A research project submitted in partial fulfilment of the requirements for the degree of
Master of Architecture (professional). Unitec Institute of Technology, 2017
within city limits

ACKNOWLEDGEMENTS

I would like to thank many people who have been on this never ending roller coaster research project.

Firstly, I would like to thank both of my supervisors Graeme McConchie and Annabel Pretty for their enormous contribution and the countless hours spent with me to get this project through completion.

A special thank you goes out to my Baby-boomer parents, Ross Beaton and Judith Riddle for the endless support and motivation. Also, to the rest of my family and friends who have helped along the way and have given me the encouragement needed.

Finally, I would like to mention Paris Magdalinos Architects Ltd and Ignite Architects Ltd for giving me the time and freedom to complete this project.
CONTENTS

I Acknowledgements

II Abstract

1.0 Introduction

Research Question ................................................................. 12
Project Aims ........................................................................ 12
Description ........................................................................... 12
Scope and Limitations ............................................................. 13
Context ................................................................................... 13
Methodology ........................................................................... 14

2.0 The Boomers

Defining the Boomers ................................................................. 16
New Zealand’s Baby Boomers .................................................... 17
Old is the New Young ................................................................. 18
3.0 Case Studies

Freedom Villages, Papamoa, Tauranga, New Zealand ........................................ 21
The Villages, Sumter, Orlando Florida, USA ..................................................... 23
The Plussenburgh, Rotterdam, Netherlands ..................................................... 26
De Rokade, Groningen, Netherlands ................................................................. 27
Princess Alexandra Retirement Village, Napier, Hawke’s Bay, New Zealand ........ 29

4.0 Site

Site .................................................................................................................... 32
Site Location ..................................................................................................... 33
Aerial Analysis ................................................................................................... 37
Site Accessibility ............................................................................................... 43
Surrounding building types and uses ............................................................. 43
History ............................................................................................................. 44
within city limits

5.0 Design Process

Programme ......................................................... 46
Turning 90 degrees ................................................. 48
Design response progress ........................................ 49

6.0 Conclusion

Concluding Statement ............................................. 70

7.0 Bibliography

Bibliography .......................................................... 72
List of Figures .......................................................... 74

8.0 Appendix

Appendix A - Lifemark Design Standards Handbook
Appendix B - Structural Response
Appendix C - Final Presentation
ABSTRACT

Village in the Sky explores the issue New Zealand has with housing its ageing population, the Baby-boomers. By 2031, the projected number of New Zealander’s aged 65 and over will amount to over 1,120,000¹, with the majority of these being part of the boomer cohort. Baby-boomers are the generation that have changed the way we live.

“At every stage of their lives, the Baby-boomers have been at the forefront of radical social, economic and political change: within the family, within the education system, within the labour market, and beyond. The way that members of this age group, the most influential generation in recent social history, choose to adapt to their changing circumstances will have a similarly dramatic impact in their later life.”

This research focuses on creating an alternative housing solution for the portion of this demographic who, by their own priorities and personal interests would prefer to live and retire within the city limits, rather than in a ‘typical’ suburban retirement village.

1.0 INTRODUCTION
Research Question

How can the needs and wants of a “Baby-boomer” retirement community be successfully provided for in a high-density, high-rise development on a site within Auckland’s City Limits?

Project Aims

To critically analyse literature about the Baby-boomer generation, and to evaluate a range of existing retirement villages and communities. This analysis will help construct and demonstrate a sustainable design solution that can assist the knowledge of others on how to house an ageing population. The proposed is a high-rise, high-density sustainable design solution within city limits, as an alternative to that of a typical suburban retirement community.

Description

This research project explores the possibilities of creating a living environment purely for our ageing Baby-boomer population. As this generation enters retirement, most will decide at some point (or have the decision made for them) to move from their existing residence into a retirement community. The portion of this generation which is the focus of this study does not want to live in the ‘typical’ suburban retirement village, characteristically labelled a self-contained ‘oasis’. They would prefer to live within the city, which provides convenient pedestrian access to amenities such as restaurants, cafes, theatres, cinemas, shopping centres and supermarkets, parks, and public transport services. These amenities are not always easily accessible to the residents of a typical suburban retirement; and when these residents lose their ability or desire to drive, they will have to rely on accessing essential amenities using public transport, or depend on family members or friends to chauffeur them around. Providing for retirement living conveniently near the everyday and discretionary amenities mentioned above will allow the retirees to keep their independence, through reduced reliance on others.
Scope and Limitations

The programme for this inner-city high-rise retirement development close to the Britomart precinct in Auckland’s CBD is derived from an analysis of the functions which are typical of a modern suburban retirement village, and a survey of amenities currently existing within comfortable walking distance of the proposed site.

Context

The context which has stimulated this research project is the increasing average age of New Zealand’s population attributed to the baby boom that occurred between 1946 and 1966 shortly after World War II. This generation is currently aged 51 to 71, and currently over a quarter of New Zealand’s population are Baby-boomers. They are often said to be a social wave as much as a demographic one. They are a strong political based force due to their large number and have consistently set about redefining accepted realities.

The Boomers grew up without the same rigid and firm social constraints that existed prior to their generation. A strict ethic of ‘work hard’, live within one’s means, save for the future and be self-sufficient. This generation is the richest, most educated, most travelled and have the highest expectations and demands more!

As more of this generation comes into retirement, the wants are vastly different to the generation before them. The portion of the retirees that this study focuses on has a different view on an ideal retirement community; not being a self-contained flat, but rather an inner-city environment that has all modern necessities, health services and facilities, social spaces, communal gardens and leisure facilities with the opportunity for active and generous engagement with the world as a whole. This creates more options and independence than the traditional suburban retirement village.
Methodology

The methodology of this research project will be formulated around continuous problem solving with each iteration influencing the next. Working in this format highlights a problem, extends knowledge, investigates other alternatives and evaluates the result. In order to establish ways of housing the Baby-boomers an investigation into useful precedents, literature, illustrations and site analysis will uncover potential problems within the project. Research will be broken down into sub categories for a more in-depth investigation as follows:

-The Boomers. Defining the Baby-boomers and who the New Zealand Baby-boomers are.

-Case Studies. Investigating a wide range of retirement villages from around the globe. Ranging from the traditional retirement village, to the super-sized aged community.

-Site. An in-depth site investigation which will consist of history, photographic investigation, surrounding buildings and a full aerial analysis.

-Design Process. This is where the research and findings will be implemented. Going through possible design solutions to issues that will be explored. Developing the design through a series of models, drawings and diagrams will help resolve the identified issues.

-Programme. Form the direction and requirements for this design to undertake

-Presentation. The final aspect of the project, but the most important. The presentation will affect how the project is going to be portrayed. Showing how the needs and wants of the Baby-boomer generation can be constructed into a high-rise, high-density village within the city limits. The presentation will consist of Plans, Sections, Elevations, 3d images, and a physical 3d model.
2.0 THE BOOMERS
Defining the Boomers

“The Baby Boomers are widely seen as a vanguard generation; they have not just experienced various social transformations as they have passed through different life stages, but actively instigated them.” ³

“Baby-boomers” is the title given to the generation born post World War 2, between 1946-1966. Within the Boomers two groups can be distinguished: Early Baby-boomers (1946-1956) and Late Baby-boomers (1956-1966). There were two defining ‘baby-boom’ spikes within the two decades this generation spanned. While late Boomers could be considered less conservative in attitude than the early Boomers there are however, multiple characteristics and views within the wider demographic which both groups share.

The Boomers have lived through a period of radical technological, social and cultural change and shared a set of formative influences and experiences – including the absence (excepting for the Vietnam War) of large scale military conflict, the ‘sexual revolution’, the introduction of mass education and the emergence of a “consumer” society – which are distinctly different from those of their parents and the generations before them.⁴

“Where their parents had rationing”, comment the baby boomers had the TV dinner”.⁵

The Baby-boomers are the products of an age of affluence. They have been described as “the first generation to have grown up in a consumer society . . . to have been advertised and marketed to all their lives . . . to have come to expect their individual wants and needs to be satisfied; to have been encouraged to define themselves by the personal choices they make about what to wear, buy, eat and watch.”⁶

⁴ ibid, p35
⁵ ibid, p35
⁶ ibid, p35
According to 2003 research the baby-boomer generation in the UK is the most economically powerful section of society. While earning more than any other age group, the boomers also own more assets. Described as “pioneers of the consumer society” they are a generation of “smart consumers”; aware of their power to make individual and personal lifestyle choices.

New Zealand Baby Boomers

“Boomers are operating on the assumption that they have 25 to 30 years left, possibly longer. Plenty of time not only to plan for the future, but to envision a whole series of futures. They’re starting new businesses, going back to school, travelling the world, entering new relationships, constantly churning, ‘re-inventing’ themselves.”

As with all developed nations, New Zealand has an ageing population. This is due to three main factors: declining birth rates, increasing longevity, and the post WWII baby boom. As a result, the composition of New Zealand’s population pyramid is changing, with a widening at the top in the older age groups. As of June 2016 the current population for the 65 plus bracket is 698,000. By 2031, the projected number of New Zealander’s aged 65 and over will amount to over 1,120,000. With a projected total population over 5,200,000 this puts the 65 and over bracket above 21 percent of the population.

The Baby Boomers currently account for nearly one quarter of New Zealand’s population with a figure of 1,125,000, and with the first of the demographic having turned 65 in 2011, and therefore with more people entering retirement, they commanding more resources than older people in the past. We will

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8 ibid, p51
9 ibid, p36
see the average age rise as the baby boomers are expected to live longer and healthier lives than the cohort before them. As this demographic has a span of two decades, there will be people at different stages of their lives; a portion will need more health care and assistance, with a large number not only feeling healthier, but also feeling mentally younger than their age. This means that leisure, retail and support sectors of New Zealand’s economy need to tap into the views of older people, rather than rely on assumptions about their needs and wants based on the past.

**Old is the new Young**

“The image of a bus-load of docile ‘seniors’ obediently wobbling into a museum, listening to a few words from their guide and then climbing back on to the bus, is fast being obliterated by the go-anywhere, do-anything mindset that drives ‘Boomeraging’. ”

What does retirement mean for baby boomers? Huber and Skidmore note that our assumptions about the future are rooted in a particular conception of older generations, “but the baby boomers have transformed every station they have passed through and show no sign of stopping in old age. As a result, we must confront the conceptual framework we use to think about ageing and the conventional wisdom about the central political or governance challenge it poses.” Many Baby-boomers will choose to blend work and leisure into their late 60s and early 70s, with disregard for the conventional concept of retirement at age 65. It is already evident that Baby-boomers will live longer and generally be fitter, more active and healthier than previous generations of older people. And not only will older people be healthier, they will also feel mentally younger than their age.

This generation are the most travelled, and are likely to keep travelling as they come into ‘retirement

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age. The Boomers have the time and money to spend. Travel agencies now target the members of this demographic with extravagant trips around the world, and month-long cruises. For example, in the United States, 80 percent of the population over 65 took an extended vacation in the last year, and 70 percent took two or more vacations.19

The Boomers are not behaving as the generation before them. Not for them, “no surprises”, beach, sun, a hand of Bridge, relaxing tried and true locations, dinner at the same restaurant day in day out at 6pm on the dot. Not likely! The Baby Boomers want new and exciting experiences, craving the physical rush of climbing to Everest Base Camp, skiing in Japan. And if they’re not physically able, they will instead seek intellectual and cultural adventures.

“Boomers grew up determined to experience new things, break new ground, get what they wanted. They see no reason to let their chronological age determine their mental or emotional age”10

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3.0 CASE STUDIES
Freedom Villages, Papamoa, Tauranga, New Zealand

Freedom Villages is a new $46 million resort style retirement village located in the Tauranga suburb of Papamoa, neighbouring Mount Maunganui. Intended for the growing demographic and active over 50’s age group, this being the first of its kind within New Zealand, spread over 7 hectares with 160 homes through 5 stages planned in total on-site.

Freedom Village moves away from the conventional retirement community in a number of areas, first one being ownership. The residents own their house but do not have ownership of the land it resides upon; this is set under a Lifetime Site Agreement (LSA). The village operator owns all land in the development, and under the LSA allows the resident to live on site for life. This model allows the residents to have full control of their finances heading into retirement with brand new houses selling from $235,000 - $350,000.

Unlike conventional retirement developments, Freedom Villages provide no healthcare within the complex, but still operate as a registered retirement community. Developer, Juliette Yarrell, states “the village targets the younger, more active and still working or semi-retired, compared to those who choose to live in a more traditional retirement development in New Zealand.” Yarrell is predicting 25% of residents will use Freedom Villages as their ‘home base’ in which they can lock up and leave for travels around New Zealand or further abroad with the feeling of knowing their house and belongings are and secure.

Freedom Villages gives new owners an option of three various house layouts; The Bach, The Beach, and The Bay. Having these pre-fabricated and made to order, gives new owners the freedom to custom-build their home and personalise it with their tastes and specific requirements. All homes are built for easy conversion to comply with Lifemark accredited mobility standards should they be required. Yarrell states “we felt it was crucial to future-proof homes for our residents who will be able to feel confident that what they’re buying will serve their changing needs;” The Bach is the cheapest of the homes at 97 square metres. It consists of 1.5 bedrooms, a large outdoor deck and an attached garage. The Beach has a total area of 113 square meters and contains 2 bedrooms, 2 bathrooms, out-

door deck and an attached garage. The Bay is the largest coming in at 132 square metres and boasts
two bedrooms, two bathrooms, a den, outdoor deck, and an attached garage. The key facility which
makes this village different to conventional developments, is the specifically designed park for the
residents' large motor homes, trailers, and boats, which also includes a maintenance and wash-down
area. In addition to this there is a range of facilities offered to the residents within the Community
Centre complex in the heart of the Village:

- Gym
- BBQ outdoor areas
- Walkways connecting resident's houses
- Cafe, Bar and function area
- Library
- Entertainment and theatre
- Blokes garden sheds
- Gardening plots
- Self-drive courtesy van

The main entrance is off Golden Sands Drive, it is not a gated community, but provides full time secu-
ritry. The Village is within walking distance to Papamoa Beach, “4 Square” and other local amenities.
The urban planning suggests the Village is trying not to segregate itself from the neighbouring sur-
roundings, but invite them in with the use of communal-linked walkways linking the two together.

Freedom Villages is a ‘retire by the beach’ response. Focusing strongly on the active 50's demograph-
ic, the laid back vibe and amenities on offer in the village suggests this is a new-age retirement vil-
lage. This model does not provide any level of healthcare, in order for the residents to seek medical
advice they must go off-site. The streetscape is an aspect of interest as it helps create a sense of com-
munity. This is also portrayed through the minimal fencing and large trees in front of each dwelling.
The Villages, Sumter, Orlando Florida, USA

The Villages is a private development designed for the over-55 age group. Gary Morse, son of founder, Harold Schwartz, transformed his father’s trailer park (Orange Blossom Gardens) into the largest retirement community in the world. His envision for this community was to be the “Disney World for Active Retirees.” A village that “intentionally supports nostalgia through the bracketing of contemporary time. It is suggested that this produces a form of ‘resilient time’, one that dulls the subject from the perception of time passing, and in turn defines an alternate performative role for architecture and urban settings that typically categorized as ‘representational post-modernism.’

Located 32km south of Ocala and 72km northwest of Orlando, spread through Sumter, Lake and Marion Counties. The masterplan is a large scaled low density retirement community covering 25,000 acres, with more than 50,000 homes, housing over 115,000 residents. Morse’s scheme was based around the idea of ‘small hometown, small community’. Rather than having one large urban centre to service for all residents, he created over 50 ‘neighbourhoods’ throughout the development, all containing detached single storey family dwellings. Each would be individualized with its own name, theme, identity, and amenities. This in turn breaks the development up and leads the residents to feel as though they are living within a small town. “The community is designed around the notion that every resident should have simple and convenient access to the various amenities.”

The Villages features three ‘downtowns’, housing more amenities per capita than any other age restricted community in the USA. The Spanish Springs Town Square, the oldest downtown, “speaks to Florida’s legacy as a site of exploration and settlement by the Spanish.” The buildings in this downtown are “articulated in a somewhat exaggerated Spanish Colonial Revival style, featuring stucco exterior walls, large arches, exposed black-stained wooden beams, and clay-tiled roofs.” The downtown hosts more than 30 retail establishments, 12 restaurants, Rialto theatre, radio station, a

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24 Deane Simpson, Third Age Urbanism: Retirement Utopias of the Young-Old, (ETH Zurich 2010.), P82
26 Hugh Bartling, Tourist as Everyday Life: an inquiry into The Villages, Florida, Tourism Geographies 8. no. 4 November 2006): P390-391.
27 Deane Simpson, Third Age Urbanism: Retirement Utopias of the Young-Old, (ETH Zurich 2010.), P82
hotel, chamber of commerce, church, small park and a variety of other establishments. The downtown also features a piazza; 100 metres by 100 metres with a fixed gazebo where bands and entertainment plays from 5pm every evening. The second themed downtown which opened in 2004, is, Lake Sumter Landing Market Square. Loosely based on a twentieth century Floridian beach-side town, “the buildings feature, according to designers, a mixture of styles and influences, from Key West’s Victorian architecture and bright Caribbean colours to Cracker-style shotgun houses and New England cedar roofs.” Lake Sumter offers a large range of amenities such as, several dozen retail shops, restaurants, a lakeside hotel, a lighthouse, Old Mill playhouse movie theatre and a piazza that fronts onto the edge of Lake Sumter, which is a 340 acre man-made lake. As is the case with Spanish Springs, the piazza at Lake Sumter has a central gazebo for local entertainment on a nightly basis. Brownwood Paddock Square the third and newest downtown, opened in 2013. Florida was one of the largest cattle producing states in the United States in the 1800’s so the developers design for Brownwood “is based on old-look architecture of Old World Florida and will take residents back to a time in the 1800’s when Florida’s cattle hunters and cowboys roamed the state.” The spatial organization of Brownwood is somewhat similar to that of Spanish Springs, and Lake Sumter, having a central piazza with gazebo, with a large number of retail shops and restaurants.

The infrastructure within the Villages is somewhat different to any other age-restricted community. The urban design is organized with a highly developed system of golf cart-specific infrastructure which allows the golf cart to access the entire community. It is estimated that the Villages contains more than 135km of golf cart-specific roads, with more than 30,000 golf carts owned within the community. The overall planning logic and frequency of amenities, such as ‘downtowns’ and recreational centres, is based around Morse’s desire to prevent any of these to become larger than a ‘small hometown.’ The organization and layout dictates the maximum travel time to ‘downtowns’ and ensures this is kept to roughly 4.8km or 10 minutes by golf cart. Similarly, the recreational centres have been kept to a distance of approximately 2km or 4 minutes by golf cart.

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The 4.3km of HighwayUS27/441 running through the Villages property is known as the ‘strip-hospital’, supporting roughly 180 specialized health professional and related businesses in what is “termed ‘professional plazas’ - concentrations of single storey mall-like commercial spaces with adjacent parking lots.” The ‘strip’ is arranged much like a typical centralised hospital, and is “organized according to types of procedures and corresponding body parts, assembling a centralised and coherent body, the hospital strip redistributes this body into fragments along the strip.”

The Villages markets itself as being a year-round vacation offering vast amounts of leisure based amenities; including three downtowns, 55 tennis courts, 69 pools, 48 swimming pools, 3 fitness clubs, 91 recreational centres and 9 softball fields. The community has an estimated 1800 groups or clubs which represent a variety of activities or interests, giving the residents an opportunity to be able to take up a new hobby or sport.

This is a super-sized retirement village, equipped with its own healthcare, including their own specialists on hand. Ageing in place is not so promoted, majority of residents will be forced to move if the time arises for health purposes. This model has a rich sense of community with a variance of levels. Morse’s idea was ‘small hometown, small community’, constructing 50 smaller neighbourhoods to create smaller intimate communities. There is no sense of connection with the outside world, this community is pre-occupied with what is happening inside the gates.

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30 Dean Simpson. Third Age Urbanism: Retirement Utopias of the Young-Old, (ETH Zurich 2010.), P100
31 Ibid., P104
The Plussenburgh, Rotterdam, Netherlands

Located in the suburb of IJsselmonde, one of Rotterdam’s Tuinsteden (garden suburbs). The Plussenburgh is designed for seniors aged 55 years and over, with inspiration coming from the retirees of the hippie generation. “The project embraces its target markets denial of ageing by proposing a playful, coloured apartment block.”

Comprising of two new rectangular volumes in the form of a tower and floating slab, housing 104 apartments extending over 16 levels. All apartments are fitted out with a kitchen, guest toilet, ensuite and master bedroom. From here the tenants have the chance to individualise their apartments with the uninterrupted 9.6 metre span providing enough space for a second bedroom/study, creating multiple floor plans. The elevators strategically link the new building with the adjacent pre-existing nursing home in a subtle approach. Rent for these apartments ranges from 754 - 907 euros per month.

The building’s colours and facades are somewhat different from a traditional retirement village, the horizontal circulation turned glazed galleries takes on 200 different shades derived from the hippie generation. The apartment facades take on a three-dimensional element with the repeated curve elements horizontally and vertically, taken all the way through to the balcony railings. “The building is incredibly exuberant and colourful that some people find it hard to believe that it houses apartments - let alone for the elderly.”

Elevating the slab 11 metres above the ground on diagonal stilts, allowed the building to have a minimum footprint creating a space for a new residential garden.

Entrance to the Plussenburgh is off Grote Hagen, visitor parking at ground level, and the residents parking facility based underground with only 51 car parks provided for the complex. Basic amenities have been provided onsite which include; medical care, kitchen (cooks) and a large 250 square metre recreational space. Public transport is in walking distance with stops on Grote Hagen and the large Keizerswaard Mall is adjacent to the Plussenburgh making it effortless for the residents to access their needs and personal freedom.

De Rokade, Groningen, Netherlands

De Rokade apartment tower is situated in Groningen, the Netherlands, designed by Arons en Gelauff Architecten. This residential tower is intended to be rented out to the ‘young seniors’ with a total of 74 apartments including two penthouses offering up to 115 square metres, spread over 21 floors. The Rokade is located on an increased density location, part of ‘The Intense City,’ a project launched by the Groningen municipal council in an effort “to keep the city compact by increasing the building density of districts around the centre.”

The Netherlands Government suggest towers have a minimum of four dwellings per floor for finance reasons. This is evident within De Rokade having taken the structure of a cruciform plan with four apartments per floor. “The four apartments are situated in L-form around the inside angles of the tower,” allowing the apartments to have views in two directions with minimum privacy issues. The facade of the tower has been designed to be load bearing, this giving three different layout schemes for potential residents to individualise their apartments in their own way. As an alternative to the car parks being underground, it was cheaper to build the facility above the commercial space on the first and second floor. Residents reach these floors via car lifts stopping at both levels.

Maartenshof is the existing nursing and care home which is immediately adjacent to the De Rokade tower, with the capacity to accommodate over 200 residents thru a range of different care facilities. Maartenshof has the ability to provide healthcare services to the tower residents for when/if they ever need. These facilities are joined in a subtle way, not exposing its relationship to the outside world.

34 arctecen, arons en gelauff, “Sparkling white tower.” arons en gelauff architecten, accessed 6 October 2017
Ground floor of De Rokade is completely occupied by a physiotherapist. But there are many facilities for the residents within the hub of Maartenshof. These include, a Cafe, Beauty Parlour, and convenience store all within “a giant foyer conceived as a public space for all seasons, somewhere between a traditional square and a duty-free food court.”36 Public transport is on the residents door step giving them the freedom to travel the city to accommodate for their needs and wants.

Both The Plassenburgh and De Rokade demonstrate how a typical retirement model can be incorporated into a vertical structure within an urban area. These buildings have a range of different healthcare options and have incorporated the necessary amenities. An interesting idea to come out of this case study is the idea of individuality. The façade of De Rokade is load bearing, this giving the residents some freedom to personalise their apartment layout.

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Princess Alexandra Retirement Village, Napier, Hawke’s Bay, New Zealand

Princess Alexandra is part of Ryman Healthcare, one of New Zealand’s largest retirement village operators, providing homes for 8,000 residents over the age of 70. “Our villages provide a range of retirement living and care options, including independent townhouses and apartments, serviced apartments and a care centre providing the very best of rest home, hospital and dementia level care.”

Princess Alexandra has the capacity to accommodate for over 400 residents thru a range of care options as follows:

**Care**
- Dementia care (24 Beds)
- Rest home care (24 Beds)
- Hospital care (60 Beds)
- Residential care suite (54 Beds)

**Assisted Living**
- One-bedroom serviced apartment (32 beds)
- Studio serviced apartment (22 Beds)

**Independent**
- Two-bedroom apartment (17 Beds)
- One-bedroom townhouse (9 Beds)

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within city limits

- Two-bedroom townhouse (37 Beds)
- Three-bedroom townhouse (9 Beds)

The Princess Alexandra layout follows that of a traditional village with the ‘Village Centre’ being the large 4 storey building first on entry from the Battery Road entrance. The level of independence can be looked at as the stages of ageing in a way suggesting the ‘care’ is situated in the centre, with the ‘independent’ townhouses on the perimeter of the site.

The village centre houses the local amenities for the residents that include: bowling green, terrace, swimming pool, library, spa pool, separate lounges, bar, gym, internet cafe, dining, hair-salon, pool table, indoor bowls and an endless activities schedule encouraging interaction within the community. The ‘care’ options are split between the two single levelled buildings (red) and also part of the central four story building. Assisted living is limited to the central four storey building. Independent apartment living is spread throughout the two story complex (yellow), plus the top storey of the central building. The independent townhouses are very much regular in plan and adjoin one another in lots of twos or threes, creating various spatial arrangements for the residents.

The main entrance to the village is on the east off Battery Road. There are two smaller entrances off Domett Street on the West but are typically only used by the residents. The townhouses have been specifically arranged in a way that encourages the road to meander thru the site creating a sense of privacy and community.

This is a gated community in two aspects, firstly the village has electric gates that close automatically at a reasonable time of night to give the residents a sense of security. Secondly, the townhouses on the perimeter all tend to be aimed inwards, ignoring the outside world and separating it from the surrounding suburbs.

Princess Alexandra is a ‘typical’ retirement village with the hierarchy and stages of ageing. Supplying all levels of healthcare. Locating the main building at the centre with amenities draws the occupants in to create a sense of community. With this model, the resident does not have the option to age-in-place, if the time comes they will have to move into a 24-hour care facility.
Site

The current site as it sits hosts a tired 2-storey retail building and a large gravel pit used as a car parking facility. On the eastern boundary, there is a large adjacent building, with the structure running along the perimeter boundary. On the western side of the site, there is a historic 2-storey building. Some consideration is needed as in how the two structures will relate to one another. The north boundary is locked in by Customs St East, while Gore St Lane closes in the Southern edge. Having a service lane on the southern perimeter is an ideal situation, meaning all amenities and services vehicles can supply back of house out of sight.

The process for site selection required a site that would offer diverse opportunities and sufficient complexity. This needed to be one different from the conventional suburban area. With Auckland having a high population growth rate, it makes it evident we need to start searching for other options. Higher density complexes need to be thought about to attack the problem of urban sprawl. The site needs to be suitable for the ideas and concepts of ‘village in the sky’ to be applied.

Figure 4.1 Location maps.
Site Location

The site chosen for this project is within the Britomart area in Auckland’s Central Business District. The site suits the research intention as it is located in one of Auckland’s newest social destinations and is part of the revitalization process of Auckland. Britomart is typically known as the Hub for Auckland’s rail system, but has attracted new types of businesses in the more recent years. The importance of being able to live and work without the need to travel a great distance, reducing the pressures on the transport system is mandatory.

Using the site criteria, a proposed site was discovered at 69-89 Customs Street East. This presenting a number of difficulties and challenges that will suit the direction of this project. It is located on the corner of Gore Street, and Customs Street East, this putting the site right in the heart of the CBD. The current site as it stands spreads over two titles, firstly is a gravelled car park. The second being a two storied building currently occupied by ‘The Brewery, Britomart’. The North half of this building is labelled as historic and will remain in place. A proposed development on this site would have its advantages and liven the ‘dead’ space up, but it also has a number of concerns and difficulties to thoroughly work through including, access in and around the site, pedestrian follows, road patterns, historic places trust, and type of structure. These challenges encountered with the site will help govern and provide constraints that will help steer and produce a valid design for this under-developed space that will be beneficial not only for Britomart, but Auckland City as a whole.
Figure 4.2 Panorama of site. Taken from Customs St East, facing South.
within city limits

Figure 4.3 Range of images through Britomart and around proposed site.
Figure 4.4 A key driver for this project was that the site must be directly accessible to public transport and the necessary amenities. The diagram above is an indication on time and distance from the site. The starting point of the radii have been pinned right in the centre of 85 Custom Street East. The first radius indicating a 2 minute walk over a 200 metre distance, and the second being 400 metres with a walking time of 5 minutes.
within city limits

Analysing the site from an aerial perspective shows the relationship in which 85 Customs Street has with the surrounding buildings. The shaded figures indicate the predominant residential buildings within the area. The red line being the ‘imaginary’ boundary in which the buildings change their occupation from residential to retail/hospitality etc. This showing 85 on the boundary trying to collaborate with the two occupations.
The existing pedestrian traffic between Quay Street and Waterloo Quadrant is disjointed in areas with a few problems that restrict comfortable pedestrian flow. Starting with Customs Street East, the road traffic (green) has a barrier effect on the pedestrian traffic with its axis running from West to East, segregating Upper Queen St from the waterfront environment. The proposed site as shown on the diagram has little pedestrian and road movement in relation to the rest of this sector. There are a number of reasons for this. Firstly, Fort Lane is a ‘one way’ road running North to South significantly reducing the road traffic flow. Gore Street Lane directly behind the site is ‘one way’ and classed as a service lane with very little movement with exception of cars using it for access to the existing car park. As with Gore Street, this has light pedestrian movement with moderate road flow shooting from Queen Street and Commerce Street.

**ACTIVITY FLOW**
within city limits

Figure 4.7 Restaurants & Bars

RESTAURANTS & BARS
Figure 4.8 Health & Beauty.
within city limits

Figure 4.9 Design & Shopping

DESIGN & SHOPPING
Figure 4.10 Complete overlay.
Site accessibility

Location of the site was critical for this project enabling easy access to the transportation hubs of Auckland. Having Rail, Bus and Ferry within a 5-minute walk makes the option of using public transport that much easier and inviting. Private motor vehicles can easily access the site too, being in close proximity of the major motorways.

Surrounding building types and uses

A large amount of buildings in the Britomart precinct are historic in the historic places trust and carry a lot of history with them. Predominately these are brick buildings which have had significant upgrades to now house a variety of amenities in Auckland’s largest social scene. Some of these buildings date back to the 1800’s.

Surrounding buildings are carrying a whole range of uses including – Health & Beauty, Design & Shopping, Restaurants & Bars, etc. Looking at figure 4.10 it shows the vast amount of amenities within the 5-minute walking radius from the site.
History

The chosen site is on the fringe of the Britomart Precinct filled with rich history. The name Britomart derived from a Royal navy gunship called HMS Britomart. In 1885, the train station was constructed and for the next 45 years was the hub for Auckland’s railway network. From the early 1900’s Britomart was the transport hub for Auckland, hosting trams, trains, trolley buses and ferries. But following the invention of the automobile, Britomart went into a rapid decline through the 1940s-1950s as the car became more affordable. In the years to come, lower Queen Street became unpopular and businesses opted to move to upper Queen Street, closer to the new Town Hall. As the stores and businesses migrated up the hill Britomart became run down and derelict, leaving the area a wasted unused, unsafe place.

In the mid 1990’s, the Historic Places Trust acknowledged the large amount of buildings in the precinct that need to be protected. From the early 2000’s majority of Britomart was now owned by a development company called Cooper and Company, who have a long term contract to lease majority of the buildings heading into the 22nd Century. Since the arrival of Cooper and Co. Britomart has been renovated and revitalised, with many high end restaurants, bars, and retail stores coming back in, and has begun to be a central hub for Auckland City once more.
5.0 DESIGN PROCESS
Programme

The research in previous chapters has identified the need for alternative options to house the ageing Baby-boomer generation. The programme put forward for the design is to create a high-rise, high-density opportunity within Auckland’s CBD, incorporating the necessities of a typical retirement village.

The site chosen is located on Customs St East to utilise existing amenities and provides a suitable platform to create the village in the sky. The occupants of this building will be the segment of the Baby-boomer generation who are after a particular lifestyle with access to multiple amenities and care facilities at their fingertips. This group do not fancy staying within the large family home in the surrounding suburbs, and are looking for a location in where they can lock up and leave for weeks or months at a time with the peace of mind that their home is secure. A home where they feel comfortable to age in place, and if the time comes, have full access to 24-hr care.

The programme requirements are broken down into five categories; Retail/Commercial, Back of House, Residential, Communal Spaces, and Amenities.

Retail spaces will be incorporated to provide diversity within the building, occupying ground floor, and utilising the large amount of foot traffic from Customs St East, Commercial space will also be incorporated essentially as a hot desk office space scenario. The office spaces have been incorporated with the intention that some of the residents are not yet ready to retire and will want to continue working, giving them the option to keep their work and personal lives separate. In saying this, the office space will be accessible for the public to use also.

Back of House covers fundamental core tasks associated with the typical retirement villages, as previously researched. These include the working parts of the building; Sluice room, Laundry, Kitchen, Maintenance, Ambulance Bay, Rubbish Room and the way in which an occupant can exit the building if the time has come to ‘catch the final bus’ or rather “dignified exits”.

Apartments will be of various generous sizes, including 2-bedroom and 1 bedroom. There will be pent-houses on the upper floors that will boast larger floor areas giving the potential occupants a number of options and floor plans. Studio suites are also provided for those who would like the bare minimum of spaces (travel often) or will be designed for the residents who need 24-hr care.
The communal spaces will be strategically placed throughout the building. This category is one that has been researched through ‘typical’ retirement villages, but is one that will be considerably different. This will cover the communal dining hall and lounge. But consideration is needed for other spaces that will relate more to the Baby-boomer generation needs and wants.

The amenities that will be incorporated into this village will be a Cafe, Restaurant, onsite Doctor, Fitness centre and Pharmacy. Although a number of these amenities are located within walking distance of this site, it is worth housing the more important necessities.
Turning 90 degrees

Moving from a horizontal linear form of a typical retirement village, to a vertical standing form takes a considerable amount of consideration. After analysing the typical retirement village in New Zealand, they have a generic hierarchy starting from the central core. The central building is home to the ‘dependent’ occupants as well as the required services and amenities. Moving further out from the core determines the amount of care occupants receive. There are certain elements in which can be taken from this model and applied to the design for this research topic.

Having 85 Customs St East chosen for this site, there are a lot more limitations compared to a conventional retirement village. For starters, the site is a mere 1690m², substantially smaller than previously analysed. Having this constraint ensures the design is forced up, turning the horizontal into a vertical village, creating a multi-story, multi-complex building.

Creating a village in the sky will create new implications for this project. For starters, circulation will not be as straightforward as putting a 1:12 ramp into a single-story dwelling. Having proposed to create a high-rise building, the vertical circulation will be a significant problem. The placement of the amenities and necessities will be an element that will need to be considered, having these located strategically in the building in which all occupants and access and use is essential. Connectivity is generally important for traditional retirement villages in a way of pedestrian and vehicle access. The chosen site would suit retail on ground level with minimum connectivity. The site was chosen for the close proximity to public transport and multiple amenities within the area, but also the connectivity each and every resident would have with the City and the Witemata harbour at large.
within city limits

Figure 5.1 Demonstrates how vehicles and pedestrians could access the site. This sketch uses the historic building on the western corner for pedestrian access. Vehicle access has been proposed off Customs St East. This could cause issues with traffic and pedestrian access.
Figure 5.2 illustrates the need to keep vehicle access to the service lane on the south, allowing a full retail facade on the north. As Gore St Lane is one way, the congestion for vehicles into the building will be minimal.
within city limits

Figure 5.3 demonstrates the need to consider public vs. private on ground level. Essentially, there needs to be a threshold where the occupants have access to their residency; at the same time, there is the need to maximize the area for retail and public use. Having the site backed onto a service lane is ideal as this provides vehicle access on the south, enabling the north facade untouched in terms of automobiles.
Figure 5.4 illustrates the direction the public vs private spaces are going for this design response. Creating a foyer for the residents from Customs St East was always a key driver. Adding area behind the retail space allows the design to have the services and vertical circulation on the southern side of the site with easy access to the service lane. Looking at Figure 5.4 it demonstrates the positioning of the vertical circulation, and possible public area within the structure.
within city limits

Figure 5-6 Expresses connectivity of the site has with the wider Auckland CBD. Displaying main arterial routes and typical walking distances.
Figure 5.7 Describes the massing and arrangement of areas. The sketch on the right shows movement of the 'communal' space to be above back of house. Communal area consists of the dining room and lounge, so having back of house adjacent to this is logical.
within city limits

Figure 5.8 illustrates iterations of arrangement, the sketch on the right sees the addition of commercial and amenities that will service the resident and public realm. The major social space has been moved to the roof of the structure. There will also be smaller, intimate social spaces within the floors of the apartments.
These figures illustrate the iterations of the ground floor and the way these spaces are to be arranged.

Figure 5.10 investigated having an internal atrium with retail on the perimeter. This idea had a few obstacles to overcome in terms of structure above, vertical circulation and access for the residents. This sketch also explored the use of the historic building as a means of access to the proposed site.

Figure 5.11 has been the preferred option with all retail stores having frontage onto Customs St East.
within city limits

Figure 5.12 illustrates the design response for ground floor thus far. In respect of the heritage building (green), the building has been set back, giving breathing space. Currently the ground has six retail spaces accessed from Customs Street East with the residents’ foyer in the center. Vertical services have been strategically located to be center and on the southern facade. Structure for the building has been considered with the addition of shear walls into the floor plan (refer Appendix B - Structural Response).
Figure 5.13 illustrates the arrangement of spaces for the first floor (back of house). Having the structure set out with the shear walls helps enable the spaces and sizes. The building is up against the existing adjacent building on the right.
Figure 5.14 Demonstrates the process of creating the form for the building. On the left explores having three main towers arranged facing north. The problem encountered with having this scenario was vertical circulation and the amount of available space unutilised. The sketch on the right investigated having one row of apartments, this allowing to have one central circulation area and each apartment exposed to the northern views and sun.
Figure 5.15 Shows the iterations of the design response has gone through this far in terms of apartment layout and sizes. Creating this form allows the horizontal and vertical circulation to be located on the southern side. These sketches also explore how to make the journey to each apartment an experience with the use of bridges, apertures, and indirect sunlight. The top left sketch has begun to investigate the ‘family rooms’ where resident family members can stay for periods of time. As stated earlier, there tends to be a hierarchy of care within the typical retirement village. Throughout exploration, this design will incorporate all tiers of care throughout all levels to enable the resident can age in place. Nursing stations have been considered to be strategically located on certain floors of the design in place of some ‘family rooms’.
Figure 5.16 Shows the typical plan for each type of apartment. The studio apartment is designed around the care suites within the Princess Alexandra case study. These are for the residents less able how need 24 hour care. One and two bedroom apartments are generous in size and each bedroom is supplied with an ensuite. Consideration has been taken into account with door swings and wheelchair access. Using Appendix A - Lifemark Design Standards Handbook as a guide to future proof the building.
Figure 5.17 illustrates the typical floor plan for apartment levels. The shear walls have been highlighted in red and have helped to formulate the layouts for the apartments (refer Appendix B). The yellow areas on the south are the ‘family rooms’, utilised by family members for short periods of time. The apartment on the far left starts from level 08, allowing the historic building space.
Figure 5.18 Explores arranging the spaces vertically. Placing the vertical circulation on the south side gives the building the flexibility to arrange the more important spaces in prime locations.
Figure 5.19 Shows and highlights the shear walls (green). This section indicates the size and positioning of the commercial space within the building (levels 09-13). Helping to break the form up in elevation and give diversity to the building. Staggering the balconies also helps to create privacy for the individual.
within city limits

Figure 5.20 Demonstrates how the building allows space for the heritage building on the right (red dash). The shear walls (black) are also utilised as a design feature through exaggerating the size helps to break up the facade. The commercial space (green) provided breaks the facade up as well as giving the residents a place to work if they desire. Amenities (blue) will cater for the residents needs in terms of cafe, restaurant and leisure hub.
Figure 5.21 Sketch on the left is a typical horizontal circulation scenario for the residents, trying to eliminate the standard corridor. This also provides the apartments south facing windows with more privacy. The sketch on the right is a typical scenario for the circulation every fifth floor. Here is the area for sub communities to gather.
within city limits

Figure 5-22 illustrates how the building relates to the surrounding buildings. Design features have come in a way with the exaggeration of the shear walls and steel portal overtop of the historic building. Pulling the commercial sector out and pushing the amenities gives the building facade depth.
Figure 5.23 Demonstrates how the building sits in relation to the Auckland Skyline. Showing the prime location the site has to Auckland's CBD.
CONCLUSION

This research undertook New Zealand’s issue of a growing ageing population, the Baby-boomers. The boomers account for one quarter of New Zealand’s current population, the first of whom were eligible for superannuation in 2011. The project addresses the lack of options in terms of housing New Zealand’s ageing population and how a portion of the Baby-boomer cohort portray the ‘typical’ suburban retirement village as being the last resort, with many rejecting this idea completely. New alternatives have to be put forward.

The project investigated how the needs and wants of a “Baby-boomer” retirement community be successfully provided for in a high-density, high-rise development on a site within Auckland’s City Limits. The investigation into who the Baby-boomers are revealed some aren’t yet ready to retire; many are still willing to travel the world and engage in extreme sports. Others are looking for somewhere to age-in-place but are not willing to be pushed into ‘typical’ retirement villages. The case studies looked into existing models around the globe. Looking into their frameworks, target audience, and what amenities, communal spaces and services were provided. The site was chosen for a number of factors that related to the focus group. Due to the chosen site being centrally located in Auckland’s CBD, locates it in close proximity to a large amount of amenities, and all main public transport centres. The final design has been thought through in terms of public vs private and layering the high-rise in an appropriate manner in order to give each resident a north facing dwelling with views of the Harbour bridge and Waitemata Harbour. Communal spaces have been a driver for the overall design and to create a sense of community in such a large vertical village.

In conclusion, the design response ‘rejuvenates’ the traditional idea of a retirement village. It challenges the current retirement models and creates new ideas around communities and connections to the public. Allowing the residents to keep their independence and interactive lifestyle with the outside world, and having the option to age-in-place in an environment where they still feel connected to the external community.
7.0 BIBLIOGRAPHY


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LIST OF FIGURES


3.7 (Resident/Homeowner), Rosie Bloom, Just Visiting - Thank Goodness Because I Would Never Want to Live There, Patricia Duffey (Resident/Homeowner), Eguy (Resident/Homeowner), MrNmrsC (Resident/Homeowner), Jon (Resident/Homeowner), and Doctor Bob (Resident/Homeowner). “The Villages ® - The Villages, FL.” The Villages ®, FL | Real Estate The Villages®, Florida | 55 Community. January 27, 2017. https://www.55places.com/florida/communities/the-villages.


photoblog.com/dbaird90/2013/03/30/lake-sumter-landing-square/.


4.2 Image by Author; Panorama Photograph

4.3 Image by Author; Selection of Photographs

4.4 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

4.5 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

4.6 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

4.7 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

4.8 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

4.9 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

4.10 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/auck-
within city limits

land council viewer/.

5.1 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

5.2 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

5.3 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

5.4 Image by Author; Free hand sketch – section.

5.5 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

5.6 Image by Author; derived from Auckland Council GIS Viewer, maps.aucklandcouncil.govt.nz/aucklandcouncilviewer/.

5.7 Image by Author; Massing model

5.8 Image by Author; Massing model

5.9 Image by Author; Free hand sketch

5.10 Image by Author; Free hand sketch

5.11 Image by Author; Free hand sketch

5.12 Image by Author; GA’s

5.13 Image by Author; GA’s

5.14 Image by Author; GA’s

5.15 Image by Author; GA’s
8.0 APPENDIX A
## Contents

### Introduction
- Purpose of this Handbook
- What is the Lifemark?
- The Lifetime Design Principles
- Who the Lifemark Handbook is for
- Relationship to NZS 4121:2001
- Background to the Lifemark Design Standards

### The Lifemark™ Standards
- Lifemark Standards Overview
- The Lifemark 5-Star Rating System
- Accessing the Dwelling
  - 1 Car Parking
  - 2 Pathways
  - 3 The Entrance
- Getting Around
  - 4 Internal Doors
  - 5 Corridors
- Fittings and Fixtures
  - 6 Light Switches
  - 7 Powerpoints
  - 8 Windows
  - 9 Door Fittings
  - 10 Tap Fittings
  - 11 Alarms
- Bedrooms
  - 12 Bed Space & Bedrooms
- Dwelling Facilities
  - 13 Laundry Space
  - 14 Kitchen Space
- Bathrooms
  - 15 Toilet
  - 16 Shower
- Multi-Storey Access
  - 17 Stair Lift or Platform Lift
  - 18 Internal Stairways

### How to get the Lifemark™
- The Certification Process
- Lifemark Standards Assessment Form
- Checklist of the Things Most People Forget

### Acknowledgements

www.lifemark.co.nz
the
Lifemark
design
standards
Lifemark Standards Overview

Lifetime Design Ltd’s aim is to influence the design of mainstream housing so that a greater proportion of new homes built will be suitable for older people and people with disabilities to live in for a longer period of time.

The following Handbook explains the 7 areas that are so important to get right at the design stage of a new home. They include the minimum structural and spatial requirements that cannot be changed later without major expense. We have also included the most important home injury prevention standards because of the value of reducing the significant costs and social burden associated with home injuries. But most importantly we have included a healthy dose of common sense.

For each of the 7 areas, namely Accessing the Dwelling, Getting Around, Fittings and Fixtures, Bedrooms, Dwelling Facilities, Bathrooms and Multi-Storey Access, we:

• list the relevant individual standards, indicating with an asterisk and a darker shading those standards that are required to achieve a 3-Star Lifemark rating
• note how many points can be accrued for each standard and the minimum points required to achieve a 4-Star or 5-Star Lifemark rating
• explain in simple terms why the standard is important
• explain exceptions to the standards and suggest other design considerations

The Lifemark 5-Star Rating System

The Lifemark 5-Star rating system provides consumers with information on how usable, adaptable, accessible and safe a home is. The entry-level 3-Star Lifemark rating is achieved by meeting certain minimum required standards that earn points toward a Lifemark Score. 135 points are required for a 3-Star Lifemark which means a home is fully adaptable in the future at minimal cost. 180 points are needed for a 4-Star Lifemark and 240 points are needed for a 5-Star Lifemark which means a home is fully accessible now.

The more stars, the more accessible, safe and usable.

The Lifemark Seal of Approval helps the home builder or home buyer choose between homes based on how appropriate they are for their current and future needs.
Car Parking

Where the parking space forms part of the dwelling access it shall allow a person to open their car doors fully and easily move around the vehicle.

Why car parking is important

Vehicle access is very important to the mobility of older people as well as temporarily and permanently disabled people to enable them to be actively involved in the community. So easy access to and from the car is critical to a Lifemark home. A flat car park with sufficient clearances allows people to transfer to/from wheelchairs or walking frames and to move comfortably around the vehicle and open doors fully. It also allows young children to be easily secured in car seats or transferred to pushchairs without the pushchair rolling away.

| POINTS | 1.1a | At least one car parking space is able to be adapted to a minimum width of 3500mm.* |
|        | 1.1b | At least one car parking space actually has a minimum width of 3500mm. |
|        | 1.1c | At least one car parking space actually has a minimum width of 3500mm and length of 5000mm. |
|        | 1.2a | At least one car parking space is able to be adapted to have a level, firm, slip resistant flat surface with a slope not exceeding 1:50. |
|        | 1.2b | At least one car parking space actually has a level, firm, slip resistant flat surface with a slope not exceeding 1:50. |

*A required standard for a 3-Star Lifemark*

---

A tight steeply sloping parking space makes getting in and out of a vehicle difficult for everyone. Parking spaces should allow for doors to be opened fully.

In this example, there is no available flat surface next to the vehicle making transferring to and from a walking frame or wheelchair very difficult. Even getting out of a vehicle with crutches is difficult on a sloping surface.
Design Considerations

Parking that meets the key dimensional requirements may be easier to provide than garage parking and this is perfectly satisfactory provided the occupants can easily access the entrance to the house (Section 3, The Entrance).

When designing carports, consider the placement of support posts to ensure car doors can be fully opened.

Where the parking space is external, the space requirements may be met with landscape strips that could be ‘sacrificed’ for paving in the future if required. Where this approach is taken, care should be used in calculating the future total paved/impermeable surfaces, with regard to stormwater run-off.

A double garage would normally provide sufficient space to meet this requirement. Where double garages are provided, single wide-opening doors should be used in preference to paired doors – to allow a vehicle to be parked towards the centre of the space if required.

The slope of a parking space is a determinant of how slippery it might be. See the explanation of slip resistant surfaces in Section 2, Pathways.

A wide, flat surface with no slope makes getting in and out of a vehicle easy for everyone.

Ideal parking space dimensions enable someone to get into and out of a vehicle safely and easily and onto a pathway without needing to go over a step.
Pathways
Occupants can easily and safely access the dwelling entrance

<table>
<thead>
<tr>
<th>POINTS</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>2.1a</td>
<td>A pathway from EITHER the front boundary of the property OR a car parking space to a dwelling entrance is able to be installed with a minimum clear width of 1200mm. *</td>
</tr>
<tr>
<td>3</td>
<td></td>
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<tr>
<td>2.1b</td>
<td>A pathway from EITHER the front boundary of the property OR a car parking space to a dwelling entrance is installed with a minimum clear width of 1200mm.</td>
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<td>6</td>
<td></td>
</tr>
<tr>
<td>2.2a</td>
<td>A pathway from EITHER the front boundary of the property OR a car parking space to a dwelling entrance is able to be installed with a level, firm, slip resistant surface with a maximum slope of 1:20 and a crossfall of not more than 1:50. *</td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2.2b</td>
<td>A pathway from EITHER the front boundary of the property OR a car parking space to a dwelling entrance is installed with a level, firm, slip resistant surface with a maximum slope of 1:20 and a crossfall of not more than 1:50.</td>
</tr>
<tr>
<td>10</td>
<td></td>
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<tr>
<td>2.3</td>
<td>A pathway from EITHER the front boundary of the property OR a car parking space to a dwelling entrance is installed with a light switch at the dwelling entrance for pathway lighting. *</td>
</tr>
<tr>
<td>1</td>
<td></td>
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<tr>
<td>2.4</td>
<td>A pathway from EITHER the front boundary of the property OR a car parking space to a dwelling entrance is installed with sensor lighting for the pathway.</td>
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<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*required standard for a 3-Star Lifemark

Why an easy to use pathway is important

Direct and level access is the starting point for barrier-free design. A fall is often the first disabling event in a cascade toward immobility and a restricted lifestyle. Prevention of slips, trips and falls is the critical first step in preventative health care for the aging.

Easy and safe access to the home is required not only by older people and those in wheelchairs, it will also help users of walking frames, parents with strollers, a parent balancing a child on one hip with bags of groceries in the other hand and toddlers taking their first steps.

An uneven, mossy and narrow pathway makes independent access difficult and unsafe whether using a walking frame, wheelchair or even if not using any walking aid at all.

Narrow uneven pathways are also inconvenient and unpleasant to use with prams or push chairs and young children are more likely to trip.
Accessing the Dwelling

Barrier-free design begins outside the home. Lifemark approved homes enable easy and comfortable access, whether from the garage, carport or the front gate. Generally, access from the car parking space to the house is the most critical to get right in the initial design of a house.

Barrier-free access does not necessarily mean a collection of institutional-type ramps, rails and platforms. It is about providing sufficient clearance and manoeuvring space, level thresholds and slip resistant paths. It is about easy progress from outside to inside, from the car or street to the house.

Design Considerations

A wide pathway surface provides plenty of room for an older or disabled person to be assisted by a person walking next to them.

A flat, slip resistant and non-sloping pathway is much safer and more convenient for everyone.

Slip Resistant or Non-slip Surfaces

Building Code Clause D1 Access Routes requires that access routes ‘have adequate slip resistant walking surfaces under all conditions of normal use.’ Acceptable Solution D1/AS1 requires a friction coefficient of 0.4 for level access routes used by the public. For houses, this includes only the route to the main entrance. Table 2 of the D2 Compliance Document lists the materials that are acceptable where a slip resistance of 0.4 is required.

Compliance with the slip-resistant performance of NZBC D1.3.3 (d) may be verified by confirming that the walking surface under the expected conditions of use has a coefficient of friction (μ) of no less than:

\[ μ = 0.4 + 0.0125 S \]

where S is the slope of the walking surface expressed as a percentage.

The Lifemark Design Standards require non-slip surfaces in areas other than access routes such as kitchens, bathrooms and other wet areas.
### The Entrance

Occupants can easily and safely enter and exit the dwelling.

<table>
<thead>
<tr>
<th>POINTS</th>
<th>Requirement</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>The dwelling entrance shall provide an entrance door with a minimum clear opening width of 810mm. (860mm door leaf)</td>
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<tr>
<td>5</td>
<td>The dwelling entrance shall provide an entrance door with a maximum threshold of 20mm.</td>
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<tr>
<td>15</td>
<td>The dwelling entrance shall provide an entrance door with a level transition.</td>
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</tr>
<tr>
<td>2</td>
<td>The dwelling entrance shall include an external landing area measuring 1200mm x 1200mm.</td>
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<tr>
<td>2</td>
<td>The dwelling entrance shall include an external landing area that is level with a 1:50 fall or shallower.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>The dwelling entrance shall include an external landing area that provides shelter from the weather.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The dwelling entrance shall include an external landing area that is slip resistant.</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>The dwelling entrance shall include an external landing area with switch operated lighting at the dwelling entrance.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>The dwelling entrance shall include an external landing area with sensor lighting.</td>
<td></td>
</tr>
</tbody>
</table>

*required standard for a 3-Star Lifemark

### Why an accessible dwelling entrance is important

Ease of movement at, and through entrance doorways is important to make this as convenient as possible for the widest range of people including those with push chairs, those less agile and those using walking sticks or other mobility aids. A well lit and dry entrance is important for safety and convenience. Providing some degree of good lighting and shelter from the weather to people unlocking or waiting at the door will reduce injuries. The best way to prevent slips, trips and falls at the entrance is to provide a level threshold. The following section will illustrate various options to achieve a maximum threshold of 20mm.

The entrance has a threshold less than 20mm, a landing area greater than 1200mm x 1200mm; it is covered and has sensor lighting, but all of that is meaningless since the steps to the front door make this entrance inaccessible to many.
This entrance meets or exceeds the required Lifemark Design Standards which means it is easy to use by everyone. However the door mat represents a tripping hazard.

Entrance design considerations.
Design Considerations

Level entry doorways can be achieved in many different ways of which some are shown below.

Examples of level threshold entrance doors.
Internal Doors
Internal doors facilitate comfortable and unimpeded movement between spaces

| 4.1 | ALL doorways to ALL rooms on the primary living level shall provide a minimum clear opening width of 810mm (860mm door leaf). | 15 |
| 4.2 | ALL doorways to ALL rooms on the primary living level shall provide a level transition and threshold. This accepts difference in floor materials either side of the doorway. | 8 |
| 4.3 | ALL doorways to ALL rooms on the primary living level shall provide a 300mm return wall on the door handle edge of the door facing the side the door swings towards. | 5 |

*required standard for a 3-Star Lifemark

Why user-friendly doors are important

Wider doors inside the house provide extra space for manoeuvring, which becomes more important as people get older and families grow.

A 300mm return wall as shown in the diagrams below make reaching a door handle possible for a wheelchair user. The photo shows how difficult it is to open a door from a wheelchair when there is no 300mm return wall. Note how the footplate is touching the wall.

Design Considerations

Whether a door is a side hung standard door, a cavity slider, bifold door or a ranch slider, an 810mm clear opening should be clear of all protrusions including the door handle and the thickness of the door in the open position. This will require an 860mm door leaf, able to be opened to at least 90 degrees. It is important to plan the protrusion of the door into rooms and circulation space in the design of the home, to ensure there is sufficient space to accommodate the door swing while still allowing movement space within the room.

The Lifemark Handbook presumes that primary living spaces such as a living/family room, a space or room capable of being used as a bedroom, a bathroom, and the kitchen and laundry are all on the primary living level. However, in some homes such as a two storey townhouse, the bedroom and bathroom may be upstairs. When these homes are designed as Lifemark homes they will require provision for a future stair or platform lift so they can be accessed. While we do not require non-primary living level doorways to have clearances of 810mm, we strongly encourage such a clearance whenever possible.
Wide Corridors

Corridors facilitate comfortable and unimpeded movement between spaces

| POINTS | 5.1 | ALL internal corridors or passageways shall provide a minimum clear width of 1050mm.* |
| 5.2a | 3 | ALL internal corridors or passageways shall provide light switches at both ends of any corridors. |
| 5.2b | 5 | ALL internal corridors or passageways shall provide sensors to automatically turn lights on at night. |

*required standard for a 3-Star Lifemark

Why wide corridors are important

Movement through a Lifemark home should be as convenient as possible to the widest range of people including those using walking frames, wheelchairs or other mobility aids and those moving furniture or other large objects. Corridors need to provide free movement between all the critical facilities for the widest range of potential occupants. Lighting in corridors is also important to reduce the number of incidences of people tripping over objects left in the corridor at night.

A clearly sub-standard corridor with restricted accessibility.
Design Considerations

When corridor and doorway widths and other key circulation and space standards are considered from the outset of design, these spatial requirements need not be onerous and can often be incorporated with little effect on the overall dwelling area. However, it goes without saying that dwellings with generous overall dimensions will enable easy incorporation of the requirements and will offer more convenience to the occupiers.

Consideration should also be given to the space required for turning movements at doors and ‘intersections’, and clearances adjacent to doors. Turning spaces at doorways and intersections can be well used to increase the perceived spaciousness of a home and therefore its amenity and appeal. Clever design will see the sharing of turning spaces with other uses in the home. Living areas can overlap turning areas so as to increase the overall perceived spaciousness. Turning areas can serve several doorways simultaneously to increase efficiency. Perceived spaciousness through good design adds value.

Avoiding long corridors will improve the efficiency of the layout, contain construction costs and also provide a more accessible home. It should not be presumed that wheelchairs and walking aids simply travel in straight lines. The designer needs a realistic understanding of the difficulties of manoeuvring, especially in the circumstances of compounded disability or frailty of older people.

Modern lighting solutions today include ankle height sensor strip lighting for corridors that help to prevent night time trips in hallways. At the least, corridors, especially long corridors, should have light switches at each entry point.
## Bed Space and Bedrooms

Bed space and bedrooms support ease of movement around the bed by occupants.

**Why a bed space on the primary living level is important**

There are many circumstances when having a sleeping space on the primary living level may be required. This standard is not just about meeting the needs of people with a permanent disability but also enabling independence for people who have a temporary injury that impacts their mobility. Occupants with a back or other mobility impairing injury may prefer to sleep on the primary living level for the term of their injury rather than have to make their way to other levels of the house.

Lifemark homes do not necessarily have to be single storey, but key rooms and facilities that are essential for day-to-day living should be located on one easily accessible level. These spaces include a living or family room and a space that can be used for sleeping. The sleeping area does not necessarily have to be a dedicated bedroom but Lifemark homes are about flexibility and adaptability so it is important that a separate dining room or study nook can be used as a bedroom in the future if required so that the occupant can maintain independence when remaining in their home.

The light switch standards in the bedroom are related to safety considerations. A large number of trip injuries occur in the bedroom when people get up in the night to go to the bathroom so having accessible light switches will prevent trip injuries.

---

### Points Table

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.1a</td>
<td>There is space on the primary living level where a standard single bed (measuring 900mm x 1900mm) can fit with a minimum 800mm clear space available around one side and the foot of the bed. A clear minimum 800mm wide path is also required from the door to the side of the bed.*</td>
<td>5</td>
</tr>
<tr>
<td>12.1b</td>
<td>There is space on the primary living level where a standard double bed (1350mm x 1900mm) can fit with a minimum 800mm clear space available around both sides and the foot of the bed. A clear minimum 800mm wide path from the door to the side of the bed.</td>
<td>10</td>
</tr>
<tr>
<td>12.1c</td>
<td>There is at least one bedroom on the primary living level where a standard double bed (1350mm x 1900mm) can fit with a minimum 900mm clear space available around both sides and the foot of the bed and a clear minimum 900mm wide path from the door to the two sides which includes a 1500mm turning circle.</td>
<td>15</td>
</tr>
<tr>
<td>12.2</td>
<td>Light switches are provided at the entry door and on both sides of the bed in the case of the master bedroom.</td>
<td>5</td>
</tr>
</tbody>
</table>

*required standard for a 3-Star Lifemark

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*This bedroom provides plenty of space to access both sides of the bed easily, including with a walking frame or wheelchair.*
Design Considerations

Lifemark homes should be planned so that when entry level sleeping spaces (that were not originally designed as bedrooms) need to be used, they do not appear to be compromised spaces. The bedroom space on the primary living level needs to enable easy movement in and out of the room and around normal bedroom furnishings.

Direct and simple movement paths between the bedroom or bedroom space and other primary living level facilities improves accessibility and increases independence. The bedroom space or bedroom should therefore allow for easy manoeuvring and easy access to a wardrobe and to a bathroom. Direct access from the bedroom space or bedroom to a bathroom is good practice when designing for people with limited mobility. The route between this bedroom and bathroom should not pass through any living/habitable room or area.

If the design of the house does not enable a space that can be used for sleeping on the primary living level, then access to the other levels may be considered by making provision for a future use of a stair lift or platform lift.

Designers and builders may also wish to build in the potential for the future fitting of hoists. For almost no additional cost, a main bedroom and bathroom ceilings should be made capable of supporting single point ceiling hoists above the bed, bath/shower and toilet.

These sample bedroom layouts show the minimum dimensions required to earn 5, 10 or 15 points toward your Lifemark Star Rating.
Ground-floor plan without (Left) and with (Right) temporary bed-space

Ground-floor plan without (Left) and with (Right) temporary bedroom
Laundry Space

The laundry space is designed to support ease of movement and ease of use of laundry appliances and storage space.

| 13.1a | The laundry space or room shall be large enough to provide at least 1050mm clearance in front of fixed benches and appliances.* | 2 |
| 13.1b | The laundry space or room shall be large enough to provide at least 1200mm clearance in front of fixed benches and appliances. | 4 |
| 13.2 | The laundry space or room shall be large enough to accommodate appliances at ground level. | 2 |
| 13.3 | The laundry shall include slip resistant flooring. | 5 |

*required standard for a 3-Star Lifemark

Why an easy to use laundry space is important

The Lifemark laundry standards are mostly about independence with an additional standard relating to safety. Independent living requires access to all facilities in the home including the laundry. An occupant is not living independently if they require someone else to do the laundry so it is important that the laundry space is designed in a way that makes doing the laundry easy. The laundry is also a wet area and therefore should have slip resistant flooring for increased safety.

Design Considerations

Provision of a laundry as an independent utility room can demand a disproportionate amount of space in a modern home when considering the sophistication of modern appliances. It may be warranted to consider combining the laundry with other wet areas such as bathrooms to enable sharing of circulation space and reduced travel distances (e.g. between undressing and placing clothes in a washing basket or machine).

Alternatively, it may be worth expanding the laundry into a larger more broadly useful utility room or easily accessible attached garage. This may be used for storage, recycling, wheelchair parking for overnight charging etc.

Laundry facilities in cupboards off a passageway or other room may borrow circulation space from the adjoining area. When designing cupboard laundries it is worth considering the floor surface of the adjoining area to avoid damage from splashes or flooding accidents.

As for other wet areas, it is appropriate to ensure a level threshold at doorways, the impact of floor slopes to the waste, and slip resistance of tiles. See Section 2, Pathways for an explanation of slip resistance.

This dryer is too high and makes loading and unloading awkward. Reaching items at the back of the dryer may require a stool which has safety implications. Ideally, dryer and washer units should be at ground level and frontloading.

A minimum 1050mm clearance in front of appliances is the required standard but 1500mm is the preferred minimum clearance.
Kitchen

The kitchen is designed to support ease of movement between fixed benches and ease of use of appliances and storage space.

### Why an easy to use kitchen is important

Independent living requires access to all utilities of the home. The kitchen is often a central focus of the home, where a great deal of recreation and social interaction occurs. Natural and easy access to participate in these activities is fundamental to leading a normal life.

### Points

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.1</td>
<td>The kitchen space is not a main thoroughfare in the home.*</td>
</tr>
<tr>
<td>14.2</td>
<td>The kitchen space is located next to the dining area.</td>
</tr>
<tr>
<td>14.3a</td>
<td>The kitchen space includes at least a 1200mm clearance provided in front of fixed benches, major appliances and fittings.</td>
</tr>
<tr>
<td>14.3b</td>
<td>The kitchen space includes at least a 1200mm clearance provided in front of fixed benches, major appliances and fittings. This clearance extends to a 1500mm turning circle measured up to at least 250mm above the floor.</td>
</tr>
<tr>
<td>14.4</td>
<td>The kitchen space shall have slip resistant flooring.</td>
</tr>
<tr>
<td>14.5</td>
<td>The kitchen space shall have task lighting above workspaces.</td>
</tr>
<tr>
<td>14.6</td>
<td>The kitchen space shall have easy to use handles on doors and drawers.</td>
</tr>
<tr>
<td>14.7</td>
<td>The kitchen space shall have at least half of the storage space below the bench tops consisting of drawers and not cupboards. Bottom drawers shall be a minimum of 250mm from the floor.</td>
</tr>
<tr>
<td>14.8</td>
<td>The kitchen space shall be designed with appliances located at least 300mm from the internal corners of bench units.</td>
</tr>
</tbody>
</table>

*required standard for a 3-Star Lifemark

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*Drawers make reaching items at the back a lot easier even if you are not a wheelchair user.*

*Note the excellent task lighting and that there are no appliances near the internal bench corners.*
Design Considerations

The key requirement for a Lifemark home is to ensure the space is there to provide flexibility for a range of future needs. 2.7m between any facing walls generally allows sufficient space for wheelchair manoeuvring between bench tops (i.e. 2 x 600mm deep bench tops and 1500mm between them).

Most modern kitchen designs are open plan so they already meet the special requirements of a Lifemark home.

Arrangement of kitchen fittings (especially the location of the sink) can have some bearing on the cost of adaptation. Where a bench is capable of relocation, it is preferable that it does not contain the sink.

Selection of appropriate appliances in the original kitchen can significantly improve its safety for older people. For example, older people are generally more susceptible to burns due to deteriorating skin sensitivity and their burns often take longer to heal. Burns are common when they are required to reach across boiling pots to adjust hotplate and oven controls. Selection of a cook top with hotplate controls along the side (or front) can lessen this risk. (Side controls are preferable as controls along the front are too easily reached by young children).

Cost efficiencies are improved by avoiding benches that require ‘site measurement’. This is achieved where the benches are not constrained between walls (i.e. an open plan kitchen). This is in fact the most common arrangement of modern homes, where the kitchen and family rooms are combined. Open planning also allows the space between benches to be increased in the future if required, by relocating the return bench. Often it will be possible to ensure that no plumbing or electrical fittings connect to this bench, or if they do, that they do not constrain future relocation of it.
Points

15.1a Dwellings shall have the plumbing and drainage space for the future installation of a toilet on the primary living level that includes a minimum 800mm clear space beside the toilet and a centre line of the toilet pan that is 450mm from the wall.*

15.1b Dwellings shall have a toilet on the primary living level that includes a minimum 800mm clear space beside the toilet and a centre line of the toilet pan that is 450mm from the wall.

15.1c Dwellings shall have at least one toilet on the primary living level that is compliant with accessible toilet dimensions.

15.2 Toilet walls are reinforced to provide a fixing surface for grab rails to be safely and economically installed in the future.*

*required standard for a 3-Star Lifemark

Why an accessible toilet is important

Wet areas are among the most expensive parts of a house to construct and to refit. They are also the places where the requirement to accommodate different levels of mobility become most apparent in order for people to retain their independence. It is therefore critical that wet areas are designed with flexibility to meet different needs over time.

Typically, modern houses are designed with toilets that are separate from bathrooms. The adaptation of these designs, combining the two into one room, may provide the circulation space required for people who are less mobile.

While Lifemark Design Standard 15.1b will provide for most wheelchair users, Lifemark Standard 15.1c provides specifically for the needs of wheelchair users. NZS4121.2001 10.5.1 – 10.5.6 sets out the definition of an accessible toilet.

This sample bathroom layout shows a bathroom that meets standard 15.1a. As a separate toilet room the toilet does not have the required 800mm clear space beside the toilet but when the red non-load bearing wall with no power or plumbing is removed the 800mm becomes available between the toilet and the vanity. Please note this is just a sample layout and there are many toilet and bathroom configurations that meet the Lifemark Design Standards.
Design Considerations

Where Lifemark homes are designed with a separate toilet and bathroom, the designs should allow easy adaptation without having to relocate any major fixtures (i.e. by removing a ‘loose fit’ dividing wall only).

If walls are to be removed to provide future circulation space, then they need to be non-structural, independent of the integrity of waterproofing systems and not contain plumbing or electrical fixtures.

Ensure the construction program allows for full floor waterproofing where the toilet and bathroom are initially divided, waterproofing of the floor should be contiguous, independent of any wall between the bathroom and toilet. If a separating wall is used, it needs to be fitted after the waterproofing. Similarly, waterproofing should continue below the bath hob to enable easy removal of the bath in the future if required (to gain circulation space). Careful management of the construction process will be required.

The location and dimension of bathroom doors and the impact of door swings on clearances within the bathroom are best considered in the initial planning of the home.

Reinforcing walls for the future installation of grab rails or a shower seat cost no more than a small piece of wood, a few nails and the time it costs to nail gun it in place. Whereas the cost of reinforcing walls after the build can run into thousands of dollars. Grab rails are rails used to steady, stabilise or support the full weight of a person who is changing position. The method of fixing grab rails or a shower seat to their support shall be capable of sustaining a force of 1100N (110kg) applied in any direction at any point. The force shall be applied for a period of 2 minutes after which there should be no sign of fracture of the fixing points nor shall there be deformation greater than 5mm. With the force removed there shall be no permanent deformation greater than 1mm.
BATHROOMS

Shower

The primary living level has a bathroom with a shower that supports easy and independent use for occupants and visitors

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.1a</td>
<td>Dwellings shall have the space for the future installation of a shower on the primary living level that includes a level entry shower recess with minimum dimensions of 1200x1200mm, drainage for the shower recess located in the corner of the room, a clear space that provides for a 1500mm turning circle and 800mm clear space beside the shower seat.</td>
</tr>
<tr>
<td>16.1b</td>
<td>Dwellings shall have a shower on the primary living level that includes a level entry shower recess with minimum dimensions of 1200x1200mm, drainage for the shower recess located in the corner of the room, a clear space that provides for a 1500mm turning circle and 800mm clear space beside a shower seat.</td>
</tr>
<tr>
<td>16.1c</td>
<td>A bathroom on the primary living level shall have a code compliant accessible shower.</td>
</tr>
<tr>
<td>16.2</td>
<td>Dwellings shall have reinforced shower walls on the primary living level for the future installation of grab rails and a shower seat.</td>
</tr>
<tr>
<td>16.3</td>
<td>Dwellings shall have slip resistant flooring in all bathrooms.</td>
</tr>
</tbody>
</table>

Why an easy to use shower is important

The bathroom is the most expensive room in the house to adapt later on, but it is also arguably the most expensive, so it’s important to get this right at the design stage.

The first shower standard is once again about independent living. It provides for the future or initial installation of a suitable shower that will enable someone to remain living independently in their home. The second and third standards are all about safety. The bathroom is the highest risk area of a house for slips, trips and falls and providing for grab rails and a shower seat in the future as well as ensuring slip resistant flooring is in place will significantly reduce the risk of injury.

Slips, Trips and Falls

About 45 New Zealanders die every year resulting from a fall on the same level due to ‘slipping, tripping or stumbling’. Injury from all types of fall is the major cause of hospitalisation for injury in New Zealand. These statistics show the importance of providing grab rails and safe walking surfaces in dwellings to protect users from slipping and tripping.

Design Considerations

Lifemark bathrooms need to provide sufficient space, remove trip hazards and allow for future fixtures as required. The bathroom is one of the key areas for potential injury through slips, trips, falls and scalding. The bathroom should therefore be designed to reduce the risk of injury. Level entry and slip resistant flooring in bathrooms and showers will reduce the risk of trips and strengthened walls will allow for the future fitting of grab rails if required. See Section 15 for more information regarding grab rail specifications.

Thresholds at bathroom doors: often include a level change between tile and carpet surfaces, resulting from the different thickness of materials over the slab. This is a trip hazard and may limit access for some people. It is marginally more...
In this ‘minimum dimensions’ sample there is a shared 800mm clear space beside the toilet and beside where a shower seat could be installed in the future.

The shower unit without solid walls on the side enables a 1500mm turning circle for wheelchair users to manoeuvre.

Ensure the construction program allows for full floor waterproofing where the toilet and bathroom are initially divided, waterproofing of the floor should be contiguous, independent of any wall between the bathroom and toilet. If a separating wall is used, it needs to be fitted after the waterproofing. Similarly, waterproofing should continue below the bath hob to enable easy removal of the bath in the future if required (to gain circulation space). Careful management of the construction process will be required.

The location and dimension of bathroom doors and the impact of door swings on clearances within the bathroom are best considered in the initial planning of the home.
Stair Lift or Platform Lift

Enable access to multi-storey dwellings above or below the entrance level now or in the future

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.1a</td>
<td>Multi-storey dwellings shall have reinforced stairway walls for the future installation of a stair lift.*</td>
<td>4</td>
</tr>
<tr>
<td>17.1b</td>
<td>Multi-storey dwellings shall have the space to provide for the future installation of a 1200mm x 1200mm platform lift.</td>
<td>8</td>
</tr>
<tr>
<td>17.1c</td>
<td>Multi-storey dwellings shall have a stair lift installed.</td>
<td>12</td>
</tr>
<tr>
<td>17.1d</td>
<td>Multi-storey dwellings shall have a minimum 1200mm x 1200mm platform lift installed.</td>
<td>15</td>
</tr>
</tbody>
</table>

*required standard for a 3-Star Lifemark

Why this is important

Single level living is the most accessible for people with any type of mobility constraint. This becomes more important as people get older. Having living, sleeping and bathroom spaces on one accessible level will mean that people who are or become movement impaired – whether permanently or for a short period – will be able to live independently. The concept behind Lifemark homes is that design should not compound already difficult life-transition events.

As allotment sizes decrease, there is increasing pressure to plan bedrooms and bathrooms on upper floors (e.g. in a smaller two storey townhouse). Because of such constraints on space, some house types will be more suitable as a Lifemark home than others. However, homes with bedrooms and bathrooms upstairs can still be designed for full access by making provision for a future stair lift or platform lift.

Design Considerations

To minimise adaptation costs and disruption, the potential lift route and the potential lift entrances and exits should be clear of services.

It is acceptable for the identified route to require some degree of alteration or moving of lightweight partition walls. If the identified lift route within the dwelling passes through a concrete floor, a ‘knock-out’ panel should be pre-formed within the floor.

Stair lifts are a mechanical means of ascending or descending stairs. The stair lift track is either fixed to the stairs or to the wall side of the stairway. A stair lift either has a chair or wheelchair platform and is usually operated by the occupant. Stair lifts shall comply with BS5776.

Stair lifts are generally less expensive to install on straight stairs, rather than return or curved flights. ‘Parking space’ for the chair lift should also be considered in the layout of the home.
Potential platform lift route utilising storage space on ground floor.

Ground-floor plan:
- Minimum area: 1200 mm × 1200 mm clear of services

First-floor plan:
- Optional (recommended) ‘knock out panel’ to create future doorway

Potential platform lift route, living room-bedroom, requiring moderate adjustment of optimum furniture layout.
**Internal Stairways**

Where installed, stairways are designed to reduce the likelihood of injury

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>18.1 Stairways shall provide a minimum clear width of 900mm.*</td>
</tr>
<tr>
<td>4</td>
<td>18.2 Stairways shall be straight in design and not have winder treads or spiral design.*</td>
</tr>
<tr>
<td>4</td>
<td>18.3 Stairways shall have consistent tread depth and riser height with a maximum riser height of 180mm and minimum tread depth of 310mm, with no open risers.*</td>
</tr>
<tr>
<td>4</td>
<td>18.4 Stairways shall be slip resistant and have a suitable non-slip tread</td>
</tr>
<tr>
<td>5</td>
<td>18.5a Stairways shall have reinforced walls to provide for future installation of code-compliant accessible handrails on both sides.*</td>
</tr>
<tr>
<td>7</td>
<td>18.5b Stairways shall have a code-compliant accessible handrail installed on at least one side.</td>
</tr>
<tr>
<td>12</td>
<td>18.5c Stairways shall have code compliant accessible handrails installed on both sides.</td>
</tr>
<tr>
<td>3</td>
<td>18.6a Stairways shall have a 1200mm x 1200mm unobstructed landing at the bottom of the stairs.</td>
</tr>
<tr>
<td>2</td>
<td>18.6b Stairways shall have a 1200mm x 1200mm unobstructed landing at the top and bottom of the stairs.</td>
</tr>
<tr>
<td>4</td>
<td>18.7 Stairways shall have light switches at the top and bottom of the stairs.*</td>
</tr>
</tbody>
</table>

*required standard for a 3-Star Lifemark

**Why internal stairway standards are important**

If a Lifemark home is to be truly inclusive, its design will enable effective and efficient adaptation works to allow access to levels above and below the entrance level for occupants with less agility and mobility well before they get to the point of requiring a stair-lift or platform lift. As we age, even if we are fully mobile and able to walk unaided, the way we walk changes. We don’t lift our feet as high and we are susceptible to slips, trips and falls. Stairs are a particularly common place for older people to fall and because the falling distance is greater so are the injuries. It is therefore vital that stairways are designed with safety in mind. Wider stairs will assist with movement past a ‘parked’ chair-lift, aid assisted movement on the stairs, be more convenient for parents carrying children and generally assist with movement of furniture and other objects between levels.

**Design Considerations**

Handrails are rails used in circulation areas such as corridors, passageways, ramps and stairways to assist in continuous movement. The method of fixing handrails to their support shall be capable of sustaining a force of 1100N (110kg) applied in any direction at any point. The force shall be applied for a period of 2 minutes after which there should be no sign of fracture of the fixing points nor shall there be deformation greater than 5mm. With the force removed there shall be no permanent deformation greater than 1mm. NZS 4121 Appendix D3.1.4.1 and D3.1.4.2 refer to ideal heights and grip measurements for handrails. The average preferred handrail height for young and old subjects alike is 927mm. NZBC D1/AS1 also provides guidance on ideal handrail widths for an ideal grip.

These stairs illustrate the minimum dimensions and other standards required to earn points toward your Lifemark rating.
8.0 APPENDIX B
Construction
- Floors - Pre-stressed Reinforced Concrete Slab, with precast concrete surrounds to provide fire and acoustic separation
- Will act as a diaphragm to transfer loads to the vertical shear walls or steel frame

- Walls - Concrete shear walls - Very Tall so potential for significant uplift forces. May need timber piles. Preferred CSW extended all the way down on seam minimal penetrations. Often ground floor concourses mean it is not desirable for CSW to extend to the ground floor. This creates structural challenges for gravity or seismic loads to the foundations

- Longitudinal lateral load mechanism
  - Steel Portal Frames at the front
  - Concrete shear walls at the rear
  - Lateral capacity and load paths to be confirmed

- Foundations - Dependent on Geotech Report & advice from engineer. Possible uplift demand: piles will need to be designed for uplift

- Assumed Plant Room on Roof
- Seismically Isolated Apartments from Lift & Stairwell Building

Structural Feedback Rev A
10/10/17
Planted saw
Need to be
checked for
out of plane
loads

Not sure what
this tower is?

Plant Room
or Roof?

C.A. Cecil
Clyne
Balcony
? Panoramic
staircase?

Not sure what
this tower is?

C.B. Radul Steel
Foundation
Piles?

Foundations
"K" or "X" Form

Lightweight steel
roof

Transferring load
from C.S.W. to slab
frame needs careful
attention

Piling under shear
walls to resist
gyration & uplift loads
 Possibly screw piles
Geo tech engineer to advise

Does any concourse requirements
prevent C.S.W. from entering
all the way down?

Structural Feedback
By J. Ross
8.0 APPENDIX C
Full name of author: Hayden McDonald Beaton

ORCID number (Optional): ......................................................

Full title of thesis/dissertation/research project ('the work '):
Village in the Sky - within the city limits

Practice Pathway: Architecture
Degree: Master of Architecture
Year of presentation: 2017

Principal Supervisor: Graeme McConchie
Associate Supervisor: Annabel Pretty

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This Thesis/Dissertation/Research Project entitled:  
VILLAGE IN THE SKY - WITHIN THE CITY LIMITS  

is submitted in partial fulfillment for the requirements for the Unitec degree of 
MASTER OF ARCHITECTURE (PROF)  

Principal Supervisor:  
GRAEME MULCHIE  

Associate Supervisor/s:  
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I confirm that:

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• The contribution of supervisors and others to this work was consistent with the Unitec Regulations and Policies.
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Student number:  
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