

DESIGN GUIDE FOR LONG TERM CARE HOMES

2018 EDITION



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2018 EDITION



ROBERT WRUBLOWSKY
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Thank you to the Centre for Health Design whose contribution and access to research shaped this document into a credible resource for guideline initiatives. Obtaining my EDAC certification through the Centre enabled our team to appropriately rely upon a well defined process in utilizing Evidence Based Design (EBD) practice in health care to translate the vast amounts of research and peer journals into executable design initiatives in the environment of care for those afflicted with neurocognitive disorders. Special recognition to Terri Zborowsky PhD, EDAC, whose research contribution, co speaking partnership, and joint publication partnership has enabled me to understand the EBD process more thoroughly and see it as a tool to move conversations forward with executable initiatives.

Many thanks to the administrators and architects for touring me through the facilities showcased in this design guideline. Without your shared passion to provide a better quality of life for our seniors, and your willingness to carve out precious time to meet with our team, this guideline would not have been possible. Each of these projects demonstrates the relationship between the design environment and the positive influence it has on individuals with cognitive challenges by levelling or reducing the trajectory of the disease. The outcome of proper execution of these design initiatives will provide a better quality of life for our seniors in their last chapter of their lives. Our buildings will become places to live rather than places to die.

Lastly, I wish to acknowledge the support of Winnipeg Regional Health Capital Planning for realizing that the buildings they were building could be much better. The Region started the journey by questioning the means and methods in which they were designing and procuring Personal Care Homes. This opened up discussion not only on the physical environment and but also challenged the operational models where the new focus is placed on the resident, their schedule, their wishes and their life and not around a time clock of efficient mobilization.

TOURED RESIDENCES

1. *Greenhouses at Stadium Place*
1010 East 33rd Street
Baltimore, MD 21218
2. *Hearthstone at New Horizons Alzheimer's Care*
402 Hemenway Street
Marlborough, MA 01752
3. *Leonard Florence Centre For Living*
165 Captains Row
Chelsea, MA 02150
4. *Levindale Geriatric Centre*
2434 Belvedere Avenue
Baltimore MD 21215
5. *Westminster Memory Care Support*
4100 Jackson Avenue
Austin, TX 78731
6. *NewBridge on the Charles*
5000 Great Meadow Road
Dedham, MA 02026
7. *Sherbrook Community House*
401 Acadia Drive
Saskatoon, Sask. S7H 2E7
8. *White Oak Cottages Dementia Care*
6 Longwood Drive
Westwood, MA 02090
9. *Irene Baron Eden Centre*
1385 Molson Street
Winnipeg, MB R2K 1E4

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Principal MMP Architects

CHAPTER 1

Design Guidelines for Personal Care Homes

“MAKING LIVES MEANINGFUL IN OLD AGE IS NEW. IT THEREFORE REQUIRES MORE IMAGINATION AND INVENTION THAN MAKING THEM MERELY SAFE DOES.”

-Atul Gwande

The quality of life in a long term care (LTC) home typically is one of routine, lack of freedom, and absence of dignity. If admitted into such a facility one can expect to be well nourished, sheltered and protected, however all emphasis on the continuum of daily life with purpose and fulfillment are lacking in most LTC homes. As designers, we are in part, responsible by creating environments that do not capitalize on the opportunity to provide space that is part of the therapeutic and care solution—environments that bring a purposeful life to our elders. This guide will provide insight into how these environments, when designed correctly, will provide a better quality of life through opportunity for better socialization, easier navigation, better cognitive function and predictable care outcomes. Overall the well being of our elders can be improved significantly once we begin to understand the positive role the environment plays in their daily lives.

This design guide has been assembled with the emphasis on deinstitutionalizing the personal care home. The hope is to reduce the negative outcomes typically associated with models of care that rely upon older traditional standards. We need to support a change in culture and the way we think about providing care. A small house model changes the philosophy, architecture, and organizational hierarchy of a facility and decisions made can be supported through Evidenced Base Design (EBD) to provide a higher quality of life and overall better care for the residents who live in these models. This study will help the designer understand how the small house model concepts can be adapted from a small rural single storey “cottage” with 12-15 residents to multi story structure with 120 plus residents.

The majority of our LTC residents are experiencing some degree of cognitive impairment. By reshaping the typical environments that we have become accustomed to seeing in the traditional institutional based personal care homes we aim to bring a higher quality of life to our elders suffering from these various forms of neurocognitive impairments. Among the positive quality of life attributes mentioned earlier, research indicates that additional operational and medical benefits include better staff understanding of dementia care, improved physical environments, access to safe familiar patterns of everyday living and a decreased dependence on psychotropic medications.

Spatial organization in the past has been the product of factory-like focus on efficient processes and optimal staffing levels geared to legislated hours of care that an individual must receive. Our physical environments are controlled by such tight space programs that nurse's stations, central dining rooms, commercial kitchens, central laundry facilities, and supply rooms – are all programmed to serve large numbers of individuals in an assembly line model. Double loaded corridors are designed to maximize floor plan and staffing efficiency at the expense of mandating wheelchair dependence. Encouraging incontinence is a result from a drive for operational staff efficiency when it is quicker to allow a resident to become incontinent and changed afterwards rather than creating a situation whereby the resident can self toilet when the environments are designed to foster independence. It appears that our current priority is to provide the operational efficiency of a hospital, and in our concern to nourish, shelter and protect the elderly, we have accepted that a life of worth and purpose is not possible once you lose independence.

The institutional-based environment of care (EOC) that we have been designing for our elders has contributed to their agitation and restlessness. As designers we need to understand why an Alzheimer resident becomes agitated or constantly shouts out, or why bathing is one of the most feared activities for our elders so we can respond by providing design strategies in the environments that decrease stress levels and nourish and increase the independence for these individuals. Research-based evidence exists that we can learn from—there are certain features in the environment that according to research will increase agitation, aggression and restlessness, yet we see these aspects included in design concepts time and time again. Further, research informs us that disruptive behaviour can be predicted when a person's stress threshold has been exceeded and often the environment that we place these individuals has a direct impact on these levels. To date, the priority has been heavily weighted on operational efficiencies and processes of care. We continue to make the same mistakes and, worse, set up residents in such environments to fail. We need to refocus our priorities on understanding the relationship between the people who occupy these facilities, the care processes and needs AND the built environment—how all these elements interrelate, not how they work in isolation.

Developing small house models for the elderly is certainly not a new concept. We see a growing trend to adopt this resident-focused approach in many new facilities predominantly planned in the United States. In the US there are over 100 Green House projects completed—in Canada we have but a few. This document will provide the designer with the guidelines, supported by research, to design better environments in which our elders can live out their later years with purpose and fulfillment.

“OUR ELDERLY ARE LEFT WITH A CONTROLLED AND SUPERVISED INSTITUTIONAL EXISTENCE, A MEDICALLY DESIGNED ANSWER TO UNFIXABLE PROBLEMS, A LIFE DESIGNED TO BE SAFE BUT EMPTY OF ANYTHING THEY CARE ABOUT...”

-Atul Gawande

Long Term Care Guiding Principles

The goal for each facility should integrally relate the philosophy of care and intended programming and staffing model into the overall design. The primary guiding principle is that a holistic model of care, rather than a traditional medical model, would better sustain residents. Holistic practices affirm their personal dignity and support their capabilities instead of focusing on their deficiencies. The following principles developed are values that are widely adopted in this Culture Change movement:

PRINCIPLES FOR RESIDENT CARE:

- *Enable residents to maintain their independence for as long as possible without jeopardizing their safety.*
- *Respect the dignity of every person.*
- *Acknowledge everyone's needs for both privacy and community.*
- *Provide individualized care, permitting flexible daily rhythms and patterns.*
- *Offer focused and appropriate stimulation and avoid a sterile monotonous and excessively distracting environment*
- *Create small-group environments that support relationship building.*
- *Design a residential (non-institutional) environment in layout, scale, and architectural language.*
- *Encourage family and caregiver participation.*
- *Support a holistic approach to resident centered care – addressing physical, social, mental and spiritual well being.*
- *Enable and encourage participation in activities of daily living, allowing for flexible scheduling to accommodate individual's needs*

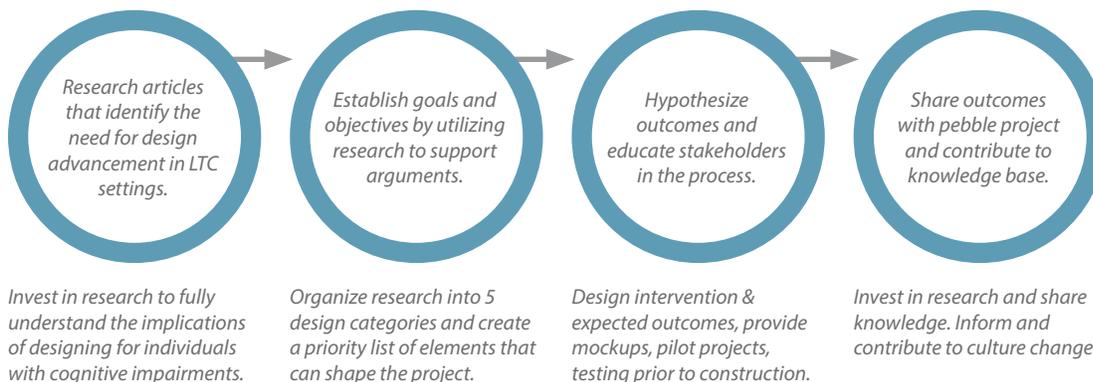
PRIORITIES FOR STAFF NEEDS

- *Support the occupational and organizational health, well being and safety of staff.*
- *Support innovative and alternative models of care delivery for the provision of resident-focused care.*
- *Provide a workplace for staff that is pleasant, with areas for staff respite.*
- *Support efficient operations through careful planning and study of functions*

SMALL HOUSE MODEL COMPARISON

Small House Models Comparison to Institutional Personal Care Homes		
	Institutional Model	Small House Model
Size	20-40 elders for operational group.	10-14 elders per household.
Care	Based on operational efficiencies first, residents needs second.	Resident focused care supports a daily rhythm of elders and responds to their needs first.
Supervision + Communication	Relies on paging systems/walkie talkies. Disconnected from households due to physical area.	Requires less distance paging, non auditory communications, more direct and efficient response.
Philosophy	Medical model emphasizing provision of clinical services to patients (nourish, protect, shelter).	Quality of Life Model emphasizing purpose, community, family extension and fulfillment.
Organization	Traditional staffing Hierarchy dependant heavily on nursing control.	Flattened bureaucracy - Empowerment of direct care staff; nurses visit the house to provide skilled services to meet Government Standards.
Decision Making	Decisions made by the organizational leadership in a top down authority structure.	Decisions made by elders or person closest to elders as often as feasible; Care staff plan menus, activities, and house routines.
Outdoor Space	Most often challenging to get to and access is most often prevented due to locked doors.	Outdoor secure fenced, shaded, easily located space remains accessible to all household residents.
Living Areas	Lounges and dining rooms usually at the end of long corridors often designed to accommodate larger social densities greater than 12 elders (often 20-40).	Central hearth with an adjacent open kitchen and dining area, short distance to bedrooms that follow a similar spatial relationship to one's own home.
Kitchen	Central kitchen disconnected from elders. Food carts, uniformed servers, trays, cafeteria style dishes.	Kitchen located in centre of household and plays important role in daily lives of elders through meal prep and activities or socialization.
Nurses Station	Central control point in most buildings that supervise 2 wards of 20 resident populations. Desk creates a physical barrier and confirms institutional structure of environment.	Small charting and supervisors desk built into each household kitchen that acts more like a home desk than a large central control point.
Staffing	Rigid hierarchy of staff with top down authority and decision making.	Care aides in each house provide direct care, companionship, laundry, housekeeping activities, and meal preparation service.
Visitors	Limited ability to participate, awkward family visitation, often shorter visits with less quality time, less privacy, fewer visitations.	Participation in meals. "Stay for dinner" philosophy, more casual visitation experience in a home setting.

PROCESS OF EBD FOR LONG TERM CARE PROJECTS



How to use this Document

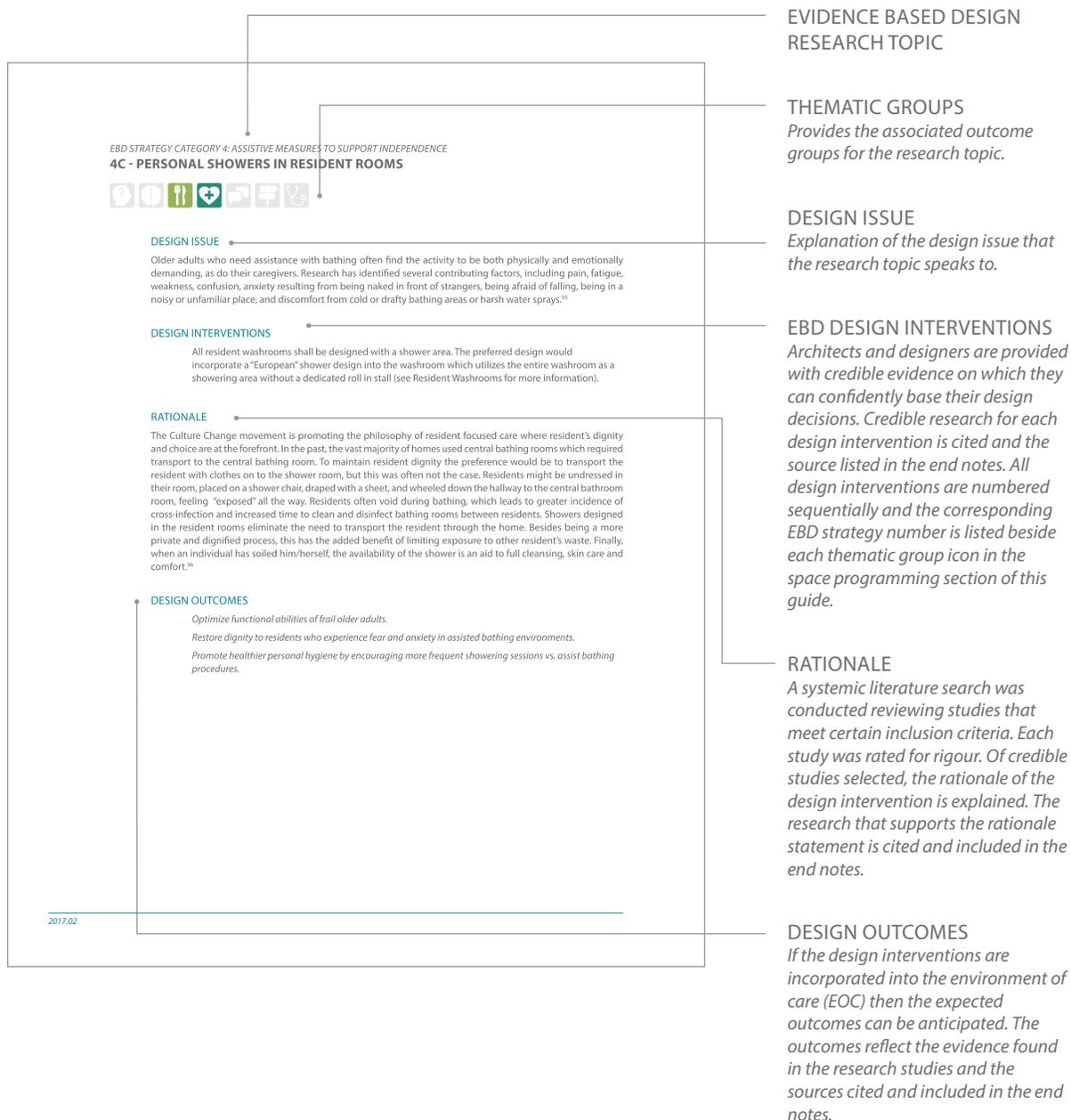
READING THIS DOCUMENT

The design guidelines have been organized into 5 distinct sections. While each section can be read independently the intention of the document is to provide a solid framework for the designer and stakeholder groups to connect the references of best practice with Research and establish the relationships between the two.

Document Framework	
Section	Description
Chapter 1	<i>This chapter provides a brief dialogue establishing the need to change in the way we approach long term care projects and how Evidence Based Design (EBD) informs us of better care environments resulting when adopting small house model concepts.</i>
Chapter 2	<i>Chapter 2 provides the culmination of over 200 research papers organized into 5 logical categories that provide dialogue supporting quality of life for residents. Each category then breaks down further into thematic groups that each describe a tangible benefit to the residents quality of life within the care environment. This section educates the reader on the application of EBD when informing the design of long term care environments. This section is more general in application and is intended to lead the reader through a series of design interventions backed by credible research that focuses on Person Centered Care.</i>
Chapter 3	<i>Chapter 3 provides a prescriptive checklist of design elements that should be followed when designing Long Term Care environments. It is organized into a logical hierarchy which describes the design requirements for the Community, the Neighborhood and the Household. This section incorporates the current provincial set of design guidelines as well as the latest versions of guidelines from other jurisdictions that have supported the small house model concept.</i>
Chapter 4	<i>Chapter 4 provides the narrative of current National Building Code and more specifically the application of utilizing a B3 occupancy vs a B2 Occupancy.</i>
Chapter 5	<i>Chapter 5 provides the reader with best case studies selected from over a dozen nationally toured long term care facilities.</i>
Appendix 1	<i>Appendix 1 provides a summary of support and the rationale behind adopting a small house model concept</i>
Appendix 2	<i>Appendix 2 provides a summary list of the Evidenced Based Design interventions selected the research papers included in Chapter 2</i>
Appendix 3	<i>Appendix 3 is a complete list of citations and footnotes included in this document.</i>

APPLYING EVIDENCE BASED DESIGN

From the conducted research, all interventions were categorized into the five design decision categories. Each research topic in these categories was then assigned the thematic groups to which the topic relates. Each research topic lists the assigned thematic groups, explains the design issue, provides strategies to address the design issue, explains the rationale behind each strategy and finally provides the expected health outcomes if the design intervention is applied to the environment of care.



CHAPTER 2

Evidence Based Design (EBD)

INFORMING DESIGN DECISIONS

The physical environment can have a therapeutic effect on individuals suffering from the various forms of cognitive disorders. EBD researchers in this field are now able to confidently provide strategies that are supported by rigorous research which inform the design of these environments. The aim of EBD is to translate these findings into design practice and connect the best available evidence with the design strategies to predict health outcomes.

This document is organized around the pillars of design that have been researched through a rigorous EBD process which support and encourage a better quality of life for residents in long term care. A quality of life in a Personal care home that extends beyond the basics of nourishment, protection, and shelter.

In addition to providing spatial program requirements, this document will introduce elements of EBD that support a lifestyle for residents beyond the typical program driven by functionality, safety, and efficiency. These guidelines will introduce language that describes the intent to create better design and operational strategies supporting quality of life for residents. It will propose strategies that encourage residents to maintain a healthy and familiar daily routine. In order to better understand what elements contribute to a positive quality of life, this design guideline will describe the impact of design decisions that can affect outcome variables of the Environment of Care (EOC).

There is an abundance of research studies utilizing EBD to inform design decisions regarding the built environment in LTC settings. This guideline incorporates the work of many of these studies and is organized around the systematic review conducted by the Centre for Health Design. 2,642 EBD records were reviewed while researching these guidelines, of which 632 papers fit the inclusion criteria for 1) Quantitative and qualitative research conducted, 2) Influence on physical environment was measured, 3) Study participants were people with cognitive impairments, and 4) All people were living in a long term care facility. After scanning these full papers, 169 studies were included for further detailed analysis. The majority of these studies (88) were conducted in the United States. 19 studies were conducted in Canada, 18 in the United Kingdom, 33 in other European countries, 5 in Australia, and 6 studies in Asia. Regarding the evidence levels, 49 studies were considered to be level 2, 62 studies were categorized into level 3a, 40 studies reached level 3b, and 18 articles were evidence level 5 (see Appendix B for the rating levels of evidence)¹

This guideline will be utilized as a basis to reveal the effectiveness of design interventions on resident quality of life - specifically the impact of design on the behaviour, cognition, function, well being, social abilities, orientation, and care outcomes of people in LTC setting. The results will be used to inform design decisions. The five main categories of supported studies used include:

CATEGORIES

1. BASIC DESIGN ATTRIBUTES

This category covers the basic design decisions when planning, designing and building long term care facilities. The basic design layouts of households / neighborhoods is the main building block that can result in positive health outcomes engaging all seven groups of design intervention. The research focuses on Special Care Units (20 papers included), small scale environments (46), low social densities (17), and building layouts (7).

2. AMBIENCE

This category covers design interventions that aim to create a pleasant and stimulating environment. In order to achieve a positive outcome to improve the behaviour and well being of residents the following design elements have been identified: a non-institutional character and personalization (21 papers included), sensory enhancement (11), and multisensory environments have been reviewed (9).

3. ENVIRONMENTAL ATTRIBUTES

This category covers all the design interventions that concern the issues of lighting (29 papers included), noise levels (11), thermal comfort (3), and the use of color, contrasts and patterns in care home settings (9).

4. ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE.

This category covers design strategies that enable elders to maintain their independence longer. The studies focus on such strategies to support nutrition intake (7 papers reviewed), ambulation assist (4), personal hygiene (8), fall prevention (5) and incontinence avoidance (5).

5. ENVIRONMENTAL INFORMATION

This category covers design strategies which focus on orientation and wayfinding so wandering behaviours and elopement can be controlled. These studies are focused on visual cues (11 papers reviewed) and physical barriers (10) as design elements.

After the studies were assigned to one of the five main categories they were further summarized into seven thematic groups. Each group has listed a series of outcome variables that contribute to improving the Quality of life for residents.

EBD Outcome Group Icons						
Behaviour	Cognition	Function	Well Being	Social Abilities	Orientation	Care Outcomes
						
68 papers cited	12 papers cited	20 papers cited	23 papers cited	31 papers cited	19 papers cited	33 papers cited
<ul style="list-style-type: none"> • Agitation • Aggression • Eating Behaviour • Wandering 	<ul style="list-style-type: none"> • Attention • Cognitive performance 	<ul style="list-style-type: none"> • Activities of Daily Living • Falls • Mobility 	<ul style="list-style-type: none"> • Depressive symptoms • Mood 	<ul style="list-style-type: none"> • Engagement • Social interaction 	<ul style="list-style-type: none"> • Wayfinding 	<ul style="list-style-type: none"> • Medication • Oral intake • Sleep hygiene

Evidence Based Design (EBD)

THE DEFINITION OF BASIC DESIGN ATTRIBUTES

This category covers the basic design decisions when planning, designing and building long term care facilities. The basic design layouts of households / neighborhoods is the main building block that can result in positive health outcomes engaging all seven groups of design intervention. The research focuses on Special Care Units (20 papers included), small scale environments (46), low social densities (17), and building layouts (7).

Evidence shows that providing segregated care in Special Care Units (SCU) has a tangible impact on resident behaviour, their social abilities, and care outcomes. Studies of residents with cognitive impairments living in small-scale environments indicate mainly positive effects on all outcomes investigated; strong evidence was found for improved social abilities, functionality and well being. This is further supported by findings showing that a low social density is positively associated with residents' behaviour and care outcomes.²

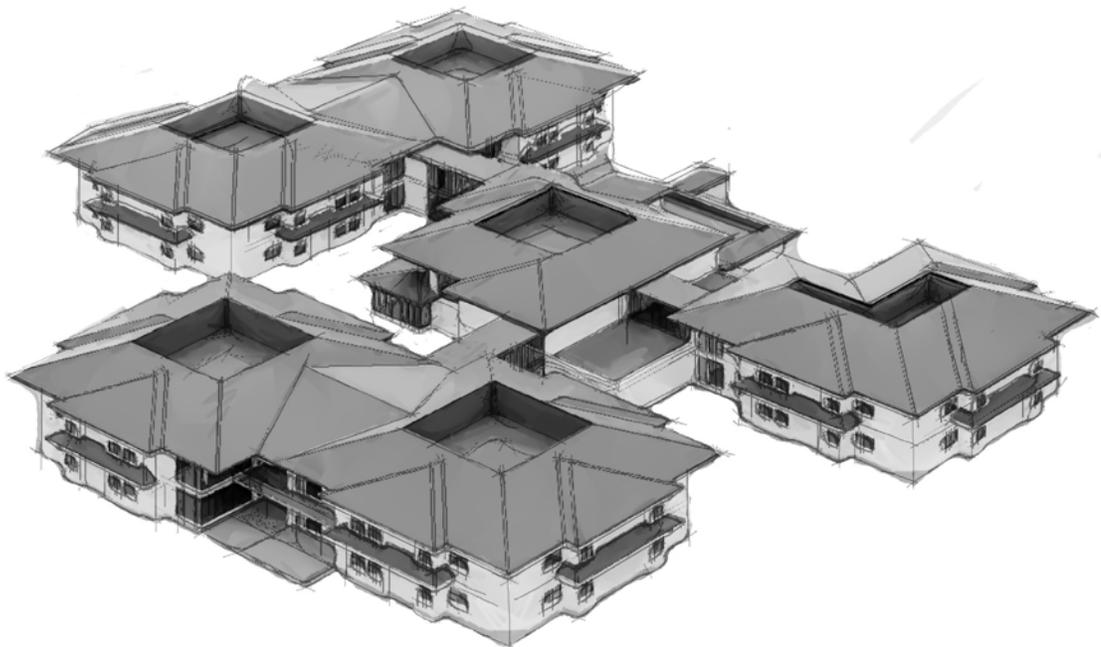


Figure 1: Small house model village concept illustration. MMP Architects, 2017.

*EVIDENCE BASED DESIGN
CATEGORIES LEGEND*

CATEGORY 1: BASIC DESIGN ATTRIBUTES

- 1A - BUILDING LAYOUTS
- 1B - POPULATION SIZES
- 1C - SPATIAL HIERARCHY
- 1D - ACCESS TO OUTDOORS

CATEGORY 2: AMBIANCE

- 2A - RESIDENTIAL CHARACTER
- 2B - RESIDENTIAL KITCHENS
- 2C - FLEXIBILITY AND AUTONOMY
- 2D - CONTROL OF PERSONAL SPACE
- 2E - IMPORTANCE OF ART

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES

- 3A - OPTIMUM LEVELS OF STIMULATION
- 3B - EXPOSURE TO LIGHT
- 3C - COLOUR AND CONTRAST
- 3D - TEMPERATURE AND AIR QUALITY

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE

- 4A - TOILETING AND BATHING STANDARDS
- 4B - INCONTINENCE AVOIDANCE
- 4C - PERSONAL SHOWERS IN RESIDENT ROOMS
- 4D - REDUCTION OF PATIENT FALLS
- 4E - FEATURES FOR AMBULATION

CATEGORY 5: ENVIRONMENTAL INFORMATION

- 5A - PURPOSEFUL WANDERING
- 5B - ORIENTATION AND WAYFINDING
- 5C - LOCATING INDIVIDUAL RESIDENT ROOMS
- 5D - EXITING AND ELOPEMENT

1A - BUILDING LAYOUTS



**See Appendix B for small house model research.*

DESIGN ISSUE

Decisions on the building's spatial layout are among the first steps when designing care environments. This process involves choosing the size and shape of hallways and the distribution of residents' rooms as well as common spaces. Staff need to unobtrusively monitor residents throughout the interior and exterior common spaces. Emphasis in dementia care should move towards creating an environment which offers a better balance between quality of life, perceived well-being and care delivery. Studies have shown conclusively that designing smaller scale clusters has produced a more positive quality of life for residents (see Appendix B for a bibliography of research that indicates better outcomes for small house building layouts).

DESIGN INTERVENTIONS*

1. Organize the Facility into Households that are as small as staffing and servicing efficiencies will permit. Provide no more than 14 residents to a household. The traditional model is 10-12.
2. Include familiar spatial organization similar to that found in a typical house/home.
3. Design the spaces to allow residents to move freely within the household and from one room to another without having to use a corridor (ie. rooms are laid out contiguous to each other).
4. Eliminate corridors whenever possible. This includes eliminating typical double loaded corridors that serve entire households. Should corridors be incorporated they should serve an immediate section of resident bedrooms of not more than 6 residents. Bedrooms should not open up directly into main corridors that serve as the general circulation for a "ward".
5. Design spaces so that allocentric orientation is possible (see wayfinding).
6. Provide multiple opportunities for intimate or private conversation that are comfortable, designed for couples or small groups
7. Do not create dead end corridors.
8. Utilize a form of cluster plan that centralizes shared spaces amongst resident bedrooms. This accomplishes maintaining line of sight to significant spaces such as hearth (kitchen) living and dining areas (see examples following this section for suggested cluster plan layouts).
9. Features such as windows or wall openings between spaces for visual connections, minimized hallway distances, and areas that promote staff presence should be included.
10. Incorporate passage or transitional space connecting 2 households, with the ability to keep it open or closed. This allows 2 households to combine for programmed activities if desired, for residents to leave their home to "visit the neighbours", and provides easier capability for limited staff to monitor 2 households during the night.

RATIONALE

Inherent in the residential model is the idea of small groups of residents living in households with their own space for dining and common activities. Households in four facilities studied house either 10 or 12 residents, and it was found that this grouping facilitates resident-centered care and supports personal relationships among the residents, their families, and the direct care staff.³ It is increasingly recognized that PCH environments should have a home-like atmosphere, since residents with dementia can live several years in a care facility and will benefit from a familiar environment. By providing the familiar feel, character, and scale of a home, residents are likely to adapt more quickly to their new surroundings. Several studies also indicate involvement in activities is very important for the quality of life for residents, and continued activity with familiar daily tasks such as household chores are

supported better in a small scale environment. There should be designated zones for pastimes such as casual conversation, dining, cooking, and watching television. Research findings also suggest that a home-like atmosphere may offer better opportunities for residents to be involved in other additional common activities, such as listening to music, watering plants, reading, cleaning, or having a group conversation in the shared living room.

DESIGN OUTCOMES ^{4 5 6 7}

- Residents in small-scale living environments had a better cognitive and functional status, than residents of traditional institutional style PCHs.
- Residents of care facilities that more closely follow spatial character and scale of a personal residence are more likely to become engaged in socialization and activities.
- Small scale home-like environments evoke positive outcomes such as higher emotional well-being, pleasure, and social interaction among residents and with the care staff, and with less anxiety, agitation, and depression.
- Decreased use of psychotropic medications.
- Better staff rapport with residents.
- Less resident abuse.
- More activity involvement for impaired residents.
- Less resident agitation/anxiety, depression, withdrawal, behavioural and mood disturbance, delusions, hallucinations, psychosis, aggression and phobias.
- Less pressure ulcers and restraint use.
- Fewer resident conflicts over space and less aggressiveness.

HOUSEHOLD MODELS

BASIC LONG WING PLAN

This spatial layout works well when introducing multiple wings that can serve each independently as a household. Grouping these wings can create a common core that provides shared space for administration such as bathing rooms, staff conference, soiled utility rooms and other shared services between households. This spatial organization maximizes one long wall for natural light.

LEGEND

● Resident Room	● Service / Support
● Activity / Dining	● Outdoor Space

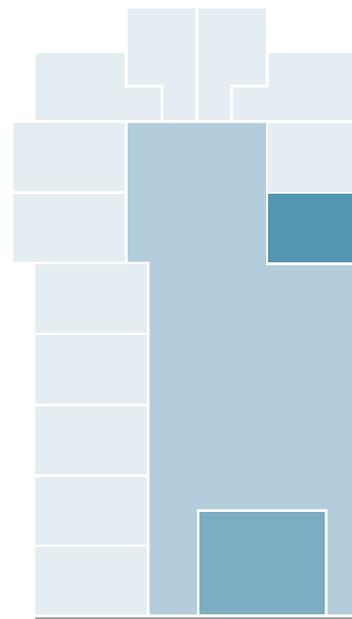


Figure 2: Basic long wing plan concept illustration. MMP Architects, 2017.

1A - BUILDING LAYOUTS CONTINUED

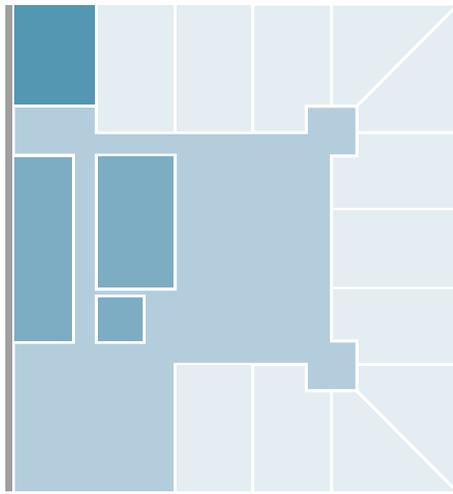


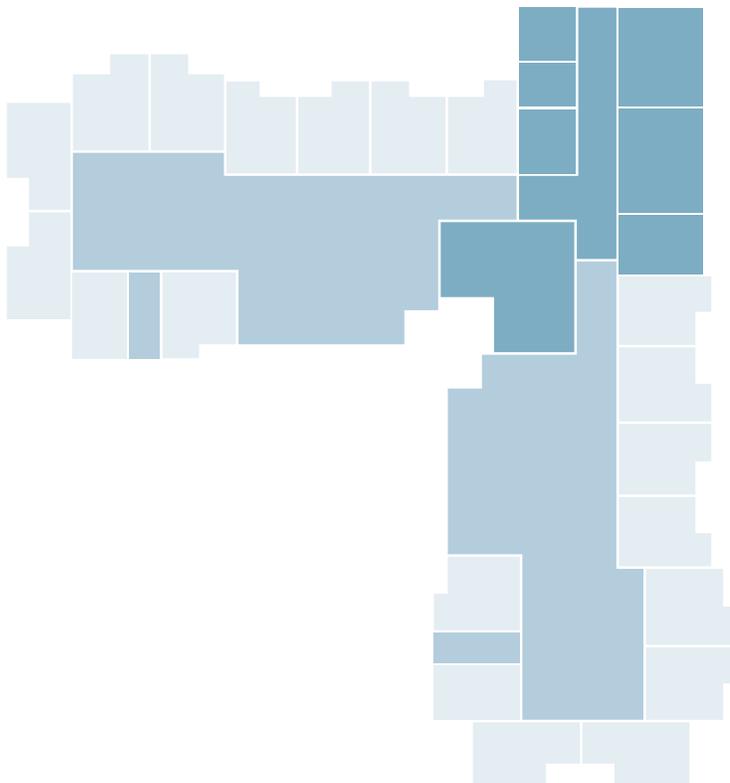
Figure 3: Basic square household concept illustration. MMP Architects, 2017.

BASIC SQUARE HOUSEHOLD

This spatial layout can be clustered quite easily to form a townhouse model. Many best practices utilize this organization to create households due to their efficient use of social space. Other benefits include easy wayfinding as all rooms are visible from the central core of the household. Disadvantages include limited opportunity for window walls thus driving the dining area deeper into the floor plan.

LEGEND

● Resident Room	● Service / Support
● Activity / Dining	● Outdoor Space



L- PLAN

This spatial organization works extremely well when designing larger projects beyond 100 residents. The L shaped wings offer a private outdoor courtyard shared only by the two households. Each household is autonomous but still shares a common core of support services. If challenged to reduce area and a small house model cannot be achieved this plan can utilize the central core as common resident space shared between 24 residents for activity and dining spaces while still providing separate lounge and living spaces within each household.

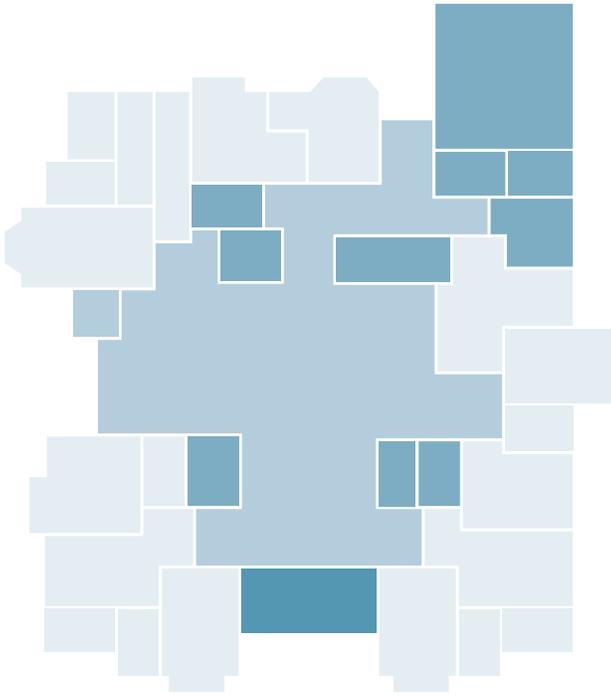
LEGEND

● Resident Room
● Activity / Dining
● Service / Support

Figure 4: L-plan concept illustration based on Windsor Elms. MMP Architects, 2017. Fairmouth NS. William Nycum Associates.

QUAD PLAN

This model is an appropriate model to adopt where smaller densities are planned. The floor plan can be mirrored to double the density of the building structure to accommodate 24 individuals or maintain the single plan as shown for an independent small house model of 12 residents. This model is especially desirable to integrate seniors into the community fabric while living in a residence closely resembling a single family dwelling.



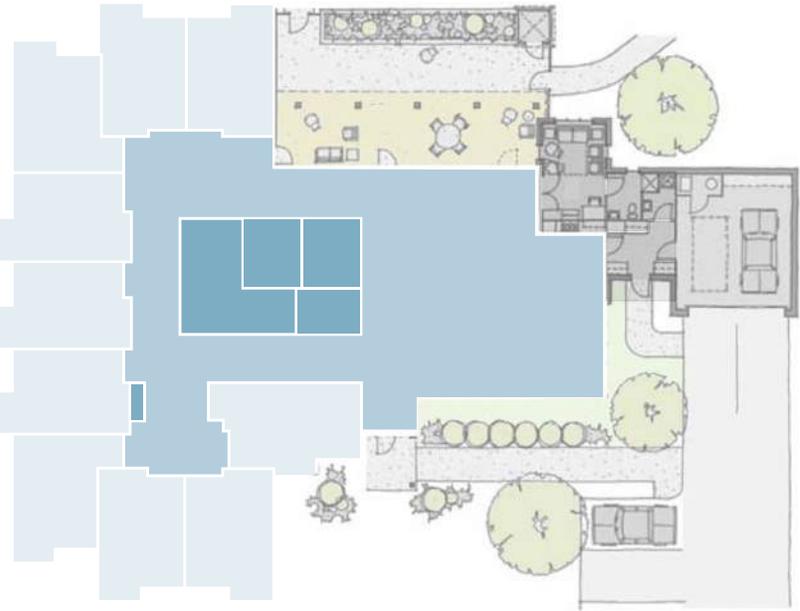
LEGEND

● Resident Room	● Service / Support
● Activity / Dining	● Outdoor Space

Figure 5: Quad plan concept illustration of St John's Senior communities. MMP Architects, 2017. SWBR Architects.

TRADITIONAL BEDROOM CONCEPT

This spatial organization most closely resembles the same organization one would find in a single family residence. The bedroom wing is off to one side and separated from the living and activity areas. This organization works well to promote privacy for residents however may be more difficult to supervise and may not be as appropriate for individuals with lower functional abilities. This model also works extremely well as infill residences in a community.



LEGEND

● Resident Room
● Activity / Dining
● Service / Support

Figure 6: Traditional bedroom plan. MMP Architects, 2017.

1A - BUILDING LAYOUTS CONTINUED

COMMUNITY MODELS



TOWNHOUSE MODEL 1

The townhouse model is an example how higher densities can be achieved by clustering households to form neighbourhoods (3 households form the neighborhood). All neighbourhoods can then be linked back to a common core providing support services, amenities and a downtown. If clustered creatively the negative spaces between the households can form private outdoor spaces that are secure and dedicated to the house (see Basic Design Attributes-Access to outdoors).

Figure 7: Townhouse model concept illustration. MMP Architects, 2017.

TOWNHOUSE MODEL 2

This concept illustrates another example of how higher densities can be achieved using a basic square configuration clustered to create neighbourhoods of 24. Advantages of utilizing the basic square configuration is that the form is easy to cluster and create separate buildings interconnected by a series of walkway connections. The central core between two households is efficient and by including only 12 residents per household a large corner can be left open for ample daylight for socialization spaces. This concept can also be stacked by designing outdoor decks adjacent to the living areas. This concept plan as illustrated includes vertical circulation dividing the two bedroom wings. This concept is illustrated in the case studies (Bridgwater Personal Care Home).

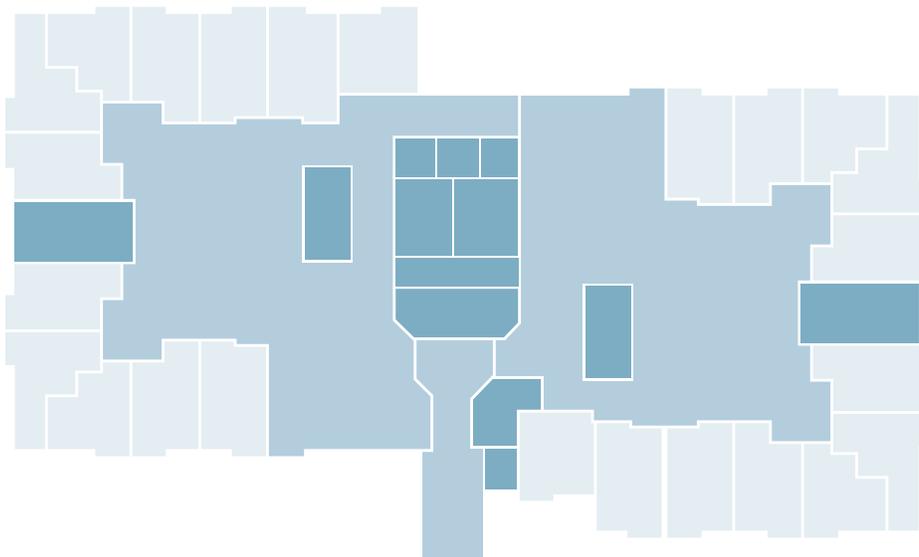


Figure 8: Townhouse Model 2, Bridgwater PCH. MMP Architects, 2017..

HIGH DENSITY CLUSTER CONCEPT

This plan increases the household population to include 14 residents. (while decreasing social density) The concept illustrates how higher densities can be accommodated efficiently while still maintaining autonomous households. Sharing a small central core for support staff and services the concept utilizes a version of two basic square plans offset to each other to effectively provide ample daylight into the social zones of the floor plan. The corner configuration is an interesting solution for often awkward conditions. The floor plan could easily be stacked however would require better utilization of edge condition to include access to outdoor space. This plan is featured in the case studies (Levondale Hebrew Geriatric Centre).



Figure 9: High density cluster, Levindale Hebrew Centre. MMP Architects, 2017. Caplan Mach Inc. Architecture.

1B - POPULATION SIZES



DESIGN ISSUE

Previous traditional PCH models were based on staffing and medical efficiencies; this is the primary reason for grouping 20 residents (typically) to a single unit. Two units are then controlled by a central station. However, the vast majority of all studies on population size promote smaller groupings as a healthier environment for residents (see Appendix B for a bibliography of research that indicates better outcomes for small group populations).

DESIGN INTERVENTIONS ⁸⁹

11. Create individual households where 10-14 residents share a common house or cottage. Two households can be linked or adjoin each other to share common support spaces such as admin spaces, soiled and clean linens, mechanical and electrical, and staff-assist bathing suites.
12. Households should provide a shared, resident-accessed kitchen, (see kitchen design section for access limitations) dining area, and living room, plus secure outdoor space appropriate in scale for smaller populations. Focus on maintaining an intimate setting which attracts small group socialization much the same way a private home kitchen serves as the hub of the family gathering and socialization.
13. Within the household, provide small group spaces with some visual and acoustic privacy. These spaces can be used by residents who get easily overwhelmed by crowds and noise - a common symptom of Alzheimer's disease that can result in behavioural issues and distractions. For instance, large, noisy dining spaces have been linked with an individual's reduced food intake.
14. Avoid multi-purpose rooms for residents associated with the household or neighbourhood. Though the general concept of flexibility is important so the building can evolve over time, multi-purpose spaces are not recommended since a person with Alzheimer's disease may not adapt to the room's changes in use and expected social patterns. A multipurpose room can be included outside of the neighbourhood community for larger group gatherings; however it should be located in a main separate building or distinct separate zone.
15. Create spaces that can house shared activities between households. If smaller numbers of residents per household want to participate in an activity, operational efficiency can be gained by grouping two smaller resident groups together for that activity.

RATIONALE

People with Alzheimer's disease can easily be overwhelmed, confused and/or distracted when faced with large groups or spaces. This applies to activity participation, meal times, and even residential living arrangements. Residents can often function better in quieter, smaller groups. In addition, these small-sized groupings support resident-centered care and personal relationships among the residents, their families, and professional caregivers — an important factor given that social support has long been known to affect an individual's emotional and physical health and general well-being.¹⁰ Smaller living units provide many opportunities for residents to interact with one another and to engage in self-care skills. In this sense higher functioning individuals can share a common household where activities promote the continuation of familiar daily routines. There is very good evidence that small group clusters will provide environments that are associated with higher levels of cognitive and behavioural functioning. Additionally having the flexibility of grouping populations into smaller households we maintain the ability to have two neighbouring households open up to each other where resident function and manage the stimulus of larger social settings. Conversely, lesser functioning individuals can be placed in an environment better suited to their needs where a maximum of 12 like individuals share a household where outbursts and confusion may be more readily controlled and accepted.

The small house model supports those with cognitive impairment by consciously implementing changes in philosophy, environment, daily life, and staff understanding of care. Architectural, social, emotional, and psychological cues are built into the environment to make the space home-like. Individuals with cognitive disorders are provided with a familiar environment that is more easily identified as home. The small house model is rooted in home—the warm, private, familiar, comforting, safe, and predictable living spaces that people have created for themselves all their lives.¹¹

DESIGN OUTCOME*

- *Small house projects reflect observed behavioural changes in residents with cognitive impairment, including decreased wandering, pacing, and aggression and increased engagement.*
- *A smaller number of residents per living area facilitate orientation and wayfinding.*
- *Residents or families of the small houses reported better quality of life on 7 of the 11 subscales (privacy, dignity, meaningful activities, relationship, autonomy, food enjoyment, and individuality) than those in traditional nursing homes.*
- *Small house residents also reported greater satisfaction, emotional well-being, functioning, and mobility. In addition, they had lower prevalence of bed rest, fewer residents with little or no activity, less depression, and a lower incidence of decline in ADL's*

**See Appendix B for small house model research.*

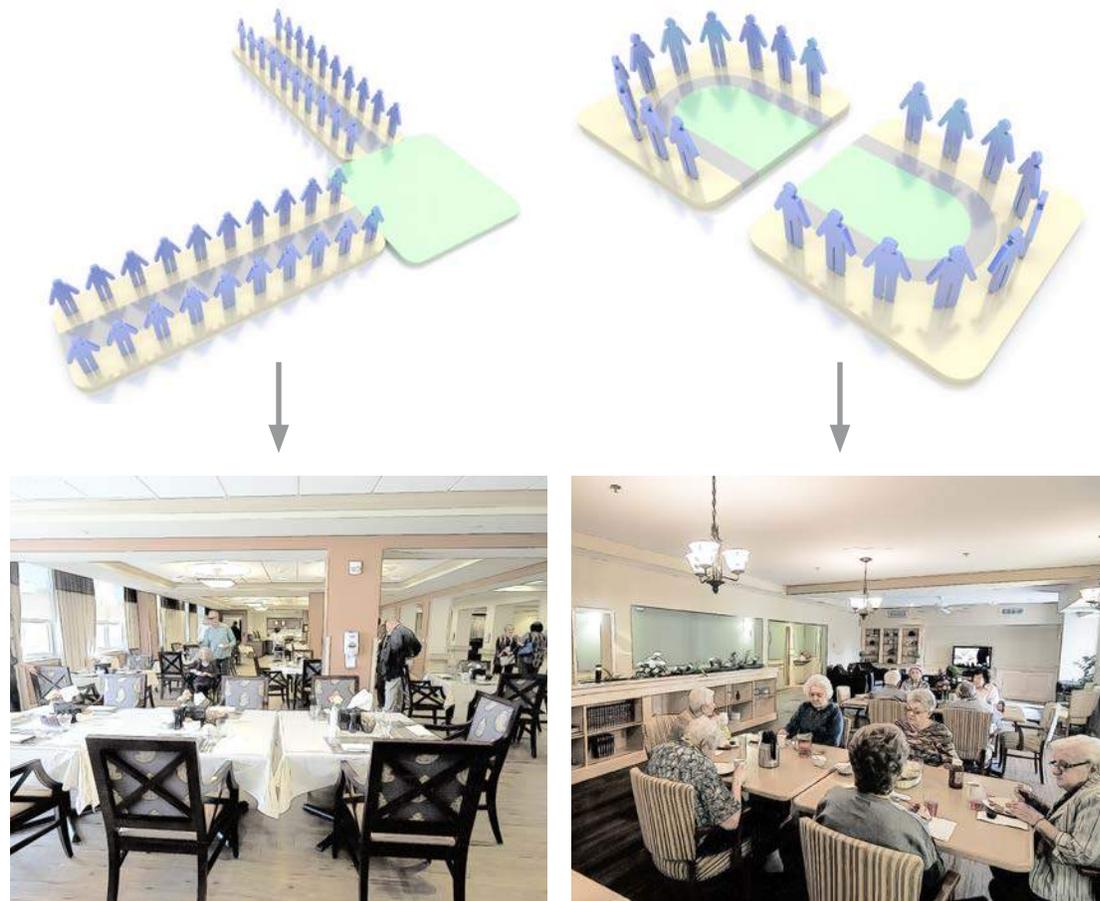


Figure 10: Institutional planning vs small house concept illustrations. MMP Architects, 2017.

Figure 11: Westminster Memory Care. Photo Credit R.Wublowky, 2017. Austin, TX.

Figure 12: Irene Baron Eden Centre. Photo Credit R.Wrublowky, 2015. Winnipeg MB.

1C - SPATIAL HIERARCHY



DESIGN ISSUE

Residents often do not have the opportunity for individual quiet time or conversation one-on-one with other residents due to the lack of opportunity of rooms suited for varying functions. Often the resident only has two choices of space, either personal bedroom space or full group activity space. There is often no semi-private small lounge or sitting opportunities providing choices for socialization. The challenge is to create environments that provide privacy, opportunities for movement, and safety for all residents using the least restrictive methods possible.

DESIGN INTERVENTIONS ^{12 13}

16. Design intermediate spaces that allow for transitions between private and public areas. Bedrooms are the most private spaces that belong to residents. When designing to the context of a small house model the absence of corridors can make separation between bedroom and living spaces difficult. The designer should incorporate the separation of the 4 major types of space found within the household. These include:

- *Private spaces: Resident Bedrooms / Resident Bathrooms.*
- *Semi Private Spaces: Transitional spaces between bedroom egress and living spaces. This may be simple as creating a "front porch" zone in front of resident room areas which provides demarcation between room and semi-public activity areas.*
- *Semi Public spaces: Living and activity areas shared primarily by residents who belong to the same household or neighbourhood. Visiting loved ones will also become guests of the home and be invited to share living room and kitchen areas. Creating a sense of "guest in the home" helps the residents identify their space as their own home and will be more comfortable accepting visitors. Quality of visitation is much improved when this relationship of homeowner and guest is reinforced.*
- *Public Spaces: areas intended for group functions which bring mixed resident household populations and visitors together.*

RATIONALE ^{15 16}

The provision of rooms for different functions provides the greatest opportunity for freedom of choice for residents to move freely within their environment. Residents in facilities with more individual rooms and more opportunities for personalization tend to experience less anxiety and aggression. The provision of common areas that vary in ambiance is associated with reduced depression, social withdrawal, misidentification and hallucinations. A well

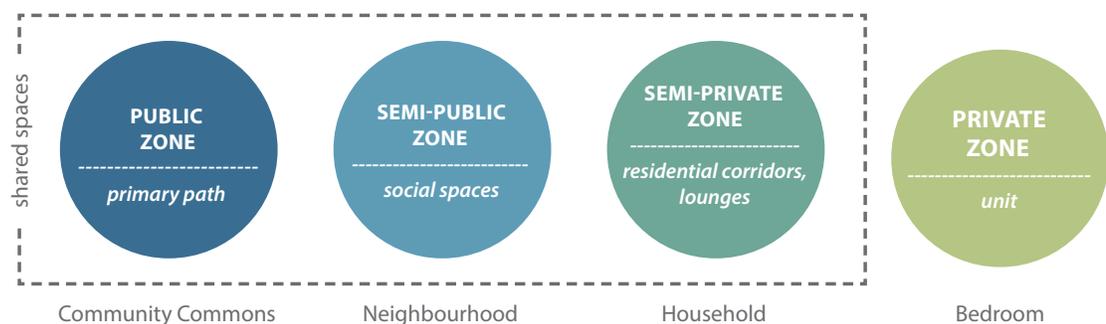


Figure 13: Privacy zones concept illustration. MMP Architects, 2017.

gradation of space is associated with resident quality of life, highlighting the necessity for design guidance to emphasize a variety of spaces. The availability of private rooms has been shown to reduce irritability and improve sleeping patterns in people with advanced Alzheimer’s disease and other related disorders.

DESIGN OUTCOMES ¹⁷

- Residents will have better opportunities for socialization and become less agitated.
- Residents will have more variety in the type of semi private spaces available to them.
- Residents who experience greater freedom through open concept design, and hence have less conflict about trying to leave the household, feel a greater sense of control and empowerment, leading in turn to less depression.
- Environments that establish the familiar spatial hierarchy of a residential home, (living room, dining room, kitchen, private bedroom zone), where sensory input is more understandable and where such input is more controlled, residents tended to be less verbally aggressive.

SPACE PROGRAM DIAGRAM - 60 RESIDENTS

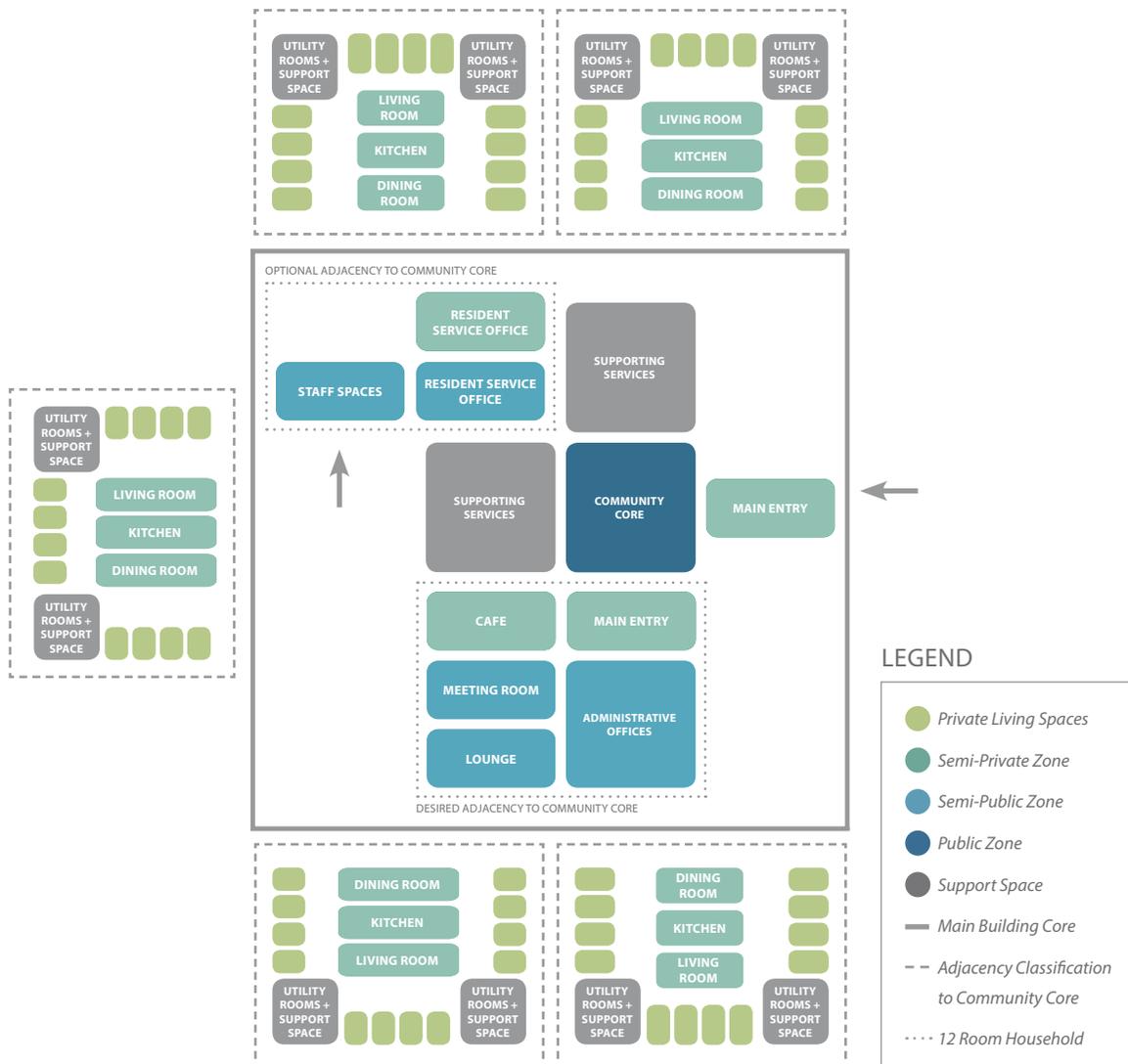


Figure 14: Space program design concept illustration. MMP Architects, 2017.

1D - ACCESS TO OUTDOORS



DESIGN ISSUE

Many long term care homes do not provide easy access to outdoor natural environments due to safety concerns, or physical design limitations. Access to nature provides access to daylight, but also exposes people to the natural elements as well as engagement to nature. All residents within a long term care environment are entitled the opportunity to move about freely in a safe and secure outdoor environment. It is considered unethical to restrict residents' access to outdoors if they wanted to go outside.¹⁸

DESIGN INTERVENTIONS^{19,20}

17. Provide easy access to an outdoor space. The best location to provide access is from the central activity areas where residents can visually see and freely access a safe outdoor patio area.
18. Provide decks on upper storeys so that each household has their own outdoor environment.
19. Consider including enclosed courtyards within the building footprint. These courtyards are fully enclosed and secure by nature of being surrounded by the building(s), allowing residents free access without fear of wandering away from the facility.
20. Consider including outdoor activity amenities such as active bird feeders, walking paths, and raised gardens. Outdoor space should support passive as well as active activities.
21. Ensure all outdoor areas remain wheel chair and walker accessible. Consider materials used on pathways to ensure no uneven surfaces or tripping hazards over time.
22. Carefully consider plants used in outdoor spaces to avoid poisonous plants.
23. Secure outdoor spaces with perimeter fencing at least six feet high, and camouflage the fencing with landscape design features such as trees or shrubs so it does not attract residents' attention or feel prison-like. In addition, the fence and landscaping should not have ladder-like elements that could be used for climbing and furnishings should also prevent a resident from scaling the fence.
24. Construct walking paths that are continuous and loop back to building entrances. There should be "multiple cues that reduce demand on the user, allowing one to enjoy walking in a natural environment without the frustration of figuring out how to return.
25. There are two distinct forms of outdoor space that the designer needs to be familiar with. Together with the landscape consultant the designer should understand the differences and benefits of a healing garden, vs. a horticultural and therapeutic landscape. The most common outdoor space designed for long term care homes is a sensory garden (a form of healing garden) with a section of horticultural gardening which may include elements such as raised garden beds.
26. Consider building in raised planting beds where residents can participate in gardening activities. Beds should allow residents to sit on the edge while working or drive a wheelchair alongside.
27. Provide sufficient resting spots (benches) along longer walkways, or handrails to assist those with mobility issues. Handrails can provide short term rest areas by leaning on them, and also assist with balance for those who require it. Seating will also allow multiple areas for passive enjoyment; ensure some areas also allow for wheel parking off the main walkway paths.

RATIONALE

There is a recently resurrected body of knowledge that supports the long held view that our natural surroundings can have a profound effect on people's health, well-being and quality of life. Nature is restorative and has healing powers.²¹ With this in mind, gardens and outdoor environments are increasingly being re-introduced as an im-

portant support tool in the care, behaviour management and contributor to the quality of life, of people. Gardens designed to support people with dementia provide therapeutic activities designed to maximise retained cognitive and physical abilities and lessen confusion and agitation often associated with the condition.²²

OUTCOMES^{23 24}

- Well being benefits including reduced stress, anxiety, blood pressure and muscle tension.
- Opportunities for socialization.
- Bright light exposure and sunlight therapy. Maintain circadian rhythms.
- Contributes opportunities for ADL tasks (gardening, walking, and bird watching).
- Contributes to risk management programs in LTC settings by reducing incidents of aggressive behaviour.
- Produces higher cognition scores.
- Supports better sleep hygiene.
- Reduction in high dose anti-psychotics and other medications.
- Residents who spend more time outdoors sleep less during the day and appear to enjoy the outdoors, as evidenced by a simulation in which residents with dementia spent significantly more time in a simulated outdoor corridor than a bare one, exhibiting a trend toward less trespassing, exit seeking and other agitated behaviours, and also a significant increase in interest and pleasure and less anger and anxiety.
- Opportunity to exercise or participate in daily living outdoor activities, such as gardening.

LANDSCAPE MODELS



Figure 15: Pathway garden concept illustration. Spearman Landscape Architect, 2017.

1D - ACCESS TO OUTDOORS CONTINUED



Figure 16: Large garden concept illustration. Spearman Landscape Architect, 2017.

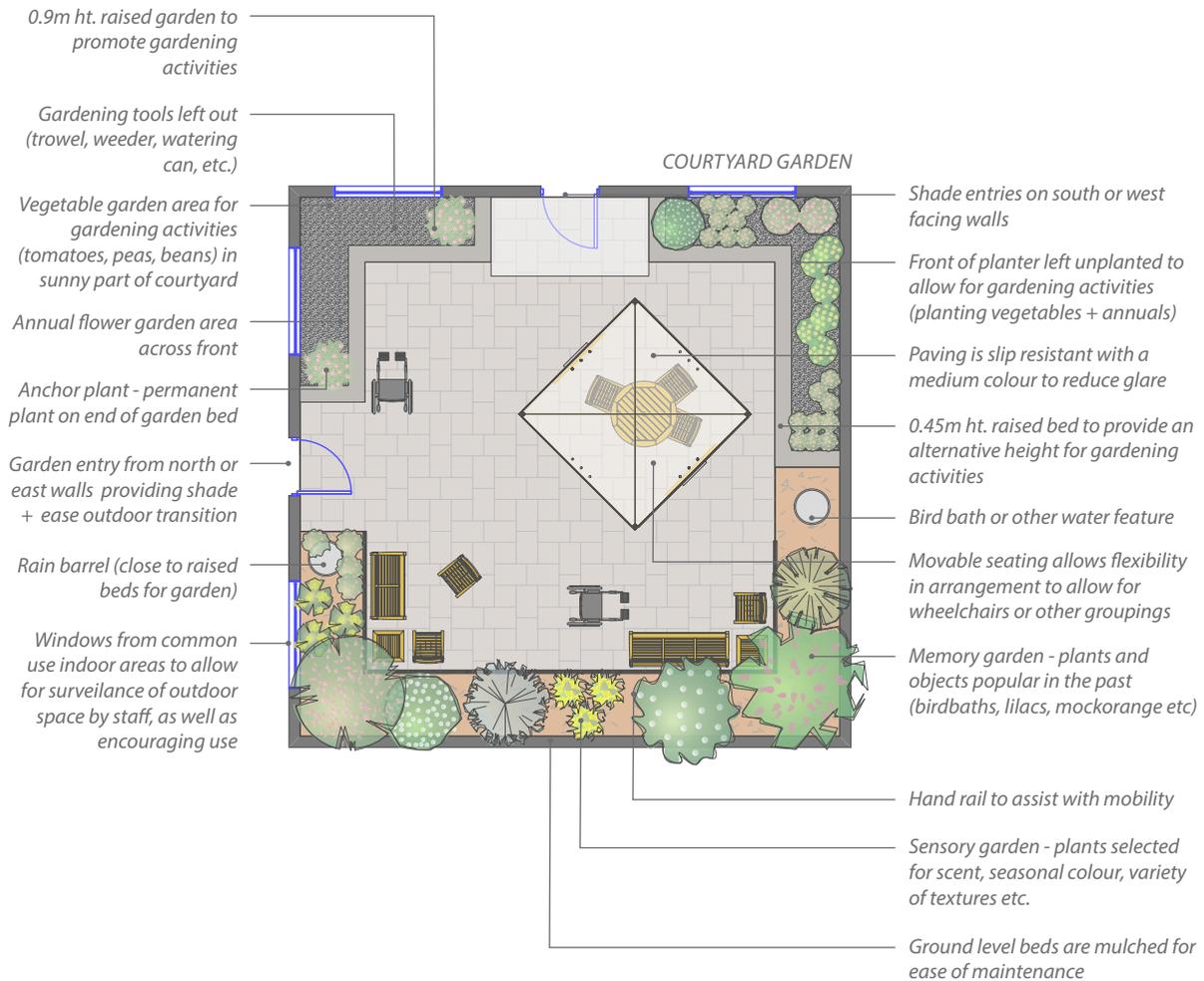


Figure 17: Courtyard garden concept illustration. Spearman Landscape Architect, 2017.

Evidence Based Design (EBD)

CATEGORY 2: AMBIANCE

This category covers design interventions that aim to create a pleasant and stimulating environment. In order to achieve a positive outcome to improve the behavior and well being of residents while providing autonomy and preservation of dignity. The following design elements have been identified: a non-institutional character and personalization (21 papers included), sensory enhancement (11), and discussions on multisensory environments (9).

Offering residents an environment that does not have an institutional design but has a homelike appearance and allows for individual transformations has positive effects on behaviour, well being, social abilities, and care outcomes. Among other results, residents were found to display fewer behavioural disturbances, experience a higher quality of life, and interact more with each other and staff. A homelike, personalized environment provides the frame for less institutional care routines and thus is beneficial for people with dementia. For example, studies suggest that a homelike dining room atmosphere characterized by residents dining in a small group with familiar mealtime routines where residents can serve themselves, results in improved eating behaviour and more communication. Further, the environment needs to provide sensory stimulation through visual, auditory, tactile, and olfactory stimuli. Evidence shows that unwanted behaviour, especially agitation, can be reduced and care outcomes will be improved.²⁵



Figure 18: Leonard Florence Centre for Living. Photo Credit R.Wrublowsky, 2016. Chelsea, MA. DiMella Shaffer Associates.

*EVIDENCE BASED DESIGN
CATEGORIES LEGEND*

CATEGORY 1: BASIC DESIGN ATTRIBUTES

- 1A - BUILDING LAYOUTS
- 1B - POPULATION SIZES
- 1C - SPATIAL HIERARCHY
- 1D - ACCESS TO OUTDOORS

CATEGORY 2: AMBIANCE

- 2A - RESIDENTIAL CHARACTER
- 2B - RESIDENTIAL KITCHENS
- 2C - FLEXIBILITY AND AUTONOMY
- 2D - CONTROL OF PERSONAL SPACE
- 2E - IMPORTANCE OF ART

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES

- 3A - OPTIMUM LEVELS OF STIMULATION
- 3B - EXPOSURE TO LIGHT
- 3C - COLOUR AND CONTRAST
- 3D - TEMPERATURE AND AIR QUALITY

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE

- 4A - TOILETING AND BATHING STANDARDS
- 4B - INCONTINENCE AVOIDANCE
- 4C - PERSONAL SHOWERS IN RESIDENT ROOMS
- 4D - REDUCTION OF PATIENT FALLS
- 4E - FEATURES FOR AMBULATION

CATEGORY 5: ENVIRONMENTAL INFORMATION

- 5A - PURPOSEFUL WANDERING
- 5B - ORIENTATION AND WAYFINDING
- 5C - LOCATING INDIVIDUAL RESIDENT ROOMS
- 5D - EXITING AND ELOPEMENT

2A - RESIDENTIAL CHARACTER**DESIGN ISSUE**

A setting that has an institutional look and feel is not a “home.” The residential quality of the building is very important, inside and out. Building massing (i.e., the building’s volume and shape) and internal layout, hierarchies of space and circulation (i.e., hallways, stairways, elevators, lobbies), materials and furnishings, color palettes, inaudible alarm/alert systems, and even room names (e.g., a “living room” or “den” versus a “lounge”) can make a big difference.²⁶ Personal care home guidelines will include language in its documentation that describes the physical environment to be of “residential character”, or “home like”. But the translation of this gesture often does not always manifest itself into the physical environment in a meaningful manner. Design of the physical environment is increasingly recognized as an important aid in the care of people with Alzheimer’s disease and other dementias. Facility administrators and designers now view the design of long-term care, assisted living, and other environments as more than simply decorative.²⁷

DESIGN INTERVENTIONS²⁸

28. Remove medical icons from the environment. This includes nursing stations, medication carts, uniforms on caregivers, wall hangings that only provide information (ie. handwashing instruction).
29. Design spaces so that smaller groups function autonomously. Households with smaller population sizes reduce over stimulation. Larger unit size (greater than 14 residents are associated with higher resident agitation levels and increased intellectual deterioration and emotional disturbances).
30. Select furniture that resembles furniture one would place in their own home. Many health care furniture products are still designed to hospital appearance and function, but more home-like products are available. There are also many healthcare appropriate fabrics for upholstery that provide a softer tactile experience to the resident (see section on furniture design for more information).
31. Encourage personalization of rooms. Design opportunities that will support personal items, pictures and furniture within the private space of a resident’s bedroom.
32. Design dining areas that provide the optimal dining experience. Provide a larger table for larger groups of higher functioning individuals to sit together family-style while providing smaller tables for those in need of assistance.
33. In addition to bedrooms, households should provide a shared, resident-accessed kitchen, dining area, and living room, and secure outdoor space. Additional areas for residents within the household may include (but are not limited to) a spa/bathing room, small den and/or activity space
34. Within the household, provide small group spaces with some visual and acoustic privacy. These spaces can be used by residents who get easily overwhelmed by crowds and noise, a common symptom of Alzheimer’s disease that can result in behavioural issues, agitation, and distractions. For instance, large, noisy dining spaces have been linked with an individual’s reduced food intake.
35. Exterior massing should be articulated (with distinct elements and walls that jog to create different planes, rather than a solid, monolithic façade) and at a scale that relates to a person (i.e., “human-scale”), with residential detailing and materials appropriate to the building’s locale.
36. Provide a distinct entrance to each household complete with all the elements consistent of a home entrance. Front porch, mailbox, door bell, exterior materials, and so on. The household entrance IS the front door to each person’s residence no different than the front door in your own home.
37. Rooms are arranged enfilade, which means walking through rooms rather than hallways to get to a place (e.g., walking through the living room to enter the dining room).
38. Include familiar spatial relationships as you would find in one’s home. This would bring a family

dining room adjacent to a living room. Access to an outside porch should be designed from either the living area or dining area as the kitchen is central to the household plan.

RATIONALE

As the nursing home is reconceptualised from a hospital to a home, the familiarity of home provides a guiding force for practice and design. In past, this had often been lost in favour of a more commercial or “home” institutional approach, given a PCH is considered a “facility” and was designed to address an increasing concern for resident safety. The idea of “home” provides clarity for not only the physical environment, but also the organizational structure that supports and nurtures daily routines and spontaneous activity.²⁹ Many PCH designs attempt to be “home-like” but fail in the execution, as conceptually the designer is still thinking in terms of a large scale facility. The physical environment must go beyond the aesthetic of simply including residential looking finishes, artwork, and domestic furniture. An environment that feels more like the homes they left behind is more comforting and familiar for residents, as opposed to one that is more characteristic of an institution. A “home” environment encourages residents to continue to participate in activities that are familiar from their past lives, in spaces that are similar in scale and form to what they recently left behind.

OUTCOMES³⁰

- *Non-institutional environments characterized as having homelike or “enhanced” ambiance (personalized rooms, domestic furnishings, natural elements, etc) are associated with improved intellectual and emotional well-being, enhanced social interaction, reduced agitation, reduced trespassing and exit seeking, greater preference and pleasure, and improved functionality.*



Figure 19: Living Room at White Oak Cottages. Photo Credit R.Wrublowsky, 2016. Westwood, MA. EGA Architects.

Figure 20: Home-like living/dining room at Blue Skies of Texas. Casey Dunn, 2014. San Antonio, TX. Perkins Eastman.

Figure 21: Household entry at Leonard Florence Centre for Living. Photo Credit R.Wrublowsky, 2016. Chelsea, MA. DiMello Shaffer Associates.

2B - RESIDENTIAL KITCHENS



DESIGN ISSUE

Upon admittance to a PCH, residents often have to give up their familiar daily routines which are replaced by a fixed schedule geared more towards operational efficiency. Dietary needs are often provided through central food systems and delivered to resident wards where the resident has had limited choice in food selection and no input on food preparation. Small house design offers an opportunity to restore a familiar and important aspect of everyone's daily routine.³¹

Maintaining or increasing oral intake in people with dementia is a regular concern for staff. Design cues and a welcoming kitchen can encourage residents to spend more time eating and enjoying the food offered. Meal and snack times play a large role in a resident's day; and could become a highlight for them throughout the day.

DESIGN INTERVENTIONS ³²

39. Incorporate residential or therapeutic kitchens into projects. The kitchens should be located in households and form part of the daily routines. The kitchen becomes the center focus of the space.
40. Ensure direct sightlines to the kitchen from all parts of the household, to encourage visual cues for eating. This assists with alerting residents to mealtime when they see activity occurring there, as well as encouraging snacks and keeping residents hydrated throughout the day if they see food or drink.
41. Provide open counters low enough for residents to sit and participate in kitchen activities from the adjacent space.
42. Style of cabinetry should be traditional and built out of wood as opposed to a melamine (rail and stile is appropriate) Specify residential hardware. Try to avoid "D" style pulls.
43. Provide an area that is accessible to residents to store dishes. A typical china cabinet feature will provide the familiarity of home. Do not serve meals via tray service.
44. Design kitchens to accommodate both family-style dining where food is served from large bowls, or to be plated direct from the food preparation area.
45. Include warming drawers, soup warmers, and other appliances that will keep food warm over a period of time, to allow residents to eat when they feel hungry or have breakfast after sleeping in.
46. Pantries may be incorporated for storing larger volumes of food stuffs or perishables. Keep the kitchen and its visible appliances residentially scaled similar to what would be in a house.
47. Incorporate commercial grade hood over the stove, and light commercial grade dishwasher which can achieve proper sterilization temperature.
48. Kitchens are still deemed residential if only light cooking occurs there, and thus do not require commercial stoves, ovens, grease traps, etc. Review with the AHJ but a residential look is priority.

RATIONALE

LTC facilities are increasingly incorporating residential kitchens in their projects. The homelike kitchens are integral to transforming a facility from institutional to residential. Balancing concerns for safety with opportunities they provide for engagement, the kitchen serves several functions: to make it easy for staff to offer breakfast and snacks to residents when they want to eat, to provide a familiar setting for everyday activities in which the residents can participate or just watch, and to give staff a place to do their work without losing touch with the residents. The kitchens are still used as a place for the household staff to keep records, though they are particularly attentive to maintaining confidentiality.³³

Residential kitchens also provide opportunities to create a continuation of familiar routines, reinforce homelike imagery, and enhance ADL (activities of daily living) task opportunities. Therapeutic kitchens are used to varying degrees to support the daily program for residents with dementia. In some settings, for example, a therapeutic kitchen may be used for structured activity programming (e.g., weekly baking, daily household chores, arts and crafts) with staff present to supervise.³⁴ Research has also found that a therapeutic kitchen can function as a social area if tables and islands are designed correctly. The benefits of activities that are associated with therapeutic kitchens such as familiar household tasks, such as washing dishes or setting tables, encourage feelings of pride and accomplishment, instill a sense of purpose and contribution, and prevent the boredom of having “nothing to do”. The intent of a therapeutic kitchen is not specifically to provide food preparation, but rather to reinforce activities that contribute to the preparation of the meals. In true “Greenhouse” models the entire meal is prepared with the household but further research indicates that approximately 50% of facilities built with therapeutic kitchen still receive a portion of the meals from a central source. Based on the functioning ability of the resident population this may be necessary; however it does deprive residents of the cooking aromas and other familiar routines associated with past eating and household experiences. Typically if the protein portion of the meal is prepared in bulk, it is still brought to the kitchen and further prepared or presented on plates. Residents are then served plated food to maintain as much familiarity as possible to the home experience.

There is much discussion regarding the effectiveness of therapeutic kitchens when residents’ functional abilities decline. As the characterization of the resident population changes from early to late stages of cognitive disorders, the level of importance of the kitchen considerably decreases for residents and staff. However, the kitchen still maintains importance among family members and contributes to the quality of visitation when family members are able to easily access the kitchen amenities.

DESIGN OUTCOMES ^{35 36}

- *Residents will become more socially active, and more able to occupy themselves. Reduction in boredom and increase in cognitive stimulation.*
- *A higher number of residents will participate in recreational activities such as socializing and sitting, arts and crafts, baking, holiday dinners when a therapeutic kitchen is available.*
- *Familiar household tasks can reinforce previous roles & engage residents in normal, day-to-day activities.*
- *Certain activities such as cooking can stimulate the senses through color, aroma, and touch. Can stimulate increased food consumption.*
- *Can stimulate increased food consumption.*
- *Food-related tasks, such as chopping or stirring, can have health benefits if the tasks improve or maintain muscle strength, range of motion, gross hand coordination, concentration, and attention.*
- *Increasing the number of housekeeping activity items that can be acquired, such as meal preparation, table setting, and so on, are linked to improvement in quality of life.*



Figure 22: Residential Kitchen at Levindale Geriatric Centre. Photo Credit R.Wrublowsky, 2015. Baltimore, MD. Caplan Mach Inc. Architecture.

Figure 23: Residential Kitchens at Leonard Florence Centre for Living. Photo Credit R. Wrublowsky, 2016. DiMella Shaffer Associates.

2C - FLEXIBILITY AND AUTONOMY**DESIGN ISSUE**

Many personal care homes have a set schedule of eating times, activity times, bed times, etc. and regulate almost every part of a resident's day. The challenge is to provide an environment that gives residents a feeling of personal control and independence. Given the different acuity levels, this can become difficult for care environments where one resident's participation may require more choreographing than that for a higher functioning individual. A non-institutional program based on small, informal groups and flexible schedules can allow this; and the physical environment can help support this kind of philosophy of care.

The environment should provide passive spaces for personal hobbies as well as areas where group activities can occur. Art spaces, horticulture, crafting areas should be flexible to appeal to a range of small group or personal interests that were once a regular activity prior to coming to a personal care home. A resident should be able to sleep in, get food or a meal when he or she is ready to eat, or participate in a scheduled or personal activity as desired.

DESIGN INTERVENTIONS ³⁷

49. Create an area in or adjacent to the kitchen, where food is available to residents all the time. Space should be planned so residents can access a snack, fruit, or a drink either on their own or with assistance, without having to enter into the kitchen work triangle reserved for care givers.
50. Provide a wheelchair accessible area contiguous to the kitchen that is large enough to allow small groups of residents to take part in meal preparation, as their abilities allow. This would also include residents who want to participate by simply watching the action and being included with the group.
51. Provide glass fronts on cabinets where residents have freedom to access the contents. For example, if the dishes are visible and accessible (like in a home china cabinet) then residents may choose to participate in an activity like setting the table.
52. Residents' bedrooms should include a closet/wardrobe unit with two compartments: One side should provide limited access to seasonally appropriate and/or one day's clothing with open-wire drawers to enable socks and undergarments to remain visible. The second compartment stores additional clothing and can be locked as necessary (e.g., for people who rummage or hoard — common behaviours in people with Alzheimer's disease). Keeping extra clothing in the locked portion of the closet is helpful for residents who need reassurance that their property is still there; the door can easily be opened upon request. Also available are closet units with sequential, ascending hanger rods to cue a person with Alzheimer's disease to put undergarments on first, then clothes, then shoes, and so on, allowing a person to dress him/herself. The wardrobe should be located so that the doors open directly in front of a wheelchair or sitting area, allowing the resident to contemplate wardrobe selection and make their own selections. A good location for the wardrobe would be perpendicular to the front of the bed.
53. In addition to providing a flexible dining area where table/chair placement can be modified, the household should also contain areas where individual interests can take place. A hobby area provides opportunity for artwork, clay modelling, woodworking, scrapbooking, and so on. Allow an area out of the way from the lounging and passive spaces as to not disrupt television viewing and casual socializing.
54. Create an area in each resident room where personal activities such as listening to music, reading, looking at a memory book, or one-on-one visiting can occur. This area should be organized in such a way that hobbies or personal activities are highly visible or displayed without clutter, to encourage use. The area should be distinctly separate from the bed, to give the feel of a different space.

RATIONALE

“Because people with Alzheimer’s [disease] and related dementias often have trouble adapting to changes and transitions, settings should conform to their needs and preferences, rather than demand conformity.”³⁸ From self-determined daily routines to accommodating mobility assistance devices, resident autonomy and the link between independence and the way caregivers and family treat residents, is central to providing residents with a high quality life despite their dementia. Furthermore, remaining autonomous (among other factors) can actually contribute to successful aging.³⁹ Recognize that flexibility is crucial, and that residents should have an environment that allows them to choose when and how to participate in activities, or alternatively choose not to participate in them at all. Since freedom and perception of choice have been shown to be more important to the physical and psychological health of the elderly, a protective environment (primarily concerned with resident safety) should not infringe on a resident’s right and need to move about freely.⁴⁰

DESIGN OUTCOMES

- Care can be provided in groups with varying levels of functioning.
- Residents feel they have more personal control through their freedom of choices.
- Higher satisfaction and better quality of life for individuals, due to participating in activities that they enjoy.
- Reduction in acting out or bothersome behaviours by residents due to boredom or rigid scheduling. Less intervention by staff to divert residents from inappropriate behaviours.
- Better opportunities for socialization and increased participation in daily activities.
- Longer independence by allowing residents to function at their highest level using design elements such as wardrobe cabinets that provide some access to personal items.
- Potential to increase resident eating, nourishment, and hydration.
- Stimulation of cognitive abilities through making choices, increased participation, and engagement in daily activities and hobbies.



Figure 24: Open Residential Kitchen at Greenhouse Stadium. Photo Credit R. Wrublowsky, 2015. Baltimore, MD. Marks Thomas Architects.



Figure 25: Art Studio Space at Sherbrooke Community Centre. Photo Credit R. Wrublowsky, 2015. Saskatoon, SK.



Figure 26: Sunroom at Hearststone New Horizons Memory Care. Photo Credit R. Wrublowsky, 2016. John Ziesel, PhD.



Figure 27: Greenhouse at Sherbrooke Community Centre. Photo Credit R. Wrublowsky, 2015. Saskatoon, SK.

2D - CONTROL OF PERSONAL SPACE



DESIGN ISSUE

Although the resident's room is considered personal space, there are significant cognitive limitations preventing residents from wrongfully entering rooms.⁴¹ Care home designs need to incorporate strategies that promote privacy for individuals, provide control over personal space, and potentially thwart intrusion by other residents that may have dementia. Residents should feel respected, private, and safe in their rooms, by both staff and other residents, should they choose to spend time there. Additionally, cognitive impairment may cause some residents to take other resident's things, thinking that they are their own; theft or misplacement of resident belongings are common issues. Residents who feel their privacy or belongings are violated can act out, become verbally upset, or even exhibit violent behaviour.

DESIGN INTERVENTIONS ^{42 43}

55. The two most accepted practices are to provide a mesh fabric gate secured to the door frames by Velcro or magnets, or a simple fabric strip secured by Velcro. These items are often neglected in a designer's initial specification. If a fabric or mesh gate is the approved method to reduce intrusion these items should be specified in the initial design tender. Ensure magnets or Velcro does not impede the door from latching properly, and will stay adhered to the frame material permanently.
56. Another more active method to reduce intrusion is to provide Dutch doors. This practice is preferred over the Velcro door strips but may not be allowed in all jurisdictions. When the upper half is left open it allows views into private bedrooms, enabling monitoring by staff, as well as promoting resident orientation. When residents have a visual connection into a room, it alleviates curiosity or need to see what is behind a closed door; it also may serve as a memory assist to recognize their own rooms. Closing the lower portion of the Dutch door limits resident access to other people's rooms for privacy, which in turn promotes safety and respect, and helps to reduce rummaging in others' belongings. Using Dutch doors may pose a challenge from a building code perspective because while the door itself may not require a self closing device, it may be required to maintain a smoke separation between resident room and the adjacent floor area.

RATIONALE

When addressing the needs of a mixed population of residents it remains important to recognize that within the population group there will be a varied level of personal cognitive function. Higher level functioning residents have a better grasp of personal invasion and more likely to become agitated when intrusion or theft occurs from their private spaces. The residents feel vulnerable and a lack of control over their room and belongings. Theft causes significant emotional and personal stress to the residents, which negatively impacts their fit within the environment.⁴⁴

DESIGN OUTCOMES ⁴⁵

- *Reduction in frequency of unwanted intrusion into personal space of residents.*
- *Better privacy reduces aggression and agitation of those who feel violated.*
- *Improved sleep.*
- *Enhanced sense of personal control.*
- *Reduction of theft or misplacement of personal items.*
- *Enhanced feeling of safety and respect.*



Figure 28: Dutch Door.
Randall Perry, 2014.
Perkins Eastman.



Figure 29: Dutch Door
into Resident's Room.
Robert Ruschak, 2014.
Blue Skies of Texas,
Perkins Eastman.

2E - IMPORTANCE OF ART**DESIGN ISSUE**

Most designers do not associate art as part of their role or scope of work when designing a personal care home. However, artwork (and music) can play a crucial role in resident happiness and engagement when chosen and carefully placed in appropriate locations. Artwork chosen merely for colour coordination or aesthetic design purposes misses the opportunity to enhance resident quality of life.

Art touches and engages the brain in a more profound way than other activities. Music, painting, sculpture, comedy, drama, poetry, and the other arts link together separate brain locations in which memories and skills lie. The brain systems affected in this way are therefore called “distributed.” Music, for example, touches parts of the brain that link what we sense, know, and feel. Various arts are also hardwired in the brain. We know that a child in its mother’s womb late in its development responds to music. A young child does not have to be taught to relax when she hears a lullaby, nor does he need to be taught to paint colourful pictures, or to laugh at a silly joke. These universal, pre-existing, and hardwired abilities, lost only late in the progress of individuals with NCD’s (neurocognitive disorders) if at all, serve as the basis for successful art expression and appreciation throughout the progress of the disease.⁴⁶

DESIGN INTERVENTIONS^{47 48}

57. Provide artwork that has been identified to be a positive distraction for residents. Certain themes for artwork have been suggested:
 - *Waterscapes, containing calm or non-turbulent water.*
 - *Landscapes, containing visual depth or open foreground, trees with broad canopy, savannah landscapes, verdant vegetation.*
 - *Positive cultural artifacts (e.g. barns and older houses).*
 - *Flowers, which are healthy and fresh, familiar, in gardens with open foreground.*
 - *Figurative, with emotionally positive faces, diverse and leisurely.*
 - *Artwork also could be used in a therapeutic way, which is to evoke memories either for wayfinding or for engagement.*
 - *Consider that people with NCD, especially in the early stages, may be able to assist in artwork selection, to help select artwork that is culturally sensitive.*
58. Provide information cards beside each piece of artwork that gives examples of questions that you can ask a resident about the image. This strategy has been employed in the Hearthstone facilities as a device successfully used as an instrument supporting Alzheimer’s disease (AD) residents.
59. Provide art or craft pieces that residents can interact with. Encourage play.
 - *Textiles or sculpture that can be touched, with different textures (smooth, rough, soft, lumpy, etc)*
 - *Fabric art or quilts with activity pieces that can be buttoned or moved using velcro.*
 - *Books where pages can be turned.*
 - *Hooks with hats, bags, purses, blankets that residents can take, hold, or wear.*

RATIONALE

While the majority of people with NCD have AD and this aspect of the NCD is better understood, those suffering from other NCDs may face different cognitive impairments and, as a result, interact with the world around them quite differently. Depending on the area of the brain affected, these abilities are lost; however, in those aspects of the brain not affected, the remaining skills may be enhanced.

Few research articles deal specifically with the impact of art on the elderly, fewer still have written on the impact of art on the elderly with NCD. However, there is one study that explored the stability of art preference in people with AD and age-matched control participants. The researchers found that a preference for specific paintings differed among individuals with AD and non-AD individuals. However, both groups maintained about the same stability in terms of preference judgments across two weeks, even though the AD patients did not have explicit memory for the paintings. So it could be summarized that individuals with AD, while they may not remember the exact paintings that they like, can indicate a preference for specific art pieces. And, that perhaps, aesthetic preferences can be preserved in the face of cognitive decline. This should encourage caregivers and family to engage in arts appreciation activities with people with NCD.

PEOPLE LIVING WITH NCD'S UNDERSTAND VISUAL ART BY:

- *Perceiving and describing—talking about what they see in the artwork.*
- *Telling a story—narrating the story they see in the painting.*
- *Linking it to their own lives—describing personal and historical memories.*
- *Identifying the emotion—naming and expressing the emotions in the artwork.*
- *Identifying objects that make up the painting—seeing, naming, and describing the objects.*
- *Making critical judgments—commenting on moral issues raised in “risqué” artwork.*

**For a better understanding of the selection of artwork, please see chapter 5 of “I’m Still Here” by John Zeisel (founder of “Art for Alzheimers”)*

OUTCOMES

- *When placed appropriately, subject matter in the artwork can enhance wayfinding. For example, still life pictures of food or dining with an arrow can indicate direction to the kitchen or dining area.*
- *Opportunities for socialization between residents and staff.*
- *Enhanced and more enjoyable family visitation through more meaningful conversation.*
- *Reduction of anxiety and agitation.*
- *Increased cognitive stimulation.*

The following paintings are good examples to use for an environment with individuals with NCDs.⁴⁹ It is not the intention of this design guide to prescriptively provide a list of artwork but rather educate the designer on the importance of the selection of themes, colors, and vibrancy for care environments.



Figure 30: Gas, Edward Hopper. 1940.

Figure 31: A Sunday on the Island of La Grande Jatte, George Seurat. 1884.

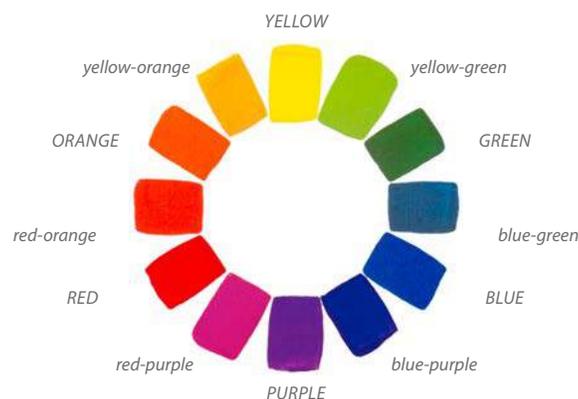
Evidence Based Design (EBD)

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES

This category covers all design interventions that concern the issues of lighting (29 papers included), noise levels (11), thermal comfort (3), and the use of color, contrasts and patterns in care home settings(9).

In order to create a pleasant environment that positively affects the outcomes of residents with dementia, an informed design of environmental attributes such as lighting, acoustics, room temperature, and the use of colors, contrast, and patterns is necessary. Drawing from the evidence, one example that can be stated is that bright light therapy has a positive impact on sleep; associations between light and improved behaviour and well being also have been established, but have not been confirmed by all studies. Also, there may be a positive correlation between bright light therapy and cognition. A higher luminance level to improve vision, for example at the dining table, might be effective for residents' functional abilities and oral intake. Therefore, providing sufficient lighting should be one of the key architectural efforts in care environments for people with dementia. The same can be stated for appropriate acoustics. There is strong evidence showing a relationship between high noise levels and unwanted behaviour. Conversely, pleasant sounds were found to be positively stimulating, and comfortable room conditions may further contribute to improved behaviour and well being in residents. Visual impairments are frequently found in older adults, and therefore also in people with dementia, and this needs to be considered in PCH design. Evidence shows that residents benefit from informed and carefully considered application of colour, including strong colour contrast. However, caution is necessary when using patterns and dark lines or patches on flooring, which may be confusing for residents and even cause falls.⁵⁰

COLOUR THEORY CHART



Right: Avoid utilizing adjoining principle colours and their associated hues when communicating contrast.

*EVIDENCE BASED DESIGN
CATEGORIES LEGEND*

CATEGORY 1: BASIC DESIGN ATTRIBUTES

- 1A - BUILDING LAYOUTS
- 1B - POPULATION SIZES
- 1C - SPATIAL HIERARCHY
- 1D - ACCESS TO OUTDOORS

CATEGORY 2: AMBIANCE

- 2A - RESIDENTIAL CHARACTER
- 2B - RESIDENTIAL KITCHENS
- 2C - FLEXIBILITY AND AUTONOMY
- 2D - CONTROL OF PERSONAL SPACE
- 2E - IMPORTANCE OF ART

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES

- 3A - OPTIMUM LEVELS OF STIMULATION
- 3B - EXPOSURE TO LIGHT
- 3C - COLOUR AND CONTRAST
- 3D - TEMPERATURE AND AIR QUALITY

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE

- 4A - TOILETING AND BATHING STANDARDS
- 4B - INCONTINENCE AVOIDANCE
- 4C - PERSONAL SHOWERS IN RESIDENT ROOMS
- 4D - REDUCTION OF PATIENT FALLS
- 4E - FEATURES FOR AMBULATION

CATEGORY 5: ENVIRONMENTAL INFORMATION

- 5A - PURPOSEFUL WANDERING
- 5B - ORIENTATION AND WAYFINDING
- 5C - LOCATING INDIVIDUAL RESIDENT ROOMS
- 5D - EXITING AND ELOPEMENT

3A - OPTIMUM LEVELS OF STIMULATION



DESIGN ISSUE

People with dementia have difficulties dealing with high levels of stimulation, which can include visual clutter as well as audible noise. Their ability to screen out unwanted stimuli appears to be reduced and they can become more confused, anxious and agitated when overstimulated.⁵¹ In general, exposure to noises exceeding a quiet level of 40 to 50 dB is associated with negative outcomes, and noise levels above 55 to 60 dB have been found to trigger an increase in catecholamine and cortisol levels - which are associated with stress.⁵² The main sources of ambient noise within a personal care home are alarms, intercoms, ringing phones, loud televisions, and crowds. Exposing individuals with severe dementia to high noise levels may increase confusion and trigger fear or other negative feelings, which results in a reduced amount of social interaction and could induce difficult behaviours. The main sources of ambient noise within a personal care home are alarms, intercoms, ringing phones, loud televisions, and crowds; these should all be considered and addressed in the design.

DESIGN INTERVENTIONS⁵³

60. Common causes of both audible and visual overstimulation to individuals with dementia are busy entry doors. When possible, the designer should minimize the amount of doors that are visible to the residents that lead to areas of administration or public zones. The introduction of transitional corridors assists in avoiding doors opening onto paths frequented by residents.
61. Specify silent alarm systems that activate small buzzers held by staff.
62. The elimination of linen trolleys, pill/medication carts, nursing stations, and a public address system with buzzers and flashing lights will help to keep unnecessary noise and distress low, plus make the environment appear more homelike and less institutional.
63. Remove audible 15 second delay alarm on exit doors equipped with magnetic locks. This will require alternate solutions submission to authorities having Jurisdiction (AHJ) and may not be supported.
64. Restrict unnecessary ambient noise generated from televisions in open environments by setting controls on volumes.
65. Provide wireless headphone sets for individuals accepting and able to utilize these items (designer to specify 3 sets per household).
66. Ensure that all ACT ceiling tile is specified with an effective STC rating (STC 50) in all resident areas.



Figure 32: Clerestory lighting at White Oak Cottages. Photo Credit R.Wrublowsky, 2016. Westwood, MA. EGA Architects.

RATIONALE

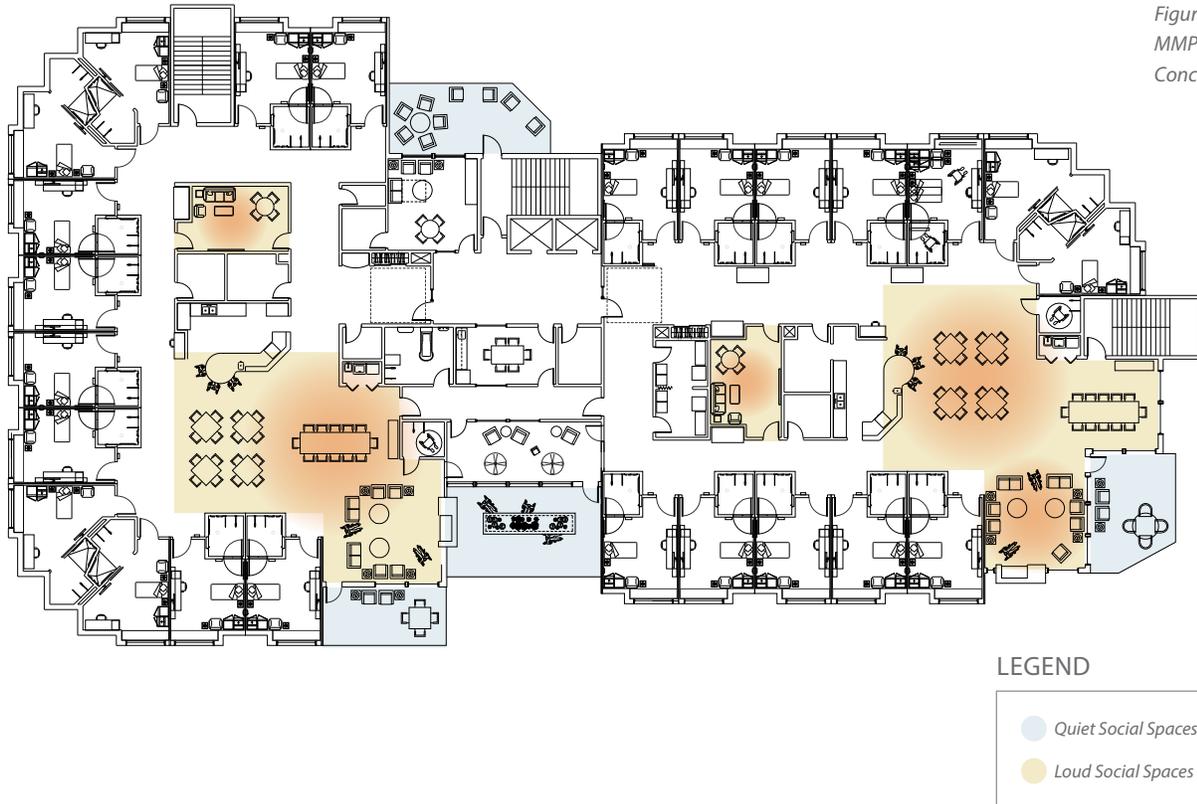
Residents in care homes are exposed to a variety of different noise sources including man-made noise and noise from household/electrical equipment. Repeated measurements in nursing homes reveal that noise levels may reach 55-70dB, comparable to busy road traffic noise. This often goes unnoticed and accepted as normal ambient noise. Older PCH homes are often designed with audible corridor alarms, and wander guard alarms. An individual with a cognitive impairment is more sensitive to over stimulation and the ability to shut out external noise is greatly reduced. Designers must look for opportunities to reduce visual distraction, audible noise, and clutter from the environment.

Hearing acuity decreases about one decibel per year after the age of 65. Moreover, because older people cannot separate signal from noise, they have difficulty in noisy environments. These deficiencies not only impair social interaction and have safety implications, but they may also increase confusion and disorientation.⁵⁴

DESIGN OUTCOMES ⁵⁵

- *Studies involving the combination of reduced stimulation with other environmental and care practice have been shown to reduce behavioural disturbance and agitation.*
- *Residents spend more time in enhanced environments and show increased pleasure.*
- *Reduction in noise levels contribute to better sleep hygiene.*

NOISE LEVELS IN HOUSEHOLDS



3B - EXPOSURE TO LIGHT**DESIGN ISSUE**

Cognitive decline is frequently accompanied by disturbances of mood, behaviour, sleep, and activities of daily living.⁵⁶ The human circadian timing system is highly sensitive to environmental light, darkness and the release of the hormone melatonin and may not function optimally in the absence of their synchronizing effects. In elderly patients with dementia, synchronization may be attenuated if light exposure and melatonin production are reduced. With the disruption of circadian rhythms, associated problems of agitation, sleep restlessness, memory loss and cognitive decline are prevalent.⁵⁷ Exposure to daylight, or simulated daylight, is critical to not only the physical body, but also supports cognitive function. Additionally, sleep in a nursing home environment is extremely fragmented, possibly in part due to decreased light exposure. [49] Nocturnal awakenings associated with sleep interruption (light, noise, motion) are strongly related to cognitive and functional deterioration.⁵⁸

DESIGN INTERVENTIONS ^{59 60 61 62}

67. Provide opportunities for a min. of 1000 lux of light to residents early morning and late afternoon.
68. Provide correct light spectrum during sunlight supplement periods. 509 nanometers (nm) has been found to produce the most significant reaction from the retinohypothalamic tract which controls the circadian rhythms. Fluorescent bulbs have different spectrum distributions. Lamps with a higher blue content (daylight 5600-6000k) for example are more circadian effective than warm white light.
69. Provide easy access to outdoor daylight which remains visually available to residents from the main activity areas, as well as a window in their bedroom.
70. Respect the need for darkness during the night and provide only a yellow amber night light at the floor level to assist care givers during late night supervision. Provide a gentle LED rope light lit path (or similar solution) to the resident washroom that is motion sensitive.
71. Provide good window coverings to shade residents from intense moonlight during sleep.
72. Consider a variable lighting design that varies both the intensity (lux) as well as the spectral wavelength during different times of the day. Increasing light exposure throughout the day and evening is likely to have the most beneficial effect on sleep and on circadian rhythms in patients with dementia. Low intensity dawn - dusk simulation (DDS), a 'naturalistic' form of light therapy designed to embed sleep in its accustomed phase, could improve the disturbed circadian rest - activity cycle, nocturnal sleep and/or cognitive functions in dementia.
73. In the evening use table lamps with a warm light, approximately 2700 Kelvin.
74. Light Emitting Diodes (LED) as a light source are preferable for providing bright light environments. LED's as a light source provide the best solution to vary both color as well as light intensity, thus can produce a light solution best tailored to support biological effects.
75. Introduce skylights where possible to bring daylight deep into spaces. It would be beneficial to use skylights with diffusers to avoid unevenness and glare.

RATIONALE

Human beings and their bodily functions have daily and seasonal rhythms. From individual cells to entire organs, every unit controls its own time program. Breathing and heartbeat, waking and sleep - all biologically controlled functions have their highs and lows over the course of the day. Even healthy adults, during the course of the dark months of the year, may find it more difficult to concentrate and have slower overall responses. The effect is so notable that the decline in activity and mood may result in clinical depression and these individuals are diagnosed with Seasonal Affective Disorders (SAD). This phenomenon is a result in part from depriving the body of light

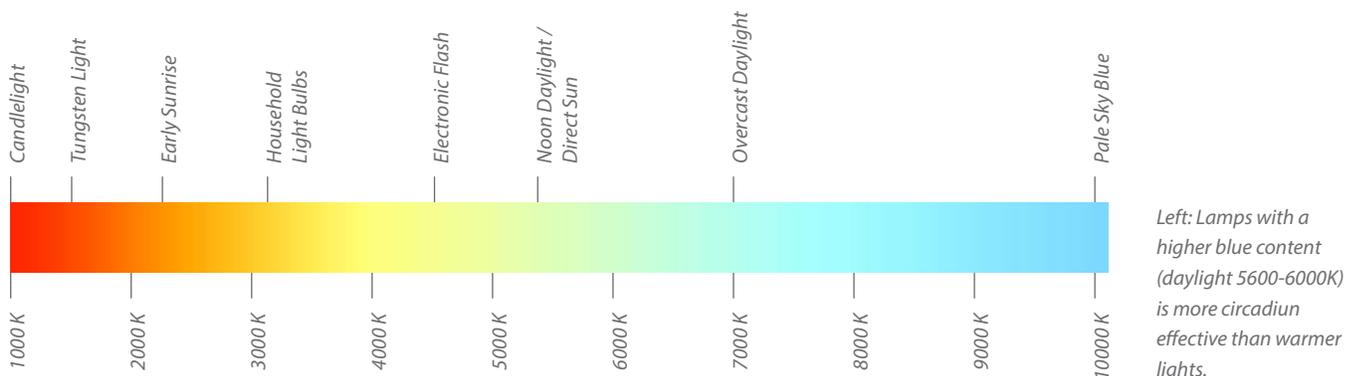
energy during crucial times of the day. Elderly people, and even more so cognitively impaired individuals, are typically exposed to significantly less daylight or bright environmental light. The average healthy young adult is exposed to 1000 lux of light energy for 1.7 hours per day while the average institutionalized elderly are exposed to a median light level of only 54 lux and were exposed to more than 1000 lux for only 10.5 minutes per day.^{63 64} Even worse, those with severe dementia may spend only 1 minute exposed to light above 1000lux each day.⁶⁵ Evidence shows that residents exposed to 1500-2000 lux from 19.00 to 21.00 h (3 hours per day) for 1 week resulted in improved sleep quality, less sun downing and an increase in the circadian rest-activity amplitude. Individuals with more severe behavioural and sleep disturbances showed the greatest improvement. Most often long term care facilities are designed with standard levels of illumination and often without consideration to color temperature. It is believed that both the light intensity (lux) as well as the spectral wavelength (K) play important parts in regulating our internal clocks. The spectrum of light sources also plays an important part of maintaining circadian rhythms. Monochromatic light with a wavelength of 509 nm achieved the largest suppression of melatonin. Thus it remains important to ensure proper daylight bulbs are used in areas where daylight supplement is introduced. A daylight bulb of 5600K will emit light within the optimum spectral wavelength.

"If results of these studies are combined with results of the previous studies done on the effect of light on rhythms and sleep in dementia, the overall conclusion would be that increasing light exposure throughout the day and evening is likely to have the most beneficial effect on sleep and on circadian rhythms in patients with dementia. Increasing bright light exposure for patients with AD might even postpone institutionalization. In addition, it would behoove nursing homes to consider increasing ambient light in multipurpose rooms, where patients often spend much of their days. This, in combination with other behavioural therapies, might be the most efficient approach for improving sleep and circadian activity rhythms in this population."⁶⁶

OUTCOMES ^{67 68 69 70}

- Morning bright light (1000 lux) improve self evaluations for alertness, mood motivation, happiness, refreshment, concentration and appetite.
- Morning bright light will improve self-evaluated sleep maintenance and quality. Both improvement of the sleep-wake rhythm and function has been demonstrated with 2 h of daily light exposure.
- Increased noticeable wakeful and alert periods in residents during the mid-day times.
- Better overall cognitive performance and maintenance of higher level functioning aptitude.
- Decrease with memory problems due to less disruption in circadian rhythms.

COLOUR TEMPERATURES IN THE KELVIN SCALE



3C - COLOUR AND CONTRAST



DESIGN ISSUE

Elderly residents - particularly those with cognitive impairments - face particular visual deficits, including difficulty with color discrimination, depth perception, and sensitivity to contrast. These deficits exacerbate normal changes in vision that accompany aging, such as irritation from glare and change in color perception. Research has also postulated that color discrimination may disproportionately diminish in Alzheimer's disease patients as compared to their non-impaired counterparts.⁷¹

DESIGN INTERVENTIONS ^{72 73 74}

76. Increase overall illumination levels to increase vision and contrast.
77. Provide contrasting objects to their field background color (example contrasting toilet seats to floor, contrast toilet to wall colour, contrasting shelves to wall color, and contrasting switch plates to walls).
78. Increase contrast between furniture and walls/floor. This is often neglected by designers when selecting furniture fabrics.
79. Carpeting rather than vinyl is preferable to avoid glare problems as well as to reduce noise (see section on carpeting for greater discussion on issues).
80. Do not wrap (cove) floor coverings up walls in residential looking areas and preference should be given to floor coverings that clearly demarcate the floor from the wall.
81. Once hues have been chosen for the color palette, ensure that adjacent colors are separated in both value and chroma to ensure better visual acuity (Munsell color theory).
82. Utilize complimentary colors when communicating contrasting surfaces.
83. Avoid utilizing adjoining principle colors and their associated hues when communicating contrast (Yellow/Green, Green/Blue, Blue/Purple, Purple /Red and Red Orange. Pale colors and pastels should be avoided (especially in the blue green range).
84. Utilize Light Reflectance Values (LRV) of colors that measure greater than 65% for all surfaces including laminate selections for millwork and design features. Avoid dark colors which are generally not easily processed in elderly persons.
85. Ensure finishes are not glossy or cause glare or reflections.
86. Use color in the environment as a memory aid such as painting each resident room door differently, or including a feature immediately visually accessible to the resident from standing outside of the resident room such as a window seat detail, or a bed spread.
87. When selecting floor colors, select simple or solid patterns to avoid visual clutter, which can cause confusion in visual processing for cognitively impaired individuals.
88. To promote personalization of the residents' bedrooms, offer a neutral color palette (a blank canvas).
89. During colour selection, be aware that hues may look different or faded to residents with cataracts or similar visual impairment. Imagine colours to have a slight yellowish film over them, as this would more closely mimic how elderly people will perceive them.

RATIONALE

As the lens in the human eye ages, it will gradually thicken and yellow. Changes in vision such as degrading of retinal image, reduced light to the retina, increased sensitivity to glare, and altered colour perception underlie

many recommendations in design strategies. Elderly residents are not able to discriminate between various colours, and things may appear faded or yellow.

Often color coding is used as a design strategy to assist with orientation,⁷⁵ however the choice of colors can defeat the purpose if not chosen correctly. Designers should be aware of suitable principle color combinations and understand competing chroma and hue values. Other visual losses influence orientation, because elderly persons lose the ability to differentiate objects from their background. For example, using contrasting colours between the toilet and wall colour, or the contrasting the seat colour from the bowl or floor colour, can help residents locate washrooms easier and reduce incontinence. Context is also very important; dark stripes or black patches on a pale floor may be perceived as holes and hence are barriers to free locomotion. Stepping on these patches may cause agitation in some people with cognitive impairment. Wall protection using the same material or colour as the adjacent floor covering may especially provide difficulty to the elderly viewer⁷⁶ in that they may not be able to distinguish the difference between planes. Providing contrast can help a person more easily identify possessions and promote independence in using them; for example, if a comb and brush are a light color, they may be kept on a dark tray or counter.

By being aware of LRV of paints, flooring, and other finishes, the designer can cultivate and “bounce” daylight deeper into spaces improving orientation and visual acuity for residents.

DESIGN OUTCOMES

- Residents with dementia ate more and displayed less agitation when dining arrangements incorporated brighter light and heightened color contrast (i.e., high contrast tablecloths, place mats, dishes).
- Resident orientation is supported through color cueing of objects and rooms.
- Reduction in agitation and fear through better visual communication of the physical environment.
- Fall reduction based on easily interpretable floor to wall interface.
- Minimize confusion concerning depth perception fostering more active involvement in activities.

LIGHT LEVELS IN HOUSEHOLDS



Figure 34: Light levels. MMP Architects, 2017. Concept Illustration.

3D - TEMPERATURE AND AIR QUALITY



DESIGN ISSUE:

Elderly people are highly susceptible to cold, breezes, and temperature. Typical nursing homes built in an institutional manner contain forced flow air ventilation systems where both cool and warm air are pushed through ceiling grilles, which often can create cold breezes felt by residents. Air in the facility is exchanged per standards and code but is circulated throughout the entire facility; so if one resident is sick, their germs can be distributed elsewhere through the ventilation system. Operable windows for fresh air are rarely provided as an option for resident rooms in traditional design.

DESIGN INTERVENTIONS ^{77 78 79 80}

90. In resident bedrooms and neighbourhood daily living areas, provide passive heat sources as much as possible. Incorporate in floor heating or radiant panels that do not generate breezes. Or, if forced air systems are utilized, specify grilles to divert or diffuse the air away from areas where residents will sit or sleep.
91. Utilize quality windows with good seals to prevent cold air from migrating to the interior. If possible, provide operable or partially operable windows in some resident areas.
92. Keep heat sources low to the ground where possible, preferably where residents are sitting.
93. If possible, provide resident rooms with individual air exchange. This will assist in preventing spread of illness and germs.
94. If possible, provide individual temperature controls in resident bedrooms.
95. Design and maintain an environment that supports a higher range of thermal comfort for older adults year round – approximately 25° C.

RATIONALE

In general, the optimum temperature for older adults is on average about 3-4° C higher than the preferred mean average temperature for younger adults (25.3° C compared to 22° C for younger adults). As people age, metabolic rates slow; blood flow and body heat are reduced. Some care homes set temperatures to suit staff preferences, as staff are working hard and prefer a cooler environment. However small house design is about developing spaces for residents and addressing their comfort and well being. Individual temperature controls allow for personalization of an individual's room and addresses personal preference. Contained air exchanges will assist with infection control; residents with an illness can be contained comfortably in their rooms without infecting others around them who may be susceptible. Residents are less disturbed with a reduction of perceptible indoor breezes.

Operable windows provide residents with a connection to the outdoors, where they can hear sounds such as bird song or the wind rustling leaves on a tree. Such sounds are soothing and can reduce agitation. If residents are unable or unwilling to go outside in nicer temperatures, an operable window can provide an alternative for fresh air and can be utilized even for the most severely disabled or cognitively impaired person. In-floor radiant heat is a good option for residents especially when utilized in areas where they may walk or have bare feet, such as getting in/out of bed or to the washroom. An added benefit to radiant heat in the resident washroom is that it will quickly dry any wet floor areas caused by water spills from the sink or shower area.

OUTCOMES ^{81 82 83 84}

- *Increased comfort of residents*
- *Increased sense of control of resident environment with individual controls and operable windows*
- *Better control and containment of infectious agents*

Evidence Based Design (EBD)

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE

This category covers design strategies that enable elders to maintain their independence longer. The studies focus on such strategies to support nutritional intake, ambulation assist, personal hygiene, fall prevention and incontinence avoidance.

Since the Americans with Disabilities Act Accessibility Guidelines (ADA) were initially issued in 1991, millions of people have benefited from changes to the built environment that provides greater opportunity for full participation in society and an enhanced quality of life. Like most other accessibility codes, standards, and guidelines, they are intended to promote independence, generally based upon the stature, strength, and abilities of younger adults with a single disability, most of whom transfer directly from wheelchair to toilet. In the time since the development of these early standards, the demographics of the population of people with disabilities have changed dramatically. People are growing older and a larger number of individuals are living longer with disabilities. As a result an individual's functional abilities may not be well served by today's accessibility design guidelines and the designer should be aware where these guidelines are not appropriate.⁸⁵ Having an understanding of the mechanics of how an elderly person transfers to a toilet, or depends on a hand rail or grab bar, will aid in the effective design for elderly environments. Further, understanding how providing confidence in a person's perception of the built environment can lead to a more stable gait and postural sway which will result in less falls, contributing to longer independence. Incontinence in long term care environments can be significantly reduced by implementing simple measures. There are many forms of incontinence however the most common in long term care settings is functional incontinence where an individual's inability to reach a toilet is because of environmental barriers, loss of cognition, and disorientation.⁸⁶



Figure 35: Contrasting plates. Margaret Calkins, IDEAS Consulting Inc., 2012.

*EVIDENCE BASED DESIGN
CATEGORIES LEGEND*

CATEGORY 1: BASIC DESIGN ATTRIBUTES

- 1A - BUILDING LAYOUTS
- 1B - POPULATION SIZES
- 1C - SPATIAL HIERARCHY
- 1D - ACCESS TO OUTDOORS

CATEGORY 2: AMBIANCE

- 2A - RESIDENTIAL CHARACTER
- 2B - RESIDENTIAL KITCHENS
- 2C - FLEXIBILITY AND AUTONOMY
- 2D - CONTROL OF PERSONAL SPACE
- 2E - IMPORTANCE OF ART

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES

- 3A - OPTIMUM LEVELS OF STIMULATION
- 3B - EXPOSURE TO LIGHT
- 3C - COLOUR AND CONTRAST
- 3D - TEMPERATURE AND AIR QUALITY

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE

- 4A - TOILETING AND BATHING STANDARDS
- 4B - INCONTINENCE AVOIDANCE
- 4C - PERSONAL SHOWERS IN RESIDENT ROOMS
- 4D - REDUCTION OF PATIENT FALLS
- 4E - FEATURES FOR AMBULATION

CATEGORY 5: ENVIRONMENTAL INFORMATION

- 5A - PURPOSEFUL WANDERING
- 5B - ORIENTATION AND WAYFINDING
- 5C - LOCATING INDIVIDUAL RESIDENT ROOMS
- 5D - EXITING AND ELOPEMENT

4A - TOILETING AND BATHING STANDARDS**DESIGN ISSUE**

Most designers rely upon guidelines that have been developed specifically for accessibility for barrier free standards. The provincial amendments (MB) are intended to promote independence, generally based upon the stature, strength, and abilities of younger adults with a single disability, most of who transfer directly from wheelchair to toilet. Maximizing functional independence with safety is a key goal. Yet, frail elders residing in LTC facilities have different physical abilities than the general population of adults with disabilities for whom the accessibility standards were primarily intended. A well designed bathroom can greatly enhance a resident's quality of life while a poorly designed one contributes to lack of independence, lower well being and an increase in incontinence.

DESIGN INTERVENTIONS ^{87 88 89}

96. Space is needed on both sides of the toilet to accommodate the range of transfer techniques including the front approach normally used in independent transfers and the need for space on both sides of the toilet for one and two person assisted transfers as well as the potential use of a lifting device. To accommodate this, the preferred distance from centerline of toilet to wall is 750mm. (30") clear and not 455mm (18") as indicated in provincial guidelines.
97. Provide toilet in direct line of sight from the resident bedroom – preferably from the bed itself - and perpendicular to the bathroom door to allow for easier execution of assisted transfer with a floor-based lift device, or ceiling sling.
98. The toilet also should be located so that a mechanical lift device can be moved through the doorway without having to make a 90 degree turn. Note the width of many manual lifts is wider than 36" and the door width may need to be increased to accommodate.
99. Residents are familiar with the look and function of residential toilet tank design; for those with less core strength, they are able lean back onto the toilet seat lid supported by the tank. Flush valve toilets have no tank, and if seats with lids are specified they are not necessarily very stable if a resident decides to lean backwards. For this reason residential tank toilets are preferred, with solid seats and lids.
100. Wall mounted toilet grab bars are not suitable for long term care residents and should not be used for toileting purposes; and further, horizontal grab bars are essentially useless. Being able to grasp an angled grab bar at the lower position and move up the bar can increase transfer independence. Providing one swing up or down drop down grab bars on either side of a toilet provide much greater safety because they are less difficult to use. A rear mounted grab bar is not used by this population and their placement would not permit the use of drop down grab bars without conflict.
101. Grab bars should optimally be between 650 and 762mm apart (on center) on either side of the toilet. Often guidelines suggest greater distances but anything wider than 762mm is too far apart requires a resident to engage their shoulders to sit-stand-rise. Shoulder muscles typically have much less strength than arms, and residents will have great difficulty. The smaller dimension allows residents to use their arm strength with a narrower center of gravity.
102. Provide a toilet seat height of 450mm (18"). A "handicapped" toilet mounted at 600mm (23.5") will not allow older residents who are less than 5'5"(1651mm) tall to place their feet on the floor, causing seated instability, which can lead to falls. In addition, being unable to have their feet flat on the floor or not having their hips at or below knee height does not facilitate the emptying of the bladder or evacuation of the bowel.
103. Doors should open outwards from the toilet room to avoid a resident being trapped or difficult to reach after a fall. Alternative options to achieve the same goal are double swinging doors, accordion

doors, pocket or sliding doors, or curtains. Arrange the opening of the door to avoid overlapping of other doors.

104. Grab bars are preferred to be powder-coated rather than stainless steel, and should be specified in a contrasting colour to the wall so that they are visually distinguishable. Stainless steel appears too institutional and can be slippery if not textured; textured grab bars are more difficult to maintain cleanliness and may harbour pathogens within the textured pockets.
105. In shower areas, provide a dry flooring area where care providers can stand while assisting a resident (see Resident Washroom Design for further information).
106. Barrier free codes require a fold down seat in showers. The use of a folding seat is not ideal for a long term care environment, as it only provides access for a care provider on two sides of the resident. Shower chairs with arms provide a much better solution, so staff can easily address all sides.
107. Specify a contrasting colour toilet seat from the toilet colour, to enhance visual differential for residents who can toilet themselves.
108. The walls around the toilet should be painted in a contrasting colour to emphasise the visual of the toilet. Visibility of the toilet can help with incontinence prevention.
109. Specify a toilet with an easy to use lever flush handle that residents can see and identify – preferably in a contrasting colour. Residents may not understand or be able to find flush-mounted buttons that are located either on the top of the tank or are hidden behind the seat lid.

RATIONALE

Frail elders tend to have less upper body strength, range of motion and overall functioning, which restricts their ability to perform sliding transfers directly from wheelchair to toilet using side and back wall mounted grab bars. However, they do have relatively higher levels of lower body function, which enables them to bear weight and perform sit-to-stand transfers. Design guidelines for accessibility standards do not adequately address the functioning ability of the elderly.

DESIGN OUTCOMES

- *Properly designed toilet rooms will extend the duration of independence.*
- *Maintain higher continence rates.*
- *Maintain personal dignity.*

Resident washroom at Boston's Leonard Florence Centre for Living depicts toilet location 900mm from wall with a dual height grab bar with a powder coat and contrasting colour to the walls. Note the pull station beside the toilet location as well as the shower alcove for personal resident bathing.



Figure 36: Resident washroom at Leonard Florence Centre for Living. Photo Credit R.Wrublowsky, 2016. Baltimore, MD. DiMella Shaffer Associates.

4B - INCONTINENCE AVOIDANCE**DESIGN ISSUE**

Incontinence is a major health issue that affects women and men during any stage of life. Although its prevalence increases with ageing, incontinence is not a normal consequence of ageing. Incontinence has significant psychological and social impacts, places major limitations on the quality of life. Incontinence contributes to admission to PCH's and remains one of the biggest care challenges. It is estimated that approximately 75% of residents living in a PCH experiences some degree of incontinence.

DESIGN MEASURES ^{90 91 92 93}

110. The built environment can have a supporting role in promoting better independence for toileting. The reliance of memory to locate toilet rooms is a poor strategy to assist residents in self toileting. Therefore the designer must locate toilet rooms in direct line of sight from major activity areas such as lounges and kitchens within the households. Frequency of toilet use increased dramatically when toilets were visibly accessible to residents. Residents' use of toilets increased by over 800% when curtains surrounding toilets (in lieu of doors), were left open, making public and private toilets clearly visible when not in use. Signage will also assist the resident, however being able to actually see the toilet has shown a reduction in incontinence.
111. Functional incontinence is also thought to be influenced by environmental factors such as low chairs that are difficult to get out of, poor lighting, and physical restraints. Research links associated slow-timed chair stands (due to lower-extremity impairment) with incontinence and falls.
112. Ensuring that all washrooms are adequate in size to allow easy access for a wheel chair and 1 caregiver promotes a more successful strategy.
113. Directional signage has shown to be successful. Early and moderate stage dementia residents were most likely to locate and use public toilets in response to primary color signage affixed to the floor (responding to residents' typically downcast gaze) comprising a band with the word "toilet".
114. Ensure proper design of washrooms is followed and acknowledge that ADA requirements are not suitable to follow for elders. If the design of a bathroom does not promote successful toileting then there will be a rise in incontinence. Understanding how a resident uses a grab bar through both horizontal and vertical forces will aid in good design (see Features for Ambulation for further information). The designer should have a basic understanding of the ergonomics of using a toilet and how the design assists successful toileting (knees in relation to hips, ie. toilet seat height and the importance of the seat and tank for back support, ie. no wall mount toilets).
115. Read design of a new grab bar for older adults Xiang, Wanlin, 2013, (Georgia Institute of Technology August 2013)

RATIONALE

Older adults who use mobility aids have different clinical conditions from younger wheelchair users, so they transfer on and off the toilet differently. Older adults typically transfer on and off the toilet from a standing position rather than a sitting position. When they transfer between a wheelchair and a toilet, they stand up from the wheelchair and sit down on the toilet, and then after they finish toileting, they stand up from the toilet and sit back in to the wheelchair. Studies found that grab bars that are commonly used to assist toilet transfer were originally designed to help people who slide on the toilet from a sitting position. These grab bars do not work so well for facilitating standing transfers which accounts for the majority of elders in a long term care facility. A better understanding of how elders use and rely upon grab bars is necessary for the designer to effectively provide an environment that best supports their functioning ability.⁹⁴

The goal of an incontinence program should be to elevate patients to the highest functioning level possible. In cases where residents are ambulatory, this goal most commonly translates into teaching the resident to self-initiate and execute the entire toileting sequence independently. In some instances, the design of toilet rooms may exacerbate toileting problems. Designers that do not understand how a grab bar functions or are unfamiliar with elderly toilet transfers will design toilet rooms based on prescriptive codes and standards which may not be appropriate for the senior's environment. This is especially true when addressing barrier free requirements of local codes and ADA guidelines.

DESIGN OUTCOMES

- Residents will become more self sufficient to execute the toileting process and thus a general reduction of incontinence issues will be experienced in the facility.



Figure 37: Resident washroom at White Oak Cottages. Photo Credit R.Wrublowsky, 2016. Westwood, MA. EGA Architects.

Note the direct line of sight from the bed to the toilet. As well as dual height grab bars that are powder coated as opposed to stainless steel.

4C - PERSONAL SHOWERS IN RESIDENT ROOMS



DESIGN ISSUE

Older adults who need assistance with bathing often find the activity to be both physically and emotionally demanding, as do their caregivers. Research has identified several contributing factors, including pain, fatigue, weakness, confusion, anxiety resulting from being naked in front of strangers, being afraid of falling, being in a noisy or unfamiliar place, and discomfort from cold or drafty bathing areas or harsh water sprays.⁹⁵

DESIGN INTERVENTIONS

116. All resident washrooms shall be designed with a shower area. The preferred design would incorporate a “European” shower design into the washroom which utilizes the entire washroom as a showering area without a dedicated roll in stall (see Resident Washrooms for more information).

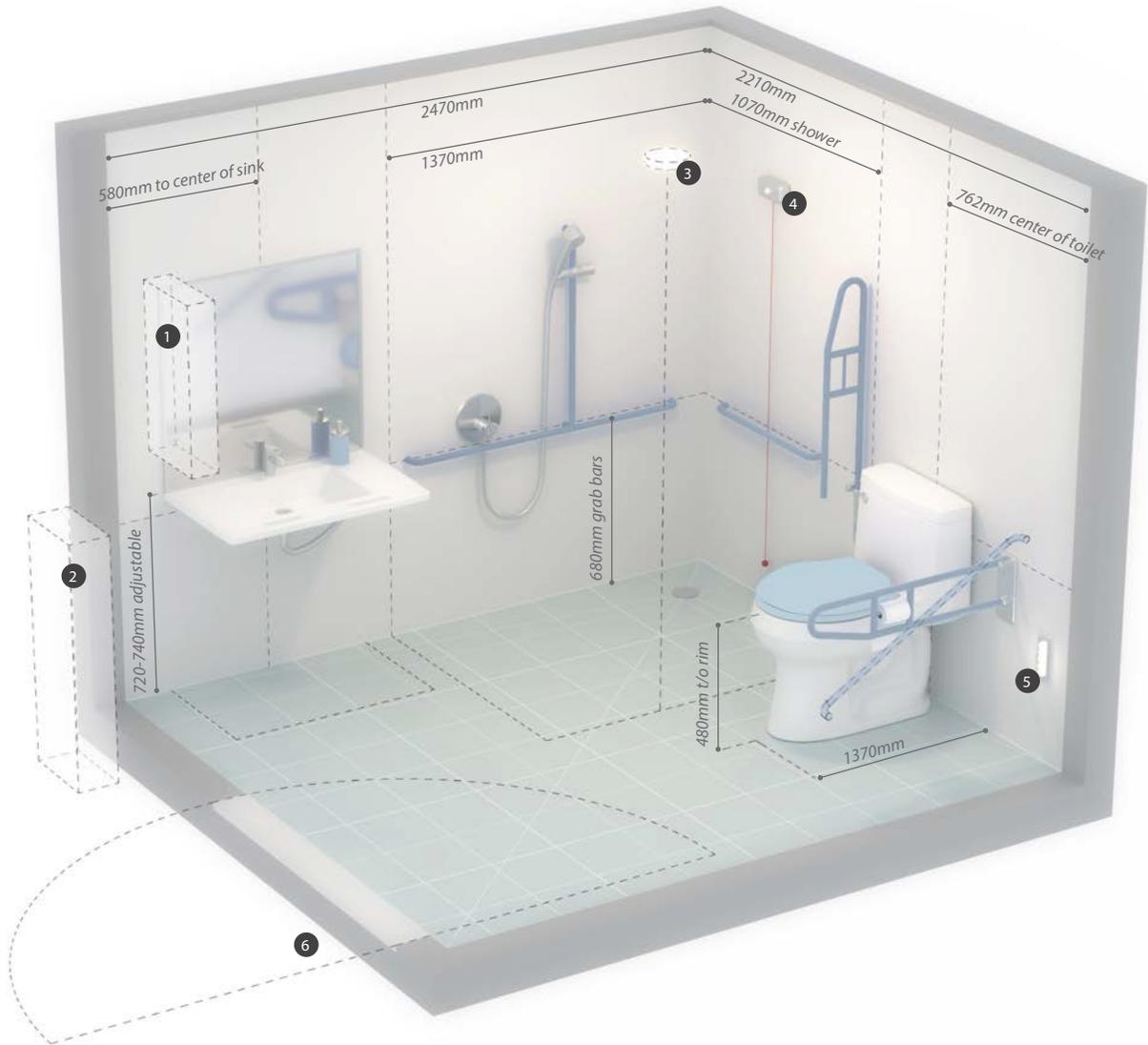
RATIONALE

The Culture Change movement is promoting the philosophy of resident focused care where resident’s dignity and choice are at the forefront. In the past, the vast majority of homes used central bathing rooms which required transport to the central bathing room. To maintain resident dignity the preference would be to transport the resident with clothes on to the shower room, but this was often not the case. Residents might be undressed in their room, placed on a shower chair, draped with a sheet, and wheeled down the hallway to the central bathroom room, feeling “exposed” all the way. Residents often void during bathing, which leads to greater incidence of cross-infection and increased time to clean and disinfect bathing rooms between residents. Showers designed in the resident rooms eliminate the need to transport the resident through the home. Besides being a more private and dignified process, this has the added benefit of limiting exposure to other resident’s waste. Finally, when an individual has soiled him/herself, the availability of the shower is an aid to full cleansing, skin care and comfort.⁹⁶

DESIGN OUTCOMES

- *Optimize functional abilities of frail older adults.*
- *Restore dignity to residents who experience fear and anxiety in assisted bathing environments.*
- *Promote healthier personal hygiene by encouraging more frequent showering sessions vs. assist bathing procedures.*

MODEL OF IDEAL BATHROOM



LEGEND

1 Medical Cabinet	4 Nurse Call
2 Incontinent Supplies	5 Night Light
3 Heat Lamp Above	6 Double Swing Door

Figure 38: Bridgewater PCH washroom design. Photo Credit R.Wrublowsky, 2016. Winnipeg, MB. MMP Architects.

4D - REDUCTION OF PATIENT FALLS



DESIGN ISSUE

Falls among elderly residents remain one of the major concerns in the geriatric care environment. People fall for a variety of reasons linked to weakness, disorientation, urgency of incontinence, and so on, however, most often it is a combination of factors that leads to a fall.⁹⁷

DESIGN INTERVENTIONS ^{98 99 100 101 102 103 104}

117. Particular design shortcomings have included door openings that are not wide enough, slippery or perceived slippery floors due to glare, poor design of bathroom door orientation or placement of bedrails, and incorrect fixture heights.
118. All toilets should be clearly visible from activity areas including from a residents bed. It is not enough to maintain an open door that does not provide a visual cue to the toilet. Residents with visual agnosia (the inability to interpret visual images) do require excellent visual reminders to initiate successful toileting responses.
119. Characteristics of flooring material may impact fall risk; references in the literature pertain to the type of floor material (resilient vs. soft), the amount of contrast in the pattern, transitions with other floor materials, and the coefficient of friction of the floor surface as considerations in fall prevention. Carpet can be used successfully providing that it be of a low pile tightly woven structure. Postural sway (one's ability to maintain a static balance) is not affected with commercial type carpet tiles and thus carpeting in and of itself does not contribute to the risk of falls. Flooring material should be of low contrast. Flooring types with high contrasting patterns was associated with more incidents (stumbles, reaching for handrail, veering, purposeful stepping, pausing, stopping) than carpeting with low color contrast.
120. Transitions between flooring types must carefully be considered and remain flush to each other with little or no transition strips utilized and also to be of matching color without contrast to the major flooring field. Concerns over different coefficient of friction between flooring types is often a perceived issue between carpet and sheet flooring transitions. When a sheet flooring material maintains a dry buff finish or a non gloss finish, there is no statistical evidence to suggest a relationship between the coefficient of friction and the risk of fall.
121. Avoid using waxed or gloss buffed flooring such as linoleum or marmoleum. Floors which receive a sealant or wax based finish have a lower coefficient of friction and may contribute to higher fall rates

Often overlooked in senior's residences, heavy contrast in floor patterns can lead to tripping hazards.

Figure 39: Avoid dark flooring inserts as they become obstacles.

Photo Credit R. Wrublowsky, 2017. Austin, TX. Westminster Memory

Figure 40: Complex pattern in floor carpet not acceptable. Photo Credit R. Wrublowsky, 2017. Austin, TX. Westminster Memory Care.



(linoleum, marmoleum). In one study, linoleum flooring in the bedroom was associated with significantly more falls than either vinyl composition tile (VCT) or vinyl. In bathrooms the rate of falls was 10 times higher for linoleum flooring than for VCT or ceramic tile.

122. Floor mats placed strategically to absorb spills must not be used in elderly healthcare environments as they pose a tripping hazard.
123. The selection of furniture remains important to the reduction of falls. Of particular note is the specification of a wrong type of chair. Interior designers must be aware of the ergonomic factors that contribute to an appropriate chair designed for the elderly. The chair must have a heightened sitting dimension and a cushion that does not allow for an elder to sink low in the chair making it difficult to get out of the chair. The chair must be significantly heavy to allow for a resident to rise from the chair either from one or both armrests, the back support of the chair must also be designed to the correct handrail height as well as statically balanced to support the weight of an elder leaning against the back of the chair for support. One study found that when rising from a chair a resident who needs to push up with his or her arms, legs, or use a walking aid to rise from a chair was 2.16 times more likely to fall than a patient who could rise in a single movement. A patient who could not rise from a chair at all was more than 10 times more likely to fall than the unimpaired patient. While at first glance this finding might seem to refer solely to an intrinsic risk factor, chair design can also play a significant role in enabling patients with impaired abilities. Features such as the presence or absence of chair arms, how far the arms extend toward the front of the chair, the seat height, seat depth, slope of the seat, etc. can have a significant impact on ability to rise from the chair easily.

RATIONALE

We know that design strategies can affect a positive outcome to reduce falls in our health care environments. The majority of falls occur when ambulating to a washroom. Urge incontinence has been linked to an increased risk of falling. Rushing to the bathroom to avoid urge incontinent episodes was associated with an increased risk of falling.

The majority of falls occur in resident bedrooms and bathrooms. Understanding the ambulation process from the bed to the toilet require a designers investment into learning grab bar mechanics and design, understanding how current codes for accessibility are not the same codes that are appropriate for long term care settings, choosing appropriate furniture that assist sit to stand mechanics, and choosing appropriate cueing strategies to assist elders locate destinations easier. Fall prevention strategies come with the designers understanding of the following areas of study:

- Why current ADA and accessibility guidelines are not appropriate for long term care settings.¹⁰⁵
- Bio mechanics of grab bar design and location.¹⁰⁶
- Age-related gait changes on the biomechanics of slips and falls.¹⁰⁷
- Postural sway and balance strategies in elders.¹⁰⁸
- Furniture design beyond the fabric selection (seat height, arm rest shape and width, firmness, weight, centre of gravity, and slide resistance)

DESIGN OUTCOMES

- *Reduced incidence of falls.*
- *Reduced injury from falls.*
- *More confident gait when moving about promotes being more active and involved in socialization.*
- *Improved wellness and mood by remaining independent and functioning independently longer.*

4E - FEATURES FOR AMBULATION**DESIGN ISSUE**

Fixed assistive features in the patient environment such as adequate and appropriately secured handrails and guardrails in the bathrooms, corridors, and pathways are considered supportive factors for fall prevention. Handrails (as well as grab bars and safety poles) can be designed to promote more effective reach-to-grasp reactions, by maximizing ability to: (a) grasp the rail rapidly and effectively, and (b) generate stabilizing reaction forces and moments once the rail has been grasped. A lack of handrails and guardrails or improperly designed assist features in the long term care environment is associated with risk factors for falls. Accessibility design guidelines intended for younger individuals are not appropriate for long term care environments as they may not compensate adequately for the range of co-morbidities and secondary conditions that are common among elders (See reduction of patient falls for more information).

DESIGN INTERVENTIONS ¹⁰⁹

124. Grab bars are the single most effective method to stabilize an individual when walking or rising from sitting position. Grab bars must be designed and located appropriately for washroom use, as well as, in public areas. The use of fold down grab bars should always be utilized in washroom location including the public washroom located off of the living space for the resident.
125. Handrails are necessary in all corridors and come in a variety of designs. Although many codes require handrails only on a single corridor side it is preferred to include hand rails or lean rails (or both) on both sides of the corridor to accommodate a residents sidedness (often previous strokes may render one left or right side weaker).
126. The most common handrail utilized is a handrail that enables a finger grasp or one that allows the full hand to grasp the rail. A circular shape (38mm diameter) enabled a "power grip" and allowed large forces to be generated and studies show is the most effective shape to effectively generate the greatest resistive force to counteract a balance perturbation. A circular shape always allowed a power grip to be achieved. Rails that forced a "pinch grip" are less effective.
127. Enamel and varnish surfaces on handrails and grab bars are more effective than chrome-plated and acrylic surfaces in allowing the hand to generate force without slipping.
128. Handrails should be of contrasting color to the wall. Bright colors and high contrast will, at the very least, have the benefit of making the rail more visible, which may be particularly important for elderly persons with visual deficits.
129. The preferred distance for a handrail clearance to a wall is 13 cm (5"). Most handrail brackets support a handrail that is less than this clearance.

RATIONALE

The ability to ambulate and move about safely, without falling, is a fundamental aspect of mobility, yet falling is a very common occurrence in older adults and is a leading cause of serious injury, loss of independence, and nursing-home admission. In addition, fear of falling can lead to social withdrawal and inactivity as well as contribute to incontinence issues due to the lack of confidence to safely make ones way to a washroom. Although the causes of falls are varied and complex, impaired control of gait and balance is widely recognized to be a major contributing factor. Consequently, interventions to improve control of balance during gait and other activities are likely to have a significant impact on risk of falling. Handrails (as well as grab bars and safety poles) can be designed to promote more effective reach-to-grasp reactions, by maximizing ability to: (a) grasp the rail rapidly and effectively, and (b) generate stabilizing reaction forces and moments once the rail has been grasped. Many designers do not understand the importance of a power grip vs. a finger grasp when specifying handrail shapes.

Also many supplies of hardware that support handrails are too close to wall finishes and do not allow the hand to grasp the handrail.

DESIGN OUTCOMES

- *Reduced falls*
- *Reduced fall injury*
- *Greater mobility and independence.*
- *Confidence in walking promotes activity and exercise*

SIX STEPS SENIORS TAKE TO TRANSFER FROM A WHEELCHAIR TO A TOILET

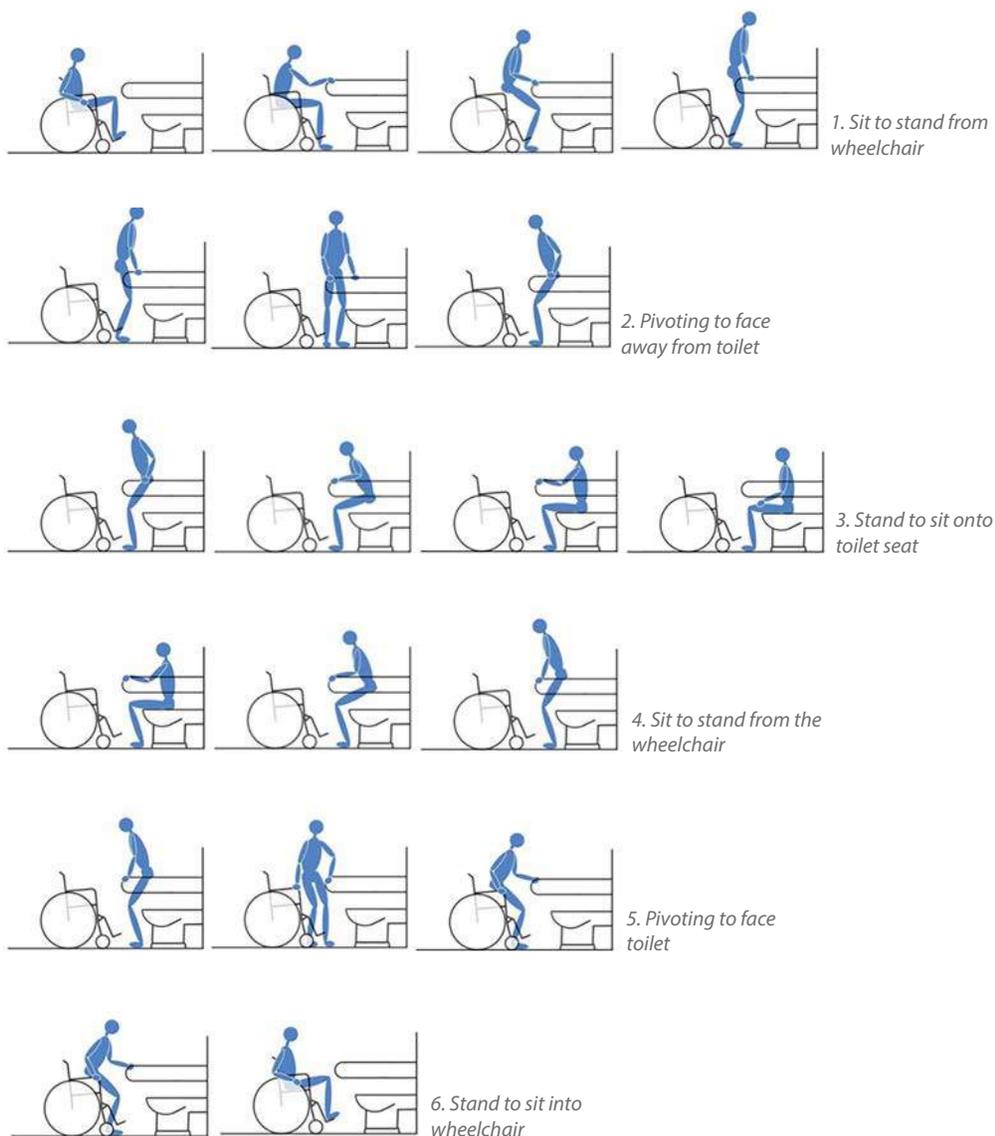


Figure 41: An excellent resource to assist the designer in understanding the biomechanics of how grab bars are used by seniors is the thesis presented to the Academic Faculty of the Georgia Institute of Technology. Design of a new Grab Bar for Older Adults. Xiang, Wanlin, 2013.

Evidence Based Design (EBD)

CATEGORY 5: ENVIRONMENTAL INFORMATION

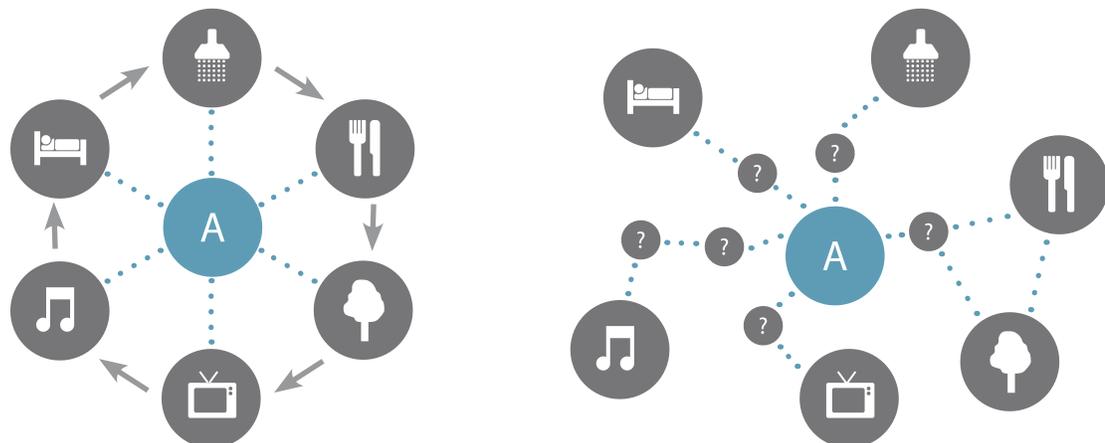
This category covers design strategies which focus on orientation and wayfinding so wandering behaviours and elopement can be controlled. These studies are focused on visual cues (11 papers reviewed) and physical barriers (10) as design elements.

Visual cues can support the ability of people with dementia to orient themselves. Effective cues were identified to be signposting, room numbers, and colors. However, the type and the design of the cues are of great importance. Signs, for instance, should contain icons and text. The personalization of cues has been found to be especially supportive. Nameplates, portrait-type photographs, or personal memorabilia can be placed outside of rooms to help residents locate their room. Visual barriers, such as camouflaged doors or door knobs, are effective to reduce the attempts of people with dementia to leave the facility and may even increase their well being.¹¹⁰ Orientation and the ability to reach destinations (wayfinding) are the prerequisites of personal autonomy and quality of life. By understanding how a person with cognitive impairments orients themselves in an environment, the designer will be able to provide environmental strategies for optimal mobility and quality of life for residents. Wayfinding, seen in terms of spatial problem solving, incorporates spatial orientation, but it views a cognitive map as a source of information to be combined or partially replaced by environmental information necessary for making and executing decisions.

Figure 42: Effective Circulation Pattern. Adapted and modified from Evidence Based Design Journal Ltd. ISSN 2204-0188 Australia.

- A** Decision point based on sensory input not memory
- ?** Node with no visible or audible destination, multiple branches lead to disorientation

ORIENTATION BY SENSORY INPUT



*EVIDENCE BASED DESIGN
CATEGORIES LEGEND*

CATEGORY 1: BASIC DESIGN ATTRIBUTES

- 1A - BUILDING LAYOUTS
- 1B - POPULATION SIZES
- 1C - SPATIAL HIERARCHY
- 1D - ACCESS TO OUTDOORS

CATEGORY 2: AMBIANCE

- 2A - RESIDENTIAL CHARACTER
- 2B - RESIDENTIAL KITCHENS
- 2C - FLEXIBILITY AND AUTONOMY
- 2D - CONTROL OF PERSONAL SPACE
- 2E - IMPORTANCE OF ART

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES

- 3A - OPTIMUM LEVELS OF STIMULATION
- 3B - EXPOSURE TO LIGHT
- 3C - COLOUR AND CONTRAST
- 3D - TEMPERATURE AND AIR QUALITY

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE

- 4A - TOILETING AND BATHING STANDARDS
- 4B - INCONTINENCE AVOIDANCE
- 4C - PERSONAL SHOWERS IN RESIDENT ROOMS
- 4D - REDUCTION OF PATIENT FALLS
- 4E - FEATURES FOR AMBULATION

CATEGORY 5: ENVIRONMENTAL INFORMATION

- 5A - PURPOSEFUL WANDERING
- 5B - ORIENTATION AND WAYFINDING
- 5C - LOCATING INDIVIDUAL RESIDENT ROOMS
- 5D - EXITING AND ELOPEMENT

5A - PURPOSEFUL WANDERING



DESIGN ISSUE

Resident wandering is among the most problematic behaviors to manage for nursing home staff. However, wandering and pacing may be adaptive or appropriate behaviors for cognitively impaired residents seeking avoidance from unfavorable stimuli or seeking favorable ones.

DESIGN INTERVENTIONS ¹¹¹

130. Include as many accessible areas as possible for the resident to promote self choice and freedom. This is especially true for access to outdoors.
131. The enhanced environment should provide opportunities to support avoidance as well as opportunities that support engagement. This translates into providing a large central lounging area that supports a dynamic group interaction, and having smaller satellite sitting areas that allow avoidance from these larger activities.
132. The main social areas should be designed as an enhanced environment. An enhanced environment will be one that is warm, embellished, welcoming, colourful and familiar. Residents were less likely to wander when surroundings had a soothing quality.
133. Maintain an environment where there are designated areas to walk freely, and do not prevent residents from accessing positive associated environments such as access to outdoors. Preventing residents from reaching a desirable location can cause agitation leading to escalation of aggression. Therefore the designer should ensure that desirable locations (outdoors) are designed to be secure and allow residents access with little supervision.
134. Allow for favourable stimuli along wandering paths. Activity spaces are kept open to circulation paths so that residents can see what's going on and more easily get involved. In the common area, circulation paths are integrated into the habitable space, rather than separate, institutional-like corridors.
135. Do not use geriatric chairs with locked trays to inhibit wandering.

RATIONALE

Wandering behavior may provide stimulation and exercise in an environment that is otherwise lacking in both, especially for the cognitively impaired resident who is already suffering from barriers in accessing outside stimulation. Wandering and pacing, therefore, need to be accommodated environmentally and become more acceptable to caregivers. Allowing these residents to pace in an area both agreeable to and safe for them may create less of a burden for the nursing staff and provide more comfort and satisfaction for them and other residents.¹¹² The positive association between sitting duration and ambiance indicates that an engaging environment attracts staying in, whereas the negative association between frequency and duration of walking with ambiance indicates that a non engaging situation spurs avoidance/seeking.¹¹³

OUTCOMES

- Nursing home residents who pace frequently are expressing their preference for an enhanced environment by spending more time in locations characterized by an enhanced environment than in other locations.
- Nursing home residents who pace frequently are expected to manifest less exit-seeking and trespassing behaviours in an enhanced environment than in other locations.
- Nursing home residents who pace frequently are expected to show improved mood (as reflected in greater interest and pleasure, and less anger and anxiety).

CHOICES PROVIDED



Figure 43: Choices. Adapted and modified from Evidence Based Design Journal Ltd. ISSN 2204-0188 Australia.

Far Left: Choices Provided

Left: Insufficient Choice (Territorial Issues Arise)

5B - ORIENTATION AND WAYFINDING**DESIGN ISSUE**

Residents experiencing cognitive impairment become confused easily and lost in their environments. They have difficulty in finding activity areas that require cognitive mapping skills to navigate routes. Wayfinding consists of three key components: knowing where you are, how to get somewhere (having a “mental map”), and recognizing when you have arrived.¹¹⁴ “For people with dementia, the concept of wayfinding should be thought of as ‘place knowing.’ People with dementia know where they are when they’re there; they only know where they are going if they see the destination; and they realize where they were going when they arrive. The in-betweens — the connections between destinations — are lost on them.”¹¹⁵

DESIGN INTERVENTIONS ^{116 117 118 119}

136. To design an environment where memory markers are utilized to support resident movement. Individuals with cognitive impairments lack the ability to maintain cognitive mapping skills and they move through their environment in an allocentric manner. Memorable reference points which can support a resident’s allocentric orientation strategy are thus needed. These can be architectural elements (such as the live-in kitchen) or fixtures, fittings, and furniture (such as objects with a biographic reference). It is very important that these reference points are carefully placed at the spot where the direction changes, and that they are interpreted, remembered, and used by the residents in the designated way (i.e. linear from point A to B).
137. All activity areas should be visually accessible to residents in a straight line of site. Designers are encouraged not to provide circular wandering paths without meaningful destination.
138. In the event that corridors are unavoidable they should be kept minimally short and should not dead end. Clear visible endings with a form of activity node or lounge space should terminate corridors. Cul-de-sacs should be avoided.

RATIONALE

The typical accepted typology utilized by designers in past is to provide continuous paths believing that this design feature would keep wandering resident’s content. However, this recommendation was not substantiated by empirical findings. Spatial situations and places should not be repeated. The live-in kitchen, in particular, should be designed in such a way that it becomes a unique and memorable feature of the living area. Its function as a spatial anchor point can be intensified by the allocation of other functions, such as the exit to the garden or balcony, or the duty room. The ability for a resident to successfully navigate through the environment is predicated on the ability to access the five major destinations as follows:¹²⁰

- *To go to the live-in kitchen (in all homes these were open-plan kitchens, featuring a kitchen unit and a dining table).*
- *To identify and go to the resident’s individual bedroom.*
- *To go to the toilet (either in the resident’s own bathroom or to an additional bathroom within the living area, if provided).*
- *To go outside (into the garden or to a balcony).*
- *To go to the common room.*

DESIGN OUTCOMES

- *Decreasing wandering behaviours*
- *Decreased agitation*
- *Decreased incontinence*
- *Increased engagement in ADL's*



Figure 44: Wayfinding node. From <http://www.tektura.com/blog/projects/roker-mowbray-dementia-care-centre>

5C - LOCATING INDIVIDUAL RESIDENT ROOMS



DESIGN ISSUE

When residents with cognitive impairments are unable to locate their own room, it can create a variety of problem for residents and staff.

DESIGN INTERVENTIONS ^{121 122 123 124}

139. Memory boxes or photographs have successfully demonstrated higher success rates in enabling residents to locate their own rooms. Photos taken in the past tend to be more easily recognized by the patients. In addition to a memory box, the individual's name should also be provided in large clear text.
140. Each door should be uniquely different from each other. The style, as well as differing colors will aid in determining which is the correct door.
141. Alternate hardware types between two doors within the same alcove to provide another opportunity for correct choice based on tactile response (both lever style hardware but with varying tactile sensations).
142. Sometimes residents may still be unsure of their own room, particularly when room doors are grouped in a pair which is commonly the case. In these instances the designer should provide immediate feedback opportunities from personal items within the room to aid in recognition. The bed cover seemed to be a particularly important element of appropriation assisting in providing immediate feedback. Other items such as visible shelves to store personal photographs or personal items that are visible from the corridor will assist in resident wayfinding.
143. Allow for personalization at bedroom entrances, since residents respond more to personalized landmarks than generic ones. For instance, a generic cue like a change in carpet or wall color is less effective than a memory box with personal photos. In fact, memory boxes (where the content remains static) have been shown to aid in wayfinding and can also be used to spark conversation, discovery and fulfillment.
144. Identify things and spaces by names and numbers in addition to other kinds of cues, since research has shown that people with Alzheimer's disease typically retain recognition of words and numbers longer than many other kinds of memory.
145. Offering views of the outdoors can serve as landmarks but also provide temporal orientation by knowing what time of the day it is by the quality of light.
146. Introduce a prominent element in the room that can be seen from the open doorway such as a window wall painted in a stark contrast from the rest of the walls and ensure that adjacent rooms have distinguishable differences so that once in a bedroom door zone outside of the bedrooms the resident can quickly determine which of the two doors will lead them into their own room based on the prominent wall color feature.

RATIONALE

Orientation and the ability to reach destinations (wayfinding) are the prerequisites of personal autonomy and quality of life. While most nursing homes post room numbers and resident names outside each resident's room, this approach is often an insufficient means of facilitating room finding. Additional environmental modifications in the living environment that serve as orientation cues and external memory aids may increase functional independence in room finding by persons with cognitive impairments.¹²⁵

DESIGN OUTCOMES

- Residents will become more active when they can confidentially navigate back to their own rooms.
- Ease of wayfinding will reduce anxiety, and promote autonomy for the residents through the personalization of semi private door zones and individual rooms. ¹²⁶

Figure 45: Using EBD in Practice. EFA Conference. Photo Credit R.Wrublowsky, 2015.



LEGEND

- 1 Memory boxes with large graphics vs. nick nacks
- 2 Alternating door hardware
- 3 Dutch doors allow resident to see inside room while providing privacy
- 4 Example of a typical velcro barrier (a last resort alternative).
- 5 Individual window wall colours to provide immediate feedback
- 6 Personal bed spreads
- 7 Different coloured doors
- 8 Provide semi-private zone in front of doors where possible

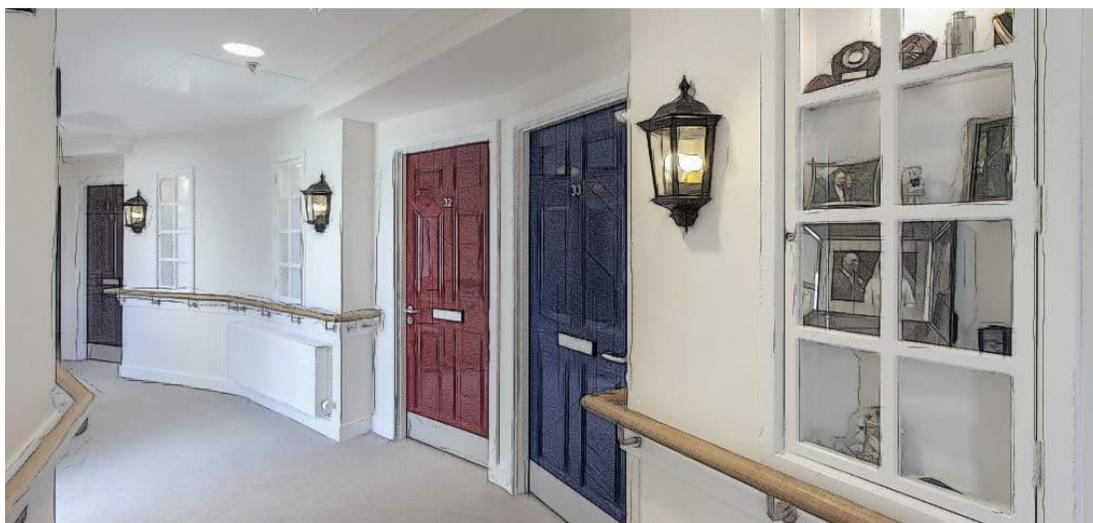


Figure 46: Example of the use of different colours to identify resident room doors. Also, the large memory box is very effective. From http://www.castleoak.co.uk/project_gallery

5D - EXITING AND ELOPEMENT



DESIGN ISSUE

The wandering of residents with dementia presents a special challenge to long-term care facilities and staff. Independent mobility in combination with impaired mental functioning increases safety risks not only for wanderers themselves but also for other residents. Exits in particular are a challenge, as they must be maintained easily accessible, but not distracting as to cause fixation. When exit doors are opened an alarm is typically sounded which further exasperates an individual with cognitive impairments. A balance must be struck to ensure safety of residents while supporting their right or need to move about freely.^{127 128}

DESIGN MEASURES [129](#) [130](#) [131](#) [132](#) [133](#) [134](#)

147. Strategies used to reduce residents with cognitive impairments from leaving through an exit door involve disguising exit doors as to not attract attention. One successful approach is to provide a cloth covering approximately 450mm wide attached with hook and loop Velcro to the sides of the door frame starting at 700mm above the floor finish and extending to the height 1350mm. This cloth barrier will hide the door hardware from the resident. The success of the cloth panel, irrespective of color, appears to be due to the visual agnosia that characterized all the wanderers. A doorknob is a protuberance for which the hand may reach whether or not there is intent or comprehension of consequences. When a door is a solid panel, only the door hardware makes it appear different from the adjacent walls. When the knob is concealed, a person with visual agnosia may be unable to interpret the panel as anything other than a dead end.
148. Grid patterns or bold contrast in the floor are sometimes effective but do not deter all residents from exploring the area adjacent to the exit doors and thus this design strategy should not be relied upon solely for exit control.
149. Murals are also an effective way to effectively disguise exits and deter elopement. One benefit of the wall mural was that it may have allowed the residents to experience a sense of control. That is, by disguising the doorway, residents did not need constant redirection from personnel for testing the doors. The control is obtained when the residents wander up the hall and decide, without intervention, to turn around and return to the day area where personnel and other residents are generally congregated. Another benefit is that the wall mural may have helped make the environment less institutionalized, fostering the aim of moving away from the medical model.¹³⁵



The thought of including a fake bus stop has a few people questioning the validity and ethics of this design intervention. When used correctly, this design device can be the catalyst to calming an agitated resident who is determined to leave the facility. When accompanied with a care giver sitting at the bench, this design device can provide an immediate resolve to the fixation on elopement.

Figure 47: Bus stop to nowhere. From <http://cdn.slidesharecdn.com>

150. Locating exit doors should also be designed to be parallel to paths of travel. Doors that are perpendicular to paths of travel encourage distraction from residents.
151. In the event that a resident does make their way out of the facility strategies to distract them to remain stationary can be employed such as including a “bus stop to nowhere.” This intervention was initiated successfully at the Benrath Senior Center in Düsseldorf, Germany. At this site, a bus stop (bench and sign) was installed right in front of the building to attract residents who have eloped or to escort those who feel an urgent need to be somewhere (a staff member will bring the resident to the bus stop and sit with them until the urge passes).

RATIONALE

Wall murals have potential uses besides just disguising the entrance/exit doors. They may also be employed to keep residents out of other unwanted areas, such as the laundry or hazardous material rooms. Most of these locked rooms also elicit door-testing behaviours, simply because the doors are locked.

DESIGN OUTCOMES

- *By disguising the doors, the mural discouraged the residents from walking up the main hallway and congregating at the doors.*
- *Wall murals and cloth barriers are an effective intervention to decrease door-testing behaviours.*
- *With the residents engaged in other behaviours (i.e., interacting with personnel, talking with other residents, wandering in the living quarters, and congregating in the day room), their functioning is improved. Positive interactions are fostered when there is no need to redirect residents from the doorway. If the wall mural helps at the main doorway, it could also help at all other locked doors and so increase residents’ quality of life.*



Figure 48: Murals painted on exit doors have proven to be an effective method of discouraging elopement. Sudbury, ON. Finlandia Nursing Home. From <http://memini.ru/discussions/26033>

CHAPTER 3

Space Program

ROOM DATA SETS AND PRESCRIPTIVE DESIGN REQUIREMENTS

When designing a long term care home, it is important to consider all major factors that play a role in maintaining the fundamental values of a home. The focus and support of such a place should resonate with the residents as being 'their home.' Although we cannot recreate their own home, as designers, we are able to give our elders the privacy and respect of one's own personal space. For this to be successful, the philosophy of care requires that staff acknowledge the theory of being a guest within the resident's home. Their daily tasks and duties cannot supersede the well-being and happiness of the resident.

For this to be possible, a culture change is essential. This is no easy feat; however, we can begin to make significant improvements in our approach to care and design that recreate the essence of a home.

CATEGORY 1 - THE HOME

The well being of our everyday living begins here. The home is a unique space that is defined and shaped by every resident. It is a place where daily activities unfold and stories are shared and created. Most of all, a home is a place of refuge.

When we consider the design of a home, we must look at the spaces that bring comfort and warmth. Spaces such as the kitchen bring the heart of any home to life with daily meal preparation. Living and dining areas serve to bring us opportunities for interaction and outdoor spaces provide us with natural light and scenes of nature. All of these spaces contribute to the sense of calmness in their home with empirical evidence showing a reduction in stress and anxiety. We must not forget the resident room. This space is the private and personal domain of a resident. The bedroom shall operate with the care essentials required, yet remain dominant as a personal space unique to the resident's tastes.

CATEGORY 2 - THE NEIGHBORHOOD

Every neighbourhood has an identity. Through different themes of cobbled streets to a boardwalk thoroughfare, every material contributes to the spatial experience and interaction of a community. Lighting, seating nodes and interconnected pathways create unique spaces for individuals to find refuge but also seek opportunities for social interaction.

Beyond the social opportunities within a neighbourhood, the amenities that serve to support such clusters of homes are equally as important for the appeal of any area. From the local café, your barber shop or to your local

pub, the streets of a neighbourhood are the interconnecting links that draw residents from their homes to the community core, the hub of larger social gatherings.

CATEGORY 3 - THE COMMUNITY CORE

At the centre of the community life, the village centre is the core of social gatherings. A space that allows for the flexibility to celebrate, interact and create memories.

As much as the community core is the hub of social activity, it is also the place that fuels the energy exerted by the thriving neighbourhoods. One is not mutually exclusive without the other. Their participation and reciprocity between the homes, the neighbourhoods and community core are all a cooperative endeavour. A symbiotic relation in which they dynamic nature and respect of supporting needs contribute to the human culture of a care home.

SOCIAL DENSITIES

A small house model utilizes space more efficiently as compared to an institutional model. Roughly 1/3 of program area is dedicated to Quality of Life (social) space.

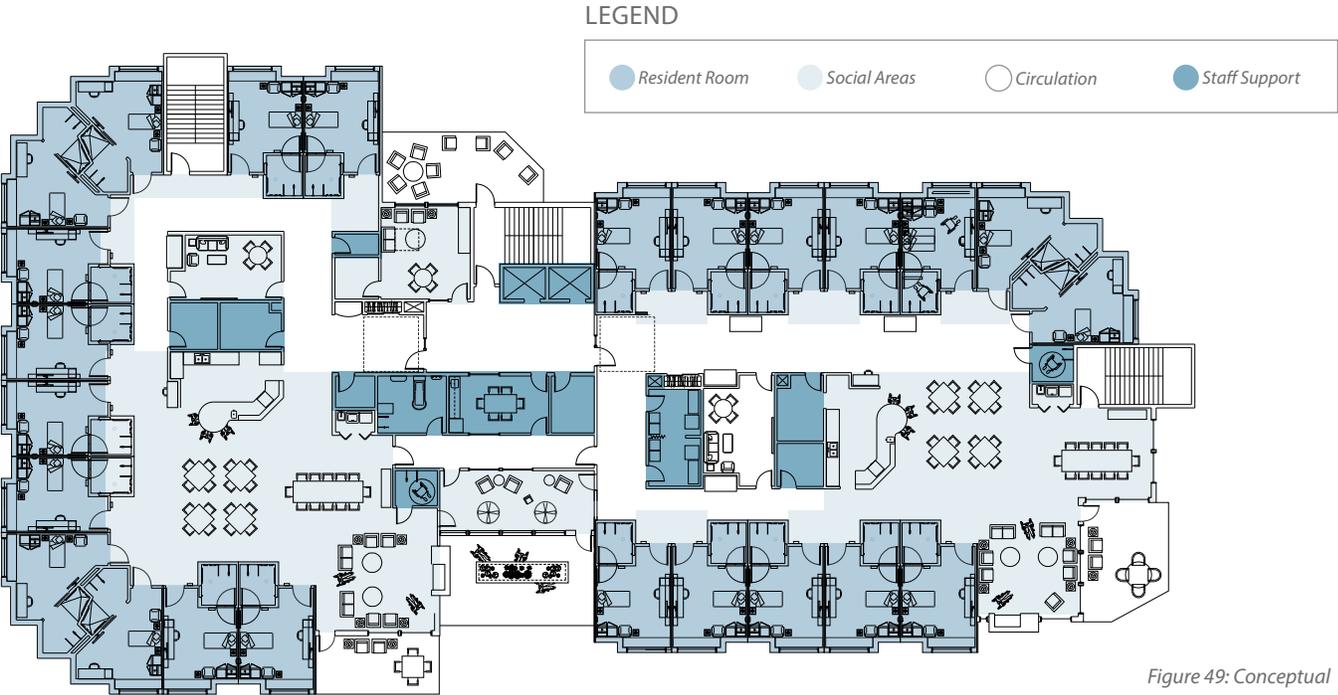
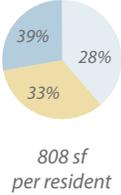
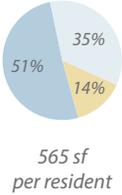


Figure 49: Conceptual high density floor plan. MMP Architects, 2016.

Typical Small House Model Breakdown		
Area	%	feet ²
Total Res. Bedrooms	39%	7528
Total Social area	33%	6452
Total Other	28%	5416
Total Neighbourhood	100%	19396



Typical Institutional Model Breakdown		
Area	%	feet ²
Total Res. Bedrooms	35%	7916
Total Social area	14%	3103
Total Other	51%	11573
Total Neighbourhood	100%	22592



PCH SPACE PROGRAMMING

PCH CASE STUDY PROGRAM STATISTICS

Resident Population: 120 beds
 Townhouse Concept: 2 floors
 Houses: 12 residents
 Neighbourhood: 24 residents with a shared service core

The Home (12 residents sharing support services)			
Room	Footprint (sf)	Quantity	Net Area (sf)
RESIDENT SUITE			
Resident Suite	236	12	2832
Resident Washroom	64	12	768
THE KITCHEN (INCLUDES SEATING)			
The Kitchen	800	1	800
Resident Work Centre	100	1	100
Pantry	60	1	60
COMMON LIVING SPACES			
Living Area	400	1	400
Dining Area	400	1	400
Outdoor Spaces	N/A	N/A	N/A
Net Home Area for 12 Residents			5360
Net Home Area for 24 Residents			10720

The Neighbourhood (24 residents sharing support services)			
Room	Footprint (sf)	Quantity	Net Area (sf)
Assisted Bathing Room	220	1	220
Laundry Room	120	1	120
Soiled Utility	120	1	120
Clean Storage	120	1	120
Accessible Washroom	65	2	130
Resident Care Office	120	1	120
Medication Room	65	1	65
Housekeeping	65	1	65
Mechanical/Electrical Space	120	1	120
Net Service Area for 24 Residents			1080
Net Home Area for 24 Residents			10720
Required Program Net Area			11800
Vertical Service Space			1000
Circulation Space Factor 0.45			5760
5 Neighbourhoods of 24 Residents Program Net Area			92800

The Community			
Room	Footprint (sf)	Quantity	Net Area (sf)
COMMUNITY CORE			
Main Entrance / Meeting Area	200	1	200
Multipurpose Space	2000	1	2000
Central Courtyard	N/A	N/A	N/A
THE STREETSCAPE			
Cafe	300	1	300
Tuck Shop	100	1	100
The Hair Salon / Barber	150	1	150
Meeting Room	400	1	400
The Lounge	200	1	200
The Family Room	200	1	200
The Family Dining Room	240	1	240
Resident Care Treatment Room	200	1	200
Reception and General Business	150	1	150
Resident Service Offices			
Social Worker / Therapeutic Services	130	2	260
Spiritual Care / Resident Services / Volunteer Services / Itinerant	100	4	400
Administration Offices			
Executive Director / Patient Care Manager	130	2	260
Executive Assistant / Financial / Manager / Payroll and HR / Staff Development	100	4	400
Staff Meeting Room	150	1	150
Staff Room	300	1	300
Staff Change Rooms	600	1	600
SUPPORT SERVICES			
Community Kitchen	400	1	400
Office of Supervisor and Dietician	100	2	200
Housekeeping and Laundry Services	400	1	400
Office of HSKP and Laundry	100	1	100
Workshop and Storage	400	1	400
Office of the Maintenance Manager	100	1	100
Equipment Storage	400	1	400
Central Storage	350	1	350
Shipping and Receiving	350	1	350
Waste Disposal and Recycling	300	1	300
Office of the Operations Manager	100	1	100
Mechanical Room	500	1	500
Electrical Room	200	1	200
ICT Room	120	1	120
OTHER SPACES			
Exterior Storage	200	1	200
Exterior Mechanical Space	N/A	N/A	N/A
Required Community Net Area for 120 Residents			10630
Vertical Service Space			1000
Circulation Space Factor 0.45			5234
Community Support Services Net Area			16864
5 Neighbourhoods of 24 Residents Net Area			92800
Total Building Gross Area			109664

1A - THE RESIDENT SUITE

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETSCAPE

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

Resident Service Offices

Administration Offices

Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

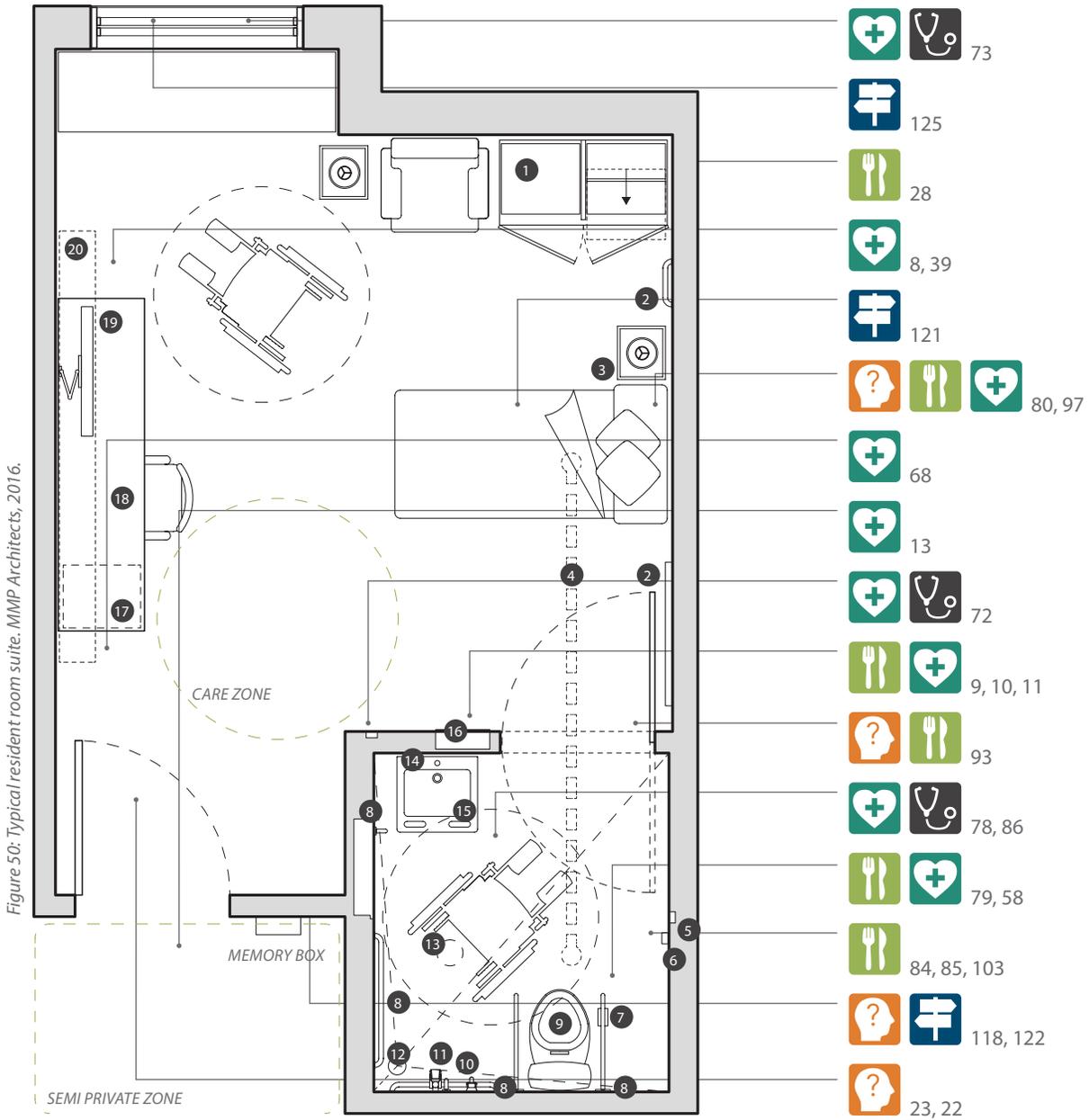
The resident suite is a private living space that functions as a personal care zone and private family zone as well. In essence, a private bedroom with the additional amenities that help care givers provide the support residents need with incontinence, basic hygienic needs and physical limits. The resident room requires the supporting spatial layout to allow for the smooth transition between sleeping zone, lounge space and private bathroom space.

Although layout options are fairly limited in plan, opportunities in spatial quality are limitless. It is important to consider that when a resident is moving into a care home, they are coming from the comforts of their own home into a small bedroom/washroom of less than 260 square feet. Within this footprint, they are required to downsize the contents of their personal life. This is undoubtedly a challenge. As designers, we must have empathy for this significant change in a resident's life and be cognizant that storage space, personalization and unique features will need to be thoroughly considered with each individual room.

The residential suite should offer options for personalization, which includes shelves and wall space for personal pictures and souvenirs. Furnishings such as beds and nightstands should be residential in nature and not clinical. If feasible, bringing in a furniture item from the comforts of their own home is a great way to allow residents to adjust to their new space.

The resident washroom is another personal space that requires thoughtful design. Adaptable to the needs of the resident, the washroom should be visible to the resident from the bed at all times. Contrast and ease of access are key components to reducing incontinence for residents. Depending on square footage availability, care homes should ideally consider having a separate barrier free shower space in the washroom.

SPACE PROGRAM: THE HOME
1A - THE RESIDENT SUITE



LEGEND

1 Wardrobe	5 Night Light	9 Toilet	13 Heat Lamp	17 Pedestal
2 Hand Rail	6 Garment Hook	10 Shower Valve	14 Mirror	18 Desk
3 Bedside Table	7 Toilet Paper	11 Shower Wand	15 Basin	19 Television
4 Overhead Lift	8 Grab Bar	12 Floor Drain	16 Incontinent Supplies	20 Shelf

1A - THE RESIDENT SUITE CONTINUED

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

*The Spa (Assisted Bathing Room)**Laundry Room/ Closet**Soiled Utility Room**Clean Storage**Accessible Washrooms**Resident Care Office**Medication Room**Housekeeping**Mechanical/Electrical Space***2. THE NEIGHBOURHOOD**

NEIGHBOURHOOD PLANNING

*Site Specific Operational Typologies***3. THE COMMUNITY**

THE COMMUNITY CORE

*Main Entrance/ Meeting Place**The Multi Purpose Space**Central Courtyard*

THE STREETSCAPE

*Cafe**The Shop**The Hair Salon**Meeting Rooms**Lounges**The Family Room**The Family Dining Room**Resident Care Treatment**Reception and General Business**Resident Service Offices**Administration Offices**Public Washrooms**Housekeeping**Staff Meeting Room**Staff Room**Staff Change Rooms**Staff Washroom**Staff Entrance**Other Streetscape Considerations*

SUPPORTING SERVICES

*Main Kitchen**Housekeeping and Laundry Services**Maintenance Services**Material Management**Service Entrance**Waste Disposal & Recycling*

SPECIFICATIONS

RESIDENT SUITE

1. Each resident bedroom must be a minimum of 194 Square feet (18 Square meters) excluding resident washroom. The washroom is to be a minimum of 60 Square feet. Bariatric resident room is to be a minimum of 250 Square feet (24 Square meters). The bariatric washroom is to be a minimum of 86 square feet (8 Square meters).
2. The doors into suite and washroom shall be a minimum of 44" (1120mm) clear. Bariatric doors shall be a minimum of 48" (1220mm) clear.
3. Dutch doors are optional for the suite entry doors. They provide security for private spaces but still allow visibility for resident care workers. This option is Care Home specific.
4. Suite Washroom doors must swing outward if not equipped with a double swinging door. To reduce incontinence, having the toilet fixture visible from the resident's bed is critical. Designer should allocate the door opening so that visibility is clear from all bed positions.
5. Within the resident rooms, closet space, dresser, resident bed, side tables and resident chair are standard furniture requirements. Note that there must be a minimum of 5 feet (1500 mm) clear on either side of the bed and 4 feet (1200 mm) clear at the end of the bed.
6. The bedroom design must include space for items such as shelving and bookcases to allow residents to display and store personal items. Residents must be given maximum opportunity to personalize their bedrooms..
7. Freestanding wardrobes, if any should be securely fastened to the wall and the floor to ensure resident and staff safety.
8. Each bedroom must include a ceiling track for a resident lift to facilitate resident transfers from their bed directly to a toilet or a wheelchair. Note that the door frame and wall space above resident washroom entrance will have to accommodate the track.
9. For purposes of planning minimum clearances around beds, unless otherwise specified by the Nursing Home Functional Program, the dimensions of the bed shall be 890mm wide x 2235mm long. For a bariatric bed, 1118mm wide x 2286mm long is the normal position and 1550mm wide x 2489mm long with safety sides in place.
10. Provide a night-light. Preferably amber. This is to be designed into the suite entry space to allow care workers to check on residents without the need to turn on lights. A night-light should also be used to cast light in front of bathroom door.
11. Each bedroom must have a large exterior window to ensure that sufficient natural lighting is available for the bedroom. A portion of the window must be operable (e.g. with appropriate opening restrictions to limit openings to be no more than 8 inches) and have a maximum sill height of 25 inches (630 mm). Windows that open to the outdoors must have screens.
12. STC ratings between resident rooms shall meet or exceed STC 50.
13. Wiring for a phone jack, cable television service and internet shall be provided for each resident in each bedroom area. Each Bedroom shall have additional power outlets for other electrical equipment (e.g. computer, stereo, TV, Internet). Wall area should be made available to allow for a big screen TV.
14. There shall be a device for each resident in each bedroom that will activate the Resident/Staff Communication and Response System of the LT Care Home. The device to activate the Resident/Staff Communication and Response System shall be located within easy reach of the resident, including when the resident is lying or sitting up in bed and in the washroom.
15. Flooring shall be matte finish and solid colour. Patterned flooring or contrasting colour changes shall not be used. Floor colours shall contrast wall colours.
16. Wall hinged, fold-up bars are to be installed on either side of the toilet to accommodate lifts and transfers. Rear and wall mounted grab bars are not utilized by elderly residents and should not be used.

1A - THE RESIDENT SUITE CONTINUED

17. Effective height for side bars is 775mm (30.5") above the floor. The centres of grab bars should optimally be between 650 and 762mm.
18. Centre of toilets should be a min of 750mm off an adjacent wall (preferred is 900mm) to allow for double assist transfers which will require fold up bars on both sides of the fixture.
19. Each toilet must be barrier free height. Preferably floor mounted as you would see in a home. However, wall-hung toilets are generally considered easier for maintenance/housekeeping purposes.
20. Toilet seat to be of contrasting color to bowl and floor. Toilet seats should be extra wide with a 453 kg (1000 lbs.) rating.
21. Toilet bowl rim shall be 420mm above the floor.
22. Each washroom must have a mirror which is located over the sink designed to accommodate residents of differing heights. It is preferred not to incorporate a downward tilting mirror. The mirror (if not adjustable) should be long enough in height to accommodate either a standing resident or one in a wheelchair.
23. Hand Basins shall have level surfaces on each side of the basin (in consideration for a residents handedness due to weakness caused by stroke) to allow for residents personal belongings.
24. Hand basins should extend at least 600 mm (24") from the front edge of the basin to the wall. This will allow for a resident in a wheelchair sufficient open space for legs.
25. Basins and mirrors are available that are have adjustable heights. If these type of basins are specified it is important that they come with automatic stops to prevent a residents legs from becoming pinched.
26. Each washroom must provide storage space for resident's personal toiletry items and secure storage for staff supplies.
27. Each bathroom may be designed with an accessible shower or as a European shower room. Sloped floors are required to control water flow.
28. The shower wand shall be mounted on a vertical grab bar with a minimum hose length of 1800mm. This will allow the care giver to administer perineal care (Peri Care) to the resident Pressure volume control to be included with design. Operated by a thumb press on the wand itself.
29. Controls should be located to minimize reaching across the resident or shower.
30. Horizontal and vertical grab bars shall be mounted on both sides of the shower. Be powder-coated rather than stainless steel. Stainless steel appears too institutionalized and can be slippery if not textured. Powdered finish can be installed in a contrasting color.
31. The use of shower chairs is the preferred method of showering for a majority of nursing home residents; this allows for repositioning and increase safety of both the resident and the assistant. Different shower chair styles are associated with different levels of care. Contact a local rep for health grade products.
32. Provide a safe "footwork" area for caregivers in shower areas.
33. Each bathroom shall be equipped with an additional source of heat to raise the temperature of the bathroom for showering comfort. Resident Bath and Shower Rooms must have individual quick response room temperature control capable of maintaining 30°C (85°F). Connecting heat lamps to timer switches or motion detectors should be considered.
34. Provide a cabinet for incontinence supplies and perineal care close to the bathroom for ease of use by care givers. However design the cabinet such that the supplies are not seen openly. A small cabinet just adjacent to and outside of the bathroom door is a suitable solution.
35. Mechanical, Electrical & Communication requirements
 - Electrical requirements for television, computer and personal electronics
 - Flexible lighting levels
 - Nurse call station

1B - THE KITCHEN

SPACE PROGRAM LEGEND**1. THE HOME**

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

*The Spa (Assisted Bathing Room)**Laundry Room/ Closet**Soiled Utility Room**Clean Storage**Accessible Washrooms**Resident Care Office**Medication Room**Housekeeping**Mechanical/Electrical Space***2. THE NEIGHBOURHOOD**

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THE COMMUNITY CORE

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SUPPORTING SERVICES

*Main Kitchen**Housekeeping and Laundry Services**Maintenance Services**Material Management**Service Entrance**Waste Disposal & Recycling*

The kitchen, the central location for many staff and residents is the hub of daily activities. Although recent in nature, the open concept floor plan is the ideal space planning exercise for the small house model. With the kitchen serving three meals daily and constant staff attention, this area is a prime active space that residents enjoy observing and participating. Often referred to as “Therapeutic kitchens,” or as “country kitchens,” this active space has been cited in literature as a supportive environmental space for residents with dementia.

In the ‘therapeutic kitchen,’ each household will provide food for their own residents with the aid of resident care workers, care home dietician and food supervisor. Although a challenge, the preparation process and smells of cooking will undoubtedly bring the essence of a home to life.

To operate such a model, each care home will need to first establish their philosophy and ensure that the level of care in a home like environment will not only meet their physical needs but exceed their emotional needs. A kitchen is each household will provide food for their own residents with the aid of a key component to completing the small household model. The benefits of activities that are associated with therapeutic kitchens include washing dishes or setting tables. Cooking can stimulate the senses through color, aroma, and touch. Chopping vegetables or stirring a pot can help improve or maintain muscle strength, range of motion, gross hand coordination and concentration for residents. All these are small active daily living (ADL) tasks that contribute to feelings of pride and instill a sense of purpose.

It is important to mention that there are other options for meal preparation such as, the centralized commercial kitchen within the community core where meals can be prepped for an entire home and distributed. Another option is to use the local Regional Distribution Facility who delivers prepared meals to the care home. However, one must really consider the effects of removing the essence of an active kitchen from the home before considering the latter.

When considering the spatial design of the kitchen, a central island is ideal. The island is to be designed with accessibility requirements for wheelchairs and direct access by staff from the opposing side of the table. Note that the operational side of the daily meal prep is home specific. Both the client and designer need to devise a proper kitchen plan that allows for the flexibility of residents having access to the kitchen. This may be access outside of meal prep time only or at all times.

Included within the kitchen zone is the resident care work centre. Formally known as the nursing station, this area is intended to blend within the millwork space of the kitchen area. Used for charting and digital communication, the workspace is ideally tucked into a space that allows staff members to have a clear visual view of the surrounding open floor plan. In no way should this area appear to be off limits to the residents.

1B - THE KITCHEN CONTINUED

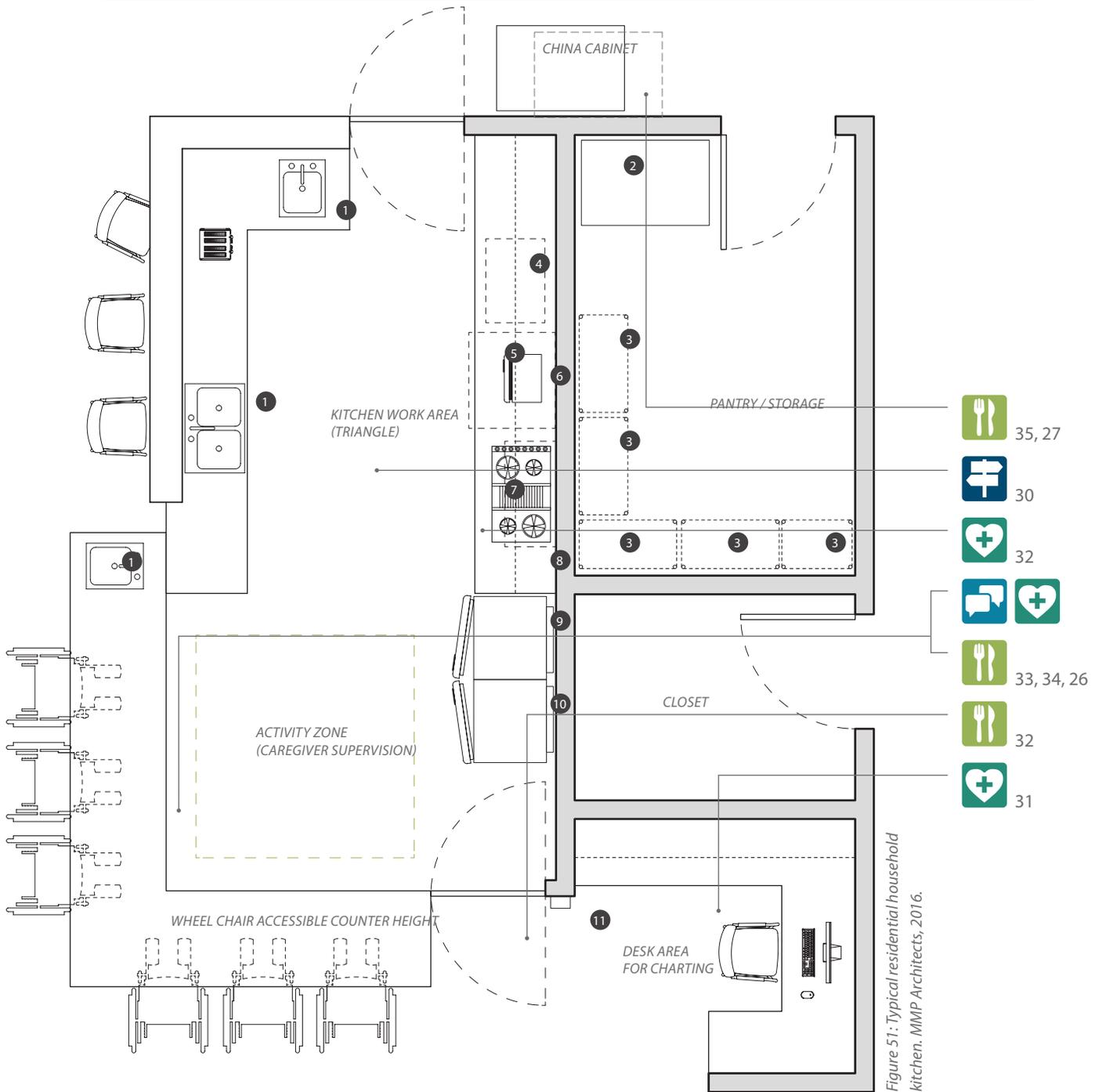


Figure 51: Typical residential household kitchen. MMP Architects, 2016.

LEGEND

1 Sink	4 Warming drawer	7 Range	10 Refrigerator
2 Chest freezer	5 Dishwasher	8 Fire Suppression Hood	11 Hand Dispenser
3 Stainless Steel Shelving	6 Microwave	9 Freezer	

SPACE PROGRAM CATEGORY 1: THE HOME
1B - THE KITCHEN CONTINUED

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETSCAPE

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

Resident Service Offices

Administration Offices

Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

SPECIFICATIONS

THE KITCHEN

1. *The kitchen shall be located next to the dining area. Note that the preferred option is to provide flexible dining options. An assisted dining area should be immediately adjacent to kitchen with tables for smaller dining groups. A second separate dining area should be provided for family style dining, capable of seating the household population. The family dining area should have direct access to exterior views and the outdoors. Ideally, the kitchen and smaller kitchenette areas will also have natural light.*
2. *Kitchen design consideration should be inclusive. Ideally the kitchen is accessible by all. Client and designer will need to establish the operations within the kitchen environment. All inclusive can mean that residents have access at all times or only during dedicated periods when the kitchen is not in use by staff.*
3. *Provide a food preparation zone accessible by staff and residents for active daily living tasks. This resident zone shall be incorporated with counters that are CSA/ ADA compliant. Include opportunities for group socialization around the kitchen area (4 residents minimally).*
4. *Immediately adjacent to the food prep zone, include a hand hygiene sink accessible by staff and residents.*
5. *Countertop material to be solid surface. Solid surface to be of a neutral color with a light reflectance value (LRV) of 75% or greater. Higher contrast between counter and food assists visually impaired individuals.*
6. *Each kitchen must have storage cabinets above and below (e.g. including space for pans/pots, dishes, glasses and utensils etc.) and counter space with a compartment sink. Millwork will need to be a high-grade finish to stand up to commercial grade use.*
7. *Appliances shall be residential in nature. Ideally, commercial grade quality and effectiveness is ideal when cooking for a larger household. Consideration to meet with the local health authorities should be made when designing the household kitchen. A commercial grade dishwasher and refrigeration is ideal. Other appliances to include in the design; a separate freezer, range hood, range, oven/wall oven, a warming drawer and microwave.*
8. *A deactivation switch must be provided for the range/oven and be inaccessible to the residents.*
9. *All food being prepared in households will require staff to have a food handling certificate. This is easily attainable. Staff preparing food will need to work with the local dietician and food supervisor in preparing recipes for daily meals.*
10. *Workflow and distribution of food to households is to be operationally determined by the care home. Typically, food is centrally delivered in bulk to the main service building in the commercial kitchen area. Food is then further distributed via carts to each individual household and stored for up to 1 week.*
11. *Consideration to include a hutch or an accessible china cabinet that stores daily glasses, plates and cutlery. Residents that are more able bodied will be able to assist in setting table placements.*
12. *Note that the communal resident washroom shall be located in close proximity to the dining areas. This washroom shall not open directly into the dining or the food preparation areas.*
13. *Mechanical, Electrical & Communication requirements*
 - *Electrical requirements for equipment with backup supply*
 - *Gas or electrical accommodations for range/oven*
 - *Flexible lighting levels*
 - *Hand hygiene sink*
 - *Barrier free sink for resident use*
14. *Recommended area to be decided between client and designer based on care home resident population.*

SPACE PROGRAM CATEGORY 1: THE HOME
1B - THE KITCHEN CONTINUED

RESIDENT CARE WORK CENTRE

1. *Communications centre should ideally be integrated within the kitchen area. This zone is specific to staff for maintaining resident care information and all communication between neighbouring households and community core. Area should not be closed off but rather uniquely designed into a home-like office area.*
2. *Area should facilitate one on one communication with residents or other staff members.*
3. *Location near kitchen to have visible views of the larger communal area.*
4. *Lockable cupboard space for private information to be included.*
5. *ICT workstation*
6. *Nurse Call Station/Room alert, CCTV and other applicable systems access as per care home.*

THE PANTRY

1. *Depending on the food service delivery model, a sizeable pantry should be provided to hold food (both frozen and dry) for a period of time as defined by operations. The designer should take into consideration the quantity of supplies and allocation. Additional refrigeration may be required. It is recommended that a designer work with a kitchen consultant to prepare and assess the allocation of food supplies, appliances and other recommended practices in effective kitchen design.*

SPACE PROGRAM CATEGORY 1: THE HOME
1C- COMMON LIVING SPACES

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETSCAPE

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

Resident Service Offices

Administration Offices

Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

The resident living room and dining room combinations provide the opportunity to maintain a familiar setting and resident engagement. Ideally located in close proximity to each other, the living room and family dining area is typically at the periphery of the central kitchen where household members spend the majority of their daytime hours.

The living room is the hub of activity outside the kitchen. The design should include an optimal arrangement that initiates residents to engage in conversation with other residents, family members, visitors and staff in a comfortable, homelike atmosphere. Items found in the comforts of home include the comfy couch, end tables, table lamps, books and artwork. It should be welcoming, comfortable and relaxing. However, it is important to include the design of smaller alcoves or nooks within the general house planning space. These smaller niches are great cozy spaces for reading or having a private conversation. Other options include a veranda or a study.

The dining room is a more flexible space. It can be formal or informal. The dining area is a great space to have all residents at the table for special occasions or other daily activities. Possibilities are endless.

SPECIFICATIONS

LIVING / FAMILY ROOM

1. *Each Resident House must have a living room that is sized according to the quantity of residents living in the home.*
2. *Living rooms and activity spaces should have convenient access to a wheelchair accessible public washroom that is separate from the resident washrooms located with the bedrooms. There should be no direct views into the washroom from the living or family room.*
3. *Living rooms should be designed for clustered seating to facilitate resident interaction and socialization through activities such as board games and cards.*
4. *There should be storage space for recreational supplies located within, or in close proximity to the activity spaces.*
5. *Living rooms and activity areas within the houses, may also include spaces for the display and storage of familiar objects (e.g., books, cards, table games, etc.) that residents may wish to use independently, or with others.*
6. *The dining room or living room is an ideal location to include appropriate artwork.*
7. *The living room should be carpeted or have an inlay carpet section to suggest a throw carpet. Zero thresholds between surfaces should be maintained for inlays.*
8. *Access to outdoors and therapy gardens should be adjacent to living / dining room combinations.*
9. *The living room is the main TV viewing area. Consider the relationship of flat screen placement to viewing areas. Televisions need to be located where daylight and glare do not compromise viewing, but also where the sound will not intrude on other people or activities.*
10. *Space for storage of wheelchairs and walkers (during resident use of the Living Room) must be located nearby.*
11. *Effort must be made to minimize noise in these areas through the provision of finishes that reduce reflected noise and increase sound absorption.*
12. *A fireplace should be provided in the living room. May be electric or gas. Fireplaces in living rooms serve as positive distractions, creating focal points to enhance social interaction.*
13. *Consideration to include small nooks and alcoves for more privacy and alternative seating areas.*

1C - COMMON LIVING SPACES CONTINUED

14. Mechanical, Electrical & Communication requirements

- Electrical requirements for television
- Gas or electrical fireplace accommodations
- Flexible lighting levels

THE DINING ROOM

1. Ideally located near the living/family room and direct access from the kitchen.
2. Dining area should accommodate a large seating table for all residents to be seated at, including staff members or visiting guests.
3. Access to outdoors and therapy gardens should be adjacent to the living / dining room combinations.
4. Optional space for other activities such as artwork or games.
5. Mechanical, Electrical & Communication requirements
 - Electrical requirements for television
 - Gas or electrical fireplace accommodations
 - Flexible lighting levels

OUTDOOR SPACES

1. Connected to every household, an outdoor living space should accompany the living and dining areas. This space can take shape in the form of a balcony, a patio or an outdoor garden depending on the care home model.
2. It is important to consider the spatial organization of the outdoor space in relationship to security. The small house model may be designed with a private outdoor space similar to a backyard that is separate from the community outdoor space.
3. Items to consider including in the outdoor spaces are sitting areas for barbecues and family visits, lounging space for everyday leisurely activities and green space for plants or gardening.
4. Consider providing a water source in close proximity to plants. If planting beds are to be used, provide a height that is ideal for residents to get their hands dirty.
5. Tactile surface of exterior grade finish should be non-slip and smooth in nature. Edge conditions should be provided for any drops in surface or grade.
6. Refer to Central Courtyard in Community for additional design consideration.

1D - UTILITY ROOMS + SUPPORT SPACES

SPACE PROGRAM LEGEND**1. THE HOME**

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

*The Spa (Assisted Bathing Room)**Laundry Room/ Closet**Soiled Utility Room**Clean Storage**Accessible Washrooms**Resident Care Office**Medication Room**Housekeeping**Mechanical/Electrical Space***2. THE NEIGHBOURHOOD**

NEIGHBOURHOOD PLANNING

*Site Specific Operational Typologies***3. THE COMMUNITY**

THE COMMUNITY CORE

*Main Entrance/ Meeting Place**The Multi Purpose Space**Central Courtyard*

THE STREETScape

*Cafe**The Shop**The Hair Salon**Meeting Rooms**Lounges**The Family Room**The Family Dining Room**Resident Care Treatment**Reception and General Business**Resident Service Offices**Administration Offices**Public Washrooms**Housekeeping**Staff Meeting Room**Staff Room**Staff Change Rooms**Staff Washroom**Staff Entrance**Other Streetscape Considerations*

SUPPORTING SERVICES

*Main Kitchen**Housekeeping and Laundry Services**Maintenance Services**Material Management**Service Entrance**Waste Disposal & Recycling*

Within every household, the support spaces are essential to maintaining both the home and the daily activities that take place. Known as the 'back of the house', the list of rooms below indicates spatial requirements for both staff and residents.

The Assisted bathing room is becoming less frequent in current care home models. When given the opportunity to shower in one's own personal washroom, the frequency of a public bathing process is less appealing. However, certain circumstances may dictate the use of a bathing tub over a resident shower. In order to adequately design the assisted bathing room it is helpful to understand why the progression to move away from assisted bathing rooms has occurred. Bathing in unfamiliar centralized public spaces has been reported as one of the most difficult activities of daily living for both the residents and staff members. Resulting in unwanted behaviours, residents often resist assisted bathing rooms for a number of reasons: it's often uncomfortable to be in a cold room while being sprayed with hot water, there is a feeling of exposure and vulnerability when being transported to and from the bathing room, undoubtedly, and feelings of embarrassment arise. Fortunately, there is a mutual understanding in the nursing home community that the ritual of bathing should be a private and personal event that takes place within their own suite. Therefore, with the notion of culture change, it is encouraged that all residents have their own showering facilities built within their suites.¹¹² Moving forward, maintaining an assisted bathing room is still common practice and the designer is encouraged to create a more 'SPA' like atmosphere.

Another daily activity in the home environment is laundry. Personal laundry being done within the home will support residence independence, positive family / friend involvement, and reduced risk of losing personal items. Larger items such as linens can be sent to the community's central laundry if equipment is available or outsourcing laundry cleaning is a viable option.

The medication room is another area of discussion that falls into questioning with its distribution of medication than the physical space allocated for its use.

1D - UTILITY ROOMS + SUPPORT SPACES CONTINUED

Figure 52: Typical medication room. MMP Architects, 2016.

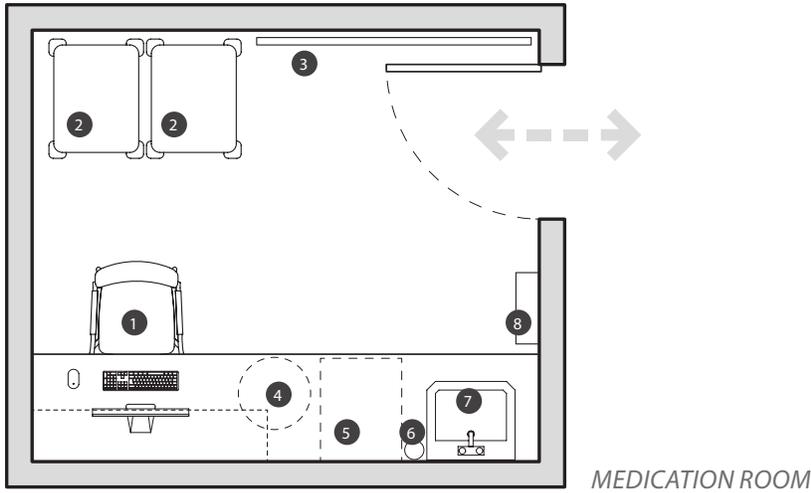
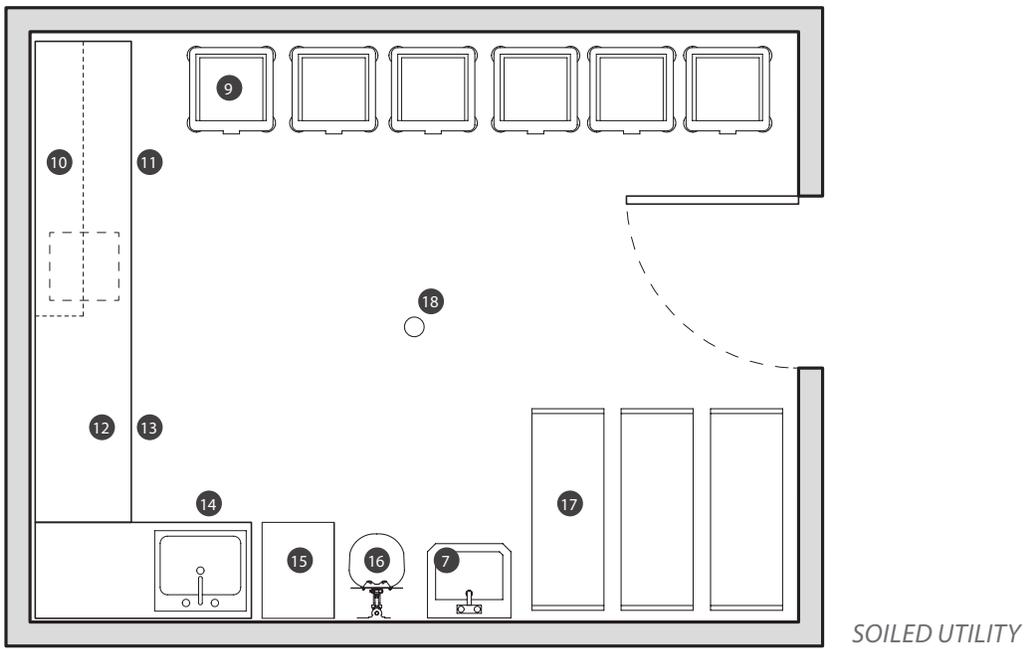


Figure 53: Typical soiled utility room. MMP Architects, 2016.



LEGEND

1 Work Station	6 Soap Dispenser	11 Lower Cabinets	17 Slop Basin
2 Medication Cart	7 Sink	13 Stainless Worktop	18 Dirty Linen Cart
3 White Board	8 Paper Towel Dispenser	14 Clean Storage	19 Floor Drain
4 Waste Recepticle	9 Personal Hampers	15 Sink Unit + Discharge Table	
5 Above Counter Refrigerator	10 Stainless Steel Shelves	16 Flusher Disinfecter	

1D - UTILITY ROOMS + SUPPORT SPACES CONTINUED

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

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Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

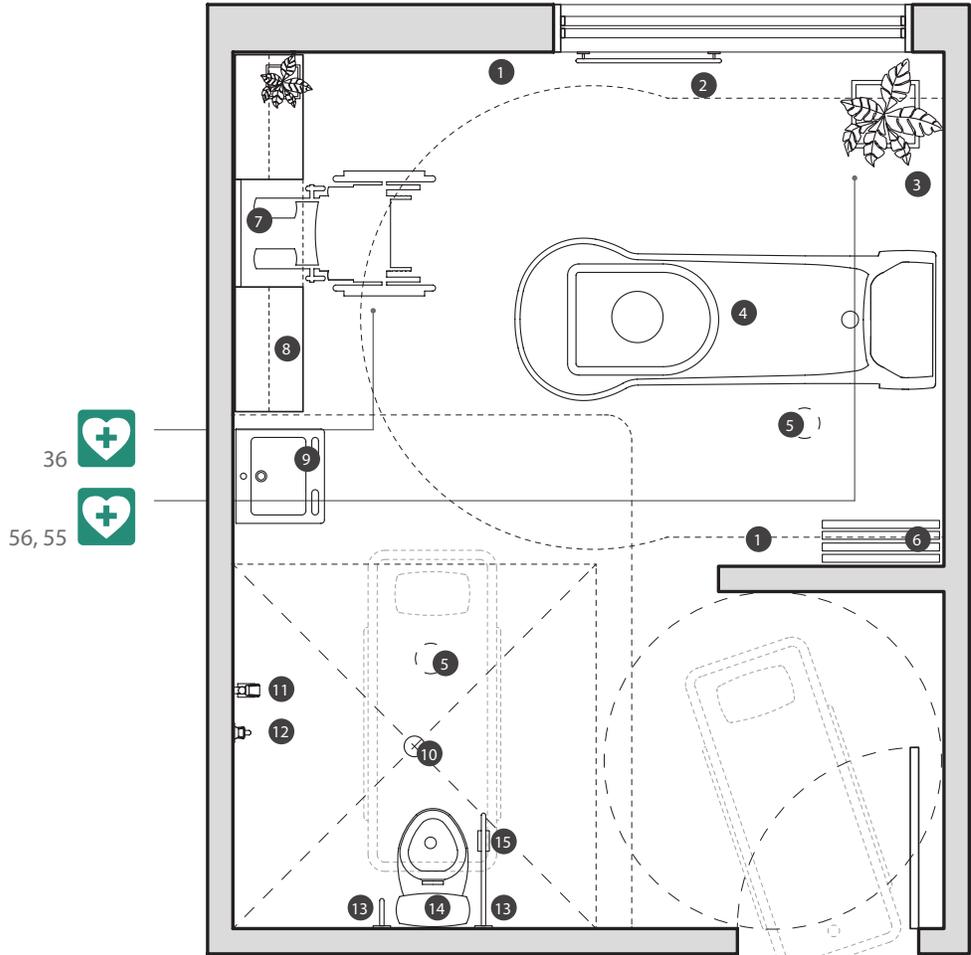
Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling



ASSISTED BATHING ROOM

LEGEND

1 Garment Hook	6 Changing Bench	11 Shower Wand
2 Heated Towel Bar	7 Mirror	12 Shower Valve
3 Plant	8 Millwork	13 Grab Bar
4 Bathing Tub	9 Sink	14 Toilet
5 Heat Lamp	10 Floor Drain	15 Toilet Paper on Grab Bar

Figure 54: Typical assist bathing room. MMP Architects, 2016.

1D - UTILITY ROOMS + SUPPORT SPACES CONTINUED

SPECIFICATIONS

THE SPA (ASSISTED BATHING ROOM)

1. Whenever possible, natural lighting should be provided in the assisted bathing room to provide for a more pleasant and comfortable experience. Residents' privacy can be assured through the use of frosted windows.
2. Assisted bathing rooms should have supplemented heating and be individually controlled to maintain the room temperature at a comfortable level for residents while bathing. A ceiling mounted heat lamp, provided in the room, may be helpful to maintain resident warmth while in the room. Connecting heat lamps to timer switches or motion detectors should be considered.
3. Provide a music system to provide relaxing music during bathing.
4. Create a feature wall that is at the head of the bathing tub such as millwork and picture, or even a flat screen TV. Effort should be made to make bathing a relaxing experience through the use of room finishes (e.g., murals)
5. Where a facility has only one assisted bathing room, it should be designed to bariatric standards. Where a facility is supporting several residents with obesity, there may be a need for more than one bathing room designed to bariatric standards. This should be determined during the functional program process. Note that bariatric lifts can also be used with residents with lower BMIs but the reverse is not true.
6. Assisted bathing rooms should have an area for in-room storage (e.g., a one-day supply of clean towels, washcloths, etc.), including space for a towel warmer and a separate soiled laundry hamper. There should be adequate space to ensure separation between the storage/holding and flow of clean supplies and soiled items into and out of the room. Bulk storage for towels and linens is also required but should be in a separate location.
7. Assisted bathing rooms should have secure lockable areas to store cleaning supplies for the cleaning and sanitizing of bathtubs, showers, toilets and hair wash and hand wash basins. Within this millwork, include a utility sink.
8. Placement of towel warming and shelving cabinets should be a sufficient distance from the tub, shower and sink to prevent contamination for water spray or splash. Shelving cabinets should be enclosed.
9. Assisted bathing rooms may be equipped with a ceiling lift to facilitate the transfer of residents.
10. A toilet area with accessible grab bar fittings to be located within the bathing area.
11. Optional addition of a shower area for conditions when a fully reclined position is preferred. This is care home specific.
12. Splash protection shall be provided on surrounding walls
13. Flooring shall be of seamless, impermeable and non-slip material
14. Maintain a 44" (1120mm) door opening or 48" (1220mm) for bariatric residents.
15. Mechanical, Electrical & Communication requirements
 - Nurse Call Station
 - Hand hygiene sink
 - Utility sink
 - Towel warmer (optional)
 - Showering hose (optional)
 - Recommended minimum area of 200 square feet (18.6 square meters)

1D - UTILITY ROOMS + SUPPORT SPACES CONTINUED

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

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Central Courtyard

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Staff Change Rooms

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SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

LAUNDRY ROOM/CLOSET

1. Two options to consider when designing the laundry space; a laundry closet off a public space or a separate room.
2. If laundry area is within the public household space, consider locating the washer and dryer in an area where the activity of washing one's clothes and folding afterwards can become a communal activity. An opportunity for socialization similar to the experience of a laundry mat.
3. Create an area for folding adjacent to the laundry area.
4. Washer and dryer units to sit on raised pedestals and front loading. Consider if units are accessible by residents or their family members.
5. When in spin cycle, the washer and dryer pair should not generate more than 65 on the decibel scale in an open floor plan.
6. If laundry is in its own separate room, consider providing a utility sink built within millwork. Consider the counter space design and height for folding clothes.
7. Mechanical, Electrical & Communication requirements
 - Electrical power supply
 - Venting as required for dryer exhaust
 - Utility sink next to washer and dryer
 - Recommended area of 100 square feet (9.6 square meters).

SOILED UTILITY ROOM

1. The soiled utility room shall accommodate: a utility sink for surface cleaning of contaminated equipment and disposal of fluids; Spray wands shall not be installed for rinsing of items.
2. Space shall be provided for separate mobile carts/ containers for soiled linen, general waste, medical/ hazardous waste, confidential waste, and recycling, etc. Consider providing a storage bin system for individual residents.
3. Provide countertops and storage space for products that are lockable. Counter tops shall be of non-porous material, free from seams and tolerant of routine daily cleaning with CCF approved low level disinfectants.
4. Consideration should be given to exceeding the minimum exhaust and air exchange requirements in the soiled utility room to support an odour-free environment
5. Splash protection shall be provided on all walls near water supply, sinks, or human waste management systems
6. Flooring shall be of seamless, impermeable and non-slip material
7. Maintain a 44" (1120mm) door opening
8. Mechanical, Electrical & Communication requirements
 - Nurse Call Station
 - Automated disposal station (e.g., enclosed bedpan washer/disinfector or equivalent product)
 - Include a hand hygiene sink near the entrance.
 - Eye Wash Station
 - Utility sink
 - Recommended minimum area is 130 square feet (12 square meters) or as recommended by care home and resident count.

1D - UTILITY ROOMS + SUPPORT SPACES CONTINUED

CLEAN STORAGE

1. Consider two types of storage space: General Storage & Resident dedicated storage.
2. Create storage space for accessories such as linens and hygienic products for residents. Cabinet storage in corridors outside of resident rooms is ideal for ease of access.
3. Larger equipment storage will require its own space. Built in shelving is optional. Consider items that will be stored in such a space (i.e. wheelchairs, carts, portable cassettes for patient lifts, holiday decorations, etc.). Include charging stations as needed.
4. The shelving in storage rooms should be adjustable, rust proof and easily maintained/cleaned.
5. Consideration should be given to providing a well-ventilated and separate area for the recharging of batteries on wheelchairs and other equipment such as lifts. Wheelchair batteries should not be recharged in resident bedrooms because of potential explosive dangers and release of noxious fumes.
6. The amount of space allocated for the storage of resident belongings should be reasonable and based on the needs of residents. It is not expected that the long-term care home provide space for belongings that will not be used by residents during their stay. Each home will determine their own footprint allocation.
7. Maintain a 44" (1120mm) door opening.
8. Recommended area based on care home design and availability. Assume a minimum of 10 square feet per resident.

ACCESSIBLE WASHROOMS

1. A Universal Washroom shall be provided in each home for use by residents, guests and staff. Proximity to Common Living Spaces is ideal.
2. Include amenities that serve the resident (refer to resident washroom design considerations).
3. Maintain a minimum 44" (1120mm) door opening. Preferably with an automatic door operator.
4. Recommended minimum area of 60 square feet (5.6 square meters).
5. Mechanical, Electrical & Communication requirements
 - Nurse Call Station

RESIDENT CARE OFFICE

1. This space is exclusive to the use of staff. Used for the purpose of administrative functions and staff rest periods, storing personal belongings, changing clothes and staff-specific activities.
2. Room can also be used to hold private conversations between residents and their family members.
3. Include millwork for storage of office material and an ICT workstation. Lockable cupboard space for personal belongings to be included.
4. Worktable with 6 chairs
5. Recommended net area of 120 square feet (11.2 square meters).
6. Mechanical, Electrical & Communication requirements
 - Nurse Call Station

1D - UTILITY ROOMS + SUPPORT SPACES CONTINUED

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

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Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

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Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

MEDICATION ROOM

1. *The medication room is a dedicated space for staff to prepare resident medications.*
2. *Area is to be secured and locked at all times.*
3. *Provide millwork with built in ICT workstation. Include lockable cupboard space for the storage of stock medications related to pharmacy services.*
4. *Facilitate medication storage/cart/dispenser into built area. Items to be confirmed by Care Home Management.*
5. *Recommended net area of 6 to 10m² depending on resident count*
6. *Mechanical, Electrical & Communication requirements*
 - *Hand hygiene sink*
 - *Nurse Call Station*
 - *Include any additional refrigeration requirements as requested*

HOUSEKEEPING

1. *Provide space for housekeeping supplies. Depending on care home scale, a housekeeping cart may be used.*
2. *Include a curbed floor sink with mounting clips directly above for wet mops.*
3. *Storage shelving that is lockable. Care home specific.*
4. *Wall protection shall be provided to prevent damage by the carts to a height of 1.2 metres.*
5. *Maintain a minimum 44" (1120mm) door opening.*
6. *Recommended minimum area is 50 square feet (4.6 square meters).*
7. *Mechanical, Electrical & Communication requirements*
 - *Negative air pressure to surrounding corridor*
 - *Curbed floor sink*
 - *Hand hygiene sink*

MECHANICAL & ELECTRICAL SPACE

1. *Allow a dedicated space for both mechanical and electrical equipment, including a LAN closet.*
2. *Note that the amount of space required is based on the systems being used within the care home. Space will vary in size.*
3. *Maintain secure access into room by staff only. Minimum 44" (1120mm) door opening.*
4. *Recommended area is determined by scale of home, care home design and selected systems.*

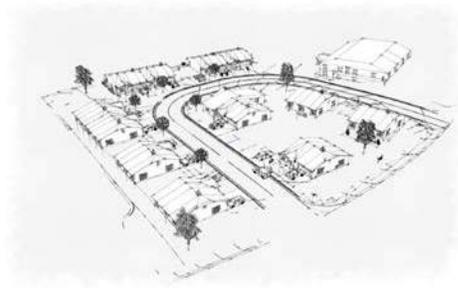
SPACE PROGRAM CATEGORY 2: THE NEIGHBOURHOOD

2A - NEIGHBOURHOOD PLANNING

Operational & Site Typologies dictate the neighbourhood planning of any care home. When the focus is around the small house model, the support spaces and community relationship vary in its spatial organization. Some care homes are spread out into a village complex design when land is made available and other designs may grow vertically for lack of land. One design is not mutually exclusive from the other programmatically. However, since the spatial organization will vary, operations will need to accommodate the spatial structure accordingly. A few examples of such scenarios are as follows:

THE VILLAGE CONCEPT

The village concept is a cluster of small one storey buildings that are interconnected by sidewalks with a central community core. The small house model thrives independently from the community core and is focused on independence and privacy. Architecturally, such a model of space planning is ideal in creating the independent home environment. However, operationally, the interdependence between homes and the community space is a challenge due to distance. Relative to the level of care and security, movement for residents can be heavily dependent on staff, volunteers or family members. Consideration on frequency of interaction between households and communal activities need to be considered, especially during the winter season. Nonetheless, the village concept is the fundamental basis for the small household model.

*THE TOWNHOUSE CONCEPT*

The Townhouse concept is your middle ground between the independent small house model and the high rise. Usually two to three stories in height, the townhouse concept has more flexibility in spatial arrangement of households and their connections to each other and the community core. Options to consider include side by side townhouses where households can be split into vertical or horizontal floor plates. Community spaces can be interconnected by links or treated as separate buildings. The store front concept is an alternative idea that can include the community core spaces at the main level with the living spaces on the 2nd and 3rd floors. However, vertical circulation should be considered as a major cost factor in this type of model.

*THE HIGH RISE CONCEPT*

The High Rise concept is the vertical driven footprint when land is scarce or resident population is high. The village concept is intertwined with the similarities of a hotel spatial concept. Community core amenities are located at the lower levels and the small households are located on the upper levels. Small households can take up an entire floor or perhaps create a neighbourhood of two or three households with a shared vertical service core as a major cost factor in this type of model.

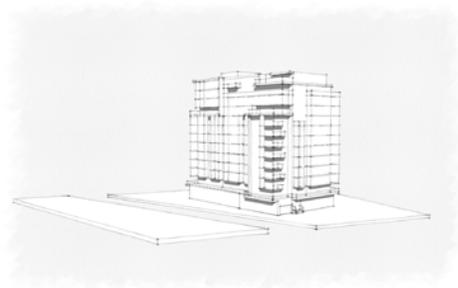


Figure 55: Concept neighbourhood planning. MMP Architects, 2016.

3A - COMMUNITY CORE

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETSCAPE

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

Resident Service Offices

Administration Offices

Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

The core of social gatherings is the community, the primary space for ceremonies, concerts and social interaction amongst homes. Known as the meeting place, first impressions of a care home usually occur in the main entrance. Residents, staff and guests should all be greeted with the warmth and comfort of an inviting space. Think hospitality. Having a large open space allows for niches of seating zones where members of the household communities can gather and have a casual conversation whilst watching the day's events unfold.

This area should ideally be linked to the multipurpose room where space is ample for large events of song and dance and where praise and play can all take place. This open volume within the core of the community is where neighbouring homes are linked through streetscapes. Passages that could be either indoor or household communities can gather and have a casual conversation whilst watching the day's events unfold.

Adjacent to the multipurpose room, is the outdoor space. The central park of a community shall we say is a vital component to create the sense of 'place'. Whether a garden oasis or an open green space, opportunities for socialization or privacy outdoors enables physical activity, fresh air and opportunities for barbecues in a safely controlled environment. There is substantial empirical evidence that access to nature—both physical and visual has significant, demonstrable, positive health outcomes.

SPECIFICATIONS

MAIN ENTRANCE/MEETING PLACE

1. *The main entrance should be designed with a recognizable reception point for visitor greeting and residents.*
2. *A vestibule is a mandatory requirement that should be designed to prevent drafts into the seating/ reception area. Staff will use the vestibule as a control point for security after hours. Automatic sliding doors are ideal but auto operators are reasonable options as well.*
3. *Security Camera to be included.*
4. *A passenger drop-off area shall be located in close proximity to the building entry. The covered entry should be large enough to accommodate an ambulance or a Handicap-Bus with a loading and unloading zone. However, it is not required to accommodate fire truck access unless requested.*
5. *Consider including in the design a faux bus stop with a bench immediately outside the front entrance to assist in elopement prevention (Refer to Exiting and Elopement).*
6. *Comfortable indoor and possibly outdoor seating areas should be provided near the entrance. Residents enjoy sitting and watching the activity around the main entrance, often while waiting to greet visiting family and friends.*
7. *Amenity spaces, streetscape connections, tuck shops, hair salons should all be located adjacent to or within close proximity of the main entrance.*
8. *A great option near the main entrance is a solarium or conservatory that can act as an extension of the outdoors. This will allow residents the opportunity to still view the activities around the space yet be within a comfortable climate.*

3A - COMMUNITY CORE**THE MULTI PURPOSE ROOM**

1. A central activity space for larger gatherings should serve for multiple functions such as ceremonies, concerts or spiritual gatherings. Capable of accommodating the care home population, staff and visitors, the size of room is determined by the care home and occupancy loads indicated in local codes.
2. Spatially inviting, location should have direct access to outdoor space and close proximity to main entrance/lobby.
3. Ideally, the MPR space is the axial centre of the care home whose streetscapes radiate from its periphery.
4. Consideration for the types of equipment and furniture required for the space include; podium, tables with seating, projection screen with projector, exercise equipment, seasonal decorations (include storage space) and a central fire place or other focal points that draw the viewer into the space.
5. Mechanical, Electrical & Communication requirements
 - Nurse Call Station
 - Consideration of a built in speaker system and visual media are important
 - Flexibility of lighting levels.
 - Hand hygiene sink

CENTRAL COURTYARD

1. The central courtyard should be designed with a nature retreat in mind. A space where meditation and respite are key to creating the overall quality of a green space.
2. Incorporate a simple looped path system to lead users along a journey of interesting focal points and then return them to a where they began.
3. Ensure main paths are wide enough for two users either walking or in wheelchairs to pass easily.
4. Provide a walking path with little glare. Adding color to concrete is a great way to reduce this and provide aesthetic interest. Ensure paths are slip resistant and level.
5. Provide edge paving to support way finding and assist residents in staying on the hard surface.
6. Provide a few outdoor handrails for residents in the garden space so that those who have an unsteady gait have something to hold onto while walking. Residents have a habit of using the handrails or walkers in-doors and a continuation of that design element and physical support would allow them to be more confident going outdoors.
7. Develop a garden that stimulates the five senses through use of colour, scent, texture, sound, taste and seasonal change. Include wind chimes that contribute to the auditory stimulation
8. Plant flowers with bright colors. Residents notice bright contrasting colours when flower beds are mixed with rich hues.
9. Use predominantly low maintenance plants except in interactive garden beds used for horticultural therapy activities.
10. Include interactive garden features that will bring people together such as a shed, raised garden beds, flower gardens, bird feeders and bird baths. Do not include water features that pose either risk to residents or require heavier maintenance requirements.
11. Provide the courtyards with shade (awning or umbrellas could assist) since the sun and glare are barriers to use.
12. Incorporating a range of garden beds at differing heights for vegetable gardens is a great way to engage residence in the task of food production. Produce can be used in activity programs, daily meals or social BBQ's.
13. Provide a small spot (preferably waist-high) where residents can "get their hands dirty." Residents discuss working in the soil and often talk about wishing they could plant something like they used to do. Such a provision enhances physical therapy. Locate gardens where they can be easily viewed from inside to encourage people to venture out.
14. Ensure the garden is self-sufficient by including a rainwater tank specifically for watering the garden.
15. Ensure that gardens are visible to staff. Staff should feel relaxed enough to allow people with dementia unrestricted access to the garden. If this is not possible then users will not gain the maximum benefit from the garden.

3A - COMMUNITY CORE

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETSCAPE

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

Resident Service Offices

Administration Offices

Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

16. *Include elements that encourage interaction between family members and people with dementia such as child-friendly elements, areas for pets and easy conversation pieces.*
17. *Incorporate all-year sheltered and heated outdoor entertaining areas for celebrations, family visits and outdoor group activities.*
18. *Choose garden furniture that is of a sturdy construction with armrests for ultimate comfort and accessibility.*
19. *Locate seating at regular intervals for resting.*
20. *Include a range of seating styles in numerous locations which offer people with dementia an opportunity to choose how they use the garden.*
21. *Include quieter, passive areas for refuge and large activity areas for groups.*
22. *Design the main path to lead people with dementia along a journey of discovery, linking small and large garden spaces and focal elements of interest.*
23. *Placing a small playground for visiting small children is a great way to draw outdoor activity.*
24. *Incorporation of elements that evoke memories of the users pasts such as bird baths, wheelbarrows, old cars, farming elements, pottery, old kitchen utensils and old gates.*
25. *Incorporate lighting for night time use or viewing from indoors. Provide adequate outdoor power receptacles to plug in Christmas lights and ornaments.*
26. *Secure the garden so that residents cannot elope from the outdoor area but do not include an obvious sense of enclosure. Hide fencing material, keep taller shrubs to the perimeter to assist in providing a secure environment*
27. *Mechanical, Electrical & Communication requirements*
 - *Security from patient wandering if applicable*
 - *Outdoor lighting*
 - *Recommended size is specific to site typology and care home preferences.*

SPACE PROGRAM CATEGORY 3: THE COMMUNITY

3B - THE STREETScape

The Streetscapes of a care home are the connecting links (corridors) between community core and the small household model. These are the defining neighbourhoods that draw residents into the community core.

In the village concept, the separate households can form an interconnecting web of outdoor sidewalks or internal corridors that link them to the community core. Throughout these paths, the services listed below can be placed strategically to create a storefront design.

The second building typology would be the townhouse concept. Architectural arcades are a great way to bring the outdoors into an internal space. Having a café or a barber shop in a widened corridor provides a great opportunity for seating and interaction.

If a building is vertically stacked, an optional large atrium with terraced gardens is a great way to bring the access to outdoors. Neighbourhoods can be designed as horizontal floor plates, each with its own services at the core.

A great opportunity for a play on design, the overall concept is heavily dependent on the operational and site typologies. Each streetscape should be unique and will vary depending on the care home design.



Figure 56:
Neighbourhood
rendering of
Bridgwater PCH. MMP
Architects, 2016.
Winnipeg, MB.

3B - THE STREETScape

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

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Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETScape

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

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Administration Offices

Public Washrooms

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Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

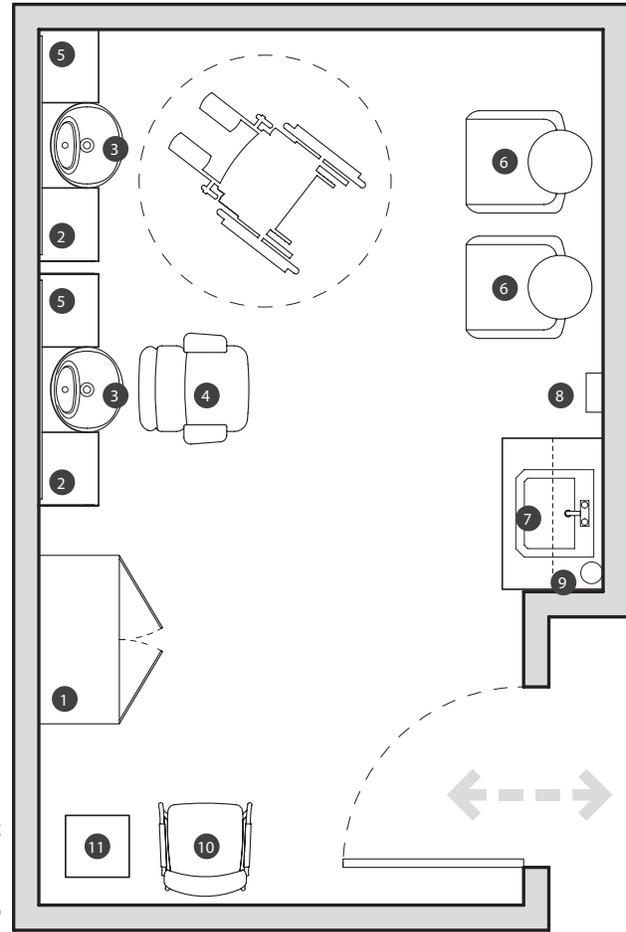


Figure 57: Typical hair salon. MMP Architects, 2016.

HAIR SALON

LEGEND

1 Storage Cabinet	5 Mirror	9 Soap Dispenser
2 Stylist Station	6 Hair Drying Station	10 Chair
3 Hair Wash Sink	7 Hand Sink	11 Corner Table
4 Stylist Chair	8 Paper Towel Dispenser	

SPACE PROGRAM CATEGORY 3: THE COMMUNITY
3B - THE STREETScape

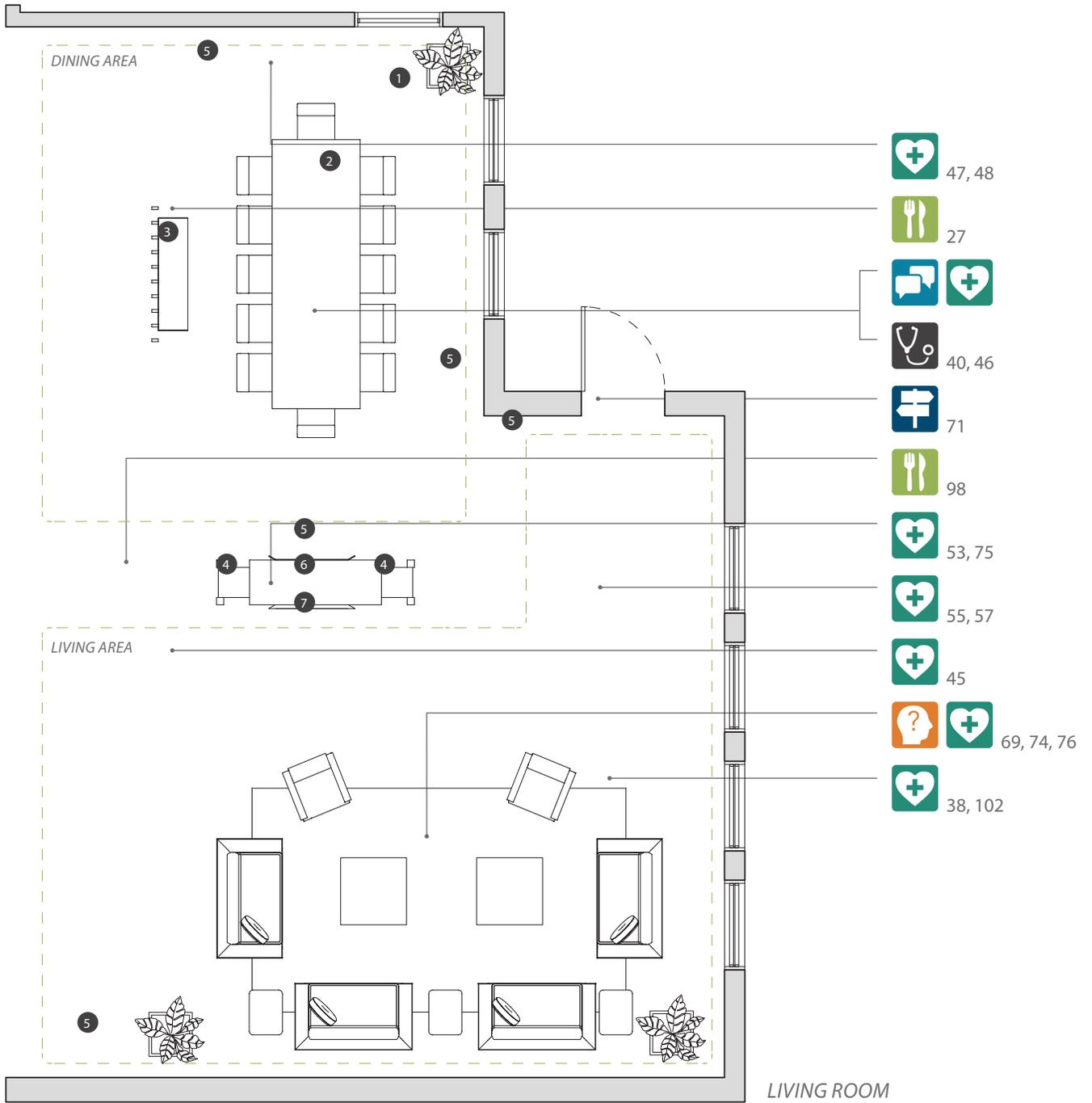


Figure 58: Typical living/dining area. MMP Architects, 2016.

LEGEND

1 Plant	3 Dining Hutch	5 Art	7 Television
2 Dining Table	4 Bookcase	6 Fireplace	

3B - THE STREETScape

SPACE PROGRAM LEGEND

1. THE HOME

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SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

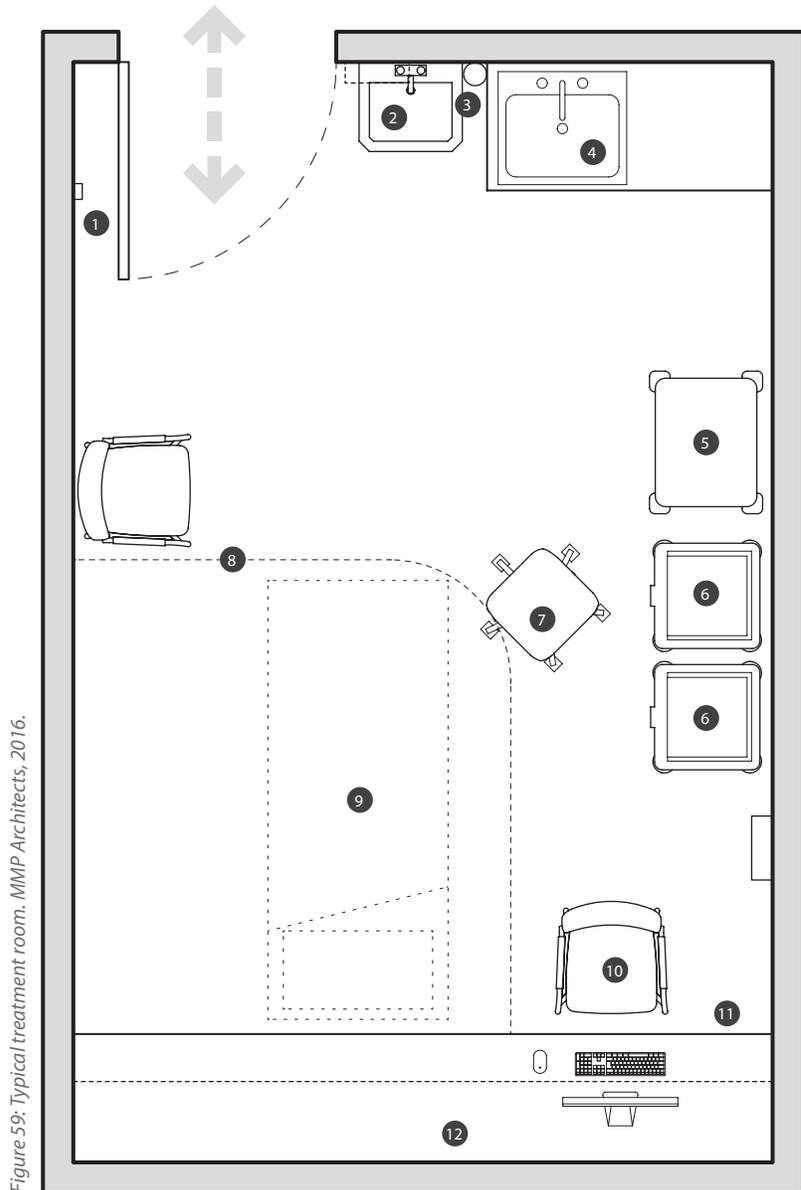


Figure 59: Typical treatment room. MMP Architects, 2016.

TREATMENT ROOM

LEGEND

1 Garment Hook	5 Medication Cart	9 Exam Table
2 Paper Towel Dispenser	6 Personal Hamper	10 Work Station
3 Soap Dispenser	7 Exam Stool	11 Lower Cabinets
4 Sink and Discharge Table	8 Privacy Curtain	12 Upper Cabinets

SPECIFICATIONS

CAFÉ

1. Provision for various sizes seating groups should be considered. Overall consideration for 35 – 40 person occupancy. Include spaces for wheelchair seating.
2. Inclusion of a café area creates a pleasant and comfortable space. Allows for a separate space for residents to meet and visit with their guests outside of the main care area.
3. Café may be used by outside visitors from the local neighbourhood can be an optional form of revenue for the care home can be considered.
4. Café may be used for birthday celebrations and other small scale gatherings.
5. Depending on the care home program, the Café should be able to accommodate for food services of snacks, juice and coffee/tea at all times.
6. Location of café is ideally located on the periphery of the core adjacent to the front reception. Residents enjoy being near hubs of activity and watching people come and go.
7. It is important that the Café be adjacent to Nutrition Services so that the services can benefit from one another.
8. Provision for washrooms and housekeeping shall be in close proximity to the Café.
9. Consideration of smooth, easy to clean and moisture resistant surfaces is required.
10. Finishes shall be selected to assist in noise reduction and to also increase sound absorption where possible.
11. Furniture, Fixtures & Equipment considerations shall be durable, moisture resistant and easily cleaned in accordance with the facilities maintenance program. Ensure to consider types of cleaner that will be used by the maintenance staff when selecting furniture finishes.
12. Mechanical, Electrical & Communication requirements
 - Nurse Call Station
 - Lighting flexibility

THE SHOP

1. Provision to be made to allow for display and storage of merchandise in the shop area. Ideally located in an area where traffic is constant, particularly near the main entrance.
2. Possible considerations for the shop include a mobile cart with locking storage for merchandise, similar to a vendor street cart. Another option is a fixed retail like space similar to a gift shop for permanent storage. Consideration should be made on whether the shop is staffed by paid members or by volunteers. This will be care home specific.
3. Overall theme of the care home should be considered for the character of the traditional tuck shop.

3B - THE STREETScape

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

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Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETScape

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

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Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

THE HAIR SALON/BARBER

1. Location of this shop should be considered carefully as it is an activity that most residents participate in, however a degree of personal privacy should be considered for those receiving personal care.
2. This space is an extension of the social area of the building, consider it as a place where residents can sit, watch and discuss the events.
3. Work stations can have hair wash sinks incorporated into the counter space in front of the mirror to assist in layouts with smaller space availability.
4. Hair wash sinks should be selected based on allowance for hair being washed in either a leaning forward or leaning back position. Consider also, a height adjustable sink that allows for access from a wheelchair.
5. Barrier free requirements – some residents may need to remain in their wheelchair for the duration of their treatment, ensure to provide at minimum one station that will accommodate a wheelchair.
6. Dryer chair (at minimum one station that will accommodate a wheelchair equipped with a hooded dryer) shall allow for comfortable seating and the ability to transfer a resident from a wheelchair if required.
7. Ensure to include an adequate number of electrical outlets for the items required to be included. Ventilation system should be included in the room to remove any odors related to treatments provided.
8. Finish material selections should be made considering requirements for resistance to hair treatment chemicals and dyes, and considerations for water resistant materials.
9. Maintain a minimum 44" (1120mm) door opening. Preferably with an automatic door operator.
10. Recommended minimum area of 150 square feet (15 square meters).
11. Mechanical, Electrical & Communication requirements
 - Nurse Call Station
 - Hand hygiene sink
 - Supporting wash basins and hair drying equipment. Electrical requirements to suit.

MEETING ROOMS

1. This is an educational space and will require some flexibility of furniture arrangements. Accommodation for a large boardroom table and seating should be considered including storage space.
2. Locate this room convenient to the administrative spaces.
3. Include storage space for any media equipment, binders and other supplies.
4. Include a small kitchenette for coffee
5. Adjustable lighting levels – dimmer controls or similar method to control the room lighting.
6. Black out blinds to be included for screen presentations.
7. Maintain a minimum 44" (1120mm) door opening
8. Recommended area for a minimum of 20 -30 persons
9. Mechanical, Electrical & Communication requirements
 - Include Electrical and data hookups for computer presentations on projection screens and/or a TV
 - Nurse Call Station
 - Flexibility of lighting

3B - THE STREETSCAPE**LOUNGES**

1. *This space provides a place where residents and visitors can meet and socialize while observing the daily activities around them. This can also act as an extension of a waiting area off of reception.*
2. *Location of this space should be centrally located, easy for residents and visitors to access from both the main building entrances as well as the various neighborhoods.*
3. *Space can include concepts of a greenhouse space to attempt to bring the outdoors in and provide an activity for users of the space.*
4. *Design should have distinctive features that stand out as an inviting and stimulating space. Ensure that residents can distinguish the Lounge area from the rest of the building areas.*
5. *Configuration can be accomplished in a variety of ways based on the identified program requirements and the designers overall conceptual design.*
6. *Smaller pockets of spaces are desirable for any residents that would prefer not to engage in the stimulation of larger groups. Long linear rows of seating should be avoided. To promote conversation and interaction between users, smaller clusters of seating arrangements are preferred.*
7. *Inclusion of natural light should be considered. Any window sills should be no more than 24" (610mm) above finished floor to allow an unimpeded view for any individual that is seated near the window or in a wheelchair.*
8. *Mechanical, Electrical & Communication requirements*
 - *Supply an outlet for a Television in larger lounge configuration.*
 - *Nurse Call Station*
 - *Flexibility of lighting*

THE FAMILY ROOM

1. *This room provides a private area for any family that are visiting due to a residents illness, passing or if they are visiting from a remote location. Design of the space should allow for a calming and comforting environment. Include furnishings that adjust for overnight stays with a television.*
2. *The family room is to include a small kitchenette with a bar fridge, toaster, microwave and kettle.*
3. *Inclusion of a washroom space complete with shower is required. Barrier free access shall be provided complete with roll in shower. Include an emergency call system within the shower area.*
4. *Location of this room shall be more private but still have ease of access to the rest of the community spaces in the core.*
5. *Recommended minimum area of 200 square feet (18.6 square meters).*

THE FAMILY DINING ROOM

1. *This space is allocated to allow families to come together and share a meal in a more private setting. Co-locate this space with the Family Room to allow cross use.*
2. *Allow space for 10 – 12 persons.*
3. *Spatial design should invoke the sense of a family dining room in a home.*
4. *Provide 2 different heights to suit standard chair/wheelchair requirements, as well as higher powered wheelchairs*
5. *Dining room is to include a kitchenette with a bar fridge, toaster, microwave and kettle.*
6. *Recommended minimum area of 200 square feet (18 square meters).*

3B - THE STREETScape

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETScape

Cafe

The Shop

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Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

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Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

RESIDENT CARE TREATMENT

1. *Intent of this space is to provide a private location for residents to receive basic care and assessments including; wound care, podiatry, dental visits, optometry and hearing assessments, etc.*
2. *Overall design concept should provide a calming atmosphere to relieve any negative connotations individuals may have with the activities being performed.*
3. *Can be located in core activity spaces as residents will be accessing the space.*
4. *Care home to confirm whether a bed or a dentist chair is to be installed. This will be care home specific.*
5. *A workstation for visiting health care professionals is required with secure storage.*
6. *Stool w/ castors, exam light and portable carts as required.*
7. *Entry door with a minimum opening of 44" (1120mm)*
8. *Recommended area of 200 square feet (18.6 square meters)*
9. *Mechanical, Electrical & Communication requirements*
 - *Negative air pressure to surrounding corridor*
 - *Hand hygiene sink*
 - *Utility sink*
 - *Nurse Call Station*
 - *Electrical wiring in resident care room must be bonded*

RECEPTION AND GENERAL BUSINESS

1. *This area is designed for clerical and storage purposes. Location is to be determined by care home. Ideally situated near administrative offices, space is to include a work station.*
2. *Accommodate space for printer and accessories.*
3. *Recommended area to be determined by care home.*

RESIDENT SERVICE OFFICES

- *Social Worker*
 - *Therapeutic Services*
 - *Spiritual Care*
 - *Resident Services*
 - *Volunteer Services*
 - *Dietician's Office*
1. *Resident Service offices are intended to assist in supporting the social functions of the facility to enhance the residents overall quality of life.*
 2. *Can be located in core activity spaces where residents and staff will be frequenting the space.*
 3. *The office itself should provide a dedicated private space for staff to coordinate and organize the various recreational activities for the residents.*
 4. *Office to include desk, guest chairs, storage space and a file cabinet.*
 5. *Recommended minimum area is 100 square feet (9.3 square meters) per office. Additional space is required if a small meeting table is to be included in the office.*

3B - THE STREETSCAPE**ADMINISTRATION OFFICES**

- Director of Care
- Executive Director
- Executive Assistant
- Chief Financial Officer
- Finance / Payroll
- Business Manager
- General Business Space
- Itinerant uses

1. Administration offices are intended for the business operations of a care home and should be located away from main core activity spaces.
2. Provide offices with a private, dedicated space for administrative duties, interviews and storage as required.
3. Office to include desk, guest chairs, storage space and a file cabinet.
4. Recommended minimum area is 100 square feet (9.3 square meters) per office. Additional space is required if a small meeting table is to be included in the office.

PUBLIC WASHROOMS

1. Include washrooms as per code requirements. Locations to be determined based on design layout.
2. Accessible washrooms will be used by both staff, residents and visitors
3. Include a Universal toilet room
4. All washrooms to include hygiene product disposal, baby change station, and all other dispensers.
5. Maintain a minimum 44" (1120mm) door opening. Preferably with an automatic door operator.
6. Mechanical, Electrical & Communication requirements
 - Negative air pressure to surrounding corridor
 - Include an emergency call system

HOUSEKEEPING

1. Provide space for housekeeping supplies. Depending on care home scale, a housekeeping cart may be used.
2. Include a curbed floor sink with mounting clips directly above for wet mops.
3. Storage shelving that is lockable. Care home specific.
4. Wall protection shall be provided to prevent damage by the carts to a height of 1.2 metres.
5. Maintain a minimum 44" (1120mm) door opening.
6. Recommended minimum area is 50 square feet (4.6 square meters). Quantity of rooms to be determined by care home scale.
7. Mechanical, Electrical & Communication requirements
 - Negative air pressure to surrounding corridor
 - Curbed floor sink
 - Hand hygiene sink

3B - THE STREETScape

SPACE PROGRAM LEGEND

1. THE HOME

THE RESIDENT SUITE

THE KITCHEN

COMMON LIVING SPACES

UTILITY ROOMS + SUPPORT SPACES

The Spa (Assisted Bathing Room)

Laundry Room/ Closet

Soiled Utility Room

Clean Storage

Accessible Washrooms

Resident Care Office

Medication Room

Housekeeping

Mechanical/Electrical Space

2. THE NEIGHBOURHOOD

NEIGHBOURHOOD PLANNING

Site Specific Operational Typologies

3. THE COMMUNITY

THE COMMUNITY CORE

Main Entrance/ Meeting Place

The Multi Purpose Space

Central Courtyard

THE STREETScape

Cafe

The Shop

The Hair Salon

Meeting Rooms

Lounges

The Family Room

The Family Dining Room

Resident Care Treatment

Reception and General Business

Resident Service Offices

Administration Offices

Public Washrooms

Housekeeping

Staff Meeting Room

Staff Room

Staff Change Rooms

Staff Washroom

Staff Entrance

Other Streetscape Considerations

SUPPORTING SERVICES

Main Kitchen

Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

STAFF MEETING ROOM

1. *The staff meeting area ensures to provide a private space for discussions, delivering educational and training programs, interviews and general staff meetings.*
2. *Location of the meeting room should be adjacent to the administrative spaces.*
3. *Meeting room to include a table for a minimum of 6 persons, storage space, file cabinet and television.*
4. *Adjustable lighting levels to suit the various tasks occurring in the room*
5. *Recommended minimum area is 140 square feet (13 square meters).*

STAFF ROOM

1. *This area provides the staff a dedicated space for respite during a break in their shift that is separate from the resident and visitor areas.*
2. *This space should be located in the more private administrative area, away from resident and visitor traffic.*
3. *A kitchen should be provided for staff use including a fridge/freezer combo, dishwasher, microwave, kettle, toaster, coffee maker.*
4. *Multiple zones for seating tables and lounge furniture to be provided within the space.*
5. *Recommended area is based on staff population.*

STAFF CHANGE ROOMS

1. *Staff changing areas to provide space for personal locker storage, change areas and shower rooms. Should be secure and away from the main resident and visitor areas.*
2. *Change rooms can be unisex or male/female. Each care home is to determine their own requirements.*
3. *Recommended area is based on staff population.*

STAFF WASHROOM

1. *A separate private washroom for staff only is required in areas such as the administration and service corridor.*
2. *Design shall be accessible and include hygiene product disposal, baby change station, and all other dispensers.*
3. *Recommended minimum area of 60 square feet (5.6 square meters). Locations and quantity to be determined by care home*

STAFF ENTRANCE

1. *Provides a separate and secure entrance for staff away from the main entrance.*
2. *This entrance should be adjacent to the staff parking areas.*
3. *Security Camera to be included.*
4. *Recommended area determined by care home.*

3B - THE STREETScape

OTHER STREETScape CONSIDERATIONS

The following spaces list suggestions that can be incorporated into a care home. Spaces are not included in government funded care homes. A financial operational model will need to be provided to the regional health authority to confirm supporting additional spaces.

- *A daycare*
- *Restaurant space (food supplied from food services but in a separate private restaurant like environment).*
- *Grocery store (dementia care)*
- *Tailor*
- *Classrooms for visiting school programs*
- *Art room*
- *Occupational/Physical Therapy Room*
- *Digital media room*
- *Greenhouse*
- *Pet friendly zone*
- *Dedicated faith space*
- *Exterior gazebos and/or sunrooms*

3C -THE SUPPORTING SERVICES

SPACE PROGRAM LEGEND

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Other Streetscape Considerations

SUPPORTING SERVICES

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Housekeeping and Laundry Services

Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

The supporting service space is the fuel that burns the fire of the entire care home. In every operational model, the central service area houses the bulk of activity that occurs within the care home such as the laundry services, housekeeping and other storage space for delivery and distribution.

Located typically at the back of the central community, this zone is a dedicated staffing space. Separated from the public zones, access should be discreet and secure. Consideration to locate staff entrance near support service is recommended.

The general care home operations are managed from the offices of facility directors and their associated workshop space. Here, much of the repair and maintenance of the care home is tracked and replaced. Housekeeping and laundry maintains the bulk of their service and storage within this zone. Coordination of housekeeping and laundry should be discussed operationally with the design of all new care homes. Depending on the owner's operational budget and preferences, both services could run independently within the households or as larger production between the care home community.

SPECIFICATIONS

MAIN KITCHEN

1. *Central Commercial Kitchen should be sized and designed according to the care home nutrition program.*
2. *This operational model should be established prior to schematic design. The operational impact has significant implications on the kitchen design in both the homes and commercial kitchen area.*
3. *To operate the small household kitchens independently, the commercial kitchen would act as a staging area for when deliveries of bulk food are purchased and stored. From here, the distribution of produce is supplied to individual homes. Ideally this operation occurs approximately once a week.*
4. *Consideration from operations to provide support from main commercial kitchen to smaller household kitchens regarding certain recipes is optional. Allows for more flexibility in time within the households and a diverse menu for residents.*
5. *If in the event that the household kitchen is not being used for food production, the meal preparation would take place here.*
6. *The central kitchen must be commercially graded with appropriate equipment for cooking and refrigeration. Scale of equipment is based on food operations and care home population.*
7. *Engage a kitchen consultant to coordinate kitchen equipment requirements in the care home for operational efficiency. Electrical and Mechanical engineers to coordinate equipment with power and fire suppression requirements according to local fire codes. Designer should also consider engaging the local health authority for the area.*
8. *Main kitchen is also used to serve the café. The care home is responsible in establishing what type of food is supplied to the general public available for purchase. This can be limited to a soup and sandwich operation or a full on commercial kitchen that can be used for weekly public functions. Scale is specific to care home intent.*
9. *Kitchen equipment to include but not limited to walk in coolers and freezers, ranges, ovens, soup kettles, toasters, coffee makers, grinders, slicers, dispensers a food distribution carts.*
10. *Kitchen doors to be double doors. Easy access for large palette & cart activity. Entrance ideally tucked away from the public zones.*
11. *Mechanical, Electrical & Communication requirements*
 - *Negative air pressure to surrounding corridor*
 - *Hand hygiene sink*
 - *Eye wash station*

SPACE PROGRAM: THE COMMUNITY
3C -THE SUPPORTING SERVICES

- Specific electrical requirements for supporting equipment
- Commercial range hood with fire suppression systems as required by local fire codes.
- Include a grease and solids interceptor as required.
- Limit access control into kitchen area to be determined by care home.

HOUSEKEEPING & LAUNDRY SERVICES

1. The housekeeping & laundry service model shall be established operationally at the beginning of the care home schematic design. Extent of operation will determine spatial requirements.
2. Items to consider for the laundry service space include but are not limited to commercial washer and dryers (quantity based on use and care home size), repair and mending area, folding zone, storage of carts both soiled and clean in separate areas.
3. Laundry operations should be established at the early onset of design. If the care home chooses to provide personal laundry services within the homes and bulk laundry is outsourced, the community core laundry and housekeeping services may be combined. Laundry space would be limited to smaller items. Second option is to maintain all laundry in community where linens and towels would be washed. This will require multiple washers and dryers, quantity to be determined based on population, frequency of use and linen count. The third option is to do all laundry in the community or by out sourcing, therefore, laundry facility space is heavily reduced.
4. Housekeeping area should accommodate the storage of larger cleaning equipment, supplies and or service carts. Depending on the scale of the housekeeping zones and codependence between neighbouring homes, the scale of housekeeping will vary from care home to care home.
5. Coordination of receiving, sorting and distribution shall be established prior to the care home design with client and designer
6. If the care homes bulk storage of housekeeping equipment is being stored in the central community, central supply and equipment storage are optional storage spaces.
7. Provide secure storage for cleaning products and a designated area for storage of Personal Protective gear (easy access).
8. Mechanical, Electrical & Communication requirements
 - Negative air pressure to surrounding corridor
 - Hand hygiene sink
 - Eye wash station - location and quantity to be confirmed
 - Floor drain / hot & cold water within equipment cleaning area
 - Electrical service sufficient to support equipment such as washers, dryers, folders, repair / mending

3C -THE SUPPORTING SERVICES

SPACE PROGRAM LEGEND

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Maintenance Services

Material Management

Service Entrance

Waste Disposal & Recycling

MAINTENANCE SERVICES

1. Maintenance services support the building upkeep of equipment, furnishings, and other contents. Adequate space should be provided for equipment of various hand tools and secure storage as required by care home services.
2. Bench space and table top space is needed for carpentry workspace. Space will be used for repair and sorting purposes.
3. Other items such as paints, hardware surplus, extra parts for equipment and other maintenance supplies would be stored in this space.
4. A deep utility sink for cleaning smaller equipment such as paint brushes is ideal. Having a filter in the drain is recommended. Larger equipment can be cleaned in the waste disposal area.
5. Finishes should be suitable for wear and tear. Non-slip flooring throughout is ideal.
6. A set of double doors for larger equipment transfer.
7. Mechanical, Electrical & Communication requirements
 - Negative air pressure to surrounding corridor
 - Hand hygiene sink
 - Eye wash station - location and quantity to be confirmed
 - Floor drain / hot & cold water within equipment cleaning area
 - Electrical service sufficient to support equipment
 - Recommended area is approximately 400 square feet (18.6 square meters) including office space.

MATERIAL MANAGEMENT

1. Equipment Storage & Central Supply
2. Equipment Storage and Central Supply will be used for storage of resident items that are not frequently used, seasonal decorations, furniture or equipment not in use. Storage for cleaning supplies and bulk purchases.
3. Configuration of storage space is care home specific. Depending on care home typology, the equipment storage and central supply may be further broken down into smaller spaces and added to the dedicated areas within the households, closer to residents and staff.
4. Mechanical, Electrical & Communication requirements
 - Provide additional electrical outlets and power for machine & equipment loading stations.

SERVICE ENTRANCE - SHIPPING & RECEIVING

1. The Service Entrance is the main area for receiving the bulk of items distributed between the households and community.
2. A designated ICT work station is required for processing incoming and outgoing equipment
3. Access lane away from the main entrance shall be provided with for service vehicles. Overhead rolling door shall be sized according to the scale of facility. Consideration for a manual operation override and a doorbell for access is preferred.
4. A dock leveler with bumper guards may be used to allow adjustments for various service vehicles. Concrete bollards and durable material should be used within this surrounding area to avoid damage from vehicles.
5. A staging space next to the docking area is ideal to temporarily place larger deliveries. Item such as delivery carts may be stored in this area when it is not in use. Consider this space specific to care home equipment needs and distribution frequency.
6. Some upper storage space should also be provided.

SPACE PROGRAM: THE COMMUNITY
3C -THE SUPPORTING SERVICES

7. *Mechanical, Electrical & Communication requirements*

- *Security and/or delivery notification shall be established through an intercom system and doorbell or as requested by operations.*

WASTE DISPOSAL & RECYCLING

1. *This room is dedicated for the temporary storage of bulk garbage and recycling materials.*
2. *Included within this space should be a designated washing area for carts, bins, wheelchairs and the like. A designated corner with appropriate floor and wall protection from splash back is required*
3. *Designated flooring and wall protection should be used throughout the room to protect walls from damage.*
4. *Double doors into service space should be provided. Double swinging ideally.*
5. *Location of room shall be located next to shipping area for ease of removal.*
6. *Mechanical, Electrical & Communication requirements*
 - *Negative air pressure to surrounding corridor*
 - *Hand hygiene sink*
 - *Eye wash station - location and quantity to be confirmed*
 - *Floor drain / hot & cold water within equipment cleaning area*
 - *Electrical service sufficient to support equipment for larger equipment transfer.*

CHAPTER 4

Building Codes and Standards B2 vs B3 Classification

CARE VS. TREATMENT

In the past facilities that provided supervision to individuals in need of care such as daycares or personal care homes were classified under the same occupancies as an acute care hospital. The National Research Council set out to create a new building classification to accommodate a less medically intrusive environment that would be more appropriate for such care settings. Hence the B3 classification was introduced with the intentions that Long Term Care facilities would fall into this new building classification. However the first edit of this classification has been met with much controversy regarding its application. The reason for this confusion lies in the language that defines treatment vs. care. Other jurisdictions have amended the language to clarify the use of a B3 classification for care settings that include Long Term Care facilities. This section of the design guidelines will explain how the B3 occupancy may be beneficial to a project to apply.

Currently the 2010 building code does not adequately provide the clarity for distinction between the two types of environments. Many consultants have relied upon the test that if a person requires assistance to evacuate a building and that if a person is not capable of recognizing and responding to an emergency given their physical, cognitive and behavioural abilities, and able to move to a safe location without the assistance of another person then they must be classified as a B2 Occupancy. This is not the case; in fact the intention of the B3 classification was to implicitly take these environments with individuals requiring assistance into account. A resident may be frail, mobility challenged and not capable of self evacuation and will still be well supported in a B3 environment.

The advantages of classifying a long term care facility under a B3 occupancy is that it supports the dynamic shift in the way we perceive what a long term care facility should be and how it operates. Given the shift to a resident vs. patient focus and embracing that such a facility is first and foremost a continuation of a resident's home it should provide a similar residential character albeit with the required safeguards of a B3 occupancy. We see a strong shift in the physical environments of these settings through such ideologies as Eden Alternative Facilities, Green House projects, Group Living communities, Residential Care facilities and small house models. These new ideas embrace a care model that is clearly different from more traditional and institutional Long Term Care Facility of past days. A B2 occupancy model is a treatment environment first and foremost. It should be noted that a Personal Care Home or other forms of long term care environments may indeed be designed with the intention that they will operate as a "treatment facility" and maintaining a B2 classification would then be appropriate. However note that the vast majority of Personal Care Homes should be classified as "care" environments without "treatment" and therefore classified as a B3 occupancy.

The National Building Code defines treatment and care as follows:

TREATMENT

Treatment means the provision of medical or other health-related intervention to persons, where the administration or lack of administration of these interventions may render them incapable of evacuating to a safe location without the assistance of another person (see Appendix A of the code).

Appendix A: The ability to evacuate unassisted implies that a person is capable of recognizing and responding to an emergency given their physical, cognitive and behavioral abilities, and able to move to a safe location without the assistance of another person. For example, such persons must be able to arise and walk, or transfer from a bed or chair to a means of mobility, and leave the building or move to a safe location on their own. Treatments may include such things as surgery, intensive care, and emergency medical intervention. Treatment services differ from the services provided by care occupancies like personal care assistance or the administration of medication, and from those provided by business and personal services occupancies like dentistry or day procedures.

CARE

Care means the provision of services other than treatment by or through care facility management to residents who require these services because of cognitive, physical, or behavioral limitations (see Appendix A of the code).

Appendix A: Support services rendered by or through care facility management refer to services provided by the organization that is responsible for the care for a period exceeding 24 consecutive hours. They do not refer to services provided by residents of dwelling units or suites, or to services arranged directly by residents of dwelling units or suites with outside agencies. In the context of care occupancies, these services may include a daily assessment of the resident's functioning, awareness of their whereabouts, the making of appointments for residents, and reminding them of those appointments, the ability, and readiness to intervene if a crisis arises for a resident, supervision in areas of nutrition or medication, and provision of transient medical services. Services may also include activities of daily living such as bathing, dressing, feeding, and assistance in the use of washroom facilities, etc. No actual treatment is provided by or through care facility management.

The definition of treatment describes persons who occupancy describes persons having physical, cognitive, or behavioral limitations and describes a level of care that includes attending to residents' personal hygiene and feeding. These residents may be physically able to move to a safe place in the building, or out of the building if necessary, but are in need of direction. Supervised evacuation is common in many facilities other than Group B occupancies, such as schools, theatres, or casinos and differs from the physical moving of patients by staff that occurs in a treatment occupancy.

The definition of treatment describes persons who are incapable of self-preservation due to either:

- *Medical intervention; they are immobilized by restraint, sedation or connection to medical equipment;*
- *Lack of medical intervention; they are immobilized by their own physical, cognitive, or behavioral limitations.*

This describes patients who are typically taken in their beds or on gurneys or transferred from beds to wheelchairs, evacuation chairs or other equipment and moved to a safe place by staff.

In a care occupancy the provision of direction or supervision to residents in evacuating to a safe place is not considered treatment nor is it an indicator of a treatment occupancy. The description in Appendix A of what constitutes the ability to evacuate unassisted is for explanatory purposes only and does not infer that occupants in a care occupancy must be able to evacuate unassisted. Moreover, the description of care occupants as persons who require assistance due to "...cognitive, physical or behavioral limitations" implies that occupants may not

be capable of unassisted evacuation and, practically, unrestricted access to exits and the exterior for these occupants may pose a serious threat of harm due to wandering, exposure, or vulnerability to others. Attachment B to this report is a copy of an e-mail from the National Research Council confirming that occupants in a Group B3 occupancy are not expected to evacuate without assistance.

“There is no assumption in the NBC or in the NFC that residents in a B3 occupancy must evacuate unassisted. On the contrary, the NBC and NFC requirements imply that residents in care occupancies and patients in treatment occupancies will both require assistance during an evacuation. The following measures were implemented to address this concern:”

- larger egress capacity of 18.4 mm per person,
- wider exit stairs,
- fire compartments on floor areas, and
- a sufficient number of supervisory staff on duty to perform the fire safety plan.

Marc Fortin, Eng.
 Technical advisor
 Canadian Codes Centre
 NRC-CNRC Construction

PHYSICAL DIFFERENCES BETWEEN B2 AND B3 OCCUPANCY

The rationale to work within the B3 occupancy classification is that it supports a more residential environment. Consider the differences between the two occupancies.

Physical Differences Between Occupancies		
Occupancies	B2	B3
Maximum building height that can be combustible	2 storeys	3 storeys
Maximum building area (combustible construction)	1600m ² if 2 storeys	2700m ² if 2 storeys
Maximum building area (combustible construction)	Not allowed if 3 storeys	1800m ² if 3 storeys
Maximum building height that can be unsprinkled	All buildings must be sprinklered	All buildings must be sprinklered
Building height for a one-hour floor assembly	3 storeys or less	3 storeys or less
Fire alarm system required	All buildings	All buildings
Corridor width	2400mm to move beds	1650mm residents not moved in beds
Doorway width	1100mm	850mm
Egress width of stairs	18.4mm per person	18.4mm per person
Minimum width of exit stairs	1650mm	1100mm if not more than 2 storeys
Fire compartments on floor areas in zones	Yes	Yes (if more than 10 persons)
Fire safety plan with a sufficient number of supervisory staff	Yes	Yes
Fire drill frequency not greater than	1 month	1 month

Applying a B3 occupancy requires that the designer has a very good understanding of the intent of the project operations. The challenging aspect of utilizing a B3 occupancy is that the code has not done such a good job at differentiating how it can and should be applied for a long term care setting verses a supportive housing model which may also be classified as a B3 occupancy. It is the intent of this guide to illustrate how the new classification is beneficial, where it is not appropriate and how the designer can work with alternative solutions to satisfy the shortcomings of the classification. First off we shall discuss why a B3 occupancy can satisfy occupancies for long term care home requirements and why it is preferred.

BENEFITS OF ADOPTING A B3 OCCUPANCY

BUILDING FOOT PRINT

The first clear advantage of utilizing a B3 occupancy is that the building footprint can be increased by 1100 sm if two stories as compared to a B2 occupancy. A B3 Occupancy allows for a 2 storey max building area to be 1800 sm. If the designer is following a small house model prototype it is therefore possible to create a neighborhood footprint that does not exceed this limitation. All case studies in the guideline have small house neighborhoods under 1800 sm. The result is fewer firewalls translating into cost savings.

COMBUSTIBLE CONSTRUCTION AND BUILDING HEIGHT

The B3 occupancy allows you build up to three stories in combustible construction. This will allow a project to have a higher density while maintaining a smaller building footprint. Additionally the cost per bed is decreased with a three storey structure vs. a 2 storey structure bringing value to the project.

FIRE COMPARTMENTS IN FLOOR ZONES

A fire compartment in floor zones is not required if the small house contains up but not exceeding 10 residents.

CONNECTED BUILDINGS

Should the designer opt to design the Personal care as a series of neighbourhoods as separate buildings as the Bridgwater case study then Article 3.2.3.19 "Walkway between buildings" of the NBC shall apply. This strategy allows the designer to maintain smaller footprints without the requirement of firewalls.

SELF CLOSING DEVICES

Article 3.3.3.5 of the Code includes a number of specific design requirements for floor areas which include sleeping rooms. Of these requirements a B3 occupancy does require self closing devices at doors in sleeping room separations. The designer will write an alternate solution to eliminate the need for self closing devices from resident room doors. This guideline will provide the rationale for this alternative.

BARRIER FREE DESIGN

Barrier free design will be in conformance with Section 3.8 of the Code. Barrier free access will be provided to all pedestrian entrances to the building from the outdoors at sidewalk level or via a ramp.

The following summarizes the key barrier free design features provided within the proposed building to serve all uses, occupants, workers, and visitors:

- *Barrier free path of travel, designed to Article 3.8.1.3, provided from the barrier free entrances throughout the 1st storey and to normally occupied floor areas served by an elevator.*
- *Barrier free path of travel is not required to service rooms, attic, or roof spaces.*

- *Barrier free path of travel more than 30m long shall include areas 1500mm wide x 1500mm long spaced not more than 30m apart.*
- *Power-operated doors that open from either side upon activation at doors in every exterior*
- *Pedestrian entrance and into washroom facilities with multiple stalls per Sentence 3.8.3.3.(5).*
- *Power-operated doors at the outermost set of doors at entrances with multiple sets of doorways per Sentence 3.8.3.3.(5.1), and conforming to the requirements of Sentence 3.8.3.3.(5.2).*
- *Doors in barrier free paths of travel to include clear spaces at doors per Sentences 3.8.3.3.(10) and (13) which are 1500mm long. The spaces are to be as wide as the door plus a clear space beyond the door frame at the latching jamb of 300mm when the door swing is away from the occupant or 600mm when the door swing is towards the occupant.*
- *Doors installed in series (e.g. vestibules) must be separated by a space not less than 1500mm plus*
- *The width of any door swinging into the separating space per Sentence 3.8.3.3.(11).*
- *Counters which serve the public (e.g. admissions) shall have at least one barrier free section no less than 800mm long and conforming to the design criteria in Article 3.8.3.14.*
- *Passenger elevators will conform to Appendix E of CSA B44, "Safety Code for Elevators" (includes requirements for door timing and design of controls).*

ALTERNATIVE SOLUTIONS

ALTERNATIVE SOLUTION: RESIDENT SLEEPING ROOM DOOR CLOSURES

Sentence 3.1.8.11.(1) requires every door in a fire separation to be equipped with a self-closing device designed to return the door to the closed position after each use. This is appropriate for long term care facilities as staff supervision includes the ability to quickly assess a resident's well being through visual observation of the room. The objective statement of this article clarify that the concern is that a door left open during a fire could lead to the spread of fire from one compartment to another, resulting in harm to persons or building damage in the other fire compartment.

The small house model design is such that each sleeping room zone is considered a household within a neighborhood and occupants function socially as a group with staff assistance; each neighbourhood design includes common areas for leisure, recreation, and dining. To address concerns of resident isolation and psychological decline, resident room doors are encouraged to be open at all times. To address concerns of risk to vulnerable residents a 'dutch door' design is used. This permits the top half of the door to remain open and maintain visual interaction with residents while the lower half can be closed to restrict a resident experiencing a behavioural episode or to separate residents who are not getting along. The use of self-closing devices on resident room doors contradicts this design philosophy.

The sleeping room zone fire separation is designed to remain in place in a fire condition for a period of 1h and to retard the passage of smoke. Doors in the sleeping room zone fire separation are typically weather-stripped to eliminate the clearances permitted by NFPA 80 and, if held open, release on a 1st stage fire alarm signal; any ducts which penetrate this fire separation are designed with fire and smoke rated dampers. The smoke dampers will close immediately on activation of an in-duct smoke alarm or building fire alarm devices in the same floor area (1st stage). This provides each sleeping room zone with a level of protection sufficient to shelter occupants in the event of a fire in an adjacent zone.

It is left up to the designer to determine whether their design will require the elimination of closures from the resident sleeping doors if should this be the case formally provide an alternative solution to successfully implement this strategy.

APPLICATION OF CSA Z32-09 (R2014) - ELECTRICAL SAFETY AND ESSENTIAL ELECTRICAL SYSTEMS IN HEALTH CARE FACILITIES

Although the 2010 NBC has provided the designer with an alternate building classification for long term care facilities unfortunately the electrical and mechanical standards have not addressed this model of care with the same rigour and consideration. It is imperative that the designer discuss the requirements of the application of these standards with the electrical and mechanical consultant to determine how the standards ought to be applied. It is not the intention of this guideline to delve into the great detail of the project engineering but rather to provide the dialogue to reconsider the extent in which these applications ought to be applied. The discussion with the project consultants does take on a different tone now that we can dismiss activities of treatment in a personal care home. Should the stakeholders and consultant agree that the facility does not provide “treatment” but rather “care” then it is appropriate to have the conversation about the adoption of the CSA Z-32 standards. Essentially under a B3 classification it becomes easier to qualify the majority of rooms in a long term care home as “non patient areas.”

The designer should discuss the relevance of this understanding with the electrical engineer as it pertains to the following areas;

1. *The size (if any) of the generator and the identification of essential electrical systems in which the generator powers and for what duration. As Long Term Care is not considered a Group B, Division 2 (treatment) facility, the following may be designed and installed to CAN/CSA –C232 “Emergency Electrical Power Supply for Buildings”: emergency electrical power supply, emergency lighting, and fire alarm systems. The designer should discuss this in greater detail with the consultant team.*
2. *Should CAS Z32-09 be applied CEC rule 8-102 (1) (c) requires that the voltage drop for a branch circuit not exceed 3% for all installations but only applicable to patient care areas. All test requirements for voltage drop test, voltage difference between ground points test, impedance to ground test, etc., as mandated by Section 5 of Z32 must be met ONLY for the rooms identified as treatment rooms.*
3. *The use of hospital grade receptacles is not required.*
4. *In accordance with Article 3.2.7.3, emergency lighting will be provided at minimum 10lx at the floor in exits, principal access to exit routes, corridors serving sleeping rooms, public corridors and corridors used by the public, and service rooms.*
5. *Emergency power will be provided to emergency lighting and fire alarm systems in accordance with Articles 3.2.7.8 for a duration of 24h for supervisory power and, following that, 1h under full load.*

APPLICATION OF CSA Z317.2-15 - SPECIAL REQUIREMENTS FOR HEATING, VENTILATION, AND AIR-CONDITIONING (HVAC) SYSTEMS IN HEALTH CARE FACILITIES

The same logic pertains to the engineering of HVAC systems for long term care facilities. It is up to the designer and engineer to best determine the application of this standard and the differences in how the standards are applied in care environments that do not contain patient treatment areas.

Disclaimer

It should be noted that application of code interpretation is the responsibility of the designer and that the content of this section of the guideline represents the writers opinion only and should be utilized as a source of discussion and in no way be construed as exhaustive or complete. It intended to cause the designer to pause and re-examine how the application of a B3 occupancy classification may be appropriate for their own project. It is strongly recommended that the designer seek the assistance of a professional code consultant for the application of alternative solutions. See special acknowledgements section for code consultants utilized for the small house model concept for the Bridgwater Personal Care Home case study Winnipeg Manitoba.

CHAPTER 5

Case Studies

The following case studies have been selected because they represent a variety of scenarios in which a small house model can be applied. The term small house carries connotations that all designs follow a small density and cottage like development however a small house model concept is perfectly adaptable into a higher density multi story block. We have toured through many “Nursing Homes” throughout the United States that have embraced the culture change of adapting to a small house model and have selected the ones which we feel provide the designer with the most options depending on the project scope. Of these residences some are authentic Greenhouses while other have adopted a similar design philosophy which supports smaller social densities.

1. THE HOUSEHOLDS AT LEVONDALE

The Households at Levondale, located in Baltimore provides an excellent example of how two 14 resident households can be designed utilizing a perimeter edge of resident units with all activity and living centers internalized. There are essentially no corridors with the majority of rooms opening up into semi private zones and open to the kitchen and living room areas. This example was chosen particularly for its excellent open therapeutic kitchen concept. Another interesting element of the design is that the project was actually an addition onto a traditional T shaped institutional model. This design concept illustrates that even with existing institutional building stock a small house model can be successfully implemented.

2. THE LEONARD FLORENCE HEALTH CENTRE

The Leonard Florence Health Centre for the Living located on Admiral's Hill in Chelsea Massachusetts was chosen for the case studies because it was the first “urban” greenhouse project to explore how a small house cluster model can be adapted as a higher density solution while still respecting the smaller social densities of the household model. The centre provides a home environment where residents receive individualized level 3-4 nursing care. The complex consists of ten 7,000 square foot condominium-style households, with each house containing ten private bedrooms arranged around a common living room, dining area and open kitchen. Along with serving the elderly and providing short-term rehabilitation, the Leonard Florence Center for Living also will have separate high-tech residences to accommodate those living with ALS (Lou Gehrig's disease) and multiple sclerosis as well as residences for those other nervous system disorders. The model can be adopted as future special care households which provide the flexibility of use when the long term care pressures relax in future decades.

3. THE GREENHOUSE RESIDENCE

The Harry and Jeanette Weinberg Greenhouse Residents at Stadium Place located in Baltimore MD was chosen as a case study for its transitional design concept which utilizes a central hearth design where 12 residents spend

their days in the living and dining room. The 12 resident bedrooms per household are divided into two zones of 6 each with a private bedroom corridor. The example illustrates how the designer can depart away from a perimeter resident room clusters in previous examples while still maintaining a small social density household.

4. THE WHITE OAK COTTAGES

The White Oak cottages (Westwood Massachusetts) demonstrates a true independent household designed for individuals with cognitive impairment with 12 residents living as close to a home style environment as possible. The White Oak cottages are part of the continuum of care campus in Fox Hill Village. The cottage demonstrates the potential for developing a rural model prototype which can be entirely constructed in wood while still maintaining all the safety elements of the B3 occupancy. This model can be designed so that two cottages can be joined to form an operational unit of 24 residents with an enclosed courtyard.

5. IRENE BARON EDEN CENTRE

Irene Baron Eden Centre was described as being ahead of its time and built in 2009 and was designed when a B3 NBC occupancy classification was not available and the building was designed as a residential C occupancy with alternatives written to increase the safety level for providing care to those with cognitive challenges. While technically the structure is a “supportive housing model” as per its residential classification it maintains a level of care above that of a typical supportive housing model. It is relevant for this design guideline as a point of departure illustrating the use of combustible construction in a larger population size (48 residents). The plan configuration is consistent with the elements found in a small house model and could easily be adapted as a level 3-4 personal care home utilizing today’s current NBC guidelines for “care occupancies”.

6. BRIDGWATER PERSONAL CARE HOME

Bridgwater Personal Care Home is the most current project which adopts the small house model while achieving a density of 120 residents through 10 households of 12 residents each. The project demonstrates significant savings by utilizing the B3 occupancy classification which allowed a larger building footprint vs. a B2 classification (see Building Codes and Standards). The vast majority of all the Evidence Based Design (EBD) elements of this guideline have been incorporated in Bridgwater.

HOUSEHOLDS AT LEVINDALE HEALTH CENTRE, BALTIMORE MD

Thanks to Hord Coplan Macht Inc. Architecture for permission to use the Levindale Hebrew Geriatric Center as a case study in this document.



KEY STATISTICS

Total Residents:	140
Total Households:	10
Residents per household:	14
Household area:	882 sm (9,500 sf)
Neighborhood area:	2,034 sm (21,900 sf)
Resident room area:	18.58 sm (200 sf)
Resident bathroom area:	6.9 sm (75 sf)
Area resident/household:	63.2 sm (678 sf)
Area resident/neighbourhood:	72.6 sm (782 sf)

Levindale Hebrew Geriatric Center is dedicated to providing quality of life programs along a consistent continuum of care for the elderly, frail and ill in a warm, caring environment. Levindale accepts a leadership role in defining and developing elder care. We are proud to be the first registered Eden Alternative center in Maryland. This philosophy infuses companionship, empowerment and spontaneity into the daily lives of our residents and patients.

The Neighbourhood Model was the next step in our journey to change nursing home culture. This ideal turns rigid nursing homes into places where residents' desires are the top priority.

EDEN ALTERNATIVE AND NEIGHBORHOOD MODEL

Levindale has adopted the Eden Alternative and Neighbourhood Model, which implements homelike living spaces and "neighbourhood" amenities, such as a synagogue, boutique and museum, to create a sense of community for all residents. Nursing home units are designed as "neighbourhoods," and all Levindale employees are trained in "person-first" techniques, which emphasize the individual needs of residents.

Households: Design based on "Green House" concept. Not only a building expansion but a redesign of model of care, more "home like" Town Center: Provides the features of a true community town center.





LEGEND

● Resident Room	 Circulation
● Activity/Dining	● Staff Support

LEVINDALE HEALTH CENTRE FEATURES

SITE PLAN: The site illustrates how a small house model can be suitable as an addition to an existing institutional model of long term care. The expansion at Levindale included 4 households each with 14 residents attached to the central administration area of the older institutional model.

TYPICAL NEIGHBOURHOOD: The typical neighbourhood is made up of two households. Each household will have its own kitchen and dining areas.

KITCHEN: Full kitchen allows for custom and flexible meals that can be prepared with the assistance of the residents at the lower

and accessible counter. The look and feel is like a house with different level surfaces to allow residents with different needs to participate in household activities

SITE TOUR OBSERVATIONS: Excellent outdoor courtyard spaces designed with raised planter boxes and outdoor features. Very elaborate from hospitality style lobby. Very interesting shower alcove in resident washroom designs. Very interesting memory boxes. Large curtain wall living room windows provide excellent light quality.

THE LEONARD FLORENCE HEALTH CENTRE

Thanks to DiMella Shaffer Associates Inc. for permission to use the Leonard Florence Center for Living Green House as a case study in this document.



KEY STATISTICS

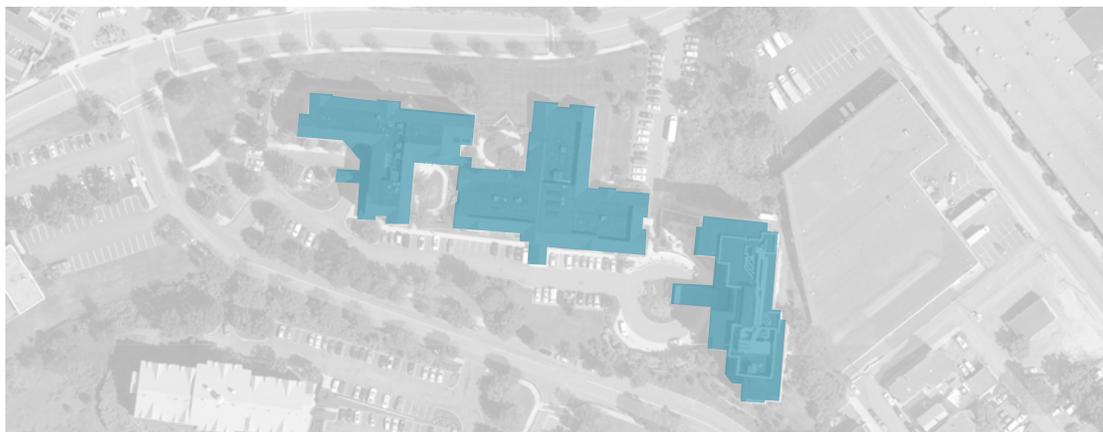
Total Residents:	100
Total Households:	10
Residents per household:	10
Household area:	589 sm (6,350 sf)
Neighborhood area:	1254 sm (13,500 sf)
Resident room area:	18.2 sm (195 sf)
Resident bathroom area:	4.2 sm (45 sf)
Area resident/household:	58.9 sm (635 sf)
Area resident/neighbourhood:	62.7 sm (675 sf)

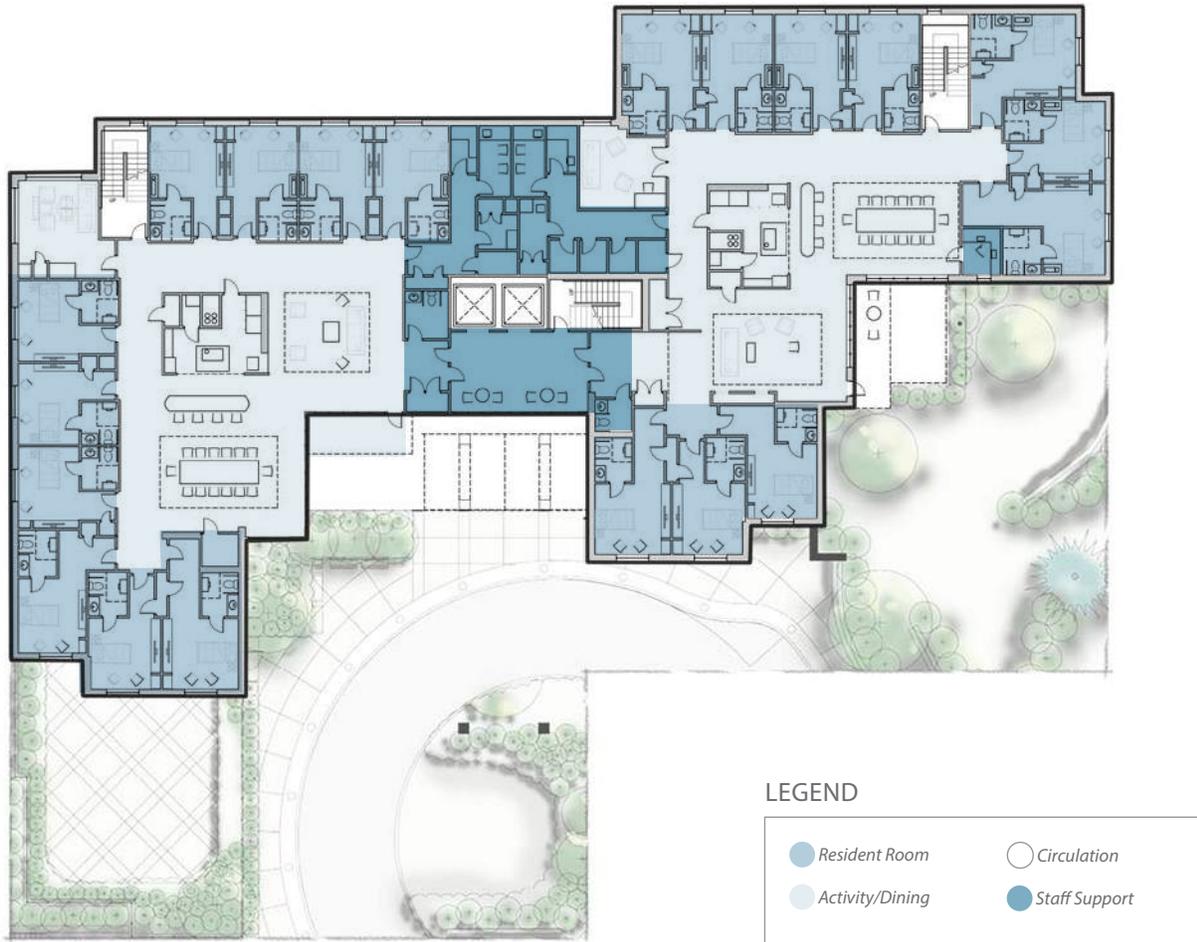
The award-winning Leonard Florence Center for Living Green House®, named after the late Chelsea-born philanthropist Leonard Florence, is a revolutionary, state-of-the-art skilled nursing residence. As the first urban Green House® skilled nursing facility in the country, the Center is dramatically different from a traditional nursing home.

Overlooking the scenic Boston Harbor, the Leonard Florence Center consists of ten condo-style “homes” on six floors. Each “home” houses ten residents in private rooms, with its own bath and shower. In essence, the Center embodies the comforts, design and ambiance of one’s personal home. In 2010, the Leonard Florence Center for Living opened its doors and quickly became recognized throughout the world as an innovative model of care for seniors and those in need of support. The centre illustrates how a small house model can be utilized to support not only residents in a long term care setting but also how a household can be designated as a special care unit which can provide care for individuals with Amyotrophic Lateral Sclerosis (ALS), Acquired Brain Injury (ABI), Parkinsons, Multiple Sclerosis (MS), Epilepsy, and Stroke victims.

THE DESIGN FEATURES

- Spacious private rooms, each with its own bathroom, shower, flat screen TV
- 24/hour cafe, deli, European day spa, library/family room, chapel, outside patio
- Dining area, open kitchen, and fireplace living room for each of the ten households.
- On-site therapy gyms, complete with weights, bike and balance bars.





LEONARD FLORENCE HEALTH CENTRE FEATURES

SITE PLAN: The site plan illustrates how the Chelsea Jewish Foundation evolved in their design and care environments from the previous construction of two traditional "T" shaped institutional models of care to the more accept practice of a small house model.

TYPICAL NEIGHBOURHOOD: The typical neighbourhood is made up of two households. Each household will have its own kitchen and Dining areas. Each neighbourhood is 1254 sm (13,500 sf). The connecting lobby is 800 sf.

FRONT PORCH ENTRY: Each household is designed as an autonomous living residence with a front porch entry compete with exterior siding, mailbox and door bell just as you would find in your own residence.

SITE TOUR OBSERVATIONS: Excellent household entry lobby from elevators. Very nice and resident accessible open kitchen

concept. Good selection of appropriate art work. Very elaborate front lobby.

CENTRE AWARDS:

- Chelsea Jewish Foundation CEO Barry Berman Honored as "Leader of Tomorrow" by Leading Age
- Chelsea Jewish Foundation Wins Top Place in McKnight's "Excellence in Technology" Awards
- North Shore Elder Services Recognizes Leonard Florence Center with "Innovation of the Year" Award
- Leonard Florence Center RN wins Leading Age "Hearts & Hands" Award
- Leonard Florence Center for Living Wins Leading Age's "Innovation of the Year" Award

THE HARRY AND JEANETTE WEINBERG GREEN HOUSE RESIDENCE

Thanks to Marks, Thomas Architects for permission to use the Harry and Jeanette Weinberg Greenhouse Residence as a case study in this document.



KEY STATISTICS

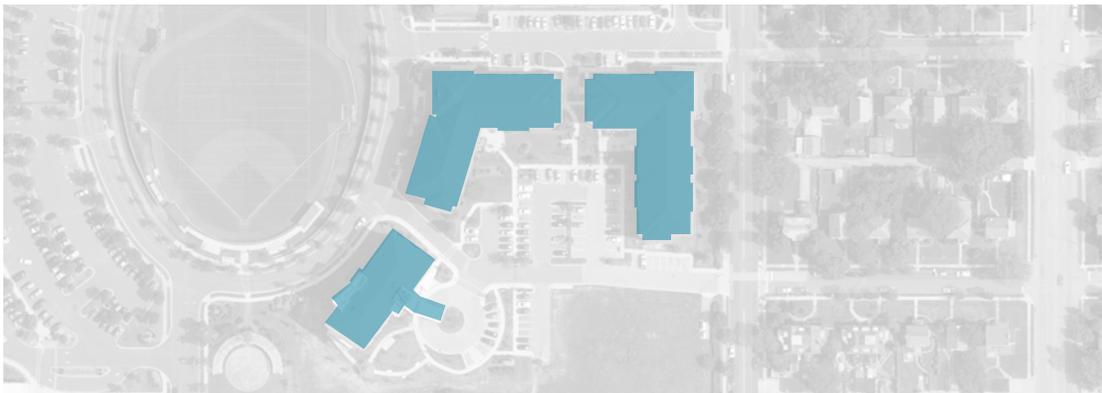
Total Residents:	48
Total Households:	4
Residents per household:	12
Household area:	635 sm (6845 sf)
Neighbourhood area:	37.1 sm (400 sf)
Resident room area:	15.7-26.3 sm (170-290 sf)
Resident bathroom area:	3.8 sm (41 sf)
Area resident/household:	52.9 sm (570 sf)
Area resident/neighbourhood:	- N/A

The Green House offers a new approach to skilled nursing, rehabilitation and long term care through Elder-centric life in an environment where Elders make choices to live full and vibrant lives with all of the support they need.

The residences are based on a home floor plan with intimate spaces and warm interior designs centered around a beautiful shared living space (hearth). The staff of each home help the Elders live as independently as possible. In the Green House Residences, the Elders receive a high level of personalized, professional medical care. That support familiar daily living without Elders feeling that their lives are being disrupted or overtaken. The small house model replaces traditional nursing home facilities with inviting, comfortable, social living spaces and private bedrooms and bathrooms, helping Elders to lead happier and more satisfying lives.

Each residence is designed to be home for 12 Elders (older adults). The homes are vibrant spaces with pleasing aesthetics both inside and out. Each Elder has a sunny, private room with a private bathroom. The Elders' rooms are clustered around the "Hearth," a shared living room with an open kitchen and dining area. Safety features are carefully built into each home.

Elders are encouraged to make themselves at home, decorate their private rooms and baths with their own belongings. They have easy access to all areas of the house, including the kitchen, laundry, outdoor garden, and patio. Elders are free from schedules and can eat, sleep, and entertain themselves when and where they choose. Meals are prepared by the staff in the open kitchen and served at a large, well-set dining table where staff, elders, and visitors all gather and socialize.



NEIGHBOURHOOD PLAN



LEGEND



GREEN HOUSE RESIDENCE FEATURES

OUTDOOR SPACES: The design incorporates two outdoor accessible spaces with a total accessible outdoor area of 51 sm (550 sf.) The larger deck is 37 sm) 400 sf and is screened in.

RESIDENT ROOMS: The resident room sizes vary between a very small 15.7 sm (170 sf room) with a 3.8 sm (41 sf) bathroom to a more appropriate sized 26.3 (290 sf) room with a 3.8 sm (41 sf) bathroom.

HOUSEHOLD KITCHENS: The household kitchens are not accessible and open to residents and are fully staff only areas. However

the accessible seating and open counter to the kitchen provides an excellent socialization opportunity as well as some meal preparation by residents to take place.

HEARTH DESIGN: The central living area (hearth) is immediately apparent from the household entry. The spaces receive excellent light from windows on both sides of the open plan.

SITE TOUR OBSERVATION: Resident washrooms were too small, however, still incorporated a European shower design. The facility had excellent outdoor deck access and area.

IRENE BARON EDEN CENTRE

Thanks to MMP Architects Inc. for permission to use the Irene Baron Eden Centre as a case study in this document.



KEY STATISTICS

Total Residents:	48
Total Households:	4
Residents per household:	12
Household area:	845 sm (9096 sf)
Neighbourhood area:	N/A
Resident room area:	29.3 sm (316 sf)
Resident bathroom area:	7.1 sm (77 sf)
Area resident/household:	70.4 sm (758 sf)
Area resident/ neighbourhood:	- N/A

The Irene Baron Eden Centre located in Winnipeg Manitoba Canada was constructed in 2009 and incorporates the elements of a small house design concept. The project was built prior to the inception of the new NBC B3 building code classification and represents innovation ahead of its time. The client's vision was to create a care facility that best supports the Eden Alternative care philosophies. This directed the design to include a grouping of 12 residents around a hearth area of living room, dining room, den and porch with a residential style kitchen in each household. The architects designed the facility as residential occupancy (C occupancy) however incorporated all the architectural elements of a personal care home such as wander guard protection, smoke control, and widened stairways. The example is chosen as a case study for its spatial organization and quality of residential character. The resident room sizes are larger than what would typically be found in long term care projects which distorts the resident to household ratio. Irene baron although technically is a supportive housing project provides the quality of care at a level appropriate for individuals with compromised memory and cognition abilities. The facility also has a dedicated house for lower level functioning residents with advanced stages of the disease. Care staff remain on site 24/7 and skilled nursing care is provided the regional health authority on a daily basis.

Although the floor plan of the facility takes on a more traditional "T" shaped organization, special attention was given to restrict each wing to limit the number of residents to 4 residents. The project represents the early concepts of small house model and could easily be adopted as a point of departure towards a full level 3-4 long term care facility which incorporates all the EBD elements of ambiance and residential character.





LEGEND

● Resident Room	 Circulation
● Activity/Dining	● Staff Support

WHITE OAK COTTAGES FEATURES

SITE PLAN: The project was designed to nestle into the existing site of the River East Personal Care Home and provides a continuum of care on a single campus.

HOUSEHOLD: Each household is designed for 12 residents who share a common living, dining, and den areas. Activity spaces have been designed at the end of the wings of each private bedroom wing.

RESIDENT ROOMS: Each resident room is larger than the typical PCH scale. Each room has been designed to include a sleeping alcove.

SITE OBSERVATIONS: Excellent home like quality with the familiar scale and element one would find in their own home. The activity areas at the end of the bedroom wings provide for intimate socialization opportunities as well as hobbies. The Eden Alternative model works very well and the facility is home to a number of cats.

WHITE OAK COTTAGES AT FOX HILL VILLAGE

Thanks to EGA Architects for permission to use the White Oak Cottages as a case study in this document.



KEY STATISTICS

Total Residents:	24
Total Households:	2
Residents per household:	12
Household area:	718.4 sm (7733 sf)
Neighbourhood area:	N/A
Resident room area:	19.3 sm (208 sf)
Resident bathroom area:	5.9 sm (64 sf)
Area resident/household:	59.8 sm (644 sf)
Area resident/total floor area:	59.8 sm (644 sf)

Located on the Fox Hill campus in Westwood, Massachusetts, the White Oak Cottages are designed as a small house model long term care residence supporting memory care. The design is warm, technologically smart, and supportive of a small house staffing model and philosophy of care. Each cottage has a living room, dining room, kitchen, den, enclosed garden, and 12 private bedrooms and bathrooms. Its layout offers Residents a combination of privacy and the opportunity for engagement. Elements within each cottage support Residents with memory loss, allowing them to achieve maximum functioning and independence.

The scale of the project makes it a strong candidate for rural settings where land area may not be as much of an issue. The cottage can easily be designed so that it can be mirrored to create an enclosed courtyard to form a neighborhood of 24 residents. This model most closely resembles a family home, and the small scale eliminates long hallways and elevators, making it easier for Residents to move throughout the cottage. The interior layout and décor have been specifically designed to support the needs of those with memory loss through the use of color and contrast, circular pathways, and bright lighting. The homes offer inviting community spaces, more intimate areas for small gatherings, and the privacy of one's own bedroom. The daily rhythms of the cottage are also those of a home. Residents wake up and go to sleep when they want to. Someone arriving at the home may smell dinner cooking in the oven, see laundry being folded, or meals being planned with Resident participation.

Architectural features that support functioning abilities of residents with cognitive disorders include the easy wayfinding due to the absence of corridors. Dutch doors have been utilized which provides a visual ability to check in on a resident while reducing intrusion of private space. The cottage is flooded with ample natural light providing correct color spectrum and intensity (80-100 foot-candles, 5600K°). Enclosed and accessible outdoor space allows residents to enjoy nature and go outside freely. There is no audible paging system. All paging systems utilize texting messages only. The fabrics, artwork, and color schemes account for the visual and spatial deficits of those with dementia, and provide gentle cueing. The interior and garden areas have circular traffic patterns to allow Residents to wander without the need for staff redirection.





LEGEND

- Resident Room
- Activity/Dining
- Circulation
- Staff Support

WHITE OAK COTTAGES FEATURES

HOUSEHOLD: The household most closely resembles a large home with a kitchen living room, dining room and private bedrooms. Bedroom wings are pulled away from the main hearth living areas.

RESIDENT BEDROOMS: Each resident bedroom is uniquely zoned with an entrance, sleeping area and bathroom. The entry has two built in closets which is not recognized as a best case solution for self wardrobing (see flexibility and autonomy). Resident bedrooms utilize a Dutch door concept with provides excellent privacy and significantly reduces intrusion.

RESIDENT WASHROOMS: Resident washrooms are equipped with double acting doors that swing in either direction with a

lever that can be disengaged by staff for immediate entry when a need arises. Each washroom includes a dedicated shower area and the toilet is nicely spaced away from a corner which allows for two person assists easily.

SITE OBSERVATIONS: The project is an excellent concept for a household and provided the most familiar like home setting than any other residence toured. However, the area per resident is slightly larger than most. This concept can be reworked quite easily to combine two households with an enclosed secure courtyard in between.

BRIDGWATER PERSONAL CARE HOME

Thanks to MMP Architects Inc. for permission to use the Bridgwater Personal Care Home as a case study in this document.



KEY STATISTICS

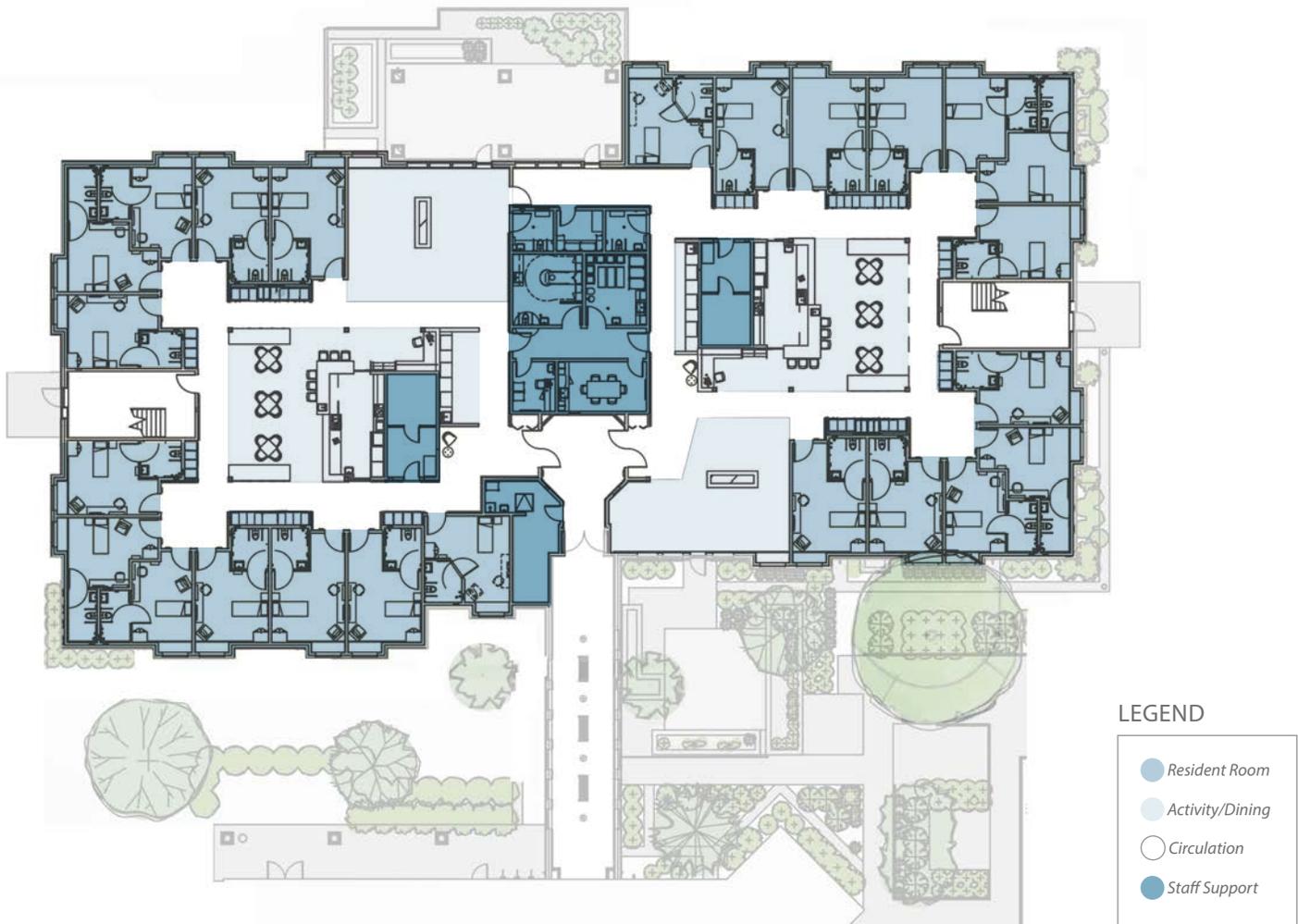
Total Residents:	120
Total Households:	10
Residents per household:	12
Household area	700 sm (7535 sf)
Service area	279 sm (3000 sf)
Resident room area	20.4 sm (220 sf)
Resident bathroom area	6.0 sm (65 sf)
Area resident/household	58.4 sm (628 sf)
Area resident/total floor area	69.8 sm (752 sf)

The Bridgwater personal care home is Winnipeg Manitoba's (Canada) first unique small house model that incorporates over 100 residents in a single facility. Comprised of three separate buildings linked together via a walkway between buildings the designers were able to maintain the allowable building footprint in combustible construction methods. This eliminated two firewalls. The project consists of 10 twelve resident households with a total population of 120 residents. The project maintains small social densities and creates an environment that is intimate and comforting to individuals with cognitive impairments where larger population sizes can cause agitation. This project is registered with the Centre for Health Design as a Pebble project which means it has been designed through the Evidence Based Design (EBD) process and incorporated a researcher to work alongside of and EDAC registered architect.

The project incorporates over 120 EBD elements that promote Quality of Life for residents and prolongs the trajectory of Alzheimer's disease. The health outcome of this is that the environment of care allows for the functioning ability of residents to be maintained for a longer duration when compared to that of an institutional setting. Each Neighborhood shares the common core support spaces and provides the ability for caregivers to move freely between households. A link through the greenhouse section of the neighborhood can also be left open and available to residents to wander into the adjacent household if the level of cognition of the two household populations can function in the larger 24 resident population density. This provides the flexibility to be able to operate each household of 12 residents geared to the functioning ability of the residents who reside there.

The project utilizes stretch ceilings to create extremely well lit activity areas with the capacity to alter the light temperature to create dusk to dawn lighting simulation. A study will follow utilizing the 7 EBD steps to determine if the health outcomes of better sleep hygiene and longer active hours during the day can be achieved through this concept. In addition to correct color temperature the light intensity has been designed in these areas to achieve 100 foot candles during the late morning periods.





BRIDGWATER PERSONAL CARE HOME FEATURES

SITE PLAN: Bridgewater has been designed as a townhouse concept. (see neighborhood planning) which creates three separate buildings connected by a walkway between buildings. NBC 3.2.3.19

NEIGHBORHOOD PLANNING: The neighborhood plan can be opened up to allow residents to move freely between each household if the functioning capacity of the residents allow for the larger social population density (flexibility).

RESIDENT WASHROOMS: The resident washrooms have been designed to include a personal shower. Plumbing fixtures have been selected specifically for eldercare and include a flat basin with accessible grips on the front to assist in the stability of residents which promotes self hygiene.

RESIDENT ROOMS: Each resident room has been designed carefully to include EBD features such as self wardrobing closet design, (Caulkins), wayfinding cues to identify one's own bedroom, Dutch doors to reduce intrusion, and carefully located incontinence supplies within the room assist caregivers.

THERAPEUTIC KITCHEN: Each household has a full residential kitchen capable of preparing all the dietary needs of the household. The large counter design is intended to promote socialization around the kitchen during dinner hours as well as allow residents to participate to basic meal preparation tasks promoting independence and maintenance of active daily living tasks. (ADLs)

Appendix A:

Measurement Scales

PEAR SCALE: PERSON–ENVIRONMENT APATHY RATING

The PEAR scale that measures environmental stimulation and apathy in persons with dementia and to evaluate its psychometrics.

NBD: NEED DRIVEN BEHAVIOURAL MODEL (ALGASE ET AL., 1996; ALGASE ET AL., 2012)

CMAI: COHEN-MANSFELD AGITATION INVENTORY.

The CMAI (Cohen-Mansfield, 1986) is a 29-item questionnaire designed to measure the types and frequencies of agitated behaviors commonly exhibited by dementia patients. Each item describes a specific agitated behavior for which respondents rate the frequency on a 7-point scale ranging from 1 (never engages in) to 7 (manifests the behavior on the average of several times an hour).

PAS: PITTSBURG AGITATION SCALE

The PAS (Rosen et al., 1994) is a questionnaire designed to assess four categories of agitated behaviour in dementia patients. The categories include aberrant vocalization, motor agitation, aggressiveness, and resisting care. Respondents use a 5-point scale with 0 indicating that the behaviour was not observed during the specified observation period and 4 indicating severe intensity, frequency, and/or resistance to redirection of the behaviour.

OAS: OVERT AGGRESSION SCALE (OAS).

The OAS (Yudofsky, Silver, Jackson, & Endicott, 1986) is a checklist designed to document and measure specific aspects of aggressive behaviour based on observable criteria. Aggressive behaviours are divided into four categories: verbal aggression, physical aggression against objects, physical aggression against self, and physical aggression against others. Each category contains statements describing, four levels of severity.

MAS MOTIVATION ASSESSMENT SCALE (MAS)

The MAS (Durand & Crimmins, 1988) is a 16-item questionnaire designed to identify variables maintaining self-injurious behavior in developmentally disabled individuals. It addresses four categories of situational determinants of self-injurious behaviors that may also be relevant for describing the context of behavior for dementia patients. The situational determinants include social attention, tangible consequences, escape from unpleasant situations,

and sensory consequences. Respondents are asked to rate the likelihood of the specified target behavior occurring in each of the situations listed using a 7-point Likert-type scale ranging from 0 (never) to 6 (always)

BEHAVIOUR ENVIRONMENT TAXONOMY OF AGITATION (BETA)

The BETA scale is a modification of the MAS specifically designed for use with dementia patients. The BETA asks respondents to describe the likelihood of specific agitated behaviors occurring in any of four classes of situations. The classes of situations in the BETA include "Social attention," "Escape from unpleasant situations" "Increase sensory consequences" and "Reduce sensory consequences" As with the MAS, respondents rate the likelihood of occurrence of a given target behavior on a 7-point scale ranging from 0 (never) to 6 (always).

ENVIRONMENT AND COMMUNICATION ASSESSMENT TOOLKIT FOR DEMENTIA CARE (ECAT)

ECAT™) is an assessment protocol designed to be used by clinicians who work with people with dementia in long-term care settings (Brush, Calkins, Bruce, & Sanford, 2012). Speech-language pathologists, occupational therapists, physical therapists, nurses, and other direct care staff will find the ECAT™ useful for identifying environmental barriers and facilitators to communication and developing appropriate interventions to support communication. The ECAT™ is the first resource of its kind to guide clinicians through learning about the impact of the environment on communication and to provide practical tools for identifying interventions to improve communication. The components of the ECAT™ include a Manual, Assessment Instruments (including light and sound level meters), and Intervention Procedures.

MULTIDIMENSIONAL OBSERVATION SCALE FOR ELDERLY SUBJECTS (MOSES)

A 40-item questionnaire that focuses on five areas of functioning in institutionalized older adults: self-care ability, disoriented behaviour, depressed/anxious mood, irritable behaviour, and withdrawn behaviour. For each of the five areas, higher scores indicate higher levels of impairment or dysfunctional behaviour. This scale is a very good scale and can be administered by front line care givers and is often cited as the preferred scale to utilize when assessing residents quality of life.

Appendix B: Research Support for Small House Models of Care

The Centre for Health Design conducted an in depth literature review on the available research on the Impact of the Design of the Built Environment on People with Dementia. The study was conducted in 2014 and has been published HERD 8 (1). The search results of the systematic literature review are shown in Figure 1. After eliminating duplicate articles, 2,642 records were identified; 632 papers were found to fit the inclusion criteria. Of these 62 were hand searched or taken from reference lists of identified articles. After scanning full texts, 169 studies were included for further detailed analysis. The majority of these studies were conducted in the United States (n = 88). Nineteen studies were conducted in Canada, 18 in the United Kingdom, 33 in other European countries, 5 in Australia, and 6 studies in Asia. Regarding the evidence levels, 49 studies were considered to be level 2, 62 studies were categorized into level 3a, 40 studies reached level 3b, and 18 articles were evidence level 5.

The identified studies were inductively summarized into four main categories: Basic Design Decisions, Environmental Attributes, Ambience, and Environmental Information.

Levels of Evidence for Healthcare Design		
Level	Description of Quality	Included
Level 1	<i>Systematic reviews of multiple randomized controlled trials (RCTs) or nonrandomized studies, meta-analysis of multiple experimental or quasi-experimental studies; meta-synthesis of multiple qualitative studies leading to an integrative interpretation</i>	No
Level 2	<i>Well-designed experimental (randomized) or quasi-experimental (non randomized) studies with a low attrition rate, intention to treat analysis, blinding, masked randomization, and consistent results compared to other, similar studies</i>	Yes
Level 3a	<i>Observational studies with a cohort design; experimental or quasi-experimental studies that did not fulfill the criteria of level 2</i>	Yes
Level 3b	<i>Cross-sectional studies or case-control studies; qualitative research that, based on a literature review, on a theoretical framework, reports a clear method and considers a diversity of views</i>	Yes
Level 4	<i>Professional standards or guidelines with studies to support recommendations</i>	No
Level 5	<i>Observational studies with a cohort design; experimental or quasi-experimental studies that did not fulfill the criteria of level 2</i>	Yes
Level 6	<i>Observational studies with a cohort design; experimental or quasi-experimental studies that did not fulfill the criteria of level 2</i>	No

Source: Stichler (2010b) and Marquardt & Motzek (2013).

SMALL HOUSE MODELS STUDY SUMMARY



BEHAVIOUR

The outcome variable behaviour was taken into account by 10 studies. Five studies from all evidence levels reported that residents in small-scale and homelike environments were less behaviourally disturbed (Cutler & Kane, 2009; Malmberg & Zarit, 1993; Proctor, Brook, Blandford, & Billington, 1985) and less aggressive (Annerstedt, 1997). Another study at level 3b observed that a large-size unit was associated with an increased level of agitation (Sloane, Mitchell, Preisser, Phillips, Commander, & Burker, 1998).



COGNITION

Eleven studies investigated the relationship between small-scale environments and residents' cognition. Six of the studies, encompassing the levels 2, 3a, and 3b, showed either an improvement or maintenance of cognitive function in small-scale units (Annerstedt, 1993; Dean, Briggs, & Lindesay, 1993; Kihlgren et al., 1992; Suzuki et al., 2008; Verbeek, Zwakhalen, van Rossum, Ambergen, Kemp-en, & Hamers, 2010b) or that residents were more confused in larger units (Proctor, Brook, Blandford, & Billington, 1985).



FUNCTION

Eleven studies investigated the outcome variable function. Nine studies, mostly at evidence levels 2 and 3a showed a beneficial impact of small-scale environments on the performance of the activities of daily life (Annerstedt, 1997; Reimer, Slaughter, Donaldson, Currie, & Eliasziw, 2004; te Boekhorst et al., 2009; Thistleton, Warmuth, & Joseph, 2012), functional status (Dean et al., 1993; Malmberg & Zarit, 1993; Suzuki et al., 2008; Verbeek et al., 2010b), and motor function (Annerstedt, 1993) in residents.



WELL BEING

Well being was investigated by 12 studies. Eight of them, predominately rated evidence level 2, showed a positive impact of small-scale units on mood (Dettbarn-Reggentin, 2005; de Rooij et al., 2012), quality of life (Funaki, Kaneko, & Okamura, 2005; Kane, Lum, Cutler, Degenholtz, & Yu, 2007; Nakanishi, Nakashima, & Sawamura, 2012; Reimer et al., 2004), and a decline in depressive symptoms (Dean, Briggs, & Lindesay, 1993; Kihlgren et al., 1992).



SOCIAL ABILITIES

Fourteen studies looked at the outcome variable social abilities. Twelve studies at all evidence levels observed a positive effect and showed that small-scale units improved residents' social abilities (Dettbarn-Reggentin, 2005; Kihlgren et al., 1992; de Rooij et al., 2012) and communication skills (Campo & Chaudhury, 2012; Dean et al., 1993; Skea & Lindesay, 1996; Zimmerman et al., 2007). Furthermore, residents were more engaged in activities (Campo & Chaudhury, 2012; Morgan-Brown, Newton, & Ormerod, 2013; Smit, Lange, Willemse, & Pot, 2012; Smith, Mathews, & Gresham, 2010; te Boekhorst et al., 2009).



ORIENTATION

In a study at level 3b small-scale units were found to provide residents with better orientation than larger units (Marquardt & Schmieg, 2009),



CARE OUTCOMES

Care outcomes were taken into account by four studies. Two studies at level 2 found that residents in small-scale units had lower drug use than residents in traditional nursing homes (Annerstedt, 1993; Annerstedt, 1997). Another study at level 3a showed a decline in blood pressure after residents moved to smaller sized units (Thistleton et al., 2012). Furthermore, a study at level 3b found that small-scale units can create opportunities for individualized care and attention to residents' personal needs (van Zadelhoff, Verbeek, Widdershoven, van Rossum, & Abma, 2011).

RESEARCH USED DIRECTLY IN THIS STUDY GUIDE.

The following research papers were utilized directly in this design guideline. Each reference includes a quotation from the abstract to provide context of the citation.

SMALL-SCALE, HOMELIKE FACILITIES VERSUS REGULAR PSYCHOGERIATRIC NURSING HOME WARDS: A CROSS-SECTIONAL STUDY INTO RESIDENTS' CHARACTERISTICS

Abstract note:

Residents living in small-scale, homelike facilities had a significantly higher functional status and cognitive performance compared

Verbeek, Hilde, Sandra MG Zwakhalen, Erik Van Rossum, Ton Ambergen, Gertrudis IJM Kempen, and Jan PH Hamers. 2010. 9. Small-scale, homelike facilities versus regular psychogeriatric nursing home wards: A cross-sectional study into residents' characteristics. BMC Health Services Research 10 (1): 30

THE PHYSICAL ENVIRONMENT OF SPECIAL CARE UNITS: NEEDS OF RESIDENTS WITH DEMENTIA FROM THE PERSPECTIVE OF STAFF AND FAMILY CAREGIVERS

Abstract note:

Findings of this study suggest that space requirements are lessened when the number of residents living together in one space is limited to a smaller group, thus avoiding some of the negative effects associated with large physical spaces. More compact units also may make it easier to create a comfortable, homelike atmosphere and may make it easier for staff to monitor and supervise.

Morgan, Debra G and Norma J Stewart. 1999. 39. The physical environment of special care units: Needs of residents with dementia from the perspective of staff and family caregivers. Qualitative Health Research 9 (1): 105-118

DESIGN FOR DEMENTIA CARE: A RETROSPECTIVE LOOK AT THE WOODSIDE PLACE MODEL

Abstract note:

They saw the need for a better kind of therapeutic environment for the increasing number of people with dementia, who were placed in nursing homes despite their otherwise good health because no other care was available for them.

The environment conveys the message that it "belongs to" the residents. For example, the entrance leads right into the residents' living space, not to administrative space. Households provide places for residents to participate in activities of everyday life.

Stefani Danes (2012) Design for Dementia Care: A Retrospective look at the Woodside Place Model, Journal of the Housing For The Elderly, 26:1-3, 221-250 DOI: 10.1080/02763893.2012.658272

OCCUPATIONAL NEED IN SEVERE DEMENTIA

Abstract note:

Moreover, studies on small-scale living have found that residents in small-scale care facilities, compared to residents living in traditional units, are more frequently engaged in verbal communication.

Perrin, T., 2008. Occupational need in severe dementia. Journal of Advanced Nursing 25 (5), 934-941

SPECIAL CARE FACILITY COMPARED WITH TRADITIONAL ENVIRONMENTS FOR DEMENTIA CARE

Abstract note:

Taken as a whole, the findings of the study suggest that quality of life for adults with middle- to late-stage dementia is the same or better across time in a SCF than in traditional institutional facilities (MTIFs and STIFs). This is the first longitudinal study of its type to demonstrate positive effect on quality of life over time in these later stages of dementia. Specifically, the group living in the SCF had significantly better ADL function over time than the two control groups, as measured using the FAST. In addition, affect for the residents living in the SCF was better, with increased interest and less anxiety/fear.

Reimer, M.A., Slaughter, S., Donaldson, C., Currie, G., Eliasziw, M., 2004. Special Care Facility compared with traditional environments for dementia care: a longitudinal study of quality of life. Journal of the American Geriatrics Society 52, 1085-1092

RESIDENT OUTCOMES IN SMALL HOUSE NURSING HOMES: A LONGITUDINAL EVALUATION OF THE INITIAL GREEN HOUSE PROGRAM

Abstract Note:

There are statistically significant differences in self-reported dimensions of quality of life favored the GHs over traditional Personal Care Homes. The quality of care in the GHs at least equaled, and for change in functional status exceeded, the comparison traditional nursing homes. The GH is a promising model to improve quality of life for nursing home residents, ... GH residents had higher quality of life on nine of the 11 domains than did residents in the more traditional Personal Care Homes.

Kane, Rosalie A, Terry Y Lum, Lois J Cutler, Howard B Degenholtz, and Tzy-Chyi Yu. 2007. 17. Resident outcomes in small-house nursing homes: A longitudinal evaluation of the initial green house program. J Am Geriatr Soc 55 (6): 832-9.

LONG-TERM CARE FOR PEOPLE WITH DEMENTIA: ENVIRONMENTAL DESIGN GUIDELINES

Abstract Note:

Perhaps the most influential combination of principles in recent decades has been that of "small and home-like". Their frequent combination makes it virtually impossible to tease out the individual contributions of the principles. While there is evidence supporting the proposition that small size - i.e. a small number of residents - is associated with a variety of positive outcomes for people with dementia.

Fleming, Richard and Nitin Purandare. 2010. 32. Long-term care for people with dementia: Environmental design guidelines. Int Psychogeriatr 22 (7): 1084-96.

ENVIRONMENTAL GERONTOLOGY. WHAT NOW?

Abstract Note:

Last Words on Household Models...You make people feel as if they have control over living a satisfying lifestyle that is not that different than what they've had during the first 75 years of life." At another level, Regnier discusses how small, novel changes in the social environments of culture change nursing homes can make powerful differences for residents on an everyday level.

Scheidt, Rick J and Benyamin Schwarz. 2013. 12. Chapter 18 Environmental Gerontology: What Now? Routledge

ENGAGING LIFE IN TWO IRISH NURSING HOME UNITS FOR PEOPLE WITH DEMENTIA: QUANTITATIVE COMPARISONS BEFORE AND AFTER IMPLEMENTING HOUSEHOLD ENVIRONMENTS

Abstract Note:

The results show that the implementation of the household environment was associated with highly significant changes in resident behaviour for both nursing homes. Residents spent more time in the household communal living areas. They spent this time being more socially engaged, being more interactive with their environment and doing more for themselves

Morgan-Brown, Mark, Rita Newton, and Marcus Ormerod. 2013. 30. Engaging life in two Irish nursing home units for people with dementia: Quantitative comparisons before and after implementing household environments. Aging Mental Health 17 (1): 57-65

A COTTAGE MODEL FOR ELDERCARE

Abstract Note:

Cottage settings were aesthetically appealing to residents, family, and staff. Modest improvements in health out-comes were observed, and operational costs remained stable. As long-term care institutions evaluate methods of care delivery, new architectural models hold great promise for transforming the ways in which elders relate to their physical environment, their families, caring staff, and each other.

Thistleton, William, Jacqueline Warmuth, and Joanne M Joseph. 2012. 12. A cottage model for eldercare. HERD 5 (3): 99-114
Thistleton, William, Jacqueline Warmuth, and Joanne M Joseph. 2012. 12. A cottage model for eldercare. HERD 5 (3): 99-114

HOME AGAIN SMALL HOUSES FOR INDIVIDUALS WITH COGNITIVE IMPAIRMENT

Abstract Note:

The changes for nursing practice in this a small house model concept are dramatic. However, they are consistent with the core values of nurses as caring professionals. Watson's (1988) theory of caring proposes that nursing views clients as unique, holistic beings who deserve care rooted in understanding of the individual and his or her particular needs. The small house becomes the ideal setting for nurses to engage in caring, person-centered practice. Indeed, after nurses transition and adjust to the change, a common response to the small house model of care is: "This is what I went into nursing to do—care for people."

Rabig, Jude. 2009. Home again: Small houses for individuals with cognitive impairment. J Gerontol Nurse 35 (8): 10-5.

EVIDENCE BEHIND THE GREEN HOUSE AND SIMILAR MODELS OF NURSING HOME CARE

Abstract Note:

Viscerally, these settings seem to embody a better culture of NH care, and the few outcome studies conducted to date (using a quasi experimental design in four Green House homes and two comparison sites) found better reported quality of life in four of 11 domains (privacy, dignity, autonomy and food enjoyment), less decline in late loss ADLs, less family involvement in providing assistance, and more activities outside the NH and satisfaction reported by residents and families. In studies that compared matched residents with dementia in small group homes to those in NHs, over 1 year residents in the smaller settings had better preserved function, less aggressiveness, anxiety and depression, and a lower use of neuroleptics, tranquilizers and antibiotics. Staff differences were that group living staff were more in favor of independent activities for residents, were more satisfied and felt more strongly that they were providing quality care, and less often reported that they needed to spend more time with residents

Zimmerman, Sheryl and Lauren W Cohen. 2010. Evidence behind the green house and similar models of nursing home care. Aging Health 6 (6): 717-737

Appendix C:

Master List of Design Interventions

THE DEFINITION OF BASIC DESIGN ATTRIBUTES 14

1A - BUILDING LAYOUTS 16

1. Organize the Facility into Households that are as small as staffing and servicing efficiencies will permit. Provide no more than 14 residents to a household. The traditional model is 10-12.
2. Include familiar spatial organization similar to that found in a typical house/home.
3. Design the spaces to allow residents to move freely within the household and from one room to another without having to use a corridor (ie. rooms are laid out contiguous to each other).
4. Eliminate corridors whenever possible. This includes eliminating typical double loaded corridors that serve entire households. Should corridors be incorporated they should serve an immediate section of resident bedrooms of not more than 6 residents. Bedrooms should not open up directly into main corridors that serve as the general circulation for a "ward".
5. Design spaces so that allocentric orientation is possible (see wayfinding).
6. Provide multiple opportunities for intimate or private conversation that are comfortable, designed for couples or small groups
7. Do not create dead end corridors.
8. Utilize a form of cluster plan that centralizes shared spaces amongst resident bedrooms. This accomplishes maintaining line of sight to significant spaces such as hearth (kitchen) living and dining areas (see examples following this section for suggested cluster plan layouts).
9. Features such as windows or wall openings between spaces for visual connections, minimized hallway distances, and areas that promote staff presence should be included.
10. Incorporate passage or transitional space connecting 2 households, with the ability to keep it open or closed. This allows 2 households to combine for programmed activities if desired, for residents to leave their home to "visit the neighbours", and provides easier capability for limited staff to monitor 2 households during the night.

1B - POPULATION SIZES 22

11. Create individual households where 10-14 residents share a common house or cottage. Two households can be linked or adjoin each other to share common support spaces such as admin spaces, soiled and clean linens, mechanical and electrical, and staff-assist bathing suites.

12. Households should provide a shared, resident-accessed kitchen, (see kitchen design section for access limitations) dining area, and living room, plus secure outdoor space appropriate in scale for smaller populations. Focus on maintaining an intimate setting which attracts small group socialization much the same way a private home kitchen serves as the hub of the family gathering and socialization.
13. Within the household, provide small group spaces with some visual and acoustic privacy. These spaces can be used by residents who get easily overwhelmed by crowds and noise - a common symptom of Alzheimer's disease that can result in behavioural issues and distractions. For instance, large, noisy dining spaces have been linked with an individual's reduced food intake.
14. Avoid multi-purpose rooms for residents associated with the household or neighbourhood. Though the general concept of flexibility is important so the building can evolve over time, multi-purpose spaces are not recommended since a person with Alzheimer's disease may not adapt to the room's changes in use and expected social patterns. A multipurpose room can be included outside of the neighbourhood community for larger group gatherings; however it should be located in a main separate building or distinct separate zone.
15. Create spaces that can house shared activities between households. If smaller numbers of residents per household want to participate in an activity, operational efficiency can be gained by grouping two smaller resident groups together for that activity.

1C - SPATIAL HIERARCHY 24

16. Design intermediate spaces that allow for transitions between private and public areas. Bedrooms are the most private spaces that belong to residents. When designing to the context of a small house model the absence of corridors can make separation between bedroom and living spaces difficult. The designer should incorporate the separation of the 4 major types of space found within the household. These include:

1D - ACCESS TO OUTDOORS 26

17. Provide easy access to an outdoor space. The best location to provide access is from the central activity areas where residents can visually see and freely access a safe outdoor patio area.
18. Provide decks on upper storeys so that each household has their own outdoor environment.
19. Consider including enclosed courtyards within the building footprint. These courtyards are fully enclosed and secure by nature of being surrounded by the building(s), allowing residents free access without fear of wandering away from the facility.
20. Consider including outdoor activity amenities such as active bird feeders, walking paths, and raised gardens. Outdoor space should support passive as well as active activities.
21. Ensure all outdoor areas remain wheel chair and walker accessible. Consider materials used on pathways to ensure no uneven surfaces or tripping hazards over time.
22. Carefully consider plants used in outdoor spaces to avoid poisonous plants.
23. Secure outdoor spaces with perimeter fencing at least six feet high, and camouflage the fencing with landscape design features such as trees or shrubs so it does not attract residents' attention or feel prison-like. In addition, the fence and landscaping should not have ladder-like elements that could be used for climbing and furnishings should also prevent a resident from scaling the fence.
24. Construct walking paths that are continuous and loop back to building entrances. There should be "multiple cues that reduce demand on the user, allowing one to enjoy walking in a natural environment without the frustration of figuring out how to return.
25. There are two distinct forms of outdoor space that the designer needs to be familiar with. Together with the landscape consultant the designer should understand the differences and benefits of a healing garden, vs. a horticultural and therapeutic landscape. The most common outdoor space designed for long term care homes is a sensory garden (a form of healing garden) with a section of horticultural gardening which may include elements such as raised garden beds.
26. Consider building in raised planting beds where residents can participate in gardening activities. Beds should allow residents to sit on the edge while working or drive a wheelchair alongside.

27. Provide sufficient resting spots (benches) along longer walkways, or handrails to assist those with mobility issues. Handrails can provide short term rest areas by leaning on them, and also assist with balance for those who require it. Seating will also allow multiple areas for passive enjoyment; ensure some areas also allow for wheel parking off the main walkway paths.

CATEGORY 2: AMBIANCE

30

2A - RESIDENTIAL CHARACTER 32

28. Remove medical icons from the environment. This includes nursing stations, medication carts, uniforms on caregivers, wall hangings that only provide information (ie. handwashing instruction).
29. Design spaces so that smaller groups function autonomously. Households with smaller population sizes reduce over stimulation. Larger unit size (greater than 14 residents are associated with higher resident agitation levels and increased intellectual deterioration and emotional disturbances).
30. Select furniture that resembles furniture one would place in their own home. Many health care furniture products are still designed to hospital appearance and function, but more home-like products are available. There are also many healthcare appropriate fabrics for upholstery that provide a softer tactile experience to the resident (see section on furniture design for more information).
31. Encourage personalization of rooms. Design opportunities that will support personal items, pictures and furniture within the private space of a resident's bedroom.
32. Design dining areas that provide the optimal dining experience. Provide a larger table for larger groups of higher functioning individuals to sit together family-style while providing smaller tables for those in need of assistance.
33. In addition to bedrooms, households should provide a shared, resident-accessed kitchen, dining area, and living room, and secure outdoor space. Additional areas for residents within the household may include (but are not limited to) a spa/ bathing room, small den and/or activity space
34. Within the household, provide small group spaces with some visual and acoustic privacy. These spaces can be used by residents who get easily overwhelmed by crowds and noise, a common symptom of Alzheimer's disease that can result in behavioural issues, agitation, and distractions. For instance, large, noisy dining spaces have been linked with an individual's reduced food intake.
35. Exterior massing should be articulated (with distinct elements and walls that jog to create different planes, rather than a solid, monolithic façade) and at a scale that relates to a person (i.e., "human-scale"), with residential detailing and materials appropriate to the building's locale.
36. Provide a distinct entrance to each household complete with all the elements consistent of a home entrance. Front porch, mailbox, door bell, exterior materials, and so on. The household entrance IS the front door to each person's residence no different than the front door in your own home.
37. Rooms are arranged enfilade, which means walking through rooms rather than hallways to get to a place (e.g., walking through the living room to enter the dining room).
38. Include familiar spatial relationships as you would find in one's home. This would bring a family dining room adjacent to a living room. Access to an outside porch should be designed from either the living area or dining area as the kitchen is central to the household plan.

2B - RESIDENTIAL KITCHENS 34

39. Incorporate residential or therapeutic kitchens into projects. The kitchens should be located in households and form part of the daily routines. The kitchen becomes the center focus of the space.
40. Ensure direct sightlines to the kitchen from all parts of the household, to encourage visual cues for eating. This assists with alerting residents to mealtime when they see activity occurring there, as well as encouraging snacks and keeping residents hydrated throughout the day if they see food or drink.
41. Provide open counters low enough for residents to sit and participate in kitchen activities from the adjacent space.
42. Style of cabinetry should be traditional and built out of wood as opposed to a melamine (rail and stile is appropriate) Specify residential hardware. Try to avoid "D" style pulls.

43. Provide an area that is accessible to residents to store dishes. A typical china cabinet feature will provide the familiarity of home. Do not serve meals via tray service.
44. Design kitchens to accommodate both family-style dining where food is served from large bowls, or to be plated direct from the food preparation area.
45. Include warming drawers, soup warmers, and other appliances that will keep food warm over a period of time, to allow residents to eat when they feel hungry or have breakfast after sleeping in.
46. Pantries may be incorporated for storing larger volumes of food stuffs or perishables. Keep the kitchen and its visible appliances residentially scaled similar to what would be in a house.
47. Incorporate commercial grade hood over the stove, and light commercial grade dishwasher which can achieve proper sterilization temperature.
48. Kitchens are still deemed residential if only light cooking occurs there, and thus do not require commercial stoves, ovens, grease traps, etc. Review with the AHJ but a residential look is priority.

2C - FLEXIBILITY AND AUTONOMY 36

49. Create an area in or adjacent to the kitchen, where food is available to residents all the time. Space should be planned so residents can access a snack, fruit, or a drink either on their own or with assistance, without having to enter into the kitchen work triangle reserved for care givers.
50. Provide a wheelchair accessible area contiguous to the kitchen that is large enough to allow small groups of residents to take part in meal preparation, as their abilities allow. This would also include residents who want to participate by simply watching the action and being included with the group.
51. Provide glass fronts on cabinets where residents have freedom to access the contents. For example, if the dishes are visible and accessible (like in a home china cabinet) then residents may choose to participate in an activity like setting the table.
52. Residents' bedrooms should include a closet/wardrobe unit with two compartments: One side should provide limited access to seasonally appropriate and/or one day's clothing with open-wire drawers to enable socks and undergarments to remain visible. The second compartment stores additional clothing and can be locked as necessary (e.g., for people who rummage or hoard — common behaviours in people with Alzheimer's disease). Keeping extra clothing in the locked portion of the closet is helpful for residents who need reassurance that their property is still there; the door can easily be opened upon request. Also available are closet units with sequential, ascending hanger rods to cue a person with Alzheimer's disease to put undergarments on first, then clothes, then shoes, and so on, allowing a person to dress him/herself. The wardrobe should be located so that the doors open directly in front of a wheelchair or sitting area, allowing the resident to contemplate wardrobe selection and make their own selections. A good location for the wardrobe would be perpendicular to the front of the bed.
53. In addition to providing a flexible dining area where table/chair placement can be modified, the household should also contain areas where individual interests can take place. A hobby area provides opportunity for artwork, clay modelling, woodworking, scrapbooking, and so on. Allow an area out of the way from the lounging and passive spaces as to not disrupt television viewing and casual socializing.
54. Create an area in each resident room where personal activities such as listening to music, reading, looking at a memory book, or one-on-one visiting can occur. This area should be organized in such a way that hobbies or personal activities are highly visible or displayed without clutter, to encourage use. The area should be distinctly separate from the bed, to give the feel of a different space.

2D - CONTROL OF PERSONAL SPACE 38

55. The two most accepted practices are to provide a mesh fabric gate secured to the door frames by Velcro or magnets, or a simple fabric strip secured by Velcro. These items are often neglected in a designer's initial specification. If a fabric or mesh gate is the approved method to reduce intrusion these items should be specified in the initial design tender. Ensure magnets or Velcro does not impede the door from latching properly, and will stay adhered to the frame material permanently.
56. Another more active method to reduce intrusion is to provide Dutch doors. This practice is preferred over the Velcro door strips but may not be allowed in all jurisdictions. When the upper half is left open it allows views into private bedrooms, enabling monitoring by staff, as well as promoting resident orientation. When residents have a visual connection into a

room, it alleviates curiosity or need to see what is behind a closed door; it also may serve as a memory assist to recognize their own rooms. Closing the lower portion of the Dutch door limits resident access to other people's rooms for privacy, which in turn promotes safety and respect, and helps to reduce rummaging in others' belongings. Using Dutch doors may pose a challenge from a building code perspective because while the door itself may not require a self closing device, it may be required to maintain a smoke separation between resident room and the adjacent floor area.

2E - IMPORTANCE OF ART 40

57. Provide artwork that has been identified to be a positive distraction for residents. Certain themes for artwork have been suggested:
58. Provide information cards beside each piece of artwork that gives examples of questions that you can ask a resident about the image. This strategy has been employed in the Hearthstone facilities as a device successfully used as an instrument supporting Alzheimer's disease (AD) residents.
59. Provide art or craft pieces that residents can interact with. Encourage play.

CATEGORY 3: ENVIRONMENTAL ATTRIBUTES 42

3A - OPTIMUM LEVELS OF STIMULATION 44

60. Common causes of both audible and visual overstimulation to individuals with dementia are busy entry doors. When possible, the designer should minimize the amount of doors that are visible to the residents that lead to areas of administration or public zones. The introduction of transitional corridors assists in avoiding doors opening onto paths frequented by residents.
61. Specify silent alarm systems that activate small buzzers held by staff.
62. The elimination of linen trolleys, pill/medication carts, nursing stations, and a public address system with buzzers and flashing lights will help to keep unnecessary noise and distress low, plus make the environment appear more homelike and less institutional.
63. Remove audible 15 second delay alarm on exit doors equipped with magnetic locks. This will require alternate solutions submission to authorities having Jurisdiction (AHJ) and may not be supported.
64. Restrict unnecessary ambient noise generated from televisions in open environments by setting controls on volumes.
65. Provide wireless headphone sets for individuals accepting and able to utilize these items (designer to specify 3 sets per household).
66. Ensure that all ACT ceiling tile is specified with an effective STC rating (STC 50) in all resident areas.

3B - EXPOSURE TO LIGHT 46

67. Provide opportunities for a min. of 1000 lux of light to residents early morning and late afternoon.
68. Provide correct light spectrum during sunlight supplement periods. 509 nanometers (nm) has been found to produce the most significant reaction from the retinohypothalamic tract which controls the circadian rhythms. Fluorescent bulbs have different spectrum distributions. Lamps with a higher blue content (daylight 5600-6000k) for example are more circadian effective than warm white light.
69. Provide easy access to outdoor daylight which remains visually available to residents from the main activity areas, as well as a window in their bedroom.
70. Respect the need for darkness during the night and provide only a yellow amber night light at the floor level to assist care givers during late night supervision. Provide a gentle LED rope light lit path (or similar solution) to the resident washroom that is motion sensitive.
71. Provide good window coverings to shade residents from intense moonlight during sleep.
72. Consider a variable lighting design that varies both the intensity (lux) as well as the spectral wavelength during different times of the day. Increasing light exposure throughout the day and evening is likely to have the most beneficial effect

on sleep and on circadian rhythms in patients with dementia. Low intensity dawn - dusk simulation (DDS), a 'naturalistic' form of light therapy designed to embed sleep in its accustomed phase, could improve the disturbed circadian rest - activity cycle, nocturnal sleep and/or cognitive functions in dementia.

73. In the evening use table lamps with a warm light, approximately 2700 Kelvin.
74. Light Emitting Diodes (LED) as a light source are preferable for providing bright light environments. LED's as a light source provide the best solution to vary both color as well as light intensity, thus can produce a light solution best tailored to support biological effects.
75. Introduce skylights where possible to bring daylight deep into spaces. It would be beneficial to use skylights with diffusers to avoid unevenness and glare.

3C - COLOUR AND CONTRAST 48

76. Increase overall illumination levels to increase vision and contrast.
77. Provide contrasting objects to their field background color (example contrasting toilet seats to floor, contrast toilet to wall colour, contrasting shelves to wall color, and contrasting switch plates to walls).
78. Increase contrast between furniture and walls/floor. This is often neglected by designers when selecting furniture fabrics.
79. Carpeting rather than vinyl is preferable to avoid glare problems as well as to reduce noise (see section on carpeting for greater discussion on issues).
80. Do not wrap (cove) floor coverings up walls in residential looking areas and preference should be given to floor coverings that clearly demarcate the floor from the wall.
81. Once hues have been chosen for the color palette, ensure that adjacent colors are separated in both value and chroma to ensure better visual acuity (Munsell color theory).
82. Utilize complimentary colors when communicating contrasting surfaces.
83. Avoid utilizing adjoining principle colors and their associated hues when communicating contrast (Yellow/Green, Green/Blue, Blue/Purple, Purple /Red and Red Orange. Pale colors and pastels should be avoided (especially in the blue green range).
84. Utilize Light Reflectance Values (LRV) of colors that measure greater than 65% for all surfaces including laminate selections for millwork and design features. Avoid dark colors which are generally not easily processed in elderly persons.
85. Ensure finishes are not glossy or cause glare or reflections.
86. Use color in the environment as a memory aid such as painting each resident room door differently, or including a feature immediately visually accessible to the resident from standing outside of the resident room such as a window seat detail, or a bed spread.
87. When selecting floor colors, select simple or solid patterns to avoid visual clutter, which can cause confusion in visual processing for cognitively impaired individuals.
88. To promote personalization of the residents' bedrooms, offer a neutral color palette (a blank canvas).
89. During colour selection, be aware that hues may look different or faded to residents with cataracts or similar visual impairment. Imagine colours to have a slight yellowish film over them, as this would more closely mimic how elderly people will perceive them.

3D - TEMPERATURE AND AIR QUALITY 50

90. In resident bedrooms and neighbourhood daily living areas, provide passive heat sources as much as possible. Incorporate in floor heating or radiant panels that do not generate breezes. Or, if forced air systems are utilized, specify grilles to divert or diffuse the air away from areas where residents will sit or sleep.
91. Utilize quality windows with good seals to prevent cold air from migrating to the interior. If possible, provide operable or partially operable windows in some resident areas.
92. Keep heat sources low to the ground where possible, preferably where residents are sitting.

93. If possible, provide resident rooms with individual air exchange. This will assist in preventing spread of illness and germs.
94. If possible, provide individual temperature controls in resident bedrooms.
95. Design and maintain an environment that supports a higher range of thermal comfort for older adults year round – approximately 25° C.

CATEGORY 4: ASSISTIVE MEASURES TO SUPPORT INDEPENDENCE **52**

4A - TOILETING AND BATHING STANDARDS **54**

96. Space is needed on both sides of the toilet to accommodate the range of transfer techniques including the front approach normally used in independent transfers and the need for space on both sides of the toilet for one and two person assisted transfers as well as the potential use of a lifting device. To accommodate this, the preferred distance from centerline of toilet to wall is 750mm. (30") clear and not 455mm (18") as indicated in provincial guidelines.
97. Provide toilet in direct line of sight from the resident bedroom – preferably from the bed itself - and perpendicular to the bathroom door to allow for easier execution of assisted transfer with a floor-based lift device, or ceiling sling.
98. The toilet also should be located so that a mechanical lift device can be moved through the doorway without having to make a 90 degree turn. Note the width of many manual lifts is wider than 36" and the door width may need to be increased to accommodate.
99. Residents are familiar with the look and function of residential toilet tank design; for those with less core strength, they are able lean back onto the toilet seat lid supported by the tank. Flush valve toilets have no tank, and if seats with lids are specified they are not necessarily very stable if a resident decides to lean backwards. For this reason residential tank toilets are preferred, with solid seats and lids.
100. Wall mounted toilet grab bars are not suitable for long term care residents and should not be used for toileting purposes; and further, horizontal grab bars are essentially useless. Being able to grasp an angled grab bar at the lower position and move up the bar can increase transfer independence. Providing one swing up or down drop down grab bars on either side of a toilet provide much greater safety because they are less difficult to use. A rear mounted grab bar is not used by this population and their placement would not permit the use of drop down grab bars without conflict.
101. Grab bars should optimally be between 650 and 762mm apart (on center) on either side of the toilet. Often guidelines suggest greater distances but anything wider than 762mm is too far apart requires a resident to engage their shoulders to sit-stand-rise. Shoulder muscles typically have much less strength than arms, and residents will have great difficulty. The smaller dimension allows residents to use their arm strength with a narrower center of gravity.
102. Provide a toilet seat height of 450mm (18"). A "handicapped" toilet mounted at 600mm (23.5") will not allow older residents who are less than 5'5"(1651mm) tall to place their feet on the floor, causing seated instability, which can lead to falls. In addition, being unable to have their feet flat on the floor or not having their hips at or below knee height does not facilitate the emptying of the bladder or evacuation of the bowel.
103. Doors should open outwards from the toilet room to avoid a resident being trapped or difficult to reach after a fall. Alternative options to achieve the same goal are double swinging doors, accordion doors, pocket or sliding doors, or curtains. Arrange the opening of the door to avoid overlapping of other doors.
104. Grab bars are preferred to be powder-coated rather than stainless steel, and should be specified in a contrasting colour to the wall so that they are visually distinguishable. Stainless steel appears too institutional and can be slippery if not textured; textured grab bars are more difficult to maintain cleanliness and may harbour pathogens within the textured pockets.
105. In shower areas, provide a dry flooring area where care providers can stand while assisting a resident (see Resident Washroom Design for further information).
106. Barrier free codes require a fold down seat in showers. The use of a folding seat is not ideal for a long term care environment, as it only provides access for a care provider on two sides of the resident. Shower chairs with arms provide a much better solution, so staff can easily address all sides.
107. Specify a contrasting colour toilet seat from the toilet colour, to enhance visual differential for residents who can toilet themselves.
108. The walls around the toilet should be painted in a contrasting colour to emphasise the visual of the toilet. Visibility of the toilet can help with incontinence prevention.

109. Specify a toilet with an easy to use lever flush handle that residents can see and identify – preferably in a contrasting colour. Residents may not understand or be able to find flush-mounted buttons that are located either on the top of the tank or are hidden behind the seat lid.

4B - INCONTINENCE AVOIDANCE 56

110. The built environment can have a supporting role in promoting better independence for toileting. The reliance of memory to locate toilet rooms is a poor strategy to assist residents in self toileting. Therefore the designer must locate toilet rooms in direct line of sight from major activity areas such as lounges and kitchens within the households. Frequency of toilet use increased dramatically when toilets were visibly accessible to residents. Residents' use of toilets increased by over 800% when curtains surrounding toilets (in lieu of doors), were left open, making public and private toilets clearly visible when not in use. Signage will also assist the resident, however being able to actually see the toilet has shown a reduction in incontinence.
111. Functional incontinence is also thought to be influenced by environmental factors such as low chairs that are difficult to get out of, poor lighting, and physical restraints. Research links associated slow-timed chair stands (due to lower-extremity impairment) with incontinence and falls.
112. Ensuring that all washrooms are adequate in size to allow easy access for a wheel chair and 1 caregiver promotes a more successful strategy.
113. Directional signage has shown to be successful. Early and moderate stage dementia residents were most likely to locate and use public toilets in response to primary color signage affixed to the floor (responding to residents' typically downcast gaze) comprising a band with the word "toilet".
114. Ensure proper design of washrooms is followed and acknowledge that ADA requirements are not suitable to follow for elders. If the design of a bathroom does not promote successful toileting then there will be a rise in incontinence. Understanding how a resident uses a grab bar through both horizontal and vertical forces will aid in good design (see Features for Ambulation for further information). The designer should have a basic understanding of the ergonomics of using a toilet and how the design assists successful toileting (knees in relation to hips, ie. toilet seat height and the importance of the seat and tank for back support, ie. no wall mount toilets).
115. Read design of a new grab bar for older adults Xiang, Wanlin, 2013, (Georgia Institute of Technology August 2013)

4C - PERSONAL SHOWERS IN RESIDENT ROOMS 58

116. All resident washrooms shall be designed with a shower area. The preferred design would incorporate a "European" shower design into the washroom which utilizes the entire washroom as a showering area without a dedicated roll in stall (see Resident Washrooms for more information).

4D - REDUCTION OF PATIENT FALLS 60

117. Particular design shortcomings have included door openings that are not wide enough, slippery or perceived slippery floors due to glare, poor design of bathroom door orientation or placement of bedrails, and incorrect fixture heights.
118. All toilets should be clearly visible from activity areas including from a residents bed. It is not enough to maintain an open door that does not provide a visual cue to the toilet. Residents with visual agnosia (the inability to interpret visual images) do require excellent visual reminders to initiate successful toileting responses.
119. Characteristics of flooring material may impact fall risk; references in the literature pertain to the type of floor material (resilient vs. soft), the amount of contrast in the pattern, transitions with other floor materials, and the coefficient of friction of the floor surface as considerations in fall prevention. Carpet can be used successfully providing that it be of a low pile tightly woven structure. Postural sway (one's ability to maintain a static balance) is not affected with commercial type carpet tiles and thus carpeting in and of itself does not contribute to the risk of falls. Flooring material should be of low contrast. Flooring types with high contrasting patterns was associated with more incidents (stumbles, reaching for handrail, veering, purposeful stepping, pausing, stopping) than carpeting with low color contrast.
120. Transitions between flooring types must carefully be considered and remain flush to each other with little or no transition strips utilized and also to be of matching color without contrast to the major flooring field. Concerns over different coefficient of friction between flooring types is often a perceived issue between carpet and sheet flooring transitions. When a sheet flooring material maintains a dry buff finish or a non gloss finish, there is no statistical evidence to suggest a relationship between the coefficient of friction and the risk of fall.

121. Avoid using waxed or gloss buffed flooring such as linoleum or marmoleum. Floors which receive a sealant or wax based finish have a lower coefficient of friction and may contribute to higher fall rates (linoleum, marmoleum). In one study, linoleum flooring in the bedroom was associated with significantly more falls than either vinyl composition tile (VCT) or vinyl. In bathrooms the rate of falls was 10 times higher for linoleum flooring than for VCT or ceramic tile.
122. Floor mats placed strategically to absorb spills must not be used in elderly healthcare environments as they pose a tripping hazard.
123. The selection of furniture remains important to the reduction of falls. Of particular note is the specification of a wrong type of chair. Interior designers must be aware of the ergonomic factors that contribute to an appropriate chair designed for the elderly. The chair must have a heightened sitting dimension and a cushion that does not allow for an elder to sink low in the chair making it difficult to get out of the chair. The chair must be significantly heavy to allow for a resident to rise from the chair either from one or both armrests, the back support of the chair must also be designed to the correct handrail height as well as statically balanced to support the weight of an elder leaning against the back of the chair for support. One study found that when rising from a chair a resident who needs to push up with his or her arms, legs, or use a walking aid to rise from a chair was 2.16 times more likely to fall than a patient who could rise in a single movement. A patient who could not rise from a chair at all was more than 10 times more likely to fall than the unimpaired patient. While at first glance this finding might seem to refer solely to an intrinsic risk factor, chair design can also play a significant role in enabling patients with impaired abilities. Features such as the presence or absence of chair arms, how far the arms extend toward the front of the chair, the seat height, seat depth, slope of the seat, etc. can have a significant impact on ability to rise from the chair easily.

4E - FEATURES FOR AMBULATION 62

124. Grab bars are the single most effective method to stabilize an individual when walking or rising from sitting position. Grab bars must be designed and located appropriately for washroom use, as well as, in public areas. The use of fold down grab bars should always be utilized in washroom location including the public washroom located off of the living space for the resident.
125. Handrails are necessary in all corridors and come in a variety of designs. Although many codes require handrails only on a single corridor side it is preferred to include hand rails or lean rails (or both) on both sides of the corridor to accommodate a residents sidedness (often previous strokes may render one left or right side weaker).
126. The most common handrail utilized is a handrail that enables a finger grasp or one that allows the full hand to grasp the rail. A circular shape (38mm diameter) enabled a "power grip" and allowed large forces to be generated and studies show is the most effective shape to effectively generate the greatest resistive force to counteract a balance perturbation. A circular shape always allowed a power grip to be achieved. Rails that forced a "pinch grip" are less effective.
127. Enamel and varnish surfaces on handrails and grab bars are more effective than chrome-plated and acrylic surfaces in allowing the hand to generate force without slipping.
128. Handrails should be of contrasting color to the wall. Bright colors and high contrast will, at the very least, have the benefit of making the rail more visible, which may be particularly important for elderly persons with visual deficits.
129. The preferred distance for a handrail clearance to a wall is 13 cm (5"). Most handrail brackets support a handrail that is less than this clearance.

CATEGORY 5: ENVIRONMENTAL INFORMATION 64

5A - PURPOSEFUL WANDERING 66

130. Include as many accessible areas as possible for the resident to promote self choice and freedom. This is especially true for access to outdoors.
131. The enhanced environment should provide opportunities to support avoidance as well as opportunities that support engagement. This translates into providing a large central lounging area that supports a dynamic group interaction, and having smaller satellite sitting areas that allow avoidance from these larger activities.
132. The main social areas should be designed as an enhanced environment. An enhanced environment will be one that is warm, embellished, welcoming, colourful and familiar. Residents were less likely to wander when surroundings had a soothing quality.
133. Maintain an environment where there are designated areas to walk freely, and do not prevent residents from accessing positive associated environments such as access to outdoors. Preventing residents from reaching a desirable location

can cause agitation leading to escalation of aggression. Therefore the designer should ensure that desirable locations (outdoors) are designed to be secure and allow residents access with little supervision.

134. Allow for favourable stimuli along wandering paths. Activity spaces are kept open to circulation paths so that residents can see what's going on and more easily get involved. In the common area, circulation paths are integrated into the habitable space, rather than separate, institutional-like corridors.
135. Do not use geriatric chairs with locked trays to inhibit wandering.

5B - ORIENTATION AND WAYFINDING 68

136. To design an environment where memory markers are utilized to support resident movement. Individuals with cognitive impairments lack the ability to maintain cognitive mapping skills and they move through their environment in an allocentric manner. Memorable reference points which can support a resident's allocentric orientation strategy are thus needed. These can be architectural elements (such as the live-in kitchen) or fixtures, fittings, and furniture (such as objects with a biographic reference). It is very important that these reference points are carefully placed at the spot where the direction changes, and that they are interpreted, remembered, and used by the residents in the designated way (i.e. linear from point A to B).
137. All activity areas should be visually accessible to residents in a straight line of site. Designers are encouraged not to provide circular wandering paths without meaningful destination.
138. In the event that corridors are unavoidable they should be kept minimally short and should not dead end. Clear visible endings with a form of activity node or lounge space should terminate corridors. Cul-de-sacs should be avoided.

5C - LOCATING INDIVIDUAL RESIDENT ROOMS 70

139. Memory boxes or photographs have successfully demonstrated higher success rates in enabling residents to locate their own rooms. Photos taken in the past tend to be more easily recognized by the patients. In addition to a memory box, the individuals name should also be provided in large clear text.
140. Each door should be uniquely different from each other. The style, as well as differing colors will aid in determining which is the correct door.
141. Alternate hardware types between two doors within the same alcove to provide another opportunity for correct choice based on tactile response (both lever style hardware but with varying tactile sensations).
142. Sometimes residents may still be unsure of their own room, particularly when room doors are grouped in a pair which is commonly the case. In these instances the designer should provide immediate feedback opportunities from personal items within the room to aid in recognition. The bed cover seemed to be a particularly important element of appropriation assisting in providing immediate feedback. Other items such as visible shelves to store personal photographs or personal items that are visible from the corridor will assist in resident wayfinding.
143. Allow for personalization at bedroom entrances, since residents respond more to personalized landmarks than generic ones. For instance, a generic cue like a change in carpet or wall color is less effective than a memory box with personal photos. In fact, memory boxes (where the content remains static) have been shown to aid in wayfinding and can also be used to spark conversation, discovery and fulfillment.
144. Identify things and spaces by names and numbers in addition to other kinds of cues, since research has shown that people with Alzheimer's disease typically retain recognition of words and numbers longer than many other kinds of memory.
145. Offering views of the outdoors can serve as landmarks but also provide temporal orientation by knowing what time of the day it is by the quality of light.
146. Introduce a prominent element in the room that can be seen from the open doorway such as a window wall painted in a stark contrast from the rest of the walls and ensure that adjacent rooms have distinguishable differences so that once in a bedroom door zone outside of the bedrooms the resident can quickly determine which of the two doors will lead them into their own room based on the prominent wall color feature.

147. Strategies used to reduce residents with cognitive impairments from leaving through an exit door involve disguising exit doors as to not attract attention. One successful approach is to provide a cloth covering approximately 450mm wide attached with hook and loop Velcro to the sides of the door frame starting at 700mm above the floor finish and extending to the height 1350mm. This cloth barrier will hide the door hardware from the resident. The success of the cloth panel, irrespective of color, appears to be due to the visual agnosia that characterized all the wanderers. A doorknob is a protuberance for which the hand may reach whether or not there is intent or comprehension of consequences. When a door is a solid panel, only the door hardware makes it appear different from the adjacent walls. When the knob is concealed, a person with visual agnosia may be unable to interpret the panel as anything other than a dead end.
148. Grid patterns or bold contrast in the floor are sometimes effective but do not deter all residents from exploring the area adjacent to the exit doors and thus this design strategy should not be relied upon solely for exit control.
149. Murals are also an effective way to effectively disguise exits and deter elopement. One benefit of the wall mural was that it may have allowed the residents to experience a sense of control. That is, by disguising the doorway, residents did not need constant redirection from personnel for testing the doors. The control is obtained when the residents wander up the hall and decide, without intervention, to turn around and return to the day area where personnel and other residents are generally congregated. Another benefit is that the wall mural may have helped make the environment less institutionalized, fostering the aim of moving away from the medical model.¹³⁵
150. Locating exit doors should also be designed to be parallel to paths of travel. Doors that are perpendicular to paths of travel encourage distraction from residents.
151. In the event that a resident does make their way out of the facility strategies to distract them to remain stationary can be employed such as including a "bus stop to nowhere." This intervention was initiated successfully at the Benrath Senior Center in Düsseldorf, Germany. At this site, a bus stop (bench and sign) was installed right in front of the building to attract residents who have eloped or to escort those who feel an urgent need to be somewhere (a staff member will bring the resident to the bus stop and sit with them until the urge passes).

Appendix D: End Notes

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THIS GUIDE IS NOT AND SHOULD NOT BE CONSIDERED AS LEGAL ADVICE. ALL APPLICABLE AND CURRENT CODES AND STANDARDS SHALL APPLY TO DESIGN AND CONSTRUCTION OF PERSONAL CARE HOMES IN MANITOBA