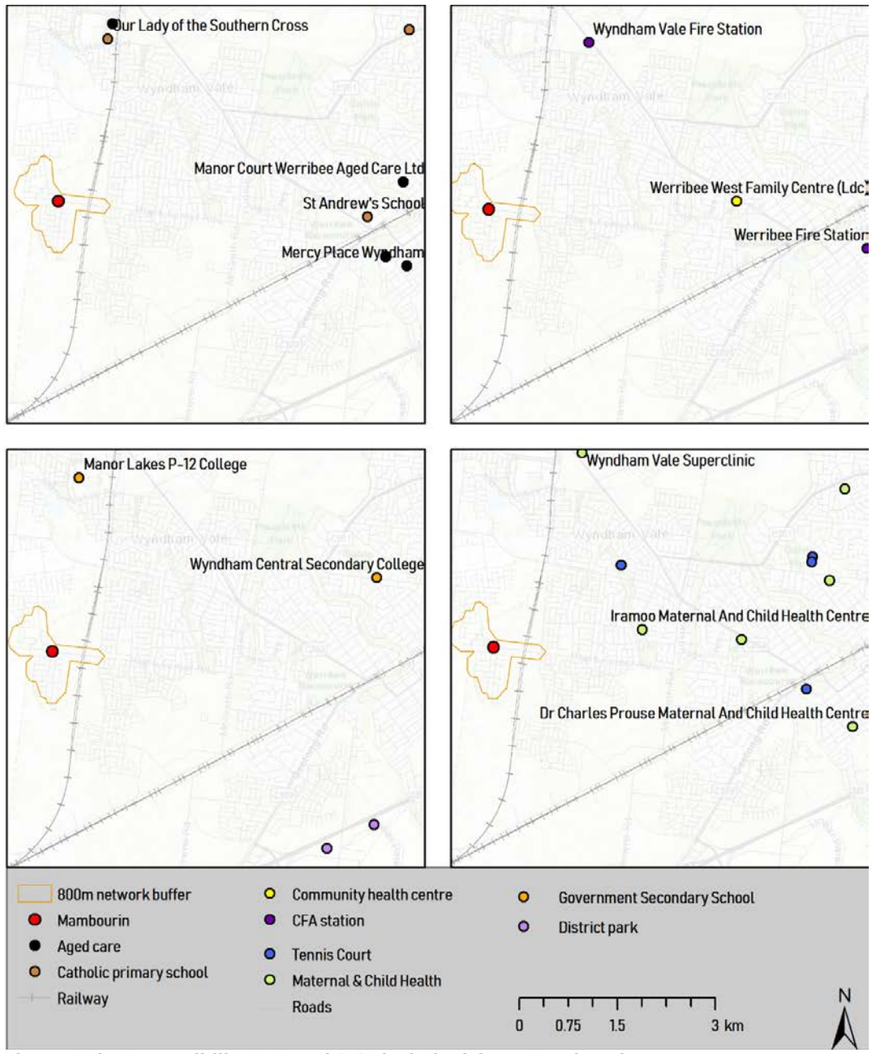


Figure A5b: Accessibility to Level 2 CI (existing) from Mambourin

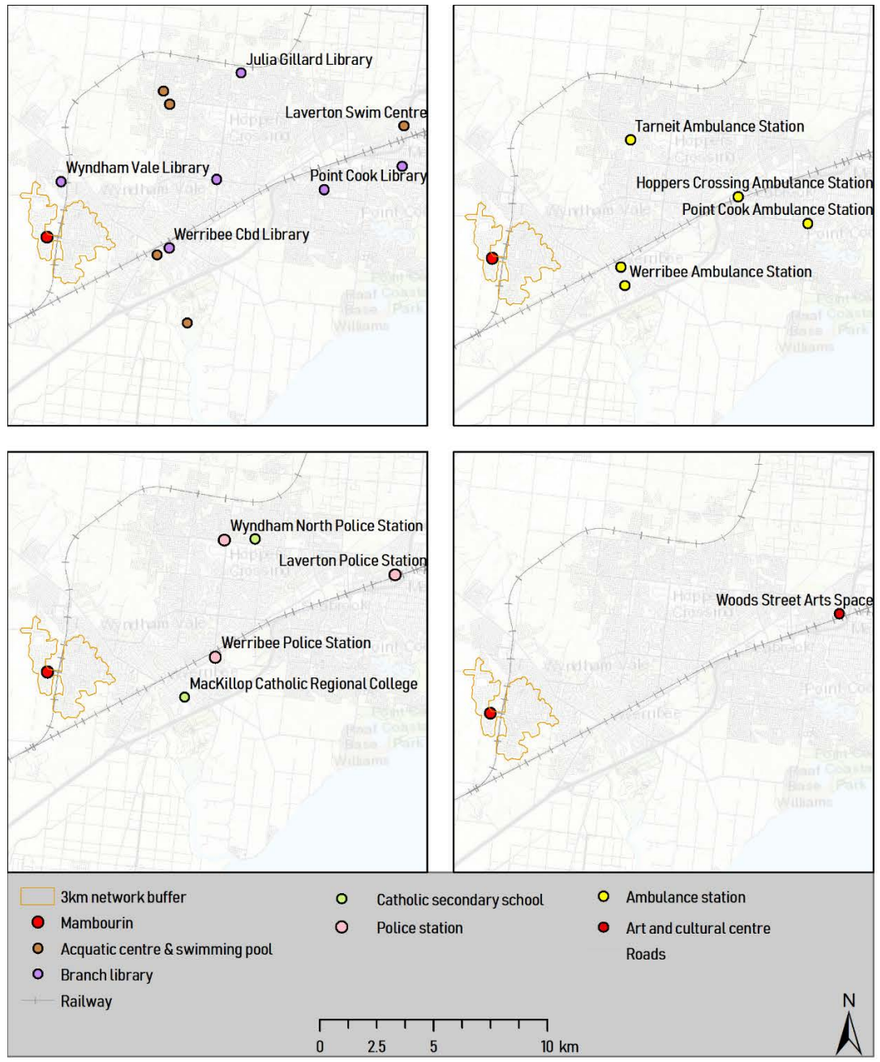


Figure A5c: Accessibility to Level 3 CI (existing) from Mambourin

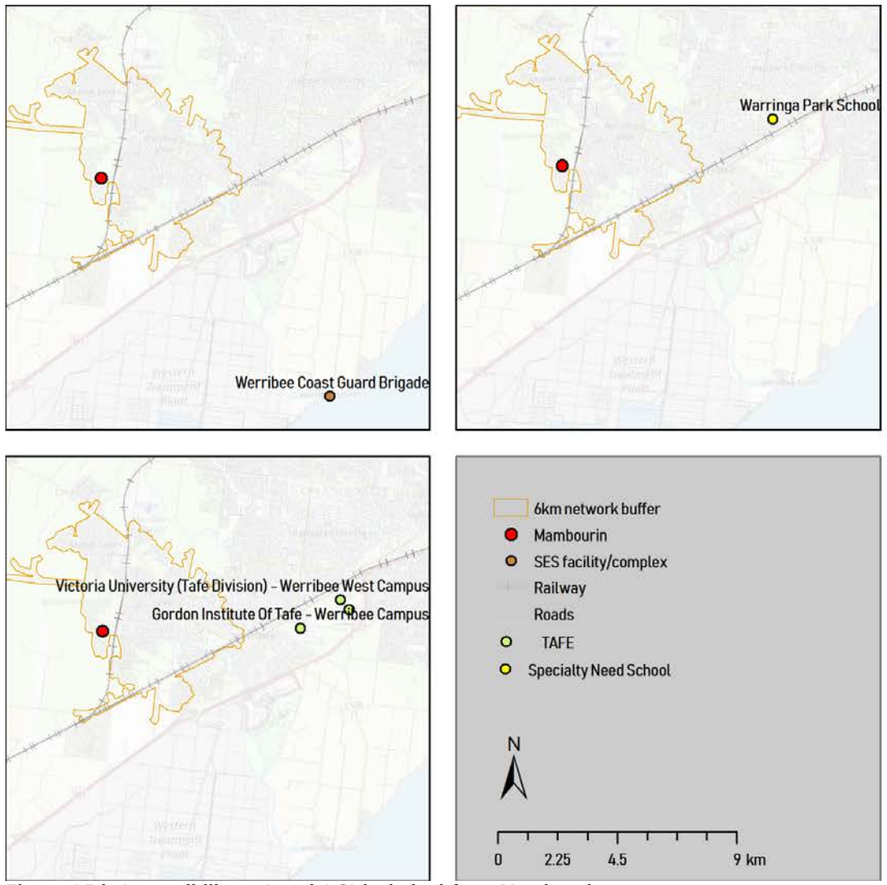


Figure A5d: Accessibility to Level 4 CI (existing) from Mambourin

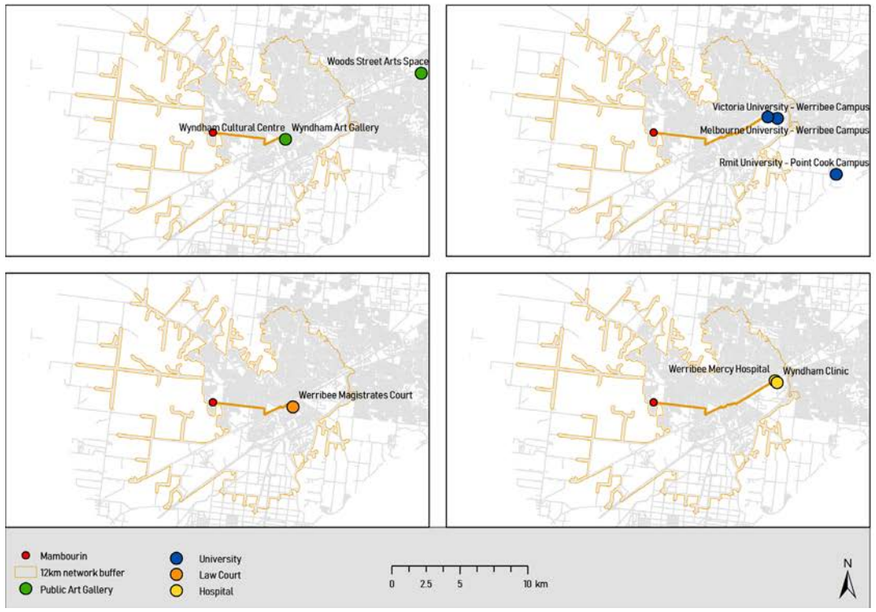


Figure A5e: Accessibility to Level 5 CI (existing) from Mambourin

Estimation of current residential population within the catchments

People living within the five catchments were estimated based on the 2016 census data. The catchment areas were overlaid on the Meshblock (the smallest census geography) and the population of all Meshblock that were located inside the catchment areas were summed to derive catchment population (Figure A6 - left). Population of Meshblock containing the Mambourin site was estimated based on proposed 1,200 dwelling units which equates to 3,120 persons (average household size of 2.6 persons). Table A6 shows estimated residential population within each catchment area.

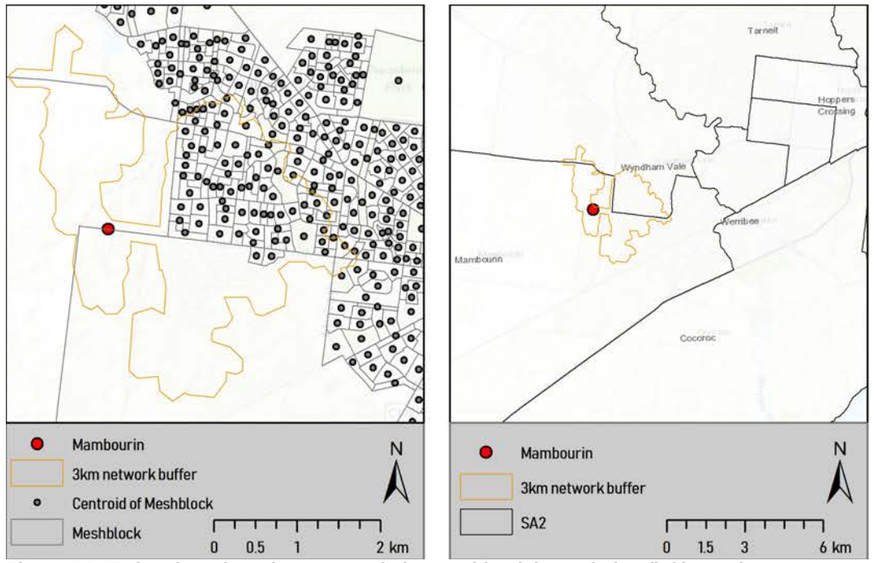


Figure A6: Estimation of catchment population: residential population (left), employee population (right)

Table A6: Estimated and projected population

Level	Catchment area	Existing catchment residential population	Projected catchment residential population, 2040	Existing catchment employee population	Projected catchment employee population, 2040	Total projected population, 2040
1	400 m	3,120	6,958	3	4	6,962
2	800 m	3,198	7,131	7	10	7,141
3	3 km	12,468	27,804	82	120	27,924
4	6 km	37,933	84,591	532	779	85,370
5	12 km	116,156	259,028	13,768	20,152	279,180

Projection of residential population within the catchments for 2040

A smaller area population projection data surrounding Mambourin site was obtained from Wyndham City Council (Table A7). Based on Table A7, the population growth rate in surrounding areas was calculated as 2.23 between 2020 and 2040. This rate was applied to project population within the catchment areas for the period of 2040 as shown in Table A6.

Table A7: Projected population by age group in Mambourin and surrounding areas (Source: Wyndham City)

Age Group	2020	2025	2030	2035	2040
0-4 years	3,402	4,571	5,839	7,081	7,400
5-10 years	3,726	4,796	6,281	7,760	8,400
11-18 years	3,534	4,777	6,202	7,810	8,842
19-23 years	2,290	2,857	3,527	4,385	4,804
24-35 years	7,900	10,647	13,268	15,880	16,076
36-65 years	12,781	16,621	21,231	26,474	29,928
66-75 years	1,843	2,468	3,160	3,800	4,386
76-110 years	951	1,549	2,172	2,970	3,730
Total	38,447	50,311	63,710	78,195	85,606

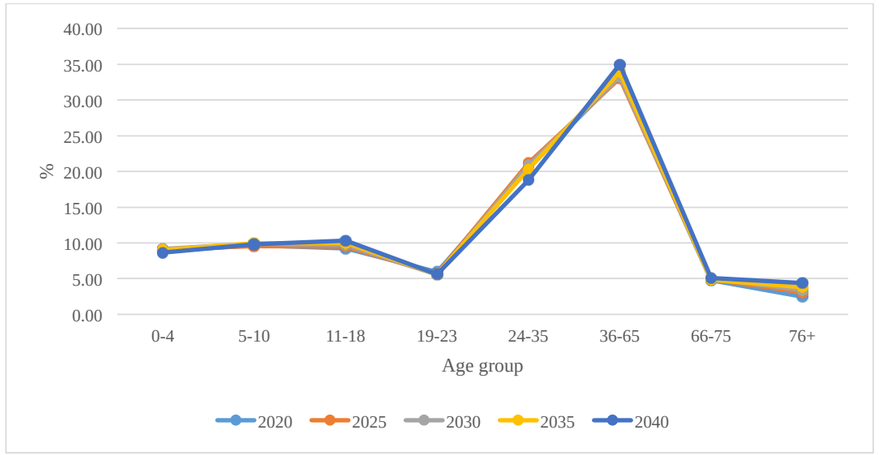


Figure A7: Changes in demographic composition of people in Mambourin and surrounding areas

Estimation of current employee population within the catchments

A similar method to the estimation of residential population was applied to estimate employee population. However, unlike residential population, data for employee population was available only at the statistical area 2 (SA2) level. An SA2 is much bigger in size compared to Meshblocks, even bigger than some catchment sizes (400m, 800m). As a result, a proportionate method was applied – i.e. employee population was proportionately allocated to the catchments depending on the area of overlap (Figure A6 - right).

Projection of employee population within the catchments for 2040

Unlike residential population, a long-term forecast of employee population is rarely available. Wyndham City Council observed an 8.1% employment growth between 2015 and 2016 (Figure A9a), which is unlikely to sustain over the period until 2040. In contrast, a medium-term forecast by the Australian Government shows that Wyndham region will experience an 8% growth over the next five years (2023) (Figure A9b) – i.e. an increase of 1.6% per annum. This rate was applied to project employee population within the catchments using Equation 1.

$$P_f = P_p(1 + r)^n \qquad (1)$$

where P_f is forecasted population, P_p is present population, r is the rate of increase per year, and *n* is number of years.

The projected employee population for 204 is shown in Table A6.

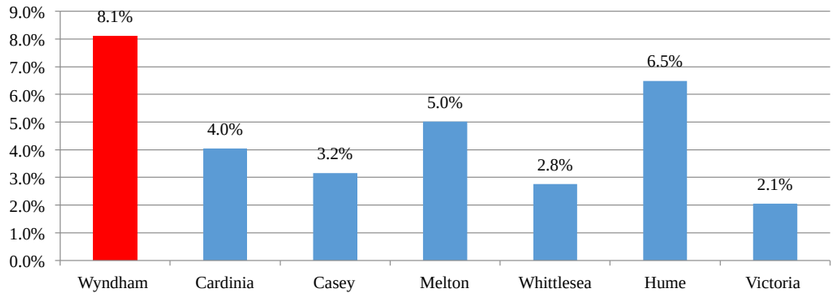
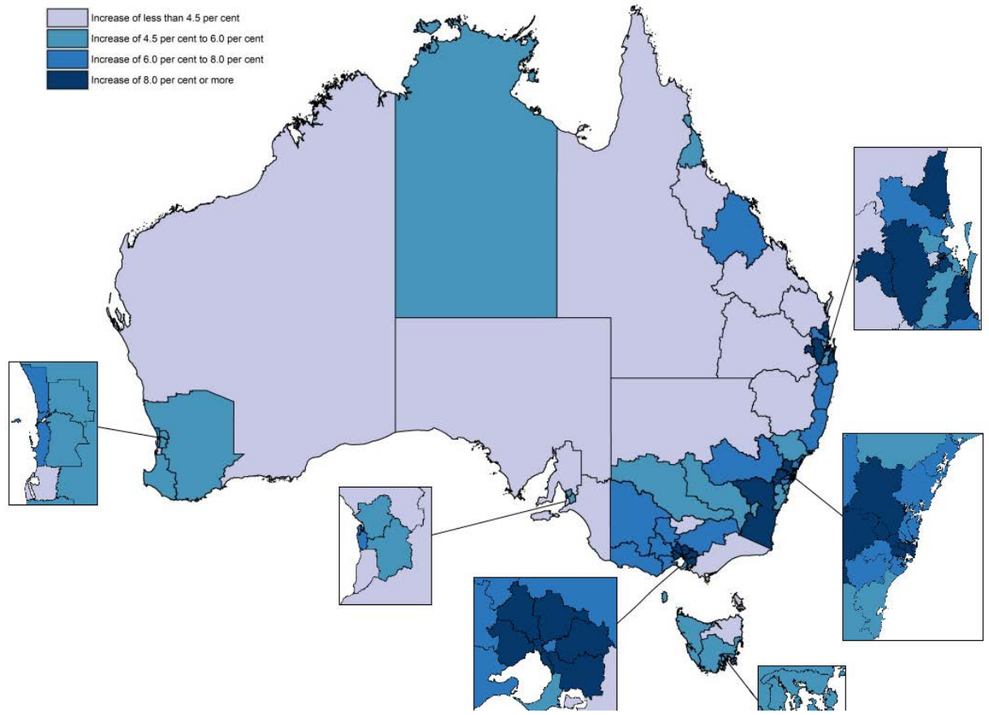


Figure A9a: Percentage Change in Number of Local Jobs, 2015 to 2016 (Source: Wyndham City Plan 2017 – 2021)



Demand for CI

The demand for CI was calculated based on total population (residential population a employee population) for 2040. The number of CI required is derived based on the st CI as outlined in Table A2. For example, if a park needs to be provided for 1,000 pop the projected population is 5000 within the Level 1 catchment area, this mean that th demand for 5 parks. Table 2 shows the demand for different CI against their availabil and proposed). A subtraction of existing/proposed number of CI from the required nu equates to the gap in CI.