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Sustainable in 2030? The impact of population growth in Melbourne’s inner activity centres.

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ABSTRACT: The advent of sustainable approaches to managing an increase of population in our urban centres, such as the Melbourne 2030 planning policy, has led to questions regarding their successful implementation at local government level. Issues relating to the location of sustainable built form and infrastructure are of particular importance considering Melbourne 2030’s direction regarding intensification around existing activity nodes. The following paper embarks on an investigation into the impact of the projected population growth set out in the 2030 policy, focusing particularly on the consequent implications of increased residential densities in and around activity centres within the inner Melbourne region. Utilising various mapping techniques, a series of comparative built form/density scenarios will be generated that begin to explore the issues of implementation faced at a local government level.

Conference Theme: Human and natural environments
Key words: population increase, built form, mapping projections

1. INTRODUCTION

The metropolitan region of Melbourne is set to grow by up to 1 million people or 620,000 dwellings by the year 2030. (Infrastructure 2002) The impact of this growth on existing infrastructure and services, especially within inner, highly urbanised areas is estimated to be substantial. It is important to recognise the implications of such an increase in population, especially in areas where residential land use coincides with business and mixed-use zones. The translation of a growth in dwellings from a numerical figure, into a three-dimensional spatial value is a core component of this understanding.

Utilising the parameters of projected growth and simulated density, the following paper explores a range of visualised built form scenarios for projected residential growth in the Inner Melbourne region over the next 25 years. A simple computational approach is adopted to begin to assist in exploring future development initiatives and determining key urban change management issues for a particular Inner Melbourne activity centre.

This paper forms the basis for an initial investigation into the future growth of Melbourne’s inner suburbs which is being further advanced at Doctoral Research level.

2. INNER MELBOURNE

Characterised by the four major municipal areas of The City’s of Melbourne, Yarra, Port Phillip and Stonnington (part), the Inner Melbourne region contains the traditional core of Metropolitan Melbourne, housing many of the city’s state, national and international attractions. Logically, being an inner metropolitan area, access to retail and commercial services is greater and of a higher density than in outer urban and suburban areas, serviced by a comprehensive public transport network.

Recent population projections suggest that by the year 2031, Inner Melbourne’s population is set to increase by a further 144,886 people or about 78,000 dwellings. (Sustainability and Environment 2004) This kind of growth is akin to the growth Melbourne experienced during the “long boom” (Forster 1999) period after the Second World War (1947-71) where metropolitan Melbourne grew by about 1.16 million people. Whilst post-war growth was fuelled mostly by the “baby boom” and subsequent immigration policies, growth over the next 25 years is expected to be influenced heavily by changes in housing, namely the effects of the ageing population and trends towards smaller household numbers (Infrastructure 2002).
3. POPULATION AND HOUSING PROJECTIONS

Since the publication of Melbourne 2030, population projections have been updated and subsequently published in the State Government’s document entitled, ‘Victoria in Future 2004’. The research presented here utilises this updated data whilst drawing on principles and initiatives outlined in the original Melbourne 2030 documentation to present an analysis of the impacts of residential demand around an Inner Melbourne activity centre – Bay Street in Port Melbourne.

The following tables outline the population and housing projections for (a) the Inner Melbourne region and its component municipal areas, and (b) the suburb-level projections for the Port Phillip municipality.

Table 1: Inner Melbourne & Municipal Areas - Projected Growth, 2001-2031

<table>
<thead>
<tr>
<th>Municipal Area</th>
<th>Population</th>
<th>Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Melbourne (SSD)</td>
<td>+144,886</td>
<td>+78,057</td>
</tr>
<tr>
<td>Melbourne (LGA)</td>
<td>+94,465</td>
<td>+49,215</td>
</tr>
<tr>
<td>Port Phillip (LGA)</td>
<td>+32,740</td>
<td>+15,913</td>
</tr>
<tr>
<td>Stonnington (Part) (SLA)</td>
<td>+7,798</td>
<td>+6,436</td>
</tr>
<tr>
<td>Yarra (LGA)</td>
<td>+20,915</td>
<td>+12,792</td>
</tr>
</tbody>
</table>

Table 2: Port Phillip (LGA) Municipal Area - Projected Growth, 2031. Suburb-level

<table>
<thead>
<tr>
<th>Suburb</th>
<th>Area (km²)</th>
<th>Population</th>
<th>Dwellings % from 2001</th>
<th>Ave. H’Hold Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Melbourne</td>
<td>2.5</td>
<td>14,748</td>
<td>4,227</td>
<td>2.10</td>
</tr>
<tr>
<td>South Melbourne</td>
<td>9.7</td>
<td>11,134</td>
<td>3,229</td>
<td>1.90</td>
</tr>
<tr>
<td>Albert Park</td>
<td>3.2</td>
<td>7,980</td>
<td>2,314</td>
<td>2.00</td>
</tr>
<tr>
<td>Balaclava</td>
<td>0.8</td>
<td>7,058</td>
<td>2,047</td>
<td>1.98</td>
</tr>
<tr>
<td>Elwood</td>
<td>2.6</td>
<td>18,079</td>
<td>5,243</td>
<td>1.81</td>
</tr>
<tr>
<td>Middle Park</td>
<td>0.9</td>
<td>5,601</td>
<td>1,624</td>
<td>2.15</td>
</tr>
<tr>
<td>Ripponlea</td>
<td>0.3</td>
<td>1,892</td>
<td>549</td>
<td>1.96</td>
</tr>
<tr>
<td>St Kilda</td>
<td>3.2</td>
<td>22,420</td>
<td>6,502</td>
<td>1.61</td>
</tr>
<tr>
<td>St Kilda East</td>
<td>2.3</td>
<td>16,562</td>
<td>4,803</td>
<td>2.00</td>
</tr>
<tr>
<td>St Kilda Road</td>
<td>0.8</td>
<td>7,176</td>
<td>2,081</td>
<td>1.63</td>
</tr>
<tr>
<td>St Kilda West</td>
<td>0.6</td>
<td>4,580</td>
<td>1,328</td>
<td>1.76</td>
</tr>
</tbody>
</table>

Detailed projection data was not available for individual suburbs in the Victoria in Future 2004 document therefore an approximate representative proportion was determined from existing Port Phillip suburb profiles. It is assumed that...
although projections are not guaranteed to remain in the same proportions, using this extrapolated information provides an interesting base from which to analyse possible impacts at an activity centre scale.

4. MODELLING CONTEXTS – THE PORT MELBOURNE CASE STUDY

The City of Port Phillip consists of eleven suburbs, four (4) of which accommodate a Major Activity Centre – Balaclava (Carlisle Street), Port Melbourne (Bay Street), South Melbourne (Clarendon and Coventry Streets) and St Kilda (Acland and Fitzroy Streets). For the purposes of this initial study, the focus will centre on the Major Activity Centre of Bay Street in Port Melbourne. The Activity Centre itself is characterised by the existing retail and commercial strip denoted by the existing Business 1 Zone.

Located approximately 5km south-east of Melbourne’s Central Business District, Port Melbourne is one of Melbourne’s most unique bayside suburbs. Characterised by its diverse urban form and structure Port Melbourne boasts a rich maritime history with prominent features such as Princes and Station Piers articulating the coastline. The past decade has seen the transformation of Port Melbourne from an industrial, working port to a bayside revitalisation of the Bay Street shopping precinct.

The Bay Street activity centre is the main shopping and retail centre servicing Port Melbourne. Functioning predominantly as a local convenience centre, it also hosts a range of home wares, entertainment and eateries that attract shoppers from a wide range of locations within metropolitan Melbourne and beyond. Bay Street’s proximity to the foreshore and the tourist operations at Station Pier positions it potentially as the gateway activity centre to Melbourne for both interstate and international tourists arriving by cruise ship.

Figure 2: Port Phillip Municipal Area – consisting of 11 suburbs, four of which accommodate a Major Activity Centre.

5. USING THE GRID AS A FORM GENERATOR

5.1. Background

In a recent paper by Esteban, Sowinski and Rollo (2004), which utilised a set of predetermined constructs for different types of urban/city based user groups, such as net floor space requirements and time/travel distances, Figure 3a, the authors presented a simple model for assisting in identifying, mapping and spatially exploring various development scenarios.

The model was initially developed in order to assist in exploring future development initiatives for the proposed expansion of the Deakin University Waterfront campus at Geelong from a present cohort of 700 students to a planned cohort of 5000+ students. Working with the University City paradigm the authors conducted a precedent study of different inner city structures which accommodate higher education institutions. These institutions were assessed and analysed in terms of their: student populations; estimated gross floor area; and dispersion distances between facilities. This information was compared with current operational requirements for Higher Education facilities and a net floor area established which could be divided into different spatial arrangements based on the management and academic structure of the university. The concepts generated by the model established a range of generic permutations, or seeding plans, which enabled both city and university planners to consider the urban morphology of Geelong in ways not previously defined. While the seeding plans could, in themselves, be interpreted as real built form, providing indicative projections of the relationship of built space to open public/private space, they were
designed more to be interpreted as location points on a Cartesian framework. Hence one of the benefits of the model was the way in which simple constructs could assist in reflective thinking regarding the spatial relationships between sites of use and the urban context. Facilitating discourse they compel designers to compare the analytical criteria that describe the current framework of the city and a projection of how the criteria may change if subject to a particular seeding plan.

The current model draws on concepts presented in Sir Leslie Martin’s essay “The Grid as Generator”, which provides a strong theoretical basis for urban design by demonstrating how changes in the relationship between built form and space can affect the city as a whole. Martin’s presentation worked with the spatial qualities of the city by interpreting them as purely mathematical arrangements, or groupings, that could be manipulated, depending on density and grain, to reveal the possibilities available to urban planners, architects, developers and engineers. Adopting the concept of the ‘Fresnel Square Diagram’ (Figure 3b) where “all concentric squared annuluses have the same surface area, which is also equal to the area of the centre square.” (Martin 1972), Martin studied the relationship between distance and built form, in the development of medium density and terrace housing models, to counter argue the generation of the high rise apartment block in lower socio-economic neighbourhoods.

Figure 3a: University_City - Generating the base grid and cell size

Figure 3b: (a) Fresnel Diagram and (b) Density study models developed by Martin and March at Cambridge during the 1960’s.

5.2. Current Model

While the model developed by Esteban, Sowinski and Rollo can be codified with a language of coefficients representing a range of criteria, such as distance and density relationships, the method presented here uses a base grid generated from the existing urban structure found around the Bay Street activity centre. Figure 4 represents the structure of this grid constituting approximately 200m x 100m blocks separated by streets varying from 20m and 30m in width. In order to facilitate the scenario mapping process and accommodate the assumed generic housing sizes, blocks are broken down into cells measuring 20m x 20m.
6. ASSUMPTIONS

In order to facilitate the mapping process, two key assumptions were established relating to the form and arrangement of the modelled scenarios. These were:

1. The projected dwelling increase for the particular geographic area, and
2. Two (2) generic housing footprint sizes (floor area).

These assumptions function as parameters in the process of scenario mapping and assist in the creation of a framework of possibilities that contribute to the discussion of housing growth sustainability.

The first assumption relates to Melbourne 2030’s policy on Housing, whereby, “…a substantial share of new dwellings will continue to be built in established residential areas.” (Infrastructure 2002) For the purposes of this exercise it is assumed that a “substantial share” will consist of 50% of all new housing, to be located within a comfortable walking distance (400m or 5 minutes) from its nearest activity centre. Working with the case study of Port Melbourne where the projected housing increase is 1,926 dwellings, it is assumed therefore that approximately 963 new dwellings will be required for the Bay Street Activity Centre, as the lone existing activity centre in Port Melbourne itself.

In order to facilitate the scenario mapping process, a set of generic housing footprint sizes were required. Based on existing medium density housing typologies as well as current and projected average household sizes, two generic housing sizes were established – 50m² and 100m² (Figure 5). These base floor area sizes form the basis for a number of housing typologies ranging both in footprint size and density.

An initial projected built form requirement analysis for these generic housing sizes reveals the net floor area required to house the required 963 dwellings for Bay Street is, 48,150m² for the 50m² housing size or 96,300m² for the 100m² housing size (Figure 6).
7. SCENARIO MAPPING

Utilising the generic housing sizes and the required net floor area to accommodate housing growth, a number of density models were developed to be located within the comfortable walking distance catchment area (400m radius) around the Bay Street activity centre.

Figure 7 outlines the series of built form scenarios developed in the study in their primitive form, prior to application to the Bay Street context. In this primitive form, the generic scenarios represent built form on the grid and are configured by a predetermined distance of building dispersion. Schemes 1-3 are based on the same configuration, assuming a clustered form while scheme 4 looks at a development of similar nature but with a reduced footprint size. Schemes 5 and 6 simulate the results of placing a series of tower buildings (10-20 storeys) in the activity centre.

The development and subsequent application of these generic built form scenarios to Bay Street assists in the process of testing densities within existing areas of urban form, whilst allowing for the formulation of a series of sustainability benchmarks and indicators particular to such a context. By modelling the scenarios in the 3rd dimension, an appreciation may be gained of the relationships between existing built form and projected new growth, thus affording the designer a mechanism in which to conduct an initial critical analysis of perceived changes (Figure 8).

The application of these generic built form scenarios to the context of Bay Street raise a number of key issues relating to the sustainable development and management of activity centres within the Inner Melbourne region.

8. CONCLUSIONS & PRELIMINARY OBSERVATIONS

While the permutations and models presented are hypothetical, modeling growth through built-form scenario mapping nonetheless helps to provide insight into the potential residential capacity/saturation level around existing activity centres.

To meet the projected housing demand for the Port Melbourne area by 2030, a modelled rate of constant growth over a 24 year period would yield a total of 40 dwellings per year. When translated into a range of density types, a net land-use footprint can be anticipated ranging from 0.25-0.5 Ha of single storey dwellings to one 10-20 storey tower block every two years.

Modeled rate of growth over a 24 year period @ 40 dwellings per year yields:
1. 0.25 - 0.5 Ha of single-storey dwellings, or
2. 4 levels of medium density housing @ 500-1000m² net floor area, or
3. One 10-20 storey tower block every two years

While these preliminary projections do not take into consideration a whole range of socio-economic criteria and hence can only be considered as hypothetical observations, they nonetheless appear to suggest several key factors relating to the management of urban change, in particular:

- How can local and state governments be best informed as to the implications of sustaining residential growth within activity centres over the next 25 years and beyond?
- What sustainable housing typologies are best suited to meet this anticipated growth/demand?
- What are the implications for such growth projections on current urban design criteria such as: heritage overlay, local character, access, and public open space requirements.
- What policy strategies will need to be put in place to ensure appropriate and effective management practices and the maintenance of appropriate place setting attributes?

9. REFERENCES


Figure 7: Generic built form scenarios and seeding plan permutations.
Figure 8: Context mapping of built form scenarios.

- Existing Heritage Overlay
- Existing Mixed Use Zone
- Existing Activity Centre Built Form
- Projected Residential Stock