# Alternative futures for Melbourne's peri-urban regions


## Abstract:

Peripheral-urban areas are under unprecedented threat from development globally. Australia has a weak tradition of regional planning with two thirds of the Australian population concentrated in five capital cities and 72 per cent of growth to 2056 is projected to occur there. Only 15 per cent of the Australian population lives in medium sized cities with population from 100,000 to 1 million. Yet regional communities are growing rapidly in Australia. This growth tends to take the form of detached housing on expanding township fringes replicating the problems of capital city outer urban growth. The protection of peri-urban areas offers cities a range of adaptive benefits in a rapidly changing world, helping maintain urban resilience. Using a case study of Melbourne's peri-urban region, this paper explores the capacity for regional growth under different spatial scenarios.. The scenarios include 'business as usual' growth in rural areas and towns, and alternative scenarios involving extensive relocation of potential rural dwelling growth to towns together with six urban intensification options for regional centres. The use of a number of regulatory planning techniques to limit rural dwelling growth is modelled. Urban intensification options all prevent further outward growth. The paper demonstrates the potential of spatial planning techniques to provide large regional land supplies as an alternative to the metropolitan primacy of Australia's cities, and to achieve economic, social and environmental outcomes. Application of rural protection scenarios substantially reduces the supply of small rural lots and provides large land supplies in fringe urban township zones. Application of infill scenarios for Bendigo provides three times the land required by 2041.

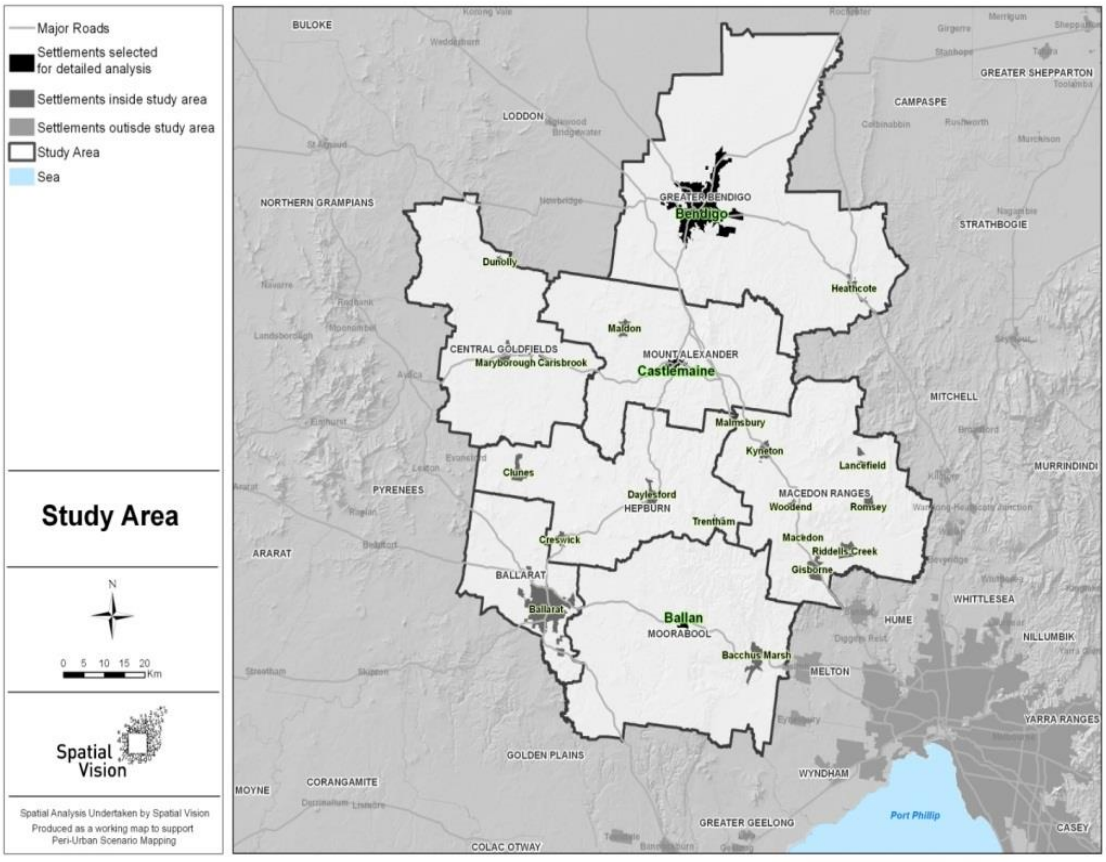

## Introduction

For decades, successive Commonwealth governments have declined to develop a national urban policy leaving a policy vacuum filled by fragmented sectoral policy such as financial and road construction initiatives. Australian urban policy is fragmented and concentrated on capital city growth. Most Australian states recently have developed new metropolitan strategies which maintain this capital city focus. There is no extensive regional planning tradition in Australia despite some notable examples of successful regional planning. Australia remains one of the world's most urbanised countries, with two thirds of the population living in the five largest capital cities and three quarters in 17 urban centres over 100,000 people (Commonwealth of Australia, 2013). As Australia moves from a population of 23 million people in 2013 towards one of up to 42-46 million in 2056, this urban concentration is expected to increase, with 72 per cent of growth expected in capital cities (Commonwealth of Australia, 2011). Currently, only 15 per cent of the Australian population live in medium sized cities with populations from 100,000 to one million (Commonwealth of Australia, 2013).

This paper examines the potential of regional planning to prevent the regional equivalent of metropolitan outer urban sprawl and small lot peri-urban development, and to intensify residential development in regional centres. The paper expressly links the maintenance of rural landscapes with the intensification of regional settlements, and provides a model for networked city development by transferring a proportion of metropolitan growth to intensified regional centres. It suggests a supply led model of growth, proposing that land supply and development type influence demand, specifically that the existence of small rural lots will lead to their use for dwellings but that alternative housing types and lots within townships will influence demand in different ways. This implies a strong regulatory role for government in controlling rural land subdivision and directing regional township development.

A case study approach is followed. The case study area includes the municipalities of Moorabool, Macedon Ranges, Ballarat, Hepburn, Mount Alexander, Central Goldfields and Greater Bendigo, with a total population of 308,556 people (ABS 2013). The area studied is bounded to the south by Melbourne's urban-rural edge, to the west by the transport corridor to the city of Ballarat and the north by the transport corridor to the city of Bendigo. Ballarat with a population of 95,000**,** and Bendigo of 86,000 people are the two largest regional settlements (ABS 2013). Alternative development models are also examined for Bendigo. Melbourne is the capital city of the State of Victoria with a 2014 population of 4.35 million but is predicted to reach almost 8 million in 2056 in a State with a population of almost 9 million. Regional development is being concentrated on four such corridors extending from Melbourne to Bendigo, Ballarat, Geelong and the Latrobe Valley. However, the main model of township development is the expansion of low density detached housing, inadequately serviced on township fringes. The most recent Victorian government metropolitan plan, *Plan Melbourne*, sought to expand metropolitan planning to include regional planning by redirecting some metropolitan growth into regional towns, proposed to designate regional towns for growth, encourage urban infill and more diverse housing in regional townships and protect high quality agricultural land for food production. This paper aims to demonstrate how such policies can be achieved.

**Figure 1: Case study region**




## Peri-urban regions

A peri-urban area can be defined in relation to a nearby metropolitan area on its inner boundary (Burnley and Murphy, 1995), a rural area on its outer boundary (Bunce and Walker, 1992), or as a distinct settlement pattern as the land in between, neither urban nor rural but an interface, a

transitional zone (Audirac, 1999, Nelson and Dueker, 1990). Melbourne's peri-urban region consists of a non-urban belt of land round the city and associated townships extending from the edge of the metropolitan urban growth boundary to about 160 kilometres from the Melbourne central business district. The Melbourne peri-urban region can be defined structurally by its physical structure and form, or functionally, or by a combination of spatial and functional factors (Buxton et al, 2006). Structural characteristics include lower population and building densities compared to urban regions, the heterogeneous nature of land uses and rapid rates of change; while a functional analysis of social and economic processes is both interactionist and system based. The resilience of peri-urban systems therefore is determined by both the system components and how they interact, that is by multiple physical and social states. Thus, the relationships between elements determine the system's function and its capacity to respond to change.

Regions have undergone various stages of conceptualisation. At the most general level, they are adjoining areas or places which share common characteristics (Beer et al, 2003, Agnew et. al. 1996). These common elements may range from formal to functional attributes (Beer et al., 2003, Väyrynen 2003). Regions have been defined according to their social characteristics (Gilbert 1988), physical landscapes (Hamin and Marcucci, 2008), bio-regions (Holloway 1981), or as a locus of economic growth (Storper, 1995, Scott, 2001). Paasi (1991) describes the region as a socio-spatial unit that is characterised by institutionalised practices that are embedded in the history of the region. Regions are therefore socially produced and reproduced through communication and symbols.

Differentiating between structural and functional definitions can lead to different understandings. A formal region, on a structural analysis,is constituted by the grouping together of smaller geographic units according to identified similarities such as population distribution, employment patterns, dwelling density, the location and types of land uses.. This approach contrasts t to functional ties such as transport patterns and capital flows. Such functional processes connect a hierarchy of settlements internally and to external urban areas, and relate sectoral activities such as agriculture and manufacturing to each other. Increasingly, the view has been accepted that regions can only be understood through an analysis of their operation internally and externally. A 'networked' relational conception of the region (Castells, 2000, Jones, 2009) recognises regional scale as 'functional space' for the deployment of a range of connected activities such as economic and political processes. A functional analysis therefore concentrates on relationships between elements within a region and the contribution of elements to broader connections such as with a nearby metropolis. A functional analysis is central to this study through the analysis of potential transfers of demand between urban and rural lots, between types of township housing, and of other complex relationships between structural elements.

In turn, such a concentration on functional connections has implications for urban centres. The concept of the 'city region' can reorient urban areas towards their hinterlands and the complex relationships between metropolitan and regional urban and rural areas. The term 'city-region' has grown to encompass a breadth of alternative descriptors including: urban regions, metropolitan areas, sub-regions, polycentric regions and functional urban areas (Healy 2009, p. 833). This orientation can supplement or replace a concentration on global city connections and a traditional monocentric and hierarchical centre-periphery model of the city region with 'aspatial conceptualisations' and 'polynucleated urban landscapes' (Batty 2001).

## Scenario Methodology

The approach to regional planning adopted here is part of a growing body of research that uses scenarios as a method to examine the impacts of current trends and practices on the future. A scenario can be defined as a story involving an internally consistent and plausible explanation of how events unfold over time (Swart et al, 2004). Scenarios generally are not regarded as predictions but as statements of possible future states. Porter (1983), Schwartz (1991), Ringland (2002) and Shoemaker (1995) agree that scenarios are not simply random imaginings but are part of a consistent methodical tool kit for thinking strategically about the future. In the Borjeson et al

(2006) typology of scenarios, three main categories of the future are identified: possible, probable and/or preferable futures.

Scenarios can be normative subjective narratives which explore plausible futures, or quantified explorations. Various scenario typologies have been proposed. Linear approaches explore a continuation of trends to varying extents, while systems approaches investigate the multiple and complex interactions of elements. Such elements can be physical and social. The concept of risk is central to complex system analyses.

Scenarios can be forward looking or involve backcasting. In backcasting, scenarios "define a normative state in the future…then diagnose how to achieve that state over time" (Jones, 2010: 5). Glenn and Gordon (1997) propose two types of scenarios, exploratory and normative. Exploratory scenarios follow a foresighting approach, projecting trends based on the question "What do you think the future will be?", while a backcasting approach is based on the normative question "What kind of future would you like to see". Backcasting is an imaginative exercise. It requires "working backwards from a particular desired end point to the present in order to determine the feasibility of that future and what policy measures would be required to reach that point" (Robinson, 1990 p.823). Nordlund (2008), Beer (2006) and Jones (2010) also discuss this approach.

The comparative approach followed here uses both a forecasting approach, projecting current trends forward, and a backcasting approach in proposing how to achieve an alternative future state. The study also uses a modified scenario approach by adopting a game workshop method that tests assumptions about regional futures, visualises outcomes associated with different futures and evaluates different policy and practical outcomes.

The study reported here estimates current and potential land supply for seven peri-urban municipalities, part of the Melbourne peri-urban region. Three rural scenarios test the extent to which rural land supply can meet projected rural dwelling demand, and seven density scenarios tested the capacity of land supply in the City of Bendigo to meet projected demand for residential development to 2041. The first rural scenario (Business-as-usual scenario) projects growth in the case study area to 2041 on current trends assuming the continuation of current policy settings. Two alternative scenarios are proposed to limit rural growth and redirect it to townships, and to concentrate township growth primarily within the existing town boundaries of larger regional settlements.

Every individual rural land parcel was plotted for SLAs. Projected future growth was then applied to individual rural and urban land parcels to build a picture of housing growth at a highly localised level beyond that of the more general 'Victoria in Future' (VIF) trends. The concept of an attractiveness index was developed to distribute VIF projections to individual rural land parcels for a one square kilometre grid surfaces. This index used criteria such as infrastructure, environmental, settlement and demographic factors as indicators of preferences for location and timing of development to identify the most probable rural settlement pattern within each SLA. Business-as-usual land supply was determined by the number and size of existing individual rural land parcels without dwellings; potential for future subdivision; the impact of constraints and land use planning provisions. Demand was distributed by applying the attractiveness index to supply, demonstrating how soon demand would be met in the rural parts of the region's SLAs.

The second two scenarios assume an alternative future to be achieved by 2040 and propose measures to achieve this end. The alternative future is defined as a continuation of 2014 existing physical conditions, particularly landscapes, environmental attributes and natural resources, and the continued capacity for agricultural production in a region linked through efficient and accessible transport options. Scenario 2, the Rural Preservation scenario, requires minimum rural lot sizes for the construction of one dwelling of 40 hectares in the Farming (FZ) and Rural Conservation (RCZ) zones, and 16 hectares in the Rural Living zone (RLZ). It also reduces the minimum lot sizes for dwellings in three future urban zones of rural appearance on the edges of towns to 0.04 hectares in the Urban Growth (UGZ) and Comprehensive Development (CDZ) zones, with no minimum size

applied in the Township zone (TZ). Scenario 3, the Tenement Control scenario, requires the area of multiple rural lots in the same ownership to total 25 ha or 40 ha for the construction of one dwelling.

## Results

The application of the second two scenarios substantially reduces the potential for dwelling construction in the three rural zones by reducing rural development on existing land parcels and restricting rural land subdivision. However, the scenarios increase the development potential in the three urban edge zones through a number of techniques. Firstly, forgone rural demand is transferred from rural to township zones. Secondly, under scenario 2, the three future urban zones on the edges of townships can be subdivided to small lots substantially increasing their yield. Thirdly, under scenario 3 the BAU yield applies together with transferred rural demand.

*Business-as-usual (BAU) scenario*

A large oversupply of lots exists in the rural areas of the peri-urban region of Melbourne. Under business-as-usual projections, demand is unlikely to ever lead to all existing lots being used for housing. Yet additional lots are being created through subdivision. The most noticeable spatial feature of the rural areas is their extensive spatial fragmentation. Vacant rural lots total 47,759, with large numbers situated away from population centres in areas where demand is low. Yet in high amenity locations closest to Melbourne, rural development would substantially alter landscapes. Most vacant rural lots, or 47,759 on 710,686 hectares, are situated in the Farming Zone, so their development would significantly affect farming. Most lots are small, with almost 75 per cent 10 hectares or less on 93,394 hectares. However over 3,500 lots over 40 hectares exist on a significant land area of 286,280 hectares or about 49 per cent of the rural land area. These large lots represent much of the study area's future, maintaining options for future agriculture and containing much of the remnant biological diversity.

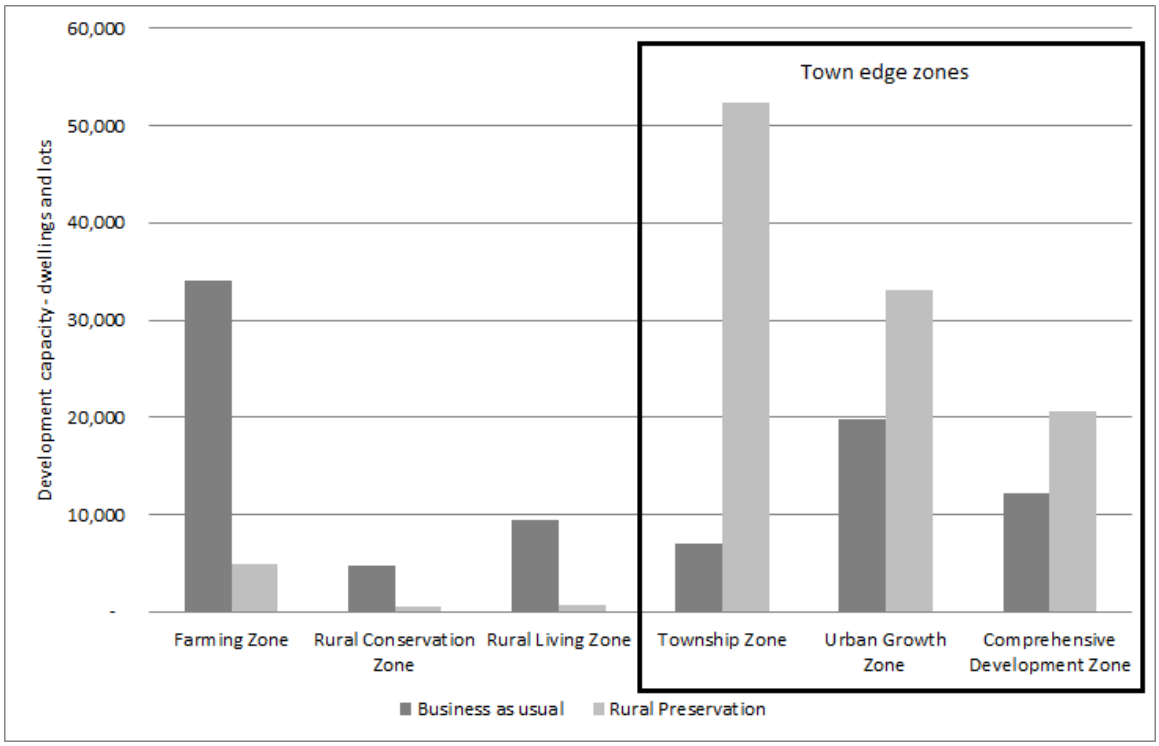
Yet substantial additional dwelling capacity exists on undeveloped land on the edge of townships in three future urban zones. Only 7,085 lots exist in these three township edge zones. However, their subdivision capacity accounts for 38,954 new lots, or 45 per cent of the subdivision capacity of town edge and rural zones.

*Rural Preservation (RP) Scenario*

Application of the Rural Preservation scenario reduces the number of lots with rural zoning from 79,075 in the Business-as-usual scenario to 12,726 lots. Development capacity, including lots and subdivision potential, is affected even more strongly. This falls in the three rural zones from 48,261 to 5,911 dwellings. Figure 1 shows that the greatest quantitative reduction occurs in the Farming zone where dwelling yield falls from 34,112 in the Business-as-usual scenario to 4,841 in the Rural Preservation scenario, an 86 per cent reduction. This represents a fall from almost 40 per cent of total capacity under Business-as-usual to 4 per cent under Rural Preservation scenario. Higher percentage reductions occur in the rural Conservation zone by 90.3 per cent to only 459 dwellings, and 93.4 per cent in the Rural Living zone by 93.4 per cent or 611 dwellings.

Figure 2 also shows that conversely, application of the Rural Preservation scenario to the three future urban zones on township edges increases their yield considerably from 38,934 to 106,082 dwellings. Yield in the Township zone (TZ) increases from 6,950 dwellings at a business-as-usual density of 2 dwellings per hectare to 52,406 dwellings at 18 dwellings per hectare, and the Urban Growth (UGZ) and Comprehensive Development zones (CDZ) by another 21,693dwellings. The effect of this combined fall in the capacity of rural zones and an increase in capacity of urban zones on the rural edge of townships is an overall increase in development capacity from 87,195 under Business-as-usual to 111,994 under Rural Preservation scenario.

**Figure 2: Development capacity by planning zone under BAU & RP scenarios**



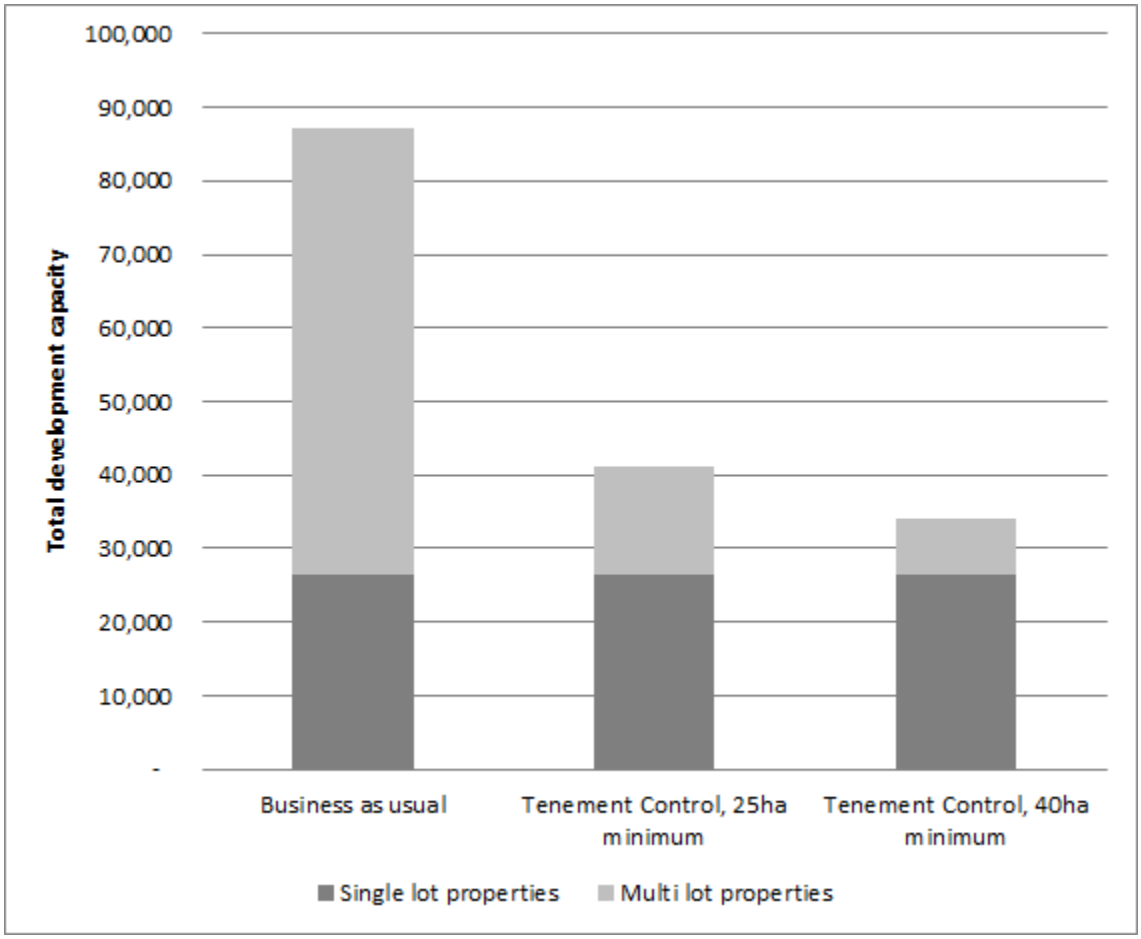

Under the *Rural Preservation Scenario*, application of a higher minimum lot size will transfer demand for 11,082 dwellings from rural to urban areas increasing urban dwelling demand from 60,651 under the Business-as-usual scenario to 71,733. Demand for dwellings was transferred according to the existing size of townships in two ways, firstly from rural areas to townships within SLAs, and secondly within LGAs. Under the second method, most growth will occur in the larger centres of Ballarat, Bendigo and Bacchus Marsh. Total dwelling capacity in all six zones provides a large oversupply of 108,066 lots because of the large number of new lots in the three township edge zones. Under the Rural Preservation scenario, the use of a regulatory control would shift development pressure to far fewer settlements, and significantly reduce the capacity for rural development compared to the Business-as-usual scenario. The use of pressure criteria such as services and infrastructure would tend to concentrate development in regional centres, district towns and townships on rail lines.

*Tenement Control Scenarios*

There are 32,896 singly owned lots in the six zones examined in the study region qualifying for the construction of a dwelling under this scenario, of the 79,075 total lots. Tenement controls were then applied to the 46,179 multiple lots or 58 per cent of the total held in single ownership on the 10,196 properties comprising combinations of lots. Figure 3 shows that applying tenement controls reduces significantly the Business-as-usual development potential of the multiple lots, under a 25 hectare control to 14,597, and a 40 hectare control to 7,395 dwellings. The greatest impact would apply to the Farming zone where 70 per cent of lots are held in common ownership although all rural zones and the Township zone would also be affected significantly.

Transfer of foregone rural demand for development under the 25 hectare tenement control would comprise a small component of new urban dwelling demand of 4,247 compared to the demand of 60,651 dwellings to 2041.

**Figure 3: Total development capacity – under BAU & TC scenarios**




*Urban scenarios*

The land supply available for dwelling development within the urban boundaries of major regional centres of Bendigo and Ballarat, medium sized towns such as Kyneton and many smaller towns is more than sufficient to meet future population and development needs of townships and transferred rural land demand beyond 2041. Substantial supplies of land either subdivided or designated for future urban development are available also on the fringes of townships. The large land supplies within townships present the opportunity to prevent unnecessary fringe growth and provide a range of dwelling types and lot sizes within townships. Increasing average densities by building a range of housing types would substantially increase the supply of housing in townships and place new residents in well serviced locations. However, both township and fringe urban land is being developed rapidly because of the use of the dominant model of low density detached housing.

In applying the seven density scenarios, by 2041, 19,672 more detached dwellings will be required in Bendigo (Groenhart and Buxton, 2013) in a total *business-as-usual* new housing scenario supply of 21,691. Under the *higher density broad hectare development* scenario, 770 hectares is suitable for greenfield development. Development at the current 12 lots per hectare would provide 9,240 lots, exhausting the supply of greenfield land by 2016. Development overlays further reduce this yield to 6,054 lots. Increasing density to 25 lots per hectare would yield 19,250 dwellings on the same land supply reducing the shortfall of detached houses by 2014 to 400. The transfer of a significant number of rural lots under the Rural Preservation and Tenement Control scenarios to fringe area development would significantly reduce the amount of broadhectare land over time. For example, 2,456 dwellings would be transferred to Bendigo under the Rural Preservation scenario and 872 under the Tenement Control scenario.

**Figure 4 City of Greater Bendigo density scenarios**

| Scenario | Business as usual greenfield | Future greenfield development | Dual occupancy infill | Activity centre infill | Residential infill | Other redevelopment | CBD redevelopment |
|---|---|---|---|---|---|---|---|
| | Development at current trend densities | Maximum yield of lots over one hectare | Two lot development on existing occupied and vacant residential lots | Development occurs on sites within 400m radius of BZs | Development occurs on R1Z sites identified as green by COGB | Residential development occurs on infill sites outside CBD zoned Business and Industrial and identified as green by COGB | Development on sites determined as appropriate, to heights defined by CBD Strategy |
| **Land supply** | 770 hectares from 279 lots | 770 hectares | 555 hectares from 6,756 lots (220 vacant) | 322 hectares from 4,154 lots | 344 hectares from 1,129 lots | 275 hectares from 209 lots | 14.4 hectares from 138 lots |
| **Dwelling density** | **12** dwellings per hectare | **25** dwellings per hectare | **13** dwellings per hectare | **35** dwellings per hectare | **35** dwellings per hectare | **35** dwellings per hectare | Average **140** dwellings per hectare |
| **Dwelling yields** | **Detached dwelling supply**:<br><br>9,240 | **Detached dwelling supply**:<br><br>19,250 | **Detached dwelling supply**: 6,536 + 440 = 6,976 | **Townhouse dwelling supply**:<br><br>11,270 | **Townhouse dwelling supply**:<br><br>12,040 | **Townhouse dwelling supply**:<br><br>9,625 | **Apartment dwelling supply**:<br><br>2,000+ |
| **Sample of lots available** | | | | | | | |

Under the *Dual occupancy infill scenario*, one additional dwelling could be constructed on 6,459 lots containing one dwelling and two lots on 220 vacant lots between 700-1000 square metres on 555 hectares at 13 dwellings per hectare, excluding lots available within other infill scenarios (below). This could satisfy Bendigo's demand for detached housing till 2012, or coupled with the higher density broadhectare scenario of 19,250 would meet detached housing demand to 2041. Alternatively, the dual occupancy supply of 6,976 dwellings would meet a target of 30 per cent of all new detached dwellings by 2041.

Under the *Activity centre infill* scenario, 12,040 dwellings on 4,154 lots covering 322 hectares could be constructed in activity centres at 35 dwellings per hectare. Projected demand for townhouses to 2041 is only 509. There is substantial potential for medium density development in activity centres to substitute for detached housing on the Business-as-usual model. Its availability would be expected to lead a supply led replacement for substantial detached housing demand. This scenario provides ample capacity to meet transferred rural demand.

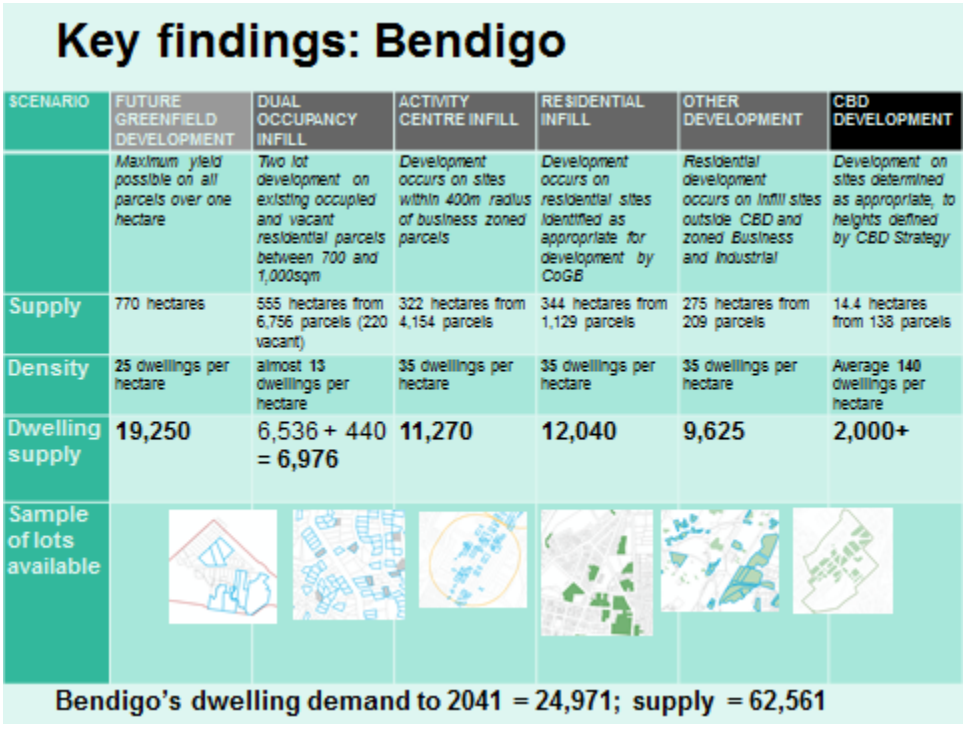
Under the *Residential infill scenario*, 1,129 residential lots between 3000 square metres and eight hectares in size totaling 344 hectares would yield an additional 12,040 dwellings at a density of 35 dwellings per hectare. Again, this scenario could be combined with others to produce a large quality of diverse housing types. The *Other infill scenario* examines the capacity of non-residential lots over one hectare in size. At a density of 35 dwellings per hectare, 209 identified lots covering 275 hectares would yield 9,625 dwellings.

The *Central Bendigo redevelopment scenario* examines potential individual sites in the Bendigo CBD excluding sites affected by a heritage planning overlay, specifying a minimum site size of 150 square metres and limiting development to three storeys, consistent with council's CBD strategy (Planisphere and City of Greater Bendigo, 2005). This scenario produces about 2,000 dwellings on 140 lots on 14.4 hectares at an average density of 140 dwellings per hectares. It could provide a mixture of townhouses and apartments, meeting an emerging demand.

Under these scenarios, a substantial oversupply of land would be available to meet all future housing needs in Bendigo. The expected supply of dwellings required to 2041 is 24,971 made up of 21,850 detached houses, 566 townhouses and 1,555 apartments. The six development options (including the 25 lot per hectare greenfield option) provides 62,161 dwellings. The higher density dwelling supply almost wholly meets the anticipated demand for detached housing to 2041 from existing residential zoned land. There is no need to rezone any further fringe area land for residential development. Adding the potential 6,976 dwellings from dual occupancy detached housing provides a substantial oversupply of this type of housing. Council could pursue a combination of these scenarios to substantially reduce the need for fringe area development on zoned land.

The potential 35,935 lots available for townhouse and apartment dwelling types offers the potential to achieve a substantial shift in dwelling demand from detached housing on the fringe to townhouses and apartments within the established urban area. The supply of these housing types substantially exceeds the demand for detached housing to 2041. Council could pursue the objective of diverse, affordable housing with a mix of attached and detached housing types, providing a land supply to 2060 and beyond without any further expansion of existing residentially zoned greenfield land.

**Figure 5: Dwelling supply and demand Bendigo**



## Conclusion

Applying a functional analysis to the region, metropolitan Melbourne continues to exercise its dominant role taking the vast proportion of Victoria's population growth and infrastructure expenditure. Regional settlement is not acting as an alternative to metropolitan growth either informally or in a planned manner. There is no evidence of a network city model or polycentric model supplanting this traditional monocentric approach to settlement. Regional system elements are interacting to cause progressive reciprocal impacts which are leading to substantial sectoral change and are progressively moving the region to a new state.

Anticipatory policy intervention would be required to avoid undesirable scenarios derived from the incremental continuation of current trends, and to substitute a preferred alternative rural landscape scenario. Backcasting from the defined alternative future would be employed, particularly the use of anticipatory policy change to restrict non-agricultural rural land markets. A radical reduction of the existing supply of small rural lots, effective controls over subdivision and a transfer of demand for future rural land holdings to regional settlements would occur. In addition, under alternative urban settlement scenarios, extensive capacity exists in the developed areas of larger regional centres and the network of smaller towns to accommodate expected township growth and transferred rural development. This capacity would enable a shift to occur from peri-urban rural development to existing built up areas of settlements through a policy of increasing existing urban density. The extensive development capacity of large and medium sized settlements in the study region offers possibilities which could be explored for a regional transfer of a significant proportion of projected metropolitan growth. Such change would require integrated policy settings, vertically across all levels of government, and horizontally across spatial, social, economic and natural resource sectors.

This analysis draws also from the position that production can influence consumption, that is, that a land supply of small fragmented rural lots, or detached housing on the fringes of towns, influences consumer preferences, and that altering models of subdivided land and dwelling products can change demand for land and housing. Radical shifts in consumer housing preferences have occurred in Australian cities since McLoughlin (1991:153) predicted for Melbourne in 1991 that "population levels are likely to go on falling in most inner and middle-ring suburbs" and that apartment living was unlikely to prove popular. More diverse housing choices are now being constructed in larger regional settlements such as Bendigo with increasing local political support.

Australian state governments in their peri-urban planning have only rarely attempted to achieve an identified future state and intervened to implement detailed outcomes, particularly to reduce the number of existing rural lots. Rural land use traditionally has been regulated by subdivision controls which often have increased land fragmentation and not protected rural resources. In Victoria, the integrated regional planning undertaken by the Upper Yarra Valley and Dandenong Ranges Authority provides a rare exception of land use planning radically reducing the number of existing urban and rural-residential lots and controlling future subdivision. The use of tenement controls was an established technique in many Victorian planning schemes to reduce the potential for dwelling construction on multiple lots held in single ownership by requiring a minimum lot size for a dwelling. Such provisions in planning zones were removed by the introduction of the standardised measures of the Victoria Planning Provisions in 1996. Referral authorities in Victoria sometimes now are acting informally to require large minimum lot sizes, whether singly or jointly owned, to reduce the capacity for dwelling construction on small rural lots in potable water catchments.

Effective regional planning requires integrating both metropolitan and regional township planning and also planning for peri-urban rural areas and townships. Central to the approach followed here is the integration of an analysis of both rural and urban land supply and demand, and the actual and potential relationships between rural and urban areas. Land tenure is the key factor in a complex network of interacting variables and reciprocal relationships. Fragmented lot ownership increases the price of rural land, reduces the rate of return on rural pursuits, prevents lot amalgamation for farming purposes and attracts land owners to financial returns from development.

Ad-hoc and incremental development will continue to characterise Australia's peri-urban areas unless governments move beyond general and often vague strategies to detailed planning aimed specifically at fragmentation in land ownership and subdivision potential. The result for Melbourne's peri-urban area will be dwelling construction on most of the vacant and subdivided rural lots in high amenity areas close to Melbourne and along major transport corridors by 2030. Such rural development would alter landscapes, deplete many natural resources and remove options for maintaining metropolitan resilience in times of potentially rapid change. Under the alternative Rural Preservation and Tenement Control alternative scenarios, existing landscapes and natural resources would be protected, and dwelling growth accommodated under a range of scenarios.

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