Final Report

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Processes for developing affordable and sustainable medium-density housing models for greyfield precincts

authored by

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ACRONYMS

ABS	Australian Bureau of Statistics
ACGP	Ashwood Chadstone Gateway Project
AHURI	Australian Housing and Urban Research Institute
BAU	Business-as-Usual housing models
CBD	Central Business District
CHO	Community Housing Organisation
DHS	Department of Human Services
DPCD	Victorian Government Department of Planning and Community Development
EJD	Effective Job Density
EOI	Expressions of Interest
ESD	Environmentally Sustainable Design
FaCSIA	Australian Government Department of Families, Community Services and Indigenous Affairs
GIS	Geographic Information System
HDD	Housing Development Data
KDR	Knock Down Rebuild
MHP	Median House Prices
NBESP	Nation Building Economic Stimulus Plan
NFP	Not for Profit
NRAS	National Rental Affordability Scheme
OECD	Organisation for Economic Co-operation and Development
PPHA	Port Phillip Housing Association
PPP	Public Private Partnership
PTAL	Public Transport Accessibility Level
SAP	Service Access Points (transport)
SEIFA	Socio-economic Indexes for Areas
SHI	Social Housing Initiative
VCAT	Victorian Civil and Administrative Tribunal

EXECUTIVE SUMMARY

This project investigates a design-oriented, integrative development approach that responds to a timely opportunity in the greyfields of Australian cities: how to redevelop dispersed and ageing public housing properties in the middle suburbs. Greyfields in the Australian context have been defined as those *ageing but occupied* tracts of inner and middle ring suburbia that are physically, technologically and environmentally failing and which represent under-capitalised real estate assets—given that in greyfields, the built asset makes little or no contribution to the market value of the property compared to the land component (Newton 2010).

The project sits at the core of questions regarding the intensification of the middle suburbs: how to find new ways to accommodate population increases; how to create affordable and diverse housing options; how to manage ageing housing stock, and how to maximise the use of existing infrastructure and amenity. Through a design lens, this research focuses on alternative development approaches that could challenge conventional methods of infill delivery. At present, the main model for redevelopment in the greyfields is informal infill undertaken by small developers (Phan et al. 2008), rather than in the government-sanctioned areas such as activity centres where there is relatively little development (Goodman et al. 2010). This *ad hoc* infill development is uncoordinated, lacks strategic focus and is not achieving the required increases in density, nor is it improving the amenity of the city (Newton 2010).

The potential availability of dispersed ageing public housing assets, which are scattered throughout Australian cities, offers a significant opportunity to develop and test a new development approach that offers an alternative to the market-led one-off infill type. This research does this by exploring how innovative design strategies can create coordinated precincts that involve the redevelopment of multiple, non-contiguous public housing lots considered as one development. By approaching development of these lots at precinct scale, a range of individual and collective benefits can be achieved such as better quality urban amenity and infrastructure, and a diversity of housing types that achieve higher yields and more affordable living options. In relation to ageing government housing stock, this requires an integrated approach with multiple partners including state government housing authorities, community housing organisations, local government authorities, the private sector and the community.

Research scope and process

This project uses the integrative processes of design research as the theoretical basis for its enquiry. Such an approach offers an alternative to traditional policy and technical analyses, which are failing to change standard market mechanisms. The project takes a three-pronged approach to testing the feasibility of redeveloping government-owned housing land in the middle suburbs. The first stage of research examines innovative design and procurement processes used in social housing delivered under the Nation Building Economic Stimulus Plan (NBESP) from 2009–12; the second focuses on where the opportunities are in the middle suburbs for dispersed public assets to be redeveloped at precinct scale; and the third develops three plausible design scenarios to explore how this land could be redeveloped at precinct scale to achieve intensification and good housing/neighbourhood outcomes. The design propositions have involved community engagement around infill design alternatives and preliminary modeling of precinct viability. The methods employed in this stage of the research are underpinned by a place-specific engagement with real sites, physical contexts and stakeholder concerns. The design-led study provides spatial analysis for public housing policy in the context of broader urban regeneration priorities.

Summary findings

Stage 1: Design innovations in Nation Building Economic Stimulus Plan (NBESP) Social Housing Initiative (SHI)

Public housing redevelopment is an opportunity for innovation and market leadership in affordable housing design and delivery. The SHI's primary objective was to provide jobs in the construction industry at a time of global economic crisis. Those quality, innovative housing outcomes that were achieved were more a chance by-product of this process rather than a strategic intention of the program. The vast majority of projects delivered under the SHI were 'business as usual' 2-for-1 dual occupancy developments. Given the magnitude of the SHI building program, this outcome can be considered a lost opportunity and an underutilisation of public investment (both financial and land). However, there were some lessons learned that showed that quality urban outcomes are possible within constrained social housing scenarios, even if these qualities are limited to individual developments or were only partially achieved. The design innovations were often simple but well executed strategies and focused on: parking arrangements; design of common areas; interfaces of private dwellings with common areas and public spaces; addressing privacy and noise (landscaping, screening, careful planning); arrangement of tenancy mix/social diversity; and efficiency of internal apartment/unit planning.

Stage 1 also revealed the critical role that procurement methods play, particularly creative/non-standard approaches to partnerships and financing, in delivering innovative design outcomes. Factors leading to innovation included the involvement of CHOs who could access alternative land and funding sources, offer design and delivery expertise and facilitate mixed tenancy outcomes; a 'champion' for design quality; relaxation of selected planning controls; and project alignment with existing urban renewal strategies. Barriers to innovation included the project scale, with smaller projects having a limited scope for design; project locations, where available public housing land was often in areas of relative disadvantage with poor transport access; and lack of long-term strategic planning for affordable/social housing and neighbourhood uplift. The outcomes from this stage are published as an AHURI refereed Positioning Paper entitled *Design innovations delivered under the Nation Building Economic Stimulus Plan—Social Housing Initiative* (Murray et al. 2013).

Stage 2: Dispersed public housing land in the middle suburbs

The study found that the Department of Human Services (Victorian Government) has existing housing assets in sufficient number in well-located areas of Melbourne's middle suburbs broadly suitable to infill development. Preliminary investigations of public housing landholdings in Brisbane and Sydney metropolitan areas showed similar patterns of landholdings. The nature of these landholdings is disaggregated, forming loose site-clusters at different scales, as a result of past policies for acquisition, construction, disposal and transfer of public housing assets over a 50-year period. The dispersal of these government-owned assets is unplanned, but nevertheless now represents an opportunity for a larger scale of redevelopment than is usually the case in middle suburban locations. Much of the building stock on these numerous sites is currently in need of replacement or substantial refurbishment, at the same time as their middle suburban neighbourhoods need to intensify in order to play a more positive role in the quality, amenity and functionality of the metropolitan system as a whole.

High impact development opportunities—where ageing housing stock exists in high value areas with good access to transport, employment, amenity and services—are not common occurrences within the existing DHS portfolio. The majority of middle suburban stock has reasonable proximity to open space and employment but limited access to public transport in low value areas. The commonality of these conditions is a significant consideration for developing replicable and sustainable affordable housing models. Stage 2 research identified which specific groups or 'clusters' of DHS properties have the most strategic potential. When certain conditions of clustering or 'nearness' of sites are met, the particular qualities and

metrics of this dispersal are suited to a coordinated precinct type of redevelopment. The spatial examination also identified the greyfield contexts in which different precinct models could be replicated including: typical residential streets; on the edges of parks and open space reserves; and near existing local strip shops or community 'hubs'.

Stage 3 Developing and testing of precinct design scenarios

Through the development of three design scenarios, Stage 3 found that the coordinated precinct approach could offer an effective model for redeveloping dispersed public housing assets. When considered as a precinct (defined in this study as clusters of 12 lots), their integrated redevelopment can achieve substantial increases in dwelling yield within a plausible building envelope. The design scenarios developed in this study delivered two to four times the number of dwellings over 12 lots when compared to business-as-usual dual occupancy outcomes. Simple but well-executed design and place-making strategies impacted, not just on the dwelling, but also the neighbourhood and beyond. A precinct design approach allows for non-uniform, flexible siting of higher density buildings, effective program mixes, efficient parking arrangements and a variety of households and tenure types to be accommodated across a neighbourhood.

Place-specific public realm enhancements enable existing community assets to 'work harder' for more people. These can then be supplemented with targeted amenity and infrastructure upgrades tailored to local needs and aspirations. Good quality design encourages other flow-on benefits, such as attracting local business or institutional investment through active streetscapes and improved access/connectivity. Preliminary discussions with key stakeholders—municipal authorities, community housing organisations and local community members—showed real interest in the benefits of a coordinated precinct-based development approach. For instance, the key message from the community consultation undertaken is that higher-density development needs to 'give something back' to the community to be supported and ultimately successful—this was adopted in the three design scenarios. Stage 3 found that a relaxation of particular planning controls enables substantial flexibility in medium-density development, supporting better design outcomes and higher-yields. In particular, 'blanket' setback requirements and parking provisions restrict the ability to efficiently use residential land while also providing liveable dwellings and engaging social streetscapes.

Preliminary analysis of viability reinforced the established market understanding that higher densities and apartment typologies are more viable in locations with higher underlying land values, and low-rise townhouse typologies are more viable in lower value areas. However, this needs to be balanced against the need to provide a range of housing sizes, types and price points suited to a diverse demographic profile, and also considered over a longer term horizon of change. The study showed that continuing business-as-usual piecemeal infill is not a viable solution from economic, environmental or social perspectives; the compounding impact over a 20-year period would likely hamper sustainable transformations for much longer into the future. Achieving viable development outcomes in the long-term relies on good quality public realm improvements and amenity and infrastructure upgrades to support resultant population increases. The study speculates on the net financial impact of integrated precincts across locations and over time to explore potential cross-subsidisation of development and initiating cooperative finance arrangements.

Conclusions

The combined learnings from the three research stages provide valuable insights for precinct-scaled redevelopment of greyfield suburbs. The study focuses on public housing renewal in the middle regions of Melbourne, however, it is broadly relevant to public housing redevelopment in other jurisdictions and constitutes a new infill model that could be applied to the private sector.

Greyfield precinct redevelopment warrants strategic policy attention

Current urban containment initiatives are failing to achieve infill targets and cannot deliver the diversity of dwellings needed for more equitable and liveable cities. Unsuccessful infill strategies have been a failure on the part of government to recognise the existence of two infill segments—brownfields and greyfields. Each has a distinctive pattern of development that needs to be better understood, and strategically harnessed, to achieve real urban change. Urban policies, programs and practices are lacking an effective response to medium density redevelopment in the middle suburbs. The diverse locational and typological possibilities offered by greyfield redevelopment could provide a much needed complement to existing development initiatives.

Public housing is a significant government asset which requires strategic 'stewardship' to realise its full value

Victoria's public housing portfolio was worth $17.8 billion as of July 2012 (Victorian Auditor-General 2012). There are over 23 500 public housing assets in metropolitan Melbourne and more than half of these are located in the middle regions of the city. The portfolio of public housing is a significant government asset which could be used in the regeneration of established suburbs, but it does not feature in current metropolitan planning strategies. Public housing assets will require a holistic 'stewardship' through their pending renewal, transfer or sale to realise the full value and achieve the broadest range of public benefits. This will involve higher levels of cooperation between government agencies and better integration of strategic planning and housing policies.

The quantity, condition and distribution of public housing stock present a unique and timely opportunity to regenerate the middle suburbs

Much of the public housing portfolio in the middle suburbs comprises low density ageing stock in relatively high amenity areas. The disaggregated nature of these land-holdings offers significant advantages when developed as an integrated precinct. This research located more than 6500 DHS properties in the middle suburbs aged 1990 or older which formed suitable clusters for a precinct design approach. This represents 25 per cent of all public housing assets and equates to 471 hectares of 'development-ready' land under single ownership. The quantum of dilapidated assets presents a unique and timely opportunity for 'wholesale' and strategic redevelopment. Their dispersal across the middle regions of the city raises the prospect of delivering effective and sustainable regeneration of the greyfields.

These valuable assets are at risk of being sold-off piecemeal

The physical and operational benefits of precinct redevelopment are not possible to achieve on a lot-by-lot basis. As such, the portfolio of public housing has much greater value as a collective than as individual assets. Future policies for housing renewal, transfer or sale must capture this long-term value of the collective portfolio, not just piecemeal sites. The key risk identified by this research is that governments will opportunistically sell off these dispersed properties as a way of expediently dealing with the liability of underperforming assets. If sold and subsequently redeveloped as one-off business-as-usual infill projects, the opportunity cost would be substantial. The advantage of single-ownership could be lost and, with it, the capacity to drive strategic urban regeneration in established neighbourhoods.

Dispersed public housing land is an advantage not a limitation

Operating across clusters of dispersed sites increases the physical surface area of urban regeneration, increases the interface with the surrounding context and reduces negative concentrations of density and disadvantage. The diversity and distribution of building forms and public realm enhancements makes the precinct model inherently flexible. It leaves gaps open for future opportunities—not expending future capital or using up all of the area's potential—allowing for adjustments and adaptations over time.

A design-led process can overcome typical market barriers to infill development

This research has demonstrated how a design-led, place-specific and consultative process can positively affect typical barriers to higher density and better quality infill redevelopment:

1. Communities are not averse to higher density redevelopment as long as it 'gives something back' to the existing area.
2. More flexible 'performance-based' planning controls could substantially improve the quality, viability and yields achieved by infill housing redevelopment.
3. Design-led strategic development instruments could increase developer certainty and facilitate opportunities for creative cost/risk sharing.

The not-for-profit (NFP) sector can leverage public investment

The SHI demonstrates how public investment can be successfully leveraged for additional social housing supply by building capacity in the NFP housing sector. NFP-led developments resulted in better quality outcomes and enabled public investments to be supplemented with other sources of land and finance. Precinct strategies could further build capacity in the NFP sector by exploring spatial and operational advantages, such as suitable decanting and relocation or localised tenant/property management.

Design innovation can leverage public investment

Good quality design can impact, not just on the dwelling, but also the neighbourhood and beyond. In many instances cost-neutral design strategies, such as appropriate treatment of pedestrian connections and built form interfaces, can encourage a range of flow-on benefits. This might include community-led spaces or services, or attracting new local business and institutional investment through more active streetscapes and better access. Integrated precincts enable existing infrastructure and amenity to 'work harder' for more people. Cost effective public realm upgrades would significantly improve the quality, value and utilisation of existing community capital in established suburbs.

Technological innovation can leverage public investment

A strategic 'pipeline' of precinct-scaled redevelopment of public housing land offers an economy of scale that could drive a range of technological innovations. This includes new construction technologies, revolutionary industry practices or 'high impact' and sustainable infrastructure systems. District-wide services networks, such as renewable energy generation, water capture and re-use or hard waste management systems could incorporate both residential and non-residential properties, within and outside the precinct. This, in turn, could attract cooperative finance opportunities or become part of the long-term urban transition plan.

Precinct redevelopment of public housing assets could provide market leadership and 'kick-start' greyfield regeneration in the private sector

The redevelopment of dispersed public housing assets is an opportunity for innovation and market leadership for infill housing design and delivery. The demonstration of new and feasible infill models would work towards shifting the current industry culture of risk-averse 'rubber-stamped' development. Precinct designs can respond to the increasing demand for a range of housing types in well-located areas and have potential to test and grow 'latent' housing sub-markets for the private sector. This study has illustrated how a precinct redevelopment provides the groundwork for ongoing neighbourhood regeneration and intensification. This occurs in two ways: through physical enhancements in the public realm to support future population increases; and by spillover effects on surrounding property values, increasing the feasibility of private sector infill activity over time. This is contingent on achieving good quality design outcomes at dwelling and neighbourhood levels.

Development partnerships are needed to ensure greyfield suburbs do not become unaffordable through their gentrification

This research assumes that a percentage of all redeveloped housing needs to be owned and managed by community housing organisations, who have a long-term interest in ensuring affordable, sustainable and high quality dwellings can be delivered. Otherwise, there is a danger that the inevitable gentrification of greyfield suburbs will significantly reduce affordable housing supply in Melbourne's middle suburbs.

Viable and sustainable urban transformations will be incremental

The research has undertaken a comparative examination of different intensities and qualities of infill redevelopment. 'Doing nothing' to change business-as-usual market outcomes will have a long-term detrimental impact. Strong leadership and a long-term future vision are required to catalyse the necessary shifts in conventional development delivery and affect positive urban change. To close the initial gap between economic viability of a one-off project and ensure that optimal urban outcomes are achieved in the long-term, an incremental approach to transitioning will be required. More applied research into the long-term value of redevelopment, the efficacy of public investment and the best utilisation of existing public housing assets is needed.

Further research

Detailed feasibility study of dispersed precinct design model

This research has demonstrated the potential of an integrated precinct approach and provided a preliminary indication of its short- and long-term viability and efficacy. It is recommended that a pilot project is used as a vehicle for governments to provide market leadership and demonstrate the long-term value of innovative infill development approaches. A detailed feasibility study would be required to determine feasible yields, construction types and potential staging strategies while optimising dwelling diversity, tenancy mixes and considering decanting logistics. The formation of real development partnerships would identify creative finance and procurement arrangements and new opportunities for land contributions (e.g. Local Government or NFPs). Detailed estimates of construction and management costs, dwelling sales and rental streams would enable long-term risks and benefits to be weighed-up.

Design-led community engagement

The community design charrettes undertaken in this study offers valuable insights for future investigations into community engagement methodologies, planning and development processes for greyfield regeneration. Rather than presenting redevelopment options 'fait accompli', or asking 'what people want' from scratch, student proposals were offered as preliminary design ideas that responded to neighbourhood-specific observations. Three factors engendered a more meaningful community exchange:

1. Design-led and early engagement around concrete propositions but with scope for future alteration and change.
2. Focus on place-specific issues.
3. Multi-scalar examination encouraging both individual and collective consideration of urban aspirations, benefits and trade-offs.

National relevance

While many of the broad principles and policy implications raised through this Melbourne study would be applicable in other states and territories, their urban contexts, development processes and industry conditions differ. Undertaking a similar level of design research on 'real' public housing sites in other capital cities would be a valuable next step. This would

enable localised and specific findings that address the real-world challenges that exist in other locations.

Replicable models for a 'development pipeline' on government-owned land

This study has examined precinct designs on 12-lot clusters of public housing land, which is a replicable scale within the existing DHS portfolio. Other types of development opportunities also exist within the public housing portfolio. Developing a suite of precinct models would strengthen the potential for a 'development pipeline' on government-owned housing land. There is also huge scope to incorporate multiple land sources (i.e. owned by different departments or levels of government). Conversely, not all public housing assets are appropriate for precinct development. Further spatial examination of the portfolio could assist in determining optimal strategies for asset renewal, sale or transfer.

Short- and long-term viability measures need to be recalibrated in decisions and priorities for urban change

Current infill policies are underpinned by the need for market-led solutions. As such, the dialogue around viability tends to be dominated by short-term financial concerns relevant to private industry. Addressing these concerns is necessary to increase immediate supply of affordable housing, however, there is also a need to recalibrate viability measures so that the long-term impacts of development and the multiple objectives of sustainability are appropriately weighted in decisions and priorities for urban change. The opportunity-cost of poor development outcomes is rarely factored into determinations of what is considered viable. Unless third party benefits can be (partly) passed on to those shouldering the costs of development, the quality, quantity and sustainability of infill housing will be limited. New cost-, benefit- and risk-sharing arrangements will be essential for the regeneration of greyfield suburbs, a prerequisite for which is that all parties have a general overview of the costs and benefits involved.

Knowledge gaps

Research into the cost and performance of different development strategies has largely focused on urban fringe expansion or large-scale brownfield renewal; relatively little is known about the collective impact of residential infill in established suburbs. This is as much about knowing what to do in established neighbourhoods as it is about justifying the cost and benefits. More data and analysis specific to greyfield property and development would assist in decision-making and policy formation around infill renewal. This research has illustrated the need to consider design knowledge alongside financial development imperatives. To fully integrate these different types of intelligence, more appropriate design metrics need to be developed and incorporated into economic analysis.

Policy implications

Public housing asset renewal and stock transfer

A growing proportion of post-war public housing stock is in need of upgrade and renewal. In a context of declining rental income, increased management costs and reduced public investment in the direct provision of housing, strategies of asset divestment, stock transfer and leveraging private investment to help fund renewal are actively being explored by Australian state governments. Continuing a program of asset renewal that to date has focused on larger inner urban estates, public housing agencies have begun turning attention to the more dispersed low and medium density stock in middle suburban locations. This different urban condition and pattern of land holdings presents an opportunity for alternative asset planning and renewal strategies to deliver the broadest range of public benefits from the process. The strategic, design-led approach investigated in this project highlights the opportunity for

achieving the most from this state asset while providing a stimulus for positive on-going change.

Metropolitan strategic planning

Planning for and managing housing growth is one of the most important but difficult aspects of metropolitan strategic planning for state capital cities. Most metropolitan plans and policies include ambitions (and sometimes targets) for the intensification of established areas to increase housing supply and improve urban efficiencies. Implementing such policies in middle suburban contexts can be especially difficult, due either to local opposition or insufficient 'consolidated' land, while the piecemeal and limited gains of 'business as usual' infill development miss the strategic opportunities inherent in these areas. Precinct-scaled, design-led intensification in 'greyfield' suburbs will be necessary to achieve consolidation targets sustainably. Clusters of dispersed residential land holdings in single ownership, such as those held by state housing agencies, can be used to initiate this type of transformation and stimulate its wider replication by the private sector.

Whole-of-government strategic asset management

State policies for the management of publicly-owned land focus upon the efficiency and effectiveness of the use for which the property is held and the potential financial return from disposal of state assets where property is considered surplus to need or no longer effective in meeting that need. This project has indicated that a class of assets held for one purpose (public housing) and becoming a liability due to the need for renewal might, when considered strategically and from a whole-of-government policy perspective, be used to deliver a range of objectives *beyond* their original use, while also continuing to provide social housing. Strategic asset management across portfolios, coupled with design-led planning, has the potential to help governments meet a range of complex urban policy needs more efficiently while extracting greatest value from assets already held.

1 INTRODUCTION

> Compared to regular government housing it is a privilege to live here and I feel very lucky. (Social housing tenant)
>
> If we have new housing, regardless of how high-density it is, it needs to be connected with the community. If we can get housing that connects people with the community rather than encourages them to withdraw from it, I'm all for change. (Local community member)
>
> I like the location, affordability, energy efficiency, being allowed to keep a cat, the friendliness of the administrative staff and the private balcony. (Social housing tenant)
>
> Mix of uses and age groups is important. Mix of socio-economics too. You've got very low income and very high income, all within that area. Some people have been living here all their lives. (Local community member)

1.1 Background

This project investigates an integrative development approach at the scale of precinct that responds to a timely opportunity in the greyfields of Australian cities: how to redevelop dispersed government-owned public housing land in the middle suburbs in order to maximise its potential for its residents, its local community as well as the wider metropolis. Greyfields in the Australian context have been defined as those *ageing but occupied* tracts of inner and middle ring suburbia that are physically, technologically and environmentally failing and which represent under-capitalised real estate assets—given that in greyfields, the built asset makes little or no contribution to the market value of the property compared to the land component (Newton 2010).

The project sits at the core of questions regarding the intensification of the middle suburbs: how to find new ways to accommodate population increases, how to create affordable and diverse housing options, how to manage ageing housing stock, and how to maximise the use of existing infrastructure and amenity. Through a design lens, this research focuses on alternative development approaches that could challenge conventional methods of development. At present, the main model for redevelopment in the greyfields is informal infill undertaken by small developers (Phan et al. 2008), rather than in the government-sanctioned areas such as activity centres where there is relatively little development (Goodman et al. 2010). This *ad hoc* infill development is uncoordinated, lacks strategic focus and is not achieving the required increases in density, nor is it improving the amenity of the city (Newton 2010).

The potential availability of dispersed ageing public housing assets, which are scattered throughout Australian cities, offers a significant opportunity to develop and test a new development approach that offers an alternative to the market-led one-off infill practice. This research explores this prospect by generating innovative design strategies that coordinates redevelopment of multiple non-contiguous but nearby public housing lots and considers them as one project. By approaching development of these lots at precinct scale, a range of individual and collective benefits can be achieved such as better quality urban amenity and environments, and a diversity of housing types that deliver higher yields and therefore more affordability. In relation to ageing government housing stock, this requires an integrated approach with multiple partners including state government housing authorities, community housing organisations, local government authorities, the private sector and the community.

The project extends the research from the AHURI investigative panel, *Towards a new development model for housing regeneration in greyfield residential precincts* (Newton et al. 2011) that sought to identify the new processes and key intervention points for the regeneration of Australia's middle suburbs. That project specifically addresses the statement

released by the Major Cities Unit that explicitly targets the middle suburbs as the focus for new urban policy influencing the transitioning of our cities to a sustainable future ' … The primary intervention point should be the middle suburbs … Without coordination, sustainable outcomes will not be achieved in these areas. The middle suburbs must be the focus of the new urban policy' (Major Cities Unit 2009). The project also responds to policies for the strategic long-term development of the middle suburbs of the capitals (e.g. *Melbourne 2030*; Adams 2009; Randolph 2006). While such policies have aimed to achieve more compact and sustainable urban development, they have in fact resulted in a failure to do this demonstrated by an inability to generate sufficient net new housing in the greyfields areas of the nation's ageing middle-ring suburbs (Newton et al. 2011; Goodman et al. 2010). This project tackles this failure of implementation by focusing on strategic development opportunities that fall outside of government-sanctioned policy areas.

1.2 Research methods

The project takes a three-pronged approach to testing the feasibility of the redeveloping government-owned public housing land in the middle suburbs.

1. It focuses on innovation in design and procurement in government housing delivered through the Nation Building Economic Stimulus Plan (NBESP) from 2009–12.
2. It focuses on where the opportunities are in the middle suburbs for dispersed public assets to be redeveloped at precinct scale
3. It undertakes the development of plausible design scenarios in three precincts to consider how this land could be redeveloped at precinct scale to achieve intensification and good housing/neighbourhood outcomes.

The key research question addressed by this project is:

What are the processes required for an integrative development model capable of delivering more affordable and sustainable medium density housing through the regeneration of greyfield precincts in Australia's capital cities?

The sub research questions are:

- What are the lessons learned from the delivery of the NBESP social housing initiative?
- Where are the opportunities for land assemblage of dispersed public housing land in the middle suburbs?
- How can public housing land in greyfield precincts be developed to increase the provision of affordable housing and to increase the overall performance and contribution of these greyfield locations in terms of broader objectives of densification, sustainability and community engagement?

This project uses the integrative processes of design research as the theoretical basis for its enquiry. Design research is defined as 'the processes and outcomes of inquiries and investigations in which architects use the creation of projects, or broader contributions towards design thinking as the central constituent in a process, which also involves the more generalised research activities of thinking, writing, testing, verifying, debating, disseminating, performing, validating and so on' (Fraser 2013).

Applied design research takes a design-led, speculative approach to complex real world issues, with an aim to make a real impact on policy. Such an approach offers a genuine alternative to traditional policy and technical analyses, which are failing to change standard market mechanisms. This project develops new holistic and plausible scenarios that operate in an integrated way at a range of scales from rooms to broader urban contexts, and involve key stakeholders.

This research was undertaken in three distinct but related stages. The detailed methods used in each stage are outlined in Chapter 3.

Stage 1: Nation Building Economic Stimulus Plan—Social Housing Initiative (SHI)

A national overview of the SHI delivery involved an analysis of the method of delivery of the SHI, based on an extensive desktop review of available material, supported by a sample of interviews with government agencies and community housing organisations. Geo-spatial analysis of the locations of all projects delivered in the Melbourne Metropolitan area was plotted against key liveability indices and other urban policy objectives. A matrix of key design innovation attributes identified six innovative projects. For each of these projects, site visits, architectural and urban design reviews, and interviews with architects, delivery managers and operators took place. Analytical materials identified the key design strategies and innovations. The findings were tested through tenant surveys and an industry workshop with stakeholders involved in the SHI program. The outcomes from this stage are published as an AHURI refereed Positioning Paper entitled: *Design innovations delivered under the Nation Building Economic Stimulus Plan—Social Housing Initiative* (Murray et al. 2013).

Stage 2: Dispersed public housing land in the middle suburbs

The second stage identified the opportunities for land assemblage of dispersed public housing land in the middle suburbs through a survey of government public housing land holdings in the greyfields of Melbourne. The public housing register was collated with a series of spatial, economic, social and infrastructural datasets in a geographical information system (GIS) platform. The GIS model allowed layers of information to be overlaid and considered together; the GIS software also enabled the necessary shifts in scale required for the assessment of potential precinct-scaled redevelopment opportunities. From that, a multi-criteria framework was developed including existing physical attributes, urban context and potential redevelopment capacity. An innovative 'mixing desk' tool was developed that enabled this data to be interpreted and filtered.

Stage 3: Developing design scenarios for real sites

The third stage involved developing and testing three design scenarios in which actual public housing site precincts in greyfields were selected to demonstrate how they could be redeveloped. The methods for developing these scenarios included a speculative process and design exploration with architectural masters' students, which were then discussed and developed with the local community. As well, they were presented and discussed with community housing organisations and local government authorities. All of this informed the development of the design scenarios by the research team to a detailed design level that enables a consideration of the proposed environmental and community benefits, as well as viability issues.

1.3 Structure of this report

This is the Final Report of a three-staged project and brings all of the key elements together. Chapter 2 provides the research context for a strategic approach to the redevelopment of greyfields and discusses issues that are currently inhibiting the potential important role of design. Chapter 3 presents the aims, methods and findings of the NBESP Social Housing Initiative study. Chapter 4 presents the aims, methods and findings of a survey of public housing land in Melbourne. Chapter 5 presents the three design scenarios. Chapter 6 outlines the summary findings of the three previous chapters and Chapter 7 is the conclusion, which includes the key recommendation. The appendix provides a web link to the Positioning Paper published from the first stage, and includes detailed working materials from Stages 2 and 3.

2 STRATEGIC REDEVELOPMENT POTENTIAL OF PUBLIC HOUSING LAND IN THE MIDDLE SUBURBS

This section provides an overview of some of the key contextual issues for this research around the strategic redevelopment potential of public housing in the middle suburbs. It outlines why the greyfields are the locus of this research, describes the current infill development patterns, discusses the barriers to innovation in design of these infill practices, explores government's role in public housing asset management, and finally, presents a case study as an example of a public housing redevelopment in a middle suburb of Melbourne.

2.1 Redeveloping the greyfields

New property development models are required to enable the established suburbs of Australian cities to be retrofitted more effectively and intensively than is currently the case. Urban retrofitting (regeneration, redevelopment, renewal—all urban 're' words that tend to be used somewhat interchangeably; Eames et al. 2013) is a major challenge for growing cities in Australia and globally, as they seek pathways for becoming more environmentally sustainable, while remaining productive, liveable and equitable. The contemporary pressures on cities in Australia point to a need for more effective processes for retrofitting greyfield precincts within established suburbs at a scale that will enable delivery of more affordable medium density housing. These pressures include (after Newton & Glackin 2014):

- Consistently high rates of population growth, a significant proportion coming by way of immigration. Sydney and Melbourne are the principal destinations and this is expected to continue, given Australia's economic attractiveness internationally, and the liveability ranking of its cities (Department of Transport and Infrastructure 2012).
- Comparatively low rates of dwelling completions over the past several years, and the growing gap that has emerged between supply and demand (National Housing Supply Council 2012).
- The high cost of housing relative to incomes, especially in the big cities, where Australia was found to have the least affordable housing market compared to six developed countries surveyed in the 2010 7th Annual Demographia International Housing Affordability Survey—USA, UK, Canada, New Zealand, Hong Kong and Ireland (Kotkin 2011).
- The mix of housing in Australian cities that is out of kilter with contemporary demographics and consumer preferences; there is an undersupply of medium density housing (Kelly 2011; Newton et al. 2011).
- The comparatively high cost of delivering medium density housing in the middle suburbs (Newton et al. 2011).
- The continuing sprawl of Australian cities—the rate of growth in area is exceeding that of population (Roberts & Kanaley 2006)—which is an indicator of failure to appropriately accommodate population growth within the boundaries of metropolitan planning schemes. This represents a financial and environmental cost (Trubka et al. 2010, 2010a, 2010b) as well as exacerbating socio-spatial inequality in Australia's cities (Hulse et al. 2014).

Compact city policies (for an international overview see OECD 2012) are now the norm. In Australia, infill targets have been set for housing in all capital cities, typically in the range of 50–70 per cent in an attempt to direct population and investment inwards rather than outwards (Newton 2013). Their implementation, however, is lagging (Newton & Glackin 2014). Rather, the development of Australian cities, together with North American cities, is resulting in the lowest residential densities internationally (Newman & Kenworthy 1999).

It is argued that a reason for this situation has been a failure on the part of state government planning agencies to advance significantly beyond their current policies (e.g. Victorian

Government, *Plan Melbourne: Metropolitan Planning Strategy* 2013) that attempt to encourage concentration of higher-density residential development within designated activity centres near to railway stations and major transport (e.g. tram, road) corridors while perpetuating fragmented 'knock-down-rebuild (KDR)' in the greyfield suburbs where this type of low yield redevelopment is encouraged. Greyfields in the Australian context have been defined as those ageing but occupied tracts of inner and middle ring suburbia that are physically, technologically and environmentally failing and which represent under-capitalised real estate assets—given that in greyfields, the built asset makes little or no contribution to the market value of the property compared to the land component (Newton 2010).

Unsuccessful infill policies have been a failure on the part of government to recognise the existence of two infill segments—brownfields and greyfields—each with distinctive patterns of development that need to be better understood if urban regeneration is to figure significantly in delivering more liveable and sustainable cities. This is clearly illustrated in Table 1 below, a key output from the *Understanding infill* study (Newton & Glackin 2014):

Table 1: Dwelling yields from infill housing development projects in greyfields and brownfields regions within Melbourne 2004–10

	Proportion of different yields in greyfield and brownfield							
Region	1:1	1:2–4	1:5–9	1:10–19	1:20–49	1:50–99	1:100+	Total
Greyfield	20,462	37,034	7,250	2,638	3,657	2,661	1,477	75,179
	27.2%	49.3%	*9.6%*	*3.5%*	*4.9%*	3.5%	2.0%	100.0%
Brownfield	1,485	580	779	3,195	4,652	6,713	22,010	39,414
	3.8%	1.5%	2.0%	8.1%	11.8%	17.0%	55.8%	100.0%

Source: Newton and Glackin 2014

Low yield KDR is concentrated in the greyfields where current planning schemes allow for piecemeal intensification. By way of contrast, apartments are a feature of brownfields, where accepted development models have been in existence for some time (viz. post-Better Cities program). Current urban policies, programs and practices, however, are lacking an effective response to medium density redevelopment of the greyfields (area highlighted in italics in Table 1 above).

Despite government initiatives for large-scale redevelopment near activity centres and transport nodes, the majority of redevelopment taking place in the middle suburbs is small-scale, piecemeal infill housing. For instance, a review of Victoria's residential development activity from 2004–08 (Spatial Economics 2011) indicated that 86 per cent of all new housing developments were of one to two dwellings, while only 1 per cent comprised 20 or more dwellings. Phan et al. (2008) revealed that 98 per cent of redevelopment completed in the City of Monash in 2002–06 comprised two to seven dwellings and was broadly distributed across the local government area. Significantly, 80 per cent of the new housing was more than 800 metres from a nominated activity centre indicating that the majority of redevelopment in the middle suburbs is not driven by proximity to transport or activity centres. Rather, it is related to the size of the land assets and the age of the housing stock. Therefore, this fragmented pattern of informal infill suggests that small owner/builders redevelop private land holdings only as profitable opportunities arise.

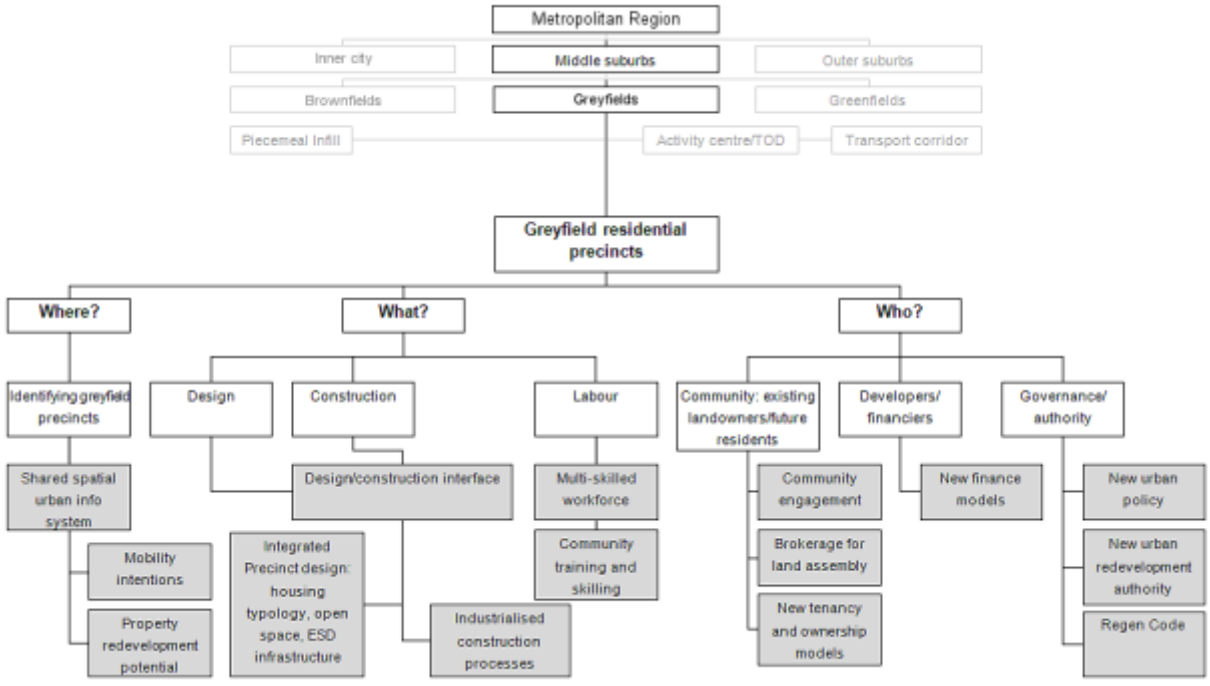
Greyfield regeneration constitutes a new and critical focus for strategic metropolitan planning, requiring the articulation of a new process (framework, model) for a more effective triple bottom line transformation of large tracts of our cities. This necessitates a focus on precinct scale rather than piecemeal infill; on new housing typologies such as low-rise medium to high-density development; on new partnerships that involve community participation in addition to the more common public/private partnerships; on new modes of constructing the built environment of the

future; and on the establishment of new nimble ‘re-gen’ organisations capable of catalysing greyfield regeneration. An AHURI-funded study (Newton et al. 2011) explored how infill redevelopment could be undertaken more effectively on a precinct basis in order to contribute to meeting a range of strategic metropolitan planning objectives. It involved a series of facilitated workshops with 70 leading built environment thinkers over a 12-month period with the objective of articulating the basis for a new development model for greyfield precinct regeneration.

The study revealed that the greyfield residential precinct regeneration approach is desirable and feasible, but a number of barriers would need to be overcome for successful implementation. Much of the innovation needed was found to be organisational and institutional, supported by some technological innovations. Figure 1 below identifies the areas (shaded) where major innovation and change need to occur to achieve a new, viable development model for greyfield residential precincts:

- Identifying the most prospective locations, which developers and planners should target for precinct redevelopment (‘where’).
- Improvements to the processes needed to achieve this, including design and construction (‘what’).
- Allocating responsibility for achieving it, including financiers, community and government stakeholders (‘who’) and new stakeholder engagement processes.

Figure 1: Innovation and ‘future logic’ for greyfield residential precinct development



Source: Newton et al. 2011

2.2 Barriers to design innovation: business as usual infill housing in greyfields

In its current form, piecemeal infill is of inadequate density and quality to contribute to the sustainable regeneration of the greyfields. Generalised requirements for parking, open space provision, building heights and setbacks restrict the diversity of housing types possible. To maximise profit margins, projects tend to be completed to minimum construction standards with little or no design consideration. On an individual project basis, costs and planning constraints

negate the opportunity to provide collective benefits for the broader urban environment. The key factor in the current development patterns in the middle suburbs is the individual ownership of the land, which inhibits the assembly of multiple development sites and also prevents design expertise being utilised. If the renewal of individual lots was coordinated and strategically redeveloped as a precinct, costs associated with design could be more effectively distributed to enhance the quality, diversity and density of dwellings delivered. As well, the precinct-scaled approach potentially offers an economy of scale that could also provide a range of construction and management efficiencies, as well as opportunities for district-wide sustainable infrastructure and public realm upgrades.

2.2.1 Standard industry practice

Small-scale infill housing is typically delivered by the domestic building industry. The viability of the sector is contingent on the supply of housing 'products' that can meet stringent price-points set by the particular conditions of this market (Newton et al. 2011; Rowley & Phibbs 2012). Domestic builders employ very economical construction methods geared towards optimising efficiencies within the cottage building industry. Housing types are standardised for efficient coordination of trades and labour which inhibits the diversity of dwellings offered. Driven by cost, industry operations are highly risk averse, seeking to avoid potential time delays or complexities in the delivery process. In this context, design innovations are difficult to achieve. Design is perceived to be a luxury item that attracts unnecessary cost impost (Alves & London 2012; Burke 2009). As a result, small infill projects lack even the most basic of design benefits, such as the advantages of passive design achieved through considerate siting and building treatments. These and other industry conditions affecting the sector's capacity to deliver housing alternatives are discussed in other literature (Rowley & Phibbs 2012; Newton et al. 2011; Kelly et al. 2011a).

2.2.2 Extant planning controls

Current planning processes have a significant impact on the design and delivery of suburban infill housing. Building controls that appropriately aim to mediate the impact of development outcomes (e.g. overshadowing, overlooking, parking provisions) also limit the diversity of dwelling typologies that can be delivered on small, highly constrained suburban sites (Murray & Khor 2011). Planning instruments are intended to facilitate development by providing increased certainty for developers and managing resident expectations for urban change. In an effort to provide an effective and transparent approval process, quantitative assessment measures are employed, such as site setbacks, building heights and site coverage. While streamlining approvals is integral for increasing infill development activity, this standardisation of building controls also limits the diversity of potential dwelling outcomes, restricting opportunities for innovative design solutions and site-specific development responses. Planning approvals are also contingent on less objective parameters, such as preserving neighbourhood character. In a highly risk-averse industry, familiar building forms and siting strategies are replicated to avoid potential delays in approval processes. The flow-on effect is an informal, self-imposed standardisation within the building industry. A number of commentators have called for new planning instruments to increase the provision of diverse and affordable infill housing in middle suburban locations (Rowley & Phibbs 2012; Kelly et al. 2011a).

2.2.3 Market demand

In a competitive price-point market, infill housing is also biased towards (perceived) consumer demand. This has led to a series of 'must haves' in a dwelling, which do not always correlate with good quality, sustainable and affordable housing outcomes. Kelly et al. (2011) found that the most important dwelling attributes to consumers were the number of bedrooms, followed by the amount of living space provided; detached houses with garages were the preferred type. In keeping with this, detached dwellings currently comprise around 75 per cent of all housing stock in Melbourne (Kelly et al. 2011). However, when asked to consider the 'trade-offs'

between dwelling type, size, location and cost, 52 per cent of Melbourne respondents would elect to live in something other than a detached house, with 38 per cent choosing medium density housing types (semi-detached and types up to three storeys).

2.2.4 Community resistance

Community resistance is another major barrier to infill redevelopment in established suburbs (Cook et al. 2012; Rowley & Phibbs 2012; Newton et al. 2011). Typical reasons for objecting to a proposed development include incongruence with the existing built form character, the effect of increased population densities, the additional vehicle traffic/parking, and, particularly in the case of producing affordable housing, objections based on socio-demographic profiling (Davison et al. 2013). Research suggests that these types of objections may not in fact represent the actual concern of a proponent, but rather are translations into terms that the planning system can register (Davison et al. 2011). In some instances, it appears that objectors are contesting any change—'full stop'. Often resistance of this nature has grown out of a lack of prior knowledge/exposure to a development; the objection relates to a sense of exclusion or disenfranchisement from the development process rather than to the development outcome itself (Davison et al. 2013). To deliver 'real' and effective transformations in underperforming greyfield areas, a deeper understanding of the community's motivations for resistance/support is needed.

Third party objections, particularly in the 10+ dwelling unit proposals, are becoming increasingly common. For instance, in Victoria 26 per cent of larger developments are being taken to the Victorian Civil and Administrative Tribunal (VCAT) (Cook et al. 2012). This continuing trend represents a significant risk to developers (costs of delays, land holding, legal expenses and potential re-designs or amendments) and threatens the progress of sustainable urban transformation, the viability of infill redevelopment and the affordability of new housing provision. Greater certainty in planning and development processes is needed to reduce the risk for developers, as well as to ensure that appropriate urban outcomes can be delivered for existing communities.

'Fast-tracking' of development approvals has been proposed as one way of achieving certainty for developers; this involves approving developments in the early stages of the projects, which allows developers to realistically assess the project's true cost and rate of return. However, fast tracking also limits the opportunity for public comment, causing anger, resentment and mistrust of the planning process among local residents (Cook et al. 2012). To meet the conditions and time constraints set by the Nation Building Economic Stimulus Plan (NBESP) Social Housing Initiative, various degrees of 'fast-tracking' were employed in some jurisdictions. In Stage 1 of this research, Murray et al. (2013) presented innovative design outcomes achieved by fast-tracked developments, which may not have been possible under conventional planning processes. However, it was also noted that the design exemplars were invariably driven by a 'champion' who could ensure that business-as-usual (BAU) standards were exceeded. Without such a 'champion', or other mechanisms ensuring design quality standards, fast-tracking risks the proliferation of BAU housing outcomes with few avenues for recourse.

To provide developer-certainty while simultaneously enabling a period of public comment, Rowley and Phibbs (2012) suggest that engagement should occur at the strategic stage of redevelopment and not at the development approval stage. This approach could lead to structure plans that, in accordance with community opinion, reflect from the onset the limitations on redevelopment in an area. Davison et al. (2011) similarly contend that the local community must be involved early on in the redevelopment process to reduce the public backlash against larger developments, particularly those involving affordable or public housing. Such suggestions are echoed by numerous national and international commentators (Herriman 2011; Jarvis Berkeley & Broughton 2012; Lawson & Kearns 2010; Reddel & Woolcock 2004; Kelly 2010).

2.2.5 Short and long-term viability imperatives

Strategic development policies are underpinned by the need for market-led solutions (Pinnegar 2007; Tomlison 2013). As such, the dialogue around viability tends to be dominated by short-term financial concerns relevant to private industry. Addressing these concerns is necessary to facilitate immediate development outcomes under current market conditions (Rowley & Phibbs 2012) and ensure that future redevelopment is not reliant on unsustainable levels of subsidisation (Victorian Auditor-General 2012). However, there is also a need to recalibrate viability measures so that long-term development impacts and the multiple objectives of sustainability are appropriately weighted in current decisions and priorities for urban change.

Increasing housing supply is not just a question of higher density dwelling delivery. Parallel services, infrastructure and amenity are also required to ensure that equitable and sustainable outcomes are achieved as populations grow and the built fabric transforms. These broader urban networks typically require public expenditure and/or community resources; the long-term cost burdens are directly impacted by the location, type and quality of development pursued in the short-term. For example, residents living in areas with high car dependency are susceptible to inactivity-related health issues, have limited access to job-markets, experience higher living costs and are more vulnerable to oil and mortgage price rises (Dodson & Sipe 2008; Trubka et al. 2010; Cheshire et al. 2014). Lack of access to public amenity and services reduces community participation and can contribute to the continuation of socio-economic disadvantage (Cheshire et al. 2014; Hulse et al. 2011). Conversely, long-term cost savings associated with improved health and productivity is a recognised benefit of well-designed, connected neighbourhoods (Lucas et al. 2010; Prochorskaite & Maliene 2013). High performing building envelopes, active building systems and networked services-technology offer long-term cost savings and environmental benefits (Sustainability Victoria 2011; Horne et al. 2008; Martinaitis & Uzsilaityte 2010). These, and other, sustainable initiatives are now readily available but their take-up is slow due to the higher up-front costs they represent.

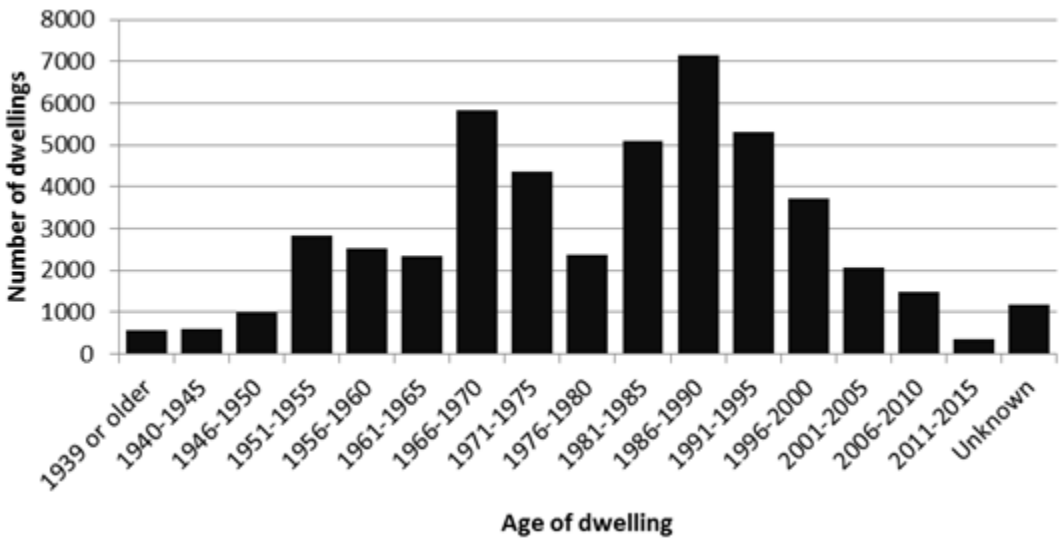
Research into the cost and performance of different development strategies has largely focused on urban fringe expansion or large-scale brownfield renewal; relatively little is known about the collective impact of residential infill in established suburbs (Szafraniec & Holloway 2012; Rowley & Phibbs 2012; Newton et al. 2011). The transformation of existing neighbourhoods is more complex than *tabula rasa* development sites. Without equivalent levels of knowledge that exist for brown and greenfield development, it is unclear if the benefits of a strategic regeneration program warrants the 'effort' and expense of implementing changes in these contexts. This is as much about knowing what to do in greyfield suburbs as it is about justifying the cost and benefits. The current policy position is to 'do nothing' and push this risk back onto the housing market. The lack of knowledge and/or interest in 'greyfield' redevelopment combined with the lack of market incentives to instigate change has resulted in an impasse. While governments seek new and innovative infill models to transition to more sustainable, affordable and liveable cities, implementing 'unproven' models or innovative step change is consistently undermined by short-term commercial barriers and irreconcilable market conditions (Dalton 2013; Pradolin 2009; Burke 2009; Newton et al. 2011; Sustainability Victoria 2011).

Government leadership is required to break this logjam. Strategic development initiatives that can positively influence existing market conditions are needed to catalyse and sustain better quality infill outcomes. This not only requires a realistic understanding of commercial imperatives, but a more holistic and ingenuous valuation of sustainable development objectives (social, environmental and economic), equitable measures of long-term development impacts/performance and recognition of who can, or should, shoulder the up-front and ongoing cost burdens of urban transformation.

2.3 Dispersed public housing stock: a timely opportunity

A focus on public sector housing provides an opportunity to potentially 'drive' innovation in precinct scale housing redevelopment and intensification. First, the 'where' question is readily answered. Much of the public housing stock built in the decades immediately following the Second World War is now physically obsolete, but is well located in a contemporary metropolitan context (see Figure 2 below). The stock has a single owner, so the challenges typically associated with 'site consolidation' are absent. The second question of 'what' to create in precincts where there is a concentration of public housing remains a challenging issue, as is the question of 'how'. This research project has the multiple objectives of tackling these two critical questions.

Figure 2: Number of DHS dwellings by date of construction



Globally there has been a move by governments in developed countries to scale back the direct provision of housing and gradually divest themselves of the ongoing costs of management and renewal of public stock. However, despite this, liberal democratic governments continue to maintain a legitimate role in planning the built environment and regulating the process of urban development. Government also remains a very significant owner and manager of property assets, and in the case of Victoria, continues to be the single largest client of the property and construction industries.

As an owner and developer of property, government can take a leadership role in the design of the built environment by setting quality benchmarks that demonstrate and foster an appreciation of the value and benefits of well-designed buildings and places. As the largest property owner in Victoria, the Victorian Government can use its assets to influence places, communities and markets in a potentially transformative manner. Government leadership through demonstration projects can set quality benchmarks and be used to trial innovative design and development concepts. Importantly, they can assist in establishing new market models in the private sector. Government can also demonstrate the benefits of processes that support good design outcomes throughout the development of a project.

Government also has a role to steward the existing stock of public housing 'assets' to ensure that in the process of asset renewal and stock transfer a range of new public benefits is delivered. This process can benefit from integrated design thinking to deliver a range of public policy objectives and assist the implementation of design-led, precinct-based and place-specific intensification of greyfield suburbs.

To date, government has sought to fund renewal of public housing assets through capitalising the increased land values of large inner urban estates. This has involved renewal of the public

housing alongside the development of new market housing on the public land, typically using a Public Private Partnership (PPP) model of project delivery. In principle, the sale of the market housing subsidises the redevelopment of the public stock, with the state further facilitating the project by assuming most of the development risk. While the result is the privatisation of what is usually the best portions of this public land, when managed well it can reduce concentrations of disadvantage in public housing estates and better integrate new building forms into the surrounding neighbourhood context, while also increasing the supply of new housing of generally good quality.

Inner metropolitan estate renewal PPP projects are delivered by development companies whose experience is in the delivery of mid-to-large scale commercial, housing and mixed-use developments on 'brownfield' sites. In relation to their development methodologies, scale, general location, and the established patterns of land ownership, estate renewal projects can be understood as a species of brownfield development. In more suburban locations, where public land holdings are less consolidated and the surrounding land use is residential—the 'greyfield' condition—development methodologies are less established or well-tested and the temptation will be to sell off assets rather than attempt to use them to deliver the similar range of potential benefits that pertain to estate renewal: public asset renewal, increased housing supply, better precinct integration and better design and sustainability outcomes.

Alongside looking to the private sector to help fund capital works and asset renewal, another trend has been to outsource or transfer management responsibility to the not-for-profit sector. For social housing, this has meant a deliberate policy of expanding the role and capacity of the community housing sector. To date, this has focused on enabling the development capacity of, in particular, registered Housing Associations, but the Victorian Government's Housing Framework foreshadows a deliberate strategy of stock transfer to community housing organisations of public stock. This might mean simple transfer of title and/or management responsibility, but could also involve development partnerships like the Ashwood Chadstone Gateway project.

2.3.1 Case study: Ashwood Chadstone Gateway Project

Completed in 2013, the Ashwood Chadstone Gateway Project (ACGP) is a large-scale social housing regeneration and urban renewal project. The largest project partnership between the Victorian Government and a not-for-profit community housing organisation to date, it is a 'game-changer' in showing how depleted public housing assets can be redeveloped. Unlike other partnership models in the redevelopment of public housing estates, profits have been invested back into further social housing development and there has been no loss of social housing. (Power Housing Australia 2014). Port Phillip Housing Association (PPHA) won a competitive tender process to develop and subsequently own and manage the project, with the Office of Housing transferring title of six sites to the community housing organisation. The sites, near Holmesglen train station, are non-contiguous but within a 1 kilometre square. As part of the deal, PPHA invested $70 million of its own financing into the project, matching an equal contribution by the Victorian Government (Victorian Government 2013).

The redevelopment resulted in a total of 282 dwellings, the majority delivered as apartments and a smaller portion as townhouses. Seventy-two dwellings were sold to the private market and the remainder retained by PPHA (PPHA 2010; 2014); thus the project saw a six-fold increase in the quantity of social housing originally present across the sites (FMSA Architects 2014). Proceeds of the private sales went to PPHA, providing the community housing organisation (CHO) with capital to build more community housing, both in Ashwood/Chadstone and in other areas across Melbourne. The association will deliver a further 180 or more social housing dwellings, without government contribution, as part of an agreed leveraging arrangement (Victorian Government 2013).

PPHA undertook extensive consultation with the community and Monash City Council during the project's development. This included the establishment of a local Community Liaison Committee who were consulted throughout the project to ensure that community views were represented (PPHA 2010; SOCOM 2010).

The project went beyond simply providing new housing, incorporating small contributions and improvements to the public open space around the project sites. These included a new pedestrian crossing linking new buildings to the nearby reserve, a new pedestrian link to the Holmesglen railway station, and upgrades to landscaping and street lighting. These are intended to provide open spaces that encourage walking, exercise and opportunities for neighbourhood activity that enables a wide range of people to participate. The proximity of sites within the precinct offers PPHA operational efficiencies and opportunities. A permanent office has been established on-site from which housing management, community development and building maintenance staff work locally, having close access to tenants and properties (PPHA 2010).

The project incorporated a diversity of dwelling designs and sizes to ensure that a variety of household types from different backgrounds will be present at any one time (PPHA 2010a). A large portion of the stock is allocated to older persons 55 years and over and has capability for tenants to age in place with lift access, stepless bathrooms, modifiable features and the ability to establish on-site support (PPHA 2014).

This case study illustrates how multiple public housing sites in the middle suburbs can be strategically coordinated to provide a range of financial, physical and operational advantages. It demonstrates how innovative redevelopment of government-owned land can achieve a range of public benefits beyond just increasing dwelling supply. It serves as a strong precedent for integrative precinct-scaled redevelopment in greyfield suburbs.

Figure 3: Aerial overview showing six sites included in the ACGP redevelopment

Source: PPHA 2010, Nearmaps.com

3 STAGE 1: DESIGN INNOVATIONS DELIVERED UNDER THE NATION BUILDING ECONOMIC STIMULUS PLAN—SOCIAL HOUSING INITIATIVE

The Social Housing Initiative (SHI) was delivered from 2009–12 as part of the broader Nation Building Economic Stimulus Plan (NBESP) introduced by the Federal Government to combat the local economic effects of the Global Financial Crisis (GFC) of 2008. The limited timeframe along with the particular processes and ambitions of the SHI provide both a valuable data set for analysis and a series of real outcomes that are able to be assessed on architectural and urban design terms. These include the physical qualities of what was built, and the potential impact of this scale and type of new development on the broader densification of the middle suburbs.

The aim of Stage 1 of this research project was to undertake a national review of SHI projects to unearth a selection of innovative design and procurement outcomes from the program and to determine the factors that influenced these outcomes and allowed them to occur. Case study material identifying key design, locational, procurement and policy issues relevant to future greyfields redevelopment in middle suburban contexts were analysed for subsequent stages of the project.

The research was undertaken through a *design quality lens* that focused on issues affecting the liveability and functionality of internal and external and shared spaces such as the quality of natural light, ventilation, aspect and outlook. It was also concerned with urban issues such as overall building form and morphology, the efficient use of land, relationships to and engagement with the surrounding context, pedestrian connections, landscape design, planting and open space distribution—and the combined impact of all of these factors on the private and public realm environments of the subject sites.

By examining the physical qualities of what was built under the SHI, as well as the impact of the program as a whole, lessons for enhancing future affordable housing development and its potential role in transforming urban contexts within our cities were identified. The research undertaken in Stage 1 is published in the AHURI Positioning Paper, *Design innovations delivered under the Nation Building Economic Stimulus Plan—Social Housing Initiative* (Murray et al. 2013).

3.1 Method

The review of the SHI involved a mixed methods research approach comprising architectural and urban design analysis, design case study research, geo-spatial and statistical analysis, desktop research, tenant surveys, industry/stakeholder interviews and an industry/stakeholder workshop. This involved:

- A national overview of the SHI delivery in each state, including the overall number of projects delivered and, where possible, locations of those projects, number and type of dwellings in each project, yield and density increase.
- An analysis of the method of delivery and administration of the SHI in each state and territory based on an extensive desktop review of available material, noting as far as possible the differences in approach and method adopted by each jurisdiction and the effects that these different approaches had on the types of projects delivered. Where available, interviews with government agencies and key housing associations[1] involved in delivering the program supported this.

[1] Relevant government agencies in all states and territories were contacted to confirm basic information regarding their SHI procurement plans. Where there were significant elements to procurement processes, these were investigated further through interviews and requests for internal documents. A number of CHOs and architects also

- A geo-spatial analysis of the locations of all projects delivered in the Melbourne metropolitan area and plotting these against key liveability indices and other urban policy objectives. More complete and detailed information on SHI projects was available for Victoria than other states and, as such, there is a focus in the research on locational and statistical information in relation to Melbourne[2].
- An analysis of architectural and urban design attributes for a 'short list' of projects nominated by industry and government and/or identified by the research team to be of strategic interest in relation to the overarching research project objectives. Through this process a matrix of key design innovation attributes (or selection criteria) was established, and six innovative case-study projects across different building typologies and urban locations were identified that substantially exceeded 'business-as-usual' outcomes.
- Site visits, detailed architectural and urban design reviews, and interviews with stakeholders including architects, delivery managers and operators for each of the selected case-study projects. Preparation of analytical drawings and diagrams identified the key design strategies employed and design innovations achieved.
- The testing of the design research findings through tenant surveys with residents of the selected case study projects; and an industry/stakeholder workshop with representatives from government housing agencies, housing associations, builders, architects and project managers involved in the SHI program.

3.2 Research findings

The SHI successfully achieved substantial social housing increases within the ambitious timeframes set by the program. More than 19 500 net new dwellings were delivered nationally by June 2012, representing a nominal increase of 5.5 per cent in overall social housing stock.[3] The conditions of the SHI both enabled and limited innovative outcomes. On an individual project level, the processes and timing imposed by the program enabled creative flexibility in the housing delivered because there was less opportunity for development resistance. However, timing and program constraints combined with existing structural issues, such as a lack of longer-term strategic plans for social housing, also limited the efficacy of the program overall—from this perspective, the SHI might be considered a lost opportunity.

That being said, a number of SHI projects achieved considerable enhancements in the quality, performance and delivery of housing. While these innovations were evidently possible under the program, they are not representative of the overall rollout. More often than not, business-as-usual models were employed in lieu of alternative designs that could better respond to contemporary urban contexts and housing needs.

The following summarises the key innovations and issues affecting the outcomes of SHI projects. For full details of the SHI review see Murray et al. (2013).

3.2.1 Methods of procurement

- *Delivery by different* sectors—The extent to which the private, public and not-for-profit (NFP) sectors led the procurement of SHI developments differed from state to state. For example, New South Wales did not fund the NFP housing sector to act as housing

provided details regarding their experience in SHI-funded projects. PowerHousing Australia (a peak body of the not-for-profit housing sector) assisted the research by sending out a call for Expressions of Interest (EoIs) from CHOs to participate in the research through putting forward details of their most innovative SHI projects. Not all agencies were able to be contacted and not all responded to the EoI or phone calls and requests for information. Nevertheless, a great deal of information was obtained from the organisations, firms and agencies that did respond.

[2] For a variety of reasons related to political sensitivity and/or confidentiality, a full national database of SHI projects was not available to the research team. As a result, an adjustment was made to the original scope of the project, which was approved by AHURI.

[3] Calculation based on 2006 national statistics for public and community housing dwellings from Atkinson and Jacobs (2008).

developers at all whereas in Victoria, Tasmania and Queensland, community housing organisations (CHOs) delivered 52 per cent, 44 per cent and 34 per cent of dwellings respectively. Where the procurement approach was more mixed, a greater diversity of development outcomes were observed.

- *Growth of the community housing* sector—The SHI contributed to growth of the NFP housing sector in all states and territories—as per Federal Government objectives for the SHI. This mainly occurred through significant transfers of completed housing stock from the state to the NFP sector. In jurisdictions where the sector was given a role as 'developers' it further contributed to stepping up the sector's development capacity.
- *Planning approval processes*—Planning processes put in place for the SHI (which bypassed conventional local council-based assessment and residents' rights to objection) significantly reduced project delivery times. For the NFP housing sector this was of great assistance as it reduced development holding costs and avoided costs associated with development disputes. Some relaxations were also observed in regulated densities, parking provisions and building height/setbacks.
- *Innovation in procurement models*—A small proportion of SHI projects demonstrated innovation in the procurement of social housing that provided a range of benefits, such as tenancy mix, mixed funding arrangements, resident cooperatives and sourcing of well-located land, as well as using SHI developments as a catalyst for larger scale urban renewal. Procurement innovations were most frequent in projects led by the NFP sector, and to a lesser extent in *flagship* state-led projects.
- *Impact of procurement on design*—Key procurement factors affecting design outcomes included the scale of the project, with smaller projects having a more limited scope for design; the degree to which design quality was a stated value of the organisation procuring the development; the skill of the architect and the extent of their prior knowledge or experience with social housing; the SHI funding cap of $300 000 per dwelling and the ability to source external development contributions (land or financial).

3.2.2 Urban location

Geo-spatial analysis undertaken on SHI developments completed in the Melbourne metropolitan area provided a reading of the program's performance through broader urban and social lenses. In Melbourne, more than 70 per cent of projects (52% of dwellings) were constructed in areas with limited access to public transport, where high levels of car dependency would be likely. Only 10 per cent of projects occurred in areas with moderate-high public transport access. However, these developments contained almost half (47.8%) of the total *dwellings* provided by the SHI, indicating an appropriate preference for higher-density developments in accessible locations. There were 55.8 per cent of dwellings that were more than 1 kilometre from an activity centre and almost two-thirds in areas of above average socio-economic disadvantage.

The SHI cost cap of $300 000 per dwelling was perhaps the most influential factor on housing location outcomes. Where the SHI funding allocation absorbed both land and development costs, projects tended to be located in areas of lower property value on the suburban periphery and delivered conventional low-density housing outcomes constructed to minimum standards. Developments completed on land already in public possession were often within ageing housing commission estates with existing disadvantage. NFP-led developments, which could access external land and finance contributions, tended to be better located projects generating higher dwelling yields. The NFP housing sector delivered 53 per cent of all SHI dwellings in Victoria.

3.2.3 Design innovations

The national review of the SHI revealed key development inputs and processes that led to a range of innovative housing outcomes in each jurisdiction. The geo-spatial analysis completed

for the Melbourne metropolitan context demonstrated how the distribution of SHI projects performed against the program's objectives for accessible and equitable higher-density housing outcomes. Drawing on the outcomes from these two processes, as well as specific requests for information about SHI developments, 17 innovative case studies were shortlisted for further examination at the scale of the site and detailed building design.

The case studies are not intended to be a *best-of* ranking or a representative sample of SHI projects. Rather, they are a collection of exemplary development outcomes that offer valuable lessons for future affordable housing delivery. In the context of affordable housing and the SHI, high impact projects employed clever, cost-effective design strategies that delivered considerable improvements at an individual or collective level. The shortlisted projects were used to develop *innovative design criteria* that would inform the detailed analysis of six SHI case studies. The purpose of the design case study analysis is two-fold: one is to reveal effective design strategies for enhancing the quality and performance of housing outcomes and the other is to examine how the conditions of the SHI may have facilitated innovation beyond that possible within conventional delivery processes.

3.2.4 Business-as-usual housing outcomes

Design innovation and quality is not greatly valued in Australia's general housing market. More often than not, design is viewed as a luxury item and an additional cost burden by the building and development industry. As a result, design professionals play a very limited role in mainstream housing provision (Burke 2009). This has led to a lack of housing diversity and inappropriate dwelling types for contemporary social and environmental contexts.

Overall, the housing delivered under the SHI continued with the *business-as-usual* standard industry practice. For example, in Victoria 80 per cent of SHI projects (yielding 30% of Victorian dwellings) were one or two dwellings on a typical residential allotment: that is, conventional detached houses that dominate greenfields or dual occupancy infill developments that are prevalent in the middle ring suburbs of Australia's cities. There are a number of reasons for this business-as-usual approach, such as the strict time and cost pressures required by the SHI, land assembly constraints, and the aspiration for social housing to be unidentifiable within its context. While the complexities and demands of the SHI are recognised, continuing business-as-usual design approaches under a program of this magnitude also presents a lost opportunity for enhancing the quality and performance of affordable housing in Australia.

3.3 Identifying design innovations delivered under the SHI

Compared to the *business-as-usual* housing models described above, the SHI case studies examined by this research demonstrate innovative design solutions that resulted in intensified housing outcomes, while contributing positively to the living environments of residents as well as to the broader suburban fabric. Using the business-as-usual housing model as a benchmark, several strategies for enhancing the quality, diversity and density of housing were observed and mapped within three broad categories: urban/location, design and tenancy mix/program mix. This cataloguing process enabled the comparative analysis of shortlisted projects, revealing a range of opportunities for design innovation, as well as the different strategies employed by each project that provided considerable improvements at an individual or collective level.

Figure 4: Business-as-usual housing delivered under the SHI in Victoria

Figure 5: Business-as-usual typical street view

Figures 4 and 5 above show a repeated model over a variety of sites—two two–bedroom, single level units replacing an existing, aged Office of Housing dwelling on a standard block. Both units have a car space adjacent to the entry and a long sealed driveway, which runs parallel to the side boundary. Orientation varies and is dependent on the site.

It is important to note that project innovations are often not directly comparable. What constitutes an innovative outcome can vary with the scale, location and type of development and will often involve both quantitative and qualitative measures. Through architectural and urban design analysis undertaken on each of the shortlisted projects, it became clear that the case studies selected for detailed examination should reflect a project's location/urban context as well as the built-form typology and spatial design strategies. The cataloguing process distilled a list of key innovative design criteria for enhancing housing outcomes in a range of urban contexts, which include:

- *Density and scale*—Building forms that are sensitive to the existing context while increasing densities and maintaining open space amenity.
- *Typological diversity*—Higher-density housing models that provide diversity in a particular neighbourhood or precinct.
- *Parking*—Intelligent design strategies that ameliorate the impact of vehicle access and parking, enhancing individual and collective amenity for residents and surrounding community.
- *Shared space*—High-quality, safe, and effective shared spaces, facilities or mix of programs that improve liveability for residents and/or surrounding community.
- *Flexibility*—Designs that allow for dual/multiple uses and changing resident needs.
- *Tenancy mix/use mix*—Incorporation of different housing tenancies and/or different household groups encouraging a healthy social mix and a more inclusive community.
- *Frugal design solutions (affordability)*—Efficient layouts and intelligent design solutions that maximise small spaces and increase amenity, while keeping costs down.
- *Environments, servicing*—Environmental impact consciously kept to a minimum, also reducing operational costs for low-income tenants.

Figure 6: Design innovation criteria

It should be noted that the universal design and 6-star energy rating required by the SHI applied to all housing developments undertaken in Stage 2 of the program and 96 per cent of all projects delivered met these standards (KPMG 2012). As such, these design attributes have

not been included as innovative criteria that can identify exemplary case study projects for the purposes of this research. However, it is recognised that these performance requirements represent a significant enhancement for conventional social housing outcomes and implementing this step-change was a considerable achievement for a program of this magnitude.

The six case studies selected for detailed examination represent a range of building scales, typologies and locations that provide valuable lessons for increasing the diversity and quality of future affordable housing in middle suburban greyfield locations. Increasing the quality and frequency of mid-range housing provision in middle suburban greyfields is the overarching research interest for this project and has guided the selection of our case studies. As such, business-as-usual detached/dual occupancies and high-rise apartment models (above eight storeys) were not considered for detailed examination. The collection of six case studies is distributed across the ranges of both building typology/scale and urban location which form the two axes of the diagram. They demonstrate, within this range, the best combination of innovation criteria developed by this research and offer a range of strategies for viable, cost effective, good quality design alternatives. (Refer to AHURI Positioning Paper, *Design innovations delivered under the Nation Building Economic Stimulus Plan—Social Housing Initiative* (Murray et al. 2013).)

Figure 7: SHI case study—aerial view before

The bulk of the land is shared, open space. Image: Nearmap

Figure 8: SHI case study—aerial view after

Shared space is minimised and each row house has its own private rear yard. Image: Nearmap.

Figure 9: SHI case study—street view before

Double-storey concrete flats owned by the Office of Housing. Image: Shaw Architects

Figure 10: SHI case study—street view after

Single-storey row houses. Image: Monash Architecture Studio

4 STAGE 2: SURVEY OF PUBLIC HOUSING LAND HOLDINGS IN METROPOLITAN MELBOURNE

The second stage of the project involved a detailed survey of all public housing sites in metropolitan Melbourne (DHS 2012), and a general survey of public housing locations in Sydney and Brisbane. Drawing on the lessons learned from Stage 1, an Assessment Framework was developed to examine the condition and distribution of government-owned public housing assets in greyfields. The two key objectives of the Melbourne survey were to:

- Assess the redevelopment capacity of existing landholdings and identify potential opportunities for precinct redevelopment.
- Select suitable public housing assets for the design and testing of greyfield precinct redevelopments in Stage 3 of the research.

To achieve these aims, the Assessment Framework needed to consider the realities of housing development and delivery in greyfield locations, and be able to operate across scales ranging from a high level examination at a metropolitan scale through to an allotment level analysis capable of capturing local, site-specific qualities. As such, the survey not only examined the physical attributes and spatial distributions of the existing public housing stock, but also mapped the land holdings against relevant urban indices in a metropolitan context and incorporated specific issues relating to the development capacity of greyfield precincts on public housing land.

4.1 Method

The survey was specifically geared towards identifying replicable conditions for precinct-scaled redevelopment in Melbourne's greyfields. The assessment framework developed by this research allows multiple criteria to be considered simultaneously and incorporates qualitative and quantitative concerns across a number of scales. The public housing register provided by the Victorian Government Department of Human Services (2012) was collated with a series of spatial, economic, social and infrastructural datasets (Appendix 1) to consider:

- *Physical attributes*—Existing physical condition and spatial distribution of public housing assets including the location and age of housing stock, type of buildings, land area, patterns of clustering and levels of allotment consolidation.
- *Urban context*—Proximity of services and amenity (activity centres, education, health, open space and recreation); distribution of housing relative to a range of social and urban indices including Socio-economic Indexes for Areas (SEIFA), Public Transport Access Level (PTAL), Effective Job Density (EFJ), Median House Prices (MHP).
- *Redevelopment capacity*—Precinct design issues relating to the quality and diversity of housing that could be delivered by greyfield redevelopment. Issues specific to public housing redevelopment, delivery and management that may influence the potential redevelopment capacity of the land holdings, such as housing diversity, decanting, tenure mix and ongoing services/management influenced the potential locations and types of sites pursued.

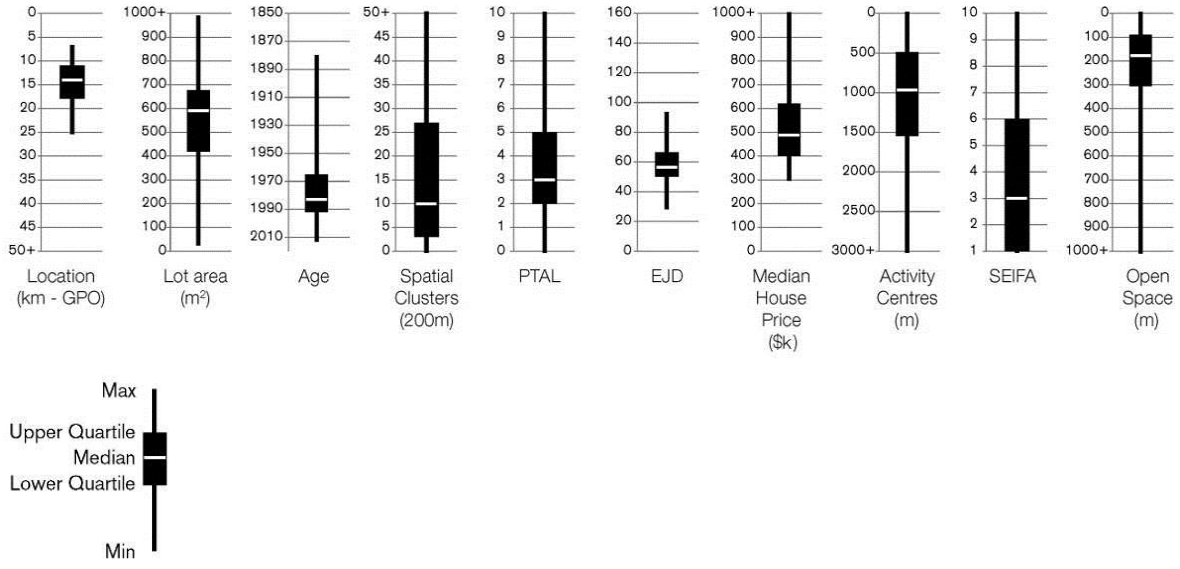
Table 2 below sets out the criteria under each of the three headings of the Assessment Framework that guided the collection of integrated information about the DHS portfolio. It is important to note that not all criteria were viewed as absolute requirements, but rather served as a series of indicators that could influence the priorities for the design of a specific precinct, as well as revealing recurring patterns and needs across the portfolio. This was particularly important in relation to the Urban Context criteria, as DHS properties generally do not rank highly across all these indices (see Figure 11 below) and they are factors that may change over time, especially with strategic influence. For example, precinct potential was not uniformly

associated with high levels of public transport access (in fact most DHS sites do not have good access). However, if other fundamentals are in place, a coordinated regeneration strategy may be able to improve links to transport networks—for this reason, Urban Context criteria are nominated as 'variable' in Table 2. The multi-criteria evaluation shown in Figure 11 was imagined as a 'live' apparatus that could be iteratively adjusted to balance different factors in the manner of a mixing desk.

Table 2: Criteria for Assessment Framework identifying potential precinct redevelopment opportunities

Physical attributes	Urban context	Redevelopment capacity
Location: 7–25km from CBD	Property value: variable	Replicable condition: required
Clusters: min. 4 allotments within 200m radius	PTAL: variable	Design considerations: diversity of housing provision; site specific opportunities; urban and social uplift.
Contiguity: 2–5 lot consolidations prioritised, all considered	EJD: variable	
Age: prior to 1990 prioritised, all considered	SEIFA: variable	Strategic policies: infill targets; Melbourne Plan; municipal structure and community plans; DHS housing framework
Type: free standing houses prioritised, all considered	Proximity to amenity and services: variable	Delivery and management: development staging, community engagement; decanting; tenure mix; social services; community capital.

Figure 11: Mixing desk: a multi-criteria evaluation

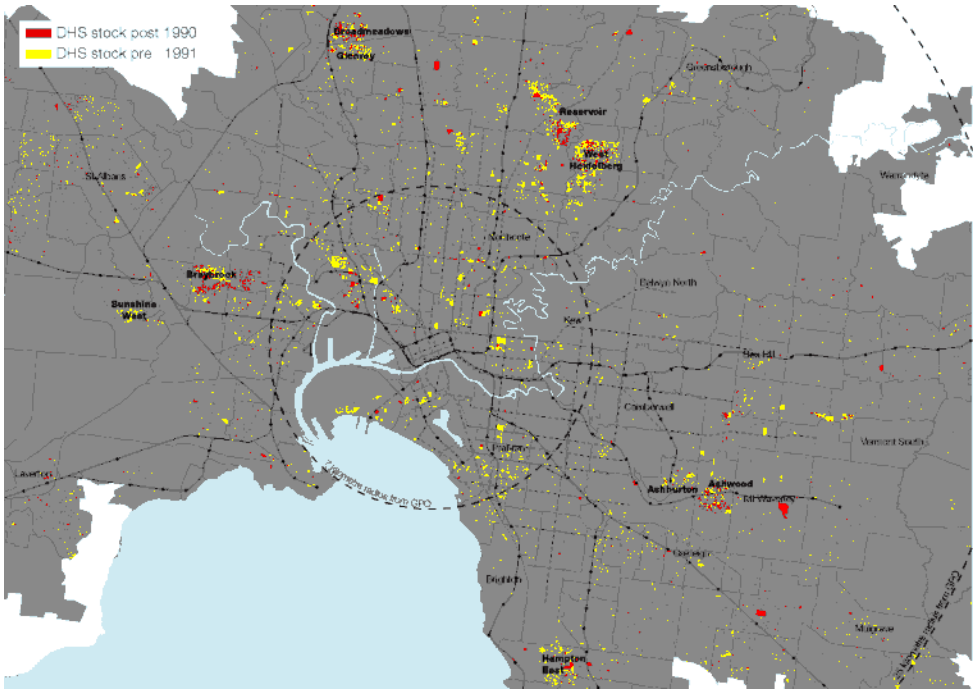


This 'box and whisker' graph plots how middle suburban DHS properties perform according to a range of criteria. The Min and Max positions describe highest and lowest individual values, the Median line represents the statistical median for all properties, and the black box spanning between Upper and Lower Quartiles represents where the middle 50 per cent of properties sit, such that 25 per cent of properties score higher and 25 per cent score lower.

Seven study areas (located in Hampton/Hampton East, Ashburton/Ashwood, West Heidelberg, Reservoir, Glenroy/Broadmeadows, Braybrook and Sunshine West) were shortlisted for closer analysis. These locations contained concentrations of landholdings that exhibited a variety of spatial arrangements and physical qualities that could support different approaches to precinct redevelopment, however, the urban context of each location differs significantly. This

shortlisting does not represent all redevelopment opportunities; the DHS portfolio has more capacity for other scales and types of precinct designs. This level of design variation was outside the scope of this project, however, the research principles presented in this report provides a strong basis for further design research investigations.

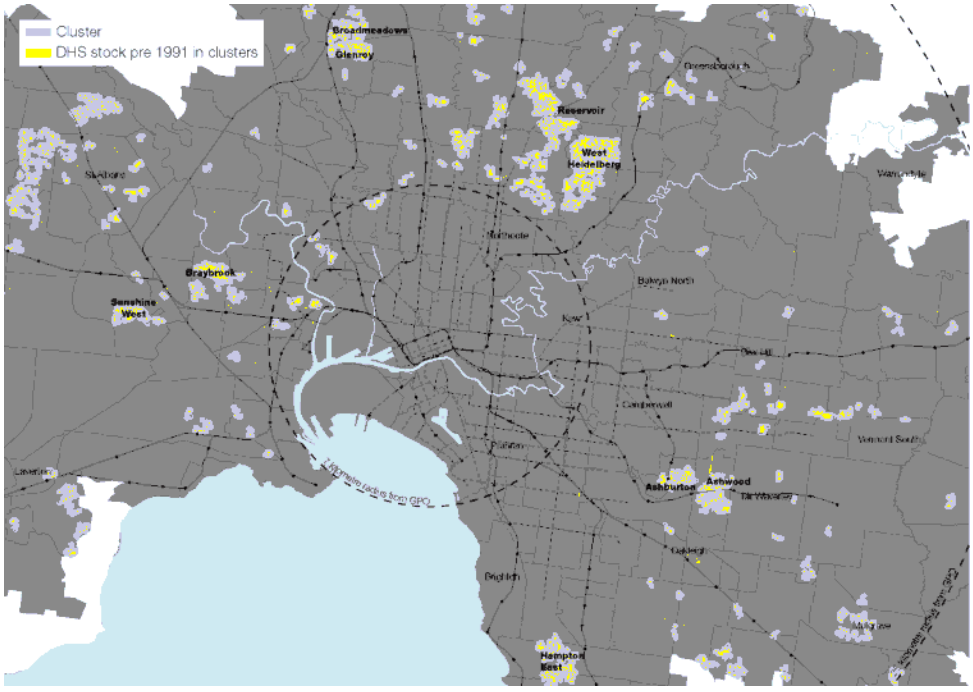
Figure 12: Spatial distribution of all DHS properties in metropolitan Melbourne



Number of public housing allotments: 23 504.

Source: DHS 2012

Figure 13: Identification of study areas for potential precinct regeneration



Study areas: Hampton/Hampton East, Ashburton/Ashwood, West Heidelberg, Reservoir, Glenroy/Broadmeadows, Braybrook and Sunshine West

Number of public housing allotments in clusters of four or more lots: 6672. Source: analysis of DHS data by MAS.

4.2 Research findings

This section of the report outlines the key observations and outcomes from the survey of public housing in metropolitan Melbourne. Appendix 1 includes the detailed material generated from the survey.

There are numerous areas in the middle suburban regions of Melbourne with suitable distributions and configurations of public housing land for potential precinct redevelopment at large and small scales. Over 6000 potentially suitable properties were identified, representing 25 per cent of all DHS properties and 471 hectares of developable land. A preliminary survey of public housing properties in Sydney and Brisbane suggests that the research findings from Melbourne could be replicated in other states (refer Appendix 1). From the analysis, the following observations can be made:

- *Capacity for greyfield precinct regeneration*—The type, age and distribution of public housing stock in Melbourne offers considerable capacity for greyfield regeneration. There are 23 504 existing public housing assets in metropolitan Melbourne (Figure 12). Just over 75 per cent of DHS dwelling stock was built within a 45-year period from 1950–95.[4] A large proportion of this stock is likely to be reaching the end of its life-span or in need of significant upgrade. More than 50 per cent of DHS land holdings are located in the middle regions of Melbourne (7–25 kilometres from the GPO), representing 42 per cent of all DHS dwellings and 50 per cent of the total land area. A single house on an allotment is representative of just over half of all DHS properties (not dwellings); and in the middle suburbs this type represents closer to 60 per cent of properties.
- *Optimal development conditions*—To achieve good quality design and urban outcomes with high yields in an economically viable way requires the assembly of ageing housing stock in areas with relatively high property values and good access to public transport, employment, public amenity and services. High-impact opportunities of this type are not common occurrences within the existing public housing portfolio.
- *Recurring development conditions*—The majority of middle suburban stock has reasonable proximity to activity centres, open space and employment opportunities, but are located in areas of relative disadvantage with poor-average public transport access and relatively low property values. While this is not ideal for redevelopment, the frequency with which it occurs is a significant consideration for the development of replicable design models.

The trade-off between replicable design models and high-impact development opportunities was a key challenge for this research requiring consideration of macro and micro concerns over time. For example, when examined at a neighbourhood scale, the DHS housing portfolio demonstrates a variety of spatial configurations that could support a diversity of good quality, flexible, medium-density housing types in greyfield suburban contexts. However, due to the locations of housing stock it is unlikely that economic viability for one-off developments could be achieved. Conversely, precinct-scaled redevelopment of greyfield land holdings could potentially drive sustainable transformations in the broader urban environment, delivering a range of built form and social benefits in areas requiring renewal. This regenerative value is significant, given the urban contexts in which the majority of the DHS properties are located and the need for greater leadership in the transition to more sustainable, higher quality infill outcomes.

The multi-criteria assessment framework begins to demonstrate the need to embed design and spatial quality measures in the processes used to identify potential precincts for redevelopment. The design-led approach to the survey of public housing land has revealed a replicable precinct scale within the DHS portfolio and identified recurring precinct types across

[4] Note data provided by DHS relating to age of developments can indicate either the date of development or the date of purchase. Preliminary review of the dataset suggests it is seldom the latter.

Melbourne's middle suburbs (e.g. around local shops, at park edges and in proximity to existing community facilities). It shows how extant data sets (e.g. age of allotments) and projective design measures (e.g. defining the 'nearness' of sites based on expected design outcomes) might be considered together to refine and prioritise precinct selections.

4.2.1 Factors influencing precinct selections

The range of factors leading to the selection of three greyfield precincts for design and testing in Stage 3 of the project provide insights into how the three categories of the assessment framework (existing physical attributes; urban context; potential development capacity) have a collective influence on the potential capacity and design outcomes achieved by a dispersed precinct development approach.

Existing physical attributes: spatial distribution, clustering and consolidation

The spatial distribution of allotments was a major determinant of the precincts selected for study in Stage 3 of this project. Analysis undertaken at a range of scales indicates that there are significant variations in the distribution of DHS properties across a neighbourhood or walkable area. The examples below (Figure 14) demonstrate large consolidated sites, fragmented 'islands' of properties (clusters of around 20 sites), pockets of smaller allotment consolidations (three to four sites) and highly dispersed single allotments. The different levels of property clustering and consolidation would have a direct impact on the proposed building types and siting arrangements possible in the precinct designs.

Figure 14: Examples of different property distributions at suburb level

Some clustering and allotment contiguity is desirable for precinct redevelopment to support a diversity of housing types and urban environments. The 'nearness' of properties is important to encourage the development of walkable neighbourhoods. However, an amount of dispersed housing allotments is also beneficial to encourage social/tenancy mixes in a neighbourhood and to provide regenerative benefits to a larger urban area. The majority of DHS housing stock is comprised of dispersed singular allotments, however, assemblies of two to five allotments forming clusters of up to 30 allotments are also prevalent.

Figure 15: Lot-level examination of site types and arrangements

Corners/ends of blocks | L-shaped assemblies | Back-to-back sites | Runs of adjacent sites

To achieve the 'critical mass' of land holdings considered necessary for effective precinct design outcomes, the dataset of DHS assets was filtered to identify lots forming clusters. Clustering was defined as the presence of four or more lots within a 200-metre radius. 6672 DHS properties dated 1990 or older met the clustering definition. Clusters of 20 allotments or less represented the overwhelming majority. When cross-referenced with the total number of lots in each cluster size (Figure 17), just over half (53%) of the 6672 properties formed clusters of less than 100 lots with most comprising clusters of less than 20 lots (37%).

Figure 16: Number of clusters by size

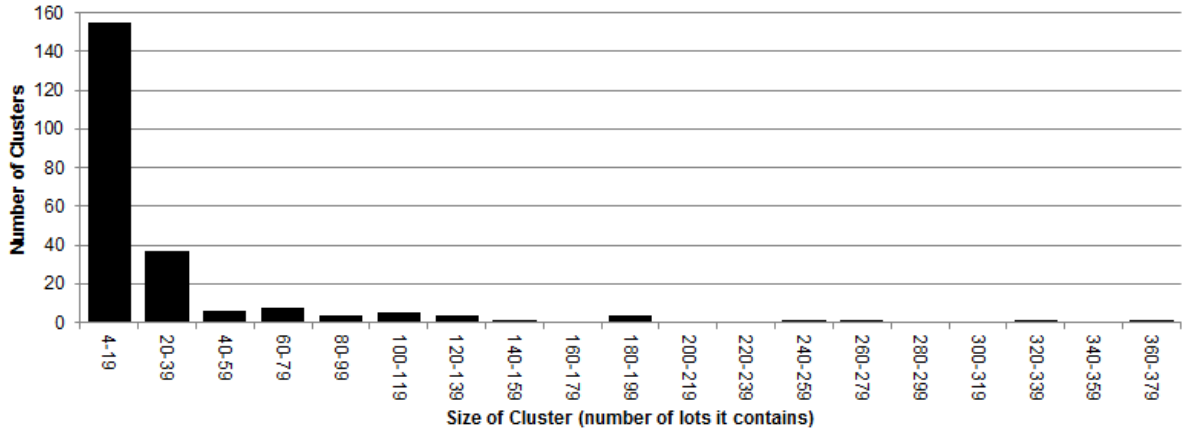
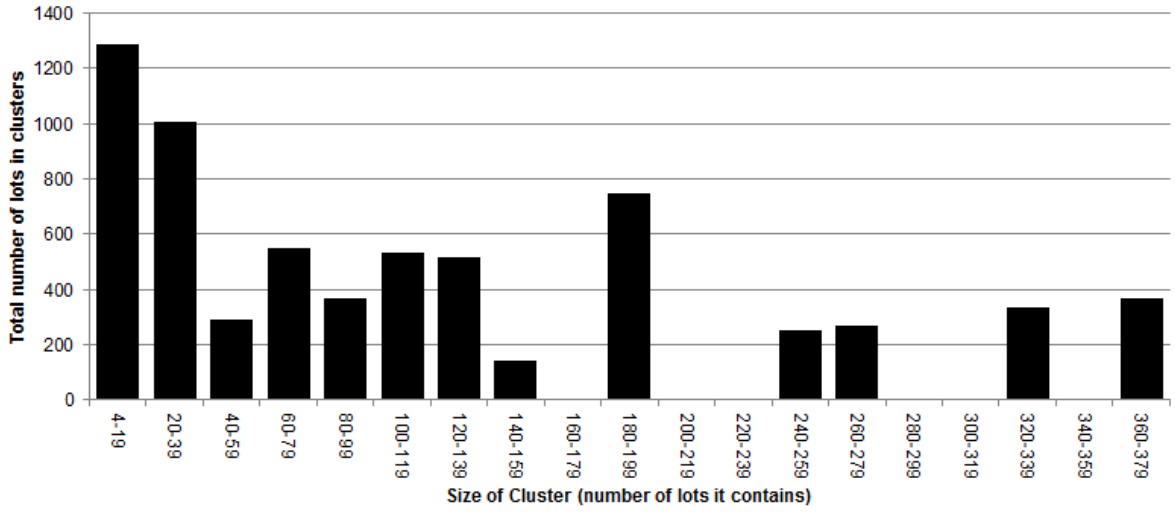


Figure 17: Number of lots by size of cluster



The DHS landholdings selected for design and testing in Stage 3 were small-scale clusters (less than 20 lots) including assemblies of up to five allotments. This is a replicable development scale and the design thinking and operations would also have relevance for larger precinct configurations. Smaller clusters could aggregate to form a larger whole, or

provide the initial catalyst for more expansive regeneration initiatives. Working within these ranges, the exact number and configuration of selected sites was determined through preliminary design stages of the project.

Property location/value

Property value is perhaps the most significant factor affecting the potential viability infill redevelopment. High-density housing is generally dependent on locations with high property values to offset the increased cost of construction associated with these building types. Figure 18 below maps the distribution of DHS properties against median house prices in metropolitan Melbourne. Table 3 below shows the quantity of DHS properties falling into different price brackets. Approximately 33 per cent of public housing assets in the middle suburbs were in areas with median house prices of $500 000–$700 000, located mostly in the east and south-east of the city. Fifty per cent of middle suburban properties were in areas less than $500 000, largely in the north and west. To examine the impact of property values on design and development of infill precincts, two locations with differing property values were selected for comparative analysis.

Figure 18: Distribution of properties relative to median house prices (2011)

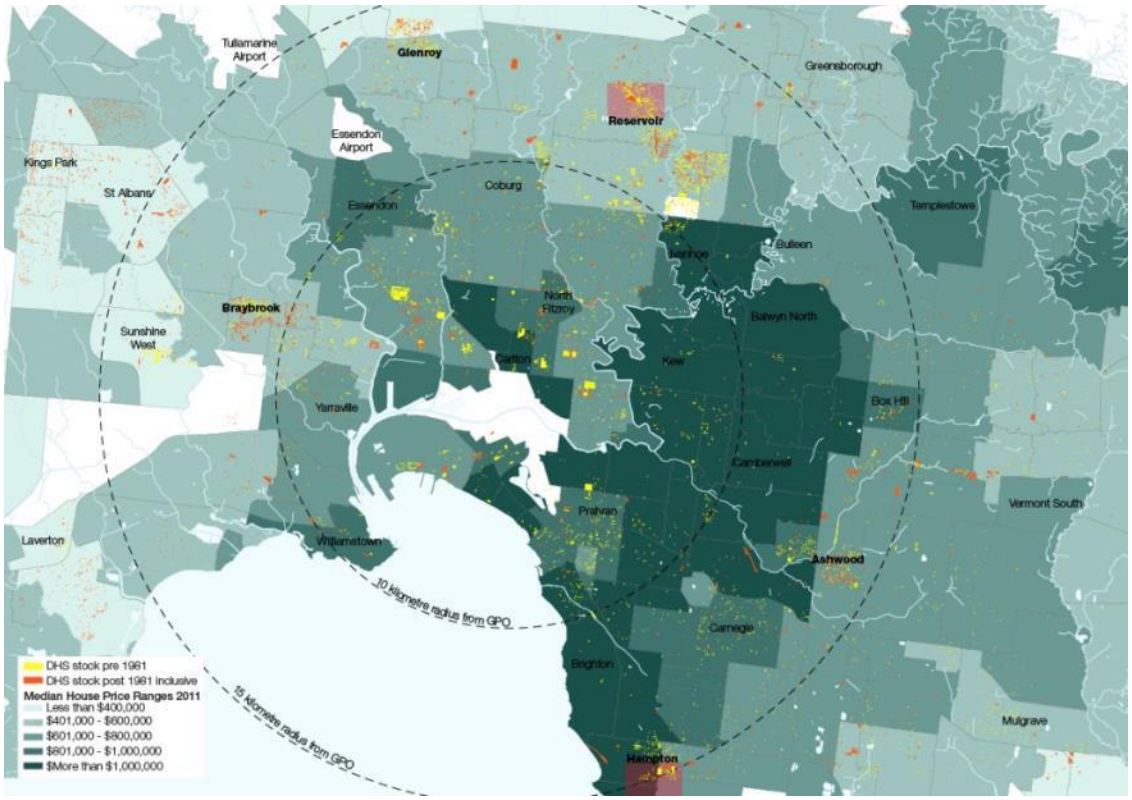


Table 3: Median house prices for middle suburban properties (2011)

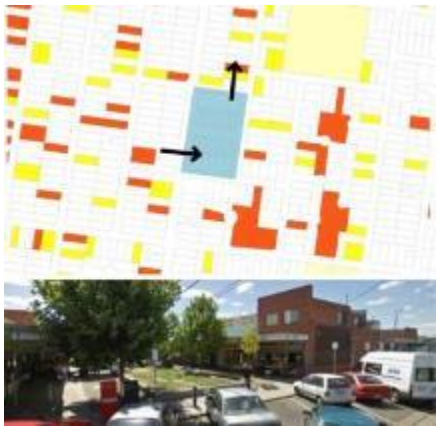
Median house price	(N)	%
More than $1M	559	5%
$701K–$1M	1,569	13%
$501K–$700K	3,936	32%
$401K–$500K	3,101	25%
$300K–$400K	3,098	25%
Totals	12,263	100%

Other urban indices

Examination of DHS properties against a range of other urban indices revealed several important considerations for the design of precincts in greyfield locations (refer to Appendix 1 for detailed examinations):

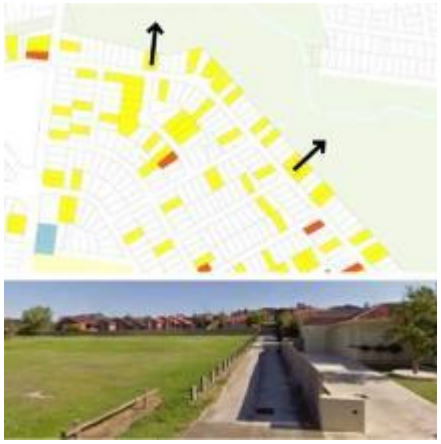
- *Socio-economic context*—DHS properties are located in areas with a broad mix of socio-economic advantage/disadvantage. Opportunities exist for mixed tenure precinct regeneration to potentially catalyse economic uplift in underperforming urban and social contexts. Socio-economic Indexes for Areas (SEIFA) classifications in Melbourne's middle suburbs are regionally biased, following a similar pattern to median house price distributions. The median SEIFA decile for middle suburban DHS properties is three, indicating overall relative disadvantage. Public housing development can impact heavily on the geographical concentration of disadvantage, or potential polarisation of communities based on social status (Hunter & Gregory 1995; Pawson et al. 2012). Careful consideration needs to be given to the continued focus on social housing in areas of relative poverty.
- *Public transport access*—The majority (83%) of DHS properties in Melbourne's middle suburbs have low-to average levels of access to public transport (Public Transport Access Level (PTAL) classification of five or less). This has considerable implications for the precinct design proposals, particularly in relation to car parking provisions, urban design strategies for reducing car dependency over time and encouraging alternative modes of private transit (e.g. walking, cycling, car-pooling).
- *Public parks and recreation areas*—These provide opportunities for different levels of social interaction and encourage community cohesion, which are essential for good quality living, and resident health and well-being. Selection of potential precincts needs to consider the range of community and open spaces that can support higher-density housing proposals. The survey revealed that on this indicator, the landholdings perform well, with more than 50 per cent of DHS land holdings in Melbourne's middle suburbs within 200 metres of existing public open spaces, and more than 95 per cent within 600 metres.
- *Access to employment*—An important factor to consider in planning and strategically locating higher-density housing development (Victorian Government, *Plan Melbourne* 2013). Effective Job Density (EJD) measures the numbers of jobs accessible from a particular location within a specified travel time (DoT 2012). EJD can also be used as a measure of agglomeration economies, that is, the ability to offer productivity and human capital benefits for people and businesses (SGS 2013). The median EJD score for middle suburban DHS properties is equivalent to Doveton (a dormitory suburb 2.5 kilometres from Dandenong railway station).
- *Activity centres*—These are locations where daily services and other needs can be met, such as a range of financial, employment and community programs. Activity centre planning is a key focus for current metropolitan planning strategies and should be aligned with future public/social housing redevelopment strategies. 35 per cent of DHS properties in the middle suburbs are within a walkable distance (500 metres) of a major or principal activity centre, and 95 per cent are within a short bicycle ride or commute (less than 2 kilometres).
- *Health, education and community facilities*—These essential services provide important 'anchors' within a community and influence the urban and housing design strategies that could be pursued in precinct redevelopments. For example, assisted living or single bedroom dwellings might be increased to accommodate ageing or student populations. The scale, type and ownership of existing facilities in middle suburban locations vary significantly. Due to a lack of suitable data it has not been possible to map these facilities against the complete DHS portfolio within this project. However, several study areas were examined on an individual basis leading to the identification of recurring 'precinct types' that could potentially be delivered in middle suburban locations (Figures 19 to 21).

Figure 19: Potential integration of existing local shops



Smaller shops (neighbourhood-scaled activity centres) could potentially be incorporated into precinct design strategies. Integrating mixed uses within the precinct would enhance possibilities for delivering a range of dwelling densities and diverse dwelling types, while also providing avenues for community and neighbourhood building.

Figure 20: Potential integration of public parks and recreation



Potential for precinct redevelopments to respond to specific tenant needs. For example, appropriate housing and urban design strategies for ageing tenants could be delivered with corresponding health services at a near-by hospital.

Figure 21: Potential integration of existing public facilities and community amenity

The interface between existing public housing sites and public open space amenity offers opportunities for increasing the density and quality of housing provisions through the incorporation of 'borrowed' landscapes and innovative shared/open space designs.

Development capacity

Other issues that relate to the design and delivery of greyfield precincts on public housing land, as well as the development and on-going management of social housing, may influence the

potential development capacity of selected locations and proposals. The following issues have been considered through the survey of the DHS portfolio and are explored further in Stage 3 of the research.

- *Development scale and staging*—The scale of an integrated precinct redevelopment could be calibrated to the capacities of the agencies undertaking the redevelopment—their available financing options, the level of risk they can carry, and the quantity and type of housing that can be sustainably managed in the long term. Similarly, scale could be calibrated to optimise economical building delivery systems, for instance prefabrication or economies of scale through the coordination of construction work. The long-term staging of precinct delivery could enable a range of procurement options, flexibility to adapt to changing circumstances in local conditions, and improved community acceptance.
- *Strategic management of public housing land*—The current age and condition of the public housing stock in Melbourne is variable and there is a mismatch in the type of housing available and the profile of current and future tenants. Strategic coordination and staging of precinct-scaled redevelopment has the potential to provide short-term benefits through increases in appropriate dwelling designs, as well as long-term sustainability through continued improvement of housing stock and urban environments.
- *Decanting*—Redevelopment of public housing stock must involve appropriate strategies for decanting and relocating existing tenants, many of whom will have long standing ties to particular neighbourhoods and social networks. A coordinated precinct could be staged to enable the necessary density and diversity and delivery of housing might be aligned with a decanting plan.
- *Tenancy mixes, social mixes*—The spatial configuration and concentration of public housing in a precinct should consider two levels of tenancy mix and social cohesion: first, built form design and tenancy mixes within the development; second, urban form and interfaces with privately owned residences surrounding the development.

4.3 Selection of two study areas for comparative design investigations

From the areas identified in the survey, two locations were selected in which to undertake parallel comparative design investigations. The physical condition and distribution of public housing properties differs in each location, as does their urban context, topography, demographic make-up and land value. Of particular note is the type and condition of existing housing stock in each area—both public and private—and the redevelopment activity that is already beginning to take place in the respective study areas. The strategic relevance of each location differs in a metropolitan planning context and for Victoria's future public housing policies[5].

The following documentation of the existing conditions of each of the selected study areas highlights various issues and opportunities present in each location, which provides a brief for structuring and approaching the design of the proposed precinct redevelopments. To be of most value, the design research requires a certain level of detail in its visual representation; due to the sensitivity of the public housing data, reporting on this research is limited. The drawings and photographs contained in this report are of real locations and the associated data is accurate. However, to ensure the anonymity of public housing tenants, specific names and other locational identifiers have been removed.

[5] For example, Study Area A lies within an emerging innovation cluster nominated under Plan Melbourne (Victorian Government 2013), which incorporates a local university and a hospital. As such, higher intensity of redevelopment may be possible in accordance with these metropolitan strategies.

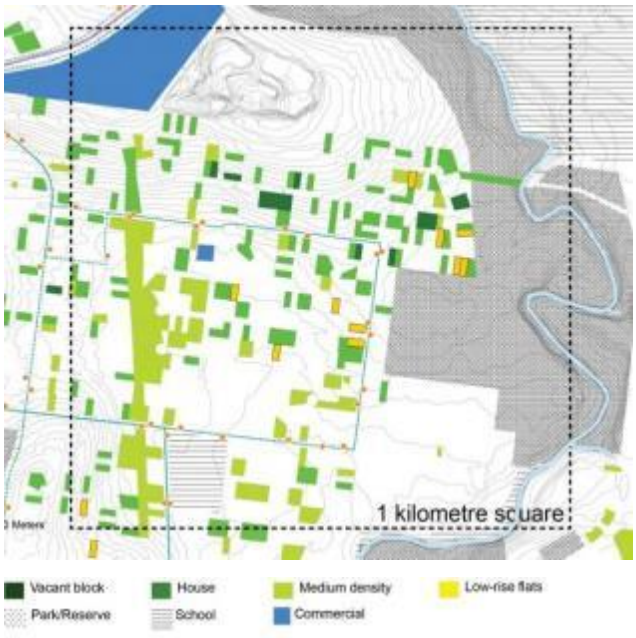
Figure 22: Study Area A

	DHS all	DHS selected	All lots in 1km study area
Number of lots*	153	24	665
# of lots as % 1km study area*	23%	4%	100%
Total lot area (m^2)*	108,076	16,918	412,980
Lots as % of 1km study area*	26%	4%	100%
Av. lot size (m^2)**	706	705	621

* residential land only

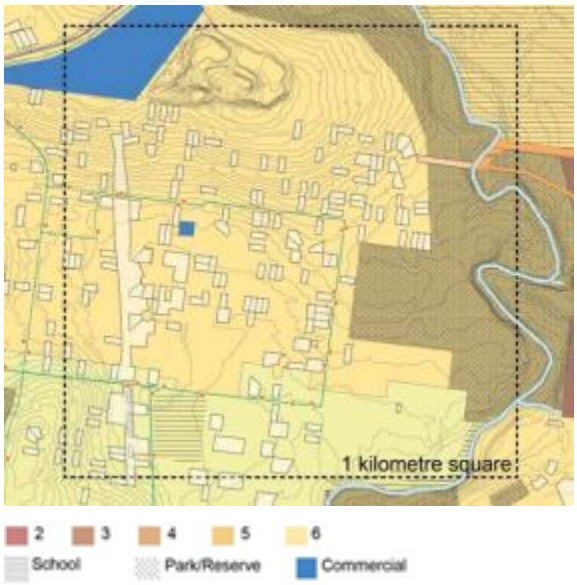
** excludes land already strata titled/subdivided.

Figure 23: Area A building typologies



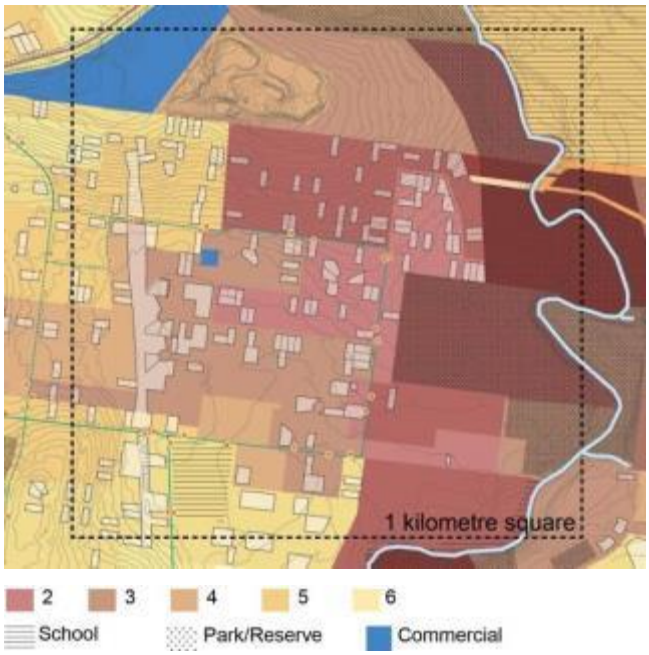
Predominantly low-density, single-storey houses, the majority either brick veneer or weatherboard, but some are made of concrete panels and connite. Most of the houses were built in the 1950s, however, there are a few built in the last decade. Larger blocks shown in yellow are newly developed, higher-density apartments, replacing older single and double-storey brick veneer flats. 'Medium density' in this instance almost entirely consists of duplexes.

Figure 24: Area A land values



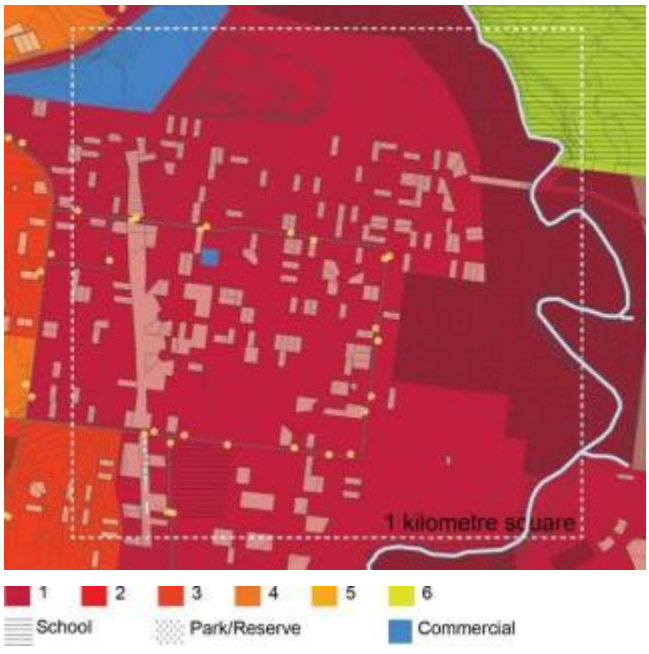
The median house price in this sample sits slightly below the metropolitan Melbourne average ($490 000) and slightly above the Victorian average ($420 000). (Victorian Department of Sustainability and Environment 2012)

Figure 25: Area A PTAL



PTAL measures: the walk time from a point of interest to transport service access points (SAP); the number of different services operating at the SAP; and the level of service (average waiting time) with an adjustment for reliability of the mode. Low to high (1–10) scores indicate poor to good ranges of transport accessibility. In this study area, very poor transport access exists in the east, with marked improvements in the west.

Figure 26: Area A SEIFA



Socio-economic Indexes for Areas (SIEFA) measures relative disadvantage and advantage. Scores range from 1–10; high scores reflecting greater advantage, low scores indicating disadvantage. The whole of this study area is relatively disadvantaged with very poor scores of 2 or less.

Figure 27: Strip of empty shops

Under-utilised empty commercial strip in the centre of the residential area.

Figure 28: Ageing DHS stock

On large suburban properties there is a lot of 'leftover' space.

Figure 29: Existing pedestrian connection

Between residential area and rear of shopping complex; its seclusion and perceived high rate of crime mean many locals avoid this route.

Figure 30: Empty car park

An empty car park sits behind the shopping complex.

Figure 31: Public open space interface

No connection and lost opportunities—Dwellings are oriented/turn their back on large reserve.

Figure 32: Connections and access

Pedestrian and vehicle links to retirement village are closed.

Figure 33: Study Area B

	DHS all	DHS selected	All lots in 1km study
Number of lots*	71	12	717
# of lots as % 1km study	10%	2%	100%
Total lot area (m^2)*	92,477	7,052	511,876
Area as % of 1km study	18%	1%	100%
Av. lot size (m^2)***	657**	588	557

* residential land only

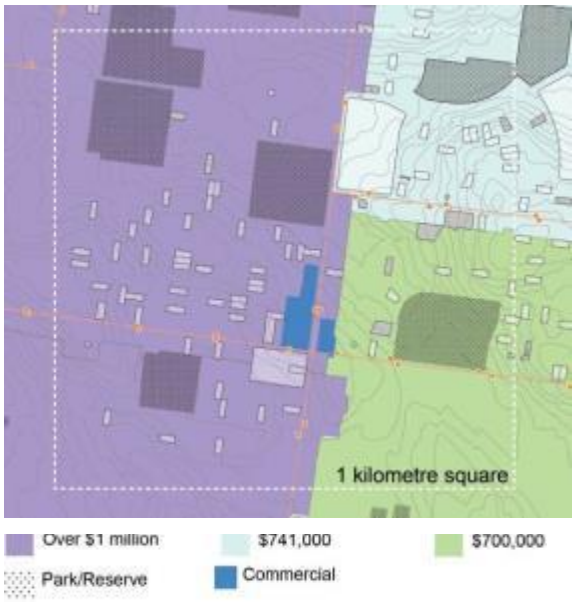
** excludes land already strata titled/subdivided

*** excludes large housing estates

Figure 34: Area B building typologies

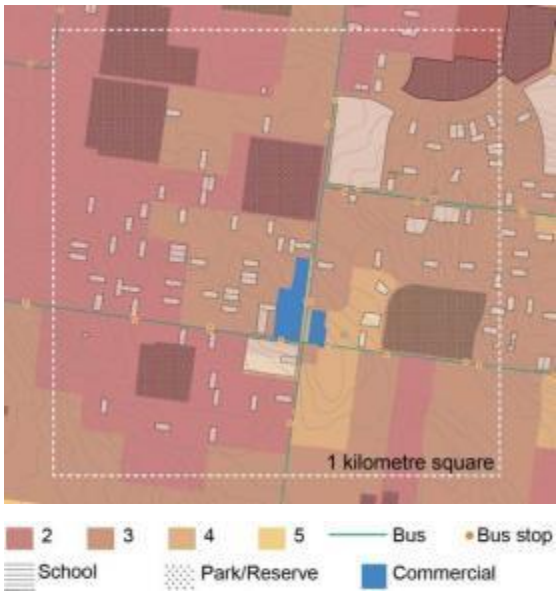
Predominantly low-density, single-storey houses, the majority brick veneer or weatherboard, but also some concrete panels. Most of the houses were built in the 1950s, however, there are a few built in the last decade. Larger blocks shown in yellow are newly developed, higher-density apartments, replacing older single and double-storey brick veneer flats. 'Medium density' in this instance almost entirely consists of duplexes.

Figure 35: Area B land values



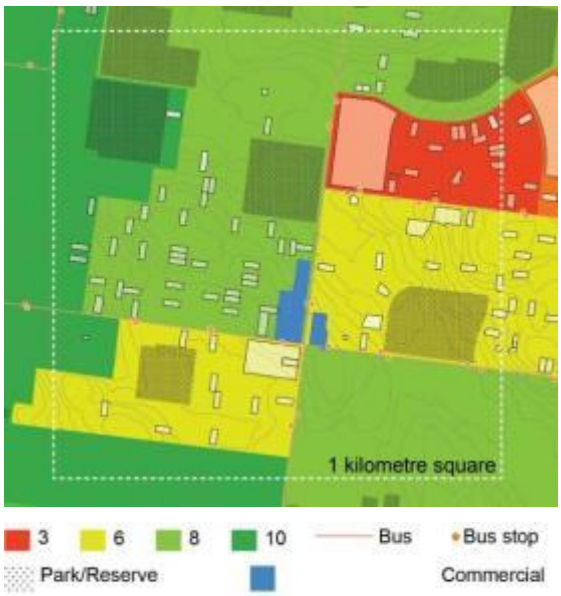
The median house price in this sample is well above average when compared with the state and metropolitan Melbourne average, at $420 000 and $490 000 respectively. (Victorian Department of Sustainability and Environment 2012)

Figure 36: Area B PTAL



PTAL measures: the walk time from a point of interest to transport service access points (SAP); the number of different services operating at the SAP; and the level of service (average waiting time) with an adjustment for reliability of the mode. Low to high (1–10) scores indicate poor to good ranges of transport accessibility. The majority of this study area has poor transport access, scoring 3 or less.

Figure 37: Area B SEIFA



SEIFA is a general socio-economic index that measures relative disadvantage and advantage. Scores range from 1–10; high scores reflecting greater advantage, low scores indicating disadvantage. With the exception of one pocket in the north-east of the frame, this study area is comprised of a resident cohort with relatively high socio-economic advantage.

Figure 38: Major road barriers

Little to no connection between large tract of public housing land (right) and large reserve (left), separated by a busy road.

Figure 39: Large estate located in local activity centre

Excellent access to shops, services and amenities, especially convenient to those without access to a vehicle.

Figure 40: Local shopping strip

A mix of leased and empty shops.

Figure 41: New and old dwelling development

Often of widely different ‘market types’, and often in direct adjacency.

Figure 42: Ageing DHS stock

In need of repair on large suburban blocks.

Figure 43: Existing open spaces

Six large green open spaces are dispersed through the study area, however, these are predominantly sporting ovals and are not designed/programmed to support other kinds of use.

5 STAGE 3: SCENARIOS FOR PRECINCT REDEVELOPMENT OF PUBLIC HOUSING LAND IN MELBOURNE'S MIDDLE SUBURBS

This final stage of research draws on Stages 1 and 2 and explores the potential for strategic, precinct-scaled redevelopment of public housing land through site-specific design explorations. The objective of this speculative mode of design research is to envision and test infill housing alternatives in greyfields, which could increase the supply of affordable housing as well as increase the overall performance of these contexts in spatial and social terms.

The work presented in this section summarises the outcomes of three stages of the design and testing processes, including:

- Developing and testing initial ideas through a Masters of Architecture design studio at Monash University, engagement with the local communities and engagement with local government authorities.
- Development of three precinct designs and liaising with community housing organisations.
- Development of preliminary viability assessments for the precincts.

5.1 Masters of Architecture design studio and community consultation

5.1.1 Masters of Architecture design studio

Monash researchers led a Masters of Architecture design studio involving 15 students exploring the site-specific design opportunities for dispersed precinct redevelopment in the two selected study areas for this project. The studio environment presents a vehicle for generating and testing speculative and innovative design ideas released from the strictures of convention and the inevitability of constraint-driven processes. The studio tested how the precinct model could be customised, identifying a broad range of design strategies: some were quite radical, challenging the nature of suburbia itself; others were almost imperceptible ways of knitting change into the existing fabric. In the community engagement, these ideas would be further tested against the views and knowledge of local residents. The following summarises the designs generated by the students and presented at the engagement forums (see Appendix 2 for details).

Figure 44: Localised density and new park interface

Before (left) and after (right). Student proposition for higher-density, low-rise housing at park edge, with improved amenity including sports equipment hire addressing otherwise barren parkland.

Image: Lara Pannuzzo

- *Localised density*—Identifying sites where proximity to different services and amenities enabled support of higher-density dwelling types, while their positioning relative to existing residential areas also meant that there would be little impact on surrounding neighbours: for instance, lot consolidations at corners, 'bookending' blocks and properties backing directly onto parkland. The schemes asked the community to consider if targeted, 'acupuncture-like' instances of high-density development might be acceptable if other areas of neighbourhoods would experience lower levels of change.
- *Key linkages*—Connections within and through a neighbourhood could make the urban environment work better and enhance its walkability. One dimension of this was the identification of existing streetscapes and paths that are currently underused or unsafe, but which could be upgraded and activated by being properly graded and lit. Another approach was the creation of smaller cut-throughs in the suburban fabric to link existing assets such as recreation facilities, transport or shops.
- *Intensification around bus network*—Buses are often the main public transport mode in middle suburbs. Several projects explored how bus stops could become focal points for intensification: new housing here could mean less car dependence and an opportunity for public realm enhancements tailored to the local context. This ranged from landscaping and traffic slowing medians to small hubs of shops, services and urban terraces that integrated with accessible bus 'super-stops'.
- *Nodes of activation/intervention*—Pressure points in the existing physical and social fabric of the neighbourhood mean small changes can provide a significant community benefit or new potential could be unlocked. Place-specific and targeted interventions can supplement community amenity and infrastructure already there. For instance, one project proposed a facility on an existing bike route to better use the open space and transit corridor; another proposed a childcare facility at the edge of the retirement village, providing a new threshold to the surrounding neighbourhood and new ways for older residents to participate in community life.
- *Diversified public spaces*—While there is often plenty of public space in the suburbs, it generally has a narrow range of uses. A variety of high-quality public spaces is needed to support higher-density housing. Students investigated how new types of piazzas, plazas and laneways could be introduced alongside housing redevelopment. Modifications to existing parks and streetscapes were proposed so they could be used by more people at different times of the day. For instance, one strategy explored how quieter tertiary streets could be shared with cars, but prioritise bicycle, pedestrian, recreational and outdoor community uses. The incremental transformations could provide a new 'green belt' network in the long-term.
- *Clustered parking*—Responding to the inevitable need to provide more parking as housing provision increases, several projects tested possibilities for clustered and off-site parking rather than being directly co-located with individual houses. Designs explored how land can be used more efficiently by dwellings and open space, when the need for driveways is eliminated. One project proposed a large car park on a triple lot site that could service residents within and outside a new precinct development, and be adapted for transient community activities such as markets and 'play' areas.

Figure 45: A new 'green belt'

Before (top) and after (bottom). Various micro interventions were proposed, ranging from planting vegetables on the nature strip, to traffic calming, expanded verges, and reclaiming the space of the street as community sports courts.
Images: Radoslaw Buczek

5.1.2 Community engagement

This project engaged local residents in a meaningful and future-directed dialogue about infill redevelopment in their neighbourhoods. The students' initial designs formed the basis of a structured public forum held in each of the study areas. Rather than present high level policy contexts and associated development options to the community '*fait accompli*', the students' proposals were offered as preliminary ideas and explorations that responded to local level, context-specific observations from their fieldwork and 'on-site' studio activities. Residents were asked to consider: '*Change is going to happen—would you like to be involved?*'

By focusing on the 'open-ended' and exploratory nature of student work, the engagement events sought to challenge the community's preconceptions about conventional development outcomes and to provoke new thinking about future possibilities. The intention was to have an open conversation about urban intensification and to better understand the participants' own ideas, aspirations and concerns for their neighbourhoods. Community members were invited to critique the schemes and provide feedback that could assist in the ongoing development of the student work by considering: Was the student's reading of the context accurate? If not, what are the actual issues/opportunities present in the local area? How might the proposals be improved? What alternatives might be more appropriate? Through these conversations, the research team aimed to:

- *Unearth tacit local knowledge*—Residents have an intimate understanding of the physical conditions, uses and interactions in their neighbourhood but this local 'expertise' can be difficult to extract. The engagement forums sought to uncover valuable insights and design intelligence that could inform development of the precinct proposals.
- *Understand the values and priorities of the respective communities*—This project sought to understand the kinds of individual and collective benefits that could potentially be delivered

by greyfield precinct redevelopment. What were the immediate pressures and needs in the respective communities? What are their future visions and desires for their neighbourhood?

- *Explore what trade-offs might be made*—The appeal of a building or designed space is often subjective, qualitative and relative to a specific context; for example, what is acceptable in one location may not be acceptable in another. Assessment of designed outcomes will typically involve multiple readings of different elements so opinions vary. As such, there are always areas of negotiation in a designed outcome that can heavily inflect on its acceptance. This project sought to move beyond generalised discussions about infill redevelopment (e.g. 'density' and 'character') and delve into more specific areas of negotiation: What are the site-specific levers and tipping points for acceptable/unacceptable urban change?

Method of community engagement

Appendix 2 details the method for the community engagement, how participants were invited and the data that was captured. The engagement events themselves were structured as a four-part workshop:

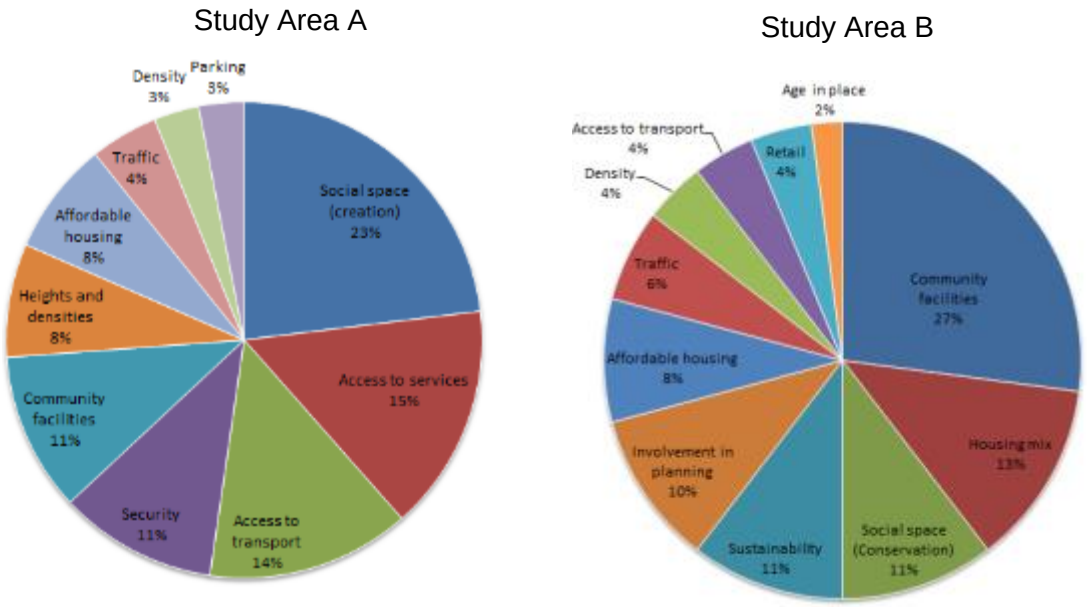
- An introductory presentation was given by the research team, providing a context for the discussion, explaining why the workshop was being held, the types of information being sought and what the material would be used for. The presentation set the 'future-looking' tone for discussions and encouraged a frank and positive contribution from attendees.
- Six to eight student proposals were exhibited on the walls of the venue in the respective locations. In small groups, attendees were invited to review individual designs and talk directly with the students about their work. Initial responses to the designs were captured with written comments on 'sticky notes' attached to the exhibited drawings. This first step allowed participants to digest small components of a larger precinct concept (see *Emergent design strategies and hypotheses*).
- As a collective group, workshop participants were then asked to consider each of the projects in a larger context. Attendees gathered around a large physical model of the suburb, which exhibited each of the students' proposals in relationship to each other, and in the context of the broader neighbourhood. Students 'reported back' on their individual discussions and the key issues that arose, from which a group discussion began to 'tease-out' design-specific concerns and opportunities. Through this collective dialogue, participants began to see the impact of the designs from a precinct-scaled perspective while also considering differing opinions present within the group. This was particularly pertinent as the conversations evolved into the 'tipping-points' for urban change and the trade-offs that might be negotiated.
- Finally, individual participants were asked to reflect on the discussions and list the top five opportunities/issues/concerns of most importance to them. This undisclosed, individual exercise allowed participants to put forward additional topics that may not have surfaced through prior discussions and enabled a 'profile' of the workshop attendees to be constructed.

5.1.3 Findings

The outputs in this section synthesise data captured at each of the workshops; responses to individual student projects and transcribed round-table conversations (both of which were coded and analysed), as well as quantitative analysis of residents' individually nominated top five concerns (see Appendix 2 for further detail). The decision to use design ideas and design research as a vehicle for challenging preconceived attitudes and to petition a positive, forward-looking dialogue from participants has provided a range of insights relevant for future investigations into community engagement methodologies, planning and development processes for greyfield regeneration.

Figure 46: Individual interactions with students and collective discussions

Figure 47: Local residents' top five concerns by percentage



The consultations for Study Area A and Study Area B produced relatively distinct outcomes, largely reflecting the different socio-cultural, economic and physical contexts of the areas. There were, however, some commonalities including:

- *Open to change*—Residents were far less resistant to urban change than expected and, in fact, welcomed redevelopment if it contributed to local community building and improvements to public amenity. In Study Area A, this centred on the need for more public space, local services, nodes of activation and creating a more secure environment. In Study Area B, the issues were conserving existing open space, improving walkability/ride-ability of existing street networks, and building more diverse offerings of public amenity/facilities.
- *Giving back to the community*—Traditionally issues arising in planning such as overshadowing, overlooking and parking were considered important, but in both study areas attendees were responsive as to how these could be resolved through careful design consideration and the strategic location of larger buildings. Once these concerns had been addressed, increased density and height did not seem to be significant issues, and larger developments were mostly deemed acceptable if they 'gave back' to the community through offering benefits to that particular area.
- The two study areas have distinctive socio-economic and physical contexts. Despite their differences, the responses received during the workshops were equal in demonstrating

support for appropriate, context-specific regeneration strategies. Participant responses were not based in limiting development outcomes or preserving the existing suburban fabric. In fact the prospect of urban transformation was welcomed when the designs could demonstrate specific contributions to the existing built and social fabric; typical objections to development become secondary, as locals focus on how to make an area better, as opposed to just protecting it.

- The most important factor for the workshop respondents in both areas was the enhancement of public spaces, community services and amenity to support greater social interaction.

Collective feedback specific to the Study Area A and Study Area B were analysed under three main headings: broad community aspirations/needs, points of negotiation and site specific knowledge. In summary these are:

5.1.4 Study Area A

Broad community needs and aspirations

- *Enhanced vitality and public amenity*—There was considerable interest in the possibilities of social and cultural regeneration brought about through neighbourhood regeneration. Strong emphasis was placed on providing new or improved public spaces and places that will support greater social interaction and community activity. A recurring idea was the creation of places to stop and socialise en-route to other destinations. Modest interventions such as refurbishing public streets and parks with seats, bins and toilets were seen as an effective way to create small spaces that can accommodate small, informal gatherings of people. This was linked to an aspiration for social inclusion and interaction between age groups.
- *Security*—A number of attendees stated that, due to the lack of passive surveillance and street level activity in both transit areas and public parkland, there was a prevalent level of fear in the community. Security measures such as lighting and cameras were frequently requested, but this issue was equally linked to existing low densities.
- *Greater access to services*—Local facilities and services that are centrally located within the neighbourhood were highly prized; this was also viewed as a component of enhancing vitality and security. To ensure viability and relevance, suggestions were to start with basic services that many people could use (specific examples given were a pharmacy, general medical centre, café, youth centre).
- *Using existing neighbourhood structures and spaces more effectively*—There was a preference for renewing and upgrading existing facilities and amenity rather than necessarily developing new ones.
- *Greater connectivity*—Connections between existing infrastructures and networks, such as increasing access to the adjacent parkland, connecting to bike trails, secure walkways to existing public transport, were seen as very important.

Points of negotiation

- *Larger buildings*—Increased building height, density and changing character were of much less importance/less controversial than might have been expected. There was concern about how larger buildings would ‘fit’ with the surrounding fabric, but it was only an issue where proposals diverged significantly from localised norms. Centralised massing of bulk and peripheral ‘buffer’ zones were proposed in order to alleviate the impact of larger buildings, and three to four storeys was nominated by some participants as a general height limit.

  If a development incorporated benefits for the broader community, such as connectivity to important services and well-designed public/shared open spaces, its increased scale and density was considered much more acceptable. Furthermore, the additional passive

surveillance resulting from higher populations residing locally was viewed favourably, however it was emphasised that this required careful design and implementation between buildings and the street or public realm (the public-private interface of any development).

- *Parking*—Attracted significantly less attention than anticipated. While it was recognised that parking strategies in medium to large-scale redevelopments can have a significant impact on existing residents, it was accepted that this could be resolved through intelligent consideration and compromise (e.g. additional dwelling level to offset cost of underground parking).

  Clustered parking, in lieu of parking directly with adjacent dwellings, was considered possible, but only in situations where access and security could be guaranteed. An important aspect of this was that parking lots remain at a small scale so as not to encourage anti-social behaviour.

- *Gentrification*—Respondents expressed concerns about existing residents being ostracised from, or priced out of, their own community. On the other hand, increasing the demographic diversity and possibly improving levels of interaction and activation in the area was viewed favourably. Affordability, gentrification and social cohesion are inter-related issues that need careful consideration in the approaches taken to precinct-scaled regeneration.

Site-specific knowledge/values

- The parkland to the east of the research was the most notable example of an underutilised neighbourhood asset, due to its sheer scale, the lack of public amenity (e.g. toilets, seats) and passive surveillance. The possibility of new development at the park's edge to open this space up for the rest of the community was welcomed; proposals for linkages through the site and a hub at the corner site were very positively received. It was emphasised that this should not be 'just about the buildings' butting up to open spaces but that better landscape interfaces to the residential neighbourhood and the addition of urban furniture and community facilities should also be considered.

- The run-down strip shops, the existing sports club and community centre were all noted as existing 'centres' that are (or were) active and should be built upon or augmented as catalysts to lead regeneration in the surrounding areas. The existing sports club is expected to be redeveloped in the near future.

- There was considerable support for a proposal to improve access to the existing tramline on the north-west periphery of the study area which is currently poorly defined and unsafe. This would involve redeveloping the derelict car park and rear of the existing shopping precinct in a way that incorporated a linkage for the residential community behind (noting recent proposals for redevelopment of the shopping centre have not done so).

- Several vacant land parcels in the area, many of which are contiguous, were identified as problematic.

5.1.5 Study Area B

Broad community needs and aspirations

- *Diversity of community facilities*. There was a strong interest in smaller-scale community facilities suited to semi-private, organised community use, such as rentable shared work spaces, 'hot desks', technological centres or group meeting rooms.

- *Green spaces*—Public and private green open spaces distributed across the suburb are well established. The focus was more on their protection than on their activation and enhancement. The role they play in supporting eco-systems and providing space to 'get away from things' was pointed to, requiring careful consideration and conservation.

- *Diversifying streetscapes*—A proposal to transition selected local residential streets towards greater recreational use and non-car-based mobility was positively received, particularly in regard to the walkability and neighbourly interactions it supported.
- *Housing diversity*—Greater provision for diverse housing was noted, as there is a lack of dwelling choices for older and younger sub-markets requiring smaller accommodation types. This was affecting existing residents in the area, who were facing the prospect of having to relocate as they transitioned into different life-phases. Sophisticated housing (with integrated care) that supports ageing in place and strategies to promote social integration were foregrounded.
- *Participation*—Workshop participants demonstrated a considerable willingness to be more involved in design and redevelopment processes. This was seen as a positive opportunity for a two-way education process: residents could voice their opinions to inform/effect planning and development processes, and their concerns could be eased through discussion of the pros/cons of developments.

Points of negotiation

- *Larger buildings*—The students' schemes presented a range of alternatives to conventional infill redevelopment. Where workshop attendees were concerned about the impact of larger buildings on lower-scale neighbouring properties, this was addressed by strategies such as changing locations, adjusting the volumetric configuration of the proposed buildings, using attractive design, incorporating high performing environmental features and new shared community resources. As well, it was recognised that strategically located higher-density projects may offer more control and reduce the impact of development in other parts of the suburb, when compared with the widespread change produced by current market-driven lower yield infill outcomes.
- *Parking*—Parking was surprisingly under-represented as a contentious issue, and was not mentioned among the residents' 'top five concerns' data. Some expressed a preference that new parking be provided underground. The benefits of clustered parking were understood and accepted if provided in a safe and convenient manner.

Site-specific knowledge

- The northern end of the major road (running north-south in the study area and opposite a recreational reserve) was considered a good location for larger building types and more intensive redevelopment.
- A broader range of support services and facilities for public housing residents were identified as a need.
- Several parks in the area are designed for sporting use only. There was an interest in enabling other community uses through reconditioning the edges of these spaces, and there was a positive response to aspects of student designs that proposed this.

5.1.6 The benefits of community engagement

This project did not set out to explore new methods for community engagement; the public events sought to uncover local intelligence and candid resident responses to development alternatives for incorporation into the design models proposed by this research. However, the decision to use *design*—design ideas and design research—as a vehicle for challenging preconceived attitudes and to petition a positive, forward-looking dialogue from participants has provided a range of insights relevant for future investigations into community engagement methodologies, planning and development processes for greyfield regeneration.

The two study areas selected for this research exhibit distinctive socio-economic and physical contexts. Despite these differences, the responses received during the workshops demonstrated support for and interest in appropriate, context-specific regeneration strategies.

Participant responses were not based on limiting development outcomes or preserving the existing suburban fabric. In fact the prospect of urban transformation was welcomed when the designs could demonstrate specific contributions to the existing built and social fabric; typical objections to development became secondary, as locals focused on how to improve an area, as opposed to just protecting it.

The usual problematic planning issues such as overshadowing and parking, were not considered as negatively as initially imagined. Rather, it was suggested that if attention was given to overcoming these problems through designing better public and social spaces, providing greater amenity and generally raising the vitality of the area, then additional dwellings might be favourably considered. For instance, once line of sight, massing and appropriate placement of larger buildings were achieved, it was evident that additional dwellings were not overly significant to residents; particularly if they addressed some of the demographic and affordability issues, such as ageing-in-place and providing smaller dwellings to retirees and young families.

5.2 Coordinated precinct designs

This next stage of the design research draws on the broader urban and affordable housing issues arising from Stages 1 and 2, as well as the context-specific opportunities and insights gained through the architectural design studio, community engagement events and further consultations with local government authorities and community housing organisations. It explores how the priorities of the respective stakeholders might be cohered within innovative and viable approaches for precinct-scaled redevelopment of selected public housing land parcels to enhance urban outcomes in spatial, environmental and social terms.

The research has endeavoured to identify a suitable scale and type of redevelopment on public housing landholdings in these contexts and asks: What is an acceptable/unacceptable level of change? As well, it explores what would be required to make a precinct-scaled development viable. It has particularly focused on design strategies that could inform the potential transfer of public housing assets from the Department of Human Services (DHS) to CHOs.

Design research is inherently speculative and site-specific. This mode of working enables an exploration of a diverse range of dwelling and urban design strategies that respond to ‘real world’ concerns and physical constraints. A comparative examination of the proposed designs in each location begins to uncover the key inputs and processes required to increase the supply, quality and diversity of affordable housing in differing contexts. As well, the design research demonstrates how a precinct design approach to the redevelopment of dispersed public housing land has the potential to deliver broader urban and community benefits in established suburbs of Melbourne.

5.2.1 Precinct design objectives

Section 4.4 of this report outlines the differing physical and socio-economic contexts that exist in the two study areas—Study Area A and Study Area B. To determine how the respective urban environments might impact on precinct redevelopment opportunities, a common set of design objectives were established for examination in each location. These include:

- *Replicable design models*—Design models should respond to site-specific opportunities while also providing lessons/strategies that can be replicated in other locations.
- *Dwelling diversity and quality*—A range of dwelling design models should be developed that better respond to contemporary social housing needs. Dwellings should have a minimum of 1.5 bedrooms to ensure flexible uses, such as the accommodation of a carer overnight. As well, all dwellings need to be provided with generous private open space, sized and located for maximised ‘useability’.

- *50:50 tenure mix, no net loss of social/public housing*—A principle of mixed-tenancy development—notionally 50 per cent social housing and rental assistance, and 50 per cent market housing—is an assumption applied to each of the development scenarios, based on analysis of recent best practice examples and advice from housing providers. This enables urban transformation without forming 'islands' of under-privilege. With this assumption, there is no net loss of public housing numbers in any development scenario. It should be noted that the nature of the tenant mix and the way that social housing assets are distributed within an overall development are not part of this study.
- *New connections and mixed uses*—Precinct designs should enhance connections in the existing neighbourhood. For instance, this might involve the design and siting of dwelling models that allow public circulation through allotments while maintaining resident privacy; or they could involve site-specific intervention and upgrades to increase access to existing neighbourhood nodes, amenity or transport.

  The proposed precincts should enhance the mix of uses and supporting community infrastructure that is available in a neighbourhood. This could include new buildings and stand-alone facilities, or flexible design of new dwelling types that could accommodate a range of uses and occupations (e.g. home office, rentable room).
- *Quality of open space, not just quantity*—Both study areas comprise existing generous public open space amenity that is highly underutilised. Precinct designs should provide different scales and types of public open space that can accommodate a diversity of uses, as well as explore strategies to improve the quality and utility of existing open space amenity. This might include street upgrades, as well as specific treatment and programming of open spaces related to new building designs to accommodate a variety of activities.
- *Parking efficiencies*—Greyfield locations have variable levels of access to public transport and therefore some parking allocation has been deemed necessary: one car park per dwelling was chosen as the standard for the precinct designs. This is achieved partly through consolidated parking that encourages the prioritisation of pedestrian environments within 50 metres from their car park, as well as all dwellings having convenient access to 'drop off' areas, encouraging visitation and ease of use (e.g. dropping off shopping).

5.2.2 Precinct types

The surrounding context has a significant impact on the types of design outcomes that are possible. To be of most value, the design investigations have been carried out in response to site-specific opportunities and constraints in the respective study areas. The survey of public housing land holdings in Melbourne revealed a range of replicable scales of site clusters from small to large. The precinct designs developed here use 12 allotments as a standard cluster size. In addition, the Masters Design Studio explorations, the community feedback and specific context opportunities in the study areas all confirmed this as a workable size.

Three representative precinct types were selected that could ensure that the design investigations could have applicability across the DHS portfolio:

1. *Park edges*: present a replicable opportunity for targeted and intensive redevelopment that enhances the quality of existing open spaces. Development impacts are reduced on park edges because there are generally less neighbouring properties. 4 per cent of all DHS land holdings in the middle suburbs directly adjoin public open space, representing approximately 115 hectares of land; 53 per cent of DHS land holdings in the middle suburbs were within 200 metres of some form of public open space. The *Park Edge* precinct selected for the design study comprises a series of two and three-lot assemblies, enabling two to four storey-building forms.
2. *Green streets*—Typical low-density residential contexts are highly constrained environments for redevelopment. The proximity of neighbouring properties and the potential

impact of development prevent the possibility of large-scale, high-density dwelling forms, particularly on single allotments. This is the condition of the majority of DHS land holdings in Melbourne's middle suburbs. The *Green Streets* precinct confronts this difficult context by exploring the impact of density increases, public realm upgrades and the social benefits that can be delivered on a cluster of predominantly single-residential lots. It tests the limits of individual sites, while also investigating the potential of their aggregation.

3. *Local shops*—In the middle suburbs, large activity centres are being developed around retail based activity. Small local shops are failing to compete with the emergence of larger shopping centres. The type and location of retail services are important considerations for community building and neighbourhood vitality. Smaller, every-day shops such as pharmacies, post-offices and milk-bars can facilitate incidental meetings and social interactions. This precinct strategy does not directly redevelop the shops (which are not owned by DHS), instead it examines how the surrounding residential development might 'seed' opportunities for their redevelopment by others. It works across a range of one, two, three and four-lot assemblies to generate value uplift for the shops for potential future upgrade and renewal.

The following section includes the three precinct designs and a range of dwelling types that have been developed in Study Areas A (one precinct design) and B (two precinct designs).

5.2.3 Precinct design #1: Park edge, Study Area A (1)

This proposal focuses on enhancing the interface between the existing neighbourhood and the large public reserve to the east of the study area. The string of redeveloped sites also serve to diversify and link existing parts of the community which are currently self-contained or mono-functional: the aged living facility to the north (see (1) in Figure 48 below), the swathe of low-density residential fabric to the west (see (2) below), and the sports club to the south (see (3) below).

A diverse range of terrace, courtyard and apartment types are distributed along the edge of the park. Generous landscaped 'street' connections are provided between the rows of new housing, increasing access to existing pedestrian and bicycle networks in the public reserve. These are important structural enhancements that could also contribute to reduced car-dependency, as the reserve connects to other public transport services and near-by education and employment areas. The prioritisation of pedestrian movement is further emphasised by localised clusters of vehicle parking, which over time can be adapted for other uses (see (4) below) or increase the scale and type of open space provisions.

Building forms abut the rear boundary of allotments, enabling greater densities to be achieved, as well as providing opportunities to activate the currently blind edge of the reserve. This porosity and activity would improve security and passive surveillance in these areas (a key concern voiced by workshop participants). The new 'park frontages' have the potential to accommodate a range of small community facilities or commercial programs (see (5) below) related to recreational park uses and the existing sports club (e.g. bike or equipment hire). The precinct design also 'seeds' the potential for new facilities to be built; the landscaped interfaces could be populated with community gardens, barbeque facilities and the like, further increasing the use of this extensive public open space asset.

The aged living facility is currently gated off from the rest of the neighbourhood. The community engagement suggested that greater integration of different age groups was desirable. The precinct opens up the boundary and proposes to develop a child care centre (see (6) below) at the apex of the two residential environments and the open space reserve. This context-specific response provides opportunities for participation by the aged community and offers a site for potential activation and social interaction. In addition to residents, the centre could also be used by near-by students and workers outside the immediate neighbourhood.

The scale and location of the precinct introduces the possibility for district-wide servicing, which could be installed linearly along the park edge. For example, a bio-swale system could treat storm water and grey/black water captured from the precinct redevelopment and re-used to maintain the recreational ovals in the park (see (7) below). Over time, the infrastructure could expand to incorporate other properties in the surrounding neighbourhood.

Figure 48: Urban plan—Park edge

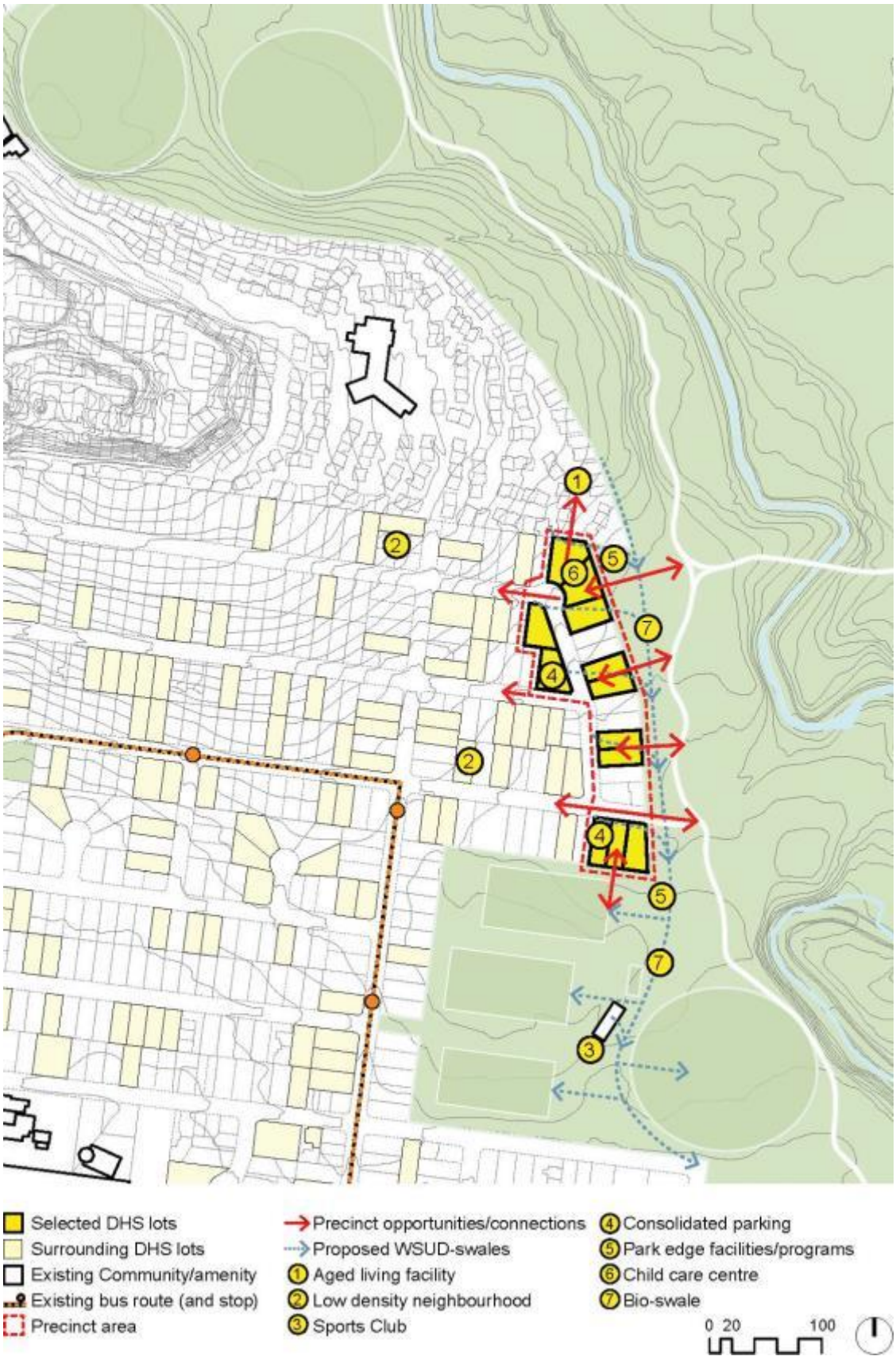


Figure 49: Precinct plan—Park edge

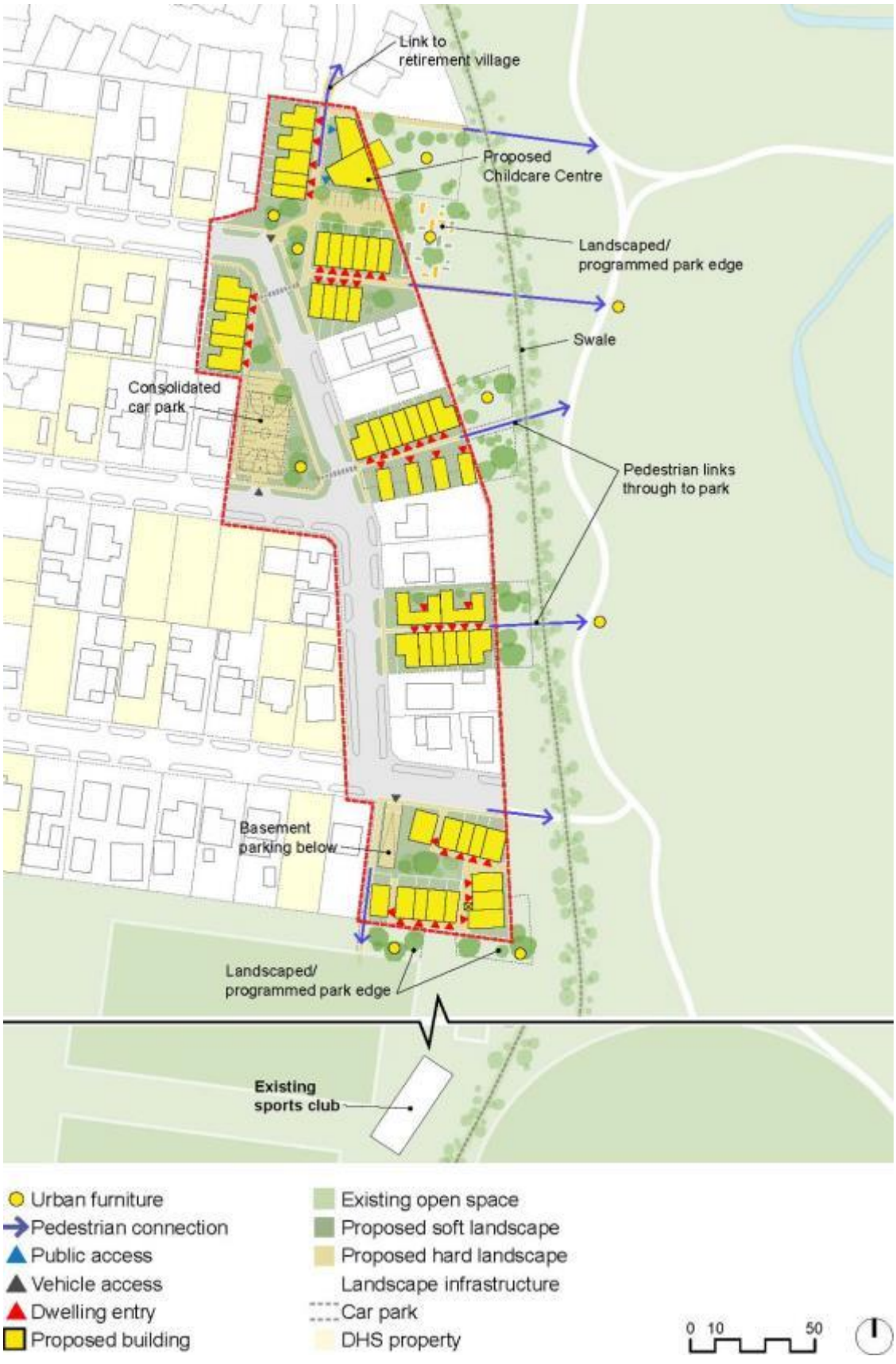
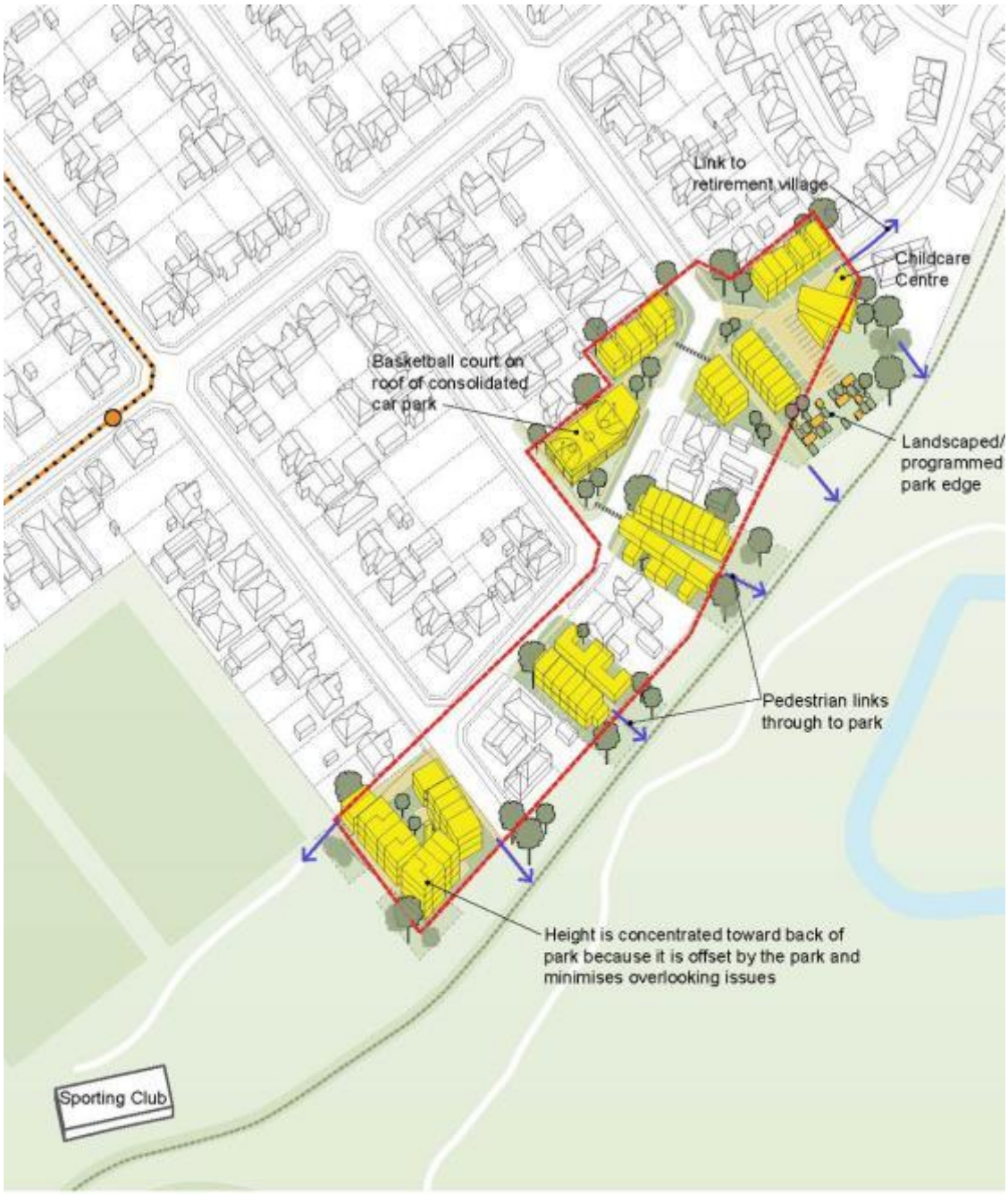


Figure 50: Axonometric view—Park edge



No. allotments:	**12**	**Dwellings:**	**89**	**Public realm upgrades (included):**	
Site area:	9100m²	1.5BR	20	Childcare centre	
Public realm:	2385m²	2 BR	49	Parking deck and recreation	
Total area:	11485²	3 BR	8	Connections to park and aged care facility	
Bldg footprint:	4455m²	4 BR	10	Streetscape and common spaces	
Open space:	4645m²	5 BR	2		
Floor area ratio:	1.40			**Public realm upgrades (by others):**	
Site coverage:	49%	**Car parks:**	**95**	Upgrades on public parkland	
Net density:	98 dw/ha	per dwelling	1.07	500 lineal metres bioswale & servicing	

5.2.4 Precinct design #2: Green streets—Study Area B

The intent of this precinct is to create a fully accessible ‘walkable neighbourhood’ that promotes a strong sense of community, delivers a range of high-density, good quality dwellings and provides both new and existing residents with high-quality, functional amenities. In this instance, two existing parks (see (1) in Figure 51 below) are linked through a series of design interventions that transform and improve the overall streetscape and public realm and introduce new programs into the neighbourhood.

A ‘health centre' (see (2) below) is located on the edge of a small park and sports oval, and contains a range of possible consulting and retail spaces on ground level, with two levels of assisted living units above. Servicing both residents and the wider community, the development creates an opportunity for a fully integrated supported living environment. The building is set back from the side boundary, not only to avoid overshadowing of the neighbouring properties, but also to create a public, landscaped pedestrian link (see (3) below) to the park for use by residents and others from the neighbourhood.

Located 50 metres north of the health centre is a series of fully accessible units (see (4) below), which enable residents to live independently, but with the convenience of having good access to health and support services. The units are connected by a pedestrian link (see (5) below) that ensures safe and convenient travel between their homes and services.

A three-storey apartment block is located towards the rear of a large consolidated corner block (see (6) below). On the northern corner sits a two-storey community building (see (7) below), comprised of a series of bookable rooms to service the local area. Landscaped grounds separate the apartment and community buildings, and provide a space for neighbourhood events. Below the apartment building sits a large, semi-submerged car park, providing car parks for all new dwellings within 50 metres.

Towards the north of the precinct is a 'cut-through' development that provides a new access point through an existing block. A generous setback on the northern side provides space for a basketball court and small pocket park (see (8) below).

A trade-off is proposed that would change the setback rules and allow developers to build right to the front boundary; this achieves a greater floor area (and return) for the developer, in exchange for the construction of the footpath, nature strip and road directly in front, at the developer’s cost. This land would be the property of the local council and provide opportunities for new amenity that may include communal gardens, playgrounds or small parks, depending on the extent and location of the site (see (9) below). This addresses residents' comments that although there are numerous established parks in the area, they tend to be sports grounds that do not offer facilities for more informal, recreational activities. The improved amenity has the potential to increase the desirability of the area, raising property values and thus operating as a catalyst for other landowners to undertake similar projects.

Dotted throughout the remainder of the precinct are an assortment of townhouses and unit dwellings on single lots that respond to their site size, location and orientation. Car parks are strategically pooled (see (10) below) on several sites (a maximum of 50 metres from dwellings) to maximise private open and landscaped space for dwellings, which would otherwise be used up by driveways/vehicle access.

Figure 51: Urban plan—Green streets

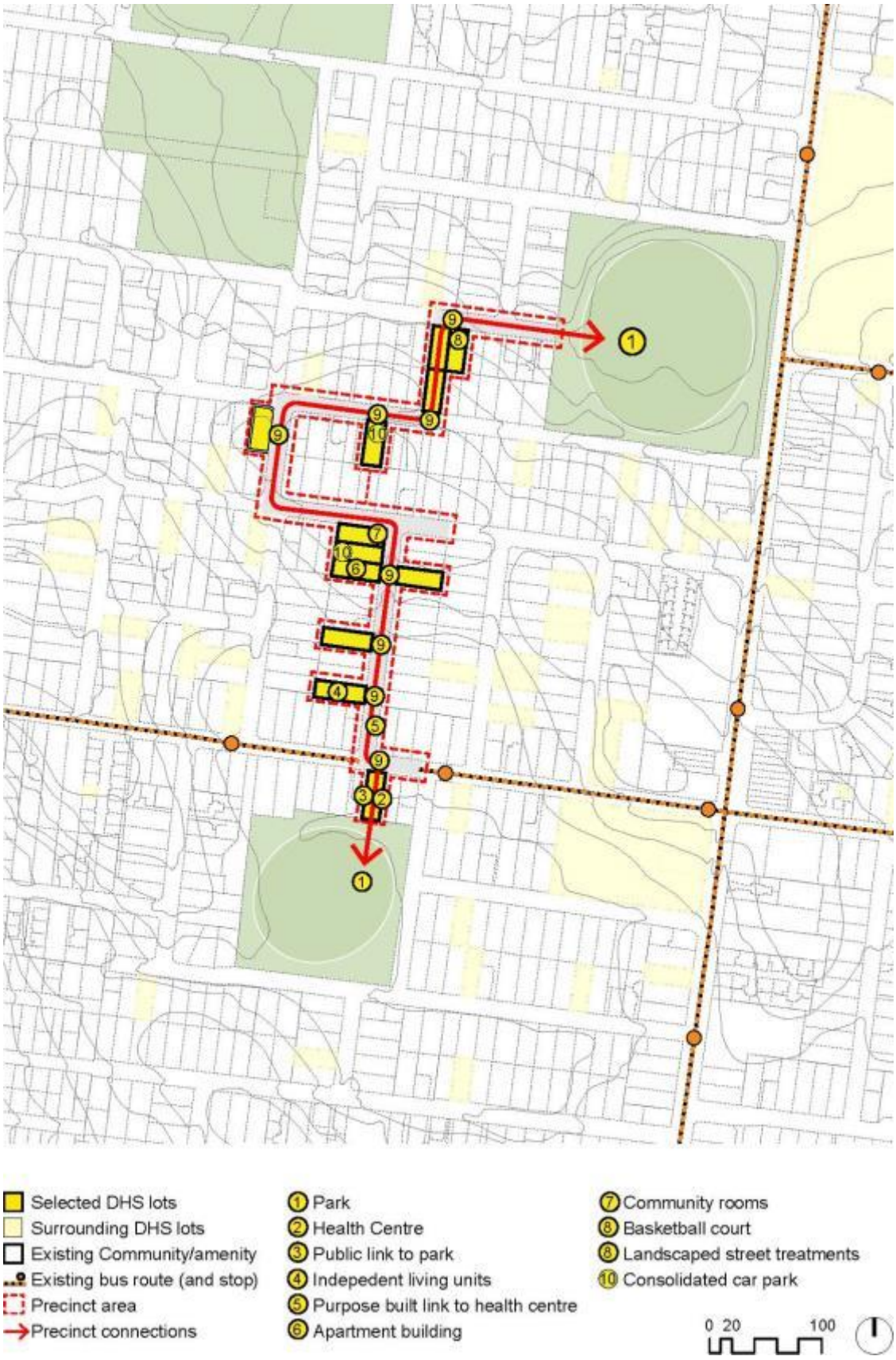
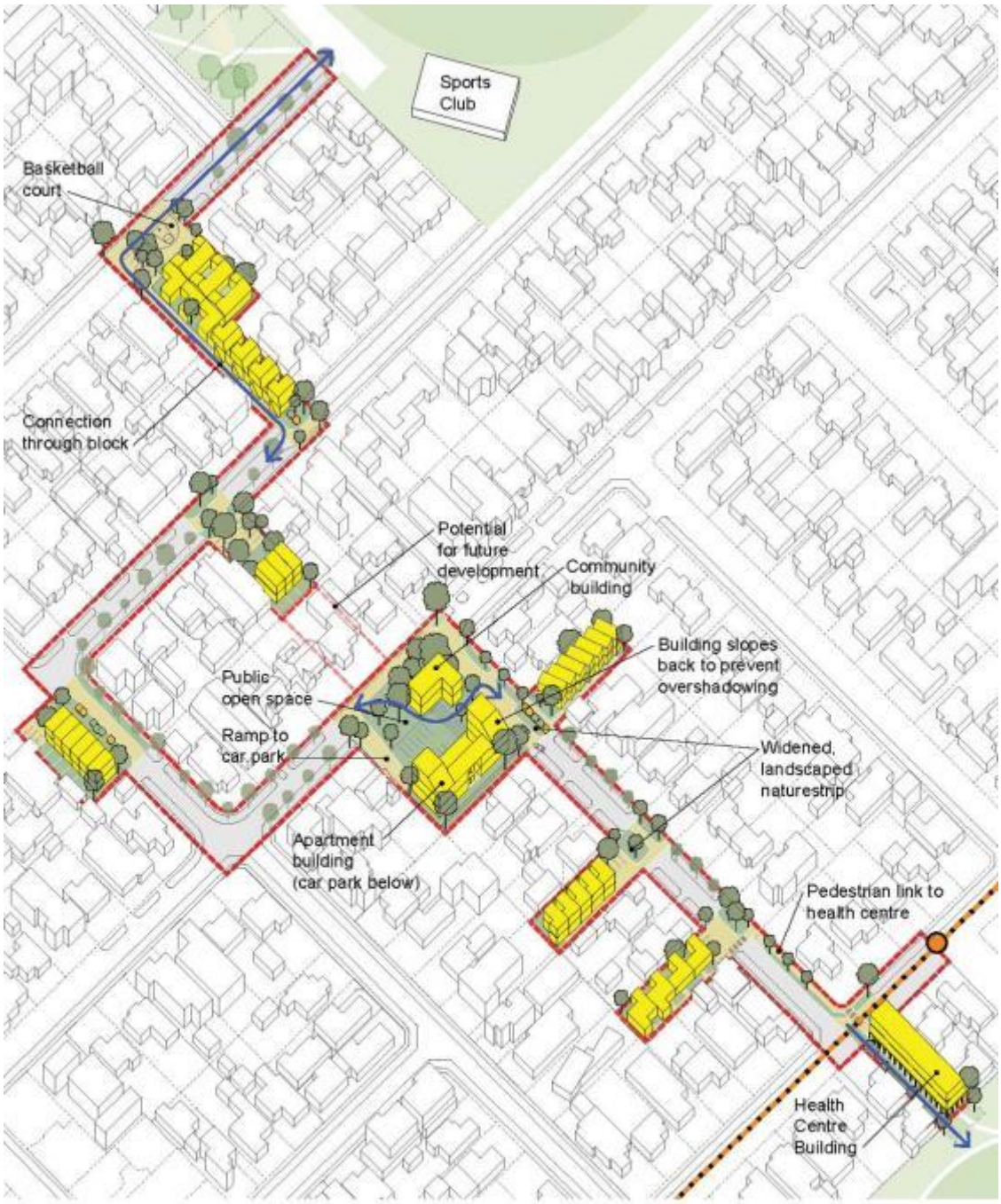


Figure 52: Precinct plan—Green streets

Figure 53: Axonometric view—Green streets



No. allotments:	**12**	**Dwellings:**	**68**	**Public realm upgrades (included):**
Site area:	7747m²	Assisted living	12	Community centre
Public realm:	3845m²	1BR	4	Health care and assisted living
Total area:	11592²	1.5 BR	9	Street upgrades
Bldg footprint:	2937m²	2 BR	34	
Open space:	4810m²	3 BR	6	**Public realm upgrades (by others):**
Floor area ratio:	0.54	4 BR	3	Private lots acquired
Site coverage:	38%	**Car parks:**	**95**	Private lots opt into street network
Net density:	88 dw/ha	per dwelling	1.4	

5.2.5 Precinct design #3: Local shops—Study Area A (2)

This precinct seeks to target intensification around an existing retail strip (see Figure 54 (1) below) that is currently depressed—a lone milk bar being the only shop still open. This strip was identified during community engagement as an important focal point for renewal; local residents want this small hub reactivated to once again provide local services and a place for community life, and they would welcome higher-density housing if it achieved this.

DHS sites in walking distance to this strip were selected for redevelopment, and proposed mostly as compact two-storey housing types 'knitted in' among existing neighbours. Three sites with longer street frontages presented an opportunity for slightly higher (three to four-storey) apartment buildings, located and shaped to avoid overlooking and overshadowing.

The lane behind the shops is reconditioned to enhance pedestrian amenity, but also to create an opportunity for shop properties to have a rear lane frontage. The privately held corner site (see (2) below) presents a unique opportunity to kick-start uplift of the broader area through a hybrid building with commercial and community spaces at ground level, and housing above. This could be incentivised through a partnership, whereby an allowance for surplus parking to serve this housing is made on the lot at the other end of the lane (see (3) below).

To enhance the neighbourhood pedestrian network, the existing park (see (4) below) is linked through to the other side of the block by a new public path (see (5) below). This connects to the lane with a high-quality pedestrian street crossing, also increasing amenity and public activity at the adjacent bus stop (see (6) below). Car parking for new housing adjoining the park is located on sites immediately above and below where it can be provided more efficiently. This ensures that the public path is pedestrian friendly, and allows the low-rise housing to be higher-density than would be possible with on-site parking and driveways.

A well-used but poorly established and unsafe pedestrian shortcut links the neighbourhood to a tram corridor and shopping centre to the north (see (7) below); the local council could fund its physical upgrade. Passive surveillance of this important linkage could be achieved through placing a prominent building at the corner site, with upper level housing overlooking the public thoroughfare and a small 'bookable' community room at ground level (see (8) below).

The steep topography at the north of the precinct creates a barrier for elderly and disabled residents (in the wider community) wishing to walk up to the tram or down to the shops. To address this, the lift and circulation system servicing the apartment building at the end of a block (see (9) below) is designed for public access during business hours, allowing users to avoid the steepest part of the slope. A small commercial medical outlet located beside it could monitor the lift. The residents of the gated retirement village, only a few metres north, would also benefit from this lift; as well, a new secured entry (see (10) below) could enable these residents to make full use of the precinct's services and amenities just down the road, while also increasing patronage and foot traffic at the shops.

Figure 54: Urban plan—Local shops

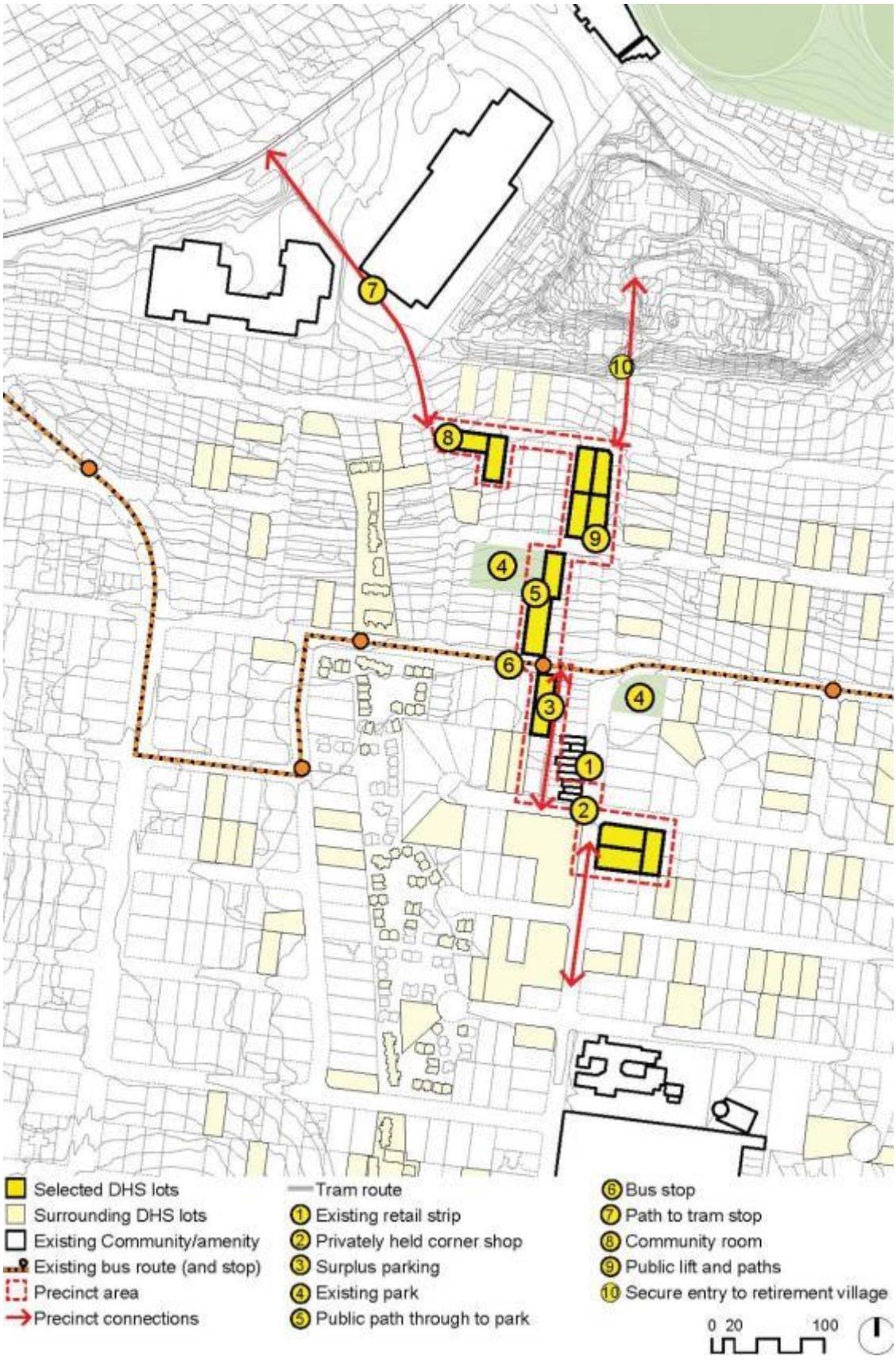


Figure 55: Precinct plan—Local shops

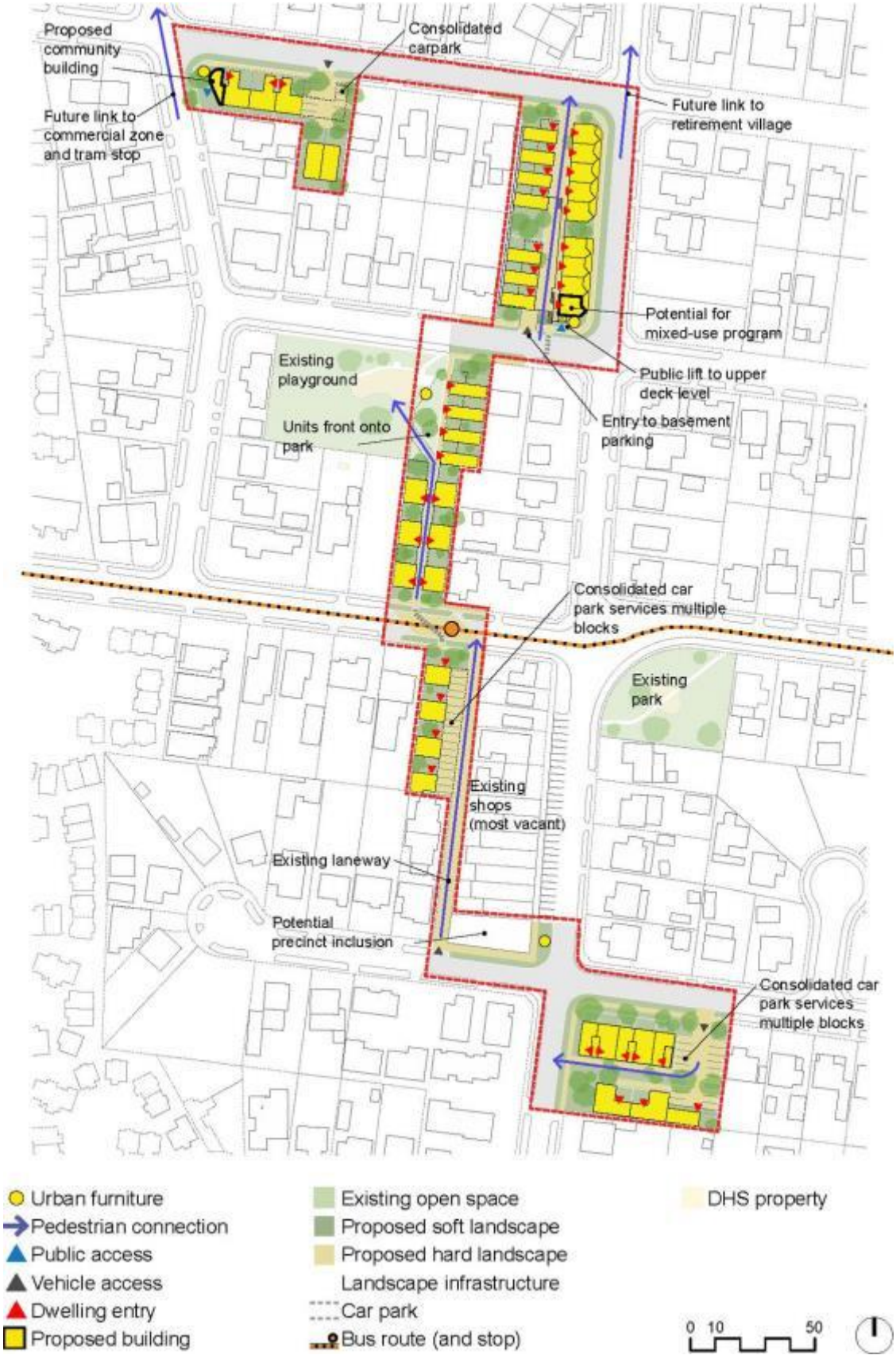
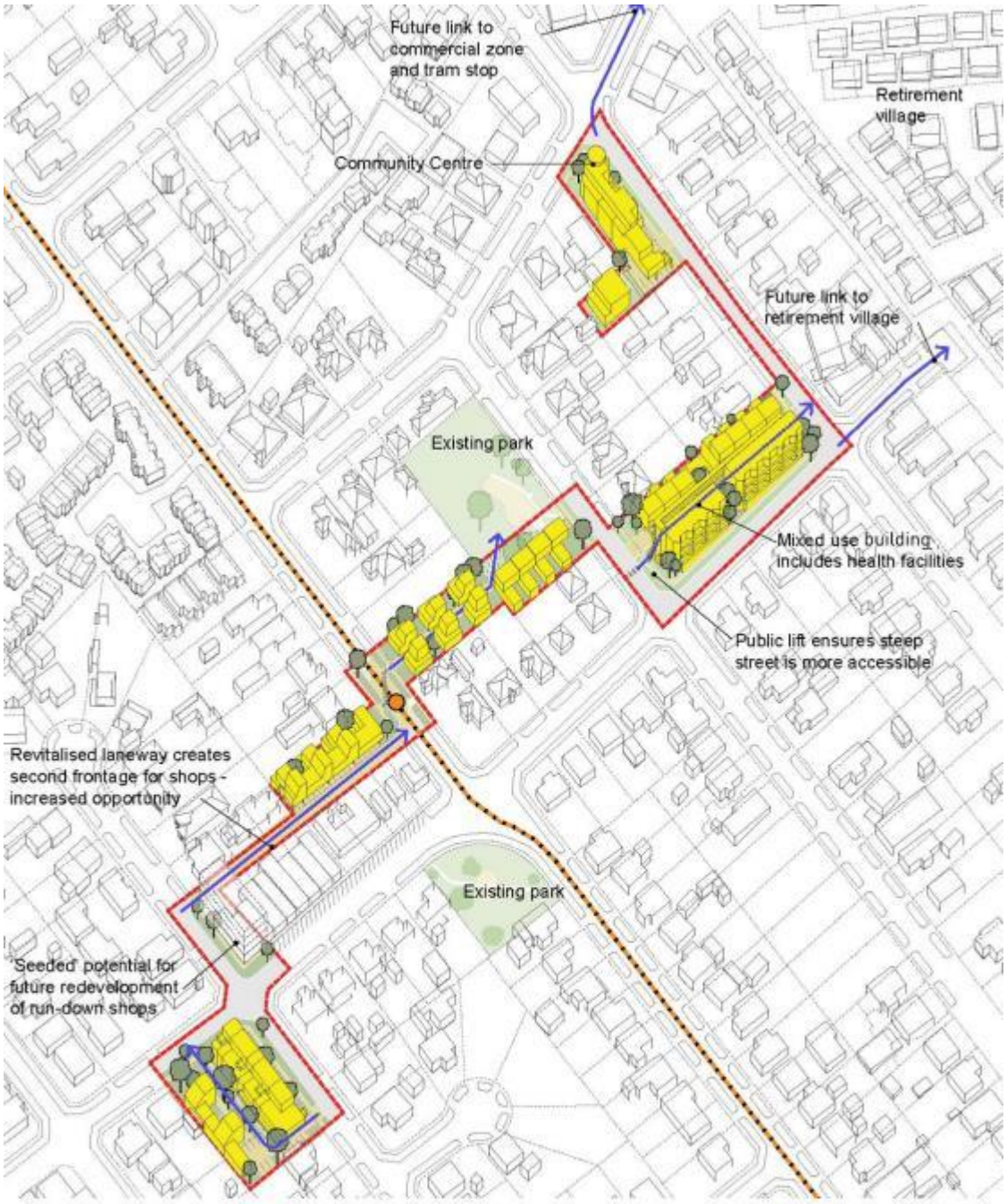


Figure 56: Axonometric view—Local shops



No. allotments:	**12**	**Dwellings:**	**77**	**Public realm upgrades (included):**
Site area:	7814m²	1.5 BR	34	Pharmacy/medical
Public realm:	2449m²	2BR	34	Community room
Total area:	10263²	3 BR	3	Street upgrades
Bldg footprint:	2844m²	4 BR	3	
Open space:	4975m²	5 BR	3	**Public realm upgrades (by others):**
Floor area ratio:	0.36			Pedestrian connection to public transport
Site coverage:	36%	**Car parks:**	**83**	Connection to retirement village
Net density:	98 dw/ha	per dwelling	1.08	

5.2.6 Detailed drawings of new buildings in precincts

The following section is a compilation of detailed design proposals for a range of individual dwellings sited throughout each precinct. These include condition-specific examples, such as the apartment building located on the edge of an established park (Figure 59), and examples of less site-specific typologies. All of the designs are replicable and address the following key points:

- *Diversity of dwelling types*:

  Dwelling sizes range from 1.5 bedroom units and apartments through to five-bedroom townhouses; this range of types can accommodate a variety of different household types and enables a diverse mix of residents within any given precinct.

- *Scale and density*:

  The designs consist of a series of replicable, interchangeable building typologies that differ in scale and density. The designs are responsive to the wide range of variable suburban site conditions that are encountered, such as overlooking, overshadowing, street address and orientation issues, while still increasing overall densities and maintaining good quality open space amenity.

- *Flexibility*:

  Where possible, dwellings have been designed to be 'flexible' and adaptable to occupants' needs as they change over time. Design strategies include separate, and multiple entries into a dwelling that enables residents to work from home, lease rooms out, house a carer and the like. In addition, some dwellings have been planned so that walls can be added or removed depending on occupants' requirements.

- *Efficiency of plan*:

  Careful planning maximises the liveable area of each dwelling while ensuring good access to natural light and ventilation and providing a floor area that is more efficient than the business-as-usual model, reducing both initial construction and ongoing maintenance costs.

- *Environmentally Sustainable Design (ESD)*:

  All dwellings have been planned to ensure that living areas are always oriented to the north with appropriate shading, maximising passive heating and cooling throughout the year and reducing overall energy usage and costs.

- *Private open space*:

  All dwellings, regardless of size, have access to private, outdoor space oriented to the north to ensure good access to sunlight. Outdoor spaces include balconies, terraces, and courtyards.

- *Car pooling*:

  As discussed throughout this report, car parks have been pooled together on consoldated sites where possible to maximise quality open space and only appear in these detailed design drawings when located at the dwelling.

5.2.7 Non site-specific replicable dwelling typology examples

Figure 57: Typical unit types

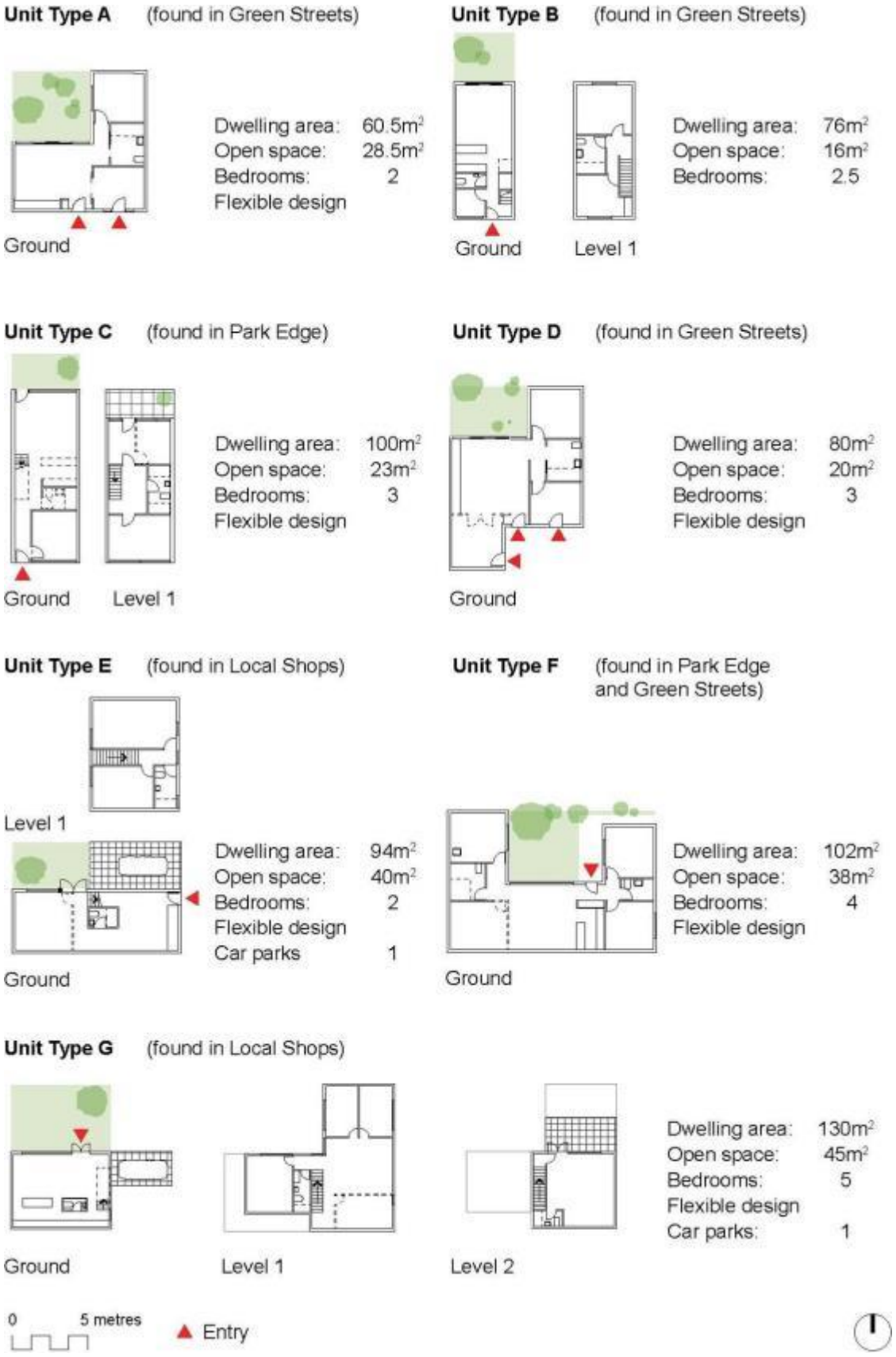
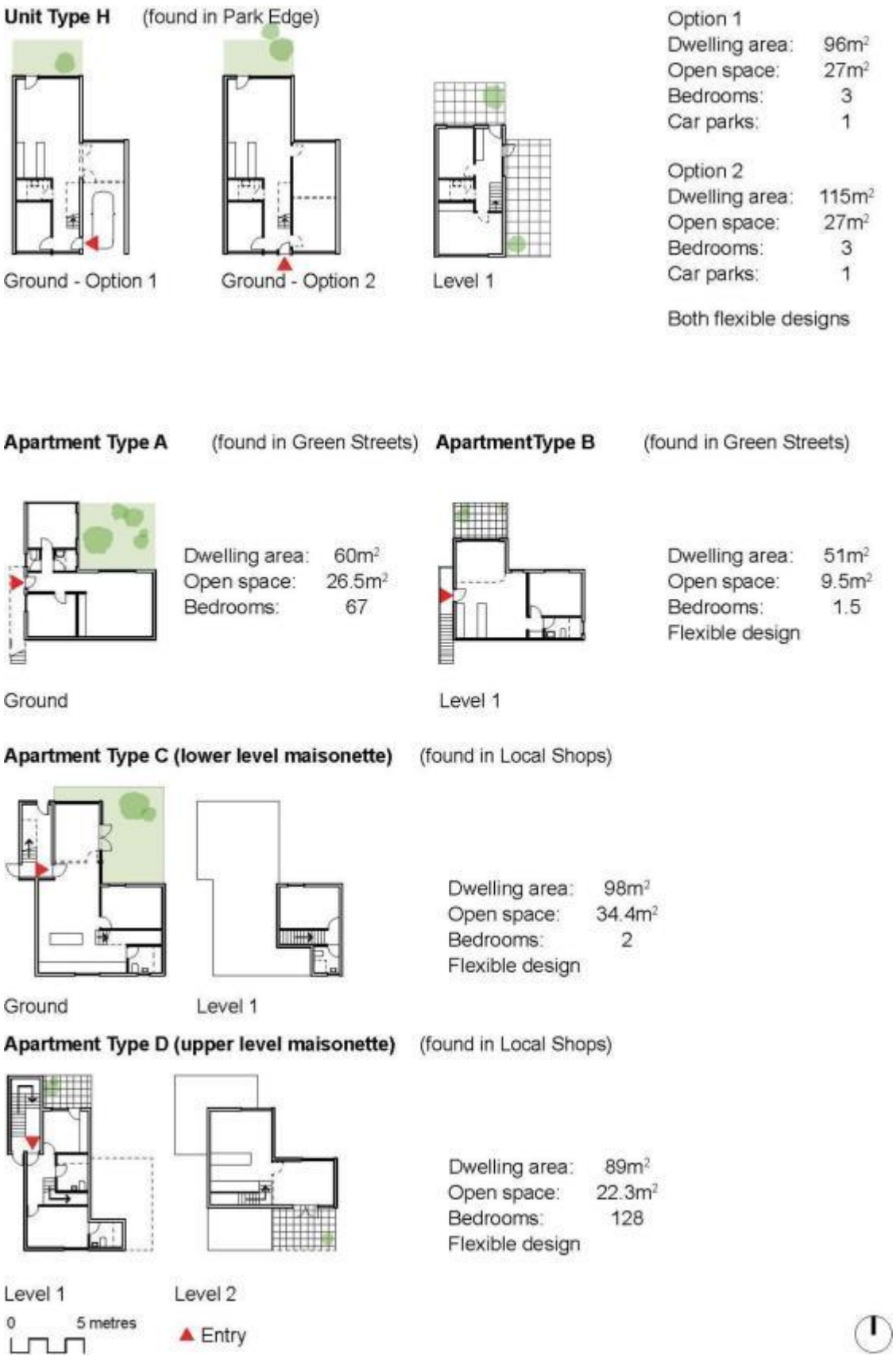
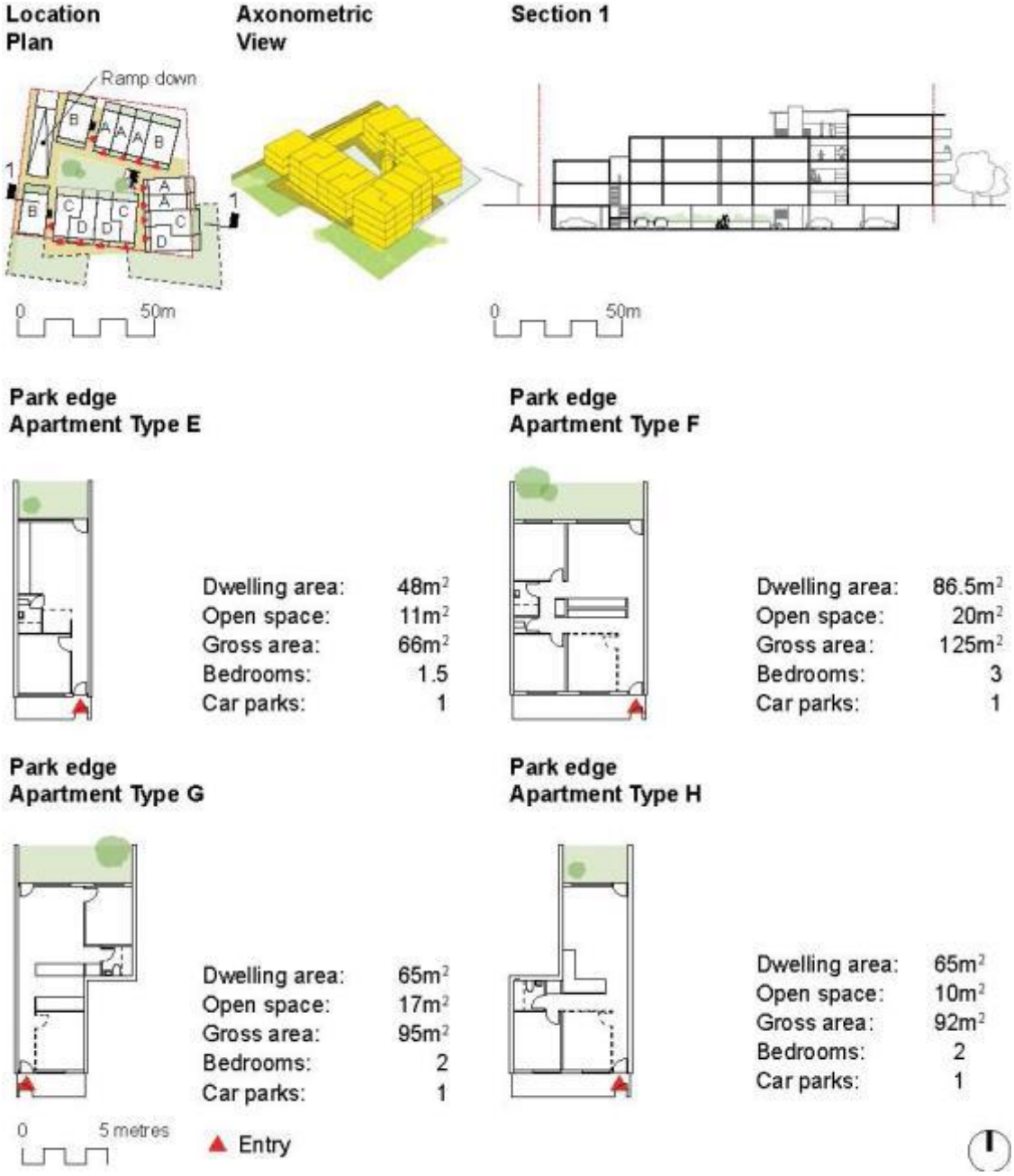


Figure 58: Typical unit types, continued



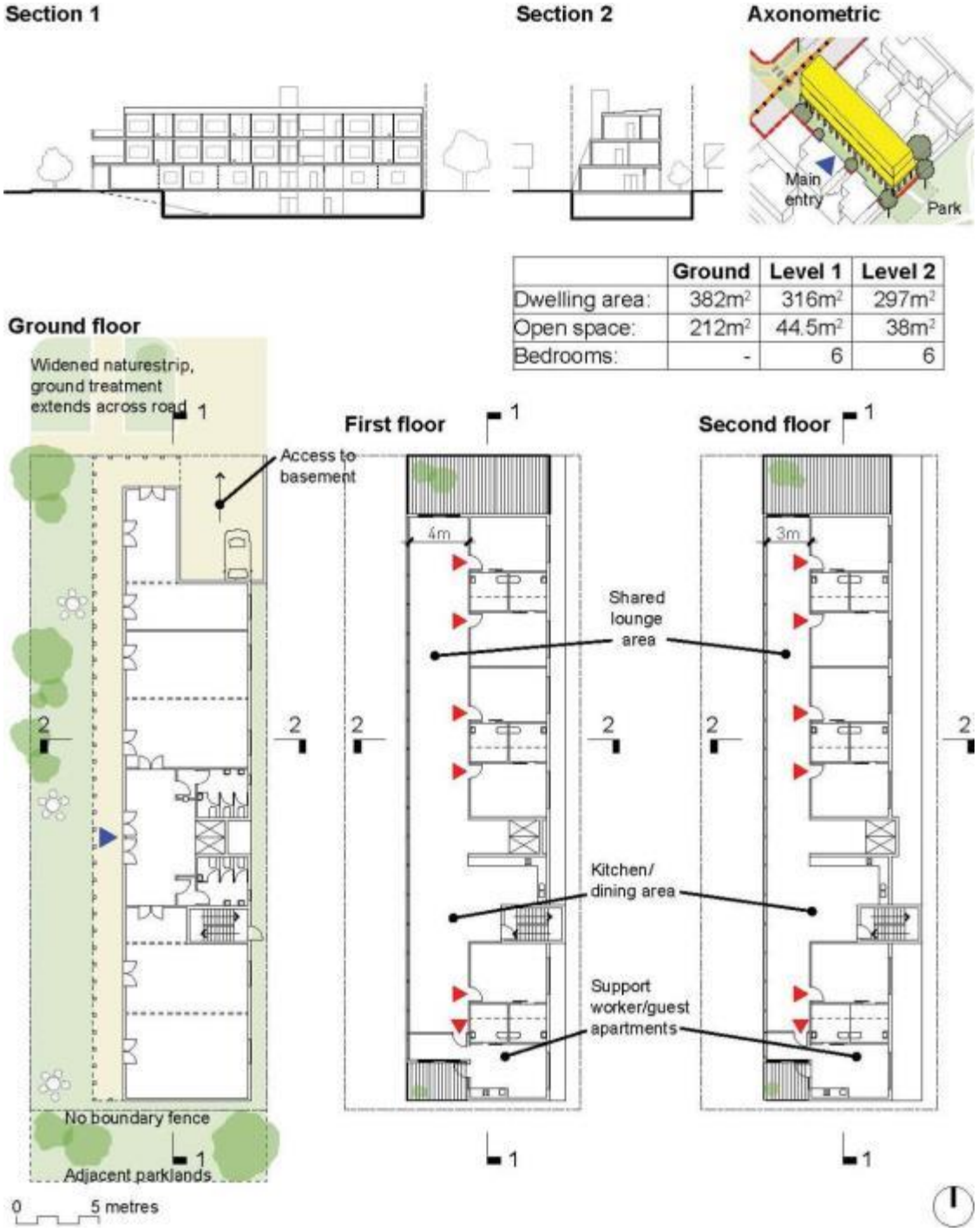
5.2.8 Replicable, condition/site-specific examples of larger apartment buildings with degrees of mixed use

Figure 59: Park edge apartment building located in Park edge precinct



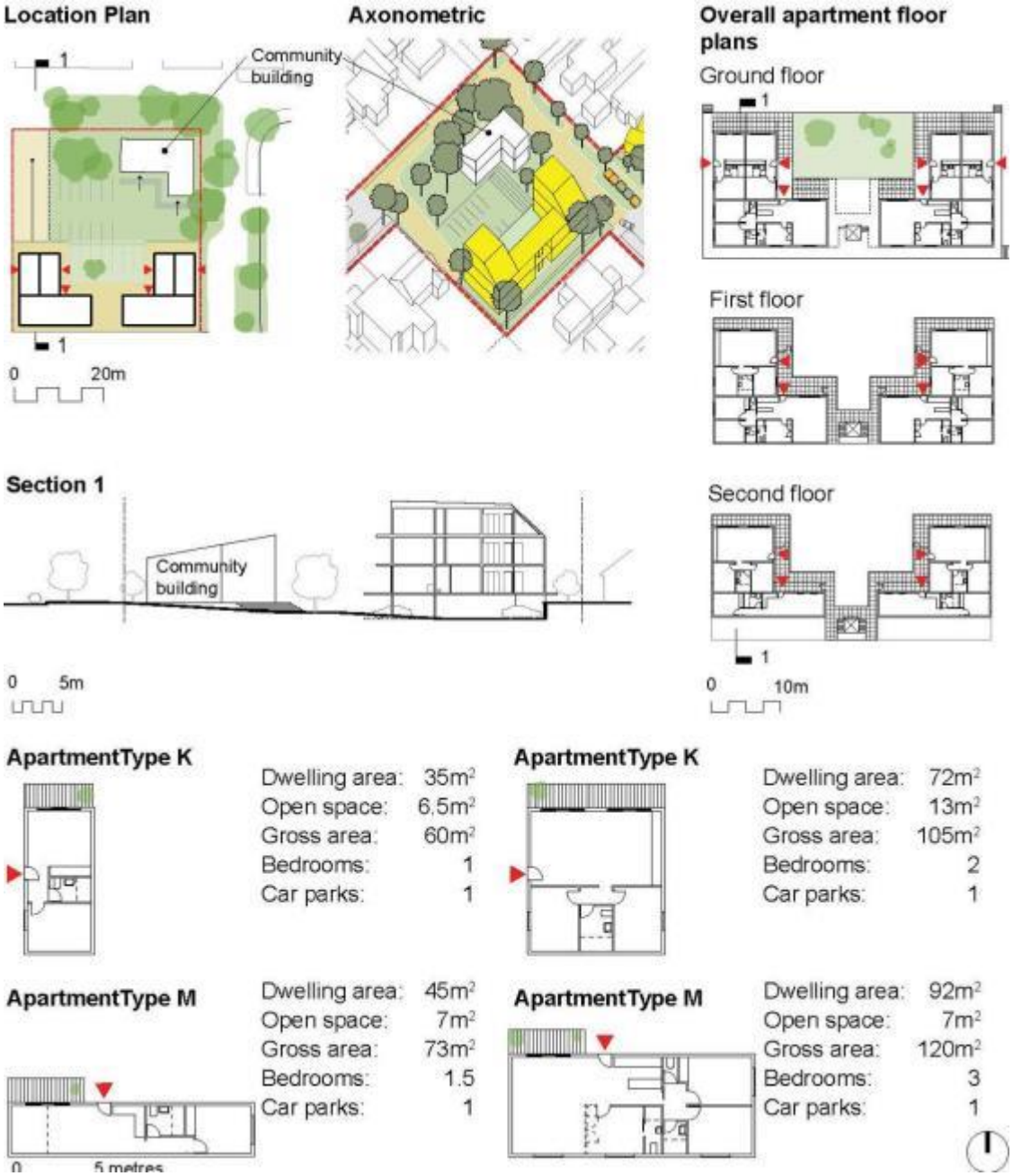
These buildings are comprised of four single-loaded apartment types that range in size and are clustered around a central courtyard. The smallest—a 1.5 bedroom—has been designed to accommodate overnight guests while retaining privacy for the primary occupant, while the remaining types are made up of a series of flexible spaces that can accommodate different scenarios such as working from home, live in support workers, etc. All apartment types have a balcony or small courtyard. The building sits right on the boundary of the existing reserve, 'borrowing' the natural amenity as well as contributing with additional landscaping/planting on the ground to serve residents and the wider community.

Figure 60: Health centre building located in Green street precinct



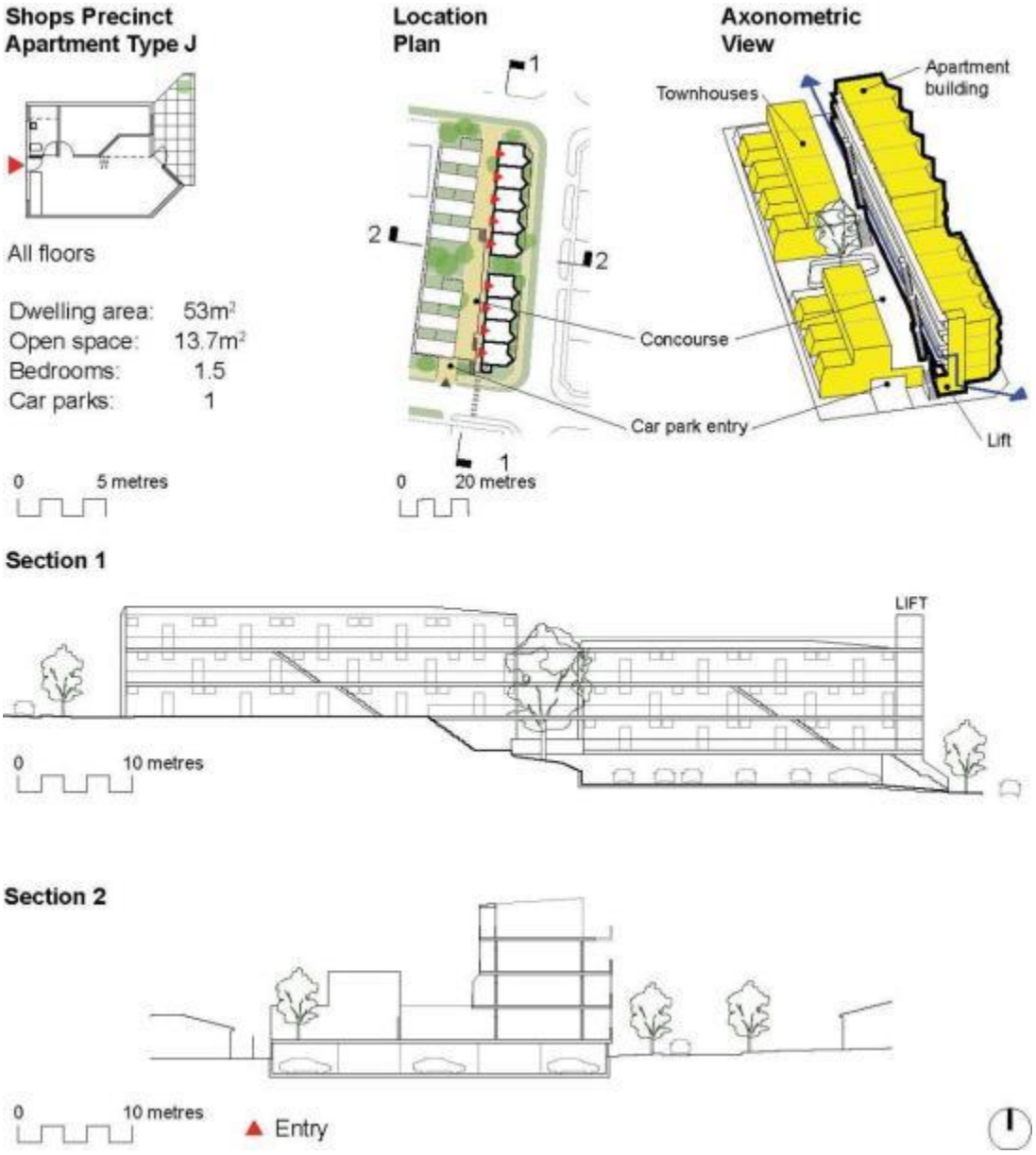
This building is comprised of a series of medical spaces/suites on the ground floor, a 12-car basement including six accessible car parks, and two levels of supported accommodation with 12 units in total. All units measure 24 square metres, leaving room for a bed and small sofa or table, and include a private bathroom. Units are connected by a large shared living space. Both floors have a north-facing balcony and large shared kitchen and dining areas, as well as a unit with a kitchenette that can be used by support workers or guests.

Figure 61: Apartment building with community facilities in Green streets precinct



Located over three 'standard' blocks, this development is comprised of an apartment building with a range of apartment types on the southern boundary and a community building on the prominent northern corner. Rather than provide a specifically programmed building such as a library, the community building consists of a series of bookable rooms for locals to hold meetings, run classes or hold social events. Generous, landscaped grounds separate the public from private and provide a space for neighbourhood events. The apartment building sits half a level above ground, ensuring all residents privacy. Below is a large, consolidated car park, providing all parking for dwellings within 50 metres of the development. The building slopes down on the southern side to avoid overshadowing and overlooking of neighbours.

Figure 62: Mixed use apartment building in shops precinct



A three-storey, mixed-use apartment building located over a very steep hill on a busy local road, is shared with local shops further south and adjacent to a series of townhouses to the west. The development includes a small medical centre and a large consolidated basement car park for residents, visitors and nearby developments. A lift on the south side connects to a wide concourse shared with the townhouses that runs through the block and connects again to the street on the north side. This lift assists less abled residents from the community to access the steep neighbourhood. It is open during business hours, and the adjacent medical centre provides some passive surveillance. The apartment building consists of 34, 1.5 bedroom apartments with provisions for an overnight guest, and overlooks the long, landscaped street frontage. Service rooms are located on the western/public corridor, and living spaces on the east. The design preserves a large existing eucalyptus tree in the centre of the site, incorporating this as part of a green communal courtyard.

5.2.9 Findings

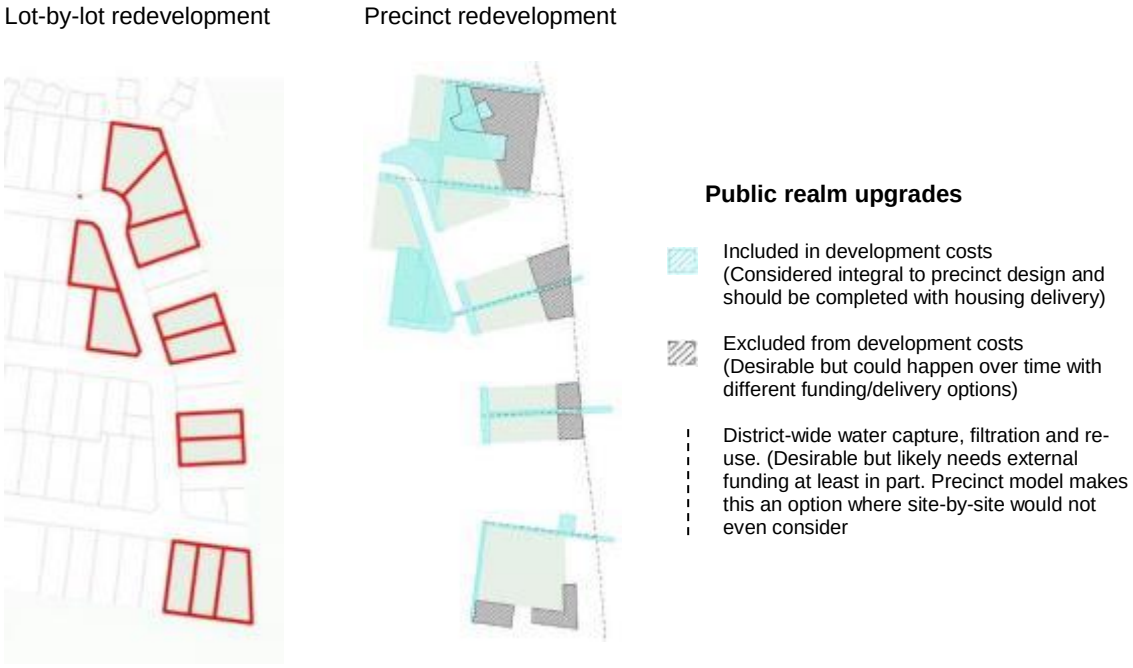
The quantity and distribution of underperforming public housing assets in Melbourne's greyfields presents a significant opportunity to increase the diversity and supply of good-quality

affordable housing in relatively well located areas of the city; and to effect real and positive change in ageing middle suburbs by providing the groundwork for these contexts to transition to high-quality, sustainable urban environments.

Replicable and adaptive development approaches

To capitalise on this considerable opportunity, innovative and replicable but locally tailored design models are needed for effective delivery across the DHS portfolio. Tailored design outcomes can respond to the specific physical attributes in established suburbs and take advantage of localised networks and neighbourhood qualities. By operating across a field of disaggregated lots, the coordinated precinct model can target pressure points in a neighbourhood. The integration of urban, community and environmental priorities can be cohered and restructured across site, precinct and urban scales. The diversity and distribution of built forms and public realm interventions makes the precinct model inherently flexible. It leaves gaps open for future opportunities—not expending future capital—allowing for adjustments and adaptations over time. It provides the groundwork required for ongoing regeneration of the physical and social fabric, supporting long-term, and genuinely sustainable urban transitioning within the broader neighbourhood (Figure 63 below). In this way, the disaggregated precinct is an asset not a limitation.

Figure 63: Targeted public realm upgrades in precinct design

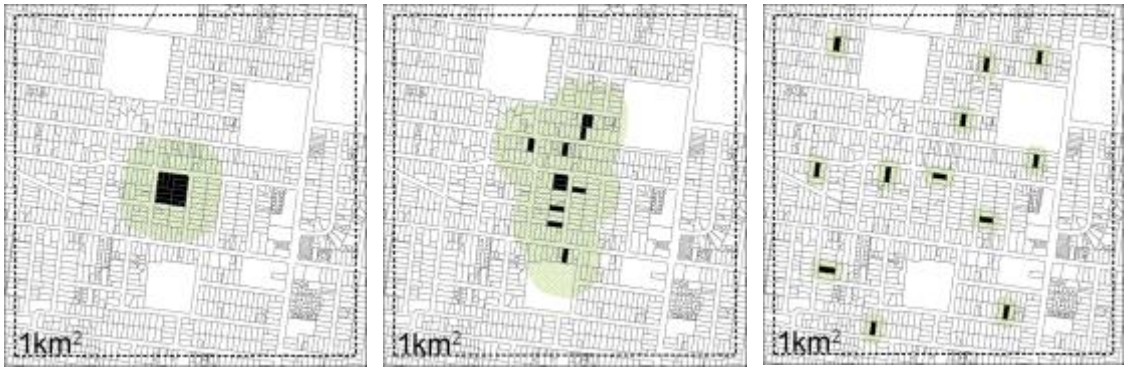


Scale and nature of precinct clustering

The precinct design scenarios have revealed that coordinated redevelopment of dispersed clusters of lots (in this case 12 lots) has a 'field of influence' that expands well beyond the boundary of the selected sites. When compared to one large consolidated site, the design strategies spanning across dispersed lots results in a greater surface area for potential regeneration. This is only possible if the sites have an appropriate level of 'nearness' to one another and if the collection of sites are designed and developed as a single, coordinated precinct. Lot-by-lot redevelopment of the same cluster of sites would not provide the necessary spatial connections, urban upgrades and community benefits that 'stitch' a coordinated precinct together. Or, if the dispersion of sites is too great, the 'field of influence' offered by coordinated redevelopment becomes diluted (see Figure 64 below).

The scale and nature of site clusters have a direct impact on the design outcomes that can be achieved. For the purposes of this research, 12-lot clusters were selected as a replicable scale within the DHS landholdings. When considered in the context of the 1 square kilometre study areas, the 12-lot clusters present a number of advantages. They are large enough to offer wide-reaching benefits for the broader neighbourhood. Yet, they are small enough to be perceived and understood as discrete redevelopment projects, the function of which is clear and the proposed extent of urban change is 'contained'. This is an important consideration for successful community engagement and facilitating cooperative partnerships. In addition, the lessons learned from this scale of investigation can be applied to larger precinct assemblies and neighbourhood contexts.

Figure 64: 'Field of influence' of precinct types: consolidated, cluster



Consolidated lots	**Dispersed clustering of lots**	**Highly dispersed lots**
Number of sites: 12	Number of sites: 12	Number of sites: 12
Total site area: 8320m^2	Total site area: 7747m^2	Total site area: 8034m^2
Av. dist. to all other sites: 17m	Av. dist. to all other sites:124m	Av. dist. to all other sites:452m
Area of 'influence': 78 000 m^2	Area of 'influence':179 000 m^2	Area of 'influence': 70 000m^2

General lessons learned from context-specific design investigations

Operating across clustered allotments enables conventional development provisions to be reconsidered. The diversity of dwellings, building types, open spaces, parking, and mixed uses can be coordinated to achieve higher-density and better quality urban outcomes. The surrounding physical context has a significant impact on the arrangement and type of buildings that can be delivered, which is demonstrated by the various outcomes that were possible for the Park edge, Green streets and Local shops scenarios. To be most useful, the speculative precincts designs have been undertaken in real locations and respond to context-specific constraints and opportunities. By working through and comparing the attributes and issues present in the two study areas (see Appendix 2), the research has identified a number of design strategies that could be translated to other greyfield locations in Melbourne.

Open spaces

The nature, scale and amount of open space vary from suburb to suburb but it can be generally classified into three main types—large parks and reserves; recreational sports grounds; and small pocket parks. While there is a large quantity of open spaces in the middle suburbs, its quality, access and useability is often inadequate. Many are bounded by the back fences of houses, which can result in unappealing, insecure environments and limited accessibility. Many lack basic infrastructure, such as adequate seating or covered areas, to accommodate different types and lengths of occupation. The potential use of sports grounds is restricted outside of 'game days', when local club rooms are typically locked and unshaded playing fields are used for little more than dog-walking. While highly valued, these public assets are currently underutilised and could 'work harder' for suburban dwellers. The precinct designs

examined three main strategies for enhancing the existing open space amenity in greyfield suburbs:

- *Increase connectivity and access*—The uninterrupted blocks of housing that often edge or enclose open spaces need more frequent breaks to increase connectivity and access for the broader neighbourhood. For example, pocket parks could be better utilised if they formed part of a neighbourhood circuit, allowing people to walk through them rather than being a 'destination' that is entered from one point or side of egress. This would encourage different types and lengths of occupation, supporting incidental meetings and informal interactions in these spaces.
- *Treatment of edge conditions*—Establishing active interfaces between new precinct developments and existing public open spaces can increase the variety, utility and quality (and hence frequency of use) of these community assets. New landscaping treatments, lighting and programmatic activation would in turn enhance the perceived security and passive surveillance of these spaces, which can sometimes seem neglected and unwelcoming.
- *Provide complementary programs and facilities*—Dual benefits can be gained if proposed redevelopment on the edge of open spaces can provide complementary programs (at least at ground level). For example, health and medical centres might service adjacent sports clubs as well as ageing people in the neighbourhood, or bike/equipment hire might increase convenient use of large open reserves. Allowing new developments to abut public open spaces is an effective way of increasing access and creating new activated frontages. This would also enable better utilisation of redevelopment sites, particularly at the rear of allotments.

Better utilisation of community assets

Melbourne's middle suburbs have substantial community assets but they are often outdated and underutilised. In the study areas reviewed by this research, existing community centres, youth facilities, sports clubs and the like, tended to be singular in purpose and intermittently 'open' for public use. If they could be modified or altered to accommodate multiple activities or programs, they could make the whole suburb a better place to live in, while simultaneously increasing its capacity to support higher population densities.

Like the surrounding housing stock, older community assets in greyfield areas are physically run-down and lack relevance to current socio-cultural patterns and needs. Facilities common in the 1940/50s, such as tennis and bowling clubs, may need to be rethought as multi-purpose centres and adapted to suit a broader range of ages and cultural backgrounds. By rethinking and building on these nodes, a type of cultural regeneration could transpire, contributing to the development of a shared history and 'sense of place' in a neighbourhood. The location and condition of these facilities also require upgrading to physically re-link them to a changed urban context. This type of reintegration could occur at both a spatial and utility level, where physical connections and interfaces are improved, as well as potentially implementing district-wide servicing (such as energy generation or water re-use) networked with residential zones for dual operational benefits.

The usual approach of lot-by-lot development does not address how these facilities can be improved, augmented or better integrated. In partnership with municipal authorities, precinct redevelopment has the potential to coordinate and adapt what is already there, making these assets 'work harder' for more people and play a stronger role within the neighbourhood. Integrated precincts can also help support the ongoing upkeep and operation of community assets (in contrast to greenfield development where new community facilities have to be built from scratch, or are often not available).

Examples of existing suburban community assets that have been examined in the Stage 3 precinct design scenarios include:

- Strengthening the community role played by the existing clubhouse and supporting its ongoing operation with better connections, integration of complementary programs and potential networked servicing.
- Enhancing connections and increasing access points to metropolitan bicycle trails, open spaces and pedestrian networks.
- Encouraging greater integration of the retirement village by 'opening up' entrances and edges.
- Increasing the value of local activity nodes, such as local shops, by increasing access and potential for flexible uses.
- Improving pedestrian links to a major tram route by regenerating a derelict car park at the rear of an adjacent shopping centre.
- Joining a series of large but isolated sports fields (with associated clubs and facilities) by creating new hierarchies and connections within the existing homogenous street network.

Similar opportunities to enhance the role and impact of isolated single-purpose community assets and public space amenity exist in most middle-suburban locations.

Neighbourhood street networks and connectivity

Another public asset that is highly underutilised is the existing street network. Developing and maintaining road spaces and footpaths represents a considerable infrastructure cost for state and local governments and, at present, vehicle users are the only beneficiaries. The car-dominance of suburban streets inhibits their use as open space and impedes pedestrian and bicycle movement. The hierarchy of street networks, the scale of residential blocks and the lack of pedestrian/bicycle 'cut throughs' all encumber the potential connectivity within a neighbourhood. The precinct designs examine how existing streets might be improved to increase walkability, connection and alternative uses.

Built form diversity and localised density

Coordinated precincts respond to site-specific opportunities to interpose a variety of build types and densities across a neighbourhood. By increasing densities in localised areas, other parts of a neighbourhood can undergo less intensive transformations. This not only encourages higher levels of dwelling diversity, but is also an important attribute in terms of engaging with existing residents.

The consultations (see Section 5.1) revealed that the local community is not necessarily opposed to higher-density development or physically higher built forms if it is appropriately designed and located. The design research has examined how different lot assemblies and contexts can accommodate a range of built form outcomes.

In fact, density increases were supported by the communities in both study areas if it meant that base services and social benefits would be delivered. The key message is that higher-density development needs to 'give something back' to be successful. Provisions such as local shops/services and bookable community meeting rooms were seen as highly desirable by-products of higher intensity development—with an understanding that their viability increases with higher population numbers. The precinct design for Local shops also examined how necessary elements in higher-density building models might in fact provide dual benefits for surrounding residents. In this instance, the mechanical lift required for the multi-level dwellings was designed so that secure public access was also possible. This part of the neighbourhood had a particularly steep terrain and was close to a retirement village. Vertical circulation was needed to enable safe and convenient pedestrian connections for this demographic. While this decision was specific to this context, it explores challenges that are broadly relevant for future urban transformation in the context of an ageing population.

Planning regulations and envelope controls

A relaxation of particular planning controls would provide more flexibility in medium-density development and enable greater diversity, better quality design outcomes, as well as higher yields. In the proposed design scenarios these relaxations included:

1. Reduction in front and rear setbacks (where there is no impact on adjacent amenity).

   The blanket prescription of setbacks under current planning schemes does not take into account site-specific opportunities and limitations, or other variables such as topography. In reality, the particularities of site have a large impact on the lived experience of privacy or access to sunlight. The precinct approach allows for more site-specific customisation of setbacks to make the most of local opportunities while responding to neighbouring built form.

   The current front street setback requirements in particular have a substantial effect on the ability to use residential land efficiently and to provide both liveable dwellings and engaging social streetscapes. This inefficiency is amplified when combined with typical requirements for on-site vehicle circulation and access. In the two study areas and in most middle suburbs of Melbourne the streets are wide, generous and well planted, making the additional requirement for large front garden setbacks somewhat redundant. (The current front setback requirement under the general planning scheme is merely the average of what happens to be built on either side, rather than any scientific or considered approach to actual amenity or street capacity.)

2. Pooling of car parking (with a maximum 50-metre distance from car space to dwelling).

   Attaching parking to the development rather than the dwelling is common and accepted practice for high-quality, higher-density developments. However, this is generally not the case for lower-density dwellings in the middle suburbs due to their one-off nature and scale. Current planning controls have set requirements for on-site parking provisions per dwelling. When repeated on a lot-by-lot basis, a significant amount of a land is consumed by vehicle servicing which places huge restrictions on the built form outcomes that are possible. It should be noted that parking does not only include the car space; access driveways and turning circles needed for multi-unit developments can consume more than 25 per cent of a site (Bertram et al. 2011). When multiplied across a neighbourhood, the physical impact is pronounced; the regulatory requirement for which seems contradictory to contemporary moves towards reduced car-dependency.

   Collectivised car parking within a precinct presents significant efficiencies for redevelopment and helps to prioritise pedestrian and bicycle movements in a neighbourhood. There may be an issue with people's perception of security with pooled parking, or that it reduces resident convenience, but these issues can be overcome with good design, such as appropriate scales and locations for parking areas within a precinct and simple public realm treatments (well-lit, visible pathways from parking to surrounding buildings). The precinct designs examined by this research have also included shared 'drop off' areas in convenient locations, allowing for visitation and ease of use (e.g. dropping off shopping). If the need for car-based transport reduces in the long-term, pooled parking spaces and infrastructure can be adapted for other community uses.

Affordable housing supply

A principle of mixed-tenancy development—notionally 50 per cent social housing + rental assistance and 50 per cent market housing. To ensure long-term affordability, a certain percentage of housing needs to be owned and managed by community housing organisations, who have an equally long-term interest in the success, quality and sustainability of the living environments they provide. Otherwise, there is a danger that the inevitable gentrification of greyfield suburbs—coupled with the short-term interests in its profitability—will significantly reduce affordable housing supply in well-located areas of the city. The short-term and long-

term viability of precinct redevelopment is examined in more detail in the next section of the report.

From a design perspective, one way of increasing affordability is to increase the diversity of housing types. Affordable apartments are a way forward in this regard. If precincts are well designed, smaller dwellings can offer a high-quality of life: small private spaces (financially in-reach for more people) are augmented by appealing, shared spaces in the public realm. In this way, the high prices typically associated with high amenity living are borne by the neighbourhood, not the individual. That is to say, affordability and quality can simultaneously be achieved if the dwelling is considered in its locality, rather than looking at the dwelling in isolation.

This logically extends to the notion of affordable living (as opposed to affordable housing). Well-designed housing and urban environments can reduce the operational costs for individuals and households. In addition to cost-neutral strategies, such as optimal passive design, at this scale of redevelopment the implementation of sustainable infrastructure and new technologies is also more feasible. Material and construction innovations, such as energy efficient building envelopes, will enhance the performance of dwellings and in turn reduce energy and water consumption. Opportunities for onsite energy generation, water re-use and waste reduction will also contribute to reduced cost of living. Integrated precinct design provides a fuller complement of amenity and services within a walkable neighbourhood. Coupled with better connections to public transport and bicycle networks, everyday travel costs can be significantly reduced. Increased access to a range of education and employment opportunities (within or outside the precinct) also contributes to the long-term advantages available to residents.

5.3 Viability

The viability of the coordinated precinct model is of critical importance if it is to be trialed and tested on underperforming public housing assets in Melbourne's middle suburbs. Perhaps the greatest challenge is to determine the best approach for increasing the quality and supply of affordable housing in low-value suburbs. This challenge is conjoined with several other considerations pertinent to the portfolio of public housing assets in Melbourne's greyfields (see Appendix 2 for discussion): ensuring strategic selection of DHS landholdings for equitable redevelopment; potential asset transfers to CHOs; potential sale of public housing assets; maximising opportunities for delivering broader urban transformations in areas in most need of renewal; and maximising public benefits gained from government assets and expenditure. To begin weighing up how the precinct redevelopment performs against these multiple priorities, it is necessary to consider both the financial feasibility of development in the short-term and its impact/value for social, spatial and economic urban outcomes in long-term.

The financial feasibility of sustainable, higher density redevelopment in greyfield suburbs is constrained by the particular conflicts in the current middle suburban housing market. These are discussed in Chapter 2 of the Final Report and in more detail in Appendix 2. Briefly, they include: land assembly, land values, standard industry practices, housing price-points, development scale and yield, lack of design input, planning controls, approval processes, resident resistance and consumer demand. In this study, the challenge of land assembly is addressed by operating across clusters of government-owned housing sites. Chapter 5 explores how a precinct-scale and place-specific design approach might positively affect other market challenges, such as a requisite development size for medium-density delivery, cooperative planning and design-led community engagement. This section of the report tests how these shifts in conventional market delivery might impact on the quality and viability of different redevelopment scenarios. The aim of the study is to examine the short- and long-term impacts (both financial and physical) of integrated precinct designs, with a view to aiding decisions about the potential redevelopment of dispersed public housing land in greyfield suburbs.

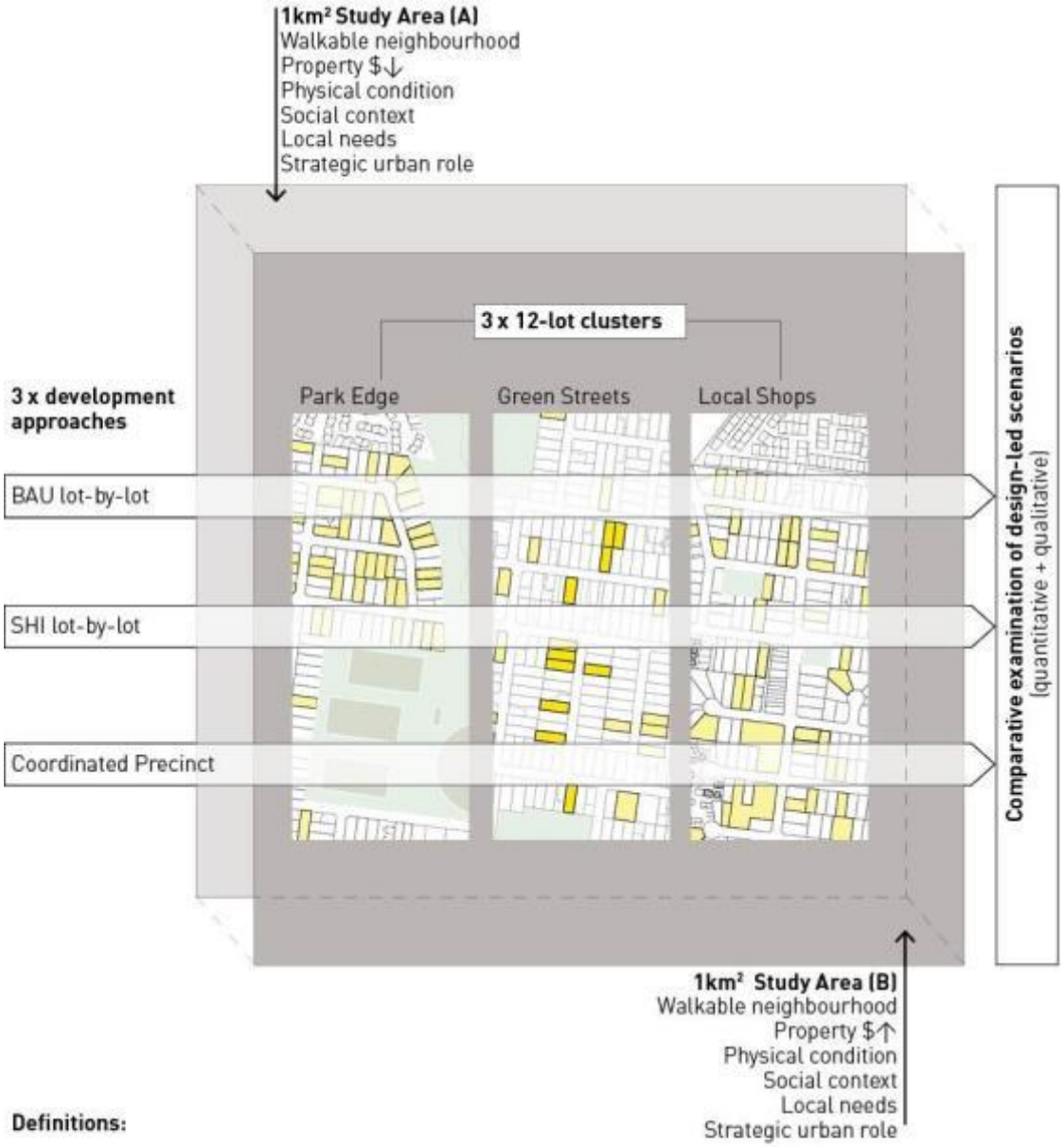
5.4 Method

Appendix 2 details the methods and assumptions used in the viability assessments. The research explores viability in two ways. The first is an assessment of 'as of now' viability, primarily relating to the capital costs of precinct redevelopments. The second relates to long-term viability and poses a new way of assessing the net financial impact of redevelopment over a 20-year life-cycle encompassing a range of quality and performance criteria.

A detailed feasibility study was not within the scope of this project. More comprehensive analysis was precluded by a lack of data specific to the residential infill market combined with a lack of design metrics for evaluating redevelopment quality (see Appendix 2). As such, the research is presented as an 'experiment' (see Figure 65 below) that tests the level of investment required to achieve different redevelopment outcomes and the potential physical and financial impact of these outcomes in the long-term. It is intended as a proof of concept for recalibrating short- and long-term viability measures within a highly constrained infill housing market and offers a platform from which to undertake further investigations.

Both viability approaches have been based on the property values in Study Areas A and B, which enable a good comparison of two very different socio-economic areas. It examines the three precinct clusters—Park edge, Green streets, Local shops—but this time these are considered as generic types in both study areas for the sake of the comparison. The assessments compare three development approaches Business-as-Usual (BAU), SHI, and Coordinated Precincts, played out across the same clusters of DHS allotments selected for this research. These are then aggregated and re-assessed as a larger assembly in each study area. The development scenarios are outlined below.

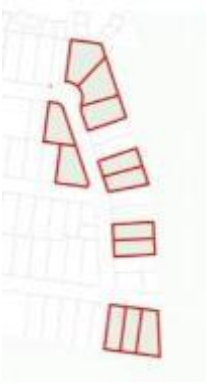
Figure 65: Structure of the Stage 3 design 'experiment'



Definitions:

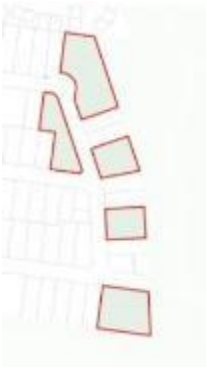
1km² Study Areas:	Walkable neighbourhoods selected for this research exhibiting different property values, physical contexts and socio-economic profiles which will impact on the type of redevelopment that is possible in each location.
Clusters:	Selection of sites distributed within an appropriate distance of each other for effective and integrated redevelopment.
Lot-by-lot approach:	Development approaches that treat individual allotments, or a contiguous assembly of allotments, as discrete projects. Design strategies are purely residential and operate soley within the site boundary. Standardised dwelling requirements and provisions are repeated on each site. Additional community amenity or facilities are not typically delivered under this model.
Coordinated precinct approach:	Development approaches that consider a cluster of dispersed allotments as a single precinct and propose integrated design strategies across this larger field. Dwelling provisions, community amentiy and public infrastrucutre can be distributed across the precinct area, achieving both 'on-site' and 'off-site' benefits.

Figure 66: BAU lot-by-lot approach



Individual sites developed lot-by-lot, with a 2-for-1 dwelling replacement regardless of site-specific opportunities. Low-density, low quality, low performing outcomes. Low risk model.

Figure 67: SHI/private sector



Bang-for-buck approach on consolidated sites. Valuable assemblies still developed lot-by-lot. High-quality, higher-density housing outcomes. Adversarial development process. Higher levels of risk.

Figure 68: Coordinated precinct approach

Collection of sites treated as one precinct. High-quality, high-density housing integrated with public realm upgrades. Stakeholder cooperation required. Un-tested model represents high risk.

→ Business-as-usual (BAU) (lot-by-lot, suboptimal)

The majority of Social Housing Initiative (SHI) projects carried out in metropolitan Melbourne comprised 2-for-1 dwelling replacements—that is dual occupancy units on a single residential allotment. This mirrors the redevelopment activity in the private sector across Melbourne's middle suburbs. The design outcome is for low density, homogenous dwellings with poor levels of occupant amenity and environmental performance (Murray et al. 2013). This is a lost opportunity for sustainable regeneration in greyfield suburbs; in fact, their combined effect

across a broad urban field limits the possibility for future regeneration. However, dual occupancies are a proven development model, presenting a low-risk scenario for developers in terms of cost, approvals and community resistance. Standard industry practices are geared towards this scale and type of construction, making them an efficient and feasible option from an economic perspective. Data for this scenario has been determined by transposing the BAU case study undertaken in Stage 1 of this project (Murray et al. 2013) onto the DHS sites selected for this investigation. For the purposes of this examination, it has been assumed that two dwellings per lot will be delivered on all sites irrespective of their size and context (see Appendix 2).

→ Social Housing Initiative (SHI) best practice (lot-by-lot, opportunistic, adversarial)

Exemplar projects from the SHI successfully achieved medium to high densities and high-quality housing outcomes. On a lot-by-lot basis, these projects demonstrate clever design approaches to increasing affordable housing supply. However, they do not deliver additional amenity, services or facilities to support the population increases that will result. Compared to BAU, innovative housing projects are more difficult to realise, requiring higher levels of professional expertise, more time to resolve designs and often involving more complex construction processes. They also carry significant risk for developers; the scale and density needed for adequate financial returns will often attract resident resistance and is subject to uncertain planning approvals (particularly if dispensations are being sought). More often than not the development process is adversarial. The increased time and cost associated with dispute resolution inhibits high-quality and affordable housing supply in greyfield locations. Data for this scenario was determined by transposing the SHI case study exemplars (Murray et al. 2013) onto the DHS sites selected for this investigation, where the allotment sizes and contexts were in parity with the original projects (see Appendix 2 for details). Parking allocations were increased (from an average of 0.375 per dwelling to one per dwelling) to be consistent with BAU and precinct scenarios for the purposes of the comparisons, and to reflect normalised situations outside the exceptional conditions during the economic stimulus.

→ Coordinated precinct approach (cooperative development, untested model)

The spatial, environmental and community benefits of the proposed coordinated precinct models have been discussed in detail in previous sections of this report. The most challenging aspect of a coordinated precinct approach is that it remains untested and, as such, represents high levels of risk for developers and financial stakeholders. As with the SHI exemplars, the scale and density of development is likely to attract resistance, potentially amplified by the dispersal of development across a neighbourhood. However, the model prescribes early engagement with the community, municipal authorities and CHOs to ensure a cooperative approach to its design and delivery and incorporate neighbourhood enhancements in line with community aspirations. Cohering inputs from these respective stakeholders represents a time and cost impost which has been factored into the comparative scenarios.

The design proposals encompass significant public realm upgrades, which would ensure that appropriate services/amenity are delivered in parallel with population increases. The precinct designs also enhance the existing physical conditions and connectivity within a neighbourhood to increase the quality and utilisation of community facilities and infrastructure that are already there. These improvements are unlikely to register in immediate market sales prices. As such, urban upgrade costs are borne by the development, but dwelling sales remain at median prices in the ‘as of now’ viability tests. However, the value of urban enhancements can be captured over time, represented by the differential between capital costs and increasing property prices in the long-term modeling. In this way we can begin to understand the type and extent of regeneration that is viable in the first ‘iteration’ of a long-term strategic plan compared to what is possible at the end of its life-cycle.

5.4.1 'As of now' viability: testing development costs

The comparative cost tests[6] have initially been simplified to present the *overall cost to deliver: potential sales revenue*. From this basic starting point, different finance, procurement and partnership models can then be considered. The development costs incorporate:

- land value (median as at 2013, assumes $0 capital improved value)
- engagement, assembly of partnerships (5% of build)
- demolition, excavation, site retention (nom. amount)
- build cost (calculated on area rates)
- fees (% of build—varied to reflect complexity)
- developer margin (20% of build)
- time delays, such as approvals, VCAT (5% of build)
- contingencies (10% of build)
- unit prices (median price for each location as at 2013)
- apartment prices (adjusted median unit price—see Appendix 2)
- saleable community assets (construction cost + land value—see Appendix 2).

[6] The authors note that the scenarios provide an indication of development costs only. They are not formal cost estimations of the proposed outcomes, which are beyond the scope of this project. The rates and items have been determined in consultation with industry and each scenario has been 'costed' in the same way that enables relative conclusions to be drawn from the research.

Table 4: Development data—Park edge

	BAU	SHI	Precinct
No. allotments:	12	12	12
Site area (m^2):	9,100	9,100	9,100
Additional public land (m^2):	-	-	2,385
Total precinct area (m^2):	*9,100*	*9,100*	*11,485*
No. dwellings:	**24**	**58**	**89**
1 BR	-	31	-
1.5 BR	-	6	20
2 BR	24	15	49
3 BR	-	4	8
4 BR	-	2	10
5 BR	-	-	2
Dwelling types:	**24**	**58**	**89**
units	24	27	39
apartments	-	31	50
No. car parks:	**24**	**58**	**95**
per dwelling	1.00	1.00	1.07
Public realm upgrades (m^2) (included in development costs):			
Community/commercial facility	n/a	300 Common room	465 Child care centre
Public infrastructure	n/a	n/a	668 Parking deck + recreation
Landscape infrastructure	n/a	n/a	1,661 Connections park + aged living
Green landscaping	n/a	n/a	1,377 Streets and common areas
Dwelling construction (m^2):	**2,676**	**4,660**	**12,733**
Multi-level apartments	0	3,235	7,474
2-storey attached	0	165	5,006
1-storey semi-detached	2,676	1,260	253
Residential open space (m^2):	**6,424**	**6,065**	**2,511**
Landscaping infrastructure:	2,952	2,827	350
Green landscaping:	3,472	3,238	2,161
Indicators:			
Building footprints (m^2):	2,676	3,002	4,455
Open space (m^2):	6,424	6,098	4,645
Floor area ratio:	0.29	0.51	1.40
Site coverage (%):	29%	33%	49%
Net density (dw/ha):	26	64	98
Public realm contributions by others			
			2,838m^2 upgrades on public parkland
			500 lineal metres bio-swale + networked servicing

Table 5: Cost summaries—Park edge

Study Area A	BAU	SHI	Precinct
Development cost	-$14,874,352	-$24,990,022	-$53,780,954
Dwelling sales (by median $)	$9,000,000	$19,425,000	$29,625,000
*Saleable residential floor area (m^2)	2,676 m^2	4,660 m^2	12,733 m^2
Community assets (saleable)	$0	$ 0	$2,805,088
Sub total	*$5,874,352*	*-$5,565,022*	*-$21,350,866*
Land value	$5,059,600	$5,059,600	$5,059,600
Open space contribution	-$252,980	-$252,980	$0
Relative cost total	*-$1,067,732*	*-$758,402*	*-$16,291,266*
Study Area B			
Development cost	-$24,129,052	-$34,244,722	-$ 63,035,654
Dwelling sales (by median $)	$16,080,000	$37,310,000	$57,130,000
*Saleable residential floor area (m^2)	2,676 m^2	4,660 m^2	12,733 m^2
Community assets (saleable)	$0	$0	$4,176,004
Sub total	*-$8,049,052*	*$ 3,065,278*	*-$1,729,650*
Land value	$14,314,300	$14,314,300	$14,314,300
Open space contribution	-$715,715	-$715,715	$0
Relative cost total	*$5,549,533*	*$16,663,863*	*$12,584,650*

* Sales revenues have been calculated using median unit and apartment prices, which do not reflect the diversity of dwelling provisions or associated floor areas. Saleable residential floor areas are provided for reference. See Appendix 2 for details.

The BAU model delivers 24 dwellings across the 12 sites, representing a net increase of 12 dwellings. The SHI model achieves 2.4 times (58 dwellings) the yield 3.8 times (46 dwellings) the net increase of BAU. The precinct model delivers 3.7 times (89 dwellings) the yield and 6.4 times (77 dwellings) the net increase of BAU; and 1.5 times the yield and 1.7 times the net dwelling increase of the SHI model. BAU and SHI provide no upgrades to the broader urban environment. Opportunities to increase connections and the use of the public park would be lost. Dwelling diversity is poor in both models. SHI offers enhanced dwelling quality but 90 per cent of dwellings would be one and two-bedrooms. The Precinct design includes more than 4000 square metres of public realm upgrades, including new facilities, connections and open spaces. Modest increases in parking service the proposed child care centre and potential commercial/retail uses aligned to the existing sports club. The precinct also paves the way for additional regeneration initiatives to be contributed by others.

Redevelopment in Study Area A is not viable for any of the scenarios tested. Nor does gifting the land bring them into a profitable situation. Development is much more feasible for BAU and SHI than for the Precinct approach largely due to the proportion of higher cost dwelling types and additional expenditure on public realm upgrades. The cost to deliver is amplified by the percentage allocation of fees, the developer margin and development contingencies. By comparison, in Study Area B, the SHI scenario is viable, where the BAU and Precinct approaches are not. If a proportion of the land were gifted, all scenarios would be feasible. The BAU approach represents the least benefit in Study Area B both in terms of development outcomes and economic viability. Here, the property values are such that the additional yield delivered by a precinct model would off-set much of the additional public realm works.

Table 6: Development data—Green streets

	BAU	SHI	Precinct
No. allotments:	12	12	12
Site area (m^2):	7,747	7,747	7,747
Additional public land (m^2):	0	0	3,845
Total precinct area (m^2):	*7,747*	*7,747*	*11,592*
No. dwellings:	**24**	**50**	**68**
Assisted living units	0	0	12
1 BR	0	31	4
1.5 BR	0	12	9
2 BR	24	7	34
3 BR	0	0	6
4 BR	0	0	3
Dwelling types:	**24**	**50**	**68**
units	24	38	28
apartments	0	12	40
No. car parks:	**24**	**50**	**94**
per dwelling	1.00	1.00	1.38
Public realm upgrades (m^2) (included in development costs):			
Community/commercial facility	0	0	300 Community centre
	0	0	1947 Health cnt + assisted living
Landscape infrastructure	0	0	1110 Streetscape upgrades
Dwelling construction (m^2):	**2,676**	**3,587**	**4,166**
Multi-level apartments	0	1,250	1,665
2-storey attached	0	3.587	1.848
1-storey sem-detached	2,676	2,337	653
Residential open space (m^2):	**5,071**	**5,147**	**3,730**
Landscaping infrastructure:	2,952	3,153.5	1,280
Green landscaping:	2,119	1,993.5	2,450
Indicators:			
Building footprints (m^2):	2,676	2,197	2,937
Open space (m^2):	5,071	5,550	4,810
Floor area ratio:	0.35	0.46	0.54
Site coverage (%):	35%	28%	38%
Net density (dw/ha):	31	65	88
Public realm contributions by others			
			Private lots acquired/join redevelopment
			Private lots opt into street network

Table 7: Cost summaries—Green streets

Study Area A	BAU	SHI	Precinct
Development cost	-$13,582,237	-$17,961,484	-$29,174,991
Dwelling sales (by median $)	$9,000,000	$17,850,000	$18,900,000
*Saleable residential floor area (m^2)	2,676 m^2	3,587 m^2	4,166 m^2
Community assets (saleable)	$0	$0	$7,048,278
Sub total	*-$4,582,237*	*-$ 111,484*	*-$3,226,494*
Land value	$4,307,332	$4,307,332	$4,307,332
Open space contribution	-$215,366	-$215,366	$0
Relative cost total	*-$490,271*	*$3,980,482*	*$1,080,838*
Study Area B			
Development cost	-$21,460,936	-$25,840,183	-$37,053,690
Dwelling sales (by median $)	$16,080,000	$32,900,000	$36,120,000
*Saleable residential floor area (m^2)	2,676 m^2	3,587 m^2	4,166 m^2
Community assets (saleable)	$0	$0	$8,637,849
Sub total	*-$5,380,936*	*$7,059,817*	*$7,704,378*
Land value	$12,186,031	$12,186,031	$12,186,031
Open space contribution	-$609,301	-$609,301	$0
Relative cost total	*$6,195,794*	*$18,636,547*	*$19,890,409*

* Sales revenues have been calculated using median unit and apartment prices, which do not reflect the diversity of dwelling provisions or associated floor areas. Saleable residential areas are provided for reference. See Appendix 2 for details.

Despite contextual differences, the BAU model provides the same outcomes for *Green streets* and *Park edge* scenarios: 24 dwellings and a net increase of 12. The SHI model doubles the dwelling yield (50 dwellings) which is three times the net increase that of BAU (38 dwellings). To achieve these densities, the SHI model only delivers one and two bedroom dwellings. The precinct model offers almost three times (68 dwellings) the yield and 4.7 times the net dwelling increase (56 dwellings) of BAU, and 1.4 times the yield and 1.5 times the net dwelling increase of SHI. A broad range of dwelling types is offered and an increase in parking services the assisted living, health and community centres proposed. It includes 1100 square metres of streetscape upgrades, providing residents with new open space amenity and the first stages of a pedestrian network connecting existing recreation and community nodes in the neighbourhood.

None of the development scenarios are viable in Study Area A but the SHI model is close to breaking even and the Precinct model could return a profit if dwellings were sold at improved values (see Appendix 2). Both the SHI and Precinct models are viable if the land is subsidised. The sale of community assets in the precinct offsets the cost of the improved residential construction. This precinct comprises a lower proportion of apartments (than Park edge and Local shops), indicating that there is an optimal relationship between property value and construction type. In Study Area B, both SHI and Precinct are viable, where BAU is not—presumably due to the low yields relative to the property values in this neighbourhood. All scenarios are feasible with the land value discounted. Interestingly, Precinct is more profitable than SHI in this location, despite the different levels of public realm intervention. In this case,

the additional density that can be achieved by an integrated precinct and the value of its community assets has offset the regenerative works in the public realm.

Table 8: Development data—Local shops

	BAU	SHI	Precinct
No. allotments:	*12*	*12*	*12*
Site area (m^2):	7,814	7,814	7,814
Additional public land (m^2):	0	0	2,449
Total precinct area (m^2):	*7,814*	*7,814*	*10,263*
No. dwellings:	**24**	**53**	**77**
1 BR	-	24	-
1.5 BR	-	9	34
2 BR	24	20	34
3 BR	-	-	3
4 BR	-	-	3
5 BR	-	-	3
Dwelling types:	**24**	**53**	**77**
units	24	24	29
apartments	0	29	48
No. car parks:	**24**	**55**	**83**
per dwelling	1.00	1.04	1.08
Public realm upgrades (m^2) (included in development costs):			
Commercial facilities	n/a	n/a	37 Pharmacy/medical
Community facilities	n/a	n/a	42 Community room
Landscape infrastructure	n/a	n/a	1,129 Streets and common areas
Dwelling construction (m^2):			
Multi-level apartments	2,844	4,462	9,759
2-storey attached	0	3,000	6,271
1-storey sem-detached	0	632	3,429
Residential open space (m^2):	**2,844**	**830**	**59**
Landscaping infrastructure:	4,975	5,818	4,169
Green landscaping:	2,410	4,444	1,436
Indicators:			
Building footprints (m^2):	2,676	1,996	3,645
Open space (m^2):	4,975	5,818	4,169
Floor area ratio:	0.36	0.57	1.25
Site coverage (%):	36%	26%	47%
Net density (dw/ha):	31	68	99
Public realm contributions (by others)			
			1,210m^2 Connection to transport
			110m^2 Connection to retirement village
			1,320m^2 Open space upgrades

Table 9: Cost summaries—Local shops

Study Area A	BAU	SHI	Precinct
Development cost	-$13,839,205	-$22,840,430	-$40,909,615
Dwelling sales (by median $)	$9,000,000	$17,700,000	$25,275,000
*Saleable residential floor area (m^2)	2,676 m^2	4,462 m^2	9,759 m^2
Community assets (saleable)	$0	$0	$301,762
Sub total	*-$4,839,205*	*-$5,140,430*	*-$15,259,269*
Land value	$4,344,584	$4,344,584	$4,344,584
Open space contribution	-$217,229	-$217,229	$0
Relative cost total	*-$711,850*	*-$1,013,075*	*-$ 10,914,685*
Study Area B			
Development cost	-$21,786,043	-$30,787,268	-$48,856,453
Dwelling sales (by median $)	$16,080,000	$34,060,000	$49,190,000
*Saleable residential floor area (m^2)	2,676 m^2	4,462 m^2	9,759 m^2
Community assets (saleable)	$0	$0	$456,346
Sub total	*-$5,706,043*	*$3,272,732*	*$333,547*
Land value	$12,291,422	$12,291,422	$12,291,422
Open space contribution	-$614,571	-$614,571	$0
Relative cost total	*$5,970,808*	*$14,949,583*	*$13,081,315*

* Sales revenues have been calculated using median unit and apartment prices, which do not reflect the diversity of dwelling provisions or associated floor areas. Saleable residential areas are provided for reference. See Appendix 2 for details.

In this scenario, SHI delivers more than double the dwellings (53 dwellings) and nearly 3.5 times (41 dwellings) the net increase of BAU, but again relies on a low-diversity offering (one and two-bedroom units only). The Precinct model provides 3.2 times the yield (77 dwellings) and 5.4 times the net increase (65 dwellings) above the BAU model. It achieves 1.4 times the yield and 1.6 times the net increase of the SHI model. 83 per cent of dwellings are for one and two-bedrooms, with the remainder spread across three, four and five-bedroom types. A modest increase in parking supports the future renewal of the shops; near this ‘local centre’ the precinct proposes a rentable community room and local pharmacy/medical centre. The design includes 1200 square metres of public open space upgrades to open-up and better use an existing pocket park and to increase the commercial value of the shop sites. A publicly accessible lift helps to overcome the steep terrain, increasing connectivity and providing new regeneration opportunities.

None of the scenarios are viable in Study Area A, even with the land value subsidised. As for the Park edge, the Precinct model is much less feasible than BAU or SHI, again due to the higher cost apartments and additional expense of public works relative to current property values. In Study Area B, both the SHI and Precinct are viable, where BAU is not. All scenarios become profitable with the land value discounted. When compared to the Park edge precinct, where viability relied on the subsidised land, we can begin to gauge the extent of regenerative works that are feasible for a one-off development.

Table 10: Development data—combined clusters (36 lots)

	BAU	SHI	Precinct
No. allotments:	36	36	36
Site area (m^2):	24,661	24,661	24,661
Additional public land (m^2):	-	-	8,679
Total precinct area (m^2):	*24,661*	*24,661*	*33,340*
No. dwellings:	**72**	**161**	**234**
Assisted living units	-	-	12
1 BR	-	86	4
1.5 BR	-	27	63
2 BR	72	42	117
3 BR	-	4	17
4 BR	-	2	16
5 BR	-	-	5
Dwelling types:	**72**	**161**	**234**
units	72	89	96
apartments	-	72	138
No. car parks:	72	163	272
per dwelling	1.00	1.01	1.16
Public realm upgrades (m^2) (included in development costs):			
Community/commercial facilities	n/a	300 Common room	2,782 Child care cnt; community cnt; health care + assisted living; pharmacy/medical; rentable community room
Community infrastructure	n/a	n/a	668 Parking deck + recreation
Landscape infrastructure	n/a	n/a	5,277 Connections; open spaces + streetscape upgrades
Dwelling construction (m^2):	**8,196**	**12,709**	**26,658**
Multi-level apartments	0	7,485	15,410
2- storey attached	0	797	10,283
1-storey semi-detached	8,196	4,427	965
Residential open space (m^2):	**16,470**	**17,030**	**10,410**
Landscaping infrastructure:	8,314	10,425	3,066
Green landscaping:	8,156	6,606	7,344
Indicators:			
Building footprints (m^2):	8,196	7,195	11,037
Open space (m^2):	16,470	17,466	13,624
Floor area ratio:	0.33	0.52	1.08
Site coverage (%):	33%	29%	45%
Net density (dw/ha):	29	65	95
Public realm contributions (by others)			
			Upgrades on public park land; bio-swales + networked servicing; private lots acquired or opt into new street networks; connections to significant transport or community nodes

Table 11: Cost summaries—combined precinct designs

Study Area A	BAU	SHI	Precinct
Development cost	-$42,175,794	-$ 65,671,936	-$124,027,121
Dwelling sales (by median $)	$ 27,000,000	$54,975,000	$77,400,000
*Saleable residential floor area (m^2)	8,028 m^2	12,709 m^2	26,658 m^2
Sub total	*-$15,175,794*	*-$10,696,936*	*-$46,627,121*
Land value	$13,711,516	$13,711,516	$13,711,516
Community assets (saleable)	$0	$0	$8,926,520
Open space contribution	-$468,346	-$468,346	$0
Relative cost total	*-$1,932,624*	*$2,546,234*	*-$23,989,085*
Study Area B			
Development cost	-$67,256,031	-$90,752,173	-$149,107,577
Dwelling sales (by median $)	$48,240,000	$104,270,000	$149,880,000
*Saleable residential floor area (m^2)	8,028 m^2	12,709 m^2	26,658 m^2
Sub total	*-$19,016,031*	*$13,517,827*	*$ 772,423*
Land value	$38,791,753	$38,791,753	$ 38,791,753
Community assets (saleable)	$0	$0	$11,260,535
Open space contribution	-$1,325,016	-$1,325,016	$0
Relative cost total	*$18,450,706*	*$50,984,564*	*$50,053,060*

* Sales revenues have been calculated using median unit and apartment prices, which do not reflect the diversity of dwelling provisions or associated floor areas. Saleable residential areas are provided for reference. See Appendix 2 for details.

When we combine the outcomes for each of the site clusters—Park edge, Green streets and Local shops—we can begin to see the aggregate effect of the respective development scenarios—BAU, SHI and Precinct.

BAU—an unfeasible approach for sustainable urban transformation

The BAU model delivers 72 dwellings across the 36 sites, representing a net increase of 36 dwellings. The outcome presents sub-optimal levels of dwelling diversity, density and quality across the neighbourhood. When we consider the transformation *en masse*, the considerable opportunity cost of a BAU approach becomes evident. For the 2.4 hectares of public housing land that has been redeveloped, very few affordable housing or urban regeneration benefits have been gained. Based on the costing method employed, the BAU model is not viable in either location and only becomes so in the higher value Area B when the land cost is subsidised. Compared with the other two development scenarios, BAU cannot be considered a feasible option from housing, urban or economic perspectives.

Increasing amenity and services in greyfield suburbs

The SHI development approach achieves 2.2 times the yield (161 dwellings) and represents a net dwelling increase 3.5 times (125 dwellings) greater than the BAU model. Ninety-five per cent of dwellings are for one and two bedrooms. On an aggregate level, high-quality, high-density housing would be delivered across the neighbourhood but the lot-by-lot development approach restricts the diversity of dwellings that might otherwise be possible and no supporting services, amenity or infrastructure are delivered to support the resultant population increases.

The lack of amenity and services being delivered with new housing supply is a significant consideration for the regeneration of greyfield areas. Firstly, high amenity, highly serviced suburbs tend to correspond to higher property values. The ongoing viability of realising sustainable urban transformations will have a direct relationship to the amenity and services provided in these contexts. Secondly, based on the housing development data (DPCD 2013) for the 1 square kilometre Study Areas A and B, 125 net new dwellings represent increases of approximately 15 per cent and 11 per cent respectively. More research is required to understand a neighbourhood's capacity to support population increases over time, the spatial constraints of delivering new amenity and services in established suburbs and who would shoulder the financial burden of doing so. However, this preliminary 'experiment' suggests that lot-by-lot redevelopment approaches to public housing land in Melbourne's greyfields may prove to have a detrimental opportunity-cost for effective and sustainable urban change.

Development staging and quality benchmarking

Importantly, the SHI model is the only scenario that becomes viable in Study Area A when the land value is discounted. This is largely due to the innovative dwelling designs that can be delivered by efficient construction methods. This observation points to potential pathways for affecting viable urban change by staging development approaches in 'run-down' low value neighbourhoods (see Life-cycle assessment below). Additionally, the viability of the SHI scenario in higher value areas, such as Neighbourhood B, sets a quality benchmark for one-off developments delivered by the private market that do not have the advantage of land assembly.

Development formulas and strategic transitioning

The precinct model delivers 3.2 times the yield (234 dwellings) and 5.5 times the net dwelling increase (198 dwellings) of the BAU approach. It achieves 1.4 times the yield and 1.5 times the net dwelling increase of the SHI model. Operating across the cluster of selected allotments enables alternative distributions of dwelling forms, parking provisions and open spaces such that high densities can be achieved while delivering high-quality spatial outcomes, high levels of dwelling diversity and considerable public realm improvements. This research demonstrates that a high yield, high-density precinct approach is feasible for a one-off development in high value suburbs. However, the proposed models are not immediately viable in lower value areas (see Life-cycle assessment below). As identified in each of the cost scenarios, this is predominantly due to the differential between the higher cost construction types (which enable the greater density and diversity of dwelling outcomes) and current property prices (low, due in part to the failing physical context).

The proposed precinct designs have been developed in response to site-specific opportunities, strategic urban considerations and the localised socio-economic conditions that exist in each study area. The outcomes have also been driven by community concerns and aspirations for their future neighbourhood and what would be considered acceptable/unacceptable levels of change. To better align the precinct outcomes with the economic reality of delivering a one-off project in low value suburbs, it would be possible to modify the development formula and adjust the design models to encompass optimal yield increases using more cost effective construction types and fewer public realm provisions. Careful consideration should be given to the impact on long-term outcomes and the equity of selective redevelopment approaches in disadvantaged areas.

To close the initial gap between economic viability of a one-off project and ensure that optimal urban outcomes are achieved in the long-term, an incremental approach to transitioning would be required. This could involve strategic design at a precinct level, earmarking sites and connections within a neighbourhood integral for achieving future dwelling diversity and broader urban benefits. Cost effective construction types could be initially delivered, with other components of the precinct coming on-line as the viability equation shifts over time. In effect,

this requires the development of a neighbourhood structure plan that is underpinned by strategic, precinct-scaled redevelopment of public housing clusters (see Life-cycle assessment below).

Strategic development 'pipeline', cross-subsidy and innovative procurement

The comparative examination of the two study areas reveals that, with strategic oversight, there is an opportunity to cross-subsidise developments within the portfolio of DHS landholdings. When the land value is removed from the calculations, the 'profit' made by the precinct redevelopment in Area B offsets the 'loss' incurred by the regeneration of Area A with $6.5 million in proceeds. These basic cost comparisons have been generated to imitate conservative 'private market' conditions for a one-off development, including a 20 per cent developer margin and 10 per cent contingency on all construction undertaken. Further economic advantages may be possible by employing innovative finance, procurement and partnership models having identified a strategic 'pipeline' of potential public housing redevelopments across Melbourne's middle suburbs. In addition, the potential scale and extent of public housing redevelopment introduces opportunities to viably employ innovative construction techniques (e.g. modular or prefabricated housing assembled off-site). With considerate design and effective implementation, such technologies could potentially offer further cost advantages while increasing the quality and performance of affordable dwelling provisions.

Additional cost efficiencies offered by a coordinated precinct approach

In addition to construction technologies, a coordinated precinct approach also offers potential cost efficiencies in the design, development, approval and delivery processes, which are unavailable to lot-by-lot developments. For example, fees for professional services might be 'consolidated' and shared across a precinct rather than repeated for individual sites. A single approval process would save time and reduce the expense of making multiple submissions. Conventional development fees (such as open space contributions) could be negotiated or waived in lieu of the public realm upgrades incorporated into the development outcomes. Lastly, efficiencies achieved through economies of scale in construction and delivery processes may also offer financial benefits. More research is required to determine the specific impact these efficiencies would have on the overall viability of a development.

Procurement partnerships and tenure mix

The designs assume a 50:50 mix of social and private dwellings but the specific nature of the tenant mix and the way that social housing assets are distributed within an overall development have not formed part of this study. Furthermore, the potential finance arrangements, procurement method and development partnerships have not yet been specified within these basic cost comparisons. As such, it is difficult to discern what kind of impacts this would have on development revenue and viability. If we assume that development is delivered by the NFP sector, half of the dwelling yield would not be available for sale, but may attract some form of rental income (e.g. NRAS). If delivered by the private sector, 50 per cent of dwellings would need to be sold at an affordable price to social housing providers. More detailed research is required to accurately establish these cost scenarios. However, these preliminary tests indicate that a reduction in revenue would not be feasible in Area A but could potentially be supported in Area B.

5.4.2 Life-cycle assessment: optimisation modeling for long-term decision-making

The long-term viability assessment examines the cost and quality of the proposed precinct designs and their impact on infill market conditions over a 20-year life-cycle. It employs optimisation techniques to model and examine different levels of urban transitioning from BAU lot-by-lot development to a higher instance of coordinated precincts in each of the 1 square kilometre study areas. For the purposes of this research, the modeling seeks to maximise the

dwelling sales that are possible under the constraints of three different 'strategic directions' and calculates the implications in terms of cost, profit, time required for transitioning, the share of development approaches constituting the outcome (i.e. BAU, SHI and Precincts) and the dwelling yield and types supplied.

Dench Analytics was engaged as a consultant on this project to provide the modeling expertise necessary for the investigation (see Appendix 2 for method, assumptions and limits). Importantly, the model is design-driven: it uses the 'qualitative' design knowledge revealed through preceding stages of the project to speculate on 'quantitative' outcomes that could potentially be achieved in each neighbourhood. It is not intended to comprehensively simulate the complexities of the development industry, the market-forces at play or the multiple unknowns of future urban regeneration initiatives. Rather, it demonstrates how the quality and performance of alternative design outcomes might be valued alongside the upfront costs of development to support a more holistic measure of what constitutes a viable outcome. It engages with the related issues of public realm upgrades, property values, market leadership and uplift of private sector infill activity (see Appendix 2 for discussion). Through these multiple considerations, the study poses new ways of thinking about the net financial impact of precinct redevelopment in greyfield suburbs over time that encompasses a range of quality and performance criteria.

Three notional 'strategic directions' were used to nominate key determinants in the optimisation model:

- *Do nothing*—This model assumes very little strategic coordination of DHS landholdings takes place resulting in a low level of sustainable urban transitioning. Maximum dwelling sales are sought through a predominantly BAU development approach, with limitations set on the possible occurrence of SHI developments and no possibility of Precinct delivery. Due to the relative 'ease' of BAU, an increasing number of lots are redeveloped per year. Because no substantial improvements are delivered to the urban environment, there is a lower likelihood that property prices would significantly increase or that the demand for redevelopment on surrounding properties would show much movement.
- *Housing quality benchmark*—The SHI exemplars provide a housing quality benchmark for lot-by-lot redevelopment approaches but they offer little dwelling diversity and do not provide any broader urban upgrades. This model examines the impact of effective increases in housing density with little strategic concern for diversity or delivering community upgrades in parallel with new dwelling supply. It models a moderate shift in approach from BAU to SHI, with very few precinct redevelopments occurring over a 20-year period. This approach would require the identification of consolidated sites for SHI projects and some strategic coordination to deliver a limited number of integrated precincts on public housing land. As such fewer SHI and Precinct developments occur in year 1, but their share of development slowly increases by year 20. While development outcomes are more effective, the 'degree of difficulty' associated with the coordination of strategic urban transitioning is registered in the model by placing greater limits on the number of lots that are redeveloped compared to the previous scenario. The built form enhancements are reflected in the differential between development costs and property prices. This activity incentivises modest uplifts in private activity in the 1 square kilometre neighbourhood.
- *Strategic urban transitioning*—This model explores the potential outcomes if a proactive impetus was placed on strategic precinct-scaled redevelopment of public housing land. Again, it is assumed that minimal SHI and Precinct developments would occur in year 1, but the shift towards these development types happens more rapidly than in the previous scenario and their share of the overall development activity is greater by the end of the 20-year timeframe. The timing and extent of urban enhancements along with upgraded amenity and services would attract earlier rises in property values. These improved physical and economic conditions in turn catalyse higher levels of uplift in private development activity. While the overall intensity of redevelopment is greatest in this

scenario, the difficulty of assembling appropriate 12-lot clusters required by a precinct approach would constrain the recurrence of this development type within the 1 square kilometre study areas. That is to say, precincts can't happen on all available lots. This is reflected in the optimisation model by lower levels of growth for Precinct redevelopment than its SHI and BAU counterparts.

Figure 69: Study Area A

	DHS all	All lots in 1km^2
Number of lots	153	665
Number of lots as % 1km neighbourhood	23%	100%
Total lot area (m^2)	108,076	412,980
Lot area as % of 1km^2 neighbourhood	26%	100%
Av. lot size (m^2)	706	621

* residential land only ** excludes land already strata titled/subdivided

Figure 70: Study Area B

	DHS all	All lots in 1km^2
Number of lots	71	717
Number of lots as % 1km neighbourhood	10%	100%
Total lot area (m^2)	92,477	511,876
Lot area as % of 1km^2 neighbourhood	18%	100%
Av. lot size (m^2)	657	557

* residential land only **excludes land already strata titled/subdivided *** excludes large housing estates

There are finite quantities of DHS land available for redevelopment in the respective study areas. The number of private allotments existing within the 1 square kilometre differs for each location (Figures 69 and 70). In addition, the three precinct designs propose various levels of dwelling diversity, density and public realm upgrades. To enable a more transparent 'break-down' of how various levers and limits affect the long-term development outcomes (i.e. the possible yields and differing costs involved for Park edge, Green streets and Local shops respectively), each of the scenarios have initially been modeled independently.

Findings

Eighteen different scenarios were generated from the optimisation model encompassing two study areas x three precinct designs x three 'strategic directions'. Appendix 2 contains each set of results and a discussion of their comparative outcomes. To explore the limits, levers and long-term 'value' of a coordinated precinct approach, this section of the report focuses on the Park edge precinct in the low-value Study Area A where development viability was most difficult to achieve in the short term. It then combines the outcomes for all 18 scenarios to discuss the potential net impact of precinct redevelopment across the DHS portfolio. Based on the BAU, SHI and Precinct development outcomes, the model extrapolates the potential 20-year impacts in the 1 square kilometre study area if these approaches were replicated on surrounding properties under shifting market conditions. These changing conditions reflect the physical and financial impact of initial development investments on the life-cycle of redevelopment activity. Table 12 below lists the cumulative outcomes over the 20 years. Figures 71 to 73 show the dwelling supply and type (left axis) and profit generated per annum (right axis). The two datasets reveal a number of long-term considerations for urban transitioning.

Table 12: Twenty-year cumulative outcomes—Park edge Area A

		'Do nothing'	Housing quality benchmark	Strategic urban transitioning
Housing supply	Units	1,343	1,425	1,575
	Apartments	129	550	1,091
	Total	*1,472*	*1,975*	*2,665*
	Net new dwellings	*817*	*1,320*	*2,010*
* % of lots redeveloped by approach:	BAU	95%	80%	65%
	SHI	5%	14%	17%
	PRE	0%	6%	18%
Quality of broader urban environment:		Low-density, low quality, low diversity housing outcomes. No enhancements provided to the broader urban environment. No upgrades in community amenity or services.	Higher quality, higher-density housing outcomes but relatively low diversity. Some increase in quality to the overall built fabric, but no upgrades provided to the broader urban environment, no enhancement of existing or provision of new community amenity or services to support population increases.	High-quality, high-density high diversity housing outcomes. New neighbourhood connections and urban realm upgrades resulting in higher quality and better use of existing community assets. Significant enhancement in the quality and sustainability of the broader urban environment. New facilities, amenity and services to support community building and socio-economic networks in a higher-density neighbourhood.
Dev't cost ($M):		$825.7	$1,012.0	$1,338.3
Residential sales($M):		$559.8	$805.9	$1,423.2
Profit ($M):		*-$265.9*	*-$206.1*	*$84.9*

* For the purposes of the research, all 665 allotments in the 1 square kilometre have been allowed to redevelop over the course of 20-years. This represents an average of approximately 30 lots per year. See Appendix 2 for details.

Figure 71: Dwelling supply & profit per year—'Do nothing' Park edge Area A

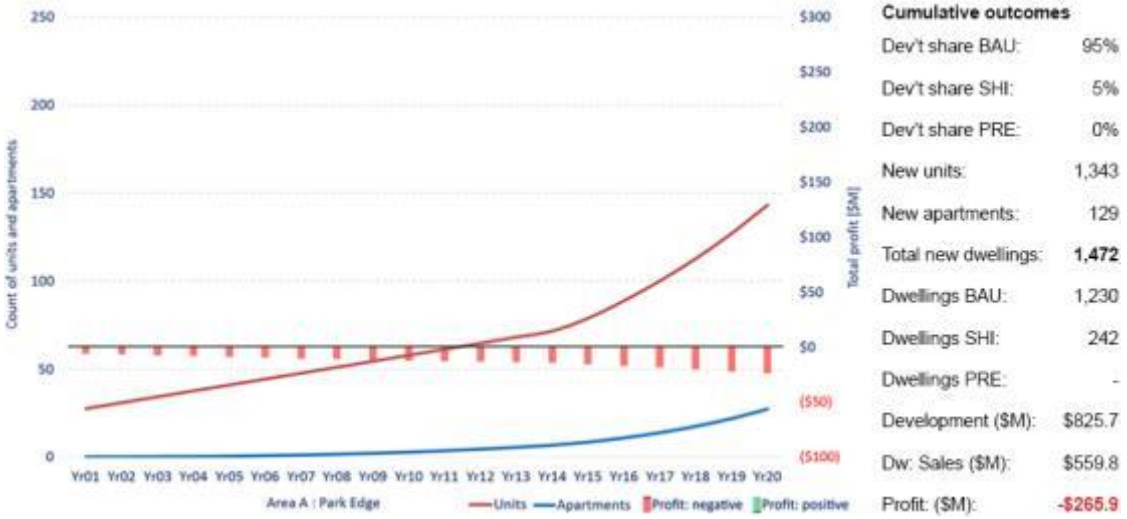


Figure 72: Dwelling supply & profit per year—quality benchmark Park edge Area A

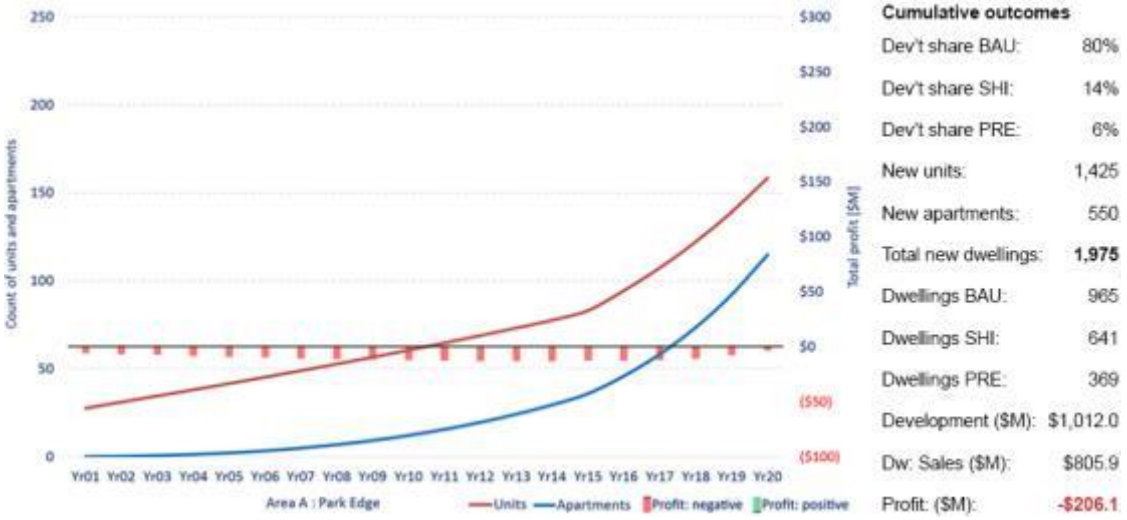
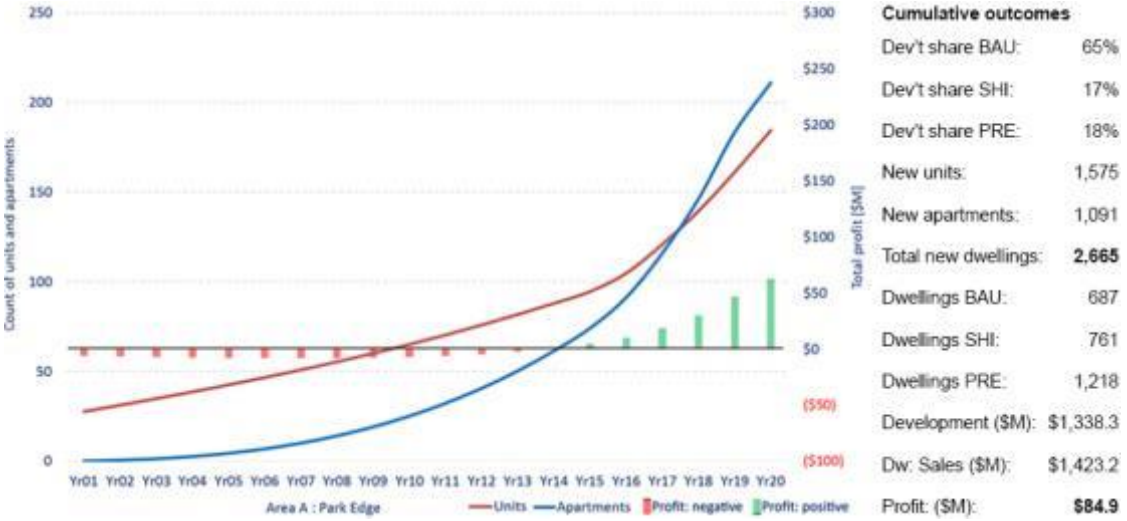


Figure 73: Dwelling count & profit per year—strategic transitioning Park edge Area A



Source: Dench Analytics

We can't afford to 'do nothing'

The 'do nothing' model results in an unprofitable development outcome, with the increasing 'deficit' per annum generating a cumulative loss of -$265.9 million over the development life-cycle. Without external funding and delivery of broader urban or community upgrades, the development activity occurring under the constraints of this 'strategic direction' would not be able to catalyse the conditions required for viable redevelopment ongoing. A cumulative total of 1472 dwellings represent a net increase of 1.2 dwellings per lot.

This is a poor outcome for sustainable urban transitioning, and an underutilisation of relatively well-located greyfield sites. The diversity of dwelling provisions is also lacking, with the growth in units climbing steeply away from the slower growth in apartments. Ninety-five per cent of lots are redeveloped by a BAU approach representing 86 per cent of new dwellings. Without strategic foresight, the disproportionate supply of units (91% of cumulative total) compared with apartments (9% of cumulative total) will be exacerbated as time goes on.

Isolated improvements in housing quality isn't enough

The 'housing quality benchmark' scenario offers marginal benefits for development viability, with a negative profit generated per year and a cumulative deficit of -$200 million. Minor public realm upgrades are delivered by a limited number of precinct redevelopments (6% of all lots redeveloped). Low levels of urban regeneration, combined with a net increase of two dwellings per lot (1975 cumulative dwelling total), represent a lost opportunity for sustainable urban transitioning. In this model, the overall growth of units is paralleled by the growth apartments, however, there is still a lack of diversity and quality in the cumulative mix of dwelling types; 72 per cent of new dwellings supplied are units (1425 total), of which 95 per cent are for one and two bedrooms delivered by a mix of BAU and SHI approaches. Fifty per cent of all new dwellings supplied are low-quality, low diversity BAU types.

A strategic program of precinct redevelopment is needed for long-term viability

The 'strategic urban transitioning' scenario is the only model that achieves a cumulative profit over the life-cycle of redevelopment ($84.9 million). The initial development investments result in a deficit until year 14, after which time the ongoing urban improvements tip the physical and economic conditions into a more favourable state for viable regeneration. During the development life-cycle, the yearly growth in apartments overtakes the growth of units (year 17). When read in parallel with the precinct design outcomes, better quality and greater diversity of dwellings are delivered over the life-cycle of redevelopment (59% of new dwellings supplied are for units and 41% are apartments; 75% of dwellings are for SHI or precinct types). The cumulative dwelling yield (2665) represents a net increase of three dwellings per lot—a modest, but effective average increase across the 1 square kilometre. Within this urban transition, 65 per cent of lots are still redeveloped under a BAU approach (providing only 25% of the new dwelling supply). A higher instance of integrated precinct delivery (currently 18% of lots redeveloped) would mean that densities could be more strategically distributed across the 1 square kilometre study area, taking advantage of context-specific opportunities while allowing some parts of the neighbourhood to remain relatively unchanged.

Getting the mix and timing right

The SHI approach was shown to be most viable in Area A when a single development is considered in isolation. However, on an ongoing basis and in the context of the broader urban area, the SHI approach does not deliver the necessary urban upgrades to catalyse property price rises or the development uplift required for long-term viability and sustainable urban transformations. This is in part due to the adverse impacts of BAU developments being undertaken in parallel. The 20-year cost deficit in the 'do nothing' and 'quality benchmark' scenarios are largely due to the lack of broader urban enhancements and the lower dwelling yields delivered (the latter having a marked impact in higher land value suburbs—see

Appendix 2). Conversely, the precinct approach was least viable in Area A when considered in isolation. However, it is the public realm and community upgrades, coupled with higher-density outcomes, which provide the groundwork for high-quality and profitable development opportunities in the long-term. This investment generates the necessary acceleration in property prices and uplift in private-sector development for viable urban transitions to occur in the neighbourhood as a whole. Irrespective of which 'strategic direction' is pursued, a mix of development approaches will be carried out over a 20-year development life-cycle. Optimising the mix and timing of redevelopment could offer further advantages for short- and long-term viability of public housing renewal. For example, the value uplift caused by a strategic program of precinct redevelopment could be appropriately captured to fund initial development works.

Comparative outcomes: land value, quality, diversity, uplift and culture change

Other outcomes from the optimisation model (Appendix 2) reveal further insights when compared in different ways. The respective 'strategic directions' result in different dwelling yields, types, levels of urban regeneration and profitability over time. The collective results begin to suggest the inter-relationships between land values, good quality design strategies, public realm enhancements, community capital, property price rises, development growth and industry uplift. Profit/loss patterns are more pronounced in the higher value Area B for all precinct designs. This works in both directions: 'do nothing' is less profitable per annum and the cumulative 20-year loss is greater in Area B than Area A; 'strategic transitioning' becomes more profitable earlier in the development life-cycle, resulting in much greater cumulative earnings in Area B than Area A. The amplification of development profits over 20 years due to underlying land value offers further flexibility in potential cross-subsidy of development across locations and over time. Interestingly, 'housing quality benchmark' tips into a profitable scenario in the last few years of its lifecycle in Area B, whereas in Area A it trends slowly towards breaking even but doesn't ever reach it.

'Housing quality benchmark' generates different outcomes across the two locations for the various design types. All scenarios oscillate around a $0 profit margin; a small, but increasing, loss is generated per annum for the first 12–14 years. After this time, the urban and economic conditions tip into a favourable state and the models begin to regain profitability. Of the three designs, only Green streets reaches profitability in Area A, but the cumulative profit is still negative (-$37.8 million over 20 years). All design scenarios reach profitability by year 20 in Area B, but only Green streets generates a cumulative profit ($85 million over 20 years).

Under the conditions of 'strategic urban transitioning', we can observe how the context-specific design opportunities and constraints impact on the long-term diversity and profitability of housing outcomes. For example, the number of apartments delivered in the Park edge scenarios overtakes the number of units, whereas apartment and unit types increase in parallel in the Green streets scenario.

Replicable model for long-term urban transitioning

When the quantitative modeling is read in parallel with the qualitative design research, we can begin to envision the composite effects and long-term influences on the physical and social make-up of greyfield suburbs. These averages take into account the differing property values and number of available allotments in each of the study areas. As well, the average outcomes absorb the differences in dwelling yields and development costs associated with the context-specific design outcomes. As such, they provide a preliminary indication of how an integrated and strategic approach to precinct redevelopment might perform across the portfolio of DHS land holdings. Figure 74 below plots the urban transitions that are possible under the constraints of each 'strategic direction', demonstrating the shifts from lot-by-lot development types to a higher instance of coordinated precincts occurring over a 20-year time frame.

The average mix of BAU, SHI and Precinct development approaches generated in each scenario provides an indication of the housing quality and broader urban upgrades that would

be delivered over the life-cycle of development. When read in parallel with the average net dwelling increases (Figure 75 below) and average profit (Figure 76 below) generated under each ‘strategic direction’, valuable insights are offered for effective and long-term urban regeneration solutions in greyfield suburbs.

Under the ‘do nothing’ scenario, 95 per cent of lots would be developed by a low-density, low-diversity and low-quality BAU approach. The average net dwelling increase is less than 1.5 dwellings per lot in year 20 and the combination of developments returns a negative profit, which worsens over time. This model is unfeasible from both an urban quality perspective and a long-term viability perspective. The compounding effect of BAU over the 20-year period is likely to retard the transition to more sustainable urban environments (both physically and economically) for much longer into the future.

Despite a focus on enhancing the quality and quantity of affordable dwellings, the benefits delivered under the ‘housing quality benchmark’ scenario are relatively limited. The urban transitioning that occurs in this model means that 55 per cent of lots developed are for SHI (40%) or Precincts (15%) in year 20. However, due to the time and speed of transitions, the cumulative outcome is that 80 per cent of lots are still redeveloped by a BAU approach. This is largely due to the lack of broader urban benefits delivered, the associated levels of development growth and intensity of development ‘uplift’ within the private sector. In addition, the lack of diversity offered by SHI and BAU dwellings would restrict its suitability for contemporary household make-ups and housing submarkets. The average net dwelling increase rises slowly, peaking at 2.7 dwellings per lot at the end of the 20-year period, with a negative profit generated per annum until year 17. After this time, relative modest profits are returned resulting in a cumulative deficit of $75 million over the development life-cycle. Overall this model represents a lost opportunity for enhancing the quality and supply of affordable housing as well as potential regeneration in greyfield areas.

Under the ‘strategic urban transitioning’ scenario. BAU development is phased out, with 50 per cent of lots developed by integrated precincts and 40 per cent by an SHI approach by the end of the 20-year period. The time required for the transition means that, cumulatively, 65 per cent of lots are still developed by BAU over the development life-cycle. The mix of development types would deliver a broad range of dwellings, with the quality and quantity of affordable housing supply vastly improved. The average net dwelling increase rises more sharply in this scenario, with an average increase of 4.2 dwellings per lot by year 20. In contrast to the immediate viability of an isolated development, the most profitable long-term scenario occurs when greater instances of precinct redevelopment is undertaken. It is the public realm and community upgrades, coupled with higher-density outcomes, which provide the groundwork for high-quality and profitable development opportunities ongoing. Again, the investment in strategic redevelopment initially generates a negative return per annum. However, under this scenario, the shift into profitability occurs earlier in the development life-cycle (year 9), the pay-back period is reached in year 14, and the cumulative outcome generates an overall return of $555 million.

The comparative life-cycle examinations suggest that the most viable and highest performing long-term outcomes will require a strategic approach to the design and delivery of urban regeneration in greyfield suburbs. When considered across a broader urban field, and in the context of the private development activity occurring in parallel, precinct-scaled redevelopment of public housing land offers an opportunity to ‘kick-start’ sustainable and viable urban transformations, enhancing the density, quality and diversity of affordable housing through a mix of development types. Strong leadership and a long-term future vision are required to catalyse the necessary shifts in conventional development delivery and affect positive urban change. The potential ‘uplift’ in redevelopment offers a scale and intensity of construction activity which brings with it a range of other beneficial possibilities, such as innovative building

techniques (e.g. modular or prefabricated housing) and district-wide, sustainable technologies and servicing (e.g. tri-generation, black water reuse, collective waste management systems).

Figure 74: Average mix of development approaches based on all scenarios modelled

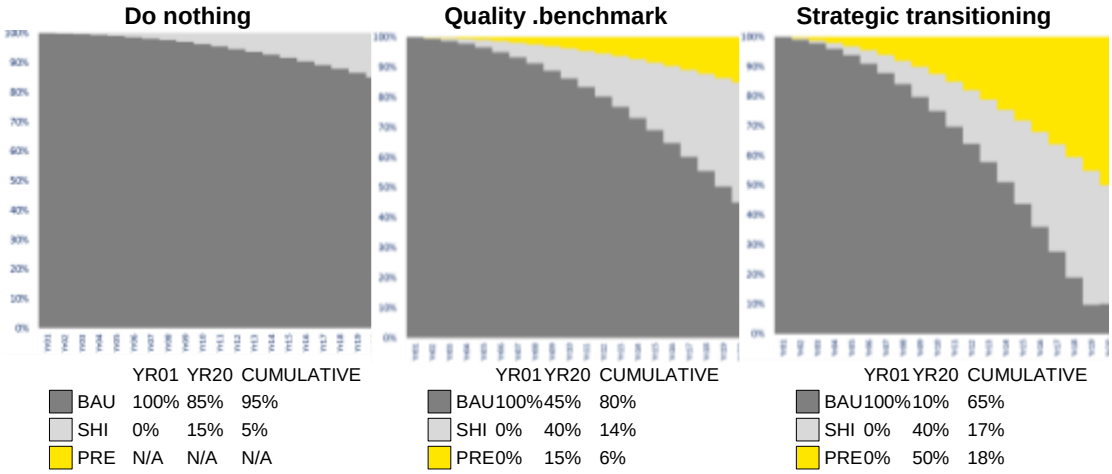


Figure 75: Average net new dwelling increase per lot for all scenarios modelled

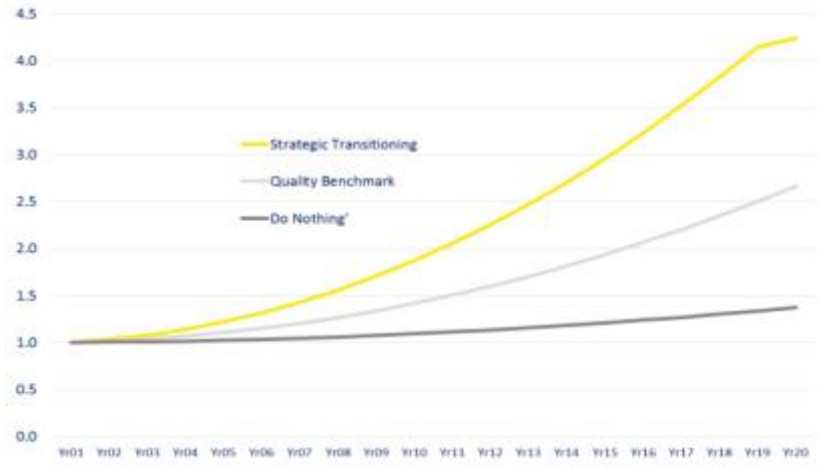


Figure 76: Average profit generated for all scenarios modelled

Source: Dench Analytics

6 SUMMARY FINDINGS OF STAGES 1, 2 AND 3

6.1 Stage 1: What are the lessons learned from the delivery of the NBESP social housing initiative?

The SHI's primary objective was to provide jobs in the construction industry at a time of global economic crisis. Those quality, innovative housing outcomes that were achieved were more a chance by-product of this process rather than a strategic intention of the program. The vast majority of projects delivered under the SHI were 'business-as-usual' 2-for-1 dual occupancy developments. The low-density housing outcomes were generally delivered in poor locations and with little consideration of site-specific qualities. However, there were some lessons learned that showed quality urban outcomes are possible within constrained social housing scenarios, even if these qualities are limited to individual developments or were only partially achieved. The design innovations were often simple but effective strategies that delivered a high level of internal amenity and urban design quality. The key areas of careful/detailed design leading to enhanced outcomes were: parking arrangements, design of common areas; interfaces of private dwellings with common areas and public spaces; addressing privacy and noise (landscaping, screening, careful planning); arrangement of tenancy mix/social diversity and efficiency of internal apartment/unit planning.

Stage 1 also revealed the critical role that procurement methods play (particularly creative/non-standard approaches to partnerships and financing) in delivering innovative design outcomes. For example, the Brisbane Housing Company combined funding from multiple sources to achieve a mixed-tenancy project at a high-density, which in turn allowed a range of innovative semi-public shared spaces and future-proofing initiatives to be delivered by the architects. Other factors leading to innovation included a 'champion' for design quality, relaxation of selected planning controls, and project alignment with existing urban renewal strategies. Barriers to innovation included project scale, with smaller projects having a limited scope for design; project locations, where available public housing land was often in areas of relative disadvantage with poor transport access; and lack of long-term strategic planning for affordable/social housing and neighbourhood uplift.

6.2 Stage 2: Where are the opportunities for land assemblage of dispersed public housing land in the middle suburbs?

Stage 2 found that the DHS has existing assets in sufficient number in well-located areas of Melbourne's middle suburbs broadly suitable to infill development. Preliminary investigations in Brisbane and Sydney metropolitan areas showed similar patterns of public housing landholdings. The nature of these landholdings is dispersed and disaggregated, forming loose clusters at different scales, as a result of a series of previous policies regarding the acquisition, construction, disposal and transfer of public housing assets over a 50-year period. The nature of current holdings and configurations of this public land are unplanned, but nevertheless now represent an opportunity for a larger scale of redevelopment than is usually the case in these middle suburban locations. Much of the building stock on these numerous sites is in need of replacement or substantial refurbishment, at the same time as their middle suburban neighbourhoods are in need of intensification and densification in order to play a more positive role in the quality, amenity and functionality of the metropolitan system as a whole.

The Stage 2 research identified which specific groups or 'clusters' of DHS lots have the most strategic potential. When certain conditions of clustering or 'nearness' of sites are met, the particular qualities and metrics of this dispersal are suited to a coordinated precinct type of redevelopment. The design-led examination also identified typical greyfield contexts in which different precinct design models could be replicated. These contexts present different opportunities and constraints for infill redevelopment strategies. The precinct types include:

typical residential streets; on the edges of parks and open space reserves; and near existing local strip shops or community 'hubs'.

6.3 Stage 3: How can public housing land in greyfield precincts be developed to increase the provision of affordable housing and to increase the overall performance and contribution of these greyfield locations in terms of broader objectives of densification, sustainability and community engagement?

Through the development of three design scenarios, Stage 3 found that the coordinated precinct approach could offer an effective model for redeveloping dispersed public housing assets. When considered as a precinct (defined in this study as clusters of 12 lots), their integrated redevelopment can achieve substantial increases in dwelling yield within a plausible building envelope. The design scenarios developed in this study delivered 2–4 times the number of dwellings over 12 lots when compared to business-as-usual dual occupancy outcomes.

Simple but well-executed design and place-making strategies impacted, not just on the dwelling, but also the neighbourhood and beyond. Significant benefits can be achieved with cost-neutral initiatives, such as appropriate siting and orientation for solar access. Other advantages include:

- *Precinct design*: allows for non-uniform, flexible siting of higher density buildings, effective program mixes, efficient parking arrangements and a variety of households and tenure types to be accommodated across a neighbourhood. Place-specific public realm enhancements enable existing community assets to 'work harder' for more people. These can then be supplemented with targeted amenity and infrastructure upgrades tailored to local needs and aspirations. Good quality design encourages other flow-on benefits, such as attracting local business or institutional investment through active streetscapes and improved access/connectivity.
- *Higher density buildings*: shared circulation and common spaces can augment compact dwelling options, support positive social/private tenure mixes and mitigate negative impacts of higher density living. For example, the arrangement and treatment of access ways and dwelling entries can reduce noise and increase privacy. Large, undefined open space or common areas can be noisy and 'intimidating' and are often underutilised. Clever distribution of small shared spaces which are purpose-designed provides useful amenity and meeting places for residents with shared interests.
- *Internal design*: careful planning of dwelling spaces provides substantial flexibility and liveability benefits. Examples include adequate size and configuration of rooms that readily allow for visitors or carers; ensuring bathroom access is not from a bedroom.

Stage 3 found that a relaxation of particular planning controls enables substantial flexibility in medium-density development, supporting better design outcomes and higher-yields. For instance, the blanket prescribed setbacks under the current planning scheme in Victoria do not take into account site-specific opportunities and limitations, or other variables such as topography which in reality have a large impact on the lived experience of privacy or access to sunlight. The precinct approach allows a more site-specific customisation of setbacks to make the most of local opportunities while responding to neighbouring built form. Another example is car parking requirements. Attaching parking to the development rather than the dwelling is common and accepted practice in many high-quality, higher-density developments. However, this is generally not allowed under the planning rules for lower-density dwellings in the middle suburbs due to their one-off nature and scale. The Stage 3 design scenarios pooled car parking to achieve higher densities and higher quality environments that prioritised pedestrian and bicycle movements within a neighbourhood.

Much of Melbourne's middle suburbs are well resourced in terms of public open space and community assets. However, much like the housing that surrounds it, community facilities and amenity are also becoming outmoded. Stage 3 found that establishing active interfaces between new precinct developments and existing public open spaces and other amenities can increase the variety, utility and access to these community assets. Preliminary discussions with key stakeholders for this process—municipal authorities, community housing organisations and local community members—showed real interest in the benefits of a coordinated precinct-based development approach. For instance, the key message from the community consultation undertaken is that higher-density development needs to 'give something back' to the community to be supported and ultimately successful—this was adopted in the three design scenarios.

Preliminary analysis of viability reinforced the established market understanding that higher densities and apartment typologies are more viable in locations with higher underlying land values, and lower-rise townhouse typologies are more viable in lower value areas. However this needs to be balanced against the need to provide a range of housing sizes, types and price points suited to a diverse demographic profile, and also considered over a longer term horizon of change. This is particularly pertinent when considering the best use of government-owned housing land in the context of broader urban regeneration policies. Continuing business-as-usual piecemeal infill is not a viable redevelopment solution from economic, environmental or social perspectives. Furthermore, the compounding impact of piecemeal outcomes over a 20-year period would hamper transitions to more sustainable urban environments for much longer into the future. Setting new housing quality benchmarks will deliver higher dwelling densities and improve the built fabric of established suburbs, which is immediately viable with judicious design and construction. However, a lot-by-lot development approach cannot achieve the dwelling diversity, additional amenity or infrastructure upgrades needed to support resultant population increases. The most viable and best performing long-term outcomes require a strategic precinct-scaled design approach. Higher yields and effective neighbourhood upgrades are feasible for a one-off development in high value suburbs but the proposed models are not immediately viable in lower value areas. The study speculates on the net financial impact of development across locations and over time to explore the potential of cross-subsidising precincts and initiating cooperative finance arrangements.

7 CONCLUSION

Where the body of the report has focused on issues and findings specific to each stage of the research, the *Conclusion* draws these pieces of knowledge together and expands on them as combined learnings for precinct-scaled redevelopment of greyfield suburbs. The study focuses on public housing renewal in the middle regions of Melbourne, however, it is broadly relevant to public housing redevelopment in other jurisdictions and constitutes a new infill model that could be applied to the private sector.

7.1 Integrated research findings

7.1.1 Greyfield precinct redevelopment warrants strategic policy attention

Unsuccessful infill policies have been a failure on the part of government to recognise the existence of two infill segments—brownfields and greyfields. Each has a distinctive pattern of development that needs to be better understood, and strategically harnessed, to achieve real urban change. Large-scale brownfield models continue to be the primary policy vehicle for urban containment; high-density apartments are an accepted component of this type of intensification. Urban policies, programs and practices, however, are lacking an effective response to medium density redevelopment of the greyfields. Its continued omission from strategic plans perpetuates the fragmented, low density and poor quality infill housing occurring outside government-sanctioned development areas. This status quo is failing to achieve infill targets and cannot deliver the diversity of dwellings needed for more equitable and liveable cities. By overlooking greyfields as a strategic site for redevelopment, planning policies also ignore the potential of the existing urban fabric, rather than just intensifying privileged sites or zones.

The strategic potential of greyfield redevelopment warrants more policy attention. This research outlines how a design-led, precinct-scaled approach to the redevelopment of dispersed public housing assets could catalyse effective and sustainable transformations in the middle suburbs and increase the supply of good quality infill housing. It shows how the diverse locational and typological possibilities offered by greyfield redevelopment could provide a much needed complement to existing development initiatives.

7.1.2 Public housing is a significant government asset which requires strategic 'stewardship' to realise its full value

Victoria's public housing portfolio was worth $17.8 billion as of July 2012 (Victorian Auditor-General 2012). There are over 23 500 public housing assets in metropolitan Melbourne and more than half of these are located in the middle regions of the city. The portfolio of public housing is a significant government asset which could be utilised in the regeneration of established suburbs but it does not feature in current metropolitan planning strategies. The consequence of this oversight can be illustrated by the outcomes from SHI. Given the magnitude of the SHI building program, the amount of piecemeal infill housing delivered was a lost opportunity and an underutilisation of public investment (both financial and land). The *business-as-usual* housing outcomes can be largely attributed to the lack of a long-term strategic framework for social housing at regional and sub-regional levels. That is, a framework that considers both the spatial distribution and design typologies of appropriate dwellings within place-specific contexts, rather than just considering state-level economic and social policies. Lessons from the SHI provide valuable insights for the future management of public housing stock. It highlights the need for cooperation between government agencies and better integration of strategic planning and housing policies. The portfolio of public housing assets will require a holistic 'stewardship' through their pending renewal, transfer or sale to realise the full value and achieve the broadest range of public benefits.

7.1.3 The quantity, condition and distribution of public housing stock present a unique and timely opportunity to regenerate the middle suburbs

Seventy-five per cent of DHS housing in metropolitan Melbourne was built in the 45 years following 1950. Much of this stock has not been maintained and now needs immediate replacement or significant refurbishment. The age and type of housing no longer caters for contemporary tenant needs and, without considerable capital works, the gap between existing stock and future demand (quantity and type) will continue to grow. Around 60 per cent of DHS properties in Melbourne's middle suburbs are single houses on a lot. The low density ageing stock represents underutilised land in relatively high amenity areas. Many of these 'greyfield' properties form one to five lot assemblies clustered in close proximity to one another. The particular pattern of disaggregated land-holdings offers significant advantages when developed as an integrated precinct. This research located more than 6500 DHS properties in the middle suburbs aged 1990 or older which formed suitable clusters for a precinct design approach. This represents 25 per cent of all public housing assets and equates to 471 hectares of 'development-ready' land under single ownership. The quantum of dilapidated assets presents a unique and timely opportunity for 'wholesale' and strategic redevelopment. Their dispersal across the middle regions of the city raises the prospect of delivering effective and sustainable regeneration of the greyfields.

7.1.4 These valuable assets are at risk of being sold-off piecemeal

The physical and operational benefits of precinct redevelopment are not possible to achieve on a lot-by-lot basis. As such, the portfolio of public housing has much greater value as a collective than as individual assets. Future policies for housing renewal, transfer or sale must capture this long-term value of the collective portfolio, not just piecemeal sites. The key risk identified by this research is that governments will opportunistically sell off these dispersed properties as a way of expediently dealing with the liability of underperforming assets. If sold and subsequently redeveloped as one-off business-as-usual infill projects, the opportunity cost would be substantial. The advantage of single-ownership could be lost and, with it, the capacity to drive strategic urban regeneration in established neighbourhoods.

7.1.5 Dispersed public housing land is an advantage not a limitation

Operating across clusters of dispersed sites increases the physical surface area of urban regeneration, increases the interface with the surrounding context and reduces negative concentrations of density and disadvantage. An integrated precinct model can target pressure points in a neighbourhood by taking advantage of localised networks and specific physical attributes to enhance development outcomes and strengthen existing communities. This scale of design intervention enables urban, social and environmental priorities to be integrated and restructured across site, precinct and neighbourhood scales. The diversity and distribution of building forms and public realm enhancements makes the precinct model inherently flexible. It leaves gaps open for future opportunities—not expending future capital or using up all of the area's potential—allowing for adjustments and adaptations over time.

7.1.6 A design-led process can overcome typical market barriers to infill redevelopment

This research has demonstrated how a design-led, place-specific and consultative process can positively affect current market barriers to higher density and better quality infill redevelopment:

1. *Communities are not averse to higher density redevelopment as long as it 'gives something back' to the existing area*.

   Residents are far less resistant to urban change than one might expect. In fact, redevelopment is welcomed if it contributes to local community building and improvements to public amenity. Community design charrettes carried out in this project revealed that typical sticking points, such as overshadowing, overlooking and parking were considered

important, but local residents were open to how these issues could be resolved through careful design and place-specific siting. Once these concerns had been addressed, increased density and height were no longer seen as negative attributes, and larger developments were mostly deemed acceptable if they 'gave back' through physical neighbourhood upgrades or responded to specific community needs.

2. *More flexible planning controls could substantially improve the quality, viability and yields achieved by infill housing redevelopment*.

   Planning controls appropriately aim to mediate the impact of development for existing residents and streamline approval processes by setting clear development expectations. However, overly-prescriptive requirements can hinder site-specific design opportunities and limit the diversity of infill dwellings that can be achieved in established neighbourhoods—particularly when working on a precinct scale. In particular, 'blanket' setback requirements and parking provisions restrict the ability to efficiently use residential land while also providing liveable dwellings and engaging social streetscapes. More flexible 'performance-based' planning controls could significantly increase the quality and yields achieved by infill redevelopment and support more sustainable design practices.

3. *New strategic development instruments could increase developer certainty and facilitate opportunities for creative cost/risk sharing.*

   Long-term development frameworks for 'greyfield' suburbs would enable community visions to be aligned with broader urban and housing policies. A design-led and place-specific approach to stakeholder engagement facilitates a cooperative and positive approach to neighbourhood renewal, identifying ways to enhance existing community attributes while maximising opportunities for new and appropriate intensification. Targeting locations with suitable clusters of ageing public housing stock as the first stage of an ongoing renewal program could lay the groundwork for future regeneration and intensification by the private sector. Creating strategic development instruments from this basis would increase developer-certainty while ensuring equitable and sustainable outcomes are achieved in the long-term. Operating at a neighbourhood level maximises overlapping interests for stakeholders within and outside a prospective precinct. By understanding the full gamut of benefits available, new opportunities for creative cost/risk sharing may ensue, facilitating more viable and sustainable change in these contexts.

7.1.7 The NFP sector can leverage public investment

The SHI demonstrates how public investment can be successfully leveraged for additional social housing supply by building capacity in the not-for-profit housing sector. NFP-led developments resulted in better quality outcomes and enabled public investments to be supplemented with other sources of land and finance. The Ashwood Chadstone Gateway Project shows that similar leveraging arrangements can occur outside a Commonwealth funding program and illustrates how multiple government-owned sites can be effectively developed for a diversity of dwelling outcomes. These examples provide strong precedents for an effective and strategic program of precinct-scaled redevelopment on dispersed public housing sites in middle suburban locations. Precinct strategies could further build capacity in the NFP sector by exploring spatial and operational advantages, such as suitable decanting and relocation strategies or localised tenant/property management.

7.1.8 Design innovation can leverage public investment

This study has demonstrated that good quality design can impact, not just on the dwelling, but also on the neighbourhood and beyond. In many instances cost-neutral design strategies, such as appropriate treatment of pedestrian connections and built form interfaces, can encourage a range of flow-on benefits. This might include community-led spaces or services, or attracting new local business and institutional investment through more active streetscapes and better access. Much like the housing in greyfield suburbs, community facilities and amenity are also

becoming outmoded. Integrated precincts enable existing infrastructure and amenity to 'work harder' for more people. These can then be supplemented with targeted amenity and infrastructure upgrades tailored to local needs and aspirations. Cost effective public realm upgrades would significantly improve the quality, value and use of existing community capital in established suburbs.

7.1.9 Technological innovation can leverage public investment

A strategic 'pipeline' of precinct-scaled redevelopment of public housing land offers an economy of scale that could drive a range of technological innovations. This includes new construction technologies, revolutionary industry practices or 'high impact' and sustainable infrastructure systems. District-wide services networks, such as renewable energy generation, water capture and re-use or hard waste management systems could incorporate both residential and non-residential properties, within and outside the precinct. This in turn could attract cooperative finance opportunities or become part of the long-term urban transition plan.

7.1.10 Redevelopment of existing public housing assets could be cross-subsidised in low and high value suburbs

High impact development opportunities—ageing housing stock in high value areas with good access to transport, employment, amenity and services—are not common occurrences within the existing DHS portfolio. The majority of middle suburban stock has reasonable proximity to open space and employment but limited access to public transport located in lower value areas. The commonality of these conditions is a significant consideration for developing replicable and sustainable affordable housing models and raises issues around the equity of 'selective' renewal in viable (already relatively 'wealthy') locations. The comparative cost tests undertaken in this research suggests that there is scope to cross-subsidise development in high and low value suburbs within the portfolio of DHS landholdings. Capturing the value uplift generated by initial development investments could potentially be recycled through a strategic program of asset renewal. A strategic 'pipeline' of public housing development across Melbourne's middle suburbs introduces new possibilities and prospects for instigating creative partnerships, finance and procurement.

7.1.11 Precinct redevelopment of public housing assets could provide market leadership and 'kick-start' greyfield regeneration in the private sector

The redevelopment of dispersed public housing assets is an opportunity for innovation and market leadership for infill housing design and delivery. The demonstration of new and feasible infill models would work towards shifting the current industry culture of risk-averse 'rubber-stamped' development. Precinct designs can respond to the increasing demand for a range of housing types in well-located areas while retaining the nature of suburban neighbourhoods and has potential to test and grow 'latent' housing sub-markets for the private sector. International evidence shows that public and community housing developments have a contagion effect on new home finance within the surrounding neighbourhood. The 'snowballing' of development activity offers a way to leverage private investment for strategic greyfield redevelopment. This study has illustrated how a precinct design approach can provide the groundwork for ongoing neighbourhood regeneration and intensification. This occurs in two ways: through physical enhancements in the public realm which can support future population increases; and by spillover effects on surrounding property values, increasing the feasibility of private sector infill activity over time. Precinct redevelopment of dispersed public housing stock could catalyse urban uplifts (physical, social and financial) and cultural change necessary to transition to more sustainable neighbourhoods in the long-term. This is contingent on achieving good quality design outcomes at dwelling and neighbourhood levels. The uplift in redevelopment offers a scale and intensity of building activity which brings with it a range of other beneficial possibilities, such as innovative construction and district-wide services technologies.

7.1.12 Development partnerships are needed to ensure that greyfield suburbs do not become unaffordable through their gentrification

The study addresses the issue of housing affordability through designing a diversity of housing types, including small apartments and units, and townhouses that have ready access to shared open spaces, community facilities and public services. However, further mechanisms are required to achieve long-term affordability. This research assumes that a percentage of all redeveloped housing needs to be owned and managed by community housing organisations, who have a long-term interest in ensuring affordable, sustainable and high quality dwellings can be delivered. Otherwise, there is a danger that the inevitable gentrification of greyfield suburbs will significantly reduce affordable housing supply in Melbourne's middle suburbs.

7.1.13 Viable and sustainable urban transformations will be incremental

The research has undertaken a comparative examination of different intensities and qualities of infill redevelopment. In reality, a combination of development types will be delivered throughout the life-cycle of neighbourhood renewal. Strategic policy formation must consider how various infill outcomes will interact and impact on the overall capacity of established suburbs to sustainably accommodate higher levels of population. Preliminary modeling indicates that 'doing nothing' to change business-as-usual market outcomes will have a long-term detrimental impact. Strong leadership and a long-term future vision are required to catalyse the necessary shifts in conventional development delivery and affect positive urban change. To close the initial gap between the economic viability of a one-off project and ensure that optimal urban outcomes are achieved in the long-term, an incremental approach to transitioning will be required. This could involve strategic design at a precinct level, earmarking sites and connections within a neighbourhood integral for achieving future dwelling diversity and broader urban benefits. Cost effective infill types could be initially delivered on strategic sites, with other components of the precinct coming on-line as the viability equation shifts over time. A more aggressive strategy would involve higher levels of investment earlier in the development life-cycle to maximise subsequent infill development opportunities and higher quality neighbourhoods. More research is required to determine an optimal balance between short- and long-term redevelopment imperatives.

7.2 Further research

7.2.1 Detailed feasibility study of dispersed precinct design model

This research has demonstrated the potential of an integrated precinct approach and provided a preliminary indication of its short- and long-term viability and efficacy. Coordinated redevelopment of clusters of public housing land offers several physical and financial benefits for a range of different stakeholders. It is recommended that a pilot project is used as a vehicle for governments to provide market leadership and demonstrate the long-term value of innovative infill development approaches. To this end, undertaking a more detailed feasibility study would be required. This would involve detailed design, development and testing of one or more of the precinct scenarios presented in this research to determine feasible yields, construction types and potential staging strategies while optimising dwelling diversity, tenancy mixes and considering decanting logistics. Through the formation of real development partnerships, the study could determine creative finance and procurement arrangements and new opportunities for land contributions (e.g. Local Government or NFPs). More accurate forecasting of construction costs, dwelling sales, rental streams and housing management would be required to determine the development risk and feasibility over a long-term timeframe.

7.2.2 Design-led community engagement

This project did not set out to explore new methods for community engagement, however, the decision to use design—design ideas and design research—as a vehicle for challenging

preconceived attitudes to infill redevelopment and petition a positive, forward-looking dialogue from participants has provided a range of insights relevant for future investigations into community engagement methodologies, planning and development processes for greyfield regeneration. Rather than presenting redevelopment options 'fait accompli', or asking 'what people want' from scratch, student proposals were offered as preliminary design ideas that responded to neighbourhood-specific observations. The forums didn't seek to gain community support per se. They were structured as shared explorations which aimed to uncover local knowledge and aspirations about each neighbourhood. From this cooperative starting point, the engagements were able to challenge expectations and provoke new thinking about future possibilities. Residents responded with frank and astute contributions that focused on how to improve an area, as opposed to just preserving it. Three factors engendered a more meaningful community exchange:

1. Design-led and early engagement around concrete propositions but with scope for future alteration and change.
2. Focus on place-specific issues.
3. Multi-scalar examination encouraging both individual and collective consideration of urban aspirations, benefits and trade-offs.

7.2.3 National relevance

This project has focused on the ageing public housing stock that exists in metropolitan Melbourne as a basis for the geo-spatial analysis and site-specific design investigations. Preliminary studies of public housing land holdings in Queensland and New South Wales indicate a similar pattern of fragmented assets across 'greyfield' suburbs. While many of the broad principles and policy implications raised through the Melbourne study would be applicable in other states and territories, their urban contexts, development processes and industry conditions differ. For example, the review of the SHI revealed that the development capacity and expectation of CHOs in affordable housing delivery differs in various jurisdictions. Undertaking a similar level of design research on 'real' public housing sites in other capital cities would be a valuable next step. This would enable localised and specific findings that address the 'real world' challenges that exist in other locations.

7.2.4 Replicable design models for a 'development pipeline' on government land

This study has examined precinct designs on 12-lot clusters of public housing land, which represents a replicable scale and configuration within the existing DHS portfolio. Furthermore, the three precinct design types were selected to test the opportunities and constraints in typical greyfield neighbourhoods: residential streets; park edges; and small local strip shops. This scale of precinct has its advantages—it is not so large that engagement with stakeholders becomes overly complicated, nor is it too small to take advantage of a coordinated 'network' of design strategies. Having said this, however, other scales and types of development opportunities exist within the existing public housing portfolio. Building on the design-led assessment framework developed in this research, it would be possible to expand the examination of existing public housing assets to identify a range of replicable precinct development models. This would further strengthen the breadth and applicability of a potential 'development pipeline' on government owned housing land. There is also huge scope to incorporate multiple land sources (i.e. owned by different departments or levels of government). Conversely, not all public housing assets are appropriate for precinct development. Further examination of the portfolio could assist in determining optimal strategies for asset renewal, sale or transfer.

7.2.5 Short- and long-term viability measures need to be recalibrated in decisions and priorities for urban change

Current infill policies and practices are underpinned by the need for market-led solutions. As such, the dialogue around viability tends to be dominated by short-term financial concerns relevant to private industry. Addressing these concerns is necessary to increase immediate supply of affordable housing, however, there is also a need to recalibrate viability measures so that the long-term impacts of development and the multiple objectives of sustainability are appropriately weighted in decisions and priorities for urban change.

Governments seek new development strategies to transition to more sustainable, affordable and liveable cities. However, private markets fail to capture the value of improved environmental performance, neighbourhood quality, community participation or public health. Nor do they gain from third party cost-savings achieved through more efficient use of existing amenity, infrastructure and services. Indeed, sustainable design and infrastructure upgrades can increase asset value for property-owners. This in turn contributes to uplifted development activity and offers economies of scale for the industry overall. But the reality is that individual developers, focusing solely on their own financial interests, are unlikely to contribute to these collective industry effects. Unless third party benefits can be (partly) passed on to those shouldering the costs of development, the quality, quantity and sustainability of infill housing will be limited. Sharing benefits equally involves an equitable distribution of costs and risks. Increasing housing supply is not just a question of higher density dwelling delivery. Parallel services, infrastructure and amenity are also required to ensure that equitable and sustainable outcomes are achieved. Public realm improvements and upgrades to broader urban networks typically require public expenditure and/or community resources. These long-term cost burdens are directly impacted by the location, type and quality of development strategies pursued in the short-term. The opportunity-cost of poor development outcomes is rarely factored into determinations of what is considered viable.

More applied research into the long-term value of redevelopment, the efficacy of public investment and the best use of existing public housing assets is needed. New cost-, benefit- and risk-sharing arrangements will be essential for the regeneration of established neighbourhoods. A prerequisite of successful risk-sharing is that all parties have a general overview of costs and benefits involved, but this is currently lacking in a greyfield context.

7.2.6 Knowledge gaps

Research into the cost and performance of different development strategies has largely focused on urban fringe expansion or large-scale brownfield renewal; relatively little is known about the collective impact of residential infill in established suburbs. Without equivalent levels of knowledge that exists for brown and greenfield models, it is difficult to ascertain what benefits could be achieved through a strategic program of greyfield regeneration. This is as much about knowing what to do in established neighbourhoods as it is about justifying the cost and benefits. More data and analysis specific to greyfield property and development would assist in decision-making and policy formation around infill renewal. For example, estimating how intensification and urban upgrades might alter property values over time requires an understanding of existing infill development patterns, as well as real pricing data for both existing dwelling types and new ‘products’ in a suburban residential market. Furthermore, this research has illustrated the need to consider design knowledge alongside financial development imperatives. To fully integrate these different types of intelligence, more appropriate design metrics need to be developed and incorporated into economic analysis. This would enable different stakeholders to compare, examine and optimise future development outcomes based on both quantitative and qualitative spatial inputs.

7.3 Policy implications

7.3.1 Public housing asset renewal and stock transfer

A growing proportion of post-war public housing stock is in need of upgrade and renewal. In a context of declining rental income, increased management costs and reduced public investment in the direct provision of housing, strategies of asset divestment, stock transfer and leveraging private investment to help fund renewal are actively being explored by Australian state governments. Continuing a program of asset renewal that to date has focused on larger inner urban estates, public housing agencies have begun turning their attention to the more dispersed low and medium density stock in middle suburban locations. This different urban condition and pattern of land holdings presents an opportunity for alternative asset planning and renewal strategies to deliver the broadest range of public benefits from the process. The strategic, design-led approach investigated in this project highlights the opportunity for achieving the most from this state asset while providing a stimulus for positive on-going change.

7.3.2 Metropolitan strategic planning

Planning for and managing housing growth is one of the most important but difficult aspects of metropolitan strategic planning for state capital cities. Most metropolitan plans and policies include ambitions (and sometimes targets) for the intensification of established areas to increase housing supply and improve urban efficiencies. Implementing such policies in middle suburban contexts can be especially difficult, due either to local opposition or insufficient 'consolidated' land, while the piecemeal and limited gains of 'business as usual' infill development miss the strategic opportunities inherent in these areas. Precinct-scaled, design-led intensification in 'greyfield' suburbs will be necessary to achieve consolidation targets sustainably. Clusters of dispersed residential land holdings in single ownership, such as those held by state housing agencies, can be used to initiate this type of transformation and stimulate its wider replication by the private sector.

7.3.3 Whole-of-government strategic asset management

State policies for the management of publicly-owned land focus upon the efficiency and effectiveness of the use for which the property is held and the potential financial return from the disposal of state assets where property is considered surplus to need or no longer effective in meeting that need. This project has indicated that a class of assets held for one purpose (public housing) and becoming a liability due to the need for renewal might, when considered strategically and from a whole-of-government policy perspective, be used to deliver a range of objectives *beyond* their original use, while also continuing to provide social housing. Strategic asset management across portfolios, coupled with design-led planning, has the potential to help governments meet a range of complex urban policy needs more efficiently while extracting greatest value from assets already held.

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