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Designing for relationships: housing and communities that improve the quality of life of the high-needs elderly

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Abstract: Globally population profiles are ageing and the proportion of elderly people with high-care needs is projected to increase at an even higher rate. Subsequently, there is an increasing demand for housing that can support independence and provide a high Quality of Life (QoL). Relationships are one of the significant contributors to QoL for the high-needs elderly. However, a loss of social connection and isolation is a growing social concern in the ageing-society. Housing design can have a significant influence on occupant relationships. Through a qualitative investigation of the experiences and spatial use of 30 high-needs elderly people, the research finds themes for relationships, which included; living with a spouse, having guests in the home, relationships with other residents and staff, and connections with the wider community and nature. In the design of dwellings, there should be attention to flexibility for providing sufficient space for social activities, and design for views and sound to provide control-of and connection-to visitors/neighbours and nature. Walkability and appropriate deployment of communal space should be sought in the design of the complex. These considerations contribute to comfortable and meaningful relationships for the high-needs elderly, thereby enhancing their QoL.

Keywords: Design of housing and communities; relationships; high-needs elderly; quality of life.

1. INTRODUCTION

Globally population profiles are ageing, which is also the case in New Zealand. Particularly, elderly people with high-care needs are projected to increase at an even higher rate (Te Pou - The National Centre of Mental Health Research, 2011). Even when care needs arise, most people in New Zealand wish to live separately from their family to avoid being a burden (Davey *et al.*, 2004). Difficulties in maintaining home and increases in care requirements induce them to move to a dwelling that is more controllable and/or provides some levels of care and support (Statistics New Zealand, 2002).

Currently in New Zealand, there are three main housing types that allow the elderly to live independently and provide some level of care and support; public-sector housing (PU), private-sector rental housing for the elderly (PR), and retirement villages (RVs). RVs offer high levels of care and support, but are only viable options for home-owners and wealthy people (Glasgow, 2013). PU includes that provided by the central government and local authorities. PR includes that run by Community Housing Providers and religious and charitable groups. PU and PR are options for those who cannot afford to live in RVs; however, the levels of care and support for residents are low in these types of accommodation, except for a limited number of PR (Kuboshima *et al.*, 2017). There is a growing demand for all these types of housing (New Zealand Government, 2015; JLL, 2017).

The quality of life (QoL) of the high-needs elderly has been studied internationally, and it has been reported that the main elements for QoL include; independence, meaningful activities, relationships, identity and quality of care (Tester *et al.*, 2004; Murphy *et al.*, 2007). Among these, relationships are a significant contributor (Yeun *et al.*, 2017). However, often the elderly experience a loss of social connection (Toepoel, 2013; Kiwaki and Arai, 2015). Isolation is a growing social concern in the urban ageing-society, the consequences of which include people dying alone (Klinenberg, 2001; Hand *et al.*, 2017). Privacy can be a sensitive issue in cases of worsening health conditions and increasing care needs. It can also be influenced by the physical environments of housing (Hayward, 2012). This paper aims to clarify important considerations in the design of housing for the high-needs elderly, particularly with regards to improving their relationships.

2. METHODS

As part of a larger research project on QoL, an ethnographical study was conducted of 30 high-needs elderly people living in RVs, PU and PR in the urban areas of the Wellington Region of New Zealand. Ethnography is a qualitative method which is often characterised by a mix of observation with complementary interviews and to profoundly understand the reasons/ contexts behind the behaviour/event (Crouch and Pearce, 2012). It has much potential for post-occupancy studies in architecture and built environment (Lucas, 2016). In this study, data was collected for their spatial usage and perceptions through three procedures; documentation of physical environments, semi-structured interviews and full-day observations of residents combined with unstructured interviews. For the focus of this paper, limiting the range to information on relationships and related design features, interview notes/transcriptions and observation notes were analysed and emergent themes for relationships were coded, then synthesized to establish design considerations.

Participants were selected through a preliminary questionnaire of 804 residents, of which 387 responded. Fifty-nine possible participants were identified using inclusion criteria of; receiving personal care from professional caregivers; 70 years or older; and willing to participate in the survey. Of these 30 actively participated. In qualitative research, there is no specific formula for calculating sample size (Morse, 2000). An adequate sample depends on the methodology and the amount and richness of the data obtained. For example, a large number of participants (at least 30 to 60) are needed if only relatively shallow data can be obtained, and fewer participants in the study (perhaps only 6 to 10) are needed if a large amount of data for each participant is obtained (Morse, 2000). The survey in this research combines multiple qualitative interviews and observations, collecting rich data from each participant. Therefore, the sample size of 30 is considered sufficient to draw meaningful results.

Basic data on participants and housing complexes/units are summarised in Tables 1 and 2. Housing complexes studied are five PU complexes, three PR complexes and five RVs. All RVs had independent living units (RVIs), and two contained supported living units (RVSs) in addition.

Table 1: Summary of residents (*numbers in italics show the number of residents*)

Gender		**Age group**		**Ethnicity**		**Living arrangements**		**Type of main mobility aids**			
								Indoors		Outdoors	
Male	*13*	70-79	*6*	European/NZ	*28*	Alone	*27*	No aids	*10*	No aids	*5*
Female	*17*	80-89	*19*	Middle Eastern	*1*	With spouse	*3*	Walking stick	*2*	Walking stick	*5*
		90-99	*5*	Asian	*1*			Walker frame/ trolley	*14*	Walker frame	*13*
										Wheelchair	*4*
								Wheelchair	*2*	Mobility scooter	*2*
										Bicycle	*1*

Table 2: Summary of housing complexes/units (*numbers in italics show the number of complexes/units*)

Housing complex type	**Number of units supplied**						**Adjacent facilities**
	10-39	40-69	70-99	100-149	150-199	200-249	Has at least one communal lounge/ hall
PU complexes (*n=5*)	*3*	*1*	*1*	*0*	*0*	*0*	*2*
PR complexes (*n=3*)	*2*	*1*	*0*	*0*	*0*	*0*	*2*
RVI complexes (*n=5*)	*1*	*2*	*0*	*1*	*0*	*1*	*5*
RVS complexes (*n=2*)	*2*	*0*	*0*	*0*	*0*	*0*	*2*

Housing unit type	**Layout of bedrooms**			**Access type**		**Unit Floor Area**		
	Bedsit	1-bedroom	2-bedroom or more	Outdoor access	Indoor access	0-50m^2	50-90m^2	90-130m^2
PU units (*n=6*)	*3*	*3*	*0*	*6*	*0*	*6*	*0*	*0*
PR units (*n=7*)	*2*	*5*	*0*	*5*	*2*	*5*	*2*	*0*
RVI units (*n=11*)	*0*	*1*	*11*	*9*	*2*	*0*	*2*	*9*
RVS units (*n=6*)	*0*	*6*	*0*	*0*	*6*	*4*	*2*	*0*

3. FINDINGS: THEMES FOR RELATIONSHIPS

Themes for relationships emerged through analysis and have been incorporated into six broad themes: Living in a couple, Having guests stay in their home, Relationships to other residents, Relationships to on-site staff, Connection to the wider community and Connection to nature and animals.

3.1 Living in a couple

For one RVS resident, the reason of choosing her current dwelling was that; '*With [this] apartment, we lived here together… Rather than have a room each, you know, like in a hospital situation…That was really important to be together*.'

However, RVS units, which were typically one-bedroom, were often too small to comfortably accommodate two people. In particular, participants often experienced insufficient wardrobe and storage space for two people. While residents in two-bedroom houses had enough wardrobe space by using the one in the second-bedroom (3 RVI residents), one-bedroom apartments typically did not contain enough wardrobe space. *One man said; 'Sufficient for one person, not quite for two* (RVS resident).' Some living with their spouse appreciated or desired two toilets (2 RVI residents), which allowed each of them to use each toilet.

For a couple with disabilities, being in the sight of each other was important. An open-plan kitchen-lounge provided views to each other, even when the husband with limited mobility spent a long time sitting in the lounge and the wife was in the kitchen. One RVS unit had a sliding-door type partition between the bedroom and the lounge; '*You can seal off the bedroom, or you can ... For instance, if I was unwell, and I'm in bed, my wife could sit here and still see me with the door open, or if I'm snoring a lot she could close it* (RVS resident).' On the other hand, the resident desired for greater privacy between a couple; '*it would be nice to have somewhere where the two people can be together but apart, if you like. A bit of privacy for one*.' For example, a separate office could be added, which '*need not be very large*.'

3.2 Having guests in their home

The family connection was the most important in terms of catering for guests, and regular family/friends visits were appreciated for physical/mental support. Having guests was also important for those with limited mobility, because; '*I can't get out to the big meetings anymore* (PR resident).'

3.2.1 Welcoming guests

Being able to '*see who is coming* (2 PU residents)' before their arrival was important to control and welcome visitors. Unfortunately, residents of indoor-access units typically did not have views of approaching guests (4 PR, 2 RVI residents). An apartment-resident who could not see the door from her sitting space said; '*I can't go to the door easily, so I just wait. The door is unlocked* (RVI resident).' When residents called out 'Come in!' while seated, their voice could not always be heard by guests because of the distance of the seat to the door or the presence of walls (1 PU, 1 RVI residents).

Interphones were used in units with indoor access, which was useful to notify a resident of guest's arrival (PR resident). However, residents who lived in an apartment with indoor access had an individual external door as well, which was preferred (PR resident, RVS resident). It was also preferred by her family and caregivers because; '*they like to feel… it's more homely... They can just come, and if I was not well also. It's good to know they don't have to get me up before they come* (PR resident).'

Having a lounge separate from the bedroom was generally preferred for greater privacy when entertaining guests (5 PU residents, 4 PR residents). One woman who enjoyed socialising did not invite many guests because her bedsit room was '*more like a bedroom* (PU residents).'

3.2.2 Accommodating large numbers of guests and small children

Some participants had many guests at a time in their own house, such as extended family members (PR resident) or personal groups (1 PR, 2 RVS residents). However, many dwellings were too small to accommodate a group of ten people and necessary extra chairs (RVS resident). Common indoor/outdoor space could be used to accommodate guests or chairs. One woman had held parties using the open lawn space leading out from her lounge (PU resident). Another RVS resident used communal dining room near her unit, when '*we have family meals and everyone brings something potluck* (RVS resident).'

Participants particularly enjoyed having grandchildren/great-grandchildren to visit. However, special attention was needed for their movements, '*running around all over the place.*' One resident's bedroom, where he normally stayed, was shut off to keep out children '*because they're very inquisitive* (RVI resident).' A man with limited eyesight had a concern with children; '*my biggest worry is little children… About this high, running and scampering along. And I've got to be very careful that I don't run into them…* (RVI resident).'

3.2.3 Having guests stay

Most residents of one-bedroom or larger units used the second bedroom for overnight guests (8/10 cases). Some of them used it frequently (once a month or more) (2 RVI residents), or for longer periods such as several weeks (2 RVI residents). The garage was also used to accommodate guests, by parking a car outside (RVI resident). One RVI resident furnished the

garage with chairs and a desk and stored a mattress for grandsons' stay; '*They like it out there… they read books, and they look at their computer all night*.' However, '*It's not insulated, so it's OK in summer but not in winter* (RVI resident).'

In contrast, there were no bedsit residents who had guests stay overnight. One-bedroom units could accommodate one or two family members or intimate friends, using an extra bed or a sofa bed (1 PR, 1 RVS residents). It was important, because '*if you [resident]'re sick, we [family] can come and stay* (RVS resident).' However, one woman didn't have space for extra bed for her visiting son, who '*used to stay here in his cushions… on the floor [in the lounge]* (RVS resident)'

3.3 Relationships to other residents

Connection to other residents was important and contributed to a greater sense of security and safety.

3.3.1 Socialising with other residents in communal spaces

Activities in communal spaces allowed residents '*to mix with the other residents* (PR resident).' In a previous complex without communal space, one resident '*hardly ever saw them [neighbours]* (RVI resident).' However, others did not participate in collective activities for various reasons, such as limited mobility or poor eyesight (1 PU, 2 RVI residents) and privacy needs due to health issues (1 PU, 1 RVS resident) or simply preferences for socialising (2 RVI, 1 RVS resident). The physical environment also affected their participation due to issues such as; a long distance from each housing unit (3 RVI residents), slopes (1 PU, 1 PR, 1 RVS residents), a heavy front door (RVI resident) and darkness (RVI resident). One RVI resident had difficulties with walking to the communal space at 22 m distance; '*I get breathless*.' Another also said; '*it's a long walk… I could see me having to give it up* (RVI resident)'

A resident of a RV with over 200 units felt a loss of sense of homeliness; '*I liked the village as it was… it's got bigger… they used to… more homely* (RVI resident).' This impacted the size of the communal spaces that could accommodate all residents when they were invited to communal meals or tea (2 PRs and 2 RVs). One resident said; '*they gotta have it in three different sittings… you only get to know the people who go to the one sitting you would go to* (RVI resident).'

3.3.2 Informal meeting with residents

Encounters among residents often occurred near the entrance to their unit, such as in the corridor or on the porch. The view and proximity from the lounge to outside encouraged resident interaction; for example, a man, sitting in his lounge, found a neighbour pass in front of his unit and talked to him in the porch (PU resident). One woman in a complex where many people sat in their porches said, '*if you're lonely you could walk around and there's always somebody to talk to and it feels safe* (PU resident).'

In RVS units, a common lounge near apartments was used frequently for sitting in the sun and reading; *'This was a place to relax. We were close, because we felt "This is our room"* (RVS resident).' She used the space often (10-12 times a month), sitting in the same chair. The other two armchairs also had dedicated occupants. Residents' autonomous activities motivated resident interactions in a small lounge. For example, one resident liked to play the piano which attracted other residents; '*when I do practice, within a matter of 60 seconds I have an audience. People come and sit around* (RVS resident).'

3.3.3 Privacy and connection

At times, residents preferred to maintain privacy from each other, saying; '*We're not living in each other's pocket* (3 PR residents).' Windows facing each other were not preferred (2 RVI, 1 PU residents). By contrast, the layout of units at an angle with a long distance between them was praised (RVI resident). A level difference was also effective for maintaining privacy. A RVS resident living on the first floor said, '*I could stand here and nobody would see me*.' Effective unit layout also enhanced their sense of connection. One RVI resident said; '*there's quite a few feet between us… It's not close enough to worry me… If my neighbours on my side don't see my blinds go up in the kitchen, they know there's something wrong*.'

Some participants were annoyed by noisy neighbours in flats with no sound insulation (1 PU, 1 PR residents); '*If somebody has their radio too loud it could be heard in the next flat* (PU resident).' By contrast, another resident missed the noise; '*It's very private. Very sound proof… I've lived in nosier places, so there could be more noise… very lonely* (RVI resident).'

3.4 Relationships to on-site staff

The presence of the on-site staff provided residents with a greater sense of safety. One PU resident talked; '*you only need to ring [the custodian] if there's something wrong and he'd be here like a shot*.' The attendance of medical/care staff was appreciated in RVs, and desired by one PU resident; '*I think in all these villages – of course we have to pay more if we had all these services – there should be a nurse.*' In RVS units, flexible manner of care provision was appreciated; '*when I need care I get it…They'll just see whatever I need… I just want to have as much independence as much as I can* (RVS resident).'

However, too many staff visits affected resident privacy. In RVS units where the staff pass frequently in corridors, the ability to '*shut the door*' was important for residents to maintain privacy (2 RVS residents). One resident dreaded the thought of having to move into a rest home, where '*I wouldn't have a choice [to shut the door]* (RVS resident).' The manner of the frequent staff visits for care activities and tea service also affected their privacy. During the observation sessions, no staff member waited for the residents' reply before opening the doors, one even entered without a knock (RVS resident). In the situation a resident wears a hearing impairment, a knock would not notify them of the staff arrival, particularly when they were not wearing their hearing aids (RVS resident). Often, hinged doors didn't shut properly following a light push of a staff member, so the door was left half-open (2 RVS residents).

3.5 Connection to the wider community

Most participants left their complexes to visit family or go into town regularly, which was; '*what I look forward to* (PU resident).' Common activities in town included going to the café (12 participants), going to the club or RSA (4 participants) attending church (8 participants) and joining personal hobby groups (2 participants). It was also '*a change from [their complex]* (PR resident).' Many lived in complexes in their former neighbourhoods and half of the participants expressed an attachment to place.

3.5.1 Accessibility and walkability

Thirteen participants drove a car. The car access between the gate and the unit was an issue in large complexes. One resident complained about confusing roadways; '*There's so many one-way streets here now you can't get around… to try to direct someone through this to find this place is very difficult* (RVI resident).' Confusing unit-numbering systems were also annoying; '*they've got numbers going that way, this way, that way, round that way and the streets are not named or nothing* (RVI resident).' He also desired a shorter route between resident units and the main road.

For those who only walked, accessibility to the wider community was important. However, getting out of the dwelling was demanding for some. It was hard for those using a walker frame or a wheelchair to open and close the hinged exterior door while moving their mobility aids ahead of them (3 PR, 1 RVS residents). One man had a difficulty in walking over the threshold of his exterior door which had a small level difference (PU resident).

Walking outside the complex entertained many residents (1 PU, 1 PR, 1 RVI residents); one of them walked regularly in town and passed many of his familiar venues such as shops and cafes on the way. The ability to walk differed by individual impairments, and having a space to rest was important for some; one RVI resident had difficulties in walking a distance of 80 m: '*I would be sitting down halfway*.' Many residents of a large RV with villas crowded in a line walked to the gate of the village and then returned to their house. They expressed frustration, '*you do the same route all the time* (RVS resident).' Car safety was another concern in large complexes, especially those with a long driveway; *'You get the occasional persons who don't take any notice of the speed limit* (RVI resident).' One resident with a sight impairment preferred to walk on the road rather than on the footpath, because '*it gives me more space to walk* (RVI resident).' A speedbump on the road was a hazard, and had previously caused him a fall.

3.5.2 Peacefulness and safety

'*Peace and quiet'* and safety was important for many (1 PU, 2 PR, 1 RVI residents). One RVI resident said; '*I had a burglar [in his previous home]. It frightened me. I started to think I want to live safe*.' Current housing was preferred because '*we have… no problems from… boys coming in* (PR resident).' The enclosure of the site and the locking the gate or common entrance increased the sense of safety (2 RVI, 1 RVS residents). One PU resident had school kids come through the complex at night and said; '*I don't believe that the Council… of putting a walkway down here that allows the public to walk through… Although they've got signs up saying No Access nobody takes any notice of it*.'

3.5.3 Visits from people outside

Inviting people outside in communal areas was mentioned as a key contributor to a greater connection with the wider community (1 PU, 2 RVI residents). For example, in the PU complexes, '*guest speakers'* such as *'Age Concern' and 'Resolve'* were invited. In RVs, people were invited for activities such as concerts, exercises, handcrafts as well as for giving talks.

3.6 Connection to nature and animals

3.6.1 Views to nature

Views to nature were generally preferred by participants. Many liked views to the mountains, hills and bush or vegetation (10 participants). These preferences related to having had similar views from their previous houses and past activities such as mountaineering and tramping; '*out the lounge window, I can just see the tops of the Tararua Range, which I used to*

walk across (RVI resident).' Another resident pointed out the effective unit layout; '*How many [villages] are set such that every house has a view without impinging upon the neighbour?… The house next-door was set back, so here we had uninterrupted view in that way* (RVS residents).'

3.6.2 Trees and birds

Some residents liked to see trees, shrubs and/or birds from their sitting space (2 PR, 2 RVI residents); one PR resident could '*look out at the cherry trees and cyprus if I want to and that's my favourite spot* (PR resident).' Native fauna and flora such as tuis, wood pigeons, kowhai and flax were also preferred (2 PU, 1 PR, 1 RVI residents). The presence of trees was pleasing, particularly in confined situations (RVI resident). Some people fed birds on their porch or a common deck (1 PR, 2 RVS residents); '*As soon as I open my curtains, they're all sitting on the fence waiting for their breakfast* (RVS resident).'

However, trees and shrubs also limited the views and access to the sun. One PU resident said; '*Smaller trees, bushes, they're more suited.*' Garden maintenance was also a concern; '*They only come out and trim them because they're asked to, otherwise they would just let them go mad* (PU resident).'

3.6.3 Pets

Some residents had or desired a cat (1 PU, 1 PR, 2 RVI residents). In PU where pets were prohibited, one resident regretted; '*it's a bit of a shame really because cats for the elderly is very good, they have a calming effect.*' Some RVs were pet-friendly, which was appreciated by residents. However, not all liked pets. A RVI resident was concerned that; '*Cats might kill birds. I love to watch the birds*.' Another RVI resident shooed a cat constantly coming to her flower pots. A PR resident kept her cat on a harness in her porch. But the cord was a hazard for her neighbour with limited mobility who regularly visited her.

4. DISCUSSION: DESIGN FOR RELATIONSHIPS

Based on the findings, design considerations for both housing and communities have been identified.

4.1 Personal dwellings

In the design of dwellings for people with restricted mobility, there should be careful consideration for access and control from the sitting area to the outside and, in particular, consideration for views and sound. Spatial organisation that allows residents to view visitors coming while being seated improves their sense of control. The front door should be close enough for a voice to reach as well as be within sight of the sitting space. Views to open space and moving things such as people or even cars are preferred over views to other buildings. Views to neighbours can motivate conversation. Views to nature such as mountains, even partial views can lead to greater satisfaction. Where a house is joined to other houses, soundproofing walls is important; however, being too quiet can cause a sense of isolation.

There should be enough space for visitors in the lounge and a separation of the lounge from the bedroom. Having enough space for a sofa bed (being stretched out) or a portable bed in the lounge allows guests to stay overnight, which is particularly valuable in one-bedroom units. For visits with small children, there should be design consideration for the space where they will interact with residents.

The design of a spare room has great potential to facilitate relationships. The second bedroom or the garage was found very useful for having guests stay. For garages, there should be insulation in the walls and roof as well as appropriate windows for ventilation and natural lighting for greater flexibility of their use. As the loss of their spouse is a common event for the elderly in late life, there should be design consideration to accommodate the change in the number of residents. Even a one-bedroom apartment could accommodate a couple with added wardrobe space utilising design strategies to provide appropriate privacy between them; for example, adding only a small office can provide greater privacy.

4.2 Transitional space between in and out of personal dwellings

Doors should not be too heavy to operate easily. A hinged door with a door closer should be avoided, as it is difficult for those with a mobility aid to go through. There should be no level changes at entry thresholds; as even a one-centimetre lip can be a hazard. Individual doors leading directly to the outside are preferred over those to a corridor, for greater sense of homeliness and convenience.

There should be enough consideration in the spatial organisation of exterior space and placement of windows to meet the needs for high levels of privacy and the desires for views to outside. The solutions include ensuring a level difference between the outside ground and the unit, and providing sufficient open space between paths and individual units. Open space can also work as an extendable space for accommodating numerous guests or small children who want to play or keeping pets; some separation of these spaces from the path is important to prevent residents tripping over children or leads.

Trees that bloom or attract birds should be placed in regard to the location of windows. Proximity to the porch can give residents a chance to feed birds. The species should be considered for size, leaf cover and ease of maintenance. Tall trees should not be planted near resident units as they can block the sun.

4.3 Complex design

A complex size of over 200 units should be avoided for greater familiarity and sense of homeliness of residents. In the layout of units, attention should be given to the window angle and viewing distance to avoid residents looking into each other's dwelling. For example, one strategy is avoiding parallel blocks. However, having the window in the kitchen facing to the neighbour's window with a 6-meter distance was sufficient to enhance sense of connection and safety of residents, without infringing privacy.

In the design of walking routes, routes should extend to the gate at a minimum or to the outside of the complex. There should be a variety in walking routes to meet the needs of individual mobility. A circular route is better than walking the same route there and back. Spaces for resting should be deployed at short intervals, such as at every 20 m. Walkways should be wide enough to prevent falls from moving off the path due to unsteadiness. There should be sufficient outdoor lighting for greater safety, particularly given that many residents suffer from sight loss. Public access should be limited for heightened safety and security through the careful layout of pathways. Long roadways should be avoided to prevent cars from running at high speed. Speedbumps should be used with caution as they are a potential trip hazard. In the transportation planning of a large complex there should be attention given to easy wayfinding and comprehensible unit-numbering systems.

In complexes where residents are invited to tea/meals in the communal space, the room size should accommodate all residents while seated. Allowing communal rooms to be adjacent and open to the wider community can facilitate interaction with people from the outside. Small communal spaces adjacent to resident units can facilitate social activities that individual units could not accommodate.

4.4 Accommodating diverse needs

The requirements for space vary by residents' individual factors such as impairments and preferences. Given that the elderly have more complex and severe impairments as they age, the design of their housing should assume accommodating as many/severe impairments as possible. To facilitate individual preferences such as those for socialising and for pets, one of the solutions is diversifying the design of dwellings and communities so as to expand the options for desirable living conditions.

5. CONCLUSION

This paper has examined the important relationships of the high-needs elderly and the design considerations that can best accommodate them. In the design of dwellings, there should be greater consideration given to flexible means for providing sufficient space for social activities, and to design for views and sound from inside to outside so as to provide for control-of and connection-to visitors, passers-by and nature. In the complex design, greater attention should be paid to walkability and accessibility to the wider community. These design considerations contribute to comfortable and meaningful relationships for the high-needs elderly and can thereby enhance their QoL.

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