Estimating unmet housing demand and priority areas for public and affordable housing at the Local Government Area level – a housing practitioner's approach.

Julie Considine and Sarah Mewett
WA Department of Communities

Abstract:

Access to affordable housing is essential for the wellbeing of individuals, families and communities. Low to moderate income earners are most at risk of not being able to access affordable housing. Government agencies and the not-for-profit sector provide a much needed safety net for those who the private market has failed. In the current fiscal environment it has become increasingly important to ensure public resources are directed to areas where the level of need is highest. One of the facets of this is understanding the geography of the unmet demand for social and affordable housing for those in the low to moderate income bracket.

This paper presents a method for estimating social and affordable housing demand at the Local Government Area (LGA) level. It is based on data from the 2016 Australian Bureau of Statistics (ABS) Census, information from the Western Australian Department of Communities (WA DoC) and Western Australian Government population projections.

The output from the Demand Model is transformed into information which is easy to understand and can be practically applied in the decision making process of social and affordable housing providers.

1.0 Introduction

The Western Australian Department of Communities (WA DoC) operates across the housing continuum with a focus on increasing the range and diversity of affordable housing options for people on low to moderate incomes. The WA DoC provides public housing for those most in need; land and affordable housing opportunities; low deposit home loans through Keystart; assistance to access the private rental market; and homes in regional areas for government employees and other key workers so that they can deliver necessary services to their communities. As set out in the strategy for affordable housing (Department of Housing, 2015) the WA DoC aims to provide at least 30,000 affordable housing opportunities by 2020 to help low-to-moderate income earners have a place to call home. To enable the provision of housing where it is needed, it is necessary to understand where current demand is located, the scale of that demand, and by how much the demand is likely to change over time. Having this information, along with other contextual information, facilitates the decision making process being grounded on an evidence base.

2.0 Background

Finding a consistent definition of affordable housing is difficult as an exact explanation of the term has been the source of much debate (Stone, 2006). Broadly, housing affordability relates to the balance between household income levels and the ongoing cost of housing (Clapham, Clark, & Gibb, 2012, p. 379). However, the exact balance between income and cost is more complex and to truly define housing affordability the dimensions of spatial location and appropriateness of the dwelling for the household residing in it also need to be considered (Disney, 2007).

It is well recognised that lack of access to affordable housing will usually result in households falling into housing stress (Clapham, Clark, & Gibb, 2012). However, as with affordable housing, the definition of housing stress, and how to measure it, has been the basis of much deliberation (Kutty, 2005). While many methods for estimating housing stress exist (Yates & Gabrie, 2006) a ratio approach has generally been used by policy practitioners (Nepal, Tanton, & Harding, 2010).

Nepal et al compared three common ratio approaches and concluded that the 30/40 rule whereby a household is considered to be in housing stress if they spend more than 30 per cent of their income (gross or disposable) on housing and falls in the bottom 40 per cent of the income distribution, was the most suitable metric for measuring housing stress (Nepal, Tanton, & Harding, 2010). In this comparison the authors excluded households who had reported negative or nil incomes as research from the ABS had shown that the expenditure of many of these households was similar to that of households with much higher incomes and was therefore considered an unreliable guide to the household's standard of living (ABS, 2005).

2.1 Estimation of demand for housing

There have been a number of methodologies proposed for estimating housing demand. Some of these use a net stock approach (Holmans, 2000) while others use a combination of the ratio methods, residual income methods and a standard set of assumptions (Bramley & Karley, 2007). Similarly, the WA DoC had previously commissioned modelling. The approaches taken looked at estimating supply of affordable stock and demand, with the difference being the gap or hidden demand. Unfortunately, problems with the validity of the assumptions used to estimate both of these, impacted on the usefulness of the models.

In his presentation to the Australian Community Indicators Network, Professor Andrew Beer looked at measuring unmet need for low cost housing through the analysis of persons permanently residing in non-private dwellings (NPDs) and structures considered outside of the residential housing market (such as caravans, cabins and houseboats) (Beer, 2012). Beer noted that the number of persons permanently residing in the NPDs and caravans etc. had increased between the 2001 and 2006 Census, possibly because of an inability to access the market for conventional dwellings.

Using Beer's idea of direct estimation of unmet need as a starting point, the WA DoC expanded on his approach to determine whether a broader definition for unmet need for housing could be used to assist in the Department of Communities context.

3.0 Methodology

The purpose of developing a Demand Model was to enable the WA DoC to understand the scale of demand for social and affordable housing in Western Australia including where the demand was currently located and the potential changes to the magnitude of demand including identifying areas of emerging demand. The Demand Model could then be used in conjunction with other information to inform the decision making processes relating to developments, acquisitions, expenditure and funding bids.

To do this a number of factors were highlighted as being crucial to identifying the correct cohort including:

- Income (central to eligibility around public and affordable housing);
- Current tenure / living arrangements;
- Location; and
- Potential population changes.

In previous WA DoC underlying demand models, practical application of the end product was limited by broad level geographical outputs, and the use of other assumptions which did not match with the Department's definitions. Based on this history, the decision was made to create a simpler model which directly estimated the unmet demand (or gap) for housing for those within certain income bands.

The demand being estimated is the underlying demand and not effective demand, as some households such as those in overcrowded situations or living in caravans may not choose to form their own household due to personal circumstances or economic conditions. From the perspective of the WA DoC it is important to estimate the full level of potential demand.

3.1 Data sources

The WA DoC required the model being developed to use 'robust', widely accepted data. For this reason the Australian Bureau of Statistics (ABS) Census information is one of the main data sources for the model. Internal data from the WA DoC administrative system is also used. The Census occurred on 9 August 2016 and this date is used as the point in time for all data in the model.

Population projections from: the WA Department of Planning's Western Australia Tomorrow publication (Mulholland and Piscicelli, 2015); and Informed Decisions (IDplacemaker) are also used.

3.2 Region

When considering 'region', the WA DoC needed to balance data quality versus useability for decision making purposes. Staff utilising the Demand Model requested suburb level data, while staff running Census tables were concerned about the ABS' new confidentiality technique "introduced random error" and the effect this could have on the quality of highly detailed data tables. The region chosen was the Local Government Area (LGA), which was considered a reasonable balance between data quality and useability.

3.3 Income grouping and housing outcomes

Parameters for the income ranges in the model are based upon existing definitions within the WA DoC. These match with eligibility criteria for accessing public and community housing[1], subsidised rentals[2], shared equity purchase schemes[3] and Keystart home loans[4].

The criteria for WA DoC products and Keystart loans have a higher eligibility cut-off in the Pilbara and Kimberley. This is to reflect the high housing costs in these very remote regions. The Demand Model incorporates these same assumptions for the Pilbara and Kimberley, while other non-metropolitan regions continue to have the same eligibility criteria as metropolitan regions.

Using these criteria, households were classified as either:

- Very Low Income – defined as households earning less than $649 per week ($800 per week in the Pilbara or Kimberley regions); or,
- Low to Moderate Income - defined as households which earn between $650 and $1999 a week (or between $800 and $2499 a week in the Pilbara or Kimberley regions).

These groups needed to be identified separately in the model, as the income groupings are related to the degree of assistance and product response required (i.e. very low income would align to public housing and low to moderate income would align to affordable housing solutions).

Those reporting negative or nil incomes were excluded as per ABS research which had indicated these figures were an unreliable guide to the household's standard of living (ABS, 2005).

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[1] http://www.dhw.wa.gov.au/HousingDocuments/Public_Housing_Income_Limits.pdf
[2] http://www.dss.gov.au/sites/default/files/documents/05_2013/nanras_household_income_fact_sheet_may2013.pdf
[3] http://www.housing.wa.gov.au/sharedstart/Pages/EligibilityCriteria.aspx
[4] http://www.keystart.com.au/useful-info/am-i-eligible

3.4 Current tenure / living arrangements

An internal working group was setup at the WA DoC to discuss the tenure types or living arrangements which would be considered 'unmet demand' in the DoC context. To start with, those who currently owned a home outright or were purchasing a home were excluded. Similarly, those currently housed in public or community housing and who were still eligible based on income were also excluded.

The definition of homelessness developed by the ABS' Homelessness Statistics Reference Group (2012) was used as a starting point with variables taken from the Census as described in *A Statistical Definition of Homelessness* (2012). These included:

- Those living in improvised homes, tents and those sleeping out;
- Those living in hostels for the homeless, night shelters or a refuge;
- Those staying temporarily with others (couch surfers);
- Those living in severely overcrowded houses; and,
- Those households living long term in caravans.

In addition to this, those defined as 'marginally housed' in the same report were also included:

- Those households living long term in caravans; and,
- Those in overcrowded dwellings (not considered to be severely overcrowded).

The final Census variable which was considered for unmet demand for DoC purposes was rental stress based on the 30/40 rule as defined in section 2.0 (that is, those households who are in the lowest 40th percentile of income who spend more than 30 per cent of their income on housing costs).

Two other variables which were considered important for unmet demand in the WA DoC context were:

- Those in non private dwellings who needed placing on Census night (e.g. immigrants; parolees, mental health patients etc.); and
- Those in public housing (on Census night) who were over the income threshold and needed transitioning into affordable housing.

Table 1 shows the full breakdown of tenure and living arrangements and the housing products they could be considered for (based on income).

Table 1: Tenure/Living Arrangements and Housing Outcomes

Tenure / Living Arrangements	*Public Housing (Very Low Income)*	*Affordable Housing (Low / Moderate Income)*
Overcrowded houses	✓	✓
Potentially inappropriate housing (i.e. caravans and cabins)	✓	✓
Rental Stress	✓	✓
Hostels for the Homeless, night shelters or a refuge	✓	n/a
Improvised homes, tents and those sleeping out	✓	n/a
Non-private dwellings that need placing (immigrants, parolees, mental health patients etc.)	✓	✓
Temporary accommodation – staying with others (couch surfing)	✓	✓
Public Housing tenants who are earning over the current eligibility criteria.	n/a	✓

3.5 Remaining variables

Two of the variables were unable to be sourced at the LGA level. These were:

- Couch surfing: due to the complexity of the ABS' algorithm. Estimates of couch surfing are available in the ABS' data cube, *Census of Population and Housing: Estimating Homelessness_2011 Statistical Area Level 3* (2011). An adjustment was applied to the final unmet housing demand figures at the broader regional level (SA3). A basic LGA to SA3 concordance was used, therefore all LGAs within an SA3 have the same adjustment factor. This factor will be updated for the 2016 figures when it is released in early 2018.
- Immigrants, parolees, mental health etc.: This data was sourced from the WA DoC priority waitlist, which only records broad regional preferences. These households were adjusted for at the metropolitan/ex-metropolitan level only.

Detailed specifications for running all Census variables are contained in Appendix 1.

3.6 Combining data sources and calculations

With the use of separate data sources it was important to address the potential issue of duplication. As the data was processed it was ensured that:

- No overlap existed between tables;
- Public/community housing was removed from the Census tables;
- Tables were defined as finely as possible to avoid things like 'visitor only households' etc.; and,
- Households with negative/nil income were removed from the analysis.

Rental Stress (as discussed in section 2.1) was calculated at $59,500 which was higher than the 2011 Demand Model cut-off ($46,666 per annum). This was based on the ABS' Survey of Household income and Wealth, Australia (2013-14), and then adjusted by the ABS' Wage Cost Index (WCI)

(2014-16) to bring it to June 2016. Rent stress was set at 30 per cent of household income, except where an LGA had a Socio-Economic Index for Area (SEIFA, ABS, 2011) score of 10 (i.e. most advantaged). In these areas, rental stress was set at 40 per cent to account for households choosing to spend more to live in a better area. Again, the Demand Model model will be updated for SEIFA (2016) on its release in March 2018.

3.7 Priority ranking system

The Demand Model uses the Census and admin-by-product data to produce estimates of unmet demand on Census night. The DoC then developed a method to summarise the Demand Model output so it could be used quickly and easily. Population projections were added as the second variable, to ensure emerging areas of unmet demand were given priority for expenditure. The two variables (unmet demand and population projection) were used to produce a scoring and prioritisation methodology which then allowed the production of ranking tables and maps.

3.7.1 Population growth/decay

The Department of Planning's (LGA level) Western Australia Tomorrow (2012) and the Informed Decisions (LGA level) population projections were used as the basis for estimating population growth/decay between 2016 and 2026.

Updated population projections are due to be released in mid 2018. These will be incorporated into the model once they are released.

3.7.2 Development of a scoring system

Utilising both the output from the Demand Model and the estimates of population growth/decay (2016 to 2026), a scoring system for both very low and low to moderate households was developed.

The scores were set by looking at the distributions of the two variables (unmet housing demand and population projections). Table 3.7 shows the ranking systems and the final scores used.

- Score 1: Based on unmet demand for housing at Census night, 2016.
- Score 2: Based on expected population projection 2016 – 2026.
- Total score: score 1 + score 2.

Table 3.7 Priority Ranking System Scores

Unmet demand for housing	Score 1	Population projection 2016- 2026	Score 2
<20	0	**<0**	-1
20<=X<50	1	**=0**	0
50<=X<100	2	**0<X<5%**	1
100<=X<200	3	**5<=X<10%**	2
200<=X<300	4	**10<=X<15%**	3
300<=X<400	5	**15<=X<20%**	4
400<=X<600	6	**20<=X<25%**	5
600<=X<800	7	**25<=X<35%**	6
800<=X<1000	8	**X >=35%**	7
1000<=X<2000	9		
X >= 2000	10		

A score was calculated for each LGA, with different tables/maps for the household income groups (very low and low to moderate) and by broad regional area (metropolitan or non-metropolitan area). This provided a clearer profile of the type of housing response required (public or affordable housing) and the general area required. Using the final scores the LGAs were then ranked as:

RANKING	DESCRIPTION
1	Very high priority
2	High priority
3	Neutral priority
4	Low priority
5	Very low priority

For the metropolitan area (32 LGAs), only the first three categories were used. For the ex-metropolitan area (105 LGAs) the LGAs were split evenly across the five categories. This was because in the metropolitan area all the LGAs were considered accessible to employment due to the transport infrastructure around the city. This is not the case for the 105 regional LGAs, where there are large distances between LGAs. In terms of job opportunities and transportation for work purposes, it was considered that the regional LGAs were much more self contained.

4.0 Results

Output from the Demand Model is separated into two types:

- Broad level output which estimates the overall demand for public and affordable housing across Western Australia on Census night; and
- Ranked Geographic Output which uses the scoring system discussed in section 3.7.2 to show relative demand across LGAs within the metropolitan or non-metropolitan areas.

4.1 Broad level output

The WA DoC housed over 40,000 public and community households on Census night 2016. These were made up of:

- Very low income households (e.g. public housing and very low income community housing); and
- Low income households (e.g. low income community households).

As well as these existing households, the Demand Model estimated that there was an unmet housing need of approximately 61,000 very low, low or moderate income households as at Census night, 2016. This was made up of:

- Over 28,000 very low income households; and
- Over 33,000 low or moderate income households.

4.2 Ranked geographic output

As the ranking system takes into account both the demand model figure (a count of overcrowding, inappropriate housing, rental stress in low income households etc.) and the projected population increase to 2026, it is highlighting a mix of quite different LGAs. The top ranked LGAs have both high levels of unmet demand and high projected population growth.

4.2.1 Metropolitan area: Very Low Income (Public Housing response)

The top ranked LGAs include Armadale (unmet demand of approx. 1000 public houses on Census night 2016 and a projected population growth of 36.7 per cent to 2026); Wanneroo (unmet demand for approx. 1750 public houses, growth of 36.6 per cent) and Swan (unmet demand for approx. 1300 public houses, growth of 34.3 per cent).

Other LGAs ranked highly may have had a high level of unmet demand or a high projected population growth (but not both). For example, Stirling had the highest level of unmet demand for public housing (approx. 2700) but a more moderate projected population growth (10.8%). The LGA of Kwinana has a (moderate) unmet demand of approx. 520 public houses, but the highest projected population growth (40.0% to 2026).

Low levels of unmet demand and low population growth are expected in the higher socio-economic suburbs such as East Fremantle, Cottesloe, and Peppermint Grove.

Table 6: Output - Metropolitan rankings (LGA level) – Very low income households (public housing)

Very High Priority	High Priority	Neutral Priority
Armadale (C)	Bayswater (C)	Melville (C)
Wanneroo (C)	Canning (C)	Claremont (T)
Swan (C)	Serpentine-Jarrahdale (S)	Mundaring (S)
Rockingham (C)	Murray (S)	Bassendean (T)
Mandurah (C)	Belmont (C)	Cambridge (T)
Kwinana (C)	Vincent (C)	Mosman Park (T)
Perth (C)	Joondalup (C)	Cottesloe (T)
Cockburn (C)	Subiaco (C)	East Fremantle (T)
Stirling (C)	Kalamunda (S)	Nedlands (C)
Gosnells (C)	Fremantle (C)	Peppermint Grove (S)
Victoria Park (T)	South Perth (C)	

4.2.2 Metropolitan area: Low to Moderate Income (Affordable Housing response)

Wanneroo was the highest ranked (unmet demand for approx. 2700 affordable houses, population projection of 36.6 per cent), followed by Armadale (unmet demand for approx. 1200 affordable houses, 36.7 per cent growth to 2026), and, Swan (unmet demand for approx. 1900 affordable houses, 34.3 per cent growth to 2026).

Once again, Stirling had the highest unmet demand for affordable housing at Census night 2016 (approx. 3900 houses).

Table 7: Output - Metropolitan rankings (LGA level) – Low to moderate income households (affordable housing)

Very High Priority	High Priority	Neutral Priority
Wanneroo (C)	Gosnells (C)	Melville (C)
Armadale (C)	Bayswater (C)	Claremont (T)
Swan (C)	Canning (C)	Subiaco (C)
Rockingham (C)	Serpentine-Jarrahdale (S)	Bassendean (T)
Kwinana (C)	Murray (S)	Cambridge (T)
Mandurah (C)	Fremantle (C)	Mosman Park (T)
Cockburn (C)	Kalamunda (S)	Cottesloe (T)
Stirling (C)	Joondalup (C)	East Fremantle (T)
Perth (C)	Vincent (C)	Nedlands (C)
Victoria Park (T)	South Perth (C)	Peppermint Grove (S)
Belmont (C)	Mundaring (S)	

4.2.3 Non-metropolitan area (Regional): Very Low Income (Public Housing response)

For public housing in regional WA, Busselton LGA was the highest ranked (unmet demand for approx. 640 public houses, population projection of 21.5%); followed by Greater Geraldton (unmet demand for approx. 690 public houses, 15.3% growth to 2026); and, Broome (unmet demand for approx. 400 public houses, 16.0% growth to 2026).

Areas of high population growth (but lower unmet demand for public housing) included: Capel (26.1% growth to 2026); Dardanup (20.3% growth to 2026); and Chittering (25.0% growth to 2026).

Table 8: Output - Regional rankings (LGA level) – Very low income households (public housing)

Very High Priority	High Priority	Neutral Priority	Low Priority	Very Low Priority
Busselton (C)	Derby-West Kimberley (S)	Wagin (S)	Dundas (S)	Meekatharra (S)
Greater Geraldton (C)	Esperance (S)	Halls Creek (S)	Cunderdin (S)	Mingenew (S)
Broome (S)	Wyndham-East Kimberley (S)	Ashburton (S)	Dumbleyung (S)	Dowerin (S)
Capel (S)	Chapman Valley (S)	Wandering (S)	Kellerberrin (S)	Wyalkatchem (S)
Harvey (S)	York (S)	Ravensthorpe (S)	Kondinin (S)	Morawa (S)
Albany (C)	Boddington (S)	Menzies (S)	Narembeen (S)	Broomehill-Tambellup (S)
Bunbury (C)	Toodyay (S)	Westonia (S)	Nungarin (S)	Cue (S)
Dardanup (S)	Shark Bay (S)	Williams (S)	Perenjori (S)	Kulin (S)
Augusta-Margaret River (S)	Plantagenet (S)	Woodanilling (S)	Tammin (S)	Mount Magnet (S)
Chittering (S)	Narrogin (S)	Beverley (S)	Victoria Plains (S)	Sandstone (S)
Denmark (S)	Northampton (S)	Boyup Brook (S)	Wickepin (S)	Trayning (S)
Gingin (S)	Bridgetown-Greenbushes (S)	Ngaanyatjarraku (S)	Kojonup (S)	Wiluna (S)
Northam (S)	Carnarvon (S)	Pingelly (S)	Gnowangerup (S)	Yilgarn (S)
Waroona (S)	Nannup (S)	Merredin (S)	Lake Grace (S)	Leonora (S)
Exmouth (S)	Dandaragan (S)	Brookton (S)	Moora (S)	Laverton (S)
East Pilbara (S)	Katanning (S)	Murchison (S)	Goomalling (S)	Wongan-Ballidu (S)
Karratha (C)	Coolgardie (S)	Kent (S)	Yalgoo (S)	Bruce Rock (S)
Collie (S)	Irwin (S)	Corrigin (S)	Dalwallinu (S)	Coorow (S)
Port Hedland (T)	Manjimup (S)	West Arthur (S)	Cranbrook (S)	Carnamah (S)
Kalgoorlie/Boulder (C)	Upper Gascoyne (S)	Cuballing (S)	Quairading (S)	Mukinbudin (S)
Donnybrook-Balingup (S)	Jerramungup (S)	Koorda (S)	Mount Marshall (S)	Three Springs (S)

4.2.4 Non-metropolitan area (Regional): Low to Moderate Income (Affordable Housing response)

For the low to moderate income households requiring assistance with affordable housing, Busselton LGA was again the highest ranked (unmet demand for approx. 800 affordable houses, population projection of 21.5%), followed by Broome (unmet demand for approx. 500 affordable houses, 16.0% growth to 2026), and Greater Geraldton (unmet demand for approx. 500 affordable houses, 15.3%

growth to 2026).The low and very low priority columns are dominated by LGAs in the Wheatbelt, Great Southern and the Mid-West/Gascoyne regions.

Table 8: Output - Regional rankings (LGA level) – Low/moderate income households (affordable housing)

Very High Priority	High Priority	Neutral Priority	Low Priority	Very Low Priority
Busselton (C)	Collie (S)	Manjimup (S)	Cunderdin (S)	Meekatharra (S)
Broome (S)	Esperance (S)	Ashburton (S)	Dumbleyung (S)	Mingenew (S)
Greater Geraldton (C)	Chapman Valley (S)	Beverley (S)	Gnowangerup (S)	Dowerin (S)
Capel (S)	Donnybrook-Balingup (S)	Boyup Brook (S)	Kellerberrin (S)	Wyalkatchem (S)
Harvey (S)	York (S)	Coolgardie (S)	Kojonup (S)	Broomehill-Tambellup (S)
Albany (C)	Toodyay (S)	Menzies (S)	Kondinin (S)	Morawa (S)
Bunbury (C)	Shark Bay (S)	Ngaanyatjarraku (S)	Lake Grace (S)	Cue (S)
Dardanup (S)	Carnarvon (S)	Pingelly (S)	Merredin (S)	Kulin (S)
Augusta-Margaret River (S)	Boddington (S)	Ravensthorpe (S)	Moora (S)	Laverton (S)
Chittering (S)	Nannup (S)	Wandering (S)	Narembeen (S)	Leonora (S)
Derby-West Kimberley (S)	Plantagenet (S)	Westonia (S)	Nungarin (S)	Mount Magnet (S)
Denmark (S)	Dandaragan (S)	Williams (S)	Perenjori (S)	Sandstone (S)
Exmouth (S)	Narrogin (S)	Woodanilling (S)	Tammin (S)	Trayning (S)
Northam (S)	Northampton (S)	Brookton (S)	Victoria Plains (S)	Wiluna (S)
Kalgoorlie/Boulder (C)	Bridgetown-Greenbushes (S)	Kent (S)	Wickepin (S)	Yilgarn (S)
Gingin (S)	Halls Creek (S)	Murchison (S)	Goomalling (S)	Wongan-Ballidu (S)
East Pilbara (S)	Upper Gascoyne (S)	Corrigin (S)	Yalgoo (S)	Bruce Rock (S)
Karratha (C)	Jerramungup (S)	West Arthur (S)	Dalwallinu (S)	Coorow (S)
Port Hedland (T)	Katanning (S)	Cuballing (S)	Cranbrook (S)	Carnamah (S)
Wyndham-East Kimberley (S)	Wagin (S)	Koorda (S)	Quairading (S)	Mukinbudin (S)
Waroona (S)	Irwin (S)	Dundas (S)	Mount Marshall (S)	Three Springs (S)

5.0 Conclusion

The WA DoC Demand Model provides an estimate of the need for public and affordable housing for those on very low to moderate incomes at the LGA level. The data sources used are: the Census; DoC admin-by-product; and population projections (WA Department of Planning, and Informed Decisions) population projections. These are all considered to be accurate data sources at the LGA level. However, the DoC is aware of issues impacting on data quality, including "introduced random error" (Census) and modelling error (population projections) and therefore treats the resulting Demand Model figures as indicative only.

The WA DoC Demand Model provides the Department with a valuable snapshot of current and emerging areas of demand across WA. It is not the sole source of information for decision making, but rather provides valuable insight that, when coupled with information from environmental scanning, local knowledge and other demographic information, enables more informed decisions to be made.

Future projects may include assessing methods to update the model between Census years and looking at forecasting unmet demand for public and affordable housing over time.

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Appendix 1: Specification for tables.

Housing required	Description	Housing required	Description
Very low income households	*Households living in inappropriate dwellings earning <$33,800 (Caravans, Cabins, Houseboats)*	Low to moderate income households	*Households living in inappropriate dwellings (Caravans, Cabins, Houseboats) earning between $33,801 and the maximum under affordable housing eligibility (e.g. $104,000 in metro area)*.
Specification	LGA (enumeration) STRD=caravan (91), cabin/houseboat (92) HIND HHCD=one family (1), multiple family (2), non-family (3). This removes (4): all non-classifiable households and N/A.		
Very low income households	*Households living in improvised homes, tents and those sleeping out.*		
Specification	LGA (enumeration) STRD=Improvised homes, tents and those sleeping out (93) HIND		
Very low income households	*Those in non-private dwellings category 13 (Hostel for homeless, night shelter, refuge)*		
Specification	LGA (enumeration) NPDD= Hostel for homeless, night shelter, refuge (13)		
Very low income households	*Households living in overcrowding dwellings (based on the Canadian occupancy standard) earning <$33,800. These cannot be existing social housing tenants.*	Low to moderate income households	*Households living in overcrowding dwellings (based on the Canadian occupancy standard of no more than 2 persons per bedroom) who earn more than the 40th percentile[3] for income in WA but less than the maximum under affordable housing eligibility (e.g. $104,000 in metro area).*
Specification	LGA (enumeration) HIND HOSD HHCD=multiple families		
Very low income households	*Households living in rental stress under the 30/40[2] rule (spending over 30% of income and earning less than the 40th Percentile[3] for income in WA). Maximum income is based on public housing eligibility criteria*	Low to moderate income households	*Households living in rental stress under the 30/40[2] rule (spending over 30% of income and earning less than the 40th Percentile[3] for income in WA). Must be earning between the public housing eligibility criteria*

	(e.g. <$33,800 in metro area). These cannot be existing social housing tenants.		*and the 40th income percentile[3] for WA). (e.g. $33,801-$59,500 in metro area)*
Specification	LGA (enumeration) HIND RNTRD (groupings) LLDD=Real Estate Agent (10),Person not in same HHLD – parent/relative (31), Person not in same HHLD –other (32) HHCD=one family (1)		
Very low income households	*Those in non-private dwellings who need placing: immigrants; parolees; mental health patients etc.*		
Specification	Those on the priority waiting list of August 2016 and include: Domestic Violence; Employment; Harassment; Medical Conditions; and Reuniting Children and Families.		
		Low to moderate income households	*Current social housing tenants whose income is within 10% of their eligibility criteria and who can afford the lower quartile Perth median rental price (based on the number of bedrooms required).*
Specification	Existing public housing tenants as at June 30th 2016 (including information on household income, bedroom entitlement, eligibility cut-off etc.).		

[3] The 40th percentile for income at the WA level was calculated using the ABS' 2013-14 Survey of Household income and Wealth, adjusted by the ABS' Wage Cost Index (WCI) 2014-2016 to bring it to June 2016. It was calculated to be $59,500 per annum.