● **Dwelling**
- ○ Entrance
- ○ Living & Dining
- ○ Kitchen
- ○ Bedroom
- ○ Washroom

● **Communal Area**
- ○ Main Circulation Route
- ○ Development Entrances
- ○ Carpark
- ○ Drop-offs
- ○ Building Entrances & Lobbies
- ○ Lifts (Accessible & Service Lift)
- ○ Ramps
- ○ Exercise Stairs
- ○ Clubhouse
- ○ Concierge
- ○ Multi-Component Area
- ○ Transitional Care Area
- ○ Outdoor Landscaped Area

● **Operations**
- ○ Daily Assistance
- ○ In Home Services
- ○ Resident Engagement
- ○ General Enquiry & Assistance
- ○ Integrated Care Services
- ○ Health Screening
- ○ Health Education
- ○ Multi-Component Programmes
- ○ Rehabilitation Services
- ○ Overall Operations
- ○ Service Feedback
- ○ Referrals
- ○ Facility Management
- ○ Incident Management
- ○ Human Resources Management
- ○ Information Management
- ○ IoT Integration

Curating Homes

A Guide to Residential Design for Ageing-in-Place

Curating Homes

A Guide to Residential Design
for Ageing-in-Place

Together with my housing team and our partners, we strive to build not only a shelter, but a home and a neighbourhood for all our residents on the public housing ladder. A shelter that they feel safe and comfortable to live in, a home that nurtures a sense of belonging and love, a neighbourhood that supports connections and growth. With this aspiration, we launched the Well-being Design Guide in September 2024, with a view to laying down some design references for enhancing the sense of well-being of our public housing residents.

This launch is certainly not the end of the exercise. I am glad to witness their applications in more and more public housing projects, even more excited to see the well-being concept spreading and taking root in different sectors. Aiming to provide a guide to private residential housing design for healthy ageing-in-place, this book aligns with the well-being concept that we have been promoting. Hope that the movement could sustain and evolve further, with the participation of even more partners and exchanges of more brilliant ideas!

Ms. Winnie Ho
Secretary for Housing, HKSARG

My mother broke her hip at home and later had a stroke. She was bedridden for a decade before she left us.

Trying to provide her with the best comfort in a familiar home environment, our family converted her quarter into a mini-24-hour care ward. It was a stressful time for all my siblings, and I still vividly remember the arguments among us on what would be the right facilities and cares for my mother.

I hope I had the present Guide then as it would be a useful checklist for designing better home and making a safer physical environment for people to age in place. The CUHK Jockey Club Institute of Ageing has done a great service for Hong Kong by continuing to advance the research and knowledge on active ageing. Thank you, Professor Jean Woo for their leadership in guiding the work. My heartfelt gratitude to the project team, especially Ms Rina Ko for her passion, commitment, and perseverance, to ensure this meaningful project comes to a fruition.

I hope this Guide is just the beginning of a long journey to empower independent and healthy ageing in Hong Kong. I look forward to all stakeholders coming together to share knowledge and co-create an age-friendly residential design for all. Hong Kong can do better, and it starts with each of us taking a small step forward!

Mr. Donald Choi
Former President, The Hong Kong Institute of Architects

If you are serious and passionate about empowering people to age at home with continuous purpose and dignity, health and happiness, this is a must-read Design Guide for both the hardware and software elements of senior housing. I can assure you that this is not a Guide prepared just by the elites. It is a Best Practice after thorough research and collaborative effort with people on the ground. Now that we know what should be done, the next move is for the investors, designers and operators to make it happen.

Ms. Iris Tam
Former President, The Hong Kong Institute of Planners

Foreword

Population ageing has stimulated a very active industry in senior living world-wide. This is a logical development since older people prefer to 'age in place', living independently in surroundings that are familiar to them, with an accompanying social network. Maintenance of physical and cognitive function is a prerequisite. The physical environment plays a vital role in facilitating independent living. This includes the building design and structure, the common facilities, as well as the immediate surrounding urban environment. While there are universal guidelines relating to building design, Hong Kong has a unique environment of high density living. Fit for purpose design of buildings for ageing-in-place needs to start from the users' perspective, following the principles of healthy ageing promoted by the World Health Organization, where optimising intrinsic capacity is key to maintaining both physical and cognitive function. The design of buildings, as well as the usage of common areas, are both important in achieving this goal.

This design guide represents a first in integrating these concepts, adhering closely to the World Health Organization's concept of healthy ageing, beyond the consideration of absence of chronic diseases. It includes suggestions relating to on-site activities to maintain intrinsic capacity, which can be carried out using different business models. It would not have been possible to produce without the pioneering views of the Chinachem Group and the creative effort of Ms. Rina Ko, in combining current views of healthy ageing and architectural design. Hopefully developers, urban planners, as well as management companies, will find the guide useful, for the benefit of Hong Kong's rapidly ageing population.

Jean Woo MD FRCP
Director, Jockey Club Institute of Ageing
Henry G Leong Research Professor of Gerontology and Geriatrics
Emeritus Professor of Medicine, Department of Medicine and Therapeutics
The Chinese University of Hong Kong

Design Guide

Operational Checklist

VISUAL FRAMEWORK

Dwelling
- Entrance
- Living & Dining
- Kitchen
- Bedroom
- Washroom

Communal Area

Main Circulation Route
- Development Entrances
- Carpark
- Drop-offs, Building Entrances & Lobbies
- Lifts
- Ramps
- Exercise Stairs

Clubhouse

Concierge
- Front Desk
- Staff Office
- Lounge
- Reading Room
- Consultation Rooms
- Chinese Medicine Clinic
- Toilets & Changing Rooms

Multi-Component Area
- Communal Dining
- Communal Kitchen
- Multi-Functional Rooms
- Gym
- Hydrotherapy Pool

Transitional Care Area
- Therapy Areas
- Family Breakout Room

Outdoor Landscaped Area
- Podium & Outdoor Exercise
- Communal Farm

Daily Assistance
- In-Home Services
- General Enquiries & Assistance
- Resident Engagement

Integrated Care Services
- Health Screening
- Health Education
- Multi-Component Programmes
- Rehabilitation Services

Overall Operations
- Service Feedback
- Referrals
- Facility Management
- Incident Management
- Human Resources Management
- Information Management
- IoT Integration

Clubhouse Service Pathway

In-Home Service Pathway

Introduction

This guide explores the vital connection between health and our living environments, particularly as we age. In a rapidly evolving world, our understanding of ageing remains limited. Many view older adults primarily through the lens of medical conditions and disabilities, leading to designs that prioritise clinical interventions and barrier-free environments. This perspective, however, overlooks the richness and vibrancy of their lives. Research shows that our health is influenced by a blend of personal behaviours (40%), genetic and familial factors (30%), environmental conditions (20%), and medical care (10%). This highlights the importance of recognising personal empowerment and lifestyle choices in fostering overall well-being. *Curating Homes* aims to shift this narrative by promoting a holistic approach to residential design that celebrates older adults and healthy ageing. It empowers individuals and communities to co-create spaces that nurture both health and happiness, beginning right at home. (LUS02)

Who are Older Adults?

The Life Course Approach
to Healthy Ageing

There are no typical older adults. While societal statistics often define 'old' as beginning at age 65, some consider 80 a more appropriate benchmark. Moreover, living to 100 may soon be common, particularly in places like Hong Kong, where the life expectancy is one of the highest in the world. A recently coined saying captures this shift: while a long life may not always be a blessing, a healthy life certainly is. This perspective invites us to rethink our understanding of ageing, focusing on the quality of life as much as its duration.

Age alone does not determine well-being; it is our individual experiences, lifestyles, and environments. The misconception that older adults are inherently frail or dependent overlooks the diverse capabilities and experiences of this demographic, and only serves to reinforce stereotypes. Traditionally, health practitioners measure a person's capacity by using Activities of Daily Living (ADLs)—such as personal hygiene, grooming, dressing, and eating. In alignment with the World Health Organisation (WHO), we advocate for a perspective that begins with individual aspirations rather than viewing older adults merely as service recipients. This shift moves us from a paternalistic approach to one that empowers individuals to take charge of their lives.

Consequently, we must pivot from rigid age classifications to the concept of 'health span'—the period during which individuals enjoy good health—rather than simply extending lifespan. Ageing is not a binary experience but a spectrum of gradual changes impacting our physical and brain functions. From the peak of our abilities in our 20s and 30s to the subtle transitions that may accompany later years, these changes are part of life's complex journey. Importantly, they are not necessarily signs of disease or disability but rather the natural evolution of human existence.

Peak at Age 20–30

Increased Functional Ability

Functional Ability

Lifestyle
Socioeconomic
Psychological

Physical Environment
Social Environment

Dependency Threshold

Birth

Death
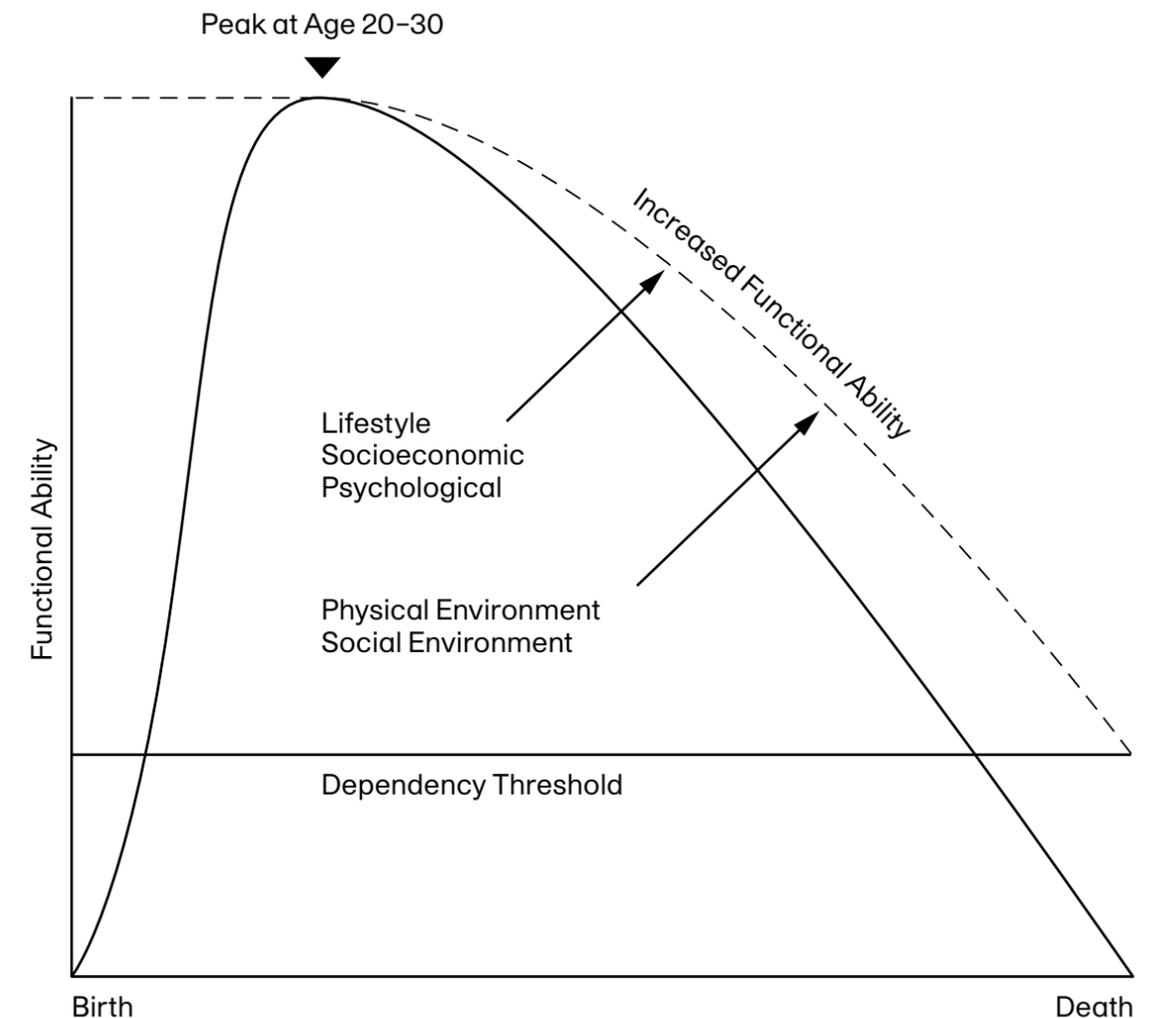
Functional Ability
○ Meet basic needs
○ Learn, grow and make decisions
○ Be mobile
○ Build and maintain relationships
○ Contribute

Why Does Home Matter?

Environment

Functional Ability

Intrinsic Capacoty

Locomotor Capacity

Hearing Capacity

Vitality

Psychological Capacity

Visual Capacity

Cognitive Capacity
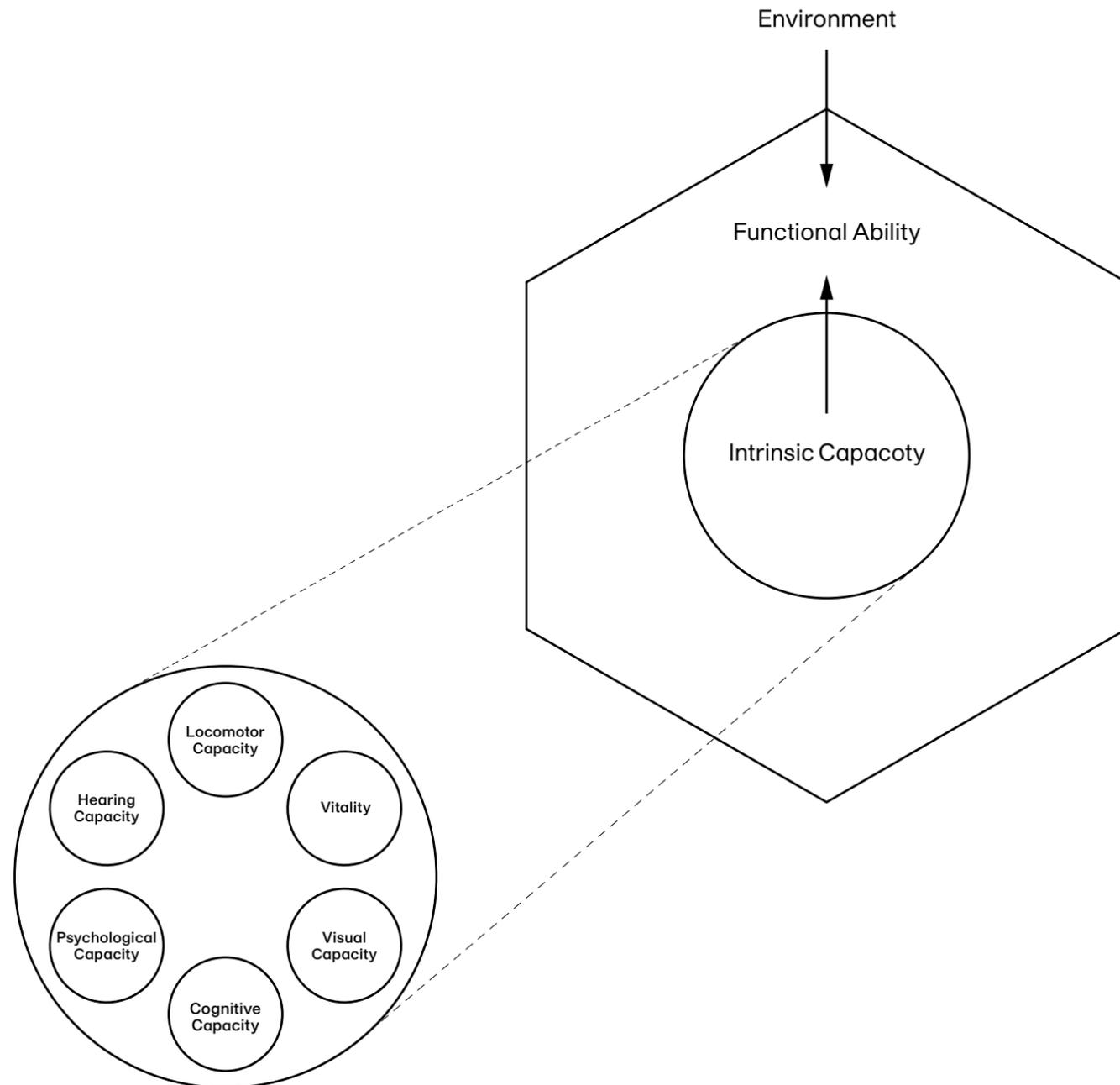
At the heart of *Curating Homes* lies the understanding that our living environments profoundly impact our health. Homes are not simply physical buildings; they serve as sanctuaries where individuals should feel comfortable, nurtured, and empowered in pursuing what they value. As we age, our homes become essential to our identity and well-being, influencing our lifestyles and daily experiences while fostering peace of mind.

Ideas around what makes a good home are shifting in line with the concept of Healthy Ageing. There must be a move away from stereotypical spaces that cater to living with illness and disability to spaces that support maintaining physical and brain functions for as long as possible. This functional ability depends on the interaction between an individual's intrinsic capacity—including vitality, cognition, mobility mental health, vision, and hearing—and their physical and social environments. Ultimately, homes should support older people's ability to meet needs, make decisions, navigate their surroundings, maintain relationships, and contribute to their communities. (AWH12)

In support of a person-centred approach to managing the functional ability and intrinsic capacity of older adults in home environments, this guide adopts the Integrated Care for Older People (ICOPE) model presented by the WHO. This model advocates tailored health and social care that addresses individual needs and accommodates changing abilities through education, screening, and community resources. Proven effective, such multi-component programmes can alleviate issues like frailty, sarcopenia, memory challenges, and nutritional deficits, while enhancing overall physical and brain function at the community level. (LHK19)

Recognising housing as one of the key social determinants of health underscores the necessity of supportive strategies and home design that prioritise the needs of residents and foster positive health outcomes. Creating health-supporting environments requires collaboration among all housing development stakeholders, including property service teams and residents, empowering them to facilitate healthy lifestyles and independence, enhance social interaction, and improve functional ability for all. The capacity to age well not only affects individual health outcomes but also contributes to the overall resilience of our communities.

Evidence-based Design?

Drawing on five years of evidence-based research, this guide synthesises insights from surveys, focus groups, stakeholder meetings, and resident interviews, alongside a thorough review of international literature contextualised to the local environment. It also consolidates findings from various research projects conducted by the institute, filtering in the health and environmental needs of older adults to contribute to the design principles laid out within.

Over the five-year period, extensive action research was conducted through the social innovation initiative known as The Nutcrackers. This initiative facilitated knowledge exchanges between health and built environment practitioners and older adults via educational talks, architectural tours, and home visits. These interactions enabled the gathering of invaluable feedback from users, illustrated by direct quotes throughout the guide, and allowed for discussions on design challenges, thus enhancing our understanding of suitable living environments for older adults. The initiative represents a long-term collaborative effort driven by a shared vision to improve quality of life for older individuals.

Buildings are often viewed as physical structures, while architecture is frequently regarded as a form of art. In fact, architecture has always encompassed both art and science, profoundly shaping our lived experiences. It goes beyond aesthetics to explore how spaces inspire us in our daily lives. In the context of housing, end users do not view residential buildings solely as artistic creations; they inhabit these spaces for specific reasons. Practical and emotional needs drive how individuals interact with their homes, and conversely, the quality of these environments significantly impacts our connections, behaviours, and state of mind. Our goal is to foster a meaningful dialogue that anchors architecture in practical realities.

Architects and housing providers hold a powerful tool: the ability to create resonant spaces that reflect and accommodate the diverse needs of their inhabitants. This guide encourages a dialogue that invites everyone—not just experts—to share their experiences and insights about their living environments. By recognising the subtle relationships between space and health—such as how lighting influences emotions and how layout can promote peace of mind—we can better understand how architecture shapes our daily lives. Acknowledging these influences enables us to design environments that genuinely support and enhance our well-being.

Nutcrackers © CUHK Jockey Club Institute of Ageing

Ready to Take Action?

This guide represents a pioneering effort to integrate the concept of healthy ageing into architectural design, specifically for housing developments in Hong Kong. It provides recommendations not only for health, social, and built environment practitioners but also for families, caregivers, and community members eager to understand and address the diverse needs and aspirations of older adults. It offers comprehensive insights into the integrated design of individual dwellings and communal spaces, accompanied by practical checklists for service operations. These design elements and checklists are intended to be viewed as complementary, reinforcing the idea that thoughtful design and effective service delivery go hand in hand. To further support these efforts, a catalogue is included as a handy reference for anyone seeking homes that cater to the unique needs of older adults.

As we conclude this introduction, it is crucial to rethink our approach to housing developments. We must move beyond the mere construction of barrier-free buildings; architecture should be embraced as a holistic practice that values the lived experiences of inhabitants. By creating nurturing environments, we can significantly enhance healthy ageing. This perspective encourages collaboration among property service staff, residents, and their families, highlighting the importance of working together to create enriching spaces. By designing with a keen awareness of how services can influence spatial arrangements, and vice versa, we can promote a healthy lifestyle through design while facilitating meaningful interactions within the community. Insights and feedback are welcome to further refine this guide in the future, ensuring it adapts to our rapidly changing world.

Ultimately, this guide represents a commitment to creating architecture that enriches the quality of life for all, including older adults and caregivers. Let us strive to create quality homes—architecture that empowers us to fully engage in what we cherish most, prioritising health and the values that define meaningful lives, while nurturing the organic connections that life has to offer.

Legend

●	Essential	HT	Health Tips
○	Best Practice	RI	Research Insights
→	Also See		

Dimensions

- ○ All dimensions are in millimetres.
- ○ The meaning of the abbreviation 'clear' used in the drawings is 'effective clear width'.
- ○ The dimensions in the figures may include :
  - ○ A recommended dimension or range of dimensions;
  - ○ A recommended minimum dimension— shown in brackets.
- ○ This guide has been developed in alignment with existing statutory requirements and relevant documents. However, the recommendations presented are intended as best practices. Users should refer to the latest statutory guidelines in case of any conflicts.
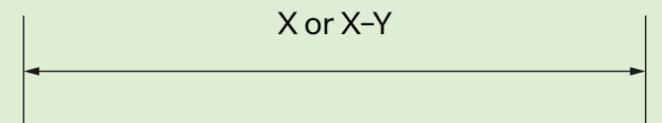
X   Recommended Dimension
X–Y Recommended range of acceptable dimensions
Z   Recommended minimum dimension

X or X–Y

(Z)
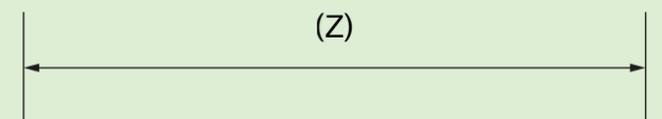
Design Guide

John Morden Centre by Mae Architects, © Jim Stephenson

Public, porous and pedestrianised ground plane. Floor patterns, landscape and outdoor seating continue outwards from the plaza to surrounding buildings.

Tree canopy over the landscaped terraces, featuring various local fruit trees and a community farm on the rooftop.

The Garden Court, framed by glazed access galleries to all apartments.
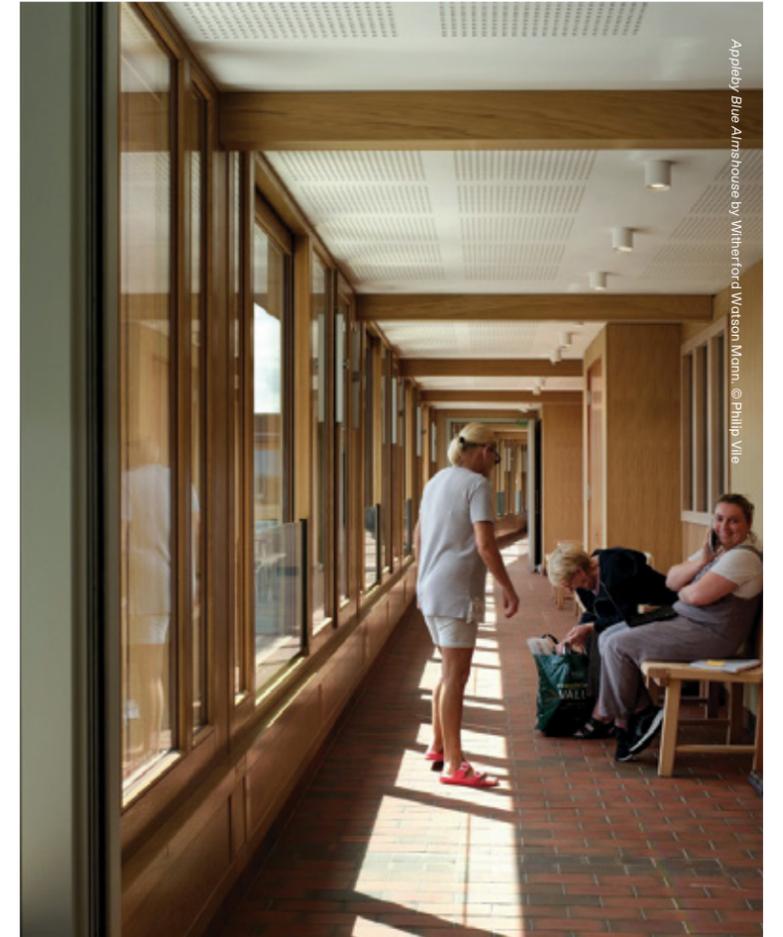
Residents chatting in spacious glazed galleries.

Balconies, set halfway back from the facade, allow residents to enjoy street views while choosing between exposure and privacy, making them ideal for those needing a bit of extra help while staying engaged with street life.

The REHAB is an open, permeable, horizontal two-floor building, resembling a small town with streets, plazas, gardens, public facilities, and secluded residential quarters, all connected by various paths throughout.

Glass spheres incorporated into the ceilings of spaces, providing the changing views of the sky overhead when indoors, especially for people with limited mobility.

REHAB Basel | Herzog & de Meuron | 2002

Home for Senior Citizens by Peter Zumthor © Ivo Stoni

Home for Senior Citizens by Peter Zumthor © Ivo Stoni

The use of materials like exposed concrete, tufa and larchwood creates a rural atmosphere in a suburban setting, inviting both new and long-term residents to feel at home. The choice is reinforced by clear construction details, resulting in a work of art that reflects familiar local elements.

Home for Senior Citizens | Peter Zumthor | 1993

1

Site Response

Accessible Neighbourhoods

Evaluate neighbourhoods for older adults considering safe, accessible walkways with diverse transportation options. This approach promotes independence and enhances quality of life by enabling exploration beyond the immediate surroundings.

Highlights

- Empowerment Through Exploration: Multiple transport options encourage community engagement and social connections.

- Encouraging Physical Activity: Flat, well-designed walkways enable safe exercise opportunities for those with limited mobility.

- Fostering Independence: Safe walkways boost confidence and autonomy in navigating neighbourhoods.

2

Environmental Quality

Enhancing environmental quality creates healthy, clean spaces that promote proximity to nature, fostering well-being and a connection to the ecosystem.

Highlights

- Tranquillity Amid Urbanity: Natural elements offer peaceful refuge from urban settings.
- Connection to Nature: Green spaces reduce pollution exposure and improve health outcomes.
- Clean Environment: Non-polluted settings provide nurturing atmospheres for older adults.

3

Cultural Narratives

Design environments that honour cultural narratives and traditions, fostering a sense of belonging and identity for older adults. This approach enhances wellness by reflecting community history and nurturing meaningful connections.

Highlights

- Enhanced Familiarity: Incorporating local history fosters comfort and belonging, improving emotional well-being. (AHK43)
- Connection to Heritage: Supporting local traditions helps maintain identities and community ties. (LEG01)

4

Harmonious Architecture

Design architecture that harmonises with neighbouring structures to create a welcoming atmosphere. This principle ensures new developments are seen as valuable community additions, enhancing belonging and minimising disruption.

Highlights

- Visual and Tactile Connection: Use of local materials promotes comfort and familiarity. (AHK43)

- Integrated Built Forms: Blended architectural styles reduce feelings of displacement during transitions to new living environments. AHK43

5

Community Engagement

Inviting potential residents and the broader community into the design process fosters a vibrant, user-centred environment that promotes social inclusion and health equity. By integrating local identity and shared spaces, this approach empowers individuals to express their needs and build relationships, ensuring the design reflects community values from the outset.

Highlights

- Maintaining Community Values: Align projects with local identity and leverage neighbourhood assets.

- Collaborative Planning: Active participation from senior residents enhances satisfaction and ownership.

- Empowerment and Relationship Building: Community involvement ensures designs reflect shared values and strengthen connections.

6

Building Design

Dynamic
& Adaptable
Design

Encouraging movement is vital for a healthy lifestyle. Thoughtful, safe floor plans accommodate changing needs, enhancing residents' autonomy and fostering community engagement.

Highlights

- Organic Layouts: Design spaces with flowing routes to inspire exploration and promote walking as a form of physical activity.

- Accessible Layouts: Facilitate easy movement to maintain independence.

- Futureproofing: Flexible spaces adapt to evolving resident needs and enable user-friendly maintenance, empowering residents to engage with their environment.

7

Privacy & Personal Space

Balance autonomy with support by creating designs that emphasise both personal space and approachable assistance. This approach upholds residents' dignity and encourages personal activities while enhancing their sense of security.

Highlights

- Privacy in Shared Spaces: Balance openness with privacy for comfortable safety and socialisation.

- Empowerment: Private areas foster autonomy and engagement in personal activities. (LHK15); (LHK16)

- Balanced Design: Integrate private and communal spaces to support both social interaction and solitude.

- Spatial Preferences: Ample secluded spaces enhance quality of life for diverse lifestyles.

8

Biophilic Design & Sensory Experiences

While functional spaces are crucial, they can sometimes lack inspiration and vibrancy. Incorporate biophilic design using natural and tactile materials to create inviting environments that enhance connections to nature, benefiting all users and promoting a restorative atmosphere.

Highlights

- Cognitive Benefits: Sensory experiences enhance cognitive function. (LID02)

- Comfort and Familiarity: Natural materials evoke positive emotions and reduce anxiety.

- Enhanced Well-Being: Sensory elements boost emotional resilience and social interaction.

9

Passive Design

Consider the home a sanctuary by improving thermal comfort and energy efficiency through natural light and ventilation. Ensure well-insulated spaces that are crucial for older adults, who may have limited flexibility to modify their environments and are vulnerable to extreme temperatures.

Highlights

- Light Sensitivity: Higher lighting levels are crucial for older adults, and natural daylight enhances the ability to show true colours, improving visibility and safety.

- Thermal Comfort: Proper insulation and orientation maintain stable indoor temperatures, ensuring year-round comfort.

- Health & Community: Eco-friendly practices enhance living conditions and community spirit.

10

Open Communication

Thoughtful spatial design and technological integration foster open dialogue addressing personal needs, empowering the entire community.

Highlights

- Responsive Design: Open floor plans and customisable spaces enhance the well-being of residents, caregivers, and property management.

- Homebound Independence: Technology improves healthcare access and supports home-based tasks.

- User-Centric Design: Intuitive features and feedback mechanisms reduce fear of judgment, ensuring tailored care services. (LPT02)

- Privacy Considerations: Safeguard privacy by minimising perceptions of constant monitoring and applying oversight only as needed.

Nearby bus stop with canopy and seating, just outside the main entrance.

GENERAL

Accessible Neighbourhood

- Facilities and Services: Conduct an audit of facilities and services in the neighbourhood to ensure that high-quality essential services, communal spaces, and healthcare options are fully accessible from door to door. If this is not the case, implement mitigation measures such as providing guidance to the nearest options or considering in-house alternatives.

- Walkability: Ensure safe, accessible and inclusive walking environments to promote independence.

- Transportation: Ensure accessible, reliable public transportation options are available, allowing older adults to access essential services and participate in physical and social activities.

- Cross-Sector Collaboration: Foster partnerships with local government, organisations, and businesses to advocate for and enhance facilities, services, and infrastructure that meet the changing needs of older adults, promoting an accessible, supportive and integrated community.

→ Appendices/Accessible Neighbourhood Audit

Environmental Quality

- Optimise Air Quality: Optimise wind flow, air quality, and thermal comfort by considering air pollution sources and topography near the site, as well as building location and height. (LHK02; LHK52)

- Reduce Noise Pollution: Locate buildings away from noise sources and utilise passive noise reduction designs when needed with consideration of the measures' visual appeal. (AHK44_8; AHK45_6)

- Assess Potential Contaminants: Conduct site contamination assessments to determine the plot's development feasibility, especially on brownfield sites. (AHK43; AHK44_8; LHK11)

Cultural Narratives

- Cultural Significance: Conduct thorough research on the site's history, focusing on its cultural, architectural, and social significance. This includes reviewing archives, consulting local historians, and interviewing long-time residents to gather diverse perspectives. (AHK43)

- Architectural Context: Analyse local architecture, such as design motifs and colours, to create designs that harmonise with the existing built environment. This could include preserving existing structures and using local materials and techniques, to create a cohesive aesthetic that honours the past.

- Socio-Economic Study: Conduct a socio-economic study to understand the neighbourhood's dynamics and requirements, leveraging assets and addressing challenges.

Harmonious Architecture

- Responsive to Built Form: Design new structures, such as active frontages that engage the streetscape, to complement the surrounding built form, rather than imposing a stark or mismatched design. (AHK43)

- Proportional Massing: Ensure that the scale and massing of new buildings align with the existing environment. This approach fosters a more welcoming atmosphere, helping older adults adapt more easily to their new surroundings.

- Soft Transitions: Design soft transitions between new and existing buildings using landscaped walkways, gardens, or communal areas to foster connectivity and a sense of continuity. (AHK43)

Community Engagement

- Stakeholder Involvement: Engage with local cultural leaders, older adults, and community members to understand the significance of local practices and how they can be integrated into design.

- Means of Engagement: Organise focus groups, workshops, and surveys to gather insights on the needs and preferences of prospective older adults and residents.

- Prototype Development: Develop prototype living spaces or amenity areas for prospective residents to experience first-hand, and gather feedback to refine designs. (LNL02)

- Identity Building: Incorporate placemaking programmes that empower all residents, including older adults and their friends, to shape the community's identity while accommodating and enhancing local traditions and rituals in the development, thereby helping them maintain their sense of identity and community connections. (AHK43; LEG01)

- Inclusive Placemaking: Ensure overall placemaking efforts are inclusive and considerate of different mobility needs, creating an accessible environment for all community members. (AHK33_3)

RI: Architecture and Place Identity
Place identity is closely connected to meaning and sense, beyond the composition and form of building structures. By considering and incorporating the local context into the design, users' comfort and connection to the space can be significantly enhanced. (LEG01)

Home for Senior Citizens by Peter Zumthor. © Benjamin Arvid Jaeger

我都係好好保重自己，我都知道自己呢個年紀一跌親就好麻煩㗎啦，所以我行路都會問姐姐有冇石級。佢話冇，我就放心；佢話有，我就慢慢行，扶住啲嘢囉。

I take good care of myself. At my age, a fall could be disastrous, so before I walk anywhere I always ask if there are any steps en route. If the answer is no, I feel much safer. If it's yes, I go slowly and find something to hold onto.

INTERNAL AREA

Layout

- Open Plan: Implement open floor layouts that allow for easy reconfiguration and promote visual clarity, empowering residents to adapt their environments and encouraging walking to prevent sedentary behaviour.

- Futureproofing: Design buildings with flexible structural elements to accommodate future renovations to adapt to residents' evolving needs. Additionally, approach design with the mindset of facilitating easy maintenance for end users, promoting autonomy, independence, and an active lifestyle.

Step-Free Access

- No Thresholds: Ensure all routes are completely step-free with no thresholds, to reduce fall risk, especially for those individuals with weakened legs or balancing issues. Implement Lifts and Ramps where there are level changes. (DIAGRAM)

Manoeuvring Space

- Corridors: In Dwelling corridors, a clear width of 1050mm (min. 950mm) is recommended. In Communal Areas, clear widths of 1900mm (min.1600mm) are suggested to create two lanes, accommodating at least one lane for mobility aids. (Fig.1a & 1b)

- Turning Circles: Provide turning circles with a diameter of 1500mm (min. 1200mm) to facilitate a 360-degree turn. (Fig.3)

Doors

- Clear Opening Width: Ensure a clear door opening width of 950mm (min. 850mm), ideally with an additional minimum 350mm nip to the leading edge of the door to facilitate easy access and manoeuvrability, particularly for those using mobility aids. (Fig.4)

RI: Walking Pattern
Older adults often adopt a 'cautious' gait with slower speed, shorter steps, and increased step timing on uneven surfaces, improving stability. (LUS14)

No threshold

Fig.1a

1050 (950)

Fig.1b

(1600)

(650)   (950)

1900

(950)   (950)

Fig.3

Ø 1500 (1200)

Fig.2

800 (700)
Space for occupied chairs

640

280

430
Seat depth

1050-1200

760-815

330-385
Space for leg rests

430
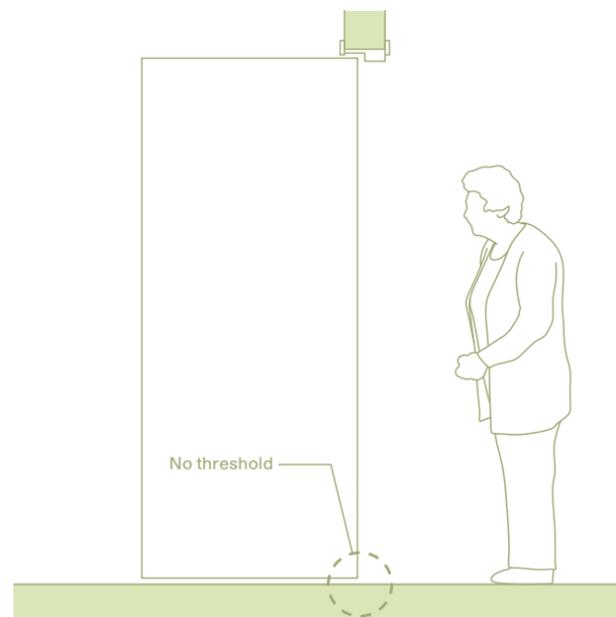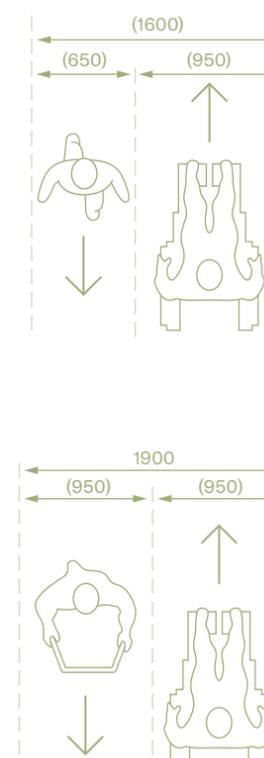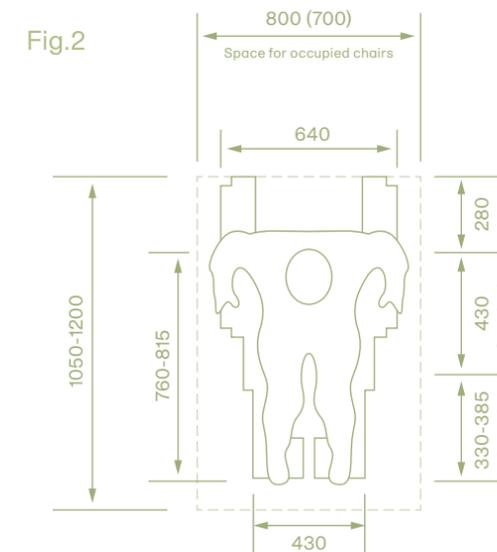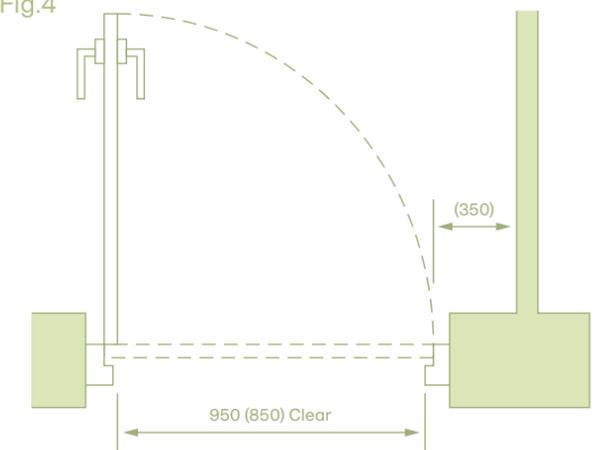
Note: The dimensions for manoeuvring space is developed based on standard wheelchairs and mobility aids in Hong Kong. They take into account the potential inexperience of some users and caregivers in manoeuvring various mobility aids but do not include provisions for larger wheelchairs or electric scooters.

Fig.4

(350)

950 (850) Clear

Fig.1a   Corridor Widths for Dwellings
Fig.1b   Corridor Widths for Communal Areas
Fig.2   Dimensions of an Occupied Wheelchair
Fig.3   Turning Circle of a Wheelchair
Fig.4   Clear Opening Width of Doors

John Morden Centre by Mae Architects. © Jim Stephenson

Harriet Hardy

Corridor lined with seating at intervals, viewing the outdoor courtyard behind the glazed wall.

Left: Cross Ventilation
Right: Wind Walls

AIR
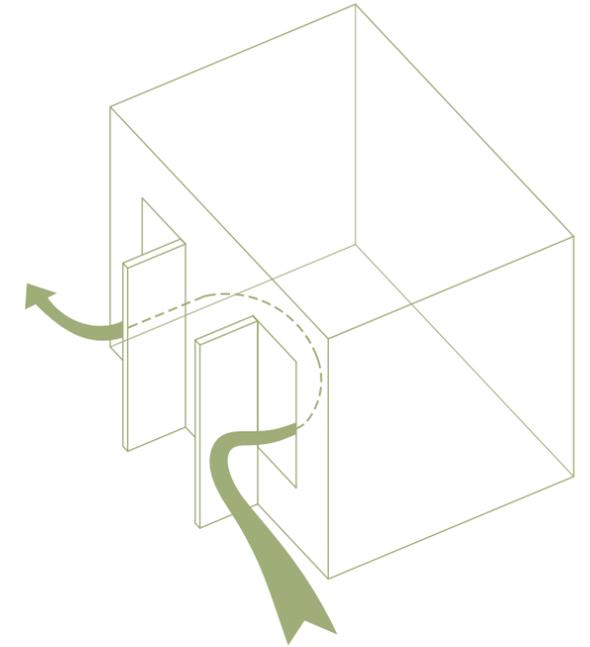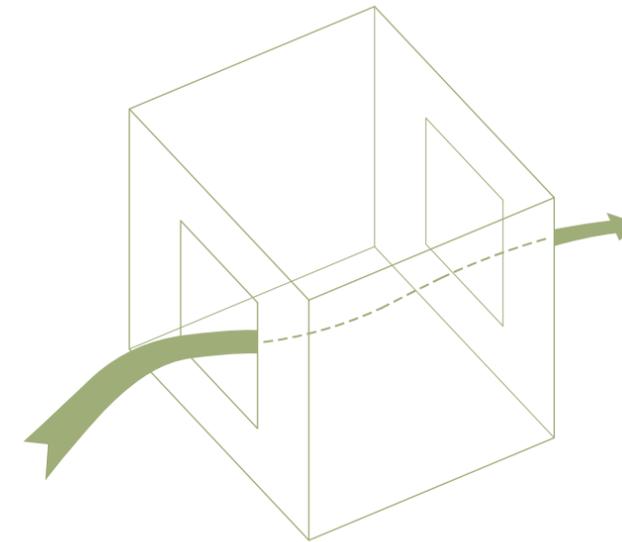
Natural Ventilation

- Operable Windows: Incorporate operable windows that utilise strategies like pressure differences and buoyancy effects, such as transom windows and wing walls, to enhance airflow and improve cross ventilation. Ensure these windows are easily accessible for residents. (DIAGRAM) (AHK33_1)

○ Building Frontage: Orient the building towards the seafront or large open spaces to enhance natural ventilation while positioning it to maximise sunlight exposure and utilise prevailing wind patterns, reducing reliance on mechanical systems. (AHK34)

Green Spaces

○ Integrate indoor plants and green walls to improve air quality and create a calming environment.

RI: Use of Outdoor Spaces
Research shows older adults' use of outdoor spaces depends on similarities in temperature and humidity between indoors and outdoors. They prefer consistent conditions and will only go outside when the differences are minimal, taking wind and sunshine into consideration too. To get more older adults using outdoor spaces, the research suggests design strategies to reduce differences between indoor and outdoor microclimates, like adding shade and improving ventilation. (LCN06)

Harriet Hardy Extra Care Housing by Mae Architects. © Tim Crocker

LIGHT

Building Orientation

- Reduce Heat Gain: Avoid west-facing façades, as they are prone to excessive summer heat gain from the late afternoon sun. If unavoidable, minimise the placement of Living Areas and Bedrooms on that side. (AHK34)

- Minimise Light Pollution: Prevent artificial light pollution from external sources that can disrupt older adults' circadian rhythms. (LIN01)

Daylight Maximisation

- Design layouts that maximise natural light through large windows, skylights, and open spaces to enhance mood and well-being. (IMAGE)

Harvesting Strategies

- Incorporate design features like light shelves, clerestory windows, or atria to channel and distribute direct sunlight deeper into spaces.

Adjustable Lighting

- Use layered lighting with dimmable fixtures to allow residents to adjust brightness according to their needs and preferences.

Anti-Glare Solutions

- Use solar-controlled glazing, like insulated glass units, dual-pane low-emissivity glass, and/or install sun control window film to optimise daylight, minimise heat gain, and improve thermal efficiency. (AHK34)

RI: Ultraviolet Radiation
Sunlight's UV radiation has antimicrobial properties that help decontaminate surfaces like clothing and tables, and it boosts vitamin D production, which declines with age and supports recovery and immunity. However, these benefits are diminished when sunlight passes through window glass, which blocks the UV rays necessary for disinfection and vitamin D synthesis. (LIT06; LKW01; LUS17; LUS27)

屋企西斜得好緊要呀。窗開埋都焗㗎。大約三四點就最曬，開冷氣瞓覺，就唔坐得嗰張椅。估唔到佢熱到咁緊要，啲熱唔散嘅。

Since it faces the west, the house gets really hot and stuffy, even with the windows open. It's hottest at around 3 or 4 p.m., which is when I turn on the air-con and take a nap. I can't bear to sit in my chair in that heat. I didn't realise it would get so hot — it's relentless.

REHAB Basel by Herzog & de Meuron, © Katalin Deér

ALL

Natural Materials

○ Prioritise the use of natural materials, such as wood, for both exterior and interior design, as older adults generally prefer natural elements. (LSK01)

Glass Materials

○ Use non-reflective, matte glazing materials or films to minimise glare and reflections that may disorient older adults.

Visual Comfort

● High-Contrast Combinations: Prioritise high-contrast colour schemes in safety indicators and navigation aids to enhance communication and usability. However, use stark high-contrast colours sparingly, as they can be disorienting unless designated for the mentioned purposes.

● Avoid Pastel Colours: Avoid pastel colours that are difficult for individuals with low vision to see as they can appear faded and lack vitality. (AUS08)

● Avoid Intricate Patterns: Avoid intricate patterns, surfaces with high contrast, complex designs, irregular shapes, or strong directionality, which may lead to disorientation and visual discomfort, increasing the risks of falls. (IMAGE)

○ Consistent Colour Scheme: Ensure colour schemes are consistent throughout the Development to create a cohesive and harmonious environment that enhances familiarity and reduces confusion.

○ Lighting Considerations: Consider how different lighting conditions can influence colour appearance. Select colours that maintain their visual appeal and comfort across various lighting environments, including both natural daylight and artificial light sources.

FLOORINGS

Safety & Fall Prevention

● Slip-Resistant: Use materials with good friction, such as floor tiles with appropriate slip resistance, textured stone, rubber, or vinyl, to minimise slip risks, especially in wet conditions. While higher slip resistance may seem safer, overly rough surfaces can make cleaning and maintenance difficult and increase the risk of falls.

● Glare-Free: Use glare-reducing fixtures and materials, such as matt finished materials, to minimise

Busy flooring patterns should be avoided, particularly those with dark contrasts.

harsh reflections and enhance visual comfort for older adults.

● Low Maintenance: Select larger floor tiles over smaller ones, as fewer grout lines make the flooring more durable and easier to maintain, especially in damp areas where smaller tiles could become unstable over time.

○ Impact-Absorbing: Choose flooring with shock-absorbing capabilities to cushion falls and reduce impact forces.

○ Workmanship: Ensure flooring is levelled before laying the floor finish to avoid any bumps or uneven spots that can pose risks, especially for residents with mobility aids.

○ Smooth Transitions: Design smooth transitions between different flooring types to avoid abrupt changes that could create tripping hazards, especially in areas where mobility aids are used.

○ Avoid Carpets: Avoid carpets, as they hinder infection control and movable options increase the risk of falls.

Visual Comfort

○ Depth Perception: Avoid dark floor patches that could be misinterpreted as holes, as weakened depth perception in ageing eyes may cause confusion.

WALLS

Round Corners

○ Round outer wall corners with a minimum 20mm radius for the ease of manoeuvring and to minimise the potential for harmful collisions and injuries, as older adults have a narrower field of vision. (ACN01; ASG08)

Colour Contrast

○ Enhance Visibility: Use contrasting colours to clearly define different elements, such as doorframes, windows, and furniture. Avoid overly high contrast within the same surface area to prevent mistaken depth perception. (AIE01)

○ Reduce Eye Strain: Use warmer, brighter colours to minimise the contrast between solar glare and walls. (AHK02; AUS05)

DOORS

Door Operating Force

○ Equip doors with closing devices that ensure a maximum horizontal force of no more than 20 newtons (N) for any manual doors (approximately 4.5 pounds) to avoid heavy door operation for older adults.

Sliding Doors/Screens

● Level Bottom Track: Ensure that sliding doors are securely installed, with a bottom track, to prevent any swaying when residents lean against them. The bottom track should be level with the surrounding floor to avoid tripping hazards.

○ Clear Visual Markers: Add tintings, frittings, frostings, or markings across glass doors, or at least a portion extending from 900-1500mm above floor level, to provide visual alerts.

Door Handles

○ Avoid Knob-Style Design: Avoid round, knob-style door handles, as they can be difficult for seniors to grip and turn.

● D-Shaped or Lever-Style Handles: Opt for D-shaped or lever-style handles that can be operated with a simple pushing or pulling motion.

○ Rounded Edges: Ensure lever handles have rounded edges to avoid sharp corners.

○ Accessible Height: Position door handles at an accessible height of approximately 1000mm above the floor for easy reach by both standing and seated users.

WINDOWS

Operable Windows

○ Window Restrictors: Install window restrictors to limit the maximum opening width of 100mm, to provide controlled ventilation and prevent break-ins at night

Home for Senior Citizens by Peter Zumthor. © Ivó Stani

or accidental falls, including for individuals who may have a temporary or permanently confused mental state caused by medication or cognitive impairment. (AGB19; AUS23)

● Lever-Style Handles: Use lever-style handles to enable easy one-handed operation without tight grasping or wrist twisting.

Glare Reduction

● Anti-Glare: Use anti-glare materials or films on the glazing to help avoid discomfort to the eyes, especially for unwanted reflections from the surroundings.

○ Diffuser for Skylight: If a skylight is included, incorporate a diffuser or other design measures to manage light transmission.

RI: Avoid Hard Flooring
Avoid using hard flooring like natural stone, ceramic, and porcelain tiles in external areas, as they can become dangerously slippery when wet, even when they are textured. (LTW09)

RI: Nature-Infused Design
Incorporating natural elements and artistic representations into the interior design of older adults' living facilities fosters a humanistic atmosphere that enhances aesthetic appeal and comfort while counterbalancing high-technology environments. Research in environmental psychology reveals that biophilic design not only promotes positive emotions and reduces stress through our innate connections to nature, but also supports cognitive health by improving memory and potentially mitigating the risks of cognitive impairment in older adults. (LBE01; LGB03)

FURNITURE

Safety Features

- Sturdy Construction: Ensure that furniture, such as tables and chairs, is robust and steady, utilising reinforced construction with wider bases and secure anchoring to minimise the risk of tipping, and assist older adults when sitting down or standing up.

- Rounded Corners: Incorporate rounded corners on furniture or install corner guards to minimise the risk of accidental injuries, particularly important for older adults who may be more vulnerable after falls. (ASG08)

Local Craftsmanship

- Use local artisans and craftsmen to create design elements that reflect the community's cultural heritage. This could include murals, sculptures, or handcrafted furniture that celebrate local artistry and traditions.

☒ Bad Example

✓ Good Example

LIGHTING

Illuminance (Lux)

- Increased Lighting Levels: Older adults require 50% higher lighting levels than younger people due to age-related changes like thickening corneas, weakening muscles, and decreasing pupil size, which reduce light entering the eye. (AGB16; LUS35)

- Layered and Optimal Lighting: Use multiple light sources instead of relying on a single fixture. Position lights close together to illuminate from various directions, softening shadows and enhancing visibility. Indirect lighting should be placed out of direct line of sight, focusing light on walls, ceilings, and floors to enhance overall illumination and reduce glare. (AUS05; AUS17)

| 1000K | 2000K | 3000K | 4000K | 5000K | 6000K | 7000K | 8000K | 9000K | 10000K |

Warm light   Cold light
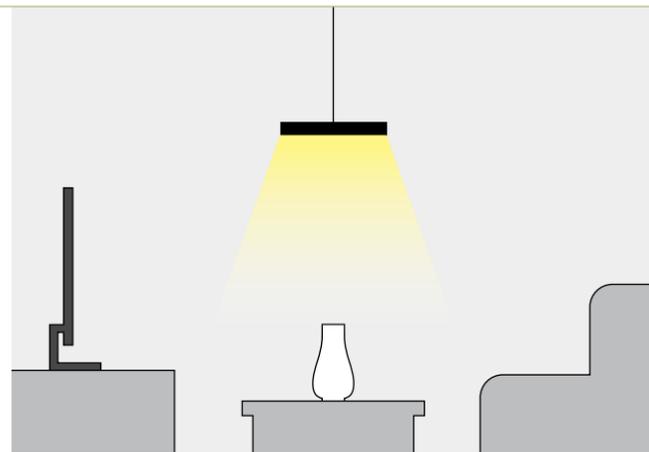
- Upward-Facing Fixtures: Use fixtures with indirect light sources, such as light troughs, that direct light upwards to wash the ceiling with illumination. This approach helps older adults better perceive the space, particularly in areas where the floor may be cluttered. (IMAGE)

- Avoid Glare: Ensure a comfortable visual environment by avoiding strong, direct lighting that creates harsh reflections and deep shadows, as this can be visually distracting and disorienting for older adults. Glare may cause issues, including reduced contrast sensitivity, increased light sensitivity, difficulty with depth perception, visual fatigue, a higher risk of falls, and headaches. (AHK02)

- Task Lighting: Provide focused lighting in areas for reading, cooking, and other activities to support residents' daily tasks and enhance safety.

Correlated Colour Temperature (CCT)

- Warmer Light for Comfort: Use warm white light (2700–3000K) in recreational areas to create a cozy atmosphere that promotes relaxation and well-being. (DIAGRAM)

- Cooler Light for Activity Areas: Incorporate cooler white light (4000–5000K) in activity areas, such as Kitchens and workspaces, to enhance alertness and productivity.

- Adjustable Lighting: Implement adjustable lighting systems that allow residents to choose their preferred CCT based on activity and personal preference.

Colour Rendering Index (CRI)

- High CRI for True Colour Representation: Use light sources with a CRI of 90 or above to ensure that colours are rendered accurately, which is particularly important for tasks like cooking, dressing, and social interaction. LED lighting generally offers higher CRI options, providing better colour accuracy.

- Consideration for Material Selection: Select materials and finishes that complement high-CRI lighting, enhancing the aesthetic appeal and visual clarity of the environment.

- Natural Light Integration: Maximise natural light to enhance CRI and create a vibrant atmosphere. Daylight has a CRI value of around 100, rendering colours accurately.

RI: Mood-Regulating Lighting
Research shows that lighting significantly affects the mood of older adults. Cozy environments with orange accent lights, 120 lux illuminance, and 2700K colour temperature reduce anxiety, while activating settings with cyan lights, 325 lux, and 4000K temperature can increase arousal level in older adults. This highlights the strong link between lighting and emotional well-being. (LNL07)

HT: Colour Rendering Index (CRI)
Higher-quality lighting with a good CRI enhances visual acuity, which is crucial for older adults who may experience decreased vision sharpness. Improved lighting aids in accurate colour representation and increases contrast sensitivity, allowing individuals to better distinguish objects and details. This leads to easier task performance and greater confidence in navigating their home environment.
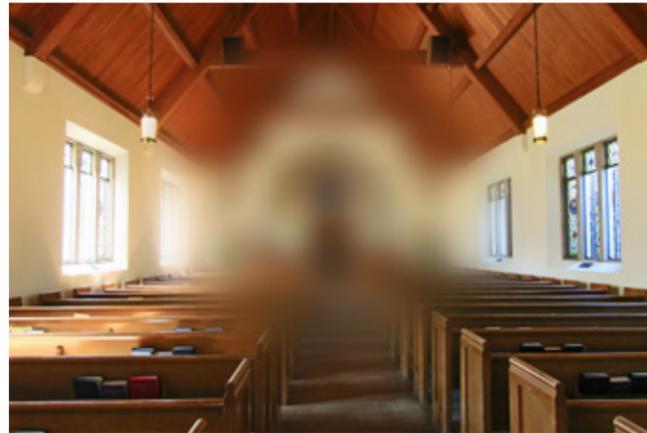
Macular Degeneration

Glaucoma

Diabetic Reinopathy

Retinitis Pigmentosa

Cataracts

Note: Simulations of the same scene as viewed by persons with various age-related visual impairments.

HVAC & WATER

Effective Ventilation

○ Even Air Distribution: When implementing mechanical ventilation, ensure the air supply is evenly distributed rather than directed at occupants. This creates a draft-free environment, which is crucial for older adults who are more sensitive to strong air currents, as direct airflow can cause discomfort and chills.

○ Prioritise Fresh Air Intake: Ensure the ventilation system prioritises fresh air intake over recirculation to maintain indoor air quality, humidity, and prevent cross-contamination.

Equipment Selection & Controls

● Cost Considerations: Consider both initial costs and the long-term operating and maintenance expenses to provide a cost-effective solution for the residents.

○ Simple Maintenance: Select systems with simple maintenance and component replacement.

○ Regular Maintenance Schedule: Establish and adhere to a regular maintenance schedule to ensure HVAC systems continue to operate efficiently and effectively. This includes changing filters, cleaning ducts, and checking system components.

○ Energy-Saving: Choose energy-saving HVAC systems to reduce operating expenses.

○ User Interface: Incorporate a monitoring and climate control interface that allows occupants to customise temperature and humidity.

○ Individual Room Control: Allow individual room temperature and humidity control to accommodate varying comfort preferences and usage patterns.

IoT PLANNING

Structural & Electrical Considerations

○ Concealed Wiring and Electrical Outlets: Design the structure to incorporate electrical outlets for the potential installation of gerontechnology, such as ceiling-mounted fall detectors and wall-mounted emergency bells. Use hidden wiring and conduits within the walls for a recessed, seamless appearance, enhancing aesthetics and improving safety by preventing loose wiring or protruding devices.

○ Mounting Points and Accessibility: Incorporate secure mounting points, such as wall brackets or reinforced ceiling structures, for IoT equipment. Strategically plan the placement of these devices to ensure they are easily accessible for older adults, considering their reach and mobility.

○ Pre-Wiring and Network Access: Install necessary connections and access points for future IoT integration during construction, ensuring consistent Internet connectivity across the development by providing network access points and data ports in strategic locations.

○ Electrical Capacity and Redundancy: Include additional electrical circuits and outlets to meet the power demands of IoT devices, ensuring adequate capacity and redundancy for future needs.

Network Considerations

● Stable Connectivity: Ensure stable high-speed internet provision, Global Positioning System (GPS), and Radio Frequency Identification Technology (RFID) are provided throughout the whole Development to support the installation and use of gerontechnology, as well as continuous learning in older adults.

Related Services in Operational Checklist

Daily Assistance

→ General Enquiries & Assistance

Overall Operations

→ Facility Management
→ Incident Management
→ Information Management
→ IoT Integration
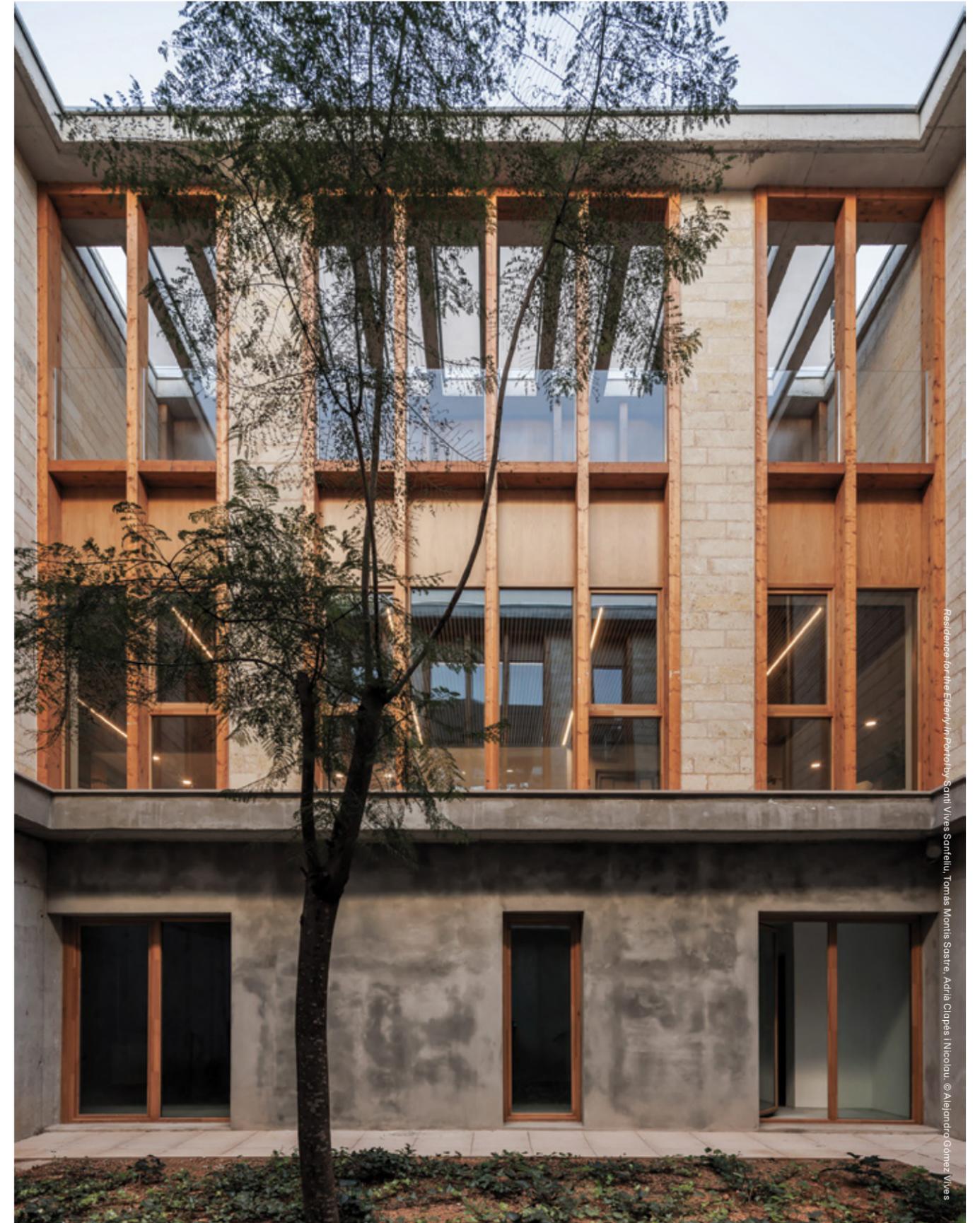
Dwelling

Residence for the Elderly in Porto by Santi Vives Sanfeliu, Tomàs Montis Sastre, Adrià Ciapés i Nicolau. © Alejandro Gómez Vives

The Dwelling should be thoughtfully designed to foster a deep sense of home and peace of mind for older adults. Careful planning is vital for safety and encourages movement and freedom, creating an adaptive and restorative environment that facilitates autonomy and supports ageing-in-place. Everyday tasks such as cooking, cleaning, and gardening are valuable physical activities that should be encouraged, promoting both physical and cognitive functions, contributing to a healthy lifestyle, and enhancing independence.

KITCHEN

DINING
AREA

Ø 1500 (1200)

WASHROOM

950 (850)

WASHROOM

950 (850)

1050 (950)

950 (850)

(3000)

(2000)

950 (850)

(750)

LIVING
AREA

(2000)

BEDROOM

BEDROOM

(750)

BALCONY

Fig.5a Conceptual Diagram for Dwellings

Space Planning   Materials & Finishes   Fixtures & Fittings   Mechanical & Electrical

Fig.5b Structural Walls in Dwellings
Fig.5c Corridor Door Arrangement for
        Continuous Grab Rails in Dwellings
Fig.5d Cross Ventilation in Dwellings

Fig.5b

Structural Wall
Partition Wall

KITCHEN
DINING AREA
WASHROOM
WASHROOM
LIVING AREA
BEDROOM
BEDROOM
BALCONY

Fig.5c

KITCHEN
DINING AREA
WASHROOM
WASHROOM
LIVING AREA
BEDROOM
BEDROOM
BALCONY

Fig.5d

KITCHEN
DINING AREA
WASHROOM
WASHROOM
LIVING AREA
BEDROOM
BEDROOM
BALCONY

如果向前仆呢就有門口扶下，一出到房嘅門口我就有個鞋櫃，又可以扶住。隻手一攤過去就係浴室嗰埲牆，另一隻手就可以摸到浴室個門框。即係無論你點跌都好啦，隻手都可以有嘢扶下。

If I fall forwards, I can hold onto the doorframe. Walking past the door, I can hold onto the shoe cabinet. Reach out and there's the Washroom wall, and the doorframe on the other side. Whichever way I fall, there's always something to hold onto.
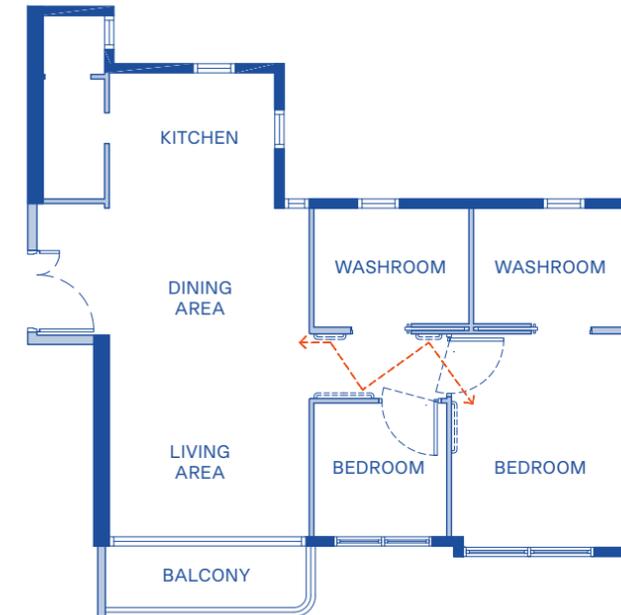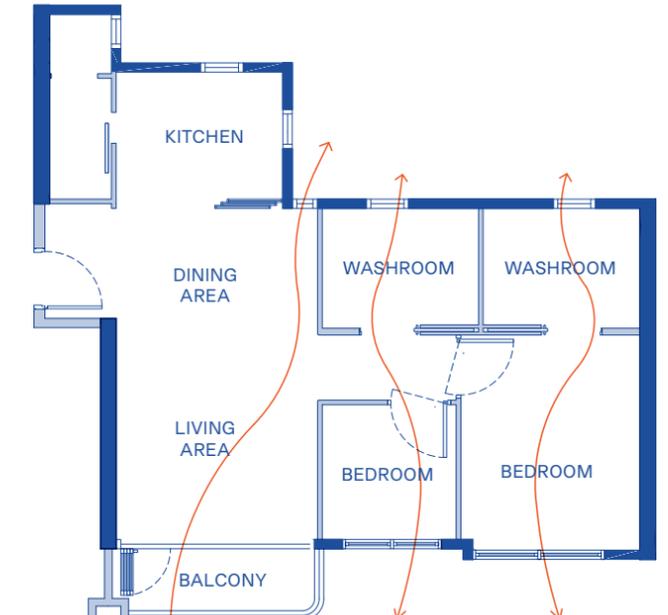
INTERNAL AREA

Layouts
- Open Plan: Design load-bearing walls at the perimeter to allow for future modifications without structural changes. (Fig.5b)
- Corridor-Free Design: Prioritise plans without corridors to facilitate easy manoeuvring, especially for those with mobility aids.

Optimised Visual & Physical Connection
- Prioritise full height glazed walls or doors to maximise visual and physical transparency between key areas to promote openness, peace of mind, and social engagement.

Corridor Wall Space
- Position the door opening to enable the potential installation of continuous grab rail support along the corridor wall. Ensure that users can easily reach the opposite side, ideally within arm's reach, even when the rail is interrupted by a door. (Fig.5c)
→ Dwelling/General/Materials & Finishes/Walls

Dual Aspect Design
- Opt for a dual aspect home design with operable windows on two opposite walls to maximise daylight, ventilation, and adaptability. (Fig.5d)

Ample Storage
- Provide built-in storage to avoid clutter at home, which can pose fall risks.

熱到三十幾度，真係頂唔順嗰時先開冷氣，如果唔係我開風扇都夠，同埋我呢隻窗都好夠風嘅。

I only turn the air-con on when it's 30 something degrees and I can no longer stand the heat. Otherwise, the fan is enough. This window helps, allowing a cooling breeze inside.

ACCESSIBLE ROUTE

Manoeuvring Space

- Provide a turning circle of diameter 1500mm (min. 1200mm) in all functional areas. (Fig.3)

Step-Free Access

- Ensure no raised thresholds or gaps to reduce trip hazards and maintain level floor throughout.

Corridors

- Provide a clear width of 1050mm (min. 950mm) allowing manoeuvring space for mobility aids, with potential for grab rails on both sides. (Fig.1a)

Doors

- Clear Opening Width: Ensure a clear door opening width of 950mm (min. 850mm), ideally with an additional minimum 350mm nip to the leading edge of the door to facilitate easy access and manoeuvrability, particularly for those using mobility aids.

- Discount Door Leaves: For sliding doors, exclude the door leaf protrusion from the clear width. (Fig.6)

Stairs

- Allow for stair lift installation options if needed.
→ Main Circulation Route/Exercise Stairs

AIR

General

- Enhanced cross-ventilation mitigates heat-related risks and improves air quality, vital for older adults with age-related conditions.

High Ceiling Height

- Prioritise high ceilings to increase air volume, improve ventilation, and create better spatial perception.

(IoT) Air Quality Monitors

- Install monitors at breathing heights (1000–1300mm) to detect indoor air contaminants and prompt increased ventilation if needed. (Fig.8) (AUS15)

→ General Recommendations/Space Planning/Air

LIGHT, VIEW & SOUND

Principal Windows (Fig.7)

- Provide principal windows in the Living Area and Bedroom with unobstructed views from both seated and standing positions.

- Locate the window sill at a maximum of 800mm above floor level for a good, seated view and extend the window height to at least 1800mm for standing views.

- Incorporate appropriate safety barriers as needed.

Shading Devices

- Select window types and shading to manage glare and heat while allowing direct sunlight:

  - East- and West-Facing: Use vertical elements, like adjustable vertical fins with proper spacing. (AHK34)

  - South-Facing: Incorporate horizontal overhangs and additional vertical shading for southeast or southwest windows. (AHK34)

Greenery & Landscaping

- Prioritise garden or nature views, which benefit cognitive function, sensory experience, well-being, and mental health.

Street Views

- Avoid busy street views, as they reduce satisfaction with surroundings.

Visual Cues

- Incorporate elements like greenery, flowers, architectural features, wildlife, water, and seasonal changes to evoke positive emotions.(ACH01; LAU05; LUS12; LUS13)

→ General Recommendations/Space Planning/Light

DOOR CLOSED

950 (850) Clear   (150)
(50)   (50)
(50)

DOOR OPENED

Fig.6
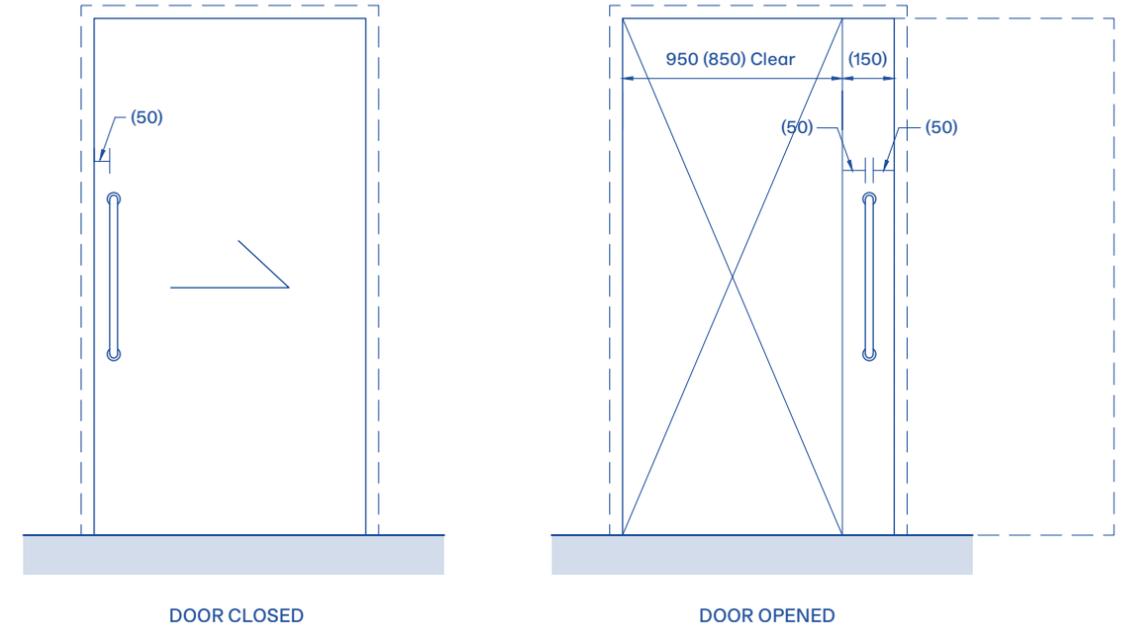
HT: Humidity Control
Maintaining optimal humidity prevents discomfort, respiratory issues, mould, and dry skin. (LNZ03)

RI: Ultraviolet Radiation
Sunlight's UV radiation has antimicrobial properties that help decontaminate surfaces like clothing and tables, and it boosts vitamin D production, which declines with age and supports recovery and immunity. However, these benefits are diminished when sunlight passes through window glass, which blocks the UV rays necessary for disinfection and vitamin D synthesis. (LIT06; LKW01; LUS17; LUS27)

RI: Benefits of Nature Views
Views of nature significantly enhance the well-being of older adults, who often spend more time at home. Natural views alleviate feelings of confinement, improve concentration, and reduce mental exhaustion and tension. Research shows that such views are linked to physiological benefits, including lower blood pressure and cortisol levels, which promote cardiovascular health. Additionally, engaging views help older adults feel connected to their community, compensating for limited mobility and fostering social engagement. Familiar neighbourhood views can also trigger memories, enhancing life satisfaction and self-esteem. (AAU19; ACH01; LCA02; LDK01; LGB03; LSG01; LUS20)

Fig.7

800–(1800) / Unobstructed view

Max. 800 Window sill height

Fig.6   Clear Opening Width of Sliding Doors
Fig.7   Principal Windows in Dwellings
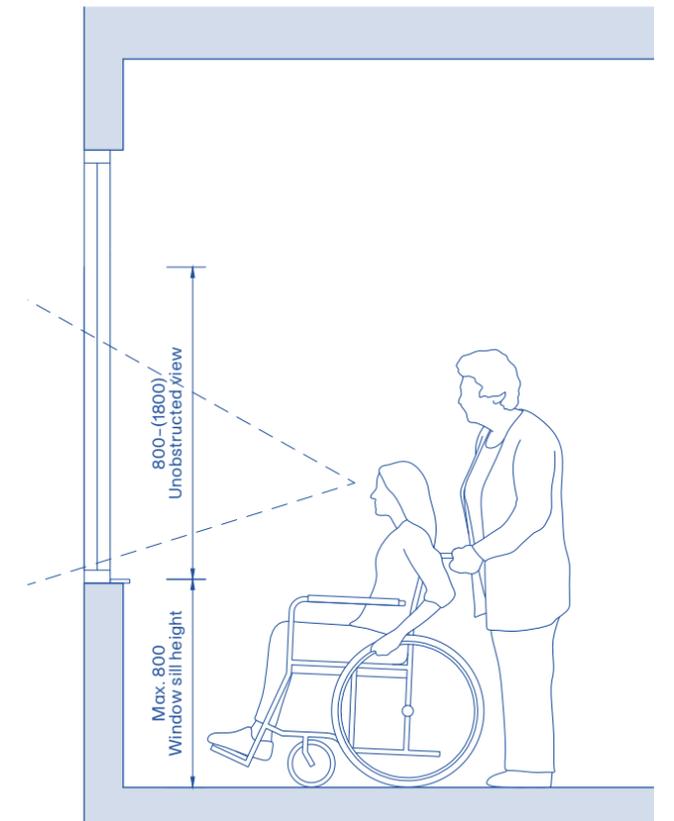
ALL

Colour Contrast

○ Use contrasting floor and wall colours for better spatial perception. Lighter tones with matte finishes and a light reflectance value of 60-80% is preferred for walls to improve lighting and reduce glare.

Anti-Mould Coating

● Apply anti-mould coatings to walls and ceilings to minimise microorganism growth.

Low VOCs

○ Adopt low-emitting and low volatile organic compound (VOC) building and furnishing materials to avoid indoor air pollution. (AHK02; AHK10)

→ General Recommendations/Materials & Finishes/All

FLOORINGS

Safety & Fall Prevention

○ Use waterproof, stain-resistant flooring and avoid slippery surfaces like polished stone and glossy porcelain.

Acoustics

○ Utilise acoustic underlays to reduce noise from inter-floor movement, water supply, and drainage.(AGB09; AHK26; LGB04)

→ General Recommendations/Materials & Finishes/ Floorings

WALLS

Avoid Reflections

● Avoid reflective materials like mirrors to prevent disorientation for those with visual or cognitive difficulties.

Sound Insulation

○ Incorporate sound insulation to minimise noise between Dwellings. (AHK26)

Adaptable Zones for Potential Installation of Grab Rails

● Needs Basis: Provide grab rail installations on a needs basis, consulting practitioners like occupational therapists.

● Horizontal Zones: To achieve the flexibility, reserve 'Adaptable Zones' on all walls within the Dwelling, between 750–1000mm above floor level, for potential installation of grab rails. (Fig.8)

● Vertical Zones: Extend the 'Adaptable Zones' next to the door frame of the opening edge between 750–1500mm above floor level, with a minimum width 150mm from the frame, for potential installation of vertical grab rails. (Fig.8)

○ Structural Requirements: Ensure the Zones are free of wires and pipes and have sufficient structural strength to support up to 150kg (1.5kN). (AAU05; AHK01; AHK06_6A)

Grab Rail Installation

● Nailed-in Grab Rails: Opt for grab rails that are nailed into the wall, as they are sturdier than suction-based options, even for temporary use.

● Continuous, Level Grab Rails: Ensure the grab rails are level and provide continuous, uninterrupted horizontal support along the walls to assist residents with exercising, rehabilitation, and walking.

● Avoid Disconnected Grab Rails: Avoid using short, disconnected segments of grab rails with gaps in between, as this can increase the risk of falls.

→ General Recommendations/Materials & Finishes/Walls

DOORS

Door Type

● Ensure all doors are operable from both sides, allowing quick emergency access via 'rescue hardware' for bi-directional swing doors. (DIAGRAM)

Sliding or Folding Doors

● Choose sliding or folding doors, as the horizontal motion is more accessible for users with mobility aids. Bi-directional swing doors are acceptable when sliding or folding doors are not practical.

Normal door swing

Emergency door swing
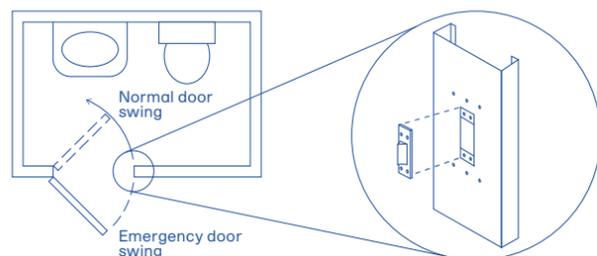
Fig.8   Recommended Heights for Utility Installations in Dwellings

1300
1000
750
450

Switches, door bells, thermostats, etc.

'Adaptable Zone' for grab rails (the shaded zone)

Sockets

Emergency call bells, night lights

(150)
1500
750
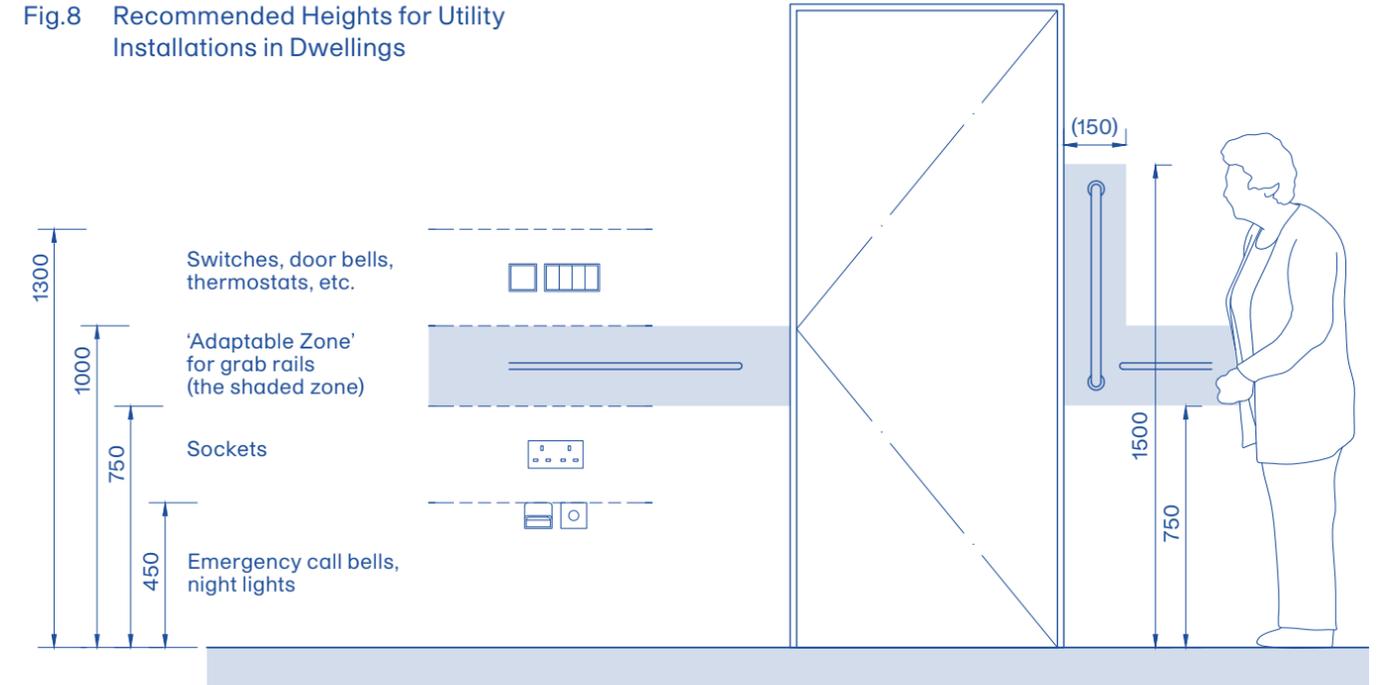
○ Wall Pockets: Plan sliding doors with wall pockets to allow potential grab rail installation on outer walls.

● Clearance from Door Frame: Ensure a minimum 50mm grip space on both sides of the vertical grab rails from the door frame. (Fig.6)

→ General Recommendations/Materials & Finishes/ Doors

WINDOWS

Acoustic Windows

○ Use acoustic windows and weather stripping to minimise external noise infiltration, such as traffic near highways and airports.

Thermal Comfort

→ General Recommendations/Space Planning/Light/ Anti-Glare Solutions

Externally Mounted Openers

○ Consider installing externally mounted mechanical or electrical window openers, such as chained actuators, for windows that are out of reach for older adults. (DIAGRAM)

→ General Recommendations/Materials & Finishes/ Windows
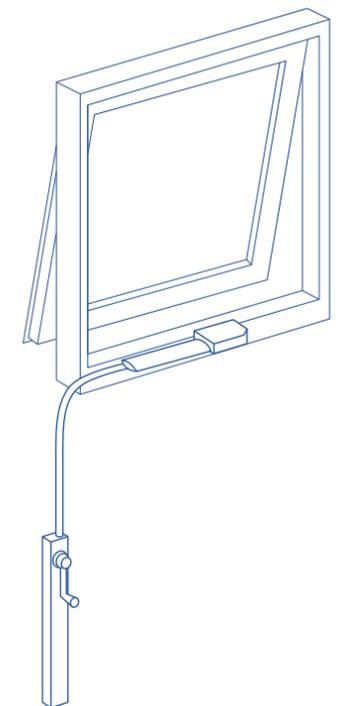
RI: Volatile Organic Compounds (VOCs)
VOCs are commonly found in interior furnishings and finishes like glues, laminates, and carpets. Maintaining clean indoor air quality is essential for older residents, who are especially vulnerable to air pollutants due to age-related health issues such as compromised respiratory function, weakened immune systems, and a higher prevalence of chronic diseases. (AHK21; LHK13)
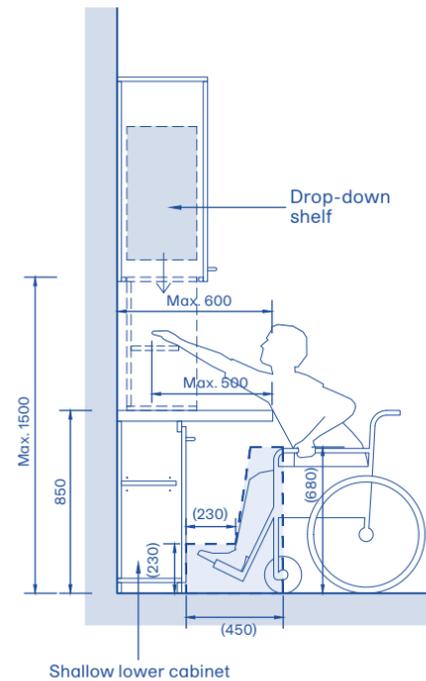
DROP-DOWN UPPER SHELF
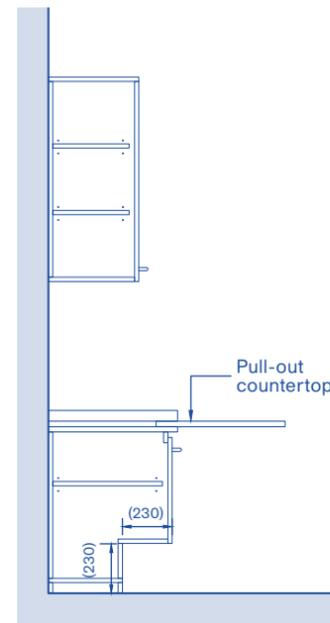
PULL-OUT COUNTERTOP
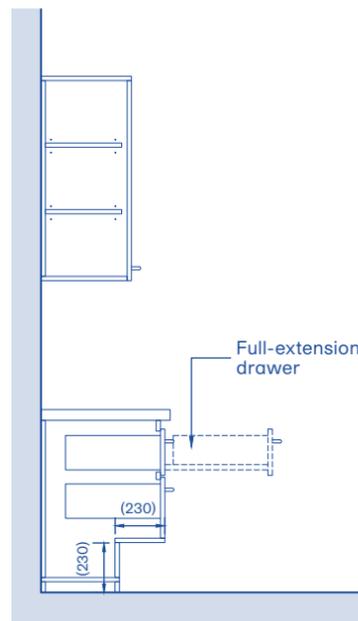
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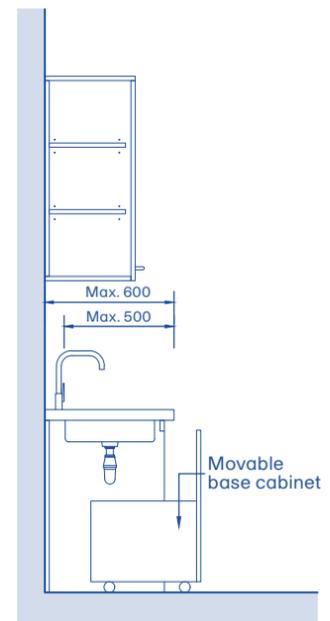
MOVABLE BASE CABINET

Fig.9   Types & Dimensions of Countertops & Storage in Dwellings

STORAGE

General

- Safety: Use open shelves, sliding doors, and soft-close mechanisms to prevent injury. Opt for light-weight doors with rounded corners.

- Depth: Limit the depth of storage to a maximum of 600mm and opt for full-extension drawers to ensure easy access and visibility. (Fig.9)

- Toe Space: For base cabinets, include toe spaces of at least 230mm high and 230mm deep to accommodate seated users. (Fig.9)

Hanging Cabinets

- Accessible Height: The cabinet bottom should be 1450mm above floor level or lowered to make it more accessible for users of all ages. (Fig.9)

- Adjustable Portion: Include a portion of the cabinet to extend the height from cabinet to countertop level, such as drop-down shelves and motorised vertical lift, for easy access by seated users. (Fig.9)

- Glass Doors: Opt for glass doors with good transparency to increase visibility for overhead storage.

Frequent Access Zone

- Position frequently accessed storage areas between 450–1450mm for ease of use, reserving higher or lower areas for less frequently used items. (Fig.15 & 18)

Movable Base Cabinets

- When legroom is not needed, provide movable base cabinets on smooth rollers with a safety lock for extra storage and flexibility. (Fig.9)

Cabinet Handles

→ General Recommendations/Materials & Finishes/Doors/Door Handles

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
200 lux	3000K
	2700–5000K (Tuneable Fixtures)

廚房嘅收納空間唔夠，只可以向高發展，但每次要爬櫈就好危險。

There isn't enough storage space in the kitchen, so we have to store things higher up on the walls. It's not safe clambering up every time you need something.

Visual Mock-Ups

- Conduct visual mock-ups during the design phase to evaluate the lighting levels, colour temperature, room surface reflectance, and natural daylight interaction in key living spaces.

Multiple Light Sources

- Establish a relaxing ambience by using multiple light sources, such as allowing light setting of a low illuminance of around 120 lux and a warm colour temperature of 2700K.

Product Selection

- Accessibility & Replacement: Ensure the lighting fittings and types are easily available in the mass market and can be easily replaced by residents themselves.

- Energy Efficiency: Select energy-saving lighting options with low operating costs.

- Appropriate Lighting Characteristics: Provide the appropriate luminance, CCT, and CRI, and consider allowing for user customisation when feasible. Choose flicker-free lighting to avoid eye strain after long exposure.

- Avoid Yellowish Tones: Avoid lighting types that emit a yellowish tone, such as incandescent light bulbs.

→ General Recommendations/Materials & Finishes/Lighting

因為太太嘅健康問題令佢對冷熱唔太敏感，好容易受傷，反應遲鈍。所以我認為沖涼前檢查溫度並親自試水溫好重要。

Her health issues mean my wife can't feel hot and cold in the same way we do. That's why it's important for me to check the temperate myself before she bathes.

LIGHTING CONTROLS

Tuneable Lighting

○ Adjustable Fixtures: Incorporate lighting fixtures that allow adjustable illuminance (in lux) and colour temperature (in K) to accommodate various needs throughout the Dwelling.

○ (IoT) Smart Lighting: Consider a smart lighting system that automatically regulates home lighting according to daylight level.

Controls Position

● Accessible Height: Locate lighting controls between 1000–1300mm above floor level to ensure easy access as body conditions such as vision and height change over an individual's lifetime. (Fig.8) (AGB16)

● Location: Position the lighting controls preceding space entrances to facilitate easy access to an already illuminated space for a better transition for the eyes. (AUS17)

Large, Intuitive Switches

○ Rocker Switches: Use large rocker switches for ease of turning on/off light. (AIE01; ASG03)

○ Dimming Controls: Where appropriate, dimming controls should be considered.

Indicate Switch Status

○ If two-way switches are used, the switch should indicate if it is already in an ON or OFF status.

(IoT) Remote Control Options

○ Incorporate voice-activated or touch-controlled remote lighting options via phone applications. (LIN03)

HVAC & WATER

(IoT) Thermostats

● Installation: Consider installing a thermostats to maintain a constant ambient temperature automatically by connecting it to HVAC units. This helps prevent heat-related illnesses in older adults with weakened temperature regulation. (AUS18; AUS34; LCA07)

● Optimal Height: Place smart thermostats mid-height of the room, 1000–1300mm above floor level. (Fig.8) (LCA07)

● Avoid Heat Sources: Position them away from heat sources for accurate indoor temperature readings. (LCA07; LGB11)

(IoT) Thermostatic Water System

● Install a thermostatic water system which allows precise control over maximum water temperature. Older adults may have a decreased sensitivity to hot temperatures, making them more susceptible to accidental scalding. (LUS09)

(IoT) Humidity Control

○ Installation: Consider installing a humidity control system connected to the HVAC system to detect and regulate indoor moisture levels. (LCH05)

○ Optimal Humidity: Maintain humidity between 40–60% to protect older adults' health, as high humidity can cause discomfort and heat-related illnesses. (LCH01)

→ General Recommendations/Mechanical & Electrical/ HVAC & Water

SWITCHES & SOCKETS

Placement & Reach

● Optimal Height: Position switches or sockets within the height range of 450–750mm, and 1000–1300mm above floor level to accommodate varying user needs. (Fig.8)

○ Ample Outlets: Provide ample electrical outlets to minimise the need for extension cords across circulation space, reducing trip risks.

● Double Sockets: Provide at least one double socket on each accessible wall in the Living Area, Kitchen, and Bedrooms.

○ Even Distribution: Distribute switches and sockets across different spaces and within spaces to avoid overcrowding.

○ Accessibility: Avoid concealing components with covers, or within cabinets or wardrobes to keep them openly accessible.

Visual Cues & Contrast

○ Large, Colour-Coded: Utilise large, colour-coded push buttons or rocker switches to clearly indicate on/off status.

○ High Contrast: Ensure switch and/or socket plates have high visual contrast against the wall and have legible labels.

IoT ITEMS

Planning

→ General Recommendations/Mechanical & Electrical/ IoT Planning

EMERGENCY CALL BELLS

General

● Reachable: At least provide call bells below 450mm from floor level to enable reachability by a person lying on the floor. (Fig.8)

● Waterproof: The call bells should be activated with waterproof push buttons or pull cords.

● High Contrast: They should be in a high-contrast colour against the background for easy identification.

● Voice-Activated: Explore the use of voice activation for emergency calls to prevent situations where call bells are out of reach.

Call System Integration

● Centralised: Consider connecting emergency call bells bell to a centralised monitoring and response system within the Housing Development.

● Integration with Nurse and Security: Consider integrating the call system with predetermined persons, such as care coordinators and/or caregivers, to enable immediate notification and response by staff as needed.

Sensory Indicators

● Alert Location: Incorporate both visual and auditory indicators at the call button and the central monitoring station to provide clear alerts.

● Accessibility: Use flashing lights, loud alarms, or vibration to ensure the call is noticed, especially for residents with sensory decline. (AAU20_3)

FALL DETECTION SYSTEM

○ Consider installing a fall detection system to automatically call for immediate help in the event of a fall.

○ Accuracy: Consider adopting LiDAR technology to reduce the occurrences of false alarms and preserve privacy. (AHK07; LIT04)

○ Predefined Recipients: Alerts should be sent to predetermined persons, such as care coordinators and/ or caregivers, without manual activation.

○ AI Integration: Consider integrating artificial intelligence to further enhance the robustness of detection and enable timely assistance for older adults after falling accidents. (LIQ01; LTW03)

OCCUPANCY SENSORS

○ Inactivity Detection: Consider incorporating occupancy sensors to detect inactivity within flat, which may be an indication of unconsciousness. (LDE02)

○ Appliance Integration: Since daily routines of older adults are very stable, activities of daily living can serve as indicators of hidden accidents. Sensors should be equipped with corresponding appliances to detect the presence of human activity.

○ Follow-up Protocols: Abnormal periods of inactivity should be followed up by predetermined persons in case of unreported emergencies.

RI: Thermal Comfort
Maintaining optimal temperature and humidity is crucial for the comfort and well-being of older adults, who are particularly vulnerable to extreme temperatures due to age-related physiological changes. They often struggle with thermoregulation and sweat response, increasing their risk of heat stress and dehydration, especially if they have chronic conditions like heart or lung disease. The ideal indoor temperature for seniors typically ranges from 20°C to 25°C, with humidity levels between 45% and 60% recommended to prevent discomfort and skin issues. Proper management of these environmental factors supports their daily activities and restful sleep, ensuring a safe living space. (AUS34; AUS35; LCN09; LCN10; LJP01)

The Entrance Vestibule should offer residents a warm welcome as they return home. As a transition space, it should prioritise comfort, privacy, hygiene, and well-being, creating a soothing atmosphere. The layout should foster a sense of rituality and familiarity, helping residents glide smoothly from common to private areas, reinforcing their connection to home.

EXTERNAL RELATIONSHIPS

General

- Outside the Entrance Door: Design the space to enhance hygiene, convenience, and personalisation, supporting the independence of older adults.

- Inside the Entrance Door: Focus on privacy and comfort, creating a smooth transition that fosters an intimate, welcoming atmosphere.

Personalised Entrance

- Include a customisable ledge or design feature outside the Entrance, where residents can display personal items, enhancing aesthetics and orientation.

INTERNAL AREA

Entrance Vestibule

- Transitional Space: Incorporate a vestibule as a buffer between the Entrance and Living & Dining Areas, reducing noise transmission.

- Zonal Demarcation: Demarcate the vestibule as a dirty zone by choosing visually distinct flooring that is also antibacterial and easy to clean, promoting hygiene and mitigating contamination risks for effective infection control.
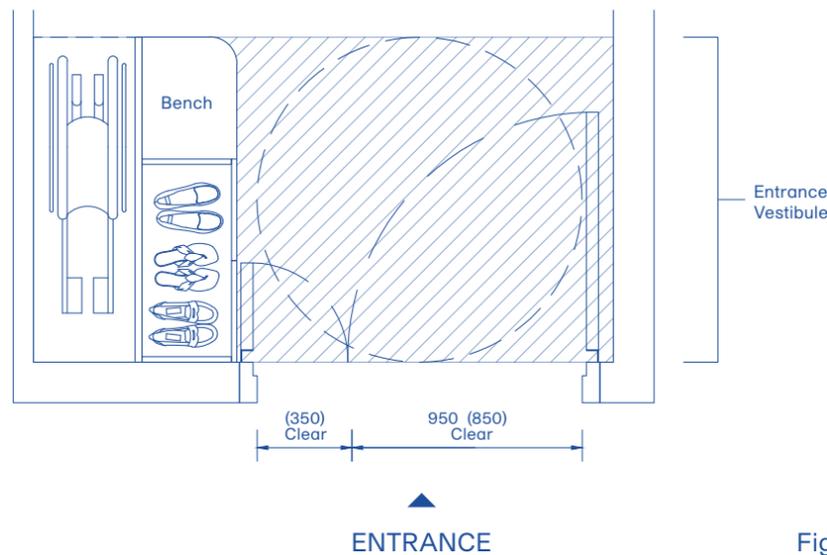
ACCESSIBLE ROUTE

Manoeuvring Space

- Ensure a minimum clear opening width of 950mm (min. 850mm) for easy access, ideally with an additional 350mm for double-leaf doors to accommodate mobility aids and stretcher beds. (Fig.10)

Step-Free Access

- Ensure no raised thresholds and indented gaps between the Dwelling and Communal Area to reduce trip hazards and maintain level floor throughout.

RI: Personalisation for Wayfinding
Featuring personal items rather than displaying distinctive but non-personal items outside rooms of people with cognitive decline is a more effective aid for orientation. (AAU07_1; AGB28)

RI: Infection Control
The Dwelling Entrance serves as a welcoming transition space, shaping first impressions of the home. A well-designed entrance should evoke comfort and privacy, clearly separating indoor living from the outside. Given that older adults may be at higher risk for infections, maintaining cleanliness is essential. Designating separate clean and dirty zones, such as through shoe removal, emphasises hygiene—especially important in the post-COVID era. Incorporating disinfection and health screening facilities, like hand sanitizers and temperature checks, can help reduce the risk of infection transmission from the exterior. (LID03; LIN02; LNL05_9; LSE02)

Bench

(350)
Clear

950 (850)
Clear

Entrance
Vestibule

▲
ENTRANCE

Fig.10   Space Planning for Dwelling Entrances

FLOORINGS

→ Dwelling/Entrance/Space Planning/Internal Area/ Zonal Demarcation

DOORS

Door Type

○ Choose one-sided swing doors.

Acoustics

○ Soundproofing: Opt for solid-core doors to contain noise.

● Noise Barrier: Add door seals at the bottom to block noise, dust, and insects from the Communal Area.

Door Closers

○ Install door closers with a delayed action function to enhance comfort and safety for older adults, particularly those with mobility aids, when entering or exiting their Dwelling.

Door Locks

○ Manual Locks: Opt for manual locks to avoid issues with battery-operated electronic locks.

● Avoid Fingerprint Locks: Avoid electronic locks with fingerprint access, as older adults may face fingerprint degradation due to reduced skin elasticity.

Door Viewers (Fig.11)

● Height Accommodation: Install door viewers at two height levels, 1100mm and 1500mm, to suit both standing and seated older adults using mobility aids.

○ Larger Viewers: Use large diameter viewers for better view of the outside, as older adults may experience reduced visual acuity.

● (IoT) Digital Viewer: Consider installing digital door viewers for remote monitoring via smartphone, while keeping traditional viewers as a backup. (LTW04)

Clear Signage

○ Large & Legible Numbers: Label the Dwelling number with large, sans-serif font size of at least 70mm in height.

○ High Contrast: Ensure the signage has a clear colour contrast against the background for easy visibility.

○ Door Visibility: Enhance the visibility of the door by using colours that contrast with surrounding surfaces.

STORAGE

Cabinets/Benches (Fig.10)

○ Small Storage Space: Provide cabinets or ledges, as a small area for residents to place essential items, such as door keys or access cards.

○ Seating & Support: Include benches that serves as a convenient seating spot for changing shoes and provides physical support.

○ Mobility Aid Parking: This space can be used as a designated parking area for mobility aids when the bench is removed.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
200 lux	3000K

Diffused Lighting

○ Use even, diffused lighting directed towards the Entrance for comfortable visibility, potentially controlled by motion detectors.

Keyhole Lighting

○ Prioritise clear visibility of the keyhole or lock area by designing appropriate lighting, as older adults commonly encounter difficulties when inserting keys.

Avoidance of Spotlights

○ Avoid using spotlights in the entrance area to prevent harsh lighting conditions, shadows, and excessive contrast.

LIGHTING CONTROLS

Master Switches

○ Two Master Switches: Install switches at the Dwelling Entrance and Bedroom to manage all electrical systems, including lighting and HVAC.

○ Replicated Functionality: Ensure both switches have identical functionality, enabling residents to control their environment easily when leaving or entering, or before sleeping and on waking.

○ Intuitive Control Panel: Design the panel with large, clearly labelled buttons or touch interfaces for easy use, accommodating visual or memory decline.

○ (IoT) Smart Integration: Supplement with a smart home system accessible via smartphone apps or voice commands to enhance ease of use.

SWITCHES & SOCKETS

Doorbell

● Accessible Height: Position the doorbell between 1000–1300mm above floor level for comfortable reach. (Fig.8)

● Rocker-Style Design: Opt for a rocker-style doorbell, which is easier to use for older adults, requiring less dexterity.

● (IoT) Visual Indicators: Consider a visual doorbell system with a flashing light to alert residents when it rings. Position the visual indicator within the resident's primary field of view, near the Entrance or in a prominent location.

Charging Sockets

○ Install charging sockets in the Entrance vestibule to enable older adults to conveniently recharge mobility aids, such as electric wheelchairs.

IoT ITEMS

(IoT) Visual Intercom

● Consider installing a visual intercom system that displays live footage of Building Entrances on a digital screen. This allows older adults to view and communicate with visitors via videophone before granting entry, providing increased security and peace of mind. (LJP02)
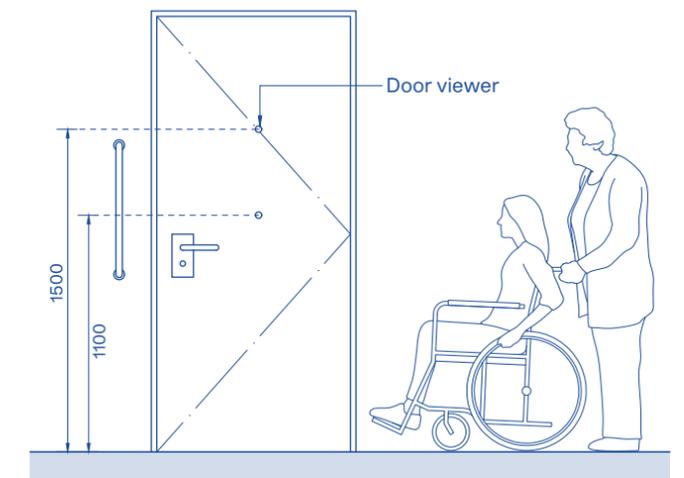
Fig.11   Door Viewers at Dwelling Entrances

The Living and Dining Areas are the heart of the Dwelling, where older adults spend extended periods engaging in hobbies and sharing meals. This space should meet key mobility and mental health needs, serving as a vital hub for daily life. A balcony allows residents to connect with the outdoors without leaving home, as well as providing Vitamin D from sunlight. Here, residents can engage in activities ranging from physical exercise and focused tasks to relaxation and social interaction, all within the comfort of their own living spaces.

OUTDOOR

INDOOR

Same level

Fig.12

(3000)

(2000)

(2000)

CLEAR ZONE

Smart Television

RI: Balconies as a Lifeline for Well-Being
The COVID-19 pandemic has highlighted the critical role of balconies in senior living, providing a vital connection to the outdoors and mitigating the surge in depression and loneliness during lockdowns. Locating balconies off central living areas, where seniors spend most of their time, allows these spaces to seamlessly integrate indoor and outdoor realms, nourishing physical and mental well-being by offering direct access to nature, fresh air, and a sense of freedom, even with limited mobility. (LTW06)

Fig.13

INDOOR

INDOOR

Ø 1500 (1200)

Full width

OUTDOOR

OUTDOOR

MINIMUM RECOMMENDED

RECOMMENDED DESIGN

INTERNAL AREA

Spatial Proportion

- Ensure a minimum width of 3000mm and a clear activity space of 2000 × 2000mm to allow residents to move freely and engage in various activities like doing exercise. (Fig.12)

Balcony

- Incorporate a Balcony to extend the Living Area, creating a harmonious indoor-outdoor connection that enhances openness and airiness. (DIAGRAM)

ACCESSIBLE ROUTE

BALCONY

Manoeuvring Space

- Provide a door with full length opening to the Balcony, ideally with a minimum clear opening of 1200mm. (Fig.13)

Step-Free Access

- Ensure no raised thresholds and indented gaps between the Balcony and interior space to reduce trip hazards and maintain level floor throughout. (IMAGE)

Fig.12   Space Planning for Living Areas in Dwellings
Fig.13   Clear Opening Width of Balcony Doors in Dwellings

Ventana by Buckner by © HKS Architects

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
100 lux (Balcony)	3500K
200 lux (Living & Dining)	2700–5000K
500 lux (Task Light)	(Tuneable Fixtures)

○ Balanced Lighting: A colour temperature of 3500K provides a balance between warm and cool light, creating a bright and inviting dining environment. (ACN02; AUS05)

○ Tuneable Fixtures: If tuneable fixtures are incorporated, different illuminance and colour temperature settings can be chosen to accommodate various table-based tasks, ranging from reading newspapers, writing practice to managing medications at the dining table.

Task Lighting

● Minimum Lux: Target a minimum of 500 lux task lighting in the Dining Area area to maintain alertness and mitigate risks like choking, expired food ingestion, and drowsiness during mealtimes.

○ Avoidance of Spotlights: Avoid using spotlights in the Dining Area to prevent harsh lighting conditions, in shadows, and excessive contrast.

HT: Choking Risk
Brighter, uniform lighting in Dining areas can help prevent choking by allowing individuals to clearly inspect their food and identify potential hazards, such as small bones. Enhanced visibility also aids in assessing the texture and consistency of meals, promoting thorough chewing and reducing the risk of swallowing problematic items.

AIR

Operable Windows

● Provide operable windows to enable effective cross-ventilation, which is essential for activities such as in-home exercising and for dissipating Kitchen odours.

LIGHT, VIEW & SOUND

Principal Windows

→ Dwelling/General/Space Planning/Light, View & Sound

FLOORINGS

BALCONY

Recommended Settings

Slip Resistance
  R11, or equivalent (Wet Areas)

Raised Decking

● Install raised decking for level access from interior space.

DOORS

BALCONY

Door Type

● Full Length Opening: Choose door types that allow for a full-length opening, such as 'slide and swing' doors, to seamlessly extend the Living area to the outdoors. (Fig.13)

● Light Operation: Prioritise doors with an easy, light operation.

○ Ensure Level Access: Special attention should be given to proprietary products for the Balcony door to ensure level access is achieved.

IoT ITEMS

Smart Television

● Tailored Workout: Broadcast tailored workout sessions and group classes from the Clubhouse, enabling older adults to exercise at home. (AGB12; LFR01)

○ Video Conferencing: Integrate video conferencing for communication with family and friends.

○ Position: Avoid placing electrical outlets or sockets that encourage a television setup facing the window to prevent glare from natural light. (AUS05)

The Kitchen should empower older adults to prepare meals independently, actively engaging their cognitive skills and fostering a sense of purpose. Thoughtful features, such as visual cues and seating arrangements, ensure that residents can move confidently and cook with ease in this space. By encouraging home-cooked meals, the kitchen supports a healthy diet, which in turn builds intrinsic capacities like muscle strength, brain power, and mental agility.

EXTERNAL RELATIONSHIPS

General

○ Kitchens, whether enclosed or open, present safety risks like slips and fatigue, which may go unnoticed for long periods. Addressing these is crucial for the well-being of older adults.

Direct Access

○ Position the Kitchen door directly facing the Dining Area to minimise distance travelled.

INTERNAL AREA

Spatial Proportion

● Prioritise a squarish layout over an elongated corridor to provide sufficient circulation space for individuals with mobility aids. (AGB04)

Food Safety Layout

○ Assembly Line Flow: Design the Kitchen for efficient meal preparation, with a flow from storage to cleaning, preparation, cooking, and delivery, ensuring food safety. (AGB16)

● Food Safety: Arrange countertops in an L- or U-shaped layout, maintaining a maximum distance of 1000mm between the sink and the food preparation area to minimise cross-contamination risks. (Fig.14) (LRO01)

→ Dwelling/Kitchen/Fixtures & Fittings/Countertops

ACCESSIBLE ROUTE

Manoeuvring Space

● Provide a turning circle of diameter 1500mm (min. 1200mm) in front of and between all Kitchen units and appliances. (Fig.14)

Step-Free Access

● Ensure no raised thresholds and indented gaps between the Kitchen and Dining Area to reduce trip hazards and maintain level floor throughout.

AIR

Operable Windows

○ Promote effective cross-ventilation by incorporating operable windows for removal of odours, particulate matter (PM2.5), and other pollutants generated during cooking.

RI: Food Safety Triangle
An optimal kitchen layout is vital for minimising cross-contamination risks in senior living facilities. The distance between the sink and adjacent worktop significantly influences hand-cleaning actions; kitchens with over 1 metre between them are 9 times more likely to experience cross-contamination. Additionally, placing the stove more than 4 metres from the sink triples this risk. Implementing the Food Safety Triangle design, which positions the sink, food preparation area, and stove within close proximity, effectively reduces these risks and enhances food safety practices. (LRO01)

RI: Pollutants From Gas & Electric Stoves
Gas stoves are a significant source of indoor air pollutants, including carbon monoxide, nitrogen oxides, and particulate matter (PM), which can cause health issues such as dizziness and throat irritation while promoting mould and bacterial growth. In contrast, electric stoves reduce emissions compared to gas but do not eliminate them entirely; they can still produce PM2.5 and ultrafine particles, especially during high-temperature cooking with induction models. (AWH05; LCN12; LUS30)

FLOORINGS

Recommended Settings

Slip Resistance
   R11, or equivalent (Wet Areas)

Visuals

○ Use a light-coloured flooring to help avoid unnoticed water or oil spills.

Drainage

● Ensure the floor has proper drainage for floor cleaning or accidental floods.

→ Dwelling/Washroom/Materials & Finishes/Floorings

WALLS

→ Dwelling/Kitchen/Materials & Finishes/Doors/Wall and Door Material

DOORS

Door Type for Enclosed Kitchens

○ Sliding or Folding Doors: Choose sliding doors or folding doors over bi-directional swing doors for easy manoeuvring.

○ Door Closers: Install door closers with adjustable delayed closing to enable safe passage for older adults with mobility aids, particularly for heavy fire-rated doors.

Wall & Door Material for Enclosed Kitchens

● Glass Panel for Visibility: Provide a glass panel on the Kitchen wall and door at a maximum of 800mm above floor level and extend its height to at least 1800mm to increase visibility and communication between the kitchen and the rest of the home, enhancing overall safety. (Fig.16)

● Quality: Be aware of the maximum push force required and potential quality issues over time.

個地板情願淺色啲,最低限度仲睇到吖嘛。見到有少少茄汁漬就可以即刻抹走,容易啲。反而塊地板深色就會懶而唔會抹。

I prefer the flooring to be lighter in colour because I can see better. I can immediately clean it if I spill ketchup. If it were dark in colour, I'd be too lazy to care.

Fig.14

OPEN KITCHEN   ENCLOSED KITCHEN
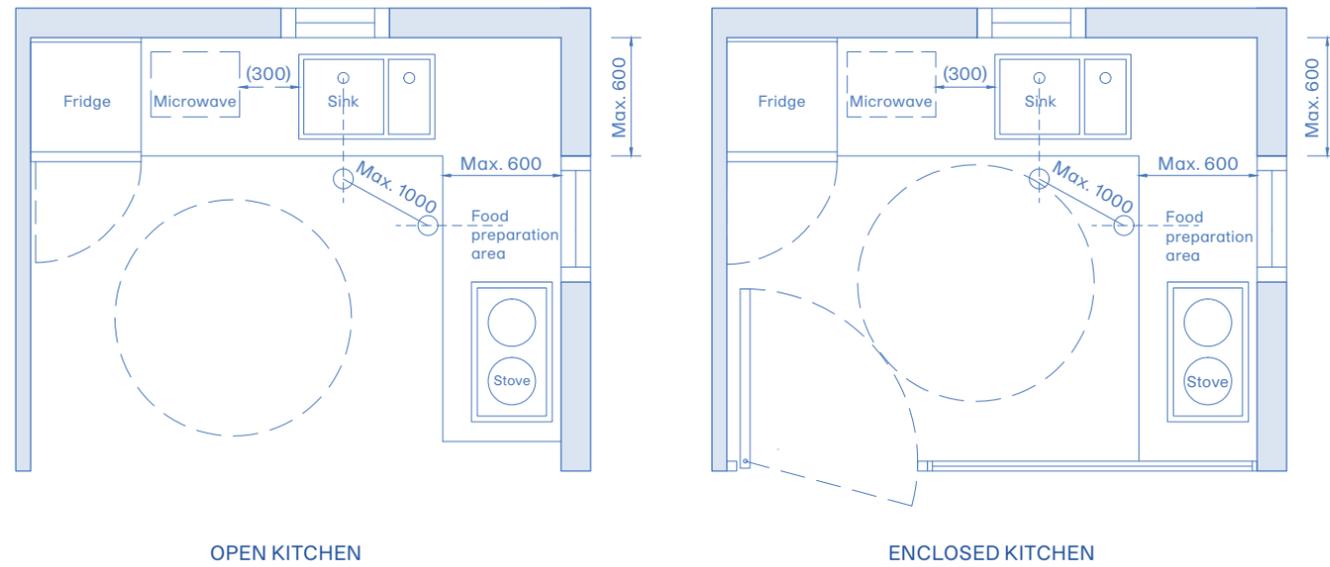
Fig.15
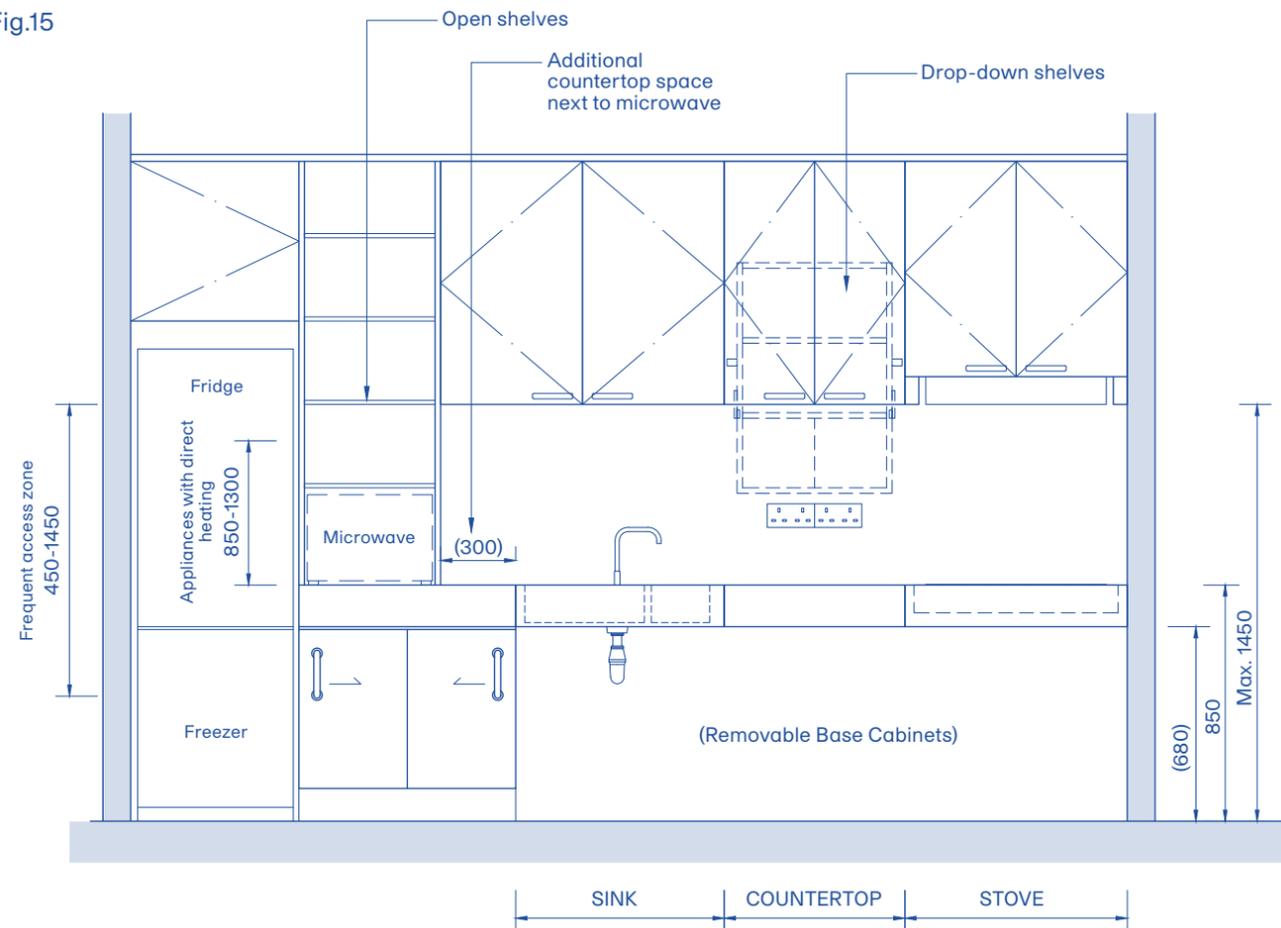
COUNTERTOPS

General

○ The Kitchen countertop should be designed to accommodate the specific needs of older adults, such as offering ample preparation space and open leg room for casual eating within the kitchen.

Dimensions

● Height: The standard countertop height is 850mm above floor level. (Fig.15)

RI: Height Shrinkage
Older adults commonly experience height shrinkage due to age-related musculoskeletal changes, such as reduced bone density. Research indicates an average height loss of 3.5cm in Chinese adults over 60, with greater shrinkage associated with advancing age, highlighting the need for lower furniture. (LUS32; LUS33; LUS34)

● Maximum Depth: Limit the maximum depth of the clear countertop space to 600mm to accommodate seated users' reaching distance. (Fig.14) (AHK02)

● Raised Edges: Include a slightly raised edge to help stop liquids from spilling and objects from falling to the floor.

● Leg Room: Provide a minimum height of 680mm and a minimum depth of 450mm for leg room for seated users, ideally along the full length of the sink, countertop and stove. (Fig.15)

Fig.16
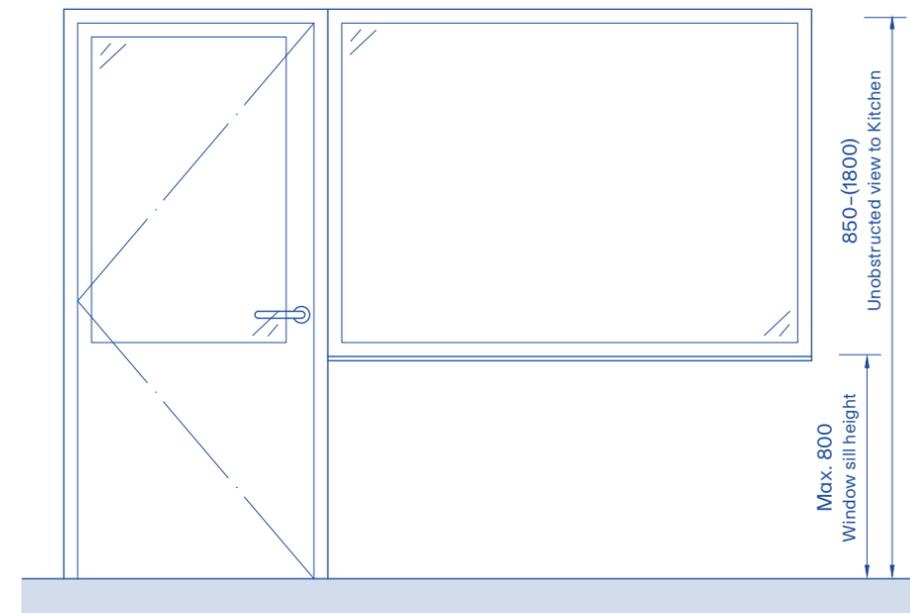
Additional Features

- Countertop Space: Offer an additional minimum 300mm of clear countertop space on at least one side of the microwave, oven, and/or fridge. This allows for placing different appliances such as blenders and slow cookers, to prepare meals with different textures as needed. (Fig.14 & 15) (AIE01)

○ Fridge Placement: Position the fridge to ensure that it does not block circulation space for users of mobility aids when the fridge door is opened.

○ Pull-Out Countertops: Consider pull-out countertops to enhance accessibility for seated users, with smooth, easy-to-operate hinges. (Fig.9) (ASG08)

Surface Material

○ Material Choice: Use stain- and heat-resistant, plain light-coloured, and non-reflective materials for the countertop surface to minimise glare and facilitate easier cleaning. (AGB16; AHK02)

○ Seamless Surface: Opt for a continuous, seamless solid surface such as Corian to simplify hygiene maintenance and avoid corner joints. (AIE01)

STORAGE

Base Cabinets

- Prioritise sliding doors, open shelves, and full-extension drawers. (Fig.9)

○ Avoid using swing doors for base cabinets to prevent blocking circulation space.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux (Kitchen)	4000K
500 lux (Task Light)	5000K (Task Light)

○ Brighter & Cooler: Ensure the overall Kitchen lighting is brighter and has a cooler colour temperature compared to other living areas. This will provide higher visibility and help older adults stay alert when using sharp kitchen tools and appliances. (AUS03)

○ Lighting Transition: The difference in lighting can help residents easily transition between the two areas and maintain proper visibility and alertness when cooking.

Task Lighting

- Installation: Install task lighting over critical areas like the sink, countertop, and stove for tasks like checking food freshness and using knives. Recess lighting fixtures to prevent glare, especially under hanging cabinets, within shelves and drawers. (AGB16; AUS05)

HVAC & WATER

Stoves

- Electric Stove: Electric stoves are preferred for safety, especially for residents with low vision or memory care needs.

- Stove Isolation System: Install automatic stove shut-off systems for both electric and gas stoves if unattended cooking is detected.

- Futureproofing: If gas stoves are used, provide power sockets for easy adaptation to electric stoves.

Exhaust Fans & Range Hoods

○ Maintenance: Opt for systems with easy-to-access filters.

○ Remote Control: Provide remote-control options such as a phone app, if systems are out of reach for seated users.

○ Noise Management: Minimise mechanical noise from exhaust fans and range hoods as they can hinder communications, such as by incorporating built-in automation to sync the systems' power levels with stove temperatures. This is especially important for interactions between residents and caregivers seeking assistance.

Sinks

- Opt for rectangular or square sinks to provide ample space for washing dishes.

- Provide insulation on the undersides to prevent scalding of seated users.

Water Taps

- Reachability: Taps should be reachable within 500mm from the edge of the countertop. (Fig.9) (AGB16)

- Operation: Use lever-operated taps with clearly identifiable hot and cold indicators. Avoid pillar taps and prioritise mixer taps for ease of use. (IMAGE) (AGB16)

○ Ease of Use: Design taps for one-handed operation without twisting, pinching, or tight grasping. Consider automatic motion sensor taps for even greater convenience.

Water Supply

○ Ensure the water supply to sinks includes isolation valves and flexible tails for easy maintenance. (AGB04)

Location of Other Appliances

- Height Placement: Place Kitchen appliances that involve direct heating, like ovens and microwaves, between 850–1300mm above floor level for easy access. (Fig.15)

- Refrigerator Design: Position the fridge door and shelves within the same height range, with the freezer located below for convenience.

- Other Appliances: Locate dishwasher and/or laundry appliance openings within the same height range, if applicable.

IoT ITEMS

Standalone Fire Detectors

○ For enclosed Kitchens, install wall- or ceiling-mounted fire detectors near the entrance door, avoiding placement too close to the stove. (AHK29)

Carbon Monoxide Detectors

○ Consider installing carbon monoxide detectors to prevent poisoning from open flames and heaters. (AUS22)
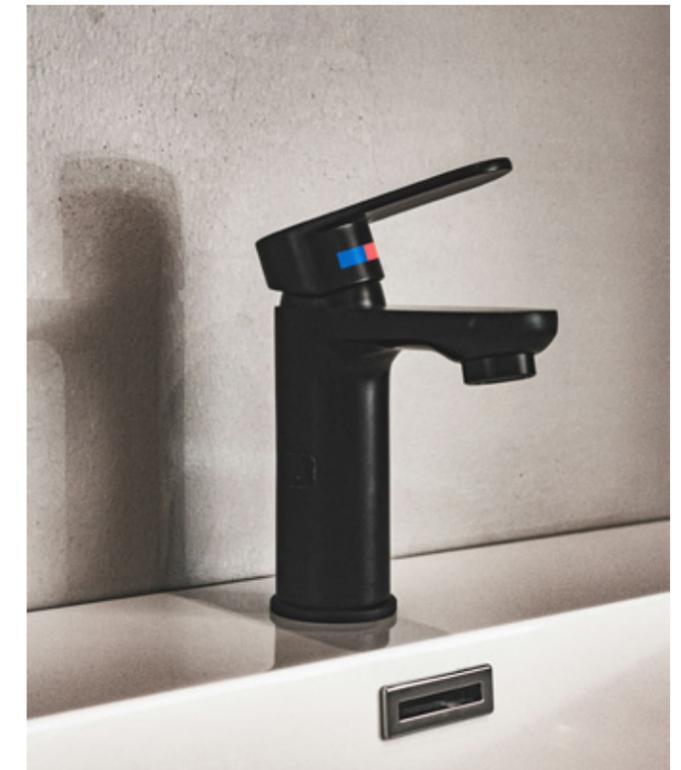
The Bedroom should serve as a fundamental retreat, facilitating restorative sleep through features that support healthy sleep-wake cycles. In this way, the Bedroom can support memory consolidation, cognitive function, and decision-making during the day. The layout should promote easy manoeuvring, helping to prevent falls and enhancing a sense of safety, particularly for those with limited mobility.

EXTERNAL RELATIONSHIPS

Direct Access

○ Plan a direct route with a visual connection between the Dwelling Entrance and the bedside for easy access and convenient monitoring as mobility decreases over time. (Fig.17) (LID01)

Ensuite Washroom

● Locate the Bedroom adjacent to the Washroom, preferably ensuite, with a direct visual connection from the bed to the Washroom to facilitate easy access for older adults who may have more frequent nighttime visits. (Fig.17) (AUS11)

INTERNAL AREA

Flexible Layout (Fig.17)

● Clear Access Route: Ensure a 750mm wide route from the bedroom door to at least one side of the bed to accommodate mobility aids.

● Adaptable Room Design: Design the rooms to allow for flexibility, making it adaptable from a double bed to twin beds. This layout also provides space for an extra bed for long-term overnight assistance.

ACCESSIBLE ROUTE

Manoeuvring Space

● Provide a turning circle of diameter 1500mm (min. 1200mm) near the Bedroom door, which may overlap with bedside routes, to ensure smooth mobility aid navigation. (Fig.5a)

AIR

Operable Windows

● Provide operable windows to regulate indoor air quality maintaining a comfortable climate for sleeping.

LIGHT, VIEW & SOUND

Principal Windows

→ Dwelling/General/Space Planning/Light, View & Sound

Recessed Curtain Tracks

○ Install recessed curtain tracks to minimise light leakage and external light pollution, creating a sleep-promoting environment.

Noise Isolation

● Position the Bedroom away from high-activity areas like the Kitchen and avoid placing it near lift shafts to minimise noise transmission.

Noise-Sensitive Orientation

● Position Bedroom windows away from noise sources to reduce disturbances during sleep. (ANL01_3)

Fig.17   Space Planning for Bedrooms in Dwellings

RI: Ageing and Sleep Patterns
As adults age, their sleep cycles, which typically last around 90 minutes and consist of four stages, shift towards lighter sleep stages (N1 and N2), while deep sleep (slow-wave sleep) and REM sleep become less prevalent. This change can impair cognitive functions critical for memory consolidation and information processing. Additionally, deterioration of the hypothalamus affects circadian rhythms, leading to disrupted sleep-wake cycles, increased daytime drowsiness, and difficulty maintaining alertness. Overall, quality sleep is essential for brain health, and age-related changes can significantly impact older adults' sleep quality. (AUS09; LUS19)

RI: Nocturia
Older adults often experience nocturia, leading to frequent washroom visits and multiple night awakenings—up to three to four times each night. This condition affects over 50% of individuals aged 65 and older, resulting in worsened sleep quality and fatigue, which are associated with other health issues such as depression and obesity. (AUS11; LUS28; LUS29)

HT: Indoor Air Pollution Risks
Human metabolism, and pollutants from cleaning agents and outdoor leakage can increase CO_2 and PM2.5 levels, negatively affecting the respiratory system and sleep quality, especially in older adults. Proper ventilation can lower airborne pollutants, increase deep and REM sleep, and prevent adverse health impacts. (LCN11)

RI: Ventilation and Sleep Quality
Ventilation is essential in bedrooms to regulate indoor air quality and maintain a comfortable sleeping environment. Sources of excess CO_2 and PM2.5, including cleaning agents and outdoor pollution, can negatively impact respiratory health, particularly in older adults, leading to reduced sleep quality and increased risk of hypertension. Proper ventilation lowers airborne pollutants, enhancing deep sleep and REM sleep, thus preventing fragmented sleep and associated health issues. (LCN11)

RI: Low-Frequency Noise and Sleep Quality
Low-frequency noise from sources like outdoor air-conditioning unit contributes to increased stress and annoyance, leading to sleep difficulties, especially among older adults. The impact is exacerbated when the noise source is unknown, resulting in higher usage of sleeping pills and sedatives and a decline in overall well-being. (ANL01_3; LGB08; LNL06)

DOORS

Acoustics

○ Choose soundproof, solid-core door for acoustic comfort to contain noise from other areas of the Dwelling.

WINDOWS

Acoustic Windows

○ Use acoustic windows to reduce the impact of intermittent noises and other disturbances like traffic or street noise, creating a quieter, more peaceful sleep environment. (LUS08)

Space Planning   Materials & Finishes   **Fixtures & Fittings**   Mechanical & Electrical

STORAGE

Wardrobes (Fig.18)

○ Adjustable Parts: Incorporate adjustable shelves and clothes rails to accommodate the changing needs and abilities of residents.

○ Daily Storage: Provide open shelves within the wardrobe for storing daily-use items, ensuring easy access and organisation.

Bedside Tables

○ Rounded Corners: Choose bedside tables with rounded corners to reduce injury risk from accidental impact.

○ Raised Edge Ledge: Incorporate a raised ledge around the table to prevent items from falling onto the floor, reducing the need for bending.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
2 lux (Night Light)	3000K
200 lux (Bedroom)	2000K (Night Light)
500 lux (Task Light)	2700–5000K
	(Tuneable Fixtures)

○ Ambient Lighting: Provide indirect ambient lighting, such as recessed lighting, to illuminate the entire Bedroom space without causing glare. Position overhead fixtures like recessed downlights away from the bed to prevent sharp glare. (DIAGRAM)

○ Task Lighting: Incorporate adjustable, dimmable bedside task lighting for convenience, allowing residents to control light levels as needed.

Night Lighting

● Incorporate small, low-wattage night lights in Bedrooms, corridors, Washrooms, and potentially throughout the whole Dwelling.

● Colour Temperature: Avoid using blue-toned lights and high illuminance so as not to disrupt residents' sleep cycles. (LCN07; LUS22)

● Location: Install low-wattage night lights at low levels (below 450mm) and recess them in walls to illuminate routes without lighting the entire room. (Fig.8)

● Automation: Use motion sensors to activate night lights when movement is detected, turning them off after inactivity.

○ Customisation: Allow residents to customise night lighting settings, enabling them to switch on all lights at once or individually.
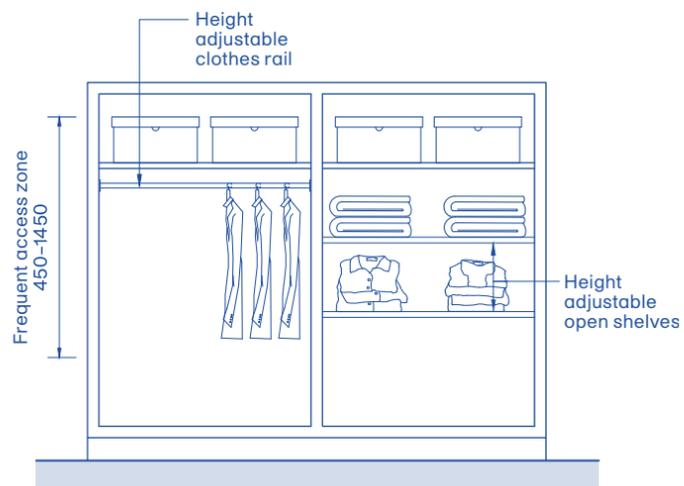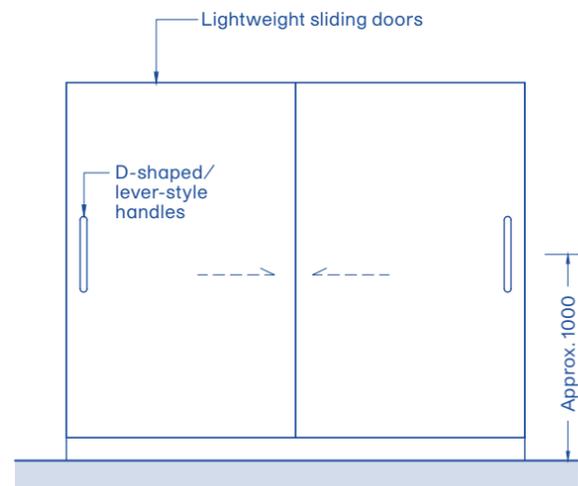
Bedside Lighting

○ Incorporate adjustable and dimmable task lighting at the bedside to allow residents to easily turn on the light when needed.

Ceiling-Mounted Sensors

● Avoid using ceiling-mounted sensors with visible on/off indicators, as they can create a feeling of being monitored and potentially disrupt sleep when the room is dark.

HT: Night Lighting on Different Floors
Residents who live on high floors may have more need for night lights as there is less lighting radiating from the outside environment at night.

RI: Optimising Night Lighting
Nocturia, a common condition in older adults, often leads to frequent nighttime visits to the Washroom. Therefore, incorporating night lights within living spaces is essential to illuminate safe pathways for older adults to compensate for poorer vision in dark environments, reducing the risks of falls. However, caution is needed regarding lighting choices as certain blue-toned lights can disrupt sleep patterns by suppressing melatonin, a hormone vital for restful sleep, potentially leading to chronic sleep issues in older adults. (AUS11; LBR04; LCN07; LUS22)

RI: Managing Blue Light Exposure
Light is crucial for regulating sleep-wake cycles in circadian rhythms. LED lighting often emits high levels of blue light, worsening conditions like late cataracts and dry eyes. To mitigate these risks, use bulbs with a lower CCT of 2700-3000K, which emit less blue light. Dimmable controls can also enhance visual comfort and reduce strain on ageing eyes. (LUS11)

因為一有乜嘢問題就開燈先,所以一定要有一盞床頭燈。我親身感受到一定要自己可以控制到同方便,要一伸手就開到燈。

Whatever's going on, the first thing I do is turn on the lights. So there must be a bedside lamp. Personally, I need the lamp to be within arm's reach and easy to switch on and off.

Space Planning   Materials & Finishes   Fixtures & Fittings   **Mechanical & Electrical**
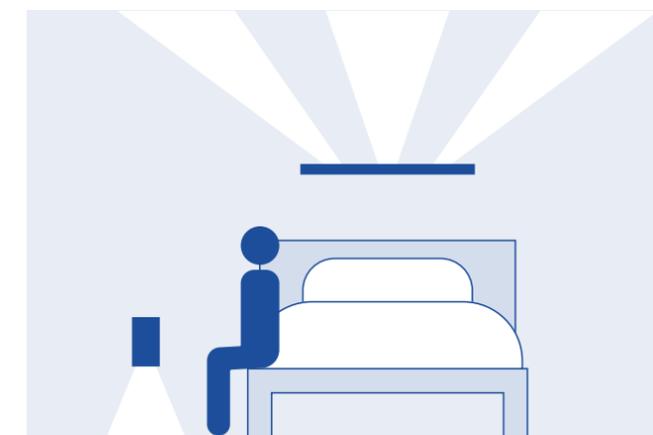
LIGHTING CONTROLS

Master Switches

→ Dwelling/Entrance/Lighting Controls/Master Switches

HVAC & WATER

Bladeless Ceiling Fans

○ Install bladeless ceiling fans for safe, unobtrusive airflow and select models with quiet operation to avoid sleep disturbances.

IoT ITEMS

EMERGENCY CALL BELLS

Location

○ Install call bells within easy reach from the bedside, ensuring accessibility from standing, seated, and lying positions.

→ Dwelling/General/Mechanical & Electrical/IoT Items/Emergency Call Bells

Lightweight sliding doors

D-shaped/lever-style handles

Approx. 1000

Height adjustable clothes rail

Frequent access zone 450-1450

Height adjustable open shelves

Fig.18   Wardrobes for Bedrooms in Dwellings

The Washroom should be designed with comfort and safety in mind, catering to challenges such as reduced mobility, impaired vision, and bowel changes in older adults. Ample lighting is essential for focused tasks, ensuring a safe and pleasant experience. The layout should accommodate mobility aids and the potential presence of caregivers, allowing residents to maintain their self-care capacity and enjoy a sense of independence.

EXTERNAL RELATIONSHIPS

Direct Access

- Plan a direct route with a visual connection between the bedside and the Washroom for clear identification, especially at night-time when residents may be half-asleep and have a sense of urgency. (Fig.17)

Hygienic Provision

- Avoid Washrooms without windows as they lack natural light and ventilation, leading to feelings of confinement, increased humidity, and potential odour issues.

INTERNAL AREA

Spatial Proportion

- Prioritise a squarish layout to provide a sufficient central circulation space for individuals with mobility aids. (AGB04)
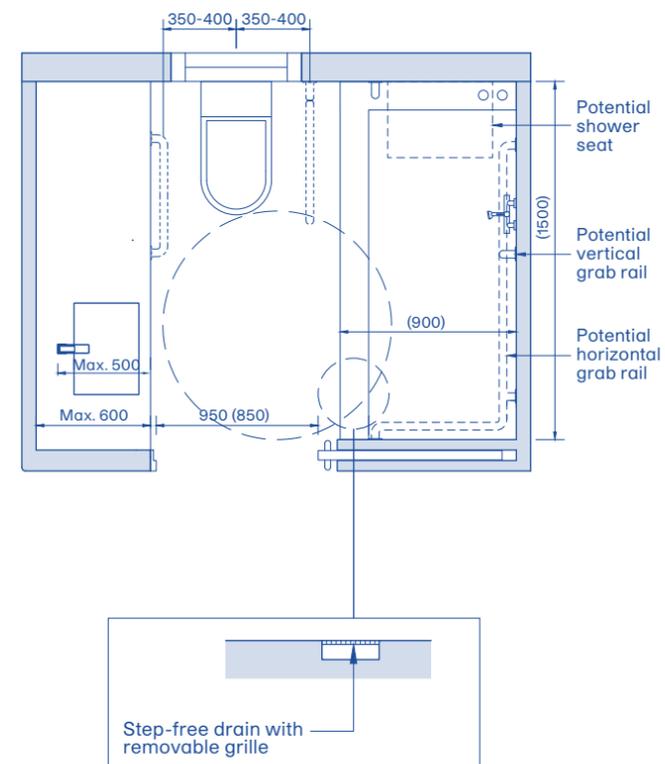
Fig.19   Space Planning for Washrooms in Dwellings

Accessible Layout

- Plan the layout of the washbasins, water closet and shower around the central circulation space of the Washroom for easy manoeuvring.

- Position the water closet facing the door, with the basin next to the door for easy manoeuvring and transferring.

Safety & Potential Conversion

- Walk-in Showers: Install level-entry walk-in showers instead of bathtubs to reduce fall risks. Shower cubicles should be at least 900mm wide and 1500mm long. (Fig.19)

- Futureproofing Fittings: If bathtubs are installed, ensure they can be converted to level walk-in showers by providing adequate clearance for drainage installation.

ACCESSIBLE ROUTE

Manoeuvring Space

- Provide a turning circle of diameter 1500mm (min. 1200mm) close to all fittings, including water closet, washbasin and mirror. Overlapping the turning space with the shower area is acceptable. (Fig.19)

Step-Free Access

- Ensure no raised thresholds or ledges at the Washroom and shower entry, replacing them with channel or slot drains to manage water effectively.

AIR

Operable Windows

- Provide operable windows to ensure cross-ventilation and reduce moisture-related issues. A transom window placed above eye level can allow for ventilation while maintaining privacy.

Thermo Ventilators

- Consider installing thermo ventilators for extra warmth.

RI: Hazards in Washroom

Washrooms are prone to mould and bacteria growth due to steam and humidity from showers and toilets, particularly in Hong Kong's humid climate. This moist environment fosters harmful biological agents like viruses and dust mites, which can worsen respiratory issues and allergies in older adults. Additionally, exhaust from gas water heaters can introduce volatile organic compounds (VOCs) and other pollutants. To mitigate these risks, it is crucial to incorporate well-ventilated windows that facilitate crossflow and natural air circulation. (ADE01; LAU06; LGB07)

ALL

Uniform Tile Pattern

- Use tiles with a uniform tone and pattern for easier future replacement, especially when installing grab rails or converting bathtubs to showers.

FLOORINGS

Recommended Settings

Slip Resistance

    R11, or equivalent (Wet Areas)
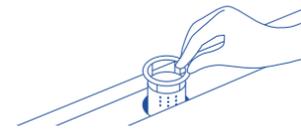
Shower Drain Grates

- Level Access: Ensure well-constructed drain grates provide level access to prevent tripping hazards and facilitate smooth movement for users. (Fig.19)

- Smooth Edges: Smooth any metal edges to avoid sharp edges and surfaces that could harm barefoot users, particularly older adults with fragile skin.

- Effective Cleaning: Use easily removable drain covers and position drains in corners to simplify cleaning and maintain clear circulation spaces. (DIAGRAM)

- Small Openings: Use a grating with small openings to prevent walking aids or wheelchair casters from getting stuck.

WALLS

Non-Porous Materials

- Avoid porous materials like natural stone for Washroom walls, as they can compromise grab rail installation and weaken suction-based supports.

ADAPTABLE ZONES FOR GRAB RAILS

Horizontal Grab Rails

- Reserve 350–400mm clearance on both sides of the toilet's centreline for potential installation of horizontal grab rails. (Fig.19)

Vertical Grab Rails

- Designate space in the shower cubicle between 750–1500mm above floor level for future installation of vertical grab rails. (Fig.20)

- Wiring Planning: Conduit for wiring of water-proof emergency call bells and sockets should be carefully
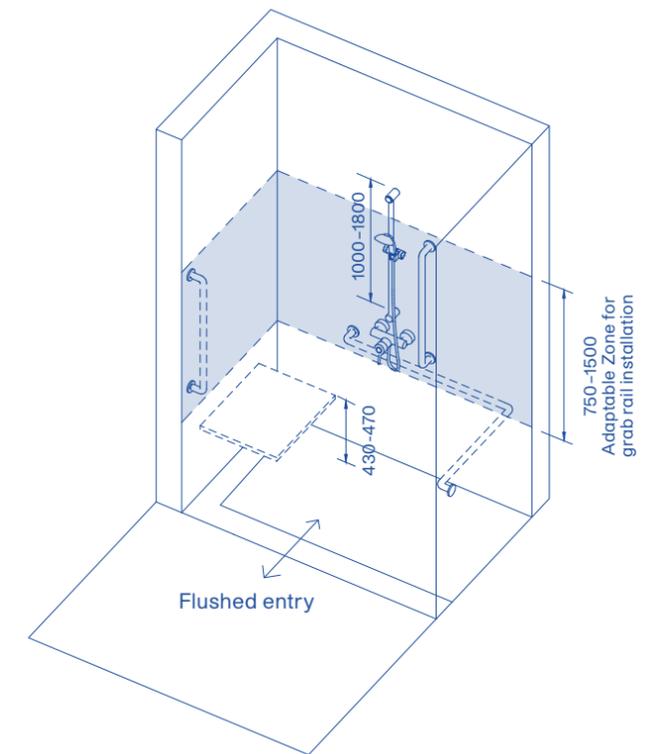
Fig.20   Shower Compartments for Washrooms in Dwellings

planned within the walls to facilitate potential installation of grab rails.

Shower Seats

- Plan a space for potential installation of wall-mounted shower seats 430–470mm above floor level, near the shower controls. (Fig.20)

DOORS

Door Type

- Choose sliding or folding doors over bi-directional swing doors for easy manoeuvring.

Shower Screen Type

- Folding screen doors are preferable to sliding ones for maximising space and easy emergency removal. Ensure shower screen design does not compromise waterproofing or tile installation.

WINDOWS

COUNTERTOPS

VANITY UNITS

General

- Ample Space: Provide ample countertop space near the vanity unit, particularly beside the water closet, allowing users to access supplies without turning when seated.

- Discrete Storage: Include a discreet storage area within the vanity unit for incontinence supplies, maintaining privacy and dignity.

- Matte Colours: Choose vanity units or countertops in light and matte colours to enhance visibility and clarity for older adults with declining vision, as they help reflect light back towards the face and neck.

- Open Shelves: Install open shelving or cabinets within arm's reach of the toilet for quick and easy access to wipes or tissues.

Dimensions (Fig.21)

- Accessible Height: Ensure a standard countertop height of 850mm.

- Leg Room: Ensure clear and continuous open leg room underneath the washbasins, with minimum height of 680mm, width of 850mm and depth of 450mm. (ASG08)
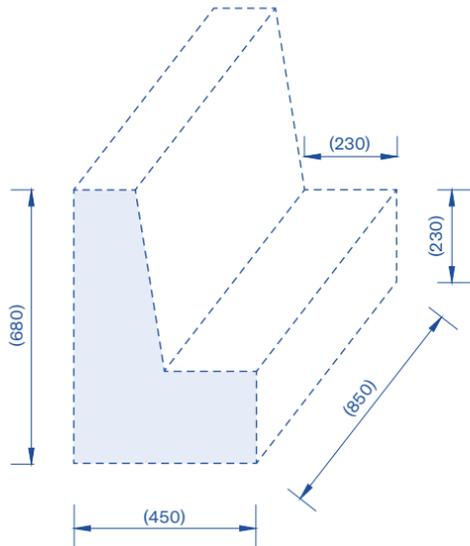
Movable Base Cabinets (Fig.9)

- Extra Storage: Where leg room or knee space is provided, a movable base cabinet under the washbasins can be considered for additional storage.

- Rollers with Locks: Ensure the cabinets are installed with smooth rollers and safety locks.

Mirrors

- Position mirrors with the bottom edge is no higher than the top of the washbasins. The top edge should at least reach 2000mm above floor level for visibility across all heights. (Fig.21)

STORAGE

→ Dwelling/Washroom/Fixtures & Fittings/Countertop/ Vanity Unit/Movable Base Cabinets
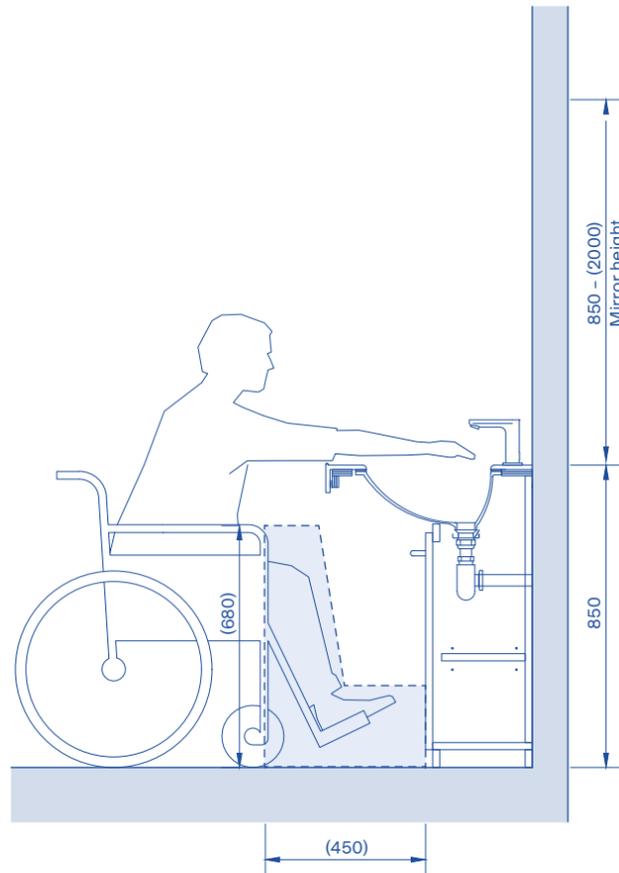
Fig.21   Vanity Units for Washrooms in Dwellings

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux (Washroom)	3000K
500 lux (Mirror & Task Light)	

- General: Ensure Washroom lighting is brighter than other living areas for visibility and safety. Brighter lighting helps older adults avoid slippery surfaces.

- Task Lighting: Position lighting to reduce shadows and glare. Place fixtures around mirrors for balanced, flattering illumination.

Mirror Lighting

- Diffused Lighting: Provide diffused lighting fixtures on both sides of the mirror to create even and flattering facial illumination.

- Avoid Directional Downlights: Avoid using directional downlights directly above the mirror, as they can cause harsh shadows on the face.

Heat Lamps

- Provide heat lamps for additional warmth post-shower, positioned over shower or dressing areas for comfort.

HVAC & WATER

Washbasins

- Opt for structurally sturdy round or oval washbasins to improve hygiene and support older adults who may use the washbasins for balance.

Showerhead & Riser Rail

- Install a long riser rail (approximately 800mm) between 1000–1800mm above floor level to allow both seated and standing shower options. Use a handheld showerhead with a flexible hose. (Fig.20)

Toilet Seats

- Seat Height: Install water closet with toilet seat height of 430–470mm which is also appropriate for general users.

- Bidet Preparation: Ensure the necessary power and fresh water supply is available for potential bidet installation. Provide the flexibility for users to install integrated bidet features in smart toilets, which can offer heated seats, warm water cleansing, and air-drying capabilities to assist individuals with weaker mobility.

Water Taps

→ Dwelling/Kitchen/Mechanical & Electrical/HVAC & Water/Water Taps

IoT ITEMS

EMERGENCY CALL BELLS

Location

- Install call bells within easy reach of the toilet and shower, ensuring accessibility from standing, seated, and lying positions.

Wiring & Conduit

- Ensure concealed wiring and conduit within wall construction near showers for waterproof call bells, keeping them flush with the wall surface for a clean appearance.

FLOOD SENSORS

Location

- Install sensors in areas prone to leaks, such as near toilets, showers, and sinks, to quickly detect any accumulating water.

Leak Detection & Alerts

- Ensure timely leak detection, especially for walk-in showers, and provide clear, easily perceivable alerts for residents.

Sensor Capabilities

- Use sensors that can detect small amounts of water and function reliably in high-humidity environments.

Communal Area

Residents resting under a cedar tree on the outdoor terrace, the focal point of the centre, enjoying the natural changing light and views.

John Morden Centre by Mae Architects. © Jim Stephenson

John Morden Centre by Mae Architects. © Jim Stephenson

Long corridors with outside views foster a connection to the environment while enhancing safety through clear visibility in emergencies.

John Morden Centre by Mae Architects. © Jim Stephenson

Maggie's Leeds Centre by Heatherwick Studio. © Hufton+Crow

Varying floor plates and ceiling designs, along with shelves for potted plants at different levels, contributes to a lively atmosphere, encouraging interaction and engagement.

Space Planning   Materials & Finishes   Fixtures & Fittings   Mechanical & Electrical

Incorporate humanistic architectural principles to create a welcoming and accessible environment that prioritises residents' well-being and comfort. Thoughtful architectural design can significantly influence feelings of intimacy, safety, and comfort, enhancing overall atmosphere.

INTERNAL AREA

Structural Variations

- Avoid Monotony: Steer clear of simple volumetric forms and uniform layouts that can create an institutional feel. (ACH01; LBE01; LGB03)

- Dynamic Ceiling: Incorporate varied ceiling heights, sizes, and materials to foster a diverse and stimulating environment. Inspired by healing architecture, spaces that promote physical and mental well-being, inclined roof designs can enhance this effect. (ACH01; LBE01; LGB03)

- Floor-to-Ceiling Height: Ensure a high floor-to-ceiling height to improve ventilation and daylight, bridging the indoor and outdoor environments. (AHK13; AUS21; LBR01; LCN06)

- Curvilinear Design: Implement curvilinear designs with rounded corners to foster positive emotions, reduce injury risks, and enhance feelings of safety. (LKR01; LPT01)

- Maximise Sheltered Space: Enhance sheltered open areas to increase natural light and airflow, improving spatial awareness and reducing the need for extensive signage. (AGB21)

Ample & Flexible Spaces

- Fluid Transitions: Design layouts that clearly define communal and private zones, as well as the connection between internal and external spaces. Use various flooring materials and lighting strategies to create distinct yet harmonious transitions that guide residents naturally through the environments.

- Spacious Layout: Ensure that Communal Areas are spacious enough to prevent overcrowding, enabling comfortable movement and interaction to foster social connections while minimising acoustic disturbance and maintaining a sense of personal space and privacy.

- Flexible Space Allocation: Avoid enclosed rooms; use transparent walls and partitions for adaptable space allocation and efficient care. (LBE01)

Integration & Access

- Shared Amenities: Promote the shared use of amenities such as reception areas, waiting rooms, staff offices, and toilets to enhance functionality and adaptability.

- Accessibility: Create porous spaces with direct access to various amenities, encouraging residents to utilise services and fostering interdisciplinary cooperation. (LMY01)

Acoustics

- Absorbent Surfaces: Incorporate absorbent surfaces such as grass land or plantations to reduce noise levels. (AHK45_6)

- White Noise as Noise Barrier: Utilise white noise, such as flowing streams and rustling of leaves, to mask undesirable noises and create a sense of calmness. (ASG10)

- Acoustic Zoning: Implement distinct acoustic zones based on activity levels to minimise noise interference: (AAU06_B)

  - Loud Zones: For buzzing activities and equipment, such as playgrounds and lounges.

  - Mixed Zones: For moderate noise activities like learning and collaboration.

  - Quiet Zones: For concentration and wellness, such as gardens or therapy areas, ideally located away from Loud Zones.

RI: Uniform Environments
Uniform environments can lead to psychological and physiological issues, including stress and negative emotions, by depriving individuals of meaningful sensory engagement. For example, the 'big block approach' to hospital design in the 1960s and 1970s was criticised for being inhumane, intimidating, and unwelcoming. (LBE01; LGB03)

ACCESSIBLE ROUTE

Manoeuvring Space

- Passage Length: Minimise the length of passages. Otherwise, repeat directional signage at junctions to provide wayfinding assurance. (AGB07)

- Avoid Dead Ends: Avoid dead-end routes, which can create confusion and frustration for older adults.

Gradient Change

- Avoid sudden minor changes in gradient to prevent unexpected shifts that may instil fear of falls in older adults.

→ General Recommendations/Space Planning/Accessible Route

The corridor features level thresholds, wooden handrails, and built-in seating, with the floor edge lined in high contrast for wayfinding (the handrail is not considered continuous, as it is interrupted by mullions).

⊠ Bad Example

Busy flooring patterns should be avoided, particularly those with dark contrasts.

ALL

Visuals

- Accent Colours: Incorporate bright accent colours, complemented by ceiling designs and lighting, to improve spatial perception, creating a sense of spaciousness. (AUS08)
- Warm Colours: Use warm colours, like amber, to promote visiting behaviour and counteract the intimidating perception of large extravagant or condensed institutional spaces. (LTH01)

→ General Recommendations/Materials & Finishes/All

FLOORINGS

Recommended Settings

Slip Resistance
  Internal Areas
    R11, or equivalent (Dry Areas)
    R12, or equivalent (Wet Areas)
  External Areas
    R12, or equivalent (All Areas)

Acoustic Comfort

- Sound Dampening: Avoid hard flooring in quiet areas to minimise excessive reverberation from walking aids. (AGB27)

Visuals

- Avoid Dark Contrasts: Avoid using dark and high-contrast colours and patterns, as they may be misinterpreted as holes or traps, such as a dark manhole on light-coloured paving. (IMAGE)
- Integration: Ensure manholes, gratings, and drains match the flooring colour to enhance visibility.

→ General Recommendations/Materials & Finishes/ Floorings

WALLS

Visual Comfort

- Avoid Complex Patterns: Avoid complex wall patterns and designs, as well as strong directionality, as these can cause disorientation and visual discomfort, increasing fall risks.
- Colour Choice: Choose light neutral tones that are softer than the floor colour, except for feature walls. In transitional spaces, these tones should minimise contrast with solar glare and artificial lights, reducing eye strain and enhancing well-being. (AHK02)

Glass Walls/ Partitions

- Visual Openness & Safety: Use glass partitions and walls to create a sense of openness and enhance visibility and sightlines. Consider combining glass with opaque materials for a balanced approach for practicality.

→ General Recommendations/Materials & Finishes/ Walls

DOORS

Door Materials

- Solid & Opaque: Use solid, opaque doors in Communal Areas to improve visual cues, reduce glare, and enhance privacy and noise control. Incorporate a vision panel to facilitate advance visibility of the space beyond the door.

Mirrors

- Avoid installing full-height mirrors opposite doors, such as those leading to Toilets, to prevent confusion for individuals with declining vision, who may mistakenly perceive mirrors as doorways. (AUS17)

→ General Recommendations/Materials & Finishes/Doors

WINDOWS

Operable Windows

- Integrate landscape views by incorporating large operable windows that enhance natural light and ventilation, fostering a connection to nature. (ACH01; LCA02; LGB03)

→ General Recommendations/Materials & Finishes/ Windows

喺個建築上面有啲大堂係密封，所以有時要等五分鐘個人會癲。但嗰陣時業委會都話冇得搞，個通風問題係改唔到。

Some of the building lobbies are completely enclosed. Waiting there, even for just a few minutes, could drive you mad. Back then, the Estate Management Owners' Committee said their hands were tied, and there was nothing they could do to improve ventilation either.

RI: The Impact of Colour on Emotions
Recent studies demonstrate a strong and consistent link between the brightness and saturation of colours and emotional responses. In contrast, the relationship between hue and emotions, particularly regarding arousal and dominance, is notably weaker. Additionally, individual interactions with colours can influence emotions and perceptions of safety. (AGB17; LSK01)

GENERAL

Touchless Fixtures

- Incorporate touchless or motion-activated fixtures, such as automatic doors and Toilet taps, to minimise the need to touch shared surfaces, enhancing hygiene and convenience.

Engaging Decorations

- Decorate circulation routes with engaging elements to encourage interaction among residents and reduce feelings of monotony. (LMY01)

Linen Blinds

- Install linen blinds designed for easy operation to reduce glare and specular reflections in areas with windows, ensuring natural lighting and unobstructed views. (LMY01)

John Morden Centre by Mæ Architects. © Jim Stephenson
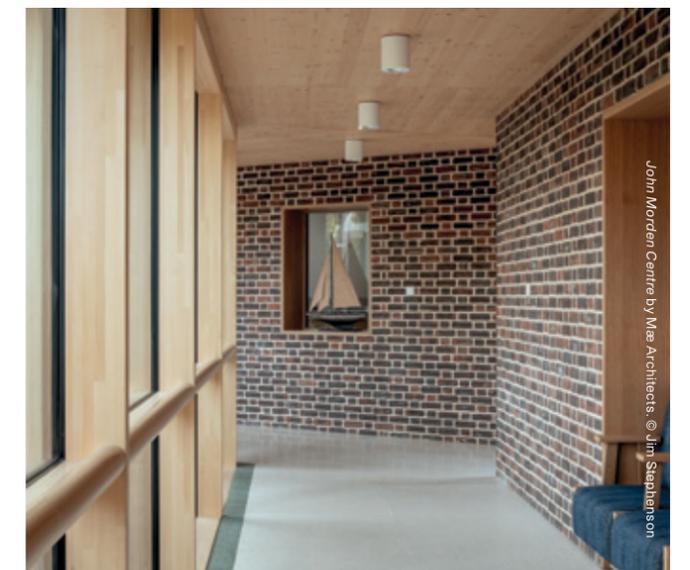
Decorative art piece placed at the turn of the corridor.

John Morden Centre by Mæ Architects. © Jim Stephenson
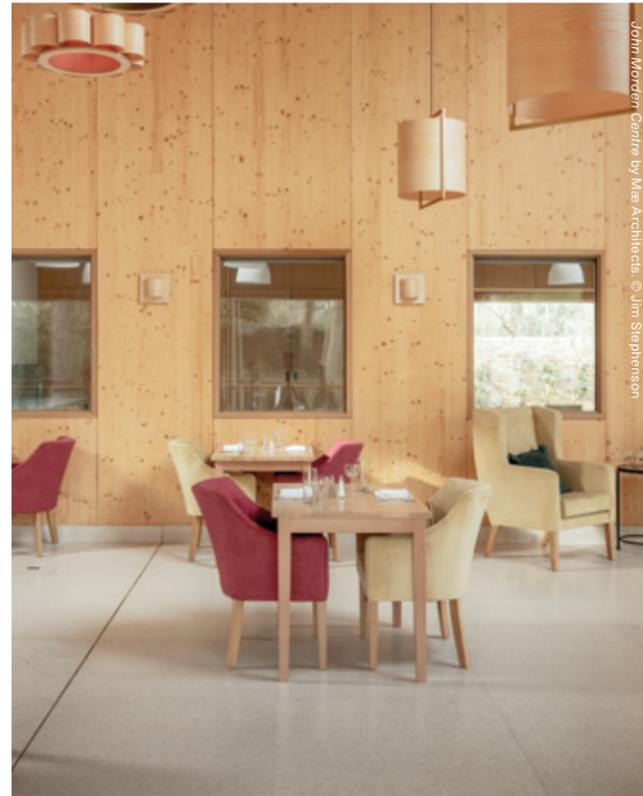
John Morden Centre by Mæ Architects. © Jim Stephenson

John Morden Centre by Mæ Architects. © Jim Stephenson

John Morden Centre by Mæ Architects. © Jim Stephenson

FURNITURE

General

- Varied Configurations: Provide a range of furniture sizes and heights to accommodate individuals, couples, small groups, and diverse mobility needs. (LMY01)

○ Movable Furnishings: Incorporate easily rearrangeable furniture to ensure adaptability for individual sessions, group activities, and community events.

Seating Arrangements (IMAGE)

○ Interactive Layout: Arrange round tables and seating in a way that allows individuals to see the faces of those they are conversing with. (LAU04)

○ Multiple Viewpoints: Organise seating and tables to provide multiple viewpoints, enabling users to observe their surroundings comfortably.

Seating Specifications

○ Seat Height: Ensure seat heights range from 430–470mm for optimal accessibility. (AHK02; ASG08)

○ Seat Depth: Design seat depths between 360–500mm to provide comfort and support. (ASG08)

○ Armrests: Equip seats with armrests to facilitate ease of use. (ASG08)

○ Parking Mobility Aids: Provide ample spacing next to or between seats to accommodate mobility aids. (AHK30; AHK33_3)

- Mobility-Friendly Options: For movable armchairs, use sturdy designs, such as integrated wheels, swivel features and locking mechanisms, to enhance mobility while ensuring stability.

- Outdoor Seating: For external areas, provide covered seating or position seating in shaded locations when possible. Use heat- and slip-resistant materials for safety and comfort.

← Various styles of seating and seating arrangements create dynamic spaces that offer diverse viewpoints and provide different forms of engagement.

Table Specifications

○ Low Light Reflectance: Choose tabletops with a light reflectance of 30–50% and matte finishes to minimise glare. Avoid glossy surfaces to enhance visibility and comfort.

→ General Recommendations/Fixtures & Fittings/Furniture

LANDSCAPING

Indoors

○ Placement & Diversity: Position plants near windows to maximise sunlight exposure while incorporating a variety of species with different masses, colours, and textures to enhance visual interest and ambience. (AHK33_2)

○ Maintenance: Consider slow-growing, non-spreading plants that require minimal watering and provide air-purifying benefits.

○ Design Cohesion: Align the colours of indoor plants with the outdoor plant palette and overall interior design for a harmonious look. (AHK33_2)

Outdoors

→ Clubhouse/Outdoor Landscaped Area/Space Planning

REHAB Basel by Herzog & de Meuron. © photo: www.scanua.ch

Effective wayfinding reduces confusion and enhances the quality of life for residents and visitors, particularly those with vision and cognitive challenges.

WAYFINDING

General

- Intuitive Navigation: Create straightforward routes in Communal Areas to foster familiarity. This is essential for reducing confusion and discomfort among older adults. (LGB03)

- Multi-Sensory Aids: Incorporate aids that engage multiple senses, such as tactile elements or auditory cues, to assist individuals with sensory decline. Simply increasing type size is often insufficient for effective wayfinding; a multi-sensory approach is recommended to enhance comprehension. (AGB26)

- Testing for Legibility: Conduct on-site mock-ups to assess readability for ageing eyes. This step ensures that signage meets the specific needs of residents, verifying its effectiveness in real-world conditions. (AGB02; AHK02)

- Consistent Design: Maintain a uniform style, colour, material, and form across all signage to create a cohesive environment. This aids memory and recognition, which is particularly beneficial for older adults. (AAU07_1; AGB26)

- Strategic Signage Placement: Position signs where residents can easily locate necessary information. Proper placement reduces stress and improves the overall experience in the facility. (AGB26)

Signage Design & Positioning

- Eye-Level Placement: Position important signage at eye level to accommodate those with mobility issues. This recommendation is crucial for ensuring accessibility for all, allowing everyone to easily see and read the information they need.

- Floor-Level Cues: Use arrows and text at floor level for clear visual guidance. Older adults often look down while walking to monitor their surroundings and reduce fall risk, making floor-level cues especially helpful for navigation.

- Avoid Bright Light: Do not place signs directly in front of windows to prevent glare. (AGB26)

Recommended Signage Heights Above Floor Level
(AGB26; AGB27; AUS24)

> Floor-and wall-mounted: 1000–1500mm
> Ceiling-mounted: At least 2100mm
> Fascia signage: At least 3300mm

Colour Scheme & Contrast

- Consistent Colour-Coding: Use a consistent and prominent colour-coding system throughout the facility to navigate and recognise different areas. (AGB26)

- Text & Background Contrast: Maintain a light reflectance value (LRV) of at least 70% for readability, especially for older adults with visual decline. (AGB02; AHK02; AHK31)

- Environment Contrast: Ensure the signage background contrasts with surrounding elements. (AGB26)

Recommended Colour Selection

- Limit Colour Palette: Use no more than five colours to avoid confusion. (AGB26)

- Avoid Safety Colours: Do not use safety colours (e.g. red, yellow) for non-safety areas. (AGB26)

- Distinctive Colours: Choose distinguishable and verbally describable colours for clarity. Avoid automatically using the development's corporate colours for signage and colour-coding. (AGB26)

Lighting & Materials

- Accent Lighting: Illuminate key signage and objects, such as building numbers, to enhance visibility at all hours. (AGB02; AHK31)

- Matte Finishes: Use non-reflective materials to reduce glare and reflections.

- External Signage Illumination: Ensure external signage is artificially illuminated to maintain visibility throughout the day and night. (AGB26)

RI: Older Adult Perception of Colour
As individuals age, vision changes affect their ability to distinguish short-wavelength colours from long-wavelength ones. This decline in vision accuracy is particularly noticeable in recognising pale colours, leading to yellows and pastels appearing white. Additionally, colours like blue, green, and purple may blend into shades of grey for ageing eyes. Therefore, warm, bright colours such as reds and oranges should highlight dangers or essential information. (LSK01)

Typography & Text Layout

- Sans Serif Fonts: Opt for fonts like Helvetica or Arial for better legibility. Sans serif fonts are generally easier to read. Steer clear of serif fonts, italics, and thin-stemmed typefaces. Adopt the same selection methodology for traditional Chinese fonts, such as selecting Microsoft JhengHei (黑體) and avoiding DFKai-SB (標楷體) (DIAGRAM). (AGB26; AHK31)

- Bold for Emphasis: Use bold typefaces for key information to ensure visibility. (AGB02; AGB26)

- Capital & Lowercase Letters: Mix capital and lowercase letters in English signage for better comprehension and recognition. (AHK02)

- Prioritise Legibility: Ensure text size is appropriate for viewing distance; larger sizes for elevated signs. Larger text accommodates those with diminishing eyesight, making information more accessible. (AGB26)

- Destination Listings & Organisation: Limit destination lists to a maximum of five items and organise them logically to facilitate easy information retrieval. (AGB26)

✓ Good Example
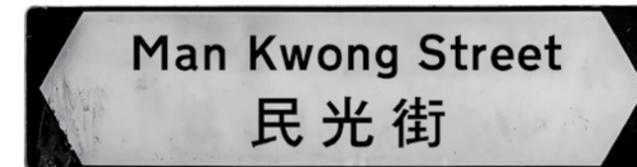
✕ Bad Example

Viewing Distance (VD)	Height for typefaces (VD x 0.07)	Height for pictograms & symbols (VD x 0.09)	Suggested signage type
1m	70mm	90mm	Internal door sign identifying a particular room
5m	350mm	450mm	Floor signage for pedestrians or drivers
10m	700mm	190mm	External locational signage for main building entrances

Suggested size for typefaces (cap height for english and roman numerals, character height for traditional chinese), pictograms, and symbols for declining vision. (LCN13)

Space Planning   Materials & Finishes   **Fixtures & Fittings**   Mechanical & Electrical

Pictograms & Symbols (DIAGRAM)

- Solid Colours: Ensure all pictograms and symbols use solid colours rather than lines, providing high contrast with the background for better legibility from the intended viewing distance. (AGB26)

- Definitive Design: Complement text with simple and definitive pictorial elements in signage to convey information clearly, assisting older adults with cognitive decline in navigating spaces. (AGB02; AHK02; AHK33_3)

- Avoid Complexity: Steer clear of overly abstract or complex symbols, like U-turn arrows, that may be difficult for older adults to interpret quickly. (AGB26)

- Arrow Ratio: Ensure the shaft-to-wings ratio is greater than 1:1. (AHK33_3)

- Recognisable Standards: Use established standards for symbols and pictograms, especially for important communal facilities.

Recommended Standards

- ANSI Z535-2011, ISO 3864, and ISO 7010 for safety pictograms
- ISO 7001 for public information symbols
- Symbols from the American Institute of Graphic Art and U.S. Department of Transport
- The Accessible Icon Project

Directories & Maps

- Location: Site maps should at least be located at Development and Building Entrances. (AGB26)

- Prominent Floor Level Display: Clearly display the floor level on the directory, especially when Entrances are not on the ground floor or are on a slope. (AGB26)

- Oriented Maps: Design and locate maps to help people understand the spaces as they approach them. (AGB26)

- Logical Arrangement: Arrange floor directories in ascending order, with the lowest floor at the bottom and highest floor at the top. (AHK32)

- Accessibility Features: Include details on accessible routes and facilities. (AGB26)

- Essential Location Information: Provide important information about the site's location in relation to nearby neighbourhood facilities, carparks, and prominent landmarks for better orientation. (AGB26)

✓ Good Example

✗ Bad Example

LIGHTING

Recommended Settings

Lux (minimum)
　20 lux (Outdoor areas at night)
　200 lux (Interior areas)
Colour Temperature
　3000K
　2700–5000K (Tuneable Fixtures)

Integration of Daylight

- Natural Light Sources: Incorporate large windows and skylights to bring ample daylight into communal areas. Natural light, complemented with shadings, can significantly improve visibility and depth perception for older adults compared to artificial lighting. (IMAGE)

- Light Distribution: Utilise light wells and atriums to capture and distribute natural light throughout the space. (IMAGE)

- Glare Control: Install blinds or shades to manage the amount of daylight entering communal areas, allowing customisation and preventing glare for residents with sensitive vision.

Automatic Lighting Control

- Equip electric lights with daylight sensors that activate only when natural light levels fall below a set threshold. This feature creates a smoother lighting experience for older adults, ensuring adequate illumination throughout the day.

Uniform Lighting

- Ensure uniform ambient lighting to prevent abrupt transitions between bright and dark areas. Such contrasting light levels can disorient residents, making it difficult for them to navigate spaces safely. (AGB16; AHK02; ASG07)

→ Communal Area/Wayfinding/Lighting & Materials

→ General Recommendations/Fixtures & Fittings/Lighting

RI: Dynamic Lighting and Circadian Rhythm
Implementing an all-LED dynamic lighting system can significantly enhance physical performance and overall well-being. By providing cooler light during the day, it promotes alertness and productivity, while transitioning to warmer, lower-intensity light in the mornings and evenings aids in rest and recovery without disrupting melatonin production. (LES04; LIR02)

REHAB Basel by Herzog & de Meuron. © Katalin Deér

Kampung Admiralty by WOHA. © Patrick Bingham-Hall

HVAC & WATER

Air Circulation

- Strategic Vent Placement: Position air outlets thoughtfully and use diffusers to minimise direct drafts on older adults sitting or standing underneath, ensuring comfort and reducing health risks from sudden temperature changes.

○ Optimised Ductwork Design: Design ductwork and air supply locations for a smooth, uninterrupted flow of air, eliminating dead spots or stagnant areas.

- Minimise Obstructions: Reduce obstructions such as structural beams, pillars, or equipment that could disrupt intended airflow patterns, particularly in high-intensity activity rooms, such as the Gym and Multi-Functional Areas.

○ Supplemental Fans: Install ceiling fans or wall-mounted fans to support the HVAC system and promote better air movement within the space, if needed.

Indoor Air Quality

- Indoor Air Quality Monitoring: Install indoor air quality sensors that monitor pollutants and provide data to adjust HVAC settings as needed, ensuring a healthy environment.

○ High-Efficiency Air Filters: Consider using high-efficiency air filters to improve indoor air quality by removing pollutants, allergens, and odours.

○ Humidity Control: Incorporate humidity control features to maintain comfortable indoor humidity levels, which is especially importants for older adults' health and comfort.

Energy Efficiency & Comfort

- Prioritise Natural Ventilation: Explore opportunities for natural ventilation, such as operable windows or vents, to enhance air quality and reduce reliance on mechanical systems.

○ Zoning Systems: Implement zoning systems that allow for temperature control in different areas of the communal spaces, catering to varying comfort levels among residents and enhancing energy efficiency.

○ Noise Reduction: Prioritise a HVAC system with noise reduction. Use sound-dampening materials and techniques to minimise the sound of airflow and equipment operation.

○ (IoT) Smart Thermostats: Use smart thermostats to optimise HVAC operations. These devices can learn user preferences and adjust settings automatically, improving comfort and energy savings.

→ General Recommendations/Mechanical & Electrical/ HVAC & Water

IoT ITEMS

PLANNING

→ General Recommendations/Mechanical & Electrical/ IoT Planning

SAFETY & SECURITY

Emergency Call Bells

- Location: Install call bells linked to the property management team. Place bells at varying heights to accommodate residents of different mobility levels, including those seated or using mobility aids.

- Wireless Provision: If wearable safety devices are provided, ensure wireless connections are intact, and receivers have complete coverage in all communal areas.

CCTV Camera

○ Install CCTV cameras in communal areas to enhance security, deter potential incidents, and provide peace of mind for residents and staff.

Access Control Systems

○ Implement access control systems, such as card access, to ensure only authorised individuals can enter sensitive areas, enhancing security and safety.

HEALTH INFORMATION

Health-Monitoring Devices

- Health Empowerment: Integrate health-monitoring devices that connect to residents' personal devices complemented by relevant services, allowing them to actively track their health status and progress. For instance, the 'iHealth Screen' app provides free self-help health screening tests on key topics for older adults.

○ Healthcare Data Management: Consider establishing a healthcare server to collect and store residents' health data, which can be accessed by the residents, carers, and healthcare professionals in the development with residents' explicit consent (AUS38; LAT01)

- Promoting Healthy Ageing: Place health information and technologies in high-traffic areas, such as lift lobbies and lounges, to encourage healthy ageing as part of residents' daily routines.

Recommended Equipment

○ Digital weighing scale with height rod

○ Automated External Defibrillator (AED)

○ Health screening kiosks

Environmental Sensors

○ Install sensors to monitor environmental conditions such as carbon monoxide, temperature, and outdoor air quality, alerting staff to potential hazards and for older adults to reference.

INFORMATION & COMMUNICATION

Public Address System

- Building-Wide Announcements: Implement a public address system to facilitate efficient reminders and announcements from property management. (AUS06)

○ Speaker Placement: Position speakers at shorter intervals and broadcast at a lower volume to enhance intelligibility. Pair with visual displays for residents with hearing decline. (ACA04)

Interactive Kiosks

- Intuitive Interface: Incorporate interactive kiosks throughout, including Clubhouse, to provide residents with up-to-date information, wayfinding assistance, and community engagement opportunities. (AHK02; ASG05; AUS26_610)

- Screen Quality: Ensure displays have high contrast and no flickering. High-quality screens are crucial for visibility and usability. (AHK02)

Main
Circulation
Route

REHAB Basel by © Herzog & de Meuron

REHAB Basel by © Herzog & de Meuron

REHAB Basel by © Herzog & de Meuron

REHAB Basel by © Herzog & de Meuron
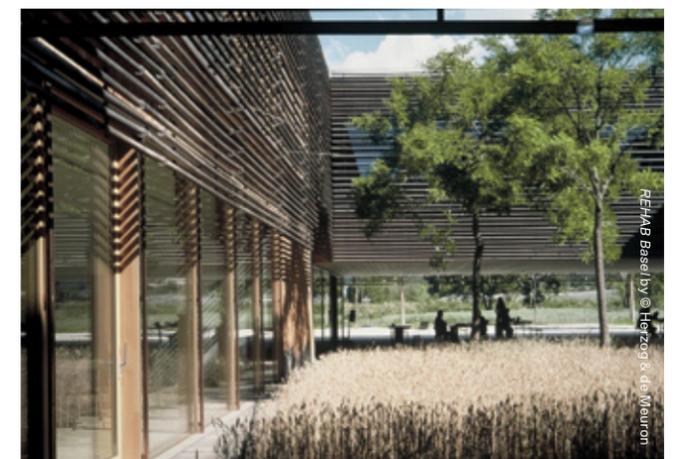
REHAB Basel by © Herzog & de Meuron

Varied internal courtyards serve as orientation cues and bring daylight into circulation spaces.

Harriet Hardy Extra Care Home by Mæ Architects. © Tim Crocker

Open-plan layouts and wide circulation paths ensure easy movement with or without mobility aids, while low window ledges keep residents connected to the Communal Area, even when seated.

REHAB Basel by © Herzog & de Meuron

Dedicated path leading up to the main entrance, with a smooth, level floor surface for safety and easy movement with mobility aids.

The Main Circulation Route, known as The Route, should facilitate ease of movement throughout the development, even in inclement weather. It should encourage residents, particularly those who drive less, to stroll at their leisure through the housing community and enjoy a safe connection to the surrounding neighbourhood. Starting at the Development Entrance, The Route should seamlessly weave through Drop-off Areas and major amenities, guiding residents to the entrances and lobbies of residential buildings and flowing up to the floor corridors outside their Dwellings.

Sentidos Comprehensive Centre for the Elderly by Estudio Cordeyro & Asociados. © walbergalledo

THE ROUTE

Manoeuvring Space

→ General Recommendations/Space Planning/Accessible Route

→ Communal Area/Space Planning/Accessible Route

Covered Route

- Weather Protection: Provide continuous overhead cover along The Route.

- Sunlight Control: Avoid transparent canopies and introduce natural shading when appropriate. (AUS23; LHK02)

○ Landscaping: Consider landscaping that can withstand exposed conditions and shallow soil on top of the covered walkways to enhance the view from the Dwelling. (AHK33_2)

Avoid Four-Way Junctions

- Avoid four-way junctions to ensure at least one handrail on either side of The Route.

Operable Windows

- Incorporate operable windows in interior corridors for natural lighting and ventilation.

Seating Provision

- Spacing of Seating: Provide seating at intervals of no more than 50m (about 50 seconds of walking distance for older adults) along exterior Routes.

○ Clear Width Maintenance: Ensure seating does not encroach on the minimum required clear width of The Route.

○ Wheelchair Parking: Include wheelchair parking spaces next to seating areas to allow caregivers to sit side by side with users.

RI: Seating Arrangements for Various Needs
The recommended distance limit without rest for walking stick and cane users is 50m, 100m for those with mobility issues, and 150m for those with declining vision and individuals using mobility aids. (AGB33)

FLOORINGS

Recommended Settings

Slip Resistance
R12, or equivalent (All areas)

Visuals

- Use a colour that contrast with to the surrounding flooring to emphasise the Route.

Manholes, Gratings & Drains

- Anti-Slip: Choose non-slip surfaces, such as using textured materials.

- Positioning: Position manholes, gratings and drains beyond the clear width of the Route.

○ Workmanship: Ensure good workmanship and maintenance for perfectly flush surfaces to avoid tripping hazards for older adults.

DOORS

Automatic Doors

- Ensure all doors are automatic along The Route for comfortable access, especially heavy doors.

○ Use markings on the floor to indicate the direction of swings.

RI: Outdoor Fall Prevention Strategies
Research estimates that 55% of slip, trip, and fall incidents occur on slippery surfaces, often due to high humidity or rainfall. Notably, falls among women aged 75 and older increase by 60% during heavy rain. Surfaces like impermeable pavements, such as gravel paths, become dangerously slick when wet, making them hazardous for older adults with reduced physical strength. Furthermore, inadequate floor maintenance can create uneven surfaces and debris, leading to tripping hazards. To mitigate these outdoor fall risks in age-friendly environments, recommendations emphasise the importance of regular checking and floor recovery by the property service team. (LES03; LHK12; LNL03; LUS25)

Horizon Retirement Living by Peter Zumthor. © Na-Shan
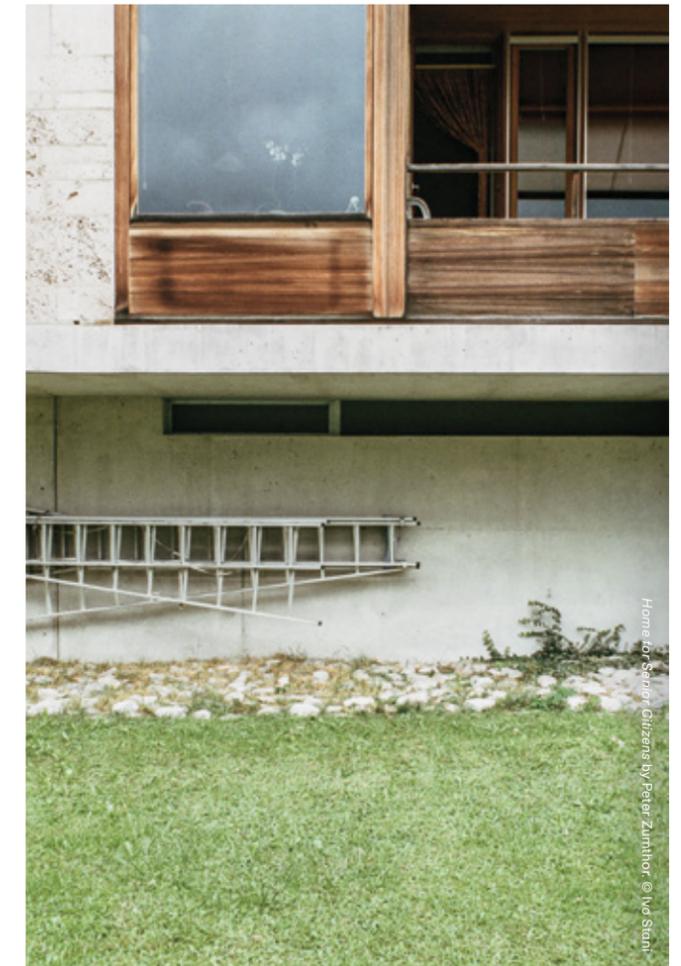
Continuous handrail from corridor to staircase, with rounded corners for a seamless connection.

HANDRAILS

Continuous Handrails

- **Dual-Level Handrails:** Install continuous, dual-level handrails on both sides of the Main Circulation Route, wherever feasible.

- **Handrail Continuity:** Ensure handrails are installed on both sides of The Route, ideally within arm's reach, to provide support in case one side is disconnected, such as at fire exit doors or junctions.

- **Removable Handrails:** If feasible, include removable handrails on any wall openings, such as fire exits.

- Fire Rrated: Use fireproof handrails on fire-rated fittings with reference to the adjacent non-fire-rated handrails for consistent aesthetics.

- **Curved Handrails:** Employ curved handrails at corners and turns for continuous support.

Thermal Stability

- Use thermally insulated materials to avoid overly cold or overheated handrails, particularly for exterior spaces.

Handrail Lighting

- Incorporate indirect lighting within the handrail to illuminate stepped flooring and provide guidance without creating glare.

WAYFINDING

Orientation Cues

- **Design Features:** Strategically place items and/or landmarks such as landscaping, art pieces, and/or informational posters at junctions, long corridors, and dead ends to aid wayfinding and identification for older adults. (LMY02)

- **Additional Signage:** Ensure frequent placement along the Route to reassure residents and visitors that they are still on the correct route. (LUS31)

RI: Enhancing Spatial Orientation in Residents with Moderate Dementia
Research indicates that displaying photographs of residents with moderate dementia from their younger years, rather than current images, can enhance their spatial orientation and sense of place. Familiar and meaningful visual cues from an individual's past positively influence their ability to navigate and orient themselves within their environment, even as cognitive abilities decline. (AAU07)

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux	3000K

The atrium, with its distinct design features, serves as an orientation cue.
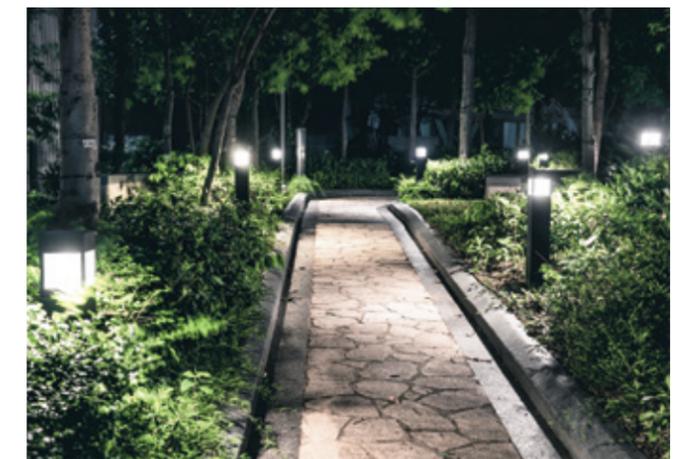
Garden path with lamp posts to assist wayfinding.

The Development Entrances serve as gateways to the development and to The Route, and should create a seamless and comfortable arrival and departure experience. Design should foster a warm and inviting atmosphere, easing the transition between public and private realms. These inviting spaces should not only encourage physical interaction between staff and residents but also act as portals to a place of confidence and autonomy.

Space Planning　Materials & Finishes　Fixtures & Fittings　Mechanical & Electrical

EXTERNAL RELATIONSHIPS

Connection to Street

- Safe Access: Orient main and secondary entrances towards flat surfaces for accessibility, avoiding sloped streets to enhance safety. (AGB33)

- Neighbourhood Connectivity: Ensure permeability from the Development Entrances to street networks and transport stops.

→ Appendices/Accessible Neighbourhood Audit

INTERNAL AREA

Prominent Entry

- Visibility: Use protruded or recessed designs for clear wayfinding and a sense of arrival.

- Taxi Assistance: Install a taxi-hailing lightbox at the main Development Entrance. (LHK56)

Space Planning　Materials & Finishes　Fixtures & Fittings　Mechanical & Electrical

WAYFINDING

Identification Cues

- Entrance Signage: Ensure the Entrances are is accompanied by clear and legible signage displaying the name, street, and street number with adequate lighting for visibility at night.

- Entrance Differentiation: Name each Entrance if the Development has more than one Entrances. (AGB26)

- Design Features: Integrate visually appealing features that differentiate the Development Entrances from Building Entrances.

Sun City Kobe Tower by Richard Beard Architects. © Steve Hall

行正門要兜個大圈，咁嗰啲人六十歲初初黎無所謂姐，但係九十歲嗰啲又唔係行得，係唔係唔使坐輪椅先？輪椅要兜落去,幾辛苦啊。

To get to the main entrance, you have to walk around the block. That's fine if you're in your 60s, but 90-year-olds can't walk that distance. And what about wheelchair users? It's very hard for them to get all the way round.

The Carpark should be designed with accessibility and convenience in mind, ensuring a seamless experience for residents. Ample parking spaces should be strategically located near Building Entrances for easy access, while clear signage and well-lit areas enhance navigation and safety. Designated spots for residents with limited mobility promote inclusivity, and features such as wide parking spaces and smooth corridors, further improve functionality and accessibility for all users.

© Raban Haaijk on Unsplash
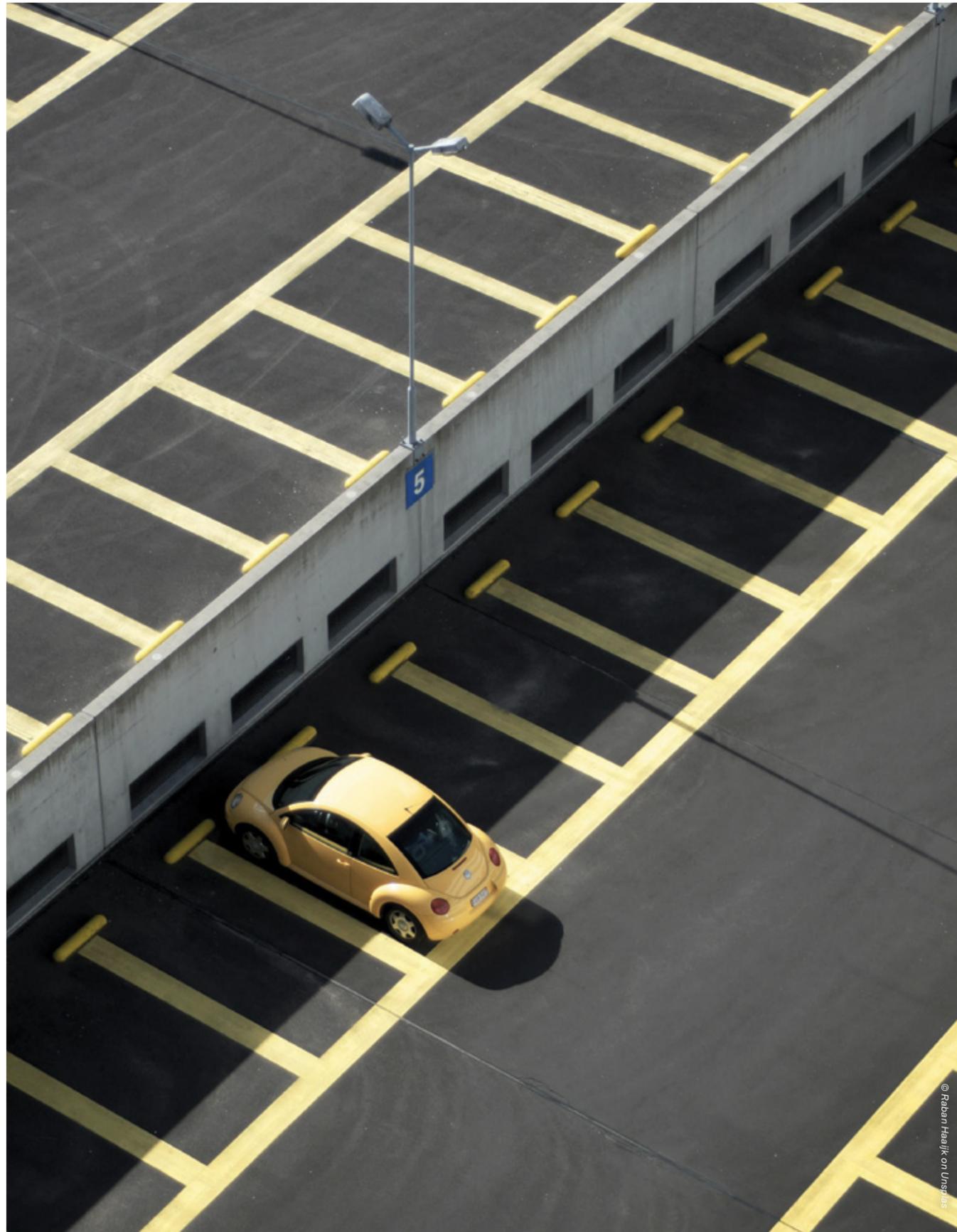
INTERNAL AREA

Drop-off at Carpark

- Convenient Drop-off: Incorporate a Drop-off Area next to the Building Lobbies to facilitate convenient drop-off for caregivers before parking.

- Pedestrian Route: Ensure level, accessible pedestrian routes to Lobbies. (ASG01; ASG07)

Family Parking Spaces

- Location and Accessibility: Allocate family parking spaces near the Building Lobbies for easy access.

- Colour Contrast: Use colours that contrast with the floor colour for easy identification from afar.

General Parking Spaces

- Clear Space Markings: Ensure visibility for drivers and pedestrians. (IMAGE)

- Straightforward Design: Keep driveways simple and easy to navigate. (AHK02)

- Wheel Stops: Use contrasting colours for wheel stops to prevent tripping hazards.

WAYFINDING

Identification Cues

- Use locational signage and site maps to help residents remember parking spots. Carparks should have memorable identities using numbers, letters, names, colours, symbols, or images. (AGB26)

Directional Cues

- Provide directional signage to guide users to the nearest exit. (AGB26)

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
20–40 lux	3000K

Transitional Lighting

- Gradual Brightness: Include transitional lighting between outdoor and indoor environments, particularly for underground and/or indoor parking.

- Natural Lighting: Use skylights in indoor Carparks for better understanding of outside conditions.

Automatic Lighting Control

→ Communal Area/Fixtures & Fittings/Lighting/Automatic Lighting Control

The Drop-offs, Building Entrances and Lobbies of the Residential Buildings are designed to create an inviting arrival experience. These spaces foster meaningful connections between residents and staff, allowing individuals to seek assistance, gather information, and address emergencies effectively. Additionally, they should provide a comfortable area for residents to linger or catch their breath between trips, enhancing the sense of community among those who share the same building.

EXTERNAL RELATIONSHIPS

DROP-OFFS (Fig.22)

Connection to Residential Buildings

- Provide a Drop-off Area for each Building Entrance to minimise walking distances.

Connection with The Route

○ Ensure the Drop-offs directly connect to the Main Circulation Route.

Separation for Ambulances

○ Consider establishing a dedicated, low-profile ambulance Drop-off and pickup area to ensure the privacy of injured residents during transfers.

INTERNAL AREA

Prominent Entry

- Visibility: Use protruded or recessed designs for clear wayfinding and a sense of arrival.

Visibility to Reception Counters

- Prominent Reception: Incorporate a prominent, staffed reception right next to the Entrance to facilitate engagement with residents and visitors and to spot any irregularities in daily routines.

• Clear Visibility: Design and ensure clear visibility between the Drop-off Areas, where accidents are common, and the staffed reception to ensure prompt assistance in case of emergencies.

Adequate Lobby Space

○ Ensure a minimum of 1500 × 1500mm levelled clear area for a landing or turning space on both sides of every Building Entrance, clear of any door swing. (Fig.22) (AIE01_2)

Seating Provision

○ Create comfortable waiting areas with seatings in Lobbies, including typical floor Lobbies.

Visual Access

○ Incorporate large window walls in the Lobbies to maximise visual access to soft landscapes and create a welcoming atmosphere that helps older adults comfortably adapt to light changes. (AHK02; AHK33_2)

Covered Drop-off outside Building Entrance

DROP-OFF

(1500)

(1500)

BUILDING LOBBY

Dropped kerb

PEDESTRIAN CIRCULATION
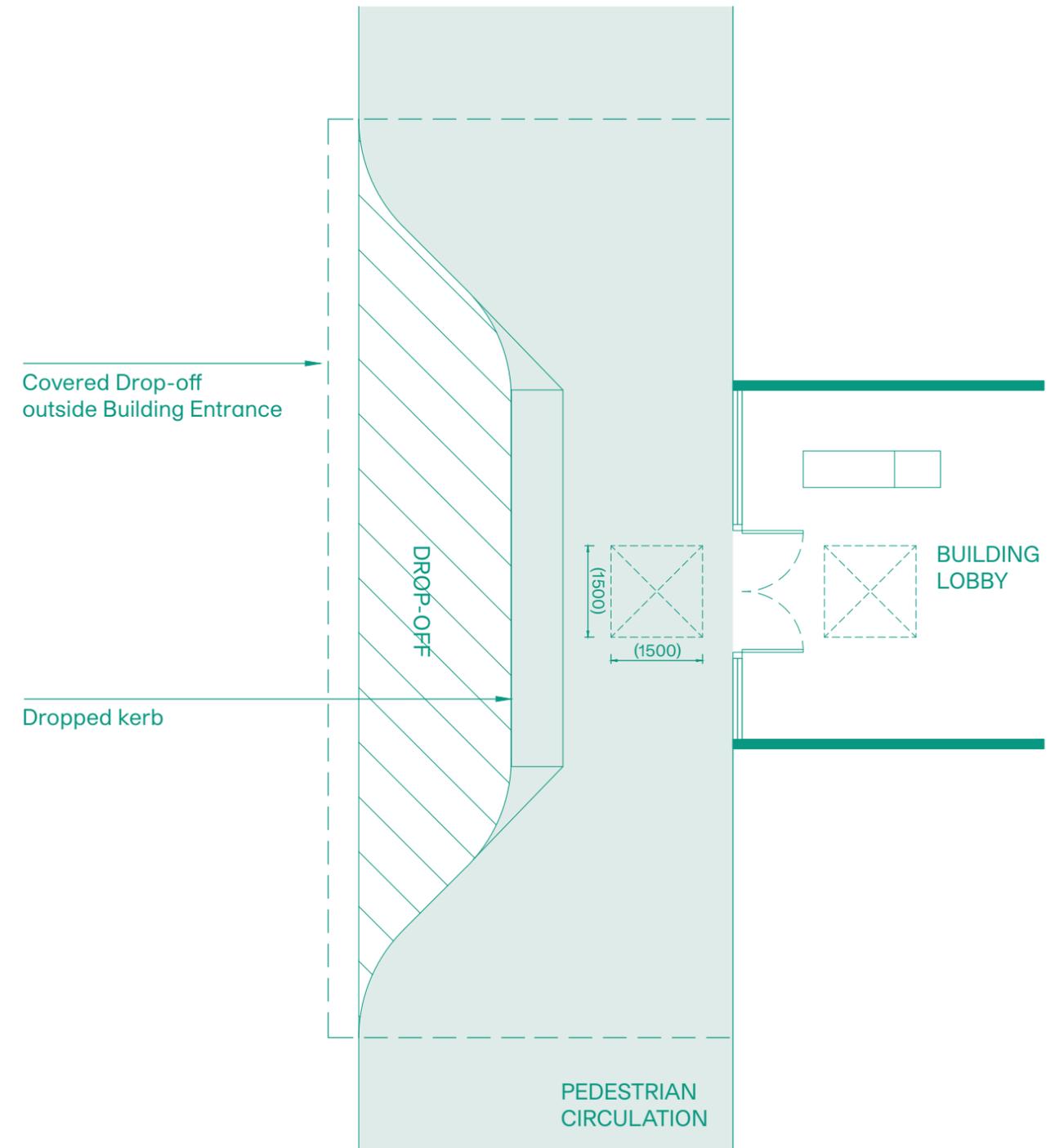
Fig.22 Space Planning for Drop-offs, Building Entrances, and Lobbies

FURNITURE

Seating & Tables

- Ensure seating and tables are sturdy yet easily movable to facilitate adaptable conversation setups and improve manoeuvrability for individuals with mobility aids.
- → Communal Area/Fixtures & Fittings/Furniture

RECEPTION COUNTERS (Fig.23)

Dimensions

- Multi-Level Design: Provide two-level reception counters with the high portion at a maximum height of 1000mm, and the low portion at a maximum height of 750mm, to cater to both standing and seated residents while enhancing visibility between residents and staff.
- Leg Room: Provide leg room, for the lower portion, with a height of at least 680mm above floor level and a depth of 450mm, where chairs or wheelchairs are expected.

Accessibility Features

- Stability Options: Incorporate grooves, ledges or handrail at the edges for older adults to stabilise themselves while standing. (AJP01)
- Notches: Consider including notches for holding walking sticks, using non-slip materials to enhance grip. (AHK02)
- (IoT) Induction Loop System: Consider installing induction loop systems to assist individuals with hearing aids, ensuring no magnetic interference. (AGB26)

Linen Blinds

→ Communal Area/Fixtures & Fittings/General

FITTINGS

Mailboxes

- Accessible Height: Provide mailboxes between 450–1450mm above floor level to accommodate different heights and abilities.
- Unassigned Mailboxes: Include several unassigned mailboxes at lower heights for easy access by residents using mobility aids. (IMAGE)

WAYFINDING

Identification Cues

- Visibility: Ensure locational signage is visible and legible for both drivers and pedestrians from all directions of approach, illuminated at all times. (AGB26)
- Floor Numbering: Display floor numbers and information prominently opposite Lift doors. (AHK32)

Orientation Cues

- Provide maps or written directions to key destinations at the Reception. (AGB26)

LIGHTING

LOBBIES

Transitional Lighting

- Lighting for Adjustment: Install ample lighting at Building Entrances to assist with transitions between Drop-offs and Lobbies, especially at night.

Reception Counters

- Lip-reading Support: Ensure the counters are well-lit to enable lip-reading for individuals with hearing aids. (AGB26)
- Avoid Silhouettes: Do not place light sources behind the receptionists.
- Shadow-free Lighting: Avoid using downward direct lighting above the reception counters and the seating areas to avoid casting shadows on the face. (AUS17)

Handrail for standing
Groove for standing
Ledge for sitting

Approx. 1000
Max. 750
(680)
(450)

Fig. 23 Reception Counters in Communal Areas

All passenger lifts should be designed for accessibility, providing ample space for mobility aids. Strategically located along The Route, these lifts should enhance fluid movement. Additionally, a Service Lift accommodating a standard medical stretcher in a fully horizontal position is essential for the building's emergency response plan, facilitating efficient evacuation for residents requiring immediate medical attention. This lift should be positioned away from the Main Circulation Route to maintain privacy.

INTERNAL AREA

ACCESSIBLE LIFTS (FOR PASSENGERS)

Lift Car Dimensions (Fig.24)

- Ensure that all Accessible Lift cars have minimum dimensions of 1500mm deep by 1400mm wide. This will provide sufficient manoeuvring space for a 1200mm diameter turning circle considering the inclusion of a fixed bench that is 300mm deep.

RI: Optimising Safety with Stretcher Design
Stretcher beds are essential for safe patient transport, ensuring proper positioning to minimise pain and prevent movement at injury sites, especially for suspected hip fractures. Unconscious patients should remain flat to maintain blood circulation, as an upright position can lead to fatality. This positioning also optimises height for effective cardiopulmonary resuscitation (CPR), reducing practitioner fatigue and enhancing survival rates for critical conditions. (LGB10; LSE04; LTW07)

SERVICE LIFTS (FOR STRETCHERS)

Lift Car Dimensions (Fig.25)

- Design the Service Lift cars with minimum dimensions of 2300mm deep by 1500mm wide to accommodate a stretcher in a fully horizontal position, along with accompanying escorts.

- Manoeuvring Space: Confirm the swept path, which is the space needed for the stretcher to navigate through corridors, Lobbies, and Service Lift cars, to ensure safe and efficient movement.


Fig.24   Accessible Lifts in Communal Areas
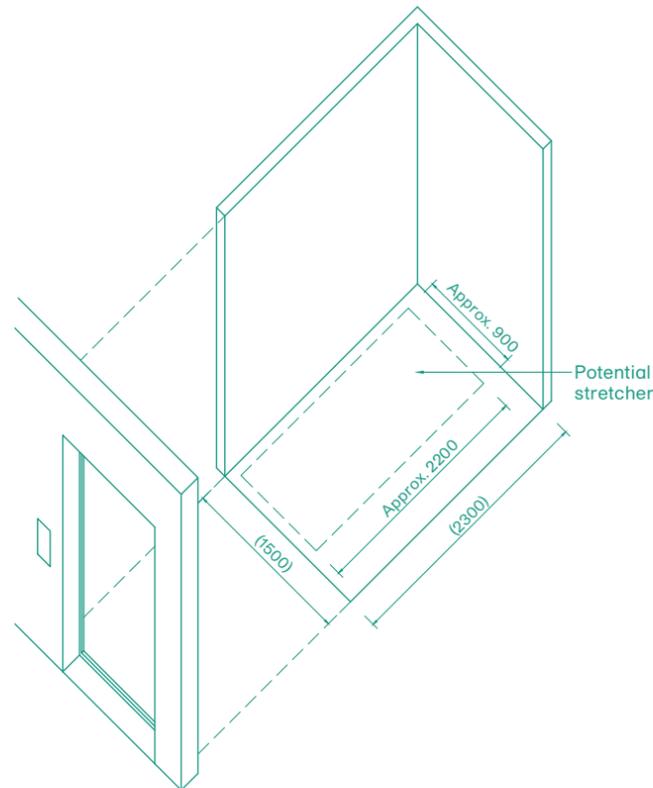
Fig.25   Service Lifts for Stretcher Beds

FURNITURE

Seating

- Ensure provision of non-foldable seating without intruding into the diameter of 1200mm turning circle.

FITTINGS

Lift Panels

- Clear Labelling: Use large, high-contrast text and symbols for clear button labelling to benefit individuals with visual declines.

- Prominent Function Buttons: Provide dedicated, prominently placed buttons for 'Open Door' and 'Close Door' functions.

Mirrors

- Rear Wall Mirror: Place mirrors on the rear wall to aid spatial awareness and reversing for individuals with limited mobility.

- Positioning: Position the mirror between 800mm to at least 1800mm above floor level to provide a comfortable view for individuals with mobility aids, while also accommodating non-foldable seating.

- Avoid Full-Height Mirrors: Avoid placing full-height mirrors in Lift cars to prevent confusion about the lift door opening.

HANDRAILS

Continuous Handrails

- Install continuous handrails on all sides of the accessible Lift walls for improved stability and support, except where seating is provided.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
150 lux (Lift Car)	3000K
200 lux (Control Panel)	

Backlit Buttons

- Incorporate backlit buttons to improve visibility and contrast, making them easier for older adults to see and locate, especially in dimly lit or variable lighting conditions. Use high-contrast colours, such as white or light-coloured buttons with dark backgrounds.

Flashing Lights for Door Movement

- Include flashing lights or visual indicators around the Lift door leaves to signal when they are opening and closing.

Avoid Downlights

- Avoid using high-intensity downlights or spotlights on the ceiling, as these can create glare and discomfort for individuals lying on a stretchers. (AUS17)

有櫈就好啲嘅，有時買得多嘢，就算唔係要張櫈嚟坐，都可以要張櫈嚟放下嘢。

It's better to have a chair. And not just for sitting… Sometimes I buy so much I need a chair to put my things on!

Ramps are vital in Residential Developments, offering accessible journeys that enhance mobility for residents, especially those with disabilities or limited mobility. Designed with a gentle slope, Ramps ensure smooth transitions between levels, promoting independence and an active lifestyle.

INTERNAL AREA

Ramp Gradient

○ Maintain a gentle slope of 1:20 (5%) or less for optimal accessibility and safety. (AHK01; ASG01)

Direct Linear Designs

○ Avoid curved Ramps that reduce visibility and involve complex movements.

HANDRAILS

Dual-level Handrails

○ Install continuous dual-level handrails on both sides of Ramps, even for minor gradients.

LIGHTING

Consistent Lighting

● Ensure consistent and even lighting along the entire length of Ramps, not just at the landings, to avoid unnecessary shadows that can lead to problems with depth perception for older adults.

Seniors Residence and San José Chapel by Peñín Architects. © Diego Opazo

Accessible Staircases along The Route encourage an active lifestyle. Stair walking builds muscle strength and helps reduce the risk of frailty, though precautions are needed to mitigate fall risks during descent. These stairs can be internal, external, or connect various floors within the residential buildings. By incorporating this active route, residents can easily integrate stair use into their daily routines, fostering empowerment and fluidity in movement.

Fig.26   Staircases in Communal Areas

300–350

250

Anti-slip nosing (50)

1500

Handrails

Additional handrail

300–350

Max. 150
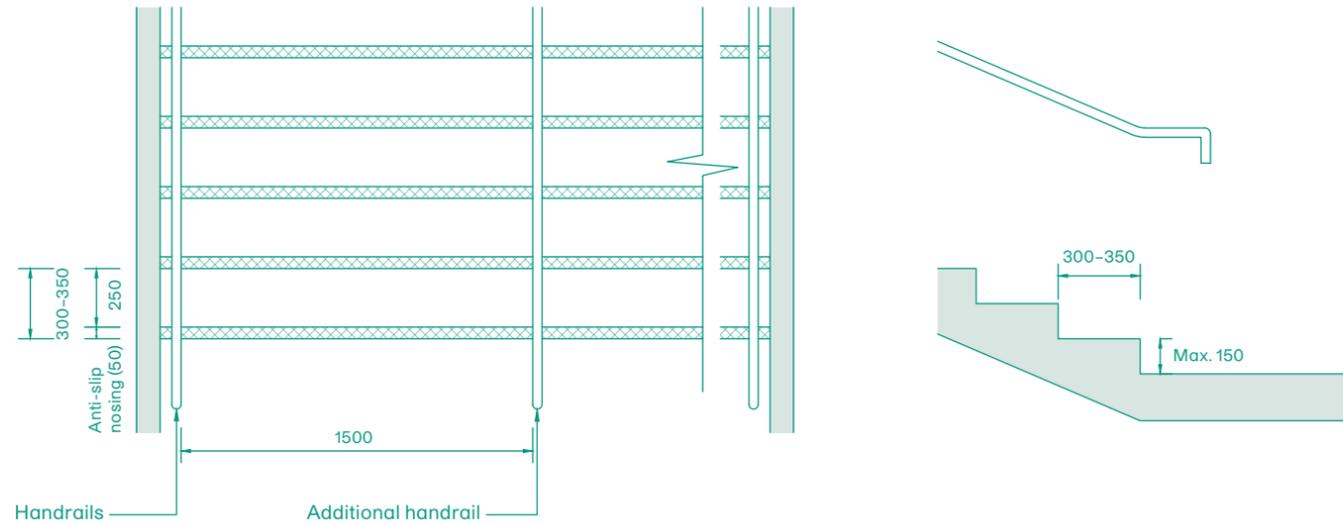
INTERNAL AREA

Encourage Stair Use

- Seamless Integration: Position stairs centrally to encourage use as an alternative to Lifts.

- Active Signage: Use signage (such as calorie counters) to encourage active living and mobility. (IMAGE) (AHK33)

Direct Linear Designs

- Avoid curved Stairs that reduce visibility and involve complex movements, especially when stepping at an angle with uneven tread width.

Wider Treads & Lower Risers (Fig.26)

- Uniform Risers: Ensure uniform risers within each flight. (AGB04; AHK01; AHK28)

- Tread & Riser Dimensions: Use tread depths of 300–350mm and riser heights of no more than 150mm within each flight.

- Avoid Excessive Tread Depth: Tread depths over 350mm can impede the natural gait pattern of older adults, compromising their balance and stability and increasing the likelihood of tripping or falling.

Operable Windows

- Natural Lighting & Ventilation: Incorporate operable windows for natural daylight whenever possible at Staircases, including Protected Means of Escape, to promote active lifestyle as a daily routine.

FLOORINGS

Contrast for Risers & Treads

- Paint the Stair risers lighter than the treads, to create a clear definition between each step and to avoid visual confusion.

Nosing Strips

- Non-Slip: Install non-slip nosing strips with a minimum width of 50mm on the leading edge of each tread. (Fig. 26) (AAU05; ASG01)

- Colour: Use coloured nosing strips to provide a clear contrast between the tread and riser edges.

WALLS

- Ensure distinct colour differences for each floor level indicator to encourage walking and signal soon-arriving levels.

FURNITURE

Seating

- Consider providing seating at Stair landings for older adults to rest and regain balance between flights.

HANDRAILS

Dual-level Handrails

- Handrail Continuity: Install continuous dual-level handrails along flights on both sides of any Staircases, even for a single step. They give older adults more confidence in their mobility and allow them to move about independently, without fear of losing their balance.

- The top of the upper handrail should be at a height between 850–950mm.

- The top of the lower handrails should be at a height between 700–850mm.

- The space between the top of the upper handrail and the top of the lower handrail should be at least 150mm.

- Additional Handrails: Incorporate at least one additional handrail in the middle for staircases wider than 1500mm. This allows two individuals to safely grab their respective handrails while navigating the stairs. (Fig.26)

- Beyond 1500mm, individuals may be inclined to reach out or grab onto the handrail, which can compromise their stability and increase the risk of accidents or falls.

WAYFINDING

Identification Cues

- Floor Numbering: Display floor numbers and information prominently at floor landings. (IMAGE) (AHK32)

LIGHTING

Consistent Lighting

- Ensure consistent and even lighting along the entire length of the Stairs, not just at the landings, to avoid unnecessary shadows that can lead to problems with depth perception for older adults.

Clubhouse

Advancing Health Equity
through Inclusive Clubhouse Design

The Clubhouse, which includes residential recreational and other communal facilities, should be committed to advancing health equity—ensuring every resident has a fair opportunity to attain their full health potential, regardless of age, background, or circumstances. This principle must be the guiding light that illuminates every facet of the Clubhouse's design and operations.

While Clubhouses have traditionally targeted younger families, this Guide offers an additional provision for older adults to complement the general Communal Areas and facilities. To uphold the vision of healthy ageing, the Clubhouse should reflect a comprehensive understanding of the diverse health needs, including physical, cognitive, and social wellbeing, within the residential community.

By actively engaging with residents through targeted health education programmes and health screening initiatives, the Clubhouse can gain invaluable insights into the unique challenges faced by older adults, including those living alone and the more vulnerable members of the community. Possessing this in-depth knowledge of the community's health profile, the Clubhouse can then strategically align and link its programmes, services, and resource allocation to address specific needs in an equitable manner.

In fact, the health conditions of older adults are often multifactorial in nature, not fitting into discrete organ-based categories. Multi-component interventions involving physical exercise, cognitive training, and nutritional education can be necessary for optimal preventive effect. The Clubhouse should proactively tailor its programmes to enable full and inclusive participation, addressing any barriers that may disproportionately impact certain residents.

The physical design of the Clubhouse facilities must serve as an integral extension of this service-based approach. Thoughtful layouts and design elements support multi-component interventions in the Clubhouse, through four key areas: the Concierge, the Multi-Component Area, the Transitional Care Area and the Outdoor Landscaped Area.

This holistic spatial configuration aims to create an environment that supports the independence, dignity, and overall wellness of all older adults, as part of the wider residential community.

Key Areas of Clubhouse

|	
Concierge	**Multi-Component Area**
Transitional-Care Area	**Outdoor Landscaped Area**
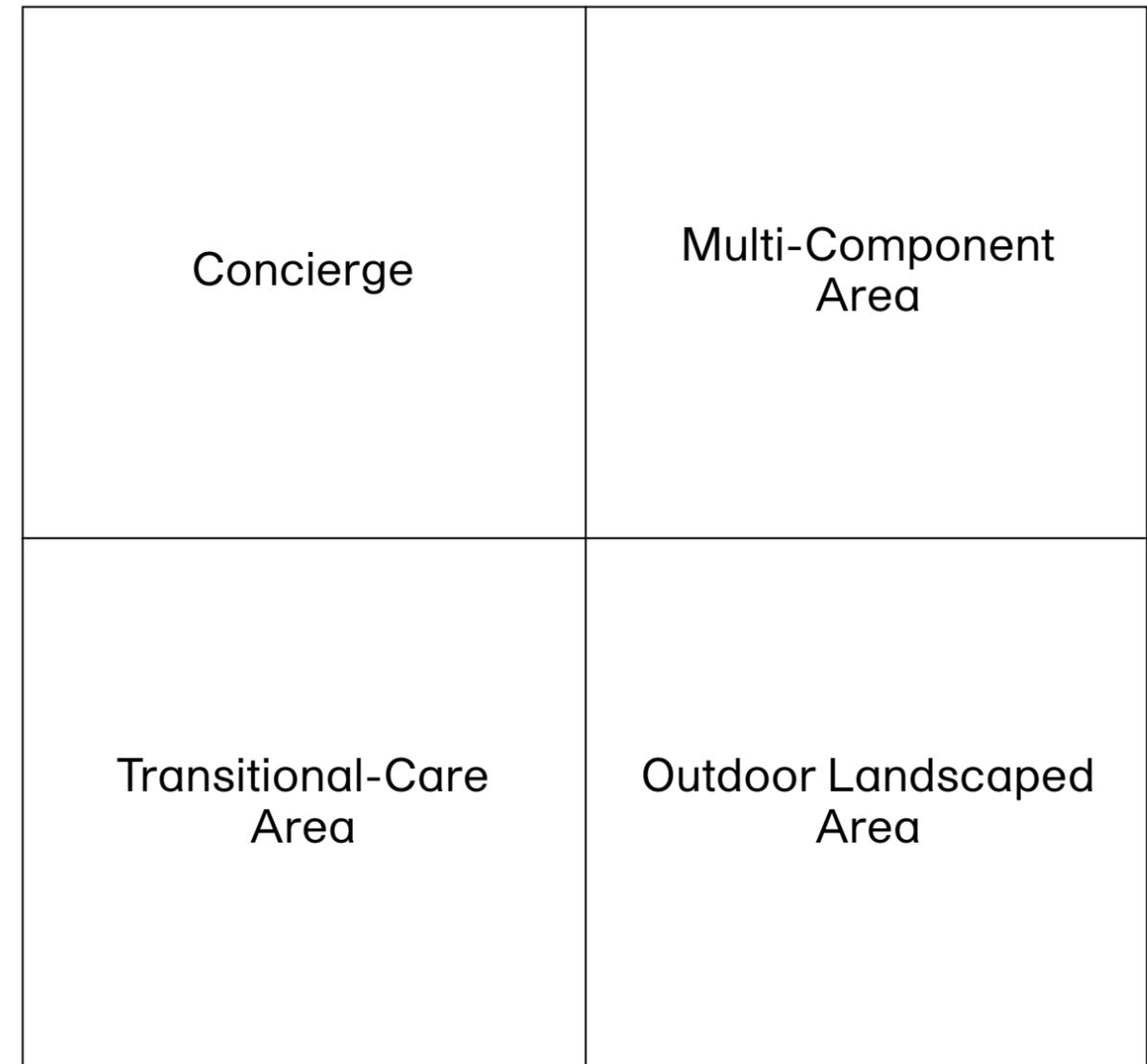
This chapter focuses solely on area-specific recommendations. For general recommendations that may also apply to Clubhouse, please refer to the following sections:

→ General Recommendations
→ Communal Area

m² = Approximation of minimum space required
Triangle ▶ Entrances
Black arrow ⟶ Functional relationship
Green arrow ⟶ Window view out
Family Toilet = Equivalent to disabled toilet

Clubhouse Entrance

Concierge

Hair & Nail Salon
· Personal care for relaxation and pampering.

Chinese Medicine Clinic
· Preventive and chronic healthcare.
· Popular among older adults. 20m²

Reading Room
· Health periodicals and computer access.
· Connect with Front Desk to enable prompt staff assistance in technology.

Staff Office
· Staff numbers are expected to grow to provide enhanced services for more older adults.
· Include a staff changing area.

Lounge
· Centrally located, this spacious social hub enables health information exchange and flexible use.

Front Desk

Family Toilet

Family Toilet

Consultation Rooms
· Private/online chats with staff/health practitioners.
· 6.5m²/room

Multi-Component Area

Transitional Care Area

VR Room
· Multi-sensory cognitive training.
· 10m²

Waiting Area

Staff

Consultation/ Quiet Room
· Private chat (e.g. speech therapy)
· Plinth bed available
· 12m²

ADL Room
· Domestic living skills training, e.g. cooking, bed/seat transfer.
· 10m²

Staff Office

Plinth Bed Area
· For both physiotherapy and occupational therapy.

Family Toilet

Family Toilet

Family Toilet

Family Breakout Room
· Family involvement and experience share in therapy sessions.

Occupational Therapy Area
· Training for daily living activities, fine motor skills and cognitive functions.
· Connect with ADL Room, VR Room, and outdoor rehabilitation garden for enhanced training.
· 4m²/User

Physiotherapy Area
· Training for physical mobility.
· Improve movement & reduce pain.
· Connect with the gym and outdoor exercise area to facilitate advanced training.
· 6m²/User

Hydrotherapy Pool
· Therapy for mobility, muscle strengthening, pain relief, post-fall rehabilitation, and stress reduction, etc.
· 15m x 10m (3 lanes) × 1.1m deep

Communal Toilet & Changing Room

Gym
· Equipments fit for various mobility and strength.
· Include focuses on endurance, balance, mobility and resistance training, tailored for older adults.

Main Clubhouse Facilities

Multi-Functional Rooms
· Lifestyle programmes combining physical and cognitive training with nutrition workshops, max 15 participants per session.
· Next to the Lounge for flexible use in health and social programmes.
· 4m²/User

Communal Dining
· Healthy eating for cutting risks of malnutrition and cognitive decline.
· Connect with Communal Kitchen for comprehensive integration of nutrition workshops.
· 1.4m²/User

Kitchen
· 40% of Communal Dining Area

Communal Kitchen
· Nutrition talks and hands-on skill training.
· Connect with Communal Farm to promote balanced, healthy diet.

Outdoor Landscaped Area

Podium & Outdoor Exercise
· Rehabilitation garden for cognitive and sensory engagement.
· Stretching and strolling to sustain physical activity level, especially when older adults age.

Communal Farm
· Horticultural activities to boost intake of fruits and vegetables.
· Visual connection with Communal Dining Area and Communal Kitchen to promote mindful eating and facilitate farm-to-table experiences.

Concierge

Front Desk

Staff Office

Lounge

Reading Room

Consultation Rooms

Chinese Medicine Clinic

Toilets & Changing Rooms

The Concierge is a vital resource for older adults, helping them identify, access, and utilise services within the Development and the surrounding community. This support system empowers residents to make informed lifestyle decisions and manage their daily needs and personal goals effectively.

Key Areas

Front Desk	Chinese Medicine Clinic
Lounge	Hair & Nail Room
Reading Room	Toilets & Changing Rooms
Consultation Rooms	Staff Office

Note: The Hair & Nail Room is dedicated to grooming and enhanced personal care. While specific design recommendations are not provided for this space, general design principles should be applied.

EXTERNAL RELATIONSHIPS

Convenient Location

- Place the Concierge in a central location within the Housing Development to encourage use and promote interaction with staff.

ALL

Acoustics

- Incorporate sound-absorbing materials like acoustic panels to reduce noise and echoes.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
200 lux (General Lighting)	3000K
500 lux (Task Lighting)	

- Use a combination of soft, glare-free ambient lighting, task lighting, and natural lighting to create a warm and inviting atmosphere.

Avoid Downlights

- Avoid downlights, particularly spotlights, over the Front Desk and seating areas to prevent harsh shadows and discomfort from heat. (AUS17)

Sentidos Comprehensive Centre for the Elderly by Estudio Cordeyro & Asociados. © waltergradcedo

Related Services in Operational Checklist

Daily Assistance

→ In-Home Services
→ General Enquiries & Assistance
→ Resident Engagement

Integrated Care Services

→ Health Screening
→ Health Education

Overall Operations

→ Service Feedback
→ Incident Management
→ Referrals

The Front Desk provides essential daily assistance, seamlessly connecting residents with in-house services and local resources. Additionally, it should facilitate integrated care services, such as health screenings and health education, while overseeing overall operations, including service feedback and incident management. This holistic approach ensures that residents can access the support they need with ease and confidence.

EXTERNAL RELATIONSHIPS

First Contact Point

- Place the Front Desk near the Clubhouse entrance for improved visibility, accessibility, and interaction between staff and residents, while enabling coordinated management. (LMY01)

INTERNAL AREA

Waiting Area

- Provide a waiting area with comfortable seating near the Front Desk, allowing residents to relax and feel at ease while they wait for assistance or appointments.

Information Privacy

- Ensure the Front Desk design prevents residents' information being seen from various angles to protect their privacy. (IMAGE)

Connection to Staff Office

- Ensure direct access or clear sightlines between the Front Desk and Staff Office for seamless internal staff support.

FURNITURE

Reception Counters

→ Main Circulation Route/Drop-offs, Building Entrances & Lobbies/Fixtures & Fittings/Furniture/Reception Counters

© Roman Kiykhi on Alamy
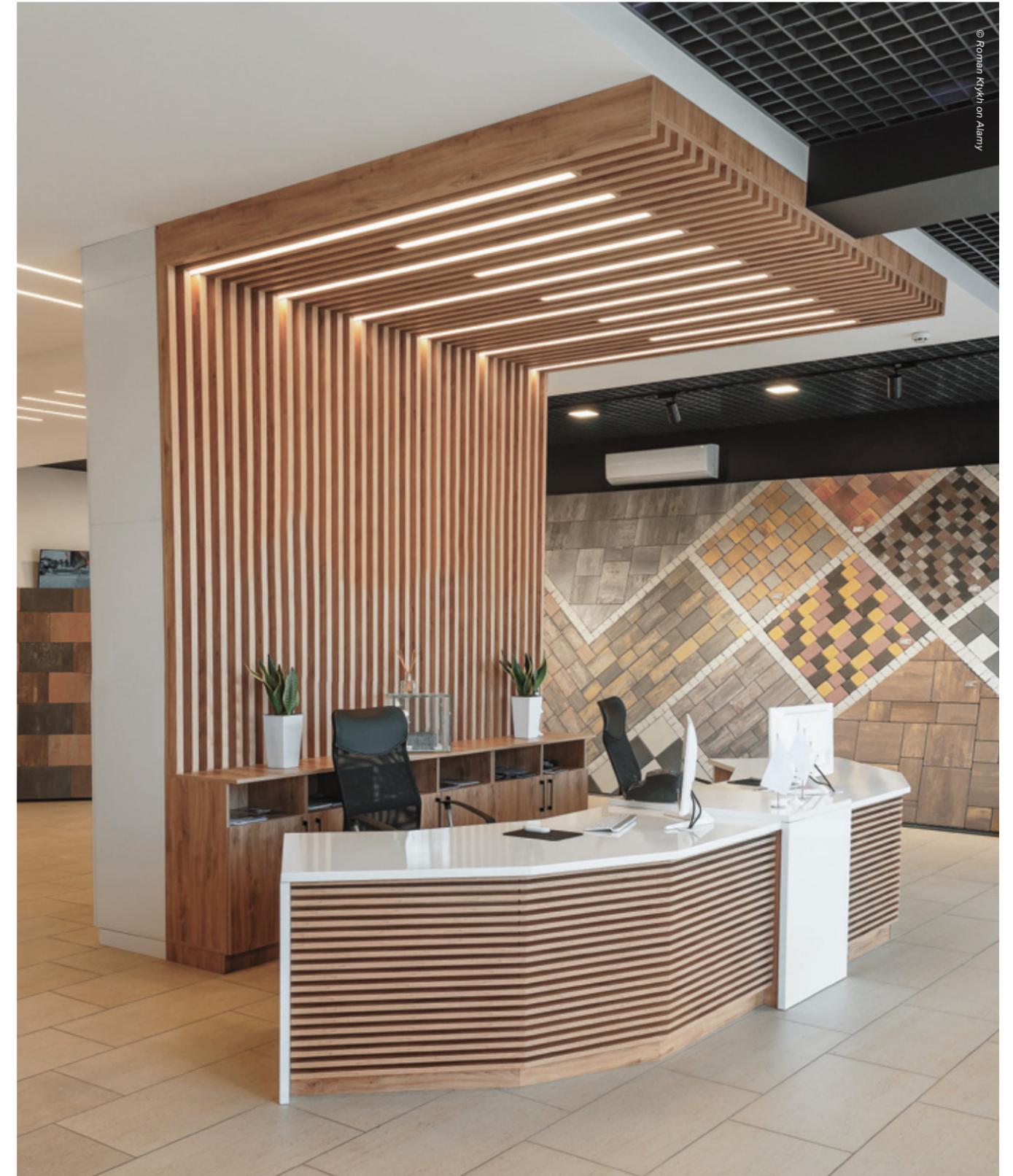
Front Desk, prominently located yet hidden from public view behind.

The Staff Office should be designed to foster collaboration across departments, facilitating the delivery of comprehensive services to residents. The office should provide a comfortable and efficient workspace that aligns with the design values of the community, promoting effective communication and teamwork among staff. The layout should enhance workflow and enable service providers to respond promptly to residents' needs, supporting a seamless integration of care and ultimately benefiting the entire community.

Note: The number of staff is expected to grow to provide enhanced services for more older adults.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Front Desk: Place the Office adjacent to the Front Desk with staff access to enhance operational efficiency.

Convenient Location

- Place the Staff Office in a convenient location within the Clubhouse for easy access to key areas like, Consultation Rooms, Multi-Component Area, and Transitional Care Area, improving interdepartmental collaboration and communication.

Staff Access Route

- Create a discreet staff circulation path for efficient movement between work areas and key facilities, secluded from residents if feasible. (AAU06_B)

Staff Changing Area

- Include a staff changing area in the Office for the convenience of staff.

INTERNAL AREA

Visual Separation

- Create visual barriers for the Office from the Communal Area to minimise distractions for staff and provide adequate personal space and privacy, while maintaining timely support to the Front Desk.

Adequate Storage

- Provide adequate storage in the Office to enable proper information and resource management.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux (General Lighting)	4000K
500 lux (Task Lighting)	

人手多啲嘅時候我哋回應會快啲同到位啲。

Our responses are always quicker and more on point when we have more staff on hand.

管理有另外一樣嘢就係守望相助喺呢方面。你主動同我哋傾下偈，傾多兩次之後大家就會講多啲嘢。

Another thing about management is looking out for each other. If staff are proactive about approaching people, after some chatting, people tend to open up more.

我哋人手持續都唔夠，喺咁嘅情況下支援度又唔高，同事同老人家都會受苦。

When we're short-staffed, we simply cannot provide sufficient support for everyone, impacting both our residents and our staff.

Related Services in Operational Checklist

Daily Assistance

→ General Enquiries & Assistance
→ Resident Engagement

Integrated Care Services

→ Health Screening
→ Health Education

Overall Operations

→ Service Feedback
→ Human Resources Management/
    Care Coordinators

The Lounge is a welcoming space that fosters community and engagement, particularly for those living alone and experiencing life transitions. It accommodates diverse preferences and needs by providing a flexible environment with various layouts and seating arrangements—including private corners. In addition to its role as a social hub, the Lounge serves as a health station, offering residents vital health information and screenings provided by staff and care coordinators. This dedicated area encourages older adults to proactively monitor their health, promoting early intervention and supporting their independence.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Toilets: Place Communal and Family Toilets near the Lounge for easy access by visitors, residents, and caregivers.

Central Location

- Place the Lounge in a central location to facilitate flexible use of space for socialisation and health information exchange.

INTERNAL AREA

Multipurpose Functionality

- Create a flexible Lounge space for:

  - Casual reading and socialising

  - Waiting for the Front Desk, Consultation Rooms, and Chinese Medicine Clinic

  - Transitioning before and after meals in the adjacent dining area

  - Informal basic health screenings and geriatric syndrome assistance

Open-Plan Layout

- Design the Lounge with an open-plan concept for flexible movement.

Visual Connectivity

- Incorporate panoramic views to foster a sense of connection and create a calming, restorative atmosphere. (LBE01)

ALL

Glass Materials

- Consider incorporating transparent walls or partitions to create a sense of openness and visual continuity. (LBE01)

→ General Recommendations/Materials & Finishes/All/ Glass Materials

Maggie's Leeds Centre by Heatherwick Studio. © Hutton+Crow

The Lounge, centrally located, wrapped around by various facilities for comfortable access.

Related Services in Operational Checklist

Daily Assistance

→ General Enquiries & Assistance
→ Resident Engagement

The Reading Room is a haven for ongoing learning, integral to cognitive health and overall well-being. This inviting space offers residents access to a diverse range of physical and digital educational materials, with a particular focus on health-related topics. With staff assistance readily available to help navigate online resources, residents can explore opportunities for empowerment through learning and stay connected to societal changes that inform their decision-making. These elements combine to enhance cognitive functioning and adaptability, fostering a lifelong journey of curiosity and growth.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Front Desk: Place the Reading Room near the Front Desk to allow staff to assist with enquiries and computer use.
- Lounge: Place the Reading Room directly adjacent to the Lounge to facilitate a seamless transition for residents between relaxed reading activities and casual socialising.

Noise Isolation

- Place the Reading Room away from potentially high traffic areas to minimise noise interference.

ALL

Acoustics

- Incorporate sound-absorbing materials like acoustic panels to reduce noise and echoes from other functional areas.

LIGHTING

Task Lighting

- Install adjustable desk lamps to reduce eye strain and minimise shadows or glare. Position lights behind and to the side to avoid direct glare.

IoT ITEMS

Technological Access

- Technology & Support: Equip the Reading Area with computers featuring large screens, reliable high-speed Internet, and large-print e-readers for easy access to digital resources.
- Tech Assistance: Ensure timely staff assistance for any hiccups in computer operations.

Charging Stationss

- Provide power outlets and USB charging stations.

啲職員真係好友善，無論咩問題都會即刻幫我解答。如果我想上網查啲資料，佢哋仲會親自幫我搵。

The staff is super friendly, always there to answer my questions. If I wanted to look something up online, they would even help me do it themselves.

RI: Libraries in Senior Housing
Residents in many senior living estates highly value libraries equipped with computers, as they serve as a central hub for accessing information. (LKR02)

Related Services in Operational Checklist

Integrated Care Services

→ Health Screening

The Consultation Rooms provide a versatile setting for private discussions and health screenings, catering to residents who prefer a personal environment. Designed for flexibility, these rooms support both in-person consultations and telemedicine, enhancing accessibility and convenience. This thoughtful approach fosters a comforting atmosphere for confidential conversations, allowing residents to feel at ease as they address their health needs. By encouraging proactive engagement in their health journeys, these rooms promote a sense of autonomy and well-being.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Lounge: Position the Consultation Rooms adjacent to the Lounge for a seamless transition between the communal and private spaces as needed.

- Toilets: Place Communal and Family Toilets near Consultation Rooms for convenient access.

Dual Access Points

- Strategic Placement: Orient access points to limit external visibility and sightlines.

- Dual Access Approach: Provide dual access for the Rooms to serve as discreet intermediary zones, allowing for easy transition between public and private areas.

REHAB Basel by Herzog & de Meuron © Katalin Deér

Consultation Rooms, a tranquil biophillic environment, enhanced by natural wood architectural elements.

INTERNAL AREA

Minimum Size

- The minimum size recommended is 6.5m² for private interviews. (AHK59)

Multipurpose Functionality

- Design flexible Consultation Rooms for:

  - Private conversations with staff, such as health screenings or counselling.

  - Telemedicine consultations with remote healthcare providers.

  - Initial discussions with therapists before transitional/rehabilitative care.

  - Other private meetings or discussions as required by residents .

Secure Space Design

- Ceiling Height: Avoid high ceilings. (LBE01; LID02)

- Privacy and Safety: Place the entrance/exit doors in a location that prevents users' exposure to create a sense of seclusion, privacy, and safety. (AAU06_B; LBE01)

Minimalist Design

- Spiritual Freedom: Use a minimalist design to create a sense of spiritual, material, and personal freedom. (LRU01)

- Avoid Symbolism: Avoid overt symbolisms that strongly represents a particular religion or set of beliefs. (AGB07)

- Minimal Technology Visibility: Minimise the visibility of modern machines and technology to create a humanistic atmosphere. (LGB03)

ALL

Acoustics

- Designate a soundproof room for private therapies, such as speech therapy and meditation, to ensure confidentiality.

Visuals

- Use bright colours, with light blue recommended. (LID02)

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux (General Lighting)	3000K
500 lux (Task Lighting)	

Tuneable Lighting

- Incorporate adjustable lighting to allow for a change to a calming atmosphere for anxious patients. (LBE01)

IoT ITEMS

Technological Access

- Equip rooms with computers, cameras, and high-speed Internet for telemedicine consultations and virtual assessments.

Charging Stations

- Provide power outlets and USB charging stations.

Change to: The Chinese Medicine Clinic within the Clubhouse should offer a holistic approach to health, empowering residents to manage their own physical, mental, and emotional well-being. Emphasising preventive care, the clinic should promote balance and harmony in daily life through educational workshops to enhance vitality and resilience. This philosophy aligns with '養生' (nurturing life) and '治未病' (preventing illness before it arises), fostering a proactive mindset towards health. (LCN15)

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Lounge: Position the Chinese Medicine Clinic near the Lounge for flexible use as a waiting area and space for Chinese medicine services and health talks.

- Consultation Rooms: Locate the Chinese Medicine Clinic next to Consultation Rooms to cater for spatial flexibility.

Flexible Utilisation

- Locate the Chinese Medicine Clinic on the periphery to allow adaptable use and integration with other areas based on service demand.

Ventilation & Odour Management

- Place the Clinic next to a window for proper airflow and odour control, especially if preparing Chinese herbal medicines, to prevent lingering smells from affecting nearby areas.

INTERNAL AREA

Minimum Size

- The minimum size recommended is 20m² for a Clinic with a bed and storage for concentrated medicine granules. (AHK59)

HVAC & WATER

Odour Control

- HVAC System: Install a standalone, high-performance HVAC system with advanced filtration to control airflow and odours, particularly if providing decoction services.

- Specialised Exhaust System: Incorporate a specialised exhaust system for the herb preparation area to remove odours and contaminants.

- Filter Maintenance: Change HVAC filters regularly, ideally monthly, to prevent blockages caused by medicine powders.

FIXTURES

Herb Preparation Area

- Include washbasins, workbenches, and proper ventilation if a herb preparation area is provided.

The Toilets and Changing Rooms must prioritise safety and comfort, ensuring essential facilities are easily accessible from all areas of the Clubhouse. Family Toilets should be included to give caregivers enough manoeuvring space to provide assistance. With safety alerts and appropriate thermal comfort, these spaces enhance the overall experience for residents. Additionally, high-standard grooming facilities promote dignity and ease of use, fostering a positive atmosphere within the community.

This is Home at Troutbeck by Shelter Design Architecture. © Nicole Franzen & Troutbeck

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Key Areas: Provide at least two Family Toilets in each key area, such as Concierge and Transitional Care Area, ideally within a 30-second to 1-minute walk as older adults often have frequent needs.

- Exercise Areas: Position the Changing Rooms near the Gym, Outdoor Exercise Area, and Hydrotherapy Pool to minimise travel distance for older adults. Design routes from their Dwellings to the Changing Rooms to avoid high-traffic areas and ensure privacy, particularly as residents may wear swimsuits.

INTERNAL AREA

COMMUNAL TOILETS

Cubical Layout (Fig.27)

- Equip all cubicles with:

  - Horizontal grab rails on both sides 350–400mm from the toilet seat centreline and 280–300mm above it. These grab rails should be at least 500mm long, with a portion of 200mm extended beyond the seat edge.

  - Vertical grab rails of at least 600mm in length placed 850mm above floor level.

  - An outward opening door with minimum clear opening width of 850mm.

  - Minimum clearance of 700–750mm between the door and the toilet bowl.

  - Hands-free sensor toilet flush.

  - Holding device for bags and walking sticks.

CHANGING ROOMS

- Levelled Walk-in Shower: Install level walk-in showers with no raised thresholds and include shower seats for seated bathing.

REHAB Basel by © Herzog & de Meuron

ALL

Recommended Settings

Slip Resistance
R12, or equivalent (Wet areas)

Automatic Doors

○ Install automatic doors in all Toilet & Changing Room entrances activated by touch pads.

FIXTURES

Countertops

○ Use light, matte-coloured countertops to enhance visibility for older adults with declining vision.

Toilet Seats

○ Opt for toilet seats at a height of 430–470mm, suitable for all users. (Fig.27)

LIGHTING

Recommended Settings

Lux (minimum)
300 lux
500 lux (Vanity Unit, Shower, Mirror Lighting)
Colour Temperature
3000K

Brighter Lighting: Ensure the overall Toilet and Changing Room lighting is brighter than the Communal Area to provide clear visibility, help older adults stay alert and identify potential hazards, and accommodate the increased time and tasks performed within the Toilet.

○ **Indirect Lighting:** Use indirect lighting to provide a softer, more diffused illumination throughout the space.

Mirror Lighting

● **Fixture Placement:** Use diffused fixtures on both sides to avoid harsh shadows.

● **Avoidance of Direct Downlights:** Avoid downlights directly above mirrors to prevent harsh shadows on faces.

Heat Lamps

● Install heat lamps to maintain warmth, especially after showers, placing fixtures above the shower or dressing area.

Fig.27   Toilet Cubicles in Communal Areas

HVAC & WATER

Washbasins

● **Touchless Taps:** Install automatic taps to minimise contact.

● **Grab Rails:** Provide horizontal grab rails, ideally at every washbasins, or at least for one basin if not possible.

○ **Splash Guards:** Install splash guards around washbasins to contain water.

Temperature Control

● Incorporate appropriate insulation and ventilation to maintain a consistent thermoneutral temperature, considering the potential challenges older adults may face in regulating body temperature.

IoT ITEMS

Emergency Call Bells

● **Location:** Install call bells that are recessed within the wall within reach in the toilets and showers, accessible from standing, seated, and lying positions.

Multi-Component Area

Communal Dining

Communal Kitchen

Multi-Functional Rooms

Gym

Hydrotherapy Pool

The Multi-Component Area (MCA) should be a versatile space designed to enhance functional abilities for older adults through a holistic approach. By integrating physical exercise, brain health activities, and nutritional education, this comprehensive facility should support a seamless experience tailored to residents' health needs. Dedicated areas for healthy eating and physical activities that combine exercise with cognitive training and social engagement should be strategically curated to support residents' health. Additionally, the MCA should promote efficient staff operations to effectively facilitate these programmes, creating a dynamic environment that encourages active participation.

Key Areas

Communal Dining	Gym
Communal Kitchen	Hydrotherapy Pool
Multi-Functional Rooms	

Note: The kitchen must meet specific licensing requirements for health and food safety. Although no specific design recommendations are provided for this space, general design principles will apply.

Space Planning Materials & Finishes Fixtures & Fittings Mechanical & Electrical

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Concierge: Position the Multi-Component Area directly behind the Concierge for seamless activity flow from the entrance.

INTERNAL AREA

Flexible Spaces

- Flexible Space Allocation: Avoid enclosed rooms; use transparent walls and partitions for adaptable space allocation and efficient care. (LBE01)

Air Circulation

- Minimise Obstructions: Reduce obstructions such as structural beams, pillars, or equipment that could disrupt intended airflow patterns, particularly in high-intensity activity rooms, such as the Gym and Multi-Functional Rooms.

Space Planning Materials & Finishes Fixtures & Fittings Mechanical & Electrical

FLOORINGS

- Slip-Resistant: Use materials with good friction, such as floor tiles with appropriate slip resistance, rubber, or vinyl, to minimise slip risks.
- Impact-Absorbing: Choose flooring with shock-absorbing capabilities to cushion falls and reduce impact forces.
- Avoid Soft Materials: Avoid these materials as they hinder infection control and movable options increase the risk of falls.

WALLS

- Sliding Partitions: Ensure that they are securely installed with a bottom track to prevent any swaying when residents lean against them. The bottom track should be level with the surrounding floor to avoid tripping hazards.

Space Planning Materials & Finishes Fixtures & Fittings Mechanical & Electrical

LIGHTING

Recommended Settings

Lux (minimum)
    300 lux (General Lighting)
    500 lux (Task Lighting)
Colour Temperature
    3000K

REHAB Basel by © Herzog de Meuron

Related Services in Operational Checklist

Integrated Care Services

→ Health Education

The Communal Dining is vital for older adults, especially those living alone, as it addresses their nutritional needs while promoting social interaction. This inviting space should encourage healthy eating habits and foster positive emotions through shared meals, contributing to a sense of community and belonging. (LSE05; LTW10)

RI: Social Dining
Older adults who live alone usually report poorer appetite. Research has revealed that the presence of others can promote food consumption. People tend to consume, on average, portions that are 44% larger compared to when they eat alone. These larger portions typically consist of higher quantities of nutrition. Furthermore, research has demonstrated that in a home delivery programme, the mere presence of a delivery person can considerably increase food intake among older adults. (LUS15)

Space Planning   Materials & Finishes   Fixtures & Fittings   Mechanical & Electrical

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Kitchen: Locate the area close to the Kitchen for efficiency and the serving of hot food.

- Rest Areas: Integrate the area with other Communal Areas with seating to create a cohesive social and relaxation zone for residents before and after meal-times.

- Toilet: Position Communal and Family Toilets near the area for convenient access.

- Communal Farm: If feasible, provide a visual connection from the area to Communal Farm to promote healthy and mindful eating.

Proximity to Windows

- Place the Area near windows to ensure ample natural ventilation and daylight.

Noise Isolation

- Locate the Communal Dining away from noisy external infrastructure to minimise noise during mealtime.

INTERNAL AREA

Minimum Size

- The minimum spatial requirement is 1.4m^2/person. (AHK59)

- The estimated number of users is 30% of the older population in the Development, with this percentage expected to exceed 50% as preferences for on-site dining increase with age. (AHK03)

- The minimum spatial requirement for the Kitchen is 40% of Communal Dining. (AHK59)

Visible Cooking Area

- If feasible, include a visible cooking area to enhance social interaction and entertainment during meal-times.

Flexible Use of Space

- Allow the Communal Dining to serve as a venue for community events, workshops, or recreational activities outside of mealtimes.

Dedicated Area for Reservations

- Consider creating a quiet dining section for private or distraction-free meals, with a simple, uncluttered table setting. (LCA07)

Multi-Sensory Design

- Atmosphere: Design and decorate the Communal Dining with multi-sensory stimuli to encourage the use of the space and enhance positive emotions from dining experiences.

- Home-like Environment: Aim for a home-like, comfortable atmosphere rather than an institutional ambience.

- Decorative Touches: Consider decorating the dining environment with tablecloths, dinnerware, or a vase of flowers to enhance the dining experience.

- Welcoming Elements: Incorporate decorative elements, artwork, and soft furnishings to make the space feel welcoming and inviting.

- Simplified Table Setting: Minimise unnecessary utensils on the table. Keep the table simple and clean to create a calm and relaxing atmosphere.

ACCESSIBLE ROUTE

Accessibility

- Ensure wide aisles and low countertops for easy access.

John Morden Centre by Mæ Architects. © Jim Stephenson

Communal Dining, with a double-height ceiling and a deeply pitched roof to enhance spatial perception, ventilation and openness.

RI: Avoidance of Loud Noise
Older adults are more sensitive to mechanical sounds, like traffic, than younger people. Minimising loud noise is important, as it can reduce the perception of sweet and salty flavours. This is particularly relevant for older adults, who may already have decreased taste sensitivity and might resort to overly salty dishes, leading to an unhealthy diet. (LCN04; LGB05)

RI: Multi-Sensory Experience
The aroma of the dishes can provide a multi-sensory experience that benefits older adults' brains and overall well-being. The exposure to food with tantalising aroma can also enhance food consumption and appetite. Additionally, a visible layout can motivate staff to uphold cleanliness standards and hygiene practices. (LDE01; LGB05; LUS15)

RI: Enhanced Dining Environment
Research in a geriatric long-term care ward demonstrated that creating a pleasant dining atmosphere—incorporating elements such as artwork, carpets, and chinaware—significantly increased food intake and encouraged more frequent communication among users. This enhanced ambiance not only promoted greater daily activity but also positively impacted body weight and health stability over a one-year period for those with poor health status, compared to those dining in a standard canteen. (LNL01; LUS15)

ALL

Visuals

○ Incorporate warm colours like orange into the area to help stimulate appetite and encourage food consumption. (AGB21; LUS15)

Acoustics

● Incorporate sound-absorbing materials on the walls, ceilings, and floors to minimise reverberation and echo.

● Avoid Hard Surfaces: Reduce the overall amount of hard, reflective surfaces that can contribute to excessive reverberation.

RI: Impact of Noise on Taste
Avoid loud noises, as they it suppresses people's ability to taste sweet and salty flavours. This is particularly crucial for older adults, who often experience age-related declines in taste sensitivity and may consequently opt for excessively salty dishes, leading to an unhealthy diet. (LGB05)

FURNITURE

Seating

● Upright Armchairs: Use straight back armchairs with spinal support to promote upright posture, aiding swallowing and reducing choking risks.

→ Communal Area/Fixtures & Fittings/FurnitureLighting

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux	3500K (General Lighting)
	5000K (Task Lighting)

○ Avoid red and blue lighting as they can reduce older adults' appetite. (LGB05; LTW02)

IoT ITEMS

Smart Television

● Educational Information: Install a smart television in the dining area to share healthy dish information and nutritional tips, encouraging balanced diets.

● Multi-Use Functionality: Use the television for nutrition talks and community activities to foster engagement around healthy eating.

● Optimal Placement: Position the television at the front centre of the area to ensure it is visible from every seat. This allows all residents to easily access to the information presented.

Related Services in Operational Checklist

<u>Daily Assistance</u>

→ Resident Engagement

<u>Integrated Care Services</u>

→ Multi-Component Programmes
→ Health Education

The Communal Kitchen should serve as a hub for nutritional education, offering hands-on workshops that empower residents to take charge of their cooking and self-care. This collaborative environment not only enhances culinary skills but also promotes healthier eating habits. By encouraging residents to share their culinary experiences, the Community Kitchen fosters community bonds and enhances social connections. (LAU11; LHK21)

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Communal Dining: Locate the area adjacent to Communal Dining to facilitate nutrition workshops and enable flexible use of space for expansion when demand increases.

○ Communal Farm: If feasible, provide a visual connection from the area to Communal Farm to promote farm-to-table experiences.

Food Safety Layout

→ Dwelling/Kitchen/Space Planning/Internal Area/ Food Safety Layout

ACCESSIBLE ROUTE

Manoeuvring Space

○ Ensure a clear space of 1500 × 1500mm in front of and between Kitchen units and appliances to accommodate mobility aids. (ACA03; ASG08)

ALL

Visual

- Extend the floor, cabinet, and wall finishes under and behind the movable base cabinets to maintain a uniform appearance in the area. (ASG08)

FLOORINGS

Recommended Settings

Slip Resistance
    R12, or equivalent (Wet Areas)

Safety & Fall Prevention

○ Use a light-coloured flooring to help avoid unnoticed water or oil spills.

FURNITURE

Countertops

→ Dwelling/Kitchen/Fixtures & Fittings/Countertops

LIGHTING

Recommended Settings

Lux (minimum)
    300 lux (General Lighting)
    500 lux (Task Lighting)
Colour Temperature
    4000K (General Lighting)
    5000K (Task Lighting)

Task Lighting (IMAGE)

○ Install task lighting at meal preparation areas (sinks, countertops, stoves), targeting high illuminance of 500 lux and cool colours of minimum 5000K to help spot expired or uncooked food and use Kitchen tools safely.

○ Recess lighting under and within cabinets to avoid glare. (AGB16; AUS05; AUS17)

HVAC & WATER

→ Dwelling/Kitchen/Mechanical & Electrical/HVAC & Water

Related Services in Operational Checklist

Daily Assistance

→ Resident Engagement

Integrated Care Services

→ Health Education
→ Multi-Component Programmes

Multi-Functional Rooms, as versatile spaces, should support a variety of interventions, including physical exercise, cognitive training, and nutritional education, all aimed at preserving our inherent abilities. The Clubhouse should actively and consistently adapt its programmes to meet the health needs of residents, ensuring full and inclusive participation for everyone, including older adults.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Other Major Functional Areas: Locate the Rooms near other major functional areas, such as Lounge and Communal Dining, to facilitate flexible use and expansion of space as needed.

INTERNAL AREA

Minimum Size

- The minimum spatial requirement is 4m²/person for comfortable movement and safety.

- Ensure space for a trainer with a participant ratio between 1:10 and 1:15 for exercise sessions, allowing close observation and guidance and support for a safe and effective workout experience.

Open-Plan

- Design a flexible layout for multi-purpose use, accommodating various group sizes.

Adequate Storage

- Include ample storage for props and furniture to support a variety of activities, such as exercise classes and board games.

FLOORINGS

Safety & Comfort

- Low-Impact Flooring: Use resilient, low-impact flooring like rubber or vinyl.

- Slip-Resistant Texture: Ensure it has a slip-resistant texture and medium-density foam or rubber underlayment for shock absorption and joint protection. Avoid overly soft flooring to maintain stability.

Smooth Transitions

- Design smooth transitions between different flooring types to prevent tripping hazards.

FURNITURE

Partitions

- Stable Partitions: Install ceiling-mounted tracks for flexible, floor-to-ceiling partitions to enhance acoustic isolation. Consider flush floor tracks for added stability.

- Effective Sound Reduction: Avoid using acoustic curtains for better sound reduction.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux	4000K

IoT ITEMS

Smart Television & Audio System

- Install a large smart television with integrated audio, microphones, and streaming options for talks, workshops, and exercise sessions. Avoid projectors due to potential resolution issues for older adults' vision.

John Marden Centre by Mae Architects. © Jim Stephenson

Multi-Functional Rooms, for evidence-based physical activities and cognitive games, promoting health and social benefits.

The Barns at Troutbeck by Shelter Design Architecture. © Nicole Franzen & Troutbeck

Related Services in Operational Checklist

Daily Assistance

→ Resident Engagement

Integrated Care Services

→ Multi-Component Programmes
→ Health Education
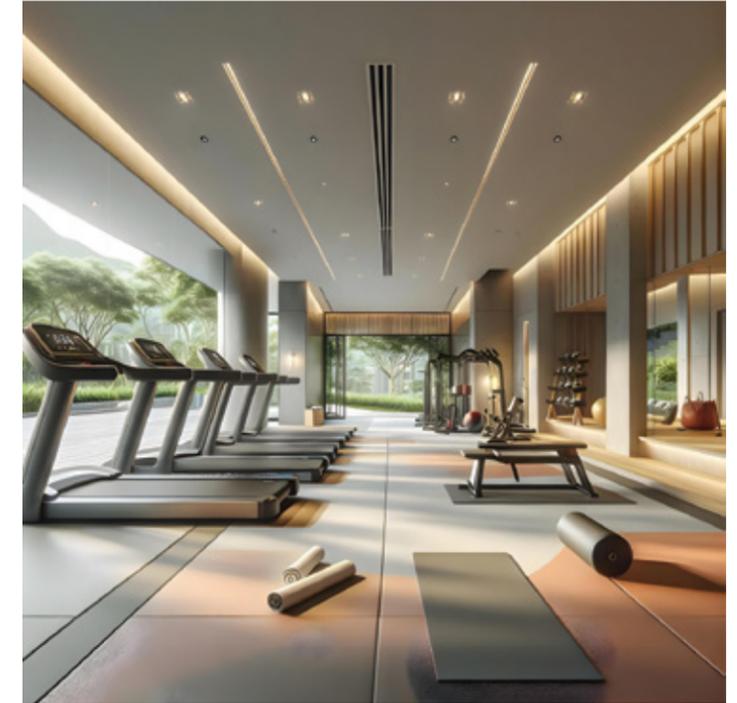
Physical activities and exercise are essential components of Multi-Component Programmes, enhancing mobility and muscle strength to reduce the risk of malnutrition, cognitive impairment, and depressive symptoms. Low-impact cardio equipment and strength training with bodyweight, resistance bands, and light weights effectively combat age-related muscle loss. Functional exercises that replicate daily tasks, such as chair stands and core work, further support residents in maintaining independence and overall well-being.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Podium & Outdoor Exercise: Ensure the Gym has direct access to the Podium & Outdoor Exercise to encourage older adults to engage in outdoor exercise.

- Transitional Care Area: Design access points from the Physiotherapy Area with access control measures to facilitate flexible use, ensuring a smooth physical and mental transition across health conditions.

INTERNAL AREA

Social Spaces

- Designate social areas near fitness equipment to foster community spirit and motivation, also serving as spaces for group fitness classes.

ACCESSIBLE ROUTE

Manoeuvring Space

- Provide a 1500 × 1500mm clear space between gym facilities and carefully place equipment to avoid collisions.

ALL

Visuals

- Incorporate warm colours, such as orange and yellow, into the Gym to help boost physical activity and promote a sense of energy among users. (LSK01)

- Avoid using red colours in the Gym which can trigger uncomfortable and anxious emotions in older adults. (LUS05)

FURNITURE

FITNESS EQUIPMENT

Safety & Comfort

- Age-Appropriate Equipment: Ensure Gym equipment is accessible and suitable for older adults, as standard fitness machines often cater to younger, more able-bodied individuals. This can create challenges or safety risks for older adults with weakened muscles, reduced mobility, or those using mobility aids.

- Joint Considerations: Consider the joint mobility and stability needs of users when selecting equipment. Opt for low-impact machines that reduce stress on joints, provide stability support, and allow for a full range of motion. Equipment should have adjustable features to accommodate individual needs and ensure users can exercise comfortably without strain.

- Comfort Features: Provide proper back support and padding on machines to enhance comfort during use.

- Safety Enhancements: Include additional safety provisions such as grab rails and strapped pedals to prevent accidents.

Accessibility

- Local Suitability: Verify the dimensions of imported equipment to ensure it suits local users, including conducting tests with older adults to gather feedback.

- Adjustable Equipment: Offer easily adjustable machines with multiple height settings and reclining swivel seats to accommodate various user needs.

- Variety of Intensity Levels: Provide a diverse selection of fitness equipment with varying intensity levels. (AHK33_1)

- User-Friendly Displays: Ensure large, easy-to-read displays on machines to enhance usability for older adults.

- Clear Instructions: Provide clear signage and instructions on how to use each piece of equipment. Consider including visual aids for clarity, especially for users with cognitive declines.

Regular Maintenance

- Ensure all equipment is regularly maintained and inspected for safety. This helps prevent accidents and ensures a reliable workout experience.

Equipment Placement

- Zoning: Divide the fitness area into zones based on exercise categories to create a logical flow and to allow users to transition between different types of workouts easily.

- Multi-Functional Equipment: Prioritise the acquisition of multi-functional and flexible equipment to minimise the overall mechanical inventory. Focus on versatile solutions rather than specialised equipment.

- Indoor vs Outdoor Placement: Locate more machine-based options within the Gym, and group multipurpose equipment in the Outdoor Exercise area.

- Weather-Resistant Equipment: Only equipment that can withstand exposure to the elements is suitable for placement in outdoor fitness areas.

Recommended Equipment for Different Exercise Categories (IMAGE) (AAU10; AHK53; AHK54; AUS39; LAU08)

- Ensure that at least one piece of equipment is included foreach of the following functions:

  - Endurance Training (to enhance cardiorespiratory system and overall aerobic capacity): Treadmills with low starting speeds, fitness bikes with separate resistance for upper and lower limbs, low-impact elliptical trainers, ski walkers.

  - Balance Training (to enhance functional movement, stability, and prevent falls): Balance beams, step-up platforms/jump boxes/vertical ladders, unstable walkway bridges, stability balls, yoga mats.

  - Mobility Training (to improve flexibility, agility, andoverall range of motions): Core twisters, step-upplatforms/jump boxes/vertical ladder, parallel bars, upper back stretchers, stretching stations, tai chi wheels, yoga mats.

  - Resistance Training (to improve muscle strength, mass, and functional ability): Leg/chest press machines, pull-up bars, push-up stations, fitness bikes with separate resistance for upper and lower limbs, low-impact elliptical trainers, dumbbells/kettlebells starting from 2 lbs., resistance bands. (LUS36)

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux (LIT05)	5000K

RI: Equipment Suitability for Asian Users
European fitness equipment, such as leg press and arm push machines, may not meet the size and load preferences of Asian users. This highlights the need for locally tailored designs that accommodate the specific physical characteristics and fitness needs of this demographic. (IOA)

RI: Comprehensive Fitness Strategies for Older Adults
Incorporating low-impact cardio exercises on treadmills, ellipticals, and stationary bikes alongside strength training using body weight, resistance bands, and light weights is vital for enhancing cardiovascular health and combating age-related muscle loss in older adults. Specifically, resistance training improves skeletal muscle function by boosting muscle mass, strength, fibres, and mobility. By incorporating functional exercises that replicate daily activities such as chair stands and core work, physical activity levels can be increased, helping to counteract the effects of sarcopenia and promote independence. (LGB06)

HVAC & WATER

Enhanced Gym Ventilation

- Ensure installation of an effective ventilation system in the Gym, particularly for older adults with reduced thermal comfort sensitivity. Proper air circulation mitigates excess body heat during workouts and manages contaminants such as sweat.

RI: Tailored Senior Fitness
The Gym Tonic Centre's strength training programme highlights the need for customised fitness solutions for seniors, as it addresses specific physical challenges. This approach not only enhances their physical capacity but also contributes to improved overall well-being. The success of such programmes can inform future initiatives aimed at promoting active ageing and robust health among the elderly population in Singapore. (ASG02)

IoT ITEMS

Charging Stations

- Plan stations with accessible power outlets and USB charging next to gym equipment for personal devices.

Smart Fit System

- Implement technology to monitor fitness progress and offer customised adaptable workout routines for a personalised experience. (IMAGE)

- Introduce an intelligent circuit training system that automatically adjusts exercise intensity based on residents' health data to enhance maximal oxygen consumption (V'O2 max), strength, and body composition in older adults. (LES01; LES02; LIT03)

Residents at automated circuit training station, rotating through exercises targeting specific muscle groups with customised intensity for comprehensive bodybuilding.

Related Services in Operational Checklist

Daily Assistance

→ Resident Engagement

Integrated Care Services

→ Multi-Component Programmes
→ Health Education
→ Rehabilitation Services

The Hydrotherapy Pool offers a gentle approach for residents to enhance functional abilities, including mobility and muscle strength. Hygiene must be carefully managed and effectively communicated to alleviate any concerns. This therapeutic environment should provide balance training to prevent falls and related injuries. The Pool's unique properties—buoyancy, resistance, and temperature—create an ideal setting for relaxation and low-impact activities that build strength, coordination, and confidence.

RI: Benefits of Hydrotherapy
The unique properties of water, including buoyancy and resistance, create an ideal environment for older adults to exercise and rehabilitate comfortably and enhance their balance, particularly benefiting those with knee osteoarthritis by alleviating pain. (LCN14; LIR03)

Semidox Comprehensive Centre for the Elderly by Estudio Cordeyro & Asociados, @victorgdacedo

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Transitional Care Area: Provide dedicated access points from the Transitional Care Area with access control measures to facilitate efficient rehabilitation, if feasible.

- Regular Swimming Pool: Potentially plan as part of the regular swimming pool, if space is tight.

Noise Isolation

- Consider the placement and orientation of the Hydrotherapy Pool in relation to other Communal Areas to minimise noise disturbance.

INTERNAL AREA

Dimensions

- Water Depth: Maintain an average water depth of 1000–1200mm to ensure safe handling, with the water level ranging between chest and waist height for swimmers.

- Multi-Level Design: Incorporate multiple levels with appropriate gradients, avoiding steep designs. (AAU06_B; AGB13; AUS04)

- Pool Size: Opt for a shorter pool length, such as 15m, with three lanes of approximately 10m total width to minimise the distance older adults need to traverse, facilitating easier navigation.

- Collaborative Design: Work with physiotherapists or occupational therapists to create a pool layout and programming that maximises health benefits for older adults.

Hygiene & Safety

- Flush Pool Edge: Design the pool edge to be level with the water surface as opposed to using a dropped edge. This design allows for a clearer view of swimmers in the pool, enhancing safety and facilitating quicker response in case of emergencies.

- Simple Shape: Design the Hydrotherapy Pool with a straightforward form, such as a square or rectangular shape to enhance visibility and safety. (AGB13)

- Straight Edges: Choose straight edges to facilitate the installation of equipment, such as exercise devices and grab rails. (AGB13)

Types of Access

- Steps: Incorporate step entrances with uniform riser heights of 150mm and tread depths of 350mm for easy access into the water.

- Ramp Entry: Consider incorporating a ramp entry with a maximum gradient of 1:12 to ensure safe access for older adults with mobility aids. (AAU06_SC; AGB13; ASG06; ASG07)

- Chair Lift: Design the Pool to accommodate the potential installation of chair lifts to assist older adults with entering and exiting the pool. Consider necessary structural modifications for floor depth and locate the lift in a private area or corner to minimise attention from other users. (AAU06_B; AGB13; AUS04)
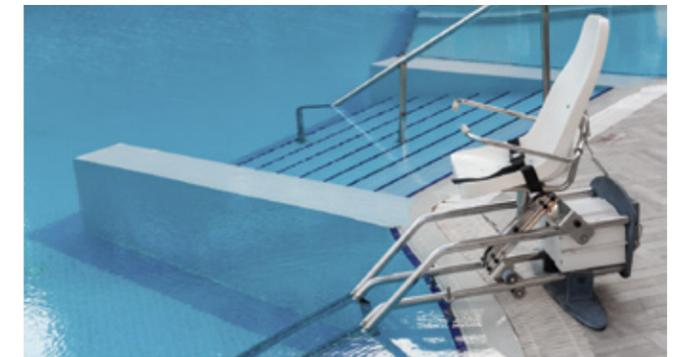
POOLSIDE

Pre-Immersion Shower Zone

- Step-free Access: Ensure a step-free entry to facilitate easy access and maintain cleanliness before the Pool entry.

RI: Hydrotherapy
Hydrotherapy is a therapeutic approach that utilises water immersion for physical and mental well-being. It offers benefits such as smoother movements and relief from joint pain, aided by the weight-relieving property and warmth of the water. Hydrotherapy also reduces falling risk factors for older adults. (LUS18)

HT: Temperature Regulation
As individuals age, their ability to regulate body temperature diminishes, making them more vulnerable to temperature extremes. Sudden exposure to cold air or water can cause older adults to experience thermal shock or a rapid drop in body temperature. Abrupt exposure to high temperatures can result in overheating, dehydration, and heat exhaustion. Therefore, ensuring controlled and gradual transitions between different temperature zones is crucial.

ALL

Visuals

- Opt for light colours and non-glossy finishes to diffuse lighting, minimise glare, and improve visibility. (AHK01; AHK02; AUS05)

- Avoid shiny and reflective finishes which potentially convey a wet, slippery appearance and compromise safety.

Acoustics

- Incorporate sound-absorbing materials and reduce overall amount of hard, reflective surfaces on the walls, ceilings, and floors to minimise excessive reverberation.

Thermal Insulation

- Install proper thermal insulation of Pool walls, floors, and ceilings to minimise heat loss and improve energy efficiency.

CEILINGS

Acoustics

- Ceiling Contours: Use irregular ceiling contours with sound-absorbing, moisture-resistant materials to enhance aesthetics and acoustics. (AGB13)

- Non-Hygroscopic Panels: Incorporate panels made of non-hygroscopic material (not able to retain water) with membranes to prevent sagging in the humid Pool environment. (AGB13)

FLOORINGS

Recommended Settings

Slip Resistance
R12, or equivalent (Wet areas)

- Ensure the use of anti-slip flooring at the Pool base, steps, and ramp accesses, particularly where users often have their feet on the bottom during Hydrotherapy. (AGB13)

Tile Selection (Pool & Poolside)

- High-Contrast Nosing: Implement high-contrast coloured nosing on the front edge of all steps and level changes, both at the poolside and within the Pool. This will help older adults clearly identify step depth and edges, improving their depth perception and reducing the risk of slips and falls, particularly in wet areas.

- Smooth Surfaces: Avoid mosaic tiles and ensure he poolside, Pool flooring, and surrounding surfaces are well maintained to provide adequate traction while being gentle on the skin, preventing cuts and injuries for older adults using the area barefoot. (AGB13; AUS04)

- Clear Markings: Implement clear markings or textures on the Pool floor to guide users and indicate important areas, such as entrances and exits.

HT: Acoustic and Ventilation
Swimming Pools face acoustic and ventilation challenges due to the large water volume, hard surfaces, and chemicals. These issues are amplified for older adults with heightened sound sensitivity and compromised respiratory systems. Excessive echoes and noise cause discomfort, while poor ventilation leads to respiratory problems. Prioritising acoustic quality and ventilation ensures older adults' safety, comfort, and enjoyment.

FURNITURE

Seating

- Designated Quiet Zone: Create a designated quiet zone or seating area for resting before and after Pool use. This space should be comfortable and inviting, allowing users to relax.

- Variable-Height Seating: Include variable-height

seats and chairs with armrests to accommodate users with limited mobility. This feature helps individuals transition to and from their seats more easily.

- Ample Space for Assistance: Ensure sufficient space around the chairs to allow caregivers to assist users as needed. This design consideration promotes safety and accessibility for all individuals.

→ Communal Area/Fixtures & Fittings/Furniture

HANDRAILS

General

- Continuous Handrails: Ensure continuous handrails are installed between the Changing Rooms, poolside, and ideally within and around the Pool area. This creates a secure pathway for older adults transitioning between wet areas and underwater environment.

- Contrasting Colours: Use contrasting colours for handrails to enhance visibility, making them easier for older adults to identify and use safely.

- Height & Grip: Position handrails at a comfortable height for users, incorporating a textured grip to facilitate easy handling, especially when wet.

→ Communal Area/Fittings & Fixtures/Handrails

Pool

- Support and Stability: Install handrails on both sides of steps and ramps to provide additional support and stability for users entering and exiting the pools. This is particularly important for older adults who may struggle with depth perception due to difficulties in judging water density and surface reflections.

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux (LIT05)	4000K

- Avoid Downlights: Avoid pointing lights directly at the water surface as it will create harsh reflections and glare. (AAU06_B)

- In-Pool Lighting: Install in-pool lighting to eliminate dark spots and create an even glow throughout the Pool area.

RI: In-pool Lighting
Proper lighting in the Pool area is essential for both aesthetic appeal and safety. The recommended approach is to install a greater number of lower-wattage lights instead of a few high-wattage fixtures. By increasing the number of light sources, the Pool area can achieve a more uniform distribution of illumination, creating a visually appealing and well-lit environment for swimming. (LRO02)

HVAC & WATER

Enhanced Pool Ventilation

- Install a dedicated mechanical ventilation system to maintain air temperature close to that of the water. Manage humidity using exhaust fans or dehumidifying air-conditioners. Ensure all systems operate quietly to preserve a relaxing atmosphere.

Water Filtration

- (IoT) Water Quality Monitoring: Deploy IoT sensors to continuously monitor and display key water quality parameters to pool users. These include pH levels, chlorine concentration, and temperature. This approach addresses residents' concern about hygiene conditions, particularly for the smaller pools.

- Efficient Water Management: Implement an overflow design to effectively remove and treat polluted surface water. This water can account for approximately 75% of pool contamination and is often ingested by swimmers. (AUS04)

- High-Quality Filtration System: Invest in a high-quality filtration system suitable for the Pool's size. Add extra filters at entry and exit points for a hygienic rehabilitation experience.

Hydromassage Jets

- Consider retrofitting hydromassage jets to enhance the relaxation and rehabilitation benefits for users.

IoT ITEMS

Audio System

- Implement an underwater and/or above-water sound system to enhance relaxation and facilitate broadcasts. Consider connecting it to a microphone for instructor voice projection during group exercise sessions. (AGB13)

Transitional Care Area

Therapy Areas

Family Breakout Room

Related Services in Operational Checklist

Daily Assistance

→ In-Home Services

Integrated Care Services

→ Health Education
→ Rehabilitation Services

The Transitional Care Area is designed to support older adults in their journey to regain independence following illness or injury. With a focus on rehabilitation and restorative care, this space should offer professional support, including physical and occupational therapy, tailored to individuals experiencing moderate declines in intrinsic capacity and functional ability. The goal is to empower residents to recover within the community, helping them regain autonomy and prevent further loss of independence.

Key Areas

Reception/Workstation	Physiotherapy Area
Consultation Room/Quiet Room	Occupational therapy Area
Staff Area	Plinth Area
VR Room (Virtual Reality)	Storage
ADL Room (Activities of Daily Living)	Family Breakout Room

Note: The Quiet Room offers a private space for conversations and includes a plinth for health check-ups. Additionally, it serves as a consultation area for services like speech therapy.

The VR Room offers multi-sensory cognitive training, which is especially beneficial for individuals with dementia, as it enhances memory retention and engagement through immersive experiences.

The ADL Room is designed to help residents recovering from illness regain essential domestic living skills, such as cooking and transferring safely from bed to seat.

While no specific requirements for these areas are mentioned in this Guide, it is crucial to consult professionals, such as occupational therapists and physiotherapists, during the design process.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Toilets: Provide at least two Family Toilets near the entrance for visitors and users to minimise disruptions for those undergoing rehabilitation sessions. (AAU06_B)

- Drop-offs: The Transitional Care Area should have easy access from the Drop-offs for rehab transportation and emergencies.

- Fire Escape Route: Consider the fire escape route and accessibility when choosing the location of the Transitional Care Area. People with limited mobility usually encounter more difficulties during emergencies.

Access Pathways to Transitional Care Area

- Privacy and Tranquillity: Position the Transitional Care Area away from the high traffic circulation spaces, roadside and main facilities, and incorporate a low-profile entrance to enhance privacy and create a tranquil environment, minimising disturbances for users undergoing rehabilitation. (LRU02)

- Location: Ensure a fully accessible, or step-free, route from Dwelling to the Transitional Care Area for user convenience. If the facility is open to the public, position it on the ground floor to facilitate convenient entry while maintaining effective access control for the development. (AAU06_B)

Transitional Green Space

- Buffer Zone: Utilise green space as a buffer zone between the Transitional Care Area and the residential buildings to provide a soothing journey from the residence to the Area. (AHK18; AHK19)

- Biophilic Design: Incorporate biophilic arrangements that offer a sensory experience along the route, featuring pleasant visual, auditory, aromatic, and tactile elements to instil energy and hopefulness in users. (LRU02)

REHAB Basel by © Herzog & de Meuron

Reception Counter/Staff Workstation

- Access Control Measures: Provide a reception counter or workstation to manage access and ensure privacy. While this desk can be shared with other areas, the Transitional Care Area should have a dedicated desk if it is situated remotely.

- Safety and Assistance: Locate the reception counter or workstation in a position that allows staff to oversee the entire area, enabling quick identification and response to any user requiring assistance or to any accidents.

INTERNAL AREA

Minimum Size

VR Room/ADL Room

- The minimum spatial requirement is 10m^2 for individual and small-group sessions. (AHK59)

- The ADL Room may require space for a mini kitchen, a shower room and toilet, and a bed.

Consultation Room/Quiet Room

- The minimum spatial requirement is 12m^2 for private consultations. (AHK59)

- The room can accommodate the standard features of a consultation room, including a worktable, chairs, a computer, and a plinth bed for detailed check-ups.

→ Clubhouse/Concierge/Consultation Rooms

Spatial Layout

- Design a square-shaped area to minimise turning corners, ensuring optimal accessibility for older adults using mobility aids.

Privacy & Personalisation

- Separation of Areas: Separate private and quiet areas from public and loud spaces to minimise acoustic disturbance and protect users' privacy and dignity.

- Physical and Visual Barriers: Implement physical separation and visual barriers, such as walls, partitions, curtains, screens, or plants, to block visibility into therapy areas, safeguarding users' comfort. (AAU06_B)

- Access Control: Establish access control measures for the Therapy Areas, allowing entry only to author-ised personnel, caregivers, or therapists to enhance users' comfort, where feasible. (AAU06_B)

Ceiling Heights

- Provide a minimum ceiling height of 2700mm to accommodate rehabilitation equipment, such as ceiling hoist machines, if needed. (AUS21)

Branding & Atmosphere

- Brand the space thoughtfully to reduce the institutional feel and stigma associated with individuals who may feel "incapable," fostering a more welcoming atmosphere.

ACCESSIBLE ROUTE

Manoeuvring Space

- Ensure the width of corridors is at least 1900mm (min. 1600mm) to accommodate older adults with mobility aids.

→ Communal Area/Space Planning/Accessible Route

HT: Supportive Environment
Separating rehabilitation facilities from other recreational amenities can help address health conditions by reducing the clinical feel and promoting a more retreat-like atmosphere. (LGB03)

ALL

Visuals

- Surface Colours: Avoid blue or yellow walls and surfaces, as these colours can interfere with clinicians' accuracy in observing and assessing skin tones. (AUS08)

- Avoid Strong Contrasts: Steer clear of strong contrasts and busy patterns that can create an overwhelming or intimidating environment. (AUS08)

- Colour Choices: Refrain from using dark colours, such as black and brown, which can contribute to a gloomy atmosphere. (LID02)

→ Communal Area/Materials & Finishes

FURNITURE

Handrails

→ Main Circulation Route/Fixtures & Fittings/Handrails

LIGHTING

Recommended Settings

Lux (minimum)	Colour Temperature
300 lux	4000K

IoT ITEMS

Electronic Check-In Kiosks

- Implement electronic check-in kiosks to streamline the check-in process. (AUS26_380)

REHAB Basel by Herzog & de Meuron © Architekturzentrum Wien, Sammlung, Margherita Spiluttini
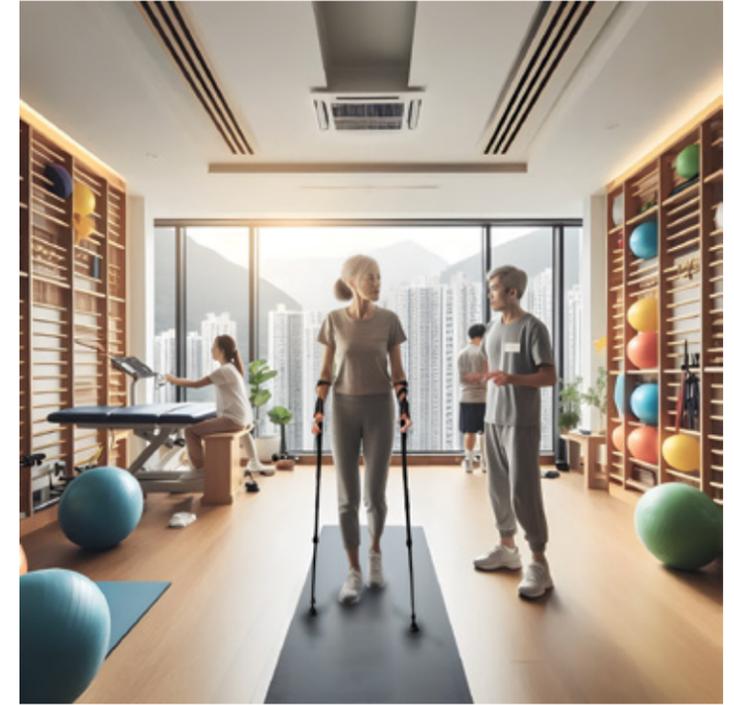
The Physiotherapy and Occupational Therapy Areas are integral components of the transitional care framework, providing specialised interventions that promote recovery and functional improvement. These spaces should be equipped with the necessary tools and technologies to facilitate personalised therapy sessions, addressing each resident's unique needs. By focusing on enhancing mobility, strength, and daily living skills, these areas play a crucial role in fostering independence.

Space Planning   Materials & Finishes   Fixtures & Fittings   Mechanical & Electrical

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

Physiotherapy

- Exercise Areas: Physiotherapy Area should have easy access to the Gym and Podium & Outdoor Exercise for therapies in a more challenging environment.

Occupational Therapy

- Landscaped Garden: Provide access to the Landscaped Garden, potentially a rehabilitation garden, from the Occupational Therapy Area to facilitate out-door multisensory cognitive training.

Proximity to Windows

- Place the Areas near windows for accessible daylight. Natural lighting is essential to provide adequate illumination for clinicians to accurately assess skin tones and for users to monitor their postures. Patients under higher daylight intensity also reported less stress and pain and required fewer pain relievers. (AAU06_B; AUS08; LID02)

- Therapy Areas should not visible from the outside to protect the users' dignity.

Noise Isolation

- Ideally, locate the Therapy Areas away from the neighbourhood or external infrastructure, such as roads or highways, to minimise noise disturbance.

© BigSilver
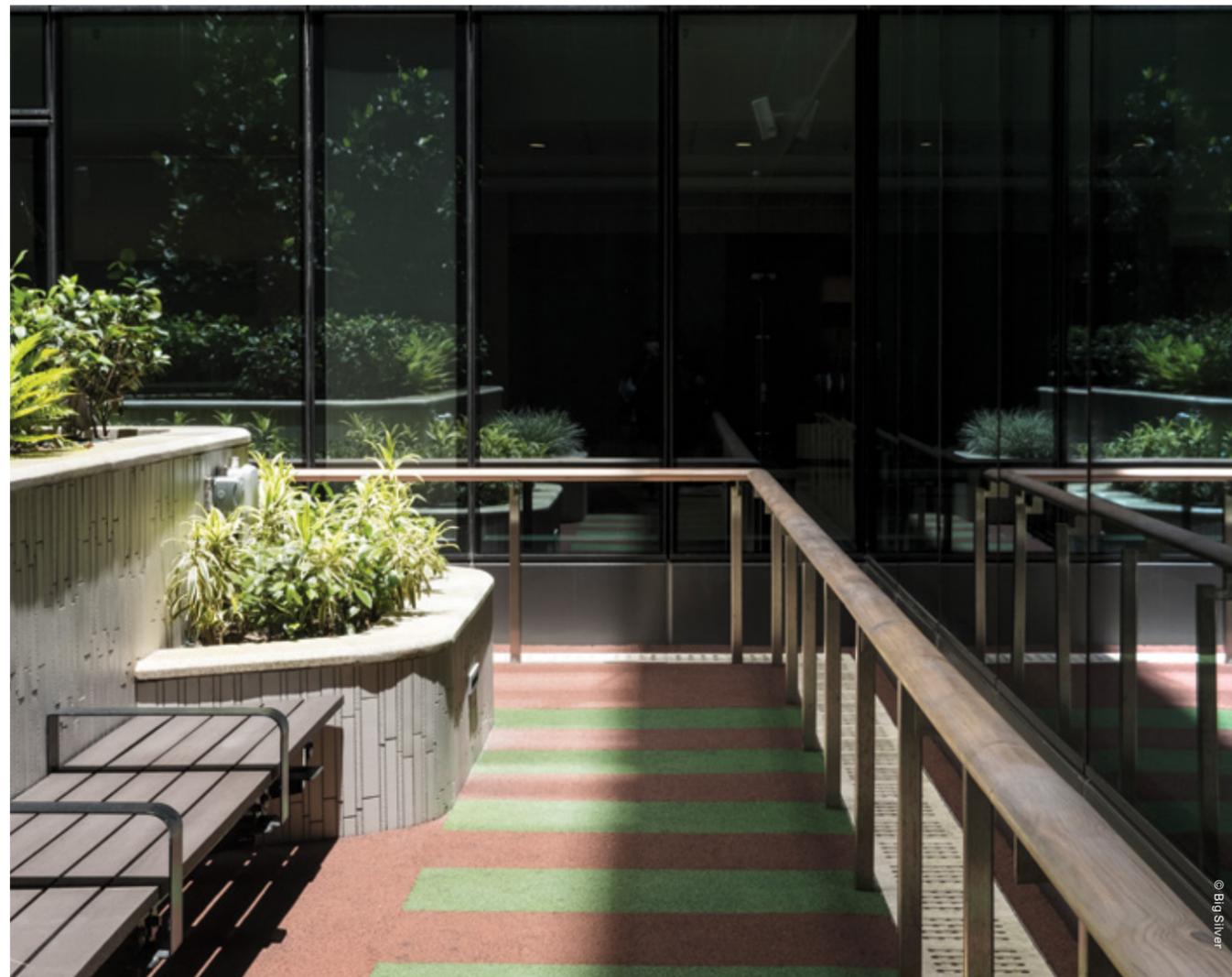
INTERNAL AREA

Minimum Size

Physiotherapy Area

- The minimum spatial requirement is 6m^2/person for individual sessions.

- The space for large equipment, such as parallel bar, is included in the calculation.

Occupational Therapy Area

- The minimum spatial requirement is 4m^2/person for fine-motoring skills and cognitive training.

Functional Training Zone

- Include a minimum of a 3-meter straight walking rehabilitation space for users to practice ambulation. This is essential for older adults recovering from falls, surgery, and other injuries, and it facilitates assessments such as the 'Timed Up and Go Test' to monitor their progress.

- Mirror Wall: Install a mirror in the Therapy Areas to enable users to monitor their posture and performance. Ensure the mirror wall is not positioned opposite windows to prevent back-lighting, facilitating better observation and imitation of movements for effective motor learning and retraining. (LIT02)

Adaptable Features

- Curtain Tracks: Incorporate flexible curtain tracks with easily operable curtains in the Plinth Area. This design allows for adaptability and privacy when required, without the limitations of enclosed rooms.

Proximity to Plinth Area

- Convenience: Position the Plinth Area to ensure convenient access from both the Physiotherapy and Occupational Therapy Areas. (AAU06_B)

- Clean Linen Storage: Locate clean linen storage near the Plinth Area within a clean utility room or separate closet to maintain hygiene and prevent contamination. This storage can be in the form of built-in cupboards, cabinets, or a mobile storage trolley. (AAU06_B)

Proximity to Staff Amenities

- Supporting Amenities: Place supporting amenities, such as workstations and storage, close to the Therapy Areas to enhance staff convenience and efficiency. (AAU06_B)

Strategic Water Source Placement

- Accessibility: Strategically plan the location of water sources, ensuring amenities requiring water—such as toilets, water fountains, and basins in the Plinth Area—are positioned nearby for ease of access.

HT: The 'Timed Up and Go Test'
The 'Timed Up and Go Test' is a mobility assessment test commonly used in therapy settings to evaluate a person's functional mobility and fall risk. It measures the time to rise from a chair, walk at a regular pace for 3 metres, turn around, walk back to the chair, and sit down. Older adults who can complete the task in less than 20 seconds are independently mobile. A time exceeding 30 seconds indicates the need for assistance with mobility tasks. (AHK50)

RI: Mirror Walls
Visual inputs are crucial in rehabilitation as patients can imitate observed actions to activate the motor system for execution and increase awareness of the affected limb, and spatial attention through monitoring self-generated moves. (LIT02)

ALL

Visuals

- Cool Colours: Use cool colours to minimise distractions and enhance concentration on challenging tasks. (AUS08)

- Relaxing Greens: Incorporate green colours to promote relaxation among users. (LID02)

- Warm Accents: Add warm colours, such as orange or yellow, to boost feelings of happiness and positivity. (LID02)

FURNITURE

RECOMMENDED FURNITURE, FIXTURES & EQUIPMENT FOR TRAINING & TREATMENT NEEDS: (ACH03)

PHYSIOTHERAPY EQUIPMENT

Mobility & Gait Training Equipment

- Height Adjustable Parallel Bar: Include a full-length mirror at the front for posture and technique assistance.

- Treadmill and Gait Training Devices: Incorporate a fall-free walking device, ceiling hoist, and a walker with a harness for safe ambulation training.

- Wooden Step-Up Boxes: Incorporate wooden step-up boxes with various heights for step training.

- Walking Aids: Provide frames and sticks to assist residents with mobility.

Strength & Rehabilitation Equipment

- Wall Bar with Suspension Frame: Install at the top for versatile training options.

- Reciprocal Pulley: Use for upper-body strength training.

- Hi-Lo Plinth with Curtain: Ensure privacy and accessibility for different therapy sessions.

- Shoulder Exercise Ladder: Use for increasing range of motion, strength,an flexibility.

- Tilt Table: Use for balance and functional training exercises.

Thermal & Electrical Therapy Equipment

- Thermal Therapy Equipment: Ensure availability of ice pads, a refrigerator, and hot pads for cold and heat therapy.

- Ice-Making Amenities: Position ice-making amenities close to the wound care area and the cold therapy area to facilitate efficient treatment. (AAU06_B)

- Electrical Modalities: Equip the area with ultrasound, interferential therapy (IFT), and transcutaneous electrical nerve stimulation (TENS) devices.

Other Equipment

- Exercise Tools: Stock items such as dumbbells, sandbags, TheraBands, stepping blocks, and gym balls for varied exercise routines.

- Exercise Equipment: Provide upper and lower limb cycling machines and a static bike for cardiovascular training.

- Sit & Reach Boxes: Use for measuring the extensibility and flexibility of the hamstrings and lower back.

OCCUPATIONAL THERAPY EQUIPMENT

- Hand Mobility Rehabilitation Kits: Use for strengthening hand muscles and finger flexibility.

- Hand Evaluation Kits: Use for measuring hand strength and flexibility.

- Board Games: Use for cognitive and fine motor training, enhancing collaboration, memory, attention, visual perception, problem solving, and senses.

SUPPORT FURNITURE

Work & Support Furniture

- Worktables for Table Tasks: Include a sturdy worktables to facilitate various therapeutic activities.

- Stable Chairs with Armrests: Ensure comfort and support for residents during therapy sessions.

- Therapist Rolling Stools: For therapists to move easily when providing care.

Storage Solutions

- Storage for Furniture: Implement adequate storage solutions to maintain an organised environment.

SWITCHES & SOCKETS

Power Points

- Provide adequate power points in Therapy Areas and equipment storage rooms for charging equipment. (AUS26_380)

→ Dwelling/General/Mechanical & Electrical/Switches & Sockets

IoT ITEMS

Remote Kiosk Monitors

- Position remote kiosk monitors strategically within the Therapy Area to keep staff informed about patient appointments. (AUS26_380)

Cognitive-Physical Rehabilitative Games

- Integrate computer games designed for older adults with cognitive decline, targeting physical and cognitive functions, including skills like pinching, attention, memory, and daily living activities. (LCN08; LIR01)

Virtual & Augmented Reality Systems

- Utilise virtual reality systems for cognitive rehabilitation by providing simulations of real-life scenarios. Additionally, implement mixed or augmented reality for movement-based games while ensuring safety. (AUS18; LIR01)

The Family Breakout Room should be strategically located near the treatment areas within the Transitional Care Area, providing a visible and welcoming space for caregivers. This Area allows caregivers to observe and engage in treatment sessions while offering users a comfortable place to rest after therapy. By encouraging interactions among users and their caregivers, this room fosters a sense of community and connection, enhancing the overall support system for individuals during their recovery process.

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Therapy Areas: Locate the Family Breakout Room close to the Therapy Areas for caregivers or users to observe activities within.

Proximity to Windows

- Place the Room near the window to provide views out, instilling a sense of positivity and hopefulness. (LMY01)

ALL

Visuals

- Low-Arousal Colours: Decorate the Room with low-arousal colours, like green, as these are preferred by older adults in spaces designed for relaxation. (LSK01)

FURNITURE

Home-Like Furniture

- Decorate the Room with homely decoration and furniture to promote social interaction and encourage users to engage with one another, share experiences, and build connections. (LAU03)

Product Information Display

- Provide information on available rehabilitation products through alternative means in the rehabilitation facility, such as display screens, flyers, and handouts.

- Place these informational displays in the waiting area or Family Breakout Room for easy access by users and their caregivers.

- The display of rehabilitation products is not necessary for the Transitional Care Area, given the available space and users' preference for online shopping.

Maggie's Leeds Centre by Heatherwick Studio. © Hufton+Crow

Outdoor Landscaped Area

Podium & Outdoor Exercise

Communal Farm

Outdoor spaces are essential for encouraging regular activity and increasing exposure to fresh air and direct sunlight, both of which promote active lifestyles and enhance overall well-being. Access to natural light supports better sleep quality and mental health, while shaded areas provide relief from heat, ensuring comfort for older adults. These spaces should cater to varying levels of activity, fostering social connections and encouraging physical fitness. Additionally, they should offer opportunities for mindfulness and quiet reflection.

RI: Effects of Vitamin D
Solar UVB radiation, the primary source of vitamin D—which is obtained through direct sunlight exposure—plays a crucial role in preventing several health issues. It helps in reducing the risk of autoimmune diseases, including Type I diabetes, inhibits tumour growth, and helps prevent bone loss. Morning exposure to sunlight can also significantly improve sleep quality. To obtain at least 1000 IU of vitamin D, the recommendation is 5–15 minutes of sun exposure in the summer, 15–90 minutes in the winter, and 10–30 minutes in the spring. For older adults above 70, a daily intake of 800 IU is recommended. (LGB02; LTW01)

John Morden Centre by Mæ Architects. © Jim Stephenson

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Transitional Care Area: Provide dedicated access points to the Therapy Areas with access control measures, enabling therapeutic outdoor activities that support cognitive health.

Integration with Indoor Spaces

- Extend Greenery Indoors: Integrate greenery into doorsteps and private outdoor spaces to create a seamless connection between indoor and outdoor environments.

- Views from Living Spaces: Enable residents to overlook the Landscaped Area from their Dwelling through features like ground-floor courtyards or podiums, enhancing the living experience.

INTERNAL AREA

Accessibility & Safety

- Unobstructed Views: Ensure clear sightlines and eliminate blind corners to enhance safety for older adults.

- Seating Areas: Position seating at intervals of no more than 50m, considering orientation for varied viewpoints. (AHK02; ASG01; ASG05)

- Immersive Greenery: Create a Landscaped Area abundant in greenery to foster an intense sense of immersion in nature, which can encourage walking and enhance knee muscle strength. (LCA01; LCN01; LGB01)

Environmental Quality

- Noise Isolation: Position the Landscaped Area in a quiet zone, away from noise pollution such as traffic and mechanical sounds, to cultivate a serene environment. (ASG05; LCN03)

- Air Circulation: Ensure the Landscaped Area is well-ventilated, free from air pollution, and protected from high wind speeds.

- Plant Selection: Choose plant species that are less prone to pest issues for a thriving, low-maintenance landscape. Use a varied planting palette to attract beneficial pollinators, such as butterflies, at appropriate sites. For areas near ecologically sensitive zones, engage ecologists early in the design process. (AHK33_1)

- Daylight Exposure: Maximise sunlight exposure, particularly during mornings and winter months.

Three-Dimensional Composition

- Wildlife-Friendly Features: Include bird feeders, butterfly gardens, and native plants to attract local wildlife, enhancing the outdoor experience and fostering ecological awareness.

- Geometric patterns: Use repetitive elements in organised patterns, and textured designs that harmonise the overall aesthetic, drawing inspiration from the geometric patterns found in nature.

- Seasonal Interests: Incorporate seasonal changing flowering plant species for year-round sensory interest and healing effects. (AGB07)

- Layered Vegetation: Use a mix of canopy trees, shrubs, perennials, and groundcovers to improve thermal comfort by providing shade and cooling through evapotranspiration. Choose trees with high, spreading canopies that can tolerate strong winds and are non-fruit bearing. Avoid large trees with invasive roots. (AHK33_6)

- Varied Scenes: Incorporate plants of varying heights, textures, colours, and scents to create visually engaging elements in each scene. (LCN02)

- Interesting Focal Points: Design landmarks and focal points within the garden to enhance familiarity and visual interest for residents.

Water Features

- Cooling & Therapeutic Effects: Include a large water feature to improve microclimates and enhance outdoor thermal comfort. Recommended features include running water, koi ponds, fountains, and waterfall streams to create a serene atmosphere. (IMAGE) (LBE01; LCA01; LCN01; LHK11)

The Barns at Troutbeck by Shelter Design Architecture. © Nicole Franzen & Troutbeck

Sheltered Activity Spaces

- Multi-Functional Design: Incorporate sheltered areas that facilitate various activities, such as exercising, yoga classes, social gatherings, or quiet reading nooks. This flexibility enhances usability for residents.

○ Variety of Shelter Sizes: Provide shelters in varied sizes to accommodate groups of varying capacities, ensuring space for at least 10 people for social interactions and activities. (ASG05)

Engaging Environmental Design

- Canopy Trees: Include canopy trees wherever possible to offer natural shade and enhance the outdoor experience.

○ Captivating Shelter Features: Create unique shelters that feature interesting designs, casting captivating shadows to encourage exploration and stimulate curiosity among residents. (LBE01)

Promote Engagement

- Interactive Elements: Introduce interactive features to encourage physical activity and social interaction among residents.

○ Maximise Visual Connectivity: Avoid tall walls or partitions to allow residents to enjoy views of surrounding greenery and the environment while seated.

Thoughtful Greenery Design

- Plant Selection and Spacing: Evaluate plant spacing and select suitable planters based on the mature size of each species. Choose resilient plant species that are less prone to pest issues.

RI: Forest Bathing

Designing a garden lush with greenery not only creates an enchanting backdrop but also sets the perfect stage for practicing Shinrin-yoku, the art of "forest bathing" that originated in Japan. This immersive practice invites people to engage all their senses to connect deeply with nature, thereby enhancing overall well-being. Internationally recognised as Forest Therapy, this approach encourages individuals to contemplate and rejuvenate, facilitating a profound healing process. Research has shown that forest therapy can bring physiological benefits such as reducing blood pressure, pulse rates, and stress hormone levels. It can also enhance mood, creativity, self-awareness, self-love, and deep listening. (LIT01)

RI: The Preference for Natural Landscapes

Research consistently shows that people prefer natural, vegetated landscapes, especially those with trees and water features. These elements enhance aesthetic appeal and trigger positive emotional responses rooted in our evolutionary past, where natural features were crucial for survival. Over time, these elements have become embedded in our neural networks as sources of positive emotions. Conversely, threatening environments can provoke negative emotional responses. Regular exposure to natural settings not only improves mood but also offers tangible health benefits, such as sharpening mental focus, reducing stress, and replenishing energy. (LBE01)

FLOORINGS

Recommended Settings

Slip Resistance
R12, or equivalent (All areas)

Outdoor Areas

○ Durability & Weather Resistance: Choose materials like EPDM rubber, known for its high durability and resistance to extreme weather conditions, UV exposure, and wear.

○ Flexible Installation: Select materials that can be installed in various patterns and shapes, allowing for creative and functional design in outdoor spaces.

EPDM rubber can be customised to fit different layouts, enhancing the overall aesthetic and usability.

○ Maintenance & Accessibility: Ensure that the materials are easy to maintain and allow for straightforward access for replacing worn or damaged sections.

→ Communal Area/Materials & Finishes/Floorings

GENERAL

Community Spaces

○ Seating Options: Provide ample comfortable seating throughout the Area, including benches with armrests for easier transitions and rest points.

○ Non-Conductive Materials: Use non-conductive materials, such as insulated or heat-resistant coatings, to prevent sun-induced burns.

Pest Management

○ Incorporate insect-repellent plants like marigolds, lavender, and basil, and utilise organic insecticides to effectively deter pests.

Soft Fencing

- For secure spaces, consider using soft fencing with shrubs and plants along the perimeter. This creates a natural, less imposing boundary compared to traditional walls or fences. (ASG05)

Weather Station

○ Install a mobile meteorological station with sensors to monitor microclimate conditions. Consider displaying this information on interactive kiosks to engage residents and enhance their understanding of the environment. (LHK03)

Educational Signage

○ Incorporate educational signage throughout the Landscaped Area as focal points that promote continuous learning and encourage residents to explore and engage with the natural surroundings. (AHK33_2)

The Podium and Outdoor Exercise play a vital role in promoting regular physical activity, essential for preventing conditions such as osteoporosis and dementia. The Podium should serve as a preferred space for residents to engage in casual stretching and light exercises, seamlessly integrating movement into their daily routines. In addition to offering accessible exercise options, it should enhance social interactions and emotional well-being.

RI: Regular Exercise and Health
Regular exercise is vital for older adults' health as it is one of the most effective ways to prevent bone loss, Parkinson's disease, and dementia. Creating a fitness area for active outdoor activities promotes exercise and encourages exposure to sunlight, facilitating vitamin D supplementation. (LUS21)

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Indoor Gym: Establish a seamless connection between the Outdoor Exercise and the indoor Gym to enhance accessibility and provide diverse fitness options.

- Transitional Care Area: Create a dedicated access point from the Physiotherapy Area with access control measures for efficient rehabilitation support.

Proximity to Children's Play Facilities

- Integrate children's play areas and informal fitness equipment in a nearby but separate location. This encourages intergenerational interactions while minimising noise and safety concerns. Include shaded seating for older adults to safely observe and engage with the children. (AHK33_1)

INTERNAL AREA

Integrated Activity Areas

- Design for Group Exercises: Allocate flat, well-drained areas for group exercises such as tai chi and Baduanjin qigong (八段錦), with adjacent open spaces for warm-up and cool-down activities. (ANZ02)

- Secluded Exercise Spaces: Incorporate pocket spaces within the Exercise Area for individuals who prefer to exercise in seclusion. (ASG01)

Sheltered & Daylit Areas

- Weather Protection: Position the Exercise Area in a sheltered location to facilitate outdoor exercise in various weather conditions.

- Indoor-Outdoor Transitions: Ensure seamless transitions between indoor, semi-covered and outdoor spaces. (AHK33_1)

- Daylight Access: Design the Area to receive ample daylight, enhancing both activity zones and seating areas. (AHK02)

Greenery & Views

- Integrate the Area with surrounding green spaces to create a natural and inviting environment, while ensuring it offers views of the surrounding landscape to foster a sense of connection to the wider community. (ASG05)
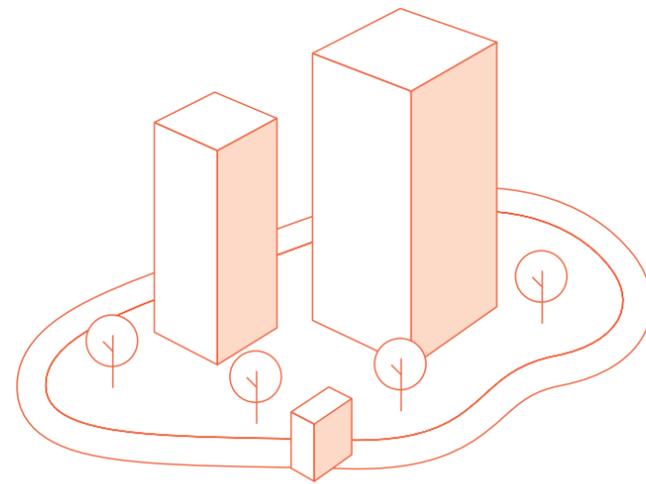
ACCESSIBLE ROUTE

LOOPED TRAIL

Trail Layout & Accessibility

- Looped Design: Create a looped walking trail that avoids steps, crossovers, and dead ends to encourage more walking and physical activity among older adults. (AGB02; LAU01; LHK02)

- Length & Entry Points: Ensure the trail is at least 400m long, allowing for a 6-to-7-minute walk, with regular entry and exit points based on site conditions. (AHK33_1; LUS01)

- Location: Position the trail away from traffic and main roads to enhance safety.

- Path Width & User Accommodation: Design the path to be a minimum of 1900mm wide to accommodate multiple users, and consider separate lanes for joggers, walkers, and individuals using mobility aids, if feasible. (AHK33_1)

- Visible Metrics: Include visible counting devices such as distance milestones, step markers, and calorie counters along the trail. (AHK33_1)

Comfortable Environment

- Natural Integration: Situate the trail within or around natural areas, incorporating continuous planting and vegetation to enhance the walking experience. (LCN01; LCN02)

- Quiet Zones: Separate the trail from busy or crowded areas to prevent collisions and maintain a peaceful atmosphere.

Engaging Design Elements

- Deflected Vistas: Integrate bends and curves into the trail to stimulate curiosity and encourage exploration, creating a more engaging walking experience. (LBE01)

- Integration With Communal Garden: Ideally, the trail should encircle the communal garden to provide a serene and therapeutic environment for exercise.

FLOORINGS

Functional Paving Patterns

- Incorporate the following floor patterns to support functional fitness activities for residents, with a focus on safety and accessibility:

  - Stepping Path: Enhances balance and coordination, crucial for fall prevention and warm-up activities.

- Balance Beam Line: Improves stability and focus, helping residents develop their balance skills in a controlled environment.

- Stretching Mat Area: Provides a safe space for gentle stretching and flexibility exercises, promoting relaxation and mobility.

GENERAL

Fitness Equipment

→ Clubhouse/Multi-Component Area/Gym/Fixtures & Fittings/Furniture

→ EN 16630 standard for minimum safety requirements and test methods for general outdoor fitness equipment

Waterproof Materials

- Use waterproof materials and incorporate soft handles and seats for improved comfort. (LTW08)

Instruction & Guidance

- Instruction Boards: Provide large, detailed instruction boards with pictures and braille for the fitness equipment. (AAU03)

- Digital Demonstration: Consider incorporating tablet-sized screen displays that play equipment demonstration videos or feature large QR codes linking to video demonstrations. (AAU03)

Related Services in Operational Checklist

Daily Assistance

→ Resident Engagement

Integrated Care Services

→ Health Education
→ Multi-Component Programmes
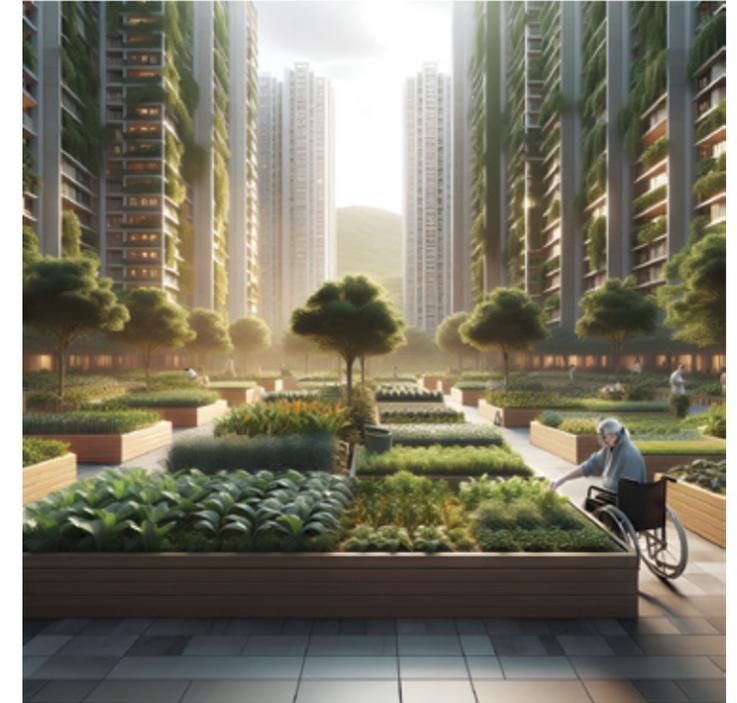
The Communal Farm should promote outdoor activity and healthy eating, significantly enhancing both mental well-being and nutrition. Participation in urban farming cultivates a sense of responsibility and community, allowing residents to connect with nature and each other. Cooking programmes further improve access to nutritious food while fostering social connectivity. This engagement not only instils a sense of accomplishment and belonging among residents but also encourages a sustainable lifestyle.

RI: Regular Exercise and Health
Regular exercise is vital for older adults' health as it is one of the most effective ways to prevent bone loss, Parkinson's disease, and dementia. Creating a fitness area for active outdoor activities promotes exercise and encourages exposure to sunlight, facilitating vitamin D supplementation. (LUS21)

EXTERNAL RELATIONSHIPS

Integration & Access to Related Areas

- Communal Kitchen: Integrate the Communal Farm with the Communal Kitchen to promote a healthy lifestyle and enhance social activities around healthy eating.

Sunlight Exposure

- Optimal Location: Position the Communal Farm in a location that receives a minimum of 6 to 8 hours of sunlight each day to promote healthy plant growth. (AHK33_1)

INTERNAL AREA

Arrival & Departure Point

- Designate a clear and accessible arrival and departure point to delineate a community space and Landscaped Areas.

Shade Structures

- Install shade structures, such as pergolas or canopies, over work areas to protect residents from sun exposure while they work outdoors.

Composting Area

- Create a designated composting area with clear signage to promote sustainable practices and engage residents in recycling organic materials.

Raised Planter Beds

- Incorporate raised planter beds at a height between 750–1000mm and a depth between 300–400mm to accommodate residents using mobility aids and those who prefer to stand. Avoid ground-level planter beds to reduce the need for bending. (IMAGE) (ASG05)

Storage Solutions

- Efficient Storage: Include designated storage space, such as open shelves, in the Communal Farm for easy access to gardening tools and supplies. (AHK33_1)

GENERAL

Gardening Facilities

- Notice Board & Tool Area: Incorporate a notice board for announcements alongside a dedicated tool area for organising gardening equipment, ensuring easy accessibility.

- Washing Facilities & Worktables: Provide multiple washing stations for cleaning tools and hands, along with sturdy worktables for potting and planting tasks, promoting comfort and collaboration among residents.

- Educational Displays: Include displays on gardening techniques, plant care, and sustainability to encourage learning and engagement.

Appleby Blue Almshouse by Witherford Watson Mann. © Philip Vile

Catalogue

Site Planning

General

Accessible Neighbourhoods

- Audit accessibility of essential services and facilities in the neighbourhood. Provide guidance to nearest options or consider in-house alternatives as needed.
- Ensure safe, accessible, and inclusive walking environments.
- Ensure reliable public transport options for accessing essential services and social activities.
- Foster local partnerships with local government, organisations, and business to advocate for facilities, services, and infrastructure enhancements.
- → Appendices/Accessible Neighbourhood Audit

Environmental Quality

- Optimise wind flow, air quality, and thermal comfort by considering air pollution sources, topography and massing.
- Locate buildings away from noise sources and use passive noise reduction designs.
- Conduct site contamination assessments.

Cultural Narratives

- Research the site's history, including cultural, architectural, and social significance.
- Analyse local architecture for a harmonious design, such as preserving existing structures and using local materials and techniques.
- Conduct a socio-economic study to understand neighbourhood dynamics and address challenges.

Harmonious Architecture

- Design new structures, such as active frontages, to complement the surrounding built form.
- Ensure the scale and massing of new buildings are proportional to neighbouring environments.
- Design soft transitions between new and existing structures with landscaped walkways, gardens and communal areas.

Community Engagement

- Engage local cultural leaders, older adults, and community members in the design process.
- Use focus groups, workshops, and surveys to gather insights on needs and preferences from older adults and residents.
- Develop prototype living spaces or amenity areas for feedback to refine designs.
- Incorporate placemaking programmes within the developments for all, including older adults and their friends and family.
- Ensure overall placemaking efforts are inclusive and considerate of different mobility needs.

Space Planning

Internal Area

Layout

- Implement open floor layouts for easy reconfiguration.
- Design buildings with flexible structural elements for future renovations.

Step-Free Access

- Ensure all routes are step-free with no thresholds. Incorporate Lifts and Ramps where there are level changes.

Manoeuvring Space

- Dwelling Corridors: Recommended clear width of 1050mm (min. 950mm).
- Communal Area Corridors: Recommended clear width of 1900mm (min. 1600mm) to allow at least one lane for mobility aids.
- Turning Circles: Recommended diameter of 1500mm (min. 1200mm) to allow for 360-degree turns.
- Door Opening: Recommended clear opening width of 950mm (min. 850mm), ideally with an additional 350mm nip at the leading edge.

Air

Natural Ventilation

- Incorporate accessible and operable windows with strategies that enhance airflow, such as transom windows or wing walls.
- Orient the building towards the seafront or large open spaces to enhance natural ventilation.

Green Spaces

- Integrate indoor plants and green walls for enhanced air quality and environment.

Light

Building Orientation

- Avoid west-facing façades and limit Living Areas and Bedrooms on that side.
- Minimise artificial light pollution.

Daylight Maximisation

- Design layouts with large windows, skylights, and open spaces.

Harvesting Strategies

- Incorporate light shelves, clerestory windows, or atria to distribute sunlight deeper into spaces.

Adjustable Lighting

- Use layered lighting with dimmable fixtures to accommodate preferences.

Anti-Glare Solutions

- Use solar-controlled glazing such as sun control window film, insulated glass units or dual-pane low-emissivity glass.

GENERAL RECOMMENDATIONS

Materials & Finishes	
All	**Natural Materials** ○ Prioritise the use of natural material in exterior and interior design. **Glass Materials** ○ Use non-reflective, matte glazing materials or films to minimise glare and reflections. **Visual Comfort** ● Use high-contrast colours for safety indicators and navigation aids but limit stark contrasts in general. ● Avoid pastel colours which are difficult for individuals with declining vision to see. ● Avoid intricate patterns and complex designs that cause disorientation. ○ Maintain a consistent colour scheme throughout the development. ○ Consider how lighting conditions can influence colour appearance and choose colours accordingly.
Floorings	**Safety and Fall Prevention** ● Use slip-resistant materials with good friction, such as floor tiles with appropriate slip resistance, textured stone, rubber, or vinyl, ensuring they perform well in wet conditions. ● Avoid overly rough surfaces that complicate cleaning and maintenance. ● Use glare-reducing materials, such as matt finishes. ● Select larger floor tiles over smaller ones to reduce grout lines for durability and easy maintenance. ○ Choose flooring with shock-absorbing capabilities. ○ Ensure flooring is levelled before laying the floor finish. ○ Design smooth transitions between different flooring types. ○ Avoid carpets for better infection control and lower fall risk. **Visual Comfort** ○ Avoid dark floor patches that can be misinterpreted as holes.
Walls	**Round Corners** ○ Round outer wall corners with a minimum radius of 20mm to reduce collision risks. **Colour Contrast** ○ Use contrasting colours to clearly define different elements, such as doorframes, windows, and furniture. ○ Avoid overly high contrast within the same surface area to prevent mistaken depth perception. ○ Use warmer, brighter colours to minimise the contrast between solar glare and walls.
Doors	**Door Operating Force** ○ Equip doors with closing devices that require a force of no more than 20 newtons (about 4.5 pounds). **Sliding Doors/Screens** ● Install sliding doors with a levelled bottom track to prevent swaying. ○ For glass doors, apply tintings, frittings, frostings, or markings at full height or at least between 900-1500mm above floor level. **Door Handles** ● Avoid round, knob-style door handles and opt for D-shaped or lever-style handles. ● Ensure lever handles have rounded edges. ○ Position door handles at an accessible height of approximately 1000mm.

GENERAL RECOMMENDATIONS

Fixtures & Fittings

Windows	**Operable Windows**	
	○ Install restrictors to limit window openings to 100mm or less.	
	● Use lever-style handles for easy one-handed operation.	
	Glare Reduction	
	○ Use anti-glare materials or films on glazing.	
	○ For skylights, incorporate a diffuser or other light transmission management measures.	

Furniture	**Safety Features**	**Local Craftmanship**
	● Ensure furniture, such as tables and chairs, is robust and steady, with wider bases and secure anchoring.	○ Use local artisans to create design elements that reflect the community's cultural heritage.
	● Incorporate rounded corners on furniture or install corner guards.	

Lighting	**Illuminance (Lux)**	**Colour Rendering Index (CRI)**
	● Increase lighting levels in all areas for older eyes.	○ Use light sources with a CRI of 90 or above for accurate colour rendering.
	● Use multiple light sources positioned closely together to soften shadows and enhance visibility. Indirect lighting should be placed out of direct line of sight to reduce glare.	○ Select materials and finishes that complement high-CRI lighting.
	○ Use fixtures with indirect light sources, such as light troughs, that direct light upwards to illuminate the ceiling.	● Maximise natural light to enhance CRI.
	○ Avoid strong, direct lighting that creates harsh reflections and deep shadows.	**Task Lighting**
	Correlated Colour Temperature (CCT)	○ Provide task lighting for reading, cooking, and daily activities.
	○ Use warm white light (2700–3000K) in recreational areas to promote relaxation.	
	○ Incorporate cooler white light (4000–5000K) in activity areas to enhance alertness.	
	○ Implement adjustable lighting systems to cater to personal preferences.	

Mechanical & Electrical

HVAC & Water	**Effective Ventilation**	**Equipment Selection and Controls**
	○ For mechanical ventilation, ensure the air supply is evenly distributed rather than directed at occupants.	● Evaluate both initial costs and long-term operating and maintenance expenses.
	○ Ensure the ventilation system prioritises fresh air intake over recirculation.	○ Select systems with simple maintenance and component replacement.
		○ Establish a regular maintenance schedule, including filter changes and duct cleaning.
		○ Choose energy-saving HVAC systems.
		○ Incorporate a monitoring and climate control interface that allows occupants to customise temperature and humidity.
		○ Enable individual temperature and humidity control in each room to accommodate preferences.

IoT Planning	**Structural & Electrical Considerations**	**Related Services in Operational Checklist**
	○ Design the structure to include electrical outlets for potential gerontechnology installations, such as ceiling-mounted fall detectors and wall-mounted emergency call bells.	**Daily Assistance**
	○ Use hidden wiring and conduits within the walls for safety and a seamless appearance.	→ General Enquiries & Assistance
	○ Include additional electrical circuits and outlets to meet future power demands of IoT devices.	**Overall Operations**
	○ Include secure mounting points, such as wall brackets and reinforced ceilings, for IoT equipment.	→ Facility Management
	○ Strategically plan the placement of IoT devices considering older adults' reach and mobility.	→ Incident Management
	Network Considerations	→ Information Management
	● Ensure stable high-speed internet provision, Global Positioning System (GPS), and Radio Frequency Identification Technology (RFID) throughout the whole Development.	→ IoT Integration

DWELLING

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Space Planning						
External Relationships		**Personalised Entrance** • Provide a customisable ledge or design feature outside the Entrance for residents to display personal items.		**Direct Access** ○ Position the Kitchen door directly facing the Dining Area.	**Direct Access** ○ Plan a direct route with a visual connection from the bedside to the Dwelling Entrance. **Ensuite Washroom** • Locate the Bedroom next to the Washroom, preferably ensuite, with a direct sightline from the bed.	**Direct Access** • Plan a direct route with a visual connection from the bedside to the Washroom. **Hygienic Provision** • Avoid Washrooms without windows.
Internal Area	**Open Layout** • Design load-bearing walls at the perimeter and minimise corridors. **Visual & Physical Connection** • Prioritise full-height glazed walls and doors. **Corridor Wall Space** • Position the door for continuous grab rail support, allowing users to reach the opposite side within arm's reach. → Dwelling/General/Materials & Finishes/Walls **Dual Aspect Design** ○ Opt for a dual aspect design with operable windows on two opposite walls. **Storage** ○ Provide ample built-in storage.	**Entrance Vestibule** • Incorporate a vestibule as a buffer between the Entrance and Living & Dining. • Demarcate the vestibule as a dirty zone by choosing visually distinct flooring that is also antibacterial and easy to clean.	**Spatial Proportion** • Ensure the area has a minimum width of 3000mm and a clear activity space of 2000 × 2000mm. **Balcony** ○ Incorporate a balcony to extend the Living Area.	**Spatial Proportion** • Prioritise a squarish layout over an elongated one. **Food Safety Layout** ○ Design the Kitchen for efficiency, with an assembly line flow from raw and cooked stages, storage, cleaning, preparation, cooking, and delivery. • Ensure the distance between the sink and the food preparation area is less than 1000mm to prevent cross-contamination. • Utilise L- or U-shaped countertops. → Dwelling/Kitchen/Fixtures & Fittings/Countertops	**Flexible Layout** • Ensure a 750mm wide route from the Bedroom door to at least one side of the bed. • Design the room so it can be easily adapted from a double to bed to twin beds.	**Accessible Layout** • Prioritise a squarish layout. • Place the washbasins, water closet, and shower around the central manoeuvring space of the Washroom. ○ Position the water closet facing the door, with the washbasins next to the door. **Safety & Potential Conversion** • Install level-entry walk-in showers instead of bathtubs. • Ensure the shower cubicles are at least 900mm wide and 1500mm long. • If bathtubs are installed, ensure they can be converted to a level walk-in showers with enough clearance for drainage.
Accessible Route	**Manoeuvring Space** • Provide a turning circle of 1500mm (min. 1200mm) in all functional areas. **Step-Free Access** • Ensure no raised thresholds or indented gaps throughout. **Corridors** • Maintain a clear width of 1050mm (min. 950mm) along corridors.	**Manoeuvring Space** • Ensure a clear opening width of 950mm (min. 850mm), ideally with an additional minimum nip of 350mm to the leading edge for double leaf doors. **Step-Free Access** • Ensure no raised thresholds or indented gaps between the Dwelling and Communal Area.	**Balcony** **Manoeuvring Space** • Provide a door with full length opening to the Balcony, ideally with a minimum clear opening of 1200mm. **Step-Free Access** • Ensure level floorings, no raised thresholds or indented gaps between the Balcony and interior space.	**Manoeuvring Space** • Provide a turning circle of 1500mm (min.1200mm) in front of and between all Kitchen units and appliances. **Step-Free Access** • Ensure no raised thresholds or indented gaps between the Kitchen and Dining Area.	**Manoeuvring Space** • Provide a turning circle of 1500mm (min.1200mm) next to the Bedroom door. This may overlap with bedside route(s).	**Manoeuvring Space** • Provide a turning circle of 1500mm (min.1200mm) close to all fittings, including the water closet, washbasins, and mirror. This may overlap with the shower area. **Step-Free Access** • Ensure no raised thresholds or ledges at the Washroom and shower entry.

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Accessible Route	**Doors** • Ensure a clear opening width of 950mm (min. 850mm), ideally with an additional 350mm nip to the leading edge, for all doors. • For sliding doors, exclude the door leaf protrusion from the clear width. **Stairs** ○ Allow for stair lift installation options if needed. → Main Circulation Route/Exercise Stairs					
Air	**Ceiling Height** ○ Prioritise high ceilings. **(IoT) Air Quality Monitors** ○ Install monitors at breathing height (1000–1300 mm) to detect indoor air contaminants. → General Recommendations/ Space Planning/Air		**Operable Windows** • Provide operable windows for effective cross-ventilation.	**Operable Windows** • Provide operable windows to help remove odours and pollutants.	**Operable Windows** • Provide operable windows to regulate indoor air quality.	**Operable Windows** • Provide operable windows to enhance cross-ventilation and minimise moisture-related issues. ○ Install transom windows above eye level for privacy. **Thermo Ventilators** ○ Consider installing thermo ventilators for extra warmth.

Light, View & Sound	**Principal Windows**
	• Provide principal windows in the Living Area and Bedroom with unobstructed views from both seated and standing positions.
	• Position the window sill at a maximum of 800mm above floor level for a good, seated view.
	• Extend the window height to at least 1800mm for standing views.
	• Incorporate appropriate safety barriers as needed.
	
	Shading Devices
	○ Select windows and shading to manage glare and heat while allowing in sunlight:
	  ○ East- and West-Facing: Use vertical elements, such as adjustable vertical fins, with proper spacing.
	  ○ South-Facing: Incorporate horizontal overhangs and additional vertical shading for southeast and southwest windows.
			Principal Windows
			→ General
					Principal Windows
					→ General
					
					Recessed Curtain Tracks
					○ Install recessed curtain tracks to minimise light bleed and external light pollution.
					
					Noise Isolation
					• Position the Bedroom away from high-activity areas such as the Kitchen.
					• Avoid positioning Bedrooms next to lift shafts.
					• Position Bedroom windows away from noise sources.	

DWELLING

DWELLING

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Light, View & Sound	**Views** ● Prioritise views of gardens and natural landscapes. ○ Avoid views of busy streets. **Visual Cues** ○ Incorporate elements such as greenery, vibrant flowers, plant life, architectural features, wildlife, water features, and seasonal changes. → General Recommendations/ Space Planning/Light					

Materials & Finishes

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
All	**Visuals** ○ Utilise contrasting floor and wall colours to improve spatial perception. ○ Choose lighter colour tones with matte finishes and a light reflectance value (LRV) of 60–80% for wall and ceiling finishes. **Hygiene** ● Apply anti-mould coatings to walls and ceilings. **Low VOCs** ○ Adopt low-emitting and low volatile organic compound (VOC) building and furnishing materials to avoid indoor air pollution. → General Recommendations/ Materials & Finishes/All					**Uniform Tile Pattern** ● Choose tiles or wall materials with a uniform tone or pattern for easier future replacement.
Floorings	**Safety & Fall Prevention** ○ Choose waterproof and stain-resistant flooring. ○ Avoid slippery materials such as polished stone and glossy porcelain tiles.	→ Dwelling/Entrance/Space Planning/Internal Area/Zonal Demarcation	**Balcony** **Recommended Settings** Slip Resistance R11, or equivalent (Wet Area)	**Recommended Settings** Slip Resistance R11, or equivalent (Wet Area)		**Recommended Settings** Slip Resistance R11, or equivalent (Wet Area)
			Raised Decking ● Install raised decking for level access from interior space.	**Visuals** ○ Use a light-coloured flooring to help avoid unnoticed water or oil spills.		**Drainage** ● Ensure drain grates are well-constructed for level access to the floor.

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Floorings	**Acoustics** ○ Use acoustic underlays between the structural slab and finished flooring. → General Recommendations/ Materials & Finishes/Floorings			**Drainage** ● Ensure the floor has proper drainage for floor cleaning or accidental floods. → Washroom		● Ensure smooth metal edges to protect barefoot users. ● Incorporate easily removable drain covers for easy maintenance. ● Position drains in corners or along wall edges to keep the circulation space clear. ● Use a grating with small openings to prevent walking aids or wheelchair casters from getting stuck.
Walls	**Visuals** ● Avoid highly reflective materials such as mirrors to prevent disorientation. **Acoustics** ○ Incorporate sound insulation to minimise noise between dwellings. **Adaptable Zones** ● Provide grab rail installations on a needs basis in consultation with occupational therapists. ● Reserve 'Adaptable Zone', between 750-1000mm above floor level on all walls within the Dwelling, for potential installation of horizontal grab rails. ● Extend the 'Adaptable Zone' next to the door frame of the opening edge between 750-1500mm above floor level, with a minimum width 150mm from the frame, for potential installation of vertical grab rails. ○ Ensure the 'Adaptable Zone' are free of wires and pipes and have sufficient structural strength to support up to 150kg (1.5kN). **Grab Rails** ● Opt for grab rails that are nailed into the wall for better stability. ● Ensure grab rails are levelled and provide continuous, uninterrupted support. ● Avoid short, disconnected grab rails. → General Recommendations/ Materials & Finishes/Walls			→ Dwelling/Kitchen/Materials & Finishes/Doors/Wall and Door Materials - Enclosed Kitchens		**Non-Porous Materials Materials** ● Avoid using porous materials such as natural stone for Washroom walls. **Adaptable Zones** ● Reserve 350–400mm clearance on both sides of the toilet's centreline for potential installation of horizontal grab rails. ● Extend the 'Adaptable Zone' in the shower cubicle from 750–1500mm above floor level for potential installation of vertical and horizontal grab rails. ● Plan wall wiring for waterproof emergency call bells and sockets carefully to allow for future installation of grab rails. **Shower Seats** ○ Include space for potential wall-mounted shower seats near the shower controls at 430–470mm above floor level.

DWELLING

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM	
Doors	**Door Type** • Ensure all doors are operable from both sides, with 'rescue hardware' for bi-directional swing doors. • Prioritise sliding or folding doors for enhanced accessibility; alternatively, use bi-directional swing doors. • Plan sliding doors with wall pockets to allow for grab rail installation on nearby walls. • For sliding doors, ensure 50mm of grip space on both sides of the vertical grab rails from the door frame. → General Recommendations/ Materials & Finishes/Doors	**Door Type** ○ Choose one-sided swing doors. **Acoustics** ○ Choose soundproof, solid-core doors. ○ Add a door seals at the bottom. **Door Closers** ○ Install door closers with a delayed action function. **Door Locks** ○ Prioritise manual locks over electronic locks. ○ Avoid using electronic locks with fingerprint access. **Door Viewers** • Incorporate door viewers with a large diameter at two height levels – 1100mm and 1500mm. • (IoT) Install digital door viewers for remote monitoring via a smartphone. **Signage** ○ Display the Dwelling number at the entrance using large, sans-serif numbers or letters at least 70mm in height. ○ Ensure a clear colour contrast between the signage and the background. ○ Enhance the visibility of the door by using colours that contrast with the surrounding surfaces.	**Balcony** • Choose door types that allow for a full-length opening, such as "slide and swing" doors. • Prioritise doors with easy, light operation. ○ Pay special attention to proprietary products for Balcony doors to ensure level access is achieved.	**Door Type - Enclosed Kitchens** ○ Choose sliding doors or folding doors over bi-directional swing doors. ○ Install door closers with adjustable delayed closing for fire-rated doors. **Wall & Door Materials - Enclosed Kitchens** • Incorporate glass panels in the Kitchen wall and door at 800–1800mm above floor level. • Fire-rated doors should not be excessively heavy.	**Acoustics** ○ Choose soundproof, solid-core doors.	**Door Type** • Choose sliding doors or folding doors over bi-directional swing doors. **Shower Screens** • Prioritise folding screen doors over sliding options for maximum space and emergency removal. • Ensure shower screen design does not compromise waterproofing or tile installation.	
Windows	**Window Type** ○ Prioritise sliding windows. **Acoustic Windows** ○ Use acoustic windows and weatherstripping to minimise external noise infiltration. **Thermal Comfort** → General Recommendations/ Space Planning/Light/Anti-Glare Solutions **Window Openers** ○ Consider installing externally mounted mechanical or electrical window openers, such as chained actuators, for windows that are out of reach. → General Recommendations/ Materials & Finishes/Windows				**Acoustic Windows** ○ Use acoustic windows to reduce the impact of intermittent noises.	→ Dwelling/Washroom/Space Planning/Air	

DWELLING

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	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Fixture & Fittings						
Countertops				**Dimensions** • Ensure a standard countertop height of 850mm. • Limit the maximum depth of the countertop to 600mm, within seated users' reach. • Include a slightly raised edge. • Include leg room with a minimum height of 680mm and a minimum depth of 450mm, ideally along the full length of the sink, countertop, and stove. **Additional Features** • Offer an additional min. 300mm of clear countertop space for extra appliances on at least one side of the microwave, oven, and/or fridge. ○ Position the fridge to ensure that it does not block circulation space for users of mobility aids when the fridge door is opened. ○ Consider pull-out countertops with smooth, easy-to-operate hinges. **Surface Material** ○ Use stain- and heat-resistant, plain light-coloured, and non-reflective materials for the countertop surface. ○ Opt for a continuous, seamless surface like Corian for easy maintenance.		**Vanity Units** ○ Provide ample countertop space near vanity units, particularly beside the water closet. ○ Include discreet storage for incontinence supplies. ○ Choose vanity units or countertops in light, matte colours. ○ Install open shelving or cabinets within arm's reach of the toilet. **Dimensions** • Ensure a standard countertop height of 850mm. • Ensure open leg room under the washbasins, with a minimum height of 680mm, width of 850mm and depth of 450mm. **Movable Base Cabinets** ○ Consider movable base cabinets under washbasins for additional storage while providing adequate leg space. ○ Ensure the cabinets are installed with smooth rollers and safety locks. **Mirrors** ○ Position mirrors with the bottom edge of the mirror not higher than the top of the washbasins. ○ Position the mirror so the top edge is at least 2000mm above floor level.
Storage	**General** • Use open shelves, sliding doors, and soft-close mechanisms to prevent injury. • Limit the depth of storage to a maximum of 600mm. • For base cabinets, include toe spaces at least 230mm high and 230mm deep.	**Cabinets/Benches** ○ Provide cabinets or ledges for storing personal items within the vestibule. **Benches** ○ Include benches for convenient seating when changing shoes. ○ The space can be used for parking mobility aids when the bench is removed.		**Base Cabinets** • Prioritise sliding doors, open shelves, and full-extension drawers for base cabinets. ○ Avoid using swing doors for base cabinets to prevent blocking circulation space.	**Wardrobes** ○ Incorporate adjustable shelves and clothes rails. ○ Provide open shelves within the wardrobe for daily use items. **Bedside Tables** ○ Choose bedside tables with rounded corners. ○ Incorporate a raised ledge on all sides to prevent items from falling.	→ Dwelling/Washroom/Fixtures & Fittings/Countertops/Movable Base Cabinets

DWELLING

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Storage	**Hanging Cabinets** • Position the cabinet bottom 1450mm above the floor. • Include features like drop-down shelves and motorised vertical lifts for easy access by seated users. ○ Opt for glass doors for overhead storage. **Frequent Access Zone** • Position frequently accessed storage areas between 450–1450mm. **Movable Base Cabinets** ○ Consider using movable base cabinets with smooth rollers and a safety lock. **Cabinet Handles** → General Recommendations/ Materials & Finishes/Doors/ Door Handle					

Lighting	**Recommended Settings**
	
	Lux (minimum)
	  200 lux
	Colour Temperature
	  3000K
	  2700–5000K
	  (Tuneable Fixtures)
		Recommended Settings
		
		Lux (minimum)
		  200 lux
		Colour Temperature
		  3000K
			Recommended Settings
			
			Lux (minimum)
			  100 lux (Balcony)
			  200 lux (Living & Dining)
			  500 lux (Task Light)
			Colour Temperature
			  3500K
			  2700–5000K
			  (Tuneable Fixtures)
				Recommended Settings
				
				Lux (minimum)
				  300 lux (Kitchen)
				  500 lux (Task Light)
				Colour Temperature
				  4000K
				  5000K (Task Light)
					Recommended Settings
					
					Lux (minimum)
					  2 lux (Night Light)
					  200 lux (Bedroom)
					  500 lux (Task Light)
					Colour Temperature
					  3000K
					  2000K (Night Light)
					  2700–5000K
					  (Tuneable Fixtures)
						Recommended Settings
						
						Lux (minimum)
						  300 lux (Washroom)
						  500 lux (Mirror and Task Light)
						Colour Temperature
						  3000K

	Visual Mock-Ups ○ Conduct visual mock-ups during the design phase to evaluate the lighting levels, colour temperature, room surface reflectance, and interaction with natural daylight in key living spaces. **Light Sources** • Avoid spotlights. • Use multiple light sources for a relaxing ambience.	**Diffused Lighting** ○ Use even, diffused lighting directed towards the Entrance area, ideally controlled by motion detectors. **Keyhole Lighting** ○ Design lighting to enhance the visibility of the keyhole or lock area. **Avoid Spotlights** ○ Avoid using spotlights in the Entrance area.	**General Lighting** ○ Use tuneable fixtures in the Dining Area to accommodate various table-based tasks. ○ Avoid using spotlights in the Dining Area.	**General Lighting** ○ Ensure Kitchen lighting is brighter and has a cooler colour temperature than other living areas. **Task Lighting** • Install task lighting at key meal preparation areas such as the sink, countertop, and stove. • Recess lighting fixtures to prevent glare.	**General Lighting** ○ Prioritise indirect ambient lighting. ○ Position overhead lighting fixtures away from the bed. ○ Incorporate adjustable, dimmable bedside task lighting. **Night Lighting** • Incorporate small, low-wattage night lights in Bedrooms, corridors, Washrooms, and potentially throughout the whole Dwelling. • Avoid using blue-toned lights or high illuminance. • Position night lights below 450mm above floor level and recess them in walls. • Incorporate motion sensors for automatic activation. ○ Allow residents to customise the night lighting settings.	**General Lighting** ○ Ensure Washroom lighting is brighter than other living areas. **Task Lighting** ○ Position task lighting to minimise glare. **Mirror Lighting** • Provide diffused lighting fixtures on both sides of the mirror. • Avoid using downlights directly above the mirror. **Heat Lamps** • Provide heat lamps over the shower or dressing area.

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Lighting	**Product Selection** ● Choose lighting products based on the following criteria: ○ Availability ○ Replaceability ○ Energy Efficiency ○ Lighting Quality (Lux level, CCT, CRI, flicker-free) ○ Colour Tone (Avoid yellowish tones like incandescent light bulbs.) ○ Lighting Quality (Lux level, CCT, CRI, flicker-free) ○ Colour Tone (Avoid yellowish tones like incandescent light bulbs.) → General Recommendations/ Materials & Finishes/Lighting				**Bedside Lighting** ○ Incorporate adjustable and dimmable task lighting at the bedside. **Ceiling Mounted Sensors** ● Avoid using blue-toned lights or high illuminance.	

Mechanical & Electrical

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
Lighting Controls	**Tuneable Lighting** ○ Incorporate lighting fixtures that allow adjustable illuminance and colour temperature. ○ (IoT) Consider a smart lighting system that automatically regulates lighting according to daylight levels. **Control Switches** ● Locate lighting controls between 1000-1300mm above floor level. ● Position lighting controls preceding space entrances. ○ Use large rocker switches. ○ Consider dimming controls where appropriate. ○ If two-way switches are used, ensure they indicate whether they are in the ON or OFF position. **(IoT) Remote Control Options** ○ Consider incorporating voice-activated or touch-activated remote options via phone applications.	**Master Switches** ○ Install master switches for all electrical systems at the Dwelling Entrance and Bedroom. ○ Ensure both switches have identical functionality. ○ Design the control panel with large, clearly labelled buttons or touch interfaces. ○ (IoT) Supplement the master switches with smart home systems that can be accessed through smartphone apps or voice commands.			**Master Switches** → Entrance	

DWELLING

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM	
HVAC & Water	**(IoT) Thermostats** • Consider installing smart thermostats 1000–1300mm above floor level. • Position them away from heat sources for accurate indoor temperature readings. **(IoT) Thermostatic Water System** • Install a thermostatic water system for precise control of maximum water temperature. **(IoT) Humidity Control** ○ Consider installing a humidity control system connected to the HVAC system. ○ Maintain humidity between 40–60%. → General Recommendations/ Mechanical & Electrical/HVAC & Water			**Stoves** • Prioritise electric stoves over gas stoves for safety. • Install automatic stove shut-off systems for both electric and gas stoves. • If gas stoves are used, provide power sockets for easy adaptation to electric stoves. **Exhaust Fans & Range Hoods** ○ Opt for systems with easy-to-access filters. ○ Provide remote control for seated users. ○ Minimise mechanical noise by syncing system's power level with the stove's temperature. **Sinks** • Opt for rectangular or square sinks over washroom-style rounded sinks. • Provide insulation on the undersides to prevent scalding of seated users. **Water Taps** • Position taps not further than 500mm from the edge of the countertop for reachability. • Use lever-operated taps, clearly marked 'hot' and 'cold'. • Avoid pillar and prioritise mixer taps for ease of use. • Design taps for easy one-handed operation without twisting, pinching, or tight grasping. ○ Consider automatic motion sensor taps. **Water Supply** ○ Ensure the water supply to sinks includes isolation valves and flexible tails for easy maintenance.	**Bladeless Ceiling Fans** ○ Choose and install bladeless ceiling fan models that operate quietly.	**Washbasins** ○ Opt for structurally sturdy round or oval washbasins. **Showerhead & Riser Rail** • Install a riser rail around 800mm long, at a height between 1000–1800mm above floor level. • Install a handheld showerhead with a flexible hose. **Toilet Seats** ○ Use a seat height of 430–470 mm. • Ensure there is adequate power and fresh water supply for potential bidet installation. **Water Taps** → Kitchen	**DWELLING**

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM	
HVAC & Water				**Location of Other Appliances** ● Position openings for Kitchen appliances with direct heating functions, like ovens and microwaves, between 850–1300mm above floor level. ● For refrigerators, locate the door and shelves within the same height range, with the freezer situated below. ● Locate dishwasher and/or laundry appliance openings within the same height range, if applicable.			**DWELLING**
Switches & Sockets	**Placement & Reach** ● Position switches or sockets from 450–750mm, and 1000–1300mm above floor level. ○ Provide ample electrical outlets to minimise the need for extension cords across circulation space. ● Provide at least one double socket on each accessible wall in the Living Area, Kitchen, and Bedrooms. ○ Distribute switches and sockets across different spaces to avoid overcrowding. ○ Avoid concealing components with covers, or within cabinets or wardrobes for accessibility. **Visual Cues & Contrast** ○ Use large, colour-coded push buttons or rocker switches to clearly indicate on/off status. ○ Ensure switch and/or socket plates contrast with the wall and have legible labels.	**Doorbell** ● Position the doorbell between 1000–1300mm above above floor level. ● Opt for a rocker-style doorbell. ● (IoT) Consider a visual doorbell system with a flashing light to alert residents when it rings. ● Visual indicators should be positioned within the user's primary field of view. **Charging Sockets** ○ Install charging sockets in the Entrance vestibule for recharging mobility aids.					

	GENERAL	ENTRANCE	LIVING & DINING	KITCHEN	BEDROOM	WASHROOM
IoT Items	**Planning** → General Recommendations/ Mechanical & Electrical/IoT Planning **Emergency Call Bells** ● At least provide call bells below 450mm above floor level. ● Use waterproof push buttons or pull cords. ● Ensure they are in a high-contrast colour. ● Explore the use of voice activation for emergency calls. **Call System Integration** ● Consider connecting the emergency call bells to a centralised monitoring and response system within the Housing Development. ● Consider integrating the call system with predetermined persons, such as care coordinators and/or caregivers, to enable immediate notification and response by staff as needed. **Sensory Indicators** ● Incorporate both visual and audible alarms (e.g. flashing lights, loud alarms, or vibration). **Fall Detection System** ○ Consider installing a fall detection system. ○ Consider adopting LiDAR technology for enhanced accuracy. ○ Alerts should be sent to predetermined persons without manual activation. ○ Consider integrating artificial intelligence to enhance detection capabilities. **Occupancy Sensors** ○ Consider incorporating occupancy sensors to detect inactivity within a Dwelling. ○ Equip sensors with appliances to detect human activity. ○ Ensure that abnormal periods of inactivity are followed up by predetermined persons.	**(IoT) Visual Intercom** ● Consider installing a visual intercom system that displays live footage of the Building Entrance on a digital screen.	**Smart Television** ● Broadcast tailored workout sessions and group classes from the Clubhouse. ○ Integrate video conferencing for communication with family and friends. ○ Avoid placing electrical outlets or sockets that encourage a television setup facing the window.	**Fire & Carbon Monoxide Detectors** ○ For enclosed Kitchens, install wall- or ceiling-mounted fire detectors near the entrance door, but not too close to the stove. ○ Consider installing carbon monoxide detectors to prevent poisoning from open flames and heaters.	**Emergency Call Bells** ○ Install call bells within easy reach from bedside. ○ Ensure call bells can be reached by a person lying on the floor.	**Emergency Call Bells** **Location** ○ Install call bells within easy reach of the toilet and shower/bathtub. ○ Ensure call bells can be reached by a person lying on the floor. **Wiring & Conduit** ● Ensure concealed wiring and conduit to allow waterproof call bells. ● Ensure call bells are flush with wall surface. **Flood Sensors** ○ Install sensors in areas prone to leaks. ○ Ensure timely leak detection, especially for walk-in showers, providing alerts for residents. ○ Use sensors that can detect small amounts of water and function reliably in high-humidity environments.

DWELLING

Space Planning

Internal Area	**Structural Variations**	**Integration & Access**

Internal Area

Structural Variations
- Avoid simple volumetric forms and uniform layouts to prevent an institutional feel.
- Incorporate varied ceiling heights, sizes, and materials, such as inclined roof designs, for a stimulating environment.
- Ensure a high floor-to-ceiling height for improved ventilation and natural light.
- Use curvilinear designs with rounded corners for safety and to evoke positive emotions.
- Enhance sheltered open areas to promote natural light and airflow.

Ample & Flexible Spaces
- Clearly define communal and private zones, and the connection between indoor and outdoor spaces using varied flooring materials and lighting strategies.
- Ensure communal spaces are large enough to prevent overcrowding and facilitate social interaction while maintaining privacy.
- Avoid enclosed rooms; use glazed walls, partitions, and curtains for adaptable space allocation.

Integration & Access
- Promote shared use of amenities such as reception areas, waiting rooms, and toilets.
- Design layouts with direct access to various amenities, fostering service utilisation and interdepartmental collaboration.

Acoustics
- Incorporate noise-absorbent surfaces such as grass land or plantations.
- Utilise white noise to mask undesirable sounds.
- Create distinct acoustic zones based on activity levels: loud zones, mixed zones, and quiet zones.

Accessible Route

Manoeuvring Spaces
- Minimise passage length and repeat directional signage at junctions.
- Avoid dead-end routes.

Gradient Change
- Avoid sudden minor changes in gradient.
- → General Recommendations/Space Planning/Accessible Route

Materials & Finishes

All

Visuals
- Incorporate bright accent colours to enhance spatial perception.
- Use warm colours such as amber to encourage visits and soften the feel of large institutional spaces.
- → General Recommendations/Materials & Finishes/All

Floorings

Recommended Settings
Slip Resistance
    Internal Areas
        R11, or equivalent (Dry Areas)
        R12, or equivalent (Wet Areas)
    External Areas
        R12, or equivalent (All Areas)

Sound Dampening
- Avoid hard flooring in quiet areas to minimise noise from walking aids.

Manholes, Gratings, & Drains
- Avoid using dark or high-contrast colours and patterns to prevent misinterpretation as holes or traps.
- Ensure manholes, gratings, and drains match the flooring colour for better visibility.
- → General Recommendations/Materials & Finishes/Floorings

Walls

Visual Comfort
- Avoid complex wall patterns and designs, as well as strong directionality to reduce disorientation and fall risks.
- Select neutral shades lighter than the floor colour, except for feature walls.

Glass Walls/Partitions
- Use glass partitions and walls for open sightlines, combining with opaque materials for practicality.
- → General Recommendations/Materials & Finishes/Walls

Doors

Door Materials
- Use solid, opaque doors.

Mirrors
- Avoid full-height mirrors opposite doors.
- → General Recommendations/Materials & Finishes/Doors

Windows

Operable Windows
- Incorporate large operable windows to enhance natural light and ventilation.
- → General Recommendations/Materials & Finishes/Windows

COMMUNAL AREA

Fixtures & Fittings

General

Touchless Fixtures
- Incorporate touchless or motion-activated fixtures such as automatic doors and Toilet taps.

Decorations
- Decorate circulation routes with engaging elements.

Linen Blinds
- Install easy operation linen blinds for windows.

Furniture

General
- Provide movable furniture of different sizes and heights to meet diverse needs.
- Arrange round tables to facilitate face-to-face conversation and organise seating to provide multiple viewpoints.

Furniture Specifications
- Seat Height: 430–470mm
- Seat Depth: 360–500mm

- Provide armrests.
- Provide ample spacing next to or between seats to accommodate mobility aids.
- For moveable armchairs, use sturdy designs, such as integrated wheels, swivel features and locking mechanisms.
- Provide covered or shaded outdoor seating in heat- and slip-resistant materials.
- Choose tabletops with a light reflectance value of 30–50% and matte finishes. Avoid glossy surfaces.
→ General Recommendations/Fixtures & Fittings/Furniture

Landscaping

Indoors
- Place plants near windows to maximise sunlight exposure.
- Use a variety of species for visual interest.
- Choose slow-growing, non-spreading plants that require minimal care.
- Align the colours of indoor plants with outdoor varieties and overall interior design.

Outdoors
→ Clubhouse/Outdoor Landscaped Area/Space Planning

Wayfinding

General
- Create straightforward routes in Communal Areas to foster familiarity.
- Incorporate multi-sensory aids, such as tactile elements or auditory cues, for those with sensory decline.
- Conduct on-site mock-ups to assess readability for older adults.
- Maintain a uniform style across signs.
- Position signs where residents can easily locate necessary information.

Signage Design & Positioning
- Position important signage at eye level to accommodate those with mobility issues.
- Use floor-level cues such as arrows and text.
- Avoid placing signs directly in front of windows to prevent glare.

    Recommended Signage Heights Above Floor Level
    - Floor- and wall-mounted: 1000–1500mm
    - Ceiling-mounted: At least 2100mm
    - Fascia signage: At least 3300mm

Colour & Contrast
- Use a consistent and prominent colour-coding system throughout the facility for navigation.
- Maintain a light reflectance value (LRV) of at least 70% for readability.
- Ensure the signage background contrasts with surrounding elements.
- Use no more than five colours to avoid confusion.
- Avoid safety colours such as red and yellow in non-safety areas.
- Choose distinguishable colours that can be easily described for clarity.
- Avoid directly using corporate colours for wayfinding.

Lighting & Materials
- Illuminate key signage and objects with accent lighting.
- Use non-reflective materials to reduce glare and reflections.
- Illuminate external signage for visibility throughout the day and night.

Typography & Layout
- Opt for sans serif fonts, such as Arial and East Asian Gothic, for both English and Chinese text for better legibility.
- Use bold typefaces for key information.
- Use a mix of capital and lowercase letters in English text to improve comprehension.
- Ensure appropriate text sizes for different viewing distances and angles.
- Limit destination lists to five items, organised logically for easy retrieval.

Pictograms & Symbols
- Use solid colours that contrast with the background rather than lines.
- Pair text with simple pictorial elements to aid understanding.
- Avoid abstract or complex symbols.
- Ensure the arrow shaft-to-wings ratio is greater than 1:1.
- Use established standards for symbols and pictograms.

Directories & Maps
- Site maps should at least be located at Development and Building Entrances.
- Display floor levels clearly on directories.
- Design and locate maps to help people understand the spaces as they approach them.
- Arrange floor directories in ascending order.
- Include details on accessible routes, in-site facilities and proximity to neighbourhood facilities.

Lighting	**Recommended Settings**
	
	Lux (minimum)
	    20 lux (Outdoor areas at night)
	    200 lux (Interior areas)
	Colour Temperature
	    3000K
	    2700–5000K (Tuneable
	    Fixtures)
	
	● Incorporate large windows, skylights, light wells, and atriums to enhance natural light.
	● Install blinds or shades to manage daylight and prevent glare.
	○ Equip electric lights with sensors that activate when natural light levels fall below a set level.
	● Ensure uniform ambient lighting to prevent abrupt transitions between bright and dark areas.
	→ Communal Area/Wayfinding/Lighting & Materials
	→ General Recommendations/Fixtures & Fittings/Lighting

Mechanical & Electrical

HVAC & Water	**Air Circulation** ● Position air vents thoughtfully for adequate air circulation without uncomfortable drafts. ○ Design ductwork and air supply locations for uninterrupted airflow, eliminating dead spots. ● Reduce structural beams, pillars, or equipment that could disrupt airflow, particularly in high-activity areas. ○ Install ceiling or wall-mounted fans to enhance air movement and support the HVAC system. **Indoor Air Quality** ● Install sensors to monitor indoor air quality and adjust HVAC settings as needed. ○ Consider using high-efficiency air filters to remove pollutants, allergens, and odours. ○ Incorporate humidity control features to maintain comfortable indoor humidity levels. **Energy Efficiency & Comfort** ● Explore opportunities for natural ventilation, such as operable windows or vents. ○ Implement zoning systems that allow different temperatures in different areas. ○ Choose an HVAC system with noise reduction and use sound-dampening materials and techniques. ○ (IoT) Use smart thermostats to optimise HVAC operations. → General Recommendations/Mechanical & Electrical/HVAC & Water
Iot Items	**Planning** → General Recommendations/Mechanical & Electrical/IoT Planning **Safety & Security** ● Install emergency call bells linked to the property management at varying heights. ● Ensure stable wireless connection and complete coverage of receivers for wearable safety devices in all communal areas. ○ Install CCTV cameras in communal areas. ○ Install access control systems for sensitive areas. **Health Information** **Health-monitoring Devices** ● Integrate devices that connect to residents' personal devices, such as digital weighing scale with height rod and health screening kiosks, complemented by relevant services. ○ Consider establishing a healthcare server to store resident's health data with their explicit consent. ● Place health information and technologies in high-traffic areas such as Lobbies and Lounges. **Environmental Sensors** ○ Install sensors to monitor environmental conditions such as temperature and outdoor air quality. **Information & Communication** **Public Address System** ● Implement a public address system for public announcements. ○ Position speakers at shorter intervals to allow broadcasting service announcements from property management at a lower volume. ○ Pair with visual displays for those with hearing decline. **Interactive Kiosks** ● Incorporate interactive kiosks for up-to-date information, wayfinding, and community engagement opportunities. ● Use high-contrast, flicker-free displays.

COMMUNAL AREA

MAIN CIRCULATION ROUTE

	MAIN CIRCULATION ROUTE (THE ROUTE)	DEVELOPMENT ENTRANCES	CARPARK	DROP-OFFS, BUILDING ENTRANCES & LOBBIES	LIFTS (ACCESSIBLE & SERVICE LIFT)	RAMPS	EXERCISE STAIRS	
Space Planning								
External Relationships		**Connection to Street** • Orient Entrances towards flat, level surfaces. • Position Entrances for connectivity with street networks and transport stops. → Appendices/Accessible Neighbourhood Audit		**Drop-offs** • Provide Drop-offs for each Building Entrance. ○ Ensure the Drop-offs directly connect to the Main Circulation Route. ○ Consider a dedicated, low-profile ambulance drop-off and pick-up area.				
Internal Area	**Manoeuvring Space** → General Recommendations/ Space Planning/ Accessible Route → Communal Area/ Space Planning/ Accessible Route **Covered Route** • Provide continuous overhead cover. • Avoid using transparent canopies. ○ Include landscaping on top of the cover where possible. **Handrails** • Avoid four-way junctions to ensure a continuous handrail on either side. **Operable Windows** • Incorporate operable windows in interior corridors for natural lighting and ventilation. **Seating Provision** • Provide seating at intervals of no more than 50m along exterior routes. ○ Ensure seating does not encroach on the minimum required clear width of The Route. ○ Include wheelchair parking spaces next to seating areas	**Prominent Entry** • Use protruded or recessed designs for Entrances. • Install a taxi-hailing lightbox at the main Development Entrance.	**Drop-off at Carpark** • Incorporate a Drop-off next to the Building Lobbies. • Ensure level, accessible pedestrian routes to Lobbies. **Family Parking Spaces** ○ Allocate family spaces near the Building Lobbies. ○ Use a high contrast colour for space markings. **General Parking Spaces** • Use clear space markings. ○ Design straightforward driveways for easy navigation. ○ Design wheel stops with high-contrast colours.	**Building Entrances** • Use protruded or recessed designs for Entrances. • Incorporate a prominent, staffed Reception next to the Entrances. • Ensure a clear view of the Drop-off from Reception for prompt assistance. **Lobbies** ○ Ensure a minimum levelled clear area of 1500 × 1500mm on both sides of every Building Entrance. ○ Create comfortable waiting areas with seatings in Lobbies, including typical floor Lobbies. ○ Incorporate large window walls in the Lobbies.	**Accessible Lifts (Passengers)** • Ensure Accessible Lift cars are a minimum of 1500mm deep by 1400mm wide with sufficient manoeuvring space for a 1200mm diameter turning circle. **Service Lifts (For Stretchers)** • Ensure Service Lift cars are minimum of 2300mm deep by 1500mm wide. • Confirm the swept path for efficient navigation through corridors, Lobbies, and Service Lift cars.	**Gradient** ○ Maintain a gentle slope of 1:20 (5%) or less. **Direct Linear Design** ○ Avoid curved Ramps.	**Stair Use** • Position Exercise Stairs centrally to encourage use. ○ Use active signage such as calorie counters. **Direct Linear Design** ○ Avoid curved Stairs. **Treads and Risers** • Ensure uniform risers within each flight. • Use treads of 300–350mm and risers no higher than 150mm. **Operable Windows** ○ Incorporate operable windows. ○ If operable windows aren't feasible, incorporate mechanical ventilation.	

MAIN CIRCULATION ROUTE

	MAIN CIRCULATION ROUTE (THE ROUTE)	DEVELOPMENT ENTRANCES	CARPARK	DROP-OFFS, BUILDING ENTRANCES & LOBBIES	LIFTS (ACCESSIBLE & SERVICE LIFT)	RAMPS	EXERCISE STAIRS	
Materials & Finishes								
Floorings	**Recommended Settings** Slip Resistance R12, or equivalent (All Areas) **Visuals** ● Use a colour that contrast with to the surrounding flooring to emphasise the Route. **Manholes, Gratings & Drains** ● Use a non-slip surface, such as textured materials. ● Position manholes, gratings and drains beyond the clear width of The Route. ○ Ensure good workmanship and maintenance for perfectly flush surfaces.						**Treads and Risers** ○ Paint risers lighter than treads for clear definition. **Nosing Strips** ● Install non-slip nosing strips with a minimum width of 50mm on the leading edge of each tread. ○ Use coloured nosing strips to create clear contrast between the tread and riser edges.	
Walls							**Level Indicators** ● Use distinct colours for each floor level indicator.	
Doors	**Automatic Doors** ● Ensure all doors are automatic along The Route. ○ Use markings on floor to indicate the direction of swings.							

MAIN CIRCULATION ROUTE

	MAIN CIRCULATION ROUTE (THE ROUTE)	DEVELOPMENT ENTRANCES	CARPARK	DROP-OFFS, BUILDING ENTRANCES & LOBBIES	LIFTS (ACCESSIBLE & SERVICE LIFT)	RAMPS	EXERCISE STAIRS	
Fixtures & Fittings								
Furniture				**Seating and Tables** • Ensure that seating and tables are sturdy but easily movable for flexibility. → Communal Area/ Fixtures & Fittings/ Furniture **Reception Counters** • Provide two-level reception counters with the high portion at a maximum height of 1000mm, and the low portion at a maximum height of 750mm. • Provide leg room, for the lower portion, of at least 680mm in height and 450mm in depth • Provide grooves, ledges or handrail at the counter edges for support and consider including notches for holding walking sticks. ○ (IoT) Consider installing induction loop systems to assist people with hearing aids. **Linen Blinds** → Communal Area/ Fixtures & Fittings/ General	**Seating** • Provide non-foldable seating that does not intrude into the 1200mm turning circle.		**Seating** • Consider providing seating at Stair landings.	
Fittings				**Mailboxes** • Provide mailboxes positioned between 450–1450mm above floor level. • Include several unassigned mailboxes at lower heights for individuals with mobility aids.	**Lift Panels** ○ Use large, high-contrast text and symbols for clear button labelling. ○ Provide clearly marked buttons for 'Open Door' and 'Close Door' functions. **Mirrors** • Place mirrors on the rear wall. • Position the mirrors between 800–1800mm above floor level. ○ Avoid full-height mirrors in Lift cars.			

MAIN CIRCULATION ROUTE

	MAIN CIRCULATION ROUTE (THE ROUTE)	DEVELOPMENT ENTRANCES	CARPARK	DROP-OFFS, BUILDING ENTRANCES & LOBBIES	LIFTS (ACCESSIBLE & SERVICE LIFT)	RAMPS	EXERCISE STAIRS	
Handrails	**Continuity** • Install continuous, dual-level handrails along The Route. • Ensure handrails are installed on both sides of The Route, ideally within arm's reach, in case of any disconnections. • Include removable handrails at wall openings such as fire exits, where appropriate. ○ Use fireproof materials for fire-rated handrails while maintaining consistent aesthetics with non-fire-rated handrails. • Employ curved handrails at corners and turns for continuous support. **Materials** • Use thermally insulated material, particularly for exterior spaces. **Lighting** ○ Incorporate indirect lighting within the handrail.				**Continuity** • Install continuous handrails on all sides of the Lift walls, except where seating is provided.	**Dual-Level** • Install continuous dual-level handrails on both sides of Ramps, even for minor gradients.	**Dual-Level** • Install continuous dual-level handrails on both sides of any Staircase, even for a single step. • The top of the upper handrail should be at a height between 850–950mm. • The top of the lower handrails should be at a height between 700–850mm. • The space between the top of the upper handrail and the top of the lower handrail should be at least 150mm. **Additional Handrail** • Incorporate at least one additional handrail in the middle for Staircases wider than 1500mm.	
Wayfinding	**Orientation Cues** • Strategically place items and/or landmarks such as landscaping, art or informational posters at junctions, long corridors, and dead ends. ○ Install additional signage along The Route for extra reassurance.	**Identification Cues** • Ensure the Development Entrances have clear and well-lit signage displaying the Development's name, street, and street number. • Name each entrance if the Development has more than one Entrances. ○ Integrate visually appealing features to differentiate the Development from Building Entrances.	**Identification Cues** • Provide locational signage and site maps. • Use numbers, letters, names, colours, symbols, or images to create memorable identities for parking spaces. **Directional Cues** • Provide directional signage to guide users to the nearest exit.	**Identification Cues** • Ensure signage at Entrances is well-lit and clearly visible to drivers and pedestrians from all directions of approach. • Display floor numbers and information prominently opposite Lift doors. **Orientation Cues** ○ Provide maps or directions to key destinations at reception counters.			**Identification Cues** • Display floor numbers and information prominently at floor landings.	

MAIN CIRCULATION ROUTE

	MAIN CIRCULATION ROUTE (THE ROUTE)	DEVELOPMENT ENTRANCES	CARPARK	DROP-OFFS, BUILDING ENTRANCES & LOBBIES	LIFTS (ACCESSIBLE & SERVICE LIFT)	RAMPS	EXERCISE STAIRS	
Lighting	**Recommended Settings** Lux (minimum) 300 lux Colour Temperature 3000K		**Recommended Settings** Lux (minimum) 20–40 lux Colour Temperature 3000K **Transition Lighting** • Install transitional lighting between indoor and outdoor areas. ○ Use skylights in indoor Carparks for better understanding of outside conditions. **Automatic Lighting Control** → Communal Area/ Fixtures & Fittings/ Lighting/Automatic Lighting Control	**Lobbies** ○ Install transitional lighting at the Building Entrances. **Reception Counters** ○ Ensure the counters are well-lit to enable lip-reading. • Avoid positioning light sources behind the receptionists. • Avoid using downlights above the counters or seating areas.	**Recommended Settings** Lux (minimum) 150 lux (Lift Car) 200 lux (Control Panel) Colour Temperature 3000K **Backlit Buttons** • Use backlit buttons with high-contrast colours. **Door Movement Indicators** ○ Include flashing lights or visual indicators around the Lift door leaves to alert residents to opening and closing doors. **No Downlights** ○ Avoid using high-intensity downlights or spotlights on the ceiling to prevent discomfort for individuals on stretchers.	**Consistent Lighting** • Ensure consistent and even lighting along the entire length of Ramps.	**Consistent Lighting** • Ensure consistent and even lighting along the entire length of Staircases.	

MAIN CIRCULATION ROUTE

	GENERAL	FRONT DESK	STAFF OFFICE	LOUNGE	READING ROOM	CONSULTATION ROOMS	CHINESE MEDICINE CLINIC	TOILETS & CHANGING ROOMS
		Related Services in Operational Checklist _Daily Assistance_ → In-Home Services → General Enquiries & Assistance → Resident Engagement _Integrated Care Services_ → Health Screening → Health Education _Overall Operations_ → Service Feedback → Incident Management → Referrals		**Related Services in Operational Checklist** _Daily Assistance_ → General Enquiries & Assistance → Resident Engagement _Integrated Care Services_ → Health Screening → Health Education _Overall Operations_ → Service Feedback → Human Resources Management/ Care Coordinators	**Related Services in Operational Checklist** _Daily Assistance_ → General Enquiries & Assistance → Resident Engagement	**Related Services in Operational Checklist** _Integrated Care Services_ → Health Screening		

Space Planning

	GENERAL	FRONT DESK	STAFF OFFICE	LOUNGE	READING ROOM	CONSULTATION ROOMS	CHINESE MEDICINE CLINIC	TOILETS & CHANGING ROOMS
External Relationships	**Convenient Location** ● Position the Concierge in a central location of the Housing Development.	**Convenient Location** ● Position the Front Desk adjacent to the Clubhouse entrance.	**Adjacent Areas** ● Front Desk **Convenient Location** ● Position the Staff Office in a convenient location within the Clubhouse for access to key areas. **Staff Access & Amenities** ○ Create a discreet staff circulation path. ○ Include a staff changing area.	**Adjacent Areas** ● Toilets **Central Location** ● Position the Lounge centrally within the Concierge for flexible use of space.	**Adjacent Areas** ● Front Desk ● Lounge **Noise Isolation** ● Locate the Reading Room away from potentially high traffic areas.	**Adjacent Areas** ● Lounge ● Toilets **Privacy & Calm** ● Orient Consultation Room access points to minimise external visibility and sightlines. ● Provide dual access points to facilitate discreet, easy transitions between areas.	**Adjacent Areas** ● Lounge ● Consultation Rooms **Flexible Use & Odour Control** ● Locate the Chinese Medicine Clinic at the periphery for flexible use and integration with other areas. ● Position the Clinic next to a window for better airflow.	**Adjacent Areas** ● At least two Family Toilets in Key Areas ● Changing Rooms

Internal Area		**Waiting Area**
		● Provide a comfortable waiting area with seating nearby.
		Information Privacy
		● Design the Desk to prevent private information in the working area from being seen by others from any angle.
		Connection To Staff Office
		● Ensure direct access or clear sightlines to Staff Office.
			Visual Separation
			● Ensure visual separation from Communal Areas.
			Adequate Storage
			○ Provide adequate storage.
				Multipurpose Functionality and Visual Connectivity
				● Create a flexible Lounge space for:
				  ● Socialising
				  ● Waiting
				  ● Reading
				  ● Arriving at or leaving the dining area
				  ● Basic health screenings.
				○ Follow an open-plan design concept.
				● Ensure panoramic surrounding views for sense of connection.
						Minimum Size
						● 6.5m^2
						Multipurpose Functionality
						● Create versatile, private spaces for conversations with staff, telemedicine consultations, therapist discussions and other private meetings.
							Minimum Size
							● 20m^2 for a Clinic with a bed and storage for concentrated medicine granules.
								Communal Toilets
								Cubical Layout
								● Equip all cubicles with:
								  ● Horizontal grab rails of min. 500mm long with a portion of 200mm extended beyond the toilet seat, 350–400mm from seat centreline, and 280–300mm above seat.
								  ● Vertical grab rails of min. 600mm long and 850mm high.
								  ● An outward opening door with minimum clear opening. width of 850mm.

CLUBHOUSE CONCIERGE

	GENERAL	FRONT DESK	STAFF OFFICE	LOUNGE	READING ROOM	CONSULTATION ROOMS	CHINESE MEDICINE CLINIC	TOILETS & CHANGING ROOMS
Internal Area						**Secure Minimalist Design** • Avoid high ceilings. • Place the entrance/exit doors in a location that prevents users' exposure. ○ Use a minimalist design approach. ○ Avoid overt religious symbols. ○ Minimise visible technology.		• Minimum clearance of 700–750mm between the door and the toilet bowl. • Hands-free sensor toilet flush. • Holding device for walking sticks and bags. **Shower Area** ○ Install level walk-in showers with no raised thresholds and shower seats included.

Materials & Finishes

| All | **Acoustics**
○ Use sound-absorbing materials, such as acoustic panels. | | **Glass Materials**
○ Consider incorporating glass walls or partitions.
→ General Recommendations/Materials & Finishes/All/Glass Materials | | **Acoustics**
○ Use sound-absorbing materials, such as acoustic panels. | **Acoustics**
○ Designate a soundproofed room for private therapies.

Visuals
○ Use bright colours; light blue is recommended. | | **Recommended Settings**
Slip Resistance
R12, or equivalent (Wet Areas)

Automatic Doors
○ Install automatic doors in all Toilet and Changing Room entrances. |

Fixtures & Fittings

Fixtures							**Herb Preparation Area** ○ Include washbasins, workbenches, and proper ventilation if required.	**Countertops** ○ Use light, matte coloured countertops. **Toilet Seats** ○ Install at a height of 430–470 mm.
Furniture		**Reception Counters** → Main Circulation Route/Drop-offs, Building Entrances & Lobbies/Fixtures & Fittings/Furniture/Reception Counters						
Lighting	**Recommended Settings** Lux (minimum) 200 lux 500 lux (Task Light) Colour Temperature 3000K		**Recommended Settings** Lux (minimum) 300 lux 500 lux (Task Light) Colour Temperature 4000K			**Recommended Settings** Lux (minimum) 300 lux 500 lux (Task Light) Colour Temperature 3000K		**Recommended Settings** Lux (minimum) 300 lux 500 lux (Vanity Unit, Shower, Mirror Lighting) Colour Temperature 3000K

CLUBHOUSE CONCIERGE

	GENERAL	FRONT DESK	STAFF OFFICE	LOUNGE	READING ROOM	CONSULTATION ROOMS	CHINESE MEDICINE CLINIC	TOILETS & CHANGING ROOMS
Lighting	**General Lighting** • Use a combination of soft, glare-free ambient lighting, task lighting, and natural lighting. • Avoid downlights over the Front Desk and seating areas.				**Task Lighting** ○ Install adjustable desk lamps positioned behind and to the side of the reader.	**Tuneable Lighting** • Incorporate adjustable lighting for a change to a calming atmosphere.		**General Lighting** ○ Ensure the overall lighting is brighter than in Communal Areas. ○ Use indirect lighting. **Mirror Lighting** • Provide diffused lighting fixtures on both sides of the mirror. • Avoid downlights directly above mirrors. **Heat Lamps** • Install heat lamps above the shower or dressing area.

Mechanical & Electrical

	GENERAL	FRONT DESK	STAFF OFFICE	LOUNGE	READING ROOM	CONSULTATION ROOMS	CHINESE MEDICINE CLINIC	TOILETS & CHANGING ROOMS
HVAC & Water							**Odour Control** • Install a standalone, high-performance HVAC system with advanced filtration if decoction services are provided. ○ Install a specialised exhaust system for herb preparation. ○ Change filters of the HVAC system regularly.	**Washbasins** • Install touchless or automatic taps, with aerators. • Provide horizontal grab rails, ideally at every washbasins. ○ Use splash guards around washbasins. **Shower Area** • Ensure consistent temperatures with appropriate insulation and ventilation.
IoT Items					**Technological Access** • Set up computers with large screens, fast Internet, and large-print e-readers. • Offer quick help from staff for any computer issues. **Charging Stations** ○ Provide power outlets and USB charging stations.	**Technological Access** • Equip rooms with computers, cameras, and high-speed Internet for telemedicine consultations and virtual assessments. **Charging Stations** ○ Provide power outlets and USB charging stations.		**Emergency Call Bells** • Install call bells within easy reach of the toilet and shower, accessible from standing, seated and lying positions.

CLUBHOUSE CONCIERGE

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
		See Related Operations **Integrated Care Services** → Health Education	**See Related Operations** **Daily Assistance** → Resident Engagement **Integrated Care Services** → Health Education → Multi-Component Programmes	**See Related Operations** **Daily Assistance** → Resident Engagement **Integrated Care Services** → Health Education → Multi-Component Programmes	**See Related Operations** **Daily Assistance** → Resident Engagement **Integrated Care Services** → Health Education → Multi-Component Programmes	**See Related Operations** **Daily Assistance** → Resident Engagement **Integrated Care Services** → Health Screening → Multi-Component Programmes → Rehabilitation Services

Space Planning

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
External Relationships	**Adjacent Areas** ● Concierge	**Adjacent Areas** ● Kitchen ● Rest Areas ● Toilets ○ Communal Farm **Proximity to Windows** ● Place the Communal Dining near windows to ensure ample natural ventilation and daylight. **Noise Isolation** ○ Locate the Communal Dining away from noisy external infrastructure.	**Adjacent Areas** ● Communal Dining ○ Communal Farm **Food Safety Layout** → Dwelling/Kitchen/Space Planning/Internal Area/Food Safety Layout	**Adjacent Areas** ● Other Main Functional Areas	**Adjacent Areas** ● Podium & Outdoor Exercise ● Transitional Care Area (with access control)	**Adjacent Areas** ● Transitional Care Area (with access control) ○ Regular Swimming Pool **Noise Isolation** ● Place and orient the Pool to reduce noise disturbance from other Communal Areas.
Internal Area	**Flexible Spaces** ● Avoid enclosed rooms; use glazed walls, partitions, and curtains for adaptable space allocation. **Air Circulation** ● Reduce structural beams, pillars, or equipment that could disrupt airflow, particularly in high-activity areas.	**Minimum Size** ● 1.4m²/person. ● Estimate the number of users to be: 30–50% of the older population in the Development. ● The minimum space requirement for the Kitchen is 40% of the Communal Dining. **Visible Cooking Area** ● Provide a visible cooking area next to the dining area to act as a focal point. **Flexible Use of Space** ● Allow the dining area to serve as a venue for community events, workshops, or recreational activities outside of mealtimes. **Dedicated Area for Reservations** ○ Create a quiet, private dining section for distraction-free meals, avoiding televisions and patterned tablecloths. **Multi-Sensory Design** ○ Design the area with multi-sensory stimuli for a comfortable, home-like atmosphere.		**Minimum Size** ● 4m²/person ● Ensure space for a trainer with a participant ratio of 1:10 to 1:15 for exercise sessions. **Open-Plan** ○ Design a flexible layout for multi-purpose use, accommodating various group sizes. **Adequate Storage** ○ Include ample storage for props and furniture to support a variety of activities.	**Social Spaces** ● Designate areas for social interaction and group fitness classes near fitness equipment.	**Dimensions** ○ Maintain an average water depth of 1000–1200mm (waist and chest level). ○ Incorporate multiple levels with gentle gradients, avoiding steep designs. ○ Opt for a shorter Pool length, such as 15m, with three lanes totalling approximately 10m wide. ○ Collaborate with physiotherapists or occupational therapists on the Pool layout and programming. **Hygiene & Safety** ● Design the Pool edge level with the water surface. ● Design the Pool with a straightforward form such as square or rectangular. ● Choose straight edges to facilitate the installation of equipment, such as exercise devices and grab rails. **Types of Access** ● Incorporate stepped entrances with uniform riser heights of 150mm and tread depths of 300–350mm for easy safe access.

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
Internal Area		○ Decorate the dining environment with tablecloths, dinnerware, or a vase of flowers. ○ Incorporate decorative elements, artwork, and soft furnishings. ○ Minimise unnecessary utensils to maintain a simple and clean table setting.				○ Consider incorporating a ramp entry with a maximum gradient of 1:12 for the ease of users with mobility aids. ● Design for the possible addition of chair lifts, ensuring proper floor depth and placement in a private area. **Pre-Immersion Shower Zone at Poolside** ○ Ensure a step-free entry.
Accessible Route		**Accessibility** ○ Ensure wide aisles and low countertops for easy access.	**Manoeuvring Space** ● Provide a minimum clear space of 1500 × 1500mm in front of and between all kitchen units and appliances.		**Manoeuvring Space** ○ Provide a minimum clear space of 1500 × 1500mm between gym equipment, positioning it carefully to avoid collisions.	

Materials & Finishes

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
All	**Sliding Partitions** ● Ensure sliding partitions are securely installed with a level bottom track.	**Visuals** ○ Use warm colours to enhance the appetite. **Acoustics** ● Use sound-absorbing materials on the walls, ceilings, and floors. ● Reduce the overall amount of hard, reflective surfaces to minimise reverberation.	**Visuals** ● Extend the floor, cabinet, and wall finishes under and behind the movable base cabinets for a uniform appearance.		**Visuals** ○ Use warm colours to encourage physical activity. ○ Avoid using red to minimise anxiety.	**Visuals** ● Opt for light colours and non-glossy finishes. ● Avoid shiny and reflective finishes. **Acoustics** ● Use sound-absorbing materials and reduce overall amount of hard, reflective surfaces to minimise reverberation. **Thermal Insulation** ○ Incorporate proper thermal insulation.
Ceilings						**Acoustics** ○ Create irregular ceiling contours using sound-absorbing, moisture-resistant materials. ○ Incorporate non-hygroscopic panels with membranes.

Floorings	**Safety & Fall Prevention**
	● Use slip-resistant materials with good friction.
	● Choose flooring with shock-absorbing capabilities.
	● Avoid soft materials.
			Recommended Settings
			Slip Resistance
			    R12, or equivalent (Wet Areas)
			Safety and Fall Prevention
			○ Use light-coloured flooring to make water or oil spills more noticeable.
				SAFETY & COMFORT
				● Choose resilient, low-impact flooring, like rubber or vinyl, with a slip-resistant texture.
				○ Ensure the flooring provides cushioning and shock absorption, ideally with medium-density foam or rubber underlayment.
						Recommended Settings
						Slip Resistance
						    R12, or equivalent (Wet Areas)
						● Use anti-slip flooring at the Pool base, steps, and ramp accesses.
						Tile Selection (Pool & Poolside)
						● Use high-contrast nosing on the front edge of all steps and level changes.

CLUBHOUSE
MULTI-COMPONENT AREA

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
Floorings				○ Avoid overly soft flooring. ○ Design smooth transitions between different flooring types.		● Avoid mosaic tiles and ensure poolside surfaces provide good traction. ● Incorporate clear markings or textures on the Pool floor to guide users and indicate important areas such as entrances and exits.

Fixtures & Fittings

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
Furniture		**Seating** ● Incorporate straight back armchairs in dining spaces to reduce choking risks. → Communal Area/Fixtures & Fittings/Furniture		**Partitions** ● Install stable, ceiling-mounted partitions for flexible space use. ○ Ensure partitions extend from floor to ceiling. ○ Use flush floor tracks for added stability. ○ Avoid acoustic curtains and opt for solid partitions.	**Fitness Equipment** **Safety & Comfort** ● Choose low-impact machines that support joint mobility, with proper back support and padding. ○ Include safety features such as grab rails and strapped pedals. **Accessibility** ● Ensure Gym equipment is accessible and suitable for older adults. ● Verify dimensions of imported equipment to suit local users, gathering feedback from older adults. ● Offer easily adjustable machines with multiple height settings and reclining swivel seats. ● Provide a diverse selection of equipment with varying intensity levels, large easy-to-read displays, and clear signage and instructions with visual aids. **Regular Maintenance** ○ Conduct regular maintenance and safety inspections for all equipment. **Equipment Placement** ○ Organise the fitness area into zones based on exercise categories to create a logical flow. ○ Prioritise multi-functional equipment. ○ Place machine-based options inside the Gym and multipurpose weather-resistant equipment outside. **Functionality** ○ Ensure that at least one piece of equipment is included for each of the following functions: endurance training, balance training, mobility training, and resistance training.	**Seating** ● Create a designated quiet zone or seating area for resting before and after Pool use. ● Include variable-height seats and chairs with armrests to accommodate users with limited mobility. ○ Ensure sufficient space around the chairs to allow caregivers to assist users as needed. → Communal Area/Fixtures & Fittings/Furniture **Handrails** **General** ● Install continuous handrails between the Changing Rooms, poolside, and ideally within and around the Pool area. ○ Use contrasting coloutrs for visibility. ○ Position handrails at a comfortable height with a textured grip for safe handling. → Communal Area/Fittings & Fixtures/Handrails **Pool** ● Install handrails on both sides of steps and ramps.

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
Lighting	**Recommended Settings** Lux (minimum) 　300 lux 　500 lux (Task Light) Colour Temperature 　3000K	**Recommended Settings** Lux (minimum) 　300 lux Colour Temperature 　3500K 　5000K (Task Light)	**Recommended Settings** Lux (minimum) 　300 lux 　500 lux (Task Light) Colour Temperature 　4000K 　5000K (Task Light)	**Recommended Settings** Lux (minimum) 　300 lux Colour Temperature 　4000K	**Recommended Settings** Lux (minimum) 　300 lux Colour Temperature 　5000K	**Recommended Settings** Lux Level 　300 lux Colour Temperature 　4000K
		Light Colour ○ Avoid red and blue lighting, which can reduce appetite.	**Task Lighting** ○ Install task lighting at key meal preparation areas, such as sinks, countertops, and stoves. ○ Recess lighting fixtures in cabinets to prevent glare.			**Pool** ● Avoid pointing lights directly at the water surface. ● Install in-pool lighting.

Mechanical & Electrical

	GENERAL	COMMUNAL DINING	COMMUNAL KITCHEN	MULTI-FUNCTIONAL ROOMS	GYM	HYDROTHERAPY POOL
HVAC & Water					**Ventilation** ○ Install an effective ventilation system.	**Ventilation** ○ Install a mechanical ventilation system to keep the air temperature near that of the water, manage humidity with exhaust fans or dehumidifiers, and ensure quiet operation. **Water Filtration** ● Deploy IoT sensors to continuously monitor and display water quality parameters (e.g., pH levels, chlorine concentration, temperature). ● Implement an overflow design to effectively remove and treat polluted surface water. ● Invest in a high-quality filtration system with additional filters at entry and exit points. **Hydromassage Jets** ○ Add hydromassage jets to enhance relaxation and rehabilitation benefits.
IoT Items		**Smart Television** ● Install a large smart television in the dining area to showcase information about healthy eating. ● Use the television for nutrition talks and other engaging activities. ○ Position the television at the front centre for better visibility.	→ Dwelling/Kitchen/Mechanical & Electrical/HVAC & Water	**Included Equipment** ● Large smart television with a computer setup and streaming capabilities. ● Audio system with microphones and speakers. ● Do not use projectors.	**Charging Stations** ○ Plan stations with accessible power outlets and USB charging next to gym equipment. **Smart Fit System** ● Install a smart circuit training system that allows residents to monitor their fitness progress and access customised workout routines.	**Audio System** ○ Install an underwater or above-water sound system that can be connected to a microphone for instructions during group exercise sessions.

CLUBHOUSE MULTI-COMPONENT AREA

	GENERAL	PHYSIOTHERAPY & OCCUPATIONAL THERAPY AREAS	FAMILY BREAKOUT ROOM	
	Related Services in Operational Checklist **Daily Assistance** → In-Home Services **Integrated Care Services** → Health Screening → Rehabilitation Services			

Space Planning

	GENERAL	PHYSIOTHERAPY & OCCUPATIONAL THERAPY AREAS	FAMILY BREAKOUT ROOM	
External Relationships	**Adjacent Areas** ● Family Toilets near entrance ● Drop-offs ● Accessible fire escape route **Access Pathways** ● Position the Transitional Care Area away from high-traffic spaces and roads. ● Incorporate a low-profile entrance to minimise disturbances for users in rehabilitation. ● Incorporate a fully accessible, step-free route from Dwelling. ● If the Area is open to the public, locate it on the ground floor . **Transitional Green Space** ○ Utilise green space as a buffer between the Area and residential buildings. ● Incorporate biophilic design elements that offer a sensory experience. **Reception Counter/Staff Workstation** ● Implement access control measures, with a dedicated reception counter for the Area if located remotely. ● Locate the reception counter or workstation in a position that allows staff to oversee the entire Area.	**Adjacent Areas (With Access Control Measures)** ● Gym, Podium & Outdoor Exercise (Physiotherapy) ● Landscaped Garden (Occupational Therapy) **Proximity to Windows** ● Position the Areas near windows to ensure ample natural light. **Noise Isolation** ○ Locate the Areas away from noisy external infrastructure.	**Adjacent Areas** ● Therapy Areas **Proximity to Windows** ○ Position the Room near windows to provide views out.	
Internal Area	**Minimum Size** **VR/ADL Room** ○ 10m² (potentially for accommodating a mini kitchen, a shower room and toilet, and a bed in ADL Room) **Consultation Room/Quiet Room** ○ 12m² (for a standard consultation room and a plinth bed) → Clubhouse/Concierge/Consultaion Rooms **Spatial Layout** ○ Use a square layout to minimise turning corners for residents using mobility aids.	**Minimum Size** **Physiotherapy Area** ● 6m²/per person for individual sessions with large equipment (e.g. parallel bar). **Occupational Area** ● 4m²/person for fine-motoring skills and cognitive training. **Functional Training Zone** ● Provide a minimum of 3m of dedicated rehabilitation space for ambulation practice and for assessments. ● Install a mirror wall and ensure it is not positioned opposite windows.		

CLUBHOUSE TRANSITIONAL CARE AREA

	GENERAL	PHYSIOTHERAPY & OCCUPATIONAL THERAPY AREAS	FAMILY BREAKOUT ROOM	
Internal Area	**Privacy & Personalisation** ○ Separate quiet private areas from loud public spaces. ○ Use physical separation and visual barriers to ensure privacy. ○ Establish appropriate access control measures. **Ceiling Heights** ● Provide a minimum ceiling height of 2700mm to accommodate equipment like hoist machines. **Branding & Atmosphere** ● Brand the space to avoid an institutional feel and reduce stigma.	**Adaptable Features** ● Incorporate flexible curtain tracks in the Plinth Area for adaptable privacy. **Proximity to Plinth Area** ● Position the Plinth Area for easy access from both the Physiotherapy and Occupational Therapy Areas. ● Store clean linen in a nearby utility room, built-in cupboard or mobile closet. **Proximity to Amenities** ● Place workstations and storage close to Therapy Areas. ○ Plan water sources near amenities like toilets, water fountains, and basins in the Plinth Area.		
Accessible Route	**Manoeuvring Space** ● Ensure the width of corridors is at least 1900mm (min. 1600mm) → Communal Area/Space Planning/Accessible Route			

Materials & Finishes

	GENERAL	PHYSIOTHERAPY & OCCUPATIONAL THERAPY AREAS	FAMILY BREAKOUT ROOM	
All	**Visuals** ● Avoid blue or yellow walls and surfaces to minimise interference with clinician observation. ● Avoid strong contrasts and busy patterns. ○ Avoid dark colours (e.g. black or brown). → Communal Area/Materials & Finishes	**Visuals** ○ Use cool colours to enhance concentration and green to promote relaxation. ○ Add warm accents (e.g. orange or yellow) to boost feelings of happiness.	**Visuals** ○ Decorate the Room with calming colours (e.g. green).	

Fixtures & Fittings

	GENERAL	PHYSIOTHERAPY & OCCUPATIONAL THERAPY AREAS	FAMILY BREAKOUT ROOM	
Furniture	**Handrails** → Main Circulation Route/Fixtures & Fittings/Handrails	**Recommended Furniture, Fixtures, and Equipment for Training & Treatment Needs** **Physiotherapy Equipment** **Mobility & Gait Training Equipment** ○ Height adjustable parallel bar with a full-length mirror in front, treadmill and gait training devices, wooden step-up boxes, walking aids **Strength & Rehabilitation Equipment** ○ Wall bar with suspension frame, reciprocal pulley, hi-lo plinth with curtain, shoulder exercise ladder, tilt table **Thermal & Electrical Therapy Equipment** ○ Thermal therapy equipment (e.g. ice pads, hot pads, and a refrigerator), ice-making amenities, electrical modalities (e.g. ultrasound, interferential therapy [IFT], and transcutaneous electrical nerve stimulation [TENS] devices)	**Home-Like Furniture** ○ Decorate the Room with homely furniture and other touches. **Product Information Display** ○ Provide information on available rehabilitation products using display screens, flyers, and handouts in the waiting area. ○ It is not necessary to display products in the Transitional Care Area.	

CLUBHOUSE
TRANSITIONAL CARE AREA

	GENERAL	PHYSIOTHERAPY & OCCUPATIONAL THERAPY AREAS	FAMILY BREAKOUT ROOM	
Furniture		**Other Equipment** ○ Dumbbells, sandbags, TheraBands, stepping blocks, gym balls, upper and lower limb cycling machines, static bikes, and sit & reach boxes **Occupational Therapy Equipment** ○ Hand mobility rehabilitation kits, hand evaluation kits, and board games **Support Furniture** ○ Worktables, stable chairs with armrests, therapist rolling stools, storage		

Lighting	**Recommended Settings**
	Lux (minimum)
	   300 lux
	Colour Temperature
	   4000K			

Mechanical & Electrical				
Switches & Sockets		**Power Points** ○ Provide adequate power points and equipment storage rooms for charging equipment. → Dwelling/General/Mechanical & Electrical/Switches & Sockets		
IoT Items	**Electronic Check-in Kiosks** ○ Implement electronic check-in kiosks to streamline the check-in process.	**Remote Kiosk Monitors** ○ Position remote kiosk monitors within the Area to keep staff informed about patient appointments. **Cognitive-Physical Rehabilitative Games** ○ Integrate computer games for older adults with cognitive decline, targeting physical and cognitive functions (e.g. pinching, attention, and memory). **Virtual & Augmented Reality Systems** ○ Utilise virtual reality for cognitive rehabilitation by providing simulations of real-life scenarios and implement augmented reality for movement-based games.		

CLUBHOUSE TRANSITIONAL CARE AREA

	GENERAL	PODIUM & OUTDOOR EXERCISE	COMMUNAL FARM	
			Related Services in Operational Checklist <u>Daily Assistance</u> → Resident Engagement <u>Integrated Care Services</u> → Health Education → Multi-Component Programmes	
Space Planning				
External Relationships	**Adjacent Areas** ● Transitional Care Area (with access control) **Integration with Indoor Spaces** ● Integrate greenery into doorsteps and private outdoor spaces. ● Enable residents to overlook the Landscaped Area from their Dwelling with features such as ground-floor courtyards or podiums.	**Adjacent Areas** ● Indoor Gym ● Transitional Care Area (with access control) ● Children's Play Facilities	**Adjacent Areas** ● Communal Kitchen **Sunlight Exposure** ● Position the Farm in a location that receives a minimum of 6–8 hours of sunlight each day.	
Internal Area	**Accessibility & Safety** ● Ensure clear sightlines and eliminate blind corners. ○ Position seating at intervals of no more than 50m, considering varied viewpoints. ○ Create a Landscaped Area rich in greenery. **Environmental Quality** ● Locate the Landscaped Area in a quiet zone, away from noise pollution. ● Ensure it is well-ventilated, free from air pollution, and sheltered from high winds. ● Choose pest-resistant plant species and a varied planting palette to attract beneficial pollinators. Engage ecologists early in the design process for ecologically sensitive areas. ○ Maximise sunlight exposure. **Three-Dimensional Composition** ● Include bird feeders, butterfly gardens, and native plants to attract local wildlife. ● Use repetitive elements and textured designs inspired by nature's geometric patterns. ● Include seasonal flowering plants for year-round interest and healing. ○ Implement a layered vegetation structure with high-branching trees and avoid large trees with aggressive root systems. ○ Design with varying heights, textures, colours, and scents to create visually engaging scenes, along with landmarks and focal points. ○ Design landmarks and focal points within the Area.	**Integrated Activity Areas** ○ Allocate flat, well-drained areas for group exercises with adjacent open spaces for warm-up and cool-down activities. ○ Include secluded pocket spaces. **Sheltered & Daylit Areas** ○ Position the Exercise Area in a sheltered location. ○ Ensure seamless transitions between indoor, semi-covered and outdoor spaces. ○ Design the area to receive ample daylight. **Inviting Environment** ○ Integrate the Exercise Area with surrounding green spaces.	**Arrival & Departure Point** ● Designate a clear and accessible arrival and departure point. **Shade Structures** ● Install shade structures such as pergolas or canopies over work areas. **Composting Area** ○ Create a designated composting area with clear signage. **Raised Planter Beds** ● Incorporate raised planter beds at heights of 750–1000mm and depths of 300–400mm, and avoid ground-level beds. **Storage Solutions** ● Include designated storage space, such as open shelves.	

	GENERAL	PODIUM & OUTDOOR EXERCISE	COMMUNAL FARM	
Internal Area	**Water Feature** • Include a large water feature such as running water, a koi pond, fountain, or waterfall. **Sheltered Activity Spaces** • Incorporate sheltered areas for activities such as exercise, yoga, social gatherings, or quiet reading. ○ Provide shelters in varied sizes accommodating at least 10 people for social activities. **Environmental Design** • Include canopy trees for natural shade. ○ Design unique shelters that cast interesting shadows to encourage exploration. • Introduce interactive features. ○ Avoid tall walls and partitions. **Greenery Design** • Evaluate plant spacing and select planters based on mature sizes. Choose resilient plant species that are less prone to pests.			
Accessible Route		<u>Looped Trail</u> **Trail Layout & Accessibility** • Create a looped walking trail of at least 400m, avoiding steps, crossovers, and dead ends. • Provide regular entry and exit points. ○ Position the trail away from traffic. ○ Design the path to be at least 1900mm wide, and consider separate lanes for joggers, walkers, and those using mobility aids. ○ Include counting devices such as distance milestones or calorie counters along the trail. **Comfortable Environment** ○ Situate the trail within or around natural areas, incorporating continuous planting and vegetation. ○ Separate it from busy areas. **Engaging Design Elements** ○ Integrate bends and curves. ○ Ideally, the trail should encircle the Landscaped Garden		

CLUBHOUSE
OUTDOOR LANDSCAPED AREA

	GENERAL	PODIUM & OUTDOOR EXERCISE	COMMUNAL FARM	
Materials & Finishes				

Floorings	**Recommended Settings**
	Slip Resistance
	   R12 for floor tiles, or equivalent (All areas)
	
	Outdoor Areas
	○ Choose highly durable materials like EPDM rubber to withstand all conditions.
	○ Opt for materials that can be customised into various patterns and shapes, combining aesthetics and functionality.
	○ Ensure they are easy to maintain and allow for straightforward partial replacement.
	→ Communal Area/Materials & Finishes/Floorings
		Functional Paving Patterns
		○ Incorporate the following floor patterns to support functional fitness activities for residents:
		   ○ Stepping path
		   ○ Balance beam line
		   ○ Stretching mat area		

Fixtures & Fittings				
General	**Community Spaces** ○ Provide ample comfortable seating in the Area, including benches with armrests. ○ Use non-conductive materials to prevent sun-induced burns. **Pest Management** ○ Incorporate insect-repellent plants and utilise organic insecticides. **Soft Fencing** ● Consider soft fencing of shrubs and plants to create a natural boundary in secure spaces. **Weather Station** ○ Install a mobile meteorological station, displaying the information on interactive kiosks. **Educational Signage** ○ Incorporate educational signage throughout the Area.	**Fitness Equipment** → Clubhouse/Multi-Component Area/Gym/Fixtures & Fittings/Furniture → EN 16630 standard for safety requirements. **Waterproof Materials** ○ Use waterproof materials with soft handles and seats. **Instruction & Guidance** ○ Provide large instruction boards with pictures and braille. ○ Consider tablet-sized screens for video demonstrations or QR codes linked to instructional content.	**Gardening Facilities** ○ Incorporate a notice board and dedicated tool area. ○ Provide washing stations for cleaning tools and hands, and sturdy worktables for potting and planting. ○ Include displays on gardening techniques, plant care, and sustainability.	

CLUBHOUSE
OUTDOOR LANDSCAPED AREA

Operational Checklist

1

Needs-Driven Approach

Focus on diverse resident needs through accessible resources and empowered service teams to foster health and well-being. This approach promotes understanding and proactive care, ensuring that the team addresses each resident's unique requirements.

- Diversity for Empowerment: Older adults exhibit significant diversity in their capabilities, needs, and preferences, making a one-size-fits-all approach inadequate. Tailored, person-centred services that actively involve residents in decision-making foster a sense of control and independence.

- Collaborative Planning for Community Integration: Engaging older adults as collaborators in service planning allows property management to better meet diverse needs and strengthens community integration.

- Staff Engagement for Ageing-in-Place Support: Involving staff at all levels is vital for supporting ageing-in-place and addressing age-related risks. A thorough understanding of the service model helps staff attend to older adults' psychosocial needs, improving residents' well-being and care effectiveness. (LSE03)

2

Continuity of Care & Services

Provide consistent, comprehensive support that adapts to changing resident needs, alleviating concerns about service interruptions and fostering trust and security while enhancing care quality.

- Active Health Management: Age-related changes can happen suddenly and progress rapidly. Timely needs assessments allow for swift responses to evolving requirements. Continuous health screening and management support early detection and intervention, fostering health equity.

- Security, Stability and Trust: Consistent service delivery and familiar care providers instil security and stability in older adults, reducing anxiety. Continuity of care fosters trust, creating an environment where residents feel comfortable and valued.

- Seamless Transitions of Support: As older adults' needs evolve, continuity of care ensures smooth transitions between different care levels or settings, minimising disruption and maintaining seamless support.

3

Freedom of Choice & Resource Optimisation

Promote resident autonomy by maximising available resources and expanding access to support within the Housing Development and neighbouring communities, addressing various needs beyond property management's scope.

- Respect for Individuality and Autonomy: Older adults should be recognised as unique and independent individuals. Offering choices empowers them to engage in their preferred care and decision-making, fostering autonomy and dignity while ensuring personalised support.

- Community Partnerships: Collaborating with external partners enhances access to specialised services, expanding the support network for residents. These partnerships strengthen connections between the development and the community, creating a more integrated environment for older adults.

4

Quality Assurance

Achieve service excellence through systematic and continuous monitoring and improvement.

- Streamlined Workflow: A smooth workflow enhances user experience and satisfaction. Streamlining procedures and removing unnecessary steps leads to quicker turnaround times and improved service quality.

- Ensuring Fairness and Consistency: Fairness for older adults is achieved through consistent service delivery and robust protocols that ensure high-quality care and service curation. Standardised documentation enhances communication, reduces disparities, and fosters trust, empowering residents to advocate for their needs.

NEEDS-DRIVEN

1 Service Delivery

- Inclusive: Cater to diverse interests, including male older adults and those living alone.

- Tailored: Target services for residents' needs, for example, curation of health talks based on results of residents' health screenings.

- Convenience: Schedule events at convenient hours for older adults. (AWH02)

- Special Needs: Maintain and regularly update a list of residents with special needs.

2 Sense of Community

- Partnership: Include older adults in decision-making. (AWH02)

- Placemaking: Adopt participatory placemaking based on residents' needs.

- Intergenerational: Organise cross-generational activities. (AWH02)

3 Onboarding

- Welcome Pack: Offer new residents a pack containing information about the development, and neighbourhood facilities and services.

- Storage: Provide temporary storage services to assist with residents' transitions.

4 Communication

- Recognisable: Ensure easy staff recognition through uniforms/badges. (AGB35)

- Body Language: Train staff in effective body language to accommodate older adults with sensory decline.

- Language: Use clear communications in multiple languages. (AWH02)

- Channels: Utilise diverse communication methods, including posters, digital applications, and face-to-face interactions.

Examples of Older Adults' Special Needs

- Weak familial support (e.g. living alone, no children)

- Mobility limitations (e.g. wheelchair use)

- Acute conditions (e.g. post-surgery)

- Cognitive and mental health conditions (e.g. dementia, depressive symptoms)

- Sensory issues (e.g. declining hearing)

Recommended Welcome Pack Contents

- Information about the facilities within the Development

- Information about the Development's services and resources and how residents can access them

- Emergency numbers (remind residents to keep the list prominently displayed within their homes for quick reference)

- Emergency protocols

- Service feedback mechanisms

- Dwelling layout guide showing adaptable wall, or 'adaptable zone', for potential installation of grabrails or other fixtures

- Map of the neighbourhood covering neighbourhood facilities and services. → Appendices/Accessible Neighbourhood Audit

CONTINUITY OF CARE & SERVICES

1 Staffing & Relationship Building

- Consistency: Avoid frequent changes in personal care and property service providers to foster familiarity and trust in service relationships.
- Transparency: Clearly communicate care service options, especially for in-home care workers or services.
- Training: Develop staff-resident trust-building skills and learn to understand residents' health needs.

→ Operations/Integrated Care Services/Health Education

2 Absentee Follow-Up

- Engage absent residents through calls or visits to understand their situation and determine if any additional assistance is necessary.

3 Transition & Care Coordination

- Develop protocols for smooth transitions to lower or higher levels of care.

FREEDOM OF CHOICE & RESOURCE OPTIMISATION

1 Information Provision

- Access: Ensure residents have clear information on how to access care, services, providers, pricing, and how to raise concerns.
- Resources: Equip residents and caregivers with information on rights and decision-making avenues.

2 Resident Autonomy

- Participation: Offer options for older adults to participate with friends or caregivers, ensuring affordability and transparency. (AWH02)
- Preferences: Honour residents' choices and define care pathways, if feasible.

3 Resident Privacy

- Consent: Obtain explicit permission for any health data handling.
- Security: Implement robust data security measures to safeguard resident information collected, for example, results of health screenings.

4 Neighbourhood Resources Access

- Audit: Survey local facilities and services.
- Collaboration: Establish partnerships with neighbourhood organisations to leverage resources and co-host events.
- Opportunities: Gather feedback on neighbourhood services to assess quality and relevance for older adults and identify gaps and opportunities to enhance in-house offerings.
- Sustainability: Assess long-term partnership viability.
- Training: Ensure staff are knowledgeable about community resources for prompt referrals and support.

→ Appendices/Accessible Neighbourhood Audit

QUALITY ASSURANCE

1 Service Planning & Resource Assessment

- Needs: Assess the needs and preferences of residents.
- Evaluation: Comprehensively evaluate the necessary resources for integrated care services (staffing, training, technology, programme development).
- Collaboration: Facilitate interdepartmental collaboration for streamlined integrated care services.

2 Service Protocols & Staff Training

- Protocols: Develop clear protocols for service operations (feedback handling, referrals, emergency responses).
- Capacity: Ensure that address the unique needs and capacities of older adults.
- Training: Provide comprehensive training for staff on protocols and decision-making.

3 Participant Enrolment Management

- Admission: Implement centralised procedures for activity enrolment.
- Fairness: Ensure transparent participant enrolment for all activities.

4 Documentation & Information Management

- Records: Maintain detailed service case documentation for accountability and continuity.
- Systems: Implement systems for comprehensive resident records, for example, health status and personal histories.
- Standardisation: Establish standardised incident reporting.
- Organisation: Use consistent information formats for streamlined communication.
- Gaps: Acknowledge information gaps and follow up as needed.

5 Continuous Improvement & Updates

- Audits: Conduct regular audits of service contents and protocols based on feedback.
- Updates: Update resident information promptly and ensure timely updates of policies and procedures.

6 Sufficient Service Time

- Ensure that staff have adequate time to provide quality care without rushing, especially for residents needing additional support.

7 Organisational Communication & Collaboration

- Roles: Ensure the clear definition of roles and responsibilities of each department to prevent duplication.
- Meetings: Conduct regular team meetings to discuss progress and address challenges.
- Platform: Create a centralised platform for sharing updates and feedback among departments.

8 Technology Integration

- Undertake continuous exploration of technology solutions to enhance communication and access to services for residents.

Operations

Daily Assistance

In-Home Services

General Enquiries & Assistance

Resident Engagement

Provide comprehensive home assistance through complimentary and paid services, supporting older adults with daily activities.

Rationales

- Daily Task Challenges: Older adults may encounter challenges with daily tasks and minor upkeep due to decreased mobility and physical abilities, leading to insecurity with activities like climbing or squatting.

- Expertise in Age-Friendly Design: Conventional service providers may lack expertise in age-friendly design or care services, resulting in additional costs or incomplete work.

- Service Accessibility: Older adults may have difficulty locating suitable services independently due to limited knowledge or resources, necessitating a more supportive approach to service provision.

好多師傅唔明長者需要咩，裝修個時講得清楚就會做，但要求太詳細就唔會理。希望有專幫長者嘅家居顧問或機構，因為通常長者唔識裝修，所以有啲師傅會呃人。裝修個時，長者需要完成工作嘅人，亦需要解答問題同提供建議。

Most handymen don't understand the needs of older adults. Clear instructions during work usually help, but detailed requests are often ignored. Older adults need consultants or NGOs for guidance, as they lack knowledge and can be exploited. They also want someone to answer their questions.

Home Maintenance

- Adaptation: Explore home modification services to adapt dwellings as residents age and their needs evolve.
- Finance: Incorporate basic home maintenance into the management fee or as a user-paid option.

Examples of Basic Home Care Services

- Meal delivery
- Home cleaning services
- Laundry
- Gardening
- Food preparation
- Escort service
- Friendly visitor and senior companion services

Examples of Basic Home Maintenance Services

Listed from most frequently need to less adopted:

- Replace light bulbs (provide light bulbs for sale if feasible)
- Inspect home appliances
- Inspect the water cistern
- Inspect or repair pipe and drain blockages
- Remove and install filters for air conditioners
- Inspect water seepage
- Inspect windows
- Inspect and reset a tripped breaker
- Repair or replace a leaking washbasin
- Replace shower heads, hoses, or filters
- Repair the toilet seat
- Drill holes in the wall
- Inspect or repair door hinges
- Inspect or repair the doorbell
- Repair the lock for the mailbox
- Intercom maintenance
- IoT Installation

Advanced Home Care

- Offering: Cater for older adults with chronic or temporary needs due to injury or illness.
- Comprehensive: Provide health assessments and regular multidisciplinary team meetings for customised rehabilitation.

Recommended Advanced Home Care Services

- Care management and assessment
- Personal care
- Rehabilitation exercises
- Environmental risk assessment and home modification
- Speech therapy
- Senior sitting
- Mobility assistance (e.g. lifting and transfer)
- Nursing care
- Pain management
- Bedsore prevention
- Counselling services
- Caregiver support and training

Establish accessible communication channels, both physical and digital, ensuring prompt response to resident needs.

Rationales

○ Connection and Support: A centralised contact point is essential for connecting the service team with residents and promoting help-seeking behaviour, reducing hesitation in asking for assistance.

○ Resource Accessibility: Designating a contact minimises the effort and time older adults need to find appropriate resources, encouraging active lifestyles.

○ Technology Engagement: Integrating IoT technology allows older adults to engage with modern trends they may find difficult to navigate independently. Involving them in technology integration within Clubhouse operations helps overcome barriers like lack of self-efficacy, digital illiteracy, and stereotypes about their technological abilities. (LAU07)

General   **Concierge**   Multi-Component Area   Transitional Care Area

General Enquiries

○ Assistance: Assist residents with service enquiries and deliveries, referring them to the appropriate departments.

○ Engagement: Encourage staff to engage in daily conversations to gather insights and foster a supportive atmosphere.

○ Knowledgeable: Ensure staff are knowledgeable about resources in the Development and surrounding community.

Transportation Assistance

○ Provide information on local transportation, including real-time public transport updates and ride-hailing services at the Front Desk.

IoT Assistance

● User Training: Offer regular training sessions in the Clubhouse to help residents use IoT devices.

● Hub: Establish a hub in the Clubhouse with digital tools to enhance resident connectivity and engagement.

○ Support: Assist with IoT enquiries and device installation, either verbally or through in-home support.

○ Data Privacy: Educate residents on data privacy best practices and options for managing personal information.

Provide volunteering opportunities for older adults to actively engage with and enrich their neighbourhood and community.

Rationales

○ Sense of Purpose: Empowering older adults with a sense of purpose through active participation is crucial, particularly after significant life changes like retirement or the loss of a spouse.

○ Community Enrichment: Involvement in community activities enriches the neighbourhood by bringing diverse perspectives and experiences, fostering a stronger, more inclusive community. (AWH02)

○ Intergenerational Connections: Engaging older adults in volunteering allows them to bridge generations, sharing wisdom, traditions, and values with younger community members, ultimately benefiting everyone involved.

General   **Concierge**   **Multi-Component Area**   Transitional Care Area

Volunteer Programme

○ Training: Develop a training programme to equip older adults with the skills and knowledge needed to fulfil their volunteer roles effectively.

○ Matching: Match volunteers' skills and interests to appropriate voluntary positions. (AWH02)

○ Leadership: Encourage residents to lead the organisation of Clubhouse or community activities.

○ Workplace: Adapt the workplace to accommodate the needs of older adults, including those with health conditions. (AWH02)

Examples of Volunteer Activities

○ Activity helpers
○ Home maintenance for neighbours
○ Visiting singletons
○ Local tour guide
○ Interest class tutor
○ Front Desk services
○ Facility maintenance

Community Engagement

- Community Service: Facilitate projects that allow residents to give back, such as charity drives, volunteering, and environmental initiatives to promote unity.

- Gatherings: Organise gatherings like holiday parties, themed dinners, and cultural celebrations to encourage socialisation and relationship-building.

- Peer Support: Implement peer-to-peer support programmes to foster mutual support among residents.

- Sharing: Encourage residents to share their experiences and publish these stories to strengthen neighbourhood ties and inspire community engagement.

Reward Schemes

- Implement recognition programmes to motivate residents to participate in activities.

Recommended Activities for Older Adults

- Residents volunteer team
- Regular activities (e.g. games night, music and karaoke party, pet gathering, movie gathering)
- Local tours
- Exercise and stretching classes
- Tai Chi
- Yoga and progressive muscle relaxation exercises
- Mindfulness and meditation exercises
- Technology and social media classes
- Art classes
- Community cooking programmes
- Community dining programmes
- Buddy pairing schemes
- Activities allowing the participation of staff and residents

RI: House Captain
'House Captain' is an initiative by the Home and Youth Affairs Bureau, launched in 2012. It recruits volunteers to regularly visit local neighbourhoods, fostering a strong sense of community. Currently, around 8,600 trained dorm heads are active in Hong Kong. Volunteers also participate in community projects, teaching younger generations traditional games to strengthen intergenerational relationships. (AHK58)

Regular cultural tours organised by Nutcrackers are well received for their knowledgeable guides and enriching experience exchanges, fostering community engagement through meaningful social gatherings.

Integrated Care Services

Health Screening

Health Education

Multi-Component Programmes

Rehabilitation Services

Primary care is essential in age-friendly housing developments to promote ageing-in-place and prevent older residents from losing their intrinsic capacity for independent living. To effectively support more residents within limited resources, a stepped-care approach with interdepartmental collaborations is recommended.

This evidence-based model, recognised in WHO's ICOPE, operates on the principle that individuals should first receive the least intrusive intervention suitable for their needs, with the option to escalate to more professional and intensive care only if they do not fully recover through primary care. (AWH04)

HT: Useful Tool for Health Education
For more information on healthy ageing, functional abilities, and geriatric syndromes, please refer to the following link or the QR Code: https://www.youtube.com/@jccadenzaetools/featured

Use a customised stepped-care model to deliver efficient integrated services for older adults, including activities, advanced care, and rehabilitation.

Recommended Themes

- Take charge of ageing
- Intrinsic capacity
- Frailty
- Sarcopenia
- Nutrition and healthy eating
- Oral health
- Cognitive functions and memory care
- Mobility
- Self-care

- Incontinence
- Hearing
- Vision
- Mental health and depressive symptoms
- Multi-component programmes
- Sleep hygiene
- Fall prevention
- Thermal comfort
- Polypharmacy

- Wound care
- Pain management
- Immunity
- Home modification
- End-of-life care
- Financial management and fraud prevention
- Caregiver tips and support
- Geron-technology

RI: Multidomain Caregiver Support
Research shows that multicomponent support for caregivers, including counseling groups and psychoeducation, effectively alleviates symptoms of depression and anxiety, which is associated with reductions in burden and institutionalisation rates for care recipients, enhancing overall well-being. (LDE03)

RI: Sleep Hygiene Workshop
Research indicates that optimising sleep environments by improving air quality, temperature, reducing noise and light can notably enhance sleep quality, decreasing insomnia and anxiety in older adults. A single 90-minute workshop incorporating these interventions has demonstrated lasting effects for up to four months. (LCA04)

Rationales

- Routine Health Monitoring: Older adults require regular monitoring to prevent rapid declines in functional abilities due to injuries or acute illnesses.
- Improved Access and Management: The stepped-care model enhances access to services, reduces waiting times, and improves overall healthcare management, such as maintaining and reversing frailty. (LGB09; LHK07)

Stepped-Care Model

1 Conduct initial health screenings using evidence-based tools and digital resources with care coordinators.
2 Design multi-component programmes for older adults with varying functional abilities, focusing on those at risk of decline.
3 Recommend activities that match assessed functional abilities for appropriate care.
4 Provide self-help resources, such as handbooks and digital tools to facilitate self-monitoring and care management at home.
5 Offer professional in-depth assessments for high-risk individuals identified during initial screenings.
6 Provide rehabilitation services only for those with specific assessed needs.
7 Ensure ongoing monitoring of health status through care coordinators.

Promotion & Communication Strategy

- Utilise diverse communication methods, including social media and physical displays, to effectively promote activities.

Technology Integration

- Tools: Consider electronic health records, communication platforms, and telehealth solutions for real-time information sharing.
- AI and Gerontechnology: Explore enhancements to healthcare services for residents needing assistance, ensuring data security and compliance with privacy regulations.

Thematic Healthcare Activities

- Targeted: Organise activities and health talks focused on specific health topics or populations to streamline service delivery.
- Optimised: Use themed events to address resource limitations in regular healthcare services.
- Engagement and Assessment: Engage older adults to understand their preferences and barriers, conducting assessments to identify priority health concerns.
- Holistic: Ensure each themed programme includes educational, therapeutic, and social activities, incorporating evidence-based practices.

Cadenza Hub's frailty prevention programmes attract over 50,000 participants, offering health check-ups, talks, and workshops.

Perform initial health screenings and follow-ups through care coordinators.

Rationales

○ Early Identification and Intervention: Proactive health screenings enable early intervention for at-risk individuals, managing declines in functional abilities and reducing the need for costly hospitalisation due to preventable complications.

○ Empowering Self-Management: Continuous health monitoring, combined with support to help older adults understand their health status, enhances outcome by promoting self-management.

Health Services Management

● Screenings: Conduct screenings by care coordinators to optimise resource use.

● Technology: Use digital screening tools and monitoring devices, like step counters.

● Communication: Clearly explain screening results and provide resources, like health activities in the Clubhouse, to encourage ongoing monitoring.

● Continuity: Use screening results to customise activities and provide necessary referrals.

iHealth Screen by Jockey Club Cadenza Hub, with comprehensive functions and a user-friendly interface, facilitating self-service health screening at any time.

RI: Health Screening Mobile App
iHealth Screen is an interactive mobile app designed for health screening. It offers tools, test reports, and self-training materials for 12 geriatric syndromes, empowering users to conveniently monitor their health at home. Refer to the following link for more information: https://www.cadenza.hk/e-tools/zh/ihealthscreen/

○ Monthly Follow-Ups: Conduct monthly screenings and follow-ups to monitor health changes and address issues promptly.

○ Annual Check-Ups: Offer annual body check-ups to promote regular monitoring and collaborate with external organisations if resources are limited.

In-Depth Assessments

● Conduct assessments advised by health practitioners, such as the Short Physical Performance Battery (SPPB) and Mini Nutritional Assessment (MNA) for high-risk older adults identified in initial screenings. (AWH04)

Coordinate health management activities for residents and caregivers.

Rationales

○ Empowering Independence: Knowledge transfer equips older adults and caregivers with the skills and information needed to navigate health, technology, and social engagement, fostering autonomy and informed decision-making without solely relying on caregivers.

○ Preventive Health Intervention: Providing health-related information acts as a preventive measure, motivating older adults and caregivers to adopt healthier practices, thus reducing the likelihood of illness and institutionalisation.

Health Talks & Workshops

● Empowerment: Organise health talks and workshops to empower older adults and caregivers in managing their health.

● Targets: Create programmes for underrepresented groups, such as older men, to boost engagement.

● Caregivers: Include caregivers in workshops and joint activities to help maintain intrinsic capacities. (AGB36)

Health talks by Nutcrackers introduced existing elderly services in housing property management across Hong Kong, providing valuable information and support to older adults.

Catering Services for Healthy Eating

Menu Design

● Healthy: Provide catering services with a healthy menu in the Communal Dining Area to support nutrition workshops and encourage healthy eating among residents.

○ Variety and Rotation: Ensure a diverse menu with regular rotations to prevent monotony, incorporating guidance from healthcare professionals for adequate nutrients and appropriate portion sizes.

○ Restrictions: Include meals for specific dietary needs, such as dysphagia and vegetarianism. (AHK19)

○ Labelling: Display calorie content and allergen warnings on menus. (AUS33)

○ Feedback: Conduct taste tests and gather customer feedback through surveys to enhance dining experiences. (LUS04)

Nutrition & Allergy Awareness

○ Training: Train staff on nutrition for older adults and address enquiries about allergens and bones.

○ Sanitation: Provide training on proper food handling and hygiene.

Dining Atmosphere

○ Music: Consider playing calming music during meals to enhance the dining experience.

→ Clubhouse/Multi-Component Area/Communal Dining

Fresh Product Availability & Accessibility

○ Sourcing: Partner with local farms for regular deliveries of fresh fruits and vegetables to support healthy diets and promote community ties.

○ On-Site Market: Establish an on-site produce market offering a variety of fresh, nutrient-dense foods.

○ Bulk Procurement: Implement collective bulk buying to make fresh produce more affordable and accessible.

○ Pickup: Designate a central pickup location, such as the Concierge, to streamline logistics.

Living Aid Roadshow

- Organise pop-up booths to showcase living aids and appliances for health and accessibility, keeping older adults informed about gerontechnology and assistive products

List of Recommended Products

Living Room

- Corner guards to prevent bumps due to narrower receptive field of older adults

Bedroom

- Height-adjustable bedrails on the bedside to prevent falling out of bed and assist in adjusting between standing, sitting, and lying positions (AHK49)
- Safety floor mats on the bedside to reduce the impact of falling from bed
- Weighted blankets to improve sleep quality and aid in relaxation
- Electric blackout curtains to block external light sources for better sleep quality. Consider electric blackout curtains with programming functions that allow users to pre-set opening procedures at night to prevent oversleeping

Washroom & Kitchen

- Height-adjustable shower seats
- Inclinable toilet lifts for raising and lowering the toilet seat using control buttons and safety handrails on both sides of the toilet seat (AHK05)
- Electric can openers and blenders

Medication Management

- On-Demand: Offer on-demand polypharmacy management services, including thorough medication reviews.
- Mitigation: Ensure proper prescription and usage of multiple medications to reduce the risk of incorrect consumption.

RI: Group-Oriented Nutrition Education on Dietary Habits
Group-oriented nutrition education effectively enhances nutritional behaviour, leading to healthier dietary habits. Studies show a 10% increase in fruit and vegetable consumption and a 200% rise in fish intake following group sessions. Additionally, year-long group discussions on nutrition have been linked to reduced diabetes risk factors. The peer environment fosters experience sharing, promoting positive social norms and self-efficacy in healthier eating. Extended group-based interventions yield higher success rates, highlighting the importance of sustained education in driving dietary changes among older adults. (LNL04; LUS26)

RI: Calming Music During Mealtimes
Research shows that playing calming music during mealtimes can enhance the emotional well-being of older adults. In contrast, fast-paced music may speed up eating and increase choking risks. However, studies indicate that music in nursing wards can lead staff to offer more food, particularly desserts, which could undermine healthy eating efforts. (LGB05; LSE01)

RI: Assistance with Medication
Older adults often take multiple medications for conditions like hypertension and diabetes, which can lead to accidentally taking the wrong medication or dosage, affecting treatment effectiveness. With numerous medical appointments and prescriptions from different doctors, they need help to prevent duplication and harmful interactions.

Integrate physical exercise, cognitive training, and nutrition education to prevent geriatric syndromes and promote healthy ageing.

Rationales

- Maintaining Intrinsic Capacity: Research, including the FINGER study in Finland and a similar programme in Hong Kong, indicates that regular healthcare sessions combining physical exercise, cognitive training, and nutrition workshops significantly improve memory and mobility, helping prevent high-risk syndromes like dementia and frailty. (LFI01; LHK01)
- Promoting Social Interaction: Group activities foster social interaction, reducing isolation and allowing older adults to build peer support networks that motivate and emotionally support each other in achieving their goals.

RI: Multi-Component Programme
Frailty is a significant risk factor for falls, disability, hospitalisation, and institutionalisation, making it a growing concern for ageing populations. Addressing this issue during middle age and the pre-frail stage is crucial, as demonstrated by a three-month frailty prevention programme in Hong Kong that offers hope for older adults facing declining health. This programme combines exercise, computer-assisted cognitive training, and board games into a cohesive 2-hour intervention, resulting in a marked reduction in frailty among pre-frail participants, with improvements in muscle endurance, balance, attention, working memory, and executive function, while the control group showed increased frailty. This innovative initiative has successfully reversed the trajectory of frailty, empowering participants to regain strength and cognitive function, and has gained considerable popularity among middle-aged and older adults in the community. (LHK01)

'Smart Fit' Programmes by Jockey Club Cadenza Hub, a blend of guided physical exercise classes and cognitive training through tabletop games, attracting older adults from all across the city with its unique programme structure and relaxing environment.

Programme Components

Exercise

- Tailored: Design exercise sessions for varied abilities, focusing on strength, endurance, balance, and mobility. (LHK01; LHK04; LHK05)
- Awareness: Ensure trainers recognise different skill levels within the class.
- Variations: Include diverse drills and change venues to keep participants involved.
- Gym: Encourage capable participants to use the Gym for additional exercise.
- Organise outdoor sessions with a focus on safety and comfort, considering sun exposure and weather to promote vitamin D intake and improve sleep quality.

Cognitive Training

- Range: Incorporate cognitive training activities like computer exercises, board games, and facilitated discussions to cater to diverse preferences.
- Social: Promote social interactions to stimulate cognitive functioning.

Nutrition Integration

- Education: Offer additional classes, such as cooking workshops and nutrition talks.
- Integrated: Pair exercise sessions with nutrition workshops that introduce suitable pre- and post-exercise meals to enhance fitness and recovery.

Programme Structure

- Inclusive: Classes should accommodate participants with varying abilities, promoting engagement and social interaction.
- Qualified: Involve qualified professionals in programme design, implemented by trained staff.
- Evaluation: Collect participant data using questionnaires and screenings before and after the programme to assess effectiveness. (LHK04)
- Resources: Provide additional online content or printed materials to support continued engagement. (LHK01; LHK05)
- Communication: Establish a dedicated messaging group for participants to access resources and connect with instructors and peers.

Recommended Programme Structure (LHK01)

- Schedule courses twice a week for 3 months, totalling 24 classes
- Each class lasts 1.5 hours, including:
  - 1 hour for warm-up and aerobic circuit training
  - 30 minutes for cognitive training
  - Option for an additional 30-minute nutrition session once a week
  - Maintain a class size of 10 to 15 participants for adequate guidance and engagement

我成日聽人講素食好,但係素食就要識配搭囉。試過一輪學人素食,食到自己免疫力都差咗,營養不良搞到自己生蛇!所以前排都參加咗好多素食班,學下人哋點樣配搭素食,希望第日真係可以轉素食。

I've always heard that *vegetarianism* is healthy, but it needs to be balanced. I tried to switch to a vegetarian diet without any guidance but ended up with a weakened immune system, malnutrition and shingles! That's why I've been taking a lot of vegetarian classes lately to learn how to create a balanced diet, so one day I can actually go vegetarian successfully.

HT: Sunscreen for Protection
Excessive UV exposure can lead to age-related macular degeneration and skin cancer. Older adults should use sunscreen, avoid outdoor activities between 10:00 and 14:00, and limit direct sun exposure to under 4 hours. (LGB02; LTW01)

RI: Sun Exposure
Increasing outdoor activities boosts sun exposure, helping to regulate circadian rhythms, melatonin, and serotonin levels, thereby improving sleep quality. Enhanced sunlight and physical activity can significantly reduce daytime naps and nighttime awakenings, addressing common sleep issues in older adults. (LFR02; LUS03)

RI: Benefits of Communal Dining
A communal dining programme can foster healthy eating habits through social modelling. When older adults share meals, the benefits go beyond just food. Research shows that dining in groups encourages individuals to adopt positive eating patterns from their peers, influencing both food preferences and portion sizes. (LDE01)

RI: Enhanced Cooking Skills and Nutrition
Optimal nutrition in older adults starts in the kitchen. Research shows a strong link between diet knowledge and food quality. Cooking skills are associated with better physical health, lower mortality, and higher fruit and vegetable intake. Dietary variety also enhances nutrient adequacy. Conversely, lacking cooking skills predicts malnutrition, increasing the risk of poor nutritional status and its negative effects. Without the knowledge and confidence to prepare nutritious meals, older adults are more likely to face nutritional challenges. (LDE01)

Nutrition Classes

- Nutrition talks and interactive cooking sessions can help older adults develop practical culinary skills.

Interactive Cooking Sessions

- Hands-On: Organise cooking sessions for healthy meal preparation to develop culinary skills.
- Singleton: Encourage singleton older adults to participate through coordinated co-cooking registrations.

Budgeting & Nutritious Food Choices

- Affordable: Offer sessions on buying nutritious foods while developing budgeting skills for cost-effective choices.
- Partnership: Partner with local farmers to educate residents on seasonal and locally-sourced ingredients.

Recommended Topics for Nutrition Talks

- Meal planning and portion control
- Food label reading
- Nutrition, sarcopenia and frailty
- Food safety
- Special meal preparation
- Specific dietary requirements for common health conditions

John Morden Centre by Mæ Architects. © Jim Stephenson

RI: Art Therapy
Research shows that art therapy effectively enhances coordination and cognitive functions such as communicative abilities in older adults with dementia, as well as alleviating symptoms of depression. (LBR02)

Provide rehabilitation services, including physiotherapy, occupational therapy, and pain management, for older adults with specific needs, such as those recovering from illness or surgery and those with moderate-level geriatric syndromes. These services aim to help maintain their independence.

Rationales

○ Addressing Functional Decline: Older adults may experience functional decline and reduced independence following illness or surgery. Comprehensive rehabilitation in a familiar environment is crucial for recovery, preventing decline and promoting faster healing.

○ Supporting Ageing-in-Place: Rehabilitation services support ageing-in-place initiatives, enabling older adults to receive essential care and support at home.

Individualised Services

● Multidisciplinary: Assemble a team of care coordinators, healthcare professionals, social workers, and caregivers to provide tailored support.

○ Information: Collect detailed information on users' medical history, medications, mental health, mobility, self-care abilities, and rehabilitation needs before planning.

○ Care Coordinator: Appoint care coordinators to lead planning, ensuring clear communication and regular updates among service providers.

○ Resident Involvement: Encourage residents to actively participate in their care plans, empowering them to make informed decisions.

○ Group-Based: Incorporate group-based activities to foster peer support, community, and wellness among service users.

○ Documentation: Implement care diaries to record residents' needs and preferences, regularly updating care plans to reflect evolving requirements.

● Technology: Consider integrating technology-enabled care solutions, such as telecare, remote monitoring, and assistive devices.

John Morden Centre by Mæ Architects. © Jim Stephenson

RI: Enhancing Independence Through Transitional Care Programmes
Transitional care programmes in long-term care facilities effectively promote independence among residents by emphasising physical rehabilitation. Research indicates improvements in health and function—such as enhanced mobility, urinary continence, and reduced medication use—among older adults in transitional care units. Post-intervention, these groups experience lower rates of hospital readmissions, emergency department visits, and home health usage, along with shorter hospital stays compared to control groups. Overall, transitional care fosters recovery and rehabilitation, leading to greater independence for older adults. (LCA05; LCA06)

Examples of Additional Rehabilitative Services

○ Diatetic and nutrition consultations
○ Group therapy and support groups
○ Emotional health and well-being
○ Continence management
○ Mobility aids and assistance
○ Hearing, visual, or communication assistance
○ Social assistance
○ Mindfulness and meditation exercises
○ Progressive muscle relaxation exercises
○ Cognitive training
○ Art therapy
○ Horticultural therapy
○ Reminiscence therapy

Overall Operations

Service Feedback

Referrals

Facility Management

Incident Management

Human Resources Management

Information Management

IoT Integration

General   Concierge   Multi-Component Area   Transitional Care Area

Seek regular feedback from residents and caregivers—who act as key informants, advisers, and beneficiaries—for assessing satisfaction with services, maintaining high-quality standards, and cultivating a harmonious relationship between the property management team and residents. (AWH02)

Rationales

○ Commitment to Quality: Older adults view the service team's responsiveness to feedback and complaints as a key indicator of their commitment to high-quality, satisfactory services that meet residents' needs.

○ Understanding Resident Needs: A robust feedback system helps the property management team understand changing resident needs, preferences, and expectations, minimising the risk of overlooking critical issues and reducing potential conflicts.

○ Fostering Trust and Collaboration: Proactively soliciting feedback fosters a culture of transparency, open communication, and collaboration, strengthening trust between the property management team and residents.

Quality Assurance

● Solicit Feedback: Regularly gather feedback from residents on in-house services, facilities, staff performance, and external referral services to assess satisfaction.

● Accessibility: Ensure feedback channels are user-friendly and accessible for older adults.

● Engagement: Encourage staff to engage in daily conversations with residents to collect valuable feedback.

● Audits: Conduct audits to enhance service effectiveness and revise the service scope as needed.

Staff Engagement

● Knowledge: Equip all staff with knowledge of performance pledges, feedback handling procedures, and active listening skills to ensure consistent and efficient responses.

○ Recognition: Recognise and reward staff who demonstrate exceptional responsiveness to residents' needs.

Feedback Management

● Tracking: Document all feedback and complaints to monitor resolutions and identify trends.

○ Follow-Ups: Regularly follow up on cases and provide timely updates to residents.

○ Investigation: Ensure all complaints are promptly investigated.

● Analysis: Analyse feedback for continuous improvement in service quality.

Resident Communication

○ Accessibility: Make feedback and complaint procedures transparent and readily accessible by displaying them on visible notice boards in the Clubhouse.

○ Transparency: Keep residents informed about property management updates and service changes.

○ Feedback: Provide reports detailing actions taken in response to residents' suggestions and concerns.

General   Concierge   Multi-Component Area   Transitional Care Area

Establish a robust and responsive referral system for covering services that extend beyond the property management's core offerings. This system should consider the diverse needs of residents and the operational feasibility of service provision.

Rationales

○ Diverse Service Needs: Older adults often require a variety of services beyond those property management provides, such as home maintenance, healthcare, and social support.

○ Commitment to Well-Being: A well-defined referral system demonstrates a commitment to meeting these diverse and evolving needs, fostering a supportive environment that prioritises resident well-being and satisfaction.

○ Enhanced Team Efficiency: A structured referral protocol and a reliable network of service providers enhance team efficiency, enabling effective resource allocation while ensuring residents' varied needs are met.

Resident Support & Community Engagement

○ Information: Provide residents and caregivers with details about neighbourhood support services and community networks.

○ Resources: Offer information on community services, including religious organisations and volunteer schemes, to encourage resident engagement and support.

Service Provider Management

● Database: Create and maintain a comprehensive database of community resources, including neighbourhood organisations, support groups, and government agencies, to offer residents diverse support options.

→ Appendices/Accessible Neighbourhood Audit for potential service offerings

● Contractors: Regularly update a list of trusted, vetted contractors and service providers for resident recommendations.

Resident Engagement & Communication

● Declaration: Provide residents with a clear declaration outlining property management's responsibilities, the scope of offered services, and residents' responsibilities.

○ Feedback System: Establish a system to gather residents' experiences and satisfaction with referred service providers using this feedback to update and refine provider lists.

Implement proper craftsmanship, regular inspections, and proactive maintenance of equipment, materials, and facilities to assure residents a sense of safety in the Clubhouse. This approach reduces the risk of accidents, injuries, and liability while extending the lifespan of the facilities.

Rationales

○ Hygiene and Maintenance: Hygiene and maintenance are critical for older residents, impacting their comfort and satisfaction. Hazards like uneven flooring and corridor obstacles can lead to injuries and prolonged recovery times.

○ Proactive Planning: Diligent maintenance and timely repairs help preserve the infrastructure and equipment of the Clubhouse, minimising the need for costly replacements or major renovations that could disrupt residents' experiences.

Hygiene

● Assistance: Provide support for residents with limited mobility in hygiene and refuse management tasks.

● Shared Responsibility: Encourage residents to take ownership of cleanliness and safety within the Development.

Air Quality & Ventilation

● Flush-Out: Perform a thorough air flush-out before occupancy to reduce pollutants from construction, ensuring compliance with indoor air quality standards. (AUS25)

● Maintenance: Implement a regular HVAC maintenance schedule, including filter changes, duct cleaning, and sensor calibration.

○ Monitoring: Consider installing real-time air quality monitoring systems to track particulate levels, CO_2 concentrations, and volatile organic compounds.

○ Review: Regularly analyse air quality data and maintenance records to identify trends and optimise performance.

Pest Control

● Non-Chemical: Prioritise non-chemical pest control methods, such as mechanical traps and biological controls.

○ Waste Management: Implement proper waste disposal protocols to discourage pests infestations.

Repair & Maintenance

● Craftsmanship: Ensure high-quality craftsmanship in maintaining frequently visited flat surfaces to seal edges and prevent unevenness from wear and water accumulation.

● Hygiene Checks: Regularly assess ground conditions and hygiene during patrols for prompt cleaning and necessary repairs.

○ Flooring Assessment: Evaluate outdoor flooring regularly, addressing excessive wear or reduced traction due to weather exposure.

○ Clear Corridors: Maintain clear corridors in common areas by prohibiting storage in Lobbies and discouraging personal items in Circulation Routes.

○ Safety Audits: Conduct safety audits annually or more frequently if significant changes occur in the building or grounds.

Environmental Enhancement

○ Plants: Include and maintain healthy plants in common areas to create a soothing environment for residents.

○ Sound: Provide calming sounds, such as nature sounds and music preferred by older adults, to promote relaxation and enhance resident engagement. (LES01; LUS15)

RI: Pesticides and Dementia
Research has revealed that older adults without dementia who had been living in areas with chronic exposure to pesticides exhibited poorer neuropsychological performance, including impairments in language, executive function, visual-spatial abilities, and attention. (LEL01)

Develop, implement, and continuously refine safety and emergency protocols to mitigate potential hazards and risks, particularly for older adults facing unique challenges such as mobility issues and wandering.

Rationales

○ Prompt and Efficient Responses: Safety and emergency policies are primary concerns for older adults considering new homes. Robust protocols and attentive staff are vital for preventing accidents related to wandering, household hazards, and risk of solitary death.

Security Measures

● 24-Hour: Provide 24-hour security services with a call centre in the Security Room or Front Desk for resident assistance.

○ Patrols: Conduct regular security patrols in high-risk areas to detect and prevent falls.

○ Measures: Implement security features like CCTVs access control systems to enhance safety.

○ Technology: Use technology-enabled solutions, such as fall detectors and help buttons, for prompt emergency responses in communal areas.

○ Maintenance: Regularly test and maintain emergency systems, ensuring all residents, including those with sensory needs, know how to respond.

● Communication: Develop an integrated emergency communication system to alert and coordinate staff for immediate incident responses.

Comprehensive Safety Protocols

● Preparedness: Develop protocols for fall prevention, medication management, and protection against abuse.

● Responsibilities: Clearly outline staff roles in emergency protocols to prevent confusion.

○ Support: Provide resources when staff notice changes in a resident's condition.

○ Monitoring: Continuously monitor and address risks in resident care, such as missed appointments.

○ Privacy: Obtain residents' consent for property management to enter flats and use personal information in emergencies.

● Contacts: Collect and update residents' emergency contacts upon move-in.

○ Abuse: Refer suspected abuse cases to social workers immediately.

Communication Systems

○ Intercom: Install a home security intercom system linked to the Concierge or security station, featuring a help button or app for direct staff communication.

○ Emergency Numbers: Maintain a list of emergency numbers within reach to ensure efficient assistance for residents in need.

Evacuation Planning & Training

○ Tailored: Create evacuation plans tailored to the mobility needs and health conditions of older residents, including necessary equipment like evacuation chairs or ramps.

○ Training: Conduct regular training and drills to familiarise residents and staff with evacuation procedures.

○ Consultation: Consult fire safety professionals during design and construction, reviewing safety measures regularly based on their guidance.

Staff Training & Awareness

● Awareness: Train staff to identify and respond to changes in residents' conditions, health, and abilities, including signs of deterioration and neglect.

○ Guidelines: Provide guidelines for frontline staff on handling emergencies and appropriate follow-up actions.

○ First Aid: Ensure staff are certified in first aid for prompt emergency response.

Resident & Family Engagement

○ Open Dialogue: Foster open communication with residents and their families to understand their safety and security needs.

○ Training: Provide educational resources on safety practices, emergency procedures, and recognising signs of deterioration.

To effectively implement ageing-in-place practices, it is essential to provide unwavering support to staff through clear protocols, ongoing training, and career growth opportunities.

Rationales

○ Motivation and Quality Care: Valued and supported staff are more motivated to deliver high-quality care, resulting in improved resident outcomes and a positive work environment.

○ Attracting Talent: A supportive culture helps attract, recruit, and retain skilled individuals, driving continuous success in service delivery.

Staff Training

● Plans: Develop training on healthy ageing, fostering a stigma-free environment.

● Identification: Include training on recognising at-risk individuals and facilitating behavioural changes. (AGB37)

● Engagement: Use a mix of classroom sessions, simulations, and on-the-job coaching.

Recommended Training for Staff

Ensure training programmes are highly relevant to the staff's roles and responsibilities in supporting older adult residents, covering topics such as:

○ Common physical, mental, and sensory needs of older adults

○ Local community services and support networks

○ Identifying and supporting at-risk individuals

○ Emergency and safety protocols

○ Interpersonal skills: Handling feedback, complaints, and effective conflict resolution

○ IoT and gerontechnology applications

○ Addressing ageism and stigma

○ Communication skills, including non-verbal cues.

○ Cultural sensitivity

Staff Development

○ Cross-Training: Offer cross-training opportunities to enhance staff capabilities across various roles.

○ Qualifications: Support staff in acquiring additional qualifications for career advancement. (AGB30)

● Opportunities: Highlight ongoing training and advancement opportunities to attract talent.

Staff Onboarding & Supervision

○ Programme: Provide an effective induction programme to prepare staff for their roles. (AGB30)

● Supervision: Ensure continuous or periodic supervision to maintain staff competence. (AGB30)

○ Appraisals: Conduct regular performance appraisals by skilled supervisors to assess staff performance. (AGB30)

○ Mentorship: Implement mentorship programmes for personalised guidance and support, fostering professional growth and collaborations.

RI: Staffing
Knowledgeable and supported staff improve the coordination of person-centred services, making them more cost-effective and aligned with the preferences of older adults. (LNL08)

Effective collaboration with healthcare professionals and mental health training for frontline staff enables them to provide daily care within their expertise, minimising the need for constant referrals. (LAU02)

HEALTHCARE STAFF MANAGEMENT

Care Coordinators (AGB34)

Role

○ Care Coordinators act as the primary contact for residents, connecting them to essential healthcare support and services. They foster trust and understand individual needs to empower residents in managing their health.

Key Responsibilities

○ Conduct regular screenings to assess residents' healthcare needs

○ Build trust with residents to understand care requirements

○ Integrate care plans across services and recommend suitable activities

○ Educate residents to enable self-management of their conditions

○ Facilitate connections with healthcare professionals as needed

○ Monitor individual needs and facilitate information flow

○ Link residents with community resources and social services

Requirements

○ Strong interpersonal and communication skills

○ Ability to work effectively in multidisciplinary teams

○ Understanding of healthcare systems and services

○ Empathy and compassion for individuals with diverse needs

○ Prior experience in care coordination is advantageous

Training & Support

○ Stepped-Care: Educate Care Coordinators on the stepped-care model, assessment protocols, communication strategies, and resident privacy.

○ Assessments: Ensure Care Coordinators are trained for basic assessments and screenings of common health conditions.

○ Train-the-Trainer: Optimise resources in healthcare services through peer training.

○ Monthly Supervision: Provide regular supervision by professionals, including a designated contact for support.

○ New Staff: Offer heightened supervision for new Care Coordinators during their first six months.

○ Continuous Education: Promote continuous education and professional development to keep staff updated on best practices and encourage certification.

Establish a robust information management system for protecting sensitive data, such as residents' health histories and personal information, from breaches and system malfunctions, while enhancing interdepartmental collaboration.

Rationales

- Trust Maintenance: Safeguarding sensitive data is crucial for maintaining residents' trust.
- Seamless Collaboration: Robust systems facilitate quick access to critical information, improving communication and decision-making.
- Legal and Reputational Protection: Promoting a culture of data security mitigates legal and reputational risks.

Information Governance & Privacy

- Guidelines: Develop and adhere to strict procedures for managing confidential information.
- Prohibition: Prohibit staff from discussing residents with anyone not involved in their care without explicit consent.
- Protocols: Follow established protocols for handling external requests for information.

Cybersecurity & Data Protection

- Measures: Implement robust measures like encryption and role-based access controls to protect personal information from unauthorised access.
- Audits: Conduct regular security audits to identify vulnerabilities and ensure compliance with data protection regulations.
- Recovery: Develop a comprehensive disaster recovery plan, including regular data backups and contingency measures for emergencies.

Continuously exploring technology solutions, such as property management applications and smart home ecosystems, can significantly enhance communication, access to services, and social engagement for residents, particularly those who may benefit from digital tools.

Rationales

- Enhanced Safety: IoT devices can alert caregivers and property management in emergencies, ensuring prompt assistance for older adults.
- Promoting Independence: Smart home technologies, like automated lighting and voice-activated assistants, empower older adults to manage their living environments, promoting autonomy.
- Enhanced Service Quality: IoT can streamline routine tasks, such as maintenance requests and service notifications, enhancing service quality and response times.

Property Management Application

- Functionality: Develop an app for easy access to information, activity registration, and communication with management.
- User-Friendly: Tailor interfaces for older adults, focusing on input methods, typeface, colour contrast, and intuitive navigation.

Examples of IoT Application Contents

- Management announcements and updates
- IoT-enabled booking and payment systems for facilities and activities
- Feedback submission
- Connected emergency notification systems (e.g., smart smoke detectors, CO_2 monitors, water leak sensors)
- Smart home control for electronics and connected devices
- Health monitoring tools
- Real-time transportation information

In-Home Systems

- Integration: Design IoT subsystems for easy integration into existing Dwellings, enabling flexible upgrades and replacements without disrupting operations.
- Standardisation: Establish standardised hardware and interfaces for seamless integration of IoT devices, simplifying maintenance and future expansions.

Technological Framework

- Scalability: Implement a scalable IoT platform with open standards to enhance interoperability.
- Flexibility: Ensure seamless integration of new devices and services as needs evolve.
- Open Protocols: Choose technologies that avoid vendor lock-in and ensure long-term compatibility.
- Internet: Establish reliable, high-speed internet throughout the Development to support IoT device operations.

Security & Reliability

- Equipment: Choose reliable and durable IoT equipment suitable for residential settings, accounting for environmental factors.
- Redundancy: Implement redundancy measures and robust network monitoring tools to ensure system uptime and proactively address issues.

Appendices

Accessible Neighbourhood Audit

From the perspective of ageing-in-place, older adults' experiences extend beyond merely living at home; they also include becoming familiar with their environment, from their residence to the wider community.

Within the Development, Communal Areas and Clubhouses play crucial roles in facilitating health and social interactions through curated, resident-driven activities and the inherent spaces. Outside the Development, access to the neighbourhood and beyond is equally essential for maintaining older adults' independence and functioning. A well-connected environment provides key resources—such as local shops, healthcare, and recreational facilities—enabling older adults to manage daily tasks and engage actively in their communities, thereby enhancing their quality of life.

To further support older adults in connecting with local networks and resources, property management should maintain a comprehensive understanding of the surrounding neighbourhood through ongoing audits. A proactive approach to guide residents in exploring nearby amenities can help fully integrate the development into the community and promote the concept of healthy ageing and ageing-in-place.

This list can be used to audit and assess the neighbourhood during the planning phase and daily operations. It also serves as a foundation for gathering information for older adults about the neighbourhood.

Physical Connection Facilities & Services

WALKABILITY

Audit Scope

When considering topography, walkways, and road safety, the audit should examine specified routes:

- At least 2 routes from the Development to major transport hubs, offering different modes of transport.
- At least 1 route to the nearest facility with dining and retail options.
- At least 1 route to the nearest blue-green infrastructure, excluding pocket parks.

Topography

Topography in the immediate neighbourhood supports mobility with safe, accessible environments.

- Ideally, the Development and its neighbourhood are not on sloping terrain. (LHK20)
- Where slopes are present, ramps with gentle gradients, but not steps, should be provided.
- The ideal gradient for ramp is 1:20 or lower, with no abrupt changes. Ramps with a gradient over 1:12 are not acceptable. (AGB33; AHK01; AHK45_2)
- Level landings are provided for rest, ideally at 50m intervals. (AGB33)
- Hillside escalator links or travellators are provided to deal with steep gradients, level differences and long walking distances. (LHK45_6)

Walkways

Well-maintained and accessible walkways improve safety and comfort, enabling confident neighbourhood navigation.

General

- Walkways, footbridges, and subways have clear and comfortable widths. (AGB33; AHK45_6)
- Simple, consistent, well-maintained glare-free paving in light colours with defined edges are incorporated. (ASG05)
- Continuous, non-glazed covered walkways are provided for protection. (ASG01)

Step-Free Access

- At-grade crossings are retained and not completely replaced by grade-separated crossings, avoiding the need for stairs or ramps. (AHK45_6)
- A regular walkway maintenance schedule is in place to prevent uneven surfaces and gaps between paving slabs. (AGB33)

Footbridges & Subways

- Footbridges and subways are equipped with accessible lifts, preferably with door delay functions. (ASG01)
- Footbridge and subway networks allow 24-hour step-free public access and do not replace on-street walkways.
- Footbridges are prioritised over subways for better personal security, ventilation, lighting, and reduced risk of flooding. (AHK45_6)

Ramps, Lifts, and Escalators

- Escalators are not prioritised over ramps and lifts as they pose safety issues. (AHK45_6)
- Curved or circular ramps should not constitute to the only accessible route as they pose wheelchair steering issues. (AHK01; AHK45_6)
- Moving walkways, such as escalators and travellators, have slower speeds, such as 0.5–0.75 m/s for lower demand areas. (AGB33)

Street Furniture

- Rest pockets with shaded seating are provided at 150m intervals or less. (AHK46; ASG01;)
- Street furniture does not obstruct and clutter walkways. (AHK44_8; AHK46)

Greening

- Trees and other forms of natural shade for protection are included. (AGB31)
- Defined edges, such as planters with plantations or grass verges on walkways are provided to aid navigation. (AGB31)
- A regular landscaping maintenance schedule is in place to prevent overhanging tree branches or shrubs. (AGB31)

Visibility

- Walkways are well-lit, free of hidden corners and dead ends. (AGB31; AHK44_8)
- Walkways are within view of multiple buildings and trees are placed strategically to maximise natural surveillance and minimise hidden spots. (AGB31; AGB32)

Safe & Efficient Crossings

Effective traffic control and safe crossings empower older adults to explore their surroundings with increased comfort and confidence.

Crossing Design

- Direct single crossings are in place instead of staggered crossings. (AHK45_6)
- Parking is prohibited on driveways near crossings to avoid blocking sightlines.
- Crossing times are adequate, ideally with countdown timers on traffic signals.. (AGB31)
- Crossings and the islands within them have clear and comfortable widths, with extra space depending on pedestrian flow. (AGB31; AHK45_2)
- Diagonal crossings are provisioned at wide junctions with heavy pedestrian demands. (AHK45_6)

Traffic Management

- Clear and visible road signs and markings are provided to guide both pedestrians and drivers effectively. (AGB31)
- Vehicle speed and traffic density are regulated through measures such as introducing shared streets, speed tables, road diets, or corner radii reduction, and banning vehicular movements or types, respectively. (AGB31; AHK45_6)

Neighbourhood Permeability

Easy navigation through neighbourhoods encourages outdoor activities and fosters community connections.

Accessibility

- Compact urban form with shorter blocks, or mid-block shortcuts in larger blocks, are planned to reduce walking distances and encourage exploration. (AGB31; AGB33; AHK46)
- Transit-oriented neighbourhoods are designed so that pedestrian routes to key destinations are direct, clear, and intuitive. (ASG01)

Attractiveness

- Vibrant and active frontage for streetscapes with activity spaces are encouraged in the neighbourhood. (AGB31; AHK46)
- Placemaking initiatives are encouraged and sustainable. (ASG11)

TRANSPORTATION

Accessible & Reliable Public Transportation

Reliable public transportation options enhance mobility, allowing older adults to reach essential services and participate in social activities.

- At least 1 bus stop should be located within 400m of the Development and equipped with at least 2 seats, shelter, and real-time service information. (AGB33; AHK45_8; AHK48; ASG09; LHK08)
- Headways in non-peak hours should be adequate for routes heading to different neighbourhoods. (AHK52; LHK09; LHK10).
- Step-free public transport or private shuttle services should be adequately provided to overcome challenges if the Development is located on sloped terrain.
- A railway station should be located within 800m of the Development. (ASG09)
- A taxi stand and ride-hailing services should be provided near the Development. (LHK09; LHK10)
- Cycle tracks, parking, and rentals should be provided near the Development. (AGB32; AHK44_8)
- Partnerships with ride-sharing or community transport providers to offer demand-responsive transportation can be considered. (AGB32; AHK52)
- For Housing Development in new development areas, the above provisions should be implemented concurrently with the Development's construction timeline.

Physical Connection   Facilities & Services

DAILY NEEDS

Physical Exercise

The availability of the following services allows older adults to meet daily needs, and enjoy a healthy, active, and connected lifestyle.

Facilities

- Parks, blue-green spaces, open spaces (AAU15; AGB31; AGB32; AHK44_3; ASG09)
- Fitness centre (AHK44_3)
- Swimming pool (AHK44_3)
- Walking trails

Dining & Entertainment

Facilities

- Diverse range of dining options (no more than 50% from chains) (AHK46)
- Shopping and retail variety (AHK44_3)
- Movie theatre and performing arts venue (AHK44_3)

Services

- Meal delivery (AHK51)
- Food assistance (e.g. texture modified meals)

Necessities

Facilities

- Grocery store/healthy food provisions/wet market (AGB22; ASG09)
- Drinking fountains and accessible public restrooms at major pedestrian nodes (AHK46; ASG01; ASG09)
- Hair & nail salon (AHK43; AHK44_3)
- Laundry/dry cleaning (AHK43)
- Bank and post office (AAU15; AHK43; AHK44_3; ASG09)
- Recycling centres
- Self-storage

COMMUNITY

Community Support

Communal spaces and services are essential for fostering social interactions, supporting mental well-being, and encouraging lifelong learning.

Facilities

- Kindergarten and other facilities to allow intergenerational interactions (AHK43)
- Library with computers and Internet access (AHK44_3)
- Community centres/activity clubs (AHK44_3)
- District Elderly Community Centre
- District Councillor Office/Family Services Centre (AHK30)
- Place of worship (ASG09)

Services

- Job and volunteer opportunities (AHK51)
- Intergenerational community opportunities
- Mental support
- Caregiver support services
- Shop outlets accepting Community Care and Residential Care Service Vouchers
- Information and assistance of social welfare and resources

Lifelong Learning

- Lifelong learning study centres (AHK51)

INTEGRATED CARE

Primary Care

Comprehensive healthcare options provide older adults with timely access to medical support.

Facilities

- District Health/Primary Care Centres (AHK47)
- Chinese medicine clinic (ASG09)
- Community pharmacy (AGB25; AHK30)
- Proximity to hospitals and general outpatient clinics (AHK44_3)
- General practice clinics
- Dental office (AHK43; AHK44_3)
- Eye clinic
- Speech therapy clinic
- Psychiatric clinic

Services

- Domestic helper services
- Assistive tool rental and purchase
- Health risk assessment
- Nursing services
- Medication consultation
- Nutrition consultation
- Cognitive assessment and training
- Optometric assessment
- Hearing assessment
- Clinical psychological services and counselling

TRADITIONAL CARE

Rehabilitation

Tailored rehabilitation and personal care services ensure older adults receive the support needed to maintain independence.

Facilities

- One-stop shop for senior personal care and rehabilitation
- Rehabilitation centre and clinic (e.g. physiotherapy and occupational therapy) (AHK44_3)
- Day care/respite care facility (AHK44_3)
- Residential care homes

Services

- Escort services

Home Modification

Facilities

- Home modification retail outlets

Services

- Home assessment

Disclaimer: All Figures included in these architectural drawings are diagrams intended for illustrative purposes only. They are indicative and may not accurately represent actual dimensions, materials, or construction methods. Users are advised to consult with a qualified professional before making any decisions based on these drawings.

The human body varies widely in shapes and sizes, which is studied through anthropometrics (human dimensions) and ergonomics (interaction with designed spaces). There is no universal standard for human shape; average heights differ significantly by age, sex, ethnicity, and nationality. This Guide focus on the central 90% of the population, using a bell curve to exclude the lowest and highest 5% (5th and 95th percentiles), ensuring the Guide accommodates approximately 90% of the Chinese population. (AHK01; AUS40; LCN16; LCN17)

The bell curve also accounts for older adults, who often experience age-related height loss. Research shows that Chinese adults over 60 lose an average of 35mm in height, with additional reductions as they age. (LUS32) Nonetheless, the Guide also considers the height gains in Hong Kong's general population over the decades as our physical health improves.

Moreover, an individual's reach varies with size, agility, dexterity, and whether they are seated or standing. A seated person's reach creates an arc based on shoulder height, allowing comfortable movement without excessive torso motion. Understanding these factors is crucial for designing accessible and usable environments for all users.

① Standing Heights
② Standing Side Reaches
③ Sitting Heights
④ Sitting Side Reaches

① Standing Heights

Body Height
Eye Level
1300-1650
1400-1800

② Standing Side Reaches

Max. Reach Up
Oblique Reach Up
Shoulder Reach
Oblique Reach Down
1750-2300
1550-1800
1100-1450
750-1000

③ Sitting Heights

Body Height
Eye Level
Shoulder Height
Leg Room
Seat Height
1100-1400
900-1300
750-1100
430-470
400-550

④ Sitting Side Reaches

Max. Reach Up
Oblique Reach Up
Shoulder Reach
Oblique Reach Down
Max 500
1450-1800
900-1300
750-1100
450-750

This section details the methods and procedures used to collect data for the Guide.

Conducted from 2019 to 2024, this research project aimed to explore the relationship between the built environment and World Health Organization's (WHO) concept of healthy ageing, with a focus on enhancing the functional ability and well-being of older adults in Hong Kong.

The project employed a mixed-methods approach, integrating quantitative data from surveys with qualitative insights from individual and focus group interviews, desktop research, and case studies. By prioritising primary data collection from relevant users and stakeholders, the research ensured that the subsequent secondary data reflected the needs of older adults in Hong Kong.

PRIMARY DATA COLLECTION

Questionnaires

In the initial stage of the project, a total of 1,454 questionnaires were collected from general public and Hong Kong residents aged 50 or above in order to understand views and preferences in ageing-in-place and the environmental attributes and characteristics of housing and neighbourhood. Informants were recruited using a convenience sampling method from multiple sources, including general housing, senior living estates, elderly centres, community centres, referrals from stakeholders and local agencies, recruitment advertisements in housing estates and university campuses, online platforms, snowball referrals from participants and community members, etc. The design of the questionnaire was mainly based on the eight domains of age-friendly city (AFC) by WHO, which includes outdoor spaces and buildings, transportation, housing, social participation, respect and social inclusion, civic participation and employment, communication and information, and community support and health services. The survey results indicated that participants were most concerned with the domains of housing and community support and health services.

Individual Interviews and Focus Groups

To gain deeper insights into the experiences and perspectives of older adults and practitioners in the field, individual and focus group interviews were conducted. These interviews aimed to explore the challenges and preferences related to ageing-in-place and the built environment. A total of 39 individual interviews and focus group sessions involving a total of 162 participants were carried out.

For the individual interviews, 22 home visits to older adults living in general housing, including public and private estates, were conducted in 2022. The interview questions were designed to understand the relationships and interactions between their health conditions, including geriatric syndromes and activities of daily living (ADLs), and their living environment, including the dwelling, amenities within the development, and the neighbourhood. The home visits also involved occupational therapists in providing home assessments to the participants. The interviews provided insights into their challenges in maintaining independence in their current living environment and how it could be improved. Additionally, 17 property management personnel and practitioners, such as social workers, developers, and healthcare professionals were also interviewed to understand their perspectives and challenges in facilitating ageing-in-place.

Four phases of focus groups were conducted from 2021 to 2023, involving a total of 162 participants. These sessions focused on the general public's perspectives on age-friendliness, older adults' views on senior housing, and the experiences of young-olds, caregivers, and service users at a day care and rehabilitation centre. The focus groups provided detailed narratives of participants' perceived values and concerns in ageing-in-place, allowing the research team to develop a more nuanced understanding of the multifaceted needs and aspirations of older adults and their caregivers in the context of senior living.

Site Visits

The research also explored 5 local case studies in Hong Kong, comprising both public and private sector senior living developments. These included three projects from the public sector—Blissful Place, Cheerful Court, and Tanner Hill—as well as two private sector developments—De Novo, and Ventria Residence. Site visits were conducted to the research team to gain first-hand insights into the design strategies, implementation processes, and outcomes of these age-friendly projects. Key insights were drawn regarding the practical challenges of planning and building, the integration of assistive technologies, the creation of inclusive community spaces, and the provision of supportive services for older residents.

Action Research

In addition to collecting views and perspectives from various stakeholders, the research team also undertook action research projects focused on knowledge transfer between health and architectural professionals, older adults, and university students. The aim was not only to gather insights but also to drive tangible actions and social impacts.

A total of 749 participants were involved in these activities, which included 13 public talk sessions, an online exhibition, tours, workshops, and home visits. The projects successfully met their objectives of facilitating knowledge transfer, identifying gaps between professional practice and user experience, and creating opportunities for collaborations between professionals and laymen with joint contributions to the community, as evidenced by the positive feedback received from the participants. These action research initiatives served as an important complement to the primary data collection, allowing the research team to bridge the gap between academic knowledge and real-world application.

SECONDARY DATA COLLECTION

Desktop Research

To supplement the primary data, the team conducted extensive desktop research, including:

○ Literature review on design elements supporting healthy ageing, drawing on frameworks such as WHO's healthy ageing and Integrated Care for Older Adults (ICOPE) model

○ Review of Hong Kong's existing age-friendly and barrier-free design regulations and guidelines

○ Benchmarking of international best practices in age-friendly urban and architectural design

○ Age-friendly design elements and their benefits to older adults

Case Studies

Lastly, in-depth analysis of exemplary international and local senior living case studies was conducted to examine the practicality of the Guide.

International case studies from different regions, including Asia, Europe, and North America, were examined. These case studies highlighted a diverse range of age-friendly urban developments, senior housing projects, and community-based initiatives that have successfully enhanced the health, independence, and quality of life for older residents. The insights and lessons drawn from these mature international experiences provided valuable context for the development of senior living in Hong Kong.

Research Outputs

As part of this research project, 4 academic articles that provide more detailed information on the research and data have been published:

Mo, K. H., Lei, D., Woo, J., & Ko, R. (2023). Housing preference for ageing-in-place: Are there differences among emerging-old, young-old and old-old adults living in Hong Kong's private housing estates? Journal of Aging and Environment, 1-28.

Mo, K. H., Ng, E., Woo, J., Jian, Y. I., Chen, W. (2024). Revisiting the implementation and effectiveness of age-friendly neighborhood initiatives in Hong Kong: A strengths-based perspective. (To be published in Journal of Aging & Social Policy)

Woo, J., Ko, R., Yu, R., Chan, S., Lo, R., & Mo, K. H. (2023). Healthy ageing should be a key component of ageing in place: Case study from Hong Kong. International Journal of Environmental Research and Public Health, 20(10), 5779.

Woo, J., Mok, K., Chu, W. L., Lo, R., & Ko, R. (2024). Implementing aging in place in Hong Kong: Meeting the needs and aspirations of older adults and their caregivers living in private housing. International Journal of Environmental Research and Public Health, 21(3), 348.

Accessible
A site, building, facility or portion thereof that is barrier-free, can be approached, entered and used by persons with a disability. (AHK36)

Activities of Daily Living (ADLs)
The essential tasks that young, healthy individuals can perform independently; inability to do so may lead to unsafe conditions and a lower quality of life. (LUS23)

Adaptable Zone
A designated wall space where grab rails or handrails can be installed to provide support and stability for individuals.

Age-friendly
A supportive environment that is designed to help older persons live safely, independently and enjoy a good quality of life. (ASG08)

Ageing-in-place
The ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level. (ASG08)

Ageism
The stereotypes (how we think), prejudice (how we feel) and discrimination (how we act) towards others or oneself based on age. (AWH07)

Assistive Technology
The products, systems, and services that enhance functioning in areas like cognition, communication, hearing, mobility, self-care, and vision, fostering health, well-being, and inclusion. (AWH11)

Atrium
An open, skylit court around which a building is constructed, featuring linked floors through openings that connect the levels. (AHK35; AKR01)

Barrier-free/Step-free/Level Access
Design features that ensure accessibility by eliminating physical obstacles such as steps and uneven surfaces, allowing smooth movement for individuals with mobility challenges.

Bi-directional Swing Door
A door that swings open in both directions without additional force, providing quick access in emergencies, which is especially beneficial for older adults needing prompt assistance.

Biophilic
An approach to design that incorporates natural elements and environments to enhance well-being and create a connection between people and nature, often through the use of natural light, plants, and natural materials. (LUS24)

Blue-green Infrastructure/Space
An interconnected network of natural and designed landscapes that provides functions like water storage, flood control, and wildlife habitat. (LAU09)

Brownfield Site
Agricultural land in the New Territories used for low-efficiency industrial operations, presenting potential land use conflicts and environmental issues. (AHK55)

Built Form
Human-made structures, including buildings, defined spaces, architectural elements, and room layouts, that shelter or define activities. (LUS10)

Cap Height
The height of a typeface's uppercase letters, measured from the baseline to the top of flat-topped glyph. (AUS36)

Care Coordinator
Healthcare professional who facilitates and streamlines personalised care across various services, ensuring effective resource coordination. (AGB34)

Caregiver
A person who provides support and assistance to seniors or persons with disabilities. (ASG08)

Clear Width
The unobstructed horizontal space between two fixed points.

Clerestory
A portion of an interior rising above adjacent rooftops and having windows admitting daylight. (AKR01)

Clubhouse
A recreational facility within a residential composite development, designed for the common use of residents and their visitors. (AHK38)

Community Engagement
A dynamic process that fosters communication and interaction between an organisation and a community, enabling members to access information and collaborate while helping organisations understand and respond to community needs. (LAU10)

Corner Radii Reduction
The practice of decreasing the radius of a street corner to slow down motorists, enhancing pedestrian safety by shortening crossing distances and improving visibility.

Colour Rendering Index (CRI)
A measure of how accurately a light source represents the true colours of illuminated objects with respect to a reference light source. Values range from 0 to 100 CRI, with a CRI of 100 indicating perfect colour accuracy.

Correlated Colour Temperature (CCT)
A measure of the tint of the illumination provided by the light source in Kelvin (K), with low values (3000K and below) indicating warm light and high values (4000K and above) indicating cool light.

Communal Area
The areas open to and available for the common use and enjoyment of all occupiers of the Residential Development. (AHK36)

Corridor
The indoor pedestrian circulation within the site boundary.

Decoction
A Chinese medicine infusion where active compounds are extracted from herbs by boiling or simmering them in water.

Development Entrance
The transition point between the interior and exterior of the site boundary of a housing development.

Disability
Any impairment of the body or mind that makes it more difficult for the person with the condition to do certain activities and interact with the world around them. (AUS37)

Driveway
Part of a public or private street used or intended for use by vehicular traffic.

Drop-off Area
A designated space where vehicles can temporarily stop to allow passengers to get in or out.

Dwelling
A self-contained domestic unit with separate kitchen and washroom.

Dysphagia
The sensation of food being delayed or hindered in its passage from the mouth to the stomach. (LUS06)

Façade
Any side of a building facing a walkway or pedestrian space and finished accordingly. (AKR01)

Fascia Signage
Any signage that covers a vertical or horizontal section of a building.

Fire-rated
The ability of a building element to withstand fire for a specified duration, preventing the spread of fire and smoke while maintaining structural integrity. (AHK35)

Frail(ty)
A decline in functional reserves in older adults, increasing vulnerability and the risk of adverse health outcomes after stressors. This dynamic condition arises from age-related declines in multiple physiological systems and is not inevitable or irreversible. (LHK06; LUS01)

Fritting/Frosting
The techniques used to alter the transparency and appearance of glass surfaces for both functional and aesthetic purposes.

Frontage
The linear extent of access to the public open space from the adjoining street. (AHK40)

Functional Ability
The capabilities that enable individuals to achieve what they value, encompassing five key domains: meeting basic needs, learning and decision-making, mobility, relationship building, and societal contribution. Each domain can be influenced by environmental factors. (AWH08)

Gait
The manner or pattern of walking, encompassing rhythm, speed, and movement style, often assessed to evaluate mobility and health.

Geriatric Syndrome
A range of clinical conditions in older adults that do not fit into well-defined disease categories but significantly impact their functionality and quality of life. (AHK56)

Gerontechnology
A multidisciplinary field that combines gerontology and technology to create innovative products that enhance the quality of life for the ageing population, improving autonomy, health monitoring, safety, and community engagement while reducing caregiving burdens. (AHK57)

Glaze(d)
The glass portion of an exterior window that permits views to the exterior or interior. (AKR01)

Grab Rail
Devices, usually straight or angled, that are attached to walls, floors and/or ceilings to provide support to a person while standing or changing position. (AWH03)

Grout Line
The distance that separates one tile from another.

Handrail
Bars, usually cylindrical, attached to a wall, floor or other stable structure that provide the means for a person to support or stabilise themselves using hands or arms while walking. (AWH03)

Healthy Ageing
The process of developing and maintaining the functional ability that enables well-being in older age. (AWH08)

Heating, Ventilation, and Air Conditioning (HVAC) System
The mechanical system used to control the temperature, humidity, and movement of air throughout a building or other indoor space.

Housing Development
A site of residential use containing at least one domestic building and complementary ancillary facilities.

Hydrotherapy
The use of exercises while the body is submerged in water to aid injury rehabilitation and enhance muscular strength, balance, and cardiovascular fitness. (LUS18)

Illuminance (Lux)
A quantified measurement of light falling on a surface. In contrast, luminance measures the perceived brightness of light emitted or reflected from a surface in a specific direction.

Impairment
An absence of or significant difference in a person's body structure or function or mental functioning. (AUS37)

Intrinsic Capacity
The composite of all the mental and physical capacities that a person can draw on, including their ability to walk, think, see, hear and remember. (AWH08)

Integrated Care for Older People (ICOPE)
A framework that promotes a community-based, person-centred approach to optimising older adults' functional ability through screening for care dependency, assessments in primary care, and personalised care plans. (LHK05)

Interoperability
The ability of different systems, devices, or platforms to communicate and work together effectively. (LDE04)

Internet of Things (IoT)
The network of 'things', or physical objects, which are embedded with sensors, processors and communication technologies for the purpose of collecting, processing and exchanging data over the Internet. (LAT01)

Kerb
A border of stone, concrete or other rigid material at the edge of a driveway.

Landing
A level area at the top of a staircase or between one flight of stairs and another.

Landscaping
The modification of the visual appearance of a land area, whether natural, man-made environment, urban or rural.

Life-course Approach
A framework that examines the stages individuals experience from birth to death, emphasising the interplay of biological, behavioural, psychological, and social factors that influence health outcomes. It highlights how early life risk exposures can impact long-term health and well-being, recognising the accumulation of risk and resilience throughout life. (AWH09)

Light Reflectance Value (LRV)
A measure of the quantity of visible light reflected by a surface when illuminated by a light source. (ASG08)

Light Shelf
A passive architectural device used to reflect natural daylight into a building.

Load-bearing Wall
A structural element that supports the weight of the building elements above it, transferring this load to the foundation.

Low Emissivity
A surface condition that emits low levels of radiant thermal (heat) energy.

Main Circulation Route
The continuous corridors and/or paths that begin at the Main Development Entrance and end at both the Clubhouse entrance and Dwelling Entrances.

Massing
The perception of the general shape, form, and size of a building.

Microclimate
The climate of a small community or a cluster of developed areas. (LHK18)

Mobility Aid
A device that is used to assist people with mobility impairments to move within their environment. Devices include canes, walkers, rollators and wheelchairs. (ASG08)

Multi-component Programme
An evidence-based intervention aimed at improving physical and cognitive functions, as well as self-rated health in pre-frail and frail older adults. This programme combines physical exercise, nutritional guidance, cognitive training, and social support to reverse frailty and promote healthy ageing. (LHK06)

Nocturia
The complaint that an individual has to wake at night one or more times to use the Washroom. (LNL09)

Non-communicable Disease (NCD)
Also known as chronic diseases, these tend to be of long duration and are the result of a combination of genetic, physiological, environmental and behavioural factors. (AWH10)

Older Adult
An adult person who may experience a decline in physiological and cognitive functions associated with ageing.

Open Plan
A design concept in which multiple functional areas in a dwelling are merged into a single, unobstructed space without interior walls.

Passive Design
A design that optimises layout and materials to reduce or eliminate reliance on mechanical heating, cooling, and lighting by using the climate to maintain comfortable indoor temperatures. (AAU18)

Path
The outdoor pedestrian circulation within route the site boundary.

Placemaking
Placemaking is a collaborative, people-centred approach that reimagines public spaces by engaging communities to understand their needs, fostering a shared vision that enhances urban design and promotes health, happiness, and well-being. (AUS32)

Plug & Play
A specification that facilitates the recognition of a hardware component in a system without the need for physical device configuration or user intervention.

Podiatry
A profession dedicated to providing holistic care for medical conditions and injuries of the foot, ankle and lower limb.

Polypharmacy
The concurrent use of multiple medications, commonly defined as the routine use of five or more medicines. (AWH06)

Principal Window
The main or largest glazed area of a space designed to provide unobstructed views from both standing and seated positions.

Proprietary Product
Any patented material, specification, or process that can only be obtained from one manufacturer.

Protected Means of Escape
A required staircase, or ramp, or passageway, enclosed by fire barriers and leading to an ultimate place of safety. (AHK42)

Ride-hailing
A service that lets users request rides remotely, connecting them with drivers of vehicles for hire.

Riser
The vertical part of a staircase step, the height of which should not exceed a maximum standard to ensure safe access.

Road Diet
A technique in transportation planning that involves reducing the number and/or width of travel lanes on a street to decrease crash rates.

Rocker Switch
A switch that operates by rocking or tilting back and forth, rather than pressing straight in.

Sans Serif
A typeface designed without small projecting lines at the ends of characters. Typically, sans serif fonts have higher legibility. (AUS36)

Sarcopenia
The decline in muscle mass and strength that occurs with healthy ageing. (LUS07)

Shower Riser Rail
A vertical support that holds the showerhead, allowing for adjustable height positioning to enhance user comfort.

Sleep Hygiene
A set of behavioural and environmental recommendations designed to promote healthy sleep, originally developed for treating mild to moderate insomnia. (LUS16)

Slip Resistance (R Value)
A grading based on the frictional force required to keep a shoe heel or crutch tip from slipping on a walking surface. (AHK01)

Speed Table
An elongated mound in the driveway pavement that extends across it at a right angle to traffic flow, designed to discourage speeding.

Stretcher
A light frame made from two long poles with a cover of soft material stretched between them, used for moving patients who require medical care.

Streetscape
The collective appearance of all buildings, footpaths, gardens and landscaping along a street.

Street Furniture
Objects and facilities located in urban public spaces that provide various services and functions to the public. (LHK17)

Telemedicine
The practice of medicine at a distance, where interventions, diagnoses, and treatment recommendations are based on patient data transmitted through telecommunication systems. (LHK14)

Thermal Mass
The capacity of a material to absorb, store, and release heat, helping to regulate indoor temperatures and enhance energy efficiency in buildings.

Thermo Ventilator
A device that combines the functions of a heater and a ventilator, providing the functions of clothes drying, heating and ventilating within a single unit.

Threshold
A horizontal strip located at the bottom of a doorway which serves as a transition between different flooring materials or levels.

Turning Circle
The diameter of the circle in which a mobility aid can turn in either direction.

Transitional Care
A set of programmes that are aimed at preventing prolonged hospital admission and avoiding premature residential care admission. (LCA05)

Transom Window
A narrow window, sometimes hinged at the top, positioned over a doorway or larger window. (AKR01)

Tread
The horizontal part of a step in a staircase measured from the face of one riser to the face of the next.

Typeface
The underlying visual design that can be implemented in various typesetting technologies. A font is a specific instance of that typeface. (AUS36)

Vanity Unit
A washroom fixture that combines a washbasin and storage, typically featuring a worktop and a cabinet.

Vestibule
A small entrance hall between the outer door and the interior of a dwelling or building. (AKR01)

Visual Acuity
The clarity or sharpness of vision.

Volatile Organic Compound (VOC)
A diverse group of organic compounds that evaporate at room temperature, often found in interior furnishings and finishes. (LHK13)

Walkability
The suitability of an area for walking, determined by the design and connectivity of pedestrian walkways, safety from traffic, accessibility to destinations, and the presence of amenities. (AHK43)

Walkway
Any pedestrian circulation route not within the site boundary.

Wayfinding
The processes people go through to find their way round an environment. (AGB26)

Well-being
A positive state experienced by individuals and societies, encompassing quality of life and the ability to contribute meaningfully to the world. It is influenced by social, economic, and environmental conditions. (LWH07)

Window Sill
The horizontal ledge at the bottom of a window frame, providing structural support and a surface for decorative or functional objects. (AHK41)

Architectural Design Guides: Codes starting with A
Literature: Codes starting with L

AU	Australia	EL	Greece	IR	Iran	RU	Russia
AT	Austria	ES	Spain	IT	Italy	SE	Sweden
BE	Belgium	FI	Finland	JP	Japan	SG	Singapore
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CN	China	ID	Indonesia	NL	Netherlands	US	United States of America
DE	Germany	IE	Ireland	NZ	New Zealand	WH	World Health Organisation
DK	Denmark	IN	India	PT	Portugal		
EG	Egypt	IQ	Iraq	RO	Romania		

AAU01 Department of Human Services. (2014). Design Guidelines for Hospitals and Day Procedure Centers State of Victoria.

AAU02 Department of Health. (2017). Residential Aged Care Services Built Environment Audit Tool. State of Victoria.

AAU03 Play Australia. (2020). Guidelines for Planning, Installing and Activating Outdoor Fitness Equipment.

AAU04 Department of Planning. (2015). Apartment Design Guide. State of New South Wales.

AAU05 Standards Australia. (2009). AS 1428.1-2009 Design for Access and Mobility.

AAU06 Health Facility Guidelines Australia. (2020). International Health Facility Guidelines.

AAU07 Dementia Training Australia. (2021).Using the Built Environment to Create Comprehensible, Manageable and Meaningful Environments for People with Dementia: Combined Suite of Environmental Design Handbooks.

AAU08 Department of Human Services and Aged Care Services. (1999). Aged Care Residential Services: Generic Brief. State of Victoria.

AAU09 Department of Planning. (2023). Seniors Housing Design Guide. State of New South Wales.

AAU10 Healthdirect Australia. (2021). Physical Activity Guidelines for Older People.

AAU11 Australian Building Codes Board. (2019). National Construction Code.

AAU12 Dementia Training Australia. (2021). Environmental Design Resources Handbook.

AAU13 Zumtobel Group. (2015). Light for Health and Care.

AAU14 Association of Australasian Acoustical Consultants. (2017). Guidelines for Healthcare Facilities.

AAU15 Department of Human Services and Aged Care Services. (2020). 20 Minute Neighbourhoods Checklist. State of Victoria.

AAU16 Adelaide University. (2020). ThermalComfort at Home: A Guide for Older South Australians.

AAU17 Nature Play WA. (2021). A Guide to the Australian Playground Standards.

AAU18 Your Home. (2014). Passive Design. Australian Government.

AAU19 Sarkissian, W. & Stenberg, B. (2013). Guidelines for Planning for Older People in Public Open Space.

AAU20 Department of Infrastructure, Transport, Regional Development, Communications and the Arts. (2023). Reform of the Disability Standards for Accessible Public Transport 2002— Stage 2 Decision Regulation Impact Statement.

ACA01 Parke, B., & Friesen, K. (2015). Code Plus: Elder Friendly Hospital Design Guide.

ACA02 City of Toronto. (2017). Toronto Multi-Use Trail Guidelines.

ACA03 City of Toronto. (2017). City of Toronto's Accessibility Design Guidelines.

ACA04 Public Health Agency of Canada. (2010).Age-Friendly Communication: Facts, Tips and Ideas.

ACA05 Buildings Division, Department of Transportation and Infrastructure. (2015). DSD Standards for Nursing Homes. Government of New Brunswick.

ACH01 Wagenaar, C., Mens, N., Manja, G., Niemeijer, C., & Guthknecht, T. (2018). Hospitals: A Design Manual.

ACH02 International Organization for Standardization. (2021). ISO 21542: Building Construction — Accessibility and Usability of the Built Environment.

ACH03 International Committee of the Red Cross. (2014). Physical Rehabilitation Centre: Architectural Programming Handbook.

ACN01 深圳市装行业会 (Shenzhen Decoration Industry Association). (2024). 深圳市居住建筑适老化设准 (Design Standard for Elderly-Oriented Residential Buildings in Shenzhen).

ACN02 住房和城建设部 (Ministry of Housing and Urban-Rural Development). (2017). 老年人照料设施建筑设准 (Building Design Standards for Elderly Care Facilities).

ADE01 Kramer, S. (2015). Bathrooms and Sanitation: Principles, Design, Implementation.

AGB01 Ministry of Housing, Communities and Local Government. (2024). Access to and Use of Buildings: Approved Document M.

AGB02 Housing Learning and Improvement Network. (2021). Design Principles for Extra Care Housing (3rd Edition).

AGB03 Ministry of Housing, Communities and Local Government. (2013). Access to and Use of Buildings: Approved Document K.

AGB04 UK Government. (2024). The Building Regulations 2010.

AGB05 Department of Health. (2013). Health Building Note 00-10 Part A: Flooring.

AGB06 Department of Health. (2013). Health Building Note 00-04: Circulation and Communication Spaces.

AGB07 Department of Health. (2014). Health Building Note 00-01: General Design Guidance for Healthcare Building.

AGB08 Greater London Authority. (2023). London Plan Guidance: Housing Design Standards.

AGB09 Greater London Authority. (2021). Interim London Housing Design Guide.

AGB10 Department for Communities and Local Government. (2006). Planning Policy Guidance 24: Planning and Use.

AGB11 Habinteg Housing Association. (2015). Lifetime Homes/Accessible Housing Standards.

AGB12 Carmichael, A. (1999). Style Guide for the Design of Interactive Television Services for Elderly Viewers.

AGB13 The Aquatic Physiotherapy Association of Chartered Physiotherapists. (2019). Hydrotherapy Pools: Expert Clinical Considerations in Planning and Design.

AGB14 National House-Building Council. (2023). NHBC Standards 2023.

AGB15 Thomas Pocklington Trust. (2017). An Occupational Therapist's Access Checklist A Practical Tool.

AGB16 Housing Learning and Improvement Network. (2014). Interior Design for People with Sight Loss: A Guide for Interior Designers.

AGB17 Trust Housing Association. (2016). Colour & Wayfinding.

AGB18 Thomas Pocklington Trust. (2015). Daylighting in Older People's Housing.

AGB19 Health and Safety Executive. (2012). Falls From Windows or Balconies in Health and Social Care.

AGB20 Thomas Pocklington Trust. (2015). A Practical Guide to Improving Lighting in Existing Houses.

AGB21 Sunderland City Council. (2013). Enabling Independence: Design Guide for Independent Living.

AGB22 C40 Cities Climate Leadership Group. (2020). C40 - How to build back better with a 15-minute city.

AGB23 Portsmouth City Council. (2018). Design Guide for Wheelchair Accessible Housing: Occupational Therapy Service.

AGB24 Campaign to End Loneliness. (2020). Tackling Loneliness Through the Built Environment.

AGB25 Bristol Ageing Better. (2019). Make Your Neighbourhood Age-Friendly.

AGB26 The Stationery Office. (2005). Wayfinding: Effective Wayfinding and Signing Systems - Guidance For Healthcare Facilities.

AGB27 Centre for Accessible Environments. (2012). Designing for Accessibility.

AGB28 Alzheimer's Disease International. (2020). World Alzheimer Report 2020: Design, Dignity, Dementia: Dementia-related Design and the Built Environment Volume 1.

AGB29 British Standards Institution. (2018). BSI Standards Publication - Design of an Accessible and Inclusive Built Environment.

AGB30 Care Quality Commission. (2024). Health and Social Care Act 2008 (Regulated Activities) Regulations 2014.

AGB31 Transport for London. (2020). The Planning for Walking Toolkit.

AGB32 Homes England. (2020). Building for a Healthy Life: A Design Toolkit for Neighbourhoods, Streets, Homes and Public Spaces.

AGB33 Department for Transport. (2021). Inclusive Mobility: A Guide to Best Practice on Access to Pedestrian and Transport Infrastructure.

AGB34 NHS England. (2023). Workforce Development Framework for Care Coordinators.

AGB35 National Institute for Healthcare Excellence. (2016). Service User Experience in Adult Mental Health: Improving the Experience of Care.

AGB36 National Institute for Healthcare Excellence. (2018). Care and Support of People Growing Older with Learning Disabilities.

AGB37 National Institute for Healthcare Excellence. (2015). Dementia, Disability and Frailty in Later Life – Midlife Approaches to Delay or Prevent Onset.

AHK01 Buildings Department. (2024). Barrier Free Access 2008 (2024 Edition).

AHK02 Architectural Services Department. (2019). ASD Elderly-Friendly Design Guidelines.

AHK60 Centre for Health Protection. (2023). Report of Population Health Survey 2020-22 (Part I).

AHK04 Architectural Services Department. (2017). General Specification for Lift, Escalator and Passenger Conveyor Installation in Government Buildings of the Hong Kong Special Administrative Region (2017 Edition).

AHK05 PolyU Jockey Club Smart Ageing Hub. (2023). Jockey Club Smart Ageing Hub Resource Library.

AHK06 Architectural Services Department. (2004). Universal Accessibility Best Practices and Guidelines.

AHK07 Big Silver. (2023). 長者家居改裝攻略 (Elderly Home Remodeling Tips).

AHK08 Hong Kong Housing Society. (2005). Universal Design Guidebook For Residential Development in Hong Kong.

AHK09 Hong Kong Green Building Council. (2024). HKGBC Retrofitting Guidebook (Version 2).

AHK10 Indoor Air Quality Management Group. (2019). Guidance Notes for the Management of Indoor Air Quality in Offices and Public Places. HKSAR Government.

AHK11 Hong Kong Housing Society. (2018). Aging-in-Place Scheme Booklet.

AHK12 Jockey Club Design Institute for Social Innovation. (2020). The Toolkit for the Age-friendly Community Kitchen.

AHK13 Food and Environmental Hygiene Department. (2021). Final Report on Compliance with the Requirement on Air Change or Air Purifiers in Seating Areas of Dine-in Catering Premises under Cap. 599F.

AHK14 Centre for Health Protection. (2017). Guidelines on Infection Control of Commercial Spa Pools. Department of Health.

AHK15 HK Electric. (2022). 電力裝置設計指南 (Guide to Connection of Supply).

AHK16 Big Silver. (2022). Age-friendly Practices in Catering Industry.

AHK17 Social Welfare Department. (2023). Innovation and Technology Fund for Application in Elderly and Rehabilitation Care: Reference List of Recognised Technology Application Products.

AHK18 Architectural Services Department. (2007). Universal Accessibility for External Areas, Open Spaces and Green Spaces.

AHK19 The Hong Kong Council of Social Service. (2023). 照護食標準指引 (Guideline of Care Food Standard).

AHK20 Buildings Department. (2019). APP-111: Design of Car Parks and Loading/Unloading Facilities.

AHK21 Environmental Protection Department. (2022). Improve the Indoor Air Quality in Your Home.

AHK22 Environmental Protection Department. (2023). Application of Innovative Noise Mitigation Designs in Planning Private Residential Developments against Road Traffic Noise Impact.

AHK23 Hong Kong Green Building Council. (2019). Beam Plus New Buildings Version 2.0.

AHK24 Food and Health Bureau. (2009). Development of Chinese Medicine Hospital: Schedule of Accommodation.

AHK25 Food and Health Bureau. (2009). The Development of the Chinese Medicine Hospital - Planning and Design Brief.

AHK26 Environmental Protection Department. (2023). Application of Sound Insulation in Residential Buildings to Reduce Noise Transmission Between Units.

AHK27 HKSAR Government. (2024). Residential Care Homes (Elderly Persons) Regulation (Cap. 459).

AHK28 Buildings Department. (2024). APP-151: Building Design to Foster a Quality and Sustainable Built Environment.

AHK29 Hong Kong Fire Services Department. (2021). Stand-alone Fire Detector: General Guidelines on Purchase, Installation & Maintenance.

AHK30 Jockey Club Design Institute for Social Innovation. (2022). Double Smart Assessment Indicators for Elderly-friendly Community.

AHK31 Ng, H. (2020). 誌同道合—香港標牌探索 (De-sign Age - Exploring Hong Kong's Signage).

AHK32 Buildings Department. (2010). ADV-3: Standardization of Floor Numbering.

AHK33 Hong Kong Housing Authority. (2024). Well・being Design Guide.

AHK34 The Chinese University of Hong Kong, City University of Hong Kong, The University of Science and Technology, & University of Hong Kong. (2024). The Guidebook on the Built Environment for Senior Citizens in Extreme Hot Weather (Draft Version).

AHK35 Buildings Department. (2023). Code of Practice for Fire Safety in Buildings 2011 (June 2023 Edition).

AHK36 HKSAR Government. (2024). Cap. 123F Building (Planning) Regulations.

AHK37 Buildings Department. (2024). APP-41: Buildings to be Planned for Use by Persons with a Disability Regulation 72 of Building (Planning) Regulations Design Manual: Barrier Free Access 2008.

AHK38 Leisure and Cultural Services Department. (2000). Practice Note Issue .4/2000(B): Recreational Facilities in Residential Developments.

AHK39 Buildings Department. (2004). Code of Practice for the Provision of Means of Access for Firefighting and Rescue Purposes 2004.

AHK40 Development Bureau. (2011). Public Open Space in Private Developments Design and Management Guidelines.

AHK41 Buildings Department. (2016). APP-130: Lighting and Ventilation Requirements – Performance-based Approach.

AHK42 Buildings Department. (1996). Code of Practice for the Provision of Means of Escape in Case of Fire 1996.

AHK43 Hong Kong Green Building Council. (2016). Beam Plus Neighbourhood Version 1.0.

AHK44 Planning Department. (2024). Hong Kong Planning Standards and Guidelines.

AHK45 Transport Department. (2024). Transport Planning and Design Manual.

AHK46 Civic Exchange. (2016). Measuring and Improving Walkability in Hong Kong.

AHK47 Health Bureau. (2022). Primary Healthcare Blueprint.

AHK48 Labour and Welfare Bureau. (2022). Consultancy Study for Enhancement of the Accessibility of Physical Environment in Hong Kong - Final Report.

AHK49 Social Welfare Department. (2020). Code of Practice for Residential Care Homes (Elderly Persons) January 2020 (Revised Edition).

AHK50 Health Bureau. (2021). Hong Kong Reference Framework for Preventive Care for Older Adults in Primary Care Settings.

AHK51 Jockey Club Age-friendly City Project. (2019). Jockey Club Age-Friendly City Project Cross-district Report of Baseline Assessment on Age-friendliness (18 Districts).

AHK52 Jockey Club Age-friendly City Project. (2021). Age-friendly City Guidebook: Practical guidance and resources for Age-friendly City development in Hong Kong.

AHK53 Elderly Health Service. (2024). Tips About Planning Physical Activities Programme for Elderly. Department of Health.

AHK54 Elderly Health Service (2018). Elderly Health Service Newsletter Volume 41-49. Department of Health.

AHK55 Planning Department. (2019). Agreement CE40/2016 (TP) – Study on Existing Profile and Operation of Brownfield Sites in the New Territories – Feasibility Study: Final Report.

AHK56 CUHK Jockey Club Institute of Ageing. (2018). AgeWatch Index for Hong Kong - Topical Report on Health Status.

AHK57 Asia-Pacific Institute of Ageing Studies. (2021). LU Jockey Club Gerontechnology and Smart Ageing Project: Project Brief. Lingnan University.

AHK58 Community Investment and Inclusion Fund. (2020). 特色計劃:「樓長」你的隔離屋巴打/絲士打」 (Featured Programme: House Captain). Home and Youth Affairs Bureau.

AHK59 Social Welfare Department. (2020). Schedule of Accommodation (Design Standard) for Day Care Centre for the Elderly (Capacity: 40 to 120 places) (Kitchen-based).

AIE01 The National Disability Authority. (2023). Universal Design Guidelines for Homes in Ireland.

AJP01 Japan Association for the 2025 World Exposition. (2022). Universal Design Guidelines for Facility Implementation.

AJP02 X-Knowledge (author) & 林詠純 (translator). (2022). 一輩子用得上的尺寸事典，全能住宅裝修必備 (A Lifetime's Worth of Sizing Facts, A Must-have for Any All-around home Renovation).

AJO01 Jordan Green Building Council (2018). Your Guide to Building Envelope Retrofits for Optimising Energy Efficiency & Thermal Comfort in Jordan.

AKR01 Nguyen, D. (2024). Architecture Dictionary.

ANL01 The Health Council of the Netherlands. (2004). The Influence of Night-time Noise on Sleep and Health.

ANZ01 Standards New Zealand. (2001).

NZS 4121:2001 Design for access and mobility: Buildings and associated facilities.

ANZ02 Auckland Council. (2016). Designing Play Spaces for Older Adults.

ANZ03 Auckland Council. (2023).Auckland Design Manual: Accessible Space Dimensions.

ASE01 Ecophon. (2022). Age-Friendly and Memory-Friendly Acoustic Environments.

ASG01 Building and Construction Authority. (2016). Universal Design Guide for Public Places.

ASG02 Yap, W. (2019). Ageing Urbanism: Notes on Recreation 22 - Gym Tonic.

ASG03 Building and Construction Authority. (2019). Code on Accessibility in the Built Environment 2019.

ASG04 Lien Foundation. (2018). Second Beginnings: Senior Living Redefined.

ASG05 National Parks Board. (2017). Design Guidelines for Therapeutic Gardens in Singapore.

ASG06 Building and Construction Authority. (2006). Universal Design Guide (Commercial Buildings) 2006.

ASG07 Building and Construction Authority. (2007). Universal Design Guide 2007.

ASG08 Singapore Standards Council. (2024). SS 605:2015 Guide for Age-Friendly Homes (2024).

ASG09 Yuen, B., Bhuyan, M. R., Song, S., Moogoor, A., Yap, W., Močnik, Š., & Chua, R. (2022). Age-Friendly Neighbourhood Planning and Design Guidelines: A Singapore Case Study.

ASG10 Centre for Liveable Cities and Agency for Integrated Care. (2023). Dementia-Friendly Neighbourhood Design Guide.

ASG11 Yuen, B., Bhuyan, M. R., Dieterich, A., Yap, W., & Chua, R. (2022). Age-Friendly Neighbourhood Post-Implementation Toolkit.

ATH01 Junprateep, C., Seviset, S., & Eakwutvongsa, S. (2020). Guideline for Innovation Management Design of Home Bathroom Environment to Help Reduce Accident Risk among Elderly.

AUS01 Portland Parks and Recreation. (2009). Trail Design Guidelines for Portland's Park System.

AUS02 U.S. Department of Justice. (2010). 2010 ADA Standards for Accessible Design.

AUS03 2Life Communities. (2018). Design Guidelines for Aging in Community.

AUS04 Global Wellness Institute. (2018). Guide to Hydrothermal Spa & Wellness Development Standards: What You Need to Know Before Building Wet Areas (Third Edition).

AUS05 Lighting Research Center. (2001). Lighting the Way: A Key to Independence.

AUS06 New York City Department of Aging. (2017). Aging in Place Guide for Building Owners: Recommended Age-Friendly Residential Building Upgrades.

AUS07 Clark, J. A. (2009). Solving Kitchen Ventilation Problems.

AUS08 Bosch, S. J., Cama, R., Edelstein, E., & Malkin, J. (2012). The Application of Color in Healthcare Settings.

AUS09 Newsom, R., & DeBanto, J. (2023). Aging and Sleep.

AUS10 Eaton's Cooper Lighting and Safety Business. (2013). Lighting Design Guide.

AUS11 Brodkey, F. D. (2022). Aging changes in sleep.

AUS12 Wilkerson, C., Berdahl, E., Ju, W., & Gurevich, M. (2022). Introduction to Electronics.

AUS13 Thomas, C., Norman, E. J., & Katsigris, C. (2014). Design and Equipment for Restaurants and Foodservice: A Management View (4th Edition).

AUS14 California Building Standards Commission. (2022). California Building Code 2022 (Vol 1 & 2).

AUS15 U.S. Environmental Protection Agency. (2024). A Guide to Siting and Installing Air Sensors.

AUS16 Centers for Disease Control and Prevention. (2024). Heat and Older Adults (Aged 65+).

AUS17 Illuminating Engineering Society of North America. (2020). ANSI/IES RP-28-20 Recommended Practice: Lighting and the Visual Environment for Older Adults and the Visually Impaired.

AUS18 National Safety Council. (2020). Virtual Reality and Augmented Reality For Hazardous Work Training.

AUS19 U.S. Department of Justice (2023). The Fair Housing Act, 42 U.S.C. 3601.

AUS20 U.S. Environmental Protection Agency. (2013). Moisture Control Guidance for Building Design, Construction and Maintenance.

AUS21 U.S. Department of Veterans Affairs. (2014). Polytrauma Rehabilitation Center Design Guide.

AUS22 U.S. Environmental Protection Agency. (2009). Preventing Carbon Monoxide Poisoning Fact Sheet.

AUS23 Enterprise Green Communities. (2016). Aging in Place Design Guidelines for Independent Living in Multifamily Buildings.

AUS24 National Institute of Building Sciences. (2015). Design Guidelines for the Visual Environment.

AUS25 U.S. Green Building Council. (2013). LEED v4: Reference Guide for Building Design and Construction.

AUS26 National Institute of Building Sciences. (2023). DoD Space Planning Criteria for Health Facilities.

AUS27 International Code Council. (2021). 2021 International Building Code (IBC).

AUS28 UCLA Complete Streets Initiative. (2014). Placemaking For An Aging Population: Guidelines for Senior-Friendly Parks. UCLA Luskin School of Public Affairs.

AUS29 U.S. General Services Administration. (2024). Playground Safety Compliance Audit Form.

AUS30 U.S. Consumer Product Safety Commission. (2015). Public Playground Safety Handbook.

AUS31 Playworld Systems. (2015). Playground Audit Guide: ASTM and CPSC Compliance.

AUS32 Project for Public Spaces. (2022). Placemaking: What If We Built Our Cities Around Places?

AUS33 Restrepo, B.J., Minor, T., & Peckham, J. (2018). The Association Between Restaurant Menu Label Use and Caloric Intake.

AUS34 Dutchen, S. (2021). The Effects of Heat on Older Adults.

AUS35 Brodkey, F. D. (2022). Aging changes in vital signs.

AUS36 Google Fonts. (n.d.). Google Fonts Glossary.

AUS37 Centers for Disease Control and Prevention. (2024). Disability and Health Overview.

AUS38 Watson, S. (2020). Telehealth: The advantages and disadvantages.

AUS39 U.S. Department of Health and Human Services (2019). Physical Activity Guidelines for Americans (2nd edition).

AUS40 Buxton, P. (2022). Metric Handbook: Planning and Design Data (6th edition).

AWH01 World Health Organization. (2021). WHO Global Air Quality Guidelines: Particulate Matter (PM2.5 and PM10), Ozone, Nitrogen Dioxide, Sulfur Dioxide and Carbon Monoxide.

AWH02 World Health Organization. (2007). Global Age-Friendly Cities: A Guide.

AWH03 World Health Organization. (2019). Assistive Product Specification For Procurement: Handrails and Grab Bars.

AWH04 World Health Organization. (2019). Guidance on Person-Centred Assessment and Pathways in Primary Care.

AWH05 World Health Organization (2010). WHO Guidelines for Indoor Air Quality: Selected Pollutants.

AWH06 World Health Organization. (2019). Medication Safety in Polypharmacy: Technical Report.

AWH07 World Health Organization. (2021). Ageing: Ageism.

AWH08 World Health Organization. (2019). Decade of Healthy Ageing.

AWH09 World Health Organization. (2021). Health Promotion Glossary of Terms 2021.

AWH10 World Health Organization. (2023). Fact Sheet: Noncommunicable Diseases.

AWH11 World Health Organization & United Nations Children's Fund. (2022). Global Report on Assistive Technology.

AWH12 World Health Organization. (2015). World Report on Ageing and Health.

LAU01 Veitch, J., Flowers, E., Ball, K., Deforche, B., & Timperio, A. (2020). Designing Parks for Older Adults: A Qualitative Study Using Walk-Along Interviews. Urban Forestry & Urban Greening, 54, 126768.

LAU02 Snowdon, J. (2010). Mental Health Service Delivery in Long-Term Care Homes. International Psychogeriatrics, 22(7), 1063-1071.

LAU03 Lipson-Smith, R., Churilov, L., Newton, C., Zeeman, H., & Bernhardt, J. (2019). A Framework for Designing Inpatient Stroke Rehabilitation Facilities: A New Approach Using Interdisciplinary Value-Focused Thinking. HERD, 12(4), 142–158.

LAU04 Hayne, M. James. & Fleming, R. (2014). Acoustic Design Guidelines for Dementia Care Facilities. Proceedings of 43rd International Congress on Noise Control Engineering: Internoise2014 (pp. 1-10).

LAU05 Engelen, L., Rahmann, M., & de Jong, E. (2022). Design for Healthy Ageing–The Relationship between Design, Well-being, and Quality of Life: A Review. Building Research & Information, 50(1-2), 19-35.

LAU06 Kempton, L., Kokogiannakis, G., & Cooper, P. (2021). Mould Risk Evaluations in Residential Buildings via Site Audits and Longitudinal Monitoring. Building and Environment, 191, 107584.

LAU07 Wilson, J., Heinsch, M., Betts, D., Booth, D., & Kay-Lambkin, F. (2021). Barriers and Facilitators to the Use of e-health by Older Adults: A Scoping Review. BMC public health, 21, 1-12.

LAU08 Levinger, P., Panisset, M., Parker, H., Batchelor, F., Tye, M., & Hill, K. D. (2021). Guidance about Age-Friendly Outdoor Exercise Equipment and Associated Strategies to Maximise Usability for Older People. Health Promotion Journal of Australia, 32(3), 475-482.

LAU09 Ghofrani, Z., Sposito, V., & Faggian, R. (2017). A Comprehensive Review of Blue-green Infrastructure Concepts. International Journal of Environment and Sustainability, 6(1).

LAU10 Johnston, K. A., & Lane, A. B. (2018). Building Relational Capital: The Contribution of Episodic and Relational Community Engagement. Public Relations Review, 44(5), 633-644.

LAU11 Alghamdi, M. M., Burrows, T., Barclay, B., Baines, S., & Chojenta, C. (2023). Culinary Nutrition Education Programs in Community-Dwelling Older Adults: A Scoping Review. The Journal of Nutrition, Health and Aging, 27(2), 142-158.

LAT01 Dohr, A., Modre-Opsrian, R., Drobics, M., Hayn, D., & Schreier, G. (2010, April). The Internet of Things for Ambient Assisted Living. In 2010 Seventh International Conference on Information Technology: New Generations (pp. 804-809).

LBE01 Joye, Y. (2007). Architectural lessons from environmental psychology: The Case of Biophilic Architecture. Review of General Psychology, 11(4), 305-328.

LBR01 Andrade, A., Dominski, F. H., Pereira, M. L., de Liz, C. M., & Buonanno, G. (2018). Infection Risk in Gyms during Physical Exercise. Environmental Science and Pollution Research, 25, 19675-19686.

LBR02 Souza, L. B. R. D., Gomes, Y. C., & Moraes, M. G. G. D. (2022). The Impacts of Visual Art Therapy for Elderly with Neurocognitive Disorder: A Systematic Review. Dementia & Neuropsychologia, 16(1), 8-18.

LCA01 Finlay, J., Franke, T., McKay, H., & Sims-Gould, J. (2015). Therapeutic Landscapes and Wellbeing in Later Life: Impacts of Blue and Green Spaces for Older Adults. Health & Place, 34, 97-106.

LCA02 Vartanian, O., Navarrete, G., Chatterjee, A., Fich, L. B., Gonzalez-Mora, J. L., Leder, H., ... & Skov, M. (2015). Architectural Design and the Brain: Effects of Ceiling Height and Perceived Enclosure on Beauty Judgments and Approach-Avoidance Decisions. Journal of Environmental Psychology, 41, 10-18.

LCA03 Blundon, E. G., Gallagher, R. E., & Ward, L. M. (2020). Electrophysiological Evidence of Preserved Hearing at the End of Life. Scientific Reports, 10(1), 10336.

LCA04 Desjardins, S., Lapierre, S., Vasiliadis, H. M., & Hudon, C. (2020). Evaluation of the Effects of an Intervention Intended to Optimize the Sleep Environment Among the Elderly: An Exploratory Study. Clinical Interventions in Aging, 2117-2127.

LCA05 Manville, M., Klein, M. C., & Bainbridge, L. (2014). Improved Outcomes for Elderly Patients Who Received Care on a Transitional Care Unit. Canadian Family Physician, 60(5), e263-e271.

LCA06 Weeks, L. E., Macdonald, M., Helwig, M., Bishop, A., Martin-Misener, R., & Iduye, D. (2016). The Impact of Transitional Care Programs on Health Services Utilization among Community-Dwelling Older Adults and Their Caregivers: A Systematic Review Protocol of Quantitative Evidence. JBI Evidence Synthesis, 14(3), 26-34.

LCA07 Huchuk, B., O'Brien, W., & Sanner, S. (2018). A Longitudinal Study of Thermostat Behaviors based on Climate, Seasonal, and Energy Price Considerations using Connected Thermostat Data. Building and Environment, 139, 199-210.

LCH01 Alsmo, T. and Alsmo, C. (2014) Ventilation and Relative Humidity in Swedish Buildings. Journal of Environmental Protection, 5, 1022-1036.

LCN01 Zhai, Y., & Baran, P. K. (2017). Urban Park Pathway Design Characteristics and Senior Walking Behavior. Urban forestry & urban greening, 21, 60-73.

LCN02 Wang, X., & Rodiek, S. (2019). Older Adults' Preference for Landscape Features along Urban Park Walkways in Nanjing, China. International Journal of Environmental Research and Public Health, 16(20), 3808.

LCN03 Wang, L., & Kang, J. (2020). Acoustic Demands and Influencing Factors in Facilities for the Elderly. Applied Acoustics, 170, 107470.

LCN04 Yu, L., & Kang, J. (2010). Factors Influencing the Sound Preference in Urban Open Spaces. Applied Acoustics, 71(7), 622-633.

LCN05 Guo, M., Zhou, M., Li, B., Du, C., Yao, R., Wang, L., ... & Yu, W. (2022). Reducing Indoor Relative Humidity can Improve the Circulation and Cardiorespiratory Health of Older People in a Cold Environment: A Field Trial Conducted in Chongqing, China. Science of the Total Environment, 817, 152695.

LCN06 Zong, H., Wang, J., Zhou, T., Sun, J., & Chen, X. (2022). The Influence of Transient Changes in Indoor and Outdoor Thermal Comfort on the Use of Outdoor Space by Older Adults in the Nursing Home. Buildings, 12(7), 905.

LCN07 Cai, J., Hao, W., Zeng, S., Qu, X., Guo, Y., Tang, S., ... & Luo, A. (2021). Effects of Red Light on Circadian Rhythm: A Comparison Among Lamps With Similar Correlated Color Temperatures Yet Distinct Spectrums. IEEE Access, 9, 59222-59230.

LCN08 Jie, S., Haoyong, Y., Chaw, T. L., Chiang, C. C., & Vijayavenkataraman, S. (2017). An Interactive Upper Limb Rehab Device for Elderly Stroke Patients. Procedia Cirp, 60, 488-493.

LCN09 Jin, Y., Wang, F., Payne, S. R., & Weller, R. B. (2022). A Comparison of the Effect of Indoor Thermal and Humidity Condition on Young and Older Adults' Comfort and Skin Condition in Winter. Indoor and Built Environment, 31(3), 759-776.

LCN10 Wu, Y., Liu, H., Li, B., Kosonen, R., Kong, D., Zhou, S., & Yao, R. (2019). Thermal Adaptation of the Elderly during Summer in a Hot Humid Area: Psychological, Behavioral, and Physiological responses. Energy and Buildings, 203, 109450.

LCN11 Yan, Y., Zhang, H., Kang, M., Lan, L., Wang, Z., & Lin, Y. (2022). Experimental Study of the Negative Effects of Raised Bedroom Temperature and Reduced Ventilation on the Sleep Quality of Elderly Subjects. Indoor air, 32(11), e13159.

LCN12 Zhang, Q., Gangupomu, R. H., Ramirez, D., & Zhu, Y. (2010). Measurement of Ultrafine Particles and Other Air Pollutants Emitted by Cooking Activities. International Journal of Environmental Research and Public Health, 7(4), 1744-1759.

LCN13 Zhang, E., Zhao, W., Mei, Z., Yang, Z., Chen, F., Xia, Y., & Wang, Y. (2024). Experimental Study on the Universal Design of Signage Size and Brightness Contrast for Low Vision Individuals. Buildings, 14(7), 2063.

LCN14 Lei, C., Chen, H., Zheng, S., Pan, Q., Xu, J., Li, Y., & Liu, Y. (2024). The Efficacy and Safety of Hydrotherapy in Patients with Knee Osteoarthritis: A Meta-Analysis of Randomized Controlled Trials. International Journal of Surgery, 110(3), 1711-1722.

LCN15 Liu, T., Li, X., Zou, Z. Y., & Li, C. (2015). The Prevalence and Determinants of using Traditional Chinese Medicine among Middle-aged and Older Chinese Adults: Results from the China Health and Retirement Longitudinal Study. Journal of the American Medical Directors Association, 16(11), 1002-e1.

LCN16 Hu, H., Li, Z., Yan, J., Wang, X., Xiao, H., Duan, J., & Zheng, L. (2007). Anthropometric Measurement of the Chinese Elderly Living in the Beijing Area. International Journal of Industrial Ergonomics, 37(4), 303-311.

LCN17 Lee, Y. C., Chen, C. H., & Lee, C. H. (2019). Body Anthropometric Measurements of Singaporean Adult and Elderly Population. Measurement, 148, 106949.

LDE01 Stroebele-Benschop, N., Depa, J., & de Castro, J. M. (2016). Environmental Strategies to Promote Food Intake in Older Adults: A Narrative review. Journal of Nutrition in Gerontology and Geriatrics, 35(2), 95-112.

LDE02 Clement, J., Ploennigs, J., & Kabitzsch, K. (2013, November). Detecting Activities of Daily Living with Smart Meters. In Ambient Assisted Living: 6. AAL-Kongress 2013 Berlin, Germany, January 22.-23., 2013 (pp. 143-160). Berlin, Heidelberg: Springer Berlin Heidelberg.

LDE03 Walter, E., & Pinquart, M. (2020). How Effective are Dementia Caregiver Interventions? An Updated Comprehensive Meta-Analysis. The Gerontologist, 60(8), e609-e619.

LDE04 Noura, M., Atiquzzaman, M., & Gaedke, M. (2019). Interoperability in Internet of Things: Taxonomies and Open Challenges. Mobile Networks and Applications, 24, 796-809.

LDK01 Stigsdotter, U. K., Ekholm, O., Schipperijn, J., Toftager, M., Kamper-Jørgensen, F., & Randrup, T. B. (2010). Health Promoting Outdoor Environments-Associations between Green Space, and Health, Health-related Quality of Life and Stress based on a Danish National Representative Survey. Scandinavian Journal of Public Health, 38(4), 411-417.

LEG01 Mahmoud, H. T. H. (2017). Interior Architectural Elements that Affect Human Psychology and Behavior. ARCHive-SR, 1(1), 10-10.

LEL01 Dardiotis, E., Siokas, V., Moza, S., Kosmidis, M. H., Vogiatzi, C., Aloizou, A. M., ... & Hadjigeorgiou, G. M. (2019). Pesticide Exposure and Cognitive Function: Results from the Hellenic Longitudinal Investigation of Aging and Diet (HELIAD). Environmental research, 177, 108632.

LES01 Baquero Larriva, M. T., & Higueras García, E. (2023). Differences in Perceptions of the Urban Acoustic Environment in Older Adults: A Systematic Review. Journal of Population Ageing, 16(3), 781-813.

LES02 Romero-Arenas, S., Blazevich, A. J., Martínez-Pascual, M., Pérez-Gómez, J., Luque, A. J., López-Román, F. J., & Alcaraz, P. E. (2013). Effects of High-Resistance Circuit Training in an Elderly Population. Experimental Gerontology, 48(3), 334-340.

LES03 Delclòs-Alió, X., Marquet, O., Vich, G., Schipperijn, J., Zhang, K., Maciejewska, M., & Miralles-Guasch, C. (2020). Temperature and Rain Moderate the Effect of Neighborhood Walkability on Walking Time for Seniors in Barcelona. International Journal of Environmental Research and Public health, 17(1), 14.

LES04 Bonmati-Carrion, M. A., Arguelles-Prieto, R., Martinez-Madrid, M. J., Reiter, R., Hardeland, R., Rol, M. A., & Madrid, J. A. (2014). Protecting the Melatonin Rhythm through Circadian Healthy Light Exposure. International Journal of Molecular Sciences, 15(12), 23448-23500.

LFI01 Ngandu, T., Lehtisalo, J., Solomon, A., Levälahti, E., Ahtiluoto, S., Antikainen, R., ... & Kivipelto, M. (2015). A 2 year Multidomain Intervention of Diet, Exercise, Cognitive Training, and Vascular Risk Monitoring Versus Control to Prevent Cognitive Decline in At-Risk Elderly People (FINGER): A Randomised Controlled Trial. The Lancet, 385(9984), 2255-2263.

LFR01 Alaoui, M., & Lewkowicz, M. (2013). A Livinglab Approach to Involve Elderly in the Design of Smart TV Applications Offering Communication Services. In Online Communities and Social Computing: 5th International conference, OCSC 2013, Held as Part of HCI International 2013, Las Vegas, NV, USA, July 21-26, 2013. Proceedings 5 (pp. 325-334). Springer Berlin Heidelberg.

LFR02 Le Cornu, Q., Chen, M., Van Hees, V., Léger, D., Fayosse, A., Yerramalla, M. S., & Sabia, S. (2022). Association of Physical Activity, Sedentary Behaviour, and Daylight Exposure with Sleep in an Ageing Population: Findings from the Whitehall Accelerometer Sub-Study. International Journal of Behavioral Nutrition and Physical Activity, 19(1), 144.

LGB01 Jorgensen, A., & Anthopoulou, A. (2007). Enjoyment and Fear in Urban Woodlands–Does Age Make a Difference? Urban Forestry & Urban Greening, 6(4), 267-278.

LGB02 Webb, A. R., & Engelsen, O. (2006). Calculated Ultraviolet Exposure Levels for a Healthy Vitamin D Status. Photochemistry and Photobiology, 82(6), 1697-1703.

LGB03 Bates, V. (2018). 'Humanizing Healthcare Environments: Architecture, Art and Design in Modern Hospitals. Design for Health, 2(1), 5-19.

LGB04 Jerlehag, C., Lee, P. J., Park, S. H., Jones, T., & Carroll, N. (2018). Acoustic Environments of Patient Room in a Typical Geriatric Ward. Applied Acoustics, 133, 186-193.

LGB05 Spence, C. (2020). Atmospheric Effects on Eating and Drinking: A Review. Handbook of Eating and Drinking: Interdisciplinary Perspectives, 257-275.

LGB06 McCormick, R., & Vasilaki, A. (2018). Age-Related Changes in Skeletal muscle: Changes to Life-style as a Therapy. Biogerontology, 19(6), 519-536.

LGB07 Moses, L., Morrissey, K., Sharpe, R. A., & Taylor, T. (2019). Exposure to Indoor Mouldy Odour Increases the Risk of Asthma in Older Adults Living in Social Housing. International Journal of Environmental Research and Public Health, 16(14), 2600.

LGB08 Leventhall, H. G. (2004). Low Frequency Noise and Annoyance. Noise and Health, 6(23), 59-72.

LGB09 Clark, D. M. (2018). Realizing the Mass Public Benefit of Evidence-Based Psychological Therapies: The IAPT Program. Annual Review of Clinical Psychology, 14(1), 159-183.

LGB10 Pumphrey, R. S. (2003). Fatal Posture in Anaphylactic Shock. Journal of Allergy and Clinical Immunology, 112(2), 451-452.

LGB11 Shipworth, M., Firth, S. K., Gentry, M. I., Wright, A. J., Shipworth, D. T., & Lomas, K. J. (2010). Central Heating Thermostat Settings and Timing: Building Demographics. Building Research & Information, 38(1), 50-69.

LHK01 Yu, R., Tong, C., Ho, F., & Woo, J. (2020). Effects of a Multicomponent Frailty Prevention Program in Prefrail Community-Dwelling Older Persons: A Randomized Controlled Trial. Journal of the American Medical Directors Association, 21(2), 294-e1.

LHK02 Ng, E. (2009). Policies and Technical Guidelines for Urban Planning of High-density Cities–Air Ventilation Assessment (AVA) of Hong Kong. Building and environment, 44(7), 1478-1488.

LHK03 Chau, C. (2016). Investigating the Effects of Greenery on Temperature and Thermal Comfort in Urban Parks. The Hong Kong Polytechnic University.

LHK04 Luk, J. K., Chan, T. Y., & Chan, D. K. (2015). Falls Prevention in the Elderly: Translating Evidence into Practice. Hong Kong Medical Journal, 21(2), 165.

LHK05 Yu, R., Tong, C., & Woo, J. (2020). Effect of an Integrated Care Model for Pre-Frail and Frail Older People Living in Community. Age and Ageing, 49(6), 1048-1055.

LHK06 Yu, R., So, M. C., Tong, C., Ho, F., & Woo, J. (2020). Older Adults' Perspective towards Participation in a Multicomponent Frailty Prevention Program: A Qualitative Study. The Journal of Nutrition, Health & Aging, 24, 758-764.

LHK07 Sin, D., Yeung, S. S., & Woo, J. (2022). A Healthy Diet Does Not Necessarily Cost More than A Typical (Unhealthy) Diet in Hong Kong. The Journal of Nutrition, Health & Aging, 26(2), 209-210.

LHK08 Wong, R. C. P., Szeto, W. Y., Yang, L., Li, Y. C., & Wong, S. C. (2017). Elderly Users' Level of Satisfaction with Public Transport Services in a High-Density and Transit-Oriented City. Journal of Transport & Health, 7, 209-217.

LHK09 Szeto, W. Y., Yang, L., Wong, R. C. P., Li, Y. C., & Wong, S. C. (2017). Spatio-Temporal Travel Characteristics of the Elderly in an Ageing Society. Travel Behaviour and Society, 9, 10-20.

LHK10 Wang, S., Esther, H. K. Y., Yu, Y., & Tsou, J. Y. (2022). Right to the City and Community Facility Planning for Elderly: The Case of Urban Renewal District in Hong Kong. Land Use Policy, 114, 105978.

LHK11 Chung, M. K., Cheung, K. C., & Wong, M. H. (2020). Pollutants in Hong Kong Soils: As, Cd, Cr, Cu, Hg, Pb and Zn. bioRxiv, 2020-02.

LHK12 Poh-Chin, L., Martin, W., Ming-Houng, C., Wing-Cheung, W., & Chien-Tat, L. (2009). An Ecological Study of Physical Environmental Risk Factors for Elderly Falls in an Urban Setting of Hong Kong. Science of the Total Environment, 407(24), 6157-6165.

LHK13 Guo, H., Kwok, N. H., Cheng, H. R., Lee, S. C., Hung, W. T., & Li, Y. S. (2009). Formaldehyde and Volatile Organic Compounds in Hong Kong Homes: Concentrations and Impact Factors. Indoor Air, 19(3), 206–217.

LHK14 Yin Choi, M. C., Chu, S. H., Siu, L. L., Tse, A. G., Yuen Wu, J. C., Fung, H., ... & Tong Mok, V. C. (2021). Elderly Acceptance of Telemedicine Use in Hong Kong during and after the COVID-19 Pandemic: A Cross-Sectional Cohort Survey. medRxiv, 2021-07.

LHK15 Wong, F., Hui, E., Chung, K. W., Li, T., & Lui, E. (2012). Housing for the elderly in Hong Kong—Affordability and preferences. Department of Building and Real Estate, The Hong Kong Polytechnic University.

LHK16 Mo, K. H., Lei, D., Woo, J., & Ko, R. (2023). Housing Preference for Ageing-in-Place: Are There Differences among Emerging-Old, Young-Old and Old-Old Adults Living in Hong Kong's Private Housing Estates?. Journal of Aging and Environment, 1-28.

LHK17 Siu, K.W.M., & Wong, K.S.L. (2015). Flexible Design Principles: Street Furniture Design for Transforming Environments, Diverse Users, Changing Needs and Dynamic Interactions. Facilities, 33(9/10), 588-621.

LHK18 Wong, P. P. Y., Lai, P. C., Low, C. T., Chen, S., & Hart, M. (2016). The Impact of Environmental and Human Factors on Urban Heat and Microclimate Variability. Building and Environment, 95, 199-208.

LHK19 Woo, J. (2024). Take Charge of Your Own Ageing: Growing Old in Hong Kong. The Chinese University of Hong Kong Press.

LHK20 Barnett, A., Cerin, E., Ching, C. S., Johnston, J. M., & Lee, R. S. (2015). Neighbourhood Environment, Sitting Time and Motorised Transport in Older Adults: A

Cross-Sectional Study in Hong Kong. BMJ open, 5(4), e007557.

LHK21 Wong, M. M., So, W. K., Choi, K. C., Cheung, R., Chan, H. Y., Sit, J. W., ... & Chair, S. Y. (2019). Malnutrition Risks and their Associated Factors among Home-Living Older Chinese Adults in Hong Kong: Hidden Problems in an Affluent Chinese Community. BMC Geriatrics, 19, 1-12.

LHK22 Woo, J., Mok, K., Chu, W. L., Lo, R., & Ko, R. (2024). Implementing Aging in Place in Hong Kong: Meeting the Needs and Aspirations of Older Adults and Their Caregivers Living in Private Housing. International Journal of Environmental Research and Public Health, 21(3), 348.

LHK23 Woo, J., Ko, R., Yu, R., Chan, S., Lo, R., & Mo, K. H. (2023). Healthy Ageing Should Be a Key Component of Ageing in Place: Case Study from Hong Kong. International Journal of Environmental Research and Public Health, 20(10), 5779.

LHK24 Mo, K. H., Ng, E., Woo, J., Jian, Y. I., Chen, W. Revisiting the Implementation and Effectiveness of Age-Friendly Neighborhood Initiatives in Hong Kong: A Strengths-Based Perspective. (To be published in Journal of Aging & Social Policy)

LID01 Rahmawati N., Jiang B. C. (2019). Develop a Bedroom Design Guideline for Progressive Ageing Residence: A Case Study of Indonesian Older Adults. Gerontechnology, 18(3), 180-192

LID02 Watuseke, B. (2023). A Modeling for Occupational Therapy Room Prototypes for Mental Disorders. Journal of Artificial Intelligence in Architecture, 2(1), 29-40.

LID03 Ruki, U. A., & Wulandari, A. A. A. (2021, July). Post Covid-19 Public Space Adaption: A Case Study of Building Entrances in Jakarta. In IOP Conference Series: Earth and Environmental Science (Vol. 794, No. 1, p. 012243).

LIN01 Kumar, P., Ashawat, M. S., Pandit, V., & Sharma, D. K. (2019). Artificial Light Pollution at Night: A Risk for Normal Circadian Rhythm and Physiological Functions in Humans. Current Environmental Engineering, 6(2), 111-125.

LIN02 Rao, S. K. M. (2004). Designing Hospital for Better Infection Control: An Experience. Medical Journal Armed Forces India, 60(1), 63-66.

LIN03 Sadasivam, B., & Rajamohan, K. (2024, April). Experimental Design of Interoperable Smart Lighting for Elderly

Care. In 2024 2nd International Conference on Networking and Communications (ICNWC) (pp. 1-14).

LIQ01 Gharghan, S. K., & Hashim, H. A. (2024). A Comprehensive Review of Elderly Fall Detection using Wireless Communication and Artificial Intelligence Techniques. Measurement, 226, 114186.

LIR01 Rahmani-Katigari, M., Mohammadian, F., & Shahmoradi, L. (2023). Development of a Serious Game-Based Cognitive Rehabilitation System for Patients with Brain Injury. BMC psychiatry, 23(1), 893.

LIR02 Kazemi, R., Choobineh, A., Taheri, S., & Rastipishe, P. (2018). Comparing Task Performance, Visual Comfort and Alertness Under Different Lighting Sources: An Experimental Study. EXCLI journal, 17, 1018.

LIR03 Shariat, A., Ghayour Najafabadi, M., Ghannadi, S., Nakhostin-Ansari, A., Hakakzadeh, A., Shaw, B. S., Ingle, L., & Cleland, J. A. (2022). Effects of Aquatic Therapy on Balance in Older Adults: A Systematic Review and Meta-Analysis. European Geriatric Medicine, 13(2), 381–393.

LIT01 Antonelli, M., Donelli, D., Carlone, L., Maggini, V., Firenzuoli, F., & Bedeschi, E. (2022). Effects of Forest Bathing (Shinrin-yoku) on Individual Well-Being: An Umbrella Review. International Journal of Environmental Health Research, 32(8), 1842-1867.

LIT02 Bolognini, N., Russo, C., & Edwards, D. J. (2016). The Sensory Side of Post-Stroke Motor Rehabilitation. Restorative Neurology and Neuroscience, 34(4), 571-586.

LIT03 Boffi, M., Pola, L., Fumagalli, N., Fermani, E., Senes, G., & Inghilleri, P. (2021). Nature Experiences of Older People for Active Ageing: An Interdisciplinary Approach to the co-Design of Community Gardens. Frontiers in Psychology, 12, 702525.

LIT04 Abbate, S., Avvenuti, M., Cola, G., Corsini, P., Light, J., & Vecchio, A. (2011, January). Recognition of False Alarms in Fall Detection Systems. In 2011 IEEE Consumer Communications and Networking Conference (CCNC) (pp. 23-28).

LIT05 Zaniboni, L., Sarey Khanie, M., Pernigotto, G., Toftum, J., Gasparella, A., & Olesen, B. W. (2022). Lighting Conditions in Physiotherapy Centres: A Comparative Field Study. Lighting Research & Technology, 54(4), 377-408.

LIT06 Sandri, A., Tessari, A., Giannetti, D., Cetti, A., Lleo, M. M., & Boschi, F. (2023). UV-A Radiation: Safe Human Exposure and Antibacterial Activity. International Journal

of Molecular Sciences, 24(9), 8331.

LJP01 Okamoto-Mizuno, K., & Mizuno, K. (2012). Effects of Thermal Environment on Sleep and Circadian Rhythm. Journal of Physiological Anthropology, 31, 1-9.

LJP02 KAWASUMI, M., TAKAHATA, K., ABE, T., ADACHI, K., & HANAI, M. (2017). Studies on New Interaction of Entrance Intercom System with Visual Contents. Transactions of Japan Society of Kansei Engineering, 16(1), 91-101.

LKR01 Kim, J., & Kim, N. (2022). Quantifying Emotions in Architectural Environments using Biometrics. Applied Sciences, 12(19), 9998.

LKR02 Na, K., Jeong, Y., & Lee, J. (2024). Exploring Older Adults' Motivation to use Public Libraries in South Korea using the Attention, Relevance, Confidence, and Satisfaction (ARCS) Motivation Model. Library & Information Science Research, 46(2), 101296.

LKW01 Almutawa, F., Vandal, R., Wang, S. Q., & Lim, H. W. (2013). Current Status of Photoprotection by Window Glass, Automobile Glass, Window Films, and Sunglasses. Photodermatology, photoimmunology & photomedicine, 29(2), 65-72.

LMY01 Li, W., Du, Z., Toe, D. H. C., Liu, Y., Yong, K. W., & Lin, H. (2022). Study on the Design Strategy of Rehabilitation Space for Patients with Cognitive Disorders Based on the Environmental Adaptation of Disease Sy mptoms. Sustainability, 14(19), 12590.

LMY02 Chee, S. Y. (2023). Navigating the Twilight Years: Supporting Older Adults' Orientation and Wayfinding in Senior Living Facilities. Archives of Gerontology and Geriatrics, 115, 105135.

LNL01 Mathey, M. F. A., Vanneste, V. G., de Graaf, C., De Groot, L. C., & Van Staveren, W. A. (2001). Health Effect of Improved Meal Ambiance in a Dutch Nursing Home: A 1-Year Intervention Study. Preventive Medicine, 32(5), 416-423.

LNL02 van Hoof, J., Rusinovic, K. M., Tavy, Z. K., van den Hoven, R. F., Dikken, J., van der Pas, S., ... & van Bochove, M. E. (2021, March). The Participation of Older People in the Concept and Design Phases of Housing in the Netherlands: A Theoretical Overview. In Healthcare (Vol. 9, No. 3, p. 301).

LNL03 Schepers, P., den Brinker, B., Methorst, R., & Helbich, M. (2017). Pedestrian Falls: A Review of the Literature and Future Research Directions. Journal of Safety Research, 62, 227-234.

LNL04 Siero, F. W., Broer, J., Bemelmans, W. J. E., & Meyboom-de Jong, B. M. (2000). Impact of Group Nutrition Education and Surplus Value of Prochaska-Based Stage-Matched Information on Health-Related Cognitions and on Mediterranean Nutrition Behavior. Health Education Research, 15(5), 635-647.

LNL05 Ronald, R., & Alexy, A. (2017). Continuity and Change in Japanese Homes and Families. In Home and Family in Japan (pp. 1-24). Routledge.

LNL06 Erdélyi, K. H., Fuermaier, A. B., Tucha, L., Tucha, O., & Koerts, J. (2023). Low-Frequency Noise: Experiences from a Low-Frequency Noise Perceiving Population. International Journal of Environmental Research and Public Health, 20(5), 3916.

LNL07 Kuijsters, A., Redi, J., De Ruyter, B., & Heynderickx, I. (2015). Lighting to Make You Feel Better: Improving the Mood of Elderly People with Affective Ambiences. PloS one, 10(7), e0132732.

LNL08 Stoop, A., Lette, M., Ambugo, E. A., Gadsby, E. W., Goodwin, N., MacInnes, J., Minkman, M., Wistow, G., Zonneveld, N., Nijpels, G., Baan, C. A., de Bruin, S. R., & SUSTAIN consortium (2020). Improving Person-Centredness in Integrated Care for Older People: Experiences from Thirteen Integrated Care Sites in Europe. International journal of integrated care, 20(2), 16.

LNL09 Bosch, J. R., & Weiss, J. P. (2010). The Prevalence and Causes of Nocturia. The Journal of Urology, 184(2), 440-446.

LPT01 Formiga, B., Rebelo, F., da Cruz Pinto, J., & Noriega, P. (2021). Hospital Lobby and User's Perceptions Architectural Kansei Method. In Advances in Ergonomics in Design: Proceedings of the AHFE 2021 Virtual Conference on Ergonomics in Design, July 25-29, 2021, USA (pp. 159-166). Springer International Publishing.

LPT02 Vauclair, C. M., Lima, M. L., Abrams, D., Swift, H. J., & Bratt, C. (2016). What Do Older People think that Others Think of Them, and Does it Matter? The Role of Meta-Perceptions and Social Norms in the Prediction of Perceived Age Discrimination. Psychology and Aging, 31(7), 699.

LRO01 Mihalache, O. A., Møretrø, T., Borda, D., Dumitraşcu, L., Neagu, C., Nguyen-The, C., ... & Nicolau, A. I. (2022). Kitchen layouts and consumers' food hygiene practices: Ergonomics versus safety. Food Control, 131, 108433.

LRO02 Serea, E., & Roco, N. (2022). Particularities in the Design of Underwater

Lighting Systems. Journal of Civil Engineering and Architecture, 16, 420-424.

LRU01 Gudkova, T. V. (2014). Minimalist Architectural Space as a Carrier of Connotations of Social Benefits (High Quality of Life). Rev. Eur. Stud., 6, 122.

LRU02 Zvyagintseva, M., Skripkina, J., & Fedorchenko, N. (2019). Principles and Examples of Design of Rehabilitation Centers in Russia and Abroad. Journal of Applied Engineering Science, 17(4), 567-570.

LSE01 Ragneskog, H., Bråne, G., Karlsson, I., & Kihlgren, M. (1996). Influence of Dinner Music on Food Intake and Symptoms Common in Dementia. Scandinavian Journal of Caring Sciences, 10(1), 11-17.

LSE02 Berner, B. (1998). The Meaning of Cleaning: The Creation of Harmony and Hygiene in the Home. History and Technology, an International Journal, 14(4), 313-352.

LSE03 Kazemi, A., & Elfstrand Corlin, T. (2022). What has Employee Loyalty to do with "Love" to Clients? Testing Approaches to Work as Mediators. Employee Relations: The International Journal, 44(7), 149-161.

LSE04 Jakopovic, D., Falk, A. C., & Lindström, V. (2015). Ambulance Personnel's Experience of Pain Management for Patients with a Suspected Hip Fracture: A Qualitative Study. International Emergency Nursing, 23(3), 244-249.

LSE05 Björnwall, A., Mattsson Sydner, Y., Koochek, A., & Neuman, N. (2021). Eating Alone or Together among Community-living Older People—A Scoping Review. International Journal of Environmental Research and Public Health, 18(7), 3495.

LSG01 Tam, W., Poon, S. N., Mahendran, R., Kua, E. H., & Wu, X. V. (2021). The Effectiveness of Reminiscence-Based Intervention on Improving Psychological Well-Being in Cognitively Intact Older Adults: A Systematic Review and Meta-Analysis. International Journal of Nursing Studies, 114, 103847.

LSK01 Hencová, M., & Kotradyová, V. (2023). Colour in the Environment for Older Adults. Architecture Papers of the Faculty of Architecture and Design STU, 28(4), 15-23.

LTH01 Tantanatewin, W., & Inkarojrit, V. (2018). The Influence of Emotional Response to Interior Color on Restaurant Entry Decision. International Journal of Hospitality Management, 69, 124-131.

LTW01 Lin, T. C., & Liao, Y. C. (2016). 陽光照射

對老人健康之影響 (Sunlight and Elderly Health). 護理雜誌, 63(4), 116-122.

LTW02 Wang, C. Y. (2021). The Enhancement of Appetite through the Use of Colored Light in case of a Cake: Preliminary Evidence from Event-related Potentials. Color Research & Application, 46(2), 456-466.

LTW03 Huang, C. Y., & Lin, F. S. (2024). AI-Driven Privacy in Elderly Care: Developing a Comprehensive Solution for Camera-Based Monitoring of Older Adults. Applied Sciences, 14(10), 4150.

LTW04 Huang, H. Y., Fanjiang, Y. Y., Hung, C. H., & Lee, C. A. (2022). Design and Implementation of a Smart Intercom System through Web Services on Web of Things. Telecom, 3(4), 675-691.

LTW05 Yeh, P. C. (2020). Impact of Button Position and Touchscreen Font Size on Healthcare Device Operation by Older Adults. Heliyon, 6(6), e04147.

LTW06 Giang Thi Ngoc, N., Tsaih, L. S. J., Chen, J. C. P., Tamariska, S. R., Coelho, A. M. F., & Kung, H. Y. (2024). Balcony Usage as a Space to Achieve Human Well-Being During Pandemic COVID-19. Journal of Asian Architecture and Building Engineering, 1-13.

LTW07 Ho, C. S., Hsu, Y. J., Li, F., Tang, C. C., Yang, C. P., Huang, C. C., ... & Chang, C. H. (2021). Effect of Ambulance Stretcher Bed Height Adjustment on CPR Quality and Rescuer Fatigue in a Laboratory Environment. International Journal of Medical Sciences, 18(13), 2783.

LTW08 Chow, H. W. (2013). Outdoor Fitness Equipment in Parks: A Qualitative Study from Older Adults' Perceptions. BMC Public Health, 13, 1-9.

LTW09 Khaday, S., Li, K. W., Peng, L., & Chen, C. C. (2021). Relationship between Friction Coefficient and Surface Roughness of Stone and Ceramic Floors. Coatings, 11(10), 1254.

LTW10 Li, C. L., Tung, H. J., & Yeh, M. C. (2018). Combined Effect of Eating Alone and A Poor Nutritional Status on Cognitive Decline among Older Adults in Taiwan. Asia Pacific Journal of Clinical Nutrition, 27(3), 686-694.

LUS01 Xue, Q. L. (2011). The Frailty Syndrome: Definition and Natural History. Clinics in Geriatric Medicine, 27(1), 1-15.

LUS02 Hood, C. M., Gennuso, K. P., Swain, G. R., & Catlin, B. B. (2016). County Health Rankings: Relationships between Determinant Factors and Health

Outcomes. American Journal of Preventive Medicine, 50(2), 129-135.

LUS03 Alessi, C. A., Martin, J. L., Webber, A. P., Cynthia Kim, E., Harker, J. O., & Josephson, K. R. (2005). Randomized, Controlled Trial of a Nonpharmacological Intervention to Improve Abnormal Sleep/Wake Patterns in Nursing Home Residents. Journal of the American Geriatrics Society, 53(5), 803-810.

LUS04 Snelling, A. M., Newman, C., Ellsworth, D., Kalicki, M., Guthrie, J., Mancino, L., ... & Nash, K. (2017). Using a Taste-Test Intervention to Promote Vegetable Consumption. Health Behavior and Policy Review, 4(1), 67-75.

LUS05 Gilbert, A. N., Fridlund, A. J., & Lucchina, L. A. (2016). The Color of Emotion: A Metric for Implicit Color Associations. Food Quality and Preference, 52, 203-210.

LUS06 Humbert, I. A., & Robbins, J. (2008). Dysphagia in the Elderly. Physical Medicine and Rehabilitation Clinics of North America, 19(4), 853-866.

LUS07 Roubenoff, R., & Hughes, V. A. (2000). Sarcopenia: current Concepts. The Journals of Gerontology Series A: Biological Sciences and Medical Sciences, 55(12), M716-M724.

LUS08 Caddick, Z. A., Gregory, K., Arsintescu, L., & Flynn-Evans, E. E. (2018). A Review of the Environmental Parameters Necessary for an Optimal Sleep Environment. Building and environment, 132, 11-20.

LUS09 Bjerke, D.L. (2010). Considerations for Thermal Injury: The Elderly as a Sensitive Population. In: Farage, M.A., Miller, K.W., Maibach, H.I. (eds) Textbook of Aging Skin. Springer, Berlin, Heidelberg.

LUS10 Lawrence, D. L., & Low, S. M. (1990). The Built Environment and Spatial Form. Annual Review of Anthropology, 453-505.

LUS11 Tatineny, P., Shafi, F., Gohar, A., & Bhat, A. (2020). Sleep in the Elderly. Missouri Medicine, 117(5), 490.

LUS12 Zhang, J. W., Howell, R. T., & Iyer, R. (2014). Engagement with Natural Beauty Moderates the Positive Relation between Connectedness with Nature and Psychological Well-being. Journal of Environmental Psychology, 38, 55-63.

LUS13 Kaplan, R. (2001). The Nature of the View from Home: Psychological Benefits. Environment and Behavior, 33(4), 507-542.

LUS14 Osoba, M. Y., Rao, A. K., Agrawal, S. K., & Lalwani, A. K. (2019). Balance and Gait in the Elderly: A Contemporary Review. Laryngoscope Investigative Otolaryngology, 4(1), 143-153.

LUS15 Stroebele, N., & De Castro, J. M. (2004). Effect of Ambience on Food Intake and Food Choice. Nutrition, 20(9), 821-838.

LUS16 Irish, L. A., Kline, C. E., Gunn, H. E., Buysse, D. J., & Hall, M. H. (2015). The Role of Sleep Hygiene in Promoting Public Health: A Review of Empirical Evidence. Sleep Medicine Reviews, 22, 23-36.

LUS17 MacLaughlin, J., & Holick, M. F. (1985). Aging Decreases the Capacity of Human Skin to Produce Vitamin D3. The Journal of Clinical Investigation, 76(4), 1536-1538.

LUS18 Turner, A. J., Chander, H., & Knight, A. C. (2018). Falls in Geriatric Populations and Hydrotherapy as an Intervention: A Brief Review. Geriatrics, 3(4), 71.

LUS19 Mander, B. A., Winer, J. R., & Walker, M. P. (2017). Sleep and Human Aging. Neuron, 94(1), 19-36.

LUS20 Rowles, G. D. (1981). The Surveillance Zone as Meaningful Space for the Aged. The Gerontologist, 21(3), 304-311.

LUS21 Kerr, J., Marshall, S., Godbole, S., Neukam, S., Crist, K., Wasilenko, K., ... & Buchner, D. (2012). The Relationship between Outdoor Activity and Health in Older Adults using GPS. International Journal of Environmental Research and Public Health, 9(12), 4615-4625.

LUS22 Figueiro, M. G., & Pedler, D. (2020). Red Light: A Novel, Non-Pharmacological Intervention to Promote Alertness in Shift Workers. Journal of Safety Research, 74, 169-177.

LUS23 Edemekong, P.F., Bomgaars, D.L., Sukumaran, S., et al. (2023). Activities of Daily Living. StatPearls, Treasure Island.

LUS24 Abrams, R. F., Malizia, E., Wendel, A., Sallis, J., Millstein, R. A., Carlson, J. A., ... & Thompson, S. (2012). Making Healthy Places: Designing and Building for Health, Well-being, and Sustainability. Island Press.

LUS25 Gilkey, D. (2021). Slips, Trips, and Falls: A Call to Duty. World Safety Journal, 30(1).

LUS26 Murimi, M. W., Kanyi, M., Mupfudze, T., Amin, M. R., Mbogori, T., & Aldubayan, K. (2017). Factors Influencing Efficacy of Nutrition Education Interventions: A Systematic Review. Journal of Nutrition Education and Behavior, 49(2), 142-165.

LUS27 Hockberger, P. E. (2000). The Discovery of the Damaging Effect of Sunlight on Bacteria. Journal of Photochemistry and Photobiology B: Biology, 58(2-3), 185-191.

LUS28 Burgio, K. L., Johnson II, T. M., Goode, P. S., Markland, A. D., Richter, H. E., Roth, D. L., ... & Allman, R. M. (2010). Prevalence and Correlates of Nocturia in Community dwelling Older Adults. Journal of the American Geriatrics Society, 58(5), 861-866.

LUS29 Varilla, V., Samala, R. V., Galindo, D., & Ciocon, J. (2011). Nocturia in the Elderly: A Wake-Up Call. Cleve Clin J Med, 78(11), 757-764.

LUS30 Gould, C. F., Davila, L., Bejarano, M. L., Burke, M., Jack, D. W., Schlesinger, S. B., ... & Valarezo, A. (2024). Exposure to Nitrogen Dioxide and Fine Particulate Matter When Cooking with Electricity Compared to Gas, a Randomized Crossover Study in Quito, Ecuador. Environmental Health Perspectives, 132(1), 017702.

LUS31 Mishler, A. D., & Neider, M. B. (2017). Improving Wayfinding for Older Users with Selective Attention Deficits. Ergonomics in Design, 25(1), 11-16.

LUS32 Huang, W., Lei, X., Ridder, G., Strauss, J., & Zhao, Y. (2013). Health, Height, Height Shrinkage, and SES at Older Ages: Evidence from China. American Economic Journal: Applied Economics, 5(2), 86-121.

LUS33 Jain, U., & Ma, M. (2020). Height Shrinkage, Health and Mortality among Older Adults: Evidence from Indonesia. Economics & Human Biology, 37, 100863.

LUS34 Amarya, S., Singh, K., & Sabharwal, M. (2018). Ageing Process and Physiological Changes. In D'Onofrio, G., Greco, A., & Sancarlo, D. (Eds.), Gerontology (Ch.1). InTech.

LUS35 Owsley, C. (2011). Aging and Vision. Vision Research, 51(13), 1610-1622.

LUS36 Ades, P. A., Ballor, D. L., Ashikaga, T., Utton, J. L., & Nair, K. S. (1996). Weight Training Improves Walking Endurance in Healthy Elderly Persons. Annals of internal medicine, 124(6), 568-572.
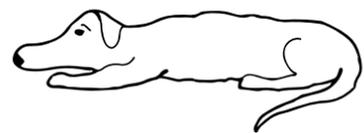
This design guide represents a first in integrating ageing-in-place with building and service design in Hong Kong, closely adhering to the World Health Organization's concept of healthy ageing, which goes beyond merely the absence of chronic diseases. It includes recommendations for on-site activities to maintain the intrinsic capacity of older adults, which can be implemented using various business models.

● Essential
○ Best Practice

HT Health Tips
RI Research Insights
→   Also See

The Chinese University of Hong Kong
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