

RICS Research

A Sustainable Community for Older People: Case Studies of Green Retirement Villages in Australia



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for Older People: Case Studies
of Green Retirement Villages
in Australia



Report for Royal Institution of Chartered Surveyors

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A report for Royal Institution of Chartered Surveyors

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Executive Summary

In Australia, the proportion of the population aged 65 years and over reached 13.5% in 2010 and is expected to increase steadily to around 20% by the year 2056 [Australia Bureau of Statistics (ABS), 2010], creating what has been regarded as a looming crisis in how to house and care for older people. As a viable accommodation option, the retirement village is widely accepted as a means of promoting and enhancing independence, choice and quality of life for older people. Recent research by Barker (2010) indicates that the current and potential residents of retirement villages are generally very conscious of resource consumption and would like their residences and community to be more sustainable.

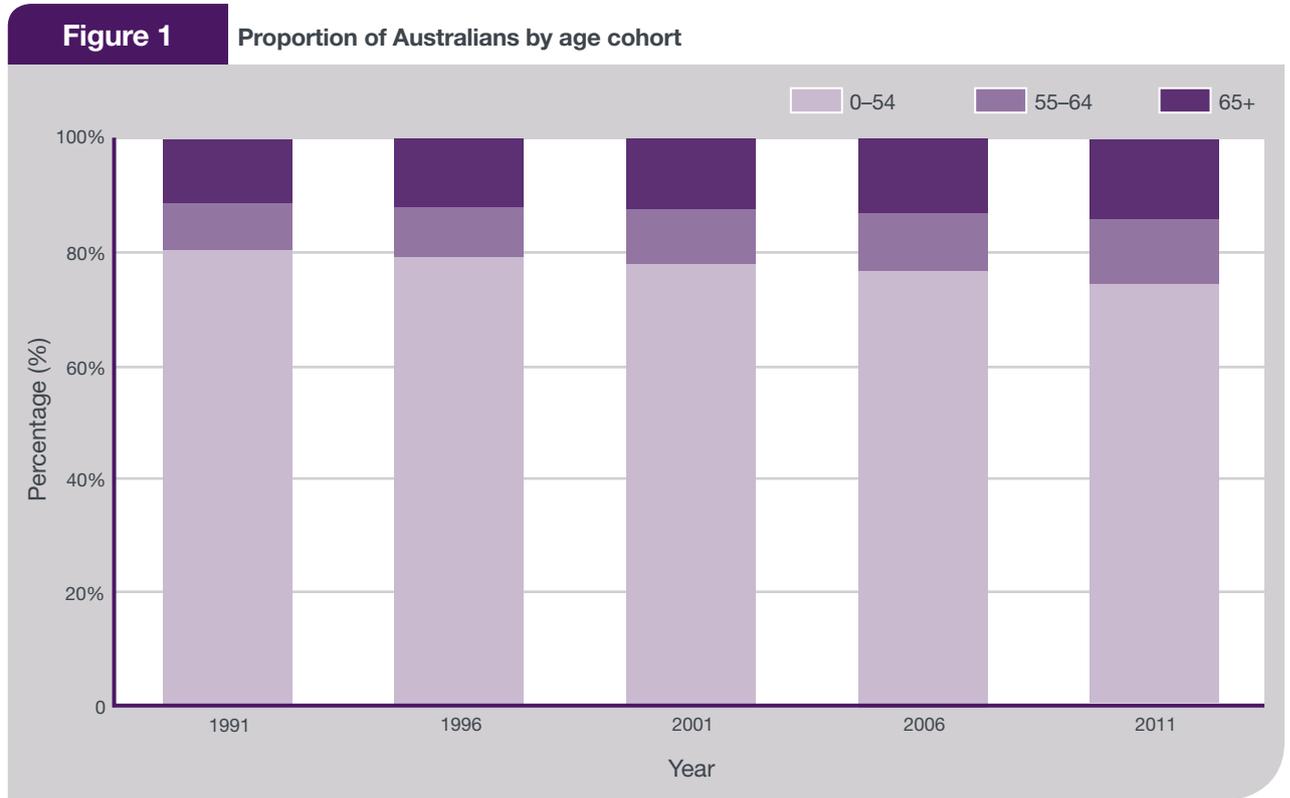
The aim of this study was to understand the perception of older people toward sustainability ideas and identify the sustainable practices involved in retirement villages to improve the wellbeing of residents. Multiple research methods, including content analysis, questionnaire survey, interviews and case studies were conducted for the research purpose. The results indicate that most retirement village residents understand and recognize the importance of sustainability in their lifestyle. However, their sustainability

requirements need to be supported and enhanced by the provision of affordable sustainability features. Additionally, many retirement village developers and operators realize the importance of providing a sustainable retirement community for their residents, and that a sustainable retirement village (that is environmental-friendly, affordable, and improves social engagement) can be achieved through the consideration of project planning, design, construction, and operations throughout the project life cycle.

The clear shift from healthcare to lifestyle-focused services in the recent development of retirement villages together with the increasing number of aged people moving into retirement villages (Simpson and Cheney, 2007) has raised awareness of the need for the retirement village industry to provide a sustainable community for older people to improve their life quality after retirement. This is the first critical study of sustainable development in the retirement village industry and its potential in addressing the housing needs of older people, providing a contribution towards improving the life quality of older people and with direct and immediate significance to the community as a whole.



Between 1991 and 2011, the proportion of Australians aged 65 years and over increased from 11.3% to 13.8% while those of 55 years and over increased from approximately 19.8% to 25.3% (Figure 1).



Source: ABS Cat. No. 3101.0, 2011



This change in demographics has a social and economic impact on such things as the availability of resources, community services, pensions, health care, the work force and the provision of alternative housing for older people (United Nations, 2002). Several choices are available in terms of living standards and housing options. Facilities such as retirement villages, serviced apartments and relocatable mobile-home parks provide an independent lifestyle. Similarly, living together with family and friends is a very popular way of living comfortably and feeling at home.

As a viable accommodation option, the retirement village is widely accepted as promoting and enhancing the independence, choice and quality of life of older people (Gardner et al., 2005; Croucher, 2006; Bernard et al., 2007). Currently, approximately 5% of Australians aged 65 years and over live in retirement villages, with approximately 7% and 8% in Western Australia and South Australia respectively (Retirement Village Association and Aged and Community Services Association of NSW and ACT, 2010). As a result of the anticipated increase in retirees, it is estimated that the demand for retirement village living will boom over the next 20 years, with investment opportunities in the construction of new villages estimated to be between AUD\$8–19 billion (Stimson, 2002).

Recent research by Barker et al. (2012) indicates that the current and potential residents of retirement villages are generally very conscious of resource consumption and would like their residences and community to be more sustainable. According to the Victoria Department of Planning and Community Development (2008), housing for older people needs to “go green” and is an existing issue that needs addressing. With the first Australian baby boomers now beginning to retire (Humpel et al., 2009)

along with the widespread acceptance of the green residence philosophy, retirement villages should be developed and operated as a sustainable community in order to improve the wellbeing of older people.

In Australia, climate change and ageing are the major challenges on the horizon. The sustainability of retirement villages for older people helps to reduce energy consumption and address the accommodation needs of Australia’s ageing population. Therefore, creating a sustainable community in retirement villages plays an important role in increasing the wellbeing of older people and protecting the environment for the future.

Before the implementation of green practices in retirement villages, it is important to understand the older residents’ perceptions of sustainable ideas. This is because, first, although nearly all the residents in retirement villages would like to have their facilities and communities more environmentally friendly, most are concerned about the costs involved, and are reluctant to pay a higher price for a sustainable village (Barker, 2010). Second, older people need to have unique ergonomic considerations, such as easy access, companionship or security. According to Croucher (2006), older people generally value highly the combination of independence and security, with the additional benefits of the support and companionship of their fellow residents, and they often develop strong friendships and a sense of belonging to the retirement village community. Facility planners and managers must therefore carefully consider sustainable practices that are specially tailored to residents when managing green retirement facilities.



2.0 Aim and objectives

The aim of this study is to address the pressing requirements of older people for sustainable retirement villages by deriving a set of sustainable practices that can increase the wellbeing and satisfaction of retirement village residents. The objectives of this research are therefore:

1. To examine the current retirement village industry in Australia. The facilities and services offered by retirement village operators and government involvement into developing and managing sustainable retirement villages will be investigated.
2. To investigate the perceptions of older people – the residents in retirement villages in this research – concerning sustainability ideas and practices in their daily life.
3. To identify and evaluate a variety of sustainability practices in the project life cycle for improving the wellbeing of older people in retirement villages.



3.0 Research methods

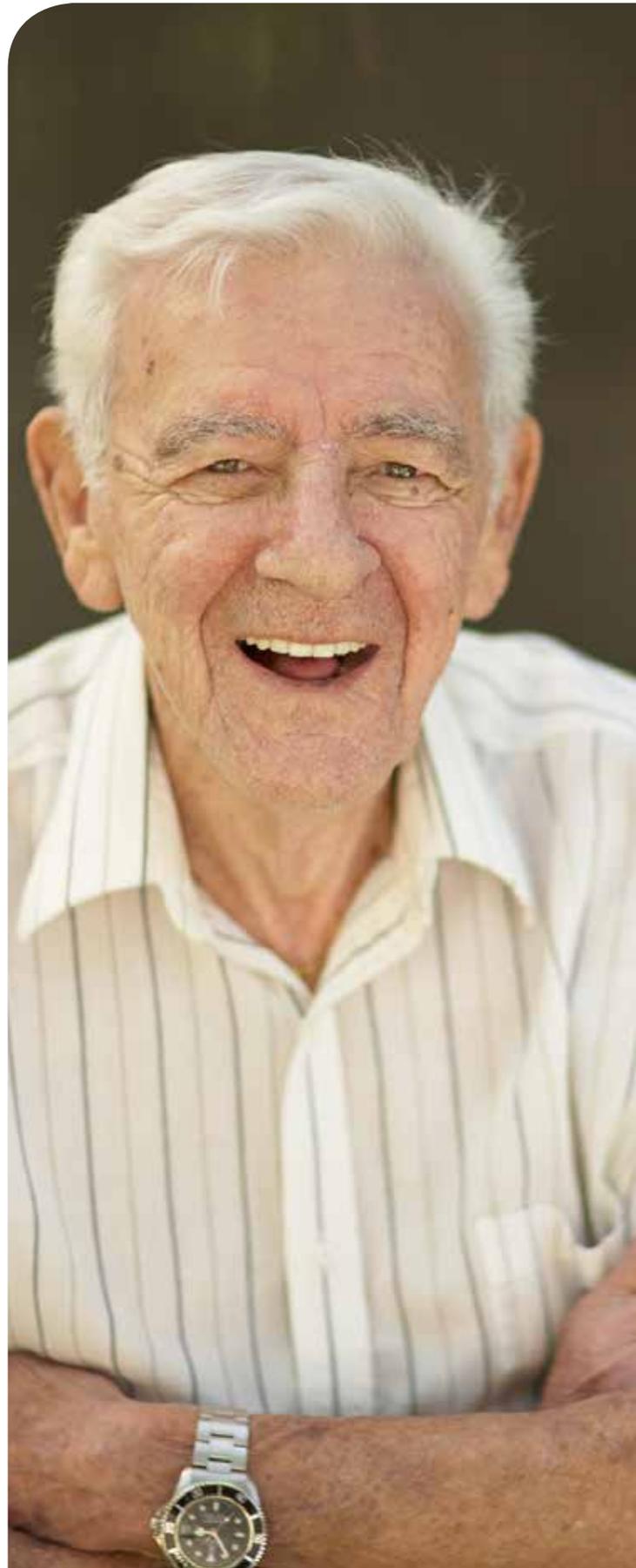
Multiple research methods, including content analysis, case studies, questionnaire survey and interviews were adopted to achieve the research purpose.

Content analysis was conducted to obtain an overview of current practice in the retirement village industry. The data was gathered from the public documents published on the websites of 17 operators and 108 villages in Queensland and South Australia. Interviews were conducted with two government officers in the QLD Department of Communities, Child Safety and Disability Services to identify the extent of government support involved.

Two case studies in both Queensland and South Australia were conducted in order to achieve the objectives of the research on retirement village sustainability perception and practices. In view of the lack of adequate historical data for quantitative analysis, the case study approach was employed to examine the successful operation of sustainable retirement villages. According to Yin (2003), a case study is a story about something unique, special, or interesting, and can be about individuals, organizations, processes, programs, neighbourhoods, institutions, or even events. A case study gives the story behind the result, and provides a good opportunity to highlight a project's success or to bring attention to a particular challenge or difficulty encountered (Neale et al., 2006). Therefore, case studies are generally preferred for explanatory research to deal with actions traced over time rather than the statistical frequency of events (Yin, 2003). In addition, as Molenaar et al. (2004) point out, case studies are especially appropriate in the construction management field, where researchers usually lack control over the events being studied. In short, the case study method is eminently suitable to investigate the provision of green retirement villages.

Within the case study, questionnaires were distributed to investigate older people's perception of sustainability in the selected retirement village in Queensland. The questionnaire survey was developed based on the sustainability literacy assessment survey, which was used to assess sustainability knowledge, attitude, awareness and practices (Cotgrave and Kokkarinen, 2011). Adjustments were made in order to make the survey suitable for the retirement village context.

Developers and facilities managers from retirement villages in Queensland and South Australia were interviewed to identify and evaluate the practices being used to provide sustainable retirement villages for residents. To ensure the validity of the results, all the interviewees were senior facility managers and developers. Additionally, detailed information concerning the village site, design documentation, green technologies and appliances, and sustainable facility management practices were explored. The collected data, therefore, represents a comprehensive picture of a sustainable retirement village community.



Housing is an important determinant of the good health of people in later life, who need a secure and comfortable home, because housing provides a social surrounding for older people to interact with others in the community (Lawton and Cohen, 1974; Cotter et al., 2012). The reduced physical performance of most of older people means that good access to amenities, ease of maintenance of the living place and operations of facilities, need for companionship, security and provision of medical service are among their unique ergonomic requirements (Pinto et al., 1997; Dul et al., 2012). Additionally, older people in general after retirement, tend to have a decreased financial capability (Poterba et al., 2011), making the affordability and maintenance costs of their accommodation always a concern in choosing among housing options. The term 'retirement village' in the Australian context normally refers to a community of independently living people, predominantly aged 55 years and over with associated facilities (NSW Fair Trading, 2011). A retirement village is a viable accommodation option to help to promote and enhance the independence, choice and quality of life for older people (Gardner et al., 2005; Bernard et al., 2007; Sim et al., 2011). Many studies have demonstrated that retirement villages have a positive impact on the independence, perceived health and social relationships, reliance on community services and social integration of the residents (e.g. Buys, 2000; Buys, 2001; Buys and Miller, 2007). There are also indications that retirement villages have a great potential to provide a person-environment balance that emphasizes the importance of the interrelationship between ageing persons and their socio-physical environment, and that the quality of the living environment should match their personal level of competence (Lawton, 1982; Wahl and Gitlin, 2007).

Factors that need to be considered for older people when they want to choose their best future home are their physical limitation, financial ability, and familial considerations. Physical limitation affects their ability to maintain their house. Financial ability may involve being burdened with mortgages, taxes or bills. Family support for older people adds to their feeling at home because the presence of family can affect elder people's psychology (Pastalan, 1995; Stimson, 2002). Moreover, adult children can influence their parents' choice of future home (Knight and Buys 2003).

Though human factors are important, another factor relating to housing requirements concerns standards in housing for older people, such as space requirements, physical support, safety and security. Moreover, there should be interaction between residents, residence managers, staff and residents (Torrington, 2007). Coomans et al. (2011) also add essential criteria for elderly people choosing to live in residential care. These concern the existence of lifelong supportive housing and 24/7 care station within walking distance, sophisticated service and infrastructure, and a safe and barrier-free housing neighbourhood. Even if older people decide to stay in

their own homes, they can modify their residential environment. Research on modifying physical residential environment indicates that even small changes (e.g. improving lighting, adding hand railings or adding non-slip mats) can have positive impact on residents' safety, autonomy, and independency (Hutchings et al., 2008).

There are several reasons why older people move to retirement villages (Stimson, 2002). Most of these relate to health or physical abilities, maintenance of previous home, changing lifestyle, and closeness and security of relatives or friends. The most attractive factors in choosing a retirement village are unit design, village design, services and facilities. Other reasons relate to security, need to maintain property, the need to be independent of family members, financial situation, health condition and enhanced lifestyle (Gardner, 1994; Grant, 2003; Grant, 2007; Tanner et al., 2008). They generally value the combination of independence and security highly, with the additional benefit of the support and companionship of their fellow residents, and they often develop strong friendships and a sense of belonging to the retirement village community.

Desirable activities for older people in retirement villages and residential care buildings includes social participation, communal life, physical activity, creative activities, daily living activities, music, conversation, gardening, eating, nature amenities, and remembrance (Torrington, 2007). Some older people place more importance on social interaction than an active lifestyle or aspects of home (Grant, 2007; Tanner et al., 2008). Tanner et al. (2008) also added that having physical space for relatives or even pets and comfortable physical environment are needed.

The concerns of older people are in making the environment of a house into a home (Tanner, et al., 2008). Besides creating the residence as a home, the desire to feel safe and warm are also important for older people (Coomans et al., 2011). However, the retirement village industry fails to meet the unique housing requirements of potential residents in terms of affordability, lifestyle and ergonomic needs (Barker et al., 2012). In addition, the industry has yet to fully meet the challenge presented by the green movement to provide a sustainable living environment for senior citizens (Pillemer, 2011).

4.1 Sustainability features of the retirement village industry

Since the Rio Earth Summit in 1992, there has been a high public agenda for the sustainability concept to meet world population's needs without compromising the needs of future generations (Myers, 2004). This visualises a cleaner environment, the efficient use of natural resources and a more inclusive society with widely shared benefits of increased economic prosperity (London Department of the Environment, 2000). More consideration is needed of the environmental impact of human activities and the consequences of their intensive use of materials and energy (Leopold, 1950).

With the ongoing campaigns for energy efficiency and greenhouse emission reduction, the relevance of implementing sustainable technologies and innovations has provoked an increased awareness and willingness to increase sustainable building (West, 2001). Sustainable building materials, recycling construction debris, and incorporating environmentally friendly and efficient architecture in building designs have been used to minimise environment impact (Smith, 2009).

The sustainability development term is usually associated with 'environmental sustainability' and its emphasis on conserving natural resources and maintaining an ecological balance. However, sustainability should be viewed not only as environmental, but also economic and social sustainability (Plaut et al., 2012). Indeed, there has been a growing demand for housing that is both sustainable and affordable (Pullen et al., 2010; Arman et al., 2009).

The elements of environmental sustainability in housing include well-known issues relating to energy, water and waste efficiency, ease of access and user friendliness. In providing a suitable living environment, and to attract and accommodate an increasing number of senior citizens, there should be a qualified physical environment with a suitable level of indoor environmental quality, energy efficiency, security, and with easy accessibility and maintenance.

Economic sustainability means savings in construction costs, running costs, living costs, costs of future modifications and long-term maintenance, good resale value and cost efficiency to the community. On the other hand, the retirement village needs to be affordable to its residents. Although almost all older people desire a living environment that is more eco-friendly, affordability is always a major concern (Barker et al., 2012; Zuo et al., 2012). This is understandable considering that most older people experience reduced financial capabilities after their retirement and live mainly on pensions. The implications concern both the initial cost of moving into a retirement village and recurrent maintenance and service costs involved. Although the cost of sustainability may be seen by many to be high from an economic perspective, others maintain that it is feasible to minimise the costs to generate positive economic growth (Jones et al., 2010).

Social sustainability can be identified as including design for flexibility, comfort, safety, security, belongingness and social engagement. In terms of social sustainability, a retirement village needs to facilitate an active and healthy life style for residents. The majority of residents believe that social activities, friendships and social networks are important for their quality of life. A wide range of research demonstrates the importance of social support in later life functioning. A well-planned retirement village can create opportunities to develop friendship networks and participate in a wide range of activities in the village and in the wider community (Golden et al., 2009; Grundy and Read, 2012).

The environment, economic and social dimensions of sustainability are interrelated. Any environmentally sustainable home has to be economically viable and any design or behavioural changes have to be socially acceptable to the people living in the home and community.

In 2009, there were 1,826 retirement villages in Australian states and territories (Stimson, 2002). Although most of the operators are commercial, there are several non-profit organisation providers such as Churches of Christ Care, RSL LifeCare, UPA, Wesley Mission and Warrigal Care. Those types of operator affect the type of retirement villages' services and style. Some providers also already belong to the Australian Retirement Village Accreditation scheme, which adds value to the development.

Retirement villages should provide adequate facilities and services to support residence independency. The place should also provide good security, modern facilities and offer comfortable environment such as good social cohesion, camaraderie, sense of belonging, and diverse option of leisure activities (Grant, 2007). Some technologies can be introduced into the residences in order to support retirement village facilities. The application of smart home technology, for example, can increase residents' well being and support security, safety and quality of life. Technology components can be assembled that can detect environmental hazards (safety monitoring), detect human threats (security monitoring), or facilitate communication (social interaction) (Demiris and Hensel, 2009).

Retirement village operators provide information relating to their villages on websites. The information usually consists of company profile, location of the village, lifestyle, facilities and services, events in the village, communities, and pricing. The content analysis mainly examined the facilities and services offered by operators and whether they mentioned any sustainability issues. Websites were converted to portable document format (pdf) from July to August 2012, and the documents were then analysed using NVivo software. From the 108 villages operated by 17 companies, 29% directly included sustainability terminology and 65% indirectly contained this in terms of environmentally friendly, eco-friendly or having environmentally friendly facilities.

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Based on the content analysis of facilities and services provided by retirement villages shown on their websites, Table 1 and Table 2 shows the summary of these facilities and services offered by 17 operators in both Queensland and South Australia.

According to Table 1, most of the villages have a community centre, library and hairdressing/salon. While in terms of services (shown in Table 2), a 24/7 emergency response system is essential, and almost all retirement villages have this system. The provision of other social and leisure

facilities/services mainly depends on the number of units involved. Villages with a large number of units (normally more than 100) provide more facilities and services for their residents. Additionally, villages that are located close to a beach usually have storage for caravans or boats.

Apparently, the term sustainability is often mentioned explicitly or implicitly on the websites. Village A in Adelaide for example, is explicitly described as “eco-friendly living, with sustainable landscaping and water management practices, and each house has a solar panel for hot water”.

Table 1 Retirement villages’ facilities in Queensland and South Australia

No	Facilities	Operators																
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
1	Community centre/Clubroom	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
2	Library	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	Hairdressing/Salon	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
4	Barbeque facilities	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
5	Billiards	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
6	Gymnasium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
7	Restaurant/dining room	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
8	(Indoor/outdoor) heated swimming pool	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
9	Medical room	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	Bar	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
11	Bowling green	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
12	Art or Craft room	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
13	Indoor bowls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
14	Theatre (Cinema)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
15	(Half) Tennis court	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
16	Community kitchen	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
17	Function room/Auditorium	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
18	Entertainment venues	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
19	Password secure access	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
20	Croquet lawn	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
21	Workshop	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
22	Caravan and boat storage/parking	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
23	Spa or sauna	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
24	(Mini/Putt putt) Golf course	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
25	Water tank or water management	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
26	Solar power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
27	Table tennis	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
28	Wheelchair and walker friendly doorways and ramps	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
29	Pool tables	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
30	Community garden	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
31	Games room	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
32	Fitness centre	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
33	Hydrotherapy pool	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
34	Greenhouse	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
35	Floating jetty	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Table 2 Retirement villages' services in Queensland and South Australia

No	Services	Operators																
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17
1	24/7 emergency response system	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
2	Gardening and maintenance	✓	✓			✓		✓	✓	✓		✓	✓	✓	✓			✓
3	Village bus/community bus	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
4	Community care services	✓	✓	✓	✓	✓	✓	✓	✓	✓								✓
5	Church services	✓	✓	✓	✓							✓						
6	Convenient delivery services to homes		✓	✓						✓		✓						✓
7	Visiting professionals (GPs, pathologist, masseur, solicitor, etc.)		✓	✓				✓		✓	✓	✓	✓					
8	Low maintenance						✓											
9	Village cab									✓								

Village B does not explicitly state its sustainability but describes the village as “beautiful, friendly, vibrant, caring and environmentally aware”. Village C and D in Queensland offer a “social and welcoming environment”. Although they do not describe their facilities explicitly, there are pictures showing facilities such as a pool table, library or dining room.

According to Table 1, all the operators provide community centres if necessary. However, some retirement villages do not have community centres due to the small number of units involved. For example, Village E in South Australia has only 13 units in the village.

Retirement villages provide different facilities, and some offer unique amenities. Village F in Queensland, for example, offers generous green spaces in the village and has a garden club in addition. Another Queensland village G has an environmentally sustainable design for the units in the village. This includes rainwater harvesting, water efficient fittings, energy efficient light fixtures, solar hot water with gas booster, low VOC material and paints, using bamboo for flooring in living areas and low allergy carpets.

The unit is the most important component of retirement villages as this is where the residents spend most of their time. Units in one operator were designed for spacious living that makes best use of natural ventilation and sunlight. In village H of this operator, all the apartment units have north facing sunrooms at every level. Additionally, village I from another operator has units with a rain flush tank storage system to save the water.

All the units in village J in South Australia are rated as seven-star energy homes with precisely positioned rooms and windows. There are spacious living areas, designed to maximize the warm sunlight during winter and minimise heat gain during summer. The units not only have solar energy and hot water supplies, but also have underground tanks to harvest rainwater. Low-toxic materials were also used during construction.

Village K is one of South Australia’s first six-star energy rated retirement villages and represents a turning point in sustainable living. Units of village L are equipped with energy efficient appliances such as water saving taps and an abundance of windows to provide sunshine and sea breezes to the interior.

With the analysis of all the facilities and services offered in retirement villages’ website, it is concluded that the operators are generally concerned with sustainability issues.

4.2 Government involvement for the older people community

The Federal government and many state, regional and local governments are currently attempting to address environmental and sustainability issues. They establish sustainable building programs and recruit officers for sustainable building. Policies and initiatives have been developed to promote a sustainable built environment at local, regional, national and international levels (Van Bueren and De Jong, 2007). Existing experience has shown that governments are probably the best placed and equipped to implement policies that create more sustainable communities and buildings (Theaker and Cole, 2001).

There are policy frameworks relating to ageing and older people in every state (as seen in Table 3). In Western Australia, the priority areas are in health and wellbeing; employment and learning; community awareness and participation; protection and security; and planning and the built environment. For the Department Office of Senior Territorians in the Northern Territory, the priority areas include independence and self-provision; attitude, lifestyle and community support, healthy ageing; and world class care. The Victoria government is promoting an age inclusive society and mature age employment as well as encouraging community participation and intergenerational activities. The priorities areas in New South Wales are improving attitudes to ageing and older people, increasing participation in community life, providing information that older people can make their own decisions, supporting neighbourhoods and communities, promoting health, accommodation, care and support for older people, and making the best use of resources. The Strategic Plan 2003-2005 was released by Australian Capital Territory Ministerial Advisory Council with healthy and meaningful ageing, transport, accommodation and planning, employment, education and training as the priority areas. In South Australia, the priorities are to enabling choice and independence, valuing and recognising contribution, providing safety, security and direction, delivering the right services and information and staying in front-innovation. Lastly, the Department of Health and Human Services in Tasmania prioritises developing community attitudes, older people's participation in the community, living in the community, health, independence and community support and education and information in the older people community.

The Queensland local governments also have strategic plans to improve seniors' quality of life. Brisbane City Council, for example, is supporting seniors in affording housing through remissions in rates, so that seniors can rent or buy houses in attractive locations. The Council also offers residential developers a reduction of up to 15% in infrastructure charges. In terms of sustainability, the Council is greening local community transport, making it more convenient and comfortable for use by seniors. In other aspects such as built environment, the Council plans to have energy-efficient buildings and better designed suburbs. Hence the Council is encouraging a universal design and more supportive housing for elderly people. This is also matched by seniors being willing to own houses that have water and energy efficient devices. Many seniors are already committed to reuse and recycling to make the city green and clean. To support this commitment, the Council helps seniors cleaning up by providing rubbish bin collection from the residents' yard if they are disabled or in poor health.

To promote sustainable development for senior housing, government intervention in form of mandatory regulations and standards are needed for sustainable technologies such as solar power, water recycling and the use of environmentally sustainable materials. Additionally, government rebates for the use of these technologies may be necessary to encourage green development that is affordable.

Table 3 Policy frameworks of ageing and older people in Australia

Governments	Policy Title	Areas of priority
Federal government (FED)	National Strategy for an Ageing Australia (2002)	<ol style="list-style-type: none"> 1 Independence and self provision 2 Attitude, lifestyle and community support 3 Healthy ageing 4 World class care
Australian Capital Territory (ACT)	ACT Strategic Plan for Positive Ageing 2010-14	<ol style="list-style-type: none"> 1 Information and communication 2 Health and wellbeing 3 Respect, valuing and safety 4 Housing and accommodation 5 Support services 6 Transport and mobility 7 Work and retirement
New South Wales (NSW)	NSW Ageing Strategy (2012)	<ol style="list-style-type: none"> 1 Seniors (tackling abuse, tech savvy seniors, linking seniors to information, living active lives, travel safely) 2 Middle years (work skills and workplace value, my life my decisions, securing your future) 3 Population ageing (public-private partnership, aged-friendly local communities, housing choices, population aging in the NSW Government)
Northern Territory (NT)	Building the territory for all generations: a framework for active ageing in the Northern Territory (2007)	<ol style="list-style-type: none"> 1 Independence and self-provision 2 Attitude, lifestyle and community support 3 Healthy ageing 4 World class care
Queensland (QLD)	Positively Ageless – Queensland Seniors Strategy 2010–20	<ol style="list-style-type: none"> 1 Supporting the aspirations of seniors who wish to remain in the workforce 2 Age-friendly public and community transport 3 Promoting active and positive ageing, and supporting prevention and early intervention approaches to health 4 Encouraging volunteering
South Australia (SA)	Improving with Age – Our Ageing Plan for South Australia (2006)	<ol style="list-style-type: none"> 1 Enabling choice and independence 2 Valuing and recognising contribution 3 Providing safety, security and direction 4 Delivering the right services and the right information 5 Staying in front – innovation
Tasmania (TAS)	Inclusive Ageing: Tasmania 2012-2014 Strategy	<ol style="list-style-type: none"> 1 Demographic profile 2 Accessing the right information at right time 3 Living affordability 4 Voluntary contributions 5 Age-friendly communities 6 Workforce participation
Victoria (VIC)	Ageing in Victoria: A plan for an age-friendly society 2010-2020	<ol style="list-style-type: none"> 1 Good health and wellbeing 2 Age-friendly communities 3 Economic and social participation
Western Australia (WA)	Generations Together – A Guide to the Western Australian Active Ageing Strategy (2004)	<ol style="list-style-type: none"> 1 Health and wellbeing 2 Employment and learning 3 Community awareness and participation 4 Protection and security 5 Planning and the built environment

Source: Government officer interviews, 2012

5.0 Perception of sustainability in retirement village

A questionnaire survey was conducted in a retirement village with 254 units in Brisbane (see details in Chapter 6) in order to obtain the residents' understanding, attitude and awareness of sustainability. With the permission of the village manager, questionnaire forms were placed in the community centre's reception room from 26 October 2012 until 4th December 2012 with a covering letter explaining the purpose of the research. 65 respondents returned the completed questionnaire, providing an overall response rate of approximately 25%.

Figure 2 provides the respondent demographics in terms of gender and age. The majority of the residents (more than 80%) are older than 70 years.

The questionnaire survey comprised two main parts. The first one concerned older people's awareness on sustainability issues and the second part determined the frequency of daily sustainability-related activities. The respondents were asked to rate the importance of sustainability-related statements and provide the frequency of their sustainable activities on a four-point rating scale. The questions concern environmental, economical and social issues as shown in Table 4.

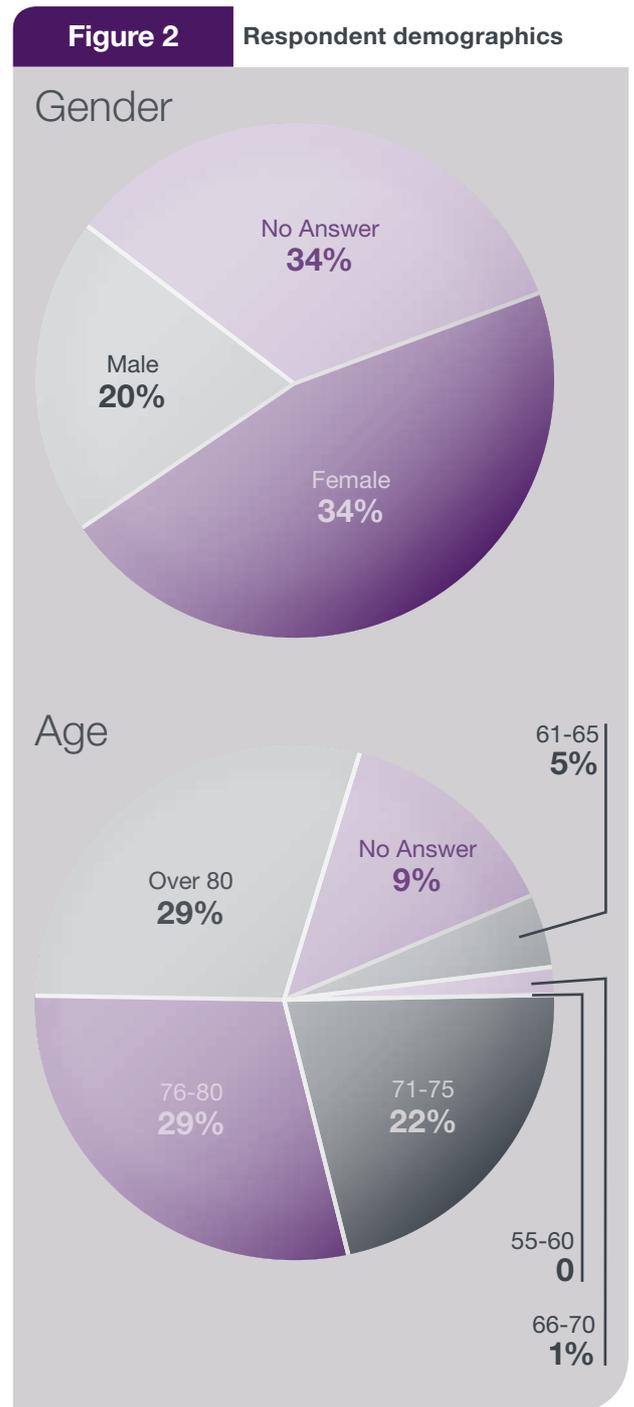


Table 4 Cluster of questionnaire survey

Category	Sustainability awareness
Environment	Saving electricity and water
	Using recycled water for gardening or laundering
	Choosing more durable items to maximise their lifespan
	Cutting down on the use of products that are harmful to the environment
	Selling or giving away items that are no longer being used
	Creating new items from old and unused materials
	Recycling items when possible
	Reporting any housing issues to facility manager to repair
Economic	Paying a higher price for a home that has environmentally friendly features
	Buying local products
	Gardening
	Planting fruits or vegetables in own garden or community garden
Social	Attending social group activities
	Actively involved in community projects
	Having a good engagement with other village resident

Category	Daily activities on sustainability awareness
Environment	Turning off lights and electronic devices when not in use
	Using as little water as necessary in the kitchen and bathroom
	Using a rainwater tank for gardening or laundering
	Walking, cycling or using public transport as a mode of travel
	Using reusable bags when shopping
	Creating crafts from recycled material or old stuff
	Making compost from leaves, litter or food waste
	Separating landfill waste and recycled waste
Economic	Donating or selling items that are no longer used
	Buying local products
Social	Attending social group activities, such as community meetings or community events, with other village residents
	Having activities such as community gardening, barbeque, sports, dancing or making crafts with other village residents

The frequencies of level of agreement (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree) with the importance of doing the various activities is set out in Table 5. Reporting house issues to the facility manager for repair (66% of respondents strongly agree) is the most frequently considered activity in relation to sustainability. Interestingly, many residents agree on the importance of paying a higher price for a home that has environmentally friendly features (67% of respondents agree) with only 20% of the respondents disagreeing. The major reason for the high percentage of agreement is that this retirement village is a private/luxury one, and most of its residents do not have any affordability problems.

Table 5 Percentage of respondent agreeing on the importance of sustainability activities

Sustainability awareness	Level of agreement (%)				n
	1	2	3	4	
Reporting housing issues to the facility manager for repair	0	2	32	66	65
Saving electricity and water	2	0	40	58	65
Recycling items when possible	0	0	46	54	65
Buying local products	0	0	50	50	64
Having a good engagement with other village residents	0	3	48	49	65
Attending social group activities	0	8	45	47	62
Paying a higher price for a home that has environmentally friendly features	3	17	67	13	60
Using recycled water for gardening or laundering	0	7	64	29	55
Being actively involved in community projects	0	13	55	32	62
Cutting down on the use of products that are harmful to the environment	0	0	55	45	64
Creating new items from old and unused items	2	30	54	15	61
Choosing more durable items to maximise their lifespan	0	2	53	45	64
Selling or giving away items that are no longer used	0	5	50	45	64
Gardening	8	18	40	34	62
Planting fruit or vegetables in own or community garden	3	31	33	33	58

Table 6 describes the frequency (1=never, 2=rarely, 3=usually, 4=always) of residents carrying out the activities that relate to sustainability issues. The activities that respondents “always” do are separating landfill waste and recycled waste, turning off lights and electronic devices when not in use, using as little water as necessary in the kitchen and bathroom, and attending social group activities. The majority of residents “usually” buy local products, donate or sell items that are no longer used, and join in activities with other village residents. In contrast, 74% of respondents never use rainwater tanks for gardening or laundering, while only 10% use them regularly.

Table 6 Percentage of respondent carrying out sustainability activities

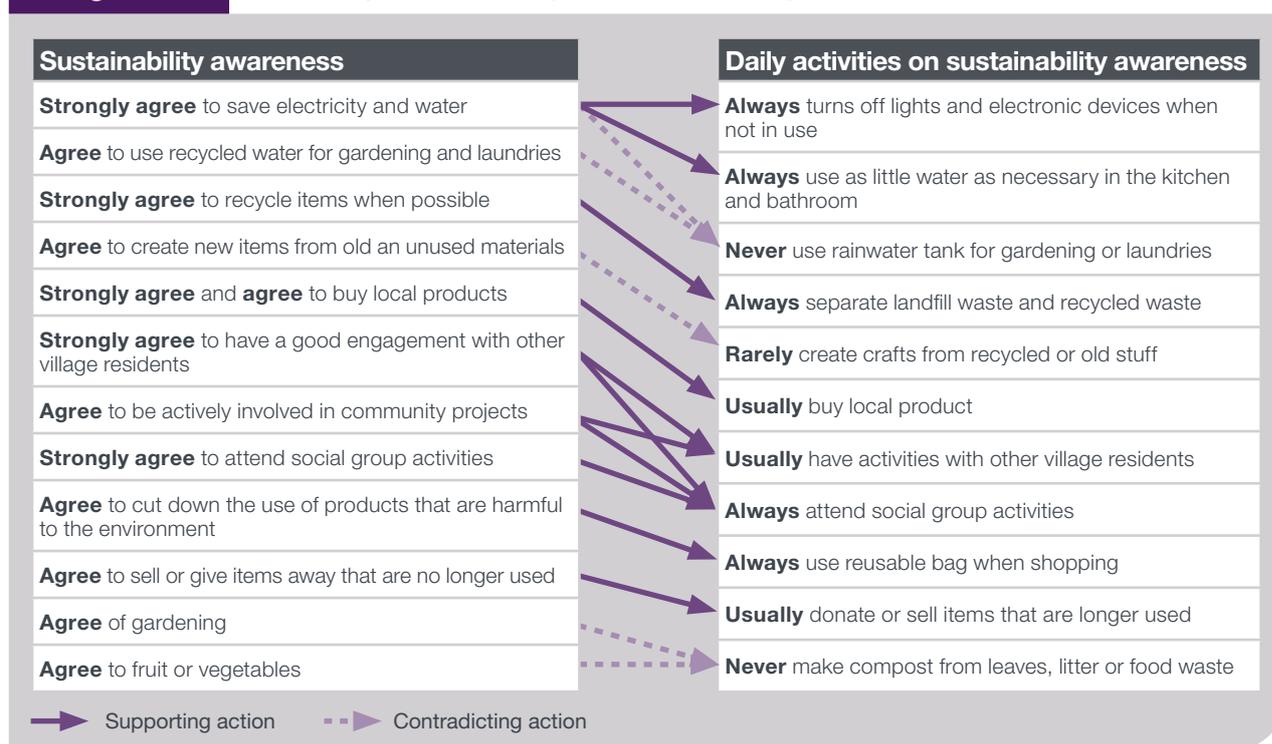
Daily activities	Frequency (%)				n
	1	2	3	4	
Separate landfill waste and recycled waste	13	6	17	63	63
Turn off lights and electronic devices when not in use	0	6	42	52	65
Use as little water as necessary in the kitchen and bathroom	0	3	48	49	65
Attend social group activities such as community meeting or community events with other village residents	3	9	42	46	65
Use reusable bags when shopping	5	19	33	44	64
Buy local products	2	3	66	30	64
Donate or sell items that are no longer used	0	6	48	45	64
Have activities such as community gardening, barbeque, sports, dancing or making crafts with other village residents	6	17	41	36	64
Walk, cycle or use public transport as a mode of travel	19	46	25	10	63
Create crafts from recycled material or old stuff	37	43	16	5	63
Use rainwater tanks for gardening or laundering	74	16	5	5	62
Make compost from leaves, litter or food waste	39	26	19	16	62

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There is relationship between the respondents' level of agreement of importance and frequency in doing activities. Respondents who agree or strongly agree with the importance of an activity always or usually carry out the activity. For example, as illustrated in Figure 3, if respondents strongly agree that saving electricity and water is important then they always turn off the lights and electrical devices when not in use and use as little water as necessary. However, although most respondents think it is important to recycle water, they never use rainwater tanks for gardening or laundering. The major reason for this contradiction is that these residents do not have rainwater tank in their units. Contradictions also exist in the "agree to gardening and planting fruit or vegetables" but "never make compost for their garden", and "agree to create new items from old and used materials" but "rarely create crafts from recycled or old stuff". This is probably because of the difficulties involved in making compost and crafts themselves.

Figure 3

Relationship of sustainability awareness and daily activities



6.0 Sustainability practices in retirement villages

Two case studies were conducted to investigate best sustainability practice in providing retirement villages. The case studies cover the development and operation phase of the project life cycle. The facility managers and developers were asked about the sustainability practices being used in their villages. Related documents were also analysed. The first case study concerns the Keperra Sanctuary and focuses on the operation stage. The second case study is of the Oakden Estate, focusing on the development stage of the project life cycle.



Figure 4 The Keperra Sanctuary site plan



Source: Lend Lease, Keperra Sanctuary

6.1 The Keperra Sanctuary Case

As a private retirement village, the Keperra Sanctuary is one of Lend Lease's retirement villages located at 998 Samford Road, Keperra, Queensland (Figure 4). It is approximately 10 kilometres north of Brisbane CBD and is close to amenities such as transport, health services, stores and libraries. The retirement village is on the site of an old quarry, some of which still remains. The village is surrounded by bushland and a big natural lake inside the village provides residents with a nature concept.

Figure 5 contains some of the scenery involved. There are 254 homes comprising one to three bedrooms units. All the units are brick built to lower their maintenance cost. In addition to the retirement village, Keperra Sanctuary also has a separately managed aged care facility.

Interviews were conducted with three senior facility managers, and project documents were examined in order to identify and evaluate the sustainability practices in the village. The documents comprised resident information books and communication papers such as the village news and facilities manager's reports. The main points of discussion with the facility managers centred on the care facilities and services available in the retirement village, the kind of sustainability practices used in its operation, the residents perception of sustainability issues, policies that address sustainability issues in the village, the motivation for sustainability practices and the concerns of the facility managers.

Figure 5 Scenery at Keperra Sanctuary



Source: Lend Lease, Keperra Sanctuary

Figure 6 Houses' design in Keperra Sanctuary



Source: Lend Lease, Keperra Sanctuary

Figure 7 Recycle waste facility



The design and operation of Keperra Sanctuary is based on a concept of environmental friendliness. Although some units are two-story houses (Figure 6a), none have any stairs except for two units (Figure 6b), which is very convenient for residents with mobilisation difficulties. The houses in Keperra Sanctuary also have very large windows with large ventilation features and natural lighting to provide a feeling of spaciousness (shown in Figure 6c and Figure 6d). Another aspect that supports Keperra Sanctuary as a sustainable retirement village is that Lend Lease now provides sustainable buildings. An example is the use of water tanks to conserve water in the community centre and some houses. The use of solar heating for the pool also reduces electricity consumption.

The management of waste is a major concern at the Keperra Sanctuary. Three types of bin are provided: a general waste bin; a recycle waste bin; and a paper and cardboard bin. The facilities management encourages residents to recycle as much as possible. Waste paper is a major product of the village and therefore a paper and cardboard recycling facility is provided to minimise waste and reduce the cost of general waste disposal (Figure 7).

Facilities

To make their life enjoyable, the residents are provided with many facilities, all of which are located in the community centre area. These include the solar heated swimming pool for the use of the residents and their families. Residents also have access to a workshop located at the back of the community centre after they complete a safety-training program. They can also use the leisure centre for private functions and family gatherings. There is a library where residents can borrow books, jigsaws, puzzles or DVDs. The residents themselves donate all the contents of the library.

Services

The manager stated that his company considers sustainability at Keperra Sanctuary to be very important. Therefore, the aim is always to provide the best for the residents. However, it is a residents' choice whether to have sustainability living or not. The services that the company provides include a shuttle bus to travel to the local shopping centre or Brisbane city, buggy rides to go to the community centre, chemist delivery, church services in the community centre, garden maintenance, and even a health service. The village has a 24-hour staff facility with a room and equipment in case of emergency. Residents only need to press the emergency button located on their pendant and kitchen telephone for a bleeped signal to be sent to the staff.

Keperra has village coordinator who is responsible for the residents' health and emotional issues. Should any residents feel isolated living in the village, they can contact the village coordinator. When this happens, the village coordinator will often suggest that those concerned have lunch at the community centre at least once a week so that residents can talk with others while having their meal. Another example is the coordinator suggesting that the resident go for a short walk instead of just sitting in the unit. In this way, it is intended that Keperra's residents will be able to enjoy their life in the village to the full.

Communication

There are various means of communication in the sanctuary, such as the notice board, resident newsletters and website, and multi screens (Figure 9). The notice board is located inside the community centre. This allows residents and managers to announce any activities and events, such as monthly dinners, residents' committee meetings or shuttle bus timetable. Additionally, multi screens broadcast information to every unit. Residents organise their own newsletters and distribute them monthly. The residents' community also has a web page that can be accessed upon registration. Managers also provide a brief report to residents every month. This contains news from the facility manager and other staff such as sales officers, maintenance officers and the village coordinator and helps to maintain the relationship between residents and village managers.

Relationship

The residents committee also helps in maintaining relations between resident-resident and resident-managers by bridging resident and manager communications. According to the facility manager, having happy residents makes the sanctuary a good place for the manager to live, enhances the manager's relationship with the committee, and means that most residents have good relationships with other residents.

Market

On one day each a week, a resident sets up a small fruit and vegetable stall from which residents can buy fresh produce in small amounts without having to leave the village. The fruits and vegetables are sometimes harvested from residents' garden. In addition to helping other residents, this activity also generates a micro economy in the village.

Affordability

The price of the houses in the village ranges over \$275,000 for a one-bedroom house, \$290,000 for a two-bedroom house, \$399,000 for a three-bedroom house, \$405,000 for a two-bedroom apartment and \$505,000 for a three-bedroom apartment. Residents also have to pay a monthly fee for services and maintenance. This is approximately \$500 to \$650 depending on the unit. Although seemingly expensive, it is thought to be within the current affordability of residents.

Figure 8 Keperra Sanctuary Facilities

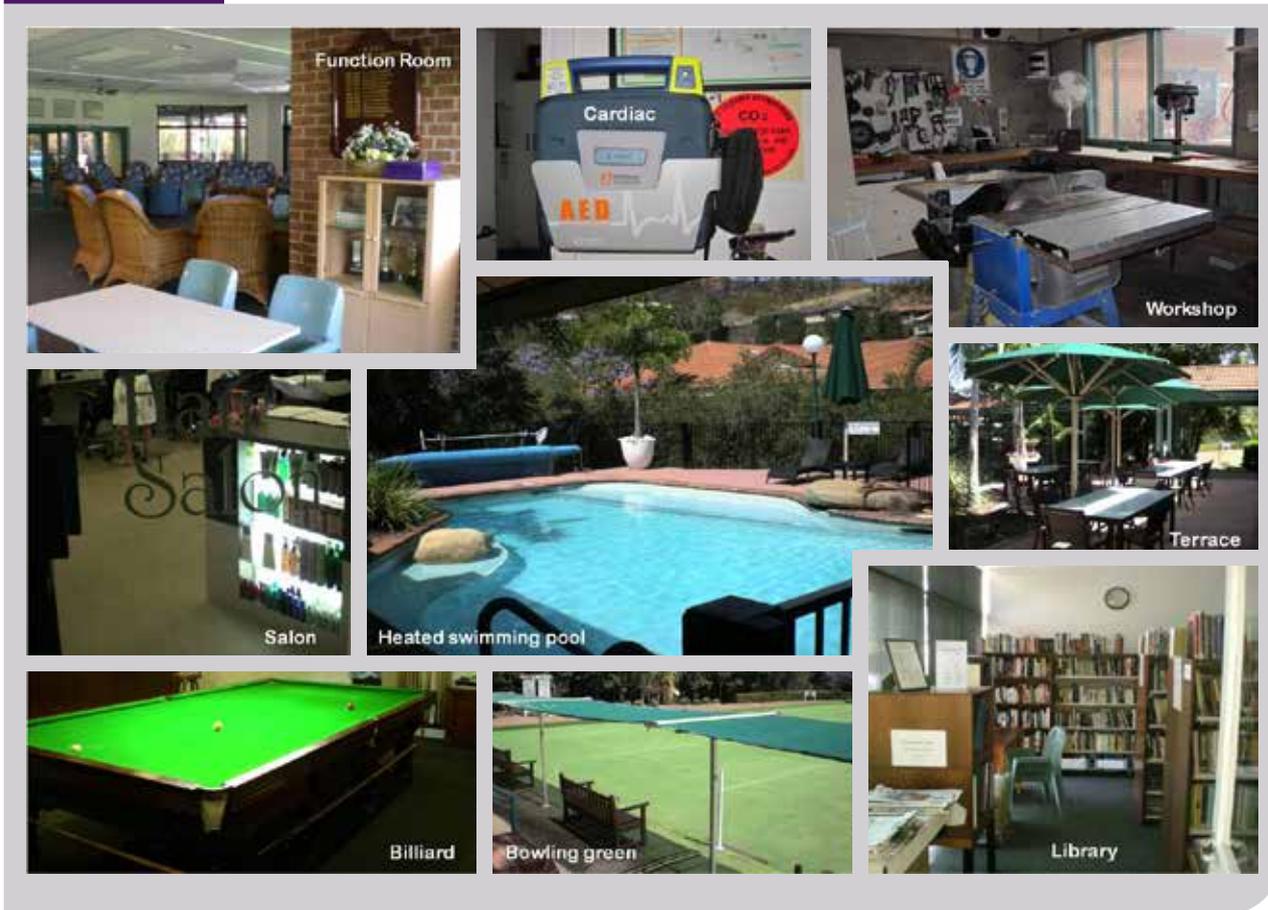


Figure 9 Communication features in Keperra Sanctuary



Figure 10 Oakden Estate site plan



Source: ECH

6.2 The Oakden Estate Case

The Oakden Estate is a development by ECH management – a non-profit organisation that provides affordable retirement living. There are 96 retirement villages and 1,630 independent living units scattered throughout South Australia. The number of residents in ECH ranges 4 to 160 in the largest development. ECH aims to provide quality affordable homes and to support the life enrichment of older people. Therefore, to be sustainable, ECH produces villages and homes that satisfy resident needs while recovering capital development costs through sales income. Any additional income generated is then invested in developing further villages, improving facilities or providing additional services.

ECH has become interested in introducing environmentally sustainable features into its developments and providing green retirement villages. The company is committed to reducing the on-going costs of residents on fixed incomes, such as pensions, and to reduce the development impact on the environment. In particular, ECH is concerned with the energy consumed by the developments. Therefore, they have made efforts to decrease energy consumption. To do this, ECH attempt to ensure that appliances they supply, for which residents are responsible for their own energy costs, for the independent living sites are as energy efficient as possible. ECH is also committed to minimise energy consumption without inflating construction costs – through solar power generation, water harvesting and the use of energy efficient appliances for example.

In exercising its preference for sustainable development, however, there are some concerns that ECH needs to address. The biggest challenge is the cost of providing green facilities. Although the residents indicate that they prefer living in a more sustainable environment, they are reluctant to pay a higher price for an environmentally friendly home (Barker, 2010). On the other hand, ECH is also concerned that the sales income might not be sufficient to recover the capital investment involved. Therefore, ECH has to find ways to provide sustainable facilities without escalating costs. A further issue is that, although ECH existing residents are concerned with the amount of energy consumption and water use, it is very difficult for them to recycle waste or to adopt significant energy saving due to the lack of recycle facilities provision and the lack of financial capacity to pay for more energy efficient technologies.

Site planning

ECH's 6,754 m² area 15-unit retirement village is located at 180 Fosters Road, Oakden, South Australia (Figure 10). The key focus of Oakden Estate's design was to develop an environmentally friendly, socially conscious and affordable low-density development in order to provide amenity for the residents.

The site is surrounded predominantly by a residential community and with a large shopping centre and public transport immediately to the west. It is ideal for a retirement village as it is important for the residents to be connected with the local community instead of potentially being a large isolated and self-contained village away public transport or other community facilities.

The key objectives of ECH's project planning and design were

1. to reduce the on-going costs of residents;
2. to deliver an attractive external appearance that utilises low maintenance materials and incorporates drought and heat tolerant gardens;
3. to ensure the residents feel safe in their units and surrounding grounds;
4. to provide a quiet and peaceful environment for the residents;
5. to provide a community feel for the residents and help them develop friendships and a sense of belonging in the community; and
6. to provide quality heating and cooling throughout the units, including reverse cycle air-conditioning and adequate orientation of the units, shading, and the use of appropriate construction materials.

In terms of style, the units' design is aimed at offering a range of styles to provide the look and feel of a typical community streetscape with a diverse range of facades, provide safety (injury prevention/minimisation) and a sense of security. The layouts are generally open plan to eliminate passageways but still provide privacy to bedrooms.

The project is located next to Fosters Road, which is a major arterial road and not appropriate for a driveway access/egress. The number of traffic movements to and from the site would not be increased significantly or to the level generated by the adjoining dwelling townhouses/unit developments. Furthermore, considering that older people generally have declining physical capabilities, it was not appropriate to set the driveway entrance along a major road with heavy traffic. The driveway entrance of the retirement village is therefore from Brookside Street with the entry dimensions designed to accord with the requirement to provide access for emergency vehicles. The speed limits within the residential development would be limited to 10kph as it is a shared zone and exit speeds from the site would be low, allowing the residents more than an adequate response time.

ECH limited the number of units to 15 in order to maximise the amenities for the residents (see Figure 10). The saved spaces were designed to be open green space for the enjoyment of residents. All the 15 units are located along the driveway, which allows easy access to all the residents. At the centre of the retirement village, a large grassed community space was provided, which comprises a common gazebo area with a path from the centre to the edge walkway. These features help to provide a quiet and convenient environment with a strong community feel.

Unit design and facilities

The floor plans for individual units were developed to achieve the ultimate layout. Design changes were made, which are typically in relation to the orientation of windows, the size of living areas and the location of internal walls, in order to achieve a solution that minimises the amount of energy needed for heating and cooling. Each unit is positioned to take full advantage of natural sunlight, maximise the use of north-facing windows and minimise the number of east, west and south windows. Of course, the benefit of northern windows in the Southern Hemisphere is that they receive winter sun, therefore helping to heat the unit during the winter cold weather, while most windows facing east, west or south receive little winter sun. It is also important to have south facing windows in order to provide a cool breeze in the summer. Anticipated reductions in heating and cooling costs were achieved, therefore, by optimising the orientation of windows throughout the unit.

The final floor plan is relatively open, with wide doorways and large open bathrooms – allowing easy access for residents to all areas and making heating and cooling more efficient. The floor areas of these units ranges from 118 to 126m² with larger bedrooms (16m² minimum) to allow for older care and other services. Much consideration was also given to the yards of each unit. Most of the features were included to allow easy access for residents and deliver an environment which is aesthetically pleasing, safe, comfortable and of low maintenance demands. Eventually, the following features were incorporated with paved areas of at least 1200mm around the units to allow easy access for elderly residents; sensor lights to light the front of each dwelling if someone approaches; an undercover veranda at the rear of each unit to provide shading and shelter for the residents; wide doorway access; a passage width that allows for aged mobility access – a minimum of 1m; no steps between the laundry and clothesline/service area; rain water tanks to collect roof water running off the units; a Gopher® charge station for easy and convenient charging; day time living areas to maintain a passive view over common areas; and wet areas to be close together.

Solar, gas and electric options were all considered for the hot water system. Electric hot water is not seriously considered as it produces the most CO₂ emissions and is therefore regarded as unsuitable for the environment. Another option is to select an instantaneous gas hot water system as it has a good life span and emits the second lowest amount of CO₂ emission after the solar option. However, ECH did not intend to have a gas supply due to the cost of supplying gas to the site and each unit. As a result, ECH intends to use solar hot water systems and solar energy systems, which are excellent from an environmental point of view but still financially acceptable as they are almost completely maintenance free once installed.

In order to reduce water consumption, water saving fixtures, including tap ware, toilets and showerheads were adopted in all the units. These fixtures are simple-to use, making them ideal for older people and large savings could be made by using them. For example, most traditional toilets use 13 litres of water to flush, while the new water saving versions use 4.5 litres for a full flush and 3 litre for a half flush. Additionally, large holding tanks were installed in the underground space of the community to harvest the overflow from the rainwater tanks and storm water running off from the development. The water collected could be used for watering the common park area and associated gardens. As one of the simplest but best environmentally friendly techniques, this system drastically reduces the water usage of the development (Figure 11).

Construction materials, methods and waste

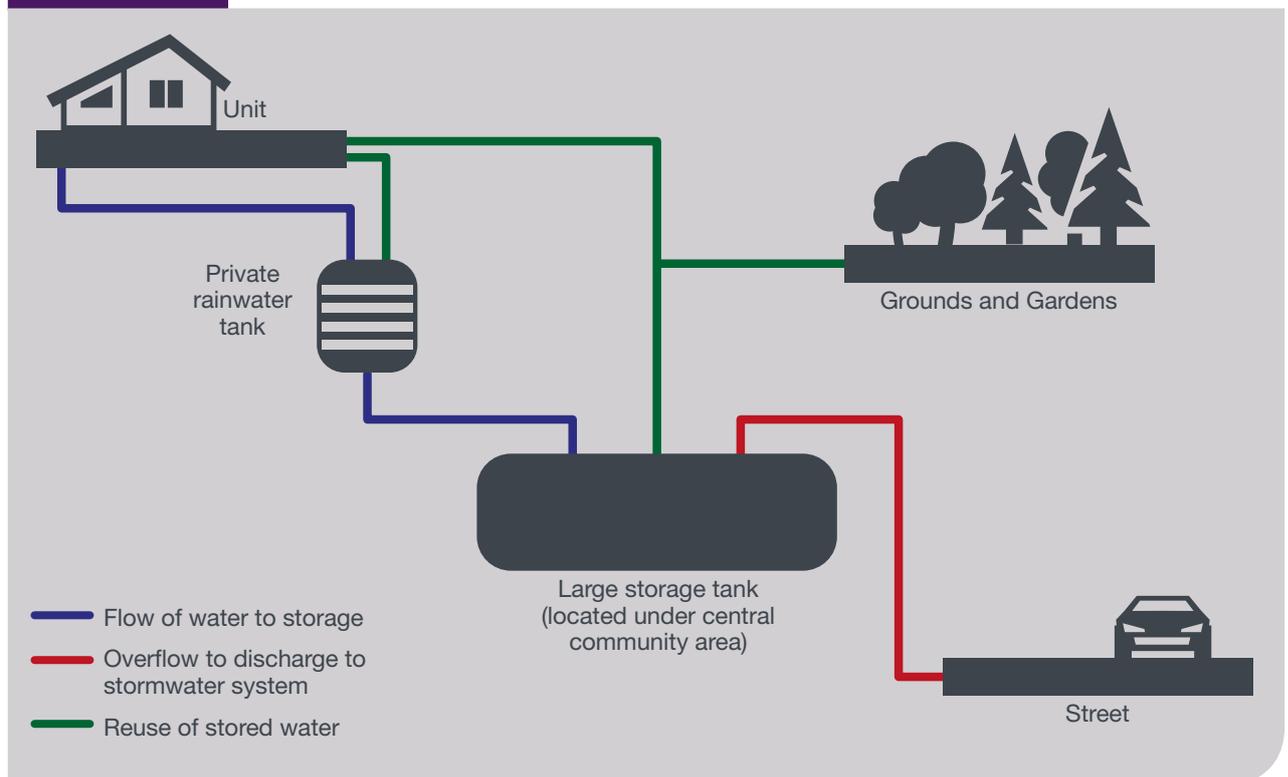
In relate to wall construction, double brick (DB) was chosen instead of brick veneer and reverse brick veneer as external walls due their being cooler in summer, warmer in winter, quieter, termite resistant, and low maintenance. The main disadvantage of DB walls relates to the fact that they have the highest embodied energy of all the options available. However, the advantages in this case were taken to out-weigh the disadvantages involved.

As a complement to the DB wall, double glazed windows (DGW) are used to minimise heat loss in the winter and heat gain in the summer. They also offer an excellent sound barrier that significantly reduces the ingress of external noise. These complement the DB walls to provide an extremely efficient external wall. Although these windows are more expensive than traditional single plain windows, they reduce heating and cooling costs. UPVC window frames were also used due to their excellent thermal efficiency and low maintenance cost. All windows are fitted with locks to ensure adequate security. In addition to the locks, the windows are to be fitted with roller shutters for both security and the increased thermal performance. All units also have a garage fitted with an automatic roller door for simplicity and security. It is also proposed that each unit has a storage area and a workbench within the garage.

For the internal walls, it was decided to use steel partitions. These are clad with plasterboard except in wet areas where fibre cement sheeting is used. All internal partition walls are insulated to reduce the rate of heat transfer and the intensity of sound, which should produce an energy efficient and quiet environment. Although all units use the same core materials, individual appearances are achieved through the use of feature brickwork, rendering as well as different colour schemes. With the establishment of external and internal walling methods it was then decided to have a steel framed Colorbond® roof, primarily because it is both easy to construct and virtually maintenance free. Sisalation®, with a high R value (in terms of thermal consistence) insulation is added in order to deliver a more thermally efficient roof. Large eaves are used to provide shading for windows and walls and in order to reduce heat gain.

In addition to the green design, building materials, construction methods, appliances and fittings, special consideration is given to the waste generated during the construction stage. Multiple bins were provided for both waste and recycling. It was also considered to be important that subcontractors are educated on the use of the recycling bins on site to ensure their proper utilisation. When choosing subcontractors, only those that could provide environment impact and management plans were contracted.

Figure 11 Water retention system in Oakden Estate





Cost implications

According to the developer's estimate, the green features discussed above account for 5.7% of total cost, including building cost, land cost and infrastructure cost. This estimate was based on the median house price in the surrounding suburbs. As a peak professional body for real estate professionals in South Australia, REISA publishes a quarterly market update that includes the median price, number of houses sold, median changes, etc. However, the expected market price for each unit was still comparatively lower than the median house price of the local suburbs. This is partially due to the not-for-profit nature of the developer, where a lower margin is built into the development budget and the capital costs are recovered over a longer period. This helps to improve the affordability of the retirement villages, as the residents of ECH most likely rely on their pensions for covering living expenses. Furthermore, from the developer's point of view, the long-term energy saving potential should contribute to a higher sales price for the units.

It needs to be emphasised that the associated costs are always a major concern for the developer when introducing green features. For example, during the planning stage of the development, one of the key areas under consideration was a gas hot water system. However, the supply cost of gas was too expensive and the developer finally chose solar HWS and solar energy systems as they are almost completely maintenance free once installed. During the village development, even though some green innovations may have resulted in reduced long-term costs, an escalating higher initial cost often intimidates potential developers and owners. This is particularly the case in retirement village developments as residents spend an average of 12 years in the property. However, for future larger projects or similar developments for residents with a higher financial capability, some green features may well turn out to be a viable proposition.

7.0 Conclusion

This study examines retirement village sustainability in Australia from the perspective of older people, government, facility managers and developers. The content analysis and case studies indicate that many retirement villages provide a sustainable environment for their residents. However, the facility managers and developers need to consider affordability issues in terms of both capital costs and post occupancy running and maintenance costs.

The questionnaire survey results show that residents of retirement villages mostly agree that sustainability activities are important. The most agreement is on the importance of reporting housing issues to the facility managers followed by saving electricity and water and recycling items whenever possible. Although residents understand the importance of sustainability in their life, this understanding needs to be supported and enhanced by the provision of associated sustainability features.

Generally, the government is supporting senior citizens through its policies and assistance. For example, the government supports the seniors' community by providing green community transportation. However, these policies are not directly related to retirement village communities. It is suggested that the government can enhance the support for retirement villages through the provision of policies and regulations tailored to the specific needs of older people living in retirement villages.

Sustainability in retirement villages should be incorporated during the project life cycle stages. Developers should embrace green planning and design for the site and floor plans; choose building materials and appliances that are efficient and environmentally friendly; use technologies and techniques that minimise construction waste; and provide facilities and services in the operation stage to improve social engagement and reduce ongoing maintenance and operation costs. Although the inclusion of sustainability features is likely to increase the capital cost of developments, there are usually savings to be made in running and maintenance costs. This can be used as a selling point for developers. For villages already in operation, sustainability can still be obtained by adding environmentally friendly features to the unit or village. Facility managers and residents can also improve community relationships to obtain social sustainability. As a result, a sustainable retirement village can substantially enhance the quality of life for older people.

The main limitation of the research lies in the small sample size, particularly in the questionnaire survey. More comprehensive data on the retirement village residents' perspective on sustainability issues will provide a broader understanding of sustainability requirements. More case studies should also be conducted to establish a database of sustainable practices in Australia. Further studies of government involvement would help to provide input to the policy and regulation framework surrounding sustainable retirement village.



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