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Friendly Neighbourhood Design Guide

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Friendly Neighbourhood Design Guide

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Foreword by

Minister for National Development Mr Desmond Lee

Singapore is one of the fastest ageing nations in the world and there are no signs of it slowing down, as our population's life expectancy continues to increase.

Over the years, Singapore has adopted an integrated, multi-disciplinary and whole-of-society approach to address the issues that come with an ageing population. This involves marrying the "hardware", that is, the design of the built environment, with "heartware" like preventive health and aged care, to support our seniors to age in place independently and actively. This integrated approach has guided the way we plan our spaces and design new housing options, to create a conducive living environment for healthy and happy ageing.

While dementia is not a natural part of ageing, its prevalence is on the rise as the population ages—not just in Singapore, but in many other developed cities, too. This calls for a deeper understanding of the condition, so that we can find better ways to provide care and support that will enhance the quality of life of individuals living with dementia. Integral to this is understanding how the design of our public spaces and infrastructure can address the unique needs that come with ageing and dementia.

The *Dementia-Friendly Neighbourhood Study* in Yio Chu Kang by the Agency for Integrated Care (AIC) and Centre for Liveable Cities (CLC) has demonstrated the potential of evidence-based neighbourhood design to empower persons living with dementia to continue living actively and confidently in neighbourhoods they are familiar with. By integrating thoughtfully planned designs in their neighbourhoods, where they have built up support networks and memories over the years, we can give them a sense of independence and security and help to slow down the progression of the condition.

Enhancing dementia-friendliness is also one of the key considerations in the planning and design of the pilot Health District @ Queenstown. In this multi-stakeholder collaboration, different stakeholders—residents, communities, care providers, businesses, academic institutions and government agencies—have come together to trial and experiment with new ideas for built environment design, new care approaches and technology. Our common goal is to support residents of all ages in leading healthy and purposeful lives. Importantly, successful initiatives can be included in future rejuvenation plans, and scaled to other towns and estates.

This *Dementia-Friendly Neighbourhood Design Guide* builds on the AIC-CLC study, and is a timely consolidation of dementia-friendly principles, guidelines and tools across agencies and academic institutions. We will also work towards incorporating the dementia-friendly principles and guidelines into our *Code on Accessibility in the Built Environment* and *Universal Design Guide for Public Spaces*, which will facilitate the scaling up of dementia-friendly neighbourhoods across Singapore. This contributes to the Healthier SG and Age Well SG initiatives that support our seniors who wish to spend their golden years healthily and happily in their own homes and neighbourhoods.

I hope that urban practitioners will find this publication helpful to make our neighbourhoods more inclusive and endearing for our seniors and persons living with dementia.



Our common goal is to support residents of all ages in leading healthy and purposeful lives. Importantly, successful initiatives can be included in future rejuvenation plans, and scaled to other towns and estates.

Minister for Health

Mr Ong Ye Kung

Singapore is progressively turning into a super-aged society, where more than 21% of our population are aged 65 and above.

Our assumption has been that with age, comes more sickness. Indeed, this has been born out of evidence throughout the history of modern society all over the world. In Singapore, the gap between our healthy lifespan and biological lifespan is about 10 years. In other words, the average Singaporean spends 10 years in ill health, before passing away.

The gap of 10 years is not abnormal amongst developed countries. But we should strive to narrow it further. Then our society can advance in age without growing old as quickly. To achieve this, having a good healthcare system is not enough, because that only ensures the good treatment of patients. We need a broader ecosystem that builds health and prevents sickness. This system needs to incorporate society, workplaces and communities which can shape the social factors that determine health.

If we succeed in doing this, through national programmes like Healthier SG and Age Well SG, we can better support individuals to manage chronic illness, and bend the trajectory of rising incidence of sickness. We will also be better able to manage major age-related diseases like dementia.

The Ministry of Health (MOH) and our partners have developed a comprehensive approach to enhance care and support for persons living with dementia and their caregivers. It comprises prevention and awareness, early identification and diagnosis of dementia, empowerment of persons living with dementia to age well in the community and support for their caregivers, development of innovative care models, and capability-building through training and education.

Building a Dementia-Friendly Singapore is an integral part of this holistic approach. Our built environment should enable persons living with dementia to live independently for as long as possible, and be able to connect with families and friends. Equally important are communities that are understanding towards persons living with dementia, and are able to support and help them when needed.

This *Dementia-Friendly Neighbourhood Design Guide* is co-developed by the Agency for Integrated Care (AIC) and Centre for Liveable Cities (CLC), in consultation with many other government agencies. It is the fruition of a valuable co-creation journey, bringing together urban planning, infrastructure development, social care and healthcare. It is one of many important initiatives to make Singapore a healthy city for active ageing.

I hope that our current and future builders, developers and architects will find this publication insightful and inspiring.



If we succeed in doing this, through national programmes like Healthier SG and Age Well SG, we can better support individuals to manage chronic illness, and bend the trajectory of rising incidence of sickness.

Preface by

Executive Director, Centre for Liveable Cities
Mr Hugh Lim

The *Dementia Friendly Neighbourhood Study* by the Agency for Integrated Care (AIC) and Centre for Liveable Cities (CLC) has pioneered evidence-based research on the relationship between persons living with dementia, as well as their caregivers, and the built environment in Singapore's predominantly high-rise, high-density urban context. This ethnographic study in Yio Chu Kang was conducted jointly with stakeholder agencies and the Singapore University of Technology and Design (SUTD). The study produced evidence-based design-thinking principles, tested through prototypes, that would enable persons in the early to moderate stages of dementia to continue navigating their daily lives in familiar neighbourhoods where they have built networks of support within the community over the years.

The study served as a foundation for this *Dementia-Friendly Neighbourhood Design Guide*. This publication provides a comprehensive overview of dementia-friendly considerations for use by urban practitioners. It consolidates and harmonises dementia-friendly principles and related guidelines across agencies and academic institutions, such as the *Dementia Friendly Design Guide* by the Housing and Development Board (HDB), *Design Guidelines for Therapeutic Gardens in Singapore* by the National Parks Board (NParks), *Transport Infrastructure Design Criteria & Specifications* by the Land Transport Authority (LTA), and the Environment Audit Tool-Lite developed by the Urban Redevelopment Authority (URA) and Ministry of Health Office for Healthcare Transformation (MOHT). The dementia-friendly principles and guidelines can be applied across different contexts, are starting points for designing different types of spaces, and can be adapted to existing tools.

As evident from our study, a close multi-stakeholder collaboration is essential to the planning and design of dementia-friendly neighbourhoods. I would like to thank all those who have contributed to this study: the persons living with dementia and their caregivers for sharing their experiences with our researchers; as well as local stakeholders, residents, and community organisations in Yio Chu Kang for their support and involvement in making our neighbourhoods more dementia friendly. I also wish to acknowledge SUTD's Social Urban Laboratory, the Building and Construction Authority (BCA), HDB, LTA, the Ministry of Culture, Community and Youth (MCCY), MOHT, NParks and URA, who have journeyed closely with us in this endeavour.

We hope this *Dementia-Friendly Neighbourhood Design Guide* offers inspiring insights into how we can design our neighbourhoods to be more dementia friendly. By embracing thoughtful design principles, we aim to empower persons living with dementia and their caregivers to enjoy safe, independent and dignified lives within their communities.



This publication provides a comprehensive overview of dementia-friendly considerations for use by urban practitioners. It consolidates and harmonises dementia-friendly principles and guidelines across agencies and academic institutions.

Chief Executive Officer, Agency for Integrated Care

Mr Tan Kwang Cheak

In Singapore, currently one in 10 people aged 60 and above are living with dementia—a total number that is projected to soar to more than 152,000 by 2030. With our increasing life expectancy and rapidly ageing population, the number of persons living with dementia is expected to continue to rise. Most of us may have a loved one or know of someone who is living with dementia and understand first-hand some of the challenges they encounter while staying in the community.

As part of the Dementia-Friendly Singapore national movement, the Agency for Integrated Care (AIC) partners key stakeholders from various spheres including health and community care, grassroots organisations, businesses, transportation and the building sector. Our goal is to build inclusive Dementia-Friendly Communities where persons with dementia and their families feel respected, valued and confident to live well in their neighbourhoods.

One common feedback is that persons living with dementia may experience disorientation and have difficulty navigating around their neighbourhood. To better understand the issue and address their needs, AIC collaborated with the Centre for Liveable Cities (CLC) and Singapore University of Technology and Design (SUTD) to embark on the *Dementia-Friendly Neighbourhood Study* in 2019.

This study adopts an evidence-based method to identify the environmental challenges faced by persons living with dementia, and to improve neighbourhood design to better support their ability to move within the community safely and confidently. It contextualises international dementia-friendly principles into Singapore's unique context so that the design principles will be culturally relevant.

The goal is to develop design elements that take into consideration accessibility, wayfinding and sensory stimulation components to address cognitive limitations that persons living with dementia face. A well-designed and supportive physical environment also helps to reduce anxiety and disorientation and provides a sense of comfort and continuity. Such a supportive built environment will also benefit the general population, beyond persons living with dementia.

Our vision is for persons living with dementia to be able to continue with their daily activities in their familiar neighbourhood—enjoying coffee with their neighbours at their favourite coffee shop, grocery shopping at the nearby supermarket or participating in activities in the community centre.

AIC is glad to be working with CLC and the building sector to realise this vision of enabling seniors and persons living with dementia to age-in-place in their local communities, strengthening care and facilitating inclusivity.



Our vision is for persons living with dementia to be able to continue with their daily activities in their familiar neighbourhood—enjoying coffee with their neighbours at their favourite coffee shop, grocery shopping at the nearby supermarket or participating in activities in the community centre.

Preamble

A liveable and inclusive city is a city for everyone, regardless of their age bands, physical abilities or cognitive functional capacities. Over the past years, various endeavours have been made in different areas to ensure a future-ready Singapore in the face of an ageing population and growing incidence of dementia.

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This handbook brings together the myriad efforts that collectively form Singapore's landscape for a dementia-friendly and inclusive built environment. It presents design guidelines developed from the work of agencies, academics and technical experts across different segments, sectors and asset types (e.g., public housing, parks, transport facilities). These evidence- and science-based methods are intended to support communities, stakeholders, service providers and designers in creating dementia-friendly neighbourhoods that are contextualised to Singapore's predominantly high-rise, high-density urban environment.

Eschewing a prescriptive method, this publication begins by guiding readers on the strategic insights and importance of adopting a design-thinking approach¹, to arrive at design considerations that can be applied in response to the needs and contexts of different communities and their neighbourhoods. In doing so, the desired qualities of a dementia-friendly neighbourhood—one that is Safe, Accessible, Legible, Familiar, Adaptable, Engaging, Comfortable, Delightful, Purposeful and Offers Choices²—can be achieved.

This guide also provides useful links and references of other works as additional and complementary resources to support the development of a dementia-friendly and inclusive Singapore.

¹ Developed by Dr Chong Keng Hua as part of the AIC-CLC *Dementia Friendly Neighbourhood Study* at Yio Chu Kang (2023)

² *Six Principles of [a] Dementia-Friendly Neighbourhood* (2019), by Dr Belinda Yuen et al.



PRINCIPLES

Foundational philosophies to guide the creation of a dementia-friendly neighbourhood (DFN)



Principles are manifested within various tools



TOOLS

Enablers to support stakeholders in creating a DFN

Complementary resources

PROCESS

Guidance on design approaches when creating a DFN

- Four design-thinking principles guided by 10 verified characteristics for creating dementia-friendly neighbourhoods³

PRODUCT

Guidance on the desired qualities of a DFN

- *Six Principles of [a] Dementia-Friendly Neighbourhood* by Dr Belinda Yuen et al.

GENERAL GUIDELINES

Guidance on design considerations and strategies to employ in a DFN

- *This Dementia-Friendly Neighbourhood Design Guide*
- Future integration into BCA's *Universal Design Guidelines*

ASSET SPECIFIC GUIDELINES

Guidance on manifesting DFN design principles within specific contexts and assets

- HDB's *Dementia Friendly Design Guide*, NParks' *Design Guidelines for Therapeutic Gardens in Singapore*, etc.

▲ Mapping of efforts, resources and stakeholders in building dementia-friendly and inclusive neighbourhoods in Singapore. (Draft)

Existing reference

Enhanced
reference with
additional
resource

AUDIT TOOL

Assists stakeholders in identifying gaps in achieving the desired qualities of a DFN, and informs future actions to address these

- EAT-Lite by MOHT-URA

This guide is organised around four design-thinking principles that have been derived and validated through research specific to Singapore's context.⁴ The rationale behind these principles is explained on page 63, articulating why and how design can support the experiences of people living with dementia. With these principles as a mental framework, we encourage designers to employ their creativity in responding to site constraints, local community needs, asset type and other contextual considerations.


These principles have also been elaborated upon to offer suggestions on approaches and strategies that can be taken to achieve the desired qualities of a dementia-friendly neighbourhood.⁵ These are provided as guidance and not meant to be a checklist. The photos included in this guide illustrate positive examples and are intended as inspiration only.

See pages 62–63 for an overview of the design-thinking principles and guidelines for creating dementia-friendly neighbourhoods.

³ Developed by Dr Chong Keng Hua as part of the AIC-CLC *Dementia-Friendly Neighbourhood Study* at Yio Chu Kang (2023)

⁴ Developed by Dr Chong Keng Hua as part of the AIC-CLC *Dementia-Friendly Neighbourhood Study* at Yio Chu Kang (2023)


⁵ *Six Principles of [a] Dementia Friendly Neighbourhood* (2019), by Dr Belinda Yuen et al.

PLUS 

D1

Design to Strengthen **MENTAL MAP**

Distinct locations within the neighbourhood are often linked to cognitive functions, routines or meaningful memories which culminate to form a person's mental map. Design strategies can be employed to reinforce positive familiarity, improve sense of physical and psychological safety, and support navigation through effective wayfinding that is clear and legible.



1.1

MAKE TRAVELLING ALONG KEY ROUTES AN ENJOYABLE EXPERIENCE

Pleasant experiences involving sensorial delight accentuate and reinforce the memory of a route, significant landmarks or anchor nodes along the route, and destinations for a person living with dementia. They strengthen mental associations and build positive familiarity within the neighbourhood.



CONSIDERATIONS INCLUDE:

- Enhancing the route by incorporating sources of pleasant sights, smells or sounds. This can be done through:
 - ▶ Strategic adjacency (e.g., weaving a route through a park or beside a childcare centre).
 - ▶ Sensorial landscaping (e.g., incorporating trees and other plants that have pleasant sensory attributes).⁶
 - ▶ Intentional use of colour (e.g., cool colours such as blue, green and purple to elicit calm and quiet emotions, and/or warm colours such as red, orange and yellow to evoke energy and excitement).⁷
 - ▶ Design interventions that offer memorable experiences. *[See 1.2—Create memorable, experiential landmarks to aid in wayfinding]*
- Where appropriate, formalising 'shortcut' and informal trails that have been created by pedestrians, which are often an indication of preference due to being more convenient, pleasant or safe.
- Creating an environment in which people feel physically and emotionally comfortable by providing safe and comfortable places to walk and sit, as well as opportunities for social connection.⁸
- Incorporating elements along key routes that can help distract users from stress. Research has shown that nature is one of the most effective providers of positive distraction. For example, designs can make use of natural materials, or highlight the sounds of nature (e.g., rustling of leaves) or presence of water.⁹
- Using colour and light to guide viewers' line of sight towards focal points, aiding in wayfinding by enticing users to take a visual journey along the route.¹⁰
- For outdoor routes, integrating shade-providing elements to allow a comfortable experience for users transiting through the space.¹¹

⁶ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 4a (pg. 7)

⁷ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for Colour & Light, sect. 2 (pg. 30)

⁸ See NParks' *Design Guidelines for Therapeutic Gardens in Singapore* (2017), Part 2, Overall Design Considerations, sect. C (pg. 29)

⁹ See NParks' *Design Guidelines for Therapeutic Gardens in Singapore* (2017), Part 2, Overall Design Considerations, sect. D (pg. 29) and sect. E (pg. 30)

¹⁰ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for Colour & Light, sect. 1 (pg. 29)

¹¹ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for Colour & Light, sect. 4 (pg. 31)

1.2

CREATE MEMORABLE, EXPERIENTIAL LANDMARKS TO AID WAYFINDING

Landmarks play a crucial role by serving as distinctive and recognisable points of reference within the environment. Compared to conventional text-based signs, landmarks enable easier wayfinding for seniors and persons living with dementia as they help people create mental maps and establish a sense of direction. They offer visual cues that make it easier to give and follow directions, and they enhance the overall navigation experience.

CONSIDERATIONS INCLUDE:

- Identifying existing landmarks and social spaces that are familiar to the community and can be reinforced as anchor nodes. These locations can be identified by leveraging on local community knowledge through participatory approaches such as community audits.
- Designing landmarks that allow persons living with dementia and their caregivers to use the space, have memorable experiences, and form lasting impressions. This will help them situate and orientate themselves in the neighbourhood. For example, this can be done by:
 - ▶ Creating distinctive precinct features to instil a sense of identity to new developments.¹²
 - ▶ Creating social spaces or design interventions (e.g., rest stops along key routes) that offer respite and comforting experiences.
 - ▶ Creating landscapes that can serve as anchor nodes along routes. These can become memorable landmarks if they include plants that stimulate the senses and provide positive natural interactions. Incorporating culturally significant plants can also help evoke memories and create a more meaningful experience.¹³



¹² See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 2a (pg. 5)

¹³ See NParks' *Design Guidelines for Therapeutic Gardens in Singapore* (2017), Part 2, Planting & Composition, sect. vii (pg. 54)



▲ At Yishun Integrated Transport Hub, the "Heart Zone" acts as a wayfinding node where commuters who need help along their public transport journey can seek assistance from other commuters.



◀ Representatives from the Nee Soon Town Council, Kebun Baru grassroots organisations, artists, community volunteers and persons with dementia painted murals on strategic walls at the void decks of HDB blocks to aid wayfinding.

Credit to Dementia Singapore





▲ Wayfinding nodes in Yio Chu Kang act as rest stops and direction markers for persons living with dementia and their caregivers. Residents are given a choice of seating—be it to sit facing inwards or outwards.

- Utilising memorable elements to facilitate wayfinding. Some examples include:
 - ▶ Using large and clear markers in highly contrasting colours at key entrances and exits, and/or introducing commonly used icons and symbols to create easily recognisable reference points.
 - ▶ Introducing visual markers such as logos, artwork or distinctive furniture at key decision-making points to serve as additional visual cues.
 - ▶ Activating the senses at key decision-making points through the use of elements such as tactile surfaces, contrasting colours and/or unique textures.
 - ▶ Using visual markers that leverage on familiar heritage or shared generational memories to serve as wayfinding references.
- Applying similar design approaches and elements across the neighbourhood to establish a cohesive series of visual anchors that will help build cognitive association (e.g., by deploying similar furniture at key nodes around the neighbourhood, or using a similar colour palette across a zone). *[Also see 2.1—Simplify decision-making, and 2.2—Minimise sensorial distractions and confusion]*

1.3

IMPROVE SENSE OF SAFETY THROUGH DESIGN

Both physical and psychological safety are concerns for persons living with dementia as well as their caregivers. People tend to go out of their way to avoid areas they perceive as unpleasant or dangerous, or feel uncertain about, including areas that are not well maintained. Design that addresses this can help reduce users' anxiety while enhancing their overall well-being.

CONSIDERATIONS INCLUDE:

- Designing features and facilities that are easy to maintain in order to ensure the actual and perceived safety of users. This is also applicable to landscapes, which should incorporate low-maintenance plants if possible.¹⁴
- Enabling persons living with dementia to “see and be seen” by having clear sightlines or open layouts which promote visibility. Open and visible spaces enhance the perception of safety while also offering opportunities for stimulation.
- Using contrasting colours (e.g., for images, text, key features) to assist recognition, minimise visual misperception, and improve the clarity and visibility of spaces and features to support daily activities.¹⁵



▲ Barricades are used at Nee Soon to protect the elderly and people with dementia by discouraging cycling on the bustling streets.

¹⁴ See N Parks *Design Guidelines for Therapeutic Gardens in Singapore* (2017), Overall Design Considerations, Maintenance and Sustainability (pg. 30)

¹⁵ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 1a (pg. 4), sect. 5a (pg. 8) and sect. 13b (pg. 16)

- Introducing passive and quiet spaces that are safe and comfortable to promote calming and provide opportunities for recovery during momentary lapses in memory.¹⁶
- Ensuring that outdoor spaces support users' physical and emotional safety and security by designing them to be welcoming, easy to access, navigable and enjoyable.¹⁷
- Providing a diversity of spaces that cater to different emotional needs of users. For example, intimate seating areas for individuals who desire privacy, or amphitheatres that can accommodate larger groups, for those who feel safer being amongst others.¹⁸
- On long routes, providing consolidated information points at intervals to reinforce direction, and provide assurance and confirmation to users.¹⁹



▲ The Therapeutic Garden at Bishan-Ang Mo Kio Park is designed with a clear layout and simple figure-of-eight circulation path that allows visitors to navigate easily through the space.



▲ Seating that is immersed in greenery and/or recessed from main paths allow respite for persons living with dementia.
Credit to NParks



¹⁶ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 8b (pg. 11)

¹⁷ See HDB's *Dementia Friendly Design Guide* (2023), Part 2, Design Considerations and Requirements, sect. 4b (pg. 7); and NParks' *Design Guidelines for Therapeutic Gardens in Singapore* (2023), Part 2, Overall Design Considerations, sect. A (pg. 29)

¹⁸ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for Landform, sect. 2 (pg. 23)

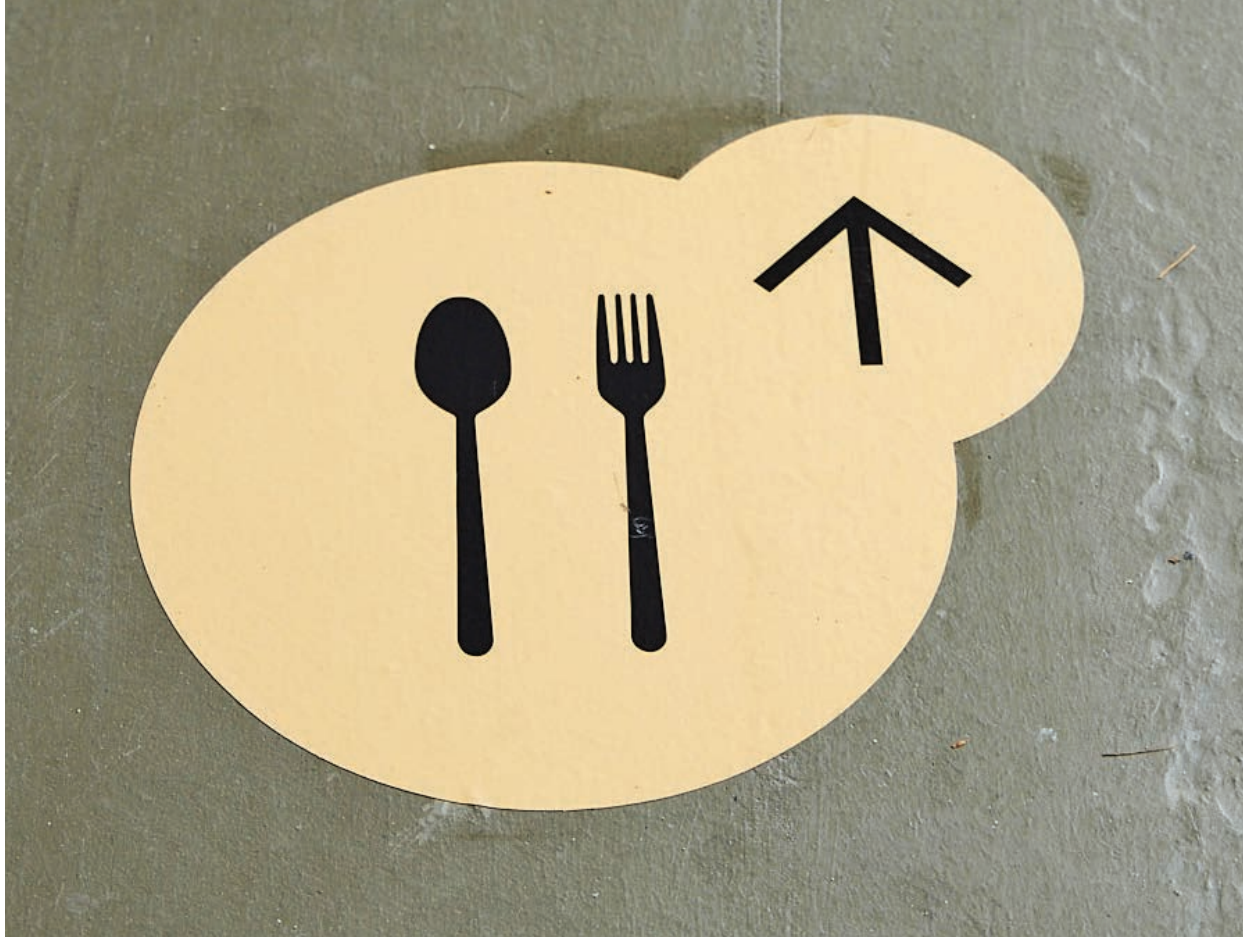
¹⁹ See LTA's *Transport Infrastructure Design Criteria & Specifications* (2022)

02

MINUS 

Design with a **MINIMALIST APPROACH**

Persons living with dementia struggle with processing and assessing sensory stimuli and information; as such, a “less is more” ethos should be embraced when designing for them. Eliminating unnecessary clutter and extraneous details can yield a more legible setting that simplifies their ability to understand the environment. An excess of options, which can lead to confusion and indecision, should be avoided by offering simple choices. The provision of calm and quiet spaces with minimal sensory input can also offer mental comfort. Collectively, these approaches can improve a person’s level of comfort and confidence in navigating their neighbourhood.



▲ Signs should be kept simple and straightforward.

2.1

SIMPLIFY DECISION- MAKING

As persons living with dementia may have deteriorating cognitive abilities, it is important to carefully consider the provision of choices presented to them as they navigate their way through the neighbourhood. Aid information processing and simplify decision-making for users by clearly defining the objectives of the design, as well as challenges and choices within the environment that need to be addressed.

CONSIDERATIONS INCLUDE:

- Providing distinct differentiation to options when offering choices (e.g., placement and number of furniture, activity choices).
- Ensuring that design elements and sources of information (e.g., signs) that can help a person to make a decision are clear and legible. [See 2.2—*Minimise sensorial distractions and confusion*]

2.2

MINIMISE SENSORIAL DISTRACTIONS AND CONFUSION

An environment that is cluttered with signs, especially if they are redundant or abstract, can overwhelm persons living with dementia. Design and aesthetic elements may also contribute to visual clutter and complexity which then increase cognitive load and make it difficult for them to understand their environment. Distractions and confusion can leave them feeling frustrated, anxious and overwhelmed, and make navigating their neighbourhood more difficult.

CONSIDERATIONS INCLUDE:

- Avoiding unnecessarily complicated forms and undifferentiated material finishes that might confuse or increase the chance of misinterpretation.
- Avoiding the use of materials that contribute to discomfort in sensation, such as those that conduct heat or retain cold.
- Minimising visual and spatial misperception to facilitate ease of moving around (e.g., by using clear and consistent floor demarcation to improve the legibility of a main pedestrian thoroughfare).²⁰
- Providing distraction from overwhelming or unpleasant sights and noises by creating a sense of enclosure, protection and security.²¹ Some strategies include:
 - ▶ Introducing vertical barriers such as solid structures, soft landscape features, or a combination of both to screen undesirable elements and reflect sound waves back toward the source.²²
 - ▶ Utilising white noise from the subtle sounds of flowing streams and other water features, rustling of leaves, etc., to mask undesirable noises and create a sense of calmness.²³

²⁰ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 9a (pg. 12)

²¹ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for character of peace and silence, sect. 4 (pg. 40)

²² See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for character of peace and silence, sect. 1 (pg. 39)

²³ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for character of peace and silence, sect. 3 (pg. 40)



▲ HDB flats at Khatib Central are labelled clearly with distinctive block numbers located at eye level as well as at the top of the blocks, enabling people to identify the buildings from both near and far.

- Designing signs that are clear and simple to understand. Some strategies include:
 - ▶ Using straightforward language.
 - ▶ Using clear and recognisable icons, larger font sizes, distinct colour contrast and consolidated information at key wayfinding points.²⁴
 - ▶ Avoiding clutter on overhead signs by moving information to eye level for ease of reference.²⁵
 - ▶ Providing additional directional wayfinding cues at key open areas (e.g., void decks) to facilitate wayfinding within the neighbourhood.²⁶
 - ▶ Facilitating vertical wayfinding (e.g., navigating building levels) by using signs that are differentiated and easy to recognise.²⁷

²⁴ See LTA's *Transport Infrastructure Design Criteria & Specifications* (2022)

²⁵ See LTA's *Transport Infrastructure Design Criteria & Specifications* (2022)

²⁶ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 6a (pg. 9)

²⁷ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 12a (pg. 15)

MULTIPLY 

03

Design to Enable **DIVERSE EXPERIENCES**

Creating an inclusive dementia-friendly neighbourhood involves extending consideration to caregivers of persons living with dementia and the wider community. Caregivers often juggle numerous tasks, all while ensuring that their care recipients are comfortable and feel safe. Thoughtful design can provide relief and bolster caregivers' mental and social well-being. Simultaneously, design of engaging spaces can enable persons living with dementia, their caregivers, and the rest of the community to experience purpose and delight together.



▲ At the Yishun Integrated Transport Hub, a quiet room is set aside for commuters who need a calming space.

3.1

ENABLE USE FOR DIFFERENT ACTIVITIES

While multi-use facilities offer vibrancy, it is also important to recognise that some individuals with cognitive disabilities may become overwhelmed in highly stimulating environments. A calm and serene environment can alleviate distress and minimise behavioural issues such as anxiety, agitation and aggression. Further, spaces that offer respite for caregivers and opportunities for delightful interaction with other members of the community will foster a network of care and support.

CONSIDERATIONS INCLUDE:

- Designing communal facilities and features that enable activities for both groups and individuals, which allow for both focused concentration and solitude, and for both active participation as well as passive observation.²⁸
- Offering spaces for passive observation so that persons living with dementia can choose to remain detached from the bustle, yet still enjoy the vibrancy of activity from the comfort of a calmer and less stimulating space. [See 2.2—Minimise sensorial distractions and confusion]

²⁸ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 8a (pg. 11)



- Where possible, utilising a flexible layout that can be easily reconfigured or adjusted (e.g., through the use of movable loose furniture and partitions) to create temporary spaces that are suitable for different activities.
- Co-locating social communal facilities with precinct facilities to allow better accessibility and greater ease for persons living with dementia and their caregivers to enjoy these spaces, stay active, and be engaged among the community.²⁹
- Encouraging intergenerational bonding and social inclusion by siting three-generation play facilities in close proximity.³⁰



▲ A three-generational playground at SkyVille @ Dawson, with features in close proximity to each other and arranged along a simple loop.
Credit to Patrick Bingham-Hall

²⁹ See HDB's *Dementia Friendly Design Guide (2023)*, Design Considerations and Requirements, sect. 3a (pg. 6) and sect. 10a (pg. 13)

³⁰ See HDB's *Dementia Friendly Design Guide (2023)*, Design Considerations and Requirements, sect. 3b (pg. 6)



▲ The hardcourt at Yio Chu Kang's Block 646 features a flexible layout with movable items, such as swing seats and planter tables and chairs.



▲ Mobility games at Yio Chu Kang help to train coordination at various levels by requiring hand-eye coordination and concentration.

3.2

ENABLE USE BY PEOPLE WITH DIFFERENT ABILITIES

Dementia and ageing impact a person's physical and cognitive abilities. At the same time, activities that are physically and cognitively stimulating are known to reduce the risk of dementia and cognitive decline. Therefore, to ensure inclusive participation across the wider community, the design of features and facilities should offer various intensities of activities and cater to users with different abilities.

CONSIDERATIONS INCLUDE:

- Designing amenities for physical activity that accommodate a range of physical abilities and movement (e.g., including standing, seated on wheelchair, poor movement range). These should adhere to Universal Design (UD) principles as much as possible.³¹
- Designing for cognitive stimulation with activities and elements that require memory, concentration, sequencing and coordination (e.g., psychometric, hand-eye), and the use of multiple senses (e.g., games, gardening, musical elements).
- Providing suitable facilities and equipment so that persons living with dementia are able to venture outdoors to engage in social activities, maintain a healthy lifestyle, and strengthen their self-esteem.³²



³¹ See NParks' *Design Guidelines for Therapeutic Gardens in Singapore* (2017), Part 2, Overall Design Considerations, sect. B (pg. 29)

³² See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 11a (pg. 14)

3.3

ENABLE USE FOR DIFFERENT TIMES OF THE DAY

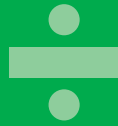
Supporting routines at different times of the day for persons living with dementia involves creating an environment that is organised, intuitive and conducive to their needs. Ensuring appropriate levels of stimulation for them in the day might help to combat sundowning³³—symptoms of restlessness, irritability and confusion that typically occur in persons living with dementia during the late afternoon. These symptoms can last into the night due to factors such as under-stimulation and boredom during the day. Exposure to natural light can also positively impact the mood and circadian rhythms of the person.

CONSIDERATIONS INCLUDE:

- Incorporating design elements which allow persons living with dementia to be active and engaged during the day, and to be outdoors where possible. This includes providing shade as well as water features for therapeutic benefits, avoiding the use of heat-transmitting materials for seating, and ensuring seamless mobility within the neighbourhood. *[See 1.3—Improve sense of safety through design]*
- Enabling routines throughout the day by ensuring that orientation aids are permanent and not transient (e.g., incorporate permanent landmarks instead of pull-up banners) to help persons living with dementia to navigate the community independently. *[See 1—Design to strengthen mental map]*
- Ensuring that key routes, facilities and anchor nodes are well-lit and well-ventilated for use in the evening and morning. *[See 1.3—Improve sense of safety through design]*

³³ See the National Institute on Aging's *Tips for Coping with Sundowning* at www.nia.nih.gov/health/tips-coping-sundowning

DIVIDE



04 DESIGN THAT ENABLES USERS to embrace change in smaller steps

While changes and upgrades to the built environment can enhance quality of life, they can also be challenging for persons living with dementia. Research has shown that adaptability holds greater relevance than continuity, and therefore, designs should take a gradual approach to change.³⁴ Designs should build on familiar elements and experiences to emphasise evolution over revolution. Introducing choice by offering a few yet fresh array of activities can aid bite-size learning, and can help persons living with dementia in utilising their cognitive and physical capabilities to adapt to change.

³⁴ Developed by Dr Chong Keng Hua as part of the AIC-CLC *Dementia-Friendly Neighbourhood Study* at Yio Chu Kang (2023)



▲ Left and right: Flowering plants at parks add sensory stimulation with their colours, textures and fragrances, and also attract fauna for further sensorial delight.

Credit to Elaine Tan

4.1

MORE EVOLUTION, LESS REVOLUTION

Abrupt and radical environmental transformations of a space may lead to confusion, discomfort and disorientation to persons living with dementia. Achieving a sense of continuity will help to support them in adapting to the changes in their neighbourhood.

CONSIDERATIONS INCLUDE:

- Building on familiar elements and adapting design motifs, materials or existing references that focus on the unique characteristic and identity of the neighbourhood.
- Building on existing experiences and introducing complementary ones to extend users' mental mapping of the place. *[See 1—Design to strengthen mental map]*
- Incorporating non-visual sensory elements to provide sounds, smells and textures that evoke a familiar atmosphere for residents.
- Introducing changes incrementally. This may include strategic phasing of planned changes, intentional integration of landscaping that will grow over time, or adopting an agile prototyping approach to enable multiple small improvements as opposed to a single large change.
- Providing permanent design features that are easily maintained to ensure greater longevity in the neighbourhood. This will allow the environment to remain familiar and help persons living with dementia build on collective memories as they age in place.³⁵

³⁵ See HDB's *Dementia Friendly Design Guide* (2023), Design Considerations and Requirements, sect. 2b (pg. 5) and sect. 7b (pg. 10)

- Introducing plants with seasonal changes in colour to provide residents with a continued point of attraction and richness in the neighbourhood landscape.³⁶
- Employing good User Experience (UX) design and creating signage systems which can be improved over time with enhancements to address feedback received and the evolving needs of users.³⁷



▲ Left and right: Flowering plants with seasonal changes in colour add vibrancy to the landscape.
Credit to NParks

Credit to Elaine Tan

4.2

SUPPORT USERS IN EMBRACING CHANGE

People living with dementia and their caregivers need support in navigating through a transforming environment. Designs should be implemented thoughtfully to avoid change-related anxiety and enable users to maintain routine and continuity.

CONSIDERATIONS INCLUDE:

- Identifying or providing alternative places of interest for residents when making changes to the environment or during the construction phase. This will help to minimise disruptions to their routines.
- Where possible, allowing safe visual access to improvements as they are being made, so that users are able to observe the changes gradually rather than being introduced to them all at once upon completion.



³⁶ See NParks' *Design Guidelines for Contemplative Landscapes* (2023), Part V, Designing for Colour & Light, sect. 3 (pg. 30)

³⁷ See LTA's *Transport Infrastructure Design Criteria & Specifications* (2022)

05 PERSPECTIVES ON CREATING a Dementia- Friendly Singapore

This collection of perspectives shines a spotlight on efforts being made and future plans for achieving a dementia-friendly Singapore.

PERSPECTIVE FROM **BCA**

Adapting to the Changing Needs of Our People

The development of Singapore's built environment has been a key aspect of our country's growth and transformation since independence. In the earlier years, the focus was on building homes, infrastructure and amenities to support the growth of the population and the development of the commercial and industrial sectors. Today, the population is rapidly ageing and has also become more diverse and affluent. Singapore's development strategies are now shifting towards creating a sustainable, liveable and inclusive built environment.

The development of the built environment is in a constant process of adapting to the changing needs of people. A major milestone in the journey was the implementation of the *Code on Barrier-Free Accessibility in Buildings (Code)* in 1990, which was enacted to ensure that buildings and public spaces are designed in accordance with a set of barrier-free access provisions to cater to the needs of wheelchair users and the ambulant disabled. Since then, the scope of the Code has been progressively enhanced and expanded to include Universal Design (UD) principles and a wider range of user-friendly provisions. This move towards UD, which basically means "Design for All", is an important step for fostering a more accessible and enabling environment where persons with disabilities, our seniors and families can move around the city with ease and participate in community life.



TAN JWU YIH is the Director of the Building Plan and Universal Department of the Building and Construction Authority of Singapore (BCA). His core duties include oversight of building works in Singapore to ensure that they are designed to comply with building regulations and constructed to high standards of safety, sustainability and accessibility. He is also responsible for strategies and initiatives to promote the adoption of Universal Design for shaping a more inclusive built environment. Jwu Yih is a registered architect in Singapore.



▲ Working closely with communities can help to identify accessibility gaps that matter most to them and increase buy-in from various local stakeholders.

Improving Accessibility through Community Partnerships

The Building and Construction Authority (BCA) is the leading agency for championing a more inclusive built environment in Singapore through promoting UD to the built

environment industry. Besides administering the Code which is regularly reviewed and updated about every five years, BCA also implements several new initiatives by working closely with other public agencies, industry stakeholders and community partners to drive wider adoption of UD.

This move towards UD, which basically means “Design for All”, is an important step for fostering a more accessible and enabling environment where persons with disabilities, our seniors and families can move around the city with ease and participate in community life.

One of the key initiatives is the Accessible City Network (ACN). Launched in 2021, the ACN programme aims to improve the accessibility and connectivity of public buildings and spaces through a community-driven, 3P (people, public, private) approach. The first two pilot community partnership groups have been successfully formed in the central business district (Raffles Place³⁸) and in the heartlands (Boon Lay³⁹). Working collaboratively, each of these community partnership groups has identified local accessibility and inter-connectivity challenges, prioritised needs, and co-developed solutions to address these gaps. In particular

for Raffles Place, these efforts have resulted in better wayfinding signage and barrier free connectivity between buildings and the MRT station. The improvements also encourage more inclusive workplaces and support the employment of older Singaporeans and persons with disabilities.



³⁸ Co-led by Ar. Michael Ngu (CE of Architects 61 Pte Ltd, who is also a practising architect and a PwD) and BCA, with members comprising representatives from the industry, public agencies and social service agencies

³⁹ Co-led by Ms Judy Wee (Executive Director of the Muscular Dystrophy Association (Singapore)) and HDB, with members comprising representatives from the public agencies, social service agencies and local Town Council



▲ The UD Excellence Award is intended to raise awareness about the benefits as well as the expanding market for UD as the population ages.

Promoting and Enabling the Adoption of Universal Design

The building industry plays a crucial role in shaping an inclusive built environment for everyone. In 2022, BCA rolled out the Universal Design index (UDi) self-assessment framework, which includes a design checklist that aids building developers

and designers to incorporate user-friendly features and measure the level of inclusiveness of their projects. The initiative encourages the project team to understand different building users' needs and provide UD features beyond the prevailing requirements under the Code. To spur the pursuit of inclusive and innovative designs, exemplary projects that have achieved the top ratings in the UDi framework will be shortlisted, assessed and accorded recognition under the annual UD Excellence Award (UDEA). In addition, the framework also enables BCA to gather more comprehensive data on the accessible facilities in

new buildings and publish such information, so that the public can find out whether the buildings provide the facilities that they need before visiting them.

The initiative encourages the project team to understand different building users' needs and provide UD features beyond the prevailing requirements under the Code.

Research and site studies such as the *Dementia-Friendly Neighbourhood Study* have been carried out to validate evidence-based design principles for dementia-friendly buildings and spaces.

Stepping up efforts on Age- and Dementia-Friendly Designs

To ensure that buildings and infrastructure design can better cater to the needs of the elderly, including those with dementia, BCA is working with the Agency for Integrated Care (AIC), Centre for Liveable Cities (CLC) and Urban Redevelopment Authority (URA) to build capabilities amongst built environment stakeholders. Research and site studies such as the *Dementia-Friendly Neighbourhood Study* have been carried out to validate evidence-based design principles for dementia-friendly buildings and spaces. These findings are further developed into practical dementia-friendly guidelines and incorporated into the curriculum of the BCA Academy's Enhanced Certification Course for UD Assessors targeted at architects, developers, facilities managers and other building professionals.



▲ The UD course helps participants gain a better understanding of the diverse needs of people of different ages and abilities, and also learn good design practices in various types of building projects.

PERSPECTIVE FROM HDB

Designing Dementia-Friendly HDB Neighbourhoods and Precincts

Beyond just providing a shelter for Singaporeans, the Housing and Development Board (HDB) is committed to providing an inclusive, sustainable and high-quality built environment for all Singaporeans to live, work and play in. To achieve this goal, we constantly seek to understand the changing demographics, social trends and lifestyle needs within Singapore, including concerns over the ageing population.

One of the key challenges facing Singapore is a higher prevalence of dementia. According to the Ministry of Health (MOH), the number of people with dementia in Singapore is projected to triple by 2050. As such, it is important for HDB, as the largest housing developer in Singapore, to play our part in creating a built environment that can support people living with dementia, so that they can continue living independently and remain engaged within the community.

Dementia can cause a decline in information processing, memory impairment and changes in visual-spatial perception. Therefore, it is crucial to design the neighbourhood with clear and easy-to-follow wayfinding signage, good linkages and seamless connectivity. These considerations can address the challenges faced by those living with dementia and help create a neighbourhood that is welcoming, safe, easy and enjoyable for them to access and navigate.

As part of our learning journey, HDB has been actively involved in working with agencies such as the Centre for Liveable Cities (CLC) and the Agency for Integrated Care (AIC), and has sought



CHOO CHIN HUA leads the Design Development Group at the Housing and Development Board (HDB), overseeing the design of new public housing projects as well as upgrading programmes for existing public housing precincts. Trained as an architect-planner, Chin Hua has worked at HDB for more than two decades, handling different portfolios ranging from architectural design, town planning, building programmes, digitisation, town rejuvenation and health & wellness.



▲ HDB collaborated with Dementia Singapore to organise workshops with people living with dementia and their caregivers.



▲ Example of a BTO project designed with dementia-friendly wayfinding features, such as individualised colours and motifs to identify different blocks, and a clear wayfinding line to demarcate the main circulation route through the space.

[HDB] is committed to providing an inclusive, sustainable and high-quality built environment for all Singaporeans to live, work and play in.

feedback and advice from health and medical professionals. We have also conducted workshops with people living with dementia and their caregivers through Dementia Singapore.

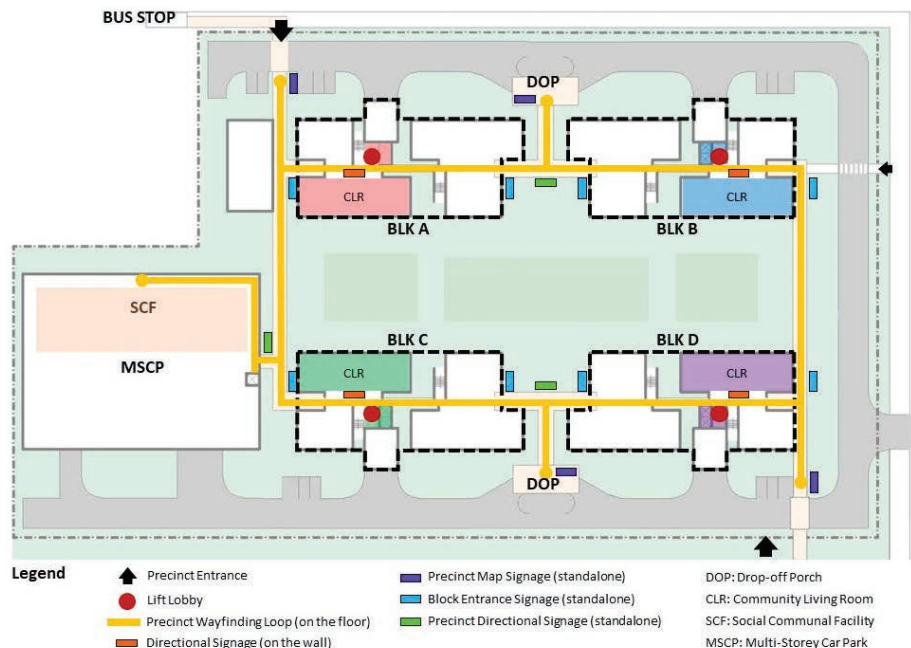
This process helped us to understand the daily challenges that face those living with dementia, enabling us to explore effective ways to assist them in our planning and design of the built environment.

Based on the feedback and learning points from these engagement sessions, HDB has developed a comprehensive set of design guidelines, including HDB's *Dementia-Friendly Design Guide* and *Dementia-Friendly Wayfinding System*. These guidelines have been incorporated in our upcoming Build-To-Order (BTO) projects. For example, in addition to block numbers, our wayfinding signs also feature motifs and colours, as we learnt that people living with dementia are able to remember these more easily than numbers. Clear wayfinding lines are demarcated on the floors of our precincts as well, indicating the main circulation route including key nodes that they link up to, and forming loops to help those living with dementia find their way around.

Our precinct facilities, such as elderly fitness areas and children's playgrounds, are also located together to encourage intergenerational bonding and social inclusion. Where there are opportunities, therapeutic alcoves are introduced to provide calming respite, and to optimise sensory stimulation through the use of plants with pleasant colours, interesting textures and various smells.

Through these efforts, we hope to create a dementia-friendly community that will enable those living with dementia to continue living with a greater measure of independence and with dignity. As Singapore's population ages, there needs to be a strong Whole-of-Government effort to continue innovating and improving our built environment to meet the evolving needs and well-being of all citizens.

► An illustrated precinct design concept showing good linkages, seamless connectivity and systematic signage to guide users in wayfinding.



PERSPECTIVE FROM LTA



JEREMY YAP is the Deputy Chief Executive, Public Transport, Policy & Planning at the Land Transport Authority (LTA) of Singapore. He oversees the development, procurement and regulation of public transport services, new mobility services like ride hail, bike sharing and Singapore's National Cycling Master Plan. He is also the Caring SG Commuters Task Force Lead, and heads a multi-agency team to coordinate inclusive public transport efforts and shape a caring commuter culture in Singapore.

Our Journey Towards an Inclusive Public Transport System

A fully inclusive land transport system can be a reality in a not-too-distant future. By 2040, the Land Transport Master Plan envisions creating a public transport (PT) system for all, complementing infrastructural features with a caring commuter culture.

Over the years, many advancements have been made to our PT nodes, featuring priority queues and seating, bus stops and MRT stations adorned with arm supports and backrests, and wheelchair-accessible and family-friendly buses to aid those who need extra support.

The Enhanced Signage System made its debut when the Thomson-East Coast Line (TEL) opened in 2020. The new and improved signage was developed after a three-year review, considering the needs of diverse commuter profiles, including the elderly. The signage hierarchy is designed with the intent of a gentler learning curve—incorporating colours, numbers and symbols to aid understanding and minimise language barriers—and follows a four-part transit signage manual created to enhance wayfinding.



While we are making progress in infrastructural design, we can only realise the full potential of these features if they are accompanied by a gracious and caring commuter culture.

As part of our key public transport stakeholders, our public transport operators (PTOs) have also been actively driving inclusivity efforts:

- ▶ SMRT, in collaboration with the Agency for Integrated Care (AIC), was a pioneer in transforming PT nodes as Dementia Go-To Points (GTPs), which serve as safe return points for persons living with dementia to connect with their caregivers, as well as dementia resource centres. To date, all MRT stations and bus interchanges are listed as GTPs.
- ▶ SBS Transit has rolled out the Find Your Way initiative, co-created with Dementia Singapore, which features colourful murals to help those living with dementia find their way around the PT network. SMRT has also adopted wayfinding murals at their bus interchanges.
- ▶ Go-Ahead Singapore piloted the Helping Hand Scheme to assist commuters with non-visible medical conditions. If needed, persons living with dementia can wear the "May I have a seat please?" or "Please alert me when I am approaching my stop" lanyard and card to request help from other commuters and PTO staff. Since April 2023, this initiative has been expanded network wide.
- ▶ Tower Transit Singapore introduced the Public Bus Inclusivity Course to provide commuters with hands-on experience on how to assist persons with disabilities appropriately.



◀ Left and right: Priority boarding and seats, queues and ergonomic seats at a PT node.

While we are making progress in infrastructural design, we can only realise the full potential of these features if they are accompanied by a gracious and caring commuter culture. Though commuters are keen to help, many have shared their uncertainties due to a lack of understanding about different mobility needs and appropriate ways to provide assistance. Hence, the Caring Commuter Champion (CCC) programme was conceived, where members of the public can undergo a 45-minute e-learning course curated with social service agencies to learn about various disability profiles and how to provide help effectively.



◀ Components of LTA's Enhanced Signage System.

The CCC course will increase the number of PT users who can voluntarily step up and show care to those in need during their daily commute. By joining the Caring SG Commuters movement, everyday citizens will help to make a truly inclusive PT system for all.

PERSPECTIVE FROM MOHT

Co-Creating Healthy Precincts for Inclusive Communities: Building Dementia-Friendly Neighbourhoods

Health is not just the absence of disease but a state of complete physical, mental and social well-being. To achieve good health, one must focus not only on treating disease but also on preventive care and addressing the social, environmental and behavioural determinants that influence health. For this reason, the Ministry of Health Office for Healthcare Transformation (MOHT) developed the "Healthy Precinct" framework to address social and environmental barriers to healthy behaviours and engage with citizens in their neighbourhoods before they become patients.

What is a Healthy Precinct?

MOHT co-developed the Healthy Precinct framework with several agencies. The framework intends to grow an activated community of residents with the interest and enthusiasm to sustain wellness and health-promoting behaviour through three key domains: Care & Support, Community and Environment. More importantly, it aims to convene a caring and supportive health and social service ecosystem to support and sustain health for all residents.



TAN WENG MOOI is the Director/Lead (Integrated Health Promotion) at the Ministry of Health Office for Healthcare Transformation (MOHT). A pharmacist by training with over 30 years of experience, she leads the development of healthy precincts and digital solutions to enhance community well-being. Weng Mooi is committed to transforming care, making it person-centric, holistic and nature-integrated, particularly in mental health and dementia care.



▲ The Healthy Precinct framework with three domains.

Why Take a Healthy Precinct Approach?

A precinct-based approach enables context-specific interventions tailored to the needs of the residents. This involves deep engagement with key stakeholders such as government agencies, grassroots organisations and community-based organisations to co-create interventions that will facilitate health-seeking behaviours of residents. Through the Healthy Precinct framework, MOHT collaborates with the Health Promotion Board (HPB) and agencies to enhance public health promotion efforts. We add value by fostering partnerships between health and social organisations and addressing the

factors that influence the social and built environment. This inclusive approach ensures a comprehensive consideration of elements that impact the health and well-being of our community.

A key objective of the Healthy Precinct framework is referencing data and evidence through the utilisation of digital tools such as the Environment Audit Tool-Lite (EAT-Lite).

A key objective of the Healthy Precinct framework is referencing data and evidence through the utilisation of digital tools such as the Environment Audit Tool-Lite (EAT-Lite). This tool offers vital insights to help identify physical barriers and seek out enablers to enhance social

and outdoor experiences, while at the same time collecting valuable feedback from residents. The resulting findings can be used to influence targeted town enhancements to improve the lives of residents, including people living with dementia.

Environment Audit Tool-Lite (EAT-Lite)

MOHT believes that more can be done to harmonise various facets of the lived environment to facilitate the care journey of those living with dementia. One cornerstone of creating a dementia-friendly environment is ensuring that physical spaces are accessible and accommodating to individuals with cognitive impairments. While the Healthy Precinct domains of Care & Support and Community have been well addressed by various agencies, more can be done to the surrounding physical Environment.

The tool focuses on seven key categories of the built environment: wayfinding, building features, facilities & amenities, lighting, mobility, outdoor spaces and safety.

MOHT partnered with the Singapore University of Technology and Design (SUTD) and Urban Redevelopment Authority (URA) in 2021 to develop the Environment Audit Tool-Lite (EAT-Lite) and subsequently worked with the Agency for Integrated Care (AIC) and other agencies to incorporate assessments related to dementia and persons living with disabilities. EAT-Lite is a simplified version of the Environment Audit Tool⁴⁰, designed for use by community stakeholders and volunteers. The tool focuses on seven key categories of the built environment: wayfinding, building features, facilities & amenities, lighting, mobility, outdoor spaces and safety. It allows residents and volunteers to capture photographs, document feedback and inputs seamlessly, and validate their observations by a scoring system. To date, MOHT and key stakeholders have deployed EAT-Lite in three precincts—Yio Chu Kang, Queenstown and Boon Lay—involving 13 agencies and over 150 residents. EAT-Lite will be deployed in more precincts to support the Age Well SG plans shortly.

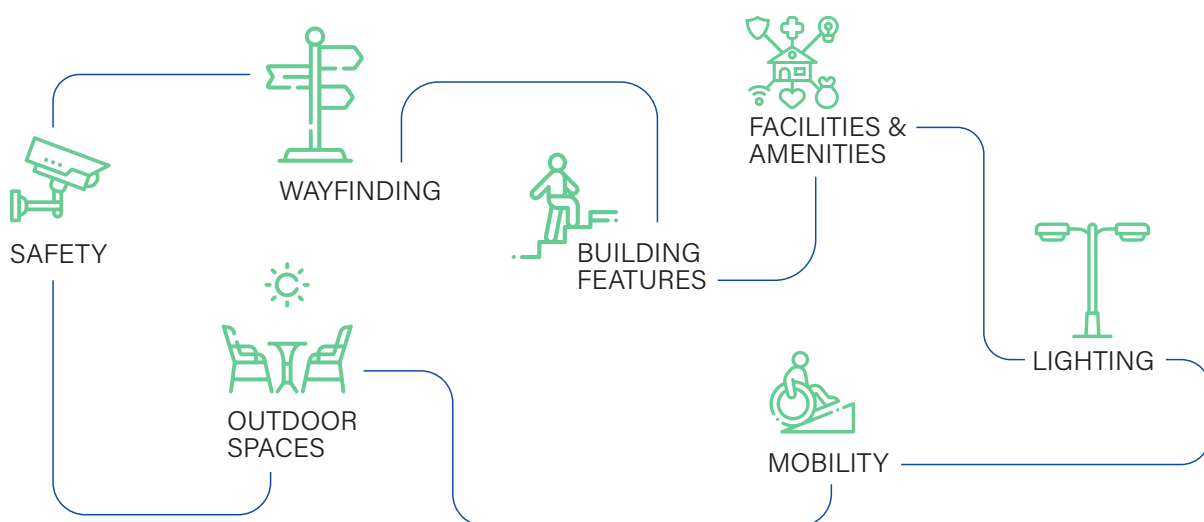
EAT-Lite empowers the community to assess public spaces and identify potential barriers for individuals with dementia. This tool evaluates factors such as clarity in wayfinding, building features, lighting and outdoor spaces, and other elements that would provide a reassuring environment for a person with dementia venturing outdoors. EAT-Lite fosters a sense of community ownership and responsibility for creating dementia-friendly spaces by engaging grassroots organisations, residents and subject matter experts in the assessment process. For example, through the EAT-Lite assessments, residents can identify areas where improvements are needed in residential areas, parks and recreational spaces. This grassroots involvement ensures that the community's collective effort goes towards creating a supportive environment.

⁴⁰ The Environment Audit Tool (EAT) was developed by the Singapore University of Technology and Design (SUTD) as part of the *Innovative Planning and Design of Age-Friendly Neighbourhoods Study* commissioned by the Urban Redevelopment Authority (URA); MOHT then partnered with URA and SUTD to enhance EAT's user-friendliness for communities, and the resulting version is known as EAT-Lite

Concluding Thoughts

Co-creating dementia-friendly neighbourhoods in Singapore requires a cross-sectoral and multi-level approach. Relevant stakeholders should leverage one another's capabilities to enhance dementia-friendly neighbourhoods and assimilate innovative tools to enable this cause. MOHT's initiatives under the Healthy Precinct framework, such as EAT-Lite, exemplify Singapore's commitment to enhancing the lives of individuals with dementia. By fostering community involvement and simplifying access to resources, these initiatives pave the way for a more inclusive and supportive society where those affected by dementia can thrive.

EAT-Lite fosters a sense of community ownership and responsibility for creating dementia-friendly spaces by engaging grassroots organisations, residents and subject matter experts in the assessment process.



▲ The seven key categories of the built environment represented in EAT-Lite.

PERSPECTIVE FROM NPARKS

Making Singapore's Green Spaces Dementia-Friendly Through Therapeutic Gardens

Evidence-based design was employed to construct a therapeutic garden which future therapeutic horticulture programmes and gardens can draw inspiration from.

In the face of a rapidly ageing population, the National Parks Board (NParks) is spearheading the development of therapeutic gardens to meet the diverse recreational and wellness needs of the community. NParks complements the development of these gardens with research and capacity-building programmes. NParks started working on the first prototype therapeutic garden at HortPark in October 2015. Evidence-based design was employed to construct a therapeutic garden which future therapeutic horticulture

programmes and gardens can draw inspiration from. The Therapeutic Garden @ HortPark has since served as a reference for other therapeutic gardens across Singapore.

Designed using evidence-based design principles, therapeutic gardens are deliberately planned to facilitate people's interactions with nature and improve the well-being of its visitors. Each area within the garden is planned to provide visitors with a serene and tranquil environment. The gardens' locations are carefully selected based on proximity to care centres, level ground for easy accessibility and an emphasis on the garden's interesting features. There are currently 13 therapeutic gardens across Singapore. Each is distinctive to its location, encompassing design features that provide cultural memory for residents of the community or target groups within the vicinity; for example, with plants that may have been encountered in childhood or daily life which can evoke memories and bring back a sense of nostalgia.

Therapeutic gardens have been shown to have a significant positive impact on the cognitive well-being of persons living with dementia. These gardens provide a safe and calming environment that can help reduce stress and anxiety, improve mood, and increase social interaction with other users. The stimulation provided by the plants through senses such as sight, smell and touch can also help improve cognitive function and memory. These gardens offer physical and emotional



SOPHIANNE ARAIB is the Group Director of Horticulture & Community Division and Group Director of Parks Central Division at the National Parks Board (NParks). NParks is a statutory board under the Ministry of National Development and is dedicated to transforming Singapore into a City in Nature, and to creating the best living environment through nature, greenery and recreation in parks.

comfort, providing serene restorative spaces that are immersed in nature, as well as invigorating active areas with facilities for programming.

Therapeutic horticulture programmes use plants and nature-related activities to maximise the benefits of a therapeutic garden. With growing interest in the benefits of therapeutic gardens

For persons with dementia, gardening activities such as planting, watering and harvesting can provide a sense of purpose, achievement and satisfaction, while nature-art & crafts, such as floral arrangement and scent bag making, promote sensory stimulation, cognitive function and social connection.

and therapeutic horticulture, NParks has developed a series of workshops which are suitable for elderly groups, persons with dementia, and those who have other special needs. For persons with dementia, gardening activities such as planting, watering and harvesting can provide a sense of purpose, achievement and satisfaction, while nature-art & crafts, such as floral arrangement and scent bag making, promote sensory stimulation, cognitive function and social connection.

Through NParks' vision of a City in Nature, we will deliver initiatives that support health-related national movements, such as Healthier SG and Age Well SG. To build a sense of community and social support for these individuals, we collaborate with external agencies and partners to make therapeutic horticulture accessible to all. NParks provides training for staff and volunteers to build the capacity of community care and healthcare providers, enabling them to run therapeutic horticulture programmes within their facilities. These initiatives aim to increase access to therapeutic gardens

and therapeutic horticulture programs for people living with dementia who may not otherwise have access to them.

NParks is moving on several fronts to build on our existing efforts to make parks and green spaces even more accessible to Singaporeans. We are working with partners and stakeholders to enhance and expand the network of therapeutic gardens beyond NParks' managed green spaces and scale up the implementation of therapeutic horticulture programmes into the heartlands to allow more in the community to reap the well-being benefits and further enhance the living environment for people living with dementia.



To find out more about therapeutic gardens and therapeutic horticulture programmes, please scan the QR code

PERSPECTIVE FROM **URA**

Building Age-Friendly Neighbourhoods in Singapore

The Urban Redevelopment Authority (URA) is the national land use planning authority in Singapore. We strive to make Singapore a great city to live, work and play for all ages. To do this, our planners need to anticipate emerging issues and trends, understand their implications, and develop plans to make our city future-ready.

Our ageing population is one such trend that we need to plan for. What are the implications of a greying population on our city? What kind of neighbourhoods provide great everyday experiences for our seniors?



CHIU WEN TUNG is the Group Director of Research & Development at the Urban Redevelopment Authority (URA). He leads his team to search for solutions that will meet Singapore's future planning needs, and steers URA's research programmes. Wen Tung graduated with a Master's in Chemical Engineering from Imperial College, United Kingdom, and with High Honours from the University of Chicago Booth School of Business's Executive MBA programme.

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Amongst other findings, the study found that safety was the most important aspect of the built environment to older adults' physical, mental and social well-being and this could be enhanced through good spatial planning and design.

URA commissioned the *Innovative Planning and Design of Age-Friendly Neighbourhoods in Singapore Study* (July 2017–Aug 2019)⁴¹. The study investigated older residents' interactions with the built environment, identified barriers and enablers to seniors' outdoor experience, and evaluated how these in turn influence their health. The multidisciplinary research team comprised academics from the built environment and health domains, as well as practising architects. They used mixed research methods including workshops with older residents.

Three ageing neighbourhoods—Hong Kah North, Toa Payoh West and MacPherson—were studied to understand how the residents perceive and use their neighbourhood.

Amongst other findings, the study found that safety was the most important aspect of the built environment to older adults' physical, mental and social well-being and this could be enhanced through good spatial planning and design. These insights were then translated into implementable outcomes in three ways.

First, the research team co-created and piloted prototypes in the three neighbourhoods, which responded to the local needs of the older residents. These included: prominent visuals for wayfinding in Hong Kah North; conceptual designs for walking paths to enhance cognitive stimulation in Toa Payoh West; and social programming in the form of a mobile kopitiam (or coffee shop) in MacPherson.

⁴¹ The study was led by Principal Investigator (PI) Dr Belinda Yuen from the Singapore University of Technology and Design (SUTD) and Lee Kuan Yew Centre for Innovative Cities (LKYCIC). It was conducted in collaboration with the Geriatric Education and Research Institute (GERI), CPG Consultants, Lekker Architects, Tierra Design, AIM & Associates, the Housing and Development Board (HDB), the Building and Construction Authority (BCA), the Agency for Integrated Care (AIC) and the Ministry of Health (MOH).

Second, an Environment Audit Toolkit (EAT) was developed as a self-assessment tool to identify gaps and opportunities to create neighbourhoods that are more age-friendly in areas such as mobility, amenities, safety and social connections. The EAT was subsequently simplified and digitised into the EAT-Lite tool by URA, the Ministry of Health Office for Healthcare Transformation (MOHT) and the Singapore University of Technology and Design (SUTD) to make it more user-friendly for local communities. The EAT-Lite has since been piloted in Yio Chu Kang, Queenstown Health District and Boon Lay.

For issues as multi-faceted and complex as societal ageing, no single agency or party may claim to have all the solutions and answers. However, by working collaboratively—including co-creating and co-solutioning with the community and like-minded partners—we can build on each other's ideas and find ways to progress together.

Third, the study proposed a set of *Planning and Design Guidelines (PDG)* by focusing on aspects including walkability, greenery, public spaces, street connectivity, sense of place and aesthetic quality. A set of principles for dementia-friendly neighbourhoods was also developed, and which contributed to this *Dementia-Friendly Neighbourhood Design Guide*.

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06 EXPERT OPINIONS

on the
Importance
of Dementia-
Friendly Design

This series of opinion pieces highlights the significance of dementia-friendly design from a user and medical perspective, and explores its importance both in Singapore and on a global scale.

Dementia-Enabling Design Requires an Understanding of the Changes in the Brain

Hence, architectural design for people living with dementia goes beyond a barrier-free environment. The design should help to compensate for reduced cognitive and sensory abilities, and contribute to emotional, physical, social, and cognitive well-being.



EMILY ONG is a co-founder of the Environmental Design Special Interest Group (SiG) of Dementia Alliance International, and a Board Member of Alzheimer's Disease International. She also set up the locally based Environment SiG to work with Dementia Singapore and various stakeholders such as HDB, Atlas and SBS Transit. Emily also provided valuable input for the AIC-CLC *Dementia-Friendly Neighbourhood Study*.

Cognitive decline is an important public health concern in an ageing population, making strategies that help to mitigate cognitive deterioration increasingly relevant to support healthy ageing and enable people to maintain their independence as they age. Evidence-based research has consistently shown that the built environment has a profound effect on the emotions, behaviours and cognitions of those living with dementia.⁴² Design and architecture can either support them to use their remaining abilities or force dependency and hinder social connection.

Making sense of the environment is a difficult task for people living with dementia. While getting lost in a familiar place can be caused by memory issues, the damage to the occipital, temporal and parietal lobes of the brain

may negatively impact the spatial perception of architectural characteristics and elements.⁴³ The parietal lobe is crucial for sensory perception and integration, as well as visuospatial navigation and reasoning. Many living with dementia may have their parietal lobe affected at an early stage. Therefore, spaces that are cramped, noisy, poorly ventilated and/or not well-lit can cause confusion, anxiety and distress to these individuals.

⁴² Fleming, R., Zeisel, J. & Bennet, K. (2020). *World Alzheimer Report 2020: Design Dignity Dementia: dementia-related design and the built environment*, Volume 1, London, England: Alzheimer's Disease International

⁴³ Assem, H.M., Khodeir, L.M. & Fathy, F. (2023). Designing for human wellbeing: The integration of neuroarchitecture in design – A systematic review. *Ain Shams Engineering Journal*, 14 (6)

▼ A distinctive and nostalgic mural can help to aid information processing and simplify decision-making when it comes to navigating in a typical HDB neighbourhood where all blocks appear identical.



▲ Co-designing spaces within the public transportation system together with persons who have a lived experience of dementia can help to identify gaps in wayfinding to enable users to travel more independently.

It is equally important to include people living with dementia and their caregivers in the co-design process so that their needs are noticed and addressed.

Hence, architectural design for people living with dementia goes beyond a barrier-free environment. The design should help to compensate for reduced cognitive and sensory abilities, and contribute to emotional, physical, social and cognitive well-being. It is equally important to include people living with dementia and their caregivers in the co-design process⁴⁴ so that their needs are noticed and addressed.

While co-designing sites with end users and those with lived experiences of dementia is relatively new in Singapore, there are a few notable initiatives that have already been undertaken, such as the AIC-CLC *Dementia-Friendly Neighbourhood Study*, the Find Your Way initiative by SBS Transit, and Kebun Baru's wayfinding project. With first-hand input from persons living with dementia, I believe this guide will be a step

forward in ensuring that designers and architects have a better understanding of dementia-friendly design principles and how to translate them into practical applications.

⁴⁴ Golembiewski, J. (2022). Architectural design gives hope for dementia. *Architectural Science Review* 66 (5), Taylor & Francis Online

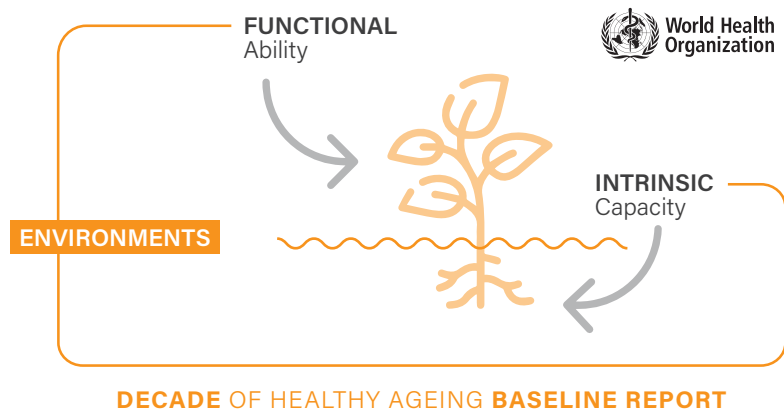


PHILIP YAP, an internist by training, is a senior consultant, geriatrician & palliative care physician in the department of geriatric medicine at Khoo Teck Puat Hospital. He is an adjunct associate professor with the Yong Loo Lin School of Medicine, NUS, and Lee Kong Chian School of Medicine, NTU, and is also an adjunct faculty member of the Geriatric Education & Research Institute. He has special interest and expertise in dementia, long-term care, end-of-life care as well as caregiving of older persons.

Dementia-Friendly Design as a Key Accompaniment to Medical Interventions

The World Health Organization (WHO) has conceptualised intrinsic capacity (IC) as a measure of an older person's functional ability to live independently. IC comprises physical (e.g., mobility, vision, hearing) and mental (e.g., cognition, mood) dimensions which serve to maintain the person's functional abilities. Ageing can be accompanied by ailments that compromise IC, thus leading to disabilities that threaten independence. As such, to upkeep function, we can restore IC or compensate for its deficiency by enhancing the environment.

In the face of an advancing dementia when efforts to restore intrinsic cognitive abilities are no longer feasible, buttressing the environment so that persons living with dementia can continue to sustain daily function is key to helping them maintain normalcy and quality of life. Such is the ethos of the person-centredness that underpins dementia-friendly design and neighbourhoods that endeavour to uphold the dignity of those living with dementia and enable them to lead meaningful lives.



Examples include simplified yet prominent directional signs, pictorial aids that draw on familiar objects embedded in long-term memories to facilitate recognition, and preserved key landmarks, even as the environment is upgraded, to enable wayfinding and maintain familiarity.

For persons with physical disabilities, using prosthetic devices to facilitate functional abilities is commonplace. However, for persons living with dementia, cognitive assistance often takes the form of a prosthetic environment whereby cognitive-enabling features are built in. Examples include simplified yet prominent directional signs, pictorial aids that draw on familiar objects embedded in long-term memories to facilitate recognition, and preserved key landmarks, even as the environment is upgraded, to enable wayfinding and maintain familiarity. Importantly, as most people living with dementia are older, they may also suffer from physical deficits such as mobility issues and impaired vision, as well as mood disorders, all of which are captured under the IC framework. Hence, dementia-friendly design would entail a holistic approach that considers other deficits that accompany older persons with diminishing IC.

Finally, fostering an enabling environment needs to go beyond the physical to empowering the community with the know-how to better understand and attend to the needs of those living with dementia. In this way, we can build a nation for all ages that leaves no one behind.

The Impact of Dementia-Friendly Design on Towns and Neighbourhoods in Singapore



EMI KIYOTA is an environmental gerontologist, consultant and organisational culture change specialist with more than 20 years of experience in designing and implementing person-centred practice in long-term care facilities and hospitals around the world. She is a founder of Ibasho, a charitable organisation dedicated to co-creating socially integrated, sustainable communities that value their elders, embodying the Japanese concept of a place where one feels at home being oneself. She is currently looking into incorporating Ibasho into the Health District @ Queenstown in Singapore. Emi Kiyota is an associate professor with the Yong Loo Lin School of Medicine, NUS, Deputy Executive Director at the Centre for Population Health, NUS, and Advisor at NUHS's Corporate Infrastructure Office.

Professionals from the built environment, as well as social and healthcare sectors, can then respond to the lessons learned from the project, which could also serve as a good practice model to be scaled up and replicated elsewhere in Singapore.

Ageing well should be characterised as independent, healthy, meaningful and equitable living. These findings were derived from a Global Ageing Network study, and they reflect the direction in which the Health District @ Queenstown is heading.

The Health District @ Queenstown is a first-of-its-kind multi-stakeholder collaboration where science-backed initiatives are piloted to support residents in leading healthy and purposeful lives while engaging with other generations. When the Health District started, the focus was on keeping people healthy in a holistic manner, recognising the importance of the built environment. The need for design professionals to work with community members, clinicians and agencies has since become clear, in order to ensure that design strategies are informed by strong evidence and expertise from the field.

Quality of life should not be defined by chronological age but by levels of meaning and engagement in one's life.

Enhancing dementia friendliness is a focal point in the Health District @ Queenstown. A well-design neighbourhood should strive for Universal Design (UD) and be rooted in locally contextualised design principles in order to facilitate an inclusive living environment for people from various backgrounds. This *Dementia-Friendly Neighbourhood Design Guide* will be a valuable tool for the Health District @ Queenstown project. Purposefully designing health and well-being initiatives in Queenstown that represent the expected demographic composition of Singapore in 2030 is significant when exploring the balanced interactions between different urban and healthcare systems. Professionals from the built environment, as well as social and healthcare sectors, can then respond to the lessons learned from the project, which can also serve as

a good practice model to be scaled up and replicated elsewhere in Singapore.

Quality of life should not be defined by chronological age but by levels of meaning and engagement in one's life. As the global population is rapidly ageing, it is essential to reframe what it means to grow old with purpose and meaning. A well-designed built environment has the strong potential to enable our society to redefine the current perception of ageing.

Brain Health By Design: Dementia Care Redefined



UPALI NANDA is Partner and Global Director of Research for HKS Architects, Associate Professor of Practice at the Taubman School of Architecture and Urban Planning at the University of Michigan, and Executive Director for the non-profit Center for Advanced Design Research and Education. Her award-winning research sits at the intersection of design and health, architecture and neuroscience, practice and academia, place and perception. She is the 2015 HCD magazine researcher of the year, 2018 Women in Architecture Innovator Award winner, and currently focused on the intersection between brain, building and biosphere.

Dementia is one of the most prevalent diseases associated with ageing, recognised by loss of memory and other mental abilities, and caused by neurobiological changes in the brain. New research is emerging that healthy childhood experiences, exercise and nutrition, strong social connections and exposure to arts and creative pursuits can contribute to avoiding and/or slowing down dementia. Research also suggests that enriched environments, or environments that provide physical, social, sensory and cognitive stimuli to engage the brain, can in fact support neurogenesis (the development of new nerve cells).

The World Health Organization defines brain health as “the state of brain functioning across cognitive, sensory, social-emotional, behavioral and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders”.

Given the potential of the environment to have such a profound impact on cognitive health, it is important to approach the issue of designing for dementia from the lens of brain health. The World Health Organization defines brain health as “the state of brain functioning across cognitive, sensory, social-emotional,

behavioral and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders”. To allow this state of functioning, environments have to fully support the directive of brain health, with sensitivity to site and culture.

This *Dementia-Friendly Neighbourhood Design Guide* takes a simple, actionable, and contextually responsive approach to providing environments that are not just friendly for those with dementia, and their caregivers, but also for all humans who want to live life with physical as well as cognitive fitness.

This *Dementia-Friendly Neighbourhood Design Guide* takes a simple, actionable, and contextually responsive approach to providing environments that are not just friendly for those with dementia, and their caregivers, but also for all humans who want to live life with physical as well as cognitive fitness. An intergenerational and experiential approach to design ensures that designing for dementia is really designing for a cognitive social tissue that allows for physical, mental and social health.

07 TOOLS & REFERENCES

An overview of available resources for creating a more dementia-friendly Singapore.



Overview:

Principles and Guidelines offers a top-line overview of the guidance and ideas presented in this publication.

At a Glance shares a collection of relevant publications in the landscape of dementia-friendly design in Singapore. This includes other research and asset-specific dementia-friendly guidelines by other government agencies.

EAT-Lite is an environmental audit tool for stakeholders to evaluate their neighbourhood and guide improvements that can make it more inclusive for all, including people living with dementia.

Principles and Guidelines

AN OVERVIEW ON HOW TO ACHIEVE THE 10 CHARACTERISTICS OF A DEMENTIA-FRIENDLY NEIGHBOURHOOD



DESIGN TO STRENGTHEN MENTAL MAP

Plan for enjoyable routes:

Pleasant experiences involving sensorial delight accentuate and reinforce the memory of a route, significant landmarks or anchor nodes along the route, and destinations for a person living with dementia. They strengthen mental associations and build positive familiarity within the neighbourhood.

Create memorable, experiential landmarks:

Landmarks play a crucial role by serving as distinctive and recognisable points of reference within the environment. Compared to conventional text-based signs, landmarks enable easier wayfinding for seniors and persons living with dementia as they help people create mental maps and establish a sense of direction. They offer visual cues that make it easier to give and follow directions, and they enhance the overall navigation experience.

Improve sense of safety:

Both physical and psychological safety are concerns for persons living with dementia as well as their caregivers. People tend to go out of their way to avoid areas they perceive as unpleasant or dangerous, or feel uncertain about, including areas that are not well maintained. Design that addresses this can help reduce users' anxiety while enhancing their overall well-being.

DESIGN WITH A MINIMALIST APPROACH



Simplify decision-making:

As persons living with dementia may have deteriorating cognitive abilities, it is important to carefully consider the provision of choices presented to them as they navigate their way through the neighbourhood. Aid information processing and simplify decision-making for users by clearly defining the objectives of the design, as well as challenges and choices within the environment that need to be addressed.

Minimise sensorial distractions:

An environment that is cluttered with signs, especially if they are redundant or abstract, can overwhelm persons living with dementia. Design and aesthetic elements may also contribute to visual clutter and complexity which then increase cognitive load and make it difficult for them to understand their environment. Distractions and confusion can leave them feeling frustrated, anxious and overwhelmed, and make navigating their neighbourhood more difficult.

Although the desired qualities of a dementia-friendly neighbourhood—one that is Safe, Accessible, Legible, Familiar, Adaptable, Engaging, Comfortable, Delightful, Purposeful and Offers Choices—serve as a valuable guide for assessing a neighbourhood's inclusivity and friendliness, their application during the design phase is less effective. The ideation phase of a design process is inherently dynamic, open-ended, and therefore cannot take a rigid checklist approach. Instead, an approach that is generative rather than prescriptive is needed so as to foster creativity in creating dementia-friendly neighbourhoods. The four design-thinking principles presented in this guide—represented by the concepts of Plus, Minus, Multiply and Divide—which have been built on evidence-based characteristics with insights from both users and designers, are thus meant to be a guide for the design journey. Through this, we can not only achieve dementia inclusivity, but also promote design creativity.⁴⁵



DESIGN TO ENABLE DIVERSE EXPERIENCES

Enable use for different activities:

While multi-use facilities offer vibrancy, it is also important to recognise that some individuals with cognitive disabilities may become overwhelmed in highly stimulating environments. A calm and serene environment can alleviate distress and minimise behavioural issues such as anxiety, agitation and aggression. Further, spaces that offer respite for caregivers and opportunities for delightful interaction with other members of the community will foster a network of care and support.

Enable use by people with different abilities:

Dementia and ageing impact a person's physical and cognitive abilities. At the same time, activities that are physically and cognitively stimulating are known to reduce the risk of dementia and cognitive decline. Therefore, to ensure inclusive participation across the wider community, the design of features and facilities should offer various intensities of activities and cater to users with different abilities.

Enable use for different times of the day:

Supporting routines at different times of the day for persons living with dementia involves creating an environment that is organised, intuitive and conducive to their needs. Ensuring appropriate levels of stimulation for them in the day might help to combat sundowning—symptoms of restlessness, irritability and confusion that typically occur in persons living with dementia during the late afternoon. These symptoms can last into the night due to factors such as under-stimulation and boredom during the day. Exposure to natural light can also positively impact the mood and circadian rhythms of the person.



DESIGN THAT ENABLES USERS TO EMBRACE CHANGE IN SMALLER STEPS

More evolution, less revolution:

Abrupt and radical environmental transformations of a space may lead to confusion, discomfort and disorientation to persons living with dementia. Achieving a sense of continuity will help to support them in adapting to the changes in their neighbourhood.

Support users in embracing change:

People living with dementia and their caregivers need support in navigating through a transforming environment. Designs should be implemented thoughtfully to avoid change-related anxiety and enable users to maintain routine and continuity.

⁴⁵ Developed by Dr Chong Keng Hua as part of the AIC-CLC *Dementia-Friendly Neighbourhood Study* at Yio Chu Kang (2023)

At a Glance

RESEARCH AND PUBLICATIONS ON DEMENTIA-FRIENDLY DESIGN IN SINGAPORE



Dementia Design Sourcebook: Architecture and Interior Design Guide (2015)

The book hopes to fulfil the urgent need to examine salient issues that designers of dense urban settings face, and through this effort engenders deeper design thinking that collectively enlarges our palette of solutions for those living with dementia. The Sourcebook is a general design reader for caregivers, designers and related service providers. It examines issues on the design of environments for those living with dementia and the elderly in general, and comprises two volumes in one: the Design Guide and the Design Elements. With complementary infographics, the Dementia Design Palette offers a glimpse at how design responses can match disabilities resulting from dementia.

PROFESSOR FUNG JOHN CHYE



For more information, please scan the QR code here

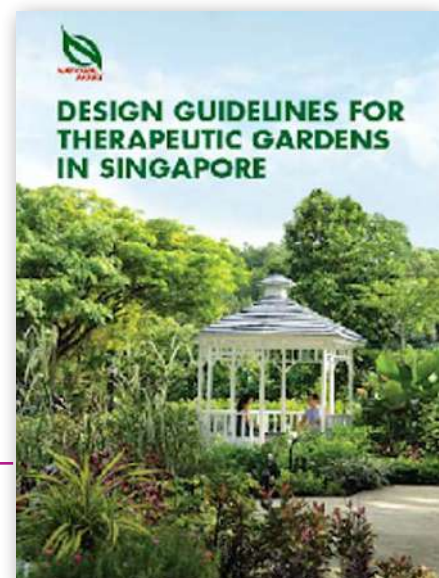
Design Guidelines for Therapeutic Gardens in Singapore (2017)

This guide puts together the basic characteristics of therapeutic gardens and aims to be a useful resource for the design of future therapeutic landscapes in Singapore, particularly for the elderly and people with dementia.

NATIONAL PARKS BOARD (NPARKS)



For more information, please scan the QR code here





Six Principles of [a] Dementia-Friendly Neighbourhood (2019)

This document outlines six guiding principles for dementia-friendly neighbourhoods, drawing on themes developed by overseas literature.⁴⁶ This document makes the distinction between “age-friendliness” and “dementia-friendliness”, highlighting that the latter requires the consideration of additional features, such as cognitively supportive design.

The principles are as follows:

- ▶ Familiarity
- ▶ Legibility
- ▶ Distinctiveness
- ▶ Accessibility
- ▶ Comfort
- ▶ Safety

**DR BELINDA YUEN, MD RASHED BHUYAN,
SPELA MOCNIK, WINSTON YAP**



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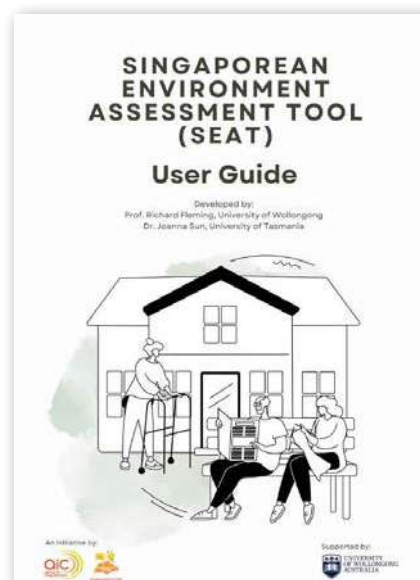
Singaporean Environment Assessment Tool (SEAT): User Guide (2020)

Commissioned by the Agency for Integrated Care (AIC), the Singaporean Environment Assessment Tool (SEAT) is a user-friendly framework for evaluating indoor environments, such as homes and aged care facilities, with a focus on enhancing the lives of those living with dementia and seniors.

SEAT employs a series of questions to assess the practical application of 10 core principles which include: inconspicuously reduce risks, provide a human scale, enable visibility, manage stimulation, encourage movement and engagement, foster familiarity, offer spaces for solitude and socialisation within the unit and the community, and design in response to a vision for a desired way of life.

Designed for non-professionals, the SEAT can be easily utilised by staff or visitors with minimal dementia care knowledge, but who are familiar with the 10 principles.

RICHARD A FLEMING, DR JOANNA SUN



For more information, please scan the QR code here

⁴⁶ See, Burton, E., Mitchel, L. & Raman, S. (2004). *Neighbourhood for Life: Designing Dementia-friendly Outdoor Environments — Checklist of Characteristics of Dementia-friendly Neighbourhoods. Inclusive Design for Getting Outdoors (IDGO)*; and Mitchell, L. & Burton, E. (2006). *Neighbourhoods for life: Designing dementia-friendly outdoor environments. Quality in Ageing and Older Adults*, 7, 26-33



Age-Friendly Neighbourhood Planning and Design Guidelines: A Singapore Case Study (2022)

This book and its supplementary toolkits touch on three main stages of age-friendly neighbourhoods:

- ▶ Planning (Environmental Audit)
- ▶ Implementation (Planning and Design Guidelines)
- ▶ Evaluation of progress made (post-implementation review)

This book aims to contribute to the ongoing discourse of how to (re)envision urban neighbourhoods to enhance health and quality of life as people age. It does not supersede but rather supports existing guidelines and regulations to improve the everyday neighbourhood environment for healthy ageing in place.

BELINDA YUEN, MD RASHED BHUYAN, SPELA MOCNIK, WINSTON YAP



For more information, please scan the QR code here

Transport Infrastructure Design Criteria & Specifications (2022)

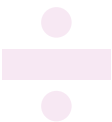
This section of LTA's Development and Construction Resources sets out the criteria and requirements for the design of transport infrastructure. Transport infrastructure comprises roads, bridges, viaducts, tunnels, stations, depots, interchanges and shelters.

LAND TRANSPORT AUTHORITY (LTA)



For more information, please scan the QR code here

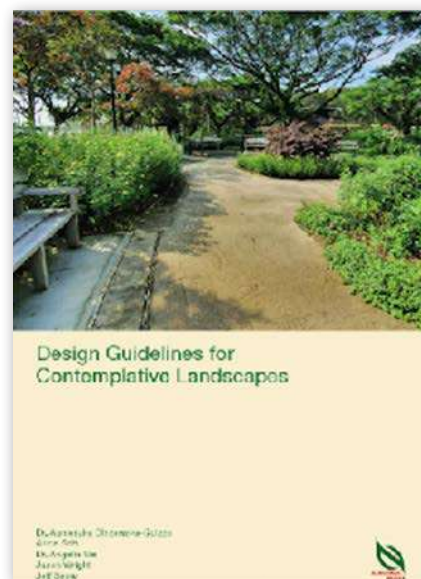




Design Guidelines for Contemplative Landscapes (2023)

This publication is a translation of research findings from the study *Effects of Landscapes on Brain Activity* into design application. The information aims to help landscape professionals design and implement landscapes that enhance mental well-being, for a more liveable Singapore.

NATIONAL PARKS BOARD (NPARKS)



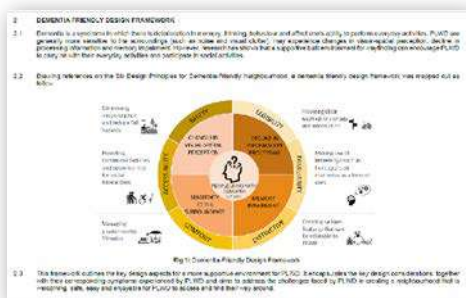
For more information, please scan the QR code here



HDB Dementia-Friendly Design Guide (2023)

This guide describes the design considerations and requirements of dementia-friendly provisions in new public housing developments. The objective is to provide a supportive and inclusive built environment to encourage and enable people living with dementia to carry on with their daily activities.

HOUSING AND DEVELOPMENT BOARD (HDB)



Dementia-Friendly e-Learning Modules (2023)

AIC developed e-learning modules to equip built environment professionals on dementia-friendly environmental design. These modules cover topics such as the role of technology and culture in dementia-friendly design, what constitutes inclusive design for people living with dementia in Singapore, and explanations on how to use the Environmental Assessment Tool, amongst others.



To access the e-learning module on the application of dementia-friendly design, please scan the QR code



To access the e-learning module on the implementation of dementia-friendly design, please scan the QR code



Creating a Dementia-Friendly Neighbourhood: A Yio Chu Kang Pilot Project (2023)

This publication is a research documentation of the AIC-CLC *Dementia Friendly Neighbourhood Study*—the first evidence-based study on dementia-friendly neighbourhoods in Singapore, derived from first-person feedback from persons living with dementia and their caregivers. Through the person-centric methodology, the Study distilled design and policy recommendations contextualised to Singapore’s high-rise, high-density neighbourhood environment. Ultimately, this research documentation highlights that persons living with dementia can be enabled to age in their communities with a higher quality of life, and to delay the need for early institutionalisation.

The Study was the basis for the development of this *Dementia-Friendly Neighbourhood Design Guide*.

**AGENCY FOR INTEGRATED CARE (AIC),
CENTRE FOR LIVEABLE CITIES (CLC),
SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN (SUTD)**



For more information, please scan the QR code here



EAT- Lite

EAT-Lite⁴⁷ offers guidance for achieving the desired qualities of a dementia-friendly neighbourhood. It identifies existing gaps and informs future action for areas of improvement in a neighbourhood's journey to becoming dementia friendly.

This *Dementia-Friendly Neighbourhood Design Guide* presents a refined EAT-Lite, which is further enhanced in its dementia-friendly considerations. This version of EAT-Lite incorporates dementia-friendly principles and guidelines as outlined in the earlier sections.

A BUILDING FEATURES

- ▶ Corridors outside the dwelling units allow easy, safe and comfortable movement (e.g., adequate corridor width, lack of obstructions).
- ▶ Handrails extend beyond the staircases/ramps on both sides.
- ▶ Lifts allow adequate time to enter and are provided with assistive infrastructure (e.g., audio announcement, visual indicators for floor numbers).
- ▶ Staircases en-route to and around the neighbourhood are safe to use.
- ▶ There are adequate benches/seats placed at regular intervals en-route to and around the neighbourhood.
- ▶ There is adequate shelter/shade en-route to and around the neighbourhood regardless of weather conditions (sun/rain).
- ▶ The materials of seats or handrails do not conduct heat or cold (e.g., made of wood or synthetic elements).
- ▶ Seats are comfortable, with sturdy arms and backrest, and are complemented by adequate space for wheelchair users to participate in a group setting.

There are sufficient features such as lifts, corridors, stairs, handrails, shelter, shade and benches for me.

⁴⁷ The Environment Audit Tool (EAT) was developed by the Singapore University of Technology and Design (SUTD) as part of the *Innovative Planning and Design of Age-Friendly Neighbourhoods Study* commissioned by the Urban Redevelopment Authority (URA); MOHT then partnered with URA and SUTD to enhance EAT's user-friendliness for communities, and the resulting version is known as EAT-Lite

B

FACILITIES & AMENITIES

- ▶ There is co-location of recreational and exercise facilities for different ages and abilities in outdoor spaces (e.g., a children's playground and senior fitness corner are co-located or in visual proximity).
- ▶ There are adequate healthcare facilities (e.g., polyclinics, TCM clinics) nearby for residents to access.
- ▶ There are adequate healthy food/eating options and/or grocery places to purchase healthy food in and around the neighbourhood.
- ▶ Recreational and exercise facilities around the neighbourhood are user-friendly and cater to people with various physical and cognitive abilities.
- ▶ There are adequate social and community facilities in and around the neighbourhood (e.g., Senior Activity Centres, community gardens, fitness areas, playgrounds, community centres).
- ▶ There are communal facilities that cater to different users and types of activities, such as for groups and individuals, interaction and solitude, active participation and passive observation.
- ▶ Facilities and amenities are clean, well maintained, and safe to use.

Suitable facilities and amenities are available in the neighbourhood to allow me to lead a healthy and engaged lifestyle.

C

LIGHTING & VISIBILITY

- ▶ There is adequate lighting en-route to and around the neighbourhood.
- ▶ All the outdoor lights are working and are well maintained.
- ▶ All areas are free from dark, disorientating shadows and bright glares.

The neighbourhood is well lit and has good visibility at key areas (e.g., corridors, outdoor spaces, roads) for my comfort, safety, and ease of navigation.

D

MOBILITY

- ▶ Ramps are available and conveniently located for safe use, with handrails and a gentle gradient.
- ▶ Routes to key amenities (e.g., coffee shops, hawker centres, healthcare facilities, public transport) are free of physical barriers, and simple to remember and navigate.
- ▶ It is easy to use a PMD or wheelchair en-route to and around the neighbourhood.
- ▶ Wheelchair-friendly routes are sheltered.
- ▶ Drains are covered, well maintained and safe.
- ▶ Pavement and floor finishings are well maintained, and material is non-slip.
- ▶ Changes in floor levels (e.g., steps, drains, kerbs) are clearly identified with markings that are easily seen, understood and well maintained.
- ▶ Footpaths are wide, continuous and level, with no sudden gradation changes.

It is easy for me to move around the neighbourhood due to enabling features and minimal hindrances.

E

OUTDOOR SPACES

- ▶ There are adequate nature elements in and around the neighbourhood to create calming effects in outdoor spaces (e.g., enriched with planted landscapes, water features, use of natural materials).
- ▶ There are pleasant, quiet areas in outdoor spaces where one can relax, rest and get respite from sensorial stimulations.
- ▶ There are visual (sight), auditory (sound), olfactory (smell), and tactile (touch) stimulations that make outdoor spaces and key routes memorable and attractive for walking (e.g., trees, flowering plants, water features)
- ▶ There are features that evoke memories (e.g., symbols and other design elements that highlight local identity and culture) to reinforce familiarity and support residents in adapting to changes in the environment.
- ▶ There are places in the neighbourhood where people can stop and rest/sit to have conversations.
- ▶ The nearby void decks are attractive spaces for social interaction.
- ▶ There are a variety of outdoor spaces and sheltered areas (e.g., playgrounds, void decks) that can be used for different activities (organised or impromptu), by people of different abilities, and at different times of the day.
- ▶ Outdoor spaces are clean, well maintained and safe to use.

The neighbourhood has spaces and features which encourage me to be outdoors.

F

SAFETY

- ▶ The traffic lights emit audible cues and adequate timing for people to cross the road safely.
- ▶ Paths have clear, visible and easy to understand safety markings (e.g., demarcation of lanes for walking or cycling/PMDs, stop signs).
- ▶ There is adequate security surveillance of outdoor spaces (e.g., CCTV) and AED for emergency assistance.
- ▶ Junctions, intersections, and crossings at vehicular roads and shared pavements have clear lines of sight (i.e., views for pedestrians are unobstructed by columns, vegetation, etc.).

I feel safe from accidents and crime in this neighbourhood.

G

WAYFINDING

- ▶ It is easy to find one's way around the neighbourhood.
- ▶ There are adequate wayfinding signs and landmarks en-route to and around the neighbourhood.
- ▶ Wayfinding signs are clear, visible and easy to understand, even for those with vision and cognitive impairment (e.g., with use of pictures that are easy to understand).
- ▶ There are patterns, tactile elements and visual contrasts (e.g., through use of materials or colours) to help guide pedestrians along key routes without causing sensorial distractions and confusion.

It is easy for me to get around the neighbourhood, self-navigate, and recognise outdoor spaces.

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