

Article

Becoming Urban: Exploring the Transformative Capacity for a Suburban-to-Urban Transition in Australia's Low-Density Cities

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Abstract: Metropolitan planning and development of Australia's cities for much of the past 75 years has been strongly influenced by what could be termed the "North American model" of low-density, car-dependent suburban development on greenfield master-planned housing estates. The negative social, economic and environmental consequences associated with perpetuating this low-density greenfield model were becoming evident by the 1990s and "compact city" policies began to feature, albeit in piecemeal fashion, in the long-term metropolitan planning strategies of the major capital cities in Australia. This compact city transition, from "suburban" to "urban" (i.e., from a low-density urban form dominated by detached housing with its own surrounding private space to one where there is a significant presence of medium-density and apartment accommodation), remains a challenging work in progress, as reflected in a rapid succession of metropolitan planning strategies—and reviews—for cities such as Melbourne and Sydney since the beginning of this century. Urban infill targets of 70% for new housing construction in these cities now represents a major break with the past and a challenge to the major stakeholders involved in urban development in Australia: state and local government, the property development industry and residents of the established, ageing "greyfield" suburbs that are a focus for intensified redevelopment. This paper comprises four parts. The introduction identifies the multiple challenges confronting 21st-century urban development in Australia. The second part frames transitions required for a regenerative retrofitting of the established suburbs of its major cities, with particular focus on the greyfields. The third section extends transition management research into an examination of the transformative capacity of each of the four key stakeholder groups that are central to achieving such a regenerative transition. To date, the greatest resistance to more intensive redevelopment has come from urban residents. The final section of the paper focuses on this stakeholder group, and draws on data from a major household survey that examines the attitudes of resident property owners in the middle suburbs of Sydney and Melbourne to neighborhood change and medium-density housing development.

Keywords: urban transition; citizen-initiated redevelopment; greyfields; transformative capacity; medium-density housing

1. Introduction

Achieving sustainable urban development in Australia's major cities that are projected to double in population over the next forty years will not be possible under strategic metropolitan plans that continue to permit more than half of all new housing to be built in greenfield locations on the periphery of these cities. This level of metropolitan growth is unprecedented and calls for more radical approaches to planning and development than has characterized government strategies to date. The degree to which sustained rapid urban growth exerts positive or negative impacts on the future economic,

social and environmental performance of Australia's cities clearly depends on how well they are planned for. A rapid succession of metropolitan plans and reviews of plans for the major capitals (e.g., Melbourne: Melbourne 2030 (2002), Melbourne 2030 Audit Report (2008), Melbourne @ 5 Million (2008), Plan Melbourne (2014), Plan Melbourne Refresh (2015) and Plan Melbourne 2017–2050 (2017)—see [1] for more details) is evidence that previous strategies for future city development have fallen short of expectation.

The current challenges for metropolitan spatial planning in accommodating rapid growth are substantial, and include:

- A shortage of housing supply capable of matching demand [2]. Failure of supply has contributed to a rapid growth in residential property prices to a position where Australian capital cities lead 26 other global housing markets in cost of housing [3]. Sydney and Melbourne are both in the top ten least affordable housing markets internationally for cities over 1 million in population [4]. Much of the higher priced housing is now concentrated in the inner and middle suburbs of these cities—reflecting established processes of new economy restructuring, reorganization and gentrification that favor central cities. Where to encourage what types of new dwelling construction is a major planning/zoning issue.
- An extended period of house price inflation above that of wages and cost of living (CPI) forcing lower income households to cheaper and less accessible locations in the car-dependent outer suburbs. Suburbanization of disadvantage has increased markedly over the past twenty years and is now clearly evident in Sydney [5] and Melbourne [6]. This socio-spatial disadvantage is multi-faced, combining concentrations of low income; poor access to jobs, public transport, education and health care services; and a spatial concentration of social problems. It is weakening the social fabric as well as the productivity of Australian cities. Construction of more affordable housing in established suburbs is now a bi-partisan political objective, but remains elusive as an implementable objective.
- Ageing urban infrastructure linked to a national shortfall in infrastructure expenditure estimated at approximately A\$100 billion—a fourfold increase in less than a decade [7]. Closely linked to this is an indifferent performance rating for a number of key urban infrastructures by Engineers Australia [8]. The key urban infrastructure challenges for governments are twofold. For the established suburbs this requires a program of investment to retrofit and transition to the next generation of urban transport, water, waste and energy infrastructures. The urban regeneration challenge raises the key questions of where best to intervene and with what infrastructure model in mind (centralized, decentralized/distributed, hybrid; public, private, or PPP). For the fast growing outer greenfield suburbs, infrastructure and service growth continues to lag population demand (where non-dwelling assets are one fifth that of the metropolitan average [9]).
- How to avoid continued dependence on greenfield development to accommodate the majority of new housing constructed in Australian cities.

The negative consequences of low-density sprawl are well established and involve economic and environmental performance in addition to the social consequences identified above. The economic cost of providing new physical infrastructures to greenfield development has been estimated as two to three times that for redevelopment in established areas [10,11]. Outer suburban residents in cities such as Melbourne also drive over 60% more kilometers per household as driver or passenger compared with inner city residents—a growing time and productivity impost for both the household and metropolitan economy [12]. Environmental costs of continued urban sprawl are considerable. While Australia's major cities have been designated among the most livable in the world, they have been demonstrated to be currently among the least sustainable. Figure 1 illustrates this clearly, where the vertical axis maps livability across 140 cities based on the Economist Intelligence Unit's Livability Index and the horizontal axis represents an estimate of their ecological footprints that encompass both resource use and carbon emissions [13,14]. The urban footprint of Australian cities has also been identified as

a major concern in the latest national State of Environment report [15], highlighting the continued loss of productive agricultural land on the peri-urban fringe to greenfield development—reducing an important source of fresh produce close to the city, increasing food miles and carbon footprints.

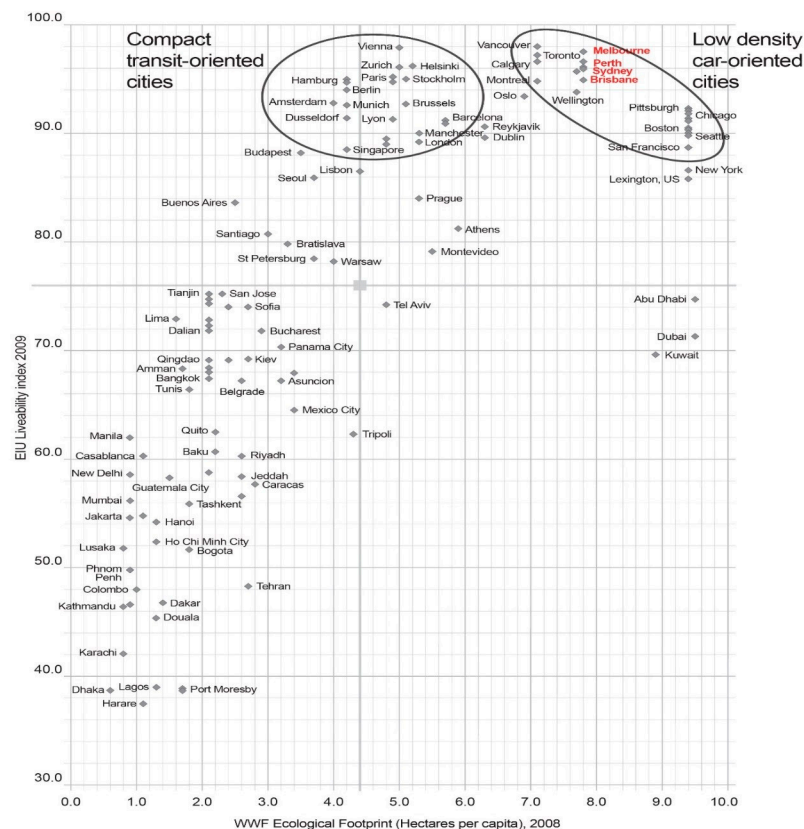


Figure 1. Livability-Sustainability nexus for world cities (Source: adapted from [13]).

Faced with these challenges, critical and inter-related transitions are required in Australia’s major cities. These include:

- transition to more compact cities—from a low-density suburban city form to an urban form and fabric, more characteristic of European cities that deliver urban livability more sustainably than those in Australia and North America as a result of their smaller sized and higher density housing and more active forms of transport [16]. Figure 2 clearly indicates the scale of change required. Sydney is Australia’s most densely populated city at 36 persons/ha—twice that of Perth; and at 26 persons/ha Melbourne is half that of Vancouver and one fifth the density of Vienna (with equivalent levels of livability). Most North American cities share a similar urban form and density with those in Australia, but there are countervailing trends emerging in the USA: four fifths of large metro areas have become more suburban since 2010 while one fifth have become more dense (e.g., Seattle, Chicago, Washington, Boston, NY, Philadelphia, Portland [17]. In comparison, Australia’s capital cities have begun densifying over this period, especially in their established areas [18,19].
- transition in type and scale of urban housing redevelopment. Infill needs to assume a dominant role in increasing the supply of medium-density housing—the “missing middle”—in the established middle ring low-density suburbs—and at a scale of redevelopment beyond that of knock-down-rebuild [20]. Table 1 illustrates the dominance of single-story detached dwellings in Australian capital cities but points to a shift beginning to occur in the supply of higher density housing.

- transition to more sustainable (steady state, no net adverse environmental impact), regenerative (eco-positive, restorative) built environments linked to precinct-scale residential infill and densification, taking advantage of new distributed/decentralized technologies related to energy and water infrastructures, alternative mobility/travel platforms and waste management systems.

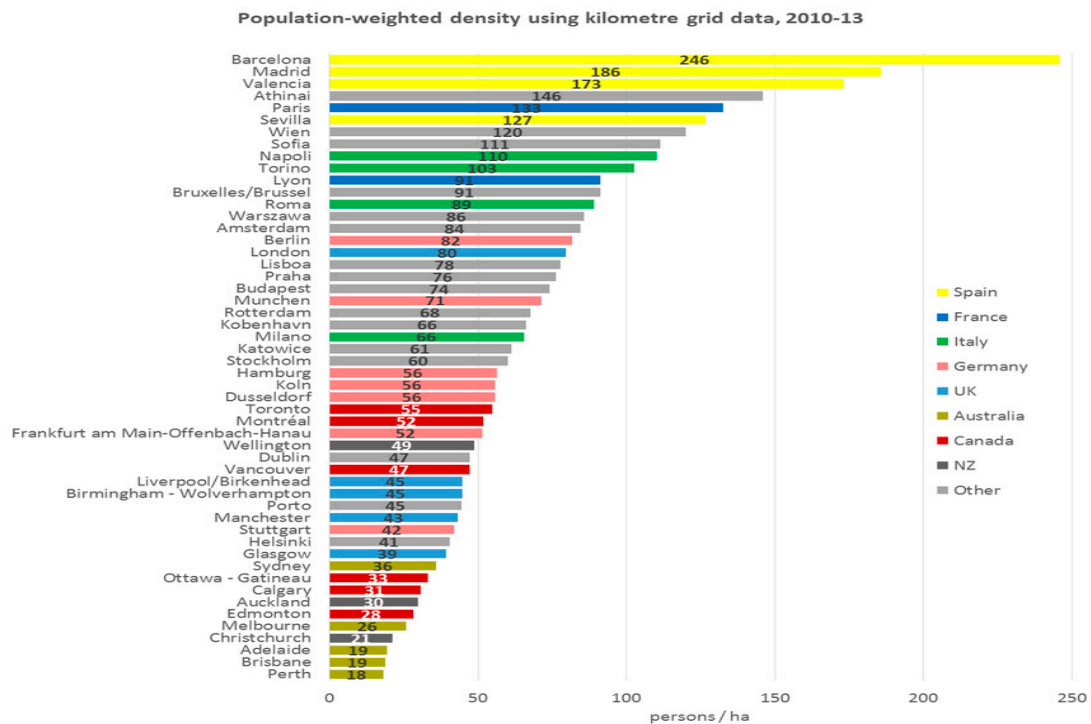


Figure 2. Comparing population-weighted density of Australian, European, Canadian and New Zealand cities. Source: [21].

Infill is now a key concept in metropolitan planning and development designed to redirect new housing and population inwards rather than outwards. Australia's five largest capital cities have infill targets ranging from 47% in Perth to 85% in Adelaide, with Sydney and Melbourne at 70%, but infill is a blanket term that obscures important outcomes that need to be distinguished in relation to the scale at which it occurs—parcel or precinct—and in terms of the urban arena in which it takes place—brownfields or greyfields [22]. Different development models are required for each configuration.

Table 1. Profile of housing stock in Australia's major capital cities, 2006 and 2011.

	Sydney				Melbourne				Brisbane				Adelaide			
	2006	2011	2011%	Inc. %	2006	2011	2011%	Inc. %	2006	2011	2011%	Inc. %	2006	2011	2011%	Inc. %
Separate house	1,000,306	1,013,427	59	1.3	1,048,868	1,163,671	71	11	551,439	637,162	78	16	469,738	557,202	77	19
Semi-detached, 1-story	86,490	94,343	6	9.1	117,994	122,157	7	4	22,956	29,725	4	29	56,468	65,118	9	15
Semi-detached, 2–3-story	110,103	125,898	7	14.3	51,729	70,343	4	36	29,279	42,310	5	45	18,045	24,700	3	37
Apartment in 1–2-story block	114,286	114,408	7	0.1	147,618	151,154	9	2	48,649	49,381	6	2	33,745	39,578	5	17
Apartment in 3-story block	151,033	162,443	9	7.6	43,791	50,680	3	16	22,571	26,594	3	18	12,978	15,786	2	22
Apartment in 4+ story block	165,356	193,783	11	17.2	50,710	67,710	4	34	22,951	27,801	3	21	13,331	18,841	3	41
Total	1,636,674	1,713,301		4.7	1,466,525	1,630,877		11	699,434	814,836		16	605,290	722,366		19

Source: Census 2006–2011, Australian Bureau of Statistics, compiled through ABS table builder.

Having identified the multiple challenges confronting 21st century urban development in Australia, we proceed to a following set of three Sections that explore the prospect for urban transition. Section 2 outlines transitions required for a regenerative retrofitting of the established suburbs of its major cities, with particular focus on the greyfields where a majority of property with high redevelopment potential is located: the ageing, occupied middle ring suburbs. Here we outline a new focus for urban development policy and practice—greyfield precinct regeneration—and introduce the four stakeholder groups involved in the transition management process: state government, local government, the property development sector and community residents. The challenge involves accelerating and scaling up precinct-scale greyfield residential renewal into a broader based urban transition process. It is at this stage where a gap appears in transition theory and transition management (TM) models capable of guiding innovations into the urban mainstream. Transformative capacity is that gap. Transformative capacity is examined in Section 3 as it relates to the four principal stakeholder groups involved in a suburban to urban transition (neighborhood density change) and a housing transition (from detached to medium-density housing). The final section of the paper assesses the current capacity of urban residents in the greyfields to embrace the need for neighborhood change and housing change; and in particular, the potential for citizen-led precinct redevelopment. This is informed by a major survey of housing and locational preferences of residents in Melbourne and Sydney greyfield suburbs undertaken in September 2016.

2. Background: Need for a New Development Model for Urban Regeneration in Greyfield Suburbs

Brownfields are internationally recognized as a focus for urban redevelopment, and in Australia well-accepted development models have operated since the 1990s—almost exclusively at a precinct level [22,23]. They are typically found in well located areas of cities that have been associated with an earlier era of economic activity (e.g., old docklands, manufacturing and abandoned retailing sites); are owned by a single party, usually government or industry; of a scale which is closer to that provided by greenfield sites for development; contaminated to some degree, depending upon the nature of prior use; and typically unoccupied, obviating the need for community engagement at a level required of greyfields.

Greyfields are markedly different. They are much more extensive and lie predominantly between the central business district and inner city housing markets and the more recently developed greenfield suburbs. Their location provides superior access to employment, public transport and services than the latter zone; and they have demonstrably higher amenity and livability. Greyfields in the Australian context have been defined as those ageing but occupied tracts of low-density suburbia that are physically, technologically and environmentally failing and where value resides in the land (generally >70%; which we label as having “high redevelopment potential”) rather than the building—representing a vastly under-capitalized real estate asset [24].

There is a significant volume of greyfield residential property in Australian cities, estimated at over three quarter of a million dwellings for Melbourne and concentrated primarily in the middle ring suburbs [25]. Figure 3 reveals that at least one third of Melbourne’s local government areas have a majority of their residential properties where more than 70% of value is in the land. However, most of these municipalities are restrictively zoned in a manner that, to date, precludes more intensive forms of redevelopment, much less regeneration and reactivation. In a recent audit of infill redevelopment in Melbourne, Newton and Glackin [20,26] found that greenfield development still represented approximately 50% of net new dwelling construction; brownfields were contributing around 25%, predominantly via high-rise apartments; and the greyfields the remaining 25%. Here, almost half were “knock-down-rebuild” (KDR) where detached housing is demolished and replaced by one larger dwelling or between 2 to 4 townhouses—dwelling types that can be accommodated within existing planning and building regulations. Less than 15% is medium density. It represents the “missing middle” of Australia’s housing stock. Most greyfield housing redevelopment is also located outside of

the designated zones where state and local governments are seeking higher density forms of residential redevelopment: along major transport arterials, near railway stations and within a range of activity centers—the Residential Growth Zones (Figure 4).

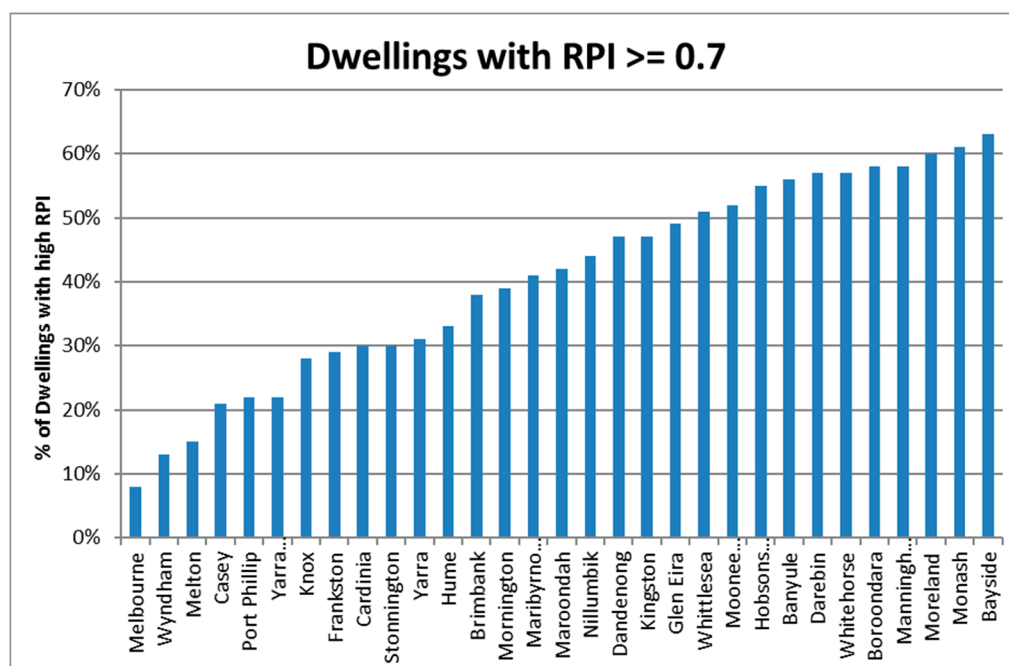


Figure 3. Percentage of greyfield residential properties in Melbourne municipalities with residential redevelopment potential above 0.7. Source: derived by the authors from data provided by Department of Environment Land Water and Planning.

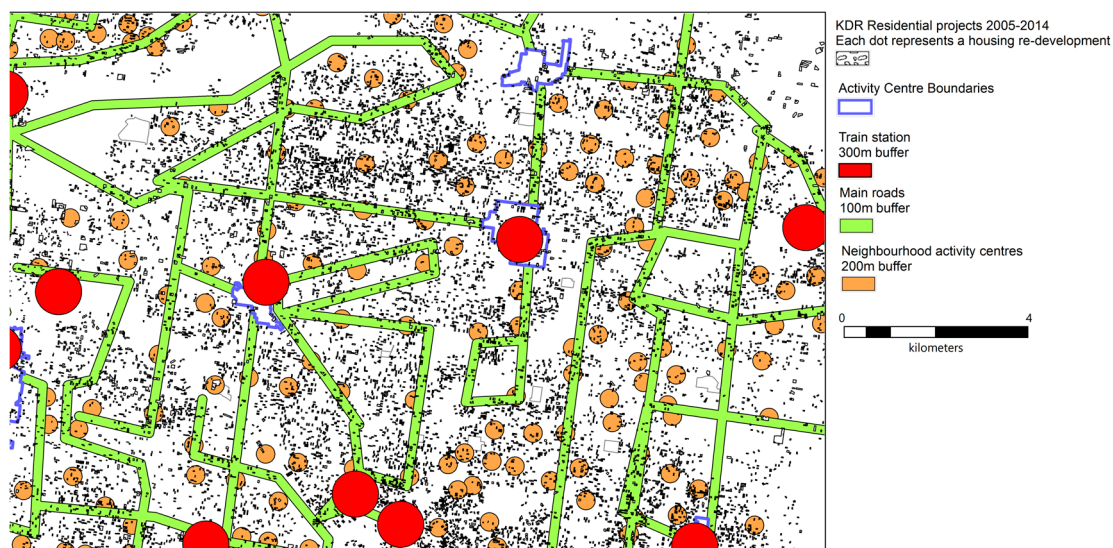


Figure 4. Location of urban infill housing projects in a section of Maroondah, a middle ring suburb in Melbourne (Note: main roads, train stations and neighborhood centres have been buffered to show immediate redevelopment effect of the respective planning zones).

Those key features of recent strategic metropolitan plans that focus primarily on intensification of development in designated activity centers and transport corridors are necessary but are demonstrably not sufficient to: halt sprawl, achieve infill targets and result in a regenerative development of

Australia's largest cities. Significant piecemeal KDR is occurring in the two major residential zones (Neighborhood Residential Zone and General Residential Zone) as sub-optimal development. It is not: providing an adequate yield of new housing, nor variety in dwelling types required of current and emerging socio-demographics; reducing traffic congestion in the middle suburbs (rather, is significantly adding to it, with considerable space continuing to be devoted to accommodating cars on site, even when redevelopment is close to public transport); maintaining green space, with almost wholesale loss of private gardens and established trees associated with KDR. Moreover, it is not regenerative. There is a limit to the extent to which redevelopment of individual buildings can be eco-positive for energy, water, transport and waste management.

There is now increasing recognition that new urban development models are needed to better align a city's built environment with its future population by better managing the land available for development; especially in established built up areas where pressure for re-development is strong [23,24] This is increasingly the case in fast-growing cities, where it is argued that poor land use planning and regulation is creating a scarcity of land in particular locations, inhibiting their capacity to accommodate growth in a manner that is environmentally sustainable, economically efficient and socially equitable [26].

Australia's cities have, for the most part, been built as precincts and according to some broader plan, as distinct from collections of buildings. They have also reflected the prevailing economy, technology, industry capacity, design thinking and lifestyles of the era. The era in which most of Australia's pre-war (2) built environment was laid down witnessed better co-ordination in city planning between land use and public transport, resulting in better connection between housing and jobs and services. The resultant urban forms (i.e., the "transit city") are artifacts of this earlier era of city building. For the last 40 years of the 20th century, however, Australian city planning was dominated by the "American model" of low-density, car-dependent urban development (i.e., the "auto city"). By the beginning of the 21st century, the landscape of Australia's two largest cities were characterized by these two contrasting urban fabrics. In the current era involving the re-building, re-designing and retrofitting of the greyfields—with an increasing set of exogenous and endogenous drivers to accommodate—precincts need to regain their significance as an organizing framework for urban planning and design. KDR represents a major challenge to more sustainable urban development. Creation of an alternative—precinct-scale—property development model for urban regeneration in the greyfields is required.

The model that has been proposed is greyfield precinct renewal (GPR), and is at the heart of a ten year Greening the Greyfields (GtG; <http://infrastructuremagazine.com.au/2017/03/20/greening-the-greyfields/>) project. Greyfield precinct renewal delivers multiple benefits compared to KDR: added housing yield and more varied housing typologies; zero carbon energy linked to distributed renewable energy and storage; integrated stormwater and wastewater systems; recycling food waste to compost; more walkable neighborhood with fewer cars; maintaining green space and enhancing community space by re-designing and re-activating the streetscape. However, it faces multiple challenges [27].

Greyfield Precinct Renewal (GPR) has been conceived as a new property development and process model designed to enable (a citizen led) aggregation of individual residential properties into a consolidated precinct capable of being redeveloped under a new class of zoning (GPR Zone or development overlay) that enables regenerative medium-density precinct redevelopment. GtG was initiated in 2009 as an urban transitions project—an area where there is a growing focus in planning studies [28–32] that reflect the magnitude of challenges now facing cities and the transformative responses required to achieve sustainable urban development. It combines the socio-technical urban transition theories of Grin et al [33] and Newton [1,13] with the transition management methods and sets of participatory processes articulated by Loorbach [34] by which a model for change involving niche innovation is identified, examined and implemented. In the GtG project, several domains where specific innovation related to GPR was required were identified from an initial twelve month engagement with over seventy thought leaders and front-runners in a series of workshops that

created the over-arching programmatic framework (see [1,26,35]). It was centered on developing implementable tools, instruments and processes linked to three fundamental questions:

- *Where* to encourage GPR. This necessitated development of multi-criteria spatial analytic tools (ENVISION) that could be used to locate contiguous residential land parcels with high redevelopment potential. These have been developed and applied at metropolitan and municipal levels in Australia and New Zealand [36].
- *What* to design for the precinct. Focus here is on urban designs for medium-density redevelopment that provide higher yield and are regenerative for energy, water, waste, mobility and green space [37,38]. Aligned to this, it was also critical to ensure that precinct designs could be assessed against performance benchmarks (beyond business as usual—BAU) by software developed specifically for this purpose [39].
- *How* to achieve acceptance of GPR by the four principal stakeholder groups (state and local government, property developers, community) in a liberal democratic society with 3rd party planning provisions and an increasingly volatile electorate when exposed to planning proposals for local change (NIMBYism). Here the key transition management processes involved in establishing a shadow process, engaging front-runners, networking and trialing the critical niche innovations with the key stakeholder groups, were all important for demonstrating the workability and efficacy of a GPR development in at least one municipal context—as proof of concept. This involved engagement with the property development industry in relation to economic feasibility models; community engagement in relation to future plans for neighborhood redevelopment; and state and local government in relation to changes required in planning regulations in order to enable medium-density precinct-scale neighborhood redevelopment to occur [40,41].

3. Transformative Capacity of Stakeholder Groups

According to Wolfram [42] “Urban sustainability transitions require particular capacities that enable stakeholders to purposefully initiate and perform radical systemic change towards sustainability and resilience. The concept of transformative capacity offers a pertinent framework here”. Wolfram [43] has identified that a consistent framework for analyzing capacity for transformative change in cities in relation to sustainable urban development is not yet available, due to the variety of stakeholder groups involved and lack of indicators of capacity for each group related to the change in question. Urban (greyfield precinct) regeneration clearly requires a level of transformative capacity to be present in the four stakeholder groups identified. Here transformative capacity refers to an ability to anticipate and plan for change in the context of slow burn pressures such as population growth and climate change as well as to disturbances associated with extreme events, where adaptive capacity tends to be the more critical focus [44]. In the long run, slow burn urban pressures can be more disruptive if transformative capacity is lacking within the city system. According to Griffith [45] transformative capacity can also be seen to embrace both forced transformations, such as those imposed by governments as a result of planning decisions such as re-zoning; and active transformations that are intentionally instigated from “within” stakeholder groups in response to perceived threats or change to their domains (e.g., resident reaction to changing “character” of neighborhood). The topic examined in this paper required a meshing of transition theory and planning theory, especially in relation to attempts made by the latter to integrate “top-down” with “bottom-up” planning paradigms [46,47].

3.1. State Government Capacity

In Australia, state governments have the responsibility for urban land use planning and development devolved from the federal government under the Constitution. A review of current metropolitan strategic plans for all the major cities reveals uniformity in their aspirational goals linked to the Council of Australian Government’s (circa 2009) objectives for Australian city performance:

competitive, productive, livable, sustainable, resilient and inclusive; as well as more recent additions that include creative, smart, safe etc. There are also a set of spatial goals, including compact city and 30 min city. There is significant alignment to the New Urban Agenda Goals articulated at Habitat 3 (<https://habitat3.org/the-new-urban-agenda>). State governments have struggled, however, to realize these goals via their recent sequence of metropolitan strategic plans and implementation mechanisms. There are a number of reasons for this, prime among them being a lack of capacity to undertake urban planning that is vertically and horizontally integrated. Horizontal integration is hampered by the existence of multiple ministries, each of which have roles and responsibilities in planning parts of an urban system: industry, housing, transport, energy, water, waste, education, health etc. Vertical integration involves ensuring important connections exist between state, federal and local governments, where jurisdictional and political differences frequently interfere with a “joined up” approach to city planning and development. Until recently, the Australian government had absented itself from the “cities” arena, despite the fact that over 80% of both the nation’s population and GDP are concentrated there [48].

Another major reason why urban innovation and change is slow and disjointed is due to the strength of regimes that are associated with the property development industry that lobby state governments on planning instruments (e.g., zoning, building performance regulations etc.) and projects (much capital city development is developer-led and therefore not necessarily delivering optimal city-wide or community benefit). These regime pressures are unlikely to diminish. However, there are signs from recent state government decisions associated with the establishment of the Greater Sydney Commission (<http://www.greater.sydney/>) of the need to be more radical and transformative in city planning and metropolitan governance capacity.

3.2. Local Government Capacity

In a comprehensive review of Australian local government planning agencies by the Productivity Commission [49], the increasing complexity of the urban development process was noted along with the often conflicting needs of different stakeholders—the result being that the costs of reaching community consensus are high in liberal democratic societies, especially those that also have third party appeal planning provisions. In an urban planning system that remains strongly top-down, local government provides the principal interface to the local community and property developers as a result of their role in the development approval process. They are under-resourced for this. It is not unexpected therefore, that community attitudes to local government’s effectiveness in city planning are negative. Extensive surveys conducted by the Productivity Commission ([49], p. xxxviii) revealed only 15% of Sydney residents considered their local governments to be “effective in planning”; 14% in Melbourne; 17% in Brisbane and 21% in Perth.

As the third tier of government, municipalities have a limited source of revenue linked to levying rates on property—overseen (and capped) by state government. This translates into a comparatively weak capacity to respond to the multiple challenges associated with urban redevelopment in established suburbs. Prime among these is a general lack of ability as well as willingness for municipalities within the metropolitan region to vertically align with state government’s strategic planning policy. Council officers have difficulties with Development Approval (DA) submissions that attempt to push the envelope, frequently abdicating their responsibility and leaving it to the third party arbiter (in Melbourne the Victorian Civil and Administrative Tribunal) to adjudicate [50]. New GPR projects are exerting pressure on municipal planning officers in relation to their ability to develop and align their local development strategies, assess new medium-density precinct proposals in relation to their performance on key sustainability dimensions (viz. determining the community cost-benefit) and engage with property owners and developers in this process. Given the general reluctance of residents to embrace neighborhood change, elected municipal councilors tend to align with their ratepayer voters in resisting change to “neighborhood character” and “overdevelopment”. Often this is reflected in municipal government’s gaming of the state government’s residential zoning schemes to ensure

housing is “locked up” in minimal change zones [27]; effectively indicating that more intensive infill housing should happen “somewhere else” (typical NIMBY syndrome).

3.3. Property Development Industry Capacity

As is common with many sectors of Australian industry, property development tends to be risk averse and has low investment in research and innovation [51]. Even more so in the housing sector, where its two major industry associations, the Master Builders Association and the Housing Industry Association, represent the public face of an industry that opposes most government attempts to introduce new standards and regulations designed to lift minimum performance of buildings much less drive for world’s best practice. It required a federally funded Building Better Cities Program in the early 1990s to bring government (at state and local levels) and property developers together to create a model for higher density brownfield redevelopment that is now in widespread use [22,52]. The current challenge for urban infill centers on the need for a model process to guide precinct-scale medium-density redevelopment in the greyfield suburbs where there is a major undersupply of this type of dwelling—now referred to as “the missing middle” [20,23]. Development guidelines for medium-density precincts are now being released for comment in both Sydney [53] and Melbourne [54].

Engagement with property developers at the outset of the GtG Project clearly identified the barriers to GPR, principal among them being the absence of urban design guidelines and related statutory planning instruments for medium-density precinct redevelopment that would establish an “as-of-right” building envelope (the development model), areas appropriately zoned for such redevelopment (thereby minimizing resident appeals) and the time (cost) involved in consolidating land parcels [27]. The pattern of medium-density approvals in Australia’s four largest cities (see Figure 5) reflects the barriers that this class of development has faced to date in achieving greater take-up: slow recognition of underlying demand by industry [55,56]; poor urban design responses [57] and restrictive government policies. KDR on individual greyfield sites, however, has been quickly embraced by the property development industry since it represented the application of a well-established greenfield model of housing design and delivery appropriate to existing planning and building regulations in the low-density greyfield suburbs where infill was being encouraged.

There is a deeper problem, however, related to the capacity of the building industry to respond to the urban infill medium-density challenge. A leader of the Australian building and construction industry has summarized it thus:

“Australia’s housing industry has some serious shortcomings that can no longer be avoided. This goes beyond the way land is subdivided. The capabilities needed to design and build small scaled medium density housing projects of three to 10 dwellings up to three storeys atop below grade parking have yet to be developed. If medium density dwellings of the type described here are to make up a third of the housing landscape, a new marketing platform and delivery model will be required. These will not be offered from the traditional builder display village. New design, procurement and construction skills will be necessary. Only financially viable builders who display a new level of professionalism will be trusted to take on these projects. The industry must shift from its current level of denial of these realities. If governments are seriously minded to harvest the potential of grey-field sites and the urban middle, they will not only need to bring the community along in support of these more modest densification initiatives, they will need to be proactive in making sure the housing industry has the capabilities to deliver them. This is a challenge for the housing industry. It is not a market that general contractors understand or have an aptitude for. This is an opportunity for the first movers in this space to realise the potential of adapting their old project housing delivery model into a modern version of ‘build to order’ multi-unit”. [58]

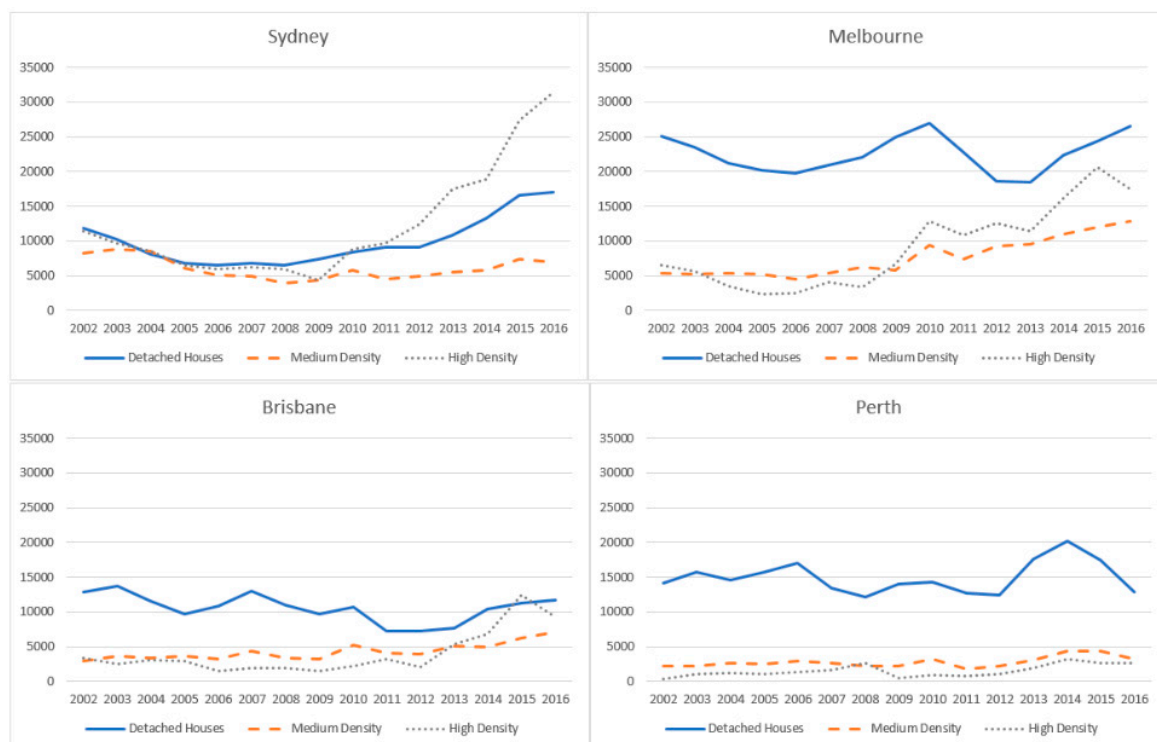


Figure 5. Dwelling Approvals 2002–2016 for Australia’s major capital cities. Source: Building Approvals, Australian Bureau of Statistics Cat. No. 8731.0. Derived from historical SRD tables.

3.4. Community Resident Capacity for Change

For over a century, the urban fabric of Australian cities has been able to transition from that of a walking city to a transit city and subsequently to an auto city as a result of the transport technologies and land use configurations they have been able to support within the average 30 min daily travel time commute [59,60]. Residential densities declined, as lower priced land in greenfield developments offered households access to house and land packages with private front and back yards in a garden city environment. This constituted the Australian dream for the traditional nuclear family of the 20th century. A review of housing preference studies that date to the early 1990s confirms this, with detached housing consistently nominated as the favored dwelling type by approximately 90% of capital city residents in all surveys [61].

Late 20th century forces were challenging the sustainability of continued urban sprawl as a means of accommodating population growth. Significant shifts in demographics, lifestyles, and urban economics were signaling a need to reconsider how cities were being planned, with increasing calls for urban consolidation, more compact cities and greater variety in housing provision [62].

Resident attitudes to neighborhood change and densification were antithetical, however [63], leading to the formation of “Save our Suburbs” movements involving local communities banding together to resist what they considered to be “overdevelopment” and urban designs that changed the “neighborhood character”. Transitioning from suburban to urban fabrics via more intensive forms of urban infill represented a challenge to the residents of established, more accessible suburbs to share their higher amenity space. During this period, housing in Australia’s largest cities was also becoming increasingly unaffordable, and urban research was indicating that fewer than half the residents surveyed in Sydney and Melbourne said they would prefer to live in a detached house [55]. Yet these stated preferences for medium density were not being reflected in supply (again see Figure 5). It is clear that understanding resident attitudes towards neighborhood change and medium-density

housing market options constitutes an important indicator of community capacity and willingness to be positively involved in an “active transformation” of the suburban fabric.

4. Contemporary Community Attitudes to Neighborhood Change, “Compact Living”, and Medium-Density Housing

This section examines the responses to a September 2016 online survey of 2000 residents living in the inner and middle (greyfield) suburbs of Sydney and Melbourne to a range of housing issues (a full description of survey, questionnaire and respondent metrics are in [64]). The questionnaire was e-mailed to a sample of households supplied by Qualtrics, who screened the participants by age (twenty or older) and postcode (residents of inner and middle ring suburbs) to achieve a representative sample for the purposes of this study. In terms of age, plans to move, duration of residence, home ownership, household size and household composition profiles were similar. A higher proportion of Melbourne respondents lived in detached houses compared to Sydney (74% versus 60%) and household incomes were higher in Sydney compared to Melbourne—both reflective of differences established over recent census periods. Focus of the survey was on understanding trends in community attitudes towards medium-density living and neighborhood change (intensification).

In response to a question posed to those households who indicated that they were likely to move residence within the next fifteen years: “What type of dwelling would you want to live in?” Table 2 reveals that close to 60% of residents in both Sydney and Melbourne favor a detached house and yard. In the space of thirty years (approximately one generation) there has been a significant attitude shift—towards embracing higher density forms of living.

Table 2. Preferred type of future dwelling for households indicating a plan to move within next fifteen years.

			Sydney	Melbourne	Total
What type of dwelling would you want to live in?	Detached, stand-alone house with private back and front yard	Count %	214 59.8%	213 58.8%	427 59.3%
	Semi-detached single or two-story (town house, duplex, villa unit with small amount of private space at ground level at either front or rear)	Count %	58 16.2%	75 20.7%	133 18.5%
	An apartment, flat, or unit	Count %	71 19.8%	62 17.1%	133 18.5%
	Retirement village/hostel	Count %	15 4.2%	12 3.3%	27 3.8%
	Total	Count %	358 100.0%	362 100.0%	720 100.0%

For those households indicating a plan to move within the next fifteen years, there were a common set of differentiating social and demographic factors for both Sydney and Melbourne residents in their preferences for different typologies of housing (see Table 3). Detached housing was favored by those aged between twenty and sixty, those owning a home with a mortgage and with other residential assets, with at least two or more members of the household in the workforce, in larger households and with children under the age of eighteen, with an expressed need for a larger dwelling and preferring a suburban location.

While there are overlapping demographics across the housing typologies, those with a stronger preference for medium density tend to be older, in smaller households, living alone or with adult children, favoring a smaller dwelling and looking to relocate within the same locality they currently live in. Those looking to move into an apartment also reveal a distinctive demographic: younger (under 30) as well as older (over 60), more likely to be currently renting, in a small single person household or living with other adults; and with a preference for inner city living and close to a park that can be used regularly.

Table 3. Associations with preferred dwelling type for those households who plan to move within the next fifteen years.

		Preferred Dwelling Type for Those Planning to Move N (Row %)			
	Chi-Squared Test of Association	Detached N = 427	Semi-Detached N = 133	Apartment N = 133	Total N = 693
City	$\chi^2(2) = 2.71, p = 0.257$				
	Sydney	214(62)	58(17)	71(21)	343
	Melbourne	213(61)	75(21)	62(18)	350
Age	$\chi^2(10) = 32.52, p < 0.001$				
	20–29	100(61)	27(16)	37(23)	164
	30–39	105(70)	23(15)	22(15)	150
	40–49	86(67)	17(13)	25(20)	128
	50–59	82(64)	25(20)	21(16)	128
	60–69	48(46)	32(31)	24(23)	104
	70+	6(32)	9(47)	4(21)	19
Weekly HH Income	$\chi^2(2) = 0.18, p = 0.913$				
	Below \$2000 pw	279(61)	89(19.5)	89(19.5)	457
	At least \$2000 pw	148(63)	44(19)	44(19)	236
Home Ownership	$\chi^2(4) = 10.49, p = 0.033$				
	Own outright	114(58)	44(22)	39(20)	197
	Own with mortgage	152(68)	43(19)	30(13)	225
	Rent	161(59)	46(17)	64(24)	271
Own Other Property	$\chi^2(2) = 6.76, p = 0.034$				
	Yes	75(71)	21(20)	9(9)	105
	No	191(60)	66(21)	60(19)	317
HH members in workforce	$\chi^2(8) = 20.07, p = 0.010$				
	0	40(56)	14(20)	17(24)	71
	1	122(53)	47(21)	60(26)	229
	2	187(69)	51(19)	33(12)	271
	3	52(62)	15(18)	17(20)	84
	4+	26(68)	6(16)	6(16)	38
Household Size	$\chi^2(8) = 34.89, p < 0.001$				
	1	41(40)	27(26)	34(33)	102
	2	141(59)	49(21)	47(20)	237
	3	91(65)	29(21)	19(14)	139
	4	101(72)	16(11)	24(17)	141
	5 plus	53(72)	12(16)	9(12)	74
Household Composition	$\chi^2(2), * p < 0.05, ** p < 0.01, *** p < 0.001$				
	Live alone ***	40(40)	25(25)	34(34)	99
	Live with a spouse or partner ***	252(68)	70(19)	48(13)	370
	Live with children <18 years ***	147(78)	20(11)	22(12)	189
	Live with children >18 years **	61(58)	31(29)	14(13)	106
	Live with related adults *	72(63)	12(10)	31(27)	119
	Live with unrelated adults	32(65)	6(12)	11(22)	49
Reasons for Moving Plan(#)	$\chi^2(2), *** p < 0.001$				
	Need smaller dwelling/property ***	59(38)	54(35)	41(27)	154
	Need larger dwelling/property ***	118(80)	20(14)	10(7)	148
	Need to release money	19(46)	13(32)	9(22)	41
	Need new location for work/family	92(60)	37(24)	25(16)	154
	Need newer/better quality dwelling **	126(70)	34(19)	21(12)	181
	Other *	100(61)	21(13)	42(26)	163
Preferred city location	$\chi^2(6) = 47.84, p < 0.001$				
	Same suburb/municipality	124(67)	33(18)	29(16)	186
	Same side of city	107(56)	50(26)	34(18)	191
	Closer to CBD	32(36)	17(19)	40(45)	89
	Further out in suburbs	42(75)	7(13)	7(13)	56
Location	$\chi^2(2) = 5.93, p = 0.052$				
	Within 15 km of CBD	143(57)	48(19)	60(24)	251
	More than 15 km from CBD	284(64)	85(19)	73(17)	442

Living arrangements extend beyond the dwelling, however, and include the neighborhood and wider (sub)urban context in which people live. Three distinctive living arrangements were explored

(listed in Table 4). Responses revealed that when locational context was combined with housing type it resulted in a significant boost in preference for medium-density housing when situated in established suburbs well served by public transport and accessible to jobs and services: 46%—equivalent to the level of preference for a separate dwelling and garden and dependent on access to a private car.

Table 4. Preference for urban living arrangements.

			Sydney	Melbourne	Total
If you had to choose between the three living arrangements specified, which would you prefer?	Separate dwelling with a garden in a suburb where there is poor public transport	Count	432	452	884
		%	45.2%	46.1%	45.7%
	Medium-density dwelling with no garden, but close to public transport	Count	435	448	883
		%	45.5%	45.7%	45.6%
	High rise apartment in CBD or surrounding inner city neighborhood	Count	89	80	169
		%	9.3%	8.2%	8.7%
Total		Count	956	980	1936
		%	100.0%	100.0%	100.0%

The question is whether these shifts in dwelling preference have been reflected in resident attitudes towards change in the built environments in the neighborhoods in which they live. In examining this we drew on the trans-theoretical model of behavior change [65] that proposes people move through a series of stages in relation to modification of attitudes towards some imposed or desired change. In clinical applications of this model there is opportunity for tracking longitudinal change in the attitudes and actions of individuals. In this study, the model is being used in a cross-sectional manner in order to gauge the spectrum of current resident attitudes towards neighborhood change in their suburb and city. Table 5 sets out the four major stages in attitude-behavior change, together with the survey questions designed to characterize households at each stage. The final “action” stage is key to the scaling up of GPR beyond KDR: where neighboring property owners agree to sell their properties as a consolidated parcel (precinct). They capture the value uplift that this generates (typically 50–100% more return than selling separately) and the developer of the precinct can employ more innovative design options to increase housing yield, return on investment and generate additional environmental and social benefits aligned to state and local government planning priorities.

Table 5. Identifying capacity for behavior change in relation to mode of urban living: a trans-theoretical stage model.

Stage	Precontemplation Stage	Contemplation Stage	Preparation Stage	Action Stage
Indicative Resident Position/State According to the Model	No Recognition of Need for or Interest in Change	Thinking about Changing	Planning for Change	Making the Change
Survey question pertaining to resident's position on neighborhood change and future housing and locational preferences	Awareness: In the inner/middle suburbs of {City} there are a lot of residential properties that are being sold and then demolished and rebuilt as townhouses or apartments. Have you noticed much of this in the suburb you are currently living in? Yes/no	Attitude: How do you feel about the change that this increase in level of housing development/density is having on the neighborhood around you?	Options: the press is reporting that where property owners in two or three adjoining properties get together and sell as a consolidated land parcel they can often get double the money they would have received if they had sold separately. Is this something you think you would consider doing in the property you are currently living in? Yes/no	Action: For those opting to sell as a consortium of neighboring property owners: Would you prefer to take the money and move somewhere else OR would you prefer to move into one of the new units developed on your land?

Source: Trans-theoretical stage model adapted from [65].

Seventy one percent of the total sample of respondents (N = 1983) were “aware of neighborhood change in their locality”, a percentage that was identical for the property owners (N = 1402) who were no more or no less sensitized to local urban change than renters. For the remainder of the analyses,

focus centers on the property owner group since they constitute those residents capable of driving precinct-scale citizen-initiated redevelopment.

The next stage relates to the “attitude” that the resident property owners that are aware of change actually have to that change. Table 6 reveals a high level of consistency in response for both Sydney and Melbourne residents. Less than 10% of residents in both cities think it is a good thing, but almost 40% understand that it has to happen and just over 10% are neutral. Preference for less or no change sits around 45%. This suggests that there is a growing capacity to accept change, but at present it is grudging and not strongly endorsed.

Table 6. Attitude to neighborhood change.

			Sydney	Melbourne	Total
How do you feel about the change that this increase in level of housing development/density is having on the neighborhood around you?	I think it is a good thing	Count %	46 6.8%	47 6.4%	93 6.6%
	I understand that it has to happen	Count %	245 36.4%	281 38.5%	526 37.5%
	Neutral	Count %	72 10.7%	83 11.4%	155 11.1%
	I would prefer less or no change in density of housing	Count %	310 46.1%	318 43.6%	628 44.8%
Total		Count %	673 100.0%	729 100.0%	1402 100.0%

There are interesting demographic differences between those households who think change is a good thing or understand it has to happen and those that are neutral or prefer no change (Table 7). The former group tend to be younger, are recent movers into the locality, are more likely to be renters, are in predominantly adult only households, are more likely to have plans to move in the next few years and prefer inner city locations. This suggests that the narrative for change and the benefits that well designed regenerative development can bring to a suburb and its residents needs to be better communicated to the stereotypical property-owning suburban households who prefer less development in their neighborhoods.

Table 7. Associations with attitude to neighborhood change for those households who are aware of this change.

Attitude to Neighborhood Change N (Row %)						
		A Good Thing	Understand It Has to Happen	Neutral	Prefer Less/ No Change	
	Chi-Squared Test of Association	N = 93	N = 526	N = 155	N = 628	Total N = 1402
City	$\chi^2(3) = 1.12, p = 0.772$					
	Sydney	46(7)	245(36)	72(11)	310(46)	673
	Melbourne	47(6)	281(39)	83(11)	318(44)	729
Age	$\chi^2(15) = 86.5, p < 0.001$					
	20–29	28(14)	82(42)	30(15)	55(28)	195
	30–39	20(10)	95(47)	23(11)	66(32)	204
	40–49	18(6)	84(3)	44(16)	133(48)	279
	50–59	9(3)	112(35)	30(9)	168(53)	319
	60–69	15(5)	109(38)	16(6)	147(51)	287
	70+	3(3)	44(37)	12(10)	59(50)	118
Duration of Residence	$\chi^2(3) = 39.29, p < 0.001$					
	At most 5 years	44(9)	217(43)	74(14)	174(34)	509
	Greater than 5 years	49(5)	309(35)	81(9)	454(51)	893

Table 7. Cont.

		Attitude to Neighborhood Change N (Row %)				
	Chi-Squared Test of Association	A Good Thing N = 93	Understand It Has to Happen N = 526	Neutral N = 155	Prefer Less/ No Change N = 628	Total N = 1402
Weekly HH Income	$\chi^2(3) = 11.01, p = 0.012$					
	Below \$2000 pw	68(7)	358(35)	121(12)	476(46)	1023
	At least \$2000 pw	25(7)	168(44)	34(9)	152(40)	379
Home Ownership	$\chi^2(6) = 27.40, p < 0.001$					
	Own outright	29(5)	209(36)	48(8)	299(51)	585
	Own with mortgage	30(7)	150(37)	48(12)	182(44)	410
	Rent	34(8)	167(41)	59(15)	147(36)	407
Household Composition	$\chi^2(3), * p < 0.05, ** p < 0.01, *** p < 0.001$					
	Live alone	21(8)	89(35)	30(12)	116(45)	256
	Live with a spouse or partner	39(5)	274(37)	82(11)	347(47)	742
	Live with children <18 years	22(9)	127(39)	39(12)	135(42)	323
	Live with children >18 years	10(4)	86(36)	25(10)	119(50)	240
	Live with related adults	10(5)	82(42)	24(12)	78(40)	194
	Live with unrelated adults*	10(14)	32(43)	8(11)	24(32)	74
Plans to Move	$\chi^2(12) = 46.20, p < 0.001$					
	Within 12 months	25(11)	95(42)	23(10)	85(37)	228
	Within 5 years	17(7)	117(51)	20(9)	76(33)	230
	Within 15 years	8(11)	28(38)	3(4)	34(47)	73
	Unsure	22(5)	134(34)	54(14)	189(47)	399
	No plans to move	21(4)	152(32)	55(12)	244(52)	472
Preferred city location	$\chi^2(9) = 19.2, p = 0.024$					
	Same suburb/municipality	14(9)	74(50)	13(9)	47(32)	148
	Same side of city	13(9)	61(43)	16(11)	52(37)	142
	Closer to CBD	13(21)	35(56)	2(3)	13(21)	63
	Further out in suburbs	1(2)	20(48)	3(7)	18(43)	42
Interest in lot neighborhood consolidation	$\chi^2(6) = 43.71, p < 0.001$					
	No	21(4)	161(31)	48(9)	288(56)	518
	Yes	25(11)	98(44)	12(5)	87(39)	222
Note: ## Only for home owners	Do not Know	13(5)	100(39)	36(14)	106(42)	255

The next “planning for change” stage probes the extent to which property owners contemplating a future move are aware of or open to options of selling as a consortium of neighbors—becoming key actors in citizen-led urban redevelopment. While not commonplace, examples of this are being reported together with the value uplift achieved (Figure 6). There is a capacity gap: a deficit of trusted and qualified brokers capable of engaging greyfield residents with the appropriate financial and legal instruments necessary to progress “kitchen table” discussions through to a positive outcome. This is not currently part of the business model in real estate agencies, local government, or among property developers. The survey revealed that one quarter of Sydney respondents were open to consolidating property for sale with neighbors—even higher (39%) for property they owned as an investment (Table 8).

Finally, for those households indicating preparedness to sell their property as part of a consolidated precinct, 84% of those in Sydney would take the money and move somewhere else compared to 74% in Melbourne. This speaks to two options for greyfield precinct redevelopment: the traditional model involving a property developer only (for those who sell and move out), and one involving a form of “private-public/community” partnership where some or all of the residents form some type of joint venture for the co-development.



Figure 6. Citizen-led lot consolidation in the suburban greyfields.

Table 8. Interest in option of selling property as a consolidated redevelopment precinct in collaboration with neighbours.

Is Selling Property Jointly with Neighbours Something You would Consider?	Property Currently Owned & Occupied			Investment Property		
	Sydney	Melbourne	Total	Sydney	Melbourne	Total
Yes %	25.4	16.9	21.1	39.1	27.4	33.9
No %	48.1	57.1	52.7	39.8	53.1	45.7
Do not know %	26.5	26.0	26.2	21.1	19.5	20.4
Total %	100.0	100.0	100.0	100.0	100.0	100.0
Total N	688	712	1400	161	128	289

5. Conclusions

Achieving sustainable urban development will be a major challenge for cities in high-income liberal democratic societies. The acknowledged livability of Australia's cities has been achieved at the expense of internationally high levels of resource consumption and carbon emissions. Planning more compact cities via regenerative retrofit provides a pathway for shrinking both urban and ecological footprints. Transformative change is required for transitioning low-density car-based cities from suburban to urban forms and fabrics however. One that needs to depart from over-reliance on high-rise and transit oriented development along transport corridors and around rail stations [19,20]. Housing infill involving medium density needs to play a major role here, and the challenging targets established for most of Australia's largest cities reflects this. In the established suburbs where infill is targeted, KDR involving small lot subdivision is the current sub-optimal response. Greyfield precinct renewal that is focused on medium-density housing has emerged as a new planning model designed to increase housing supply and deliver a more sustainable setting for urban living. There are significant barriers in relation to the introduction of this urban innovation among the existing set of policies established within current metro planning strategies.

Employing conceptual frameworks from transition theory and transition management, the Greening the Greyfields project has been successful in demonstrating "proof of concept" for GPR to the state and local government planning agencies which will be responsible for implementing new zoning

systems and medium development guidelines. Greyfield redevelopment having been incorporated as a new Policy Directive in PlanMelbourne 2017–2050 [41] represents the first major step by a state government in Australia in enabling the emergence of a new model for urban infill development. How to accelerate and scale up GPR will be the next challenge, and it is here that transformative capacity needs to become a stronger focus in urban transition studies.

This paper has explored transformative capacity as it relates to the four key stakeholder groups central to the GPR transition: state and local governments, property developers and community residents. Each group exhibits capacity constraints. For state governments, leadership has been lacking when it comes to developing a narrative that can be understood by an entire metropolitan community regarding the need for change and then successfully communicating it. For local governments, better communication and engagement is required with state government to ensure vertical alignment between metropolitan strategies, municipal plans and local development approval processes. Top-down and bottom-up planning remains to be successfully “joined up”. As the critical interface to community, local government is significantly under-resourced to cope with what will be perceived as radical change.

For urban residents in the largest cities in Australia there appears to be a shift occurring in generational attitudes towards neighborhood change and medium-density living that could help drive urban intensification. Baby boomer households as well as those born before the end of the second world war are confronted with the looming pressures to vacate their under-occupied, ageing, detached housing in order to downsize into newer, more manageable and livable properties close to where they have been living. Meanwhile, the youngest cohorts (Gen Y/Millennials) provide strongest support for neighborhood change capable of delivering the supply of more varied types of dwelling at more affordable price points in more preferred accessible central locations. Ultimately, it will be the capacity of these ordinary city dwellers and property owners to recognize that there is a wave of urban change approaching that they can ride to their advantage—if they are engaged and there is a validated greyfield precinct regeneration business model that can be readily deployed. It would appear that a groundswell is beginning to emerge.

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