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### Land Supply and Housing Affordability

Greg Costello

Curtin University of Technology  
Perth, Western Australia.

Steven Rowley

Curtin University of Technology  
Perth, Western Australia.

\*The authors advise that this is a preliminary version of the paper and should be considered as work in progress. The results of this paper should not be quoted without the express permission of the authors. (Corresponding author; Greg Costello: G.Costello@Curtin.edu.au).

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**Abstract:** A number of commentators believe that a potential solution to housing affordability is available through large scale release of newly subdivided land on the urban periphery. The argument follows that releasing more land increases supply and, through market forces, leads to lower new land and house prices. This will, in turn, lead to improved affordability within the stock of existing houses. Despite this view, there has been very little empirical research investigating how large scale land release on the urban fringe actually affects housing affordability. This question has important implications for both planning policy and affordability within local housing markets but also within the wider aggregate urban housing market. This paper explores this issue by quantifying land release in a number of Perth (Australia) suburbs and comparing the extent of land release with changes in land and house prices over a 10 year period. The paper argues that housing affordability is much more complex than simply a supply side issue and large scale land release can actually have the opposite effect and make an area less affordable over time. Structural issues such as land and housing diversity, planning policy and housing tenure all have a crucial role to play in housing affordability outcomes together with traditional economic drivers such as population and employment.

## 1. Introduction

This paper aims to examine the impact of land supply on housing affordability. The influence of land supply on housing affordability remains a controversial topic. A number of authors (Moran 2006 & 2008, Demographia 2007, Beer *et al.* 2007, White and Allmendinger 2003, Nelson *et al.* 2002) argue that releasing more land increases supply and, through market forces, leads to lower new land and house prices. This will, in turn, lead to improved affordability within the stock of existing houses. Despite this view, there has been very little empirical research investigating how large scale land release on the urban fringe actually affects housing affordability. This question has important implications for both planning policy and affordability within local housing markets but also within the wider aggregate urban housing market. Our analysis indicates that the drivers of housing affordability are far more complex than the single issue of land supply.

Housing affordability encompasses both housing prices as well as housing availability. The paper discusses the Perth planning policy environment that dictates land release. We look at patterns of land supply in the Perth metropolitan area and compare the rate of land supply with movements in house prices. Our methodology seeks to examine the question of whether the broad land release policy in Perth has impacted upon housing affordability. We also examine whether the rate of land supply had different effects on housing affordability within suburbs of very different supply characteristics. The paper is organized as follows. Section 2 extends our discussion of the motivation for this research and reviews some of the important related literature. Section 3 outlines the data used in the study, our research hypothesis and methodology. Section 4 presents our results. Section 5 concludes.

## 2. Motivation and related literature

Housing affordability in Australia remains a highly controversial issue that is frequently debated both within the popular press and the academic and government policy communities. It remains a key political issue both at State and Federal government levels. In recent years the debate concerning housing affordability has been defined in an era of rapidly increasing house prices in Australia's capital cities and some significant research and recommendations in terms of policy responses to declining housing affordability. Much of this discourse focuses on the capacity of the land use planning system to deliver sufficient new housing supply. In recent years there has been a new emphasis on supply as a housing policy concern, not only in Australia but also in many other developed countries (Lawson and Milligan 2008, Bramley 2007).

There exists a significant recent academic literature examining land supply and housing affordability in both Australia and internationally. Within Australia, the Australian Housing and Urban Research Institute (AHURI) has promoted a number of recent projects examining housing affordability issues. In "New directions in planning for affordable housing: Australian and international evidence and implications" (Gurran et al: 2008) the authors examine international approaches in planning for affordable housing. The study reviews the arguments of appropriate policy with respect to planning initiatives and affordable housing. It also compares the range of affordable housing strategies currently contained within metropolitan plans applying to a number of Australian capital cities. Gurran et al: (2008) and Gurran (2008) argue that within Australia and internationally, metropolitan planning is now heavily focused towards managing the outward growth of cities. Planning is now closely associated with environmental and urban sustainability concerns. In this new planning environment it is anticipated that cities will still grow in terms of population and new households, however a key planning objective is the containment of growth in the spatial dimensions of the city. The 'urban consolidation' or 'containment' advocates argue that more intensive development in inner-city areas and limited conversion of rural land on the urban fringe will result in more sustainable cities and promote a more efficient and equitable use of urban infrastructure.

A common view that contrasts with the new emphasis in planning policy is that a general solution to housing affordability is available through large scale release of newly subdivided land on the urban periphery. Indeed the view that containment makes housing less affordable by artificially restricting the supply of land is quite a widely held view. Moran (Moran: 2008 p54) suggests that "the stellar rise in house prices across Australia was due to land costs .... those costs were shown to be derived from state governments and local authorities acting to restrict the availability of land for housing." Demographia (2007) (an often quoted international review of house price data) identifies a number of regions as examples of where housing is affordable due to liberal land release policies. In contrast, cities including Sydney, Perth and Melbourne all rate as cities where housing is considered unaffordable due to strong planning restrictions on new land release. There is no doubt that land use planning system plays a crucial role in delivering new housing supply in metropolitan regions. If the planning system is not working efficiently causing delays in the release of residential development land this will result in an undersupply of new housing relative to demand.

The interaction of urban containment initiatives and housing affordability remains a dilemma for city planners as promoting affordable housing is also a primary objective of metropolitan strategies in Australia (Searle, 2006; Beer et al., 2007). There exists a widely held view that policies designed to contain urban growth by limiting the release of land for new development are inherently inconsistent with overall affordability goals (Beer *et al.* 2007, Moran 2006 & 2008, White and Allmendinger 2003, Nelson *et al.* 2002). Other authors express the view that the issue of housing affordability is more complex in its nature and cannot be explained merely by land supply constraints. Gurran (2008) contends that the anti-containment arguments are flawed. The suggestion that policy promoting liberal land release on the urban fringe will reduce house prices elsewhere assumes that the supply of residential land for the construction of new housing on the urban fringe determines house prices across the whole market. This argument ignores the considerable sub-market literature that has established that there are very different housing sub-markets across metropolitan regions (see Jones Leishman and Watkins (2005) or Coiacetto (2006) for a comprehensive discussion on the characteristics of housing markets and sub-markets). It also ignores the scale of new housing supply in relation to the established housing market. This limits the potential impact of new supply on existing house prices.

A significant number of studies suggest that the degree to which housing in one part of a city substitutes for housing in other locations depends upon requirements of individual households, and as a result substitution effects are limited. In terms of housing affordability effects, liberal land release policy might well provide a suitable supply of low cost housing on the urban fringe while at the same time there might be low supply and affordability of housing in other localities within the same metropolitan region. Other authors suggest that containment may affect affordability if sufficient alternative development opportunities are not provided, or because the amenity affect of consolidation is positive and so enhances house prices (Bramley and Leishman 2005a).

Much of the recent literature emanates from the UK in response to *The Barker Review of Housing Supply* (Barker: 2004). This report presented recommendations to the UK government for securing future housing needs. In general, the findings of the report were that the UK had experienced a long term upward trend in real house prices over the previous 30 years that has impacted adversely on housing affordability. In order to reduce the future rate of increase in house prices a number of policy initiatives were proposed including increasing the supply of existing houses,

and allocation of additional land in local development frameworks which could be released by market indicators (“triggers”). In general the report promotes the greater use of market indicators as the basis for providing sufficient land for future housing requirements and a more flexible and responsive planning system. A market trigger or signal such as declining housing affordability would be an indicator that increasing land supply is required to alleviate worsening housing affordability. Within this context, there has been a major shift in policy interest towards the relationship between land use planning and housing market outcomes, particularly concerning affordability for low and moderate income earners (Bramley and Leishman 2005b). In the United Kingdom and parts of the United States, policy responses have included overall approaches to enhancing the responsiveness of the planning system to housing demand, as well as more specific use of planning mechanisms to protect and create new affordable housing units (For example see Crook et al 2007).

Meen and Andrew (2008) respond to the housing affordability recommendations within the Barker report and argue that the traditional approach to land release used by planners is based on trend household projections not housing affordability considerations. They contend that the traditional planning approach will typically lead to worsening affordability over time. They develop an alternative economic model “more suitable to the post-Barker era”, covering both household formation and tenure choice. This model is used to analyse a range of policy issues, including raising home-ownership rates and home-ownership sustainability.

### **3. Data and methodology**

The data used in this study was taken from the Perth (Western Australia) metropolitan region for the period 1998-2008 and is based at the suburb level. The pattern for urban development during this period was influenced by the Perth residential development strategy. In summary, the predominant pattern of development can be described as a coastal linear band extending north and south limited by the ocean to the West and corresponding with the urban fringe and development of new public transport infrastructure. In addition, new development has also occurred to the east of the city limited by the Darling scarp. There are also a few relatively minor new developments that can be considered outside the Perth metropolitan region but still within the rural urban fringe. Exhibit 1 provides an overview of the general urban morphology of the Perth metropolitan region together with some guidance on population growth patterns. Exhibit 2 provides information on the volume of vacant land sales in the Perth metropolitan region during this period. It can be seen that the highest volumes of sales are occurring in the north and south

coastal regions. There are some other regions east of the city where there are also high volumes of vacant land sales evident. It is important to note that land supply not only influences the amount of new housing available but the different varieties of new land released also impact upon the characteristics of new building styles. The planning system determines plot density as well as certain design characteristics. These in turn determine just what type of housing will be constructed on the land. Some commentators argue that in recent years the proliferation of large lots that produce the standard four bedroom two bathroom house restricts diversity in the new housing stock and limits the supply of new housing to those that can afford to purchase a large plot of land and construct a large housing unit. This in turn tends to raise median prices in these areas as the majority of new houses are large and hence in the higher price ranges. This begs the question as to whether land is being released in a manner designed to maximise profits for key stakeholders in the development process rather than based on sound planning principles focused towards housing affordability considerations. Exhibit 3 provides additional information concerning the pattern of housing density in the Perth metropolitan region. It is notable that there exist patterns of mixed density in the newly developing regions. Higher density developments within the newer areas of the city correspond with easy access to new public transport infrastructure.

Our research hypothesis is based on the assumption that land supply has a direct impact on house prices within individual suburbs. As suggested by many authors promoting the anti-containment view of land supply, we would expect that suburbs with a significant supply of new residential lots would experience lower rates of house price growth than those areas with a very limited supply of new lots. Our principal general research question concerns whether the quantity of land supply actually affects housing affordability through a significant well measured influence on either new land or existing house prices. Our methodology examines both the demand and supply sides of the Perth housing market. In examining the demand side of the housing market we took a selection of Perth suburbs (46) and recorded house price growth over the last 1, 5 and 10 years from Real Estate Institute of Western Australia (REIWA) median house price by suburb data. In adopting this approach we assume that the rate of house price growth is the most important basic measure of change in housing affordability during the sample period. We believe this to be a reasonable assumption given that rates of house price change far exceeded corresponding rates of change in household incomes during this period.

In examining the supply side of the Perth housing market, for each suburb we also recorded the number of new residential lot final approvals from Western Australian Planning Commission (WAPC) data. We believe that this measure provides the best estimate of supply in a suburb, although of course not all approved lots will reach the market in the short term. To standardise our measure of supply we express the data in percentage terms as a proportion of new lots measured against the size of the existing housing stock for an individual suburb according to ABS data. Exhibit 4 provides an overview of suburb growth within the Perth metropolitan region. Exhibit 5 provides a brief summary of the characteristics of the supply measure and house price growth. The average supply measure of the Perth metropolitan region is approximately 11% meaning that for the average Perth suburb, the supply of newly approved lots is approximately 11% of the total stock of existing homes. The average five-year growth in house prices for the Perth metropolitan area is 15.6%. There is significant variation in the supply measure between suburbs with a maximum supply measure of nearly 160% (Darch, a new fringe suburb) and a minimum of only 0.3% (City Beach inner-city established suburb). There is not as much variation in house price growth rates. Exhibit 6 extends this analysis and is discussed in more detail in the context of the results in the next section.

#### **4. Results**

Our results commence with Exhibit 6. Here we focus on the relationship between house price growth and the supply measure. In the first part of the table we analyse the top 10 Perth suburbs according to house price growth against the supply measure. It is evident that the top six suburbs in terms of price growth are also characterised by low supply levels. However, this result is not consistent. Note also that four of the top 10 suburbs in terms of price growth also have average or well above average measures of supply of new vacant land. When this analysis is extended to the bottom 10 suburbs the results are again inconsistent. Four of the suburbs with the lowest levels of five-year growth have very high corresponding levels of supply. However, six of the suburbs also have very low levels of supply. Exhibit 7 arranges the data according to the supply measure. These results are less indicative with only minor differences in house price growth according to whether a suburb is either in the top 10 or bottom 10 according to the supply measure.

Overall in testing our hypothesis that higher levels of supply of vacant land will lead to improving housing affordability (lower house prices), our analysis confirms only a weak negative relationship between the level of supply and the rate of house price growth over the last 5 years (-0.361, significant at 5%). This figure only describes the

direct relationship between land supply and the rate of house price growth in individual suburbs. Further research will examine the relationship at the sub market level where land supply in one suburb may have an impact on house price growth in a neighbouring suburb, within the same local housing sub-market. Of course many other factors will weaken the relationship between land supply and house price growth such as the rate at which lots are built out and enter the housing market. Market conditions will alter the rate at which these lots are purchased and developed. Future research will explore these factors but for now we concentrate on the simple relationship between land supply and housing affordability within individual suburbs.

We extend our analysis by examining land supply against vacant land prices. Here we examine the hypothesis more directly in assuming that a greater supply of vacant land will reduce prices of vacant land in those suburbs with the higher supply. In this analysis data availability and sample size limit our results to 30 suburbs. Exhibits 8 & 9 are consistent in format to the previous house price analysis. The results however are more inconsistent in terms of indicating any relationship between changes in supply and changes in prices for vacant land. In examining land price growth in Exhibit 8 it can be seen that some of the suburbs with the highest levels of growth also exhibit the highest levels of supply. In a similar manner some of the low-priced suburbs also have the lowest levels of supply. However, contrary results are obtained in both the upper and lower land price growth sets. In fact, the sample is split approximately 50% in both the upper and lower price groups in terms of the magnitude of the influence of the supply measure. In Exhibit 9 the same sample is arranged in a ranking against the supply measure. These results are also inconsistent and do not indicate any significant relationship between the level of supply and the price of vacant land. A correlation analysis confirmed no relationship at all between land supply and land price growth.

## **5. Conclusions**

Although these are only preliminary results our analysis confirms that the drivers of house (and land) price growth are more complex than simply the quantity of land supplied. Releasing large quantities of land in an area does not automatically increase housing affordability. Our results indicate that in some suburbs increasing supply of new land can have the opposite effect by making an area more desirable and therefore actually reducing housing affordability.

Our results also indicate that releasing large quantities of land seems to have no consistent impact on land prices. This confirms that there are many more important



factors in determining land and house price growth and therefore housing affordability.

There are a number of key issues for further research. Our current research examines the relationship between land supply and house prices within suburbs. Of course housing markets are more complex than this and sub-markets exist within the Perth metropolitan area. The patterns of land supply and house price movements within these sub-markets, which may consist of one or a number of suburbs, is much more complex. A significant supply of land within one suburb may have a significant impact on prices within other suburbs which together form the housing sub-market. These sub-markets are characterized by substitutable housing products and just because land supply has had little or no impact on prices in the subject suburb does not mean it has had little or no impact on prices in a neighboring suburb. Our research will explore these relationships and move from suburb to sub-market analysis.

Another key issue is the implementation gap. Final lot approvals will not necessarily result in the development of a final housing product. Speculators may purchase and hold lots and it may take a number of years before these lots are built out eventually increasing housing supply. Additionally, lots may remain unsold if there is an over supply or market conditions become unfavourable. Even if all lots are purchased it may take a number of years for completed housing units to reach the market. The statistical analysis can be improved and developed with analysis of the influence of the lagged measures of supply.

The analysis could be improved by expanding the sample to include areas outside Perth metro area. In addition we can improve the analysis by using more government data to provide a more accurate gauge of demand for both existing houses and new land.

One of the most interesting results from this analysis concerns those suburbs where there is a contrary relationship to our research hypothesis. These are the areas where high levels of land supply correspond with higher levels of existing house price growth and new land price growth. Our analysis can be extended with a more detailed exploration of the drivers of house prices in these regions.

Our results do suggest that the current pattern of land release in Perth has had little impact on existing house prices for a number of reasons. For a land supply policy to achieve its desired goal of improving housing affordability land release needs to be targeted at those sub-markets under the greatest demand pressures but equally

important are the type of lots released. Rather than a single product which results in a standard house type, usually the large four bedroom, two bathroom house, policy makers need to ensure the delivery of a range of lots resulting in a diversity of final housing product that satisfies market demand. Only then will land supply begin to have a direct and significant impact on housing affordability.

Exhibit 1: Population Growth

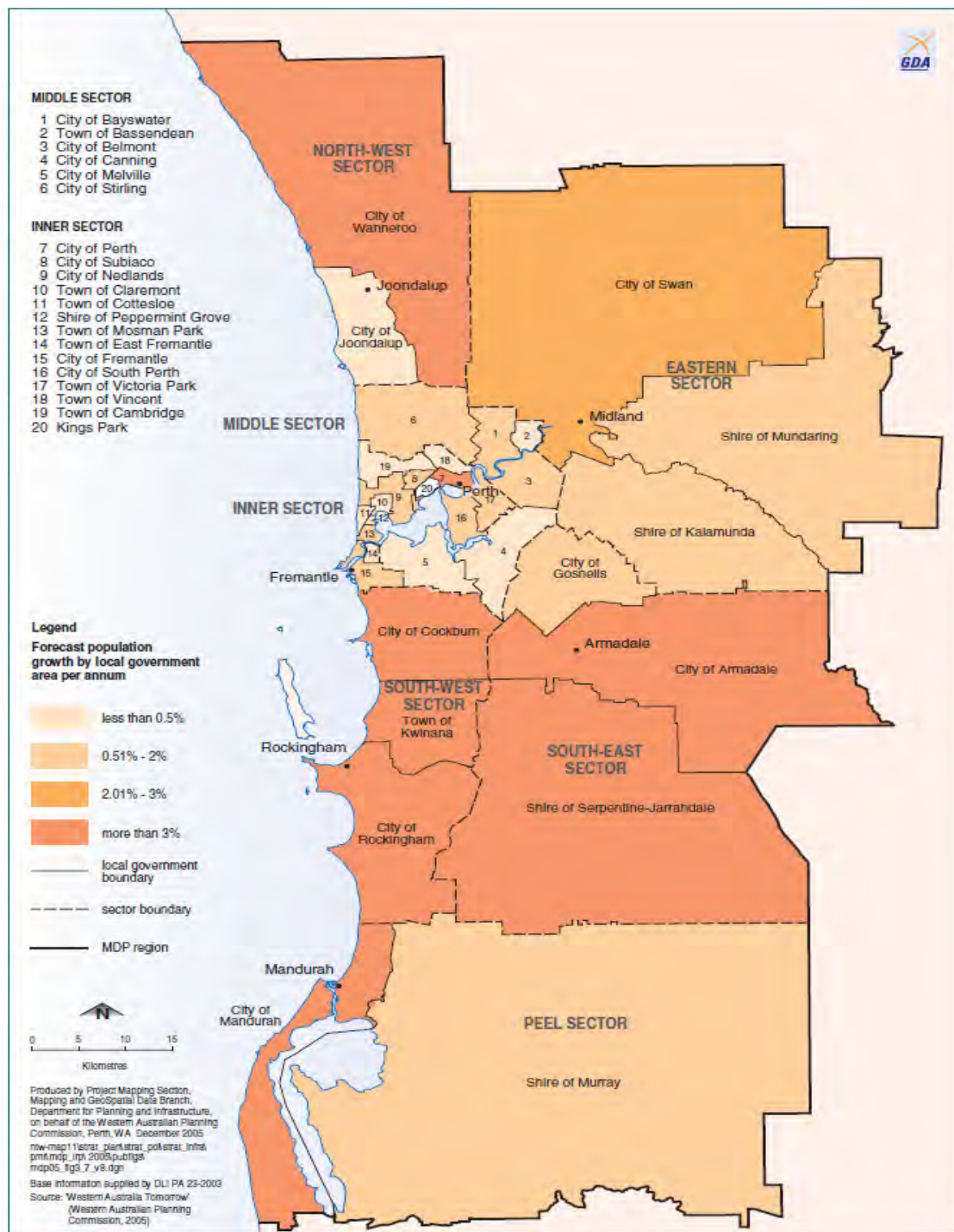


Exhibit 2: Vacant Land Sales

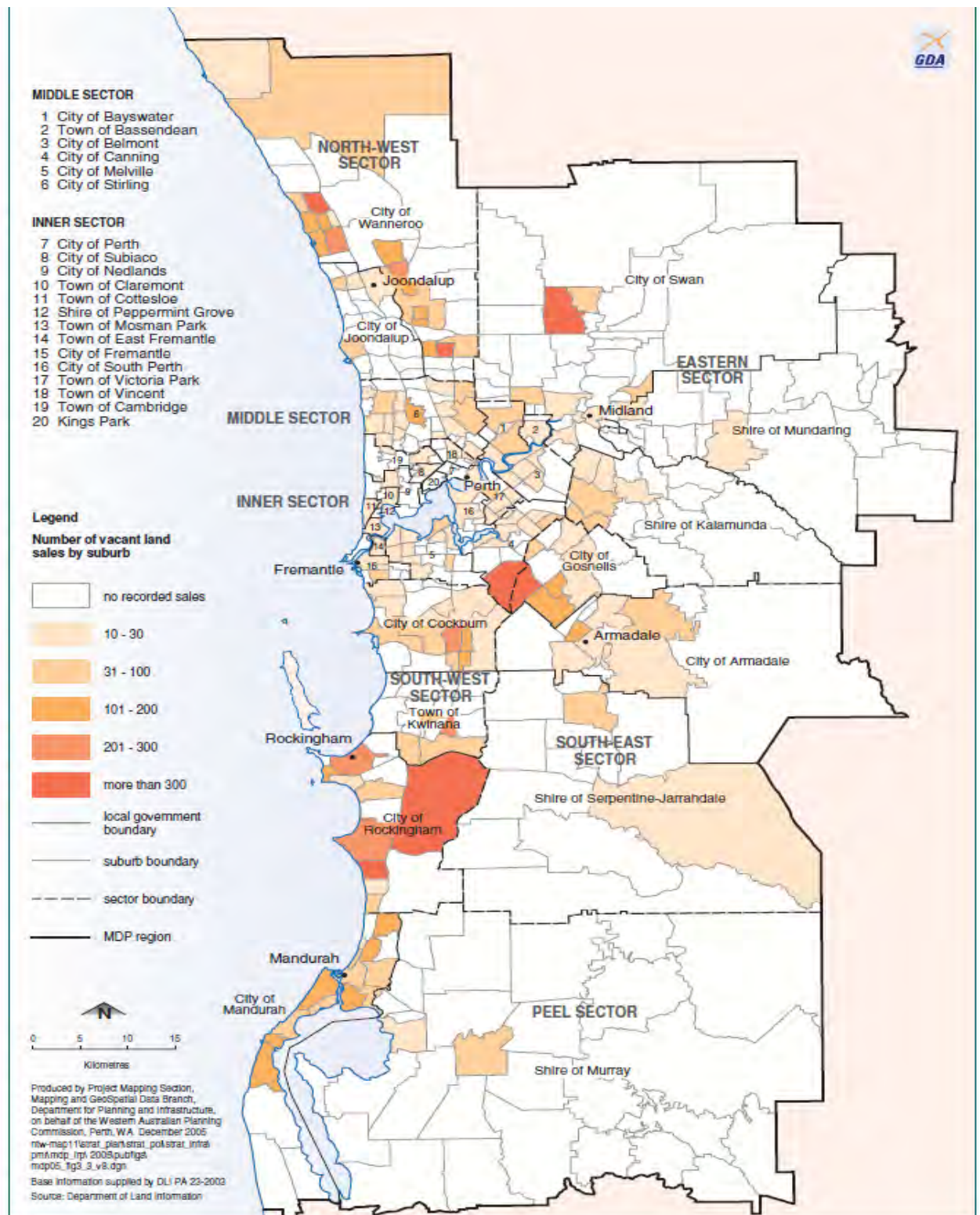


Exhibit 3: Dwelling Density

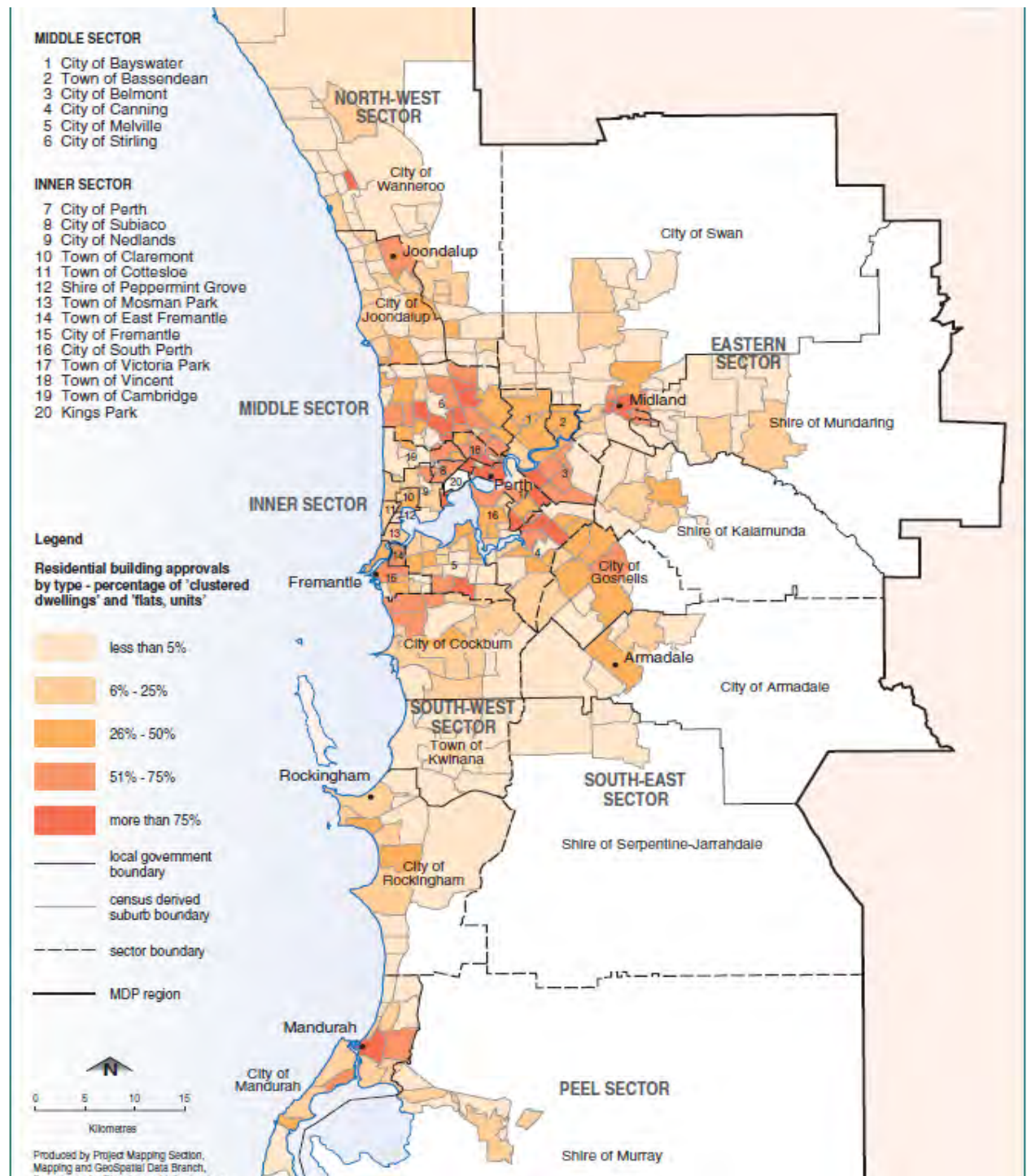
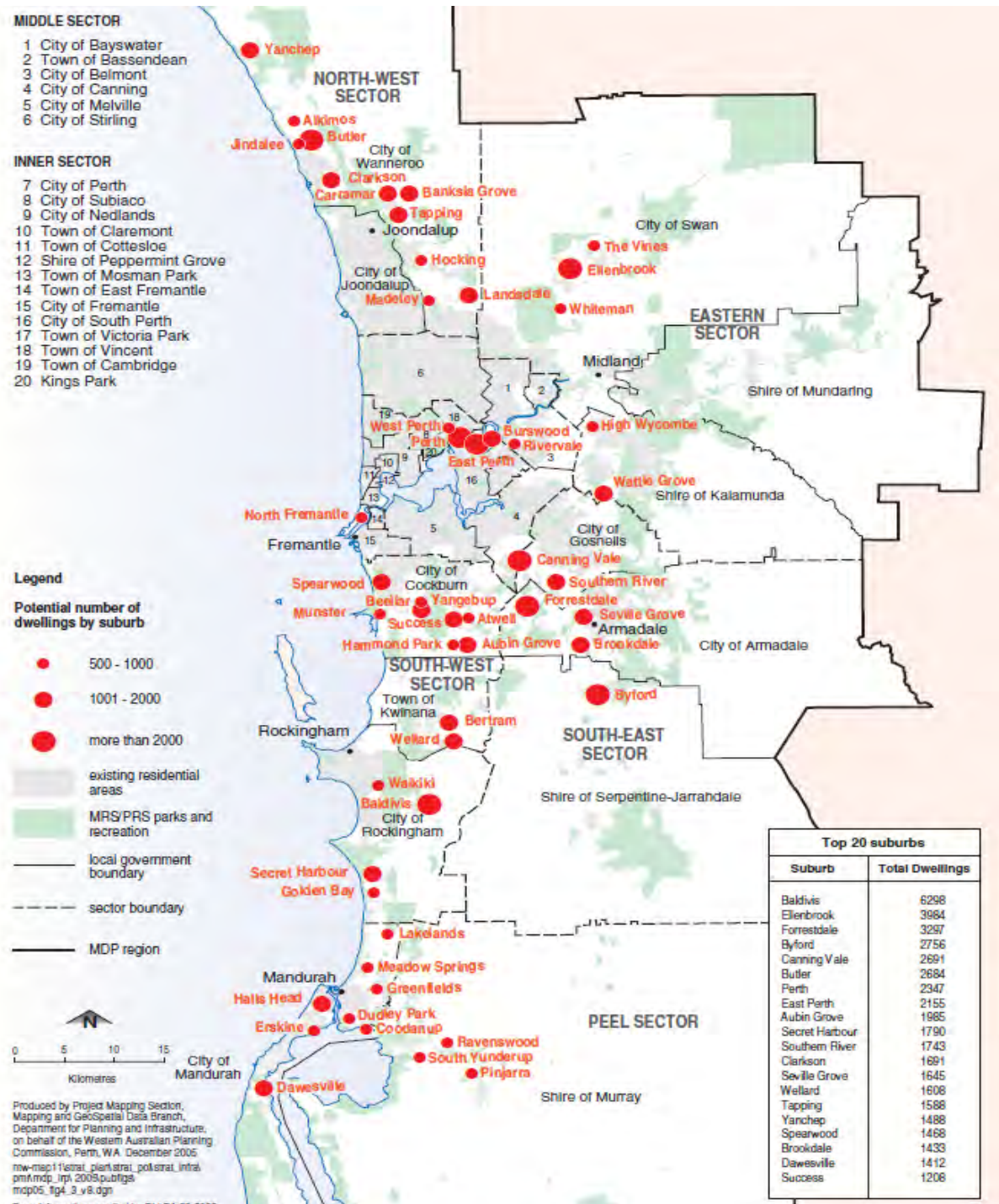


Exhibit 4: Suburb Growth



## Exhibit 5: Summary supply and house price growth statistics

	Supply Measure	1 yr Growth	5yr Growth
Perth Metro Area	11.1%	-1.1%	15.6%
City Beach	0.3%	4.2%	18.1%
Darch	159.4%	5.6%	14.3%

## Exhibit 6: House price growth and supply

Top 10 House Price Growth	5 Yr Growth	Supply	
Peppermint Grove	25.1	0.9	
Cottesloe	22	4.0	
Claremont	21.1	3.9	
Armadale	20.8	1.1	
Subiaco	20.7	1.5	
Gosnells	19.4	5.6	
Seville Grove	19.4	25.6	Above average growth but above average supply
Yanchep	19.2	35.4	
High Wycombe	19.1	15.2	
Karrinyup	18.4	11.4	
Bottom 10 House Price Growth	5 Yr Growth	Supply	
Baldivis	11.1	97.3	
Shelley	13.3	7.3	
Secret Harbour	13.4	101.8	
Canning Vale	13.9	47.6	
Joondalup	13.9	4.9	Below average growth but below average supply
Cannington	14	8.3	
Fremantle	14.1	3.3	
Scarborough	14.2	3.3	
Darch	14.3	159.4	
Victoria Park	14.5	3.3	

**Exhibit 7: Land supply and house price growth**

<b>Top 10: Tightest Supply</b>	<b>Supply</b>	<b>1 Yr Growth</b>	<b>5 yr Growth</b>
City Beach	0.3	4.2	18.1
Peppermint Grove	0.9	40.2	25.1
Lesmurdie	0.9	-4.2	16
Mundaring	1.1	5.7	17.7
Armadale	1.1	-4.5	20.8
Subiaco	1.5	9.8	20.7
South Perth	1.6	-5.8	17.7
Leederville	1.8	3	15.1
Mount Lawley	2.1	8.1	17.3
Kalamunda	2.3	10.7	18.3

<b>Top 10: Greatest Supply</b>	<b>Supply</b>	<b>1 Yr Growth</b>	<b>5 yr Growth</b>
Darch	159.4	5.6	14.3
Tapping	152.8	-1.3	16.3
Butler	122.6	-4	14.7
Secret Harbour	101.8	-4	13.4
Madeley	99.0	2.1	16.6
Baldivis	97.3	-6.4	11.1
Ellenbrook	69.8	-4.8	16.8
Success	69.6	-2.1	16.4
Canning Vale	47.6	-2.9	13.9
Port Kennedy	41.9	-5.1	14.9



## Exhibit 8: Land price growth and land supply

Top 10 Land Price Growth	5 Yr Growth	Supply	
Rockingham	28	12.1%	
Applecross	27.6	7.0%	
Port Kennedy	27.3	41.9%	
Gosnells	27.2	5.6%	
Quinns Rocks	27	19.2%	
Seville Grove	26.6	25.6%	High Growth
The Vines	23.9	23.7%	High Supply
Tapping	22.8	152.8%	
Darch	22.6	159.4%	
Butler	21.8	122.6%	
Bottom 10 Land Price Growth	5 Yr Growth	Supply	
City Beach	7	0.3	
Joondalup	9.8	4.9	Low Growth Low
Fremantle	11.1	3.3	Supply
Morley	12.1	4.3	
Scarborough	13.1	3.3	
Claremont	16	3.9	
Madeley	16.8	99.0	
Byford	16.8	30.9	
Karrinyup	16.9	11.4	
Success	17.6	69.6	

**Exhibit 9: Land supply and land price growth**

<b>Top 10: Tightest Supply</b>	<b>Supply</b>	<b>1 Yr Growth</b>	<b>5 yr Growth</b>
City Beach	0.3	-39.7	7
Armadale	1.1	-8	20.6
Como	2.7	2.4	18.1
Scarborough	3.3	-7.6	13.1
Fremantle	3.3	-50.3	11.1
Rivervale	3.4	33.3	20.7
Claremont	3.9	-19.4	16
Morley	4.3	-11.9	12.1
Joondalup	4.9	-20.2	9.8
Gosnells	5.6	0.5	27.2
<b>Top 10: Greatest Supply</b>	<b>Supply</b>	<b>1 Yr Growth</b>	<b>5 yr Growth</b>
Darch	159.4	1.6	22.6
Tapping	152.8	-3.8	22.8
Butler	122.6	-1.3	21.8
Secret Harbour	101.8	-1.9	20.8
Madeley	99.0	-2.9	16.8
Baldivis	97.3	-9.1	18.9
Ellenbrook	69.8	-5.6	21.2
Success	69.6	-6.4	17.6
Canning Vale	47.6	-6.8	17.8
Port Kennedy	41.9	-13.6	27.3

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