Methodology Statement: Population Estimates

24 June 2016

This methodology statement has been prepared to explain the process by which estimates of the future residential population, and specifically the school-age population, of the future development of 6-30 Artarmon Road, Willoughby (the Site) for 510 apartments.

Methodology

Approach

This analysis has been undertaken in order to estimate:

- Total future residential population of the Site post-development

- Total additional demand for enrolments at local public primary and secondary schools as a result of the redevelopment of the Site

In order to make these projections, this analysis identifies the existing demographic characteristics of current households residing in mid- to high-rise apartment buildings (four storeys or greater) within the Willoughby City Council local government area (Willoughby LGA). These existing apartments are predominately located within the suburbs of Artarmon, Chatswood, Willoughby and Northbridge. Based on data regarding the dwelling occupancy rates for different size dwellings and the age profile of these residents, it is possible to ascertain and project the likely occupancy and demographic characteristics of the future population of the Site.

It is also necessary to determine the proportion of students who would attend government schools as opposed to private or independent schools, so as to project the proportion of school age students who would give rise to demand for government school infrastructure. This has been analysed for all school-attending students living within the Willoughby LGA.

Development Assumptions

Household characteristics and dwelling occupancy rates are strongly correlated with the dwelling structure and with the number of bedrooms within the dwelling. Neither the approved Concept Plan or the Modification Application seek planning approval for a defined mixture of apartment types. On the contrary, Condition 27 of the existing Concept Approval requires that this mix should not be determined until the time of future Development Applications, when market conditions and demand are able to be determined closer to the point of sale and occupancy. As such, this analysis is required to make assumptions regarding the mix of apartment types that would be delivered in the future. For the purpose of this analysis, the following apartment mix has been estimated:

- One bedroom – 25%

- Two bedrooms – 60%

- Three bedrooms – 15%

Data Source

This analysis utilises data from the Australian Bureau of Statistic's 2011 Census of Population and Housing (2011 Census). The 2011 Census is the most recently available and most accurate data source providing small geography dwelling occupancy rates and population counts.

All data relied on for this analysis relates to the Willoughby LGA. For analysis of dwelling occupancy patterns, it is confined to apartments in mid- to high-rise buildings, whilst for schools it captures all primary and secondary school students living within the LGA.

Using ABS TableBuilder Pro, it is possible to refine and cross-tabulate data inquiries to produce results that are specific to defined parameters. In this instance, it is possible to narrow the reporting of demographic data to show the characteristics of only those persons who reside in apartments, and within buildings with four or more storeys, and within the Willoughby LGA, and then display this data by the number of bedrooms within each dwelling. This allows for a highly targeted approach in producing demographic results for use in the analysis.

The 2011 Census included a question that asked respondents to distinguish between the type of educational institution being attended between government schools and private/independent schools. Data gathered through this question was analysed for all school-attending students within the Willoughby LGA.

Findings

Table 1 identifies the average number of persons living with mid- and high-rise apartment buildings within the Willoughby LGA, broken into occupancy rates for apartments based on the number of bedrooms within each dwelling. As can be seen in the table there is a linear correlation in dwelling occupancy rates, with more people residing in larger apartments.

Table 2 provides an analysis of the proportion of persons of different age groupings within each of the dwellings. As can be seen in this table, school-aged students are more likely to live in larger apartments.

Table 1 – Occupancy rates for apartments in 4+ storey apartment buildings in Willoughby LGA, by number of bedrooms

Bedrooms	Occupancy Rate (Average Number of Persons Per Dwelling)
Studios	*1.43**
1 bedroom	1.60
2 bedrooms	2.19
3 bedrooms	2.78
4 bedrooms	*3.22**

Data Source: ABS 2011 Census

* Studios and 4 bedroom apartments together comprise less than 4% of total apartments within the Willoughby LGA sample. As such, these occupancy rates are based on a small sample size and are have a lower degree of accuracy than other results.

Table 2 – Breakdown of population living in apartments in 4 + storey apartment buildings in Willoughby LGA by age grouping

Bedrooms	Preschool age (0-4 years)	School Age (5-19 years)	Employment (20-64 years)	Retirement (65+ years)	Total
Studios	2.2%	3.6%	88.9%	5.4%	100%
1 bedroom	3.3%	5.7%	83.3%	7.7%	100%
2 bedrooms	6.6%	11.2%	74.2%	8.0%	100%
3 bedrooms	5.8%	15.5%	68.5%	10.1%	100%
4 bedrooms	0.0%	12.0%	73.5%	14.5%	100%

Data Source: ABS 2011 Census

Table 3 illustrates the proportional split of students living within the Willoughby LGA attending government, Catholic and other non-government schools. As can be seen, more than two-thirds of primary school students attend government schools whilst less than 40% of secondary students attend government schools.

Within the Willoughby LGA, for school-aged children living within mid- and high-rise apartments, there is an even split between children of primary school age (50.3%) and secondary school age (49.7%).

Table 3 – School attendance patterns for students living within the Willoughby LGA

School Type	Primary School	Secondary
Government	67.7%	39.6%
Catholic	17.4%	27.4%
Other Non-Government	14.9%	33.0%
Total	**100%**	**100%**

Data Source: ABS 2011 Census

Projections

Utilising the information compiled above relating to the occupancy characteristics of apartments in mid- and high-rise buildings in the Willoughby LGA above, and information relating to the proposed development for the Site, it is possible to project the likely future demographic characteristics of the Site's future residential population.

As set out in **Tables 4**, **5** and **6**, these projections indicate that:

▪ The proposed development would accommodate a total resident population of 1,087 persons.

▪ Of the total population, there would be 60 primary school-age children and 60 secondary school-age children.

▪ Of the projected students, 41 would attend government primary schools and 24 would attend government secondary schools.

▪ **This represents an increase of only 9 primary school students and 5 secondary school students compared to a residential development scheme with 400 dwellings.**

Table 4 – Total projected population for the Site

	Number of Dwellings Proposed	Occupancy Rate	Population
1 bedroom	127	1.60	203
2 bedrooms	306	2.19	670
3 bedrooms	77	2.78	214
Total	**510**	-	**1,087**

Table 5 – Total projected demand for government schools arising from the Site

	Total Population	School Age (5-19 years)	Preschool age (0-4 years)
1 bedroom	203	12	7
2 bedrooms	670	85	44
3 bedrooms	214	33	12
Total	**1,087**	**120**	**63**

Table 6 – Projected distribution of future school-aged students from site between government and non-government schools

	Total Students	Government	Catholic/ Independent
Primary	60	41	19
Secondary	60	24	36
Total	**120**	**65**	**55**

Limitations

This analysis is a projection of the possible future occupancy rates for the Site based on publicly available historical data, which has a number of inherent limitations that are common to any form of demographic projections. Key considerations include:

- Projections are based on historical occupancy rates of dwellings existing within the Willoughby LGA, and there may be differences between the occupancy characteristics of these dwellings and the occupancy characteristics of future, new dwellings being delivered on the Site. Actual occupancy characteristics of future dwellings within the site may be determined by a wide range of factors including pricing, internal size, apartment layouts, mix of owner-occupier and investors, project marketing and timing of project delivery.

- The analysis includes assumptions regarding the mix of apartment sizes (by bedroom) that would not be finalised until the submission of individual Development Applications for individual buildings, based on market demand and projected demographic characteristics. As such, the proportion of school-aged children may vary if the mix changes.

- Whilst representing the most recent available data, the 2011 Census results are now five years old and represent a snapshot of the population and dwelling occupancy characteristics in the Willoughby LGA at that time. Results from the forthcoming 2016 Census are not due for release until 2017.

- Due to the 2011 collection date for Census data, the analysis does not capture the dwelling occupancy patterns for multi-unit residential developments which have been completed between August 2011 and present. This includes a number of high-rise apartment buildings in the Chatswood CBD as well as lower-scale development predominately in the vicinity of Chatswood and Willoughby.